



34th International GEOGRAPHICAL Congress

16-20 AUGUST, 2021



VIRTUAL

ABSTRACT BOOK



**34th International
Congress**

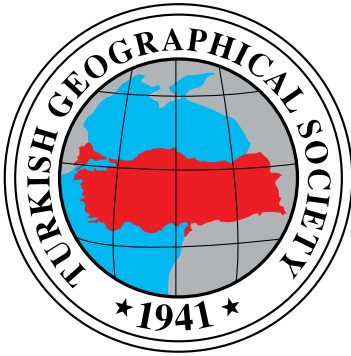
GEOGRAPHICAL
16-20 AUGUST, 2021 • Istanbul

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PREFACE



Dear Colleagues,

The organization of the 34th IGC in Istanbul was unanimously accepted at the General Assembly of the International Geography Union, which was held during the 32nd International Geography Congress held in Cologne between 26-30 August 2012.

The 150-year-old IGC will be held in Istanbul, a world city for the first time in its history. This excites the local organizing committee and our local geography community. LOC, which has started to work since 2012, has done all the work for the congress to take place in the best way. Along with the ongoing preparations in this process, we received more than 2500 applications.

However, the Covid-19 pandemic, which affected the whole world, caused our congress to be postponed for 1 year, as in all events. With the announcement we made in 2020, we shared this postponement with you. When this unexpected situation continued and the pandemic did not stop, we regretfully decided to hold the congress online together with IGU EC.

The excitement of hosting you in Istanbul turned into a bittersweet happiness for us because of the online congress. Although it is a different experience to have the first online IGC in the new world conditions, we tried our best to set an example for future congresses.

We would like to thank all our colleagues, commission chairs, IGU EC who stood by us during this difficult process, and our presidents Ronald F. Abler, Vladimir Kolosov, Yukio Himiyama and Micheal E. Meadows, who have always supported us.

Our deepest condolences to RB Sigh, who passed away untimely a short time ago.

Hoping to meet in Istanbul at another congress to be held face to face...

Prof. Dr. Barbaros GÖNENÇİL

Head of the Local Organizing Committee



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PREFACE



Dear Colleagues,

At the Regional Geography Congress held in Tel Aviv in 2010 on behalf of the Turkish Geographical Society (TGS), I had submitted a petition to former IGU President Prof. Dr. Ron ABLER that we were nominated for the International Geographical Congress to be held in the coming years of the International Geographical Union (IGU). About 10-11 years have passed on this date. Two major international geography congresses were held in Cologne and Beijing, and we even attended regional geography conferences held in Santiago, Krakow, Moscow and Kyoto.

At the IGU-General Assembly in Cologne in 2012, the “34th International Geography Congress”, which we entered as the only candidate, to be held in Turkey in 2020 was unanimously approved by the votes of 47 countries.

In 2016, we took the IGU flag from China and brought it to Turkey as a representative at the closing ceremony of the “33rd International Geography Congress” in Beijing. Meanwhile, the Vice President of the Turkish Geographical Society Prof. Dr. Barbaros GÖNENÇGİL was elected as the Vice President of IGU with high votes. This is for us, as the value given to Turkey, together with the “17th International Geography Olympiads”, it was the third great honour and happiness.

Both “17th International Geography Olympics”, as well as the “34th International Geography Congress”, were postponed to 2021 by the decision of the TGS and IGU Boards members due to the rapidly spreading Covid-19 flu epidemic in the world and the loss of millions of people and it was decided to be held virtual. This congress, which will be held in the city of Istanbul, which was set out with the motto of “Geography: Bridging the Continents” and spread over two continents between Asia and Europe, will go down in IGU history when it is held on virtual, and thus will be a first.

We are thankful to all the Turkish delegation who contributed to the organization of the congress, to the Istanbul University Rectorate, IGU Board members, members of Commissions, country representatives, session chairs and presenters, to the former IGU Presidents Prof’s ABLER, KOLOSSOV, HIMIYAMA and IGU President Prof. Dr. Mike MEADOWS who have always been supportive to us.

I wish the Covid-19 flu pandemic to be completely eliminated from the world and a successful Geography Congress to pass in health, happiness and peace.

Assoc. Prof. T. Ahmet ERTEK

President of Turkish Geographical Society



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PREFACE



Dear Colleagues,

After a postponement by one year, the 34th International Geographical Congress is finally taking place and nine years of preparation and planning can now bear fruit!

Of course, due to the ongoing COVID-19 pandemic the Congress is taking place in online mode only – although the local organizing committee has gone to considerable lengths to try to ensure that the experience will be as ‘real’ as anything ‘virtual’ can possibly be.

The postponement of the original Congress to 2021 at least allows us to reflect on the history of the discipline – as it is 150 years exactly since the very first International Geographical Congress took place, in Antwerp, Belgium from 14th to 22nd August 1871.

It was at this congress that a proposal was made to establish Greenwich as the prime meridian, although this was only finally accepted 13 years later. Admittedly, these days our discussions may not lead to anything quite so fundamental, but we can be sure that the papers presented here are indicative of the diverse but crucially relevant nature of Geography today and that the lively discussions and networking will offer great opportunities to further develop and orientate our work towards meeting the enormous local, regional and global challenges we currently face – not least the coronavirus crisis itself.

I fervently hope that the virtual connections we make here will blossom and culminate in our meeting face-to-face to celebrate the centennial of the International Geographical Union in Paris this time next year. For now, I wish to thank the participants for their contributions and to congratulate the local organizing team on their tremendous efforts in bringing us together virtually. I am sure that the event will be heralded as a great success despite the ongoing constraints.

Prof. Mike MEADOWS

IGU President



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EDITOR



Prof. Dr. Barbaros GÖNENÇİL

Head of the Local Organizing Committee



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LOCAL ORGANIZING COMMITTEE

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- T. Ahmet Ertek - Istanbul University Geography Department
- İhsan Çiçek - Ankara University Geography Department
- İhsan Bulut - Akdeniz University Geography Department
- Tolga Görüm - Istanbul Technical University Eurasia Institute of Earth Sciences



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Xiangzheng Deng
Xiaomin Fang
Yili Zhang
Yukio Himiyama



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KEYNOTE SPEAKERS



16th August 2021, 13:45 - 14:45 GMT

Keynote Lecture 1

Building Climate Resilient Communities

PROF. GORDON MCBEAN



17th August 2021, 13:45 - 14:45 GMT

Keynote Lecture 2

Bridging Geography and Geology in the Anthropocene

PROF. EDUARDO DE MULDER



18th August 2021, 10:00 - 11:00 GMT

Keynote Lecture 3

Entre local et global : l'habitat en Europe médiane Between local and global: housing in Central and Eastern Europe

LYDIA COUDROY DE LILLE



18th August 2021, 13:45 - 14:45 GMT

Keynote Lecture 4

Geographical Approaches to Evaluating Global Environmental Programs in the Age of Sustainability

DR. JUHA I. UITTO



19th August 2021, 10:00 - 11:00 GMT

Keynote Lecture 5

Bridging Cultures: How Did the Foreign Authors of Some Chinese Geography Books See China?

PROF. SHANGYI ZHOU



19th August 2021, 13:45 - 14:45 GMT

Keynote Lecture 6

TSUNAMIS: How to Develop a Tsunami Resilient Society

DR. HARSH GUPTA



20th August 2021, 10:00 - 11:00 GMT

Keynote Lecture 7

Geographies of the Anthropocene: Sustainable Development and the role of International Geographical Union

PROF. MIKE MEADOWS

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ORAL ABSTRACTS**



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C.O.African Studies Africa and Natural Resource Use Management

1384-WHAT ARE TRANSNATIONAL OIL COMPANIES GOOD FOR PETROLEUM PROFITS PUBLIC SERVICES AND RURAL COMMUNITIES IN GHANA.

Ann-Christin Hayk¹

*Trier University Regional and Environmental Sciences Trier-Germany*¹

The management of natural resources for sustainable development in Africa has become an omnipresent topic within the wider development discourse. In this context, Corporate Social Responsibility (CSR) plays a crucial role, because a number of corporations operating in the extractive industries have heavily embraced the concept in response to growing societal recognition that their operations severely impact the environment and communities. However, the assumption prevails that the powerful companies likely overlook domestic local stakeholders in their host countries, especially in Africa where CSR interventions can play a major role in overcoming provision shortages, e.g., in healthcare and education services in host countries. Accordingly, it is at stake how domestic actors such as national and local governments as well as local communities can influence CSR decision-making processes. This study helps bridging this gap by examining how, exactly, host actors in Ghana intend to steer transnational oil companies' CSR towards localised activities, e.g., in healthcare and education infrastructure and services, which are inadequate in many rural host communities. Data, derived from qualitative surveys in form of interviews and focus groups in Ghana, are analysed based on governance recommendations provided in constructivist theories such as the agency theory and the policy mobility discourse. The core results from the Ghanaian case study draw attention to the significance of pro-active local actor involvement, strong personalities among local stakeholders as promotor, and specific forms of leverage and bargaining power. Furthermore, the concept of CSR in the corporations' home countries and the company's internal idea of CSR play a critical role regarding the inclusion of domestic local actors in CSR decision-making processes.

2374-Assessing the impact of Phinda Private Game Reserve on rural livelihoods of Mngqobokazi Community.

Simphele Lindinkosi Ricardo Gcina Xulu¹, Innocent Moyo²

*University of Zululand Geography and Environmental Studies Melmoth-South Africa*¹ *University of Zululand Geography and Environmental Studies Moyo@unizulu.ac.za-South Africa*²

The ever growing human population especially in rural communities and their dependence on natural resources has been seen as one of the major causes of biodiversity loss. In response to the continued loss of biodiversity, protected areas were established, however, the history of their formation is not pretty. In South Africa, the colonial and apartheid era led to forceful removal of rural communities in their lands, and many protected areas were established on these lands. There has been significant inputs in the form of policy development and investments to try and eradicate poverty while conserving natural resources in rural areas over the years. Given this background, and the fact that Phinda Private Game Reserve was also built on land that belongs to the community of Mngqobokazi, this study investigates the impact that Phinda Private Game Reserve has on the livelihoods of the rural community of Mngqobokazi. A mixed method approach was used to gather and analyse data from the respondents in the study. Findings suggest that, while there are some positive impacts, Phinda Private Game Reserve, has in the main negatively affected the livelihoods of the rural community of Mngqobokazi in that they cannot sustain their livelihoods because they lack substantial natural resources such as land, which has led to deficiency of food, money and other necessities for some community members. Based on this, recommendations are that there must be advancements made in the involvement of the community in decision-making, improve the benefits sharing and the flow of information amongst the community.



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VIRTUAL

2568-CATENARY VARIATION OF SOIL PROPERTIES ON A QUARTZITE RIDGE IN SOUTHWESTERN NIGERIA

Adeyemi Olusola¹, Olutoyin Fashae¹, Adetoun Odusote¹, Rotimi Obateru¹

*University of Ibadan Geography Ibadan-Nigeria*¹

Relief plays a vital role in bringing about changes in soil properties as one move from crest position down to the valley bottom. The catenary differentiation of soils is of pivotal importance to the management of soils in different topographic positions in the landscape. Quite a number of studies have been carried out as regards catenary differentiation of soils. However, this study focuses on catenary variation of soils on quartzite ridges within the O-horizon in Ibadan, Nigeria. The composition of quartzites makes it worthwhile to investigate. Across each slope position, two sample points were randomly selected and soil samples were taken at varying depths (0-15 cm and 15-30 cm) using soil auger. In all, a total of 12 samples were collected: 4 (0-15cm and 15-30cm) at the upper slope, 4 at middle slope (0-15cm and 15-30cm) and 4 at lower slope (0-15cm and 15-30cm). The samples were analysed for physico-chemical properties (particle size, porosity, bulk density, organic carbon, pH, Exchangeable Bases, Total Nitrogen, Available Phosphorus and Cation Exchange Capacity) in the laboratory and statistically analysed using Analysis of Variance. Across slope, particle size distribution show variation, especially in the clay fractions. The variability of clay fractions on the slope showed that the soils on ridge is highly weathered. Furthermore, there is a significant difference in soil pH, soil organic matter, total nitrogen and phosphorus along the catena ($F_{2,9}$, $p < 0.05$). There is a great link between these properties and soil organic matter. They are all dependent on the organic matter content which serves as their main source. This study has shown that topography plays a major role in catena dynamics and thereby influences characteristics of the soils along the toposequence. Most of the important soil quality indicators were influenced by the different landscape positions, particularly at the surface horizon.

3469-A Look at the Geological and Geoenvironmental Aspects of the Montepuez District in the Province of Cabo Delgado in Mozambique

Hagira Gelo Machute¹

*Universidade Pedagógica de Maputo Geography Maputo-Mozambique*¹

Montepuez, one of the districts of Cabo Delgado province in northern Mozambique, has been the scene of a growing attraction of foreign direct investment by multinational mining companies with the rise of the exploration of precious stones such as ruby and semi precious stones like quartz and garnet and graphite. In the Montepuez district, is developing an extractive economy based on an unbridled race to capture natural resources. This process is carried out by foreign intermediaries, with the collaboration of an extensive network of local populations and others actors. These mineral resources are elements of analysis for observing the transformations taking place in the geological and environmental scope of the territory of Montepuez. The purpose of this article is to briefly detail the geological characteristics of the district referred to here. Likewise, the article reflects the impact of mining activities in the same place, highlighting the main prevailing environmental problems, the process of the transnationalization of the mineral resources and also bring back the social and economic aspects raised by the mining activities in the Montepuez. This article used the comparative qualitative method to cross information from primary source documents, comparing different categories, such as time and space, trying to understand the before and after of the territory under study. This method is relevant to this article because from this we will be able to understand the impact of multinationals on the geological aspects in Montepuez and their geoenvironmental problems, and analyse the possible challenges and solutions around those issues.



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VIRTUAL

C.O.African Studies African and Climate Change

1243-AN ASSESSMENT OF FARMERS' AWARENESS AND PERCEPTION OF CLIMATE CHANGE ON THE YIELD OF GRAINS IN SOKOTO STATE NIGERIA

LAWRENCE EJEH UDEH¹, ELISHA IKPE²

FEDERAL UNIVERSITY, GASHUA, NIGERIA GEOGRAPHY GASHUA-Nigeria¹ AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA GEOGRAPHY elishabethy@gmail.com-Nigeria²

By

Udeh Ejeh Lawrence and Ikpe Elisha

This study examined farmers' awareness and perception of climate change on grain yield in Sokoto State, Nigeria. Systematic multi-stage sampling technique was used to select 6 LGAs in the state. Seven hundred and eighty-three (783) grain farmers were purposively selected. Structured questionnaire and Focus Group Discussion scheduled were used to obtain the required information from the selected farmers. Seven hundred and sixty-two (97.3%) questionnaire was successfully returned. Both descriptive (frequencies, percentages, mean) and inferential statistics (Likert-type rating techniques) were used for data analysis and presentation. Findings from the study show that 97% of the farmers are aware of climate change. 34% of the farmers got their source of information on climate change from personal observation and from interaction with friends and researchers. The results further show that 72% of the farmers perceived that climate change is an act of God; 95% perceived that rainfall onset dates are now coming late; 75% perceived that cessation dates are now earlier than before and 90% perceived that temperature is rising. The result further revealed that the farmers perceived agricultural drought, increase in crop infestation by pest and diseases, flooding of farmlands, increase in poverty and decrease in grain yield as effects of climate change on grain yield. The study recommended that the government agencies and Non-Governmental Organization should assist in raising awareness about climate change to the farmers; there should be adequate provision of weather forecast records and climate related data; grain farmers should be encouraged to participate in agricultural extension services which will educate them on the effects of climate change and adaptation strategies.

1244-DETERMINANTS OF CLIMATE CHANGE ADAPTATION STRATEGIES AMONG GRAIN FARMERS IN SOKOTO STATE NIGERIA

LAWRENCE EJEH UDEH¹, ELISHA IKPE²

FEDERAL UNIVERSITY, GASHUA, NIGERIA GEOGRAPHY GASHUA-Nigeria¹ AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA GEOGRAPHY elishabethy@gmail.com-Nigeria²

This study examined the determinant of climate change adaptation strategies among grain farmers in Sokoto State, Nigeria. The aim of the study was to find out what determines the choice of adaptation strategies among grain farmers in the study area. A systematic multi-stage sampling technique was used to select 6 LGAs in Sokoto State. Seven hundred and eighty-three (783) grain farmers were purposively selected using Krejcie and Morgan (1970)'s sample size determination. Structured questionnaire and FGD scheduled were used to obtain the required information from the selected grain farmers. Seven hundred and sixty-two (762) questionnaires were successfully returned. Frequency, percentages and ordered logistic regression were used for data analysis and presentation. The results showed that 97% stated that it is possible to adapt to climate change. Multiple cropping, use of early maturing crop varieties and the use of organic manure are the most effective adaptation strategies in the study area among others. The logistic regression model analysis showed that age, gender, marital status, household size, educational level and years of climate change awareness of the farmers have no significant relationship with the choice of multiple cropping, early maturing varieties and the use of organic manure as adaptation strategies in the study area. The study recommended that the various government agencies and NGOs should assist in raising awareness about climate change to the farmers; the extension Programme aspect of climate change adaptation strategies policy in the state by the Sokoto Agricultural Development Project should focus on the bottom-up participatory approach so that the indigenous and the emerging adaptation strategies and technologies can be appropriately maximized. Grain farmers should be encouraged to participate in agricultural extension services which will educate them on the effects of climate change and adaptation strategies.



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3190-FARMER HERDER CRISIS AND THE ESTABLISHMENT OF GRAZING AREAS THE CASE OF LAGELU LOCAL GOVERNMENT AREA

Deborah Ayodele-Olajire¹, Tosin Olowookere¹

University of Ibadan Geography Ibadan-Nigeria¹

Conflicts occur when there is competition over scarce resources. Climate Change is resulting in the redistribution of rainfall and affecting the availability of historical open grazing areas. In this study, we assess the crisis between pastoral cattle herders and farmers in Lagelu Local Government Area, Oyo State, Nigeria. Questionnaire survey and literature reviews were used in understanding the nature of conflicts in the study area and the perception of residents on the establishment of formal grazing areas. Survey data was coded and analyzed using the Statistical Package for Social Scientists (SPSS). With this tool (SPSS), both descriptive and inferential statistics were undertaken to collate and interpret the questionnaire survey carried out. We found that the destruction of farmlands was often the initial cause of conflicts while the killing of farmers is a second cause. The conflicts between farmers and herders in the study area have led to the emigration of farmers trying to secure their life and family economy. Also, there is variation in the prevalence of crisis across communities in the study area. In Edun Community where the least amount of conflict occurrences was recorded, we found that this was due to the herdsman obeying local laws. Meanwhile, level of education seemed not to be a determinant of grazing-area policy acceptance. Overall, due to the ethnic tensions intermittently experienced across the country, residents appear to support the establishment of grazing areas only if they will be designated in the northern part of the country where herdsman have historically been majorly domiciled.

3234-CLIMATE POLICY AND LOCAL GOVERNANCE IN LESOTHO

Lucia Leboto-Khetsi¹, Abraham Matamanda¹, Verna Nel¹, Fefisa Rwanqa²

University of the Free State Urban and Regional Planning Bloemfontein-South Africa¹ Letlotlo Green Pty (Ltd) Environmental Management fefisa.rwanqa@gmail.com-Lesotho²

Climate change is one of the internationally declared, most critical environmental challenge of our time, contributing to massive ecological destruction, social disruption and compromised local economic development. Many countries have implemented various initiatives in reaction to this global dilemma. Some pursuits were vigorous and others not, and yet others seemed to be ineffective because they took a top-down planning approach and failed to see the value in community participation which permeates sustainability through enhanced peoples participation. Lesotho has, in line with global climate change mitigation and adaptation ideals, recently developed a National Climate Change Policy, and the National Adaptation Plan of Action (NAPA), a move most consider delayed. Similar to many developing countries, the country boasts of a democratic governance. Through this, decentralisation has warranted the shift to bottom up planning through local government. However, the study reveals that the country's local governance structures are faced with institutional, human and technical capacity plus fiscal challenges that inhibit resilience to climate change impacts. This paper, through a desktop study triangulated with key informant interviews with officials from Lesotho Meteorological Services and Ministry of Local Government and Chieftaincy, aims to bring insights on the importance of participatory planning in building vibrant local governance structures, capable of realizing climate change resilience at national level. The paper makes recommendations for good practices on application of different mechanisms to strengthen local governance structures, with specific focus on five focal points; capacity building, stakeholder engagement, institutional support, awareness building and areas for potential country specific programmes.



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VIRTUAL

C.O.African Studies African Borders and Borderlands

1157-Migration and the spatial mobility of borders in the Southern African region

Inocent Moyo¹

*University of Zululand Geography and Environmental Studies KwaDlangezwa-South Africa*¹

The notion of the spatio-mobility of borders adequately demonstrates that borders are not the simple and marginal lines at the periphery of nation states (Cons and Sanyal, 2013). This has been demonstrated by that, in the case of the Southern African region borders between states like Botswana, South Africa and Zimbabwe are not fixed at the margins of these states, but such borders 'migrate' inland into the interior of these nation states. For example, the South African border at Beitbridge is not only securitised, in the form of stringent immigration controls as well as the deployment of the army and police so as to monitor the border, but it also followed migrants. This materialised in many ways, such as stops by the police, who demanded to see the passports of migrants who were travelling along the freeway from Beitbridge to Johannesburg. Similar patterns were also revealed by interview data in that, along the freeway from the Botswana border with Zimbabwe at Ramokgwebana, the Botswana police also stopped migrants and demanded to see their passports. The respondents also stated that, this was the same exact practise which obtained along the Zimbabwean freeways from Botswana and South Africa borders. Cases in point relate to the 'borders' which were erected and manned by the Zimbabwean army on the freeway from Ramokgwebana to Bulawayo as well as from Beitbridge to Bulawayo and from Beitbridge Masvingo. This chapter argues that, the securitisation and the spatial mobility of borders beyond the physical line on the map into the interior of states, such as the case of South Africa so as to monitor and "border" migrants between neighbouring countries is counterproductive. This is precisely because these migrants come from member states of the Southern African Development Community (SADC).

1235-Transborder pastoralism migration conflict with farmers and border security

Omotomilola Ikotun¹

*University of Eastern Finland Geographical and historical studies Joensuu-Finland*¹

Omotomilola Ikotun

Department of Geographical and Historical Studies, University of Eastern Finland, Joensuu, Finland

Email: omotik@student.uef.fi

Abstract

The West African region has become increasingly plagued with a series of armed conflicts ranging from inter-ethnic wars, inter-religious disputes, and civil wars to insurgencies and terrorism. These violent conflicts have been responsible for an overwhelming number of deaths, displaced persons and destruction of properties.

The ECOWAS Protocol on Free Movement of People and the Transhumance Protocol have both ensured the ease of passage and migration trends of both humans and animals across the West African region. However, with the unabated desertification of the foraging paths caused by climate change, the intense struggle for limited water resources and land and the Boko haram problem in the North-Eastern region of Nigeria, migration trends of transhumant pastoralists are changing, bringing them into direct conflicts with farmers. With the recent increase of conflicts between pastoralists and farmers, across the West African region and Nigeria in particular, there is a marked proliferation of small arms and access to ammunition with which the disputes are being settled, and it is believed that the unchecked ingress and egress of these migrants through countries signed up to both protocols is the reason.

The implication of this new facet for border security is immense as no signatory country to the Transhumance Protocol has implemented any modern precautionary measures to prevent the smuggling of arms and ammunition and the outbreak of diseases amongst the pastoral animals already existing within borders. Using the Regional Security Complex, this study will focus on the lapses in the implementation of the two protocols and the implication for border security in all West African countries and beyond.



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C.O.African Studies Environmental Issues and Challenges in Sub Saharan Africa

1611-LOCAL POLITICAL AND SCIENTIFIC KNOWLEDGE THE ISSUE OF CHARACTERIZING ENVIRONMENTAL CHANGE IN RURAL AFRICA

Laurent Bruckmann¹

*University of Liège Departments of Geography & Environmental Sciences and Management Liège-Belgium*¹

The challenges posed by global change and the Sustainable Development Goals (SDGs) place Africa's rural areas as major challenges to sustainable country development. In rural areas the effects of climate change are numerous, because of the importance of activities dependent on natural resources. The transformations of environment-society relations are faster and deeper than in urban areas. Environmental changes are observed by the populations and the public authorities according to their knowledge, and thus of the perception and the representation of their space and the organization of the rural systems (management and uses of natural resources and water, social and economic organization, accessibility, influence of globalization). The adaptation of societies is based on these perceptions, which can be various according to actors and places.

The communication will therefore examine and give an overview on how are environmental changes characterized in rural Africa by local community, authorities and scientists, with the example of two different field studies: the sahelian part of the Senegal and the tropical highlands of Cameroon. Results show that environmental changes are generally not observed directly, but rather through their impacts on access to natural resources and productivity of agro-ecosystems (technical improvement, soil degradation, impoverishment, migration, etc.) Indeed, fieldworks show that some changes considered as environmental are actually linked to political and economic orientations at national scales and no longer depend on local knowledge. These examples show the importance of understanding the variations of perceptions and their relationships to the reality of environmental changes and socio-spatial practices. The main challenge is to succeed in converging knowledge on environmental changes when designing and implementing public adaptation policies. The geographer, as a neutral observer, can help understanding the complexity of environmental changes adaptation.

1996-INONDATIONS ET GESTION DES EAUX PLUVIALES DANS LA ZONE LITTORALE EST DE LOMÉ

Koko Zébété HOUEDAKOR¹, Djiwonou Koffi ADJALO¹

*Université de Lomé Géographie Lomé-Togo*¹

L'eau, moteur de la vie, sait aussi détruire, ravager les littoraux par ses raz-de-marée ou inonder de vastes portions de terrain lors de ses crues (T. Laurent, 2003). A cet effet, il est à souligner que l'Afrique de l'ouest a subi les contrecoups des extrêmes climatiques en termes d'inondations ou de sécheresses dévastatrices provoquant des pertes en biens matériels et en vies humaines.

A Lomé, l'aménagement d'un 4ème lac (juin 2013 - juin 2018) pour assainir le secteur Est de la ville, dont l'occupation du sol discontinue présente des installations précaires semble donner des résultats mitigés. La périphérie Est de la ville de Lomé constitué du canton de Baguida et de ses quartiers, bien qu'étant le lieu de villégiature des citadins, n'a pas pendant longtemps disposé d'installations pluviales adéquates pouvant préserver la population des risques hydriques en raison de sa spécificité de zone côtière.

La présente étude traite de la vulnérabilité de la zone littorale Est de la ville de Lomé aux inondations devenues récurrentes à partir des années 2007. Il s'agit d'appréhender le mécanisme d'inondation dans la zone, d'analyser l'impact de la variabilité climatique sur les inondations dans la zone et d'évaluer l'efficacité dudit ouvrage. La méthode repose sur la recension bibliographique, les observations de terrain, les enquêtes auprès des populations riveraines et les entretiens avec les responsables des services en charge de l'assainissement. Les résultats relèvent la vulnérabilité de ce secteur littoral, l'accentuation des relations précipitations - inondations - topographie - aménagement et l'efficacité structurelle de l'ouvrage, avec cependant une insuffisance de réseau de collecteurs secondaires.



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1997-ECONOMIE DE LA MER ET EQUILIBRE DE LA ZONE COTIERE DU TOGO IMPACTS DES OUVRAGES PORTUAIRES

Djiwonou Koffi ADJALO¹, Koko Zébété HOUEDAKOR¹

Université de Lomé Géographie Lomé-Togo¹

Regroupant les activités liées à la mer notamment le transport maritime, la pêche, l'aquaculture, le tourisme, la construction navale, l'extraction de matériaux marins et la production d'électricité, l'économie maritime occupe une importante place dans les pays côtiers. Au Togo, le port autonome de Lomé considéré comme élément moteur de l'activité économique du pays, assure le transit de plus de 80% des échanges commerciaux et représente l'espace de transit par excellence pour les pays de l'hinterland (Burkina Faso, Mali, Niger, etc.). Cette réalité cache cependant une profonde disparité notamment l'érosion côtière due aux facteurs naturels mais renforcés par des actions anthropiques, existence des ouvrages portuaires, provoquant la rupture de l'équilibre préétabli.

Il est intéressant de poser une loupe sur l'espace côtier du Togo, aux enjeux économiques, sociaux et environnementaux complexes, et croisés. Ainsi, le présent travail vise à relever les impacts des ouvrages portuaires sur l'équilibre de la zone côtière du Togo. Pour y parvenir, outre la documentation, l'étude est fondée sur une démarche de mise en évidence de la cinématique du trait de côte durant la période 1955-2019. Elle combine les compagnes de collecte de données de positionnement, les images satellitales et les entretiens auprès des personnes ressources pour une appréciation du recul du trait de côte.

De ces investigations il ressort que la mise en place des ouvrages portuaires sur la côte togolaise a provoqué la rupture d'équilibre du trait de côte de l'année de référence (1955) avec modification de la configuration de la côte par la création de deux cellules morpho-dynamiques. La première en progradation est située à l'Ouest du port et la seconde en érosion couvrant toute la partie Est du port a provoqué de profonds bouleversements dans la vie des communautés résidentes.

2659-Gorilla tourism and conservation comparative analysis of the protected areas in the Democratic Republic of Congo Rwanda and Uganda

Anna Dudek¹

University of Warsaw, Faculty of Geography and Regional Studies Chair of Regional and Political Geography Warsaw-Poland¹

The paper presents the conservation history of the mountain gorilla population in their natural habitat in the Democratic Republic of Congo, Rwanda and Uganda. The study covered all four national parks established for the protection of these animals: Bwindi Bwindi Impenetrable National Park (Uganda), Mgahinga Gorilla National Park (Uganda), Virunga National Park (DRC) and Volcanoes National Park (Rwanda). Central Africa is the only place in the world where you can see mountain gorillas in natural environment. At the same time, it is a politically unstable region shaken by civil wars and unrest.

Changes in the indicators showing the evolution of gorilla tourism were analysed, eg: the number of habituated groups, the number of tourists visiting parks and the prices of gorilla permits. The effects of conservation efforts, for example the mountain gorilla population size, were also taken into account. The above-mentioned indicators show the relations between the two lobbies: the tourism industry and the nature conservation lobby from the 1990s to the second decade of the 21st century. Data were collected from various sources: tourist organizations of respective countries, conservation institutions and national parks' authorities.

The paper also shows the organization of gorilla tourism in the three countries and assesses the impact of tourism on local socio-economic development. The analyzed national parks are surrounded by rural communities, which have limited opportunities to profit from tourism in these areas. Therefore, development programs financed from national and international funds are introduced to improve the standard of living of local people.

Each of the three countries has evolved in terms of tourism and conservation policy and currently uses a slightly different approach in relation to gorilla tourism.



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C.O.African Studies Food Security and Human Survival in Africa

2752-Assessing the livelihood strategy of the vulnerable fisherfolk of Korsten Port Elizabeth

Leizel Williams-Bruinders¹, Abigail Forbes¹

*Nelson Mandela University Geosciences Port Elizabeth-South Africa*¹

This paper highlights a somewhat neglected segment of the fishing sector generally, the subsistence fisherfolk. Social sustainability should be as prominent as economic and environment sustainability, the latter being the reason the promulgation of restrictive laws for subsistence fishers, who in this case study have already undergone social disruptions under apartheid law. Communities frequently cohere around memories of historical suffering. The Group Areas Act implemented in the 1950's not only destroyed a close-knit community in South End, Port Elizabeth, it also disrupted access to their livelihood source. These forced removals had detrimental effects on the non-white subsistence fisherfolk that were relocated to Korsten, from South End. Subsequent to the forced relocation, they lost their legal right to use the shores for fishing. By highlighting the socio-spatial implications of the forced removals of yesteryear, this article demonstrates that policy changes should be cognizant of the society that it implicates. Globally, food security is a critical issue. South Africa is not immune to food security issues and this article highlights the detrimental effect that legislation has had on subsistence fisherfolk. In this case, fisherfolk experienced policy changes during two very different times in its turbulent history, each one negatively affecting this sector of society in terms of maintaining a sustainable livelihood. Using a narrative analysis framework, this paper describes the economic, social and cultural impact that affected the fisherfolk, and this will be followed by an assessment of the coping strategies employed as well as the complementary practices that ensures their fiscal success.

3603-WHEN AGRONOMY FLIRTS WITH MARKETS GENDER AND NUTRITION A POLITICAL ECOLOGY OF THE NEW GREEN REVOLUTION FOR AFRICA AND WOMEN'S FOOD SECURITY IN BURKINA FASO

William Moseley¹, Melanie Ouedraogo²

*Macalester College Geography Saint Paul-United States*¹ *Université de Ouagadougou* mouedraogo808@gmail.com-Burkina Faso²

Advocates of the New Green Revolution for Africa (GR4A) approach argue that the best way to address hunger and malnutrition on the continent is to better incorporate male and female small farmers into the global food economy via value chains involving the use of improved inputs, superior production technologies, and enhanced access to markets for the sale of agricultural output. This paper critically assesses such tactics by using a feminist political ecology lens to analyze GR4A efforts in southwestern Burkina Faso targeting female smallholder farmers growing rice. The study examines three questions: what is the nature of the GR4A rice value chain in Burkina Faso; to what degree is a GR4A Project impacting the food security and dietary diversity of participating women; and, how do gender roles influence the impacts of a GR4A rice project? The study's findings are based on semi-structured interviews, as well as food security and dietary diversity surveys during the hungry season and after the harvest, with 161 female rice farmers in 2016 and 2017. We conclude that GR4A food security advocates are facilitating change in Burkina Faso, but these efforts have scarcely impacted the food security and dietary diversity of the rural poor to date. While private sector actors are central to the GR4A, their presence and engagement must often be orchestrated by donors rather than unfolding naturally via the 'invisible hand' of the market. As such, the GR4A in Burkina Faso is often about building demand, constructing markets, and getting people to behave in a certain way, which is reminiscent of colonial era efforts to introduce capitalist rationality as a learned behavior. The project's foci on gender and nutrition are add-ons at best.



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C.O.African Studies Migration Regional Integration and Development

1570-The Migration Process and Contributions of Guarantors for Immigrants in a Multi ethnic Community in Northwestern Zambia

Masaya Hara¹

*Kobe University Graduate School of Human Development and Environment Kobe-Japan*¹

This paper examines on the role of guarantors, who help immigrants with the immigration process and with establishing their new lives in rural Zambia. The study area was S Ward in northwestern Zambia. This study is based on intermittent fieldwork carried out over a 26-month period, from September 2011 to August 2019. I interviewed the local residents for their life histories. The Kaonde, who are considered the region's firstcomers, live in Northwestern Province, Zambia. There are another four ethnic groups in this area: the Lunda, the Luvale, the Chokwe, and the Luchazi, who are relative newcomers to S Ward. These four ethnic groups are immigrants, and are permitted by the Kaonde traditional chief to live in the Kaonde area. There are three basic types of migration: "village to village", where people move from one village to another; "via city", where people from villages move to the city for work and later move to a village; and "city to village", where people born in the city move to a village. Most non-Kaonde immigrants moved to a village to escape family conflict or to avoid creating envy of their city lifestyle among their relatives. Most non-Kaonde immigrants did not rely on their relatives to move to S Ward. They rely on guarantors, who are known in the Lunda language as chinsahu. The guarantors play a role of assistance for immigration to communities. Any person living in the community can become a guarantor if they are trusted by an immigrant. Guarantors can help to ensure a peaceful migration, provide friendship, and help immigrants build their new lives in northwestern Zambia.

1864-THE 2019 XENOPHOBIC VIOLENCE IN SOUTH AFRICA AFROPHOBIA CONTINENTAL RESPONSE AND REPERCUSSIONS

Brij Maharaj¹

*University of KwaZulu-Natal Geography Durban-South Africa*¹

Background

Xenophobia, and especially the periodic outbreaks of violent attacks against foreign Africans (2008; 2015; 2017; 2019) has emerged as one of the major challenges in post-apartheid South Africa. The aim of this paper is to analyse the September 2019 attacks, especially in terms of the responses from, and the repercussions across, the African continent.

Materials and Methods

This paper draws on the author's research on xenophobia in South Africa for over twenty years. More specifically, the data for this paper was obtained from policy documents; media reports; and responses of foreign African governments.

Results

The September 2019 attacks were the most serious in terms of responses and repercussions from the African continent. South African businesses and trucks were attacked in other parts of the continents; some ambassadors to the country were recalled; many countries instituted a ban on playing any sport with South Africa; flights to South Africa were suspended; Nigeria pulled out of the World Economic Forum in Cape Town, and arranged special flights to evacuate 600 of its citizens. The South African government condemned the attacks, was forced to apologise and initiate damage control strategies which included meeting ambassadors, and sending envoys to African countries.

Conclusion

There has been a xenophobic tendency to stigmatise migrants, particularly those from other African countries as criminals and competitors for social welfare, employment and resources. As South Africa's democracy fails to deliver to the poor, politicians search for scapegoats, and foreign migrants are sitting ducks. There have been persistent allegations with some evidence that the SA government, politicians and public officials have been complicit in promoting xenophobic tendencies and practices. Xenophobia is racialised and Afrophobic as hostile attitudes and behaviours are mostly aimed at other black Africans.



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VIRTUAL

2690-The Female Genital Mutilation (FGM) Migration Matrix the case of the Arab League Region

Hazel Barrett¹

*Coventry University CTPSR Coventry-United Kingdom*¹

Background

This paper examines the factors that support or deter Female Genital Mutilation (FGM) in the context of internal, regional and international migration, displacement and other humanitarian settings in and from countries in the Arab League Region. The Arab League Region contains countries with some of the highest FGM adult prevalence rates in the world, as well as countries where FGM is not traditionally performed. It is also a region with high levels of population movement, with Iraq, Sudan and South Sudan being amongst the top ten countries with the largest displaced population every year since 2003. The effect of migration on the practice of FGM in both regions and countries of origin as well as destination are little understood.

Methods

A rigorous evidence-based literature review was undertaken which provided an exploration of the linkages between culture, social norms and practices of FGM and its manifestation among groups of migrants originating from the Arab League Region. This informed the development of a new framework for analysing the effect of the migrant journey on the practice of FGM.

Results

The resulting 'FGM- Migration Matrix' explores the complexity of the situation focusing on three scenarios: migration from high prevalence regions of origin to high prevalence regions of destination; migration of non-FGM practicing groups to destinations with high FGM prevalence; and migration of FGM practicing groups to destinations with low FGM prevalence.

Conclusions

The paper illustrates the complex nature of the relationship between FGM and population mobility and demonstrates that issues such as the migrant journey, integration with host communities and importance of FGM as an identity marker require further research. More understanding is needed of the migrant journey through the FGM-Migration Matrix, to better understand the effect this journey has on migrant and host communities attitudes and practices concerning FGM.

2744-Migration governance in Africa The African Continental Free Trade Area and labour migration in Africa's development agenda

Christopher Nshimbi¹

*University of Pretoria GovInn (Centre for the Study of Governance Innovation) Pretoria-South Africa*¹

This paper takes the reluctance of African Union (AU) member states to sign the Protocol to the Treaty Establishing the African Economic Community Relating to Free Movement of Persons, Right of Residence and Right of Establishment (or Free Movement Protocol), evident in the fewer signatories relative to the African Continental Free Trade Area (AfCFTA) Agreement and the Kigali Declaration at the 2018 AU Summit in Kigali, as a point of departure to discuss labour migration within the framework of Africa's integration agenda. It analyses the attitudes, and implications on development, of African policymakers, senior bureaucrats and citizens of AU member states as well as those of epistemic communities towards labour migration in Africa. The paper addresses the question, how to explain the observation that out of three legal instruments drawn to enhance Africa's integration project presented to member states, all of which acquiesce to the project, only one instrument seems to attract the least interest? The analysis contained in the paper is based on a review of secondary data sourced from scientific and academic journal articles and books and authentic media. Based on this and in response to the question, the paper argues that though long recognised as a critical element to Africa's "self-reliant" self-sustaining development, the mobility of labour between African countries seems to be a difficult and uncomfortable issue that African leaders conveniently ignore at many a continental or regional engagement on economic integration. Member states of the AU should take pragmatic measures that demonstrate appreciation of labour migration as an essential component of economic integration.



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VIRTUAL

C.O.African Studies Post Developments Geographies in Africa

1225-Community driven sustainable socio economic change in rural South Africa

Melanie Nicolau¹

*University of South Africa Geography Florida-South Africa*¹

The legacy of spatial inequalities and poverty persist in 21st century South Africa. Despite a number of policies specifically designed to reduce poverty and inequality in the country since 1994, the unfortunate reality is that the situation is not improving but is worsening. This paper will present a post-development programme designed to assist communities in reducing their own levels of poverty and inequality and in this way drive their own development agenda. Undertaken in collaboration with a non-government organization in a number of rural communities in South Africa a Community Asset Mapping Programme (CAMP) was developed using a participatory approach that has as its purpose community-driven sustainable socio-economic change within rural communities. CAMP advocates that the success of community-driven change depend on the inclusion of processes that allow community members to not only identify and map their own social, economic, human and environmental capital but also to identify levels of power and trust within the community. Community members are assisted in gathering this information in order to create their own small business opportunities that will drive their own pathways out of poverty and in this way provide a small contribution to lowering spatial inequalities in the country. Within the context of the post development approach, this paper firstly provides a brief presentation of the CAMP as undertaken in rural communities in South Africa, and secondly, presents the roles, responsibilities and ethical considerations of the external stakeholders who enable communities to establish their own priorities to improving their quality of lives, through the provision of funding; mentoring and skills sharing without reinforcing the dependency levels on external stakeholders. Finally, using a few case studies, some successes and challenges that can shape the future application of CAMP within the post development context are highlighted for further discussion.

1238-IMPACT OF VIRTUAL CASH ECONOMY ON LIVELIHOOD OUTCOME OF INFORMAL CROSS BORDER TRADERS IN GWERU ZIMBABWE

Beauty Dzawanda¹, Nicolau .D Melanie¹, Mark Matsa²

*University of South Africa Geography Gweru-Zimbabwe*¹ *Midlands State University Geography and Environmental Studies*
*matsam@staff.msu.ac.zw-Zimbabwe*²

Informal Cross Border Trade (ICBT) is one of the most viable economic activities the majority of people in Zimbabwe have depended on for survival in times of economic hardships. It has provided many people in Zimbabwe with livelihood outcome as agriculture can no longer be entirely depended on for survival due to climate change effects. However, despite its crucial role to the livelihood of many people, ICBT has been severely affected by changes happening in the fiscal economy of Zimbabwe as the nation adopted virtual cash as the major form of payment due to cash crisis. This paper seeks to examine the changes caused by virtual cash economy on informal cross border traders livelihood in Gweru, Zimbabwe. This paper employed the triangulation approach in which both quantitative and qualitative methods were utilized to gather and analyse data. Quantitative techniques comprised closed ended questionnaires and qualitative methods included semi structured interviews, open ended questionnaires, focus group discussions and observations. The results revealed that informal cross border traders earned a positive livelihood outcome with income earned from ICBT before extensive use of virtual cash economy. However, there was a significant negative change in livelihood outcome when the virtual cash became a common method of payment. Overall, the study developed a framework which highlighted the importance of cash in the success of ICBT and its sustainability in Gweru, Zimbabwe. The paper concludes that virtual cash economy caused a significant change to the livelihood outcome of traders and affected ICBT business. The study recommends the need to integrate ICBT in policy making so as to address issues that affect this economic activity in order to ensure its sustainability in provision of essential livelihood needs.



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VIRTUAL

1670-THE PARTICIPATION AND PROTECTION OF WOMEN IN ARTISANAL AND SMALL SCALE GOLD MINING AMID THE PRESENCE OF VIOLENT MALE SYNDICATES IN MIDLANDS PROVINCE ZIMBABWE.

WINMORE KUSENA¹

UNIVERSITY OF SOUTH AFRICA GEOGRAPHY PRETORIA-South Africa¹

Kusena Winmore

University of South Africa, Department of Geography, Pretoria, South Africa
winniekusena@gmail.com

Abstract

The existence of violent groups associated with mining activities and territory marking has been a common phenomenon across most parts of Africa but relatively new in Zimbabwe. This article examines the protection, participation and beneficiation of women in mining in Midlands province within the context of the presence of aggressive syndicates dubbed 'MaShurugwi', a name based on their area of origin. Interviews with key informants from ministry of mines; ward councillors, Zimbabwe Republic Police and mining women consortiums were the main sources of data. Print and social media platforms; and radio interviews were instrumental in collecting data on perceptions about MaShurugwi and the vulnerability of women. Content analysis was then employed for data analysis. The study revealed serious bullying of women in mining. This involved chaotic and violent invasions of female owned claims. The few women who had survived in mining had their own sponsored territorial groups and political connections for protection. Regrettably, findings showed that the government was doing very little to protect ordinary women in mining. In fact, some government officials were alleged of backing the violent groups in order to benefit as well as protect their own interests. An unsubstantiated finding revealed that all the successful small scale miners whether male or female were somehow connected to the ruling party. Given the prevailing situation, it is almost impossible to achieve equality, beneficiation and active participation of women in Midlands province. The circumstance requires sincere and indiscriminate law and order enforcement by the central government of Zimbabwe in order to eradicate MaShurugwi.



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VIRTUAL

C.1. Applied Geography Applied Geography

1561-Familiar strangers in public transport networks detection measurement and characterisation

Jonathan Corcoran¹, Renee Zahnow², Min Zhang¹

The University of Queensland School of Earth & Environmental Sciences Brisbane-Australia¹ The University of Queensland School of Social Sciences r.zahnow@uq.edu.au-Australia²

Our urban environments are a complex arrays of places that we regularly share with our fellow urban dwellers. The feelings that we develop toward the places that we frequent are informed in large part by the people with which we share these locales (Paulos & Goodman, 2004). In public places these people are invariably unknown to us yet can be considered - familiar strangers - in that we recognise the individual(s) (Milgram, 1972). The importance of familiarity in an era of urban growth and concerns about liveability and wellbeing have never been greater. As we strive to understand and proactively (re)design urban environments that promote liveability and wellbeing there remains a critical need for us to be able to both systematically detect and measure who, where and when individuals interact through which we to better inform smart urban design.

Absent from current familiar strangers scholarship are measures that move beyond capturing the aggregate number of familiar strangers. To this end this paper presents a new measurement framework designed to capture the location, tempo, and timing allied with the characteristics of the individuals involved in a given familiar strangers encounter. We argue that it is only through our proposed framework that the social value of familiar strangers can be more fully assessed.

With the advent of widespread social media and urban analytics, the immense pools of automatically generated sets of big data describing urban systems, including data on public transportation, mobile phone networks and Wi-Fi usage have underpinned a new wave of research on familiar strangers. We follow this emerging trend and present results from a case study of a large bus transit network in Brisbane, Australia using smart card data.

2068-Spatial aspects of the supply-demand gap in childcare services following the implementation of a comprehensive support system for children and child rearing in Japan

Yoshiki Wakabayashi¹, Yoshimichi Yui², Mikoto Kukimoto³

Tokyo Metropolitan University Department of Geography Hachioji-Japan¹ Hiroshima University Graduate School of Education -Japan² Oita University Faculty of Economics -Japan³

With the recent increase in the number of working mothers, Japanese metropolitan areas face a shortage of childcare services. To overcome this problem, Japanese governments have been trying to expand childcare facilities by implementing a comprehensive support system for children and child-rearing since 2015. This system is aimed at increasing childcare supply and the types of childcare services available by developing more certified centers for early childhood education and care, in addition to providing greater public financial support for small-scale private childcare facilities. These measures have reduced the number of children awaiting enrollment in licensed childcare centers. However, a geographical approach is needed to clarify regional differences in these developments. This study examined the spatial aspects of developments in the supply-demand gap of childcare services following the implementation of this system. The study area was Naha City in Okinawa Prefecture, where the number of children awaiting enrollment in licensed childcare centers was exceptionally large for cities in Japan. The city authorities have promoted financial assistance for unlicensed childcare facilities to transform them into licensed centers. As a result, the number of children awaiting enrollment in licensed childcare centers reduced by half after only one year since 2016. However, about 200 children were still waiting to enroll at licensed daycare centers in 2017. Furthermore, the working conditions for nursery teachers and financial conditions for the childcare centers that were previously unlicensed have improved. Nevertheless, a spatial analysis of the supply-demand gap in childcare services with a geographic information system indicated that a regional disparity in childcare provision still exists in the city. Growing disparities in the quality of childcare services between licensed and unlicensed facilities were also observed.



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VIRTUAL

2209-GEOTRAUMA VERSUS SOCIAL PATHOLOGY IN GEOGRAPHICAL APPLIED RESEARCH

Tomasz WITES¹

*University of Warsaw Faculty of Geography and Regional Studies Warsaw-Poland*¹

Applied geography aimed at working out tangible, hands-on measures to include this discipline in the solution of real-life problems. Since it displays the chief dilemmas of civilisation, social diversity is, due to their changeability in time and space, also the object of geographical research.

The aim of the presentation is to present and explain two definitions strongly connected with social diversity. Social pathology is a general set of behaviour and phenomena at variance with accepted norms and social values, in the analysed geographical space. The second term referring, on one hand, to attitudes and behaviours that is socially unacceptable, on the other hand - to a geographical approach is geotrauma. The disadvantage of the proposition is how difficult it is to unambiguously and quickly explain the semantic scope and the more limited topical context attributed to trauma, vs. pathology.

The object of interest of are the threats that reveal the degradation of man in many aspects. Some of these are individually determined (such as addictions), others are related to life in a group (e.g. crime), others yet threaten the very existence of mankind (i.a. famine). Studies on social diversity are the examination of human behaviour and of phenomena that are defined ambiguously, that have many components and that depend on various conditions. Geotrauma and social pathology should constitute an effective discriminant of new social geography, which holds a permanent place for dissertations concerning social problems in a broad sense. The above postulate is declarative although it is the presence of geographer academics in research on the examined problems that will, to the biggest extent, determine the durability and continuity of social research in geography. The role of applied geography in far-reaching studies on social diversity seems insufficient and often remains imperceptible.

2803-Conglomerate Ecology Of Seyhan Basin East Of Mediterranean Region

İbrahim Atalay¹, Hüseyin Kozan², Sevda Altunbaş³, Refik Gündüz², Uğur Efe², Muzaffer Siler⁴

*Faculty of Arts and Sciences Geography Elazığ-Turkey*¹ *General Directorate of Forestry Study-Project* huseyinkozan@ogm.gov.tr-Turkey² *Faculty of Agriculture Department of Soil Science and Plant Nutriment* saltunbas@akdeniz.edu.tr-Turkey³ *Faculty of Humanities and Social Sciences Geography* msiler@firat.edu.tr-Turkey⁴

Some geological parent materials like limestone, marl, serpentine, and conglomerate create a special environment in terms of soil formation and vegetation productivity under the same climatic region. Zamanti tributary basin of the Seyhan River flowing into Mediterranean Sea contains very thick neogene conglomerate sequence attaining 500 m composed of big rounded mostly limestone. This conglomerate formed in the molasse basin occurring present-day Zamanti Basin has been deeply dissected as "U" shaped valley by the Zamanti River due to the uplifting of Taurus Mountains occurred during the end of Tertiary and Early Quaternary. With the weathering of the calcareous cement of conglomerate sandy loam textured soil has been developed along the soft zones and cracks of conglomerates. Because the weathering of sandy cement material produced the high content of sand attaining 78 % and low content clay (12%). This weathering process has led to development of horizontal and vertical root systems of bush and trees. Thus, rich and productive vegetation communities composed of Calabrian pine (*Pinus brutia*), *Pistacia terebinthus*, *Juniperus oxycedrus*, *Styrax officinalis*, *Ostrya carpinifolia*, *Acer tataricum*, *Quercus* sp. and *Pinus nigra* and *Abies cilicica* grow on the conglomerate. On the other hand, the seeds especially Calabrian pine falling the conglomerate cracks containing soil easily germinate and the seedlings of Calabrian pines following the seepage of the water along the cracks contribute to the productive Calabrian pine stands. Besides, the maquis vegetation regenerating with root suckers grows along the weathered zones of conglomerate. On the other hand, tube soil that formed along the conglomerate cracks also support the growth of herbaceous hydrophytic and maquis vegetation.



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2956-EXCESSIVE USE OF GROUND WATER AND ITS IMPACT ON WATER LEVEL

Anil Kumar¹

M.U., Bodh Gaya Geography Patna-India¹

Even in the Middle Ganga Valley water level is getting badly affected by the increasing cultivation of crops during dry seasons. previously Indian cultivators used to grow crops based on monsoon rain and water level remained unaffected for centuries but during recent years fastly growing population has compelled cultivators to grow crops all the year round applying chemical fertilizer and tapping all irrigation facilities. Crops grown in winter season and summer season mainly depend on ground water use.

the present paper aims to analyse the impact of fastly lowering of water level in Barh subdivision of Patna district of the Middle Ganga Plain on the failure of tube well and well which are the main sources of drinking water and irrigation. The people of the region are mainly involved in agricultural activities and failure of crops due to failure of tube well and well face the acute shortage of food and drinking water. This study will suggest planned use of ground water as well as recharge of ground water by developing Ahars (drain), Pynes (small drain), tanks, Sokhta (locally known kacha well), use of rain harvest etc.

This study will base on both primary and secondary data. Primary data will be generated through questionnaires and schedules from sampled villages of the study area and secondary data will be collected from government offices. Six villages from different parts of the study area will be selected applying suitable sampling techniques. Problems of drying wells, tanks and failure of tube wells of different areas will be highlighted and suitable measures will be suggested to cultivators. Important measures liking storing and using harvested rain water, storing rain water in artificial tanks, ponds, low lying areas, recharge of water level by different means will be suggested. This process will recharge water level will be minimized.

3035-Energy Vulnerability of the city of São Paulo

Gabriel José Mendonça de Azevedo¹, Luis Antonio Bittar Venturi¹

University of São Paulo Geography São Paulo-Brazil¹

The city of São Paulo and its more than 11 million inhabitants presented in 2014 an electric power consumption per capita of 2,612 [kWh], only 8% lower than the density as countries like Turkey. The high socioeconomic dependence of electricity in the current urban scenario, the electro-electronic development and propagation, coupled with proposes of increase participation of this resource as a way to achieve global goals to reduce air pollutant emissions, set the tone of this study. Distributing energy along a huge city, primarily throughout an overhead grid, while maintaining service continuity, is a spatially unequal daily challenge. Few authors have attempted to apply the concept of energy vulnerability empirically to urban reality. Venturi et al. (2019), within the scope of the Research Centre of Gas Innovation (RCGI), conducted a mapping and measurement of residential areas energy vulnerability of the city of São Paulo, choosing and relating five indicators of energy vulnerability. Observating the gap in Venturi's work, in which the characteristics of the electric grid were not represented, we developed this study. For the purpose of achieve greater accuracy in the representation of energy vulnerability, this work aims to include variables related to the power grid that gives greater precision in mapping it. We used a management system (patent application number 870180055653), which integrates theory, method and technique. From theory, we use the concept of vulnerability and its indicators (including grid features). Methodologically, the data were inserted in the AHP (Analytical Hierarchy Process) matrix and, later, inserted in the technical mapping base (ArcGis) to identify vulnerability classes and how they are distributed in the city. In order to validate the new map, we compare it to the official regulated indicators of Brazil national electrical energy agency. So, we got improve the energy vulnerability accuracy by 20%.



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VIRTUAL

C.2. Biogeography and Biodiversity Land use cover Change Impacts on the Mountain Landscapes

1627- LAND USE COVER CHANGE IMPACTS IN THE ROMANIAN CARPATHIANS. INSIGHTS FROM SELECTED PROTECTED AREAS

Monica Dumitraşcu¹, Gheorghe Kucsicsa², Dan Balteanu¹, Ana-Elena Popovici², Ines Grigorescu², Alexandra Vranceanu¹, Cristina Dumitrica¹

Institute of Geography, Romanian Academy Physical Geography Bucharest-Romania¹ Institute of Geography, Romanian Academy Environment and GIS mondy_ghe@yahoo.com-Romania²

The paper analyses the land use/cover changes in the Romanian Carpathians with direct impact on the landscape and biological resources of protected areas. The Romanian Carpathian Chain holds 22 major protected areas (8 natural parks, 12 national parks and 2 geoparks) covering approximately 1 million hectares and over 600 natural reserves and natural monuments totalling over 50,000 hectares. Some of these protected areas were subject to significant land use/cover changes in the wake of farming and forestry works, fragmentation of natural habitats through infrastructural developments and extension of build-up areas, water and air pollution, some industrial activities and tourism.

The political and economic changes that took place in the early 1990s had a great impact on land use in Romania, also affecting some protected areas mainly by means of deforestation, overgrazing, mining, and uncontrolled tourism. Resorting to several geospatial/statistical data-sources and GIS, the major land use/cover changes were identified and highlighted in selected protected areas (natural and national parks) in the Romanian Carpathians (e.g. Apuseni Mountains Natural Park, Maramureş Mountains Natural Park, Rodna Mountains National Park, Bucegi Mountains National Parks, Putna-Vrancea Natural Park). The intensity of land use/cover changes was estimated based on a number of indicators yielded by analyzing the resulted data for two intervals, before and after the protected areas were established.

The results are aimed at assisting the local authorities and administrations of large protected natural areas to support the identity of traditional landscapes, cultural heritage and biodiversity conservation in view of identifying the best sustainable management solutions.

2801-Importance Of Parent Material On The Natural Regeneration And Spreading Of Aspen (Populus tremula L.) In Erciyes Mountains Central Anatolia

İbrahim Atalay¹, Hüseyin Kozan², Refik Gündüz², Uğur Efe², Özdal Yağan³, Sevda Altunbaş⁴, Muzaffer Siler⁵

Faculty of Arts and Sciences Geography Elazığ-Turkey¹ General Directorate of Forestry Study-Project huseyinkozan@ogm.gov.tr-Turkey² General Directorate of Forestry Forest Management ozdalyagan@ogm.gov.tr-Turkey³ Faculty of Agriculture Department of Soil Science and Plant Nutrition saltunbas@akdeniz.edu.tr-Turkey⁴ Faculty of Humanities and Social Sciences Geography msiler@firat.edu.tr-⁵

Aspen (*Populus tremula* L.) which is the pioneer succession in the burnt and destroyed oak, scots pine, black pine forests in the various parts of Turkey and Erciyes Mountain in Central Anatolia. It regenerates with the root suckers and the germination of the seeds on the all parent materials except evaporitic sediments. But fast growing and spreading areas of the aspen occur on the soft pyroclastics and dejection cone. According to the field observations the natural regeneration and spreading of aspen depends on the physical properties of the parent materials in the upper part of the Erciyes Mountain. Here pyroclastic materials mainly composed of volcanic sand and tuff, dejection cone, rock debris on the slope contribute the spreading and regeneration of the aspen. The roots suckers occur easily on the soft pyroclastic materials; for this reason, one of natural occurrence areas of aspen correspond to the pyroclastic. The cutting of the roots of aspen along the road slopes thrive the formation of root suckers. Other aspen regeneration takes place within the rock debris and dejection cone. Seeds of aspen falling within the gravels in the dejection cones and rock debris easily germinate, because the gravelly areas decrease the solar radiation intensity and capillarity and evaporation processes. Shortly, beneath the rocky area forms a good condition for the germination process. For this reason, the dejection cones and rocky areas of the slopes are covered by the densely aspen stands; some of them are the stands of main aspen wood production. It can be said that the fast growing and rapid spreading areas of the aspen regeneration are found on the pyroclastic materials, and dejection cones and rock debris areas on the slope in the Erciyes Mountain.



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3514-Derivation of floodplain habitats from remote sensing data in the Naryn Basin Kyrgyzstan

Magdalena Lauermann¹, Florian Betz¹, Bernd Cyffka¹

Catholic University Eichstaett-Ingolstadt Applied Physical Geography Eichstaett-Germany¹

In the semiarid climate of Central Asia the rivers and their associated floodplain ecosystems have a high relevance as regional hotspots of biodiversity. One of these rivers is the Naryn River in Kyrgyzstan. Upstream of the Toktogul Reservoir, which is the first barrier in the river course, the Naryn is still in a nearly natural state. Despite its ecological relevance the floodplain habitats have not been investigated yet in detail. For further research and conservation management information about habitat structure is required.

Against this background we use multispectral satellite data of Sentinel-2 and digital elevation data from TanDEM-X to derive the floodplain habitats in a supervised classification approach. The floodplain habitats include among others pioneer vegetation, several classes of herbaceous vegetation and different forest types. 500 ground control points were collected in the field in 2019 and were complemented with additional points created based on high resolution rgb imagery. These points have been split into a training and validation data set to create a random forest classification model. As predictors, different multispectral indices like the NDVI and temporal metrics of them were used along with different terrain attributes like the distance to the river channel.

The results show that the random forest model with the combination of Sentinel-2 and TanDEM-X data can represent floodplain habitats with high accuracies ranging from 62.4 % for pioneer vegetation on sand and 99.8 % for open broad-leaved shrub. The habitats along the longitudinal profile show a very heterogenous distribution.

Sentinel-2 data have high potentials for a efficient monitoring of habitats in a nearly continuous way and are thus a very interesting data source for nature conservation not only in Central Asia but also in Europe. Our habitat derivation for the Naryn floodplain provide a basis for further research and for a efficient monitoring approach.



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C.2. Biogeography and Biodiversity Mountain Ecosystems Responses to Climate Change

2223-Changes of Shunkalpa Glacier during the past century (1886 2017) in the Central Himalaya India

Suraj Mal¹, Udo Schickhoff², Manish Mehta³, RB Singh⁴

Shaheed Bhagat Singh College, University of Delhi Geography Delhi-India¹ University of Hamburg, Germany Institute of Geography udo.schickhoff@uni-hamburg.de-Germany² (WIGH), India Wadia Institute of Himalayan Geology msmehta75@gmail.com -India³ Delhi School of Economics, University of Delhi Department of Geography rbsgeo@hotmail.com-India⁴

Mountain Glaciers are the critical indicators of climate change, although the climate variables affecting the glacier recessions differ regionally and temporally. Most of the Himalayan glaciers have retreated since the Little Ice Age (LIA). The researchers have already confirmed that the recession rates have accelerated over the later half of the century. Change in glaciers mass, volume, area, and length have been reported as a result of climate change, but an up to date regional assessment of glacier changes is lacking in some of the central Himalayan regions. Ongoing rapid glaciers recession rates in Central Himalaya already have cascading effects in the region and beyond, including reduced freshwater storage, increased seasonality of water discharge, slope failures, and other socio-economic factors. In this study, we report the recession of Shunkalpa glacier in the Gori Ganga valley of Uttarakhand, India, between 1896 and 2017. The present study based on historical field-based plane table maps, and state of the art satellite data, including Corona (1968), Landsat 5 (1990, 2011), Landsat 7 (2001), ASTER (2006) and Sentinel 2 (2017). The study reveals an overall recession of Shunkalpa glacier of 2.1 km, at a rate of 16.6 ma⁻¹ from 1886 to 2017. The glacier recession rate was observed as about 7 ma⁻¹ between 1886 and 1957, which increased to 17.7 ma⁻¹ between 1957 and 1968. Throughout 1968-1990, the recession rate was seen as high as 38.8 ma⁻¹, which reduced to about 20 ma⁻¹ per year between 1990 and 2006. Recent years (2006-2011) observed a high recession rate of 32.8 ma⁻¹, followed by a significant reduction as 25.3 ma⁻¹ between 2011 and 2017. Overall, the secular recession rate is comparatively lower than other glaciers of the Uttarakhand Himalaya, while the slowing recession corroborates well with the other nearby large valley glaciers.

2617-Sensitivity and response of a Himalayan near natural treeline to climate change

Niels Schwab¹, Karolina Janecka², Ryszard J. Kaczka³, Jürgen Böhner¹, Ram Prasad Chaudhary⁴, Thomas Scholten⁵, Udo Schickhoff¹

Universität Hamburg CEN Center for Earth System Research and Sustainability, Institute of Geography Hamburg-Germany

¹ University of Greifswald Institute of Botany and Landscape Ecology --Germany ² University of Silesia in Katowice --Poland ³

Tribhuvan University Research Centre for Applied Science and Technology (ReCAST) --Nepal ⁴ University of Tübingen Department of Geosciences, Chair of Soil Science and Geomorphology --Germany ⁵

At a global scale, low temperatures during the growing season result in growth limitations, which determine the elevation of natural alpine treelines. Temperature increases due to climate change are assumed to cause treelines to advance to higher elevations. However, empirical studies of diverse mountain ranges have yielded evidence of both advancing alpine treelines as well as rather insignificant responses. Based on an extensive collection of field data, we analysed population structures and regeneration patterns, investigated population density-environment relationships and correlated tree growth with climate in order to assess the sensitivity to climate warming of a near-natural treeline ecotone in east-central Nepal. The presence of an elevational zone dominated by a gnarled growth form of *Rhododendron campanulatum* physiognomically classifies the treeline as one with a krummholz belt. The fraction of juvenile tree individuals reflects prolific regeneration and stand densification. The species-specific variation in adult and juvenile stand density along the treeline ecotone depends not only on temperature but also on edaphic, topographic, and other microclimatic conditions. *Rhododendron campanulatum* shows highest competitiveness in the krummholz belt under a constellation of site conditions influenced by this species itself. By contrast, *Abies spectabilis* (Himalayan Silver Fir) and *Betula utilis* (Himalayan Birch) have gained predominance under warmer and more nutrient-rich habitat conditions in the closed forest below. The dense krummholz belt effectively controls the potential upslope migration of subalpine forest tree species. *Abies* growth-climate correlations show changing growth limitations in the course of 20th century, most likely due to intensified climate warming in recent decades, when moisture availability during the pre-monsoon season has affected *Abies* radial growth. It is evident from our results that to date the treeline position has responded to climate warming to a rather slight extent, and that a treeline shift is to be expected in the mid- to long term only.



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2626-Climate change in extreme microsystems an example in microbialites Andean lakes.

Patricio Guillermo Villafañe¹, Carlos Cónsole-Gonella², Leonardo Fadel Cury³, Maria Eugenia Farias¹

Planta Piloto de Procesos Industriales Microbiológicos Laboratorio de Investigaciones Microbiológicas en Lagunas Andinas Yerba Buena-Argentina¹ Instituto Superior de Correlación Geológica Instituto Superior de Correlación Geológica carlosconsole@csnat.unt.edu.ar-Argentina² Universidad Federal do Paraná Laboratório de Análise de Minerais e Rochas leonardo.fadel.cury@gmail.com-Brazil³

Microbialites outcropping in "High Altitude Andean Lakes" (HAAL) at Puna Argentina, display interesting adaptations to extreme conditions like altitudes of 3000m amsl, high salinity, UV radiation, As content, among others. Thus, these microbialites are considered fragile structures, unable to resist major environmental changes, and strongly depending of the physicochemical conditions of the lakes. But to what extent this is true?

The "Turquesa" lake (26°39'14" S, 68°10'42" W) (Catamarca), gives us an interesting opportunity to study the adaptation of microbialites to climatic changes. This lake is located a few meters to the north of "El Peinado" lake, where Valero-Garces et al., (2001) indicates that the coast line is colonized also by a microbialitic level of finely laminated facies, which form small mounds up to 20cm thick.

In 2019, through a field survey, and with the support of satellite images, we identified that in the "Turquesa" lagoon the microbialitic level described by mentioned authors now is totally subaerial, suggesting that this lagoon was connected with the "El Peinado" lake, but is supposed a fall of around 120cm in the water level which caused its isolation in the last twenty years. However, the most surprising process about this is the colonization of a new microbialitic system at the current coast level.

These new microbialites forming a biostrome covering the entire perimeter of the lake, approximately 300cm below the water level. It is composed of tabular and domical structures, and display an internal carbonatic lamination. This microbialitic level show an exceptional growth rate estimated about of 6 to 8,5 mm/year, compared to modern carbonate microbialites in lakes. Its development, is a well documented evidence of the capability of microbiological communities to establish new microbialites structures, adapting rapidly to changing conditions along the shoreline.

3350-Vegetation trend analysis in Batken oblast of Kyrgyzstan

Maksim Kulikov¹

UCA MSRI Bishkek-Kyrgyzstan¹

More than a half of population in Kyrgyzstan lives in rural areas. Animal husbandry and agriculture are the main income sources for local population in Batken oblast in Kyrgyzstan. Moreover, agriculture is very much dependent on irrigation, provided by glacier-fed local rivers. Growing population in the region increases human impact on natural resources, which can lead to overuse and degradation of as pastures, so arable lands. We used Landsat 8 images of the years 2013-2018 to generate NDVI (Normalized Difference Vegetation Index) time-series to approximate biomass in the study area. The time-series were exposed to linear regression analysis (least squares) to identify long-term vegetation trends. The NDVI time series were exposed to cross-correlation analysis with the climatic factors as well and the Isfara river runoff to identify the relative impact of the climatic factors and irrigation to the development of vegetation in the study area. We have also conducted sociological survey of local residents to understand their knowledge and experience about climate change. The results of the research indicate that the Isfara river runoff has greater direct impact on croplands than precipitation, whereas precipitation has greater direct impact on the rangelands. However, precipitation has delayed positive impact on croplands as well. Temperature has direct positive effect on croplands and is not a limiting factor (like elsewhere in Kyrgyzstan), which may indicate overall irrigation sufficiency or that agricultural production has reached its maximum in given conditions. Local residents have general understanding about climate change and agree with each other about temperature increase and decrease of precipitation, which corresponds to instrumental measurements. However, they disagree on the Isfara river water availability. The upstream villagers (mainly herders) indicate that the water availability remains the same, however the downstream villagers (mainly fruit growers) indicate that water is getting less.



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C.2. Biogeography and Biodiversity Recent Developments and Expansions in Biogeography

1110-Human-Wildlife Conflicts in the Tiger Corridor of Rajasthan Case Study of Ranthambore Tiger Reserve India

Bhanwar Vishvendra Raj Singh¹

*Mohanlal Sukhadia University, Udaipur, India Department of Geography Udaipur-India*¹

Nowadays biodiversity is very rapidly diminishing from global to local scale due to massive anthropogenic pressure. In the environment, conservation of tigers has multiple advantages such as the promotion of cultural services, increase in carbon storage and sequestration, poverty alleviation, watershed management, natural hazard regulation, sustaining food security and agriculture services, improvement of medical services and ecotourism. Tigers serve as an umbrella species, if tigers are protected the landscape also remains protected along with other endangered species and their habitats. The Ranthambore tiger reserve area has sixty plus tigers and about 0.3 million people directly or indirectly depend on these tigers. The objectives of this research are to assess the role of tiger conservation, identify of tiger habitat, habitat vulnerability, human wildlife conflicts and eco-development strategy for of tiger habitat of Ranthambore. This research based on primary and secondary database and data analysis has been done through ArcGIS, Erdas, QGIS software's and MS Excel 2016 as well as SWOT Matrix Method and other techniques. The ecosystem services and habitat ranking have been analysed through numerous methods and techniques. In Ranthambore tiger reserve, the research reveals how the existence of tiger has proved a double-edged sword as it has catalysed the protection of ecosystem and conflict planning and on the other hand given rise to human wildlife conflicts. The research identified the geographical, social, economic and political factors that are responsible for tiger conservation as well as human wildlife conflicts. The study identifies of the vulnerability in Ranthambore tiger habitat and hot spot of human wildlife conflicts. The conflicts should be mitigate by community development, consensus building for management, to adopt holistic, inclusive and sustainable development strategies of tiger corridor at grass route level, which is more sustainable for human and animal wellbeing.

1113-COMPARATIVE ASSESSMENT OF CARBON SEQUESTRATION POTENTIAL OF Terminalia superba Engl. & Diels and Nauclea diderrichii (De Wild & T. Durand) Merrill. PLANTATIONS IN FORESTRY RESEARCH INSTITUTE OF NIGERIA IBADAN OYO STATE

Bolanle Lisa Olajire-Ajayi¹, Adeniyi Sulaiman Gbadegesin², Adegoke Adejimi¹

*Federal College of Forestry Forestry Technology Ibadan-Nigeria*¹ *University of Ibadan Geography adeniyig@yahoo.com-Nigeria*²

ABSTRACT

Excessive Carbon dioxide in the atmosphere is the major culprit causing global warming. Forests are natural sink for atmospheric carbon and thus, great capacity to sequester carbon in the atmosphere. They do so in an environmental friendly way thereby presenting a viable option to mitigating climate change. However, there is dearth of knowledge about specific tree capacity for carbon uptake. The study was conducted in an even aged (8years) Terminalia superba Engl. & Diels and Nauclea diderrichii (De Wild & T. Durand) Merrill plantations in Forestry Research Institute of Nigeria, Ibadan with the aim of evaluating and comparing the carbon sequestration potential of above ground biomass of the two tree species using allometric functions. Simple random sampling was employed to establish twelve quadrats plots of 10m×10m. Trees with Diameter at Breast Height (DBH) ≥ 20cm were enumerated and their Total Height (TH) were also measured. The data collected on the DBH (cm) and TH (m) were used to calculate the above ground biomass and forest carbon stock using allometric relationships developed by Terakumpisut. Results were subjected to both descriptive and inferential statistical analyses. Results were analyzed using both descriptive and inferential statistical analyses. Result shows that mean standing biomass for Terminalia superba was 1240.6tons compared to 1344.7tons for Nauclea diderrichii. Nauclea diderrichii shows the highest potential to sequester carbon with mean carbon sequestered value of 672.33tons compared to Terminalia superba with mean value of 620.31tons. T-test showed that there was no significant difference in the amount of carbon stock present in both species at P≥ 0.05.



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3527-Biogeomorphology from Space Assessing the dynamic Interaction between Hydro Geomorphology and Vegetation along the Naryn River in Kyrgyzstan based on dense Satellite Imagery Time Series

Florian Betz¹, Magdalena Lauermann¹, Gregory Egger², Bernd Cyffka¹

Catholic University Eichstaett-Ingolstadt Applied Physical Geography Eichstaett-Germany¹ Karlsruhe Institute of Technology Institute of Geography and Geoecology gregory.egger@kit.edu-Germany²

Biogeomorphology is a relatively new scientific discipline emerging from the integrative view on rivers as complex ecosystems. It focuses on the interaction between geomorphological and ecological processes. Rivers with their interaction of hydrological and geomorphological processes with vegetation development are predestinated to be analyzed from a biogeomorphological perspective. In this context, the theory of biogeomorphological succession is relevant. It distinguishes four major succession stages: A geomorphological stage without vegetation, a pioneer stage, a biogeomorphological stage where vegetation is strong enough to resist hydromorphological disturbance to a certain degree and an ecological stage where vegetation development is governed by ecological processes rather than by hydromorphological disturbance.

The Naryn River in Kyrgyzstan being the focus of this contribution is an ideal case study for biogeomorphological research as this river is still being shaped by widely natural dynamics on a flow length of more than 600 km. In our contribution, we focus on the large scale analysis of biogeomorphological interactions using monthly time series of Landsat and Sentinel-2. We use different spectral indices to describe vegetation development and disturbance by hydromorphological processes. These indicators are used to analyze the spatial pattern of succession stages in the river corridor. In addition, time series modeling is used to track the temporal trajectory of biogeomorphological succession in the Naryn River corridor. A Bayesian time series decomposition approach is used to analyze trends and seasonal cycling of the spectral imagery time series. These trends and seasonal cycles are interpreted in the light of biogeomorphological succession theory and give insights in the pattern of the river corridor arising from the interplay of geological constraints, hydromorphological processes and vegetation.

Time series of multispectral satellite imagery have a great potential for large scale analysis of biogeomorphological interactions in river corridors for research but also for monitoring applications in ecosystem management.



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C.3.Climatology Climate Variability and Change from Global to Local Scales

1591-SYNOPTIC CLIMATOLOGY OF THE WET AND DRY CONDITIONS IN THE PRE SUMMER MONSOON SEASON OF THE PHILIPPINES

*Jun Matsumoto*¹, Lyndon Mark Olaguera²

*Tokyo Metropolitan University / JAMSTEC Geography / DCOP Hachioji-Japan*¹ *Manila Observatory -Philippines*²

This study investigates the synoptic climatology of the wet and dry conditions in the pre-summer monsoon season of the Philippines that are less emphasized in previous works. Wet cases (Type W), which account for about 23% of the total pre-summer monsoon days from 1979 to 2015, are identified from April 1 to the monsoon onset defined by the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA). The differences between the Type W and dry cases (Type D) are presented. The synoptic conditions associated with the Type W and Type D cases are sub-divided into two sub-types based on the wind conditions, the (a) westerly winds at 925 hPa (WINDS925hPa) intrusion over Luzon Island (120–122.5E, 12.5–22N) (Type WW and Type DW), and (b) enhanced easterly WINDS925hPa (Type WE and Type DE). The Type WE (Type WW) cases account for about 63.9% (36.1%) of the total Type W cases, while the Type DE (Type DW) cases account for about 88.1% (11.9%) of the total Type D cases. A subset of Type WE case (Type WEDef), which features an eastward propagating cold front to the north of Luzon Island and an intensifying anticyclone to its west originating from the east of the Tibetan Plateau and their differences are also examined. These two opposing circulations interact with the subtropical high over the northern Pacific and the easterlies over Luzon Island, and form a deformation zone. The confluence region of this deformation zone, where the cold front interacts with the warm and humid air brought by the easterly WINDS925hPa, lies over Luzon Island and contributes to the convective activities during the pre-summer monsoon over this region.

1784-MODERN WARMING MEDIEVAL AND THE ROMAN OPTIMUMS ARE THE RESULT OF ORBITAL CHANGES IN THE EARTH MOON SUN SYSTEM

*Larisa Litvinenko*¹, *Viktoriya Litvinenko*¹

Moscow Region State University Faculty of Geography and Ecology *larisa-litvinenko@yandex.ru-Russia*¹

Hypothesis. The prime, root cause of modern climate warming is the influence of gravitational forces on the geospheres of our planet, determined by the orbital configuration of the Earth-Moon-Sun system. The movement of the shadow cone of solar eclipses around the globe visually reflects annual changes in the position of the total vector of gravitational forces in space.

Materials and methods. The novelty and the purpose of the work is to identify the relationship between the number of years with four and five polar eclipses (during periods of pessimums their number reaches 15-17 years per century, and in periods of optimums it varies from 2-5 to 7 years per century) and processes of glaciation, such as the Fernau oscillation (1590–1850 AD according to E. le R. Ladurie) and Late Antique Little Ice Age, or processes of warming and degradation of glaciers. Years with four to five polar eclipses are often cold or abnormally cold. The most frequently used research methods were studying, generalization of materials, logical and graphical analysis, as well as data synthesis.

The results of the study can be used in retroanalyzing the periods of glaciation in the past and predicting them in the future. It should be taken into account that solar activity, planetary factors and processes like volcanic activity, the intensity of currents, heat exchange with the World Ocean can significantly strengthen or weaken both optimum and pessimum phenomena.

Conclusions. The anthropogenic causes of modern warming, which will last until the middle of the 22nd century, are secondary. In the second half of the 22nd century, and throughout the entire 24th century, the advance of the Alpine glaciers will be due to the conditions of the climatic pessimum.



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2164-Summer precipitation characteristics and its possible future changes in north eastern Eurasia

Yoshihiro Iijima¹, Kensuke Komatsu¹, Kaoru Tachiiri², Kazuhito Ichii³, Yasunori Kurosaki⁴

Mie University Graduate School of Bioresources Tsu-Japan¹ JAMSTEC Research Institute for Global Change -Japan² Chiba University Center for Environmental Remote Sensing Resensing -Japan³ Tottori University Arid Land Research Center -Japan⁴

Mongolia in north-eastern Eurasia has been facing large interannual variation in precipitation regime in conjunction with recent climate change. Forest-Steppe to Steppe zone in Mongolia is highly vulnerable against the severe scarcity of precipitation. In contrast, extreme rainfall events over ungauged mountainous region sometimes induce unexpected consequence of flash floods over residential area normally in lower basin. Based on these backgrounds, clarifying precipitation characteristics and its future changes are crucial to mitigate and adapt to the climatic change. The rainfall characteristics in summer over northern Mongolia shows both synoptic and local (orographic) influences. Based on both ground-based observation and precipitation satellite observation by GPM/DPR, we could find several rainfall events which shows different water vapor resources and rainfall structure. In case of the event with strong rainfall intensity and wide spatial structure, synoptic scale cyclone had substantial role to bring water vapor from both southerly and westerly fluxes, resulting strong convergence over mountainous region near Ulaanbaatar. On the other hand, the events of weak rainfall intensity with narrow rainfall bands are mainly regulated by surface heat flux from surrounding precipitated region, which are estimated using regional model simulation by WRF. Our analyses are extended to assess future rainfall structure with performing pseudo-global warming experiments using WRF adding future climate anomalies in RCP8.5 of CMIP5 MPI-ESM model. In both strong and weak rainfall intensity events, average amounts of future precipitation over the region are reduced, while we found intensive rainfall area mainly located in mountainous region. These results imply the large warming anomaly generally may reduce precipitation amount with locally strong precipitation in northern Mongolia.

3244-Spatial and temporal variability of the growing season in Central Europe in response to contemporary climate changes

Agnieszka Wypych¹, Zbigniew Ustrnul², Michal Marosz³

Jagiellonian University Climatology Krakow-Poland¹ Institute of Meteorology and Water Management - National Research Institute, Poland Meteorology and Climatology zbigniew.ustrnul@imgw.pl-Poland² Institute of Meteorology and Water Management - National Research Institute, Poland Marine Research michal.marosz@imgw.pl-Poland³

The length of growing season is a very important factor in natural ecosystems as well as for human activities. The shifts in first spring and last fall days with the air temperature exceeding 5°C leading to increasing length of growing season have already been detected in many European and non-European regions.

The aim of the study is to investigate the temporal and spatial variability of the dates of first spring and last autumn days with the air temperature exceeding 5°C followed by the length of growing season in Central Europe within the past 70 years in the context of ongoing climate change.

Analyses were conducted for two key study periods: 1951-2019 and 2021-2100 (future projections). Gridded data of daily mean air temperature from the E-OBS dataset (version 20.0e) at 0.1° spatial resolution were used for the historical period whereas future climate projections were calculated for two greenhouse gas concentration trajectories (Representative Concentration Pathways), RCP 4.5 and RCP 8.5. The daily mean temperature data for the period 2021-2100 at a spatial resolution of 0.11° were obtained from the EURO-CORDEX website (<http://www.euro-cordex.net>) for different GCM-RCM model chains. To downscale the output of RCMs to finer resolution data, statistics-based downscaling procedure, i.e. change factor method was applied.

The results confirm that there has been significant warming of the area and that this warming has been particularly pronounced over the last few decades and will continue in the oncoming years.

The results confirm so-far proved significant increase of the length of growing season. Although the tendency is significant over the whole area under investigation, trend intensity differs regionally reflecting oceanic and continental climatic conditions of respectively western and eastern part of the area.



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3363-ANALYSIS OF MAXIMUM AND MINIMUM TEMPERATURES IN TURKEY'S EGE COASTAL REGION

Barbaros Gönençgil¹, Sevilcan Dün²

Istanbul University Faculty of Letter Geography Department Istanbul-Turkey¹ Istanbul University Social Sciences Institute Geography Department barbaros@istanbul.edu.tr-²

Climatic variations and changes occurring in glacial and interglacial periods throughout the geological history of the world. The impact on climate agriculture and water resources, which shape every area of our lives, is very important. Situated in a highly sensitive area of its geographical location, Turkey is affected by the variability and change. Daily and monthly, maximum and minimum temperature values of meteorology stations located on the coasts of Aegean Region between 1975-2018 were used. Firstly, the data were subjected to quality control (QQ). After the quality control phase was completed, the data were subjected to homogeneity test with RH-Test. Information about the direction and size of the trend was obtained with the Mann Kendal and Sen test, in which no distribution condition was sought for the homogeneity-approved data set.

According to the test findings, it has been observed that there is a significant increase in the index of hot circuit time, hot nights, hot days, summer days and tropical nights in the Aegean Region Coasts, which is one of the important hot spot areas. Significant decreasing tendency was determined at the stations in general in cold circuit time indicator, cool nights, cool days, daily temperature range and frosty days. Icy days index could not be calculated in this region where maximum temperatures rarely fall below 0 °C within the specified date range. In the development season length index, there was a significant increase only in Edremit station. When monthly maximum and minimum temperature analyzes are evaluated; Temperature increases were more pronounced at monthly maximum temperatures in February, April, August and September, and at monthly minimum temperatures in March, May, June, July, August, September and November.

3517-Variations in the geomagnetic field and critical frequency of the F2 layer in the range of quasi 16 day planetary wave

Svetlana Riabova¹, Svetlana Riabova², Sergei Shalimov²

Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences Near-surface Geophysics Moscow-Russia¹

Schmidt Institute of Physics of the Earth of the Russian Academy of Sciences Tectonic-electromagnetic interactions -Russia²

Studies of variations in the density of the ionospheric plasma, carried out in recent years, show that, along with solar and magnetic activity, atmospheric waves have a comparable power effect on the ionosphere.

The work analyze the spectra of variations in ionospheric plasma parameters at two levels - in the lower (E layer) and upper (F layer) ionosphere in the range of planetary waves (using the example of a quasi-16 day wave). The studies used the data of geomagnetic monitoring at the Central Geophysical Observatory "Belsk" of the Geophysical Institute of the Polish Academy of Sciences (Poland, Belsk) and the results of high-frequency sounding of the ionosphere in the form of ionograms obtained by the Space Research Center of the Polish Academy of Sciences (Poland, Warsaw). In this case, ground-based geomagnetic variations reflect processes in the E layer of the ionosphere, while the ionosonde allows one to study variations in the plasma density in the F layer of the ionosphere. Spectral estimation was performed for the winter period of 2018-2019. (low solar activity) and 2015 (high solar activity).

The presence of practically synchronous variations in the indicated range of periods was found both at the ground magnetometric station and in the measurements of the critical frequency of the F2 layer. In this case, the spectra of temporal variations of the geomagnetic field and the critical frequency of the F2-layer in the range of planetary waves in the winter period contain both harmonics associated with the modulation effect of longer-period variations and tidal effects, and a harmonic corresponding to a quasi-16-day planetary wave.



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C.3.Climatology Hydroclimatic Extreme Events Risks Vulnerabilities and Management

1587-WINTER TIME EXTREME RAINFALL IN THE SOUTHERN PHILIPPINES

Jun Matsumoto¹, Lyndon M. Olaguera², Julie M. Dado², Gemma T. Narisma²

Tokyo Metropolitan University / JAMSTEC Geography / DCOP Hachioji-Japan¹ Manila Observatory olagueralyndonmark429@gmail.com-²

Located in the Asian monsoon region, where most of the heavy rainfalls occur in summer monsoon season, the Philippines sometimes affected by severe rainfalls and severe damages. This study investigates non-tropical cyclone (TC) related boreal winter heavy rainfall events that lead to extensive flooding (HRF) over the southern Philippines through a case study and composite analysis. The HRF event examined occurred during January 16, 2017 over Cagayan de Oro City (CDO) in Mindanao Island. The accumulated rainfall over CDO reached by about 180 mm from 00 UTC January 16 to 00 UTC January 17, 2017, the record highest daily rainfall in January over this area. The interaction of a westward propagating cyclonic circulation over Mindanao Island (MCC) and a shearline that is associated with an eastward-propagating cyclonic and anticyclonic circulations along 20°-40°N, led to enhanced moisture convergence and rainfall over CDO.

The climatology of these non-TC related HRF events was also examined through composite analysis of the HRF events documented in the Dartmouth Flood Observatory archive from 1979–2017. The authors identified 34 of such cases over the Philippines, in which 25 occurred over Mindanao Island. The composites of the circulation features of these 25 cases resemble those during the January 2017 case. A vorticity budget analysis was performed to explain the propagation tendency of the MCC. The results show that the MCC only propagated westward when the magnitudes of the stretching and advection terms of the vorticity tendency equation are almost comparable with each other, together with the weakening of the southerly winds around Mindanao Island. This study reveals how cold fronts over the north Pacific together with the MCC induces HRF events over the southern Philippines in boreal winter season.

1789-Intensifying effects of El Niño on winter precipitation extremes in southeastern China

Tao Gao¹, Qiang Zhang², Ming Luo³

Heze University College of Urban Construction Heze-China¹ Beijing Normal University Faculty of Geographical Science qxg212@163.com-China² Sun Yat-sen University School of Geography and Planning tgao.oc@gmail.com-China³

This paper studies the impacts of El Niño-Southern Oscillation (ENSO) on wintertime extreme precipitation in China from 1961 to 2017, and possibly different influences of two El Niño types are also examined. We find that ENSO poses profound influences on extreme precipitation in many portions of China. El Niño (La Niña) intensifies (weakens) the precipitation extremes in southeastern China (SEC) and slightly weakens (intensifies) that in central-north China, mainly by changing the frequency rather than the intensity of extreme precipitation. Further analysis suggests that the East Asian winter monsoon tends to be weaker during El Niño winters, suppressing the southward invasion of cold dry air. Via the weakened Walker circulation, El Niño also triggers anomalously descending motion and anticyclone over the western North Pacific (WNP), which exhibits southwesterly anomalies over SEC and is thus conducive to the transport of sufficient moisture into that area. The changes over WNP are also accompanied by ascending motions over East Asia via a local meridional circulation like the Pacific-Japan pattern. Meanwhile, El Niño induces a southward-displaced East Asian jet stream, as characterized by intensified westerly over southern China, corresponding to anomalously ascending motion there. Together, these changes facilitate the updrafts of circulations and the condensation of water vapor, thus increasing the occurrence of extreme precipitation in SEC. Moreover, we find that different Niño types exhibit distinct subregional influences. In particular, the canonical eastern Pacific El Niño significantly increases the frequency of extreme precipitation in South China, whereas the Modoki central Pacific El Niño mainly impacts that in East China.



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2800-2019 Wildfire detection using Sentinel2 and geo environmental susceptibility of wildfire occurred area in Gangwon Province Republic of Korea

Won Young Lee¹, Seon Ki Park², Hyo Hyun Sung³

*Ewha Womans University Severe Storm Research Center Seoul-Korea, South*¹ *Ewha Womans University Department of Climate & Energy Systems Engineering, Department of Environmental Science & Engineering, -Korea, South*² *Ewha Womans University Dept. of Social Studies Education -Korea, South*³

The objectives of this study are detection of wildfire occurred area in 2019 in Gangwon province and identify vulnerable geo-environmental variables to wildfires. Although the effects of atmospheric conditions such as atmospheric dryness and atmospheric instability are significant for wildfires, this study focuses on the geo-environmental variables that are likely to cause wildfires. 2019 Wildfire started on the 4th of April, and the main occurrence area was Gangneung and Sokcho. For the detection of accurate wildfire areas, we collected Sentinel-2 and Landsat8 pre-fire images and post-fire images. MIRBI(Mid-Infrared Burned Index), NBR2(Normalized Burned Ratio 2), NBR(Normalized Burn Ratio), BAI(Burned Area Index), BAIS2(Burned Area Index for Sentinel-2), B8A, B07 derived from Sentinel-2 satellite images using ArcGIS version 10.7. Among these indexes relevant to wildfires, we can find the optimal index from analysis of SI(Separability Index) and validation of overlaying Landsat 8 images. Geo-environmental resources such as DEM, forest map, soil map, forest network is constructed as raster layer sets and made a wildfire susceptibility map using FR(Frequency Ratio) and EBF(Evidential Belief Function) method. The result of the FR and EBF illustrates more vulnerable geo-environmental variables to wildfire. We analyzed geomorphic and soil moisture condition such as Slope, Elevation, TWI(Topographic wetness index), soil texture, soil drainage, soil depth as well as forest condition such as timber origin, timber type, timber diameter, timber age, timber density, distance to forest network. We split into 70% training sets and 30% validation sets of wildfire areas. The ROC(Receiver Operating Characteristic) curve and the AUC(Area Under Curve) show the verification results of the FR and EBF method for classifying the susceptible area of wildfire. From this study, we discern the highly susceptible geo-environmental variables for wildfire, and the susceptibility map could be the basis of spatial warning of future wildfire prediction area.

2844-Climate Extreme and Natural Disasters in Chilean Cities

Cristian Henriquez¹, Hugo Romero¹

*Pontificia Universidad Católica de Chile Geography Santiago-Chile*¹

Many cities in Latin America are especially vulnerable to extreme events such as storms, floods, landslides, or wildfires, especially in country like Chile. Both inner and coastal cities are highly exposed to these events because it is where most of the population is concentrated. This work reports trends in climate extreme indices (CEI) and comfort indices for the period 1965–2015 and its relationship to historical disasters associated with hydrometeorological events for several Chilean cities and urban process. Although Chile currently has one of the highest indicators of per capita income and human development index in Latin America, and it has achieved some of the lowest poverty figures, Chilean cities still have neighborhoods where poverty is linked to a lack of opportunities and equipment, and higher insecurity levels that result from combining natural and socio-economic threats. The poor people live in places with urban heat islands, where a lack of vegetation dries the air and generally occupy areas with less ventilation, which, consequently, lead to a higher concentration of air pollutants. In contrast, richer inhabitants are used to living in areas of urban cooler islands, where temperatures are not as high because of the presence of gardens, urban forests, and park. Several cases of land use changes in neighborhoods (LCZs) are described and related to socioeconomic conditions. Urban internal differences are represented by local climate zone (LCZ) analyses for some of the Chilean cities located throughout the country: Calama, Antofagasta, Valparaíso, Santiago, Concepción, and Chillán Urban heat islands and heat waves in Santiago are examined. Finally, the relationship between the spatial distribution of particulate matter, temperatures, urban geography, and socioeconomic groups are shown. The extreme events and the high frequency of natural disasters show trends toward climate change, but these trends are strongly influenced by natural climate variability.



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3268-Potential impacts of climate change on future droughts over major river basins in Southern Africa

Babatunde Abiodun¹, Nokwethaba Makhanya¹, Brilliant Petja², Abayomi Abatan³, Philip Oguntunde⁴
University of Cape Town, Cape Town, South Africa Department of Environmental and Geographical Science Cape Town-South Africa¹ Water Research Commission, Pretoria, South Africa Water Research Commission brilliant Petja -² School of Geosciences, University of Edinburgh, Edinburgh, UK School of Geosciences yomiabatan69@gmail.com-³ University of Technology, Akure, Nigeria Department of Agricultural and Environmental Engineering poguntunde@yahoo.com-⁴

Abstract

Reliable drought projections are crucial for the effective managements of future drought risk. Most of the existing drought projections over Southern Africa are based on precipitation alone, neglecting the influence of potential evapotranspiration (PET). The present study shows that inclusion of PET may alter the magnitude and robustness of the drought projections. The study used two drought indices to project potential impacts of global warming on Southern African droughts, focusing on four major river basins. One of the drought indices (SPEI: Standardized Precipitation Evapotranspiration Index) is obtained from climate water balance (i.e. precipitation minus potential evapotranspiration) while the other (SPI: Standardized Precipitation Index) is calculated from precipitation alone. For the projections, we analyzed multi-model regional climate simulations from the Coordinated Regional Climate Downscaling Experiment (CORDEX) at four specific global warming levels (GWLs) (i.e., 1.5 °C, 2.0 °C, 2.5 °C, and 3.0 °C) above the pre-industrial level and used the self-organizing maps to classify the drought projections into groups based on their similarities. Our results show that the CORDEX simulations give a realistic representation of all the necessary climate variables for quantifying droughts over Southern Africa. The simulations project a robust increase in SPEI drought intensity and frequency over Southern Africa and indicate that the magnitude of the projection increases with increasing GWLs, especially over the various river basins. In contrast, they project a non-significant change in SPI droughts at all the GWLs. The majority of the simulations clearly distinguish between the projected SPEI and SPI drought patterns, and the distinction becomes clearer with increasing GWLs. Hence, using precipitation alone for drought projection over Southern Africa may underestimate the magnitude and robustness of the projections. This study has application in mitigating climate change impacts on drought risk over Southern African river basins in the future.



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VIRTUAL

C.3.Climatology Mediterranean Climate

1506-IDENTIFYING AND CLASSIFYING THE ACTIVE RED SEA TROUGH

Baruch Ziv ¹, Ran Shimer ², Pinhas Alpert ², Tzvi Harpaz ², Ron Drori ², *Hadas Saaroni* ²

The Open University of Israel Natural Sciences zivbaruchana@gmail.com-Israel ¹ *Tel Aviv University Porter School of the Environment and Earth Sciences ranshimer@mail.tau.ac.il-Israel* ²

The Red-Sea Trough (RST) is a low-pressure system extending from south toward the Levant, the most frequent among all easterly troughs extending from the east African Monsoon. Its annual frequency is ~90 days, the autumn being the main season, with a maximum in November.

While most RSTs are characterized by hot and dry weather, about 15 days/year are characterized by clouds and rains, defined as 'Active RST' (ARST), which are a major source of flooding, particularly over the dry areas of the Levant. The peak season of ARST is during the mid-winter, DJF, and the frequency of severe events, in which at least one station measured >20mm/day is ~1 day/year. They were identified through daily rainfall data taken from the Israel Meteorological Service stations located at the semi-arid and arid regions of Israel, for 1958-2019.

Automatic classification of ARST days, using the K-means technique, yielded four types that differ in the upper-levels' structure, especially in the 500-hPa relative vorticity. One type fits the ARST pattern, with an upper-level cyclone over the Nile Delta, found by Kahana et al (2002) as responsible for severe floods in southern Israel. Second, resembles the situations in which the upper-level trough responsible for the RST activity is found east of Israel. The third appears to be a Cyprus low that delves southward and merges with a RST, and the fourth corresponds to 'tropical plume', described by Ziv (2001).

An attempt to identify the atmospheric variables that could distinguish between ARSTs and 'non-active' RSTs yielded non-significant differences between them. Identification of ARST days in maps produced by climate models will need to be based, at this stage, on the rain field offered by the models.

2723-Fractal based evaluation of hydrological processes of the SWAT model results

David Rivas-Tabares ¹, Ana Maria Tarquis ²

Universidad politecnica de Madrid CEIGRAM Madrid-Spain ¹ *Universidad Politecnica de Madrid Complex system group, CEIGRAM anamaria.tarquis@upm.es-Spain* ²

Most of the studied basins are usually highly impacted by human activities. This situation resulting in a composition of altered hydrological processes in which natural processes begin to be scarce when analysing the primary hydrological basin processes. Hyper regulated basins are usually the result of high water demand pressures (i.e., hydropower, irrigation, industry, freshwater). This is the case of Spain in which most of the basins have been altered and regulated through several river structures due to water scarcity in a semiarid weather regime. The Soil Water Assessment Tool – SWAT is a worldwide spread tool used to evaluate the hydrological process through complex routines of the water balance with a daily time step. Calibration and validation serve to confirm the quality of the model in the evaluation of plausible scenarios (i.g., climate change, land use, soil and water sustainable practices, pesticides applications among others). However, the water balance components as time series, at daily time step, present relevant patterns for water management in hyper regulated basins. In this study, we analyse the time series of the water balance of the Eresma-Adaja watershed as part of Duero's river basin in Spain, through the fractal measures in order to understand the drivers of hydrological processes. As a result, precipitation behaviour and soils properties are driving most of the surface and groundwater dynamics in time. The antipersistence of precipitation and ET of residual series are correlated confirming from large time series the weather dependence of vegetation development at watershed scales. This study presents a complimentary analysis of SWAT model results through time series analysis of the main water balance components that can be implemented easily in other basins.



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VIRTUAL

3677-Changes and trends in Precipitation the example of Sinop Hopa (Black Sea) coastal zone in Turkey

Barbaros Gönençgil¹, Zahide Acar²

*Istanbul University Geography Istanbul-Turkey*¹ *Çanakkale 18 Mart University Geography zacar@comu.edu.tr-Turkey*²

The study area covers the area in the middle and east part of the Black Sea coastal zone. This area includes the central and eastern black sea districts. In particular, the Eastern Black Sea district is the only area that is close to the oceanic climate in Turkey. In this area, precipitation is distributed equally throughout the year. Sinop, Samsun, Ordu, Giresun, Trabzon, and Rize are important settlements in the region. In this study, precipitation data provided by the Turkish State Meteorological Service. It has been tested whether the long-term annual total precipitation data are homogeneous or not. For this purpose, Pettitt's, SNHT, Buishand's tests were applied. Long-term changes and trends in the data were analyzed using the Mann-Kendall test.

Change points in precipitation data determined the 1980s and early 1990s. For long-term changes in precipitation, the early 1980s can be considered as the beginning of significant change. Especially in the last 20 years, very important changes have been experienced in the precipitation. There is an increasing tendency in more than 80% of the stations in total annual precipitation. The humid and dry periods are quite evident and long-term at all stations. The 1970s to the mid-1980s experienced less than average precipitation. After the 1980s, the effects of the humid period in which long-term rainfalls above average were observed. According to the Mann-Kendall test, the beginning of trends at some stations in the late 1980s and early 2000s. Since these change points, significant changes have occurred in precipitation data. Increases in total annual precipitation are also statistically significant.

3678-Detection of Change Points in Precipitation sample Eastern Mediterranean coastal in Turkey

Zahide Acar¹, Barbaros Gönençgil²

*COMU Geography Canakkale-Turkey*¹ *Istanbul University Geography -Turkey*²

The field of study covers the major urban settlements of Turkey such as Adana, Antalya, Antakya, Mersin. Agricultural activities are also widely carried out in these areas with a high population. Also, Turkey's southern coast has a high tourist density throughout the year, as it hosts many of its tourist activities. Variability and change of precipitation have the potential to affect many sectors or people. Especially, floods and overflow events experienced in recent years have led to the loss of life and property in the region. Detection of change points is one of the most important issues of studies to understand changes or variability of river flows and precipitation. In this study, we used the meteorological station in the Mediterranean region (eastern coastal zone) in Turkey for the period 1965-2019. Pettitt's, SNHT, Buishand's tests were applied to determine whether there was any change in the annual total precipitation data. The years 1968, 1969, 1988, and 2006 respectively are the important change points in the data. Especially, the year 1988 is an important change point for many stations. The annual precipitation difference before and after the change point determined for many stations is approximately 100 mm. In the study, long-term changes and trends of the meteorological stations in the Mediterranean coastal zone were analyzed using the Mann-Kendall test. For long-term changes in precipitation, the early 1990s can be considered as the beginning of a significant change. Especially in the last 10 years, very important changes have been experienced in the precipitation. Besides, the seasonality of precipitation, which is a prominent characteristic of this region



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VIRTUAL

C.3.Climatology Urban Climate

2002-Effect of Station Relocation on Minimum Temperature Trends Egirdir (Isparta) Meteorological Station Sample

Cihan Şen¹

*İstanbul Üniversitesi, Sosyal Bilimler Enstitüsü Coğrafya İstanbul-Turkey*¹

There are many factors affecting the accuracy and continuity of the data used in climate studies. These factors appear as environmental impacts due to urbanization around the station, changes in measurement systems and change of station location. In this study, the effect of the relocation made in 1984 in Eğirdir District station of Isparta Province on data quality and continuity was investigated. In order to determine this effect, Mann Kendall Trend Statistic method was applied to the average minimum temperature data obtained from the General Directorate of Meteorology for the years 1964-2019. Afterwards, trend analysis of the time series covering the years 1984-2019 was carried out separately from the year the station was relocated. In addition to these tests, a field study was conducted and a photograph was taken at the location of the old station in Eğirdir District and the location of the new station. While the station, which served until 1983, was on the southern slope of the mountain to the north of the city center the new station was installed at the entrance of the valley on the Kovada Lake road 3km south of the city center. As a result, there is a negative trend in average minimum temperature trends between 95% and 1964-2019. However, the negative trend disappears between 1984-2019. Along with the significant positive trend seen in the autumn season, a non-significant upward trend is observed in other seasons. Thus, the data continuity in Eğirdir station has disappeared since 1964 and the data set has been shortened. Regardless of the relocation of the station in 1984, the studies conducted with the total observation series and trend analyzes will not yield healthy results.

2091-The urban planning and design of Santiago de Chile and its contribution to Climate Change and social injustice

Hugo Romero¹

*Universidad de Chile Geografía Santiago-Chile*¹

Santiago, Chile's capital city, like all major Latin American urban areas, instead of addressing the causes and consequences of climate change, is contributing greatly to the increase in greenhouse gases and air pollution, rising temperatures and decreasing atmospheric humidity and ventilation. The inability of urban planning and design to include Climate Change as a fundamental environmental problem, as well as its consequences on human health and well-being are expressed in the permanent increase in constructed areas, substitution of agricultural zones, forests, scrub and wetlands and their replacement with high-density dwellings and high-rise buildings, devoid of green areas. Through satellite images, data from fixed and mobile weather stations and through the application of statistical and simulation models, urban climates are presented, including the generation of heat islands and archipelagos, heat corridors and hot spots, the disappearance of atmospheric moisture sources, and reduced ventilation as a result of urban canyons slowing down and redirecting winds and breezes. In the Local Climate Zones where the middle and lower social classes live, which are the majority of the urban population, there is a steady deterioration in the quality of the climate and air, warning important problems of climate justice with their effects on quality of life, public health and social welfare, which clearly contrast with the prevailing conditions in the sectors where the richest strata of society reside. Latin American urban climates have become a more indicator of inequality and inequity of spaces and environments and consequently a new source of social demand for mitigating and adaptive knowledge and actions.



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2102-Some features of park cool island intensity of Botanical garden of Faculty of Science in Zagreb

Mladen Maradin¹

University of Zagreb, Faculty of Science Department of Geography Zagreb-Croatia¹

In this study an evaluation of the park cool island and urban heat island intensities in Zagreb, Croatia, was conducted. Parks tend to mitigate urban heat island mostly due to natural land cover and vegetation, but they do not always have to be cooler than the built-up areas around them. The park cool island effect analyses were conducted for Botanical garden of Faculty of Science in Zagreb which is rather small in area, but it is located near the city centre in densely built-up part of the city. In the study the data measured by automatic data loggers on seven measuring points in Botanical garden and the surrounding area, as well as data measured in meteorological stations in Zagreb (by Croatian Meteorological and Hydrological Service) are used. Measurements of temperature and relative humidity in Botanical garden have started in May 2018. The intensity of cooling effect of the Botanical garden was analysed using hourly data for the selected periods of the year. Mostly the periods with the extreme observed temperatures were used. Additionally, impact of different data logger environment, as well as impact of part of the year and the day, on formation of park cool island were analysed. According to the currently obtained data the cooling effect of Botanical garden is, in general, more intense over a summer and in the afternoon (up to 1,6 °C) than in a winter and in the morning (up to 0,9 °C), but there were periods when the temperatures, at least in the part of the Botanical garden, were higher than in the surrounding built-up area. Impact of the Botanical garden on the variations in relative humidity were also analysed.

This work has been supported in part by Croatian Science Foundation under the project UIP-2017-05-9066.

3524-The Impacts of Coastal Reclamation Areas on Cooling of the Urban Environment

Çağdaş Kuşçu Şimşek¹, Derya Arabacı², Ufuk Çelik³

Faculty of Science Space Science and Technology cksimsek@akdeniz.edu.tr-Turkey¹ Atça Vocational School Architecture and Urban Planning Antalya-Turkey² Institute of Natural and Applied Sciences Remote Sensing and GIS -Turkey³

In recent years, sudden weather changes that occur as a result of climate change threaten human health in urban areas and also have fatal consequences. Therefore, it has become necessary to identify the climatic properties and to monitor urban climate change regularly in order to develop solution strategies since these effects are felt more severely.

When the climate structure of Istanbul is evaluated with its distinctive characteristics, it is seen that the city has important geographical advantages and exhibits a unique climate structure based on these properties. However, Istanbul has been undergoing an intensive construction process that changes the climatic characteristics of the city significantly by the virtue of the fact that urban transformation projects. Within this period, another problem that has occurred as a result of the urban transformations is the inclusion of the building demolition rubbles into the urban areas via filling the sea. Land reclamation areas that pose a threat to the marine ecosystem also bring significant effects in terms of the local climate, depending on the LUCC experienced on the urban surface.

In this study, the coastline cooling effect, before and after the coastal land reclamation process was investigated by handling the Yenikapı and Maltepe coastal land reclamation areas and their periphery before and after the reclamation process. In the analysis where the summer and winter periods were examined separately, the surface temperature changes which were obtained from satellite images were taken as references. The obtained results were interpreted by evaluating statistically. As a result; it is seen that the regions' closeness to the coastal side along with the thermal properties of the surfaces have significant effects on the urban climate and thereby these issues must be considered within the scope of planning.



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C.4.Coastal Systems Sustaining Coastal and Marine Environments in the Anthropocene

1081-Mapping Trajectories of Coastal Land Reclamation in Nine Deltaic Megacities using Google Earth Engine

Dhritiraj Sengupta¹, Ruishan Chen², Michael Meadows³, Choi Rae Young⁴, Abhishek Banerjee¹, Xia Zilong¹
East China Normal Key Laboratory of Geographic Information Science, Ministry of Education, and School of Geographical Sciences Shanghai-China¹ East China Normal University Key Laboratory of Geographic Information Science, Ministry of Education, and School of Geographical Sciences rschen@geo.ecnu.edu.cn-China² University of Cape Town/ East China Normal University Department of Environmental and Geographical Science/ School of Geographical sciences michael.meadows@uct.ac.za-South Africa³ Florida International University, Miami Department of Global and Sociocultural Studies raechoi@fiu.edu-United States⁴

Increasing demand for land resources at the coast has exerted immense pressure on vulnerable environments. Population and economic growth in coastal cities have combined to produce a scarcity of suitable space for development, the response to which has frequently been the reclamation of land from the sea, most prominently in China. Urbanization is a key driver of such changes and a detailed investigation of coastal land reclamation at the city scale is required. This study analyzed remote sensing imagery for the period 1990 to 2018 to explore the trajectories of coastal land reclamation in nine major urban agglomerations across the three largest deltas in China using the JRC Global Surface Water (Yearly Water Classification History, v1.1) (GSW) dataset on the Google Earth Engine platform. The results are considered in the context of major national policy reforms over the last three decades. The analysis reveals that total land reclaimed among nine selected cities had exceeded 2800 km² since 1984, 82% of which occurred after 2000, a year following the enactment of China's agricultural 'red line' policy. Shanghai exhibited the greatest overall area of land extension, followed by Ningbo and Tianjin, especially in the period following the privatization of property rights in 2004. In analyzing annual trends, we identified the developmental stages of a typical coastal reclamation project and how these vary between cities. Scrutiny of the results revealed voids in nighttime light satellite data (2014–2018) in some localities. Although these voids appeared to be characterized by construction, they were occupied by vacant buildings, and were therefore examples of so-called "ghost cities." In China, as elsewhere, continual land reclamation needs to be considered in relation to, inter alia, sea level rise and land subsidence that pose significant challenges to the vision of sustainable urban development in these three deltaic megacities.

1257-DEVELOPMENT OF INDICATORS AND TARGETS FOR ECOLOGICAL QUALITY OBJECTIVES IN THE NORTHWEST PACIFIC REGION

Vladimir Shulkin¹, Anatolii Kachur², Aleksander Tkalin³

Pacific Geographical Institute Russian Academy of Sciences Lab of Geochemistry Vladivostok-Russia¹ Pacific Geographical Institute Russian Academy of Sciences NOWPAP POMRAC -²

The Northwest Pacific region, including the Sea of Japan and the Yellow Sea, is a transboundary region surrounded by several countries (China, Japan, Republic of Korea, North Korea and Russia) with very different socio-economic conditions and numerous environmental problems. The Northwest Pacific Action Plan (NOWPAP) is one of the Regional Seas programs under the UN Environment with the overall goal of facilitating the wise use of coastal and marine environment. Five Ecological Quality Objectives (EQOs) for the NOWPAP region have been elaborated by nominated national experts using analysis of the major environmental problems. Then, the set of 24 indicators necessary for the assessment of the marine environment quality has been suggested and analyzed in terms of their relevance. Most of 24 suggested indicators could not be used by all countries in the region due to scarcity of data. The absence of harmonized environmental legislation, standards and norms also does not allow to use some of the suggested indicators for the whole region. Nevertheless, it was agreed that six indicators could be used in the region, mostly due to availability of reliable data: nutrients concentration, nutrient ratios, chlorophyll concentration, harmful algal blooms, concentration of contaminants in sediments and organisms as well as quantity of marine litter washed ashore. Setting quantitative targets for the above mentioned indicators is the next step for the achievement of good environmental status. In 2019, experts from NOWPAP member states have agreed on several EQO targets which are in line with similar approaches used in other regions. The analysis of the suitability of suggested targets in designated areas within the NOWPAP region will be the next stage in the implementation of relevant EQOs. While monitoring how targets are being achieved, NOWPAP will be involved in the process of reporting 2030 Sustainable Development Goals (SDGs) implementation.



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1432-COASTAL SEDIMENT COMPARTMENTS A FRAMEWORK FOR COASTAL MANAGEMENT IN SOUTHERN NEW SOUTH WALES AUSTRALIA

Colin Woodroffe¹, Rafael Carvalho², Mike Kinsela³, Tom Oliver⁴, Andy Short⁵, Bruce Thom⁶

University of Wollongong SEALS Wollongong-Australia¹ Deakin University SLES r.cabralcarvalho@deakin.edu.au-Australia²

DPIE DPIE Michael.Kinsela@environment.nsw.gov.au-Australia³ ADFA, UNSW School of Science t.oliver@adfa.edu.au-Australia⁴

University of Sydney School of Geoscience andrew.short@sydney.edu.au-Australia⁵ University of Sydney Wentworth Group bruce.thom@sydney.edu.au>; -Australia⁶

The concept of coastal sediment compartments, widely used in both the United States and the United Kingdom, has recently been adopted at a national scale in Australia to better understand sediment and shoreline dynamics and to underpin management of future shoreline behaviour in response to impacts of climate change.

A hierarchical division of the entire Australian coast differentiated 102 primary compartments within which are 354 secondary compartments. In NSW, the sediment compartments framework has been incorporated into legislation (Coastal Management Act 2016) and is advocated as the basis for understanding open coast processes and hazards within compartment-based coastal management programs.

Our studies have focused on the history of coastal landform development and the nature of the adjacent seabed in order to understand the resilience of beaches to storms, decadal variability, and longer-term response to sea-level rise. Analysis of historical changes in shoreline position, augmented by paleo-environmental and geo-chronological reconstructions using optically-stimulated luminescence dating to plot the progradational history of beach/foredune-ridge plains, demonstrates that adjacent compartments can show different trends in coastal behaviour. High-resolution seabed mapping by state government has also revealed contrasts between the predominantly rocky Wollongong compartment, and the compartment to the south where sand is sequestered into Lake Illawarra. These in turn contrast with the Shoalhaven compartment where the river has been delivering sand to the coast, sustaining ongoing buildout of the coastal plain.

Such studies of substrate, sediment transport and shoreline chronology provide an indication of the sensitivity of coasts to change. This paper demonstrates the significance of understanding this variability with examples of secondary compartments along the southern NSW coast, in an effort to provide greater confidence as to the past and present status and how the coast will respond to sea-level rise in future.

1464-BLACK SEA MARITIME SPATIAL PLANNING PROGRESS AND LESSONS LEARNED

Margarita Stancheva¹, Hristo Stanchev¹

Center for Coastal and Marine Studies (CCMS) Center for Coastal and Marine Studies Varna-Bulgaria¹

Maritime Spatial Planning (MSP) has increasingly been recognised as a new and prominent approach to the sustainable management of maritime space across Europe, including also Integrated Coastal Management (ICM) and Land-Sea Interactions (LSI) as required by the Directive 2014/89/EU for MSP. This paper analyses the development and progress of MSP in the Black Sea Basin through the concerted efforts of two European Union (EU) Member States, Bulgaria and Romania under the cross-border projects MARSPLAN-BS I & II. These actions have brought together national MSP authorities and other research organisations for understanding national/cross-border interests and approaches to MSP; identifying knowledge gaps and needs to harmonise data collection; promoting sectoral integration by highlighting conflicts and synergies among different sectors; enhancing stakeholder involvement. The study also explores the dynamics across the land-sea interface, i.e. the LSI that involve both natural processes and the impact of human activities, with a focus on coastal erosion and biodiversity, and how to integrate LSI into the MSP. One of the main findings is the pilot case study on Multi-Uses (MUs) concept to promote mutual benefits between key Black Sea sectors: tourism, underwater cultural heritage and environmental protection. The paper synthesises an array of challenges, barriers and enablers identified in developing cross-border MSP and lessons learned captured from the research projects. The conclusions drawn at the end explain how to overcome challenges that are encountered in the initial stages of MSP development and set the state of knowledge in order to frame and support the subsequent implementing of the MSP process in the Black Sea Basin.

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1592-Creation of nature parks and environmental conflicts in coastal areas the case of the Costa Teatina National Park in central Italy

Goro Komatsu¹, Barbara Staniscia², Angelo Staniscia³

*Università d'Annunzio International Research School of Planetary Sciences Pescara-Italy*¹ *Sapienza University of Rome Department of European, American and Intercultural Studies -Italy*² *3 C.P. 4 - 66041 -Italy*³

The Costa Teatina National Park was legally instituted to protect the natural environment of a section of the southern coast of Italy's Abruzzo region that is characterized by a relatively low degree of urbanization. The law instituting the park was passed in 2001, but due to difficulties in defining its spatial boundaries, the process of actually setting up the park has still not been completed. The underlying cause of this delay is a type of environmental conflict involving a variety of different players, from institutional bodies to interest groups and pressure groups. Our study identifies and documents the complex, dynamic relationships that exist between the various stakeholders, and discusses the reasons behind the difficulty in coming to an agreement on the park boundaries, a necessary step before the park can be properly established. The preliminary analysis of the conflicts surrounding the Costa Teatina National Park was conducted under the 7th Framework Programme SECOA project (244251-FP7- ENV.2009.2.1.5.1). The example of the Costa Teatina National Park is illustrative of a common set of problems that are likely to be encountered when attempting to institute a nature park in a coastal area with existing human activity and habitation. However, it should also be considered that in each situation, there are unique features that can influence the way the local population reacts to the creation of a park. In the case of the Costa Teatina National Park, there appear to be two main factors contributing to the conflicts: 1) a lack of consensus, locally, as to the need for environmental protection and a sustainable economy, and 2) the absence of an overwhelming, pressing need for the park that would override potential conflict and opposition.

1764-The red list assessment of coastal habitat types in Finland

Panu Kunttu¹

*The Finnish Expert Group On Coastal Habitats Finnish Biodiversity Helsinki-Finland*¹

Background

Assessments of the red-list status of species and habitat types are the most important indicators used to monitor the state of biodiversity, and their results are continuously alarming. The second assessment of threatened habitat types in Finland was published in 2018.

Materials and methods

The assessment was conducted using the international IUCN Red List of Ecosystems method. The primary assessment criteria were change in habitat type quantity, change in abiotic and biotic quality, and rarity. The current trends for habitat types in terms of their state were also assessed.

The assessment of threatened habitat types covered all terrestrial and aquatic habitat types in Finland (in total 388 types). Baltic Sea coast is one of eight main habitat groups.

Results

A total of 45 Baltic Sea coastal habitat types were assessed. Of these, 58% were assessed as threatened (VU, EN or CR), 15% as near-threatened and 27% least concern. The Baltic Sea coastal habitat type groups are (the number of threatened types/the total number of types): 1) Gravel, shingle and boulder shores (0/2), 2) Sand beaches and dunes (8/8), 3) Meadows (1/3), 4) Reedbeds (0/3), 5) Drift lines with organic material (2/3), 6) Coastal scrubs and forests (11/19), 7) Rock pools (0/1), and 8) Coastal habitat complexes (4/6). The group of coastal sand beaches and dunes is the most threatened.

The reasons for becoming threatened and the threat factors vary between the habitat types. The main reasons were: 1) Overgrowth caused by the eutrophication, 2) Construction and mechanical wear 3) Forestry, 4) Clearing natural vegetation for agriculture, 5) Invasive alien species, and 6) Climate change.

Conclusions

As the method used to assess red-list status changed, the results of the first (year 2008) and second assessment are not directly comparable. However, in the majority of the assessments, the red-list category assigned was still the same. In order to preserve threatened habitat types, there is an urgent need to expand the conservation network and carry out ecological restoration especially in open habitat types.



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2312-HUMAN INDUCED COASTAL EROSION ALONG GODAVARI DELTA FRONT COAST EAST COAST OF INDIA

Chinni V Naga Kumar Kommireddi¹, Nageswara Rao Kakani²

Centre for Water Resources Development and Management Geomatics Division Kozhikode-India¹ Andhra University

Department of Geo-Engineering nrkakani@yahoo.com-India²

Globally, coastal regions are facing severe coastal erosion rather than deposition at their coast owing to various factors at global, regional and local scale. The present study demonstrates how a regional factor like construction of dams in the river basin affects the coastal regions, as in the case of Godavari Delta along the east coast of India. The Godavari River, with a drainage basin area of 3.1 x 10⁵ km², flows over a length of 1465 km across the Indian peninsula and builds a large delta spread over 5,820 km² and a 170-km long delta-front coast.

Survey of India topographic maps of 1930s, Corona Satellite photographs from 1965, Landsat TM images from 1990, Landsat ETM+ images from 2000, and IRS P6 LISS-III images from 2008 and 2012 covering the Godavari delta-front were used to compute the shoreline changes in GIS environment. Data on suspended sediment loads into the delta during 1970–2012 were analysed to understand the temporal trends.

The study revealed that the shoreline advanced into the sea leading to a net accretion of 10.5 km² area to the delta during 1930s–1965. However, the trend has reversed resulting in a net loss of 45.9 km² of land during the subsequent 47-year period between 1965 and 2012. The decadal trends in suspended sediment indicated a progressive decrease from 150.2 Mt/y (1970–1979) to 128.9 Mt/y (1980–1989), 97.8 Mt/y (1990–1999), 48.2 Mt/y (2000–2009), and 44.1 Mt/y (2010–2012). The study therefore indicates a probable link between the decreasing sediment delivery and increasing erosion along the Godavari delta-front coast during the past five decades, which witnessed a large-scale sediment retention at the burgeoning dams across the Godavari River in peninsular India.

2575-TEMPORAL TRENDS IN SUSPENDED SEDIMENT LOADS IN THE RIVER DELTAS ON THE EAST COAST OF INDIA

Chinni V Naga Kumar Kommireddi¹, Nageswara Rao Kakani²

Centre for Water Resources Development and Management Geomatics Division Kozhikode-India¹ Andhra University

Department of Geo-Engineering nrkakani@yahoo.com-India²

Globally, numerous dams were commissioned across the rivers for water diversion schemes for meeting irrigation, industrial and domestic requirements in the river basins. However, dams not only impound water but also trap sediment leading to decrease in reservoir capacity as well as impeding growth of the deltas. This study deliberates on the impact of dam construction on the suspended loads in the river deltas along the east coast of India. Data on Suspended sediment loads from the apices of the respective deltas were collected from the Central Water Commission, Government of India.

Analysis of the temporal trends in the suspended sediment loads indicated substantial decrease in all the river deltas of the east coast of India. The suspended sediment loads decreased from 6.3 Mt/y during 1973–79 to 1.4 Mt/y during 2010–2013 in the Subarnarekha Delta, from 9.1 Mt/y during 1980–89 to 1.9 Mt/y during 2010–2013 in the Brahmani Delta, from 5.1 Mt/y during 1973–1979 to 1.1 Mt/y during 2010–2013 in the Baitrani Delta, from 26.4 Mt/y during 1973–79 to 5.3 Mt/y during 2010–2011 in the Mahanadi Delta, from 150.2 Mt/y during 1970–1979 to 44.1 Mt/y during 2010–2012 in the Godavari Delta, from 10.7 Mt/y during 1965–69 to 0.2 Mt/y during 2000–2009 in the Krishna Delta, and from 1.4 Mt/y during 1973–79 to 0.3 Mt/y during 2000–2009 in the Cauvery Delta. The study showed consistently decreasing sediment delivery into the deltas of all the rivers along the east coast of India, which witnessed large-scale dam construction in their upstream reaches during the past five to six decades.



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VIRTUAL

2969-The flood of March 2019 impact on spatial changes of international wetlands of Alagol Ajigol and Almagol

Maysa vali ¹, Maryam Rahmati ¹

Tarbiat Modares University Physical Geography maysavali411@gmail.com-Iran ¹

Wetlands are one of the most diverse ecosystem which are marks as a fragile aquatic ecosystems as well. Iran with numerous wetlands has a mark able position in Southwest Asia, whereas the 22 of their have been recorded in the Ramsar International Convention. It is important to note that, these valuable ecosystems need to monitor and protected for stable restoration and reconstruction due to its importance of natural resources. This research is aimed to spatial pattern change detection and extraction over the Alagol, Ajigol and Almagol international wetlands, using Landsat 8 satellite images during two periods before and after the March 2019 flood. For this purpose, images for 2017 and 2019 through radiometric, geometric and normalization corrections were preprocessed as a first step and then 4, 3, 2 FCC, RGB was created in the ENVI software. In order to better detection of change, the masking technique and Sobel filter were applied over the images. The digitization operations with high precision in Arc Gis software manually were performed based on outcome presses image as a next step. The field data collection was done using a GPS device for validation of outcome map extracted from process images. The results showed that the water level increasing due the flood and the wetlands area significantly extend. Furthermore, that recent floods have increased the area of wetlands of Alagol (12.4 Km²), Ajigol (3.9 Km²) and Almagol (1.69 Km²). Moreover, the max shoreline transgression is related to Alagol (3.20 Km) where the min is belong to Almagol (1 Km).

3147-A new framework for managing coastal resilience in a changing climate.

Jon French ¹, Robert Nicholls ², Sally Brown ³, Chris Hill ⁴, Eli Lazarus ⁵, Edmund Penning-Rowsell ⁶, Charlie Thompson ⁷, Emma Tompkins ⁵, Ian Townend ⁸

UCL Geography London-United Kingdom ¹ UEA Tyndall Centre for Climate Change -United Kingdom ² University of Bournemouth Life and Environmental Sciences -United Kingdom ³ University of Southampton Geodata Institute -United Kingdom ⁴ University of Southampton Geography -United Kingdom ⁵ University of Middlesex Flood Hazard Research Unit -United Kingdom ⁶ Channel Coast Observatory Director -United Kingdom ⁷ University of Southampton School of Ocean Sciences -United Kingdom ⁸

Climate change and sea-level rise pose a significant threat to the coast, including increased erosion and more frequent and damaging flooding. The risks associated with these hazards have hitherto been strategically managed through various forms of shoreline management planning. However, now there is interest in moving to a more holistic approach that embraces the concept of resilience and an aspiration to enhance the resilience of coastal communities. Delivering this requires that multiple objectives are addressed, including:

1. Minimisation of injury, loss of life and health impacts;
2. Minimisation of damage to property and infrastructure;
3. Minimisation of residual risk and community recovery time from events;
4. Minimisation of local economic disruption;
5. Minimisation of habitat loss and disruption of the natural coastal system;
6. Maximisation of community preparedness for events.

This must be achieved through governance arrangements that seek to improve social justice, whilst ensuring that management plans are affordable. It is important, therefore, to anticipate coastal change and to develop more proactive strategic management plans. These need to consider the physical and socio-economic components of the coastal system, historical legacy and likely future changes, and must accommodate both rapid directed measures and slower progressive transitions.

We present findings from a NERC-funded project that has explored the challenges of making the UK coast and its communities resilient under climate change. Resilience is poorly defined in current flood and erosion risk management policy documents and current shoreline management planning is not set up to deliver it. We adopt a pragmatic definition that extends the currently limited set of policy options and, for the first time, allows quantification of resilience now, and under alternative future policies. Our method for characterising coastal resilience is demonstrated using contrasting case studies, and we consider the remaining challenges and potential next steps towards more resilience-based coastal management.



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VIRTUAL

3347-Beachrock formation in Bozkırlar Beach on Lake Van coast Bitlis TURKEY

T. Ahmet ERTEK¹, A.Evren ERGİNAL², Mustafa BOZCU³, Mehmet ZOR⁴

Istanbul University Geography ISTANBUL-Turkey¹ Çanakkale Onsekiz Mart Univ. Faculty of Education aerginal@comu.edu.

tr-Turkey² Çanakkale Onsekiz Mart Univ Geology Eng.Dept, mbozcu@comu.edu.tr-Turkey³ Atatürk Univ. Social Sciences Inst.

mehmetzor70@hotmail.com-Turkey⁴

With a total surface area of 3750 km², Lake Van located in Eastern Anatolia is the largest lake in Turkey. The depth of the lake is 451 m. The lake is located in the upper basin of the Murat River valley, and its waters gained a chemical feature with soda water over time, as the Quaternary eruptions of Nemrut volcano turned the lake into a closed basin. Although the multiple proxies data of the lake sediments regarding the Eastern Anatolian climate, volcanism and seismicity have increased especially in the last 10 years, this study reveals for the first time the presence of beachrock in the lake shores. In the absence of age data, these formations were recorded on the shores of Adilcevaz, keeping records of climate fluctuations that probably controlled the late Holocene level changes of the lake. Beachrock beds crop out in Bozkırlar Beach, located 3 km east of Yolçatı Village and 6 km east of Adilcevaz, one of the districts of Bitlis. The beachrock beds, which form 500 m-long continuous layers, have an average angle of dip of 2-5°. A total of 12 samples were taken from 3 different levels under the lake waters, along the coastline and above the lake level. In each sample, thin sections were taken for petrographic analysis and microphotos of the sections were taken. In the same examples, scanning electron microscopy (SEM) analyzes were carried out to determine the grain surfaces, voids and cement tissues between them. Elemental analyzes were carried out with energy dispersive X-ray analysis (EDX) from the surfaces of the carbonate crystals that were monitored with SEM. Accordingly, during the formation of beachrock, precipitation and cementing environment and climatic conditions controlling cementing were examined. According to the data obtained, there is a similar facies environment that explains the simultaneous formation in all



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VIRTUAL

C.5. Cold and High Altitude Regions Cold Regions at the Crossroads Changing Climate Social Systems and Human Agency

1699-Polar and High Altitude social ecological systems resilience and sustainable development goals implementation the role of diverse geographical disciplines and approaches

Tatiana Vlasova ¹, Andrey Petrov ², Sergey Volkov ³

Russian Academy of Sciences Institute of Geography -Russia ¹ University Northern Iowa ARCTICenter and Department of Geography Moscow-United States ² Russian Academy of Sciences Institute of Agricultural Economy -Russia ³

The Polar and High Altitude Regions are undergoing rapid environmental, socio-cultural and economic transformation. The primary task of geographers is assessing and monitoring the resilience of integrated Social-Ecological Systems at different scales that involves a better understanding of the complex interactions between social and ecological domains and facilitates the creation of resilient systems whilst increasing knowledge capacities of polar communities and their ability to shape change. Simultaneously, geographers are very much needed in exploring current progress in making the United Nations Agenda 2030 Sustainable Development Goals (SDGs) more operational what has been underlined by the IGU recently. Despite the intention, the SDGs are fragmented and their formulation is rather sectoral and needs more integration based on SESs resilience approaches which offers complex analysis and solutions, taking into consideration the impacts of biophysical and social drivers of change. This presentation aims at exploring how polar communities and stakeholders deal with the combined challenges from climate change, political, economic and resource pressures, changes to the global order and new socio-cultural realities and what the future might hold for the Polar and High Altitude Regions. We recognize the opportunities presented by integrated interdisciplinary and transdisciplinary approaches developed within geography integrating biophysical, social, humanities and arts scholarship. Geography is considered to be the main scientific discipline in implementing of desired circumpolar sustainability monitoring network in close cooperation with local indigenous and non-indigenous communities especially in the Arctic. The role of Arctic stakeholders with their local and tradition knowledge place considerable role in managing sustainability in the Arctic. Also cooperation of decision makers and business should play a considerable role. Sustainability monitoring activity is the good platform for such stakeholders cooperation.

2962-Mass balance reconstruction of the Sary Tor Glacier Tien Shan using meteorological data

Afanasy Gubanov ¹, Victor Popovnin ¹

Lomonosov MSU Cryolithology & Glaciology Moscow-Russia ¹

Mountain glaciers on the Earth are very sensitive to climate change, dynamically responding to changes in circulation or radiation balance. Climate fluctuations determine parameters of external mass turnover of glaciers. Mass balance (bn) is the most important indicator of glacier evolution. Its direction is characterized by long mass balance series. After the decay of the USSR all direct bn measurements in the Inner Tien Shan, including the Sary-Tor Glacier in Ak-Shiyarak Massif monitored in 1985-1989, were desisted. Observations there were resumed only since 2015. The presented contribution deals with restoring continuity of bn series and prolonging it back to the beginning of regular observations at Tien Shan weather station (3660 m a.m.s.l.) in 1929. Accumulation was reconstructed by linear relationship with precipitation sum and air temperature, whereas restoring of ablation was based on its dependence on temperature or on two-parameter linear approximation by air temperature and wind velocity. Direct instrumental measurements in 1984/85-1988/89 and 2014/15-2018/19 reveal reference glacio-meteorological equations which are assumed independent on time. Thereby, calculations result in deriving continuous 90-year-long series of annual values of bn and its constituents. Reconstruction for the Sary-Tor Glacier demonstrates a dominant trend towards mass loss with only rare and brief episodes of its deceleration. Comparison with long bn series for a number of glaciers in Asia discerns their relative synchronism, less pronounced in the recent time: Sary-Tor degradation tends to proceed more intensively. Conclusions on its anticipated evolution are particularly topical for evaluating influence of Kumtor Gold Company, Canada, over the local eco-systems, in view of its interests to expand gold-mining activity to the periglacial zone adjacent to the Sary-Tor terminus. Investigation within the framework of State Assignment AAAA-A16-116032810095-6 was also supported by project 20-05-00681a of Russian Foundation of Basic Research.



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VIRTUAL

3299-Variability and changing trend of temperature in the Arctic region of Canada

Mian Sabir Hussain¹, Sujeong Im², Inhye Heo¹, Seungho Lee²

Konkuk University Climate Research Institute Seoul-Korea, South¹ Konkuk University Department of Geography -Korea, South²

This study presents a detailed account of variability and changing trends of surface air temperature in the Canadian Arctic region for the period of 1980 – 2018. Daily data of temperatures were obtained from the National Climate Data Archive (NCDA) of the Environment Canada. Data recorded at 27 weather stations fairly located in the Canadian territories of Nunavut, Northwest Territories and the northern Quebec were investigated. The simple linear regression analysis was carried out to predict the change rate (per-decade) of possible trends in temperature, focusing on coldest (January) and warmest (July) climatology. Besides, correlation coefficients were calculated between sea ice concentration and shipping traffic to find any connection with temperature trends. Investigation showed that temperature trends are generally increase over the Canadian Arctic region. Result evident, the region of Baffin Island, the north-western region of Hudson Bay and the north-western Canada showed higher rate of increasing trend of temperature which is recorded between 1°C to 2°C during January. Comparatively, the region of western High Arctic, western Parry Channel and the western Arctic waterway showed low increasing rate of temperature during January. The most typical features of July temperature is very warm containing up to 1°C, which is historically huge increasing trend in the Canadian Arctic region. Spatial analysis is more relevant when temperature observed with latitudinal extent, particularly a pattern of increasing temperature is observed from lower latitude to higher latitude during the month of July. It is reasonable to speculate that increase of mean temperature during July as a result of increase in ice melt. Results showed, high upward trend of temperature over the north-western Arctic Canada has effect of sea ice breaking resulting of shipping movement. Thus, the schematic reflection of increasing temperature with reducing sea ice and increasing shipping traffic is depicted in this study.

3311-Research Equity in Cold Climates Wicked Problems and the Structure of Research

Nancy Doubleday¹, Nidhi Nagabhatla²

McMaster University Water Without Borders Hamilton-Canada¹ UNU INWEH Water Without Borders nidhi.nagabhatla@unu.edu-Canada²

Equitable research relations are essential to multi-directional flows of data, information, knowledge and benefits. Arctic experience demonstrates the process of transformative change and development of high standards for inclusive practices and planning for long term sustainability. Benefits include policy and programmatic changes, improved health and well-being and sense of pride in identity and place. Multifaceted complex problems demand multi-dimensional inclusive solutions. This synthesis outlines interlinkages and strategies for adaptation and capacity building, and makes the case for learning adoption/adaptation by actors and agents in various biogeographic, economic, cultural and political settings.

Background: The emergence of research ethics boards affects research design, approvals, and funding altering the methodological tool kit available to researchers addressing complex and wicked problems at the human-environment interface.

Materials and methods: We survey information on Arctic-centric research programs initiated by governments, NGOs, INGOs and international research programs on a decadal basis, emphasizing applications of multi-centric models and multi-method studies; to delineate design features and accessibility to policy makers.

Results: Programs initiated by governments, NGOs, INGOs and research agencies are surveyed, processes recorded and outcomes are reported.

Conclusions: Interdisciplinary and intercultural understandings of impacts on health and well-being, capacity and adaptation, are captured when diversity is flagged as a design principle, and multi-disciplinary approaches are formalized. Identification of long-term effects may require longer study trajectories than conventionally planned, and/or possible, under a majority of current research funding programs. Lessons learned from increased diversity in research design, in relevant sources of data and the translation of data into evidence necessary for robust policy formation offer fresh perspectives of project and program planning. Collaboration with UNU INWEH supports translating this learning to a new project in the developing region in Central Africa "Addressing Climate and Water Driven Migration and Conflict Interlinkages to Build Community Resilience in the Congo Basin".



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VIRTUAL

C.5.Cold and High Altitude Regions Cold Regions at the Crossroads II Changing Climate and its Environmental Social Impacts

1773-Changes in glaciers in the mountainous regions of the subarctic in the 20th and 21st centuries. Cherskiy Mountains and the Orulgan Range.

Tatiana Khromova¹, Stanislav Nikitin¹, Anton Muraviev¹

*Institute of geography RAS Glaciology Moscow-Russia*¹

The ongoing reduction in the size of glaciers is attracting widespread attention, as it leads to a change in landscapes in the glacial zone and to an increased risk of natural hazards and natural disasters associated with melting glaciers. These processes affect subarctic regions as well. On the territory of Russia, 10 glacial systems are located in subarctic latitudes. These are the Khibiny, the Urals, the Putorana plateau, the Byrranga mountains, the Orulgan, Chersky ranges, the mountains of Suntar-Khayat, the Koryak, Chukchi and Kolyma highlands.

Detailed information on the state of glaciers in these systems for the second half of the 20th century is given in the Catalog of Glaciers of the USSR (1965–1982) and in the Atlas of Snow and Ice Resources of the World (1997).

Now freely distributed high-resolution images (Sentinel-2) significantly expand the capabilities for analyzing the state of small-sized glaciers. The report presents the results of the assessment of changes in glaciers in the Chersky mountains and the Orulgan ridge in the 20th and 21st centuries, based on satellite images obtained from Sentinel-2 satellites in 2017 and 2018. Over a period of 47 years (1970–1917), the glaciation of the Chersky Mountains reduced its area by 42.2%. During the same period 51 glaciers disappeared. Over 48 years, the area of glaciers of the Orulgan ridge decreased by 47%, 14 glaciers disappeared.

The presentation includes the results obtained in the framework of the following research projects: № 0148-2019-0004 of the Research Plan of the Institute of Geography of the Russian Academy of Sciences and № 05/2019/RGS-RFBR supported by the Russian Geographical Society.

2507-Correction of geography new Arctic islands and straits originated due to glacial recession

Wieslaw Ziaja¹

*Jagiellonian University in Cracow Institute of Geography and Spatial Management Krakow-Poland*¹

Background/Hypothesis

Since the end of the 20th century, many new islands and straits appeared due to recession of glaciers under climate warming in the Arctic. They appeared on the coasts where bedrock elevations above sea level were surrounded by depressions below this level, filled (at least from the landside) with glaciers. These depressions were flooded by sea water after the glaciers' recession, and became the new straits.

Materials and methods

Analysis of the hitherto published papers (by Pelto, Sharow, Ziaja and Ostafin, other ones), as well as maps and satellite images of the Arctic coasts, is a basic method of recognizing these islands and straits. Formation of a strait separating the potential biggest Arctic island, which is today's southern Spitsbergen peninsula, has also been investigated by the author in the field.

Results

Since the 1960s–1980s, at least 36 new islands (each 0.4 square km or more) have appeared due to glacial recession in Greenland and the European Arctic (Franz Josef Land, Novaya Zemlya, Svalbard). Formation of them was the final stage of processes which had begun earlier. There were three ways of formation of them: (1) simultaneous recession of glaciers from both sides of a bedrock depression (a potential strait), (2) uncovering a rocky hill (protruding from a bedrock depression) from under a receding glacier, (3) recession of one glacier which had reached a rocky fragment of a coast (a potential new island).

Conclusions

Origin of the new islands and straits leads to crucial changes in marine and terrestrial ecosystems. The new straits have already shortened some sea routes along the Greenland coast. There are many potential new islands and straits at the stage of formation. Some of the straits would be important from both the politico-economic and environmental point of view in the nearest future (especially in the case of a further warming).

3298-Residents' Perception of climate change in Cambridge Bay Canada

Sujeong Im¹, Eungul Lee², Seungho Lee¹

Konkuk University Department of Geography Seoul-Korea, South¹ Kyung Hee University Department of Geography -Korea, South²

Climate change is one of the greatest threat facing the global twenty-first century, however its magnitude and intensity are vary from the Equator to the Poles. The Arctic region is the fastest rising temperatures known as Arctic amplification. Climate change affects the social system as well as changes in the natural environment. In particular, Arctic indigenous people live in extreme cold conditions, and their communities are isolated and far from each other with limited living options. In other words, they are the most vulnerable to climate change than rest of the world. The 'combination of science and traditional knowledge' has emerged as an adaptation strategy for this climate change crisis. For understanding this combination, the traditional knowledge framework and culture should be on priority. In this respect, this study aimed to understand the impact of climate change on the lifestyle of Arctic indigenous people predominantly hunting practice and perception of the residents. Two geographical field surveys and interviews were conducted in Cambridge Bay, Canada during August 2018 and October 2019. The data from the field survey were used for the analysis of this study. The total population of Cambridge Bay is 1,800 and Inuit people are dominant with 80 percent of the population. According to the results, people of Cambridge Bay are clearly aware about climate change. In addition, they responded that they are already affected by the changing climate (59% of responded), specifically to changing in animals and plants (74% of responded). The hunting patterns and practices are changing and getting worse under climate change. Hunting is the primary source for their subsistence food requirement, which becomes more difficult with changing climate. Consequently, climate change is affecting the food security and public health in the Arctic communities, which is ultimately leads to destroy the hunting culture of the Inuit.



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C.6.Cultural Approaches in Geography For a Geography of Solitude Themes Concepts Case Studies

2238-ALONE BUT NOT NECESSARILY LONELY NEGOTIATING 'ALONENESS' IN OLD AGE IN SINGAPORE

Shirlena Huang¹, Brenda S.A. Yeoh¹, Elaine Ho¹, Jian An Liew²

National University of Singapore Geography Singapore-Singapore¹ National University of Singapore Asia Research Institute arilja@nus.edu.sg-Singapore²

Much research has examined how the elderly are especially vulnerable to social isolation and relatedly, feelings of loneliness, arising from the loss of personal mobility, spouses, family members, and social networks as they move through the life cycle. Research has also established that social isolation and loneliness can lead to various health-related problems among older people. Because of this, being alone in old age is often constructed as an aversive state and a problem to be prevented. As one of the world's most rapidly ageing societies and with its citizens living longer than in most other countries, Singapore has in place many policies and programmes to support age-friendly communities. Despite this, Singapore has many elderly who end up living alone or managing daily life on their own even if they live with family members. This paper examines the daily geographies of older Singaporeans and how they negotiate life alone, physically and/or emotionally. While not discounting the reality that many elderly experience fear of and actual feelings of loneliness, our paper also recognises loneliness as a subjective experience and culturally-specific. In recognising other responses – including a sense of accomplishment at being able to 'go it alone' and an enjoyment of the freedom and flexibility of independence – that the elderly have to being/going it alone, our paper troubles the notion that spaces of aloneness in old age are always problematic while highlighting that they can be hopeful spaces as well. The analysis draws on multi-staged qualitative research involving interviews and 'go-along' observations, as well as GPS tracking, conducted with 69 older Singaporeans.

3107-Solitude and the illusion of togetherness in the digital world

Louis Dupont¹

Sorbonne Universite Geography Paris-France¹

This presentation poses that places, situations, and temporalities are at the heart of the geographies of solitude. In his plea for Humanistic Geography, Yi-Fu Tuan (1976) opened a door for considering solitude in geographic analysis [5]. Reacting to the influence of quantitative analysis in geography, he proposed in response a "humanist" program at the heart of which was the experience of space. Several concepts were associated to it: crowded place and loneliness; inner space (interior geography?), sense of place, placeless (without belonging, but also the experience of "displacement"); placelessness, which is not loneliness, but definitely leads to it. Space, more concretely the interweaving of places which gives it its substance, the materiality of these places, the people who are there, the things that happen there, in short all these components of geographic analysis come into play in the unveiling of situations and moments of loneliness. Alternatively, maybe some arrangements of these components allow solitude. In this geographic perspective, this presentation questions the role of social networks as the creator of in-between places, that is, the ability or illusion of being in two places at the same time. Indeed, for years already, the discourse on the Internet has been promising us the world at our fingertips, the consequences are that people are everywhere, but can hardly be somewhere. Loneliness takes a new dimension, as it goes along with a feeling of placeless belonging. Finally, we should wonder if the digital world is producing solitude, or new forms of solitude, or is it just a new toll to express it?



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VIRTUAL

C.6.Cultural Approaches in Geography Social and Cultural Geography of Funerary Space Places and Practices Géographie Sociale et Culturelle des Espaces et des Pratiques Funéraires

1622-COMMEMORATIVE SPACES FOR THE WAR DEAD THE CONSTRUCTION AND USE OF PUBLICLY SITED WORLD WAR I MEMORIALS IN INDEPENDENT IRELAND 1919-1970

Jonathan Cherry¹

Dublin City University School of History and Geography Dublin 9-Ireland¹

In the aftermath of World War I, widespread public commemoration of the war dead came to be focused on the highly visible war memorials dotting the squares and thoroughfares of towns and villages in many of the countries involved in the conflict. For dead soldier's families, not afforded an opportunity to honour their loved ones with traditional rites and rituals surrounding death, mourning and interment, war memorials afforded some surrogacy in lieu of these important end of life rituals. However the experience in Ireland was different. As southern Ireland journeyed towards independence from Britain between 1916 and 1922, the commemoration of the 35,000 Irish men killed while fighting with the British Army during WW I became highly politicised post 1919. Republican ideologies came to dominate the socio-political space of independent Ireland and an extensive amnesia surrounding the Irish war dead enveloped much of the country.

This paper in tracing the creation and use of commemorative spaces for the Irish war dead in independent Ireland from 1919, has employed archival material, newspaper reports and site visits in building a biography of each publicly sited war memorial, thus facilitating an analysis of their 'life-cycle': origins, planning and funding, iconography and design, location, unveiling ceremony and subsequent usage down to 1970.

The research reveals two main findings. Firstly, the extent of memorial construction was limited when compared to Britain for example. Only thirteen publicly sited war memorials were constructed in independent Ireland during the period 1919-1930 - a national memorial planned from 1919, after a fraught history was finally completed in 1939. Secondly, the research demonstrates that where public war memorials existed they continued to provide the centrepiece for annual commemorative rituals down to 1970, highlighting more sustained commemoration of the war dead in the Irish Republic than has been previously acknowledged.

1840-The Placement of Religious Facilities in the City Planning of Japanese Castle Towns Changing the Location of Temples

Ayumu HARADA¹

Hiroshima university Graduate School of Education Higashi-Hiroshima-Japan¹

The aim of this research was to understand how Feudal lords integrated temples in their city planning, by studying the Hiroshima castle town. Castle towns in Japan had been structured following a typical plan of a feudal city. They had three areas: the warrior's (Samurai) quarter, the Merchant-artisan district, and the Temple area. Setting the temple's location was one of the most important elements of a castle town. However, some researchers have paid less attention to the temple area than the others. The objective of this paper was to explain the reasoning behind the distribution of temples in the Hiroshima castle town. Therefore, I have identified the social role of the temples by studying the location and transference of about 110 temples, the reason for their transfer, and the lords' city planning policies. For that purpose, I investigated various historical maps (Ezu), and plotted about 110 temples on the map according to the findings of the investigation. As a result, the study has revealed four key findings. First, the temple played an important role in the castle town while under construction and during the change of the lord of the Aki domain. Second, the importance of the temple in the castle city was gradually lost with the establishment of the political system within their domain. Third, feudal lords could not easily change the location of a temple in the castle city. They managed it only when the lord of Aki domain changed and when a temple was destroyed by "the big fire". Four, the research shows that temples of the Jodo Shin sect of Buddhism were sparsely distributed, a situation similar to the distribution of temples in Nagoya castle town.



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2202-Holocaust Sites as Difficult Heritage in Latvia

Maija Rozite¹, Aija van der Steina¹

*University of Latvia Institute of Philosophy and Sociology Riga-Latvia*¹

Cemeteries and related traditions have a special place in Latvian local culture and landscape. The Second World War left a heavy scar as mass graves and other holocaust sites on this traditional heritage. During the post war Soviet period issues related to holocaust were less discussed, avoided or not spoken about as anti-Semitic and anti-Israel policy dominated. Along with restoration of Latvia's independence, all issues related with Jewish genocide were activated. The role of holocaust sites were changed due to the increase of pilgrimages of memory by Jewish community to Eastern Europe. There are about 265 Holocaust memorial sites in Latvia, but many sites are still "hidden". The increase in tourist flows to disaster and memorial sites pose challenges to tourism industry representatives and the local inhabitants as these sites are often historically diverse, exclusive, contested and politically divisive. It is one page of Latvia's difficult heritage. Modern tourism production and consumption in sites of death and disaster demands more appropriate, responsible and ethical approach and behaviour from all stakeholders. The aim of the study is to investigate how holocaust sites are marked and represented in the local cultural landscape; how they are memorialized and communicated through narratives and practices in the local communities. Qualitative research methods as field or on-site studies and in-depth interviews were used in the present research. The research results allow us to identify different types of holocaust sites. The attitude of local residents towards those sites and tourism flows are characterized. It has been concluded that there is a need for guidelines how to interpret, communicate and manage the holocaust related sites and difficult past.

3302-la place au cimetière comme révélateur d'enjeux sociaux et culturels

camille varnier¹

*Eso-Caen geography Caen-France*¹

S'il existe différents types d'espaces de la mort dans le monde - observables à l'échelle globale ou locale -, c'est avant tout parce qu'ils constituent des espaces sociaux inégaux (Di Méo, 2010), empreints des diversités culturelles et des inégalités sociales qui divisent, en même temps qu'elles rassemblent, les sociétés, les groupes sociaux ou, les individus entre eux. En effet, les différents modes d'appropriation (mais aussi de production) de l'espace par les individus et les groupes sociaux expriment - volontairement ou non -, par la présence de marquages symboliques ou identitaires, leur(s) appartenance(s) culturelle(s) de même que leur position sociale. En partant du postulat que l'espace est incontestablement un produit social, la question des inégalités sociales et des différences culturelles s'inscrit nécessairement dans une dimension spatiale pouvant être étudiée à n'importe quelle échelle de la géographie. En ce sens, loin de se limiter à une comparaison des espaces de la mort entre eux (à l'échelle globale ou locale), il est possible d'affiner encore plus l'échelle d'analyse en appréhendant la complexité des hétérogénéités sociales et culturelles dans la configuration même de ces espaces. En s'appuyant sur quelques exemples de cimetières au Venezuela, Mexique, ou encore au Chili, et en s'intéressant à la place qu'occupent certains groupes minoritaires dans les cimetières, de même que leurs manières de s'approprier l'espace - de pratiquer les cimetières - cette communication propose une réflexion concernant la façon dont les inégalités sociales se produisent et se reproduisent à travers et au-delà de la mort. L'idée est ainsi de dresser un panorama des espaces et des pratiques de la mort. En somme, une géographie sociale des cimetières.



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VIRTUAL

C.7. Dynamics of Economic Spaces Dynamics of Economic Spaces Economic Geography and Regional Development

1061-E waste Global Value Chain and the (re)commodification of the economy in the Global South Sao Paulo (Brazil) and Accra (Ghana) study cases

*Kaue Lopes dos Santos*¹

*LSE LACC London-United Kingdom*¹

The recent and significant increase in the production of e-waste – technically known as Waste Electrical and Electronic Equipment (or WEEE) – has raised many concerns among scientists. The Platform for Accelerating the Circular Economy (PACE) predicts that the production of this type of waste will reach 52 million tonnes by 2021 and 120 million tonnes by 2050. Most scientific concerns are related the risks that e-waste inappropriate management negatively impacts human health and the environment, mostly in the urban areas of the Global South. Therefore, this paper aims to present the scientific findings obtained from a comparative study about the e-waste value chain in the Sao Paulo Macrometropolis (Brazil, South America) and the Greater Accra Region (Ghana, West Africa). The methodology of this study is based on the analysis of both secondary (books, law articles and institutional reports) and primary sources (semi-structured interviews with different actors involved in the recycling process), obtained between 2013 and 2019. Thus, this study reveals differences and similarities in the ways in which the e-waste processing (recycling) value chain is organized in the two urban areas analyzed. On the one hand, Sao Paulo presents a value chain whose e-waste is locally produced and formally recycled by companies with different levels of organization and capitalization (both domestic and foreign). On the other hand, Accra has much of its e-waste imported from developed countries and recycling process takes place through both formal and informal endeavors, which have profound impacts on the environment and local workers' health. Despite the technical and normative differences of e-waste processing in these two areas, this study reveals that this value chain operates a (re)commodification of the economy in the Global South, since the end product of this value chain is mineral raw materials, traded on multiple scales.

1711-Risk Perception Within Foreign Direct Investment Relations The Case Of Turkey And Germany

*Philip Völlers*¹

*University of Osnabrück Economic Geography Osnabrück-Germany*¹

Through the introduction of risk as an additional category in their so called GPN 2.0, Coe and Yeung (2015) assume that economic actors (lead firms) (re-)configure Global Production Networks in reaction to the perception of risk. This raises the question of the empirical robustness of this specific claim: What significance and impact does the risk perception of economic actors and—to extend the original GPN 2.0 framework—other network actors, have on the configuration of global production networks? To answer this question the case of investment relations between Germany and Turkey is analysed within the framework of a research project conducted at the University of Osnabrück (Germany) in cooperation with the University of Ankara.

Over the past two decades, Turkey has developed into a fast-growing business location, whose economic links with Germany are being increasingly reinforced through foreign direct investment (FDI). On the one hand, today Germany is one of the largest foreign investors in Turkey, while on the other hand, a growing number of economic actors from Turkey are themselves involved as investors in Germany. FDI linkages are of considerable relevance for both economies, not only to generate important employment and income, but also to ensure a lasting transfer of technology and knowledge to contribute to regional development. Despite this, it could be assumed that recently tense political relations between Turkey and Germany, changed domestic and foreign policy developments, as well as an expected slow-down in economic growth, would impact the perception of specific investment conditions among investors. Hence, risks posed for German-Turkish investment relations are currently coming increasingly to the fore. The empirical data for this study are based on qualitative interviews conducted in both countries in the year of 2020. This talk presents the initial empirical results.



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VIRTUAL

1858-Relocation in the age of fourth industrial revolution on the case of Hungarian industry

Eva Kiss¹

*Research Centre for Astronomy and Earth Sciences Geographical Institute Budapest-Hungary*¹

In the beginning of the 21st century Hungarian industry was a very attractive destination for foreign investors. At that time numerous multinational companies relocated their production from other countries to Hungary. The latest economic crisis, however made this process slowed down because foreign investors and large companies postponed the investments and relocations planned. Economic politics in several developed countries also contributed to this as they urged relocations back to mother country. Last years the fourth industrial revolution means newer challenge. The increase of digitalization, automation and robotization and the application of new technologies make the relocation of production possible from less developed countries (low wage) countries back to more developed (high wage) countries as it can be supposed that the cost of labourforce can be reduced by e.g. the application of robots in developed countries. This paper examines whether this process, the relocation back to mother countries can be observed in reality on the case of Hungarian industry, and what are its major characteristics and geographical consequences. It is also an important question how it will affect the spatial pattern of Hungarian industry, how industrial space will change. The study is based on statistical data and empirical researches conducted among enterprises relocated to and from Hungary since 2000. This research is in initial phase however, the first results show that the phenomenon of relocation is not relevant yet, but in the future the fourth industrial revolution can result in a huge volume of relocations. This research work is supported by NKFI 125 091 to which the author herewith wishes to express her acknowledgement.

1859-The Expansion of Japanese Pharmacies to North China under the Reorganization of Pharmaceutical Trade Institutions during the Sino Japanese War (1937–1945)

Takashi AMIJIMA¹

*Bukkyo University Historical Culture Kyoto-Japan*¹

The recent literature on economic geography has made significant progress in understanding the role of territorial institutions in economic development. The effects of these institutions are generally observed within a specific spatial scale, such as a state, region, and district. However, some of these spatial scales have changed and reorganized, and institutions that correspond to these scales were also modified. We can find a remarkable example of such spatial reorganization in the historical phenomenon of invasion and colonization. This study examines the expansion of Japanese pharmacies and pharmaceutical institutions into North China and the entry barriers they faced during the Sino-Japanese war (1937–1945), based on reports and articles published in Japanese pharmaceutical trade journals. After the outbreak of the Sino-Japanese war, Japan's imperial troops occupied North China, and many Japanese-owned companies in various industries entered this market. However, the number of Japanese pharmacies that opened stores in North China was limited, as they were concentrated only in cities with Japanese concessions. Most Japanese pharmacies could not develop a Chinese customer base outside these cities. The newly entering Japanese pharmacies recognized four entry barriers in China: underdeveloped pharmaceutical jurisprudence, unique method of selling medicines, high tariff rates, and restrictions on the entry of new pharmacies by the Japanese consulate. Since North China's pharmaceutical institutions prevented Japanese pharmacies from entering this market, new Japanese pharmacies required the Japanese government and the puppet government in North China to enforce pharmaceutical regulations similar to those of Japan. However, the Japanese government was reluctant to modify these territorial institutions as it sought to protect the few Japanese pharmacies that had entered North China before the war, and whose interests were based on institutions within Japanese concession. These findings suggest that territorial institutions have complex characteristics based on multi-layered spatial scales.



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VIRTUAL

1905-Customer following Overseas Expansion and Localization Process of Korean Enterprises The Case Study of Electronic Industries in Hanoi Red River Delta Vietnam.

Seonghun KIM¹

*Seoul National University Department of Geography Seoul-Korea, South*¹

This study begins with the current huge number of foreign direct investment from Korea into Vietnam in electronic industries. Since mid-2000s, 2-major Korean transnational enterprises have invested and relocated their production facilities from China to Vietnam to minimize production costs. Korean small and medium-sized enterprises have also invested into Vietnam with transnational enterprises because of their subcontracting relationship. In 2018, 23 in-depth interviews with both Korean and Vietnamese subcontractors and workers were conducted to derive the characteristics of Korean firms' overseas investment and the localization processes. Based on the interview results, Korean foreign direct investment into Vietnam might be regarded as a customer-following overseas expansion, and this is related to the endemic inter-firm relationship. By customer-following overseas expansion, both transnational enterprises and subcontractors have reciprocal advantages. Korean transnational corporation can secure stable suppliers in Vietnam and overcome the lack of suitable local supplier, while subcontractors can maintain stable volumes of transaction with their customer and strengthen the subcontracting relationship. In terms of localizing the production, there are differences in the level of localization along the enterprise activities. Only simple-task low-skilled labor is highly localized, and the other activities like research and development, and sourcing materials are relatively low because of the lack of suitable local workforces and suppliers. However, established production network is getting differentiated along the emergence the new local subcontractors and spin-off enterprises and advancement of local labor abilities. Through participating the global electronics industry production network mediated by Korean enterprise, Vietnam might have both economical and industrial upgrading chances, and, in turn, regional assets might be formed in local society. Putting those findings together, established production networks is transplanted into new economic spaces through network embeddedness and partially modified during the localization process, and it could be the driving force for regional development in developing countries.

1907-THE AGGLOMERATION'S INFORMAL MARKETS DRIVING REGIONAL DYNAMICS IN ANTANANARIVO (MADAGASCAR)

Rindra Raharinjanahary¹

*University of Antananarivo Geography Antananarivo-Madagascar*¹

Currently, informal activities are booming worldwide in the face of the insufficient formal job creation. This is why, we postulate an hypothesis that the informal markets of the agglomeration of Antananarivo stimulate a regional dynamic. This research results from surveys carried out with about thirty intermediaries in six informal markets of the agglomeration, including two central and four peripheral; and with a dozen formal like taxis-brousse and informal carriers like carts, vans... The informal markets are the main spaces for the sale of new or recovered objects, agricultural or craft products from many small production units, in the agglomeration and in municipalities located in an isochronous region of 50 km around the city of Antananarivo, before their redistribution to formal markets. Every day, actors such as intermediaries and rural traders told a fundamental role in supplying the agglomeration, both day and night. In general, these products are transported on foot, by small informal vehicles or by taxis-brousse. Networks of informal actors have formed and guarantee the functioning of these markets. Thus, the latter are a resource for these intermediaries, informal and rural traders, excluded from formal markets, and offer urban and periurban households products that they need and which are within their reach. Through this work, it is a question of discussing the place of the informal, the inextricable link between formal and informal systems and the polarization of agglomerations like Antananarivo. Anyway, the informal is essential for the economy of many households in the Antananarivo region and maintains this city-countryside interface.



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2586-Revisiting Risks in Global Production Networks

Philip Völlers¹, Martin Franz¹, Philip Müller¹, Felix Bücken¹

*University of Osnabrück Economic Geography Osnabrück-Germany*¹

Confronted with rapid changes in the global economy – such as technological shifts, production fragmentations and political frictions – firm and extra-firm actors in global production networks are faced with the task of managing risks more than ever before. Taking these developments into account Coe and Yeung (2015) introduced risk as an additional category in their so-called GPN 2.0 approach, in which they distinguish between five forms of risks: economic (e.g., changing market or technology environment), product (e.g., trademark damage in the context of quality and other subjects), regulatory (e.g., changing standards and norms), labour (e.g. struggles over working conditions and wages) and environmental risk (e.g., natural disasters). However, the theoretical foundation of risks as analytical category is rather thin and lacks references to strands of literature on risks of globalization and supply chain risks. The goal of the presentation is to further stimulate the scientific debate on risks in global production networks. In order to do that, we encourage a more in-depth conceptualization of this analysis category within the GPN approach with the help of a literature review. It is argued that risks do not only have to be discussed in terms of risks perceived by economic actors and especially by lead firms but that it furthermore concerns all actors (transnational as well as domestic companies, state institutions, labour, consumers, etc.) involved in production networks in distinct ways. Hence firm actors as well as extra firm actors reacting to perceived risks can have an influence on the configuration of the global production network. The presentation offers an opportunity to develop the GPN approach by conceptualizing risks in global production networks in a more comprehensive way.

2587-The role of institutions in the formation of ambitious entrepreneurship in the Turkish wine industry a comparative analysis

Ezgi Akdoğan¹, Yiğit Evren¹

*Yıldız Technical University Urban and Regional Planning İstanbul-Turkey*¹

Recent studies on entrepreneurial ecosystems highlight the importance of institutions and culture in the sustainment and enhancement of entrepreneurial activity, and the need for a dynamic analysis. A comparative and multi-scalar perspective is also suggested as it carries potential for a richer understanding of this concept (Alvedalen and Boschma, 2017). Although the elements of entrepreneurial ecosystems are mostly studied within a wide palette of attributes (e.g. material, social and cultural), the ambitious entrepreneur remains to be the key actor in building and sustaining an ecosystem (Stam and Spigel, 2017), and thus his/her embedded choices, decisions and actions in response to the changing institutional structure at various levels (e.g. local, national and international) deserve to be studied in detail. In this context, qualitative empirical research offers an opportunity to generate an inductive entrepreneurial ecosystem theory (Sternberg, et.al. 2019).

This paper investigates the Turkish wine industry, which has witnessed a series of institutional changes over the past two decades, including the privatization of the Turkish Tobacco and Alcoholic Beverages Company (TEKEL) and the enforcement of a series of new regulations, such as banning the bulk trade of wine and introducing a tough control mechanism over the industry to fight against its informal character. Local wine makers in Tekirdağ (34 firms) and İzmir (24 firms), the two most important provinces in Turkey in wine production, constitute our empirical focus. Our main aim here is to find out whether there are specific conditions in these two regions that make firms engage in strategic entrepreneurial actions. Our face-to-face interviews with firms in Tekirdağ so far illustrate the formation a pyramidal structure of winemakers locally and the emergence of new entrepreneurial actors, most of whom adopt new strategies and rules, and set up new networks.



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2652-Geography of the personal car market in an emerging economy the case of Poland

Tadeusz Stryjakiewicz¹, Jędrzej Gadziński¹

Adam Mickiewicz University, Poznań Human Geography and Planning Poznań-Poland¹

Geography of market(s) as well as geography of consumption spaces are underestimated fields of geographical research. Each market shows its unique features in several dimensions. The unique character of the personal car market in post-socialist countries of Central and Eastern Europe results, among other things, from the fact that until 1990 it was developing in the conditions of a centrally planned economy, different from the market economy. In principle, the supply of cars was very limited. Therefore, the rapid change that took place in the car market after the collapse of the centrally planned (command) system in many countries, including Poland, can be called 'revolution'. This change remains an intriguing research field for geographers because the factors determining its spatial pattern need a deeper analysis, and such a comprehensive analysis is presented in the paper.

Poland seems an interesting 'laboratory' for a study of factors underlying the motorization revolution. The country witnessed a significant growth of car ownership and a shift from public to individual modes of transport. Currently, Polish car market seems to be at the saturation level of its Western European counterparts, however it holds its specificity e.g. in terms of the share of the new and used cars registered.

The chief goal of the paper is to analyse, in a spatial approach, changes that have affected the Polish car market since 1990 under the influence of global, national, regional and local factors. We discuss how 'consumption spaces' for different types of cars are distributed and how they are changing. We try to identify what factors (demographic, economic, social, institutional) are controlling the demand for cars in a spatial approach. In particular, we analyse the impact of three critical moments, such as the start of transformation, Poland's accession to the EU and the world crisis 2008-2010.

2774-Chemical industry layout environmental regulation and pollution havens Evidence from the regions along the Yangtze River China

Hui Zou¹, Xuejun Duan¹, Lei Wang¹

Chinese Academy of Sciences Nanjing Institute of Geography and Limnology Nanjing-China¹

This paper explores the spatial pattern evolution of the chemical industry, the regional difference of environmental regulation, and their spatial relationship with pollution paradise effect in the regions along the Yangtze River from 2000 to 2013, through the methods of enterprise location positioning, principal component evaluation, spatial autocorrelation measurement, field survey, and interview. Results show that chemical enterprises tend to aggregate in the lower reaches of the Yangtze River but in recent years several cities in the middle and upper reaches have become hot spots with more relaxed environmental regulations (e.g. Yichang, Jingzhou, Jiujiang, Huanggang, Xianning, etc.). Since 2010, environmental regulation has continued to restrain the growth of the chemical industry. On the whole, results partly reflect the idea that pollution has an effect in the regions along the Yangtze River in which Huanggang and Enshi were the typical pollution havens. The discussion points out that the environmental turn in the field of economic geography urgently needs more attention and further study. In addition, the results show that chemical industry growth in a few cities in the middle reaches of the Yangtze River (e.g. Huanggang, Enshi, etc.) has increased rapidly with lower environmental regulation. In the context of China's strategic importance to environmental protection and the protection of the Yangtze River's economic belt, environmental regulation is bound to become an important factor affecting the location and layout of pollution intensive industries. Hence, the environmental turn in the field of economic geography should be receiving more attention. Further research could focus on an investigation of microenterprises in order to understand the mechanism of their location and layout, alongside the specific role of environmental regulation.



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3091-The Growth and Decline of Industrial Cities in Korea Industrial Specialization Globalization of Production and Population Change

Yangmi Koo¹

*Seoul National University Department of Geography Seoul-Korea, South*¹

This study aims to explore the evolutionary path of the growth and decline of industrial cities in Korea. The Korean government has fostered export-led economic growth by promoting light industries in the 1960s, heavy-chemical industries from the 1970s, and high-technology industries after the 1990s. Industrial complexes and new planned industrial cities have supported the specialization of the target manufacturing industries. This rapid industrialization has had significant impact on the population distribution, physical landscape, and the spatial structure of Korea. Major industrial cities experienced rapid population growth as well as the development of the export industries. Both industrial growth and population settlement concentrated in the Capital area, while major industries developed mainly along the Seoul-to-Busan Axis. The population polarization between the Capital and the non-Capital areas has been expanding due to an outflow of young people from non-Capital area. In particular, increasing overseas investment and globalizing production process of Korean enterprises are affecting the decline of industrial cities and the decrease in population. Overall shrinking of the economy resulted from domestic and global issues also causes this trend. Some industrial cities are experiencing economic stagnation by local hub companies' poor performance and transnational corporations' disinvestment. In this study, the change in the number of enterprises and workers, and related population change will be analyzed in industrial cities specialized in a particular industry such as Geoje (shipbuilding), Gumi (electronics), and Gunsan (automobile). The impact of corporate restructuring such as downsizing with recession, production offshoring, and factory closure will be considered in this process.

3292-The Rise of Solar Valley in South Korea A Photovoltaic Industry Cluster in Global Production Networks

Jae-Youl Lee¹

*Chungbuk National University Department of Geography Cheongju-Korea, South*¹

This study analyzes the development process of a photovoltaic cluster (known as Solar Valley) in the Province of Chungbuk, South Korea from the perspective of global production networks (GPNs). Solar Valley is the largest photovoltaic cell/module production cluster in the country, and its development process is led by major lead firms such as Hanwha Q-cells, the world's third largest producer of photovoltaic cells and modules in terms of production capacity in 2018 (only after JinkoSolar in China and Canadian Solar). Solar Valley (nicknamed as 'Route 36') is also a provincial government-led project to build a competitive photovoltaic industry cluster in the region. In this context, this study aims to examine regional opportunities and challenges in such an industrial development, and particular analytical attention is paid to (1) an international merger that took place between South Korean chaebol Hanwha Group and German company Q-cells in 2012, (2) its resultant global arrangement of Hanwha's photovoltaic production networks, and (3) the role of local embeddedness in Chungbuk Province. To do so, this presentation contextualizes the 2012 merger of Hanwha and Q-cells in the beginning and then delineates how the production networks of Hanwha Q-cells are extended through an 'internal coordination' strategy and globally organized to include Australia, China, Germany, Japan, Malaysia, and the United States, as well as South Korea. Regarding local embeddedness, the company's 'extra-firm bargaining' process to establish a new flagship factory of photovoltaic cells and modules in Solar Valley in 2015 and the plant's role in the GPNs of Hanwha Q-cells are examined. These findings from the research questions are expected to help understand the dynamic relationship between network embeddedness and territorial embeddedness in the photovoltaic industry (i.e., strategic coupling), and shed a new light on the industry's GPNs in reference to key concepts drawn from literature on GPN 2.0.



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VIRTUAL

3568-The spatial resilience of “innovative milieu” in small industrial towns a case study in Vitré France

Benoit Montabone¹, Guy Baudelle¹, Josselin Tallec²

Université Rennes 2 Geographical Departement Rennes-France¹ Grenoble-Alpes Université Institute of Urban Planning en Alpine Geography josselin.tallec@univ-grenoble-alpes.fr-France²

This paper questions the notion of resilience of innovative milieu as theorised by R. Camagni. According to this theoretical background, economic production is a result of a complex network of social relations, institutional actions and historical trajectories that bounded together form an “innovative milieu”. Based on the different interpretations of the notion of resilience recently developed in Economic Geography, the paper investigates the sustainability and continuity of local development process based on a diversified industry. The small city of Vitré and its surroundings appears to match this description. They are not formed by a random productive organisation but by the social relations between various stakeholders. These relationships constitute an institutionalised and spatialised economical system.

The paper will present an original research carried out as part of an Action Research Practice program (ARP). The ARP has been co-constructed with local political and economical stakeholders, and funded by the PUCA (Planning-Urbanism-Construction-Architecture) of the French Ministry of Territorial Cohesion. Based on the method of “shared territorial diagnosis”, specific questions concerning non-industrial factors of the local industrial development were investigated. The various qualitative surveys conducted in this context identify the central role of social relationships inside the industrial system to strengthen the common responses to spatial and economical crisis and favorise the resilience of the innovative milieu.

The results underline the essential role of three non-industrial factors for the resilience of localised industrial system. The first is the role of local public policies, oriented towards economic success and employment growth, which creates a welcoming local base to industrial investments. The second is the efficiency of local employment policies that brings together job seekers and job offers, that expedites the functioning of the labor market. The third is the fluidity of social relationships between economical and political actors, which enhances decisions that favor industrial environment.

3611-An Analysis of Employment Change and Inequality A Bayesian Network Approach

Sungwoong Choi¹

Konkuk University Research Institute of Creative Contents Seoul-Korea, South¹

Manufacturing is considered a source of employment, providing relatively higher wages for less-educated workers. By doing so, goods-producing industries, including manufacturing, have positive impacts on reducing inequality in general. However, since 2000, the U.S. has been experiencing a drastic decline in manufacturing employment. In particular, labor-intensive manufacturing sectors are heavily affected by the expansion of imports from China and have a substantial decline. Furthermore the economic crisis in 2008 explicitly reveals a vulnerability of manufacturing sectors to unexpected shocks, aggravating the collapse of regional employment structure. As a result, regional economies that heavily rely on manufacturing activities have been hugely affected by the crisis and its aftermath. In addition, a growth of low-paying service jobs is observed after the decline, replacing the previous manufacturing employment and polarizing wage distribution. The lack of replacement jobs matching the quality of manufacturing employment loss makes regional resilience a key challenge for stakeholders. This study aims to examine the probability of increasing and decreasing regional income inequality with respect to manufacturing specialization and sectoral growth and decline by technology level between 2006 and 2016. Based on the Bayesian network model, regional economies which have a different type of manufacturing specialization by technology in the U.S. are investigated to demonstrate how and to what extent sectoral change influence income inequality. To examine this, manufacturing and service industries are classified into high-tech and traditional sectors, and the impacts of their changes on income inequality are explored respectively. The main findings of this study suggest that manufacturing decline regardless of technology level consistently shows higher probabilities of increasing income inequality.



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VIRTUAL

C.8.Environment Evolution Environment Evolution and Human Activity in the Holocene and Anthropocene

2676-Holocene fire history in the forest zone of European Russia influence of climate and human impact

Elena Novenko¹, Natalia Mazei¹, Dmitry Kupriyanov¹

Lomonosov Moscow State University Faculty of Geography, Department of Landscape Science Moscow-Russia¹

Fire frequency was reconstructed on the base of macro- and micro-charcoal concentration in peat cores from five key areas, located in different landscapes in forest zone of European Russia: southern part of Valdai Upland (the Central Forest Biosphere Reserve, south taiga), Meshchera lowlands and Mordovia State Natural Reserve (mixed coniferous-broadleaf forests) and Mid-Russian Upland (Kaluzhskie Zaseki State Natural Reserve, broadleaf forests). The obtained results showed that the beginning of human occupation of the areas is clearly marked by increased fire activity. Medieval time (at about 1000 cal yr BP) and Modern Period (the last 300 years) were marked by high fire frequencies all over the East European Plain. In the model area "Kaluzhskie Zaseki" a significant increase in fire frequency was revealed around 2000 cal yr BP (Early Iron Age) and the maximum frequency of fires (8 fires per 1000 years) was reconstructed for the last millennium. However, periods of increased fire activity occurred prior to the occupation of these areas by human. The highest frequency of fire in all model areas was determined for the periods 9000-6000 cal yr BP and 3500 – 2500 cal yr BP. Fire-free interval ranged from 15- 20 to 120 years. According to data available, the influence of anthropogenic factor during these time intervals was low. Archeological findings were not revealed in vicinity of the peat cores and no pollen or plant macrofossil indicators of human impact were detected. Evidently forest fires were caused by climatic reason. The regional climatic reconstruction inferred from pollen and testate amoebae data these periods revealed high temperatures and dry summer conditions. This work was supported by the Russian Foundation for Basic Research, projects 20-05-00234

2899-Geographical aspects of Spitsbergen environment transformation after the Little Ice Age

Wiesław Ziąja¹

Jagiellonian University in Cracow Institute of Geography and Spatial Management Krakow-Poland¹

Background

Intensive environmental transformation occurs in Spitsbergen due to global and local climate warming since the beginning of the 20th century, and especially in the 21st century.

Materials and methods

Landscape field mapping was the basic method of investigation of environmental changes, used by the author during his 15 summer expeditions since 1982. This was completed with analysis of the hitherto published papers and maps, radiocarbon dating, and interpretation of air photos and satellite images.

Results

Dramatic transformations of all the environmental components lead to significant changes in functioning of environment. The snow line (together with glaciers' firn and equilibrium lines) and upper limit of vegetation are being uplifted due to the temperature increase. Hence, accumulative zones and extents of glaciers, especially in their lower parts, are becoming smaller. Glacial recession generates big topographical changes. New deposits, landforms and water bodies appear in areas abandoned by glaciers if their bedrock is situated above the sea level (their bedrock below this level is being flooded by the sea). New unglaciated landscapes undergo pioneer animal colonization and plant succession, and soil formation begins there (the same refers to areas free of glaciers but devoid of plants due to severe climatic conditions before). The glaciers located newly below their equilibrium lines (after its uplift) begin to decline. A lot of glaciers change their type into a more simple one, e.g. valley glaciers into cirque or slope (hanging) ones.

Conclusions

Spitsbergen becomes much less glaciated. Some of its mostly glaciated regions are being transformed into mostly unglaciated ones. The active layer, thawing on permafrost in summer, are becoming deeper. All these changes lead to development of continuous tundra vegetation on the eastern coast and transformation of the southern Spitsbergen peninsula into a new island (if a cold climatic fluctuation will not appear).



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3027-From Vietnam to Tunisia anthropogenic pressure risks and forest plantations during the recent history

Amélie Robert¹, Brahim Jaziri²

University of Tours UMR CITERES (CNRS/University of Tours) Tours Cedex 3-France ¹ University of Tunis UR REDRU -Tunisia ²

Vietnam and Tunisia are southern countries, which both knew a tumultuous history, especially marked by the French colonization. But they are different, first from climate viewpoint (tropical for the one, Mediterranean for the other). We intend to compare their landscape dynamics since the beginning of the 20th century. We will based our talk on results, we obtained at local scale: Thua Thien-Hue province in Central Vietnam; the coastal dunes of the Governorate of Bizerte in northern Tunisia. The land use dynamics were mapped thanks to maps, satellite images and aerial photographs. We also conducted field studies and interviews with local people and forest managers.

We will show that, beyond climate differences, common points can be identified in terms of anthropogenic pressure and its links with risks. With a time difference, both countries knew a decline of their forest area, due to a strong pressure. The inhabitants, poor, needed forest resources for their survival and forests represented a land reserve. The consequence was an increase of poor ecosystems: spatial extension of savannahs in Vietnam, dunes moving in Tunisia. By destroying their environment, people put themselves at risk. In fact, due to the forests decline, risks increase and threaten the local population. Soil erosion is stronger, floods become more dramatic and fires are more frequent and important. The growth of the exposed population increases more again risks. In Tunisia, these ones were perceived at the beginning of the 20th century and the solution was to reforest dunes. The positive effects are now visible and encourage to continue in this direction. In Vietnam, the main plantation programs were launched from 1990's. Ambitious, they now concern considerable areas. Today, both countries know an increase of their forest area. They can serve as examples as forest plantations are encouraged worldwide to mitigate climate change.

3499-Environmental History And Human Impact Of The North Caucasus

Natalia Ryabogina¹, Eleonora Nasonova¹, Idris Idrisov², Aleksandr Borisov³

Tyumen Scientific Center SB RAS Department of Archaeological and Environmental Reconstructions nataly.ryabogina@gmail.com-Russia ¹ Dagestan Scientific Center RAS Institute of Geology Tyumen-Russia ² Pushchino Scientific Center for Biological Research RAS Institute of Physicochemical and Biological Problems of Soil Science -Russia ³

In this talk, we are going to introduce new paleoecological data of the North Caucasus and their comparison with the history of agricultural development in its Eastern and Central parts. Until recently, large-scale agriculture development in these areas was studied mainly on archaeological materials, and the environmental background as the human activity importance of the landscape's formation was hardly knowing. However, the deposits of two mountain swamps allowed us to obtain new reliable data for understanding the climate-related changes of vegetation and the human's role in the landscape transformation in these completely different regions of the Caucasus.

Recently, we received the first information about the environment changes from the Neolithic to the Middle Ages, including periods of human occupation and extensive agricultural terracing in the Middle Ages by peat sequence from the mid-mountain zone of the Dagestan. Second peat paleo-archive has been investigated in the centre of the Caucasus, it covers the first appearance of farmers in the Neolithic, deforestation at the Chalcolithic and significant expansion of agricultural terraces from the Bronze to the Middle Ages. The pollen data reflected notable differences in the climate and vegetation dynamics, especially in the rate of forest spread and variety of their composition of the Central and in the Eastern Caucasus. We compared the age and intensity of frequency of anthropogenic markers based on pollen and non-pollen data. It was found that periods of anthropogenic pressure did not occur synchronously in these parts of the Caucasus, and early agricultural signals still have no archaeological confirmation. The set of new paleoecological data, including the signals of agriculture and mountain-lowland pastoral mobility, consistently demonstrate several anthropogenic phases in the vegetation history in the late Holocene in the North Caucasus.

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VIRTUAL

C.9. Geographic Information Science Geographical Distances Measuring Mapping Theorizing

2026-MAPPING INTERACTIONS OF NATURAL ENVIRONMENT DYNAMICS AND HUMAN ACTIVITY IN WESTERN TURKMENISTAN DURING LATE PLEISTOCENE AND HOLOCENE

*Margarita Shangina*¹, R. N. Kurbanov¹, S. V. Shnaider², T. A. Yanina³, S. Alisher-kyzy²

*RAS Institute of Geography Moscow-Russia*¹ *SB RAS Institute of Archaeology and Ethnography -Russia*² *MSU Faculty of Geography -Russia*³

Background. Western Turkmenistan is one of the most interesting regions in Central Asia. The study's interest is caused by the active dynamics of the Caspian Sea level over the past 100 thousand years, when there were three major transgressions and three regressions. During the largest transgression, the level of the sea-level is reconstructed to grow up to 200 meters. This played a great role in the environment evolution in the region as. In addition to significant natural changes, Western Turkmenistan is an important region for the settlement and migration of ancient humans. Over 40 archaeological sites dated to various periods of the Stone Age were discovered in this territory.

Methods. We have analyzed the results of various paleogeographic and archaeological studies conducted during previous works. To study the natural environment evolution and its effects on the activity of ancient humans, the cartographic method has been applied, which allows to fully and clearly display the phenomena and processes dynamics. We used field research materials, satellite images, topographic maps, GIS systems and DEMs to create a series of maps Results. We created series of cartographic products describing different stages. Conclusion. There is a direct connection between the influences of the environment on the settlement of ancient people in Western Turkmenistan, illustrated in continental climate when ancient humans were attached to sources of fresh water, the presence of hunting grounds and sources of stone raw materials.

The natural environment in many respects influenced the settlement and migration of ancient people in the territory of Western Turkmenistan during the Late Pleistocene and Holocene. We single out the factors of environmental change that favoured the resettlement of ancient people (11-7 thousand years ago) and, conversely, could create barriers to resettlement (20-12 thousand years ago). This research was supported by RFBR (20-39-70020).

2036-THE 'INCENSE ROAD' FROM PETRA TO GAZA AN ANALYSIS USING GISCIENCE AND COST FUNCTIONS

*Motti Zohar*¹, Tali Erickson-Gini²

*University of Haifa Geography and Environmental Studies Haifa-Israel*¹ *The Israel Antiquities Authority Research Division talixgini@gmail.com-Israel*²

As early as the fourth century BCE, the Nabateans established the Incense Road to facilitate the transport of aromatic substances (frankincense and myrrh) from the Arabian Peninsula to the Mediterranean basin. An important part of this road was the segment between Petra and Gaza. Although well known, the accurate route of parts of the road is still not clear whereas Roman milestones are only present along small segments. In addition, significant portions of the landscape have changed dramatically in modern times, essentially wiping out the tracks of ancient roads (including parts of the Incense Road). In this study, we use GIScience and Least Cost Path (LCP) functions to reconstruct the original path of the Incense Road. The LCP was reconstructed in the manner of effort of the caravan along the way as well as in terms of least time spent. Additionally, we attempt to identify the factors influencing the establishment of the road and the trading patterns during two periods of its activity. The implemented analyses support the archaeological evidence of two travel phases between Petra and Oboda (Avdat). During the first phase the Nabateans used the Darb es-Sultan route while during the second phase, from the first century BCE onward, they passed through the Ramon Crater. It was also found that slope degree and the distance to water resources were dominant factors in establishing the Incense Road from Petra to Gaza. This is the first time such analysis is implemented for an ancient road in the region of the southern Levant and may be applied to other routes.



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2159-The Effects of Environmental and Personal Factors on the Selection of Evacuation Routes from the tsunami in the Great East Japan Earthquake

Yuk Iwai¹

*Univ. of Tsukuba Spatial Information Science Tsukuba-Japan*¹

Japan is a well known disaster-prone country. After the Great East Japan Earthquake, the City Bureau, MLIT, Japan conducted an evacuation survey of victims then published its result as "Digital Archiving of the Great East Japan Earthquake Survey." This study utilized the results of this huge and precious survey. More specifically, this study focused on the evacuation routes selection of the tsunami victims and analyzed the relationship between the attributes of evacuees and the environmental situations of them. The significance of this study is to clarify how evacuation behavior is governed by environments and persons.

The study area was selected in Ishinomaki City, Miyagi Prefecture. Because, the study area is situated in a flatland, the selections of evacuation routes are not dominant much on terrain conditions. Therefore various route choices based on preferences and experiences can be observed. Next, the evacuation routes of 45 people who evacuated alone on foot and moved more than 500m were targeted in this analysis to better examine the relationships between the route selections and the environmental conditions. Also, the relationship with personal attributes was considered. Finally, their evacuation routes were categorized. For the categorization, it was considered whether they used the nearest route or not as a criterion. The length of evacuation routes of each evacuee was measured by ArcGIS.

As the results, 11 people reached the designated evacuation facilities by almost using the nearest route while others used non-designated evacuation sites. The age structure in the group where those who reached the designated evacuation facilities by using the nearest route was dominated by 70 years or more. On the other hand, the non-designated evacuation sites were established mostly in hilly areas. Also, some evacuation routes towards the sea were observed. Further examination of those who did not choose the nearest route revealed some characteristics.

2724-Modeling the spatial heterogeneity of feature density in topographic databases based on landscape complexity and economic development measures

Timofey Samsonov¹, Olga Yakimova²

*Lomonosov Moscow State University Faculty of Geography Moscow-Russia*¹ *Demidov Yaroslavl State University Faculty of Mathematics -Russia*²

One of the unresolved methodological problems in geographical information science is vague and weakly formalized notion of spatial detail. Traditional concept of scale inherited from the era of manually drawn printed maps no longer acts as a representative measure of detail, since electronic map can be viewed at any scale. Up to the moment a limited number studies reported methods to formalize level of detail (LoD) of the topographic databases and to find LoD inconsistencies based on various distance, size, density and semantic measures. However, still there are no formalizations of LoD that will characterize the detail of a spatial feature, set or database in unambiguous way. One of the problems complicating such development is a spatial heterogeneity of the landscape. Highly complex landscapes, either natural or transformed by human, require more spatial information to represent them adequately in a spatial database. That means that feature density in data covering mountainous and urban landscapes will contain more information than in data covering large water bodies and uninhabited places – at the same level of detail. Therefore feature density alone is not a reliable measure of level of detail. However, there is an obvious correlation of feature density with landscape complexity and economic development of the territory. In the current study we propose a regression-based model which predicts relative feature density (normalized on the mean) in a given spatial extent using the abovementioned factors as independent variable. Middle- and small-scale Russian digital topographic maps are used as input data. Landscape complexity is assessed using information theory indices applied to 100 m resolution Copernicus Global Land Cover raster dataset, while the level of economic development is parameterized based on official regional statistics. The study was supported by the Russian Foundation for Basic Research grant No. 18-07-01459.



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2887-Applying aerospace technologies to improve the efficiency of identification and monitoring the territories of oil spills on the Absheron peninsula.

Natavan Jafarova¹

*ANAS Institute of Geography Baku-Azerbaijan*¹

Many countries in the world with oil and gas deposits are highly dependent on these resources. Azerbaijan is one of these countries. Intensive oil production since 1993 raised the country's economy to a high level. Due to this industry, other industries began to develop. Unfortunately, oil and gas production has environmentally dangerous consequences. The Absheron Peninsula is rich in oil fields. The main problem is that many of them are old and have not been used for a long time. Old deposits need special control. The situation is aggravated by the fact that the capital of Azerbaijan, the city of Baku with a population of more than 3 million people, is located on the Absheron peninsula. Therefore, in this work, we used modern technologies for the identification of oil field territories. Monitoring the impact of oilfield activities on the environment and public health is most effectively carried out by means and methods of remote sensing, aerospace research using geoinformation technologies. In the article possibilities of widening areas of space technologies on the basis on integration with geoinformational technologies are showed on the examples of different models of using satellite information in oil field industries. Aerospace research and geoinformation technology will create a database containing information on old and new oil fields. In the future, this base will serve to eliminate environmental consequences in these territories and prevent its settlement. The methodology used in this work should be used not only in the oil sector but also in other sectors with environmental consequences.

3427-USING COMMUNITY DEVELOPMENT MAPPING TOOLS TO INFORM THE PUBLIC AMID COVID 19

Sumac Cardenas Oleas¹, Angela Johnson¹, Justin Krohn¹

*University of Missouri CARES Extension Columbia-United States*¹

The COVID-19 virus and its effects will have long term consequences on the well-being of communities in the United States and around the world. Access to reliable and up-to-date information about healthcare, education, and the economy is crucial for the planning and engagement of local, state, national, and international communities. Our team of geographers, and data and geographic information specialists at the Center for Applied Research and Engagement Systems (CARES) collect, analyze, and distribute reliable and current information at no cost to assist with community development and resilience in the US. This presentation describes our initiatives at CARES and the lessons learned from creating and providing tools through ArcGIS and other visualizing platforms. For instance, we created informative Dashboards to illustrate the importance of broadband access and food distribution during a pandemic. Our FoodFinder mapping tool facilitates the sharing of information for and about farmers and local food providers to promote their products, purchasing options, and days of operation. We also created Story Maps to demonstrate the importance of access to mental health resources and tools for recovery such as Opportunity Zones to bring investments to low-income communities. Access to timely and reliable information through ArcGIS and other visualization tools can help communities find and understand at-risk zones and opportunity areas, which in turn guide governments and organizations to better engage and distribute resources. Overall, this presentation contributes to community development efforts by small organizations to assist with the long-term well-being of local communities in the United States and globally.



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3686-UNDERSTANDING THE EVOLUTION OF RIVER BASINS USING GEOMORPHOMETRY IN REGIONAL SCALE

EMRE ELBASI¹, HASAN OZDEMIR¹

ISTANBUL UNIVERSITY GEOGRAPHY ISTANBUL-Turkey¹

Geomorphometry, as a quantitative land-surface analysis tool, has been widely used in geoscience. However, the studies examined just a couple of river basins, especially in Turkey. Region-scale analysis helps understand the evolution of the land. In this study geomorphometric analysis applied on Marmara Sea River Basins (NW-Turkey), which covers about 40 square kilometres, point of understanding their morphometric characteristics, quantitatively. Drainage density, bifurcation ratio, Gravelius index, texture ratio and hypsometric integral are the selected analysis for the study. Results reveal that a total of 632 river basins with an area of more than 1 square kilometre poured into the Marmara Sea. In the study area, river basins are both approaching equilibrium and tectonically active are located together. The basins closest to the equilibrium is the Karamandere Basin, located on the Biga Peninsula. While the basins in the Western Bosphorus and Armutlu Peninsula are longitudinal, the basins in the south of the Marmara Sea are more rounded. The hypsometric integral values are higher in the İzmit Gulf, Gallipoli Peninsula, south of the Ganos Mountain, and the Kapıdağ Peninsula, and are lower in the southern basins. The study results show that basins located north of the Marmara Sea are tectonically younger, shallower, and longer with lower drainage densities than the southern basins.



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C.10. Geography for Future Earth Coupled Human Earth Systems for Sustainability Coupling Human and Environment System for Sustainability Theory and Practice

1101-Promoting Geography for Sustainability

Wenwu Zhao¹, Bojie Fu¹, Yanxu Liu¹

Beijing Normal University Faculty of Geographical Science Beijing-China¹

Human interactions with Earth systems have accelerated dramatically in recent decades. Human activities are altering the Earth system and exerting significant impacts on the environment, and undermining improvements in human wellbeing and poverty alleviation. In order to secure global prosperity and transform to global sustainability, United Nations launched the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development in 2015. The goals include efforts to eradicate extreme poverty and to consolidate efforts to slow climate change and preserve our world environment. The process of implementing the SDGs has created new challenges for policy makers and for the scientific community. Half of the Sustainable Development Goals are related to environment and natural resources. Geographical Science is one of the most important KEY for sustainable development. Geographers have been conducting various experiments and modelling at multi-scales, and tried to identify the relationships between human activities and various earth surface processes, dwell on ecosystem processes and ecosystem services trade off at multi-scale, model the effects of human activity and earth systems, and try to figure out the possible sustainable solutions for regional, national and global developments. It's time to launch a new journal focus on Geography and Sustainability for the world. That's why, Faculty of Geographical Science (Beijing Normal University) start to publish the new journal: Geography and Sustainability. The new journal focus on: Geographical processes, Human-Environmental Systems, Ecosystem services and human being, Sustainable development, Geo-data and model for Sustainability. The new journal is also the office journal for IGU Commission on Geography for Future Earth: Coupled Human-Earth Systems for Sustainability.

1443-Partitioned responses of ecosystem services and their relationships to human activities in the Belt and Road region

Yanxu Liu¹, Jixing Chen¹

State Key Laboratory of Earth Surface Processes and Resource Ecology Beijing Normal University Beijing-China¹

Human activities directly or indirectly cause changes in ecosystem services as well as in the relationships among ecosystem services. However, the linear and nonlinear relationships between human activities and ecosystem services are still unclear when considering the large geographical differences. In this study, four ecosystem services (ESs), including habitat quality (HQ), soil retention (SR), water yield (WY), carbon sequestration (CS) and the total ESs, were measured in the Belt and Road region in 2015. We mapped the tradeoffs among ESs and the partitioned responses of the total ESs and ES tradeoffs in response to human activities (i.e., population density, GDP density, and nighttime light) using piecewise linear regressions at different scales. Then, the geodetector method was introduced to detect the major driving factors. The four findings were as follows: 1) The regions with low values for the 4 ESs were consistently in arid areas, and the distribution of the areas with high values of ESs was apparently heterogeneous. 2) The responses of the total ESs to the GDP and nighttime light each had a partitioned threshold. However, there was a positive linear relationship between the population density and the total ESs in the whole region. At the national scale, the responses of the total ESs to human activities were more obvious in China compared with those in Russia and India. 3) The partitioned thresholds were obvious in the impact of the GDP on the tradeoffs among ESs. 4) Population density was a major driver of ESs and the tradeoffs with q values greater than 0.4. The findings of this study contribute to the exploration of the influence of human activities on the total ESs and the tradeoff between ESs, thereby providing spatial information to promote the construction of a green Belt and Road region.



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1912-Network of comprehensive researches and education for restoration and sustainable land management of degraded landscapes in Asia and Africa

Toshiya Okuro¹

*The University of Tokyo Department of Ecosystem Studies Bunkyo-ku-Japan*¹

Land degradation causes reduction or loss of the biological or economic productivity and complexity, resulting from land uses or from processes arising from human activities and habitation patterns. As land degradation is also defined as “the processes of landscape changes caused by miss-match between natural land conditions and land use by human”, it is necessary to reconstruct new land use systems based on new human-environment relations which can realize sustainable use of ecosystem services. Sustainable Land Management (SLM) has become a mainstream concept to combat desertification, and defined as a set of technologies, policies and activities to achieve sustainable land productivity, livelihood and environmental conservation through appropriate soil and water management.

In recent studies, we have been trying to provide guidelines for the ecosystem restoration and the sustainable resource use in the rangelands of Asia and Africa. To achieve this purpose, we integrated ecological knowledge regarding ecological restoration and develop restoration measures that could facilitate restoration of ecosystem services.

This paper introduces case studies on SLM approaches, focusing on human-environment relations, or social-ecological systems. Firstly, I introduce modelling of nomadic pastoralism under non-equilibrium environments and elucidation of land degradation processes in Mongolian rangeland. Specifically I focus on “key resource” concept and show the importance of the appropriate management of key resources. Secondly, I show a concept and methodology of grassland management systems in consideration of biodiversity-ecosystem functioning relationships. More specifically I emphasize the importance of detecting threshold changes of ecosystem functioning. Finally I conclude that prescriptions for combating desertification should be considered based on understanding of heterogeneity of coupled social-ecological systems. I would also like to propose future perspectives of researches and education which should be further developed, and implication to SDGs by introducing recent activities of GLP Japan office and related communities.

2103-A Preliminary Study on the Integration of Land System and Ecological Services

Erfu Dai¹

*Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences Lhasa Plateau Ecosystem Research Station, Key Laboratory of Ecosystem Network Observation and Modeling Beijing-China*¹

Geography focuses on the interaction and feedbacks between humans and nature on the earth's surface. Research on man-land relationship has long been the core of geography. The land system composed of natural subsystems and social subsystems is a prominent manifestation of man-land relationships. As global environmental changes continue to intensify, the need for comprehensive integration of multi-factor changes in land system research is increasing. The land system is considered as a typical complex system. Agent Based Model (ABM) developed from complex systems theory provides a new perspective for the study of land systems and widely used recently. With a bottom-up model framework, Agent based models can simulate the macro-land change by representing the behaviors and decisions of numerous micro-agents. It is a promising tool to explore the land-use change mechanism by reproduces the land change processes. Ecosystem services are the benefits that humans gain from the natural environment and from properly-functioning ecosystems. ecosystem services are categorized into four broad categories: provisioning, regulating, supporting and cultural. There are trade-offs or synergies between different ecosystem services types. InVEST model, ARIES model and other tools have been widely used to quantify ecosystem services and their trade-off and synergies. The goal of the ecosystem service trade-off study is to pursue a win-win situation for ecological protection and economic development, and to achieve comprehensive benefits optimization. Integrating research on land systems and ecological services helps to couple the components of social systems and ecosystems, explains the human-land interaction mechanism, and further provides new ideas for realization of the sustainable development goals.

2394-Sustainable landscape management from science to action

Daniela Ribeiro¹

ZRC SAZU Anton Melik Geographical Institute Ljubljana-Slovenia¹

To meet growing demands for food, fresh water, timber, fibre and fuel, humans have changed landscapes, over the last century, more rapidly and extensively than in any other time in human history. Land use changes have contributed to substantial net gains in human well-being and economic development. However, these gains have been achieved at a high cost in the terms of loss of biodiversity and degradation of ecosystems.

Human induced changes in landscape are increasing the vulnerability of the Slovenian landscapes leading to on one hand, land abandonment in rural and marginal agricultural areas, and on the other to the agricultural intensification. These changes are compromising the harmonic proportions between cultivated land, settlements and forests, questioning not only the sustainability of present landscapes but also their long-term sustainability.

The main objective of this research is to make landscape management operational and useful in the context of policy making for sustainable development. This placed-based research attempts to provide key content knowledge to bridge the science and the practice and enhancement of sustainable development, exploring case studies represented by Slovenian landscapes going through different transformations.

The overall procedure of the methodology included a 3-phase approach. The first phase aiming to understand the landscape structure and land use changes in relation to timeline, the phase 2 aiming to explore and designing landscape alternative scenarios, and the phase 3 to designing sustainable landscape management strategies for the landscapes selected.

This research is contributing to closing the gaps from previous case studies on the importance of landscape ecology to sustainability science and policy making, by closing the gap between theory and application. Results expect to demonstrate how pattern-process dynamics interact with societal processes, to deliver collaborative decisions by local stakeholder groups, and to impact the scientific knowledge on local landscape policy and land use changes.



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3436-Multimodal approach to estimation of carbon cycle in agrolandscapes

Olga Sukhoveeva¹

*Institute of geography, Russian academy of sciences, Laboratory for anthropogenic changes in the climate system, Moscow-Russia*¹

A multimodal approach is offered – the joint use of simulation models, carbon calculators and statistical methods to analyze sources, causes and intensity of GHG emissions in crop production and animal husbandry, as well as to create a strategy and practical recommendations for reducing them in agriculture. Such a complex approach is important because each model or calculator is characterized by specific mathematical structure, different equations, mistakes, distinct input parameters, time scales and based on various field experiments.

We chose three models that were successfully approbated and applied at the national and local levels around the world: DNDC, RothC, T&P.

DNDC was parameterized to estimate components of the carbon cycle in arable soils of the European Russia. It was applied for retrospective analysis (1990-2017) of soil organic carbon, soil respiration, and net ecosystem exchange in the Central Forest zone.

This model was for the first time applied in the Central Asia for the estimation of CO₂ balance of pastures. It successfully reproduced net ecosystem exchange in Uzbekistan for the period of 1998-2001.

The method of preparing input data for RothC for arable soils of the European Russia was developed. Later DNDC and RothC were used to reconstruct dynamics of soil organic carbon and CO₂ emission from arable chernozems under five crops in Kursk region over 1990–2018.

The use of GHG calculators to estimate carbon footprint at farm level is especially relevant in animal husbandry. The widely used Cool Farm Tool, AgRE-Calc, Farm Carbon Calculator, and EX-Act were analyzed for their effectiveness to assess emissions from livestock in Russia by the examples of three farms in order to develop recommendations to reduce GHG footprint.

The study was supported by the Russian Science Foundation project no. 20-76-00023 and the state assignment for the Institute of Geography RAS no. 0148-2019-0009.



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C.11. Geography of Governance Citizen Participation in Urban Governance Formal and Informal Community Engagement in Local Government Policies

1358-Citizen Participation in Urban Planning in Portugal 1920 2020

Carlos Nunes Silva¹

*University of Lisbon Institute of Geography and Spatial Planning Lisbon-Portugal*¹

The paper explores, assesses and discusses the nature of citizen participation in urban planning in Portugal in the last century. The aim is to examine the different forms of citizen participation that have been considered and implemented, its purposes, and its impacts in the formal urban planning decision-making process. The paper addresses the following research questions: 'What has been the nature of citizen participation in each main period in the history of urban planning in Portugal in the last century?'; 'What has been the role of citizen participation in each period?'; 'What have been the real impacts of citizen participation in each of these periods?' and 'What are the prospects for citizen engagement in the current spatial planning system? The study answers these questions based on empirical evidence - legal planning framework, procedures and tools, evaluation of these procedures - for each main period considered. It examines and discusses the nature of the planning system in the country, the role assigned to citizen participation in each specific planning system, in the last century, the variables that influenced citizen participation, and the practical outcomes of citizen engagement in the planning and management of cities and other human settlements. Among other findings the study shows how citizen participation in urban planning in Portugal in the period 1920-2020 had a very limited influence in plan making and in plan implementation, never reaching, or only in a very limited way, the upper tiers in the Arnstein' ladder of citizen participation, a pattern that seems to be changing on a number of dimensions.

2053-Local Governance and the Challenge of Territorial Justice

Ivaldo Lima¹

*Fluminense Federal University Geography Rio de Janeiro-Brazil*¹

In this paper, the central question approaches the challenges of territorial justice imposed on local governance. According to expert authors, governance in general terms could be defined as the process of coordination of actors aiming to develop social, intellectual, political and material capital and coordination of territorial development based on the creation of cohesion territorial at different levels. In a more operational definition, territorial governance can be seen as an organizational mode of collective action based on partnerships between public and private actors and coalitions geared towards commonly defined objectives. In its turn, the idea of local governance refers to the set of formal and informal norms, structures and processes through which local actors collectively solve their problems and address social needs. It is an inclusive process that constitutes a critical factor in the construction and maintenance decent society, to use the notion defined by Avishai Margalit. We define territorial justice as an application of the principles of social justice to the territory, and as a socio-spatial strategy aimed at eliminating oppressive spaces. We understand that local territorial governance guided by the principles of territorial justice is one that potentiates, mobilizes and articulates four major logics of citizen intelligences - consensus, dissent, resumption and conflict - aiming at combating oppressive spaces. Our empirical context is the complex metropolitan space of Rio de Janeiro, Brazil. In this sense, we aim to underline that local political networks act as effective operators for local governance guided by the principles of territorial justice and decent society.



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2584-REFRAMING GLOBALIZATION LOCALIZATION NEXUS BASED ON THE ROLE OF LOCAL CREATIVITY INITIATIVES INSIGHTS FROM THE CASE OF ATHENS GREECE

Georgia Tseva¹

*Harokopio University Geography Athens-Greece*¹

Background/Hypothesis: This paper makes use of the globalization-localization nexus in order to investigate the impact of socially innovative practices of artistic or other creative character in local governance restructuring as a step towards the reverse of crisis implications in Athens, Greece. In the case of Athens, economic crisis exacerbated to social, economic and political problems further combined with phenomena of lack of trust, policy ineffectiveness and ideological ruptures in the institutional-governance system. What is more, economic crisis was manifested with an extreme housing and retail market crisis, abandonment, vacancy and decline trends. In this context, after also the official end of recession in 2018, policy-making at the national level started to respond with further financial and economic integration into international markets receiving hence considerable criticism regarding its disregard of dynamic local-based development strategies.

Materials/Methods: Using secondary socio-demographic and economic data as well as primitive data drawn from interviews with key informants, the paper aims at exploring firstly the patterns of crisis-related integration to global markets and thereafter addressing the prospects of integrating local-based initiatives into the institutionalized system towards the direction of a development strategy relevant to local needs.

Results: Divergence between crisis-driven responses and social consensus increases fragmentation caused both by alternative initiatives and the institutionalized system. In particular, all actors are trapped in between the absence of a purposive integral planning strategy and the lack of creativity's systematic integration towards new forms of sociability. **Conclusions:** Based on this exploration, the paper denotes the importance of a more active integration of arts-related initiatives as the basis for the enhancement of local capabilities along with their actuation into the institutionalized system.

2974-A Study on Micro Regeneration of University Unit Community in the View of Property Rights

Lingjin Wang¹, Xiao Wu¹

*Southeast University School of Architecture Nanjing-Jiangsu Province-China*¹

On the background of national urbanization and urban development transformation, the change of property rights of Unit Community has resulted in a new structural relationship and order, and the spatial form of traditional Unit Community has been unable to meet the development needs of modern communities. This study summarizes complex property right changes of University Unit Community, and concluded a series of problems coming from complication of personnel structure, property right management responsibilities blurred, and space boundary fragmentation, and further analyzes the update of existing operation mode. On the basis of analysis of property rights change process, concept of Micro-Regeneration has been introduced. Adhering to the operating principles of "different property rights ownership, different sources of funds and management, and different regeneration means", this study establishes universal Micro-Regeneration operation and pattern framework by 4 steps: (1) Analysis of property right characteristics and current mode; (2) Construction of Micro-Regeneration operation mode; (3) Micro-Regeneration system integration by stages; (4) Micro-Regeneration implementation feedback. The above framework emphasizes different sources of funds and division of management rights and responsibilities in the regeneration process of different property rights, and constructs the implementation project system of different property rights, aiming at providing reference and guidance on the path for the regeneration of universities from the community perspective. However, since the application of the concept of micro-regeneration in China is still on the exploration stage, and there are few successful practice cases. This study is only aimed at the specific type of university unit compound and whether this concept can be extended to the renovation of other unit compound needs more practical verification.



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3155-Participation cost and the self exclusion of the community participation in decision making process. Experiences in flood prone urban area in Surakarta Indonesia.

Mustika Anggraeni¹

*University of Amsterdam Human Geography, Planning and International Development Studies Amsterdam-The Netherlands*¹

Less literature discuss how we finance community participation process. This research aims to describe the process of participation in urban flood prone area and how the cost of the involvement shape the decision-making process in both structured problem and unstructured problem. This research applied in-depth interviews to the key stakeholders in Semanggi, Surakarta, Indonesia. Transcribed interview was coded and analyzed in Atlas.ti.0.8. The unstructured problem arises on the flood infrastructure project, the dike along the river. The existing houses along the site need to be relocated and or consolidated. Most of the community resisted the government planning. The stakeholders involved in this process were varied; low level of trust and the certainty of knowledge to settle this problem was high. In the second case, there was a government project to repair the drainage system, and its affected a community. This case characterized by less stakeholder involved and the knowledge to solve the problem was more precise. The participation process in unstructured problem described that the cost of the involvement was also higher because (a). the complexity of the problem needs more intense participation events; (b). more stakeholders involved in the process, cause a more extended process (c). the anxiety of the individuals due to uncertainty of the output and frustration because not all of the preferences of the people accommodated. On the other end, the structured problem shaped fewer participants willing to take part, because the community perceived that the problem had been taken care of by the government and community leaders, therefore the participation level and cost was lower. Due to higher participation cost in unstructured problem, and low willingness in the structured problem case study, there are evidences that people choose to exclude them self in the process.

3516-LANDSCAPING SENSITIVE CARTOGRAPHY AS PRACTICE OF COMMUNITY GOVERNANCE OF TERRITORY. THE CASE OF MAGNIFICA COMUNITÀ DI FIEMME TRENTO.

Cristiana Zorzi¹

*University of Rome Tor Vergata Department of History, Culture and Society Ziano di Fiemme-Italy*¹

The Magnifica Comunità di Fiemme is an ancient institution that plays an important political, social, and cultural role in Fiemme Valley, a well-known tourism destination of the Eastern Alps, between Dolomites and Lagorai Chain, in Trentino. Its history boasts centuries of care, protection, and development of its own territory: over 20,000 hectares with an agro-forestry-pastoral vocation, including numerous properties. Its forests have always been crucial for the economy of the Valley: both as the main raw material's supplier, and – for their enchanted appearance that tells plots of narratives – as tourist attraction.

We can say that it is in the dialogue with the forest that the local population built its manner of inhabiting the territory: it is not exclusively a question of forest management as the forest is a condition and affects its inhabitants' lives. The Storm Vaia is an example, an environmental catastrophe which has profoundly changed the landscape and the conditions of the forest's management. The currently health crisis is also part of the discourse, highlighting the need to move towards a rethinking of the manners of inhabiting the Earth.

In the context of crises, the Magnifica Comunità di Fiemme – due to its statutory features – rediscovers itself as a privileged device of governance for the implementation of concrete actions on the territory. To ensure the sustainability of these actions, a participatory approach is required, which seems intrinsic to the values of the institution itself.

The contribution aims to investigate how sensitive cartography – a complex system of analysis, representation, and co-construction of landscape that fits into the discourse of non-representational theories and landscaping practices – can support participatory governance of the territory. Therefore, we want to demonstrate its effectiveness through studies conducted on the territory in the context of Applied Geography or Géographie Action.



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VIRTUAL

C.11. Geography of Governance Climate Policy and Local Governance

1060-Climate Change Adaptation What Place in the Territorial Planning in Morocco

Mohamed JADAQUI¹, El Hassane EL MAHDAD¹, Lakbir OUHAJOU¹, Abdellatif ROMAN¹

Université Ibn Zohr Géographie Agadir-Morocco¹

Because of its geographical location, Morocco is a largely exposed country to the effects of climate change. Droughts and floods constitute two major phenomena affecting the whole country and creating serious impacts on its economy, society, and environment due to excessive exploitation of its natural resources. As a result, such overexploitation reduces the productive capacity of the environment, exposes the region to desertification, and makes the population directly vulnerable to poverty. In this context, adaptation strategies are developed to promote territorial resilience: National plan to fight against climate change, declined in regional plans to promote the adaptation. So what evaluation can we make of this process?

Souss-Massa Region, especially Chtouka Ait Baha province, offers a significant case for evaluating the place of adaptation actions in territorial planning. Located in the heart of the Arganeraie Biosphere Reserve, this province is subject to serious environmental pressures due to the adoption of an unsustainable economic model. The objective of this contribution is, therefore, to highlight the role of climate change adaptation policies in territorial planning, starting from the assumption that there is a phase difference between the awareness of territorial actors in relation to disruptions climate change and the translation of this awareness into perceptible actions in territorial programs and action plans. To verify this hypothesis, we have relied on the analysis of the study of the Provincial Development Plan and the communal action plans, the results of the workshops organized in the framework of spatial planning, and development studies as well as those interviews with local elected officials. The conclusions of this collective reflections confirm that natural resource management systems adopted by local actors and public authorities suffer from the lack of good governance and management of territorial development, while the achievements of local know-how adaptation to climate hazards are being lost.

1149-Assessing Climate Change Vulnerabilities of Ontario's Rural Populations

Fatih Sekercioglu¹

Ryerson University School of Occupational and Public Health Toronto-Canada¹

This presentation enhances the understanding of climate change effects on rural residents in Ontario, Canada. Rural areas are often categorized as vulnerable due to their large geographic area, inadequate public transportation, and lack of access to health services and community resources when compared to their urban counterparts. Among rural populations, individuals that work outside, the elderly, infants and children, and individuals with chronic illness or disabilities experience considerable difficulties in responding to the effects of climate change. Rural residents may have less access to community supports than those in urban centres due to greater distance from community centres and their neighbours. There is a knowledge gap concerning the experiences of rural populations to extreme weather events including flood and drought, extreme heat or cold, increased prevalence of vector-borne diseases such as Lyme Disease and West Nile Virus, provision of safe drinking water, food safety and security, access to healthcare and social support. There is a significant portion of rural populations whose livelihood depends on their farming activities, where climate change effects impact significantly. Our study uses focus groups, a commonly used qualitative method in public health research, to explore the challenges of rural populations within the context of climate change. Five focus group sessions organized at rural library locations bring rural residents together to discuss their day to day challenges. The results of the study yield fruitful results that can be used by policy makers to revise the existing policies. Municipalities and local public health organizations should also revamp their efforts to address the adverse effects of climate change on their communities.



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VIRTUAL

C.11. Geography of Governance International Cooperation of Local and Regional Authorities

2729-Cross border relations in the Pamir mountains

Paul Fryer¹

*University of Eastern Finland Geographical and Historical Studies Joensuu-Finland*¹

The north-eastern Pamir Mountains, comprising the ethnic Kyrgyz-inhabited area of rural Murghab district of the Mountainous Badakhshan Autonomous Province of Tajikistan, has long been associated with the Pamir Highway, an ancient Silk Road trade route that was popularised in the nineteenth century at a time of the 'Great Game' and the British and Russian Empires' scramble for influence in the region. Though administratively attached to Tajikistan in Soviet times, the region has relied on its Pamir Highway link to southern Kyrgyzstan for its basic needs. After the collapse of the USSR in 1991, when a 'hard' border was erected between the newly-independent republics, uncertainty developed over the future of the region and the transport corridor. Established economic links along the Highway to the Kyrgyz city of Osh were weakened during a period of instability (the Tajik Civil War), which resulted in the condition of the Highway deteriorating. The region was re-orientated towards distant Dushanbe, the national capital, causing great hardship in the region and initiating a steady out-migration of young people. Only recently has the relationship with Kyrgyzstan been re-affirmed, partly supported by an increase in foreign tourism along the Pamir Highway. In this paper, I examine the cross-border relations between Murghab and Kyrgyzstan that have emerged since 1991 and ask how has the local community been rebuilding the links to the outside world? What new opportunities have inhabitants found that make the most of their place in a border region? Research for this paper was conducted in Murghab and Osh in the summers of 2017 and 2019.

3094-GOVERNANCE OF ENVIRONMENTAL CERTIFICATIONS IN THE SPINY LOBSTER VALUE CHAIN IN QUINTANA ROO MÉXICO.

Victor Manuel Velazquez Duran¹, Rocio Rosales Ortega²

*UNAM Geography Mexico City-Mexico*¹ *UAM Iztapalapa Human Geography -Mexico*²

This paper compares governance trajectories of environmental certification in a context of spiny lobster fishing developed in the Sian Ka'an and Banco Chinchorro Biosphere Reserves in Quintana Roo, México. We were particularly interested in understanding the process of the construction of the legitimacy of environmental certifications through the complex negotiations that took place among the various actors involved and the government agencies that intervened in instrumenting the standards on various territorial scales.

Two Conservationist Civil Associations (Ecosustainables and Community and Biodiversity, COBI) have implemented platforms for dialogue and collaboration in order to respond effectively to the specific problems and needs of local fishers. However, these two groups have followed distinct trajectories as they seek to augment their credibility and legitimacy in local governance. While COBI is building-up a roundtable with emphasis on representing and including the diverse actors that make up the lobster value chain at the local and regional levels, Ecosustainables constituted an advisory council based on the exclusion of the fishing cooperatives that lack the necessary capacity to respond to the quality regulations of sustainable markets. We conclude that the scopes of environmental standards are determined by their ability to gain acceptance and authority in the decision-making processes related to the access and exploitation of natural resources in particular territorial contexts.

The present study is based on 36 semi-structured interviews with representatives of the Environmental Civil Associations, leaders of and fishermen affiliated to local cooperatives, and members of the governmental agencies involved in these initiatives, complemented by secondary sources concerning the history of the two initiatives of certification.



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VIRTUAL

3449-A Reflexion about the Water Diplomacy in the Transboundary Basin of Incomati in Southern Africa

Hagira Gelo Machute¹

*Universidade Pedagógica de Maputo Geography Maputo-Mozambique*¹

Diplomacy in the world in general has always been based on the realist principle, giving priority to the agenda of the States the issues of high politics that reside in the questions of State security. Today, diplomacy has faced new challenges linked to the rise of issues previously considered as low politics - not associated with State security, which a posteriori proved to be essential for it as an example the refugee crisis, natural disasters, climate change and the environment. Also the world is experiencing technical, economic and politics changes that reconfigure the understanding and the form of power exercise in the world. Once, the power that is self-centered in the State, today, get an expression of the others actors, putting bland actions (soft power) as agreements, associativisms and dynamics of cooperation and on the other hand, putting tough actions (hard power) marked by the imposition of economic restrictions. It is on this path that southern African countries are bypassing their diplomacy to these new challenges that have emerged. These new challenges are limited to transboundary water resources that are shared between States. This paper aims to describe the diplomacy between the States regarding the sharing of the Incomati basin, highlighting the theories of water diplomacy, the hydropolitical security complex and the valuing non-state groups that support the reality under study. In an attempt to answer the power interactions between States, the present paper aims to present some considerations about the category of power that are placed at the interface of research in geography and international relations.

3459-GOVERNANCE OF ENVIRONMENTAL CERTIFICATIONS IN THE SPINY LOBSTER VALUE CHAIN IN QUINTANA ROO MÉXICO

ROCIO ROSALES ORTEGA¹, VICTOR VELAZQUEZ DURAN²

*UAM IZTAPALAPA SOCIOLOGY Mexico City-Mexico*¹ *UNAM GEOGRAPHY victoraztzyan@gmail.com-Mexico*²

This paper compares governance trajectories of environmental certification in a context of spiny lobster fishing developed in the Sian Ka'an and Banco Chinchorro Biosphere Reserves in Quintana Roo, México. We were particularly interested in understanding the process of the construction of the legitimacy of environmental certifications through the complex negotiations that took place among the various actors involved and the government agencies that intervened in instrumenting the standards on various territorial scales.

Two Conservationist Civil Associations (Ecosustainables and Community and Biodiversity, COBI) have implemented platforms for dialogue and collaboration in order to respond effectively to the specific problems and needs of local fishers. However, these two groups have followed distinct trajectories as they seek to augment their credibility and legitimacy in local governance. While COBI is building-up a roundtable with emphasis on representing and including the diverse actors that make up the lobster value chain at the local and regional levels, Ecosustainables constituted an advisory council based on the exclusion of the fishing cooperatives that lack the necessary capacity to respond to the quality regulations of sustainable markets. We conclude that the scopes of environmental standards are determined by their ability to gain acceptance and authority in the decision-making processes related to the access and exploitation of natural resources in particular territorial contexts.

The present study is based on 36 semi-structured interviews with representatives of the Environmental Civil Associations, leaders of and fishermen affiliated to local cooperatives, and members of the governmental agencies involved in these initiatives, complemented by secondary sources concerning the history of this collective trademark.

Keywords: Governance, environmental certifications, roundtables, advisory councils, legitimacy.



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VIRTUAL

3533-The international rescaling of cities through city to city cooperations

Ninon Briot¹

*EVS-UMR 5600/ENS de Lyon Geography LYON-France*¹

Background/Hypothesis

The aim of this communication is to highlight that city-to-city international cooperations are increasingly important at an international level. The amount of cooperations between cities has surged since 1950. Cities have recently become important international actors. This increasing influence enables cities to develop a "city diplomacy". Cooperations between cities seek to exchange 'good practices' about a wide range of themes. Nevertheless, those cooperations are also a mean for cities to gain influence at the international level. This research aims to test the concept of rescaling, which has been used by Nicolas Escach to show how cities use international cooperation to be more important in the urban hierarchy and more influent.

Methodology

To test this concept, two databases have been made: one that census European cooperation projects financed by the cohesion policy (Urbact and Interreg C), and one that census international city associations. These databases are analysed through network analysis in order to measure the structure of the cooperation networks. Furthermore, interviews were made with French cities, French institutions, international city associations and European cooperation programs in order to confirm statistical results.

Results and conclusion

The first results confirm the relevance of rescaling. Indeed, important cities in those networks are secondary cities in the urban hierarchy. The concept of rescaling supports the idea that cities use cooperations to gain influence and visibility.

The second results show that city-to-city cooperation forms regional levels networked by these cooperations. The European level is particularly important.

The last results show the impact of covid-19 on those cooperations, which did not ease relations between cities but reinforced cities' need to exchange as to crisis management. Those cooperations are a mean to claim the importance of cities, which were, according to them, more qualified than States to respond to this crisis and to international problematics as a whole.



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VIRTUAL

C.11. Geography of Governance Local Government Reforms Decentralization Versus Centralization

1359-Local Government in Angola Cape Verde and Mozambique 1975 2020

Carlos Nunes Silva¹

*University of Lisbon Institute of Geography and Spatial Planning Lisbon-Portugal*¹

This paper examines, compares and draws lessons from the implementation of local government systems in three Lusophone African countries – Angola, Cape Verde, and Mozambique - in the period post-independence (1975-2020). The paper addresses the following research questions: 'What is the type of local government in these countries and how did each of them evolve since independence in 1975?'; 'What are the main similarities and differences in these three local government systems and how important have been for the governance of cities?'; 'What are the main characteristics of the recent local government reforms?'; 'What are the expected impacts of these reforms in the capacity of municipalities to govern cities and other human settlements in these three countries?'. The study answers these questions based on empirical evidence from the postcolonial period, namely the post-colonial local government acts, local government finance, and other legal frameworks related to municipal competences, in particular in the field of spatial planning. Two main sub-periods are considered in the post-colonial period: first, the revolutionary period, or 1st Republic, characterized by a single party political regime, centralized administration and by the nationalization of the main economic sectors; second, the democratic period, or 2nd Republic, characterized by a multi party political regime, decentralization and market economy. This study has also in consideration the inherited colonial local administration culture and institutional structure, which somehow influenced the early organization of sub-national tiers of government in these three countries after the independence. Among other findings the study shows how the institutional models of local government and central-local relations evolved in the last four and half decades, and the opportunities and challenges confronting sub-national tiers of government in these countries, in particular the challenges with which the implementation of recent decentralization reforms is confronted.

1520-Toward periurban regimes to engineering local sustainable development policies

BRUNO LOUSTALET^{1, 4, 4}

*ENTPE EVS-RIVES Vaulx-en-velin-France*¹

The three Acts of Decentralization in France reveals a co-production of "governance by projects" between the State and the territories as well as the gradual sliding of state rescaling governance over the time of the financialization of the economy and increasing importance of sustainable development challenges.

The first two acts of Decentralization in France (1981 and 1999) greatly contributed to the fragmentation of territories by dispersing their economic development governance on all scales of territorial organization. They have contributed to the institutionalization of political regimes, particularly in the peripheral territories of metropolitan areas. Political ecosystems made up of coalitions of local actors have mobilized economic activity in a differentiated way to create specific territories in their own area.

Act 3 of decentralization, embodied in the NOTRe law (2015), seeks to correct the asymmetrical effects in terms of territorial sustainable development by recentralizing economic competence and articulating it around intercommunalities and regions.

The peri-urbanization is investigated within the french decentralization institutional process (1981-2015) and public policies governing due to mobility and urban sprawl mainly. Thus a process of redistribution of institutional skills is at stake within the territorial development.

- (1) The comparative study of three peri-urban areas within the eastern sector of the Lyons Metropolitan Area in France allows us to examine how economic development drives coalitions of actors and questions their ability to make political territory in response to the challenges of sustainable development in order to gradually build up specific peri-urban regimes ;
- (2) Public policies in peri-urban territories are investigated through a process of appropriation of engineering resources governing coalitions to appropriate response to the contradictory injunctions of the State in matters of sustainable development as far as they are concerned with Agenda 2030..



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VIRTUAL

2328-From decentralization to centralization. Reform experiments in Hungary

Laszlo Kakai¹

*University of Pécs Political Science and International Studies Pécs-Hungary*¹

The strengthening of the local municipalities until today and the (almost continuous) changes in their role is practically in line with the permanent repression of the public services provided by the state and the extension of market circumstances. Until the economic crisis in 2008, the importance of state re-distribution increased in almost each of the developed countries, more and more nation state functions were centralized under the authority of international organizations, and the "curtailment" of the national governments' authority brought about the strengthening of the local state, i.e. the municipalities

From our perspective, the course that the municipality system has run within the relation system of central power since the transition era is a core issue. How did the relationships of the centre and the municipalities change from the transition until 2010, when the government considerably transformed this system of relations and even the municipality level itself (in a historical way and at a scale similar to that implemented at the dawn of the transition)? Thus, in this presentation, the interrelation of centralisation and decentralisation is basically determined by the question of which public services were provided at the central or governmental level and which ones were implemented at the regional or local level?

For independent research we examined how the population perceived access to local public services and what subjective population expectancies were associated with the objective conditions of the system of public services. How important is it for them whether the given service is provided by the state, the local authority, a non-profit or a for-profit organisation?

2782-Party Factionalism and the Transformation of Local Environmental Governance in Urbanizing China The Politics of Sponge City Constructions in Shanghai and Guangzhou

Shih-yang Kao¹

*Xi'an Jiaotong-Liverpool University Urban Planning and Design Suzhou-China*¹

Party Factionalism and the Transformation of Local Environmental Governance in Urbanizing China: The Politics of Sponge City Constructions in Shanghai and Guangzhou

Shih-yang Kao
Department of Urban Planning and Design
Xi'an Jiaotong-Liverpool University,
Suzhou, Jiangsu Province
P.R. China
Email: Shihyang.Kao@xjtlu.edu.cn

Abstract

Studies about China's contemporary urban processes have been dominated by the narrative of local state corporatism which often assumes the regulatory role of the central state. And yet, the recent resurgence of the one-man rule in the country's political economy suggests a continuous evolving culture of governance that local authorities deem to face. Drawing in a detailed case study of the 'Sponge City' construction fever that has recently swept across major Chinese cities including Guangzhou, Shanghai, and many others, this research highlights the growing influence of party factionalism on urban environmental governance. Through analyzing results from in-depth interviews and recent policy and planning documents, the research identifies an intriguing local environmental governing process in which local adoption of the 'sponge city' idea has been driven in part by new political agendas tailored around the reshuffling of the central party leadership. In other words, the sponge city construction fever is a process of urban environmental development informed by not only market and environmental analyses but also political considerations. In these terms, particularities in the local environments are often relegated to a secondary matter in decision-making processes. Theoretically, this paper addresses the importance of geo-political economic thinking in the studies of contemporary urban changes.

Keywords: Chinese Urbanization, Central-local State Relationship, Urban Environmental Governance, Sponge City Construction, Party Factionalism, Geo-political Economy



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VIRTUAL

2786-Centralization under decentralization The process and impact of the reform of fishers' club in Lesvos Greece

Seishiro Sakita¹

*National Museum of Ethnology Department of Modern Society and Civilization Kyoto-Japan*¹

It is widely accepted that a participation of local community in resource management system is greatly important for its success. However, when some communities are integrated into certain management system, we may overlook other communities that are missed or marginalized from the mainstream. This study presents the recent trend of fishers' clubs (FCs) in Lesvos, Greece, exploring how local communities responded to and were overwhelmed by the reform of national administration system. Lesvos is the third-largest island in Greece located in the north-eastern part of Aegean Sea. Local economy in Lesvos, especially in the rural areas, largely depends on small-scale fisheries such as gillnet, longline, or dive fishing. Some fishing villages had managed their own FC, a sort of mutual-aid group formed by local fishers which is supported by the producers' union law. In 2013, however, all 17 FCs in Lesvos were consolidated into one large-scale organization. During a field survey, semi-structured interview with local fishers was conducted in 17 fishing villages wherein local FC was established in the past. Registration record of the FCs achieved by the local court was collected in order to identify the name, location, and establishment/termination year of each FC, although it was fragmented and some FCs did not appear in the record. As a result, it was suggested that the FC consolidation was induced by the major reform of Greek administrative division in 2011 (Kallikratis reform). After the consolidation, some fishers argued that large-scale FC gained more political power to negotiate with the government. However, some fishers in isolated villages complained that their voice has been weakened due to the centralization of FC under the decentralization process of administrative system.

3119-Regional inequalities and decentralization. The case of the Central and Eastern European countries

Tomasz Kossowski¹, Pawel Motek¹

*Adam Mickiewicz University Faculty of Human Geography and Planning Poznan-Poland*¹

The purpose of the study is to determine the relationship between decentralization and regional inequalities in the Central and Eastern European countries. Results of the research presented in many papers, do not lead to clear conclusions. Depending on the approaches, the number of countries, the level of their socio-economic development, we can observe that decentralization leads to an increase in regional inequalities, as well as to their reduction in some situations. Studies also emphasized that this relationship may take the form of an inverted U. In the case of the CEE countries, results of previous research are usually very general, ignoring diversity of these countries and treating them as one homogenous group. However, socio-economic transformations in these countries followed different models. As a consequence of this fact, decentralization reforms were different among CEE countries, economic growth was different, and it resulted in various size of regional inequalities.

In this research, we try to verify hypothesis that the relationship between decentralization and inequality will be best explained by the Kuznets curve in Central and Eastern European countries. To do this, we have created a panel database covering the countries of Central and Eastern Europe in the years 1990-2016. According to many previous studies, this database contains four groups of measures related to different aspects of decentralization and inequalities. Using it, we have run a model describing the impact of decentralization on the level of regional inequalities. Due to the presence of spatial effects, the model has been estimated in several variants. For this purpose, classical and spatial econometrics methods were employed. The model approach was also used to verify the hypotheses about the change in inequality over time according to the Kuzniec curve and, the impact of economic growth on these changes.



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3180-Influence of Consolidation of Municipalities on Local and Community Governances of Peripheral Areas A Case Study of Sasebo City Japan

Yosuke Maeda¹, Kaoru Mitani²

*Niigata University Faculty of Education Niigata-Japan*¹ *Fukuoka Prefectural University Faculty of Integrated Human Studies and Social Sciences -Japan*²

The study examines how consolidating municipalities have affected the local and community governances of the peripheral areas of the new local autonomy by a case study of Sasebo City, which is located in western Kyushu, Japan. In many countries, municipal mergers have frequently been used as a means of promoting administrative and financial efficiency and rationalisation. In this respect, Japan has repeatedly experienced municipal mergers. Recently, one of the largest scale nationwide consolidation of municipalities, which is called the 'Heisei Great Merger', was implemented in the 2000s with the encouragement of the central government. Therefore, the number of the lowest tiers of local autonomy, such as cities, towns and villages, decreased from approximately 3,250 in 1999 to 1,742 in 2011. Although previous studies have discussed the financial and political impacts of municipal mergers, we explore how mergers have changed the local and community governances of the peripheral areas of the new local autonomy. Specifically, we focus on the former Uku Town area in Sasebo City, which has incorporated six small peripheral towns, including Uku, between 2005 and 2010. Sasebo City and other towns display large differences in terms of population. The population of the former Sasebo City area was 228.2 thousand in 2015, whereas the population of each incorporated town ranges from 2.2 thousand to 6.2 thousand. In particular, Uku is a remote island 50 km away from the centre of Sasebo City and is deemed a peripheral area in terms of demography and geography. Although governances exist at the local (island) and community levels before and after consolidation in the island, their multi-level structures have become complicated and experienced a significant reduction in decision-making and political representativeness. Finally, we investigate how the extent of 'governances without decision-making' influences the consensus building and well-being of the peripheral area.



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VIRTUAL

C.11. Geography of Governance Migrants and Refugees Democratic Rights in Local Governance

1646-The European and Israeli front against migration from punitive to positive policy trajectories

Lilach Lev Ari¹, Arnon Medzini²

*Oranim, Academic College of Education Sociology Yokneam-Israel¹ Oranim, Academic College of Education Geography
arnon@oranim.ac.il-Israel²*

Over the last four years, forced displacement has reached the highest recorded level since World War II. The numbers of refugees and asylum-seekers across the globe have increased dramatically. When considering migration, migrants generally react both to push and pull factors. Forced migrants, particularly refugees, react to push factors in their countries of origin.

As the movement of civilians across borders has increased, several countries have turned to walls and other security infrastructure to control access to their territory. Building anti-immigrant fencing has become the political strategy favored by nations convinced that barriers are the preferred way to deal with forced unauthorized migration. The purpose of this presentation is to analyze and discuss contemporary international (forced) migration by comparing Europe and Israel regarding policy trajectories and the efficacy of border control in preventing forced migrants from arriving in these countries. Nevertheless, although walls do not address the origins of tensions or conflicts, countries continue to roll out more of the same in response to the escalating "refugee crisis." If walls did not work in the past, and today only work to divert, not prevent, migrant flows—while simultaneously having a grave human cost—why have so many gone up in the past 30 years?

Our conclusions are that walls tend to create the illusion of a safe solution for the powerful people on the "good side" by separating "us" from "them." Meanwhile, people living on the "wrong side" of the wall often focus on planning dangerous ways of getting around it by tunnelling under it or crossing the dangerous seas. We propose a positive policy that will require international, inter-regional and local interventions and cooperation. This policy might replace the reproduction of the "illegality industry" with an alternative global model for mobility.

2488-ROHINGYA MIGRATION TO INDIA PATTERN AND SOLUTION

Nazir Akhtar¹

H.D.JAIN COLLEGE, ARA Geography Patna-India¹

The Rohingya are an ethnic group, who have lived for centuries in the western state Rakhine (Arakan) of Myanmar. In 1982, the government of Myanmar slipped the name of the tribe from the list of gazetteer and snatched all their political and socio-economical rights. On the contrary, the security forces brutally suppressed them and they became homeless in their own country. According to United Nations report, about 700,000 Rohingya had been driven out of Rakhine state till September 2018. To escape ongoing violence and persecution in the country, thousands of Rohingya migrated to other countries like Sri Lanka, Pakistan, Saudi Arabia, Malaysia and Nepal but most of them settled in Bangladesh. There is an estimation about 18,000 Rohingya refugees registered with United Nations High Commission for Refugee in India. Here, they reside in four main locations—Hyderabad, Jammu, Nuh and Delhi. This research paper will be based on qualitative and quantitative study. The primary data will be collected on the basis of survey conducted among major areas with Rohingya population. Magazines, relevant books, United Nations High Commission for Refugee reports, newspapers and research papers will be the part of secondary data. The main objective of this study is to focus on their migration pattern and solution. International and regional societies like United Nations Organisation, Association of South Asian Nations and South Asian Association and Regional Cooperation may pressurize the Myanmar for solving the Rohingya migration with repatriating policy and prevent their harassment and persecution in their homeland. South and South Eastern countries should focus on their migration on international forum and appeal for stopping genocide which is taking place in Myanmar.



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2914-Changing Multicultural Governances a case study on Ansan's Multicultural Special Village

Kwon Heo¹

Seoul National University Geography Seoul-Korea, South¹

Recently the proportion of foreigners living in Korea is steadily increasing, leading to various multicultural communities throughout the country. As these communities develop, some can now be observed through a certain place that has been named after the multicultural community. This place-making process is successfully formed through a governance based on everyday multiculturalism among the immigrants and formal residents. When this community becomes an independent place, however, the relationships between the actors seem to change into a hierarchical manner. This paper takes notice of this phenomenon and traces the relationships among the actors within the governance of an multicultural community, particularly focusing on the policy direction changes within certain actors. The case study was done in Ansan's Multicultural Special Village, because it is the oldest and largest immigrant community in Korea.

After research, I was able to divide the actors into two groups: the public, which mainly covered policy issues to improve immigrants' status in Korea, and private, which supported the immigrants everyday lives such as language or health care. It was shown that the actors were linked through a everyday multiculturalism based governance model at first, as the actors listened to and prioritized immigrants needs. But after the place was designated as a Multicultural Special Village, the amount of financial aid from the public actors increased, increasing its power as well. This changed the egalitarian governance into more of a top-down relationship where the private actors became more dependent to the public. The power change provoked conflicts among public and private actors, which eventually slowed the development of the community.



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VIRTUAL

C.11. Geography of Governance Shrinking Cities Expanding Metropolises Depopulated Villages The Governance Responses

1639-How the control of sprawl challenge the metropolitan governance. Rabat and Lyon two cases two models of governance a same suburban challenge!

Maryame Amarouche¹

ENTPE - Lyon University Geography Vaulx-en-Velin -France¹

If the fight against sprawl makes consensus into urban policies, locally this international injection has many social, environmental and spatial effects. Deeply linked to the urbanisation process and imposed by the aim of a more sustainable urban development, the question of a metropolitan governance crosses the globe.

Thanks to the comparison of two metropolitan regions: Lyon (France) and Rabat (Morocco) this presentation interrogates the ideal "scale" of metropolitan governance. Challenged by the rise of outer suburban municipalities we will see how policies against sprawl seen as being "against suburbs" are used by them and empowered them. This reflexion is part of a doctoral research based on one hundred semi-structured interviews with public urban planners, real estate developers, consultants and elected representatives.

In our two contexts, the institutional frame of a metropolitan governance is under construction and more and more challenged by peripheral municipalities development. In the case of Lyon, thanks to the decentralisation, municipalities get a strong power and the state support the structuration of metropolitan institutions: the "greater Lyon" for Lyon metropolitan area and intercommunal organisations for other municipalities. Our case study i.e West-Lyon peripheral municipalities in opposition to the Lyon growth strategies decide to fight sprawl by protecting their environmental living and agricultural lands. In Rabat, decentralisation favoured the prefectural and regional level which weakening the communal scale of decision. Here, the fight against sprawl is a State fight against "informal" settlements which justifies the construction of public housing mostly in the peripheral municipalities. However, these actions allowed peripheral municipalities to earn a demographic advantage and support their rise into the city-capital and State controlled metropolitan governance.

Going beyond these differences, this presentation will show up peripheral municipalities experimentations to take part to the metropolitan decision making and how they are transforming the metropolitan governance.

2272-Evaluating the Effectiveness of Spatial Planning Policy on Mitigating Extensive Urban Expansion. A Case Study of Cianjur Regency Indonesia

Anoraga Jatayu¹, Ernani Rustiadi¹, Didit Okta Pribadi²

IPB University Soil Science and Land Resource Management, Regional Planning Division Bogor-Indonesia¹ Indonesian Institute of Science Research Center for Plant Conservation and Botanic Garden -Indonesia²

Spatial Planning Policy has always been used as the main tool to govern regional growth in Indonesia. While it might be effective in some regions, the rigid nature of Indonesia's spatial plan might prove to be one of the constraints in managing regions with high Spatio-temporal dynamics. Cianjur Regency as one of those regions faces a great challenge, concerning its planning policy and its growth. This region is currently undergone major transformation from a hinterland area of Jakarta Metropolitan Area (JMA) to become one of the outer urban core of said metropolitan, characterized by its growth as a polycentric region with the emergence of newly established urban areas. This research aims to evaluate Cianjur's spatial planning policy as one of the regions that experience significant urban expansion processes from Jakarta-Bandung Mega-Urban Region (JBMUR). The effectiveness of spatial planning is evaluated by comparing existing land-use and regional typology using Rustiadi's Spatial Clustering Method, against land-use plan and regional typology based on Cianjur Regency's spatial planning policy 2011-2031. The result shows that the spatial plan failed to control the overall scale and distribution of urban expansion. Around 40% of the rural area has transformed into peri-urban and urban areas, following the expansion of core urban area. From the pattern of existing urban and the planned urban area, it shows that the spatial plan understate the extent of potential expansion coming from Jakarta Metropolitan Area (JMA) from the west, and Bandung Metropolitan Area (BMA) from the east, given the geographical location of Cianjur Regency as the southern corridor of JBMUR. Given the planning period of Cianjur Regency spatial planning that is still for another 10 years, major adjustment is needed, whether to conform and embrace the urban development or to stick with the current plan and working towards limiting further growth.



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3439-Urban shrinkage as a challenge for policy making and planning comparative perspective on approaches from the European Union

Bozhidar Ivanov¹

*Technische Universität Kaiserslautern International Planning Systems Kaiserslautern-Germany*¹

Urban shrinkage represents a constellation of ongoing changes that manifest with different severity in cities and regions. With effects on urban fabric, economic development and social factors, scientists have long attempted to 'diagnose' shrinkage in a robust way. Yet, when looking from the perspective of policy making and planning, understanding shrinkage remains difficult and so do the responses to it. European cities and regions have been experiencing shrinkage and the consequences of population decline for a long time. Some of those responses have prompted discussions for the possibility to identify new planning approaches to dealing with shrinkage. To what extent, however, have those responses been guided by a unifying idea, a planning concept? How has shrinkage been framed in policy and planning approaches in different contexts in the European Union and how has this interpretation affected the approaches to it?

Applying interpretive policy analysis as a discourse analytical technique to policy and planning efforts from the Netherlands, Germany and Spain, this presentation outlines the interdependencies between the effects of shrinkage on urban and regional scale and the solutions that have been identified in the respective cases. By introducing a post-positivist approach to the question of handling urban shrinkage, the preliminary results of this ongoing research outline the conceptual heterogeneity of shrinkage as a challenge for policy and planning. In addition, based on a comparative methodology, the research juxtaposes the various approaches in the different cases of handling urban shrinkage and attempts to establish a reference framework, informed by techniques of policy benchmarking

Further reflection on this framing and comparative analysis enables the identification of possible future approaches to urban shrinkage, potentially in the form of a new planning concept under the label of "Shrinking Smart" in the context of the European Union.

3545-LOCAL GOVERNANCE FOR TERRITORIAL AND SOCIAL COHESION IN SMALL DEPOPULATED MUNICIPALITIES A CASE STUDY.

Ángel Iglesias Alonso¹

*University Rey Juan Carlos Political Science Madrid-Spain*¹

In Spain, territorial and social inequalities derived from infra-municipalism and concentration-urbanization processes have been exacerbated since the economic and financial crisis of 2008. In order to be able to account for the negative implications of such a process, both public and private actors and civil society itself need to develop governance capacities to implement territory-based partnerships, and to design strategies that democratically mobilize small local governments to develop, implement and adapt social cohesion policies. To this end, based on a representative sample of small municipalities in three Spanish provinces, we identify the specific factors crystallized in the municipal and provincial processes that hinder the effective development of public policies and initiatives aimed at reducing territorial inequality and improving social and territorial cohesion. To do this we used a qualitative methodology based on conducting semi-structured interviews and focus groups with critical actors involved in the governance of the sample of small municipalities. The general hypothesis is that the different forms and levels of local governance influence decisively and differently the economic and social development and explain, the uprooting and emptying of the territories. These imbalances generate not only an increase in public expenditure and in the inefficiency and ineffectiveness of local public policies and the provision of public services, but also in the quality of democracy. Our paper shows how local governments, as experts, are decisive actors in the generation of collaborative networks with other administrations for the mobilization of endogenous resources that generate social and territorial cohesion.

Finally, in our paper we will also incorporate the description and analysis of successful solutions or "good practices" that we can identify, thus providing knowledge transfer to institutional decision makers.



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C.12. Geography of Information Innovation and Technology Information Innovation and Communication Geograph

1003-Helsinki Metropolitan Area as a knowledge intensive location

Tommi Inkinen¹

*University of Turku Brahea Centre Turku-Finland*¹

This presentation focuses on geographical analyses of innovation, economy and technology in the Helsinki Metropolitan Area (HMA), Finland. It provides empirical research results on 1) technology clusters and innovation cores, 2) solutions to promote knowledge based growth and 3) the role of spatial scales in economic geography of cities. Geographical concepts are widely used in the analyses and debates surrounding innovation and spatial knowledge resources. Knowledge creation and innovation production show that knowledge transfer processes and innovation system practices are spatially interlinked. Local action can be regionally, nationally or internationally motivated. In these debates, national and regional categories are the most employed. In order to cope with the dynamics of urban development and growth, it is important to have both a theoretical and empirical understanding of the spatial processes that are taking place in technologically advanced cities. This presentation combines various spatial analysis tools in order to provide an extensive and multidimensional view of the HMA as a smart and knowledge intensive urban environment. In addition, the focus is on urban and regional dimensions of knowledge-based growth. As an example, previous and on-going development projects and efforts manifest urban renewal where technological progression has a major part. These developments may be associated with smart mobility and Internet-of-Things (IoT). The integration of technology into urban form will become increasingly important topic for the future urban studies. The dynamic properties of urban and spatial development enable new potentials for both theoretical and empirical tool development. Particularly, spatial innovation system approaches are needed in order to systematize these complex research problems.

1891-SPATIAL SCIENTOMETRICS ANALYSIS ON GLOBALIZATION OF RESEARCH ACTIVITIES A CASE STUDY OF JAPAN

Kuniko Matsumoto¹

*National Institute of Science and Technology Policy (NISTEP), MEXT Research Unit for Science and Technology Analysis and Indicators Tokyo-Japan*¹

In recent years, the globalization of research activities is advanced. In terms of international collaboration, the number of internationally co-authored papers is increasing worldwide. The development of remote communication technologies such as Skype has facilitated connecting between international co-authors. In terms of international knowledge diffusion, the digitization of journals and the Open Access (OA) movement make it more easy to access foreign papers. And thereby they also promote foreign papers citation.

In this context, which is international co-authoring or international citation more globalized? Is geographical proximity more important in international coauthorship because international coauthorship requires closer communication between authors than in international citations?

In this study, we analyze countries that frequently co-author with Japan and countries that frequently cite Japanese papers by spatial scientometrics methods. We use the co-author and citation data of Japanese paper published in 2014 which are recorded in the Scopus database.

As a result, it was clear that many Asian countries/regions, which are neighbors to Japan, frequently co-author with Japan and frequently cite Japanese, by compared with countries/regions in the other area. These suggest geographical proximity promotes both international citation and international co-authorship. In addition, it was shown to be Asian countries/regions accounted for 44% in the top 20% of countries/regions frequently co-authored with Japan. On the other hand, Asian countries/regions accounted for 52% in the case of international citations. These results suggest that international co-authorship is more localized than international citations and that geographical proximity strongly influences international co-authorship. In other words, it suggests that international citations are more globalized rather than international co-authorship.



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3337-DETERMINATION OF LEVELS OF ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) IN THE POPULATION OF IXIAMAS SOCIAL CONSTRUCTION PROCESSES

Patricia Llanos¹

*Universidad Mayor de San Andrés POSTGRADE LA PAZ-Bolivia*¹

The incursion of Information and Communication Technologies (ICT) in the world is reconfiguring almost all areas of life in society. This foray into the digital age has great influence in the national context. We are facing a new culture that involves new ways of seeing and understanding interpersonal communications of universal scope and informs about "everything".

On the scale of the study of the population of Ixiamas, we can see that the incursion of ICTs has had different repercussions, one of which is reflected in the fact of the social reconfiguration processes that are being developed. Different groups of actors are adapting these tools to their daily lives, giving rise to different ways of establishing the social processes known so far as: personal relationships, establishing business or perceiving the notions of space and time.

Although technological progress has been accelerated, there are few studies that reflect the influence on the social environment. Then this research is presented as a contribution to analyze social processes from the geographical perspective, and to publicize the relationship of the incursion of these tools with the environment of the population of Ixiamas.

In 2009, with the arrival of cell phone and internet to this population, a new stage for interaction begins, it is from this date that more changes are seen within the actors and their way of Perform usual activities. It is the technology that allows everyday events such as interacting with other people to acquire a new connotation, because it develops in a new space generated by the incursion of technological tools, this space created by technology, where relationships can lead to out, regardless of place and time.

C.12.Geography of Information Innovation and Technology Smart Development and Growth in Cities and Regions

1163-Regional structure of the inheritance of local traditional performing arts Case study of the Kagura dance form in Iwami Japan

Kenta Yamamoto¹

*Kokugakuin University Depart of Economics Shibuya Ward-Japan*¹

This presentation focuses on the consciousness of the inheritors of the traditional Kagura dance form in Iwami, a peripheral region in Japan as a case of the use of traditional performing arts as resources for tourism and evaluates the information communication tools that form a part of the cultural inheritance in a peripheral area. We also present the results of surveys and interviews with inheritance groups, as well as the regional structure that sustains such groups.

It has long been known that peripheral regions, not only in developed countries but also in some developing countries, are witnessing depopulation, and thus, the process of the inheritance of traditional culture is affected. The Iwami region in Shimane Prefecture in Japan is one of the region that suffering significant depopulation, a declining birthrate, and an aging population. We describe the inheritance structure of a traditional dance form, Iwami Kagura, in the region. In this dance form, new costumes have been actively assimilated and dancing styles developed after the modernization period began in the Meiji era in the mid-nineteenth century. In recent times, some inheritance groups in this region have recorded their dance for young members of the group and have streamed their performance on the internet. They have also translated descriptions and explanations of the dance into English. They are utilizing information technology to ensure that it can be passed on to the next generation and can continue to attract tourists. Some inheritance groups continue to be maintained in spite of depopulation, a declining birthrate, and an aging population in the region.



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2268-Identification of Dynamic Functional Regions and Spatial Interactions in A City Based on Taxi Trajectories

Jun Xu¹, Ju Liu¹

Institute of Geographic Sciences and Natural Resources Research State Key laboratory of Resources and Environmental Information System Beijing-China¹

Urban spaces have different functions, and the main functions of a region dynamically change over time during a day. People move between different places in a city for various activities whose trajectories imply the functions of regions and the interaction between regions in a city. This paper aims to find out the dynamic functional regions and the human interactions among them in a city by analyzing the spatial-temporal pattern of residents' trips with taxi trajectory data and check-in text data on Sina Weibo, Twitter of China. First, we employ tensor decomposition model to handle the taxi OD data from multiple dimensions, including day dimension, hour dimension and space dimension, and reveal the temporal and regional patterns of residents' trips; Then, we use check-in text data of Sina Weibo to obtain the dynamic functions of each region. Finally, we propose a semantic-based trajectory clustering algorithm to merge semantic similar trajectories and reveal the interactions between different regions during different time periods. By trajectories clustering and visualization, we find out that each type of functions is more active on weekdays except that residential, educational and commercial regions are more active on weekends. The trajectory clustering results show that the interactions between working and commercial areas are most popular on weekdays, while the interactions between residential and commercial areas are most popular on weekends. On weekdays, residential areas, working areas, commercial areas and medical areas are always the hotspots of pick-ups and drop-offs. On weekends, residential areas, commercial areas, educational area, medical areas and scenic areas become the hotspots of pick-ups and drop-offs.

3077-The Impact of Information Technology and Business Processing Outsourcing (IT BPO) on the Development of Next Wave Cities in the Philippines

Arianne Dumayas¹

Chuo University Faculty of Global Management Tokyo-Japan¹

Information technology and business process outsourcing (IT-BPO) remains to be fastest growing industry in the Philippines. In recent years, IT-BPO industry generated around 20-25 billion dollars revenue annually and provided more than 1 million employment. Given the steadfast growth and economic contribution of IT-BPO industry, it has been recognized as an important driver in achieving the elusive goals of sustainable and inclusive development. To further strengthen the IT-BPO potential to diffuse growth and development to the secondary cities or areas outside the capital Metro Manila, the government, in partnership with the private sector has instituted the Next Wave Cities Program in 2007. The program aims to help prospective investors identify alternative destination and to develop the capacity of potential locations. The Next Wave Cities were selected using a scorecard based on the following criteria: availability of talent, presence of infrastructure, good business environment, and cost competitiveness. The program also classifies the cities into three different categories: centers of excellence, next wave cities, and emerging cities. This paper aims to examine the effect of the IT-BPO industry on the secondary cities that are identified in the Next Wave Cities Program. This paper also analyzes the historical transformation of IT-BPO industry in the Philippines. Through the Next Wave Cities Program, the selected cities were able to increase investments, create additional employment opportunities, and improve local business environment. The Next Wave Cities accounts now for 25% of total employment in IT-BPO industry. Cebu, Davao, Iloilo, and Bacolod are consistently listed in the Tholon's Top 100 Global Outsourcing Destination.



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3646-How Artificial Intelligence is applied in Smart City Initiatives to Combat COVID 19

Zongtian Guo¹

Trinity College Dublin Geography Dublin-Ireland¹

Cities around the world are piloting combinations of technologies to develop smart cities. To date, many cities have created and implemented policies and programmers intended to transform them into a smart city. More importantly, smart city technology can bring not only extensive benefits for cities but also the countryside through actively engaging citizens participating in the governance of their city. Based on the findings of Yigitcanlar, it can be argued that the future technological infrastructure of a smart city is essentially based on AI-enabled innovations, however, no scholarly work has provided a comprehensive review of the topic yet. Moreover, with the rise of the concept of a citizen-centric smart city in recent years, how artificial intelligence and smart city technologies can address social needs become a research hot-spot. However, to date, lacking a clear understanding of how to apply artificial intelligence to meet the needs of citizens in theory.

Using Guangzhou, the largest city in the south of China, the research will establish the key components and factors in how artificial intelligence technology is applied in Guangzhou's smart city initiatives to meet the needs of citizens. The target participant for the research will include the citizen in the Guangzhou metropolitan area. The research will employ the use of both quantitative and qualitative methods of data collection. The web-based questionnaires will be used to collect quantitative data for the research. In terms of qualitative data, the research will be addressed by policy analysis and case study. Meanwhile, the purposive sampling method will be employed to select participants for the semi-structured interview and focus group.

Overall, the findings the research will contribute theoretically and empirically to the "AI in the smart city" academic debate by providing a fuller and more critical understanding of the relationship between artificial intelligence technologies and smart city.



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C.13. Geography of Tourism Leisure and Global Change Bigdata in Tourism Geographies

1195-INFORMAL TOURIST ACCOMMODATION AIRBNB AND MUCH MORE IN WALLONIA AN APPROACH VIA MOBILE TELEPHONY DATA

Nyns Symi¹, Schmitz Serge¹

University of Liege Geography Liège -Belgium¹

Background/hypothesis

Tourism is undergoing major changes because of the volume of innovations that are intended for it. Approached as a vector of development, tourism sets off many questions as to how it is redesigned and decided. The sharing economy is part of these innovations.

This research focuses on the implications of the sharing economy for tourism and destinations. While several researches highlight the economic and social impacts related to the “new” accommodation, the knowledge of the distribution of overnight stays is currently falsified because national organisms fail to consider the huge diversity of less formal accommodation.

Materials and methods

Wallonia, as case study, allows to analyse informal tourist accommodation in small and medium cities as well as in rural areas that are, or are not, considered as tourist destinations. To understand the influences of the development of “new” accommodation on host communities, a first step consists in studying their location and spatial expansion schemes using data from mobile telephony and to conceptualize and give the green light to the data. The second step is to consult databases relating to exchange platforms as well as official statistics of tourism. These data are compared with the location data from mobile telephony.

Results

In accordance with the General Data Protection Regulations and technological limits, we developed with the mobile operator, Proximus, the definitions required to generate the algorithm to obtain tourists' overnight stays and arrivals data. It results that tourist overnight stays would be 3 to 4 times more numerous than what is reported in official statistics and that the distributions are localised throughout Wallonia.

Conclusions

The paper presents and discusses the methodology used to analyse tourist accommodation from mobile data and the results from the comparison with official and exchange platforms databases.



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2000-Short term effects of social media image on hotel industry performance

Tomasz Napierala¹, Katarzyna Lesniewska-Napierala¹, Maciej Adamiak²

*The University of Lodz Faculty of Geographical Sciences Lodz-Poland*¹ *SoftwareMill Big Data & ML -Poland*²

The goal of the paper is to identify short-term effects of social media image of urban tourism destinations on performance of hotel industry. The area of this enquiry covers five biggest Polish cities: Warsaw (the capital), Cracow, Lodz, Wroclaw and Poznan. On the one hand, social media image was identified by the analysis of sentiments and topics of Tweets posted between 1st of March and 30th of September 2019, and affiliated with any mentioned urban locations. The data was gathered and analysed in realtime by utilizing Twitter streaming API. Sentiment and topic datasets have been acquired by applying a pretrained machine learning classification model developed for the purpose of this study. On the other hand, following hotel performance indicators were considered: average daily rate (ADR), occupancy, and revenue per available room (RevPAR). Dataset with daily calculated, mentioned indicators for investigated cities, during considered time of analysis. was delivered by SHARE Center of STR Global Inc. Generalized method of moments (GMM) was applied to diagnose short-term effects of sentiments and topics of Tweets on hotel industry performance. The linear dynamic panel models describing influence of number of Tweets related to sentiments (positive, negative, and neutral) and topics (politics, life and society, sport, technology and science, travel and tourism, and other) on each considered hotel performance indicator were estimated. The research was granted by The National Science Centre of Poland as a part of the project entitled "Social media and the economic efficiency of hotels. Urban context" under the agreement No DEC-2018/02/X/HS4/02063.

2005-Comparative analysis of urban tourism in Hungary with the use of mobile positioning data

Zoltan Kovacs¹

*University of Szeged Economic and Social Geography Szeged-Hungary*¹

The use of tracking technologies in travel and tourism studies has rapidly evolved since the early 2000s. Various tracking methods have been innovated to the study of tourist movements, including mobile positioning data. The main aim of this study is to measure the spatial and temporal behaviour of international tourists in Hungary using mobile positioning data. Compared with traditional accommodation and survey data, mobile phone based tracking technologies enabled us to study tourism more precisely and effectively because the spatial and temporal accuracy of the data are better and the tracking periods are longer. For the sake of analysis mobile phone data for 2018 provided by one of the major mobile network operators in Hungary were used. Visitors of three major regional centres (Debrecen, Pécs, Szeged) were segmented and analysed according to the country of origin, the length of stay, as well as the role of nearby tourist attractions. The study shed light on the role of other major attractions in the country (e.g. Budapest, Lake Balaton), the interplay among the three investigated cities and the synergy of tourist destinations in the respective regions. Special attention was paid to the role of international conferences, mega-events, and study programmes (e.g. summer schools). As a result of geographical location, traditions in tourism and local policies on tourism development distinct differences could be pointed out among the three cities. The results enabled us to monitor and compare urban destinations based on data describing actual visits which has great potentials in destination management and urban development policies with special attention to urban tourism.



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2245-Comparative analysis of tourists' behavior in Tokyo using locational data from the photo sharing service of Flickr

Bochra Bettaieb¹, Yoshiki Wakabayashi¹

Tokyo Metropolitan University Geography Hachioji-Japan¹

New data source from ICTs makes it possible to conduct new analysis of tourist' use of space at different scales. An example of it is to use the geotagged records of social network services (SNS) to capture the tourists' behavior within a city. The aim of this study is to demonstrate the potential of photo-sharing services for comparison of the main tourist attractions between Japanese and foreigners in three major tourism spots of central Tokyo (i.e., Shinjuku, Asakusa, and Ginza). The data were downloaded from Flickr, one of the most popular online platforms for people to share their travel experiences by uploading photos. We used the data of geocoded photos from 2014, taken within 1.5 km from Shinjuku, Ginza, and Asakusa stations. Information on the nationality of contributors recorded in the Flickr data was used to compare the tourist spots by visitors' nationalities. The spatial distribution of places where the photographs were taken was analyzed with geographical information systems (GIS). The results obtained showed some tourist spots common to Japanese and foreign tourists in the three study areas. However, the distribution of foreigners' photographs showed a higher spatial concentration than those taken by Japanese tourists. In addition, in Shinjuku and Ginza, there are differences in tourist spots between Asians and Europeans. In particular, European tourist's hotspots tend to be more scattered than Asians. But such differences are not observed in Asakusa. These differences can be attributed to the spatial structure of the tourism sites and the mode of tourists' behavior.

2732-THE USE OF NEW TECHNOLOGIES BY CHINESE TOURISTS. THE CASE OF BARCELONA (SPAIN).

Dongmei Ren¹, Dolores Sanchez-aguilera¹

University of Barcelona geography and history Barcelona-Spain¹

Chinese tourism has become, since 2013, the first global outbound market. According to UNWTO, China strengthened its leadership in 2017 in a global spending on travel abroad. In the Spanish case, it is a minor but growing tourist flow with great purchasing capacity, which has great potential regarding to the future.

On the other hand, research on Chinese tourism shows a diversification of demand trends and a transformation of consumption patterns, which are becoming increasingly complex. The dominant profile (travelers in organized groups) is being displaced to self-guided travelers who base their tourism experience on the application of technology and the use of social networks.

This paper aims to analyze the use of new technologies in their trip to Barcelona for travelers on their own, a group better informed of the characteristics of the destination that they are going to visit and that seeks unique experiences through the image that is projected from social networks. The analysis is carried out through the analysis of Chinese social networks and user-generated content (UGC) by Nvivo software.

Through analysis, it was found that one of the trends that is most rapidly affecting demand and supply is form "independent tourism + millennials + social networks".

According to the research, the development of computer technology in the form of an electronic platform, online reservations and social network apps allow independent small group tourism to be in fashion among Chinese millennials. Meanwhile the chinese millennials use social networking sites to inspire Chinese tourists to travel publishing the perceptions of the trip through digital platforms, social networks and Q&A forums such as Qyer, Mafengwo, Miniblggers, wechat, weibo, Jianshu, Zhihu, Xiaohongshu, in this way, they can not only be used as good memories, but also as an incentive for readers.

2743-Global map of tourism destinations based on statistical sources and Airbnb data

Czesław Adamiak¹, Barbara Szyda¹

Nicolaus Copernicus University in Toruń Department of Spatial Planning and Tourism Toruń-Poland¹

Spatial distribution of tourism origins, flows, and particularly, destinations, have always been an interest to tourism geographers. Despite many theoretical and empirical studies, we still know relatively little about the actual quantitative distribution of tourism destinations in the global scale. Statistical information provided by World Tourism Organization have two major drawbacks. First, they are comprehensive in terms of international tourism flows, but patchy in describing domestic tourism, which is the majority of global tourism mobility. Second, UNWTO data applies to entire countries, while the distribution of tourism arrivals is geographically uneven within countries. We attempt to present the global distribution of tourism destinations on a more detailed spatial scale by employing three-step analysis. First, we estimate missing data in UNWTO database based on demographic and economic indicators for countries. Then, we disaggregate tourist numbers into smaller areas in each country with the use of geo-referenced data on the rental offers on the largest peer-to-peer accommodation platform Airbnb. As a result, we obtain a map with estimated numbers of tourists visiting about 20,000 geometric grid cells. The third step is the calculation of tourists surplus index and using it for the identification of global hotspots of tourism. After the first step we estimate the global number of tourism trips in 2017 at 1.3 billion international and 8.1 billion domestic trips. Over half of tourism trips are targeted to the countries of Asia and the Pacific. In the second step we identify major urban areas such as Paris, Beijing and Istanbul as top global tourism destinations. In the third step we delimit major clusters of tourism surplus in Europe, East and South-East Asia, India and North America.

3654-Tourism imaginaries and big data

Sairi Piñeros¹

Externado de Colombia University Tourism and Hotel Business Administration Faculty BOGOTÁ-Colombia¹

Tourism imaginaries are very closely bound up with geographical imaginaries. They are constructed from the different information sources which we encounter in our everyday life. Various forms of media play an active role in disseminating information about places. Today, the potential tourists to want visit a place usually seek information on the internet, finding different sources such as travel blogs, forums, photos and travel communities' advices. This information based on tourists who have already traveled and this material will affect potential tourists' beliefs. When the country is associated with negative images deeply rooted in the collective imaginary, this affect not only the geographical imaginary of the country concerned, but also that of their tourist destinations. That is the reason to study Colombia. Since 1980's this country was associate to negative images - war, violence, delinquency and risks, and the tourist visitors were reduced. In recent years, tourism has become very important for its economy and tourist imaginary has gradually transformed. This presentation show the analysis of comments (60,327 commentaries in different languages) shared by tourists on TripAdvisor about Colombia. Connections were traced between the different Colombian places using the Gephi software, which makes it possible to make geolocated graphs, and the R software, which makes it possible to obtain graphs with a base map. In order to facilitate our analysis and interpretation of the textual data, we have decided to extract and separate the comments in the three languages mastered by the author: Spanish, French and English. The results demonstrate that tourists co-produce and participate in the circulation of visual and textual content that shape geographical and tourist imaginaries.



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C.13. Geography of Tourism Leisure and Global Change Economic Geographies of Tourism

3138-ANALYSIS OF SNOWMAKING DEVELOPMENT IN THE TOURISM SKI INDUSTRY THROUGH A GEOGRAPHIC ECONOMIC EVOLUTIONARY APPROACH A CASE STUDY IN THE FRENCH ALPS

Lucas Berard-Chenu¹, Hugues François², Samuel Morin³, Emmanuelle George²

Univ. Grenoble Alpes, INRAE - METEO FRANCE Lessem Grenoble-France¹ Univ. Grenoble Alpes, INRAE Lessem -France² Univ. Grenoble Alpes, Université de Toulouse, Météo-France, CNRS CNRM, Centre d'Etudes de la Neige -France³

The scientific literature often considers snowmaking mostly as an adaptation to reduce climate change impacts for ski tourism. Limits to the efficiency of snowmaking are often mentioned, in addition to maladaptation issues. This analysis framework leads to isolate snowmaking development from other motivations. This contribution aims to rethink the snowmaking expansion in connection with broader changes of the ski industry.

We adopt an evolutionary economic geography approach with the concepts of path dependency and "lock-in" effect. Ski tourism requires appropriate snow conditions and a mountainous topography. While ski lift operators are locked into particular places, they are also potentially locked in development patterns inherited from past choices. The widespread use of snowmaking in ski tourism since the 1990s has exacerbated some changes in the ski industry. To understand the position and the evolution of snowmaking in the ski industry, we use both quantitative and qualitative methods. We analyzed the snowmaking investment trends of 100 ski resorts over a 20-years period. The results lead us to a deeper investigation on a sample of the large ski resorts in Savoy. We conducted more than 40 in-depth interviews with ski resort managers and winter tourism stakeholders.

Snowmaking leads ski lift operators to operate beyond the constraints of the interannual variability of snow conditions. These increasing returns reinforce ski lift operation but also add a rigidity to a mono-activity in ski tourism. nowmaking is deeply anchored in ski lift operations with clearly defined procedures and thus moved from a competitive edge to a routine asset of a ski resort.

Our approach provides a better understanding of the trajectories of snowmaking investments in the ski industry. It suggests that the bigger the capital assets of a ski resort, the higher its snowmaking path dependency and its inertia to switch to alternative tourism activities are.

3152-The tourism taxes in Spain a permanent territorial debate

Jaume Font Garolera¹, Mercè Colom Oliva², Daniel Imbert-Bouchard Ribera²

Universitat de Barcelona ANTERRIT -Spain¹ CETT-Universitat de Barcelona TURCiT -Spain²

In the Spanish state, the regulation of tourism resources, infrastructure and services lies with the regional governments of the Autonomous Communities, through their own regional legislation. This includes articulating additional tourist tax policies for the preservation, promotion and promotion of the tourist activity, economic engine of the country. The adoption of these measures has led to a paradigm shift within the tourism management of some of the Spanish destinations that implemented it. A process that becomes more controversial among the actors of the tourism system nowadays. Moreover, this debate is not just about the suitability of its application or how the funds are spent, but about how it fits with public organizations that have lower-level tourism competencies, such as municipalities. All these issues are addressed both in tourist cities such as Madrid, Valencia or Seville, and in the most visited Spanish regions, such as the Valencia Community, the Balearic Islands, Catalonia or the Canary Islands, although only Catalonia and the Balearic Islands have applied a tax. This research analyzes this debate concerning the opportunity offered by this tourist tax. This study also compares, in those destinations where their taxes have been applied, characteristics of these taxes, such as typology, the application scope and their return. The methodology used includes both literature review and the analysis of statistical sources. Main results show the noticeable commitment by Catalonia and the Balearic Islands to support their tourism policies through the application of these taxes. The funds have grown substantially and both taxes' fees, their destination have changed and the distribution among administrations has been modified. These changes occurred because the tax happens to be the focused of a permanent debate. Even so, there is a tendency to invest in the management of the territory and to restore the negative impact of the tourism,



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3357-Historical Conservation and Tourism Relationship The Case of Historical Peninsula of İstanbul

Kaan Kapan¹

*Türk Coğrafya Kurumu Coğrafya İSTANBUL-Turkey*¹

Historical Conservation and Tourism Relationship: The Case of Historical Peninsula of İstanbul

Structures, monuments, squares and many other different types of physical assets of historical origin are taken under conservation by improving them with a variety of restoration techniques (conservation, renovation, reconstruction and restitution, etc.), enabling them to have touristic function. We witness increasing number of examples where structures in different parts of the world, particularly in the inner-city areas of the old city, are restored either in district scale or structural scale and thus taken under conservation, and eventually gaining economic value in terms of recreation and tourism activities.

And a focal centre of the country in terms of cultural, political and economic activities, İstanbul leads the cities with a high concentration of historical assets. The objective of this study concerns restoration of the structures located in the historical inner-city area of İstanbul to take them under conservation and use them for tourism purpose. In those urban districts of the case of historical peninsula of İstanbul which have great intensity of historical and cultural assets, particularly the small inner-city area, which is called, the physical remnants dating back to the Ottoman Empire and Byzantine period are improved, taken under conservation, thus gaining recreational function. Most of the time, structures are restored individually and put to commercial use. Such historical structures are, once renovated, used for recreational purpose (hotel, restaurant, café, gift shops, etc.). While these structures are conserved, they are also made "attraction items" acting as source of supply for tourism in the urban space.



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VIRTUAL

C.13. Geography of Tourism Leisure and Global Change Over tourism A contemporary Geography of Excess and Counter protest

1995-The Titan Tourist and the Sacking of Polis

Richard Ek¹, Mekonnen Tesfahuney²

*Lund University Service Management Malmö-Sweden¹ Karlstad University Geography, Media & Communications Department
mekonnen.tesfahuney@kau.se-Sweden²*

Overtourism as a concept first appeared as an etiquette of a managerial problem: the temporal and spatial concentration and dispersion of tourists in popular destinations. Quickly the concept became appropriated in tourism studies as a concept that i) directs the attention on a phenomenon not that novel as the concept in itself and ii) directs the attention on something more societally/ontically complex than the managerial and the problem-solving focused invocation of the concept implies. The empirical and analytical complexity of the concept has rapidly been admitted in tourism studies, but there is yet few attempts to address the phenomenon from an explicitly ontological point of view. In this geo-philosophical paper, we go beyond the ontics of overtourism and ruminate on its ontology from a political philosophical approach.

Applying ideas from Marxism, philosophical anthropology and psychoanalysis we argue that, familiarly, overtourism is a monstrous logical outcome of well-executed destination management and marketing of the sovereignty-late capitalism complex. The political citizen is discarded in favor of the privileged mobile touristic subject, a post-political figure with a nihilistic episteme that ontologically annihilates place/polis through the ontic appropriation of the urban touristic destination. However, we go a step further and argue that overtourism also indicates a nihilistic take-over of the Anthro-po-obScene, an epistemicide that in effect, promise the twilight of the human and the dawn of the non-human. For an unbound Capitalism, this shift of positions of the creatures currently inhabiting Leviathan and the state of nature is expected, and a scenario depicted for long in popular culture, in Fritz Lang's Metropolis from 1927 as well as in Hajime Isayama's contemporary (Shingeki no Kyojin, misleadingly translated as 'Attack on Titan' in English).

2336-Towards a methodological approach to overtourism measurement the case of Mykonos Greece

Theano S. TERKENLI¹, Emmanouela TOLIATOU¹

University of the Aegean Department of Geography Mytiline-Greece¹

Overtourism is here to stay and expected to affect popular tourist destinations, increasingly and in more and more complex and intertwined ways. Thought not a novel phenomenon, its definition is still under debate and there are no stringent and comprehensive methodologies to 'measure' it, nor its impacts and consequences on all sides involved. In this context, the objective of this paper is to propose a framework of analysis for overtourism and to apply it to the island of Mykonos, Greece, a tourism destination that has been facing overtourism trends and repercussions, for a long time. The proposed framework aspires to capture the perspectives of all sides/ parties involved and affected in situations of overtourism, while being flexible enough to include additional parameters.

It proceeds by establishing the 'starting point' of analysis ('overtourism for whom/what/where/when?'), from where it addresses its various consequences, and is then tested in the case of the Chora (main settlement) of Mykonos Island, Greece, with the use of questionnaire surveys, among its local population. Although some outcomes of overtourism research around the world may point to the same or similar conclusions, we argue and show how, on the basis of the findings of our case study, such conclusions may not be universal, due to the variable environmental/economic/ cultural particularities of each case under study. Such highly contingent findings and insights are useful in planning, managing and promoting sustainable tourism destinations and overall local sustainable development. We conclude with some final remarks and suggestions towards the development of a multi-layered full-fledged methodological tool for overtourism measurement.



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VIRTUAL

3161-Overcrowded spaces vs. undercrowded spaces. The multiple faces of tourism in Barcelona (Spain).

Dolores Sánchez-Aguilera¹, Jaume Font-Garolera¹

*Universitat de Barcelona Geography Barcelona-Spain*¹

Barcelona has positioned itself in recent years as one of the first global urban tourist destinations, ranking among the top four cities in Europe. This tourist boom - very fast from point of view of its evolution - has led to a range of changes in different aspects of the city: occupation of public space, rising housing prices, gentrification processes, growing citizen resistance to tourist pressure...). Thus, Barcelona, considered as a laboratory in urban and social processes worldwide, has also acquired the status of an icon in terms of overtourism, along with other cities such as Venice or Amsterdam.

However, a detailed analysis of tourism dynamics at an internal level leads to the question of whether there is a certain banalization in the application of this concept, in the sense that the tourist phenomenon has uneven effects in the metropolitan urban area. In front of intensively frequented touristic districts such as Ciudad Vella and certain neighborhoods like Barceloneta -in which tourism is omnipresent throughout the year- there are some areas of the city where tourists pass almost unnoticed. In fact, there is no a unique Barcelona but several faces of the same city. The aim of this paper is to show the geographical differences of the tourist presence in Barcelona and its surroundings and to review the impact of public policies aimed at mitigating the negative effects of this phenomenon in order to recognise the other Barcelonas and to contribute to the debate on the impacts of mass tourism on uneven cities.

3512-TOURISTIFICATION IN BERGAMO. THE IMPACT OF LOW COST CARRIERS BEFORE COVID 19 PANDEMIC AND RECOVERY PERSPECTIVES FOR A SUSTAINABLE TOURISM

Simone Gamba¹

*IULM Milano Department of Humanities Faculty of Arts, Tourism and Markets Bergamo-Italy*¹

This presentation will focus on the urban transformation occurring in Bergamo related to increasing international tourist flows before the Covid-19 impact. Bergamo is a medium-sized city east of Milan metropolitan area where large scale tourism is a fairly recent phenomenon. The growing number of arrivals is mostly related to the development of Orio al Serio low-cost carrier terminal and the success of the Expo 2015 mega-event which promoted Milan and its region as a destination. Both local public and private actors showed interested in diversifying local economy by exploiting the UNESCO recognized cultural heritage of the Upper town. Though transformation trends until 2019 seemed to be sustainable and the surge of the pandemic drastically reduced flows, some issues must be taken into account to plan further development of tourism. The pandemic presents itself as an opportunity to re-direct tourism development towards sustainable criteria. This research aims to assess the main criticalities that could end up in common problems caused by uncontrolled growth such as overtourism, pollution and tourist-residents disputes. First, given the proximity of the airport to residential areas, the city is experiencing a considerable impact on the environment. Secondly, the city's profile is characterized by a very inhabited and industrialized belt of municipalities that surround the main town (Grande Bergamo) and whose features may prevent the spread of tourism to the city's province. Finally, most residents are unfamiliar with socioeconomic practices linked to tourism. Strategies and policies must be identified as soon as possible to scale back negative effects. Also in consideration of the post-emergency restoration of Ryanair's flights to and from Orio Airport, we argue that what the city needs is broader governance that redefines its identity, effective tourism management that activate new driving forces and inclusive processes rather than mere economic benefits for a few investors.



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VIRTUAL

C.13. Geography of Tourism Leisure and Global Change Tourism and the Sustainable Development Goals

1033-Partnerships for Revitalization Small Businesses in an Island Art Festival

Meng Qu¹, A. D. McCormick¹, Carolin Funck¹

Hiroshima University Graduate School of Integrated Arts and Sciences Higashihiroshima-Japan¹

Japan's aging, shrinking peripheral communities – representative of a nationwide depopulation trend – are viewed as a harbinger of what is to come across much of Asia this century. Initiatives to avert the collapse of communities often involve inter-regional partnerships between those communities and large public-private administration entities. A notable example of such a partnership, the Setouchi International Art Festival (SIAF) draws large numbers of domestic and international tourists to twelve aging, shrinking island communities as a revitalization strategy. The development of art festival tourism has caused a corresponding increase in in-migrants to the islands who have established small businesses. SIAF organizers claim that the increase in entrepreneurship on the islands is an indicator of successful revitalization. However, these businesses are heavily affected by the intermittent flow of festival tourists, typically relying on income from peak times to compensate for months- or years-long slow periods outside the festival schedule. This paper explores the extent of new business creation and gauges the prospects of these businesses for long-term sustainability. This research connects to SDG Goal 11.A - support positive economic, social and environmental links between urban and rural areas, and Goal 17.17 - promote effective public, public-private and civil society partnerships (United Nations, 2015). The study examines small, tourist-facing businesses across six SIAF islands through a mixed-methods approach. The authors found that in-migration patterns and small business types vary dramatically by island, with similarly varied levels of reported success and satisfaction among business owners and community members. The results suggest that a single approach to revitalization was applied with a broad brush across many communities, where local variables caused drastically different results. This in turn suggests that a partnership structure that better prioritizes the individual needs of communities alongside overall festival goals may improve community development prospects.



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1079-SUSTAINABLE PRACTICES IN THE HOSPITALITY INDUSTRY IN ZIMBABWE

Ngoni Courage Shereni¹

University of Johannesburg, Johannesburg School of Tourism and Hospitality Bulawayo-Zimbabwe¹

SUSTAINABLE PRACTICES IN THE HOSPITALITY INDUSTRY IN ZIMBABWE

Ngoni Courage Shereni

School of Tourism and Hospitality, University of Johannesburg, Johannesburg, South Africa

Department of Accounting and Finance, Lupane State University, Lupane, Zimbabwe

ncshereni@gmail.com

Abstract

Background

The hospitality industry has become a dominant global industry contributing significantly to the world economy. Of late it has been realised that the hospitality industry engages in a lot of unsustainable practices that are damaging to the earth and its inhabitants and also contributing to climate change. Attention is now being paid to the sustainability of hotel operations to ensure that negative impacts to the general environment are reduced. With climate change issues taking center stage at different international gatherings, the hospitality industry can play a critical role in addressing climate change by adopting sustainable practices.

Materials and Methods

The study conveniently sampled 125 hospitality establishments registered with the Zimbabwe Tourism Authority. The data was administered through structured questionnaires to one respondent per establishment and questions proffered sought to get an insight into the sustainable practices by each organization. SPSS version 25 was used to analyse data generating descriptive and inferential statistics.

Results and conclusions

Common sustainable practices noted were enforcing the linen reuse policy, use of solar energy, use of energy saving bulbs, proper waste disposal practices, Corporate Social Responsibility and employing locals among other practices. The findings also noted that hospitality organizations in Zimbabwe apply sustainable practices that are less costly to implement. The benefits identified in this study we also categorized into social benefits, economic benefits and environmental benefits.

Key words: sustainable practices, climate change, sustainable tourism, sustainable hospitality



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1607-Perception of and responses to climate change among skiers in China The role of motivation involvement and loyalty

Yan Fang¹, Bihu Wu²

Beijing Sport University School of Recreational Sports and Tourism Beijing-China¹ Peking University International Center for Recreation and Tourism Research -China²

The negative impacts of climate change on the ski industry have been well documented in current studies. Understanding market responses to climate change impacts, therefore, has important implications for the sustainability of winter tourism destinations. Perception of climate change plays a major role in tourist decision-making, which is particularly important for ski destinations that are sensitive to climate change and climate variability. This study advances a detailed climate change perception-ski decision model by interpreting comprehensive risk perception, and combining motivations for skiing, involvement and loyalty that are closely related to perception and behavioral adaptations. The conceptual model is tested empirically on a national sample (N = 738) of China's skiers with a different level of performance. Data are collected through a survey questionnaire and analyzed by AMOS 22.0. Results indicate that respondents feel the changing climate, but slightly difference exists between skiers of different standards as that perception is influenced by motivations, involvement and loyalty through cognitive and experiential factors. The main pathway of responses to climate change of skiers is from motivation, then involvement, loyalty and then climate change perception to ski decision. Specifically, beginners are mainly affected by climate change perception while loyalty is an important factor in the decision-making process of senior skiers. What is more, nearly half of these skiers will not change their behavior even under climate change due to unclear risk perception among China's big beginner ski market, and that perception is also reduced by the characteristic of ski resorts in China that depend heavily upon artificial snowmaking.

2040-ARGUMENTS IN FAVOR OF A LEGAL INSTRUMENT TO PROTECT INTERNATIONAL TOURISTS AT THE HAGUE CONFERENCE ON PRIVATE INTERNATIONAL LAW

Tatiana Cardoso Squeff¹, Claudia Lima Marques²

Federal University of Uberlândia Law School Uberlândia-Brazil¹ Federal University of Rio Grande do Sul Law School cmarques.ufrgs@gmail.com-Brazil²

Mass tourism is a reality in the world. If in the 1950s there were only around 25 million tourists worldwide, the figures have increased rapidly: currently this number has grown to 1.4 billion. And even though Europe continues to receive many tourists every year, countries in the Global South started to attract more international tourists, chiefly Asia and the Pacific, which now achieved a 24,43%, denoting a shift in the tourism market. However, along with such increasing mobility, different problems have flourished - especially concerning the rights of tourists. This happens because newer destinations provide less protection to international tourists, denoting a legal gap when it comes to tourists rights, who are recurrently unaware of their rights in the visited country and, thus, are more suitable to suffer of micro-damages. Besides, they typically face problems when it comes to enforcing their rights, especially because less tourism agencies are used and there is a growing problem concerning international travel insurance. In light of this, through a descriptive research and using a deductive approach, this proposal intends to highlight the new tourism patterns, indicating the need of erecting an international agreement to cover such growing gaps, in accordance to Sustainable Development Goal n. 16, notably 16.A, as it is the Brazilian proposal to the Hague Conference of Private International Law, presented in 2013 and still in debate. They hypothesis is that such legal document is needed and feasible, considering the changes in the worldwide tourism market and the growing need of international cooperation. And as a conclusion, this proposal shows that the Hague Conference is the correct place where such document should be developed due to its expertise in providing for cooperation, and that countries should really put some effort in approving it for this economic branch/industry continue to prosper.



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2289-Engagement with National Parks and Nature based Tourism Among Young South Africans.

Julia Giddy¹, Clare Kelso²

University of Mpumalanga Biology and Environmental Sciences Riverside-South Africa¹ University of Johannesburg
Geography, Environmental Management and Energy Studies ckelso@uj.ac.za-South Africa²

National parks, conservation and the “Big Five” are often viewed as a significant component of South Africa's national identity. Environmental education in South Africa involves a focus on conservation as well as an emphasis on the uniqueness of South African natural environments. Due to increased urbanization, experiences in nature are seen as important for the psychological well-being of individuals, as society becomes increasingly disconnected from its natural surroundings. Interactions with nature have also been shown to enhance environmental education experiences. Although concepts and images around conservation, national parks, and particularly wildlife protection are so closely connected to conceptualizations of what it means to be “South African,” the majority of South African youth is also increasingly disconnected from experiences within these natural spaces. This work firstly assessed prior engagement with and perceptions of nature-based tourism and national parks among young South Africans. It also, however, demonstrates the impact these experiences can have on such individuals. This was accomplished by taking students to a national park and engaging in nature-based tourism experiences and having them reflect on their perceptions and experiences. The work demonstrates the relative lack of engagement with nature-based tourism and national parks, particularly among the non-white South African youth. It also highlights the many benefits as perceived by students once they engaged with these types of experience and the ability for a single experience to promote future behavioural intentions to pursue these activities again. This research is not only important in the benefits it has on the individuals, but also to promote conservation efforts among young South Africans in the future for sustainable nature-based tourism development and continued protection of natural environments.



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VIRTUAL

2291-Archipelago Geography and Sustainable Development Goals Through Tourism Development in Indonesia

Baiquni Muhammad ¹

Universitas Gadjah Mada Development Geography Yogyakarta-Indonesia ¹

Abstract

Archipelago Geography and Sustainable Development Goals
Through Tourism Development in Indonesia

Muhammad Baiquni and Susilawardani

Sustainable Development Goals (SDGs) through tourism development have been implemented in Indonesia. Since last four years, Indonesian Sustainable Tourism Award (ISTA) have been promoted to encourage tourism actors in managing toward sustainable development. This research aimed at analyse the sustainable tourism policy the ministry of tourism and the ISTA program. This research be illustrated by a case study of Raja Ampat Islands in West Papua. The research methods are literature study, observation, focus group discussion and indepth interview. The research results are: 1) Policy and program of Indonesia Sustainable Tourism Development have been promoted to encourage the stakeholders in improving tourism destinations and their products. 2) The stakeholders respond to the partisipation of ISTA have increased from 97 in 2017 to 176 in 2018 and increased to 246 in 2019. This increased participants have shown that ISTA become popular among the tourism stakeholders who encouraged to improve their destinations and products towards sustainable ways in achieving SDGs. 3) Regarding archipelago geographic perspective, the diversity of nature and cultural contexts create challenges and constraints to measurement of a single frameworks of ISTA with 41 standards and 104 indicators. Therefore ISTA have to develop a flexible frameworks which may accommodates local uniqueness and authenticity 4) In achieving sustainable tourism in archipelago country, it is very important the role of governance and leadership in managing tourism destination in achieving sustainable development goals.

Keywords: Archipelago geography, SDGs, tourism indicators, governance and leadership.

Authors:

Muhammad Baiquni is Professor in Geography and Tourism Expert in Universitas Gadjah Mada, Chairperson FORPIMGEO Indonesia, Senior Member Indonesian Geographical Society.

Susilawardani is a senior agronomist and agrotourism expert, fellow of IDEAS (Institute for Development and Environment Studies)



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3553-Ottoman heritage in Europe as an opportunity for a cultural route development an international study of students perceptions

Aleksandra Terzić ¹, Elka Dogramadjieva ², Max Smits ³

Geographical Institute "Jovan Cvijic" Serbian Academy of Sciences and Arts Social Geography Department -Serbia ¹ *Sofia University "St. Kliment Ohridski" Geography of Tourism Belgrade-Bulgaria* ² *Stichting Sultans Trail - a European Cultural Route Board -The Netherlands* ³

Cultural routes as a contemporary approach in the presentation and preservation of cultural heritage while envisioning the sustainable tourism development principles has recently obtained considerable popularity. The establishment of cultural routes is widely seen as a successful tool for bridging distant places and people in recognizing their joint interests in preserving and utilizing cultural heritage while enhancing tourism offer. Ottoman heritage in Europe is considered somewhat a contested heritage, as it still represents a materialized manifestation of the complex social, ideological, and political contexts of national identities and contemporary societies. Thus, it is significant to explore perceptions of tangible and intangible heritage in different countries networked within the cultural route and their common goal in raising locals' awareness, outlining the importance and capitalizing on their shared heritage through tourism. This work presents partial results of wider research aimed at the identification of overall perceptions regarding Ottoman heritage in different European countries and examination of general attitudes towards the development of the Sultans Trail cultural route stretching from Vienna to Istanbul. In the pilot stage of the research, we were addressing youth, in particular university students, examining their knowledge, attitudes and opinions concerning Ottoman heritage in their country and Europe. The online survey was directed to students at different Universities in participating countries - Serbia, Bulgaria, Croatia, Hungary, Austria and Turkey. Non-probability sampling was applied using a combination of purposive, quota and snowball techniques. Questions related to Ottoman heritage in Europe and a cultural route development perspective, meanings, preservation levels, attractiveness, problems and potentials were included. Preliminary results indicate differences in perception of Ottoman heritage among different countries, outlining the potential difficulties in the cultural route development process and strong resistance among some student groups in recognizing Ottoman heritage as a common heritage within national space.



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C.13. Geography of Tourism Leisure and Global Change Tourism Shaping Places

1877-Tourism and commodification of a Japanese gay district The case of Shinjuku Ni chome Tokyo

Seiji SUSAKI¹

*Tokyo Metropolitan University Geography Kawasaki-shi-Japan*¹

The commodification of the gay district in cities is transforming the places for LGBTQ and exclude some groups of the LGBTQ (Lesbian, Gay, Bisexual, Transgender, Queer). However, little research has been conducted on areas where same-sex couples are denied the rights, which heterosexual couples enjoy at both national and local levels such as Japan. Recently, some cities in Japan have attempted to promote themselves "LGBTQ friendly" in an attempt to attract LGBTQ tourists. This report examines the impact of a commodified area such as Shinjuku Ni-chome, which is the center of the Japanese gay district, has on gay men, lesbians, and heterosexual residents. I inquire into the representation of Shinjuku Ni-chome as a gay district in tourist guide books. I also conducted interviews with the Japan National Tourism Organization (JNTO), local government, gay men, lesbians, and the neighborhood association. As a result, the two main findings were obtained. First, the mass media has commodified Shinjuku Ni-chome in Japan and overseas. This means that the local government is unwilling to market it as a place for LGBTQ. However, heterosexual women, but not LGBTQ people, encourages to visit this place. Second, the increase in visitors, including foreign tourists, at night, caused much noise in the neighborhood park, which was injurious to the health of residents. More importantly, in understanding of place for LGBTQ, heterosexual consumers harass gay men and lesbians, making them feel uncomfortable. These findings suggest that commodification of gay districts mainly caused by mass media produced the tension between gay businesses and heterosexual residents, with the place becoming less gayness.

2355-Modern nomadism Pondering the geographies of role players taking part in Afrikaans arts festivals in South Africa

Jan Hendrik Stander¹, Luke A. Sandham¹, Gustav Visser²

*North-West University Geography and Environmental Management Potchefstroom-South Africa*¹ *Stellenbosch University Department of Geography and Environmental Studies -South Africa*²

South African arts festivals have received increasing research attention in recent years, focusing mainly on their economic dimensions, visitor dynamics and impact on local communities. Festival environments are however very diverse and there are numerous role-players, apart from the festival attendees, who contribute to the continued existence of these arts festivals. Little research has been conducted to date concerning the mobility and resulting geographies surrounding these role-players which include festival attendees, artists, local business owners, festival management, service providers and stall owners. The latter makes up a large part of the Afrikaans festival attraction despite contrasting views and approaches taken by different festivals. Role-players across five Afrikaans arts festivals were interviewed to elaborate on themes such as their itinerary and travel behaviour, festival content, cultural and historical significance, perceived economic impact, perceived effect on civic pride, as well as the overall purpose of the particular festival, on the premise that the geographies of Afrikaans arts festivals will manifest in these themes. The interviews were transcribed, coded and analysed. It was found that stall owners may be sub-categorized into local entrepreneurs, traveling merchants and retailers using these events as showcases. Results further suggest that role-players, particularly artists and stall holders, contribute significantly to shaping the geographies of these arts festivals in that they are the most mobile of all participants. This may be in support of local and regional diversity, while in other instances creating a "shared/communal" geography across Afrikaans arts festival boundaries in South Africa which can also be a counter-effect to local flavour and authenticity.



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VIRTUAL

2373-Creation or and Production – a critical geographic analysis on Tourism driven Painting evolution and tourism place making in China

Jie ZHANG¹, Hui ZHANG¹, Xiao-Wan ZHANG¹, You-Hai LU¹, Yang LIU²

Nanjing University School of geography and oceanographic sciences Nanjing-China¹ Ningbo University and Angre University Joint College -China²

Though the art research has attracted geographers for long time (Wallach, 1997), the painting evolution were dominatively studied by art historians and critics. With a critical geographic analysis framework consisted of global consumption network and Rose (2016)'s visual methodological model, this paper reveals the evolution of the painting and its roles in tourism in China by social geographical investigation and deep interview in the Chinese cases of urban artist community and rural tourism destinations. Painting used to play various roles in tourism, such as attractions in the forms of souvenirs, landscape, cultural icons, and tourism image elements, and tourism event icon and even the visual identity for the destination branding. With the progress of tourism, the roles of painting played in tourism and destination society, and even painting art itself have kept changing with respect to the evolution of the art cultural industry chain, i.e., the chain of painting industry with commodity (painting art piece) – production (artist creation) – consumption (public receiving). Painting goes out from studio or literati house to open space as mural painting and plays critical role in destination place-making with artist (or painters) community, urban creative landscape with wall painting or mural painting both in urban and rural destination in China. Yet the traditional and professional artists, lost their superior status in modern society, e.g., a white-collar literati painter in studio becomes the blue-collar technic mural painting worker in public space with their updated technique from classic painting to pop arts. So in the contemporary tourism driven evolution of painting art appears the processes from art creation to production with the process of consumption network from traditional limited literati's arena to a global tourism driven consumption network. And painting art changes its role from literati art to a part of cultural creative industry.

2712-WHERE THREE BORDERS MEET EMERGING POTENTIAL FOR TOURISM DEVELOPMENT AND SYMBOLIC PLACE MAKING

Marek Wieckowski¹

Polish Academy of Sciences Institute of Geography and Spatial Organization Warsaw-Poland¹

Tourism development in borderlands is increasingly important and has been facilitated by recent border openings and the changing role of borders since the widespread geopolitical and socio-economic transitions of the past quarter century in many parts of the world.

Borders have significant potential as tourist attractions and wield an appeal for tourists in many ways (Timothy, 2001; Timothy, Saarinen & Viken, 2016) for their geopolitical, historical or symbolic values. Many elements of unique border locations attract people's attention (Timothy et al., 2016) and many of which have become tourist attractions (Jacobsen, 1997; Timothy, 2001; Löytynoja, 2008). One of these is international tripoint – a place where the borders of three different countries physically meet at one point at a very small geographical scale. There are more than 100 tripoints in the world, each with its own set of political histories, practical policies and potential for economic development. Many tripoints possess symbolic meanings as special places located between three countries, with border markers, national flags, and monuments built to commemorate symbolic meanings. In recent decades, several tripoints have transformed into international tourist attraction.

To illustrate the recent development of tourism based on tripoint geographical anomalies, this presentation examines one of the newest tripoints in Europe where the borders of Poland, Slovakia and Czechia meet in the Beskid Mountains. The study presents the genesis of the place-making processes and success stories in peripheral area. Utilizing a case study, the presentation elucidates why tripoints matter for tourism from a socio-spatial perspective. The development of tourism at tripoints has been modeled ideographically to include the process of a tripoint transforming into a tourism product. The individual stages of shaping tourist space at the tripoint are also shown.



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3274-Cross border tourism space in maritime and seaside areas – the Baltic Sea Region case

Denis Cerić¹

*Institute of Geography and Spatial Organization Polish Academy of Sciences Department of Urban and Population Studies
Warsaw-Poland*¹

The author argues that space in which the authorities, institutions and residents of two or more neighbouring countries make contact with each other by way of tourism as conceived broadly can be designated cross-border tourist space. If it is countries separated by a maritime border that are connected, then it is possible to speak of a cross-border tourist space linked to maritime and seaside areas.

The Baltic Sea is no longer an area of separation, having become – more than ever – a meeting point of numerous political, economic and ecological interests. The cooperation between entities located on two (or more) sides of the maritime border plays a significant role in delimiting the boundaries of cross-border tourist space associated with sea areas, while also serving in the integration process relating to that space, which is actually more extensive than just the interconnected cross-border sea and the coastal spaces, given that cooperating entities may be located even beyond.

The paper is examining the spatial nature of cooperation between entities implementing cooperation in the field of tourism through the Baltic Sea. Besides an overall review of the location, types, number and roles of entities cooperating, funds they employed for the cooperation, their concentration and distance, spatial networks are divided according to following four groups of tourism-related activities and accordingly elaborated: 1) cross-border management and marketing activities; 2) infrastructure and accessibility patterns; 3) development and protection of cultural and natural heritage; and 4) training and employing human resources.

The paper is the result of the implementation of the research project No. 2017/27/N/HS4/02773 financed by the National Science Center, Poland.

3420-Learning from “Saint Etienne Hors cadre”(France) Links and challenges between urbanity tourism production of space and living

Georges-Henry Laffont¹

*UMR5600 EVS, University of Lyon national school of architecture of Saint Etienne Saint-Etienne-France*¹

Tourism was first reserved for the Grand Tour of aristocrats and artists. Then it became massive in the twentieth century. Today, it's become one of the world's dominant modalities of habitation. Almost no place isn't accessible to tourism, rest and entertainment guide many social practices and urban factory.

For more than a century, urbanization and touristification have been maintaining relations of interdependence and tension. From an urbanity and a production of space defined by manufacturing industry or services, we move from an urban, spatial and experiential quality, informed by tourism.

With design as a territorial's marker, tourist attractiveness of Saint-Etienne is reinforced by obtaining various labels (Ville Design Unesco or UNESCO World Heritage List for Le Corbusier Site). In addition, the city is developing a significant range of cultural facilities (Museum of Modern and Contemporary Art, second design collection in France; Puits Couriot, providing an immersion in coal mining; Museum of Art and Industry, highlighting industrial and manufacturing excellence).

Today, like Montreal, Saint-Etienne values a creative city, constantly reinventing itself, while at the same time asserting a tourism practice based on the experience of ordinary of places and ways of living. This strategy, “Saint-Etienne Hors cadre”, is an opportunity to inform how tourism shapes and remodels places and practices.

The thesis formulated here is that entire urban fabric is colonized and shaped by a series of operations, performances, events based on entertainment, inviting people to live urban experiences combining several tourist aspirations (play, consumption, discovery, culture, encounters, etc.).

To defend it, a methodology combining lexicographical analysis of documents produced by Saint-Etienne Hors Cadre and observations of places and experiences is privileged and the first results will be presented at the Congress. This contribution aims to debate on (re) thinking the relationship between urbanity, tourism, production of space and living.



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3508-TOURISM RESHAPING PLACES OF DIFFICULT HERITAGE HOLOCAUST RELATED SITES TOURISM DEVELOPMENT AND STAKEHOLDER ATTITUDES

Aija van der Steina¹, Maija Rozite¹

University of Latvia Institute of Philosophy and Sociology Riga-Latvia¹

Compared to other European countries, where difficult heritage sites, including Holocaust sites as darkest sites of dark tourism, have been extensively studied over the last two decades, in Latvia such studies have only been initiated in recent years. With the increase in foreign tourists' interest in Holocaust-related sites, there is a change in the local communities' attitude. These sites until now have been associated with collective amnesia. There is a gradual shift from these sites being "hidden" in both the physical and information space to being "visible" sites - marked and communicated. In Latvia, Holocaust-related sites are becoming "visible" and an integral part of many places under the direct influence of tourism.

The aim is to identify and assess Holocaust related sites, analyse their current and future development, transformation and involvement in tourism, and ascertain stakeholders' attitude to these changes. The study uses field research, observation and stakeholder interviews: representatives of local DMOs, municipalities, and inhabitants in various reference areas in Latvia. As a result, a typology of Holocaust sites has been carried out, identifying the potential significance in domestic and international tourism and the related challenges. The data gathered characterises stakeholders' attitude towards the marking, highlighting, improvement and communication of the sites. The research results shows reluctance among local inhabitants to talk about Holocaust sites, visit or show them to tourists. Most DMO representatives, however, are open in communication about sites associated with difficult heritage, but lack of knowledge regarding their inclusion in tourist information materials and their communication considering the differing attitudes towards these sites and the significance of related historical events to different audiences. To ensure the sustainable inclusion of difficult heritage in tourism, site managers and DMOs need guidance on managing such sites, building better guest and host relationships, and ensuring better information accessibility.

3675-Travel motivations of Central Asian countries tourists to visit Europe

Gaukhar Chekembayeva¹, Eva Erdelyi²

Modul University Vienna Department of International Management gaukhar.chekembayeva@modul.ac.at-Austria¹ Budapest Business School Department of Methodology for Business Analyses Budapest-Hungary²

There is a growing interest and attention paid to the countries, which could further contribute and boost global inbound and outbound tourism. There are regions in Asia that was not yet studied much, such as Central Asia, but where at the same time there is growth potential both in own economy and tourism participation, due to the size of population and enhancing economies. In order to increase the flow of tourists from that region it is important to understand their major motivation factors of travelling abroad.

This study focuses on understanding the main push and pull motivational factors of tourists traveling from Kazakhstan. It is assumed that the main push factor for them is the desire for rest and relaxation, and the main pull factor is the desire for comfortable living conditions. More frequent travelers could have different travel motivations, namely the desire for self-esteem or self-actualization in comparison to less frequent travelers, how are mostly motivated by lower level factors, such as desire for physical rest and social needs fulfilment.

The present research is involved in investigation of push and pull motivational factors using several motivational theories and models, namely Maslow's hierarchy of needs, Dann's push and pull motivational theory and Pearce's travel career ladder (TCL) model. The empirical survey was conducted among the citizens of the largest Central Asian country Kazakhstan in local language, to identify the main driving factors of travel motivation, and for better understanding evaluated using statistical methods. Analysis of findings revealed one important push and two essential pull factors that are most valuable for the target group, which are only partially in line with the applied TCL theory. The results of the study are summarized in three key practical implications that could be useful for European Destination Management Organizations.



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C.14. Geoheritage Geoheritage and Parks

1265-IMPACT OF POTENTIAL GEOPARK AND GEOTOURISM ON COMMUNITIES LIVELIHOOD IN VARKALA KERALA INDIA

Subhash Anand¹

*University of Delhi Geography Delhi-India*¹

In India, Varkala (Kerala) is a perfect place for geopark development. Varkala, is a coastal town in southern Kerala and is a fast developing tourist destination in India. Tourism is a sole source of livelihood for many families in Varkala. Based on the certain factors like positive and negative consequences of geoparks and geotourism, infrastructural development etc have been ranked based on the respondent's perception. Increased tourism activity in the study area has resulted in raised demand for local services like lodging, restaurants, transport etc which acts as a source of income for the local communities. The geotourism opens new livelihood options for local people. The primary data was generated through structured questionnaires and field observations. For the purpose of research, out of 200, 100 local households of different groups, 50 per cent were domestic and 50 per cent were foreign tourists were chosen for primary survey. There is a significant impact of tourism on the livelihood of the local community in Varkala. The analysis highlights the positive relationship between an increase in the tourism and income level of the local community (0.646). Tourism shows a positive relationship with increase of hotels (0.723) and Ayurveda and Naturopathy centres (0.672) in Varkala. The tourism ensures job opportunities in the form of extra income, part or full-time jobs and seasonal employment opportunities to the people. Geopark authorities try to improve the local economy through involving in geotourism, education, conservation activities and creating new employment options for local people. Hence, if Varkala has adequate planning for tourism development, the effect of cumulative demand through tourism will help to reduce the need to buy daily use products from outside to meet the needs of the additional demand created by the tourists.

3515-The challenges on the implementation of Brazilian geoparks

Isabella Beil¹

*University of Sao Paulo Geography São Paulo-Brazil*¹

Geoparks have emerged as a concept around the 90's and in 2015 they were encompassed by the International Geosciences and Geoparks Programme (IGGP), of UNESCO. There are currently 161 UNESCO Global Geoparks (UGGp) around the world: 81 in Europe, 65 in Asia, 5 in Anglo-Saxon America, 8 in Latin America and 2 in Africa. In Brazil, there is only one area that holds the international title: the Araripe Geopark, in Ceara; however, there are 29 proposals, at different levels. This paper intends to analyze the Brazilian panorama regarding geoparks: we seek to understand the challenges on obtaining the official UNESCO title by the Brazilian geoparks proposals and to understand why Araripe is the only UGGp. To tackle this question, we analyzed the proposals and carried out a case study of the Araripe Geopark. The analysis of the proposals was based on reading the reports of each area, as well as applying questionnaires to the individuals involved in each one of them. Regarding Araripe Geopark, the analysis was carried out through two fieldworks. The main results revealed that there is a difficulty on two levels in obtaining the title of UNESCO Global Geopark in Brazil: The first of them refers to local issues that prevent areas from being transformed and modified by the local social actors into geoparks according to UNESCO guidelines. The lack of political and economic support stands out as the main difficulty. The second level, deeply intertwined with the first, refers to the negative response to inclusion in the international network due to the fragility of the applicant's proposals, in different aspects. Despite this scenario, the analysis of the Araripe Geopark shows that it is a singular case in Brazil because of the local conditions of this territory, as for the support of the state government of Ceara.



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3602-Towards Sustainable Development the role of heritage and education A Systematic Literature Review 2002 2020

Francisco Romera ¹, Eugénie Le Bigot ²

University of Portsmouth Strategy, enterprise and innovation -United Kingdom ¹ Université de Caen Geography Caen-France ²

Heritage education and sustainable development are a relatively new association of topics in which natural heritage and natural reserves as Geoparks have an important potential. The purpose of this paper is to provide a systematic and comprehensive review of the literature to explore the links between these two concepts and to identify major fields of enquiry. To do this, we followed a rigorous and systematic selection process using the Thomson ISI database (WoS) and the Scopus database. We identified a sample of 92 articles from 2002 to 2020 written in English, Spanish, Portuguese, and French languages. It was found five major interconnected themes around this relationship: i). regulated areas (geoparks, geosites...), ii). regulated education, iii). local communities, iv). tourism, v). policies, principles and guidance. Geoparks offer opportunities for sustainable tourism and economic development of the local areas and communities. Nonetheless, barriers exist as the lack of professionals, resources or the integration of the communities. A solution can be found in the education of the future generations through regulated education. Geotourism promote local and foreign citizen's awareness on sustainability through the discovery of geoheritage. More importantly, we highlighted that, in the context of geotourism or fieldtrips, young generations are particularly receptive to heritage education as discovering the fragility of their natural environment encourages them to act for its preservation. Finally, policies are a tool to integrate all the themes and to accomplish sustainable development. This work contributes to our understanding of the role of education and heritage as a tool to accomplish sustainable development; it also provides new emerging areas of research and considerations for academics and practitioners.

3620-How the Geopark concepts have been illustrated

Daichi Kohmoto ¹

Nara University of Education Geography Nara-Japan ¹

The purpose of this paper is to clarify how the concept of a geopark has been illustrated. First, the definitions and descriptions by UNESCO, the Global Geoparks Network, the Japanese Geoparks Commission, and the Japanese Geoparks Network, which are deeply related to the global and Japanese Geoparks, are compared and discussed. Subsequently, the concept of geoparks in Japan and other countries, including academic papers and websites of geoparks are examined to find out how they have been illustrated. In academic papers of most countries, there is a tendency to illustrate the character of geoparks as intersections of various concepts and activities, and the process of improving local communities through geoparks. Illustrations of the geopark concept tended to be used to explain how geoparks can be applied to the future of regions and societies in countries that joined later, such as Malaysia, Indonesia, and Turkey, rather than in Europe and China, where geopark activities were started earlier. However, the concept of a geopark is not often illustrated on the websites of foreign geoparks. In many cases, they simply provide the definition in the form of text and a logo or show photos of their own region. Those that do illustrate the concept are trying to visualize and communicate the efforts of the geopark in their region. While in Japan, the form which shows what "geo" is by the pyramid chart spreads. Based on the above results, the most effective way to disseminate the concept of a Geopark is to illustrate it in a way that suits the actual situation and target audience of each region. There is no single solution to illustrating the concept. It is best to use the illustration to consider how the concept of the Geopark can work for the better future of the region.



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C.15. Global Change and Human Mobility Environmental Risks Resilience and Human Mobility

1115-LAS PALMAS DE GRAN CANARIA "NOMAD CITY" LEISURE AND CO WORKING IN AN ATLANTIC CITY

Juan Manuel Parreño-Castellano¹, Claudio Moreno-Medina¹, Josefina Domínguez-Mujica¹

Las Palmas de Gran Canaria University Geography Las Palmas de Gran Canaria-Spain¹

Communication technologies have favored a modality of remote work that has been identified as teleworking for more than two decades. Recently it is possible to recognize an added aspect of this specialization, the case of workers defined as digital nomads because they travel long distance in search of a temporary attractive leisure-led residence, while allowing them to develop a remote work. To meet this demand, many cities have been generating a new infrastructure on accommodation (co-living) and work (co-working), modalities that are combined with the promotion of these destinations through meetings, congresses, etc. and the dissemination of this specialization through channels of digital communication.

Las Palmas de Gran Canaria is a clear example of this process and for this reason the poster we propose has set these objectives: to present the recent history of this specialization; to identify the location of the co-living and co-working spaces and the calendar of congresses dedicated to this aim; to recognize the business of entrepreneurs in this specialty; and to analyze the geographical origins, motivations and socio-demographic characteristics of digital nomads residing in the city. To reach these targets we use sources of quantitative analysis (documentation and statistical processing of the initiatives developed); qualitative (interviews with entrepreneurs and digital nomads) as well as the geo-referencing of such specialization.

We believe that these objectives allow us to defend a new urban specialization of Las Palmas de Gran Canaria, an Atlantic city at a stage of strength of digital capitalism, which uses its territorial advantages to competitive in this new global socioeconomic structure.



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1447-A methodology for the analysis of socio spatial integration in a globalized reality

Izhak Schnell¹

*Tel Aviv University Geography and Human Environment Raanana-Israel*¹

Globalization effect daily life by creating fluid spaces with open bounded places. In this reality traditional models that associate spatial distances with social distances are not adequate anymore. There is a need for a multidimensional models of integration and segregation. We suggest a model that incorporate access to economic, social, cultural and emotional forms of capital with residential and activity spaces. High access to inter-group sources of capitals are defined as integration and low access to inter-group sources of capital and strong ties to intra-group capitals are defined as segregation. We articulated a short questionnaire to gather data on 12 aspects of capitals accumulation (See table). First studies that are based on this model confirm that there is no isomorphism among the different aspects of the model leading to different styles of integration and segregation. For example, while Arab males in Israel stress the need to produce intergroup social capital as a mean for integration. Arab women tend more to produce inter-ethnic cultural capital as a mean for integration.

Table 1: The aspects of integration versus segregation among Arabs in Israel

Form of capital Aspect Operational indices in a standard day:

Spatial Activity orbits % time spent in Jewish space.

Social Encounters with Jews % Jews from encountered others.

Jewish friends %Jewish friends of all friends.

Help from Jews % requests for help from Jews in case of need.

Cultural Fluency in Hebrew How well is the person fluent in Hebrew

Attitudes towards integration Social distance scale

Hebrew media % time spent on Hebrew programs from time spent on communication.

Emotional Israeli identity Saliency of Israeli identity

Style of decorating the house Apartments decorated in Arab traditional or modern-western styles.

Sense of belonging in Jewish space How attached and comfortable one feel in Jewish spaces.

Economic Occupational status Distribution of professional statuses?

Perceived Income Evaluation of household's income relative



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3494-An assessment of drought vulnerability among households with temporary migrant members and households without temporary migrant members A comparative study across different income and social groups in rural India

Badsha Sarkar¹

TERI School of Advanced Studies Policy Studies New Delhi-India¹

In recent times, India is witnessing a significant growth in terms of both the vulnerability to climate change as well as the volume of seasonal migrants simultaneously. One of the several ways through which the climate change is supposed to impact India is the increasing frequency and intensity of droughts. India which to a large extent is dependent on the monsoonal precipitation pattern for recharging its vast drainage networks is also a country with a huge volume of workforce dependent directly on the rainfed agricultural system. A volume of field investigations has emerged which has shown a variety of migration behaviours among the different population groups, distinguished by their respective social and economic characteristics, under a given drought situation. At the same time there is also a debate between the narratives of migration as an adaptive strategy or a failure to adaptation during a given climatic hazard especially in the academic arena. Therefore, a policy choice between migration prevention and migration support under a drought situation needs to be properly backed by empirical evidences. These evidences are very small in size for the Indian population.

In this direction, the present paper will investigate the drought vulnerability among households with temporary migrant members and households without temporary migrant members in rural India across different income and social groups. Vulnerability will be defined as a function of exposure, sensitivity and adaptive capacity following Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Household level sensitivity and adaptive capacity indicators will be identified from India Human Development Survey 2011-12 (IHDS-2) which will be merged with the district level drought exposure data collected by India Meteorological Department (IMD). Weights will be assigned to the variables by principal component analysis and composite indexes will be calculated for sensitivity, adaptive capacity and overall drought vulnerability.

3537-A Complex Agent Based Model for Forecasting Disaster Displacement. The Northern Kenya Case Study

Eleonora Panizza¹, Mauro Spotorno¹

Università degli Studi di Genova Department of Political Science Genova-Italy¹

Human displacement is recognized as one of the major challenges of the contemporary world, involving millions of people every year – 79.5 million people were displaced worldwide in 2019 (UNHCR, 2020) – and this implies there is an urgent need to foresee the impact of disasters mainly on displacement in the most fragile areas of the less developed countries. Displacement is the result of a combination of circumstances – environmental conditions, disasters, conflicts, socio-economic pressures, political factors, cultural and individual attributes – each other interacting in a complex manner.

Starting from the literature, we developed a model that integrate an ABM with the typical features of the Gravity Model and is validated through an empirical investigation in an area of Northern Kenya, already investigated by the authors. The region falls within the ASALs and most of the inhabitants are nomadic pastoralists, whose survival depends on access to water and pasture for their herds. However, in the region the precipitations are increasingly scarce and irregular, and temperatures are rising due to climate change (IPCC, 2014). Our research deepens the systemic interrelation between the main factors intervening in the displacement process, on the basis of statistical first-hand data and interviews.

The model is expected to contribute to a better definition of local strategies and policies, for the purpose of reducing the risks associated with disaster displacement, especially in the IGAD region.

In conclusion, the research aims to verify to what extent this new model can be useful for implementing policies and strategies for preventing and minimizing displacement risks and to assess the impact of different socio-economic interventions at the local level.



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C.15.Global Change and Human Mobility Human Mobility and Identities Into Play Belonging and Transnationalism

1585-Investigating Ethnic Enclaves in Contemporary Japan

Yoshitaka Ishikawa¹

*Teikyo University Economics Hachioji-Japan*¹

Segregation implies the tendency of members of an ethnic group, with their distinctive ethnic characteristics and culture, to reside close to each other in cities, thereby forming distinctive neighborhoods. Since the second half of the 1980s, when the labor-force shortage became readily apparent, immigration to Japan has been remarkable. As a result, the population of Japan's foreign residents has been increasing, now numbering approximately 2.8 million persons. This corresponds to roughly 2% of the country's total population. Segregation patterns and ethnic enclaves have also formed in major cities, which has attracted a great deal of attention as an important topic in urban social geography. This presentation aims to introduce the results of a research project on several enclaves of five nationalities (Chinese, Korean, Filipino, Brazilian and Turkish), which are located in twelve municipalities of central Japan. Maps of the enclaves are drawn using a common legend at the scale of small area units, based on microdata of the 2015 population census. The findings obtained can be summarized as follows. It is not usual for these ethnic enclaves to be found in inner cities, implying a major difference from existing results obtained mainly in the US. The ethnic enclaves showing a high ratio of residents of a particular nationality are found in areas including city center/subcenter, areas near manufacturing firms, and areas containing public housing. Various reasons are given for the spatial clustering of residential areas housing foreign residents. Finally, the empirical validity of existing explanatory frameworks, including spatial assimilation and heterolocalism, is examined.

1601-Meta city and the Imagination of Borderless Cities

Rafael Martinez¹, Spela Mocnik¹

*Singapore University of Technology and Design Lee Kuan Yew Centre for Innovative Cities Singapore-Singapore*¹

Background. Advances in technology and means of transportation have granted some migrants the possibility of moving to cities without necessarily being permanently displaced from their hometowns. By having one foot in the city and the other in their hometowns, people can offset the negative aspects of city living while maintaining a family support network and having it as a backup plan. This form of living might entail a new form of imagining the city. This paper proposes the notion of meta-city to understand how supraterritorial interpretations of the city are produced and how people live within them. **Materials and methods.** The paper focuses on the cases of commuters whose daily existence encompasses a seamless to-and-fro movement between the city and their places of origin – between Jakarta and its periphery, and Singapore and Batam, Indonesia. It concentrates on their narratives associated with a mobile way of life and how the narrators construct their lives within what this paper refers to as “transit space.” Observing the way transit space derives from a dialectical movement that permanently modifies the landscape, the paper proposes to frame the studied cases as expressions of vernacularized cosmopolitanism. People who transcend city's borders in their everyday lives are creating connectivity tissues and mobility patterns that propel supraterritorial understanding of cities. Such vernacularization of cosmopolitanism will serve as a theoretical framework to make sense of ‘transit spaces’. **Results.** The paper suggests that, for many, the city has increasingly transformed into a spatial entity that fades out in the context of the fluid daily life of economic exchanges. **Conclusions.** The paper proposes to reconceptualize the idea of city not only as a porous and flexible environment, but also as a place permanently under construction, located precisely between the places where individuals make a living and where they stay overnight.



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1768-Czech and Polish Perception of the Turks During Centuries

Tadeusz Siwek¹

*University of Ostrava Science Ostrava-Czechia*¹

Perception of the Turks in Central Europe is presented on the example of two Western Slavonic nations: Czechs and Poles. Migration flows among Turkey on one side, and Poland and Czechia on the other side were during history all time very small, but awareness of the Turks was widely spread at least from historical era of Turkish expansion into Europe. "Turkish fear" was common in Europe during 15th – 18th centuries. Poland and Czechia were not exception. But the Czechs and Poles did not fear of Turks only. They had an occasion to perceive the Turks also as potential allies against their oppressors from Austria and Russia at the same time. For Czechs it was very marginal phenomenon, but for Poles it was more real perspective, but real examples of good relations with Turks were rather exceptional (for example general Józef Bem – Murat Pasha or poet Adam Mickiewicz). Because too small migrations between Turkey and Central Europe cannot be an indicator of intercultural relations, we have used another one: surnames signaling an awareness of foreign nation. We suppose, that surname means foreigners is a consequence of intercultural relations between two nations. Therefore we have analysed geographical distribution of surnames "Turk" or "Turkish" in Czechia and Poland from surname databases of both countries. The Czech and Polish people named "Turk" ("Turek" in Czech and Polish language) are considerably more numerous than Turkish immigrants or foreign students from Turkey in these countries. Their localization is interesting proof of Waldo Tobler's first geographical law: 1) their number is relatively higher in Czechia than in Poland and 2) the areas of their higher concentration are in both countries situated in the south-east parts. Both findings depend on real geographical distance of Turkey.

2157-The Irish Down Under Examining Migration Experiences of Young Irish in Australia

Kathy Reilly¹

*National University of Ireland Galway Geography Galway-Ireland*¹

Though there has been considerable research exploring migration as a theme in Irish geography (e.g. Gilmartin and White, 2016; Cawley and Galvin, 2016 – to mention but two), there have been relatively few contributions examining contemporary migration between Ireland and Australia (exceptions here include and are not limited to Breen, 2016 and O'Connor, 2010). Further to this, the Australian migration experience is presumed homogenous, that is, whatever the destination in Australia, the resulting experience is similar. This paper unpacks this presumption, examining (diverse) experiences of belonging across multiple Australian destinations, providing new and significant insight on contemporary migration practices. Transecting this, is a focus on everyday migrant lives, exploring the daily rhythms and routines associated with the places and spaces of Irish in Australia. More broadly this project engages four objectives, these include: a review of current legislation governing and regulating migration to Australia from Ireland; an understanding of the population geographies associated with migration to Australia, incorporating statistics from the Central Statistics Office in Ireland and the Census of Population and Housing from the Australian Bureau of Statistics; data collection through semi-structured interviews with Irish in Australia (including Irish living in Melbourne, Sydney, Brisbane, and Perth, in addition to destinations in the Australian interior); and finally, the project examines the decision making process leading some Irish people to remain in Australia, while others plan to return to Ireland. In particular I examine themes relating to belonging, such as: embeddedness, community, and the impact of migrant networks. Specifically for this paper I draw from qualitative data that examines how young Irish have experienced recent waves of migration to a variety of destinations.



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2910-The Role of Digital Information Sources Relating to Perceived Risks Among International Travellers Arriving to Hungary

Gábor Michalkó¹, Zsuzsanna Marton², László Kökény¹, Zoltán Birkner²

Corvinus University of Budapest Institute of Marketing Budapest-Hungary¹ Pannon University Campus of Nagykanizsa-Hungary²

Safety is one of the fundamental pillars of tourism (Hall-Timothy-Duval 2003, Mansfeld-Pizam 2006, Santana-Gallego-Fourie-Rosselló 2020). Weighing the risks when choosing a tourist destination and what local services to use during one's travels comes down to multiple factors (Liu-Wang-Fang-Zhang 2019, Pestana-Parreira-Moutinho 2020). The digital information sources used when travelling partially influence the individual's perceived risk (Björk-Kauppinen-Raisanen 2012). Considering that digital platforms are becoming increasingly more important when it comes to travelling, their effect on the perceived risk should be explored much more in depth (Seabra-Dolnicar-Abrantes-Kastenholz 2013). The number of international tourists grows year over year, and as the influence of the internet increases as well, the perceived risk of travelling is an increasingly bigger threat to the tourism industry as a result of digitalization (Curras-Perez-Ruiz-Sanchez-Garcia-Sanz 2017). Hungary is one of Europe's frequented tourism destinations and tourism is a key factor in the country's economy (UNWTO 2019, OECD 2019). "Safe place" is an important message in tourism marketing communications of Hungary. For Hungary to remain competitive, it is necessary to explore the perceived risk foreign tourists have when visiting the country and its relation to information portrayed in digital sources. The results shown in this presentation were done in collaboration with Bay Zoltán Nonprofit Ltd. for Applied Research in November 2019, where 1000 foreign tourists visiting Hungary filled out an online questionnaire. The database is analyzed by multivariate mathematical and statistical methods. The presentation will help us show the correlation between digital information gathering, the perceived risk and the creation of a destination image.

3038-THE TRANSNATIONAL ISLAMIC NETWORK BETWEEN RURAL BANGLADESH AND THE MIDDLE EAST FOCUSING ON BANGLADESHI MIGRANT WORKERS AND RETURNEES

Ai Sugie¹

Nagoya University Institute for Advanced Research Nagoya-Japan¹

Background: This presentation examines the impacts that migration to the Middle East has on the migrants' religious piety and practice and their home communities in Bangladesh. Although previous studies have paid little attention to the socio-cultural impacts of migration, they cannot be ignored because there are a substantial number of migrant workers in the Middle East from various classes and areas in Bangladesh. The research questions of this presentation are as follows: i) How do experiences in the Middle East affect the religious knowledge and practice of Bangladeshi migrant workers? ii) How do they influence religious discipline and activities in their home communities?

-Materials and Methods: This presentation's study area comprises seven villages in the Southern part of the Tangail district. I conducted fieldwork intermittently from 2011 to 2018 and a household survey and ethnographic survey in village B. I also conducted fieldwork in Makkha, Saudi Arabia, in 2018.

Results: There were 45 people who had traveled from village B to the Middle East. Almost all the travelers were migrant workers although about one-third of them had also performed umrah hajj and/or hajj. According to my interviews, 24 people's religious knowledge, practice, and piety increased or deepened since their travel to the Middle East. These people encouraged their families to pray, fast, and sent their children to madrassahs (Islamic schools) and gave additional donations to mosques. Most of these people continued to stay in Saudi Arabia, which has a distinct socio-religious environment and opportunities for adults to seek Islamic education. Wealthy Bangladeshi migrants held regular Islamic study meetings and conducted missionary activities on their own there.

Conclusions: The migration experiences to Saudi Arabia tend to increase or deepen religious piety and practice among Bangladeshi migrant workers and returnees and contribute to the increase of religious activities in their home communities.



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VIRTUAL

C.15. Global Change and Human Mobility Human Mobility and Regional Disparities Patterns of Migration from a Comparative Perspective

1204-Analysing Destination Choices of Recent Immigrants in Australia Based on Census Datasets

Kazumasa Hanaoka¹, Andrew Taylor²

*Ritsumeikan University Department of Geography Kyoto-Japan*¹ *Charles Darwin University Northern Institute -Australia*²

Background: Immigration has played an important role in driving population and economic growth in Australia. Since the mid-1990s, Australian immigration policies have encouraged new immigrants to live in regional Australia to address skilled worker shortages and mitigate infrastructure pressures metropolitan areas. In this study we analyse historical migration data to assess where immigrants have chosen to live and the extent of retention in regional areas.

Materials and methods: Australian Censuses in 2006, 2011 and 2016 were analyzed based on key variables of age, school attendance and birthplace. After constructing a partitioned database we applied a multivariate analysis to understand and visualise destination choices of recent immigrants.

Results and conclusions: (1) the Australian government emphasizes the importance of the regional migration program, but the definition of "regional" was recently changed to include larger cities. This isolates remote and small settlements and increases competition for skilled migrants among regions. In addition, the results of our analysis using Australian census datasets show that (2) while there was no change in the proportion of recent immigrants choosing the five metropolitan areas during the last 15 years, more Filipinos have migrated to live in regional Australia and work in the health care and hospitality sectors. (3) Retention rates are higher in metropolitan areas but lower in regional Australia and regions near Sydney and Melbourne. There is a positive relationship between destination choices on arrival and subsequent retention among ethnic groups. (4) Further research is needed on the determinants of destination choices among recent immigrants in Australia using multivariate analysis.

1461-THE INTERNATIONAL MOBILITY OF PORTUGUESE AND SPANISH HIGHER EDUCATION STUDENTS THE MUTUAL ATTRACTION OF TWO NEIGHBOURING COUNTRIES

Maria Lucinda Fonseca¹, Alina Esteves², Jennifer McGarrigle², Josefina Domínguez-Mujica³, Juan Parreño-Castellano³, Claudio Moreno-Medina³, Mercedes Rodríguez-Rodríguez³

*Universidade de Lisboa IGOT Lisboa-Portugal*¹ *IGOT-Universidade de Lisboa* alinaesteves@campus.ul.pt-Portugal² *ULPGC* josefina.dominguezmujica@ulpgc.es-Spain³

A growing number of Social Sciences researchers have focused their attention on the role of international student mobility between member states of the European Union because improving student mobility is a core goal of the European Higher Education Area and a major policy priority in the EU's agenda. In the words of the European Council, it is "one of the fundamental ways in which young people can strengthen their future employability, as well as their intercultural awareness, personal development, creativity and active citizenship" (Council Recommendation of 28 June 2011).

Keeping in mind these ideas, the aim of this presentation is to analyse a geographical regional context of higher education students' mobility within Europe, depicted by two neighbouring countries: Portugal and Spain. To reach this goal, the next questions will be addressed: What is the predominant type of mobility and cycle of studies among students in the educational flows between Portugal and Spain? Which flows are numerically more relevant in absolute terms and in relation to the university population of both countries? Which universities are the most attractive for these students? Can this talent mobility be the prelude to labour or professional migrations? Are university students only 'birds of passage' given the difficulties of skilled employment in these two countries?

The sources to develop this research were compiled through the educational information statistical systems of the respective countries: "Registo de Alunos Inscritos e Diplomados do Ensino Superior", published by the Portuguese Directorate General for Education and Science Statistics and "Estadísticas e Informes Universitarios del Sistema Integrado de Información Universitaria (SIU)" published by the Spanish Ministry of Science, Innovation and Universities. These data allow us to develop a quantitative methodology to unveil the recent trends of the evolving mutual relationships of Portugal and Spain through the mobility of higher education students.



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1754-International Mobility and its Spatial Impacts in the Rome Metropolitan Area an Analysis of the Last Two Decades

Barbara Staniscia¹, Gerardo Gallo², Armando Montanari¹, Enrico Tucci²

*Sapienza University of Rome Department of European, American and Intercultural Studies Rome-Italy*¹ *ISTAT Italian National Institute of Statistics -Italy*²

European Mediterranean cultural and political capitals are undergoing processes of transformation of their urban structures linked to the intensification of international and internal flows of migration and temporary mobility. The presence of migrants, tourists, temporary residents, city users is changing the way in which buildings are utilized, impacting the real estate market, the commercial system, and the infrastructure system. This has produced a redefinition of the population structure at the metropolitan scale.

This paper considers the metropolitan area of Rome and analyzes population movements during the period 2002-2017 using data relating to the structure of the resident population, international and internal transfers of residence, tourist flows, and the real estate market.

Our analysis highlights the significant impact of the growing temporary and permanent mobility flows (a) on the gentrification processes of some neighborhoods in the urban core, (b) on the progressive replacement of residential by tourist usages in many areas of the urban core, (c) on the progressive conversion in many areas of the core of commercial usages intended for the consumption of the historical resident population with businesses for the consumption of tourists and new residents, and (d) on real estate values. Our analysis underlines (a) growth rates of the resident population in the metropolitan area due almost exclusively to international migration, (b) growth rates in the inner ring higher than in other sub-areas, and (c) the capacity of some coastal and lake municipalities to attract specific segments of international migrants. Our analysis highlights suburbanization processes which were gradually decreasing towards the end of the study period, fueled mainly by the elderly component (people over 65) and by young families (people aged between 30 and 39 years). Finally, our analysis points out an insufficient retention capacity in the core of highly qualified young people.

3402-THE ROLE OF MIGRATION IN THE DEMOGRAPHIC DYNAMICS OF PORTUGAL'S INTERIOR REGIONS THE MUNICIPALITIES OF FUNDÃO AND IDANHA A NOVA

Maria Lucinda Fonseca¹, Alina Esteves¹, Luís Moreno¹, Sandra Silva¹

*Institute of Geography and Spatial Planning, Universidade de Lisboa CEG-IGOT Lisboa-Portugal*¹

Portugal is presently a country with one of the oldest populations in Europe. In addition to a very low fertility rate (2019 = 1.42 children per woman), the weight of the population aged 65 or more in the total population reaches values of concern for the sustainability of the Social Security (2019 = 163.2 people aged 65 or more per 100 people aged 14 or less). In this context, one of the ways to mitigate the negative natural change is to attract new residents.

Some municipalities have developed interesting strategies to attract and retain several groups of foreign citizens. Providing housing conditions, welcoming foreign investment and working in cooperation with the High Commission for Migration (ACM), the municipalities of Fundão and Idanha-a-Nova, located in the Centre Region, close to the border with Spain, are two examples that we explore. Characterized by ageing and loss of population, partly due to emigration, they have managed to attract foreign residents.

Although they still constitute a very small portion of the population, foreign citizens (Fundão = 5.7%; Idanha-a-Nova = 3.5%) have been increasing in the last decade. Qualified professionals, seasonal workers, EU citizens in search of alternative lifestyles and beneficiaries of international protection migrate to these two municipalities. Using data published by Statistics Portugal (INE) and the Aliens and Borders Office (SEF) and interviews with international migrants and local actors in the two abovementioned municipalities, we intend to analyse and discuss the role of public policies and local actors in creating conditions favourable to the attraction and fixation of migrants in low-density areas, strongly affected by the already long process of ageing and demographic decline.



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3487-THE RACE FOR FOREIGN STUDENTS BY PORTUGUESE UNIVERSITIES IN PERIPHERAL REGIONS FLOWS OF TALENT AND INNOVATION

Madalena Fonseca¹

*University of Porto, Portugal Department of Geography Lisboa-Portugal*¹

Peripheral regions from Portugal, as from other Southern European countries, are economically and socially impoverished, have lower productivity, lower employment rates and lower innovation; public and private investment is dropping, their populations are aging and younger generations are leaving to the main cities or abroad. Yet, those regions have a good physical infrastructure endowment; they have a good transport network, education and other social facilities. All capital cities of the most remote districts have a Higher Education Institution (HEI); but they are not able to meet locally the demand they need and their vacancies would not be filled, if there were no flows of students migrating from the outside. The Portuguese-speaking African countries, Brazil and Timor, are the main "targets" of the HEIs fight for international students. For those students there are two main reasons to move. It is a most convenient option to obtain a European degree, taking into account the language and the low cost when compared to other European countries or the USA; and, they may have as their ultimate goal, to obtain a European diploma to get a job in Europe in a permanent immigration perspective.

Immigrating students share the characteristics of those who "flee" from the peripheral areas to the most prestigious universities. They are a qualified population, have a high innovative potential, being willing and able to move and open to an international experience. They can increase social capital and reinforce the human capital of the receiving regions. They can even be a driver of improving the quality of institutions. The paper focuses on the innovative and growth potential for the receiving regions, and identifies local embeddedness. Institutional Economic Geography approaches are the theoretical framework of the study. What are the host regions doing to make the most out of these immigrant students flows?

3655-Regional disparities in Chinese students' international mobility How can non traditional destination countries become more attractive in their eyes A case study from Hungary

Kitti Köves¹

*University of Pécs Department of Political Geography and Development and Regional Studies Pécs-Hungary*¹

The Hungarian higher education witnessed large scale internationalization in the last decade, the number of international students reached almost 40.000 in the 2019/2020 academic year, which represents 13 percent of the total number of university students. Among foreign students studying in Hungary Chinese students' number grew the most dynamically, in the past few years and China became the second-largest sending country after Germany. The aim of this study to discover the motives of those Chinese students, who opt-out for less favored destination countries and institutions. Although the literature on Chinese students' international mobility thrives year by year, plenty of them examining their motivations and decision making on destination countries, these are mostly limited for the traditional anglophone host countries, where the key determinant factor is the ranking of the universities. Previous studies conducted in Hungary show that foreign students choose the country because of the available scholarships, presumed high-quality education, central location in the EU within the Schengen borders, and moderate tuition fees and cost of living. Via an online survey carried out among Chinese students studying in Hungary we could compare their motivations. We found that for Chinese students the European location is also preferable, not just because of the convenient traveling options in Europe, but security and a healthy environment play a significant role in their decision, not to mention the internationally recognized diploma they can obtain. The findings of this research can guide decision-makers and recruiters in countries where higher education professionals are looking to welcome more Chinese students on their campus.



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C.15. Global Change and Human Mobility The 'Human Mobility Career' Circular onward and Return Migrations

1474-THE RETURN CAREERS OF COLOMBIAN RETURNEES ON GOING MOVEMENT ACROSS BORDERS AND TRANSNATIONAL RELATIONSHIPS

Yvonne Riaño¹

*University of Neuchâtel Geography Utzigen-Switzerland*¹

The mobility turn has led to reconceptualising migration as being on-the-move. Taking this new perspective, this paper interrogates how to approach the transnational spatial mobilities that so far have been largely understood as 'return migration'. In this paper, I use a 'career migration' perspective to grasp the diversity and complexity of the spatial mobilities that surround the return migration of Colombians who have previously lived abroad. The paper is based on ethnographic work as well as biographic interviews with 30 Colombian returnees. I present three typologies of 'return' careers. In a first case, my research partners follow a career of repeated forced mobilities, ranging from initial internal displacement in Colombia, followed by emigration to Venezuela, and subsequent deportation to Colombia by the Venezuelan government. In a second case, the returnees follow a career of repeated mobilities, first emigrating to Europe and then physically returning to Colombia with the support of the German government, which allows on-going returns. In a third case, returnees do not physically go back but create multiple cross-border 'returns' of individuals, goods and capital. In all cases, return is never a definite return. My interview partners have one foot in Colombia and one foot abroad. I show how their practices are rooted in transnational relationships with the former country of immigration and, are built on bi-directional, or multi-directional, rather than uni-directional flows. Furthermore, many returnees feel that if they had the opportunity, conditions improved in the country where they formerly lived, or their family problems in Colombia were resolved, they would emigrate again. Although in some cases the return decision can be clearly defined as 'voluntary' or 'forced', in several cases these two dimensions mix. These findings question the notion of return as a linear and definite process, and as either a voluntary or forced process.

2246-Back to BG Return migration of Bulgarian Students Graduating Abroad

Birgit Glorius¹

*TU Chemnitz European Studies Chemnitz-Germany*¹

In Bulgaria, as in other Central and Eastern European transition countries, emigration of young and well educated migrants has become a pressing issue, especially since the integration into the EU and the full freedom of residence. However, there are also return and circulatory migration processes. Focusing on mobility circuits of Bulgarian students who moved abroad for gaining a degree, this paper wants to discuss questions of transnational mobility in the context of life course decisions, individual life goals and (changing) perceptions of living conditions at home and abroad. The theoretical frame aims to combine migration theory and theories of societal change, bridging the gap between conceptualizations of human mobility and societal development. During the project, 60 narrative biographical interviews were collected, 30 with returnees and 30 with stayers. By taking a transnational research perspective, the research design follows the hypothesis that life course decisions of migrants are embedded in a transnational social space, thus integrating a broader variety of options than for non-migrants. However, also migrants are faced with uncertainty concerning the outcomes of their decisions, which are even reinforced by the transformative context in Bulgaria and the results of societal change throughout Europe. The focus on "return migration" is less understood as a normative component, but points to the direction of observation in the course of research.

The goal of the analysis is to develop a return typology, showing the variety of decision making strategies in the context of biographical stages, personality aspects, institutional regulations and further contextual factors. The research focuses on the individual perspective of migrants, thus enabling to develop a better understanding of decisions whether to stay, to return or to develop a transnational biography. Results show, among others, that returnees, by introducing social innovation, might actively contribute to societal development of their country.



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2424-REDEFINING ADAPTATION THROUGH THE PERSPECTIVES OF LATIN AMERICAN RETURN MIGRANTS FROM SOUTH KOREA

Cassandra Gutierrez Rosales¹

*Seoul National University Geography Seoul-Korea, South*¹

This study attempts to redefine the concept of adaptation by focusing on the adaptation experiences of Latin American return migrants from South Korea. In this research, adaptation is defined as a dynamic, ongoing process by which migrants adjust to environmental changes. Through the specific case study of Latin American return migrants who lived in South Korea, this paper seeks to argue that adaptation is a process that cannot be measured in terms of its success or failure. The adaptation discourse is constantly free-flowing in that adaptation is not a fixed state or condition, but rather an ongoing, never ending process of diverse scales. This research primarily asks: (1) Why can't adaptation be measured? (2) In what ways does adaptation affect return migrants? This study uses qualitative research methods, such as archival analysis and in-depth interviews to examine the specific case of Latin American return migrants from South Korea in relation to the above listed questions. Due to the geographical and cultural distance, most Latin Americans who migrate to South Korea do so on a temporary (short to medium term) basis, with little intention of settling down permanently. This migration pattern has influenced the country's lack of a physical ethnic enclave for the small Latin American migrant community, who live scattered throughout the country. Despite the temporary nature of these migrants, the limited access to interrelation opportunities with other Latinos leave them to become heavily influenced by the surrounding South Korean and Asian culture, not only heavily influencing how these migrants cope during their return, but also how they choose to interpret their lived experiences of adaptation in South Korea and re-adaptation in their countries of origin.

C.16.Global Understanding Geography Habits and Cultural Understanding

1364-Geography Habits and Cultural Understanding

Ruiqi Liu¹

*Asian Chairmanboard shanghai-China*¹

We research: What is "culture"?

It's defined by anthropologists that culture is the shared ideas and behaviors of a community, the common understanding formed by a group of people about their deeds and the meaning of matters through acquisition, which is embodied in the habits acquired. There're altogether 8 features about culture:

- (1) Culture is a comprehensive and complete system.
- (2) Culture is the product of history.
- (3) Culture will change and will cause changes.
- (4) Culture will be strengthened owing to value orientation.
- (5) Culture plays an almost decisive role for the conduct.
- (6) Culture, to a large extent, consists of symbols and is transmitted by symbols.
- (7) The habit is a key factor and a manifestation of culture.

Based on the key research points of the research project, we generally call the culture "habit" (convention/custom) for short.

Our research consists of five research directions: "nature-based features, geography-based features, human nature, religion and system".

Geography-based features are generally the impact of the geographic environment on humanity, and rocks, current bedding and the atmosphere form the geographic environment. The landform determines the circulation; the circulation gradually changes the landform. The circulation regulates the climate and shape the living environment for plants, animals and human beings together with the landform, and therefore the earth surface is ultimately related to the human being; that is to say, the landform and the climate combine to impact the shaping of human habits. Through preliminary exploration, we found the distribution of resources under different geographic conditions can exert influence on the wealth of a region or country. Most countries short of resources are affluent while those abundant in resources are poor; those featuring a level of resource reserves between them also witness an affluence level between them.



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1451-THE EVOLUTION AND COMMERCIALIZATION FOR TOURISM OF THE NOMADIC MODE OF PRODUCTION IN RECENT YEARS IN ALTAY MOUNTAIN AREA XINJIANG CHINA

Xiang Kong¹, Yan Dai²

*East China Normal University urban and regional science Shanghai-China*¹ *Xinjiang Normal University Geography Science and Tourism -China*²

Technological progress is bound to have a profound impact on local traditional modes of production, but may therefore activate its tourism value. Based on the field research on the evolution of the nomadic mode of production in Altay, Xinjiang, China in recent years, this study is intended to preliminarily explore the possible impact of technological progress on the traditional nomadic mode and its tourism commercialization process. It shows that the traditional "transfer" activity in Altay Mountain Area not only reflects the close connection between geographical environment and local production mode, but also may become an important tourism resource. No matter the production organization system, life style or value concept of the herdsmen are all closely related to the nomadic activities and may become valuable materials for tourism. However, the tourism performance of nomadic activities do face many difficulties. Technological advances have led to changes in the way nomads are organized and the way they live, some transfer activities and settlements may become easy to develop tourism. However, the progress of technology may make the herdsmen ignore the positive value of traditional ecological concept and production experience, and the contradiction between man and land becomes obvious. Therefore, it is necessary to promote the benign interaction between the evolution of the nomadic mode of production and its commercialization for tourism, so as to better inherit the harmonious coexistence mode of people and land with local characteristics. This paper focuses on the evolution of nomadic production in western China, which is of great significance for understanding the modernization of western China

1813-Food Consumption Values in Guangzhou and the Shifting Geographies of Conventional and Alternative Food Networks

Shuru Zhong¹, Alex Hughes², Mike Crang³, Guojun Zeng¹

*Sun Yat-sen University School of Tourism Management zhongshr3@mail.sysu.edu.cn-China*¹ *Newcastle University School of Geography, Politics and Sociology alex.hughes@newcastle.ac.uk-United Kingdom*² *Durham University Department of Geography m.a.crang@durham.ac.uk-United Kingdom*³

"Embeddedness" means that activities within food networks are not only determined by economic rationality but also interlaced with complex political, social, cultural, and ideological forces. Research based on experiences in the Global North has assumed the dis-embeddedness of conventional food networks (e.g., chain supermarkets) and the embeddedness of alternative food networks (e.g., farmers' markets). Based on in-depth interviews of consumers and various stakeholders in both conventional and alternative food networks in Guangzhou, China, this study challenges the theoretical binary of conventional/dis-embedded and alternative/embedded, exploring the embedded features of conventional food networks and dis-embedded facets of alternative systems. Conventional food networks in Guangzhou creatively adopt embedded strategies, including establishing transparent traceability systems, short distribution chains, and extensive social relationships with local consumers. In contrast, the multidimensional making of the dis-embeddedness of alternative food networks is manifested by the "local trap," governmental discouragement, and consumer trust crisis. Furthermore, the shifting embedded status of these two food networks yields different results when each respectively responds to a consumer food ethics that emphasizes self-regard and food quality demonstrated by safety, freshness, and healthfulness. Thus, it can be concluded that the degree of embeddedness indicates how well a food network eases the urgent food issues of the society it inhabits. This study contributes to the food study literature on embeddedness by revealing the complexity and fluidity of this concept, as well as responses to ordinary food ethics and pressing food issues in the Global South. It would be helpful to understand the Chinese habits and food consumption



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2107-Geography History and Institution A Case Study of China's River Chief System

GUO ZHENG¹

RENMIN UNIVERSITY OF CHINA SCHOOL OF PUBLIC ADMINISTRATION AND POLICY BEIJING-China¹

River Chief System (Hezhangzhi) is a national institution for managing rivers and lakes of 31 provincial regions in the Chinese mainland. China has appointed top officials at different levels of government as chiefs of rivers to bear direct responsibility for the management and protection of rivers and lakes.

The traditional River Chief System may date back to Ming dynasty (400 years ago) in Zhuji County of Zhejiang Province. Climate, topography and population increasing were the main trigger factors of the birth of the traditional River Chief System. In Qing dynasty and the Republic of China, this institution evolved with the changing of climate and politics. The modern River Chief System originated in 2007 to address pollution woes of a blue algae outbreak in Taihu Lake, Jiangsu province. The practice was later adopted in several regions with rich water resources to ensure strong enforcement of environmental policies and enhanced coordination of different government bodies. In December 2016, the China's central government released a document to put River Chief System to effect in the whole country. Based on the historical institutionalism, this research creates a new analysis framework by adding geography variables in it. With the new analysis framework, this paper firstly elaborates the evolution of River Chief System from Ming dynasty to the present. Then it analyses the nodal point, contingency, path dependence, persistence and variability of the evolution of River Chief System. At last, this paper concludes the reciprocal influence mechanism of geography, history and institution, and tries to develop the historical institutionalism by consolidating geography factors.

2479-The Regional Discrepancy of the Folk Customs in Shaanxi during Qing Dynasty

Xiaohong Zhang¹

Fudan University Institute of Chinese Historical Geography Shanghai-China¹

The procession of the seasons and folk customs is one of the major contents of cultural geographical study. There were some different contents about the procession of the seasons and folk customs in different areas in Shaanxi province during Qing Dynasty and there also existed some discrepancies in the aspect of the date of festival. Therefore, Shaanxi province can be divided into three regions of the procession of the seasons and folk customs, namely, Northern, Central and Southern during Qing Dynasty. The region of Northern Shaanxi, including Yan'an, Yulin, Suide, and Luochuan states and Fu county which located in northern Fu state had the obvious features that Jizao (offering a sacrifice to kitchen god) was held at night on December 23 (lunar calendar), and Huotata (a Tower-like shaped with coal) was burned to celebrate the Festival on the 15th day of the first lunar month. While in Central Shaanxi, including Xi'an, Tongzhou, Fengxiang, Bin, Qian states, and south Fu State* the local people not only generally lit the special lamps which were made of wheat flour everywhere in their houses, but also celebrated Butian Festival (mending heaven festival) on the 20th day of the first lunar month especially in northern parts of this area at the same time. In Southern Shaanxi Jizao was on the 24th day of the first lunar month and there existed another custom dragon-boat race (the 5th day of the 5th lunar month) along Han River, which became a different feature compared with Northern and Central Shaanxi regions.

The formation of regional discrepancy of the procession of the seasons and folk customs in Shaanxi had close relations with local natural conditions, migration, and cultural tradition, it was also an important factor that had caused regional discrepancy of cultural landscape in Shaanxi.



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2537-The Convergence of Eastern and Western Flower Appreciation and Its Meaning

Li-Hui CHEN¹

Earth Science Yunnan University Kunming-China¹

Traditional flowers appreciation shows significant East-West differences. However, in the past 30 years, the global cultural exchange brought by space-time compression technology has been strengthened, and the traditional East-West flower arrangement and gardening have influenced and learned each other, reflecting the convergence of aesthetics. This paper chooses several cases of international flower competition works, combining the examples of daily flower arrangement and gardening, compare the traditional difference of eastern and western flower arrangement and gardening styles. Then, it describes the convergence phenomenon of east and west flower appreciation from the aspects of flower material, material matching, flower ware, design modeling, etiquette and decoration place in details. Further, the paper analyzes several influence aspects, such as the global production and trade system, as well as the commonness of aesthetics. Finally, based on above, it concluded that openness brings richness to local culture, which facilitate the flower materials, knowledge, technology, and the concrete expression of global consensus in aesthetics. All these demonstrate that the common sense on flower appreciation and the possible understanding among the people in different regions. In the future, openness, culture exchange would create more chance for people learn each other through production, trade, education, training, not only the flower appreciation, but also other aspects of daily life. Such convergence of eastern and western flower appreciation also shows some common of all people from all over the world. Maybe the need for health food, rich experience, kindness of the societies, etc. in the world. We could learn from each other and find the fascination of other culture. We could find such attitude benefit all and no harm to other interest group. We could find and build the bridge between the eastern and western, the northern and southern, by emphasizing cultural appeal and economic globalization.

2577-Insights from the world's most polluted city Understanding great social challenges of today through the lens of cultural contingents

Mirek Dymitrow¹, Ljupcho Petkovski², Slobodan Arsovski³

Lund University Department of Human Geography mirek.dymitrow@keg.lu.se-Sweden¹ Eurothink Eurothink Skopje
Lund-Macedonia² Ss. Cyril and Methodius University of Skopje Chamber of Certified Architects and Certified Engineers
slobodan67mk@gmail.com-Macedonia³

We live in times of rapid changes and unpredictability. Great social challenges of today no longer come one by one. What makes them great is their ever-greater entanglement in one other and across multiple levels, including landscapes, regimes and niches. To this background, a major challenge facing many countries today is how to address interlocking problems of unsustainability caused by cultural contingents, as this dimension is not yet fully understood amidst a plethora of literature on systems thinking and complexity science.

Drawing on insights from 35 in-depth interviews with residents and specialists, this research seeks more human-centered explanations for the retention of undesired ways of thinking. This is done through the example of Skopje (North Macedonia), a city embroiled in a host of economic, ecological, and social contradictions.

Considering the scale, scope, and character of problems in Skopje, we seek to develop a deeper understanding of the situation to outline priorities for action. By conducting a multilevel analysis, the aim of this study is to investigate the role of personal and cultural narratives upon scenarios of unsustainability. The following research questions form the bulk of this study:

- (1) What are the residents' views on (un)sustainability and (un)sustainable development in Skopje?
- (2) What are the residents' assessments of their (im)possibility to influence change?
- (3) What is the role of culture upon the developments in Skopje?

Using Skopje as an example, this presentation elaborates on the concept of 'modern outpost of unsustainability', a locality exhibiting a complex web of social entanglements that cause and maintain several dilemmas at once. By focusing on the formation of individuals through cultural carriers of meaning, this presentation explores ways in which particular discourses and social contracts can create clusters of unsustainability, and what socio-material effects they may incur upon institution building, technical input and self-governance.



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2707-Monuments at the mercy of financing. The case of Poland

Anna Sieniecka¹

*Adam Mickiewicz University, Poznań Department of Settlement Systems and Teritorial Governance Poznań-Poland*¹

In the process of monument preservation the stakeholders face many problems. Financing is one of the elements conditioning it and perhaps the most important. The aim of this work is to recognize the scale of financing monuments by the Ministry of Culture and National Heritage in Poland under the programme 'Monuments protection' in the context of the objects status – sacred or secular. The spatial scope includes Poland with particular emphasis on the regions.

There are 70 759 immovable monuments in Poland among which 11 715 are sacred monuments (it is about 16.5 per cent of all, National Heritage Board of Poland as for 2017). There is a disproportion in financing the preservation of monuments in Polish regions. The number and amount of co-financing projects for the protection of sacred monuments in comparison to secular monuments is disproportionately higher than their share in the total number of monuments.

The existence of regional inequalities in the resources of monuments seems natural, but disproportions in financing the preservation of monuments in the context of their status (sacred or secular) constitute an extremely interesting and thought-provoking issue. Why is the success rate for secular objects much lower than for sacred objects? Why is the proportion of applications for the secular objects twice lower than for sacred once, since there is on average more than five times more of these objects? Perhaps the funding rules should be re-evaluated for such a noble purpose as keeping all the heritage as long as possible for future generations.



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VIRTUAL

C.17. Hazard and Risk Contribution of Geography to Understanding Natural Disasters Research Education and Society

1150-West Nile Virus Surveillance Control and Prevention in Ontario Canada Environmental Health Response Framework

Fatih Sekercioglu¹

*Ryerson University School of Occupational and Public Health Toronto-Canada*¹

Climate change effects result in increased West Nile virus (WNV) activity in many parts of the world. WNV first arrived in Ontario, Canada, in 2001 and has since spread throughout most of the province, causing disease in humans. Ontario government has a province-wide surveillance and control program to monitor and reduce WNV transmission throughout the 35 regional health units. West Nile virus is a mosquito-borne arbovirus in the Flavivirus genus (Flaviviridae). WNV was named after the West Nile province of Uganda, in which it was first isolated in 1937. Since then, it has been a well-documented cause of human disease in Africa, West Asia, and Eastern Europe. European epidemics of WNV encephalitis occurred in southern France in 1962, in southeastern Romania in 1996, and in south-central Russia in 1999. Prior to the summer of 1999, WNV had never been identified in the Western Hemisphere. The first known emergence of WNV in the Americas occurred in New York City in the late summer and fall of 1999, causing 61 confirmed human cases of encephalitis, seven of which were fatal. The method of importation of WNV is unknown, but it may have arrived in an infected bird (including a migratory bird and captive specimens) or in mosquitoes. Canada's first record of WNV occurred when Ontario birds tested positive for the virus in 2001; a year later, Ontario recorded its first human cases. Ontario established a comprehensive framework to monitor, control and reduce WNV activity and transmission. This presentation will provide an overview of Ontario's comprehensive WNV program.

1417-CONTRIBUTIONS OF TECTONIC GEOMORPHOLOGY TO DISASTER RISK REDUCTION OVER A QUARTER CENTURY PERIOD SINCE THE 1995 KOBE EARTHQUAKE IN JAPAN

Yasuhiro Suzuki¹

*Nagoya Univ. Disaster Mitigation Research Center Nagoya-Japan*¹

The 1995 Kobe Earthquake was generated by an inland active fault, which triggered Japan to introduce disaster prevention measures against such low-frequency, large-scale disasters. Geomorphologists can assess the seismic hazards presented by active faults, and they have thereby been engaged in earthquake prevention for several decades. This presentation reviews the contributions of tectonic geomorphologists to the following four items and discusses their achievements, as well as future issues: 1) precisely mapping active faults; 2) long-term prediction of earthquakes; 3) evaluating the characteristics of intraplate earthquakes that occurred after 1995; and 4) analyzing damage resulting from intraplate earthquakes. The results are summarized as follows: 1) approximately 30 geomorphologists were involved in the creation of 1:25,000-scale active fault maps that the Geospatial Information Authority of Japan began to develop after 1995. More than 200 sheets were created by 2020. During the 2004, 2014, and 2016 earthquakes, surface ruptures appeared on the fault lines shown in the maps, thereby proving the validity of these maps. 2) The Japanese government established the Headquarters for Earthquake Research Promotion, which commenced long-term earthquake predictions based on the active fault information with contributions from geomorphologists and seismologists. By 2005, preliminary long-term evaluations of major active faults were completed, and a National Earthquake Hazard Map was created based on the results. 3) The long-term earthquake predictions were based on a "characteristic model" of fault activity; however, some subsequent earthquakes differed from these predictions. It therefore became necessary to investigate the irregularities of active fault activities. 4) During the 2016 Kumamoto earthquake, it was revealed that severe damage to buildings was concentrated within 100 m from the surface ruptures. It is widely believed that strong ground motions solely result from faults deeper than a few kilometers. However, the concentration of damage cannot be explained by this interpretation.



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1440-EARTHQUAKE RISKS OF THE NORTH ANATOLIAN FAULT AND THE ANATOLIA

Koji Okumura¹, Thomas Rockwell²

Hiroshima University Graduate School of Letters Higashihiroshima-Japan¹ San Diego State University Department of Geological Sciences trockwell@sdsu.edu-United States²

The geologic studies on the past large earthquakes from the North Anatolian fault advanced greatly in the decade following the 1999 Kocaeli earthquake. There was a serious concern about the seismic risks of the Istanbul metropolitan area and of large cities along the fault. Intensive investigations brought a lot of precious information on the past devastating earthquakes from the North Anatolian fault, and our understanding of the risks as well as the fault behavior progressed much. However, the progress seems to have been slowed down during the second decade until now and there still remains a number of unanswered questions on the future activity of the fault. On the other hand, the nation-wide efforts let us learn about many more active structures and their earthquake potentials have been partially revealed. Anatolia seems to be much more unstable than we had known before. This paper aims to summarize what we have learned and what we need to learn about the future large earthquakes from the North Anatolian fault and in Anatolia. Some important topics are as follows. The completeness of historic catalogs are seldom questioned by paleoseismology though it is the only way to supplement incomplete historic records. Many paleoseismological works just confirm catalogs based on historic records. However, the author's studies on 1944 and 1939 segment eventually excavated earthquakes without any historic reference. On the 1944 segment an event in 12 to 13 century with no records have been very unequivocally confirmed. Historic records must be unreliable during warfare and disruption. Further excavations of events without historic records are necessary. As mapping and detailed studies on the intra-plate faults advance, many more sources of hazardous earthquakes have been recognized in Anatolia.

1441-THE PAST AND THE FUTURE OF LARGE EARTHQUAKES ON THE HIMALAYAN FRONTAL THRUST IN INDIA AND NEPAL

Koji Okumura¹, Javed N. Malik², Soma N. Sapkota³, Prakash Pokhrel⁴, Hisao Kondo⁵

Hiroshima University Graduate School of Letters Higashihiroshima-Japan¹ Indian Institute of Technology Kanpur Department of Engineering javed@iitk.ac.in-India² Department of Geology and Mines Directorate somanathsapkota@yahoo.com-Nepal³ Department of Geology and Mines Department of Geophysics pku.pok@gmail.com-Nepal⁴ Geological Survey of Japan IEVG kondo-h@aist.go.jp-Japan⁵

The knowledge on past large earthquakes on the Himalayan front have been developed drastically after the 2015 Golka earthquake. However, the flood of new information resulted in many unreconcilable ideas on the timing and extent of the recent surface ruptures. The ruptures of the most recent events of 1934 Eastern Nepal and 1905 Kangra, India earthquakes came into questions. If the rupture did not reach to the surface in 1934 earthquake, The elapsed time since the last surface rupture would be 765 years assuming 1255 ruptured in eastern Nepal. No matter 1905 ruptured HFT or not, the potential of the next rupture in the 1905 source area is supposed to be high. The location and extent of 1505 central seismic gap earthquake, 1344 central Nepal earthquake, and 1255 earthquake have not been fixed yet. We have conducted paleoseismological studies around Butwal in central Nepal. Our trench in west of Butwal at 83.36 E showed 1344 (or 1408) event without any evidence of 1255 and 1505 events. Another trench in east of Butwal at 83.86 E did not show 1344 (or 1408) event but an event possibly after 1450. This post 1450 event is unknown at any other locations and need to be reexamined. This trench did not show any evidence of 1255 and 1505 ruptures. Therefore, now it is clear that the 1255 (or 13th century) rupture must have terminated in east of 83.86 E and the 1505 rupture must have terminated in west of 83.36 E. This information constrains the magnitude and extent of 1255 and 1505 rupture. Further studies are on going to further constrain the terminations of these large events. The evaluation of future activities based on these paleoseismological constraints will be discussed.



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2162-ACCRETION OF ERODED LAND AN ANALYSIS ON IMPACT AND ADAPTATION OF RIVER BANK DWELLERS IN BANGLADESH

Rebeka Sultana¹

University of Rajshahi Geography and Environmental Studies Rajshahi-Bangladesh¹

Mst. Rebeka Sultana^{1*}, Shitangsu Kumar Paul¹

¹ University of Rajshahi, Department of Geography and Environmental Studies, Rajshahi, Bangladesh.

* Corresponding author's e-mail: rebeka.sultana@ru.ac.bd

Abstract

Sediment deposition and land accretion is prominent in the countries of downstream river valleys like Bangladesh. Every year the rivers of Bangladesh are occupied by sediments due to flood and river bank erosion. Eroded land accretion becomes a dilemma to the river bank dwellers of the country. The present study aims to explore the condition of accreted land after river bank erosion. It also highlights the adaptation strategies of the respondents towards sedimentation. A mixed method approach has been applied to conduct the research and the households have been selected through simple random sampling procedure for questionnaire survey. Seven FGD's, three case studies and four in depth interviews have been carried out in seven purposively selected erosion-accretion affected unions of Teesta river bank within Bangladesh. The findings of the study reveals that among the 381 surveyed household's only 73 respondents replied regarding their eroded land accreted again. Highest percentage (46.6%) has been observed in land property accretion amount of less than 0.20 hectare. The study also demonstrates only 18 respondents got the legal ownership of the accreted land out of the 73 respondents whose land was accreted. Most of the respondents (52.2%) initiated cultivation in river island and 25.5% took livestock pasture as adaptive measure to cope with sediment accretion in river bed. The results of the study postulated that government should take necessary steps for policy formulation and implementation to mitigate the accreted land ownership problem in Bangladesh.

2167-GEOGRAPHY AND LAND. HOW FIT FOR PURPOSE LAND ADMINISTRATION INTEGRATES MULTI NATURAL HAZARDS COMPONENTS IN A UNIQUE GEOSPATIAL MODEL

RODOLFO SALAZAR¹, DENNIS USHINÁ¹, CRISTHIAN BONE¹

UNIVERSITY OF THE ARMED FORCES EARTH SCIENCES AND CONSTRUCTION QUITO-Ecuador¹

The frequency and magnitude of natural disasters due to anthropic factors such as the intensification of agricultural activities, population growth, pressure on natural resources and climate change has caused economic losses and impacts on health and safety. One of the most effective solutions to address the risks associated with these events is prevention through proper planning, in which land administration can provide information for decision-making and the creation of tools such as geospatial data infrastructures. Within the Land Administration Domain Model (LADM), ISO 19152:2012, the rights, restrictions and responsibilities for every stakeholder, according to the risk management process, are considered at municipal level.

Tools provided by the LADM are combined on the risk management process given in AS / NZS ISO 31000:2009 developed for New Zealand and, other methodologies used in Ecuador for the spatial planning, provided in the guide for the development of territorial planning of decentralized autonomous governments.

The Spatial Multi Criteria Evaluation (SMCE), is applied to obtain territorial models that reveal possible changes in the dynamics, by assigning weights to the components and indicators proposed. The next step was to verify the information of each component, its representation and modeling method with the Hierarchical Analytical Process (HAP) was considered.

Land administration tools in the management of natural hazards, allows the decision making at the property level, relating in the same system, the conditions established by the territorial planning, the cadastre, tenure, value or land use. A list of six components are placed with different relevance to be considered for the better understanding of the territorial dynamics and, what must be diagnosed to make decisions.

The proposed research, allows the interrelation of risk with land information, demonstrating the close relationship between the study approaches and, the potential of the tools provided by land administration.



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2263-DEVELOPMENT OF GIS AND GEOGRAPHY EDUCATION IN JAPAN IN RELATION TO NATURAL DISASTERS

Takashi Oguchi¹

*The University of Tokyo Center for Spatial Information Science SAITAMA-Japan*¹

Japan is prone to natural disasters caused by various triggers such as heavy rainfall, earthquakes, and volcanic activities. To investigate natural hazards and risks, Geographical Information Systems (GIS) are useful because of their functions to map, analyze, and understand various natural and social factors. Until 1994, however, propagation of GIS in Japan was delayed compared to other developed countries. Recognition of GIS in Japan rapidly increased in 1995 chiefly because 1) the US Presidential Executive Order 12906 "Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure", signed in 1994, gave a strong influence on the Japanese Government and societies, and 2) some existing geospatial data were effectively used to cope with the Great Hanshin Earthquake on January 17, 1995, for emergency responses and disaster recovery. Since then, GIS in Japan have been developing for academic research and social applications, and GIS education especially for university undergraduates became an important issue. Because of this historical background, GIS in Japan have often been linked to natural disasters, and this combination is becoming all the more important because serious disasters caused by heavy rainfall are predicted to increase due to global warming. The combination has also become a common theme in high school education in Japan. The Japanese Government has decided to introduce a new compulsory course of geography in all senior high schools in 2022, which puts strong emphasis on GIS, natural hazards, and global environment. This presentation provides a historical review of GIS and Geography education in Japan along with future perspectives with special reference to natural disasters.

2911-LANDSLIDE INVENTORY MONITORING AND MANAGEMENT OF TRANSPORT CORRIDOR (NH 21) A CASE STUDY OF KULLU ROHTANG PASS

NIRBHAV SHARMA¹, R.B. SINGH¹

*UNIVERSITY OF DELHI GEOGRAPHY DELHI-India*¹

Landslide is the complex natural gravitational mass movement of rock, debris or earth phenomenon that occur in conjunction with other natural disasters. It has been identified as the most frequently occurring geo-environmental hazard between Kullu-Rohtang Pass region. Due to some geological factors along with unprecedented growth of population during the last few decades in Kullu-Rohtang Pass, the problem of landslide has become more common and recurrent. The spatial and temporal distribution of landslide in the study region shows linear pattern viz. along roads, rivers and lineaments or faults. Heavy intensity of rainfall during monsoon season and occurrence of earthquakes enhance the vulnerable conditions of the region. The area being located near one of the well-known tourist places of Kullu-Manali, the tourist concentration and vehicular movement is very much fluctuating throughout the year and thus can be recognized as adding source to the existing vulnerability of the region to landslides and other geological instability. Recently it has been noticed that the area faced a major land cover change due to anthropogenic activities like slope cutting, construction of National Highway (NH-21), tunnel construction and thus probability of occurrence of landslide has increased. During the field study along 90 Km transport corridor 197 landslides were identified from 2001 to 2015 between Kullu-Rohtang Pass. All landslides are classified under two categories; Rock Slide and Debris Slide. With this background, the main objective of the present study has been framed to identify the landslide inventory and monitoring between Kullu-Rohtang Pass. The present study would be useful for preparing an effective regional disaster management strategy, which can be used to reduce damage by landslides and to also consider the land use or land cover for better management of evolving strategies in the mountainous region of Kullu valley.



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2982-QUALITATIVE AND QUANTITATIVE EXPLOITATION OF SAR AMPLITUDE IMAGES FOR RAPID LANDSLIDES DETECTION

Mondini Alessandro¹, Oguchi Takashi², Santangelo Michele¹, Saito Hitoshi³, Chang Kang-tsung⁴

National Research Council IRPI Perugia-Italy¹ University of Tokyo CSIS oguchi@csis.u-tokyo.ac.jp-Japan² Kanto Gakuin University College of Economics hsaito@kanto-gakuin.ac.jp-Japan³ National Taiwan University Geography ktchang@ntu.edu.tw-Taiwan⁴

In spite of some peculiarities in the processing and interpretation of the amplitude component of a Synthetic Aperture Radar (SAR) image, the SAR ability to work in all weather conditions makes it particularly valuable in geohazard assessment in frequently cloudy areas. Furthermore, the SAR C-band Sentinel-1 high revisit time, its relative high spatial resolution, and its global coverage mission foster the use of SAR for capturing rapid landslide events and resultant disasters, in particular for rainfall triggered processes.

The detection of a rapid landslide is based on the assumption that the occurrence of this type of process can change some physical and geometric properties of the pre-existing land cover including its dielectric constant and roughness, and then its backscattering coefficient. The change of the backscattering properties of the land cover can be measured by coupling pre- and post-event SAR amplitude images conveniently pre-processed, and captured using photo-interpretative methods and/or some machine learning methods. The first is mainly based on the perception and interpretation of changes of tones, and textural information originated by the occurrence of a new landslide, the latter intercepts, and eventually segments, the spatial autocorrelation induced by the occurrence of the landslide that emerges from the typical SAR random speckling signal.

This work sums up the application of the two methods in several different geographical and geomorphological contexts, both promising to systematically increase the availability of information about landslide occurrence, useful for different scopes including fast disaster responses, landslide modelling and landslide forecasting, validation of operational landslide early warning systems or impact of world wide climate change.

3020-HISTORICAL LANDSLIDES IN GEOTHERMAL AREA

astisiasari astisiasari¹, Dyah Rahmawati Hizbaron², Muhammad Anggri Setiawan²

University of Twente ESA Enschede-The Netherlands¹ University of Gadjah Mada Geography dyah.hizbaron@ugm.ac.id-Indonesia²

Within the framework of disaster risk management, landslides inventory has an integrated part in hazard analysis, that can improve the basic insights regarding the spatial-temporal variability of landslides hazard. By the growing development of geothermal energy, characteristics of historical landslides become a coherent account to this facet. The general objective of this paper is to explore the world's geothermal areas that had experienced landslides, based on the literature studies. It is an introductory recognizance, benignant for the further assessment of landslides hazard in geothermal areas. This objective addresses the characteristics of spatial features, acting as conditioning and triggering factors, that initiated the historical landslides disaster. Moreover, this work also investigates the mitigation measures that had been taken upon its affected areas. This study examines the underlying characteristics of 18 landslides events in geothermal areas, from its environmental factors, e.g.: morphological unit, geological type, hydro-meteorological circumstance, and human activity. Historical landslides in geothermal areas had brought diverse impacts, e.g. environmental loss (buried and utterly destroyed thermal manifestations), loss of life and property, and also damaged infrastructures on the geothermal field. The results of this study compiles the historical landslides events in geothermal areas, and summarizes the mitigation measures that had been taken. To a broader sense, it also demonstrates on how the spatial information contributed in characterizing the landslides hazard. Taking everything into consideration, this study can take part as a pre-existing data to extend our knowledge of landslides hazard in geothermal areas, and thus beneficial for reducing the impact of landslides.



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3685-ERROR CORRECTION ON UAV BASED DIGITAL ELEVATION MODELS FILTERING AND MANUAL CORRECTION

EMRE ELBASI¹

ISTANBUL UNIVERSITY GEOGRAPHY ISTANBUL-Turkey¹

A flood is an event that areas that are not covered with water under normal conditions are temporarily covered with water for different reasons. Floods are natural disasters that cause the most casualties after earthquakes. The simplest prevention that could be taken at the point of the flood is preparing flood inundation maps. The elevation data used in the production of the flood hazard maps directly affects the result of the study. In the last decade, access to open-access global Digital Elevation Models (DEM) has become easier and these data have also started to be used in hydrology studies. Open-access DEMs like SRTM, ASTER GDEM and MERITDEM are the datasets that commonly used although their resolution failed to represent relatively smaller catchments. Because of the high-resolution data needs, with the developments in photogrammetry, LIDAR and Unmanned Aerial Vehicles (UAV) started to be used in the production of high-resolution DEM. Although LIDAR's potential of production error-free (bare earth) DEM, it is highly over-expensive comparing with UAVs. On the other hand, the data produced using Structure-from-Motion technology with UAVs should be preprocessed to remove errors caused by trees and water bodies, before using the data for flood modelling. In this study, the UAV-DEM error removal procedure examined differently from the methods mentioned already in the literature, in order to use the data in hydrodynamic flood models.



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C.18. Joint Session Cultural Approaches In Geography(IGU) And Working Group On Cultural Geography(AGA) Asian and European geographical perspectives and practices

1577-The French Evolution of Protection Management System on the Historic Monument and Its Surrounding over One Hundred Years 1913 2016

Sujin LEE¹, Je-Hun RYU²

Seoul National University The Institute For Korean Regional Studies Montreuil-France¹ Korea National University of Cultural Heritage Dept. of Cultural Properties Management jhryu1010@naver.com-Korea, South²

The aim of this study is to examine the evolutionary process of the protection-management system on historic monument and its surrounding in France over one-hundred years. Because France and Korea shared the policy and institution in relation to the management of historic monument along with its surrounding, it is necessary to look into the French experience from a comparative perspective. Korea has developed rapidly and urban environment has radically changed, which means that the historic monument and its surrounding are confronted with the choice between economic development and specific development of cultural property. Similarly, the protection of the historic monument and its surrounding does not follow the rapid evolution of the rules of urban planning. In France, historic monument began to be recognized as a national heritage according to "the 1913 law" that has continued to evolve until today for more than one hundred years. In the beginning, historic monument was preserved as a single unit of building, but since 1943, a new policy has been implemented to preserve a set of historic monuments along with their perimeters of protection zone. Moreover, since 1980, in the context of decentralization, local authorities have been given more and more role and autonomy in the management of historic monument and its surrounding. Local authorities have played a key role in the protection-management of historic monument and its surrounding, and become more active in the conservation of their architectural heritage including historic monument. Central government, however, still remains as a headquarter whose rigorous policy provides a solid foundation for the decentralized management system of architectural and cultural heritage including historic monument. The final goal in the evolutionary process has been targeted on the effective and harmonious integration of the protection-management system on historic monument and its surrounding into the urban and regional planning.

1617-What Elements Can Be Regarded as Sources of Civic Pride

Kaori ITO¹

Tokyo University of Science Department of Architecture Noda-shi-Japan¹

Some specific local elements are regarded as sources of civic pride. Our research questions are: What elements are regarded as sources of civic pride internationally and in Japan?; and How does each factor regarding sources of civic pride influence civic pride factors?

We conducted three surveys. The first was a literature review to identify sources of civic pride internationally. The literature referring to sources of civic pride was reviewed. The second survey was an online questionnaire conducted to determine sources of civic pride in Toyama, a mid-sized city in Japan. In total, 200 citizens named a local element they were proud of in each category. The third survey was another online questionnaire conducted to measure civic pride. In total, 600 citizens provided answers regarding how proud they were of some typical local elements and how much civic pride they had on a 5-point Likert scale.

In the literature review, we identified 43 sources of civic pride, mostly in Europe, including the UK, and North America. Overall, 18 of 43 sources were classified into categories concerning the built environment, followed by sports and culture. Very few sources were concerned with the natural environment. In the questionnaire survey in Toyama, 96 of 200 citizens named the Tateyama Mountain Range, followed by fish, a park, a traditional festival, and a local industry. The other questionnaire survey also revealed that the three highest sources of civic pride in Toyama were the Tateyama Mountain Range, fish, and rice, all of which were concerned with the natural environment. These results are in contrast with those from Western cities. Finally, a covariance structure analysis using data from Toyama revealed that "built environment" and "culture and industry" increase "identity" and "attachment" factors, and that "food and nature" increases "attachment" and "desire for maintaining" factors and reduces "engagement".



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C.18. Joint Session Cultural Approaches In Geography(IGU) And Working Group On Cultural Geography(AGA) Geography of popular cultures places events practices

1944-HAJJ BRIDGING THE CONTINENTS COUNTRIES AND CULTURES

SARAH AHMAD¹, RAVI S. SINGH¹

BANARAS HINDU UNIVERSITY GEOGRAPHY VARANASI-India¹

Background: The flow or circulation of a large number of people into a religious center is one of the most important geographic facets of the pilgrimage. Likewise, Mecca serves as the central sacred place, which draws million of adherents every year. Hajj is one of the five pillars of Islam. It happens in the last month of the Islamic calendar i.e., Dhu al-Hijja at Mecca. This paper considers how Hajj continues to act as a bridge to fill the lacunae between the Muslims around the world and how it dissipates all the differences that divide Muslims on their own with regard to sect, language, caste, race, wealth and other attributes. The study briefly addresses the rituals associated with hajj and how it creates a sense of unity among the pilgrims.

Materials and Methods: Spatio-temporal analysis has been carried out to explain the pilgrimage route, contemporary pilgrimage flows from different countries. Secondary data were used to analyze the data obtained from the Ministry of Hajj and Umrah, Travelport (Travel commerce platform) and Al-Jazeera (Media Network). A set of graphs, tables and maps were used to present the whole analysis. Literary sources have also been used for this study.

Result and Conclusion: Literary sources support the idea that the hajj act as a bridge between different people coming from different corners of the world. Hajj gives the pilgrims a unifying experience through its rituals. In the last two decades, the number of pilgrims has nearly doubled, with the largest number of pilgrims arriving from Asia. The nature of journey has changed and has been replaced predominantly by air. Better accessibility to Mecca has a major role to play to bridge the gap between continents, countries and cultures.

3468-GENDER AND MASCULINITY A STUDY OF WOMEN DHAKIS OF WEST BENGAL INDIA

Sonam Roy¹

Delhi School of Economics, University of Delhi Department of Geography Cooch Behar-India¹

In India, the social structure of caste has played an important role in determining the occupation of an individual. This rigid association is not only limited to the birth of the individual in a particular caste but also with their gender identity. Traditionally, in the state of West Bengal, playing the dhak (drum) has always remained a male affair whereas women were not even remotely associated with dhak on their own because of the masculine ideal associated with the occupation of percussion. Conventionally, it was believed that only men have the strength to carry the dhak and drum it. However, in the recent years, this mould has been broken and the women dhakis (drum players) are contesting the male hegemony associated with the dhak and trying to out mark them. Hence the present study strives to understand this phenomenon of women dhakis contesting the "hegemonic masculinity". Using the ethnographic frame of research, the researcher is not only able to take part in the lives of the women dhakis but is also enabled to observe and interrogate their engagement with dhak. The techniques of participant observation and unstructured interviews were employed to understand the way these women associate themselves with dhak and in that process, how dhak becomes a medium of expression for these women dhakis. The paper argues that women dhakis through their subversive labour are challenging the hegemonic masculinity and are contesting the gendered meaning associated with dhak and in doing so they have turned the hatred and shame into fame and economic gain. Largely, the study attempts to reflect the broader feminist interplay of work, a new contribution to the feminist movement from South Asia.



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3477-A STUDY ON THE ROLE OF URBAN MEDIA FAÇADES FOR ENHANCING THE BRAND OF UNESCO MEDIA ARTS CREATIVE CITY GWANGJU

Yea-Eun Jung¹, Byung-Min Lee¹

*Konkuk University Department of Digital Culture & Contents Yongin-Korea, South*¹

The role of creativity is becoming increasingly important, as cities in different countries need to apply differentiation and competitiveness to survive in the glocalization era. To be selected to join the UNESCO Creative Cities Network(UCCN) was considered an opportunity for cities who want to secure the brand of Creative City. The Korean city of Gwangju succeeded in joining the Network as part of the Media Arts sector in 2014, and has set the establishment of hardware platform facilities as a major plan for its development into a successful media art creative city. In this paper, the use of media façades as an effective and sustainable method for enhancing the brand of Gwangju is proposed. Recently, urban media façades have been used in an attempt to express various artistic content as well as commercial content. Moreover, through technological advancements such as projection mapping, creative place experiences are possible without building new hardware. Therefore, placemaking is discussed in this study as a theoretical background to derive the role of media façades in a creative city. In particular, there is a focus on the changed values as place marketing moves from place branding to placemaking. Through case studies of media façade content, three roles of urban media façades were identified. In the creative city, media façades activate public spaces, enable content-oriented development, and facilitate sharing of city identity. When the result is applied to Gwangju, squares and public spaces in Gwangju that were historically identified with symbols of revolution and pain can be transformed into creative places through media façade content. In addition, these media façades can serve as a medium to share the vision of Gwangju as a UNESCO Media Arts Creative City with its citizens, which can help to enhance the city's brand.



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C.18. Joint Session Cultural Approaches In Geography(IGU) And Working Group On Cultural Geography(AGA) Heritage and Geography in Asian Countries A Perspective from Outside as well as Inside

1368-Bridging Nature Culture Dualisms in the Conservation Circle A Perspective from Cultural Landscape

Je-Hun RYU¹

*Korea National University of Cultural Heritage Cultural Heritage Management Seoul-Korea, South*¹

The assumption that everything in the world already belongs either to 'culture' or to 'nature' has been entrenched in the division between 'human' and 'physical' geography. The prevailing view of people in opposition to nature, the so-called culture-nature binary, was reinforced in the 20th century by the findings of the new science of ecology. Until the late 1980s there was some tension between cultural and natural heritage conservation. It is during the 1990s that criticism of the wilderness ethic emerged. In this context, there was an expanding interest in and understanding of cultural landscapes, in the conservation circle, represented by UNESCO and IUCN. Since 1992 those landscapes that the interaction between people and their environment is considered to have outstanding universal value are World Heritage Cultural Landscapes. However, even if the terms cultural landscape is now widely circulated internationally, its use in Asia still presents problems. There is a need to draw attention to the cultural landscapes of Asia, to look closely at regional values and their inextricable connection to the continuing process of landscape creation, and finally to place Asian cultural landscapes in an international context. Under these circumstances, I will review the rise of cultural landscape as a means of bridging the nature-culture dualism, and propose new challenges in the conservation circle. In order to make the discussion more understandable, I will draw an example from my research experience in a group of islands called Wando Archipelago in Korea. Then, I will propose the issues to be considered in overcoming new challenges in the conservation circles within the Asian context.

1689-Commonality of road system in East and West ancient empires

Hiroshi Todoroki¹

*Ritsumeikan Asia Pacific University College of Asia Pacific Studies Beppu, Oita-Japan*¹

In both the East and the West, ancient empires had a strong centralized character. The similarity of personality also appeared as a human geographic similarity. For example, the location and urban structure of the capital and local cities, the division of farmland, and the alignment of roads.

Regardless of the east or west of the ocean, arterial roads in the ancient empire had something in common in the following ways.

First, on flat terrain, linear alignments were often used wherever possible. Many ancient empires have expanded their territory by conquering neighboring nations. Rapid communication in the expanded territory, rapid military movements, and increased trade required the distance to the border to be reduced as much as possible. For the same reason, roads are often wide enough to allow vehicles to pass, and are often paved with stone or earth to increase durability.

Second, such roads also had the ability to show off and maintain central power through visual influence and through the mobilization of labor for construction.

Third, road planning was often done simultaneously with urban planning along the road. For example, both on Roman Road and on ancient roads in Japan, cultivated agricultural land in rural areas has the common feature that land readjustment has been performed using roads as reference lines.

Thus, the ancient roads of the East and West are considered to have commonality that can be generalized. It must be clarified whether the similarity is due to East-West exchanges or the general need of an empire. However, their historical geographical studies have been conducted separately. In the future, joint research should be promoted.



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VIRTUAL

1965-Cultural Interactive maps and WEB Atlas of the historical cultural and natural heritage of Asian regions

Aida Tabelinova¹, Farida Akiyanova², Assel Baibakisheva³

*Institute of Geography of the Republic of Kazakhstan, RPA "QazaqGeography", Kazakhstan branch of Lomonosov Moscow State University Research and Expeditions Department, Department of Ecology and Nature Management Nur-Sultan-Kazakhstan*¹ *INTERNATIONAL SCIENCE COMPLEX "ASTANA" Institute of Geography and Nature Management* akiyanova@rambler.ru-Kazakhstan² *CF "National Conservation Initiative" CF "National Conservation Initiative" assel.baibakisheva@nu.edu.kz-Kazakhstan*³

Description. The content of the Web atlas and the GIS structure of the Cultural Atlas of the Asian region, allowing interactively analyze data and their dynamics over a certain period of time, compilation of a toponymic database are examined. The advantages and problems of implementing the "Digital Kazakhstan" state program are described. **Hypothesis.** The compilation of a toponymic and cultural Atlas will serve as the basis for cultural and trade-economic cooperation and tourist development of Asian regions. The WEB-Atlas of Asian regions is an integration information system on the way to preserving and restoring the objects of historical, cultural and natural heritage of the border territories and the entire region.

Materials and methods. The GIS structure of the Cultural Atlas of the Asian region consists of the following stages: 1) compiling an information and cartographic basis at the subregional and regional levels, 2) collecting a database and compiling digital maps of geographical toponyms, 3) developing a digital toponymic dictionary in different state languages, 4) uploading digital toponymic geographic dictionary to the portal; 5) compiling interactive maps of historical, cultural and natural heritage; 6) digitizing thematic maps (demography, social sphere, tourism and recreation, industry, agriculture, transport); 7) downloading reference material and tourist guides; 8) creating a cartographic basis for the Interactive Atlas of the Cultural Interactions on the Silk Road.

Conclusions. The developed Web-portal of the Cultural Atlas of the Asian region will 1) become an online platform for international cooperation and cultural education; 2) contribute to the creation of an interactive Atlas of cultural interactions on the Great Silk Road and the improvement of the "One Belt One Road" program; 3) require creation of a working group to collect, analyze and process the database.

3063-Historic Urban Landscape and Placemaking of Ayodhya (Bharat India) within purview of Inclusive Heritage Development

Dr Sarvesh Kumar¹, Prof Rana P B Singh²

*D.D.U. Gorakhpur University Gorakhpur Geography Gorakhpur-India*¹ *Asian Cultural Landscape Association ACLA* ranapbs@gmail.com-India²

The ways the place makes sense in everyday life is the primary understanding of the sense of place (genus loci) and ancient tales is one of the path and processes helping placemaking, mostly based on context, concept, composition and construction – those are the key components of placemaking in the frame of landscape planning. The policies related to Inclusive Heritage Development (IHD) are the integrated part of urban governance and heritage preservation. Historic Urban Landscape (HUL) is also an integral part of larger ensembles of cultural landscapes among historic cities, where associated pilgrimages and the interlinking routes are the symbol of existence and continuity. The Indian historic-holy city Ayodhya situated on the right bank of Sarayu (Ghaghara) River, has been primarily an ancient tirtha (riverfront sacredscapes) and salvific place that records settlement continuity since at least ca 800BCE, and described as the birthplace of Lord Rama, a major deity of Vaishnavite group. Historically, there developed three main pilgrimage routes that define the three territorial limits of Ayodhya, viz. Chaurashikroshi, Chaudahakroshi, and Panchakroshi; however, in passage of time two others, viz. Ramkot ki Parikrama, and Antargrahi Pilgrimage routes are added. The main institutional-administrative bodies of Ayodhya, i.e. Municipality, City Development Authority, Ayodhya Research Institute, INTACH, and NGOs like TORNOS and like ones fulfil the three dimensions of urban governance – political, economic, and administrative; altogether they play an important role in making heritage inclusive development (HID) policies and programmes, including caring and conservation, preservation and planning, and getting them an inclusive part of heritage development in the overall development of the city. In this paper, attempt is made to examine various components of urban governance and their role in the strategy of HID.



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VIRTUAL

C.18. Joint Session Cultural Approaches In Geography(IGU) And Working Group On Cultural Geography(AGA) Traditional cultures folk societies and folklorization in Asia and Europe

1579-Music in regional culture in France and in Korea

Sujin LEE¹

*Seoul National University The Institute For Korean Regional Studies Montreuil-France*¹

The aim of this research was to analyze a renewal of regional musical practice in Brittany in France and in Jeolla province in Korea. Beginning in the late twentieth century, we can observe a renewal of traditional music in the local context in many parts of the world. In Brittany, it appeared in the 1970s as a form of resistance to central authority. Despite the decline in regional tensions, Brittany continues to develop local music in a parallel movement to Jeolla Province, which has been trying to promote its local identity with its traditional music since 1997, the year marked by the launching of the autonomous local government system. Situated geographically as they are in the periphery of the country, these two regions remained rural and profoundly religious for a long time, so that they still retain old traditions that have almost disappeared in other regions in the country. During the industrialization of the country in Korea, very effective means of transmission were employed to preserve musical practices so that Jeolla could conserve many traditional musicians. After the decentralization of the government, local actors chose music as a regional asset to found a cultural heritage that would preserve and strengthen the regional identity. Many musical events, festivals and competitions bear witness to this. For Brittany, the traditional musicians accepted modern popular music and practiced it with their own traditional music which renewed their traditional music and made it more interesting to young generation. Its festival called fest-noz was designated by UNESCO in 2012 as Intangible Cultural Heritage and it helps to promote regional culture. The small market for recordings offers more music representing a regional identity, a real symbol of the promotion of regions in a civilization of leisure.

2054-For a geography of sport brownfields. The case of Basque pelota frontons abandoned in Bordeaux in southwest France

André Suchet¹

*University of Bordeaux LACES SOREDE-France*¹

Compared to the study of industrial, port and tourism brownfields or wastelands, sport brownfields are a blind spot for research in human geography, architecture and planning sciences. Abandoned tennis courts, disused swimming pools, out-of-use skating rinks and frequently neglected summer or winter Olympic sites ... the reality of these wastelands is obvious.

Within the framework of a social and cultural geography (in the theoretical line of Di Méo, 1998, 2016) concerned with the relationships between sport and territories (Augustin, 2007), this presentation is interested in history, actors, uses and meanings of several traditional Basque pelota frontons abandoned in Bordeaux, a metropolis in southwest France.

This work is based on an ethno-geographic methodology in situ, that is to say a regular and permanent observation for three years, with many formal and informal interviews with the users of this wasteland.

The first part of the results is a description of the place, its topicality and above all its uses: notably artistic, militant and all festive uses. Secondly, this work allows us to reflect on the symbolic and cultural foundations of these sports wastelands in order to understand their social dynamics. More than rusty basketball hoops, the neglected Basque pelota frontons of Bordeaux offer an example of symbolic equipment of a regional identity devoid of their initial use but which has become a significant landscape, theater of different claims. Previous research by Bachimon (2013) and Gravari-Barbas (2000) on the links between territories, festivities and temporalities allows us to see the mechanisms of this place, to disenchant the narrative, to become aware of the alchemy of the forces involved in a field that is both imaginary and material.



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VIRTUAL

3195-KURUKSHETRA QUINTESSENTIAL INDIAN CULTURAL LANDSCAPE

Bharat Dahiya¹

*Thammasat University Research Center for Integrated Sustainable Development, College of Interdisciplinary Studies
Bangkok-Thailand*¹

India has been a culturally rich civilization. Over millennia, it has given birth and rise to a number of religions, languages, traditional knowledge, material cultures, architectural wonders, food habits and the like. All of these have resulted in the evolution and development of unique cultural landscapes. Yet, despite the seemingly chaotic cultural diversity, there lies an underlying bedrock of unity in the Indian culture and civilization.

What are the key features of such a cultural unity in the multifarious diversity of India? What key cultural characteristics have evolved over millennia that define India's culturally rich civilization as well as cultural landscapes? How these cultural features could be systematically understood through the distinct lens of cultural geography?

The roots of Indian culture lie in Sanātana Dharma, Eternal Dharma, which signifies that the behaviours of all are considered to be in accordance with the principle of natural order that regulates and coordinates the operation of the universe and everything within it. Through the process of sacralization, the Cosmos (macrocosm), the Earth (mesocosm) and the Human Being (microcosm) become sacred. Within this framework, the notion of kshetra is developed; it often denotes an area where a number of tirthas (singular: tirtha, which means 'crossing place') are located. In other words, a kshetra is a cultural landscape--rooted in Sanātana Dharma, where the tirthas help one to 'crossover' from the physical realm in which we live to the spiritual realm.

Within this cultural geographic framework of India, this paper will present the key features of the Kurukshetra cultural landscape located in Haryana state. Kurukshetra is the Dharma-Kshetra where the MahāBhārata war helped to re-establish the rule of Dharma. Thus, this paper will provide unique insight into the cultural landscapes of India and, in turn, enrich our understanding on cultural geography of India.

C.19.Joint Session Global Change and Human Mobility Tourism Leisure and Global Change International tourism and residential mobilities global and local perspectives

1415-South African Tourism Geographies Current Investigatory Pathways

Gustav Visser¹, Jayne Rogerson²

*Stellenbosch University Geography and Environmental Studies Stellenbosch-South Africa*¹ *University of Johannesburg School of Tourism and Hospitality jayner@uj.ac.za-South Africa*²

Tourism has become a key component of the South African economy and impacts, in various ways, the lives of millions of the country's citizens in both rural and urban settings. Tourism geographies "matter to South Africa's spatialities" has been the underlying mantra and is important because it touches millions of livelihoods, directly and indirectly. Over the past twenty years several research clusters have emerged in terms of the changed post-apartheid policy environment in South African tourism. These were explored in terms of the overarching themes of (1) studying the responses to and impacts of government intervention and of the shifting policy environment; (2) analysing a set of threats to the development of tourism in South Africa; and (3) demonstrating the sector's important role as an economic driver of the post-apartheid economy. In this investigation it is argued that these themes of investigation have persisted in the recent past and the task here is to unpack niches research foci in this broader thrust of inquiry. The paper presents new insights into the most recent research findings by a range of scholars on a number of different topics at the cutting edge of debates in South African tourism geography scholarship. The emergence of a historically sensitive reflections on tourism development is noted, the increased prominence of climate variability in tourism activity and planning, as well as new tourism niches which aim at greater inclusivity of host communities is highlighted. Collectively, South African tourism geographies present a range of new investigatory paths not considered in the past.



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VIRTUAL

1465-International Migration and Residential Displacement in Tourism Neighborhoods of Palma and Las Palmas de Gran Canaria (Spain)

Dolores Sánchez-Aguilera¹, Josefina Domínguez-Mujica², Juan Manuel Parreño-Castellano², Jesús González-Pérez³
Universitat de Barcelona Geography Barcelona-Spain¹ Universidad de Las Palmas de Gran Canaria Geography josefina.dominguezmujica@ulpgc.es-Spain² Universitat de les Illes Balears Geography jesus.gonzalez@uib.es-Spain³

The neighborhoods of the first tourism development in the cities of Palma (Balearic Islands) and Las Palmas de Gran Canaria (Canary Islands) in the Spanish archipelagoes are a valuable laboratory for studying the socio-urban processes linked to the tourism cycles: tourism growth and development; urban crisis and degradation; and tourism renovation and urban rehabilitation; namely, urban transformations and social changes tied with migrations and displacements.

The first tourism growth and development is accomplished by the immigration of local population attracted by the new labor market of the building industry and the hotel and catering businesses; during the crisis and urban degradation stage, the international low skilled immigrants find affordable lease prices for housing in those former tourism apartments removed from the tourist offer due to their level of deterioration; finally, in the phase of tourism requalification, correspondent with processes of urban gentrification, the lower income workers are expelled and replaced by tourists and residents from the European Union.

Therefore, the aim of this study is to recognize the human mobility linked to the socio-urban transformations in the neighborhoods under analysis: El Terreno in Palma and Santa Catalina-Canteras in Las Palmas de Gran Canaria, from a comparative perspective. This study takes advantage of different sources on housing (residential and holiday rental market, judicial procedures of evictions and foreclosures) and on flows and stocks of population (immigrants, i.e. foreigners by countries of birth) to demonstrate that capital investments, in a new urban-tourism cycle, give rise to the substitution of the residential rental by the tourism/holiday rental and of the South immigrants by the North. Summarizing, neighborhoods are evolving from impoverishment to elitization at the rhythm of a new stage of capitalism accumulation regime.

3222-Discovering the North Mediating strategies of Russian property purchases in Cyprus

Olga Hannonen¹

University of Eastern Finland Karelian Institute Joensuu-Finland¹

Russian recreational property purchases abroad are a widespread phenomenon in different parts of the world. However, academic attention to Russian purchases has been quite limited with only few studies and destinations covered. This paper focuses on Russian recreation properties in Cyprus. Cyprus has been a long-term attraction both for tourist visits and recreational property purchases. The dominant flow is directed to the southern part of the island, the Republic of Cyprus. However, the northern part, the Turkish Republic of Northern Cyprus, has recently also become an attraction for tourism and property purchases.

The emerged wave of Russian investors in Cyprus have pushed forward recreational property business in the Turkish Republic of Northern Cyprus. Russian and local agencies promoting the purchase of recreational properties in the northern part of the island utilise various strategies to attract recreational property buyers, underlining predominantly the economic assets related to investing in the Turkish Republic of Northern Cyprus.

Based on the empirical investigations in the field in May 2018, the paper addresses the representation of the Turkish Republic of Northern Cyprus as a destination for international residential tourism, and for Russian market in particular. The data is collected through interviews with real estate agencies and local actors, observations and conversations with potential buyers during introductory property tours and other meetings. The aims of the paper are, firstly, to frame property purchase within the special status of the Turkish Republic of Northern Cyprus; and, secondly, to define whether its' status facilitates or restrains foreign and Russian property purchases.



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VIRTUAL

C.20. Joint Session History of Geography Gender and Geography Political Geography Bridging differences East West seas and Mediterranean worlds

1330-Rescuing the Present by Calling on the Past the 1980 Turkish Military Coup D'état and Turkish Geography
*Erdem Bekaroglu*¹, Trevor Barnes²

Ankara University Department of Geography Ankara-Turkey¹ University of British Columbia Department of Geography
-Canada²

This paper is concerned with the relationship between national disciplinary geographical practice and abrupt, often violent changes in state government following, for example, a military coup, or the imposition of a dictatorship, or the suspension of democratic processes during a so-called "emergency period." As a result of the changed political regime, geographical practices are radically altered, reshaped in conformance to the external political demands of the new forms of government. Our case study is the effect on geography of the 1980 military coup d'état in Turkey. Its aim was to "fix" the social unrest and political-economic instability stemming from the 1970s when the country became more open and liberal. During the 1980-83 military administration that followed the coup, and then its subsequent aftermath, left-wing political dissent was squashed, neoliberal policies harshly put into practice, with the state adopting a Nationalistic-Islamic discourse used to create apolitical and compliant citizens. In response, Turkish geographers turned inward, practicing *étude*, a reinvention of an older idiographic regional descriptive tradition focussing on small spatial units. The broader political change and its consequences were not questioned by Turkish geographers. They retreated, turning to the earlier regional geography, which, seemingly neutral, in fact, bolstered the coup's political nationalism, and diverted critical analysis. Consequently, Turkish geography moved backwards, falling farther behind the leading edge of contemporary geographical knowledge production, and justifying its reversal as a form of "La Jetée" syndrome. In order to survive into the future, Turkish geographers claimed, the discipline must recover and practice elements from its past.

1414-Bridges burnt and bridges built A century of geography at Stellenbosch University Colonial Britain's first African geography department

*Gustav Visser*¹, Jan de Waal²

Stellenbosch University Geography and Environmental Studies Stellenbosch-South Africa¹ Stellenbosch University
Department of Geography and Environmental Studies janniedw@sun.ac.za-South Africa²

South Africa is a country that has arguably seen some of the most complex and expansive experiences of division/redivision/bridging between coloniser and various indigenous populations since the colonisation of the country in the 1600s. It has been "building and destroying bridges" between different identity formations ranging language, race and class, to name only a few dimensions, for a long time. Geography is generally acknowledged as a discipline of empire and has certainly played its role in breaking down and building "bridges" in the South African context too. This investigation provides insight into the origins and growth of the oldest university geography department of British colonial Africa. The narrative is however very different from what might be expected from of British colonial context in both the political and educational foci of the time, the various role-players and resultant knowledge that was produced. Whereas the departmental geographies produced in the starting years were heavily impacted by a descriptive analysis of the new emerging South Africa and the broader region informing the European academic audience, during the apartheid years they were introspective investigations and had little connection to a broader world, colonial or otherwise. Owing to passive support for the apartheid project the knowledge produced was one of disconnections and "burning bridges" with both the local and international geography communities. These approaches would change radically in the early 2000s and set in motion a more inclusive "bridge-building" investigatory trend. Reflecting on a century of academic publication at the Department of Geography and Environmental Studies at Stellenbosch University, this investigation unpacks the details of these changing intellectual currents. It is argued that the oldest geography department in the English-speaking countries of former British colonial Africa is one that aims to build new bridges in methodological, epistemological and ontological spheres.



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1428-CHANGING POLITICAL GEOGRAPHY OF THE BLACK SEA "BRIDGE" OR "BARRIER"

Revaz Gachechiladze¹

*I Javakhishvili Tbilisi State University Human Geography Tbilisi-Georgia*¹

From political and cultural points of view the meaning of the Black Sea, closely connected with the Mediterranean, historically was changing from unifier to divider and vice versa. Economically it almost always was a "bridge". To test this hypothesis historical data had been used.

For the ancient Greek seafarers accustomed to the nearby islands a deep water reservoir with no island in sight and coastline lacking good harbours initially was "inhospitable sea". Later the Greek colonists, primarily from Miletus, renamed the Black Sea "hospitable" (Pontus Euxeinus). Many coastal cities still bear the names given by those colonists.

In the times of the Byzantine Empire, the area around the Black Sea turned into the realm of Christianity and a certain cultural homogeneity had been achieved. When the Ottoman Empire entered the area from the south, the sea politically became an "Ottoman lake" (15th century), but Istanbul did not succeed in Islamisation of the entire hinterland, although economically it still was a "bridge".

After the Russian Empire conquered the northern and eastern coasts of the Black Sea (18-19th centuries), the latter became a "barrier" with the Ottoman Empire.

During the "Cold War" the sea served a "barrier" due to the political competition of a global scale between the "Communist block" and NATO. After the dissolution of the USSR two independent states appeared in the Black Sea area – Ukraine and Georgia. The Russian Federation seeks to expand its power at the expense of both the latter. Strategically the sea is important not only to the states of the region but to the other geopolitical players as well. While the Black Sea serves as an economic "bridge", politically it is still a "barrier".

Keywords: Black Sea, cultural homogeneity, economic bridge, political barrier

1596-Carnonormativity and its discontents (in popular culture) overcoming speciesism or falling into the anthropomorfization trap

Elena dell'Agnese¹

*Università Milano-Bicocca Sociology and Social Research Milano-Italy*¹

The system of habits, discourse and ideology that leads to not questioning the killing of animals for food purposes is called "carnism". Carnism is a choice, disguised as a non-choice, based on an ideology, "speciesism" ("a prejudice or attitude of bias toward the interests of one's own species and against those of members of another species"), within the framework of the broader system of power relations known as "anthroparchy". In media analysis, this dominant view of animals as objects, and primarily food, is defined as "carnonormativity". Through popular culture, and cinema, in particular, attempts have been made to open cracks in it. Very successful, in the Nineties, was *Babe*, a movie whose protagonist was a talking piglet. Destined to be eaten for Christmas by the farmer's family, *Babe* changed his destiny, demonstrating his ability to work as a sheepdog. Many, including the actor who plays the farmer, claimed to have become vegetarians after watching the film. 25 years later, another heavily anthropomorphized pig, *Okja*, appeared on the screen. *Okja* is a genetically modified pig, designed by a multinational corporation to feed as many people in the world as possible. *Okja* is a giant, very cute, animal, with dog-ears and very expressive eyes; again, she escapes her final destination, thanks to her cuteness, and her ability to love and be loved. One wonders, however, whether portraying anthropomorphic non-human animals to arouse empathy is the right way to overcome speciesism. Or whether it is not another way of affirming anthroparchy, showing that animals deserve rights, not in their distinctiveness, but simply because they are similar to us.



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VIRTUAL

1609-The bridge a disputed symbol

Marcella Schmidt di Friedberg¹, Marco Benedetti²

University of Milan-Bicocca Dipartimento di Scienze Umane per la Formazione "Riccardo Massa" Castelletto sopra Ticino-Italy¹ Painter, Varallo Pombia Free painter 28marcobenedetti@gmail.com-Italy²

The bridge is generally considered a positive relational metaphor, able to bring people together, to unite: "The bridge enhances every kind of difference, as well as the decolonization of geography, making it mostly inclusive". In the symbol of the bridge, however, ambiguous and sometimes threatening meanings are hidden. The bridge is first and foremost an artefact, a work made by the being that connects, that must always separate, and that without separating cannot unite (Simmel, 1957). The purpose of the bridge is to cross and connect what was originally divided. The bridge modifies and affects the earth and water, sacred elements in many ancient cultures, the bridge is a sacrilegious work (Cassani, 2018). The construction of a bridge, especially if large in size, involves the laying of foundations and large heavy engineering works that can have a strong impact on the landscape, the natural environment, non-human life. The bridge, controlled in Roman times by the Pontifex maximus, can express a logic of power. In the engineering imperialism (Fischer-Tine, Mann, Eds., 2004) of the colonial era, bridges and roads celebrated the British civilizing mission (Kipling, 1893). Bridgehead is an expression of military terminology indicating an area of territory of limited size, occupied by a military force within the enemy-controlled area, and which lies beyond a natural obstacle. The bridge shows the distance of what it bridges. The bridge speaks of the monochromy of speed while it can hide the thousand colours of life slowing down, the physical and cultural distance of the other, the difficulty of understanding it, the risk of approaching it (Cassano, 1996). The symbol of the bridge expresses hope, will there be a better world beyond the bridge?

1662-The marginalization of the Mediterranean region revisited

Olivier Lefebvre¹

Olivier Lefebvre consultant sociology Paris-France¹

The marginalization of the Mediterranean region revisited

Olivier Lefebvre

Abstract.

We propose to describe the Center and the peripheral countries (among them, Mediterranean countries) using the notions of "causes" and "reasons". These notions come from the French sociologist Tarde, who explained that "causes" characterize Science. The sociology of sciences of Bruno Latour confirms this idea. There is not a "knowledge society" but a "knowledges society": the Center knows the "causes" and the periphery knows the "reasons". When the Center (Silicone Valley, Shenzhen, technopoles, a few large metropolises ...) delivers novelties (technology) it is in the "causes". After, in the rest of the world one has to invent "reasons" which justify the projects allowing to use these novelties. Are concerned imitation, adaptation and opposition (according to Tarde). The influence of the Center is not explained by domination. We prefer explain it thanks to the ideas of Norbert Elias. The Center promotes some new behavior (the current step of civilization in the words of Elias): to play, to play again, to anticipate, to master "system analysis", to understand strategies and above all literacy concerning Internet and databanks ... If one searches for names of pioneers of this idea there are Cooley and Brzezinski.

With "causes" and "reasons" we can explain phenomena in the Mediterranean region:

- The ambiguity of Israel, with a foot in the "causes" (Tel Aviv Haifa is the only technopolis on the Southern bank of the Mediterranean) and the other in the "reasons"
- Arabic springs appear as gropings to invent "reasons"
- The opposition (Tarde) is that of Islamism
- The holistic / humanistic approach (Perroux, Duphlo) illustrates the current debate on the "reasons" in the poor countries
- Etc.

Keywords: Mediterranean region, marginalization.



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VIRTUAL

1692-Reorienting the Resettlement Planning Engaging the Project Affected Men & Women

GAURAV SIKKA¹

*L.N. Mithila University P.G. Department of Geography Darbhanga-India*¹

Development projects have become synonymous with land acquisition leading to dispossession and forced migration of a large number of people and their involuntary resettlement in an alien environment. Gendered dispossession has been a common phenomenon in development induced displacements and associated resettlement. Resettlement planning is so mechanical in nature that it fails to take into consideration any gender needs. The inherent societal bias reflected in the resettlement policy may preclude women from benefiting from opportunities provided through the project. Adding further, when gender differences and gender needs are overlooked in the planning stage of the projects, then these projects are unlikely to respond to women's need and may even have negative consequences for women.

Therefore the efforts to mainstream gender i.e. to integrate gender concerns in all aspects of planning of resettlement and rehabilitation are the need of the hour. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality (UN Economic and Social Council, 1997) and reorient the resettlement planning.

Taking the resettlement related to the Sardar Sarovar Project in Gujarat as a case study, this paper presents gender dynamics in resettlement and rehabilitation. The manuscript puts forth different engendering strategies in different phases of the project ranging from pre-project consultation, site selection, to the resettlement and rehabilitation actions. The research has adopted a complementarity of quantitative and qualitative methods in data collection. Data has been collected through household surveys, focus group discussions and in-depth interviews with key informants.

1782-Play protest and pride Un happy queers of Proud to Play in Auckland Aotearoa New Zealand

Lynda Johnston¹, Gordon Waitt²

*University of Waikato Geography Tauranga-New Zealand*¹ *University of Wollongong Geography gwaitt@uow.edu.au-Australia*²

This presentation extends discussion of urban activism through paying attention to the emotional and embodied politics of a sports event. We draw on research of the 'Proud to Play Games', an inaugural regional multisport event held during the Auckland Pride Festival in Aotearoa New Zealand, 2016. Feminist and queer theories of emotion and affect – particularly Sara Ahmed's (2010) promise of happiness – produces nuanced understandings urban gay pride events. Qualitative performative methodologies – including interviews, surveys, and participation in the games – show that during Proud to Play Auckland performed as 'happy queer city', encouraging participants to mingle sporting pleasure with consumerism while concealing inequalities and oppressions. It is in spaces comprised by urban Pride sports events where normative notions of gender, sexuality and ethnicity are reproduced, challenged and felt. Adopting Ahmed's (2010) 'unhappy queer' concept allows us to critically consider not just happiness, but also the negative, shameful and difficult feelings that circulate in and through bodies and places during urban Pride events. We focus on the experiences of three Proud to Play participants as they illustrate the tensions of play / protest, happy / sad, and pride / shame in Auckland. The portraits highlight: a homonormativity pursuit of happiness and youthful masculine athleticism; precarious happiness and oppositional lesbian desire; and, the pursuit of indigenous happiness. Through attention to affective and emotional politics, we demonstrate that Proud to Play can challenge heteronormative urban space by simultaneously fighting for a better future and making a claim for the right to be unhappy.



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1826-The participation of fathers in the reproductive sphere in Japan Focus on their masculinity in community activities

Orie SEKIMURA¹

*Gunma Prefectural Women's University Faculty of Literature Gunma-Japan*¹

New words such as "Ikumen" (men who play an active role in child-rearing) were coined in Japan recently, and the awareness of fathers in their participation in child care and housework is on the rise. Given the circumstances in which men have been reluctant to participate in care work and have left such works to women, the participation of fathers in the reproductive sphere such as local communities and homes is noteworthy. In this study, I focus on fathers who participate in childcare-related community activities and clarify their motivation for participation and specific details. Through these, I would like to consider how they deal with the existing masculine and gender relations and their restructuring potentials. For this, I used the qualitative data obtained from interviews with fathers in their 30s-50s in a suburban residential area in Osaka.

I found that the fathers took part in community activities when their children entered the school and put on efforts to solve various problems related to children, such as education, crime prevention, by utilizing their knowledge, experience, and skills. For men who are working hard in their workplaces, the local community could become a new place for their activity. However, there is still an issue left unsolved, which is found in fathers who cannot let go of their workplace-centric values and bring the logic of productive sphere into the reproductive sphere as it is. Such persons normally have little interest in restructuring gender relations there. In other words, it can be pointed out that their masculinity has not reached the level in considering "care," including "care for others" such as their wives, which is required in the reproductive sphere. In the future, I believe that facing gender relations at home will lead to the development of "care" and the construction of new masculinity.

1933-FEMINIST WAVE NARRATIVES BRIDGING GEOGRAPHIES SOME INSIGHTS ACROSS SPACES

Seema Mehra Parihar¹, Şirin Gülcen Eren²

*Kirori Mal College, University of Delhi Geography Ghaziabad-India*¹ *Süleyman Demirel University City and Regional Planning, -Turkey*²

Gendered spaces are largely fragmented and fractured in the contemporary world. The empirical evidence across the emerging and third world countries indicates that the neo-liberal policies have not been successful in including those excluded in the mainstream development process (Parihar, 2015). Present paper contextualizes holistic gendered spaces, integrating gender expansiveness in existing social, economic and political space and search for new gender narratives across geographies pointing the similarities and gaps emulating sluggish period of inactivity in many parts of Asia, Africa, and Latin America.

The wave narrative in feminist literature distinguishes three waves clearly and fourth in a fluid way. Gender spectrum across different parts of the world, especially in the Global South, are finding it difficult to match original wave narrative of first, second and third wave emanating from the United States and the United Kingdom in their occupied spaces. Original wave narrative, if on one hand helps in understanding the chronological and ideological development of feminism in the US and UK, it also illustrates on how across geographies presence of all four spaces are visible across similar places and spaces and on how there is a need for evolving new gender narrative model. This study largely engages in a search for the presence of similar wave narratives across geographies or visibility of all four in a particular place and looks for reasons across geographies. Based on assumptions, adopted methodology appraises gender and gendered spaces wearing largely a lens of women residing in India and Turkey. Geo-analytics built on both primary and secondary data and experience of making two- series of Gender Atlas of India advocates a need for 'Blended -Transitional Gender Narrative' tackling multiple intersecting inequalities to mainstream gender identities and evolve concerns across policies, plans and programmes, without negotiating their presence and visibility.



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1984-MARRIAGE MIGRATION OF OLD ARAB PALESTINIAN WOMEN IN ISRAEL A RETROSPECT

Orna BLUMEN¹, Hazeej KHALAILEH²

University of Haifa Human Services Haifa-Israel¹ University of Haifa Women & Gender Studies orna@research.haifa.ac.il-Israel²

Traditionally, Middle-Eastern, Arab societies are patriarchal, patrilineal, patrilocal social formations. This study gives voice to old Arab Palestinian women in Israel, who upon their marriage migrated to a new locale as to obey the rule of patrilocal residence. It is about a specific women's internal migration which occurred over a distinctive time, following the Palestinian's defeat in the 1948 war (the Nakba/Israel's War of Independence). Belonging to the regional Arab majority with whom they share many social and cultural characteristics, Arab-Palestinians, citizens of Israel currently constitute a 20.7% minority (82% Muslims). Exposure to the modern, western Jewish society has brought changes in traditional norms and values. Women's status has also changed dramatically as age at first marriage, schooling and employment have risen and number of children dropped. Nonetheless, patriarchal control inside and outside families remains very powerful and patrilocal residence is still imperatively common for the majority of newlyweds.

Relying on oral history, we interviewed 22 Galilean women, 70 years old or more, whose patrilocal marriage involved short-distance migration from one locale to another. They constitute an especially interesting group since they: a) experienced traditional marriage, b) have witnessed the rapid modernization and the contradictions brought into women's life also with regard to marriage, and c) experienced the 1948 displacement of Arab-Palestinians, thirteen as refugees and nine as witnesses being residents of refugees' resettling locales. The study offers a retrospect of their personal histories and discloses the social silencing of their memories as migrant brides, shedding light on the ongoing suppression of this unique feminine experience of relocated brides.

2269-PROBLEMATISING THE FUNCTIONS OF BRIDGES IN GEOPOLITICAL REPRESENTATIONS

Virginie Mamadouh¹

University of Amsterdam Geography Amsterdam-The Netherlands¹

Bridges are increasingly popular geographical metaphors, widely used in geopolitical representations. They usually stand for mediation, exchanges, interfaces, inclusion, and are as such appreciated in an age of revival of nationalism and sectarianism. However our understanding of bridges should be nuanced. This paper argues that like borders function as more than barriers, bridges function as more than connecting infrastructure. Mirroring O'Dowd's analysis of the four functions of European borders in his seminal 2002 article, the paper argues that bridges can fulfil four functions: 1) crossing point, but also 2) barrier (as a bridge highlights the differences between the two sides it connects, excluding the bridge from either side, and concealing common resources), 3) resource (as position to control movements and collect duties and levies) and 4) identity marker (for those living, using, controlling and /or identifying with the bridge).

Metaphorical bridges also have those four functions although they are more often used as identity markers. Additionally they can be incorporated in multiscale geopolitical representations, and even competing ones when different actors/localities claim being "the" bridge between A and B to capture the geopolitical or geoeconomical resource of such a position. The first part of the paper considers these functions and draw on secondary literature to provide some illustrations of real and metaphorical bridges of geopolitical relevance. In the second section the paper considers Mediterranean bridges, and the role of the bridging functions in the production of geopolitical visions and national identities. The most famous case is Turkey represented as a bridge between Europe and Asia (but then again the Middle East is a bridge itself and Istanbul is a bridge within Turkey).

O'Dowd, L. (2002). The Changing Significance of European Borders. *Regional & Federal Studies*, 12(4), 13-36.



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2416-The importation of policies from hegemonic countries to the Latin American south a geographical analysis of judicial sentences on trafficking in persons for the purpose of sexual exploitation in Argentina.

Magdalena Moreno¹

*UNCPBA CONICET Geography Buenos Aires-Argentina*¹

The paper presents a spatial analysis of the first one hundred judicial sentences for cases of trafficking in persons for sexual exploitation in Argentina, between 2009 and 2012. For this analysis, the Lefebvrian dialectical triad composed of space practices, representations of space and spaces of representation is used. Focusing on the second concept, the presentation aims to inquire about the ways in which the Argentine State, through the administration of criminal justice and judicial interpretation, represents the phenomenon of trafficking in persons for sexual exploitation in its spatial dimension. The analysis from the Critical and Gender Geography allows us to establish some hypotheses regarding the importation of policies to combat human trafficking and the implementation in territories distant from the place where these policies are produced. The article is organized in four moments. The first briefly presents the conceptualization carried out by Lefebvre to analyze the spatiality of social phenomena and emphasizes the concept "representation of space". In a second moment, the first one hundred judicial sentences are presented for cases of trafficking in persons for sexual exploitation in Argentina, to subsequently analyze the spatiality they build, from a gender perspective. After the analysis of the sentences and to conclude, some questions are raised around the representations of the trafficking space and the geographical imaginaries that could be produced by the legal discourse within the framework of the anti-trafficking campaign, in relation to the implementation in Latin American countries of policies that occur in hegemonic countries of the global North.

2500-THE GEOGRAPHICAL EXPEDITIONS THROUGHOUT THE SERTÃO OF BRAZIL A POINT OF VIEW FROM THE SOUTH FOR THE INTERNATIONAL WORLD SCIENCE

Larissa Alves de Lira¹

*UFMG Geography Belo Horizonte-Brazil*¹

This proposition aims to discuss the following question: have geographers in Brazil developed another image of Brazil for the Regional Geography, a new theoretical point of view for the international Geography during the expeditions throughout sertão, sponsored by the Brazilian Institut of Statistics and Geography, between 1940 and 1950 (10 years after French Geography begun to be teaching in the first Brazilian University) or both ? First of all, this question is verified within a new methodological framework called geo-history of knowledge, that we want to present. We see the geo-history of knowledge as a new method in the history of science that tries to incorporate the spatial turn, internationalism in science, long duration of ideas and, intellectual "infra" mentalities, that circulate over the world. We also present that our answers about our main question point out that Brazilian geographers developed a hybridism of perspective, where organicism and utilitarianism (long trends in the Mediterranean and Western Geography) were reshaped in the context of Brazilian territory and turned to promote economic development. The presentation aims to discuss the main characteristics of this new theoretical point of view, which is predominantly turned to the connection between organicism, utilitarianism, and social concerns, concerning the long trends; and geological, historical, economic and regional, concerning Geographical thought. Finally, the proposition tries to discuss theoretically if the Brazilian geography can effectively be considered as a new point the view in the international world-science, a new image from Brazil for the regional geography, or both, based on the international historiography of the geographical thought. In other worlds, a new theoretical point of view could have been developed from the South ?



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2518-GENDER CASTE AND OCCUPATION IN THE CITY OF LUCKNOW INDIA

Manisha Kushwaha¹

*Indian Institute of Science Education and Research, Mohali (Punjab), India. Department of Humanities and Social Sciences Mohali-India*¹

Dalit women in India are a victim of intersectional discrimination. The caste system as an institution has forcibly excluded certain castes from civil, educational and economic benefits that other castes enjoyed, and the deeply patriarchal Indian society discriminated women in every walk of life. The intersecting nature of caste and patriarchy brings in many complexities. The paper brings in narratives of Dalit women and their occupations, as caste affiliation of women is an important factor in understanding their social status. Caste has a more systematic influence on inequalities than just the identity of a woman. Thus, the intersectionality of both will help us understand the complexities and how it affects the occupational space of women.

The paper is based on a micro-study done in two Dalit dominated neighbourhoods of Lucknow city (India). Dalit women are concentrated in low-status occupation groups like maids, cooks, and sanitation workers which earn a meagre pay. They are found in such precarious, exploitative and demeaning jobs just like the Dalit men. However, for the Dalit women, the occupational choices are constrained by both their caste and gender. For them these jobs are not degrading but a necessity to keep their households running. But, for employers the caste identity of these women makes them suitable for such jobs, as unlike their upper-caste women, the lower-caste women do not have 'honour' to defend. Through this caste centric empirical study, the paper aims to critically investigate the gender-caste dynamics to understand the importance of the intersection of gender and ascriptive identities and its impact on occupational choices.

2597-SPATIAL EXPERIENCES OF TRAVESTIS AND TRANSWOMEN FROM DIFFERENT GENERATIONS IN CHILDHOOD AND ADOLESCENCE IN BRAZIL.

Joseli Maria Silva¹, Marcio Jose Ornat¹

*State University of Ponta Grossa Geography Ponta Grossa-Brazil*¹

This research aims at analysing the spatial experiences of travestis and transwomen from different generations in their childhood and adolescence throughout distinct political contexts in Brazil. The first group of participants lived their childhood and adolescence in the 1980s, while the second group in the 1990s and the first decade of the 2000s. The life stories of twelve people who took part in the research were transcribed and analysed using the content analysis methodology, which enabled the understanding of the different experiences of their lives. The intersectionality between sexuality, age, and social class produced different expectancies for the future of transpeople within the political contexts investigated. The first group, who lived their childhood and adolescence in a period of strong conservatism and lack of recognition of the rights of the LGBTI population, had their life trajectories marked by exclusion, abandonment, and found in prostitution one of the few alternatives for making a living. The second group, who lived during a period of advances in the social policies reported experiences of family acceptance, professional achievements and access to higher education, despite the strong marks left in the previous generations. Both groups revealed some fear of the attacks to their social rights promoted by the current extreme right government in Brazil, whose main element of political support is the restoration of the conservative heteropatriarchal moral to 'save the Christian family and the nation'. Thus, this research contributes to the analysis of the living conditions of travestis and transwomen and the relation with public policies in the context of growing political conservatism in Brazil.



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2802-Measuring and Mapping Human Progress

Stanley D. Brunn¹

*University of Kentucky Department of Geography Lexington-United States*¹

Social and policy scientists use a variety of economic, demographic and environmental data about the human condition to compare countries and regions on a world scale. These are used to compare the ranking of a country at specific point in time to demonstrate the scale and scope of human progress from within a year or a decade. The rank or position a country on a world or regional or global scale is often used to demonstrate advances or declines in specific categories, such as income, educational level, GNP growth, gender equity, political freedoms or some environmental measure. Behind these comparative national scales of development are individual stories of advances made in cities and specific sectors of an economy or society such as social well-being, green energy, cultural achievements, political empowerment, conservation initiatives and environmental quality. An invaluable database to measure and analyze human progress in various categories and at international scales are the short weekly accounts "Points of Progress" accounts from the Christian Science Monitor Weekly. I examine and categorize the subject content and countries of the nearly 1500 stories from over 1300 countries and regions from 2014-2019. The stories are divided into seven major subject categories: Human Condition, Environment and Energy, Conservation and Preservation, Women, Health and Disease, Animal Rights and Politics. World Maps showing the patterns of the leading countries in each category clearly illustrate that progress occurs not only in Europe and North America, but in selected countries in Africa, Latin America, South and Southeast Asia, the Middle East and North Africa. Human and environmental geographers have much knowledge to assist our understanding of human progress.

2804-Cliff Shelters and Hiding Complexes – Geographical and Historical Aspects of Jewish Defense in the Galilee during the Roman Period

YINON SHIVTIEL¹

*ZEFAT ACADEMIC COLLEGE LEN OF SRAEL korazim-Israel*¹

In two works, "The Jewish War" and "Josephus, The Life", the author tells us about his intention to fortify 18 named settlements which have all been identified archaeologically. The methods which he claimed to have used have never been attested. However, my research has shown that in the vicinity of each settlement a steep mountain exists full of natural caves. Research has been conducted and a method of defense called "cliff shelters" was found to have been employed. On the other hand, settlements which were not erected close to steep mountains, used "hiding complexes", which the Jews had hewn under their houses.

My research has resulted in the discovery of a central defense method which characterizes ten of the settlements surveyed. We have found that five settlements mentioned by Josephus among those he had fortified are located in close vicinity to precipitous cliffs, inside which karstic caves were formed. Reaching most of these caves was only possible by descending inside them with ropes. The finds inside these caves, pottery, coins, vessels, loops of tied ropes, ritual baths, and more have aided in resolving that these artifacts partly belong to the Hellenistic but mainly to the Roman period.

The findings in all these indicate intense activities in the area during the time of Josephus who had served as the commander of the Galilee before and during the Great Revolt. These fortification were carried out with his inspiration and encouragement. In my lecture I will discuss the spread of the cliff shelters and the hiding complexes in the Galilee and the findings, in comparison with Josephus' description.



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3023-Malls and Walls A critical examination of the geographies of economic development mobility and exclusion

Jennifer Fluri¹

*University of Colorado-Boulder Geography Boulder-United States*¹

Several feminist and critical examinations of globalization and international development have illustrated how geo-economic structures ensure the “free” flow of capitalist production/consumption, while simultaneously restricting the movement of certain individuals across spaces by securitizing borders and boundaries. The restriction of movement signals differential ideologies about what bodies belong and which are considered a threat to a given society, space, or zone of economic production/consumption. Mobility restrictions regularly rely on racist, sexist, and classist ideologies of threat, security, and access to resources. By examining the spatial and social interactions where security (examined by way of walls and other border technologies) and economic mobility (through sites of consumption such as malls or markets) meet, this paper will analyze the interrelationship between economic “progress” and corporeal segregation and separation under the auspices of security. In this examination security regimes include structures and systems that categorize and sort bodies through various processes and technologies of economic development. The hierarchies of securitizing bodies and their relationship to economic power express a geopolitics that relies on capitalist notions of progress and success as integral to how bodies are sorted, included, excluded, detained or destroyed. This paper examines how spatial and structural representations of security and immobility reinforce hierarchal security regimes and fail to ensure spatial security for civilians, particularly in locations beset upon by geopolitical violence and related conflicts. This research is based on a long-term examination of gender, economic development, reconstruction, geopolitical conflict/security, and corporeal mobility in Kabul, Afghanistan over the course of eighteen years, from the US-led invasion 2001 to recent fieldwork in the summer of 2019. This paper expands upon previous research on security and mobility to illustrate how security regimes have intensified in this capital city, while the corporeal security of civilians has deteriorated.

3262-SPEAKING THE FATHER'S TONGUE AND EATING THE MOTHER'S SALT AN INTERSECTIONAL APPROACH TO UNCOVERING THE SOCIO SPATIAL IDENTITIES OF YOUNG ANGLO INDIANS IN INDIA

Maria Anne Fitzgerald¹

*Univeristy of Delhi Geography Kolkata-India*¹

The Anglo-Indian Community in India is essentially a geographical embodiment of the boundaries between Orient and Occident. A political description of the Anglo-Indian identity is mentioned in Article 366 (2) of the Indian Constitution. While this identification delineates the rigid boundaries of ‘European’ and ‘Indian’ the identity also (un) knowingly and contrastingly marks ‘a place of crossing’. This bridging is significant to their identity as it imparts a unique heterogeneity to otherwise fixed and homogeneous traits. In the context of young Anglo-Indians, this place of convergence is attributed to other aspects of their identity such as region, religion, race, gender, mother-tongue, caste and class. While the mainstream discourse on Anglo Indian identity is yet to recognize that these do not hinge on a single-axis framework, young Anglo-Indians are identifying the compounded impact of referencing themselves within these intersections. An intersectional approach therefore obscures the boundaries established by multiple identity attributes and creates an alternative inclusive framework for identification. Apart from this inclusiveness, the intersectional approach advocates for solidarities of sameness with other marginal communities in India and seeks to bridge the gap created by social and cultural differences. In this paper I argue that rather than setting out to replicate a European consciousness, young Anglo-Indians are adopting an intersectional approach to ‘self-identifying’ as Anglo-Indians in India. By adopting an auto-ethnographical approach, the paper explores questions concerning the negotiations and contestations of young Anglo-Indians in relation to their cultural identity. Overall, the paper emphasizes the ‘way of seeing’ young Anglo-Indians adopt to mute differences, reduce inequality and promote social inclusion.



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3283-Milestones of Geography

Ali Ergin Gümüş Gümüş¹

Istanbul University Hasan Ali Yücel Faculty of Education, Social Sciences Education Istanbul-Turkey¹

Abstract

Geography science is at least 2500 years old and is undoubtedly one of the oldest scientific fields. It is spatial, and will exist as long as spatiality exists.

This study, firstly and briefly explains both incomplete and correct definitions of the science. Furthermore, its historical background, as well as the obstacles that have been overcome while exploring it, are narrated with a unique perspective while remaining true to the milestones accepted by most researchers.

Additionally, findings and ideas of respected geographers, notably Humboldt and Ritter, whose contribution to today's modern geography are undeniable, are discussed in a comparative and chronological manner.

According to most researchers, founders and characteristic representatives of the geography are Humboldt and Ritter. They lived in the same country, in Germany, in the same city, in Berlin, for 30 years at the same time, and although they represented different opinions from each other, they always managed to remain two friends who appreciate each other. Some researchers take an attitude that counts Humboldt as the main founder of the geography and belittles Ritter. On the other hand, some researchers think that there is no big difference and Ritter plays a big role in the development of geography. Therefore, in order to clarify this issue, the works and views of these two famous geographers have been given a long place, then Ritter School (developments in the field of human and country geography) and Humboldt School (developments in the field of physical geography) and their followers.

The final chapter of this study focuses on the development of geography science in Turkey. Its milestones, pioneering geographers and their contributions are explained and discussed.

3442-BLOODY GEOGRAPHIES SPATIALITIES OF VIRGINITY

Elisabeth Militz¹

University of Bern Department of Geography Bern-Switzerland¹

Feminist scholars, activists, artists and others have long addressed the topic of virginity and have dismantled it as a powerful globally circulating and gendered myth that affects how a lot of women-identifying people and persons with vaginas experience the ways in which their bodies become (a)sexual. The claim of virginity is not only heterosexist and transphobic, it is often also used to restrict persons with vaginas with regard to their sexual practices, identities and experiences.

Through focusing on the cultural context of Kyrgyzstan within which scholars argue virginity is strongly connected to the heterosexual wedding night and the pre-marital sexual taboo for persons with vaginas, this paper analyzes the spatialities of virginity. Drawing on qualitative interviews and ethnographic field work in Bishkek and Osh and in social media spaces, collected between 2017 and 2020, I discuss two distinct ways in which virginal blood is spatial. First, virginal blood blurs the boundaries between private and intimate spaces as virginity performances transform the most intimate spaces of the vagina into public property. However, my research illustrates how persons with vaginas through performing virginity reclaim ownership over their sexualized and gendered bodies. Second, the necessity to produce virginal blood inspires feminist and youth activists to create new spaces for sexuality education. I show how virginal blood incites online and offline spaces of resistance in a heterosexist and patriarchal society.

The paper contributes a case study on the geographies of sexualities and the geographies of the body from the Global East. Unraveling the spatialities of virginal blood highlights the need for geographers to further examine the materiality and fleshiness of the body and its parts as objects of analysis in order to better understand the ways in which certain body parts turn into key sites in (geo)political struggles.



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C.21. Joint Session Toponymy with ICA IGU Place names as indicators of human perception of space

1218-Place names as 'condensed narratives' about the geographical feature denoted and the name giving community

Peter Jordan¹

*Austrian Academy of Sciences Institute of Urban and Regional Research Wien-Austria*¹

Place names can be regarded as 'condensed narratives' about the geographical feature they denote as well as about the name-giving community. In the direction of the feature this is, however, only true for descriptive names, not for commemorative names like names after persons or events or for neutral names like names after flowers or birds. The function of place names as 'condensed narratives' is based on the assumption that every name has been given intentionally, i.e. with the intention to highlight an essential or striking aspect of the feature, although the meaning of a name and this intention are not always transparent for us today, since some place names are very old, originate in former languages or variants of a language spoken in a place and have been adapted to the current language in place morphologically and phonetically. From a cultural-geographical perspective the stories place names tell us about the name-giving community are especially interesting, since they convey an impression of how people perceived their environment and what was important for them. Thus, place names are also keys to cultural history, to the perception of space by already extinct societies. Farmers had perceptions and interests different from herdsmen, seafarers and coastal dwellers different from people residing in the hinterland. They are all deducible by place names, if these are analysed carefully and combined with additional historical information. The paper will illustrate this approach by examples from Central Europe and the Adriatic space.

1739-The military purpose of a topographic map as a factor in cartographic name policy

Wojciech Włoskiewicz¹

*Institute of the Polish Language, Polish Academy of Sciences Department of Onomastics Kraków-Poland*¹

Military and strategic needs were the major driving force behind most modern surveying and map-making actions taken by many countries in the late 18th as well as in the 19th and in the first half of the 20th century. It was done just according to the principle: *si vis pacem, para bellum et... tabulas geographicas*. In most cases it was the military that was fully entrusted with the conduct of such surveying projects. Both the military purpose of a topographic map and the army as the "project operator" had an important influence on a map's content. This applies to a map's toponymy as well. The aim of the paper is to analyze the way the military purpose of a topographic map and the military background of a surveyor influenced the way he perceived space and terrain. Furthermore, the goal of the paper is to discuss how this military and tactical perception of geographical features was then reflected in the toponyms the surveyor fixed and sometimes created on a map he prepared. The findings are based both on military-made topographic maps (dating from the late 18th to 20th century) and on the survey manuals. The focus is laid on the three Austrian and Austro-Hungarian topographic surveys and on the maps resulting from them as well as on some surveying and cartographic projects completed in Austria-Hungary's successor states before the WWII. Some of the survey manuals instructed a surveyor to collect names of specific types of features while avoiding fixing names of other objects. In many cases the linguistic and etymological analysis of toponyms makes it obvious that the names fixed on a map had been originally names of other features that were "shifted" on objects that needed to be named on a map.



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1744-DISTINCTIVE IDENTITIES OF PLACE NAMES

Cosimo Palagiano¹

*Sapienza Università di Roma Lettere e culture moderne Roma-Italy*¹

1. Background

In the current era of globalization, place names are taking on particular strength, starting with small villages and ending with large cities, but even with countries, with a return to nineteenth-century patriotism. With gentrification and immigration, the phenomenon is witnessed in the same cities, with people recognizing a place name as their proper identity.

2. Materials and methods

I have considered some factors that affect the belonging of a human group to an identity more than others, namely:

1. religious faith or ethnicity, 2. Common social belonging, 3. Sporting faith for a team. This identity is identified with a place name, which can be a village or the neighborhood of a large city.

3. Results

A district of Brussels, Molenbeek-Saint-Jean, unfortunately known for tragic events, is dominated by a strong Muslim presence. I can mention other neighborhoods with a strong prevalence of religious sharing, such as Kazimierz in Krakow, Portico d'Ottavia in Rome, etc. In Vienna there is a neighborhood, Ottakring, also called "Klein-Istanbul", "small Istanbul" for its significant Turkish presence. The name Bronx in New York is a label of similar neighborhoods in other parts around the world. The name China Town flourishes in New York and in other world cities. In New York itself there is also a Little Italy, originally inhabited by Italian immigrants.

But the names of places that today express an identity and a common faith are the headquarters of sports clubs. I can mention the place names of the teams of London, Manchester, Liverpool, Milan, Genoa, Turin and Rome. In Rome Testaccio and Garbatella districts show a social and sports identity.

4. Conclusions.

Although the world is heading for an unexciting uniformity, some place names still express their unique validity and reciprocal understanding for certain groups of citizens.



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1746-Toponymic perception of a historic geographical landscape

Andrey Herzen¹

Institute of Geography, Russian Academy of Sciences Laboratory of Geopolitical Studies Moscow-Russia¹

Place names are formed in the historic-geographical landscapes under the influence of diverse natural and cultural factors, in specific linguistic and ethnic environments. The perception of a geographical landscape by the human groups, which settle in it and transform it thereby to a historic-geographical, reflects first in toponymy. The toponymic component of the historic-geographical landscape through this process is formed. That is why it is the most important indicator of the landscape, and historic-geographical reconstruction of the stages of its development allows us to understand its evolution, to identify landscape-forming elements, valuable heritage objects, the foundations of the stability of multicomponent complexes in which modern socio-economic and cultural systems exist.

Toponymy is one of the most important components of the historic-geographical landscapes, which are characterized by the typicality or uniqueness of their attributes, thereby forming their own subsystems. Historic-geographical landscapes include toponymic subsystem typical of the region, and unique, clearly distinguished by their features among other functionally similar geographical objects. Unique toponyms are inextricably intertwined with typical ones, but uncharacteristic of this or neighboring landscapes, which arose under unclear ethnological, linguistic and, in general, historic-geographical circumstances. Such toponyms usually include the most ancient, with an unclear etymology, transferred from very distant places during population migrations. Also, the geographical names of this category may have a relatively clear etymology, but at the same time they are formed under obviously unique circumstances, and therefore practically do not find analogues.

Often during the centuries of the landscapes' evolution, the population changed, the same way changed the toponymic perception of the space, causing in result contradictions and even conflicts, which are represented all over the world till nowadays. It makes the research of the changes of the historic-geographical landscapes' toponymic perception permanently actual.

1770-Place naming place making and human perception of place in the Chiadzwa diamond fields in Eastern Zimbabwe during the period 2006 2008

Zvinashe Mamvura¹

Humboldt University of Berlin Institute of African and Asian Studies Berlin-Germany¹

This study explores the centrality of place naming to the process of place making in the transient and 'imagined' community created as a result of the diamond rush in eastern Zimbabwe during the period 2006-2008. The study acknowledges the symbolic function of place names in making places. The toponymic production of places in the Chiadzwa diamond fields showed a consistent pattern of using transferred place names. Different places in the diamond fields were given names of already existing places. Harare suburb names provided a rich source of place names used in making places in Chiadzwa. It is our considered view that the name-giver's sense of the place of the original named place and their interpretation of realities obtaining in different parts of the diamond fields influenced the naming process. The human perception of the places in Chiadzwa led name-givers to assign specific names to places that adequately reflect the identity of the named places. The study established that the place naming system was symbolic because resemblances between the socio-economic features of the inhabitants of different places in Chiadzwa and those of different places in Harare largely conditioned the place naming process. The place naming system considered aspects that places in Harare are widely known for or associated with and the observable features of the places in Chiadzwa. Harare's urban spatial system exhibits a three-tier categorisation of residential areas in which low/working class are predominantly found in high-density suburbs, middle-class in medium-density suburbs with the elite mainly found in the low-density suburbs. Apart from this categorisation, there are several (stereotypical) issues that are associated with each residential area, negative or positive, such as prostitution, robbery, drug abuse, snobbish culture, extravagance, among others. All these issues played a significant role in the making of places in Chiadzwa.



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VIRTUAL

2052-PLACE NAMES AS EXPRESSIONS OF THE PERCEPTION OF SPACE AND THE TOPONYM FOR MOROCCO

Malak Alasli¹

(ELTE) Eötvös Loránd University Department of Cartography and Geoinformatics Budapest-Hungary¹

Toponymy is embedded in the twofold nature of space and time and thus holds a fundamental association with geography and history. Moreover, geographical names witness a given man-place relationship, and can account for both the name givers and name users.

In Turkish, 'Morocco' is known as 'Fas', a name derived from its ancient capital of 'Fes'. 'Fas' has become part of the vocabulary of the language and thereby of the national culture. It became rooted in the lexicographic system of the language, which can be observed in daily practices. However, contact with the Turkish might raise problems in communication; 'Fas' may refer to the city of 'Fes' rather than to the whole country, and can also inhibit an efficient transmission of information as the country name 'Morocco' is unfamiliar to the Turkish. Therefore, how can the place name 'Fas' cause cultural misunderstandings?

'Fas' discerns the cultural contacts between the two nations and is therefore of great importance for the study of historical relationships. The use of a given toponym by one community may be appraised entirely differently by another, hence the intention to investigate Moroccans' attitude towards the use of 'Fas'. Moreover, surveys will be used to conduct a study on the degree of familiarity of its usage among Moroccans. Participants will be asked to answer the questions without relying on any kind of literature.

Many toponyms are considered as historical records as they carry data on the background of the name providers, and how they viewed the geographical space around them. Consequently, they reveal concepts of identity, and cultural location. The naming holds both a historical and geographical reference and thus bears a historical and cultural memory.

2158-GIS based spatial analysis of place names in Kvemo Kartli Georgia

Mariam Tsitsagi¹, Ekaterine Makharadze², Valeriane Kekenadze³

TSU, Vakhushti Bagrationi Institute of Geography Hydrology and Climatology Tbilisi-Georgia¹ Ministry of Regional Development and Infrastructure of Georgia LEPL Roads Department of Georgia Ekaterinemakharadze@yahoo.com-Georgia² TSU, Vakhushti Bagrationi Institute of Geography Physical Geography kekenadze.valeri@yahoo.com-Georgia³

Toponyms serve as symbols of regional culture and thus reflect the history, habitat and environment of a place. Toponyms are one of the most widely used tools in recognition of the place and orientation in space (spatial reasoning). Kvemo Kartli, with the largest number of minority languages in Georgia and very interesting history, is one of the most interesting region in toponyms point of view. The rich diversity of communities is reflected in its toponyms (place names). This research involves the creation of digital maps, processed in a GIS environment, in order to (1) construct a GIS database of toponyms in Kvemo Kartli from different sources of different periods; (2) analyze the spatial distribution of Georgian, Azerbaijani, Armenian, Russian toponyms and analyse reasons of their changes; and (3) examine the historical evolution of toponyms. The cartographic sources used in this study are varied and cover a large period of time. For the study we used a map published in 1931, Soviet topographic and modern maps. The obtained results showed changes of toponyms by epochs. If Georgian and Russian toponyms prevail on a map published in the 1930s, there are numerous Azerbaijani toponyms published on Soviet maps and numerous Georgian toponyms disappear. On the modern map many toponyms have been replaced by Georgian, mostly settlements. Research has shown that these changes mainly apply to places where ethnic Georgians began to settle in the 1990s. The spatial analysis of the data well illustrates the historical and political processes taking place in the region.



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2353-CHORONYMS AS CARTOGRAPHIC ELEMENTS ON OLD MAPS OF SLOVENIAN TERRITORY

Matjaz Gersic¹, Primož Gašperič¹, Drago Perko¹

ZRC SAZU GIAM Ljubljana-Slovenia¹

Using a uniform methodology, we examined cartographic elements on medium-scale maps showing the present-day Slovenian territory and its surroundings from the sixteenth to nineteenth centuries. Among the examined cartographic elements were also geographical names, which are very fragmented due to political and border changes, linguistic differences and history of each territory. Geographical names are one of indispensable elements on maps which are presented all over the world on geographical maps from the earliest discovered maps till now. Our research field are old geographical maps that were created in different periods. We analysed approximately seventy old maps. The majority of them represent Carniola (Kranjska) that is the old name for two quarters of Slovenian territory, and some of them the other regions as Styria (Štajerska), Carinthia (Koroška), Istria (Istra) and Gorizia (Goriška). We did three basic steps of research. In the first phase we were interested in representation of all types of geographical names on these maps, their appearance, type of the manuscript and other properties. In the second phase we put the choronyms in the limelight of this research. We prepared a gazetteer of all choronyms identified on analyzed maps, tried to find modern synonyms and compared maps according to this type of geographical names. In the last step of the research, we tried to find out the denotation of selected choronyms from regional identity point of view with mind mapping methods. For this purpose, the respondents had to draw the borders of individual Slovenian regions known to them on a mental map.

2738-EXPLORATORY ANALYSIS OF GEOGRAPHICAL NAMES IN YOGYAKARTA CITY CONCERNING ON THE IMPLEMENTATION OF YOGYAKARTA SPECIAL PROVINCE STATUS

Ari Cahyono¹, Bowo Susilo², Niken Wirasanti³, Noorhadi Rahardjo²

Faculty of Geography, Universitas Gadjah Mada Doctoral Program on Geography Yogyakarta-Indonesia¹ Faculty of Geography, Universitas Gadjah Mada Geographic Information Science -Indonesia² Faculty of Cultural Science, Universitas Gadjah Mada Archaeology -Indonesia³

The geographical name, as intangible cultural heritage, could present geographical properties, sociocultural & political aspect behind it. This study is situated in the city of Yogyakarta, which is one part of the special region of Yogyakarta. Local wisdom in Yogyakarta is still maintained for cultural preservation and tourism attractions. We did the spatiotemporal mapping of geographical names in Yogyakarta City. We also analyzed spatial distribution and pattern of the geographical names in the Yogyakarta City related to the implementation of special value in the Yogyakarta Special Region.

The Dutch Map and Indonesian Topographical Maps were primary data sources. In addition, we explored National and Regional Archives, historical books and existing gazetteer data. We used extensive toponymy approach to conduct this research. Spatial analysis is used to determine the spatial distribution of geographical features and spatial patterns of geographic names. A descriptive approach is required to enrich the information obtained.

Based on the analysis, it was found that some geographical names were returned again as in the past conditions to maintain the philosophy of Yogyakarta such as Mangkubumi Street changed its name to Margo Utomo Street, Ahmad Yani Street to Margo Mulyo Street and Trikora Street to Pangurakan Street. In addition to geographical names evolution, typological changes in geographical features also occur, e.g., in the Yogyakarta City, the term sub-district has changed to a kemantren. According to this research, we could perceive the distribution of geographic names associated with a job, the name of the troops, commemorative names, hopes, and other naming motives. This study also revealed the geographical name and its motivation of naming has implemented a special value of Yogyakarta Special Region. However, geographical names of real estates must be set in order to comply with language laws and the rules of place naming that preserve cultural heritage.



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3451-USE OF PLACE NAMES BY MINORITIES IN THE ZAKARPATTIA OBLAST OF UKRAINE

János Jeney¹

*Institute for Hungarian Studies Research Centre for population geography of and Geoinformatics Budapest-Hungary*¹

During the twentieth century Zakarpattia Oblast in the Ukraine was transferred between Hungary, Czechoslovakia, the Soviet Union and Ukraine. It is inhabited by Hungarians, Romanians, Slovaks, Ruthenians and Ukrainians. Three of these minorities have strong cultural ties to the neighbouring countries bordering the oblast. While Ukraine is in a different time zone to these countries, many communities unofficially use Central European Time. The minorities use their own place names in their own language, but in strong contrast to other European countries, these names are not signposted or officially recognized by the government in Kiev. While official signs are only in Ukrainian, unofficial signs are often in minority languages. Quite often these signs show street names, tourist attractions, describe war memorials or just show information for use in everyday life. Not only is the language different, but while Ukrainian uses Cyrillic script, Hungarian, Romanian, and Slovak uses Latin script, making signs hard to read in a different language. Since the area has belonged to different countries, all place do have Hungarian, Czech, Slovak, Russian, Ruthenian and Ukrainian names. It must be noted however, that not all of these names are in common use by the locals, as depending on the language spoken by the population different names get used, despite the fact that the official names are all Ukrainian. This can often mean more than one name. From the place names used and the language spoken one often can determine the cultural ties of the population. This makes the oblast a very unique, as many of the cultural and economic ties have potential to make it a bridge between the rest of Ukraine and Western Europe. This paper demonstrates these unique features through the use of place names.

3560-Evaluation of cadastral boundaries influences on place names A case study of Nairobi and environs in Kenya

Daniel Nyangweso¹, Mátyás Gede¹

*ELTE Eötvös Loránd University Institute of Cartography and Geoinformatics Budapest-Hungary*¹

Each land-sub-division generates cadastral boundaries that confines groups of people to assert ownership rights in identifiable places. A search and a physical visit are required to ascertain the rights in identified places. Conducting searches on existing rights and their relation to the actual places is time-consuming and costly. Besides, the names of cadastral bounds are not the same as places for those boundaries. This paper analyses the influence of cadastral boundaries of named places to establish a link between the boundaries and the toponyms. The places' reference points are cadastral boundaries with associated numbers that use the boundary names without the parcel numbers. We propose using place name relations and Leaflet web map models to establish the trend used in the naming of cadastral bounds and stakeholders' roles in shaping the places' toponymy. Since toponyms change both in location and usage while cadastral bounds do not change, an evaluation will be made on available datasets to ascertain affected toponyms due to cross-application in cadastral boundaries and their use as toponyms for various features. The case study location of Nairobi metropolitan, Kenya, is selected. The result is normalized distributions and trend of the influence and the motivation indicators in naming cadastral bounds. The results validation is by use of the point centroids of the described areas and their administrative sub-locations. The influences will guide stakeholders to connect the relation of the cadastral bounds with toponyms, serve as links to historical perceptions of space, hasten searches, map land rights, and visualize toponyms' relationships in current land administration mapping.



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3619-Baptizing the underwater territory the ethnic names of the geoforms of the seabed in the Colombian Caribbean.

Juan Alexis Acero Rangel¹

*UPTC Master in Geography Bogotá-Colombia*¹

The project of the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA) sponsored by the Intergovernmental Oceanographic Commission (IOC) was an initiative that articulated the development of cartography for the recognition of the underwater relief and the various forms and geographical features that they could be found in the water depths. Colombia, having a presence in the Caribbean Sea, was part of the execution of the project and as a result it not only recognized the ocean floors with their geoforms, but each of them were baptized with recognized names of indigenous terrestrial cultures of Colombia. This presentation contributes to the human recognition of underwater environments and the study of the process of naming the geographic relief of the ocean floor. From the methodological order of political or critical toponymy, it is sought to identify the geopolitical issues of territorialization through the appointment and its means or techniques. Elements that must be contextualized in time and space, related respectively to the technologies of power and territorialization. In addition, it seeks to analyze the geopolitical and historical situation conducive to the naming of the geographical features of the seabed of Colombian waters in the Caribbean Sea; which were the technologies mobilized by state actors according to their motivations and the nature of their power. Finally, an attempt is made to address the nature of the places that are intervened to give them a symbolic and territorial status that helped to configure a new nationalized geographic space. Therefore, this paper explores this field of naming as an indicator of the human perception of space, from the historical or diachronic dimension, and also from the aspect of globalization processes, through participation in a global project, and of location, through the definition and representation of an underwater territory.



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C.22. Joint Session IGU IAG Commission Working Group on Geomorphology and Society Past Present and Future Co production and evolution between geomorphological dynamics and human influence

2585-Dune systems in central Chile coast. A biogeomorphologic perspective

Hermann Manriquez-Tirado¹, Andres Moreira-Munoz¹

*Pontificia Universidad Catolica de Valparaiso Instituto de Geografia Valparaiso-Chile*¹

Central Chile coast is located in the east side of the Pacific Ocean, here the current and past climate, the strong winds, the tectonic frame, and the different Quaternary sea levels, are the main responsible for the sand dune field formation. Today those dune field has typical shape that can be found from the line coast to the inland. Each of them has a special kind of vegetation. The fieldwork it has allowed to observe a relation between the shape of the dunes and some vegetable species. The different pattern of distribution, high, and coverage of that species like *Ambrosia chamissonis*, *Carpobrotus aequilaterus*, *Scirpus nodosus* or *Baccharis concava* cause change in air flows and with it the transport of the sand.

In this coast, the winds and the vegetation cycles has a behavior connected with the season of each year. The rate transport of sand it is determined through several sand trap collector and anemometers with data logger, installed over the different dunes in a profile from the line coast. The mapping of the vegetation of the dune fields show that some species colonize only some kind of dunes, this seems to be connected with the transport of sand, and other parameters like the air humidity and the shape of the dunes. Winds in the dry season have typical speeds of 5m/s, but with speeds that can reach 20 m/s. Winds in the humid season can have higher velocities, but higher air humidity also.

Invasive plant species like *Lupinus arboreus* have an extremely higher expansion over several kinds of dunes, replacing the native species

3055-Characteristics of river morphology and bed materials in a tributary river influenced by Lake Tonle Sap

Naoko Nagumo¹, Shinji Egashira¹, Sumiko Kubo², Bunnarin Ben³

*Public Works Research Institute ICHARM Tsukuba-Japan*¹ *Waseda University School of Education -Japan*² *Ministry of Mines and Energy Department of Geology -Cambodia*³

Lake Tonle Sap in Cambodia has 11 tributaries and is connected to the Mekong River through the Tonle Sap River, which flows out from the southeastern end of the lake. In the rainy season, the lake receives floodwaters not only from the tributaries but also from the Tonle Sap River, and the lake area expands to 3 to 5 times the area in the dry season. Although the tributary rivers play a major role in forming the coastal topography, their sediment transport capacity and associated sediment sorting have been affected by seasonal lake-level changes. In order to clarify the sediment transport processes and the roles of the tributaries in forming the coastal topography, this study investigated channel topography and bed materials, focusing on the lower Stung Sen River, a tributary with the largest drainage area. Its river channel has a rectangular cross-section and forms channel bars with mega-ripples, which appear in the river bed during the dry season. The bed material in c. 180 km from the river mouth consists of sand particles less than 1 mm, which become even finer towards downstream and deposit as washload in the river bank. In the area that submerges when the lake level rises, the bed slope becomes mild in the rainy season and the channel hardly shows its course clearly and becomes narrower towards downstream. These analyses and the characteristics of the topography and lake-level changes concluded that the lower Stung Sen River can be divided into three segments from the river mouth towards upstream: 1) the segment with the narrow and straight channel that submerges when the lake level rises; 2) the segment with the meandering channel that is impacted by the backwater effect when the lake level rises; and 3) the segment that remains unaffected even when the lake level changes.



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C.23. Land Degradation and Desertification Land degradation and desertification new research and its implications for monitoring and mitigation

1200-THE CONTRIBUTION OF STUDIES INTO LAND DEGRADATION AND DESERTIFICATION TOWARDS THE 17 U.N. SUSTAINABLE DEVELOPMENT GOALS

Andrea Vacca¹, Owen Graham²

*University of Cagliari Department of Chemical and Geological sciences Monserrato-Italy*¹ (formerly) Sydney Metropolitan Catchment Management Authority (formerly) Sydney Metropolitan Catchment Management Authority -Australia²

In September 2015, the UN General Assembly adopted the Agenda on Sustainable Development. It represents a new coherent way of thinking about how issues as diverse as poverty, education and climate change fit together and it entwines economic, social and environmental Targets in 17 Sustainable Development Goals (SDGs) as an indivisible whole. In this paper we discuss how scientists and professionals studying land degradation and desertification can help to reach the SDGs in the most effective manner.

Targets 1-5 and 8-9 of Goal 15, Targets 2, 4, 7-8 of Goal 12, Targets 1-3 of Goal 13, Target 6 of Goal 6 and Target 4 of Goal 2, listed in order of relevance, are those where the contribution of experts in land degradation and desertification is mostly needed. Additionally, this contribution is also needed for some Targets of Goals 1, 3, 4, 6, 11 and 13, because of their interactions with the most relevant ones.

The contribution of experts in land degradation and desertification is specifically required in (1) the definition of terminology and concepts, (2) the adoption and development of procedures and practices, (3) the selection of suitable indicators, and (4) the set-up and maintenance of monitoring systems. Additionally, experts in land degradation and desertification should be able to improve the transfer of knowledge and to create and sustain awareness by establishing close dialogues with policy makers, stakeholders, the public and colleagues in other disciplines. The IGU's Commission on Land Degradation and Desertification (COMLAND) has facilitated activities, enabled networking and has supported scientists and professionals who work in these areas. This has occurred through technical meetings and professional events, publications and field studies. SDG Targets allow strategic focus and prioritization of emphases.

2098-LITHIUM MINING DESERTIFICATION AND ENVIRONMENTAL DEGRADATION IN THE ATACAMA DESERT

Hugo Romero¹

*Universidad de Chile Geografia Santiago-Chile*¹

Chile has the main deposit of lithium salts in the world due to the absence of rains, high solar radiation and elevated evaporation that characterize the Atacama Desert. Global demand for lithium is growing steadily and significantly as a result of its use in electricity batteries, mainly in China, which is the main world buyer. Large domestic and foreign companies have settled in the Salar de Atacama to produce more than two hundred thousand tons of this ore in this decade. The production of a ton requires two million litres of water, in the midst of one of the world's most arid deserts. The impact of mining companies on the natural landscapes, biodiversity and indigenous peoples' communities that have inhabited these areas for thousands of years are jeopardising the sustainability of this territory.

By analyzing satellite images and existing data and reports it is possible to identify changes in surface temperatures, soil moisture and plant cover, observing significant levels of environmental degradation. Through census analyses, interviews with local leaders, government authorities and business representatives, it has been possible to learn about the factors that further threaten the livelihood of ancestral lifestyles and are causing an accelerated process of desertification, emigration and urbanization of the populations of the oasis. It is very important to contribute to generating local and regional development plans that consider the fragility of ecosystems and the vulnerability of society, looking for ways of sustainable development. Otherwise, a process of great harm to the nature and extinction of local communities can be predicted.



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C.24. Land Use and Land Cover Change Change in Land System and its Implications on Ecosystem and Environment in High Asia

1352-Man land relationship culture and its application in pastoral research —Taking the arid steppe pasture area of Xilingol League as an example in China

Shan Hai¹

Inner Mongolia Normal University Research Center for Pastoral and Rural Sustainable Development Hohhot-China¹

There are many different concepts of culture. One of them considers that culture is the “bond” between human society and geographical environment. Based on this concept, this article proposes the concept of human-land relationship culture. This concept believes that, to a certain extent, each culture is the product of long-term interaction between a specific population and the specific geographical environment in which it lives. Therefore, this part of culture should be called “the culture of man-land relationship”. The man-land relationship culture also contains three elements: the spiritual culture of the man-land relationship, the social organization system culture, and the material culture. A man-land relationship culture can only be formed and developed in its specific geographical environment, and it is only suitable for geographical environments where it is homogeneous. If we blindly “transplant” a culture of man-land relationship, it will damage both the “man” and the “land”. In the history of human society, similar lessons are countless. Therefore, the effective protection and improvement of each original ecological man-land relationship culture is an important prerequisite for the sustainable development of human society in the diverse geographical environment. This should be the important practical value of the protection of cultural diversity resources. This paper systematically studies the evolution of man-land relationship culture and its ecological, economic, and social benefits in the arid steppe pasture area of China's Xilingol League, which is located on the southeast edge of the Mongolian Plateau, and explains the irreplaceable importance of man-land relationship culture in the sustainable development of a region theoretical and practical significance.

1485-Impact of land use change on environment in Thailand's mountain area

Baicha Wongtui¹

Lomonosov Moscow State University World Physical Geography and Geoecology A.Doisaket-Thailand¹

Nan Province is one of the mountain areas of Thailand that faced with land-use changes. Driving forces are divided into four groups: development of the government, socioeconomic drivers, insecurity in the land tenure and increasing population. It was found that the forest area has decreased steadily while agricultural areas are likely to increase both shifting cultivation and permanent agriculture. Especially after the government a role in the development of infrastructure in the area and to encourage farmers to grow economic crops (maize, mandarin, cassava, tobacco, and rubber). The researcher collected primary data and secondary data to analyze the impact of land-use changes on the environment. As a result, land-use changes can affect several problems: deforestation(although Thailand is canceled forest concession across the country since 1988, but there are still illegal deforestation today), natural disasters(In the past 10 years, flash flooding, flooding in rainy season, and drought frequency occurred), soil degradation(mountain areas has an erosion with more accountability from the sediments were washed down by water during heavy rainfall), reduced biodiversity(local plant and animal species were threatened), and air pollution - due to the preparation planting area of farmers, particularly upland farmers, acres will be burned during the months of February and March and cause smoke and dust dispersed in the air. Small dust was found in the last 5 years, the amount accumulated in the air exceeds the standards set which affect the health of people in the area and the higher rate of patients with respiratory diseases.



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3529-Preservation of selected Ecosystem Services of the Floodplain Forests along the Naryn River Kyrgyzstan Perspectives and challenges on the way to sustainability in a complex socio ecological system

Florian Betz¹, Magdalena Lauermann¹, Nadira Degembaeva², Ermek Baibagyshov², Akylbek Chymyrov³, Bernd Cyffka¹

Catholic University Eichstaett-Ingolstadt Applied Physical Geography Eichstaett-Germany¹ Naryn State University Agrarian Technical Faculty dknadira@gmail.com-Kyrgyzstan² Kyrgyz State University of Construction, Transport and Architecture Geodesy and Geoinformation akylbek2005@yahoo.com-Kyrgyzstan³

The riparian ecosystems along the Naryn River in Kyrgyzstan are still shaped by high natural dynamics. This makes these ecosystems on the one hand a regional hotspot of biodiversity. On the other hand, the floodplain forests provide manifold ecosystem services to local people such as the provision of firewood or pastoral land. At the same time, an intensive use of resources causes a certain pressure on the ecosystems. Wood cutting reduces the number of adult trees while livestock grazing is a threat for rejuvenation. In addition, plans for hydropower exploitation at the Naryn River are a danger for the natural dynamics and thus a potential threat for biodiversity depending on regular disturbance driven by the natural flow regime.

In this contribution, we introduce the work of a transdisciplinary Kyrgyz-German project working on sustainable solutions for the preservation of the riparian ecosystems along the Naryn River. This requires comprehensive information, environmental awareness of people and alternatives to non-sustainable natural resource use. We show a comprehensive assessment of the Naryn River corridor with its structure and anthropogenic pressures. This includes a large scale assessment of the land use/land cover pattern along with development trends based on multispectral remote sensing and an analysis of the impact of hydropower exploitation on the longitudinal connectivity of the river. Basing upon the scientific results and communication with regional stakeholders, we introduce ideas for sustainable alternatives like the establishment of short rotation coppices or the installation of renewable energy like solar power.

In this contribution, we give an impression of anthropogenic pressure on the floodplain ecosystems along a large Central Asian headwater river. In addition to the remote sensing based assessment of land cover, we introduce ideas how to cope with the complex socio-ecological challenges related to the sustainable management of riparian ecosystems along the Naryn River.



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C.24. Land Use and Land Cover Change Driving forces of land use changes

1173-ESTIMATION OF URBAN EXPANSION BY MULTIVARIATE LOGISTIC REGRESSION MODEL (CASE OF DARKHAN CITY MONGOLIA)

Myagmartseren Purevtseren¹, Ganpurev Dashlegtseg¹, Myagmarjav Indra², Byambakhuu Gantumur¹, Enkhtuya Nergui¹, Dabuxile Gungarjav³

National University of Mongolia Geography Ulaanbaatar-Mongolia¹ Mongolian University of Life Sciences Land management myagmarjav@num.edu.mn-Mongolia² Inner Mongolia Normal University Geography 3914511163@qq.com-China³

Urban expansion and land use and cover change (LUCC) studies are a key knowledge of efficient local governance and urban planning and a lot contributing to the future sustainable development of the city. The main goal of the paper is to model a future urban spatial expansion by 2029 and 2039 of Darkhan city using Landsat TM satellite imagery (land use and cover change map of 1999, 2009, and 2019) and multivariate logistic regression model.

LUCC studies' Clark Lab's (Clark University) IDRISI TerrSet software applied for the urban expansion prediction and the correlation between expansion and driving factors.

On account of multivariate logistics regression modeling, eight physical factors influencing urban expansion identified to predict urban expansion. Where are: a distance to a main active economic center; the distance from the built-up area; distance to the nearest urbanized area; distance to the educational area; distance from the road; the slope; the elevation and the population density. The regression statistic accounted for the probability of future urban expansion was significant and positive.

Overall, the LUCC was estimated that the transition of natural cover to impervious surface in Darkhan city during the study period.

Our result estimates note an increase in the total land area (9980.66 ha) of the Darkhan city the built-up area by 1.3% and 0.5%; slum (ger) area by 4.03% and 4.08%; mining area by 0.5% and 2.9%; the industrial area by 1.3% and 0.8%, while indicated decrease of the pasture land by 2.2% and 2.19%; open space by 4.9% and 6.4% during the period 1999-2009 and 2009-2019 respectively, represents LUCC were characterizing by external transformation from natural to urban area.

According to the future scenarios of 2019-2029 and 2029-2039, the expansion of the built-up and slum area would be spread significantly into the open space and pasture land.



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1489-LAND USE COVER CHANGES IN COZIA NATIONAL PARK ROMANIA

Alexandra Vrinceanu¹, Monica Dumitrascu¹, Ines Grigorescu², Roxana Cuculici³

Institute of Geography Physical geography Bucharest-Romania¹ Institute of Geography GIS and environmental geography -Romania² Faculty of Geography Regional and Environmental Geography -Romania³

Cozia National Park is located in the Southern Brach of the Romanian Carpathians and covers an area of 16.677 ha. According to the Ministry of Environment, Water and Forests, it includes large areas with virgin and quasi-virgin forests totalling nearly 24,000 ha. The current paper is aimed at targeting 3 main research objectives: (1) to assess the main land use/cover changes (2) to identify the key driving forces of change and relate them to the land use/cover changes and (3) to sort out and propose the best solutions for conservation under the landscape dynamics the area is subject to. The study is seeking to analyse the temporal and spatial changes of the main land use/cover categories in Cozia National Park in relation to the political and social factors: grazing, agriculture, tourism, deforestation and management (Natura 2000). The reduction of agricultural areas is also visible in the Cozia National Park. If in 1990 the lands were predominantly agricultural mixed with natural vegetation, in the following years they were replaced by a transitional areas with shrubs or mixed forests that were strongly affected by deforestation. The research relies on the GIS interpretation and analysis (using the Patch Analyst) of the CLC data 1990, 2006, 2012 and 2018 from Copernicus database. The statistical interpretation of the resulting figures will be performed in the R software, based on the following indicators: (i) Binary Model (ii) Markov Model and (iii) Hotspot Analysis. Land use/cover changes in protected areas are critical in understanding the spatial dimension of landscape dynamics, and the resulted environmental disturbances (e.g. habitat fragmentation, watershed protection, land degradation) in order to perform further evaluations on ecosystem services (e.g. carbon storage, climate regulation), risk assessment etc.

1629-FOREST COVER CHANGES IN ROMANIA IN THE POST COMMUNIST PERIOD

Monica Dumitrascu¹, Gheorghe Kucsicsa², Elena-Ana Popovici², Ines Grigorescu², Bianca Mitrica³, Cristina Dumitrica¹, Dan Balteanu¹

Institute of Geography, Romanian Academy Physical Geography Bucharest-Romania¹ Institute of Geography, Romanian Academy Environment and GIS mondy_ghe@yahoo.com-Romania² Institute of Geography, Romanian Academy Human Geography and Regional Development biancadumitrascu78@yahoo.com-Romania³

In Romania, the socio-economic and political transformations in the post-communist period (after 1990) marked the beginning of a new, transitional period towards the market economy and a new stage in the evolution of all economic branches. During this complex period, land use was subject to significant spatial changes and implicitly the forest cover. The retrocession of forest land generated a large number of owners with small forest plots and the uncertainty of maintaining these plots. In 2007, Romania's accession to the European Union provided a new framework for nature conservation and new land management regulations.

The current paper focuses on forest cover dynamics in post-communist period in Romania based on data derived from CORINE Land Cover Database. The study aims to examine and analyse the current forest pattern related to various associated driving factors. Four datasets of the CORINE Land Cover (available at the European Environment Agency) were used: years 1990, 2000, 2012 and 2018. The results show that over the past 30 years, forest land registered significant changes through deforestation or afforestation, especially in the hilly and mountain regions. The decreasing of forest area occurred in relation to various driving forces, but one of the significant was the illegal logging, especially on the privately-owned forest lands. On the other hand, the expansion of the forest-covered area is primarily due to natural regeneration. This process unfolded largely on deforested terrains, but also on abandoned farmlands, pastures which developed in the wake of declining shepherding.

The outcomes of this study could be useful for decision makers to adopt appropriate land use planning and environmental policy measures in agreement with the sustainable development goals.



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1648-MODELLING URBAN DYNAMICS AS DRIVING FORCES OF LAND USE CHANGE IN PORT CITIES

Aditya Tafta Nugraha¹, Ben Waterson¹, Simon Blainey¹, Frederick Nash²

University of Southampton Transportation Research Group Southampton-United Kingdom¹ University of Southampton Agents, Interactions, and Complexity Research Group -United Kingdom²

The urban environment is a complex system where general urban morphology patterns emerge from local interactions of many human and natural agents. The nature of these individual interactions is difficult to examine from empirical data due to their auto-correlation and to path-dependence in the evolution of urban systems. For the same reasons, calibrations of urban land-use and transport interaction models based on cellular automata (CA) often rely on manual methods. However, this paper shows that a gradient-descent algorithm can be used to calibrate an agent-based CA model of urban areas, wherein cells are characterised by the levels of each activity type they host rather than by categorical states representing only their dominant land-use. This automated process allows efficient calibration of the model for multiple urban settlements, enabling cross-sectional analysis of whether an observed relationship is unique to a settlement due to its path-dependence, or has similarities with results from other settlements.

This paper uses the model to investigate the nature of urban dynamics within port-cities by examining the interactions between geographic features, land-use, and transport in 46 port-based settlements and 10 non-port settlements across Great Britain. It shows that port activities had most pronounced effects on smaller settlements, with urban dynamics in larger settlements affected little by the presence of port. There were though variations in urban dynamics between larger settlements with respect to the effects of their retail and manufacturing activities on other land-use. The automated calibration of agent-based urban CA models in this paper enabled the quantification of these interactions in multiple settlements, providing the ability to look beyond the uniqueness of individual case studies to find general patterns of interaction. This study therefore provides important insights into the driving forces of land-use changes in port-cities which could help facilitate future sustainable transport and land use development.



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VIRTUAL

2075-Conversion of arable lands to abandoned lands and vice versa as examples to simulate of the soil organic carbon dynamics

Olga Sukhoveeva¹, Irina Kurganova², Valentina Lichko²

Institute of Geography RAS Laboratory for anthropogenic changes in the climate system (LACCS) Moscow-Russia¹ Federal Research Center "Pushchino Scientific Center for Biological Research RAS" Institute of Physicochemical and Biological Problems of Soil Science Laboratory of nitrogen and carbon soil cycles -Russia²

Land use changes (LUC) significantly affect the carbon balance in ecosystems. The study was aimed to determine the dynamics of soil organic carbon (SOC) under anthropogenic LUC using the RothC model. Field data was obtained at experimental plots (Luvic Phaeozem) in Moscow region. The research consisted of two parts.

1. The solution of the direct problem of modeling: to calculate SOC losses after recultivation of abandoned lands with standard parameters of transformation.

Input data included both own experimental and literature data. It was shown that SOC is accumulated only under perennial grasses because their biological features and agrotechnology are similar to native grasslands (fig. 1). The highest losses of SOC were common for annual grasses and barley due to the short vegetation period, small amount of plant residues, and inputted fertilizers.

SOC losses were minimal under pasture crop rotations with perennial grasses and maximal under rotations with row crops through intensive tillage (fig. 2). The rate of SOC losses from old abandoned lands was higher than from young ones due to low content of decomposable carbon in the last one.

2. The solution of the inverse problem: to correct coefficients in the model's formulas if field data on SOC sequestered during the reforestation of arable lands is known.

Carbon pools in abandoned lands of different ages were determined in our previous studies. The average values and the medians for all carbon pools were calculated: input plant residues (IPR), CO₂ emission, microbial biomass (Cmic), decomposable (DPM) and resistant (RPM) plant materials, and SOC. Using this data, the annual carbon balance in soils was calculated. The input parameters to simulate the SOC dynamic in abandoned lands during the reforestation were also corrected (table).

This study was supported by RFBR grant 18-04-00773a and fundamental research theme of IGRAS 0148-2019-0009.



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2430-REGIONAL TRENDS IN POST SOCIALIST DYNAMICS OF LAND COVER USE CHANGE

Igor Sirodoev¹, Natasa Vaidianu¹, Andrei Schvab¹, Mirela Paraschiv¹, Irina Florea-Saghin¹, George Secareanu²
*Ovidius University of Constanta Natural Sciences Constanta-Romania*¹ *University of Bucharest CICADIT - Interdisciplinary Center for Advanced Research on Territorial Dynamics -Romania*²

Background

On the global level, three types of drivers impact land use/cover changes: natural, economic and historical factors. In post-socialist countries natural conditions are quite various: from mountain peaks to large low plains. However, socialist past and economic transition to market economy are common drivers to all post-socialist countries. Combination of these three groups of factors have a strong regional impact, creating 'regions of changes'. Each region has its own configuration and main driving force. In our study we try to identify common (and long-term) patterns and driving forces in land-use changes for all post-socialist EU countries.

Materials and methods

Our analysis is based on both literature review and regional analysis based on Corine Land Cover Change data for the period 1990-2018, using the methodology already approved in our previous study (Petrisor, Sirodoev & Ianos, 2020). In order to identify spatial patterns of changes: LUCC are generalized by square grids small enough to have their area close to Local Administrative Units (LAU-2) of the participating countries. Regions are identified using 'dbscan' method implemented in R statistical environment. Further statistical analysis of the obtained regions will result in identification of the drivers, which significantly contributed to their creation.

Results

Several types of regions are expected to be identified, depending on main driving forces behind their creation: urbanization, deforestation, agricultural abandonment etc.

Conclusions

Our methodology applied in Romania, have shown predominance of two driving forces of LUCC at regional level: deforestation and urbanization. We expect that at the level of all post-socialist countries we will find same forces, as well as a few new ones (such as dezindustrialization and agriculture abandonment).

Reference:

Petrisor I., Sirodoev I., Ianos I. (2020). Trends in the National and Regional Transitional Dynamics of Land Cover and Use Changes in Romania. *Remote Sensing* 12(20): 230. doi: 10.3390/rs12020230

2675-The Spatial Pattern Analysis of Urban Expansion on Jakarta Bandung Mega Urban Region (JBMUR)

Ernan Rustiadi¹, Andrea Emma Pravitasari¹, Setyardi Pratika Mulya², Zahra Kartika³, Siti Wulandari²
*IPB University Center for Regional System Analysis, Planning and Development (CrestPent) Bogor-Indonesia*¹ *IPB University Soil Science and Land Resource setyardipratika@gmail.com-Indonesia*² *IPB University Regional Planning Science zhrakartika6@gmail.com-Indonesia*³

Jakarta Metropolitan Area and Bandung metropolitan are increasingly connected to become a mega-urban region through the formation of a urban corridor known as the Jakarta-Bandung Mega Urban Region (JBMUR). The expansion of the built areas in the JBMUR continuous to grow on the suburb of Jakarta and Bandung cities such Bogor, Bandung, Cianjur, Bekasi, as well as Purwakarta. The impact of the continued expansion of uncontrolled urban areas in the region is the conversion of rice fields in some of the major food production centers and the shrinking of high ecological functioning areas. The objective of this study are to analyze the land use/cover changes pattern occurred between 2005 until 2015 in JBMUR. This research used secondary data consisting of Land Use map in 2005 and 2015 from the National Land Agency (BPN) and statistics of villages level from the Central Statistics Agency (BPS). The Fragstat's spatial statistics approaches were employed to quantify the spatial pattern urban expansion characteristics. The Rustiadi's spatial clustering (quantitative zoning) method was applied to formulate some scenarios of zoning for regional policy in managing this megaurban region. The study has able to characterized some spatial pattern urban expansion as combination of relation between physical characteristics, spatial distribution, land cover, population density, village facilities, and location of villages. The spatial clustering analysis has formulate some scenarios of zoning which consist of two metropolitan city cores, urban as well as rural suburban zone. Every spatial zones is a homogenous and contiguous connected areas which should threats and managed in similar approaches and governance system.



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3181-DRIVING FORCES OF LAND USE CHANGE AND LIVELIHOOD DYNAMICS IN THE URBAN FRINGE OF VARANASI METROPOLITAN CITY INDIA

Divyanshu Kumar Dixit¹, Sukhpal Singh¹

Indian Institute of Technology Roorkee Humanities and Social Sciences Roorkee-India¹

This paper aims to find out driving forces of land-use dynamics their impacts on the livelihood of the residents of the urban fringe of Varanasi metropolitan city. This research adopts a blended approach, to fulfil the objectives of the study, consisting of geospatial analysis and ground verification of the geospatial outcomes using home schedules and group discussion. Geospatial analysis, to carry out land-use change detection, is based on the Landsat (TM) 4-5 and Landsat 8 imagery as well as Night-Time Light data for the year 1991 to 2015 and follows supervised classification method. We have surveyed 100 households in the year 2014 to verify geospatial outcomes and explored driving forces of land-use change and their impacts on livelihood on the residents of the study area. This study finds the drastic land-use change in the urban fringe as built-up land shows continuous growing pattern by increasing 31.27% and 34% from 1991 to 2001 and 2001 to 2015 respectively. On the other hand, agricultural land as well as water bodies present unremitting decreasing pattern by declining 19% and 14% respectively. Social drivers like home expenditure, gambling as well as liquor consumption, dowry, education, and economic drivers like low agriculture productivity, visa for gulf countries, indebtedness, real estate are the main factors behind conversion of the agricultural land. Analysis of primary survey reveals that factors like 'home expenditure' are dominating as 54% of the total agricultural land sellers are the marginal farmers having land less than 0.203 hectares. After losing their land, residents are shifting towards other means of livelihood sources like casual labour (30%), cottage industry (12%), shopkeepers (10%) and vendors (7%). Present study purposes of providing substantial elements for the land-use policymakers to carry out better planning in the urban fringes of cities in the developing countries like India.

3232-Rural Development and Land Use Changes in Russia Regional Approach

Alexey Naumov¹

National Research University - Higher School of Economics, Institute for Agrarian Studies Department for Rural Development Studies Moscow-Russia¹

Rural development causes significant changes in land use in the present-day Russia. Many rural areas are abandoned, while the other ones suffer intensive agricultural development. Our research includes a study of rural territories of Russian Federation at three levels of administrative division of the country - large regions, municipalities and rural settlements. Several variables were applied for reveal different types of rural development, being very important ones those associated with land use features. As the maps we have composed show, sharp contrasts between European and Asian parts of Russia and between the northern and the southern regions of the country are noticed. Within most of large regions, the core-periphery pattern in land use and social and economic development is highly expressed. The main driving forces, influencing geographical differences in land use and rural development, are the proximity to the cities and other features as, demographic and ethnic structure, seasonality of economic activities, land tenure structure and specialization of agriculture. Regional policy of the state and rural development policy in general also plays an important role. As to the dependence on natural conditions, their influence could not be determined as decisive and direct, even being obvious the contrasts between extremely harsh and mild environment. Analysis of statistical data from population, agricultural censuses and other data sources was completed by case study of several regions: the Republic of Karelia in the north of European Russia and Bryansk oblast in its south, and the Republic of Sakha (Yakutia) in north-east of Eurasia. In all these regions we conducted field studies, which enabled to detect and explain modern trends in rural development and land use changes.



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3245-LANDSCAPES CREATED BY THE SUGAR INDUSTRY

Raisa Gracheva¹, Igor Zamotaev¹, Yulia Konoplyanikova¹, Elena Belonovskaya², Natalia Telnova³

*Institute of Geography of Russian Academy of Sciences Soil geography&evolution Moscow-Russia*¹ *Institute of Geography of Russian Academy of Sciences Biogeography belena@igras.ru-Russia*² *Institute of Geography of Russian Academy of Sciences Cartography telnova@igras.ru-Russia*³

In the regions of sugar industry are large areas affected by sugar production waste rich in lime and organic residues. However, the influence of the sugar industry on changes in local landscapes over the centuries has hardly been studied in the world. In Russia, the production of sugar from sugar beets was widespread from the 16 century, and the industrial sugar production began in the early 19th century occupying large areas. In the 20-th century, modernization of processing technologies has led to the reducing sugar waste. Sites of sugar waste accumulation abandoned 50 years ago were studied in the Chernozem zone of Russia. Over the years, specific landscapes unusual in the study area have formed. Sumps turned into ponds seasonally flooded and dried and covered with dense thickets of reed; they occupy large areas on the watersheds among the arable lands. The dense thickets of highly invasive maple specie (*Acer negundo*) occupy the former dumps and landfills. The spreading of this maple leads to a significant change in ecosystems, up to the complete displacement of indigenous species, and the deterioration of the animal feed base. The soil mantle is complicated by new formed strongly alkaline soils (Technosols, Anthrosols) under reed beds, in the remediated and no-remediated landfills and fields irrigated with sugar mills' wastewater in the past. Measures show that these new landscapes and soils contain large amounts of organic carbon and are potential sources of carbon dioxide emissions. Chronological sequences of newly formed landscapes with invasive biota that changed the pattern of land cover are revealed using satellite images.

Researches were supported by the Russian Foundation for Basic Research, project № 19-29-05025-mk.

3254-Nine Years since the Great East Japan Earthquake Tsunami Disaster – Lessons about land use changes

YUKIO HIMIYAMA¹

*Hokkaido University of Education Geography Asahikawa-Japan*¹

Large scale disasters are becoming increasingly important driver of land use changes, not only of short-term, but also of more permanent. It is particularly so in Asia, where large scale disasters are more common than in the rest of the world. It is important for the Global Land Programme (GLP) to pay just attention to it.

The gigantic earthquake/tsunami that hit the Pacific coast of North-East Japan on 11th March 2011 devastated huge coastal areas and their hinterlands. The disaster, known in Japan as Higashi Nihon Dai Shinsai, or the 'Great East Japan Earthquake Disaster' in English, is far from over in many parts of the disaster areas even nine years after the quake and the tsunami. The paper focuses on the changes of land use in the disaster areas in Iwate Prefecture, Miyagi Prefecture and Fukushima Prefecture, i.e. the three most severely hit prefectures.

The damages on the land and its use caused by the earthquake and the tsunami, both directly and indirectly, were extremely serious in those areas, and the land use changes there since 11th March 2011 have been diverse regionally and temporarily. The destruction of Tokyo Electric Power Company (TEPCO) Fukushima Daiichi Nuclear Power Plant by the earth quake and the tsunami, and the radioactive contamination that followed were particularly serious, and full recovery or re-vitalization of the stricken areas is still far beyond scope in much of those areas.

The paper identifies notable land use changes and their processes with diverse drivers, socio-economic and historical backgrounds, and physical settings. Tens of thousands of geo-referenced photographs of the disaster areas taken by the present writer have been used for the comparative analyses. There are many important lessons concerning land use changes in those areas in local, regional and global contexts, which the paper intends to discuss.



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3542-Landscape fragmentation types caused by urban sprawl in surrounding zones of Central European regional centres

Tamás Hardi¹, Jenő Zsolt Farkas², Edit Hoyk², András Donát Kovács²

Centre for Economic and Regional Studies Institute for Regional Studies West-Hungarian Research Institute Győr-Hungary¹

Centre for Economic and Regional Studies Institute for Regional Studies Great Plain Research Department -Hungary²

Examining the urban sprawl around middle-size cities in Hungary and Central Europe, we should see both sides of this process, on the one hand, the rural change process in the surrounding zones characterized by counter-urbanization, and the other hand the process of suburbanization characterized by residential out-migration and at the same time by immigration from the rural areas. These processes have intensified in the former socialist countries after the 2000's and it didn't treat a number of problems, which have become apparent during the eighties and nineties in Western countries. A fast urban sprawl took place with a low level of special control and planning but under the pressure of economic and financial development. The extent of spatial growth often exceeds the rate of population growth, it is taking place even in the lack of population growth. In our research Romanian, Hungarian, and Slovak regional centers and their surroundings were assessed by GIS methods to define their forms and types of expansions. The examination of the transition of land cover and settlement-structures was done by the analysis of aerial photos (orthophotos), CORINE surface coverage database, and land register maps. Auxiliary on-field data records were used to help us make decisions in issues where maps and photos do not provide enough information. Based on these we detected different area types from the aspect of the urbanization process in the research areas. These types reflect the nature and intensity of the urban functions, the physical built-up and appearance moreover the extent and age of occurred changes. In this assessment different physical typologies of urban expansion were defined and analyzed together with historical, social, and economic features of these urban areas creating a combined model to understand these processes. This research is supported by the Hungarian National Research, Development, and Innovation Fund.



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C.24. Land Use and Land Cover Change Land cover land use and its change data-valuable source of information about landscape dynamics

1028-Land cover change analysis and impacts of deforestation on the climate of District Mansehra Pakistan

Faiza Sarwar¹, Dania Amjad¹, Sumaira Kausar¹

University of the Punjab Geography Lahore-Pakistan¹

In this study, district Mansehra, Pakistan was chosen as the study area. The main objectives of this research are to assess the extent and the changes in the rate of deforestation in Mansehra since past 20 years. It also examines the impacts of deforestation on the climate by establishing and mapping the magnitude and rates of land cover changes that had occurred in the study area. Landsat satellite images were taken as secondary data and they were foremost for the classification process. Remote sensing data together with GIS techniques have made it conceivable to display and oversee remotely detected information in various scales. The images taken for classification are Landsat 5 TM for the year 1998 and 2008 and from Landsat 8 OLI/TIRS TM for the year 2017. Climatic data from 1988 to 2017 was collected from Pakistan Meteorological Department (PMD) of Mansehra District. The Forest Cover was 14% (601 Sq. Km) in 1998, 15% (668 Sq. Km) in 2008 and 5% (194 Sq. Km) in 2017. Taking everything together, anyway the results exhibit that some land cover types experienced extending rates and sizes of changes however in the others the inverse is legitimate, results revealed that the size and the rates of land cover changes for forest areas experienced an exceptional fluctuations in these 20 years. Maximum temperature of Mansehra increased at an alarming rate from 25.82°C in 1988 and 24.8°C in 1998 to 25.667°C in 2008 and 27.304°C in 2016 and 26.739°C in the year 2017. Mean minimum temperature showed fluctuation of 1° during these 30 years. In some years mean minimum temperature showed decrease from 12° to 11° and this change is not confined to a specific year.

3156-CHANGES OF URBANIZED LANDSCAPE IN SELECTED FUNCTIONAL URBAN AREAS OF CZECHIA ASSESSED BY URBAN ATLAS DATA AND CADASTRAL STATISTICS

Ludek Krticka¹

University of Ostrava Human Geography and Regional Development Ostrava-Czechia¹

The paper analyzes the land cover and land use (LUC) change in three Czech functional urban areas (FUA): České Budějovice, Hradec Králové and Ostrava. The selection of these FUAs was made with regard to differences in size, historical development, position within the state, settlement structure and economic base. Urban Atlas (UA) data and cadastral statistics data for period 2006 – 2012 were used to analyze landscape change and to demonstrate main differences between these two datasets. Moreover, land cover flows were analyzed using UA data to identify the main processes that have taken place in each FUA. The results identified divergent and also coincident general trends in LUC in both data sets. Results showed that most urbanization occurred on agricultural land, with similar causes but different extent between studied FUAs and used data sources (losses of agricultural land ranging from 200 to 2,000 hectares). The main identified processes were sprawl of economic sites and infrastructures and urban residential sprawl. Only the FUA Ostrava recorded decline more than 200 ha in built-up areas (based on cadastral statistics) despite the urban sprawl in the hinterland of cities. Such decline can be attributed to the impacts of economic transformation and extensive reclamation processes in former hard coal mining areas. The resulting differences between UA data and cadastral statistics stem mainly from the different methodology of data collection, inconsistency between the legal status (registration of land type in the land register) and the real state of the area in the landscape. Despite these problems, coupling of UA data and cadastral statistics seems to be valuable for assessing the direction of development of urban areas as landscape dynamics can be assessed from two independent sources.



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3607-Aesthetical Perspective of River Ganga dynamics in Patna Bihar (India)

Khushbu Sharma¹

*Jawaharlal Nehru University Center for the study of Regional Development New Delhi-India*¹

The concept of environmental aesthetics reflects the shared interest of the landscape by the human in an area that focuses on human-environment relation. Aesthetical evaluation plays an important role in the planning and restoration of the natural environment specifically in an urban area. Patna is one of the ancient cities located on right levee bank of Ganga. The area occupies a part of Ganga- Sone fluvial region of Mid Ganga Plain. The area is a zone of paleo-channels and braided stream forming River Island and mid-channel bars. The objective focuses on the loss of aesthetic due to lateral shifting of River Ganga in the study area. The analysis was done using the techniques of supervised classification for Land use and Land cover mapping (1988-2019) and Change detection techniques using Landsat 5 & 8 data in ArcGIS and ERDAS IMAGINE environment. The narratives collected from the primary survey reflects the perception of people about the change in river dynamics and related aesthetics as well as the socio-religious impact of the interplay of the river and the city. Obtained results from the analysis show a rapid expansion of the built-up area with +160.98 % change. The river dynamics in the area shows the lateral shifting of the River Ganga towards the north, emergence of the Lateral bar and mid-channel bar and the change in the confluence zone of River Gandak and River Ganga with a shift of up to 4 kilometres towards the north. All these changes have affected the villages located in the near tributary bar and at the river island. Discharge of untreated sewage water, absence of dredging, heavy embankment restricting natural channel adjustments and Bridges constructions. There has been a tremendous expansion of the built-up area along the riverfront of Patna in the last 30 years.

C.24.Land Use and Land Cover Change Long term land use and land cover changes

2513-Analysis of Land Cover and Landscape Pattern Changes Based on Historical Maps a Case Study of Shanghai Chinese Government Areas in the Modern Period (1843-1949)

HAI CI¹, QINGJI SHEN¹

*Tongji university urban planning Shanghai-China*¹

Quantification is a new trend in the international study of urban historical ecological environment. Especially the use of geospatial technology to deal with historical maps is of great significance to the scientific and quantitative study of historical ecological environment. The modern period (1843-1949) saw the most rapid development of Shanghai, during which Shanghai rapidly grow from an ordinary city to the largest metropolis in modern China. However, the rapid development of urbanization also brings about drastic changes in urban land cover, which also has a significant impact on the original ecological environment and landscape characteristics. Based on the modern period (1843-1949), Shanghai Chinese government areas as an example, the use of spatial analysis and geographic visualization technology, in 1843, 1862, 1901, 1918, 1928, 1937, 1949 seven years of the history of Shanghai Chinese government areas map calibration and comparison, to the modern period (1843-1949), Shanghai Chinese government areas of land cover changes in quantitative analysis. This paper also analyzes the changes of landscape pattern in modern Shanghai Chinese government area from three aspects: landscape characteristic index, landscape heterogeneity index and landscape spatial relationship index. Through comparison of historical documents and analysis of society-environment-economy coupling factors, this paper analyzes the main driving forces of land cover change and landscape pattern evolution in modern China. It can be found that the changes of land cover and landscape pattern in the modern period (1843-1949) of Shanghai Chinese government areas can be roughly divided into four historical stages, and the characteristics and driving factors of each stage have their own specific backgrounds.



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2600-Long term land use changes research - an overview

Matej Gabrovec¹

ZRC SAZU Anton Melik Geographical Institute Ljubljana-Slovenia¹

Land use reflects a complex correlation between natural, historical, and socioeconomic factors. Land use constantly changes, which is seen in the changing of land categories or their relative proportions. Land-use changes are an important aspect of the historical relationships between society and space. Without adequate information on the changes, it is difficult to identify their drivers. Registering the changes is a demanding and expensive task, and therefore a universal methodology has not yet been advanced. The objective of the International Geographical Union Commission on Land use and Land cover change is to promote the study of land use/cover changes throughout the world as a geographical research focus. Emphasis is put on the research projects that can lead to national and international level outcomes. Unfortunately, in many countries land-use change studies are available only on the level of individual case studies, which make it possible to identify individual processes, but do not allow determination of patterns on country level. The availability of historical data differs from place to place, but 100 years is regarded as reasonable timespan to cover most of the countries and regions, but also historical materials going back as far as the 18th century or even further are available. Relevance of various historical data sources, including maps, cadastres and statistical data are discussed. The effort of land-use change mapping in different regions of the world has been documented in atlases published under the umbrella of Land use and Land cover change commission. Research gaps have been identified and some future work proposals have been made.

3470-LAND USE CHANGES DURING DIFFERENT SOCIO ECONOMIC AND POLITICAL SYSTEMS IN THE POLISH WESTERN CARPATHIANS FROM 1846 TO 2019

Anna Bucala-Hrabia¹

Institute of Geography and Spatial Organization PAS Department of Geoenvironmental Research Kraków-Poland¹

The objective of this study was analysis of the long term land use changes in three catchments located in the foothill and mid-mountain of the Polish Western Carpathians in 1846-2019. The investigated period covers three socio-economic systems with different frequency of driving force caused changes in land use: (1) Free market economics including the Habsburg Empire to World War II; (2) Communist period with centrally planned economic; (3) Free-market economics after 1989. The analysis of aerial photographs and socio-economic data indicates that land use changes have been greatly influenced by natural conditions as well as by general or local driving forces in different types of socio-economic and political systems. A common feature of land use structure was a lower contribution of forest and a higher contribution of cultivated land as well as a higher population density in the foothill catchment compared to catchments in the mid-mountains with less favorable environmental conditions for agriculture development. During the investigated period, the forest area increased by 34-72%, with a continuous decrease of the cultivated land by 91-98% in the three catchments. The first period was characterized by slow dynamics of land use change with a high fragmentation of the agricultural land and the lowest contribution of forest area in this catchments. In the communist period was observed gradually increased forest cover parallel to decreased cultivated land. In the last period was observed rapid dynamic of land use changes. The largest decrease of cultivated land and increase of forest occurred just after the collapse of communism.



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3676-Modeling the impact of urbanization on land use change in Bahir Dar City Ethiopia An integrated Cellular Automata Markov Chain approach

Melaku Bogale Fitawok¹, Ben Derudder¹, Amare Sewunet Minale², Steven Van Passel³, Enyew Adgo⁴, Jan Nyssen¹

Ghent University Geography Gent-Ethiopia¹ Bahir Dar University Geography and Environmental Studies amare1974@gmail.com-Ethiopia² University of Antwerp Engineering Management Steven.VanPassel@uantwerpen.be-Belgium³ Bahir Dar University Natural Resource Management enyewadgo@gmail.com-Ethiopia⁴

Rapid urbanization has provided the context for some of the most prominent socio-economic evolutions in recent decades, with above all many developing countries in Africa urbanizing at neakbreak speed. This fast-paced urbanization entails that many regions are facing seemingly uncontrolled land use changes (LUCs) that go hand in hand with a range of environmental and socio-economic challenges. In this paper, we use an integrated Cellular Automata-Markov Chain (CA-MC) model to analyze and predict the urban expansion and its impact on LUC in the city of Bahir Dar, Ethiopia. To this end, the research marshals high-resolution Landsat images in 1991, 2002, 2011 and 2018. An Analytical Hierarchy Process (AHP) method is then used to identify the biophysical and socioeconomic factors underlying the expansion in the research area. It is shown that, during the period of study, built-up areas are rapidly expanding in the face of an overall decline of the farmland and vegetation cover. Drawing on a model calibration for 2018, the research predicts the possible geographies of LUC in the Bahir Dar area for 2025, 2034 and 2045. It is predicted that the conversions of other land use types into built-up areas will persist in the southern, southwestern and northeastern areas of the sprawling city, which can mainly be traced back to the uneven geographies of road accessibility, proximity to the city center and slope variables. We reflect on how our urban densification findings can be geared to the sustainable urban development of and land use policies in the Bahir Dar area.



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C.26. Latin American Studies The Bicentennial of Independence and the Challenges of Latin America Today

1644-INDIGENOUS IDENTITIES AND RESOURCE ACCESS AMONG QUINOA PRODUCERS IN RURAL ECUADOR

Sumac Cardenas Oleas¹

*Iowa State University Sociology Columbia-United States*¹

Colonial and postcolonial practices in Latin America historically pushed Indigenous people into rural isolated areas with limited access to resources, crucial for their agricultural production. The isolation and marginalization contribute to their poverty and decrease their quality of life. Programs and projects that advocate for the well-being of Indigenous groups and reduction of rural poverty often focus on agricultural production as it is one major source of income and employment in rural areas. One economic strategy among Andean nations, especially in Ecuador, is the production of quinoa as it is an ancient Indigenous crop naturally grown in the Andes and with high global demand, which increased after the 2013 International year of Quinoa. Research on the social impacts of quinoa production among small-scale producers in Ecuador is limited and deserves further scholarly attention, particularly as Ecuador is the third largest exporter of quinoa worldwide, after Peru and Bolivia.

This project focuses on Indigenous producers in the province of Chimborazo, the largest quinoa producing province with the highest concentration of Indigenous people in the Andes of Ecuador. The participants of this study include Indigenous men and women who are members of an Indigenous quinoa Organization in Chimborazo. While research shows that limited access to resources in agricultural production, such as land and water, is a prominent issue faced by Indigenous people in rural Ecuador, limited studies investigate resource access as relates to quinoa production, an Indigenous crop with global demand. Thus, this study helps fill a gap in the scholarly literature. The research uses a qualitative case study methodology and includes data in the form of (42), focus groups (3 sessions), field notes, observations, and organizational documents collected over 5 months in 2018.

2046-OVERCOMING THE “COLONIALITY OF DOING” IN INTERNATIONAL LAW THROUGH SOFT LAW SOLUTIONS FOR FOOD INSECURITY

Tatiana Cardoso Squeff¹

*Federal University of Uberlândia Law School Uberlândia-Brazil*¹

Law, as a set of norms designed to regulate social life, is a field of difficult change, since it is always behind its time (OST, 2001). In international law, a branch of law, it is even more difficult. This happens because they are restricted by the limits of their positivist normative structure, formulated not only by proposals from countries that hold the power of the military/economic force in the international arena, but also in a modern/colonial historical moment that guarantees their legitimacy (RAJAGOPAL, 2003). Therefore, it is extremely difficult to have rules that contemplate the desires of the Third World. Thus, what seems to exist is that in addition to the colonialities of power, knowledge and being, there is still the 'coloniality of doing', that is, how to proceed in situations where changes are required for normative evolutions/transformations. Hence, this paper addresses this debate, which is precisely 'how to act' in order to modify the rules at the international level, since those existing today have a high coloniality burden and will hardly be altered by the currently accepted formulas. To this end, the role of soft law will be addressed as a decolonial tool capable of solving the existing impasse. As an example, the problem of food security - a typical Global South issue - will be used as an example, as it is an area where typical approaches from the Global North did not seem to overcome it whereas the Global South solutions, through soft laws, although normally neglected because of its "southern" origins, have showed great improvements.



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3650-Pioneer local and regional development in the Eastern Venezuela and the Guainas

ANNE PENE-ANNETTE ¹

Université des Antilles AIHP-GEODE laboratory SCHOELCHER-Martinique ¹

The concept of pioneer territories is still very important to analyze the territorial evolutions since the early 2000s, as a fundament for territorial planning in Latin America.

In the case of pioneer territories and emerging cities arising from mining (minerals, hydrocarbons) in Latin America, as in other developing countries, (some become heavy industrial cities), dynamics related to further integration, often brutal, to globalization (and its hazards) also overlap. Thus, because of the very high dependence of mining and energy activities in global commodity prices, the actors in the governance of in general small and medium towns are caught up in the economic mechanisms that they don't control or, conversely, may find themselves blocked. Furthermore, uncontrolled urban growth is accentuated due to the influx of migrant population, attracted by a new "The Golden" ("El Dorado").

In the case of Venezuela, the economic development linked with pioneer territories is focused in mining extraction and heavy industry since the 60's. This reality has envisioned a fundamental change of Venezuelan society, politically and ideologically, but also regarding its organization and territorial dynamics.

In the Greater East of Venezuela, since the 2000s, the territorial dynamics between Oriente (north east Caribbean coast of Venezuela) and the Venezuelan Guayana are connected to the Orinoco Socialist Project (PSO) that has been a key component of the development plan for the «Orinoco Belt» (FPO), which occupies the south eastern strip of the Orinoco river basin. It's based on the exploitation of heavy petroleum.

In this context, to realize an harmonious development is a strong defite while the deindustrialisation and the difficulties to propose an alternative of "petroleum development" are intensified in Venezuela.

This economic situation is combined with a geopolitical context where the Essequibo territory is considered as a new "El Dorado" for Venezuela and Guyana.



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C.27. Local and Regional Development Dilemmas of regional and local development

1367-A pass to enrich related variety Assisting programs for local small and medium sized firms and volunteer study groups by firms through a case study in Kagawa Japan

Atsushi Taira¹

Kagawa University Faculty of Education Takamatsu-Japan¹

In recent economic geography, 'related variety' of firms has become a critical concept to explain factors for local industrial growth. This study examines the assisting measures for small- and medium-sized firms (including new start-ups) by the local governments and related agencies, and the importance of group-learning initiatives by volunteer firms in Kagawa. The study concludes that bridging these initiatives is critical to enrich related variety of firms at the local level. In Japan there are many assisting programs for local firms by relevant public and private agencies. In Shikoku, Shikoku Bureau of Economy, Trade and Industry, a local agency of the national government in Takamatsu, has a forum for starting foreign direct investment for local small- and medium-sized firms. The 2018 winter forum was held together with the office of Kagawa Prefecture, Kagawa Industry Support Foundation, and the Kagawa office of Japan External Trade Organization. Kagawa Industry Support Foundation, located in southern Takamatsu established in 1984, aims to perform assisting measures to create new industries and to strengthen management basis of local firms. For new start-ups, the foundation gives financial assistance and holds a competition for good practices. On the other hand, there are learning groups by firms themselves. Kagawa Forum of Innovative Actions started as a small study group of local firms in the mid-2010s and held its 10th forum in December, 2019. The forum consists of a variety of firms in manufacturing and services, offering co-learning opportunities across industry. Each member firm is asked to report on its innovation practices during the past half year period at the forum. This requirement help each firm advance its business operations. An agenda for enriching related variety in the region would be creating channels between relevant public agencies and firms' volunteer learning groups.

1385-DILEMMAS AND CHALLENGES OF URBAN DEVELOPMENT IN ROMANIA

Ines Grigorescu¹, Gheorghe Kucsicsa¹, Bianca Mitrica², Monica Dumitrascu³, Ana-Elena Popovici¹, Irena Mocanu⁴
Institute of Geography, Romanian Academy Environment&GIS Bucharest-Romania¹ Institute of Geography, Romanian Academy Human Geography & Regional Development biancadumitrascu78@yahoo.com-Romania² Institute of Geography, Romanian Academy Physical Geography stefania_dumitrascu@yahoo.com-Romania³ Institute of Geography, Romanian Academy uman Geography & Regional Development mocanitai@yahoo.com-Romania⁴

In the past three decades, urban development in Romania has evolved under the challenges and dilemmas of the post-communist period (after 1990). The resulted political, institutional and socio-economic changes had caused significant spatial transformations, which included a variety of urban growth-related patterns. The paper is aimed to assess urban development in Romania after 1990 based on CORINE Land Cover (CLC) database, socio-economic statistics and environmental features. In relation to the associated political, socio-economic and decisional transformations, two intervals have been selected: 1990-2000 and 2000-2012. Taking into consideration the challenges and dilemmas of regional development and the way the socio-economic transformations have manifested regionally, the analysis was performed at two main spatial scales: national and regional (NUTS 2 level/ Development Regions). This enabled the authors to identify significant intra- and inter-regional differences of urban development. E.g. North-West Development Region registered the largest urban development (60.8%) mainly in relation to the extended suburbanization processes in the proximity of large and medium-sized towns, the renewal of former industrial sites, new foreign investments and the availability of land resources to be converted to built-up areas. The lowest share of urban development (45.1%) was recorded by the South-East Development Region, which, although holds some important towns with national-level industrial and services functions, includes large rural-agricultural and natural restriction areas with low accessibility to transportation and services, aging population and high unemployment rates. The papers main upshots provide important information on the detection and measurement of the urban development in terms of location, spatial extension and patterns in order to overcome territorial inequalities and support sustainable planning.



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1655-Reducing the clash between customary and state law in land readjustment as part of urban planning; the case of Arabs in Israel

Khamaisi Rassem¹

*University of Haifa Geography and Environmental Studies Koffer Kanna-Israel*¹

Traditional land regimes are often shaped to serve the agricultural community's needs. These land regimes, (registration, parcelation and formation) are based on, and consider customary laws and traditions. One of the impacts of urbanization is that it leads to urban sprawl of built up areas on agricultural land, which requires readjustment of the land parcels. Much of the land ownership in Arab communities is passed on through the generations and given large families, the land plots become smaller and smaller. Some of the inheritances are registered with the State, others are acknowledged through customary laws, making it difficult to meet modern urban planning needs according the State laws. These transformations, within the temporal, spatial and human frameworks, cause clashes between customary and state laws and regulation in the context of planning. This clash is fueled by geo-political, socio-cultural, ethno-national, economic and structural factors. Ignoring this clash leads to an increase of the conflict between the modern nation state, and the urbanized traditional community that requires urban planning to respond to its needs, particularly within the context of deep conflict between the state and the Arab Palestinian citizens in Israel.

This paper will shed light on the clash between the customary and state laws in multicultural and multiethnic national communities in modern nation states, by presenting and discussing this clash through preparing and authorizing urban planning among the Arab Palestinians in East Jerusalem and the Turan locality. The paper presents a theoretical framing of this clash, and a critical discussion on the context and implications for urban planning in relation to land regime. We suggest a toolbox to reduce this clash with implementation possibilities at both the municipal and state levels, considering the hybrid situation of communities in transformation from rurality to urbanity.

1771-AN INSIGHT OF URBAN RURAL RELATIONS IN ISRAEL'S PERIPHERY THE CHANGING PERCEPTION OF THE RURAL SPACE

Michael Sofer¹, Levia Appelbaum¹, Irit Amit-Cohen¹, Nir Cohen¹, Yardena Shaul², Irit Shmuel¹

*Bar-Ilan Geography and environment Ramat-Gan-Israel*¹ *Western Galilee Academic College Sociology Multidisciplinary -Israel*²

For many years the interaction between the the towns in the peripheral areas of Israel and the surrounding rural communities was characterized by a pattern of "separation of powers", manifested in separate organizational systems, economic inequality and social alienation, and almost no cooperation mechanisms. In the background of this phenomenon, was, among other concepts, the concept of a rural space as an independent developed space that relies on agriculture and independent organizational systems and that do not depend on the neighboring towns. In recent decades, the gaps between the two sectors have been narrowing and collaborations in various fields have begun to develop, both at the municipal level and among local residents. These processes are accompanied by a conceptual change of the nature of the rural space among officials in both rural and urban local authorities and the local populations.

The current collaboration between neighboring urban and rural authorities is based on the understanding that common interests require joint ventures as well as economic and social interactions between their residents. The changing perception of the rural space and its place in the regional system was examined in four case studies in the northern and southern periphery of the Israel. The key findings indicate that new conceptions are prevalent today in both the local leadership and residents regarding the nature of the mutual relationship, and thus regarding the role of peripheral towns as central places serving the entire region. This perception also indicates that the development process that the towns have undergone operates in favour of the rural communities.



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1777-Planning local development in Ukraine stereotypes contradictions nihilism

Eugenia Maruniak¹, Leonid Rudenko², Sergiy Lisovskyi³

*Institute of Geography, NAS of Ukraine Sustainable Development and Environmental Assessment Kyiv-Ukraine*¹ *Institute of Geography, NAS of Ukraine Cartography* l.gr.rudenko@gmail.com-Ukraine² *Institute of Geography, NAS of Ukraine Human Geography* salisovskyi@gmail.com-Ukraine³

Ukraine has begun to implement modern concepts of regional and local development planning with some delay relatively other EU countries and the first wave of strategies has not started until 2007-2008. The quality of documents, their innovativeness, environmental friendliness, and some problems reflected in them have remained questionable. The plans provided by different sectors are often inconsistent and do not meet state's international commitments.

The outcomes of international experience implementation are also ambiguous. Clearly the use of modern approaches and wide involvement of experts have remained as the advantages when preparing such strategies. On the other hand, the goals and objectives selection was often made through general patterns, leaving behind unique features of the territory, territorial capital. Many strategies present rather narrow understanding of environmental and social needs, with almost no spatial dimension. This makes Ukrainian communities vulnerable to challenges of national, macro-regional, and global scale.

Another problem was to get away from outdated traditions of the Soviet period. Among them top-down approach, prioritization of economic development, neglecting opinion of civil society should be mentioned. Planning practices still lack the principles of polycentricism, territorial cohesion; insufficient attention has been paid to the features of urban and rural development, remote and shrinking regions, cross-border cooperation, etc. It has also to be noted that imperfection of strategies and plans is constantly come in tandem with the weakness of monitoring of their implementation.

The authors have analyzed a number of strategies, illustrating the strengths and weaknesses of existing planning system, as well as feasibility of implementing actionable concepts, topics and indicators in the decentralization process.

Existing gaps should be overcome through the development of integrated documents such as spatial development concept and strategy. They should clearly identify priorities, concepts, terms and benchmarks for territories of different types and levels based on sustainable development.



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2035-Regional Development in Bosnia and Herzegovina Challenges and Opportunities

Haris Gekic¹, Aida Bidžan-Gekić¹

University of Sarajevo Geography Sarajevo-Bosnia and Herzegovina¹

Bosnia and Herzegovina, as delimited by its state borders, is a unique example of political and geographical integration of the contrasting landscapes of Europe. The territorially differentiated process of polarisation and regional differentiation, and the related course and intensity of transformation of the regional structure of Bosnia and Herzegovina, shows that the differences between the regions are becoming increasingly deepened. The polarities in the regional development of Bosnia and Herzegovina are continually growing, thus producing more adverse consequences to the country's overall socio-economic development.

Regarding the regionalization of Bosnia and Herzegovina, we have taken into account the Nomenclature of Territorial Units for Statistics (NUTS) criteria in the light of the European Union regionalization. According to which, regionally, Bosnia and Herzegovina could be organised in line with the NUTS 2 hierarchy level in five regions of very complex regional and geographic character could be distinguished.

Our objective is to identify the most critical challenges facing five regions in Bosnia and Herzegovina and to propose their development opportunities. We analyzed the natural, demographic, settlement, economic potentials and conditions than identified disparities to understand the spatial reality of the regions better. The paper also discusses that the current constitutional and political-geographical structure of Bosnia and Herzegovina is one of the main obstacles to the active regional development of the country. That can be seen through the fact that a state does not have an official national spatial plan. The fundamental documents for establishing regional spatial planning in Bosnia and Herzegovina were the 1974 Law on Spatial Planning and the first and the last Spatial Plan of Bosnia and Herzegovina from 1981.

2145-The Role of Tiger Corridor in Sustainable local development A Case Study of Ranthambhore Tiger Reserve Rajasthan India

Bhanwar Vishvendra Raj Singh¹

Mohanlal Sukhadia University Department of Geography Udaipur-India¹

Our common future in our hands, but nowadays biodiversity resources are very rapidly diminishing all over the globe. In the biodiversity, Tiger is an icon of healthy wildlife, which is considered as a vital factor for maintaining universal food chain system. This research paper is based on micro level study based on primary and secondary data through GIS mapping and consider as a Socio-Economic & Physical factors to inter-connect with Tiger habitats. Especially, core and periphery LULC have been obtained from the Multispectral images from ETM and ETM+ sensors of Landsat and LISS-III and AWiFS sensors of Resourcesat-satellites. This study examines the spatial and temporal patterns of LULC change along the boundary of Ranthambhore in the Rajasthan from 1975 to 2015. Tiger Landscape change within all ecological zones will be evaluated. The Landsat TM and ETM imagery will be used to produce LULC classification maps for both areas using a hybrid supervised/unsupervised methods. LULC changes are measured using landscape metrics and change maps created by post-classification through change detection. Using all the raster maps and the final change detection of the reserve will be done through spatial analysis using the raster calculator tool in ArcGIS and Erdas and MS Excel 13. The study comes out with land use and land cover change in core and periphery areas of the reserve. The research also describes human encroachment, impact from human colonization, interfere by domestic animals, Inter-breeding, rehhabilitation and the migration from core and periphery areas to human habitat, finally, the situation would be alarming for biodiversity of Ranthambhore habitat due to the high pressure from anthropogenic activities. Eventually, we should focus on the sustainable development of Ranthambhore region through inclusive, holistic, comprehensive conservation between land and people.



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2491-Spatial expansion and labor market embeddedness of transnational corporations in inland China Take Foxconn as an example

Changhong Miao¹, Xiaofei Chen¹, Yehua Wei¹

Henan University Key Research Institute of Yellow River Civilization and Sustainable Development Kaifeng-China¹

The academic debates on the local embeddedness of transnational corporations has become fiercely based on the GVC and GPNs since 1990s. However, much research work has been largely independent from the impacts of labor market, only the roles of economic contacts, technology spillover and social networks in strategic coupling were discussed extensively. Labor market is one of the most fundamental mechanisms to realize the local embeddedness of Foxconn's investment in inland China. Our theoretical framework, built upon the labor market, integrates four dimensions including corporate attributes, regional characteristics, local governments and agencies and the power and stage of nation-state. We found that the Foxconn's spatial expansion includes four stages: initial expansion, coastal dispersion, coastal agglomeration and internal diffusion. We also considered that labor market which is co-maintained by regional characteristics and company attributes, is one of the most important mechanisms for Foxconn to achieve "strategic coupling" with regional development of Henan province; and the local governments and some intermediary agencies play a very vital role as the key linkage channels and the coordinators; the flexibility of labor market also embedded in the power and stage of nation-state, in which the unique household registration system and urban-rural dual structure, and the development stage of high-speed industrialization and urbanization in transitional China bring about a huge amount of migrant workers and technical workers.

2538-The economic and symbolic value of the territory in Spain An analysis of cases

Rubén C. Lois-González¹, Inês Gusman¹, Ramón López-Rodríguez¹

University of Santiago de Compostela Department of Geography Santiago de Compostela-Spain¹

The adoption of postmodern approaches in Political Geography has been useful to explain conflicts and political-administrative processes in complex, contrasted and dispersed countries such as Spain. This is a territory with a marked internal diversity from which two narratives of great interest have risen. Regional Economy and Economic Geography have counterbalanced a rich, urban and industrial Spain with an empty and rural Spain with most of its activities in decline. On the other hand, the idea of a nation in Spain has always been subject of debate. Faced with a deep-rooted feeling of nation that was built in a unitary way, the Catalan, Basque and Galician nations, among others, asserted their own stories in a similar historical era. In this context, the aim of this study is to analyse the economic and the symbolic value of territories in Spain considering the different meanings of territory and territorialisation, through postmodern approaches. First, we use key concepts and classical readings of Geography in order to interpret the unity and diversity of Spain. Then we present information on the its historical and political-administrative organisation. Finally, to measure the internal diversity of Spain and the recent changes, we apply a socioeconomic approach through the collection of secondary qualitative data (synthetic indicators of economic development, demographic dynamics, etc.) and qualitative data of cultural and symbolic nature. The identified dynamics of the recent decades show obvious losers: the rural interior, in particular the territories near Madrid. At the same time, these contrasts are overlapped by very different territorial representations and images between citizens, depending on their place of residence. These intense territorial debates have economic consequences. In this sense, Geography should occupy a central space in explaining the complex Spanish reality of the present and in the identification of the main challenges that the country must address



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2684-Tourism as a factor of rural revival. Current demographic and economic changes in the Sudetes Mountains (SW Poland)

Robert Szmytkie¹, Agnieszka Latocha², Katarzyna Kajdanek³, Paulina Miodońska⁴, Dominik Sikorski⁵, Przemysław Tomczak⁵

University of Wrocław Department of Human Geography Wrocław-Poland¹ University of Wrocław Department of Geomorphology agnieszka.latocha@uwr.edu.pl-Poland² University of Wrocław Institute of Sociology katarzyna.kajdanek@uwr.edu.pl-Poland³ University of Wrocław Institute of Geography and Regional Development paulina.miodonska@uwr.edu.pl-Poland⁴ University of Wrocław Department of Human Geography dominik.sikorski@uwr.edu.pl-Poland⁵

Rural areas in the Sudetes Mountains (SW Poland) have been affected by the process of intensive depopulation since the end of the XIX century. This process was most visibly marked in Kłodzko Region. Depopulation processes in the local villages intensified after 1945 due to changes of state borders and mass resettlement of people after World War II. Breaking of continuity in the processes of settlement resulted in the decline of traditional crafts, local industry and mountain tourism, which, along with agriculture and forestry, were the economic base of rural areas and mitigated the outflow of people before 1945.

In the post-war period they were especially villages with a small number of economic entities in non-agricultural sectors that most severely experienced the unfavorable population trends. In recent years, trends in population changes in the Kłodzko Region have become more diversified.

Although depopulation still impacts this area, there are new processes of "revival" observable in some villages which were earlier considered to be derelict. The increase in population in these villages is relatively slight but it depicts a major qualitative change in the direction of trends. The main factor responsible for this population change is an inflow of population from large cities.

The main purpose of this study is to identify the relationship between the demographic "revival" of villages and the development of the economic base in their area. Preliminary research results indicate that tourism has become the key component of the economic base for many rural settlements in the region, and its development contributes to the development of rural tourist centers and the socio-economic development of the villages located in their surroundings.



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C.29. Political Geography Geopolitics of the Datasphere Part.1 The politics of Data

1765-Analyzing the Cuban connection several 'digital spaces' for a geopolitical approach

Margot François¹

*University Paris 8 Geography/Geopolitics Paris-France*¹

The challenge of developing new communication technologies and connecting the island to the rest of the world is being addressed at this moment as Cuba's technical and diplomatic progress with its partners is evolving.

Our hypothesis is that Cuban networks architecture can be read as a reflect of the political situation on the island, but also reveals the will from the authorities to build an autonomous capacity and keep control over its cyberspace.

For this research we propose a geopolitical approach by mapping the existent infrastructures and adding a qualitative approach. We conclude to the existence of three digital spaces in Cuba.

The first digital space is a national network, composed by virtual infrastructures for the share of health information, education, scientific research. Following the priorities of the Castro regime, this 'socialist network' comes with a strong national strategy for autonomy and control of its cyberspace (development of computer manufacturing, software industry, investment in the training of a skilled-labour force).

Besides this government-controlled national intranet, a limited access to World Wide Web has been developed since 2015. The State provides, through the state-owned monopoly company ETECSA, possible access to "navigation rooms" or via public wifi hot spots installed in parks. This exclusively urban solution has been doubled by a weak and expensive 3G offer at the end of 2019.

Finally, an illegal parallel digital space emerged from the people. Those local initiatives aimed to gain access to entertainment mainly. However, it is not a contentious space and the regime knows about its existence.

In conclusion, we find in the Cuban connection the footprint of the Castro regime and its priorities, the will to open to globalization while keeping control over information and the people's adaptation called "lucha" (the struggle) by the Cuban people itself



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1872-Bringing the concept of coopetition into the field of political geography the example of Israel and Saudi Arabia in Digital Security.

Ilan Scialom¹

*GEODE French Institute of Geopolitics Paris-France*¹

The Middle East is a very complex system confronted to different geopolitical and strategic dynamics, both global and regional. Digital Security is a real challenge in an area wracked by conflicts and rivalries. Whereas some countries have developed massive capacities, in the cyberspace, such as Israel, others, like Saudi Arabia and other Gulf States, are dependent of foreign technologies and are still working to define their cyberstrategy. These countries, even if they do not have any official diplomatic relations, faced same crucial issues – the rise of Iran, Sunni jihadi threats...-. These convergences of threat perceptions, interests and policies could be an attempt to reshape regional dynamics.

In this framework, how can digital security in the Middle East be a factor of cooperation and competition between countries that do not have any official relations and are confronted to the same regional issues? How can management of a systemic risk – digital security- prevail on long term geopolitical rivalries?

My intervention in the panel “Geopolitics of the Datasphere” will focus on a short presentation of my research on the concept of coopetition. This emerging concept is simultaneously competition and cooperation between rivals (Brandenburger & Nalebuff, 1996). Through cooperative relationships, global rivals work together to collectively enhance performance by sharing resources and committing to common goals in certain domains. At the same time, they compete by taking independent actions in other domains to improve their own performance (Luo, 2004).

I will present an application of this concept in Geopolitics, through the example of relations between Israel and Saudi Arabia in the digital security of critical infrastructures in the energy sector.

2266-From a technical component to a geopolitical object cloud computing a security issue for France

Clotilde Bômont¹, Amaël Cattaruzza²

*Panthéon-Sorbonne University Geography France-France*¹ *Paris 8 University Geography* amael.cattaruzza@yahoo.fr-France²

The use of cloud computing has been steadily growing since the beginning of 2000s. Nowadays, it is one of the globally predominant information and communication systems configurations. Cloud computing is a data storage, processing and pooling technology which relies on the outsourcing of the IT resources management. The hardware and software components managed by service providers are then hosted in infrastructures usually physically remote from the places where the digital data are produced and used.

Cloud computing depends on cross-border digital networks, and the new information and communication technologies sector benefits from globalization. Therefore, cloud computing is not initially contained into territorial administrative divisions: the data can travel the world and the cloud service provider can have a different nationality than the end customer.

This has raised issues regarding the data confidentiality, integrity and availability. Data are a valuable and strategical resource, and states are claiming sovereignty over the data related to their citizens and their internal organizations. However, the extraterritoriality of some countries' jurisdiction, such as the United States, may deny them this prerogative. Our hypothesis is that this security issue has shaped the French cloud's deployment.

We study how the French public actors' representations of cloud computing have evolved over the last decade. Our results are obtained through the discursive analysis of a corpus of official French and European documents and speeches.

The study not only confirms the securitization process at stake, but also underlines the importance of developing the French -or at least European- cloud industrial base in order to guarantee the country's strategic autonomy. The US jurisdiction leads to power struggles between the American government and the European countries. It reveals the French and the European users' demand for more trust and transparency in the IT supply chains. This concern could become a regional distinctive asset.



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3479-The strategic stakes of 5G deployment in Francophone Africa

Charlotte Escorne¹

*Paris 8 University / French Institute of Geopolitics Geography/Geopolitics Saint-Denis-France*¹

Since 2019, several African states have announced the deployment of the fifth generation of mobile Internet (5G). This disruptive technology offers the same rates of data as optic fiber and solves many territory planning problematics thanks to the advantages of a relay antennas architecture.

The goal of this presentation is to map the African states that are deploying 5G, to explain what are the security, social and economical challenges and how it could affect global governance in cyberspace.

First, the deployment of 5G in Africa represents an opportunity for the continent to bridge its digital divide. Indeed, the Internet connection is poorly developed (only 25% of the population is currently connected to the 3G/4G network). Driving force of the fourth industrial revolution, (the one of the Internet of Things and artificial intelligence), this technology opens up - thanks to a catch-up effect - the opportunity for African countries to integrate their market into the globalization process and to improve human development.

Second, 5G is settled in a tense climate of economical competition between Chinese, American and European telecommunications companies. Africa represents a huge market and this rivalry could be a real game changer regarding traditional normative power in cyberspace, into a territory that concentrates many interests for great powers. With the new silk-road and the leader position in 5G of Huawei, China could anchor its power in Africa and finally, became the new normative power, overthrowing the influence of the USA.

Third, this new network is a vector of important risks (such as industrial spying, data theft). Because it will connect critical infrastructures, the consequences of cyberattacks could be very dramatic for the integrity of states.

As a consequence, it questions the telecommunications strategies that local governments would take, to balance between risks, long time alliance and digital sovereignty.



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VIRTUAL

C.29. Political Geography Geopolitics of the Datasphere Part.2 Mapping the routes of the Internet data topologies power

1931-On a collaborative effort to map the Internet

Louis Petinaud¹, Loqman Salamatian², Colin Gerard¹

*GEODE Geopolitics Paris-France*¹ *GEODE Mathematics salamatianloqman@gmail.com-France*²

The emergence and continuous expansion of the Internet have prompted much research to understand how it transforms fundamental concepts such as space, power. Since the end of the 1990s, researchers in the network community and social sciences have proposed ways of mapping the Internet. In geography, the Internet and its extension have yielded the emergence of the notion of cyberspace, a space organized by humans with its own geography shaped by political and economic actors. However, there is still a need to develop ways to understand the shape and evolution of the Internet as a complex and dynamic system. while taking into account the heterogeneity of the actors.

In this article, we aim at elaborating a general framework for collaborative studies of the Internet. Because of its engineered architecture, the availability of extensive measurement capabilities, and thanks to a thorough understanding of its component technologies, the Internet can be mapped at different layers. This unique setting, in which most properties, structure, and functionality can be understood at different levels, leads to a fundamental question of the possibility of designing a global map of the Internet. We leverage the work accomplished by our research center at the physical, logical and informational layers.

We show through this diverse set of examples, how multi-disciplinary research has emerged as to understand the interactions between layers. From the notion of influence, ill-posed as a purely quantitative metric, to the concept of routing, which cannot be understood without assimilating the specificities of the protocols manipulated by Internet practitioners, we argue that this dialog is beneficial for all the parties involved. Finally, we elucidate commonalities in those efforts to exhort for a new paradigm for Internet research which would juxtapose qualitative analysis of the actors and quantitative efforts aiming at modeling the interaction between those actors.

2059-The Internet in Crimea a Case Study on Routing Interregnum

Romain Fontugne¹, Ksenia Ermoshina², Emile Aben³

Internet Initiative Japan *Internet Initiative Japan* *romain@iij.ad.jp -Japan*¹ *CNRS Center for Internet and Society Paris-France*

² *RIPE NCC RIPE NCC emile.aben@ripe.net-Netherlands Antilles*³

Until 2014, access of Crimeans to the rest of the Internet was predominantly handled through Ukrainian networks, held to Ukrainian law and oversight. But after March 2014 Russian Internet regulation frame, with its legal and technical constraints, had to be applied to Crimean networks. Although big infrastructural projects were quickly put in place by the Russian government in the region, such as construction of submarine cables, it took three years for Crimean Internet Service Providers to complete the transition. Crimea serves as a relevant case study on the potential for Internet choke points, regional Internet structure, and a case of geopolitical interest.

This analysis aims at deconstructing a simplistic vision of a geopolitical controversy, by looking into technical arrangements between providers on the international and regional level, and in the context of international sanctions. We employ a multidisciplinary approach, combining sociological fieldwork and Internet measurements to cross-verify our findings. This paper sheds light on transformations on Crimean networks through a longitudinal analysis of routing changes using BGP data and semi-structured in-depth interviews with ISPs and journalists from the region (n=45). We propose an adapted AS Hegemony metric to quantify the AS dependency of a geographical area and monitor regional routing changes.

This paper demonstrates the way network measurements can provide an impartial assessment of the effect of politically relevant changes. Contrary to the global Internet flattening we demonstrate that the topology in Crimea evolved towards a peculiar structure with a distinctive choke point. We also further the understanding of the impact of geopolitical and legal constraints on the networks, such as international sanctions, and backup qualitative reports with quantitative network measurements. Finally, we provide processed data and accompanying monitoring tool in order to assist the research community in documenting singularities in the Internet routing infrastructure.



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2280-The journey not the destination matters untangling data and sovereignty in the Far West.

Logman Salamatian¹, Louis Petinaud², Kave Salamatian³

Geode / Sorbonne University Mathematics France-France¹ French Institute of Geopolitics Paris 8 Geopolitics -France² LISTIC, University of Savoy Computer Science -³

The process of digitalization has prompted, in all social fields, the transformations of power rivalries, and the emergence of new stakeholders. Social sciences have sought to understand the implications of production, processing, and storage of digital data [1]-[2]. However, the way data travels implies specific and shifting geopolitical stakes [3]. Historical transit providers have for a long time dominated the market of what determines the way the global network operates [4]. In recent years, both private sector giants such as Google and public entities have taken great interest in acting at the data transportation level [5].

One example that illustrates how public authorities legislation look at the way personal data travels in the network is the European Union General Data Protection Regulation (GDPR). GDPR offers protection to European citizens across a wide range of privacy threats, including the transfer of personal data outside the boundaries of the EU [6]. However, its applicability relies on constructing an exact mapping of data paths. These paths are determined through the Border Gateway Protocol (BGP) [7]. BGP routes the data following a set of local economic, political preferences that are unrelated to geographic closeness or cable availability. Gathering the real path taken by the data is highly complicated and relies on valid mapping of network equipment to geographical locations [9].

In this presentation, we argue BGP's architecture makes assessing the efficiency of regulations such as GDPR a very complex task. We further discuss how the evolution of a transit relying on the Public Internet to privately owned backbone of Cloud Providers [10] has made it more easy to constraint the traffic to satisfy regulations because of the reduction of intermediaries in the network but is also a threat to the future of the Internet and the sovereignty of states.

3467-The geopolitical stakes for cryptocurrencies in Russia through the analysis of their mining industries in Eastern Siberia.

Hugo ESTECAHANDY¹

University Paris 8 French Institute of Geopolitics / GEODE Saint-Ouen-France¹

On September 10, 2020, the U.S. Department of the Treasury announced sanctions against three Russian citizens, accused of managing shadow cryptocurrencies wallets to finance several operations of the Internet Research Agency (IRA). Cryptocurrencies can enable, as in this case, to finance active measures abroad, but also to bypass economic sanctions through the enrichment of their owners with non-taxable capital sheltered from economic sanctions. It partly explains why in Russia cryptocurrencies and their industry, the "mining", are becoming a stake of power for some Russian elites members (oligarchs, politicians) and security services (federal security, intelligence services). The objective of this presentation is to study the stakes of these cryptocurrencies in Russia, through the geopolitical analysis of the cryptocurrencies mining industries, strongly developed in the Eastern Siberia's region of Irkutsk.

To do that, I will first explain why the Irkutsk region has the technical and climatic resources necessary for the operation of mining farms. I will then show that Irkutsk is a real historical land of political opposition in Russia and that the ideological proximity of some of its inhabitants with the political ideal behind the appearance of Bitcoin has favoured the emergence of the cryptocurrencies mining there. Finally, I will show how some influential political and financial Russian actors stepped into this industry and began to get cryptocurrencies for their own purpose or to finance abroad's cyber operations.

In a nutshell, the goal of this presentation is to show that cryptocurrencies and their mining have evolved in Russia, from a libertarian project shared by some Siberian entrepreneurs at the beginning to the support of a strategy of Russian elites to consolidate their power within a Russian political system structured by an strong clientelism.



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C.29. Political Geography Resources Space and Power How do Resources produce Territories

1709-Andean territories's extractivist requalification analysis of local global dialectic (San Juan province Argentina)

Mathilde DENOEL¹

*University of Toulouse Jean Jaurès LISST Toulouse-France*¹

Previously considered as Argentina's territorial margins, Andean territories were requalified in the 1990s according to their endowment in natural resources that could be exported as commodities. This is the deployment of the extractivist model in Argentina. In the early 2000s, the province of San Juan co-constructed with the federal government the national interpretation of this model. In the mid-2010's, San Juan became the country's leading gold-producing province, with three open-pit megamines operating there. This paper aims to examine, based on the example of San Juan in Argentina, the local-global dialectic that allows the construction of mining resources and the extractivist requalification of Andean territories as mining territories. To answer the research question, I set up a methodological device and an analysis method that allow me to confront discourse and practices, based on data collected from three research fields (2014-2017) in the mining territories, small towns near mine sites and the provincial capital. The methodological protocol is polymorphic (conversational and semi-directive interviews, participant observations and observations, participations in mining events). I carried out a multimodal analysis of these data, with a quantitative textual analysis of the corpus, a thematic analysis and a comparison of data from the speech with data collected through observations and consultation of written sources. This analysis of San Juan's case show that extractivist model is nourished by territorial particularities, which contribute to making it a dynamic and adaptable model. This porosity to local identities is part of capitalism's policy of de-territorialisation/territorialisation of capital. The local is capable of integrating, making global referents its own, or rejecting them. Territory plays a determining role and a study of the neo-extractivist model at the sub-national level reveals that power games, as close as possible to the resource, redefine the spaces of accumulation in mining territories and give depth to globalization.



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1767-ANALYZING THE EUROPEAN ENERGY TRANSITION THROUGH POWER LENSES FROM A CHANGE OF RESOURCES TO A CHANGE OF SCALE

Angelique Palle¹

Institute for strategic research (IRSEM) Armament and Defense economy Paris-France¹

Background

The European energy transition has mostly been studied by research through technological or economic lenses, social sciences have joined the field later and have been firstly asked to work on acceptability issues (Labussière and Nadaï 2015). In geography and other fields (history of transitions, sustainability transition studies, political ecology) a call to analyse the political consequences of transitions has been made (Lawhon and Murphy 2012; Köhler and al. 2019).

Hypothesis

An analysis of the energy transition through a geopolitical approach can bring valuable insights to the study of the European transition. Approaching the transition as a change of resource in a multiscale perspective (European, national, regional, local) leads to question the scale at which this resource transition is done and perceived.

Materials / methods

Bibliographic analysis of publications within the fields of geography, sustainability transition studies, political ecology and history of transition. Exploratory fieldwork among French rural municipalities carrying an energy transition project, October 2019. Fieldwork among EU energy players (transmission system operators, regulators, DG Energy, NGOs), 2013-2016.

Empirical analysis of scalar and territorial representations of the energy transition in the discourse of these actors. Bibliographic analysis of research trends on energy transition.

Results

1. Acceptability issues and conflicts over transition projects can be read as conflicting representations between actors regarding the scale at which this resource transition should be designed and implemented (local vs. national, local vs. European, etc.).
2. The Commission and Parliament leading the transition policy consider the implementation of the transition at an integrated European level as an unquestioned evidence, building a discourse around "optimality", despite previous examples of important European policies (the Euro or Schengen) implemented at other and evolving scales.
3. These conflicts over scale representations lead to question the territoriality (Raffestin 2012) of this transition and how it affects power balances between actors within the EU.



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2720-UNGOVERNED TERRITORIES AND NON RECOGNISED STATES. EXTERNAL TRADE AND INTERNAL CONSOLIDATION

Alexander Sebestov¹, Vladimir Kolosov²

Institute of Geography Laboratory on Geopolitical Studies Moscow-Russia¹ Institute of Geography, Russian Academy of Sciences Laboratory of Geopolitical Studies -Russia²

The rapid growth of the number of non-recognized states and uncontrolled territories observed since the second half of the XX century has led to the formation of an informal political map of the world, which does not fully coincide with the official one. Thus, about 80 States are covered by secessionist movements (Popov 2010), and the total number of new polities (the most of them are ungoverned territories) by some estimates reaches 60 (Kolosov, Sebestov 2012; Rabasa 2011)

The viability of ungoverned territories and unrecognized states is largely determined not only by internal characteristics (strong identity, economic resources, etc.), but also by the possibility of foreign economic relations. The opportunities and features of participation in trade relations depend on type of territory. Ungoverned territories, many of which are a mosaic of areas controlled by local "barons" and warlords, become part of regional and global trade chains of various illegal and gray products (drugs in case of Columbia, Afghanistan, Myanmar, weapons in case of Donetsk Republic, illegally extracted natural resources, etc.). Such territories join poorly governed "failed states" often involved in illegal activities and become "the gates" to the global markets. In non-recognized states foreign trade acquires more civilized forms and becomes evidence of de-facto recognition by one or more countries. The development and features of foreign trade largely depends on the nature of relations with the patron-state, which allows legalizing foreign trade flows. Sometimes the patron state launched a special preference system for de-facto state (as USA for Taiwan). The exclusive access of partially recognized states to legal markets allows them to mediate between uncontrolled territories and patron states.

3444-The Olympic Games in Rome and Turin comparison of local territorial strategies and Geopolitical Representations

Anna Maria Pioletti¹, Giuseppe Bettoni²

Università della Valle d'Aosta Human and social sciences Aosta-Italy¹ Università di "Roma Tor Vergata" Department of History, Humanities and Society giuseppe.bettoni@uniroma2.it-Italy²

Mega events in Italy have often had a very important political role to politically represent the Country in its historical phases.

The aim of this contribution is to show how the Olympic Games in Rome in 1960 and the Winter Games in Turin 2006 played a basic political and spatial role. We will show how the 1960 Games were first of all an opportunity for Rome to redefine its spatialization through planning interventions linked to the Olympic infrastructure. The Games in Rome therefore remain a key passage in contemporary Italian history both on an urban scale to redefine the spatial organization of the City (Fiadino, 2013).

The Olympic Winter Games in Turin in 2006 had a different role but of great importance on a regional scale (Dansero and Mela, 2007). They were games fundamentally organized by a Region much more than by a city and they represented an opportunity to relaunch a region that needed to relaunch after a major industrial decline. The methodology is based on a comparative research of certain elements such as: 1) The quantity of development projects carried out and the nature of urban and regional changes, 2) The territorial dimension: what was the scope of sports activities? 3) What communication strategy in both cases has been put in place? 4) Who are the actors who participated in this organization and what antagonisms have been observed?

The results are several. First in terms of the evolution of a temporary mega-event. Two mega-events had a role fundamental in changing their image, on multiple scales and are what Getz and Page define hallmark event. We will also show the governance system put in place and the possible antagonisms in a local geopolitical approach such as (Loyer 2019, Subra 2016).



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C.29. Political Geography Rethinking the Migration Security Nexus Actors Practices Knowledges

1026-Rethinking European Borders Post Brexit

David Newman¹

*Ben-Gurion University Politics and Government Beer Sheva-Israel*¹

The discussion and heated political debate surrounding Brexit has come at a time when borders throughout Europe are undergoing a process of re-evaluation. From a period in which the processes of globalization worldwide, accompanied by the opening – and even removal – of borders throughout the EU was prominent, we are now witnessing a period of border reconstruction in the face of securitization threats on the one hand, and an anti-immigration narrative by emerging right wing and populist groups on the other. Nowhere has this been more evident than in the outer borders of the EU, especially along the Hungarian interface with neighbouring countries as a result of the hard line policies of the Urban Administration. Questions of border management have also emerged as a result of Brexit, with the North-South Ireland interface becoming transformed into one of the major negotiating issues between Britain and the EU. The specific case of Ireland is a microcosm of much wider border issues, as the EU countries seek a new balance between open borders for customs and economic purposes, while reclosing some of the borders for migration and securitization issues. Contrasting discourses take place concerning internal EU borders, as compared with the outer borders of the EU, along with the changing status of “first recipient” countries, whose citizens have migrated to the wealthier countries of the west, but they have also been recipients of poorer migrants from non-EU countries. This paper examines the ongoing dynamic of the border discourse within the EU and the extent to which changes in border management may be expected to take place in the next decade under the different pressures of globalization and securitization discourses.

1780-BOSNIAK MIGRANTS IN TURKEY – Social integration and identity

Ozana Alagic¹

*JU „Srednja škola JU „Srednja škola Konjic-Bosnia and Herzegovina*¹

In the last 150 years, Republic of Turkey was exposed to the migration waves of Bosniaks for different reasons. One of the reasons was the withdrawal of Ottomans from the area of Bosnia and Herzegovina due to the Berlin Congress, and the arrival of Austro-Hungarian Monarchy to the area of Bosnia and Herzegovina. The next emigration wave happened after the World War I (the establishment of the Kingdom of Serbs, Croats and Slovenes) and the last emigration wave was happened after the World War II, due to the dominant hampering towards free religious exposure in the new-founded state. The purpose of this paper is to research the problems of migrants from all of the three emigration waves. Despite the fact that Bosniaks inhabited almost all parts of Turkey during the emigration, the research will be limited to Istanbul and its surrounding area only. The particular purpose of this paper is to explore the phenomenon of retention the authentic Bosnian language which is retained in Turkey even four generations of Bosniaks who were born and raised in Turkey. During first emigration waves, the family had the main role in retention of the cultural identity, and that role was later overtaken by Bosniaks associations all over Turkey, so this paper will take the main problems that these associations which currently exist face as the subject of its research. This paper is based on the interviews of Bosniaks who belong to different generations born in Turkey. Available archived data will be researched the stay of this paper's author in Turkey, so based on the results of the research, the conclusion for the main reasons of Bosniaks' identity retention in Turkey and the main dangers for losing it in the future will be brought.



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2120-Theorization of “Trans Border Geopolitics” in East Asia

Takashi Yamazaki¹

*Osaka City University Department of Geography Osaka City-Japan*¹

Geopolitics traditionally considers conflicts and balances among territorial states on the assumption that they are demarcated and separated by distinct borders. “Trans-border geopolitics” this paper theorizes is a kind of alternative geopolitics that attempts to transcend such classical geopolitics. In the eastern littoral of the Eurasian landmass which is characterized by inter-state tensions, the European paradigm of land-based territorial state cannot fully elucidate the geopolitical dynamism of the region. A new perspective becomes necessary to understand inter-state relations developed by littoral and island states connected to seas. “Territorial” disputes in seas are different from those in lands in that they do not necessarily develop over territorial water but over the belonging of islands in borderland seas. As Japan annexed the Ryukyu Islands in 1879 and then the Taiwan Island in 1895, state borders have shifted through the inclusion/exclusion of peripheral islands. In addition, the United Nations Convention on the Law of the Sea (UNCLOS) adopted in 1982 provides that a state can allocate Exclusive Economic Zones (EEZs) from the baseline of (is)lands belonging to the state. The location and possession of islands thus secure interests within EEZs stretching from the baseline. As a result, seas and islands create a vast space in which interests of pertinent states/regions intersect and conflict in a complex way. In particular, Japan, China, Taiwan, and South Korea not only share the legacy of Japan’s colonialism and Cold-War confrontations but also has driven global political economy with substantial military forces including the deployment of US forces toward the region. In this sense, East China Sea contains specific geopolitical tensions. Drawing on the above-mentioned issues, this paper investigates trans-island interactions among East Asian states and proposes “trans-border geopolitics” as a new theoretical framework to illuminate less-conflictual inter-states relations in the region.

2232-SECURITIZATION OF MIGRATION AND BALKAN HUBS LOCAL RESPONSES TO A GLOBAL PHENOMENON

Marta Zorko¹

*University of Zagreb Faculty of Political Science Zagreb-Croatia*¹

The migration crisis in 2015/2016 opened numerous issues and affected all the countries along the Balkan route as well as European Union member states. On the state level it mainly led to securitization of (illegal) migrations and migrants in general, while on the local levels led towards different, often ad hoc mechanisms and actions. This research will include three case studies analysis of three countries: Republic of Croatia, Republic of Serbia and Republic of Bosnia and Herzegovina. Securitization of migrations on the state level will be analyzed through the tools of critical geopolitics: practical and popular geopolitical perspective. The local level responses will be explained and categorized due to the time (during and post 2015/2016 crisis) and space factors (specific locations in states in question). The first goal is to show how mechanisms of securitization for migrations on state level operate, while second one is to describe responses on local level in different timeframes. The aim of the paper is to find out were there any systematic (coherent) policies and politics practices towards migration flow(s) and whether the lack of them resulted in unintentional processes of creating ad hoc hubs and trapping migrants in yet non-integrated parts of Europe. The latest case of Vučjak hub in Bosnia and Herzegovina showed all the layers of EU borders externalization and its potential consequences. During the crisis, ongoing EU border externalization was partially “postponed” but its merits defined the periphery and the future of people left inside non-integrated circle on the European continent.



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2534-Social inclusion and exclusion in rural areas expectations perceptions and experiences of social contacts among refugees and the local population. The example of Germany

Birgit Glorius¹, Stefan Kordel²

TU Chemnitz European Studies Chemnitz-Germany¹ FAU Erlangen-Nürnberg Geography -Germany²

Facing a tremendous increase of asylum seekers' arrivals, German politicians frequently brought up the idea that those mostly young and partly well-educated migrants could help to overcome the effects of demographic ageing and labour force shortages. Thus, asylum seekers and refugees, who are allocated to rural areas are considered as a boon, especially as they are obliged to stay there during and often also some years after status determination. Drawing from data of a nationwide research project on refugees in rural regions in Germany, we address the role of social contacts as a prerequisite for integration and long-term migration-development effects. Regarding rural neighbourhoods, research literature suggests a faster social inclusion due to greater nearness, but also obstacles towards inclusion of strangers due to a higher homogeneity of rural neighbourhoods, a stronger sense of belonging, and resulting perceived "strangeness" of newcomers. Also, local governance approaches and actors might be less specialized on questions of integration but rather pursue "hands-on" approaches, thus causing great diversity of integration approaches, and outcomes.

Following a multi-perspective approach, we examine expectations, perceptions and experiences of social relationships from the perspective of rural population and refugees in rural small towns and villages. Empirical data stem from a representative survey among 908 rural inhabitants and 137 qualitative interviews with refugees. Results show that the poor amount of social contacts in general, and the quality of social contacts in rural neighbourhoods within daily encounters have an influence on social inclusion. Taking into account reflexivity of migrants and host communities, we contend that the desire (not) to interact with immigrants often contradicts the expectations of refugees, whilst the latter also learn how to manoeuvre through cultural expectations.

3692-Migration and geopolitics Attitudes of countries around the South China Sea towards Chinese migrants

Yungang Liu¹, Ning An¹

South China Normal University Centre For Asian Geography Studies, School Of Geography Guangzhou-China¹

Migration issues are rarely discussed together with geopolitical issues, although in recent years the relationship between the two has begun to be gradually understood by political geographers. This study takes the attitudes of countries around the South China Sea towards Chinese migrants as an entry point to discuss the impact of geopolitics on migrants' everyday living conditions. To measure the emotional value of discussions about Chinese migrants on social media in these countries through the investigation of GDELT data, this study discusses what factors have influenced these attitudes. It is concluded that geopolitical dynamics between China and those countries have had a significant impact on the social media of these countries and the everyday life of Chinese migrants in these countries. On this basis, this study provides new insights and methodological innovations for understanding the link between migration and geopolitics.



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C.30. Population Geography Forced displacement refugees stranded populations and the “migration crisis”

1035-Though Shalt Not Deport Religious Ethical Discourse and the Politics of Asylum in Poland and Israel

Agnieszka Bielewska ¹, Nir Cohen ²

SWPS University of Social Sciences and Humanities Social Psychology abielewska@swps.edu.pl-Poland ¹ Bar Ilan University Department of Geography and Environment Wrocław-Poland ²

The paper explores the ways in which religious ethical discourse is used in state discourse to support more or less restrictionist approach towards asylum seekers. Drawing on the cases of Israel and Poland, it examines how religion-based ethical narratives are mobilized instrumentally by political actors to advocate pro/anti-asylum policies. In recent years both countries experienced a large inflow - or threat thereof - of asylum seekers from developing, Muslim-majority countries in Western Asia or Africa, which elicited a heated public debate. In addition, they both have relatively homogenous populations, and maintain an ethnicity-based citizenship regime (*jus sanguinis*), as well as strong relations between state and (institutionalized) religion, either Catholicism or orthodox Judaism. Finally, a dominant narrative of national victimization is salient in both countries, which is critical for understanding the political debate over asylum policies.

We do not attempt to construct a normative case about if – and how – asylum seekers should be received according to Judaism or Christianity. Instead, we analyze the political discourse in each country during the peak years of the crisis in order to show how religious arguments were employed to support pro/anti refugee policies. We use secondary data obtained through the written and electronic media, showing that in both countries, the ‘otherness’ of newcomers intersected with historical narratives of ethno-religious and national victimization, shaping a binary political discourse concerning the desired national policy towards asylum seekers. The paper concludes by drawing lessons about the ways in which ethical religious arguments shape contemporary migration discourse and policy.

1488-THE TERRITORIAL IMPACT OF HUMAN MIGRATIONS IN TODAY’S WORLD

Antonio Doval Adán ¹

University of Santiago de Compostela Geography Lugo-Spain ¹

Immigrants, and in particular irregular immigration, have acquired special visibility and have become one of the priority concerns of many developed and developing countries. For this reason, this communication has the fundamental objective of analyzing the territorial impact of human migration in today’s world.

The work appears structured in four sections: in the first one is approached the global dimension of the migratory phenomenon that affects more than 270 million people, in the second one is deepened the volume of forced migration and its roots causes, while the third and fourth section are dedicated to the study of labour and economic migrations towards the great urban agglomerations of the world and the analysis of immigration in Europe. For the preparation of the study, has been used statistical and documentary information disseminated by specialized international organizations: IOM, KNOMAD, UN DESA, UNHCR, UN HABITAT and Eurostat.

In conclusion, the research confirms that during the next years the migratory movements will intensify on a global scale, especially towards developed and more ageing countries, but also, and with greater intensity, towards large urban agglomerations of emerging and developing countries, since cities function as real powers of economic development and as catalysts for immigration, generating 80% of world GDP and promoting innovation. Similarly, the number of refugees and forced displacements will increase as a result of 117 armed conflicts and active geopolitical tensions in different regions of the world, the effects of global warming and climate catastrophes, and the progressive sale of farmland poor countries to multinational companies. All of this requires increasing international cooperation and promoting sustainable local development processes in the poorest countries to curb the intensity of irregular migratory flows on a global scale.



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1549-A Study on The Consequences of Over Migration and Highlighting the Condition of The Children of The Migrants

Dr Snehamanju Basu¹, Dr Mohana Basu²

Jadavpur University JU Kolkata-India¹ Prafulla Chandra College under University of Calcutta Geography mohana15basu@gmail.com-India²

Kolkata has witnessed large scale migration of people from the surrounding states as well as from Bangladesh in the post- independence period. The present study thrives to explore the consequences of migration on the socio-economic condition of Kolkata and also aims to throw light on the lives of the migrants with special emphasis on the children. This study integrates multiple sources of data from both primary and secondary sources to analyse the socio-economic and cultural changes that has occurred in the city of Kolkata in the state of West Bengal in India. Results reveal that the huge migration has given rise to creation of slums, squatter settlements and encroachment of pavements due to the inhabitation of the pavements by the pavement dwellers. There has been significant increase of pressure in the employment scenario of West Bengal as a whole due to the huge influx of migrants. The slum population and the number of pavement dwellers have also increased significantly. There has been increase in crime rates as a result of lack of employment generation at par with the increasing population due to the large-scale influx of migrants. Moreover, the most of the children of the migrants still suffer in spite of the efforts taken by the government and several NGOs for providing them with education and prevent them from being exploited. Gendered differences seem to exist and the men migrants enjoy a lot of advantages in terms of wage rates, access to facilities etc than their women counterpart. In this backdrop this present study seeks to put forward relevant realistic measures towards controlling the present scenario and also seeks to provide with certain measures for elevating the quality of life of the migrant children.

1860-Turkish refugees in Brazil after the 2016 Turkey coup attempt

Romerito Silva¹, Elisângela Lacerda²

CEFET-MG FG Timóteo-Brazil¹ UFRR Geografia -Brazil²

Population geography is a subarea of Geography that is devoted, among other themes, to the study of one aspect of geographic space, population flows. The flow of international migrants has intensified since the technical-scientific revolution with the development of transport and communications, which has increased Geography's interest in this subject. Another flow that catches the eye of geographical studies - which despite using the same technical structures of migration differs by the causes and conditions of mobility - is the flow of refugees. According to international definitions refugees are those fleeing political, religious and other persecution. Brazil is one of the signatories of international treaties providing for the reception of refugees and has legal and governmental structures for the recognition of refugee status, despite the quality and effectiveness of these structures. Turkey underwent a coup attempt in 2016 that resulted in the deaths of hundreds of people and increased internal political tension. The aim of this study was to verify whether this internal situation in Turkey had an impact on the number of Turkish refugee requests in Brazil and, if so, to describe the spatial distribution in Brazil of these refugees and their general profile without compromising their safety. For this purpose, data provided by the International Migration Observatory linked to the Brazilian Ministry of Justice were used. The analyzes were performed using descriptive and geospatial statistics and showed a considerable increase in the number of Turkish refugees in Brazil from 2016, as well as their concentration in the richest state of the federation. These results are believed to highlight the international effects of an internal crisis and are relevant information for an improvement in the Brazilian refugee recognition and reception system.



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2330-EUROPEAN UNION REFUGEE POLITICS AND THEIR IMPACT OF GOVERNING REFUGEES IN THE AEGEAN

Tobias Breuckmann¹, Rainer Wehrhahn¹

CAU Kiel Department of Geography Kiel-Germany¹

Since the EU-Turkey-Deal in 2016, the migration-dynamics in the outskirts of the European Union fundamentally changed. Due to the efforts to fulfil the deal, the Aegean Islands changed its function from a space of arrival and transit into a space of containment. There, asylum seekers are supposed to be registered, supplied and processed within the asylum system in order to either be granted asylum in Greece, or, following the deal, be deported back to Turkey. Until the end of 2019, only a marginal number of asylum seekers were deported back due to several reasons, so that the numbers of asylum seekers constantly grew up to app. 20.000 people on the Island of Lesbos, where the biggest Hot Spot-Center of Moria is located. The conservative party of Greece, who came into power in late summer of 2019, claimed to change this situation, mainly through changing the asylum laws and procedures and building closed camps on the Aegean Islands and the Greek mainland in order to faster process asylum seekers to deport them back to Turkey. In this paper, we will concentrate on spatial strategies within and around the Hot Spot-Center of Moria of enforcing the EU-Turkey-Deal since 2018 and its changes resulting from changes of politics in Greece on the basis of field research in Greece from 2018-2020. We will use the Foucauldian-inspired theory of governmentality, extended by geographical theories in order to identify underlying socio-spatial structures of organizing the camp and negotiating structures of control and government between the manifold actors in Moria, following the aims of the EU-Turkey-Deal.

3660-EXPLORING THE EFFECTS OF REFUGEE CAMP ON HOST COMMUNITY A CASE STUDY IN THE EGYEIKROM REFUGEE CAMP IN THE KEEA MUNICIPALITY IN CENTRAL REGION GHANA

Comfort Iyabo Ogunleye-Adetona¹, Richmond Asiedu¹

University of Cape Coast, Ghana Geo & Reg. Planning Cape Coast-Ghana¹

Political disturbance every year forces thousands of people to escape their country of origin to seek protection/ refuge in foreign countries. Most refugee situations are however found in the world's poorest regions especially in Africa (Crip, 2000; Woyongo, 2015). These refugees are often put in various camps. The Egyeikrom Camp, Central Region is one of the several refugee camps set by the Ghana Government across the country to house refugees of various nationalities (Ghanaweb.com, General News of Thursday, 1st October 2015). Often time's attention is focused on the refugee population as they are obviously in a crisis situation. The enormous refugee flows into the camps have socio-economic as well as security implications on aspects of life in the host communities. The lives of the people of the host communities becomes even more challenging (UNHCR 2011). This study attempted to examine the socio-economic impact of refugees on Egyeikrom community, a host in Central Region Ghana. Primary and secondary data were used for the study Purposeful and simple random sampling were adopted to select 140 household heads including the key informant in order to obtain the primary information. The simple regression analyses results show that the presence of the refugee camp has contributed positively to livelihood of the host community; education and health, business and trading activities. However there has been a deforestation and minor conflict. Burden sharing strategy should therefore be used by international and other donor agencies to acknowledge the burden refugees place on host countries and their communities and offer a helping hand to include hosts as well.



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C.30. Population Geography Processes of population change migration and development

1056---The Changing Urban Demography of the Arabian Gulf Cities Abu Dhabi as a Model

Fayez Ellessawy¹

*United Arab Emirates University Geography Al Ain-United Arab Emirates*¹

Abstract

Abu Dhabi is the capital city of the United Arab Emirates. Abu Dhabi and other Arabian Gulf cities have evolved rapidly in the second half of 20th century, due to investment of oil and gas revenues. The total population of the city has grown rapidly by 1000% over the last 42 years; according to the first census in 1975 the total population was 120,000 inhabitants, which increased in 2018 to more than 1.25 million, with annual rate of growth of more than 5.7%. This increase makes Abu Dhabi's population one of the fastest growing urban centers of the world. The current population increase resulted from remarkable declining of birth rates and increasing flow of guest workers immigrants from only 87 thousand in 1975 to half million in 2005. The immigrant flow has continuously increased to be doubled to reach more than one million in 2018. The percentage of non-national increased continuously from 72 % in 1975 to nearly 90 % of the total population of the city in 2018, most of them are Asians. These figures reflect the enormity of the growing role of non-national workers in population growth of the city over the last four decades. Simultaneously, the increased percentage of the foreigners to total population of the capital city is creating many positive and negative impacts on Emirati society. This study investigates some of these changes to the demographic characteristics of Emirati society; particularly, creating an imbalance of age and sex ratios and unique composition of labor force. The researcher applied the topical approach with the use of analytical and cartographic techniques to reach the study aims

Key Words: Abu Dhabi. Population growth, Guest workers, Asians, Unbalanced age-sex structure, Labor

1141-Analysis of Seasonal Variation in Birth Rate in North Central Nigeria By U. W. Ibor (Ph.D) and Jaiyeoba P

Uguru Ibor¹

*Federal University Lokoja Geography Lokoja-Nigeria*¹

The study examined seasonal variation in Live Birth (LB), with a view of providing a new explanation to variations in fertility characteristics of reproductive aged women in Lokoja, Nigeria. The study utilized LB data which has been compiled by National Population Commission (NPC), Lokoja Office, Nigeria. The monthly reported case registry data collected contained information on number of LB, including the male and female composition of deliveries for five years (2014 - 2018). The annual reported cases were obtained by adding values for the respective months and the variability was determined using trend analysis. The months of delivery were further grouped into rainy and dry seasons to calculate for seasonality. The results showed that (90.75%) of the reproductive women were 20-39 years old. Over 70% of the women were educated with at least primary education, and 84.16% gave birth in the hospital. Male children represented 50.9% of the births recorded and 35.2% of the children was first child. The result showed that there was no significant statistical difference in male and female births in the period under review ($t = 0.271$, $p > 0.05$). The highest births were recorded in December, July, and August (47.48%), while the lowest births occurred in March and February (9.67%). There was a significant upward pattern in live births from 2014 to 2018; with 29.6% increase in the number of births. Conception was highest in April (22.5%) and low in July (4.66%). The study concluded that although the number of births varies in seasons, but the numbers do not result in a substantial variation over time. The study recommended that women should take into account seasons when preparing for fertility and have adequate knowledge of potential risks and benefits associated with conception and deliveries in particular seasons especially as it relates to fertility preference.



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1255-Return migrants' individual characteristics and migration experiences and their roles in rural urban transformation of migrants' sending areas Insights from a survey of seven provinces in China

Yu Zhu¹, Wenfei Winnie Wang², Liyue Lin¹, Jianfa Shen³, Qiang Ren⁴

Fujian Normal University School of Geography Fuzhou-China¹ University of Bristol School of Geography -United Kingdom²

The Chinese University of Hong Kong, Department of Geography and Resource Management, -Hong Kong³ Peking University Centre for Social Research -China⁴

In recent years, the trend of return migration and its developmental effects in migrants' sending areas have attracted increasing attention in both academic research and policy making. Based on a survey in seven provinces and drawing on previous evidence of in situ urbanization in the coastal areas, this paper examines the individual characteristics and migration experiences of return migrants and their implications for in situ rural-urban transformation of migrants' sending areas in China. The paper first compares the individual characteristics of return migrants with those of non-migrants in their home areas, and reveals that return migrants are younger, better educated, and more likely to engage in non-agricultural activities and setting up a business. The paper also compares the conditions of return migrants before migration and after return migration, and demonstrates that returnees' migration experiences have substantially improved their economic conditions, contributed to their business creation, and led them to a more urban lifestyle. The results of logistic regression further confirm that returnees' individual characteristics and migration occupations significantly increase their possibility to engage in non-agricultural occupations post return. However they seem to have little impact on returnees' likelihood of working in local urban areas. The results suggest that even though return migrants have exhibited somewhat positive impacts on the development of their home areas, their role is rather limited in promoting in situ rural-urban transformation of their home areas. Weak industrial base at the origins has been identified as a major barrier for rural-urban transformation, which suggests that strategic measures to strengthen industrial capacity in those migrant sending areas should take place in order to fully unleash return migrants' potential in stimulating in situ rural-urban transformation of their home areas.

1311-Bulgaria From a regional crisis to a demographic crisis or vice versa

Neli Veselinova¹

Sofia University "St.Kl.Ohridski" Social and economic geography Sofia-Bulgaria¹

The relevance and the importance of the topic about migration in Bulgaria stems from the fact that there is a public need for more in-depth research in the area of external migration, regional and demographic crises, in which the country is more than 30 years.

The study aims to analyze the external migration data of Bulgaria for a short period of time (2007 – 2018) - the membership beginning in the European Union, at the end of the first period as a member – 2013, and by 2018, almost at the end of the second program period. It is determined the time range of the study, the population external migration data is analyzed, a summary of the findings and conclusions related to the demographic and regional development of the country is done.

There is no dispute that Bulgarian society has been in crisis for a long time. Negative analyzes and conclusions are prevalent in research, in society, in media. Unfortunately, the statistic in Bulgaria also adds its facts. The main problem is in the lack of geographic education or culture, the regions and the populations are studied, planned, managed and understood individually. More answers are needed about the regional and the demographic crises, why and when they started, is there an exit from them and what is the decision. All experts and politicians view the problems according to their competence, and the geography remains isolated.

The present work may be of interest to a wide range of users - representatives of the academic field, teachers, and everyone who loves geography.



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1386-OUT MIGRATION AND SOCIAL DEVELOPMENT IN ROMANIA. COUNTIES BASED APPROACH

Bianca Mitrica¹, Nicoleta Damian², Ines Grigorescu², Irena Mocanu¹, Monica Dumitrascu³

Institute of Geography, Romanian Academy Human Geography and Regional Development Bucharest-Romania¹ Institute of Geography, Romanian Academy Environmental Geography and GIS nicoleta_damian2002@yahoo.com-Romania² Institute of Geography, Romanian Academy Physical Geography stefania_dumitrascu@yahoo.com-Romania³

Migration is one of the key components of population change in Europe. Migration flows over past decades among EU Member States and in- and outside of the EU have had a significant impact on the current population size in most Member States. Out-migration has become a relatively new phenomenon for contemporary Romania, especially after December 1989 and after Romania's EU accession (2007). According to OECD, the number of Romanians living abroad is estimated to be around three million, of which, the largest share are to be found in Italy (1,131,800 Romanians), followed by Spain (708,400 Romanians), Germany (345,800 Romanians) and UK (178,300 Romanians). The present research will provide an insight on specific patterns of out-migration related to social development and effects triggered by this demographic phenomenon. For this purpose, the authors make a correlation between the out-migration flows and the social development. The out-migration issue will have a multi-levels approach - European Union, national and counties - in order to have a better understand of this phenomenon. The authors used the statistical data available at LAU1/NUTS3 level (Counties) provided by the National Institute of Statistics and various documents published by the Research Institute for Life Quality, World Bank, EUROSTAT. From a methodological point of view, the current study aims to select those indicators proving a broad and accurate picture of out-migration (through the Out-Migration Rate indicator) and social developmental levels (through the Social Disadvantage Index, having in view labour force, living standard, education, health, social protection, public utilities, transport, and culture). At EU/national level, Romania seems to be one of the main providers of labour migration flows. Generally, one may identify different trends related to social development level which have imprinted different migration flows in Europe on one hand and regional disparities at national level, on the other.

1603-KAHRAMANMARAS POPULATION FROM PAST TO PRESENT

Nadire KARADEMİR¹, Şerife BİLİNİR¹

Kahramanmaraş Sütçü İmam Üniversitesi Coğrafya -Turkey¹

Located in the south of the Mediterranean region Kahramanmaraş has a long history dating back to nine thousand BC. It is also an important settlement which has been the center of culture, civilization, society and states from past to present. It is an important route between Anatolia and Mesopotamia. It is located on the north of the railway line connecting Çukurova to Eastern Anatolia and on the highway connecting Southeast Anatolia to Central Anatolia. In 2012, due to its metropolitan status, it became a city attracting population in terms of industrial incentives and reasons received after the 1980s. It is therefore a promising place in Turkey.

In this study, city of Kahramanmaraş Turkey Statistical Institute is based on population data. Based on the results obtained, the characteristics of Kahramanmaraş population by years, distribution of population by location, density, age and sex structure, population movements, urban and rural population are explained with tables, figures and graphs. In the research, the relationship between the population and the place has been revealed by considering the settlements.

When the census conducted after the Republican Period was examined, the population of Kahramanmaraş increased from 186.855 in 1927 to 528.982 in 1970. In 2000, the population reached 1.002.384 with a rapid increase and became 1.144.851 in 2018. In this process, significant structural changes have been experienced in the population. Population density value was 79 people per km². Kahramanmaraş, Turkey's population is in the eighteenth in terms of potential. Provincial population growth and population growth rate has been determined that Turkey has similar characteristics with the general population status. In the study, the potential population of Kahramanmaraş, Turkey and the world it was concluded that the scale should be evaluated and recommendations for this it was made.



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1649-Moving Population and Changing Paddy Holdings Dynamics for Three Generations in a Remote Area of Northern Laos

Satoshi YOKOYAMA¹, Shinichi TAKAHASHI², Takahito NIWA³, Futoshi NISHIMOTO⁴

*Nagoya University School of Environmental Studies Nagoya-Japan*¹ *Niigata Sangyo University -Japan*² *Teikyo University Faculty of Economics -Japan*³ *Embassy of Japan in the Lao PDR -Laos*⁴

In the small-scale community in developing countries which does not exist complete data of residents, it is hardly clarified the relationship between population dynamics and livelihood activities. In particular, it is an important topic to understand how land ownership and food supply change as the natural and social population increase. The purpose of the study is to clarify the correlation between population dynamics and livelihood changes at the household level for three generations in villages located in a basin with limited arable land. The study area is two neighbouring villages, N village and H village, mainly engaged in subsistence paddy and swidden cultivation in the Muang Ngoi area, Luang Pabang Province, northern Laos. The area is remote, with no electricity or school, and transportation is limited to walking. The N village is an old ethnic Lao village with a history of more than 100 years, while H village is a new ethnic Lao village created after the mid-1970s after the Indochina War. A large number of ethnic Khmu households migrated from the mountains to N village in the 1970s and H village in the 1980s. However, as there was no arable land left to develop new paddy fields, the migrants conducted swidden cultivation on the slopes to obtain food. After the introduction of the socialist-oriented market economy in the late-1980s, many ethnic Lao villagers sold their paddy to landless ethnic Khmu who had migrated from the mountains, and escaped from the inconvenient remote area to urban areas. As a result, the village's inhabitant composition changed from ethnic Lao village to mixed villages of ethnic Lao and ethnic Khmu. The ethnic Khmu in the mountains descend into the lowlands, and the ethnic Lao in the lowlands continue to be pulled to a more convenient urban setting.

1708-Internal Migration from Rural to Urban in Laos A Case Study in a Small Village in Northern Laos

Takahito NIWA¹, Futoshi NISHIMOTO²

*Teikyo University Faculty of Economics Utsunomiya-Japan*¹ *Embassy of Japan in the Lao PDR -Japan*²

This study aims to uncover process of migration from rural region in Laos and to clear features of lifestyles of migrants. Study site was H village where located in northern part of Luang Phabang province in Laos. The population size of the village is 181 as of March 2018 where remains lao traditional lifestyles. H village has experience both of in and out migration. While most of new settlers in the village is Khmu who came down from mountain areas according to governmental relocation policy, out-migrants are able to decide to move by themselves. This study focuses on life histories of out-migrants for the research purpose.

We took interview survey to migrants at March and September 2019 and collected information from 40 persons, 24 persons live in Vientiane and 16 persons live in Luang Phabang province.

According to the research, process of migration is characterized by "Chain Migration", however, information about destination was shared in one's family or relatives but also in the village scale. Social tie in the village works as connection among the village and cities. For example, some migrants keep connecting to the village to find young labors even though they moved out permanently and don't visit to the village for decades. Job opportunity in large city such as Luang Phabang and Vientiane is the most important pull factor for migrants from the village. The better lifestyles of migrants are, the weaker connection with the village they have. Migrant become settled in the city, and finally they move out from the village forever. Permanent migrants evaluate social conditions highly such as educational opportunity especially higher education for their children, access to hospitals and markets, and good infrastructures in Vientiane compared to the H village.



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1963-DIFFERENTIAL POPULATION DEVELOPMENT AND REGIONAL CHALLENGES IN FINLAND – A SPECIAL CASE OF SEINÄJOKI REGION

Elli Heikkilä¹, Markku Mattila¹, Mika Raunio¹, Toni Ahvenainen¹

Migration Institute of Finland Research Turku-Finland¹

Finland's demographic development is heterogeneous in the regional level. There are municipalities in which natural population change, net migration in terms of country-internal migration and net international migration are all positive. The best situation can be found in Helsinki, the capital of Finland, and in other growth centres. At the other extreme, there are municipalities for which these indicators are negative. These development trends have led to a high number of elderly people in the population structures of certain municipalities, resulting in a high medium age for the population and a high demographic dependency ratio. The areas having negative development trends, according to many population indicators, can be said to have multiple and thus multidimensional vulnerabilities. One dimension of vulnerability may increase the likelihood for others. In other words, various indicators may lead to an accumulation of vulnerabilities.

In the Migration Institute of Finland is on-going a research and development project of Migration as a motor for municipalities' vitality in which Seinäjoki region, located outside the main growth centres, is searching for solutions to keep and get new labour force to its region. As there is a competition to get fresh new labour to open vacancies the study area is willing to input to different activities. The project has started in 2019 and will last up to end of 2021 and the main funding is from Seinäjoki region.

The purpose is to analyze by questionnaires and interviews different population groups' attitudes towards Seinäjoki region starting from students in the region and their willingness to stay there after finalizing studies up to those who have already moved out and mapping the potential return migrants, including both natives and immigrant background persons.

2175-POPULATION DYNAMICS IN A LAO VILLAGE IMPACTS OF FAMILY PLANNING SPOUSAL SEXUAL RELATIONS AND MIGRATION EXPERIENCES

Yoshie Moriki Moriki¹

International Christian University College of Liberal Arts Mitaka-Japan¹

Laos is one of the few countries in Asia that has not yet completed the demographic transition. The demographic transition is a paradigm shift from a population with high birth and death rates to that of low birth and death rates. Currently, Laos is at the third stage of its demographic transition with declining Total Fertility Rates (TFR) of about 2.5 and relatively low Infant Mortality Rates (IMR) of 39 (per 1000 births). From the viewpoint of population dynamics, the Lao population presents an interesting case study. Is the country able to complete its demographic transition and also maintain replacement level fertility rates (TFR 2.1)? Since the country's population size is small and it is important for the country not to reduce its population, it is an emerging challenge, for the purposes of social development, to achieve and maintain reasonable fertility rates. This study focuses on the case of N village in Northern Laos, where the fertility of younger (20s and 30s) generations (average 2.4 children) is significantly lower than older (40s and 50s) generations (average 3.6 children). It reveals the apparent impacts of the introduction of family planning methods. This study also explores the relationships between the frequency of spousal sexual activities and the use of contraception. Results of a survey conducted in 2019 show a high level of sexual frequency between spouses. Based on qualitative ethnographic data, the roles and meaning of gender-based intimacy are discussed with special attention on the recently migrated Khum ethnic minority people. About 32 percent of the population of N village are Khum who migrated from mountain areas. Since theory suggests that fertility levels after achieving replacement level depend on the system of family and gender relations, this study contributes to the examination of future of Lao population processes.



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2564-PROCESS OF POPULATION CHANGE MIGRATION AND DEVELOPMENT A CASE STUDY OF SHOLAGA TRIBE IN BARGUR HILLS ERODE DISTRICT TAMIL NADU INDIA.

SUMATHI S N¹

PRESIDENCY COLLEGE(A),CHENNAI,TAMIL NADU GEOGRAPHY CHENNAI-India¹

Background of the study/Objectives:

Migration – The movement of persons away from their place of usual residence, either across an international border or within a State. Migration in India is mostly influenced by social structures and patterns of development. Uneven development is the main cause of migration. In rural areas factors like agricultural transformation, changing land use pattern, limited development in non-farm sector, environmental degradation, rural urban gap in basic amenities etc raises the incidence of poverty and unemployment among the tribal people. Tamil Nadu State have 36 listed tribes. Among the tribes Malayali, Kurumba's, Paliyan, Sholagas and Todas are some important tribes in Tamil Nadu. Sholaga tribes in the Erode District of Tamil Nadu mainly speaking both Sholaga and Kannada languages. The present study was investigated at kuttaiyur hamlet in Bargur hills, Anthiyur Taluk of Erode District, Tamil Nadu.

Methods/statistical analysis

For the study 160 Sholagas members from 30 households of Sholaga community in the Kuttaiyur hamlet was selected for the primary data. Through random sampling technique primary data was collected from the Sholaga community. From the Kuttaiyur hamlet, primary data was collected by using structured self-made questionnaire and personal deep interviews.

Findings

It was depicted from the present study that most of the Sholaga communities are still agricultural labourers. Male members are migrating towards the urban regions for their basic livelihood and sustainability. Sholaga tribe's basic economy mainly based on subsistence agriculture. Sholaga tribes literacy rate was very low. Kuttaiyur hamlet is located in the isolated area and primary health centre and medical facilities are very far from their hamlet. In rural areas factors like agricultural transformation, changing land use pattern, limited development in non-farm sector, environmental degradation, rural urban gap in basic amenities etc. raises the incidence of poverty and unemployment.

2813-Statistical approach of lifestyle influence on active ageing among elderly population from Ialomița County (Romania)

Ana-Maria Talos¹, Florin-Alexandru Zaharia¹, Alina Mareci¹, Mihaela Preda¹

University of Bucharest Human and Economic Geography Bucharest-Romania¹

Ageing population is a phenomenon that affects the whole Europe, but considering the effects of the communist period, as well as the transition period, the phenomenon requires special attention in Eastern Europe. In the last years, the interest about active ageing and lifestyle has increased. While the concept of active ageing refers to the increasement of elderly population quality of life, lifestyle is related to personal choices (eating, physical activity, smoking, alcohol consumption, medication).

The present study aims to present a statistical approach regarding the evaluation of the influence that lifestyle has on the active ageing among the elderly population in Ialomița County. The paper is a methodological research and aims to identify the most efficient statistical methods for such an approach regarding the evaluation of the relationship between lifestyle and active ageing in one of the most ageing counties of Romania. The methodology is based on a survey conducted in Ialomița County (men and women over 65 years old according to Romanian legislation). For a complex analysis adapted to a large sample size data were processed using SPSS program. The results of the study are presented from a statistical perspective and explain that lifestyle is an important determinant of elderly population health status, many important variables determine territorial inequalities (income, education, living environment, gender). The paper represents a starting point in future statistical studies that intend to deal with complex social issues. The statistical approach is important because it supports the fact that elderly population has to adopt a healthy lifestyle in order to prevent disease and functional decline, extend longevity and enhance one's quality of life.



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C.30. Population Geography Short scale mobilities and the environment How environmental variability threatens crucial regional provincial urban or micro mobilities

3395-CLIMATE CHANGE SEA LEVEL RISE AND FEAR OF LOSING ONE'S LAND EVERY DAY GEOGRAPHIES OF STRUGGLE IN COASTAL ODISHA

Subhakanta Mohapatra¹

*Indira Gandhi National Open University (IGNOU) Geography New Delhi-India*¹

Extreme climate related hazards led to many densely populated areas along the coast in India in general and the state of Odisha in specific become uninhabitable and people of such places look for an opportunity to migrate. The population which could not move despite the harsh environmental conditions is termed as 'trapped population'. This 'trapped population' is a concern for the local as well as national government. The study was conducted in coastal villages namely Satabhaya and Pentha of Kendrapara district of Odisha, India. Satabhaya has already lost five villages due to sea ingress and these villages have shifted their original position twice in a lifetime period. The study has made an attempt to understand the difficulties associated with the shifting of villages and associated migration of many people from 'Everyday Geography' perspective. Major objectives of the study were to: understand the complex relationship among environmental change, migration and immobility; and explain why certain groups of population are mobile while others are not? This study was a longitudinal study conducted over a period of seven years (2012-19) by using qualitative methods. 40 key informants were interviewed. Focused group discussion was held with the female and older population of the village and local level administrators and political representatives. Major findings of the study are insufficient resources, obligations to family members or assets, social ties and network, worse alternative, lack of opportunity, physical immobility are the major reasons of immobility. Adaptive capacity has to be enhanced using multi-prong strategies such as investment in poor people's human capital, particularly their education and skill development, and specifically education of girls and women. Geographies of Every Day perspective provides a lens to critically analyse the impact of Global Environmental Change at local scale.



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C.30. Population Geography Transnational Migration and Social Diversity

1088-Negotiating Work and the Future Aspirations and Autonomy of Migrant Wives in Singapore

*Theodora Lam*¹

*National University of Singapore Asia Research Institute Singapore-Singapore*¹

As the number of international marriages in Asia continue to rise, feminist and other critical scholars have argued that pathways to integration for marriage migrants are often precariously ridden with negotiations around gender, ethnicity, nationality and class within host societies. Drawing on an ethnographic study of marriage migrants in Singapore comprising mainly Southeast Asian women who marry Singaporean men belonging to the lower social-economic strata, this paper makes two arguments. First, the paper examines the gains and pains that foreign wives are confronted with in taking up paid work in Singapore after marriage. While joining the labour force as waged workers enhances the women's respective personal growth, financial status, autonomy and networks, it also re-calibrates their relationships in the reproductive spheres, having varied effects on their marital and family relations. Second, the paper explores the aspirations of these foreign women for their own futures in Singapore. While some pursue citizenship papers in order to facilitate putting down roots in their host country, others may choose to retain their original citizenship to keep the door to return migration open. By drawing on life-story interviews with both paired and unpaired cross-national marriage partners in Singapore, we foreground the women's perspectives as they develop new statuses as foreign wives, daughters-in-law, new mothers and wage-earning workers whilst fulfilling their roles as dutiful daughters. At the same time, we highlight their spouses' reactions and responses – whether facilitating or inhibiting – to their aspirations and strategies for work, as well as to their familial plans for their own future.

1089-“Ways of Being” and “Ways of Belonging” Social Integration Experiences of Migrant Wives in Cross National Marriages in Singapore

*Brenda Yeoh*¹

*National University of Singapore Geography Singapore-Singapore*¹

“Mixed marriage” in the traditional Western-centric literature is often seen as a “facilitator of integration” as marital unions potentially provide “privileged access to residence and citizenship status for family members of citizens” (de Hart 2015, 171). In contradistinction, the scholarly literature on cross-national marriages based on the Asian experience has questioned this perspective, highlighting that marriage migrants – particularly women moving from a less developed to a more economically advanced country – face considerable barriers to integration as they navigate precarious and prejudice-ridden pathways towards residency and citizenship rights. Drawing insights from both sets of literature, this paper examines the integration experiences of 36 migrant wives from low-income, cross-national families in Singapore. We follow Charsley, Bolognani and Spencer (2017) in treating “integration” not so much as a singular measure but a complicated and contested set of processes occurring unevenly across several domains, including the social, cultural, civic/political, structural and identity. By distinguishing and examining the inter-relationships between the different domains, we frame integration as a combination of both practical “ways of being” and meaning-laden “ways of belonging” (Levitt and Glick Schiller, 2004), where marriage migrants' everyday practices in negotiating the spheres of life intertwine in influencing their sense of belonging, and vice versa.



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1740-Transnational Spirituality A Case Study on the Religious life of Filipino Migrant Workers in Macau

Tat-In Tam¹

*Royal Holloway, University of London Department of Geography Egham-United Kingdom*¹

Borders provide both constraints and opportunities for migrant workers to their religious lives and transnational religious practices. This paper particularly put the focus on the spiritual experiences of the Filipino migrant workers in Macau. Having been one of the major ethnic group in the city, the Filipino community presents a diverse picture of religious practices which have largely different from the traditional ones among the pre-defined multi-culturalism of Macau.

Extant scholars have already pointed out that migrants tend to continue their religious practice in some extent. However, the cultural borders as well as the territorial borders limit their abilities to transplant a holistic clone of the original religious association or activities to the host society. An adjusted form of religiosity thus then emerged so that the religious lives can be persisted in a sustainable way. Based on the data collected through interviews and fieldwork notes from certain participant observations, this paper will present Filipino migrants' lived experiences in transnational religious association and the transnational spirituality.

As a case study in Macau, this paper argues that transnational religious associations originated from the Filipino Community that have been rooted under migration context promote spiritual support as a means of coping strategies. Spiritual support derived from routine religious practices and celebrations. Spiritual support thus provides a way of reconstructing identity for the migrant workers through the on-going migration process. Spiritual support can be perceived as spirituality in a transnational context following the migrants' periodical journey across the borders as contract workers. This paper suggests that transnational spirituality has continuous influences on migrants' lives and on their migration decisions, which provides a unique perspective on transnationalism.

3097-New spaces of in exclusion Experiences of Eastern European young children in post Brexit schools in the UK

Thiago Bogossian¹

*University of Surrey Sociology Guildford-United Kingdom*¹

The inclusion of migrant children in schools in Britain is a contested terrain. Literature has explored their sense of belonging, their social capital, the language and other barriers they face, their social and emotional wellbeing and issues of family participation in their school life. However, compared to other migrant groups in the UK, the experiences of Eastern European children are usually overlooked in scholar research. Nevertheless, since the results of the EU referendum, hate crime motivated by race or religion has increased, impacting strongly the lives of Eastern European children and adults. While adults started to cover their language or nationality as whiteness is no longer perceived as a mask of protection (Botterill and Burrell, 2019), pupils have experienced higher levels of anxiety regarding their future and growing xenophobic bullying in their schools (Sime et al., 2017). Within this context, my study plans to investigate how pupils experience in/exclusion at schools in the UK in the context of Brexit and what factors impact on their in/exclusion according to their own perceptions. I will conduct ethnographic fieldwork in comprehensive schools in rural areas in Britain, where cultural and language diversity is less present. I will facilitate group sessions with Eastern European children and we will use storytelling, drawing and other child-centred and participatory techniques to comprehend their experience through their preferred communication channels. We will use their drawings as prompts for conversations about their perceived present challenges and future expectations of living in this country in the context of Brexit. Through this research, I expect to gather a better understanding of an overlooked migrant group in Britain in a new, dramatic social and political context.



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3536-Avoiding Parsimony in Representations of Migrants' Integration A Methodological Exercise and Some Ways To Complicate Research With Theory

Antonello SCIALDONE¹

INAPP Migration and Social Economy Rome-Italy¹

A cognitive infrastructure is essential to support and evaluate policies in migration field, but representations of phenomena in public debates don't actually seem to derive from well-grounded evidences. To replace stereotypes with data and analyses inspired by high-quality standards of scientific literature, INAPP and Italian Government have launched a project concerning integration indicators comparable at international level (acknowledging properly that focus on this topic concerns a challenging issue, due to its transversal profile with respect to different sectorial agendas and to the sensitive, polysemic and ambivalent nature of the concept). A relevant reference for common levels of observation and intervention aimed at migrants' integration in Europe is Zaragoza Study (European Commission 2011; Bijl-Verweij 2012; Huddleston et al. 2013); others supranational guidelines which direct the production of data on integration in other countries (MIPLEX, IMPALA, DEMIG, OECD, EMIX) are also taken into account. The paper aims to sketch a comparative overview of international models and to focus on theoretical-methodological problems that must be taken into account dealing with the construction of a monitoring system of integration measures (Alba-Foner 2014; Beine et al. 2016; Bertossi-Duyvendak 2012; Bilgili et al. 2015; Goodman 2015; Helbling et al. 2013). In fact approach to integration is segmented: it's easier to focus more on hard sectors such as training and job placement, and much less on sociocultural profiles, including mutual trust or discrimination; at the end we often use pragmatic meanings of integration that concern migrants' participation in key fields of society. Other critical elements concern weight of theories and national models; enhancement of the subjectivity of migrants; involvement of social and inter-institutional partnership in monitoring procedures; availability of consistent data; and trade-off between complexity of integration (which pushes to define numerous indicators) and practical translatability of the measures (which requires limited and understandable information).



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C.31. Transport and Geography 'Beahubordie' The polarizing transport connectivity and its impacts in megacity regions

2316-Political economy of transport investment for left behind places in Northern England – A case study of the South Fylde Line

Chia-Lin Chen¹

*University of Liverpool Geography and Planning London-United Kingdom*¹

This paper examines a rail improvement project that has wider economic and social transformation potential yet struggles to make a business case for implementation. Academic literature has paid more attention to mega transport infrastructure projects such as high-speed rail line but few efforts have been made to interrogate transport improvement projects that are less grand but equally critical for transition at the urban and regional level in particular for places that are bypassed by mega transport infrastructure. High-speed rail Two (HS2), UK's biggest rail investment in the 21st century is under construction for a fast connection between London and northern England onwards. Meanwhile, HS3 enabling efficient connection across northern major cities is also proposed to exploit the wider spatial-economic impacts of HS2 for Northern England. However, in parallel to these mega projects, the situation on the ground is that the left-behind places (UK 2070 Commission) are difficult to be justified with their transport investment that could be a strategic part for transformation.

A case of improving the South Fylde line linking places in Fylde Coast (North West England UK) is examined in-depth to unveil the complexity and failure of justifying its business case. A mixture of research methods is used, including literature/policy/appraisal document analysis and in-depth interview with experts and academics, key stakeholders (including local communities and business leaders) and policy makers (both local and central). A perspective of political economy is illustrated in three key themes in evolution, namely transport appraisal, institutional reform, and strategic planning. The paper aims to explore issues encountered during the planning and evaluation process in order to seek possible ways forward.

2431-THE PUBLIC TRANSPORT AND LAND USE PLANNING NEXUS THE CASE HARARE ZIMBABWE AND BLOEMFONTEIN AND MBOMBELA SOUTH AFRICA

Verna NEL¹, Abraham MATAMANDA¹

*University of the Free State Urban and Regional Planning -South Africa*¹

This study examines the public transport and land use planning nexus in an African context. We argue that despite the increasing need for affordable and effective transport in rapidly urbanizing African cities, public transport remains neglected in land use planning thus compromising urban sustainability and producing social injustices. Due to official neglect of communities' accessibility needs, informal transport services have emerged to fill the gap.

Using a case study research design with primary data obtained from key informant interviews with purposively selected respondents that include officials from local authorities, commuters, the taxi industry and transport planners along with an analysis of official policy documents, we present studies from three diverse areas; one in Zimbabwe and two in South Africa.

We find that the informal public transport sector remains unregulated and this has resulted in social injustice with poor service with scant regard to citizens' mobility in the case study areas. Minibus taxis are the dominant modes of public transport that mainly serve the most viable and profitable routes. Some routes are neglected and this marginalizes certain communities, especially residents in emerging communities who are forced to walk more than the last mile. Moreover, safety is also a major issue as the commuters as often put at risk. The pricing mechanism is not regulated – creating a situation where the poor end up paying more for transport. We recommend a spatial planning framework that integrates transport issues as an intrinsic component of urban development that can foster sustainable, inclusive and safer communities.



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2742-To Bridge or not to bridge Connectivity on the Sino Russian border

Ekaterina Mikhailova¹, Chung-Tong Wu²

*Immanuel Kant Baltic Federal University Institute of Environmental Management, Urban Development and Spatial Planning
Kaliningrad-Russia¹ University of Western Sydney University of Western Sydney tong.wu@westernsydney.edu.au-Australia²*

The great majority of the Sino-Russian border (4195 km) lies in the Russian Far East with a river (Heilongjiang or the Amur) as the border. This border changes with the seasons. It freezes over in the winter and for at least 7 months of the year, water transport is not possible or safe. Even though the narrowest point separating the two countries is just over 700m at the sites of the city of Blagoveshchensk (Russia) and Heihe (China) and supposedly a desire by both to forge a twin city, it has taken three decades of discussions for a highway bridge linking the two to start construction late last year. In the meantime, transport links between the two is served by ferries in the summer months, hydrofoils and an ice-bridge when the river freezes over. All these come with significant administrative and financial costs, not to mention inconvenience to the passengers and freight forwarders. Furthermore, the new road bridge's significance has been overshadowed by another bridge that had been under construction simultaneously with railway linking the countries at Tongjiang, a small Chinese border town, and Nizhneleninskoe, an even smaller Russian village in the least populated region of the RFE – the Jewish Autonomous Oblast, some 250 km to the east. Both bridges were completed in 2019.

The papers will shed light on competition for being a major trade and logistics hub on the Sino-Russian border and explore whether the recently completed links have lost their strategic importance in the context of China's Belt and Road initiative. The study relies on published material in Russian, Chinese and English to examine the national political environment, supplemented by periods of fieldwork in selected cities undertaken during 2013-2017.

C.31.Transport and Geography Long distance travel issues

1571-High speed Rail in China Geographic effects and Development Experience

Fengjun Jin¹, Zhuo Chen¹

*Institute of Geographic Sciences and Natural Resources Research Key Laboratory of Regional Sustainable Development
Modeling Beijing-China¹*

In 2019, China's high-speed rail mileage was about 35000 km, which was more than the total mileage of other countries in the world, and had greatly improved the mobility of Chinese citizens. With the time distance analysis method, impacts of high-speed rail on accessibility of China's city network are evaluated and the development experience of China's high-speed rail is summarized, which may provide reference for other countries considering investment in high-speed rail. Results show that, by 2030 (i) more than 80% of the population in China can enjoy the high-speed rail service with travelling less than 1 hour; (ii) the average shortest travel time between 337 cities in China will be shortened from 12.49 hours to 8.53 hours; (iii) more than 70% of Chinese citizens can reach at least one provincial capital city in three hours. These changes will provide favorable support for the development of metropolitan areas and promote the agglomeration and diffusion of socio-economic resources in China. In terms of the development experience, firstly, connecting different lines into a network is important to solve the financial problems, which provides a foundation for grouping feeder lines with main lines to pool revenues and costs. Secondly, social effect should be considered seriously during the planning and construction of high-speed rail. In China, all cities with a population of more than 200 thousand will be connected with high-speed rail by 2030, making high-speed rail travel a universal civil right. Last but not least, China's high-speed rail construction has been in line with the urbanization and industrialization process. More than 200 million migrant workers provide sufficient traffic demand. And the convenience provided by high-speed rail for travelling in turn forms a support for China's urbanization and industrialization by promoting the optimal allocation of labor resources.



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2027-European airlines serving third markets Revisiting the use of 7th and 9th air freedoms based on airlines' ownership

Dobruszkes Dobruszkes Frédéric¹, Reynolds-Feighan Reynolds-Feighan Aisling²

Brussels Free University (ULB) DGES-IGEAT Brussels-Belgium¹ University College Dublin College of Social Sciences & Law, Dublin -Ireland²

The European air market is arguably the most accomplished case of multinational liberalisation in aviation with 31 members (EU, Norway, Iceland and Switzerland) having offered nearly total freedom to their airlines. As a result, it could be expected airlines would operate flights not serving their home country, both internationally (so-called 7th air freedom) and domestically (so-called 9th air freedom). However, only the leading low-cost airlines have done this and have really become pan-European (for instance, Ireland-based Ryanair operates flights between Belgium and Italy and within Spain). In contrast, traditional airlines have apparently remained concentrated on their "natural" market, namely domestic and international flights serving their home country. As a result, computations suggest the use of the 7th and 9th air freedom in Europe is nearly inexistent besides the low-cost airlines.

The largest traditional airlines have nevertheless penetrated third markets through the purchase of shares in foreign airlines. For instance, Lufthansa wholly owns Austrian Airlines, Brussels Airlines and Swiss International Air Lines. This means that when Austrian Airlines operates international flights from/to Austria, it could actually be considered as Lufthansa's 7th air freedom flights.

In this context, this paper aims to revisit the concept of 7th and 9th air freedom based on airlines' ownerships instead of apparent brand names that may be disconnected from the capital's location. A methodology based on the investigation of European airlines' ownership will be proposed and then applied to the European market. The ultimate goal is to reassess the share of 7th and 9th air freedom supply within the whole European liberalised air market.

3519-LOVE AND HATE FROM THE SKY IMPACT OF COVID 19 ON INDONESIA'S SPATIAL ECONOMY THROUGH AIR TRANSPORTATION

Nuzul Achjar¹, Tri Tjahjono², Andyka Kusuma², Bhidara Swantika²

Universitas Indonesia Economics Jakarta-Indonesia¹ Universitas Indonesia Civil Engineering -Indonesia²

Global pandemic of COVID-19 has a significant impact on Air Transportation of Indonesia, particularly since the government implemented the lockdown or large-scale social restrictions (PSBB) in March 2020. GDP growth (year-on-year, YoY) was contracted by -5.32% in quarter-2 (Q-2) and -3.49% in quarter-3 (Q-3) 2020 along with declining consumption, export and import of goods and services. It highly affected transport (logistic) sector with negative growth by -30,84% and -16,70% respectively. Air transport suffered from peak contraction -80,23% in Q-2 and -63,88% in Q-3. Besides dramatic declining demand for air transport, COVID-19 has also an impact on the sharp drop of international and domestic tourism in the provinces.

The goal of the paper is to reveal the changing structure of air transport network and its relationship with the dynamic changes in the spatial economy of Indonesia 2005-2020. The paper departs from the conceptual framework that air transport plays an important role in shaping global economy, in this case from the lens of regional economy through aero-mobility, connectivity, and linkages. Using spatial Gini, changing pattern of domestic air transport compares the condition of before and post COVID-19.

Changing structure of air transport before COVID-19 was caused among others by competition policy, tariff and beyond tariff from the emergence of low cost budget airlines. Closed observation on post COVID-19 policy shows how tug of war between health and economic interest affect the performance of air transport. While air transport cargo includes in the restriction in order to support economic activities, limitation of regular airplane constrains inter-inland cargo. Based on the analysis of 40 pair of air transport network that connect 34 capital and other major cities during 2005-2020, alternative mode of transportation and the existence of multi-mode transportation influenced the resilience of air transport in the spatial economy



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C.31. Transport and Geography Mobility as a Service and Shared Mobility Shaping the Future of Our Cities

1315-CARSHARING FOR SUSTAINABLE MOBILITY MEASURING THE IMPACT OF 14 SERVICES ON MOBILITY PRACTICES CAR EQUIPMENT AND KILOMETRES TRAVELLED IN FRANCE

Marion Lagadic¹, Nicolas Louvet¹

*6t Research Paris-France*¹

Background

While the potential of carsharing for sustainable mobility has been widely explored, few studies include controls to isolate the impact of carsharing from that of personal situation changes and other transportation modes. Result of a thorough literature review and academic monitoring over the past years, this study experiments a novel method to measure the impact of carsharing on an original large-scale survey.

Methods

An online survey was circulated to carsharing users through 14 French operators. After quality controls, 3309 answers were analysed. The impact of carsharing on mobility practices was evaluated by comparing self-declared travel frequency for different modes before and after registering to carsharing. Its impact on car equipment was then assessed while controlling for other life factors, and converted into a number of cars abandoned per user and per shared car. Finally, the authors estimated the private car kilometres that would have been driven without carsharing, and confronted those to carsharing kilometres travelled to obtain a net impact.

Results

38% of carsharers renounced their private car because of carsharing. Each additional carsharing user entails the renouncement of 0.27 to 0.42 personal car ; each carsharing vehicle replaces 5 to 8 personal vehicles, and frees up 1.4 to 2.7 parking spaces. A great complementarity between carsharing and public transport was identified in the Paris region, with 52% of carsharers using it everyday. Outside of Paris, it is with cycling that the best complementarity is observed : 42% of users cycle everyday.

Conclusions

In France, carsharing has replaced up to 20 000 personal cars, 6750 parking spaces, and avoided almost a hundred million car kilometres. These figures remain marginal due to the niche status of carsharing. This sheds light on the importance of wisely integrating carsharing within MaaS systems along with its two best allies, public transport and cycling.



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1405-THE DEBATE AROUND MOBILITY AS A SERVICE WHAT ARE WE AGREEING AND DISAGREEING ON

Ana Condeço Melhorado¹, Daniela Arias Molina¹, Juan Carlos García Palomares¹

University Complutense of Madrid Geography Madrid-Spain¹

Background: Mobility as a Service (MaaS) is an emerging technology representing a user-centric, intelligent mobility distribution model in which all mobility service providers' offerings are aggregated by a sole mobility provider, the MaaS Operator, and supplied to users through a single digital platform. MaaS as an emerging technology is part of a larger societal trend towards the sharing economy and a strategy to achieve more sustainable transport consumption, as it provides an alternative to move people and goods faster, cleaner and in many cases cheaper, without increasing the infrastructure capacity. Some authors argue MaaS will change transport as we know it. It will bring users to the front row, with tailored mobility packages according to the user's travel needs. Mobility understood as a single service available on-demand and incorporating all transport modes, can provide an alternative to private car ownership and represent a significant innovation opportunity towards sustainable mobility. As a topical subject, Mobility as a Service is generating hype around the scientific community. Several authors have analysed its possible impacts, business models, governance issues, etc.

Materials and methods: With the rapid development of MaaS-literature, this study analyses 59 MaaS-fully-focused, peer-reviewed, journal articles published, up until December 2019, in order to summarise authors' main findings and present a brief description of positions (agreed and disagreed issues) on the different topics addressed in relation to MaaS.

Results: Our results show that some MaaS topics are close to agreement (MaaS definition, classification) while others continue to generate disagreement (governance issues, targeting segments, business models, public-private collaboration).

Conclusions: This study shows a summary of different expert positions, that policy planners could use to identify clear negotiation spots (topics with ongoing debate) that need to be urgently addressed in order to successfully implement MaaS.

2171-UNDERSTANDING PERCEPTIONS OF MOBILITY AS A SERVICE USER SEGMENTATION AND ITS ROLE IN CONCEPT ADOPTION AND MODAL CHOICE

Elena Alyavina¹, Alexandros Nikitas¹, Eric Njoya Tchouamou¹

University of Huddersfield Department of Logistics, Hospitality, Marketing and Analytics Huddersfield-United Kingdom¹

Background: Population growth and continued urbanisation resulted in creating an unsustainable mass of private cars, which challenges transport systems around the world and environment as a whole. Mobility as a Service (MaaS) is a recently emerged concept that aims to potentiate a shift in individuals' travel behaviour away from private car dependence and help in overcoming transport related sustainability issues. To enhance the reaches of public transport, MaaS heavily relies on car sharing and ride hailing services. Recent research suggests, however, that the latter are often used to fully substitute not only private car but also public transport journeys. This means that MaaS has the potential, if not designed and operated properly, to induce unsustainable travel behaviours among its users. **Hypothesis:** This study identifies whether a shift to more unsustainable travel may be a side-effect of adopting a MaaS-centric behaviour and proposes how MaaS can maximise its potential as a tool actively promoting sustainable mobility.

Methods: The key phase of this study is based on a quantitative survey looking to elicit travel related psychological make-ups of potential MaaS users in the United Kingdom. A set of Likert-scale answers are provided for participants' selection. The selected methods for analysing survey results are the combination of factor analysis and cluster analysis. Descriptive statistical analysis, chi square analysis and regression models are also applied.

Results and Conclusions: This study defines different road user type segments through investigating present travel behaviours and their drivers, gives details on intentional travel behavioural change when faced with MaaS, and distinguishes the most likely and the least likely to travel sustainably user groups. Thus, the findings of this study enable the design of effective policies and business models that will help make MaaS an effective tool for enabling sustainable travel behaviour among its users.



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2665-Can bike sharing still be part of the future of shared use mobility

Alexandros Nikitas¹

University of Huddersfield Huddersfield Business School Huddersfield-United Kingdom¹

Background:

Bike-sharing, the greenest, more affordable and easiest to implement form of shared use mobility interventions, typically 'framed' as an ideal first- and last-mile travel solution for congested metropolitan environments is now with the recent game-changing introduction of dockless fleets more relevant than ever before. It has emerged rapidly across the globe, with 2120 operating schemes and 17,794,750 self-service public use bicycles.

Nonetheless, this world domination has lately become somewhat problematic; the closure of many dockless systems and the retreat of major providers from key cities is stigmatising this novel concept.

Hypothesis:

The study aims to review the state of the art when it comes to bike-sharing and help in developing policy and business lessons that will help schemes to survive and even prosper.

Methods:

This work adopts a dual methodological approach. On the one hand uses quantitative evidence from three survey-based studies two held in Greece and one in Sweden looking at acceptability and usage determinants. The combined sample refers to more than 1500 respondents that could be subscribers, occasional users, future users or in some cases non-users of the local schemes. On the other hand, this work provides a state-of-the-art analysis of the latest developments in bike-sharing operations using a number of exemplary bike-sharing case-studies across the world.

Results:

The study provides evidence that if bike-sharing is introduced, organised, operated and promoted adequately could be acceptable even in small and medium sized cities (including those that have yet to establish a strong pro-cycling culture) even from people not intending to ever use them. Usage rates however do not always reflect the very high acceptance rates; they are significantly lower.

Conclusions:

The study provides evidence that even in this harsh climate when many bike-sharing schemes have failed the concept remains a valid option for cities and mobility providers looking to invest methodically in it.

3628-Mobility as a Service (MaaS) and rail operators future opportunities and challenges

Amparo Moyano¹

University of Castilla La Mancha Department of Civil Engineering Ciudad Real-Spain¹

Nowadays, the integration of all the links in the whole transport chain for door-to-door trips is one of the focus that 'Mobility-as-a-Service' (MaaS) applications are developing. Rail operators are starting to introduce themselves in this MaaS market oriented to ease users' experience in intermodal trips, trying to become MaaS providers. The need for entering this market is mainly due to the changing environment that many train operating companies (TOCs) are now facing. Especially in relation to high-speed rail (HSR) systems, some of the most important markets worldwide, such as Spain or France, are liberalising the exploitation of some HSR lines to competitors. In this context, digitalising customer experience through MaaS approaches is a key strategic move to attract users that TOCs are now considering, not only in the forthcoming rail market liberalisation, but also in modal share competition (both in local and long-distance scales). However, although the opportunities are many, TOCs must also measure the threats and evaluate their competence, trying to offer a product that differentiates them from the rest.

In this paper, the MaaS approach is discussed and the rail market idiosyncrasies are evaluated with the aim to evaluate the specific opportunities that high-speed rail operators have as MaaS providers and the challenges they should face to become the main actor among all the stakeholders. In particular, the main factors affecting the relation between MaaS and rail operators are presented and discussed, revisiting all the HSR cities integrated in the Spanish network, and considering the particularities of HSR mobility in terms of scale of implementation, users' needs, travel behaviour, journey planning, etc. As a result, the particularities of HSR systems are brought to light, defining the framework and policy implications which rail transport planners should consider in the implementation of their forthcoming MaaS applications.



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3641-Mobility preferences and willingness to pay for MaaS

Ana Condeço Melhorado¹, Daniela Arias Molinares¹, Filippo Tinelli²

University Complutense of Madrid Geography Madrid-Spain¹ University of Bologna Economics filippo.tinelli@studio.unibo.it
-Italy²

Currently, there are several MaaS pilots in different cities of the world, however, most do not offer sufficiently consolidated plans or MaaS bundles. Public transport is the central service of these plans, which also include other modes with a time or distance limit or the possibility of pay-per-use. However, the consolidation of MaaS business models requires knowing the preferences of users in relation to transport services, their mobility patterns, their preferences regarding the aggregation of services in fixed, flexible or pay-per-use plans, as well as the variation of preferences according to social groups or the geographic context. On the other hand, it is important to understand the potential effect of these services on modal shifts towards more sustainable transport alternatives.

Materials and methods: A survey was distributed among citizens in Madrid which consisted of three main sections: (1) a questionnaire of revealed preferences on characteristics of mobility patterns. Given the pandemic situation, some questions have been included about mobility changes due to the SARS-CoV-2 virus; (2) the MaaS questionnaire that includes the stated preferences experiment and additional questions on attitudes and perceptions, as well as the potential impact of MaaS; (3) a questionnaire on the sociodemographic characteristics and on attitudes and perceptions of the respondents.

Results and conclusions: The study will review the change of mobility patterns due to SARS-CoV-2 virus and the preferences for MaaS. Questions related to socio-demographic characteristics are important for further modelling purposes, as well as to allow market segmentation and help generalize the results to the general population. The willingness to pay for MaaS services will be estimated which will be useful for future MaaS business models in Madrid.



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C.31. Transport and Geography Transport and Social Equity Pathways to Fair Just Inclusive and Accessible Mobilities

1196-COMMUTER TRAIN DYSFUNCTION IN CAPE TOWN

Stephen Rule¹, Saahier Parker¹, Yamkela Majikijela¹

*HSRC RIA Cape Town-South Africa*¹

Background: Commuter trains in metropolitan Cape Town are continually plagued by arson and violence. In addition to the slashing and dismantling of passenger seats, graffiti, vandalism of doors and windows, and robbery of passengers, train fires have been a frequent occurrence. Although public protest is generally non-violent (Klandermans, 1997; Stekelenburg & Klandermans, 2010), and the abuse of public transport and other public property and facilities is common internationally, its extent in Cape Town is severe. Hostile targeting of public transport is well-documented (Mannheim, 1954; Zimbardo, 1970; Wilson, 1987; Geason, 1989; Lerer & Matzopoulos, 1996; Tucker, 2009; Wolff, 2011; Thompson et al., 2012; Runciman et al., 2016). The political rationale or psycho-social causation (Fischer & Roseman, 2007; Drury & Reicher, 2009; Thompson et al., 2012; Paterson & Power, 2016; Kanyane, 2019) has been attributed to relative deprivation, public frustration and perceptions of social injustice (Wright et al., 1990; van Zomeren et al., 2004; van Zomeren et al., 2008). Method: An online survey (n=1978) in December 2019 elucidated perceptions of causes of the devastation. The paper disaggregates by suburban line, the emergent views and ameliorative recommendations. Findings: Commuter frustration and anger about inefficiencies are seen as underlying justifications for violence. Lack of communication about train delays and cancellations are further exacerbations. Inadequate provision for passenger safety and security perpetuate the reactionary cycle, and a sizeable proportion of respondents attribute train arson and vandalism to opportunistic crime or stupidity. Conclusions: Notwithstanding the critical importance of the system for daily city-wide mobility, and despite high profile political undertakings to implement better management, train delays and cancellations are a daily occurrence. Intervention in respect of infrastructure, technical skills development and enhanced safety and security measures are essential to realise the imperatives of social equity, justice, inclusivity and accessibility.

1894-CONNECTED AND AUTONOMOUS VEHICLES AND TRANSPORT EQUITY A QUANTITATIVE STUDY EXAMINING PUBLIC PERCEPTIONS REFERRING TO CYBERSECURITY AND PRIVACY

Na Liu¹, Alexandros Nikitas¹, Simon Parkinson²

*University of Huddersfield Huddersfield Business School Huddersfield-United Kingdom*¹ *University of Huddersfield School of Computing and Engineering s.parkinson@hud.ac.uk-United Kingdom*²

Connected and Autonomous Vehicles (CAVs) constitute a cutting-edge technology in a fast-moving and mission-driven environment that despite numerous benefits, might also generate new unprecedented challenges in the areas of cybersecurity and privacy. As transport planning is devoted to securing greater social equity, questions are repeatedly being raised about whether CAVs can actually evolve to a tool for creating a more accessible world that will not generate new layers of transport-related social exclusion. Recent literature suggests that CAVs will be maximising the citizen's social welfare since groups of people currently not having the capacity to drive will get access to easier rides. It is however not clear yet how to include the traditionally disadvantaged populations in the CAV planning and adoption process and how to minimise cybersecurity and privacy concerns.

The majority of CAV-related studies present prediction models suggesting a CAV adoption up to 100 % but also recognise some key problems primarily reflecting trust issues that may be particularly meaningful for some 'vulnerable' populations. Since public perception plays a critical role in CAV acceptance and adoption more research is needed in understanding how people in general, and these special populations in particular, perceive factors referring to the cybersecurity and privacy of CAVs. The presented empirical study is one of the very first works, that evaluates how people view CAVs in terms of cybersecurity and privacy with a special focus on social equity considerations. We present survey data collected from the UK and analysed through regression modelling. The main acceptance and adoption opportunities and challenges relating to transport equity are discussed, and recommendations for the key stakeholders responsible for the transition to a CAV-centric mobility regime on improving cybersecurity and privacy are identified.



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1906-The Journey Experience of Visually Impaired People on Public Transport

Mengqiu Cao¹

*University of Westminster School of Architecture and Cities London-United Kingdom*¹

Most countries and cities have a common goal to build a more equal society, at least in terms of opportunity, but perhaps also in outcome. A key element here is the transport system and use by different population groups, including facilitating equal access for the physically disabled relative to the able-bodied. When the terms "access" and "disabled" are used in conjunction, common perceptions tend to focus on the provision of barrier-free access for wheelchair users. This group is of course important, but there are other types of disability, including those who are visually impaired. The use of public transport is critical for Visually Impaired People (VIP) to be independent and have access to out-of-home-activities. Despite government policies promoting accessible transport for everyone, the needs of VIP are not well addressed, and journeys can be very difficult to negotiate. Journey requirements can often differ from those of other categories on the disabled spectrum. Therefore, the aim of this research is to evaluate the journey experience of VIP using public transport. Semi-structured interviews are used in London. The results show that limited access to information, inconsistencies in infrastructure and a poor availability of staff assistance are the major concerns. Concessionary travel, on the other hand, encourages VIP to make more trips and hence has a positive effect on wellbeing. The findings suggest that more specific policies should be introduced to cater to the special needs of particular disabilities rather than generalising the types of aids available. It is also concluded that the journey experience of VIP is closely related to an individual's independence and hence inclusion in society.

2031-Evaluating the Social Impacts of Australia's new Demand Responsive Transit System Trials

Benjamin Kaufman¹, Matthew Burke¹, Timothy Beck², Abraham Leung¹, Malin Backman²

*Griffith University Cities Research Institute Nathan-Australia*¹ *Griffith University School of Environment and Science -Australia*²

Queensland and New South Wales are two Australian states investing in large pilots of demand responsive transit (DRT). These systems do not follow fixed routes or timetables, provide near real-time on-demand services, and have subsidised fares. Many of these pilots have explicit aims to ensure low socio-economic groups in society have access to opportunities. The transport agencies hope to use these pilots to 'mainstream' DRT and allow network planners to implement it when and where appropriate. A series of inter-linked research projects seek to answer two key research questions: i) how are agencies planning these systems (including their performance indicators)?; and ii) what are the social equity impacts of the large Logan City trial in Queensland? The methods include: field visits and use of the systems; key actor interviews with operators, transit agencies and local government; geo-spatial analysis of Logan operator data in conjunction with ABS Census data; and, an online survey of Logan DRT users. The results show that frequent users were less likely to have access to a car, had trouble accessing the public transport network, and had lower income. Older users were less likely to use DRT if they had access to a car, in contrast to younger users. Longer trip takers took more trips. Older users reported the services easier to access than younger users. The contributions of the research include conceptual advances in how we conceive of equity in DRT and methodological advances with new measures such as population density-based performance indicators for DRT. The results highlight the need to move from pure patronage, cost and distance-based measures of transit outcomes to incorporate density and socio-economic-based measures.



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VIRTUAL

2243-Measuring the contribution of Customized Bus to the equitable accessibility of public transit services

Kai Liu¹

*Dalian University of Technology School of Transportation and Logistics Dalian-China*¹

The transport equity may be improved through some newly emerging demand-driven, user-oriented transit services. As an innovative, demand-driven, and personalized bus transit service, customized bus (CB) has been developing in many cities of China in recent years, holding the promise of building up more attractive and diverse public transportation services, and therefore reducing urban traffic congestion during peak hours. The aim of a CB service is to provide point-to-point transit services (with one person per seat) without any transfers between the appointed boarding and deboarding stations.

Routes plan is one of the key determinants of CB system' level of service, where the survival of launched routes after several months operation proved their valueness in daily traveling. There is a paucity of studies that focus on investigating the contribution of CB to transport equity, especially those to the equitable accessibility of public transit services. This study fills the research gap through an empirical study in Dalian, China. The Dalian CB operator reduced the number of coupons significantly after the trial operation period. To make the launched routes more vital and sustainable, and thus maximize passenger retention, the operator designed the policy for route launching and canceling. This policy helped to recognize the best routes in operation with enough travel demand, while in the experiment, the operator endeavored to make the policy more flexible. The CB routes with relatively lower seat occupancy rates were partially adjusted, combined, or canceled if the occupancy rate in the operation was less than 50% for several months. Results indicate that regular transit are hysteretic to travel demands and the CB provide a potential solution of equitable accessibility of public transit services.

2256-Public transport equity under different scenarios the case of Gdańsk Poland

Adam Radzinski¹

*Adam Mickiewicz University Faculty of Socio-Economic Geography and Spatial Management Poznan-Poland*¹

Background

Public transport is an essential service for the everyday functioning of urban residents. Lack of accessibility may be one of the most serious impediments to life opportunities, particularly for residents with a low income or in elderly age. Recent years have brought a proliferation of studies on equity in public transport, and many of them suggested that inequitable distribution of accessibility should be indeed considered a serious issue with socially and economically detrimental impacts. However, some questions seem to be still far from a definite answer. For example, the distribution of what are we considering when discussing public transport equity? And the distribution among whom? While agreeing that possibly no universal answer to these questions could be given, in this paper we would like to compare different scenarios to verify how the underlying research assumptions affect the outcomes.

Methods

Using open data general transit feed specification for the city of Gdańsk, Poland (468,000 residents) we calculate public transport frequencies and travel times for a 100 m x 100 m grid comprising over 6,000 cells with population data for the whole urban area. These are then used to evaluate both horizontal and vertical equity in peak and off-peak periods. We also assume two different scenarios concerning travel destinations based on the distribution of population and jobs. High-resolution maps and distribution plots are produced in R and QGIS to highlight the outcomes of different scenarios.

Results

Preliminary findings show that large differences exist between different parts of the city in terms of both frequency and travel time. Moreover, service levels differ greatly between peak and off-peak periods. More detailed analysis is underway, which is expected to deliver further empirical evidence.



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VIRTUAL

2514-Social Equity and Impact Evaluation Based on Urban Transport Accessibility Quantitative Measure – Evidence From Shanghai City Center

Cheng Shi¹

*Tongji University College of Architecture and Urban Planning Shanghai-China*¹

Traditional transport planning theory mainly focuses on the efficiency and for a variety of social equity issues extended by this efficiency has long been neglected. This paper mainly focused on the evaluation of accessibility equity. This research defined improvement of the urban population mobility because of new built transport infrastructure as public welfare increase measured by accessibility value. Based on the finance theory, equity of accessibility is redefined and explained. Place accessibility describes the relative locations of traffic advantage, regardless of the local person's characteristics and individual accessibility described the individual mobility relative to their personal activities transportation demands. As macro-urban space, this paper showed the case of downtown Shanghai as an example and calculate the various types of place accessibility comparing different modes of transportation during the fifth and sixth census. Generalized entropy and Gini coefficient index evaluated space equity of accessibility. In the conclusion, metro transportation has played a key role in the balance of equity in Shanghai. As macro-urban space, this dissertation introduced the case of downtown Shanghai as an example and calculate the various types of place accessibility comparing different modes of transportation during the fifth and sixth census. Generalized entropy and Gini coefficient index evaluated space equity of accessibility. In the conclusion, metro transportation has played a key role in the balance of equity in Shanghai. As micro-urban space, the research calculated individual accessibility value in the survey sample and compared grouped under different socio-economic characteristics, whether there is a significant difference in order to evaluate individual accessibility equity. In the conclusion, metro transportation with good connections and sound resident-occupation balance plays key role for the individual accessibility equity. Finally, based on the above quantitative and qualitative research, it is proposed to improve the existing transportation planning process for the equity objective by variable groups.



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VIRTUAL

2620-Older People and the Automated Connected and Digitised Transport of the Future

Alexandros Nikitas¹, Alexandra-Elena Vitel¹, Corneliu Cotet¹, Athanasios Angelis-Dimakis², Eric Tchouamou Njoya¹, Grigoris Antoniou³

University of Huddersfield Huddersfield Business School Huddersfield-United Kingdom¹ University of Huddersfield Applied Sciences a.angelisdimakis@hud.ac.uk-United Kingdom² University of Huddersfield Computing and Engineering G.Antoniou@hud.ac.uk-United Kingdom³

Background:

Benefiting from a radical new transport technology toolbox including Autonomous and Connected Vehicles, Mobility-as-a-Service, Travel Guidance Apps, among others, requires specific capabilities and willingness to assume a new role as an energetic participant of the digital travel eco-system. To avoid creating unprecedented layers of social inequity, research is needed in terms of understanding senior citizens who might have a problem comprehending, accessing and embracing these technologies so that this new transport environment is designed in a way that will allow them to be part of the change.

Hypothesis:

The study aims to generate a new understanding of the challenges and opportunities that older people may face when accessing transport innovation. We tested whether older people resist to change and whether they feel that they would get enough support to adapt to a new mobility era different from the one they are familiar with.

Methods:

The research is based on a quantitative survey that was answered by 200 older people primarily located in the UK. The analysis is based on descriptive statistics and regression modelling. The process of collecting hard copies on such a 'difficult' topic has been also systematically recorded and ethnographically analysed.

Results:

Early results showcase that the transition to a new smarter mobility regime will not be easy and uncomplicated; older age has the potential to become a powerful barrier. Older people in many cases were frustrated and intimidated from the radical changes that a shift to new unfamiliar and futuristic transport technologies may dictate. Many started but never completed the survey feeling that it was negotiating overcomplicated subjects. Older people need systematic support to adjust to the forthcoming reality.

Conclusions:

The study reports older people's perceptions about smart mobility tools and develops policy recommendations (including social and educational strategies) and industrial design guidance for supporting a barrier-free Artificial Intelligence-centric transport system.



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VIRTUAL

2656-Personal car market and socio economic regional disparities. The case of Poland

Bartłomiej Kolsut¹, Tadeusz Strykiewicz¹

Adam Mickiewicz University, Poznań Department of Human Geography and Planning Poznań-Poland¹

Numerous regional studies show that spatial differences in the car market are related to the level of socio-economic development, spatial accessibility and regional disparities. The analysis of the structure and dynamics of the car market in Poland is particularly interesting because the last 15 years have been the time of revolutionary changes of individual motorization. After joining the European Union the number of personal cars increased twofold, and the import of used cars from Western countries was a decisive factor in transactions on the secondary market. In the recent years, we have also been observing a dynamic development of the market for new cars, which is associated with an increase in the level of personal incomes and changes in the consumers' purchasing patterns. All these changes have a different course depending on the location of a given area in relation to the cores of socio-economic development.

The aim of our study is to identify and explain the diversity of regional markets for personal cars in Poland analyzed in the perspective of socio-economic regional disparities. The study uses a big set of data (more than 100 billion records) obtained from the Central Vehicle Evidency that have not been analyzed so far. They describe several characteristics of personal cars registered in Poland, including the location of their owners at the municipal level (2,478 spatial units). In our paper we try to answer the following research questions:

1. How the features and indicators of the market for personal cars and socio-economic regional disparities are interconnected?
2. How are they spatially distributed and changing over time?
3. What are the consequences of our findings for regional policy?

The study is based on the results of the project „Spatial dimension of car market (r)evolution in Poland” financed by the National Centre of Science.

2775-Exploring school commuting inequities and joint travel mode decision in the case of Shenzhen China

Zuopeng XIAO¹

Harbin Institute of technology, shenzhen urban planning Shenzhen-China¹

The equity issues associated with school travel is an important subject in recent international transport behavior research and policy agenda. One direction here is to see how travel mode is decided within household members. However, few were conducted in the case of China. In China's big cities with deficient space, guiding students to adopt green and intensive traffic modes is undoubtedly a useful alternative to ease traffic congestion. Drawing from 2016 Shenzhen Travel Survey, this study aims to look at the major influence factors of school-commuting travel mode. A joint decision model is incorporated to examine how household members allocate responsibilities and household travels are constrained by built environment and responsibilities. According to the research, the average distance of school morning commute is about 2.24 km and duration is about 22 minutes for primary students in Shenzhen. Among them, students from private schools travel longer, and tend to use more motorized mode. Age and gender have no significant impact on mode choice; Compared to school location and school-centered urban form, car ownership and travel features (i.e., chauffeuring and distance) has much more significant role in school travel mode decision. Since public schools have officially limited service coverage, students registered in private school come from much more dispersed areas; therefore they travel longer with more motorized travel mode split. We argue it is necessary to focus on the equity of school travel, and enhance the workability of school zones by physical planning, and positively encourage school bus services to promote mode shift towards more active school travel.



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VIRTUAL

3187-ACCESS TO PUBLIC TRANSPORT AND INDIVIDUALS WITH REDUCED MOBILITY A CRITICAL ANALYSIS

Fahad Albahlal¹, Dimitris Potoglou¹

*Cardiff University School of Geography and Planning Cardiff-United Kingdom*¹

Accessible public transport is a crucial element of a high-quality, efficient, sustainable transport system. Access to public transport facilities is particularly essential for universal access planning to ensure that all passengers, including disabled persons, do not meet unexpected barriers that frustrate their ability to access public transport and other destinations. Even though within the last thirty years, many affluent countries have swiftly established organisations and legislations to protect the rights of people with reduced mobility to enable their participation in all aspects of life, barriers still exist. Meanwhile, such legislations are still absent in some of the low-income and developing countries. Disabled people exposed to unnecessary and unfair access barriers on their way to public transport stops or stations. This paper aims at identifying the barriers people, in particular disabled, usually face when they tend to make a trip by public transport. We report findings from a critical review of the literature, including content analysis and examining publications of 133 articles published in English, peer-reviewed journals on the three core legs of any trip: (a) access, (b) accessibility, and (c) connectivity at public transport facilities. Barriers at accessing public transport can be before getting into the transportation hubs, such as inaccessible sidewalks where poles, mailboxes, awnings, benches, shop signs and broken concretes. Other barriers are within transportation hubs like inaccessible information, elevators not in service and lack of ramps. Moreover, there are barriers related to boarding the vehicle itself, such as the physical effort resulted from high steps entry. However, a good design of infrastructure within transportation hubs and around it, ongoing equipment maintenance, ongoing professional staff training as well as good communication with customers are all would result in higher satisfaction among passengers including disabled people.

3391-Towards inclusive transport landscapes Re visualising a Bicycle Sharing Scheme in Santiago Metropolitan Region

Veronica Saud¹, Nikolas Thomopoulos²

*University College London Development Planning Unit London-United Kingdom*¹ *University of Surrey Department of Tourism researchnht@gmail.com-United Kingdom*²

Bicycle Sharing Schemes (BSS) are re-emerging as promising components of urban mobility solutions worldwide. However, the lack of consistent collaboration strategies between different actors and institutions, which have been tested in a wide range of cities and contexts regarding their design, tender, operation and expansion, raises significant social and governance implications. Urban transport features as a melting pot for diverse policy objectives, ranging from business model innovation, public tendering, and accessibility increase to the equity and social justice agenda.

By employing a Multi-Level Perspective (MLP) framework and by introducing alluvial diagrams and circular dendrograms to BSS planning through a mixed-methods approach, this article illustrates an innovative tool in managing BSS in the context of the Global South. The strength of such diagrams has been underestimated to date since they can be particularly useful for public and private urban transport planners and policy-makers. Visualising user flows in such a manner, particularly in near-live time, may offer valuable insight on the operational challenges of BSS. Findings of the cross-sectional survey in Santiago de Chile confirm that maintenance is significant for user satisfaction levels. Furthermore, decisions regarding BSS expansion and modification could be based on such analysis and diagrams due to the precise identification of both the busiest and those under-represented BSS stations based on revealed preferences.



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3492-DOES ICT INCREASE THE SPACE TIME FLEXIBILITY OF SHOPPING ACTIVITIES EVIDENCE FROM CHENGDU CHINA

Rui Shao¹, Ben Derudder², Yongchun Yang³

Ghent University Department of Geography Gent-Belgium¹ KU Leuven Public Governance Institute -Belgium² Lanzhou University College of Earth and Environmental Sciences -China³

A number of earlier studies have engaged in conceptual explorations of whether and how information and communication technology (ICT) influences the space-time constraints of people's daily activities. Most of these studies support that ICT relaxes traditional space-time constraints and increases space-time flexibility of activities. Meanwhile, some other studies assume that ICT could lead to new constraints and reduce space-time flexibility. However, to date, there have been relatively few empirical studies on the topic, with conclusions furthermore pointing in different directions. Therefore, additional empirical studies are needed to clarify this topic. Against this background, we aim to empirically explore whether and how ICT use (i.e., online shopping) alters the space-time constraint of shopping activities. The data are drawn from 607 structured interviews in June-August 2019 in Chengdu, China. In the interviews, respondents were asked to report space-time flexibility of online shopping and in-store shopping, respectively. By comparing the space-time flexibility of online shopping and in-store shopping for each respondent, we find that 50% and 46% of respondents have an increase in temporal and spatial flexibility of shopping activities due to ICT use, respectively. However, 15% and 18% have a decrease in temporal and spatial flexibility, respectively.

Furthermore, multinomial logistic regression models suggest that the changes in space-time flexibility of shopping activities are significantly influenced by sociodemographic factors, Internet experiences, car ownership, and spatial attributes. In particular, older and less-educated respondents are more likely to suffer from the decreased space-time flexibility of shopping activities due to ICT use, pointing to emerging inequality issues.

3687-Has Covid 19 made transport inequity worse Evidence from China

Pengjun Zhao¹

Peking University School of Urban Planning and Design Shenzhen-China¹

The Covid-19 pandemic has caused obvious changes in transport system in the world. These changes occurred not only in operations and business performances of transportation but also social outcomes of transport. It seems transport inequity may either be reduced due to universal declines in travel activities or be worsened due to disadvantaged people's decreases in mobility and accessibility to job market and public services. This paper contributes to new evidences for this by looking at China's cities as cases. By using individual people's trajectory big data from millions of users, this paper discovers the changes in people's travel behavior before and after the Covid-19 pandemic moment. In particular, travel changes of disadvantaged people are investigated, including elderly people, woman, and those who reside in social housing. Travel behavior changes cover the changes in travel frequency, travel distance, and travel costs. The changes in job accessibility and accessibility of basic public services by public transit are also measured. The results of analysis in this paper would enhance our knowledge of the impacts of social disaster, for instance, the Covid-19 pandemic, on travel behavior and transport inequity. It also provides new thoughts to transport policy-making in order to achieve the SDGs called by the United Nations.



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C.31. Transport and Geography Transport and the environment

1390-Community building through sustainable transport solution development in Trinidad and Tobago The role of web based social geo communication

Julia Kotzebue¹

*University of Hamburg Institute of Geography Hamburg -Germany*¹

Worldwide the United Nation's (UN), promotes sustainable transport in urban and rural communities. However, communities rarely participate in transport solution development in Trinidad and Tobago. The twin-island state share with many other states in the Caribbean region the colonial past, which resulted in a transport system that was not systematically planned for the entire island. Instead, the transport system was developed in an ad hoc way for specific purposes, for instance ports and links for the former plantation based economy and later links for tourist resorts and shopping centres. A national holistic transport planning, an integrated sustainable transport and mobility governance is lacking until today. Furthermore, the constantly increasing fuel subsidies disproportionately support high-income groups and resulted in one of the world lowest fuel prices, a high car ownership and car dependency. The road capacity is concentrated and directed towards few core locations e.g. the capital city Port of Spain. This created geographically and socially relatively isolated rural communities. To increase community involvement in transport planning cities in Europe and the United States of America have started to use community mapping and web-based social geo-communication tools. Interactive mapping allows spatially visualizing and locating transport needs. However, preliminary results of an ongoing pilot-project on community building and sustainable transport solution development in a rural community in Tobago reveals, that the community has a poor digital literacy and a low sense of community. Additionally, reliability and safety are considered as more important for sustainable transport than environmental friendliness. The paper will reveal preliminary results of the pilot-project and will discuss the challenges of using a web-based social-geo-communication tool to build-the community and to develop context and community sensitive sustainable transport solutions that might differ from the pathways of urban mobility solutions on the mainland.

1539-Relativity of change in potential accessibility. Settlement network structure staging of the road network development and form of distance decay

Piotr Rosik¹, Sławomir Goliszek¹, Patryk Duma¹, Tomasz Komornicki¹

*Institute of Geography and Spatial Organization Polish Academy of Sciences Institute of Geography and Spatial Organization Polish Academy of Sciences Warszawa-Poland*¹

The paper brings together transport and land use and confronts in a systemic manner a number of complex methodological issues related to the dimensions of potential accessibility (settlement network structure, staging of the road network development, and form of distance decay) with empirical data obtained for selected European countries (Spain, France and Poland). The general base hypothesis is that the change in potential accessibility on a nationwide level is relative and depends on a number of dimensions of accessibility, out of which the following – when seen in dynamic terms – are of key importance: (1) The spatial differentiation of trip origins and destinations within the nationwide urban settlement network (morphological polycentricity including size index – 81,6 for Spain, 66,4 for France and 84,1 for Poland and location index – 30,7 for Spain, 77,3 for France and 83,1 for Poland); (2) The phasing the development of motorway transport infrastructure components (for the nationwide urban settlement network – the functional polycentricity component); (3) Travel length (form of distance decay). The added value of the paper lies in the inclusion of the dynamics of the motorway development by taking into account the period of big push to roads in France, Spain and Poland. The paper involves a multi-criteria analysis of the relativity and effectiveness of change in potential accessibility in the context of the cost of building modern network-based transport infrastructure systems (systems of motorways). The conclusion is that countries (France, Spain and Poland) differ in terms of how they stage the development of their road infrastructure depending not only on morphological polycentricity, but also functional polycentrism (also in non-transport-related terms), and other factors (e.g. natural and anthropogenic barriers), as well as their policy aimed, for example, at supporting specific regions, etc.



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1631-A PARTICIPATORY ACTIVE TRAVEL WORKSHOP METHODOLOGY TO ASSESS DETERMINANTS FOR WALKING AND CYCLING AT UNIVERSITY CAMPUS IN MALTA

Carlos Cañas Sanz ¹, Suzanne Maas ¹, Maria Attard ¹

University of Malta Institute for Climate Change and Sustainable Development -Malta ¹

Malta, a small island state in the Mediterranean, has one of the highest population densities and per capita car ownership rates in the European Union. University students are amongst the most mobile groups in society, and in general are observed to have more multi-modal travel behaviour, as well as a higher willingness to use sustainable mobility options. However, at the University of Malta, mobility to and from the work and study place is still characterised by high levels of private car use, resulting in traffic congestion, parking constraint and land use uptake. A participatory Active Travel workshop was organised at the university in order to better understand the determinants of pedestrian and cyclist mobility and to test out a participatory method to assess perceived walkability and bikeability. Participants included people from the university community as well as other interested stakeholders. After an introductory presentation, participants took part in different guided walks or cycles along some predefined paths in the surroundings of the university, to assess the walkable or bikeable environment. Participants were asked to use different social media platforms to share their observations using text and photos, with the posts also capturing spatial and temporal metadata. They were encouraged to use predefined variables (as hashtags) to express their subjective experience (in terms of safety, comfort, pleasantness and vibrancy), as well as objective descriptors of the environment, to indicate the presence or absence of elements, such as pavements, lighting and street crossings.

Contributions from the workshop, alongside ongoing data collection through social media, are used to construct a web map depicting the spatial distribution of perceived walkability around the university campus. The results are used to identify barriers and opportunities for walking and cycling and to construct tangible policy recommendations for promoting active travel.

1946-Air Quality Crisis Is Banning Diesel Vehicles the Answer

Mengqiu Cao ¹

University of Westminster School of Architecture and Cities London-United Kingdom ¹

Air pollution contributes to thousand deaths annually in London and diesel vehicles are considered a major source of lethal air pollutants. Consequently, the UK government announced its intention to ban new diesel vehicles by 2040 to achieve a sustainable zero-carbon road transport system. Since no empirical studies have used a bottom-up approach to seek Londoners' views, it is therefore worth investigating the public opinion regarding this forthcoming ban. This paper aims to fill this research gap by taking London as a case study. A survey was designed, and fieldwork was conducted to distribute questionnaires to Londoners. Completed questionnaires were analysed using both quantitative and qualitative methods. The findings revealed that the majority of Londoners would be in favour of the ban if they were sufficiently exposed to the appropriate sources of information and were favourably disposed towards environmental protection measures. The results also showed that Londoners were more likely to switch to electric vehicles (EVs) if they were offered generous incentives and encouraged to use scrappage schemes. The present study makes a strong case for enforcing the ban well before 2040. The significance of this research is to provide clearer signals regarding the future of diesel vehicles, which in turn will strengthen the EV policy and uptake. Our findings will be useful for the Mayor of London and policymakers to push the Agenda 2030 forward so as to achieve the goals of sustainable cities and communities as well as climate action. In order to achieve the desired outcomes for air quality in the long-term, critical decisions must be taken and 'aggressive' policies implemented now to determine the quality of London's air in the future.



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C.31. Transport and Geography Transport Geography and Climate Change

2621-(R)evolution on the car market in Poland and its environmental consequences

Bartosz Wojtyra¹, Robert Kudlak¹, Jędrzej Gadziński¹

Adam Mickiewicz University in Poznań Faculty of Human Geography and Planning Poznań-Poland¹

The systemic transformation that took off in Poland in 1989 has triggered numerous changes such as opening of the Polish economy to the international trade, inflow of foreign capital and direct investments. It also stimulated a rapid growth of the level of economic activity (including transportation activity) and individual consumption. These and other processes caused significant consequences for the Polish car market and the natural environment. On the one hand, since the beginning of the 1990s the level of individual mobility and a car demand have boosted. On the other hand, the Polish economy (and specifically the car market) has witnessed significant technological and organizational modernization. These developments had important impacts on the Polish car market when considered from the environmental perspective.

The aim of the paper is to analyze the (r)evolution on the car market in Poland after 1989 and its environmental consequences (with a special emphasis on the consequences for climate change). Firstly, we analyze the changes in the level of pollution (and its dynamic) generated by the transportation sector and especially by the use of personal cars. Secondly, we investigate the spatial differentiation of the environmental consequences caused by the Polish car market. Thirdly, we focus on the rise and development of the alternative (to the oil-based fuels) technologies. We draw a particular attention to cars powered by the liquefied petroleum gas which seems to be a viable solution to tackle the challenge of climate change. We highlight the economic and institutional factors that made Poland one of the global leaders in applying this technology.

The research findings presented in the paper are based on a complete database of all cars registered in Poland (The Central Vehicles and Drivers Register) and their characteristics, such as car age, type of fuel, engine capacity and EURO norms.

3071-Decarbonising the air transport industry A temporal and spatial perspective

Tim Ryley¹

Griffith University School of Engineering & Built Environment Brisbane-Australia¹

In response to the climate change challenge, many industry sectors are having to operate differently. The air transport industry is one of the most difficult sectors to reduce emissions, particularly given the insatiable demand for air travel and the difficulty in finding alternatives for long distance journeys. Furthermore, although aviation may not be environmentally sustainable, it does provide many economic and social benefits.

There is temporal dimension to the problem, with a requirement for a viable plan moving forward for decarbonising the air transport industry, a proposal with high public and political sensitivities. Another pertinent aspect is the spatial context, such that aviation is locally situated in airports, represents regional interests though national airlines that operate across geopolitical boundaries, and overseen by international policy and management frameworks.

The approach within this paper is to review existing academic and industry literature accordingly. It will be a systematic quantitative literature review, using relevant aviation and climate change search criteria. There are two aspects to the methodology. Firstly, to review the literature on decarbonisation the air transport literature from a geographical perspective. Secondly, to review methodological literature on the temporal aspects, considering ways to develop a decarbonised air transport future. Both quantitative and qualitative methodological approaches will be considered.

The paper will discuss and conclude regarding the likelihood of achieving a decarbonised air transport industry and the timeframe involved. It is likely that a range of aviation mitigation measures implemented (e.g. EU ETS, aviation tax, carbon-offsetting), will be considered. Possible solutions are also likely to cover airlines (e.g. aircraft performance, electric aviation) and airports (e.g. energy usage, surface access, system efficiency).



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3136-Geographies of transport in the new climatic regime

Tim Schwanen¹

*University of Oxford School of Geography and the Environment Oxford-United Kingdom*¹

In this paper I will reflect on the conduct of Transport Geography research in an era in which the “geo”, or the earth system, has become an increasingly active participant in public life and urban and transport systems. Building on the work of thinkers such as Bruno Latour and Isabelle Stengers, I will argue for both a shift and an expansion in the substantive concerns, theory, and methodologies that prevail in geographical research about transport configurations. In particular, there is a need for much more attention being paid to the ongoing and just adaptation processes of transport configurations to a variety of pressures and more sudden events, from extreme heat and socio-political conflicts linked to climate change. This shift and expansion require, among others, an empirically informed reworking of concepts that are currently used or mobilised in geographical research on transport, such as survival, equilibrium, adaptation and infrastructuring. Also required are changes to common methodological practices, including valuation of changes or different relative to a reference case and what in post-colonial scholarship is known as provincialisation of knowledge production processes. These changes will make it easier to study the necessarily context-dependent geo-social politics of transport in the current era and their implications for pathways towards just, low-carbon and climate robust transport systems in the future. Some of those politics will be illustrated using examples from various ongoing research projects on walking and cycling, electric vehicles and informal transit services across different sites on the planet in which I am involved.

3392-Hybrid and electric cars in Poland their users and potential buyers

Wojciech Dyba¹

*Adam Mickiewicz University, Poznan Human Geography and Planning Poznań-Poland*¹

Hybrid and electric cars are a type of technological innovation in the automotive sector that are becoming more and more popular on the car markets in highly developed countries around the world. Their largest potential lies in reducing CO₂ emissions – therefore contributing to tackling the problem of a climate change. In Poland, the share of hybrid and electric cars in the market is small: 0,5% and 0,5% respectively, however, there has been a constant and systematic increase in the number of registrations of these cars in the past 5 years. There is a growing interest in hybrid and electric cars among entities operating in the industry. Recently, the preparation of the production of Izero – the first Polish electric car has started.

The aim of the presentation is to discuss the results of a research on the spatial distribution of hybrid and electric cars already registered in Poland (as at the end of 2019) and on the socio-demographic profiles and preferences of potential buyers of these cars. The first part consisting of maps and analysis is based on the data from Central Evidence of Cars and Drivers. The content of the second part is based on the field study conducted in 2019 in the form of personal, street interviews among a representative sample of 4,018 Polish drivers living in four types of areas: Poznan and Poznan agglomeration (large city and its suburbs), powiat stalowowolski (subregion with average-size city in Eastern Poland) and powiat Iwóweczki (subregion with small city in Western Poland). The study allowed to observe territorial differences in the interest in hybrid and electric cars and to formulate recommendations for the national and local authorities.



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VIRTUAL

C.31. Transport and Geography Urban Transport Geography

2234-TRANSPORT AND STRATEGIC LAND USE PLANNING CHALLENGES FOR THE SUSTAINABILITY OF CITIES

Richard Knowles¹

*University of Salford, Manchester School of Science, Engineering & Environment Salford-United Kingdom*¹

This research re-examines the links between transport, urban development and regeneration and the role of strategic urban land use planning in enhancing sustainability and creating smart cities.

Transit-oriented development (TOD) is important in focusing mixed-use housing development, employment sites, facilities and services around rail, light rail and bus rapid transit stations and stops. The seminal role of Copenhagen's iconic 1947 Finger Plan role is evaluated as the pioneer of planned TOD, together with its current development of Ørestad linear New Town and the regeneration of Nordhavn.

A critical analysis of contemporary TOD proposals exposes a serious mismatch between TOD aspiration and reality. For example, despite clear TOD, environmental, sustainability objectives, the 53 strategic development sites in Greater Manchester's Spatial Framework proposals are mostly dependent on road access. Only 5 sites currently have high frequency transit and future investments may deliver just 17 more. 39 of the 53 sites are located wholly and a further 9 partly on protected Green Belt.

Additional challenges for the sustainability of cities include incentivising walking and cycling and harnessing automated, connected, shared and digitised mobility technologies to revolutionise travel behaviour patterns and develop truly smart cities. New technologies such as Connected and Autonomous Vehicles and Mobility-as-a-Service (and also Internet of Things and Travel Guidance Apps) could dramatically alter the landscape and sustainability of cities and create positive change.

Sustainable cities will need to create a seamless symbiotic relationship between transport provision and land use planning and change the way mobility links to land use planning for decades to come.

3490-IS ONLINE SHOPPING UNLIKELY TO REDUCE SHOPPING TRIPS FOR CAR OWNERS A PROPENSITY SCORE MATCHING ANALYSIS

Kunbo Shi¹, Rui Shao¹, Jonas De Vos², Long Cheng¹, Frank Witlox¹

*Ghent University Geography Ghent-Belgium*¹ *University College London Bartlett School of Planning -United Kingdom*²

The rapid growth in car ownership has caused transportation problems in many countries and regions, such as raising traffic congestion, air pollution, and carbon emission. Reducing car use is commonly considered as a potential strategy to mitigate these problems. The increasing use of online shopping may potentially replace shopping trips, thus possibly reducing car use. However, car owners – compared to non-car owners – can more easily visit physical stores. Therefore, online shopping seems unlikely to reduce shopping trips for car owners. Existing studies find conflicting results using cross-sectional analyses (e.g. regression analyses), possibly because cross-sectional analyses cannot robustly support causality. The present study applies a quasi-experimental design – i.e. propensity score matching – to reexamine this issue. The data are derived from 653 structured face-to-face interviews in July and August 2016 in Chengdu, China. The results show that – after starting to buy online – 44.0% of respondents indicated a decrease in shopping trip frequency, while only 14.4% indicated an increase in shopping trip frequency. This implies that online shopping has a substitution effect on shopping trips. Applying a propensity score matching, this paper further compares the likelihoods of substituting online shopping for shopping trips between car owners and non-car owners, while considering sociodemographic factors, internet experiences, spatial attributes, and online shopping attitudes as covariates. The analysis indicates that – as expected – car owners are less likely to reduce shopping trips because of online shopping. This implies that online shopping may barely reduce driving, thus hardly being a possible effective solution for traffic congestion, air pollution, and carbon emission.



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3539-Excess commuting in medium sized cities of China A comparative analysis of Dalian and Shenyang

Jiangbo Wang¹, Kai Liu¹

Dalian University of Technology School of Transportation and Logistics Dalian-China¹

Commuting is an essential activity of most citizens in their life. Excess or wasteful commuting, which measures the proportional commutes over the optimal (average required) commute, has been usually investigated to examine the jobs-housing balance of a city. A mismatch in jobs-housing distribution may result in transport inequity and inefficient economic benefits. The longer the commuting trips, the worse the spatial match between jobs and housing for a city. Excess commuting indicators provide us very useful information to find out urban spaces where the actual commuting pattern deviates from an optimal pattern. However, researchers are often faced with the dilemma of lacking real commuting travel data. Due to that the information fetched from surveys could include reporting errors, and the sampled respondents might not be enough representative, the analysis result may bias the jobs-housing imbalance level.

Based on cellular signaling data, this paper identified actual commuting travel and investigated excess commuting at the zone level to explore the distribution pattern of how the excess commuting and spatial jobs-housing mismatch degree present in medium-sized cities of China. In particular, travel distance is employed to measure excess commuting. Commonly known as the transportation problem, the optimal commuting distance is the problem of solving the optimal journey-to-workflow between the origin and destination areas to minimize the average travel distance. We adopt the popular Linear Programming algorithm to achieve optimal commute distance. The results of the study indicate that excess commuting is not randomly distributed; they have certain spatial distribution characteristics. Although there are differences in the distribution patterns of the excessive commuting in the two cities, they generally maintain the same trend.



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C.32. Urban commission Urban Challenges in a Complex World Complex Urban Systems and processes of cities transformation

1122-Hong Kong's position in global production networks and its changing logistics industry

Jianfa Shen¹

*The Chinese University of Hong Kong Department of Geography and Resource Management Hong Kong-China*¹

Since the early 1990s, Hong Kong has been transformed into a service economy. Hong Kong plays an important role in linking the Chinese economy and the world economy and in the global production networks (GPNs). A global production network consists of suppliers of parts, components and final assembly. These producers also need financing, business service and logistics services to support their operations. Generally, Hong Kong business sectors play three roles in the global production networks. First, they participate directly in the supply of parts, components and final assembly of particular products. Second, Hong Kong provides financing, business service, logistics services to the operators of the global production networks. Third, Hong Kong also provides wealth management and advanced consumer services. As a leading trading centre and the business service centre, Hong Kong has also been leading international aviation hub and international financial centre. Its logistics industry has been transformed facing the new development environment including the changes in the global economy and the development of Guangdong-Hong Kong-Macao Greater Bay Area. Guangdong-Hong Kong-Macao Greater Bay Area includes Hong Kong, Macao and 9 cities in Guangdong province. Hong Kong, Guangzhou and Shenzhen are three leading economic centres in the bay area. All of them have developed major infrastructure such as airports and seaports. Hong Kong's international airport remains to be the leading airport in the region with the largest throughput of air cargo in the world. Both Guangzhou and Shenzhen have ambitious plans to expand their airports. Indeed, Shenzhen has overtaken Hong Kong's GDP and container throughput while Guangzhou's GDP and container throughput are catching up Hong Kong closely. Hong Kong has to speed up its economic transformation and consolidate its trading and logistics centre status to remain as the leading city in the bay area.



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1219-CIVIC ENGAGEMENT METROPOLITAN GOVERNANCE AND POLITICAL IDENTITY IRELAND IN THE METROPOLITAN CENTURY

Niamh Moore-Cherry¹, Carla Maria Kayanan¹, John Tomaney²

University College Dublin School of Geography Dublin-Ireland¹ University College London The Bartlett School of Planning -United Kingdom²

Background

While there has been significant work produced on regional development in Ireland, the politics of metropolitanisation have received relatively scarce attention, partly attributable to a historic culturally embedded divide between the (post-colonial) city and the Irish country-side (Walsh, 2014; Moore-Cherry and Tomaney, 2018). The publication of the National Planning Framework (2018), centres spatial thinking on Ireland's five major cities and provides a unique opportunity to document the tensions and challenges of creating a metropolitan state-space in a country with a traditional rural identity.

Materials and methods

We undertake a critical discourse analysis of documentary data from stakeholder observations submitted as part of the Metropolitan Area Spatial Plan development, minutes of regional assembly meetings where plans were debated, site observations of meetings discussing implementation, and semi-structured interviews with key stakeholders.

Results

The empirical phase is scheduled for February – July 2020, thus limiting results at this stage. We argue that civic engagement (Nelles, 2012) is key for spatial planning efforts to succeed and to date there has been limited evidence of civic capacity at the metropolitan scale in Ireland. Anecdotal evidence of enhanced levels of civic engagement, particularly in relation to sustainability and ecological conservation, has been more prominent than expected. However, tensions are apparent in the struggle to convince rural constituents that the metropolitan scale can address their priorities. Despite evidence of enhanced civic engagement, traditional political dynamics may stymie this momentum.

Conclusions

This detailed case-study observes, documents, and theorises metropolitanisation processes as they emerge in real time to inform a more nuanced understanding and questioning of metropolitanisation processes within the urban and regional development literature in a context where there has traditionally been a strong rural identity. We draw attention to how issues of civic capital, ecological conservation, and rural-urban tensions intersect to constrain the potential of civic engagement.



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1264-SPONTANEOUS URBAN GROWTH UNDER RIGID PLANNING CONTROL COMMERCIAL ESTABLISHMENTS IN URBAN VILLAGES IN SHENZHEN CHINA

Pu Hao¹

*Hong Kong Baptist University Department of Geography Kowloon-Hong Kong*¹

Background

The built environment of modern cities is largely shaped by urban planning rather than spontaneous development. While whether planned urban space adequately accommodates human needs remains heatedly debated, the increasing complexity of urban development continues to challenge the competence of planners and policy makers. In Chinese cities, given the rigid control of land use and development, planning generally goes undisputed. However, the distribution of urban activities is increasingly redirected by market forces, leading to unplanned, spontaneous development. Most commonly seen are various commercial establishments that have emerged spontaneously within and around the planned fabric of the urban environment, such as a convenience store popping up at the corner façade, a hair salon opened in the roadside garage and a studio concealed in an apartment building. Despite the downsides of these establishments, they not only meet market demand that is unheeded in city plans, but they also facilitate entrepreneurial endeavors for individuals who cannot afford regular premises.

Materials and methods

This paper presents empirical findings on the spatiality of spontaneous commercial establishments in urban village neighborhoods in Shenzhen, where the construction and utilization of buildings are beyond the control of planning or building codes. The configuration and distribution of unbridled commercial development are examined with respect to the intrinsic structure of the buildings and neighborhoods that accommodate such activities as well as the land, labor, consumption, and capital markets within and beyond the neighborhoods.

Conclusions

The paper offers important implications for making urban plans and policies that are more responsive to the needs of underprivileged social groups. Moreover, the spatial patterns of spontaneous commercial activities can inspire the configuration of commercial land use that better fits the needs within the conditions dictated by the physical environments and social contexts of urban neighborhoods.

1409-‘Transforming Freetown’ Dilemmas of planning and development in a West African city’

Etienne Nel¹, Tony Binns¹

*University of Otago Geography Dunedin-New Zealand*¹

The urban development and planning challenges facing Freetown, the capital of Sierra Leone in West Africa, are typical of the significant issues which face most cities in Africa, including rapid growth, resource constraints, burgeoning informal settlements and inadequate planning regimes. In parallel with many African cities, colonial neglect and racial bias in planning the urban form created a city which, in the post-independence era, has proven to be ill-prepared to cope with recent, rapid growth. This paper explores how these various parallel and often mutually reinforcing trends have played themselves out in the case of Freetown. The presentation also draws attention to particular issues which have exacerbated the city’s urban development, and the environmental and planning challenges facing the city – most notably the effects of the devastating civil war and Ebola outbreak. While the city council and local NGOs are attempting to address local development challenges, significantly more needs to be done to improve the well-being of Freetown’s population. While there is local level commitment, severe resource, financial and capacity constraints have hindered the uptake of effective interventions and the implementation of new planning strategies. Recent support provided by international agencies and NGOs appears to be going some way to help improve the situation and to develop local capacity. The presentation is based on primary fieldwork undertaken in Freetown and an analysis of historical and planning documents and various secondary sources, relevant to the city’s development. The Freetown case exemplifies the urban development challenges which many post-colonial cities face in Africa.



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1542-Amazonian urban regions living structures of society culture and nature

Pablo Cabrera-Barona¹, Manuel Bayón¹, Gustavo Durán¹

FLACSO Public Affairs Quito -Ecuador¹

Living-systems can be expressed as regions at different scales where a connection exists between the notion of place, environment and politics. The notion of place is shaped by cultural features of society. The Amazon region is diverse, not only in terms of biodiversity, but in terms of economics and populations, including not only indigenous nationalities, but western-thought societies. The Amazon region has experienced ancient urbanization since pre-Columbian times, and currently the region is having radical changes by intensive extractive activities, urban sprawl and expansion of monoculture. In this work we elaborate the concept of Amazonian urban regions incorporating the idea of human territorial influence and design. Thus, the urban configuration of Amazonian cities is multidimensional at multiple scales, and we propose models of urban morphologies and urban regional interaction between Amazonian cities. Urban morphologies and interactions can be represented and evaluated by landscape indicators, network analyses, and generative models. These metrics and models are going to be evaluated in different cities of the Ecuadorean Amazon, and in the Amazonian cities of Iquitos (Peru), Leticia (Colombia) and Manaus (Brazil). To the best of our knowledge, this work is the first proposal to develop an integrated conceptual and methodological framework for Amazonian urban regions applied to different countries. Additionally, one of our aims is to support better urban planning in the context of Amazonian diversity. Preliminary insights obtained from experiences in the field shown that Amazonian cities have experienced disorderly urbanization, are extremely dependent of extractive industries, and urban life is shaped by migration and globalization processes.

2368-Housing in multiple occupation and studentification in Johannesburg South Africa

James Gregory¹, Jayne Rogerson²

Nort West University Geography and Environmental Sciences Mahikeng-South Africa¹ University of Johannesburg School of Tourism and Hospitality jayner@uj.ac.za-South Africa²

Over the past two decades research concerning studentification has grown in importance globally. Conceptually, studentification forms part of the wider urban process of gentrification. As an emerging form of neighbourhood change, studentification essentially involves changes in the social, economic, cultural and physical fabric of cities. Although scholarly interest concerning the supply of private student accommodation has enjoyed sustained interest in the global North, only limited work is available surrounding the supply and demand for private student accommodation in cities located in the global South. Notwithstanding, in South Africa there has been growing recognition of the impact of studentification that has accompanied the massification of tertiary education in the post-apartheid period. In Johannesburg, South Africa's largest urban centre, there is evidence of studentification in established residential neighbourhoods close to the University of Johannesburg (Auckland Park Kingsway Campus). Using interviews with key stakeholders, suppliers of student accommodation, as well as focus groups with students, this paper explores the supply of houses in multiple occupation (or communes as they are more popularly known in South Africa) and explores students' perspectives on such properties in Johannesburg. Housing in multiple occupation or communes are seen as first wave studentification. Some of the key findings in this paper include, investors motivated by the closure of the rent gap in many older residential neighbourhoods close to higher education institutions. Furthermore, investors also benefit from a guaranteed and projectable rental income and see students as a low risk tenant. The latter is largely influenced by the impact of the national government funding system which was restructured in order to financially support and subsidise the tertiary education of students from previously disadvantaged communities. From the demand side, students are largely motivated by proximity, access to their peers, affordability and safety when choosing a specific type of student housing.



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2476-INVESTIGATING URBAN SPRAWL IN TAMPA BAY FLORIDA THROUGH DISCURSIVE EVIDENCE AND REMOTELY SENSED IMAGERY.

Milena Janiec Grygo¹

*Independent Researcher Geography Tampa-United States*¹

Tampa Bay, Florida, United States, has been experiencing urban transformation related to housing and commercial developments increase within New Tampa neighborhoods. This new expansion resulted in substantial transformation to the landscape. Within a decade, the area's land use altered from predominantly agricultural to residential and commercial. This paper utilizes Molotch's (1976) "growth machine" perspective to scrutinize the process of suburban sprawl. This study seeks to qualitatively engage with discursive meanings of the text (Hardy et al. 2004) and considers how the intensification of Tampa Bay's urbanization process leads to creation of new communities and urban centers. This paper considers public's interpretation of changes within the landscape through discursive evidence from the Tampa-Bay area news sources and advertisements. The relevant articles were selected through using an online search engine LexisNexis. Corpus reveals that frequent words are related to development and seeking access to infrastructure. In addition, records reveal that communities seek to produce their own "place on the map" by supporting initiation of new infrastructure, shopping, and housing projects. These discursive data are examined within the context of remotely sensed imagery which delineates changes in impervious surface (Yuan et al. 2008, 1045; Yin et al. 2018). Namely, this analysis employs LandTrendr, a time series-based change detection algorithm to trace land transformations between September 2008, a month before a shopping mall opened in the area and May 2018, when an artificial lagoon was constructed by the real-estate developers. Data demonstrates observed increase in urban infrastructure and decrease in wetland and agricultural land.

3219-ASIA TURNS URBAN URBAN CHALLENGES AND EMERGING PERSPECTIVES

Bharat Dahiya¹

*Thammasat University College of Interdisciplinary Studies Bangkok-Thailand*¹

Catching up with the global megatrend of urbanization, Asia turned urban in 2019. With 2.3 billion urban population, the region has over 50 percent of the world's total urban population. Between 1990 and 2010, the increase in Asia's urban population equalled the combined populations of the European Union and the United States. This explosive urban demographic growth has been propelled by the sustained economic growth over the past few decades. Cities and towns produce over 80 percent of the regional gross domestic product. Thanks to its dynamic cities, Asia is now considered as the economic engine of the global economy. However, city-based economic growth has not benefitted everyone, and many problems remain.

Asia houses over half a billion urban slum dwellers. Intra-urban inequality has been increasing along with the reduction of overall poverty. Due to the lack of redistributive mechanisms, low-income urban dwellers have not been able to benefit from the urban economic growth. Given its geography and diverse climate zones, Asia is considered the most vulnerable region in the world to the impacts of climate change and natural disasters. The perennial environmental problems of air pollution and poor solid waste and wastewater management still plague a large number of cities. In terms of its urban settlement system, small- and medium-sized cities are estimated to have two-thirds of the region's urban population at least until 2030. This requires concerted efforts in terms of urban and regional planning if these cities are to have improved quality of life.

While Asian governments need to deal with these big urban challenges, it is also important that the national and local urban economies innovate in order to benefit from the Fourth Industrial Revolution. The 'New Urban Agenda' and 'Sustainable Development Goals' provide important policy directions moving forward though progress needs to be accelerated.



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3276-Resource Management in Peri urban Areas Going Beyond Urban Metabolism

Denis Ceric¹

*Institute of Geography and Spatial Organization Polish Academy of Sciences Department of Urban and Population Studies
Warsaw-Poland¹*

In the European Union (EU), 16 tonnes of material are used per person per year. The inflows that stay in urban areas become part of the urban ecosystem in the form of landfills, wastewater treatment plants, and physical infrastructure, while the outflows of urban spaces are exported back to the hinterlands and distant localities as pollutants and consumer products. Research in industrial ecology and related fields have framed these material and energy inflows and outflows as a city's 'urban metabolism' (UM). In the EU, out of these 16 tonnes, 6 tonnes become waste. This waste production indicates the limited ability to use resources efficiently both in their transformation into consumer goods and waste's transformation back into valuable resources.

The paper presents the overall methods and results of the European Union Horizon 2020 research project Resource Management in Peri-urban Areas: Going Beyond Urban Metabolism (REPAiR, Grant Agreement No. 688920), where 18 institutional partners from 6 countries gathered to integrate models and methods from the environmental sciences, geographic sciences and economic sciences with design and spatial planning methods, both on a software and process level, to develop fast and reliable alternatives for spatial sustainable development strategies in the urban areas.

A shift towards a more Circular Economy is crucial to achieve a more sustainable and inclusive built environment that meets future demands. Circular Economy is a promising concept for industry and society. If implemented well, it can deliver environmental benefits and economic advantages for which innovation is essential. The main future challenges for the transition of the urban areas to more Circular Economy ones will be addressed here.



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C.32. Urban commission Urban Challenges in a Complex World Contested Social Spaces

1349-Enterprising religion New Ontologies of Religiosity and New Praxis of Urban Aspiration

Junxi Qian¹

*The University of Hong Kong Department of Geography Hong Kong-Hong Kong*¹

While culture-based development/regeneration and religious commodification are both well-established fields of inquiry, there is relatively rare dialogue between these two strands of theses. Indeed, studies on religious commodification has been largely focused the entrepreneurial mindsets of religious establishments and actors at the micro-level of day-to-day practices, offering limited consideration of the relationships between the increasingly discernible commodification of religiosity and the broader political economic conditions of capitalist urban societies amidst the entrenchment of entrepreneurial urban governance. Despite the potential dissonance between the transcendent, other-worldly pursuits of religions and the utilitarian, entrepreneurial and development-oriented logics of market economy, religions in post-reform China, particularly, Buddhism, Taoism, and folk beliefs have been targeted by the entrepreneurial urban state and involved in large-scale projects of building, developing and marketing, conditioned on massive investment of funding and people's spending. Notably, recent developments tend not to treat religions merely as "traditional culture" to be gazed remotely, but spiritual resources that modern people keenly pursue for negotiating fluid modernity and rapid social change. This presentation draws from two Buddhism-based mega-projects in transitional China – Ecological Tourism Industrial Park of the Sixth Patriarch's Hometown in Yunfu, Guangdong Province and Niu-Shou Mountain Cultural Tourism District in Nanjing, Jiangsu Province. This presentation asks two questions: (1) how the allegedly contra-market impulse of spiritual pursuit turns out to feed into highly pro-market, entrepreneurial mega-projects; (2) how the repackaging of religiosity as a sellable commodity gives it a re-invented ontological status, different from what is practiced on a mundane basis.

2628-URBANISM AND CONTESTATIONS IN TRADITIONAL SYSTEMS OF RURAL AREA OF NATIONAL CAPITAL REGION INDIA

Ruchika Singh¹

*D.D.U. Gorakhpur University Department of Geography GORAKHPUR-India*¹

The forces of urbanisation uncovers the traditional spaces for the exposure, which brings these spaces near to the dialectical processes of homogenisation and differentiation, integration and fragmentation, universalisation and particularization and this translates the contradiction over the space which is initially governed by the traditional systems. These changes brings various opportunities and new ways of living for some, while for others these changes are the source of insecurity that threaten their traditional domination. These changes have replaced the traditional certainties by the new anxieties and concerns.

The dominance of the Khap Panchayat which operates as 'territorial – political unit' and 'social organisation' in the Haryana and Western Uttar Pradesh has also gone through the process of change and adjustment under the increasing influence of urbanism in which the rural society which was governed by the traditional norms and rules are 're'-situated in the governance zone of newly created and developed modern institutions which are more democratic in nature. This whole change brings the necessity to explore the various grounded facets of the traditional khap panchayats in contemporary time of crisis.

The study tries to raise questions that why do Khaps still exist in these times of formal democracy in India and how they still legitimized their domination? Methodology will be based on certain parameters of internal cohesion and disruption of internal cohesion by the mechanism of urban spread. Mixed method approach – qualitative and quantitative, is used for the study. To understand the intricacies of the change, four sample khaps, based on the purposive sampling, were selected to study.

The study tries to bring out the social causes of the spatial configuration and the emerging conflicts within the traditional domain of the Khap Panchayats, under the influence of the changes which centrifuge by the urban way of life over the space.



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3210-Can 'She' Workout in Open Examining Gendered Right to the City in Delhi India

Lakshya Yog¹

*Jawaharlal Nehru University Centre for the Study of Regional Development New Delhi-India*¹

The present paper stands at the intersection of gender, urban space, and everyday life in the city of Delhi. This multi-sited ethnographic fieldwork conducted in Chirag Delhi Village and Sheikh Sarai located in the Southern part of Delhi centrally focuses on the question of accessibility and right to the city in relation to the recently installed Open Gyms. The story of Open Gyms started in Delhi when New Delhi Municipal Corporation (NDMC) decided to set up Open Gyms in 30 parks out of 124 parks which are under its jurisdiction including famous parks such as Lodhi Gardens, Nehru Park under its 'Go Green, Open Gym' Project. The present study is an attempt to map gender and bodies in the open gyms of Delhi by highlighting the affective, embodied, discursive and translocal nature of these spaces. The paper revolves around three central coordinates which can be summarised as Production of Space, Segregation of Space and Politics and/over Space. The first theme looks at the processes by which certain spaces are produced as gendered spaces in relation to open gyms. The second theme addresses the question of segregation of space in the city or specifically speaking open spaces in the city, which are open metaphorically but not otherwise. The third and last theme of the research focuses on the issue of Politics over these commons intrinsically related to the politics over space. Thus, the paper critically looks at the conceptions of gender, identity, caste, city, commons and public space in the case of Delhi. It presents Delhi not just as the city of contestation but also as a city of diversity and multiple geographies. It uses the concepts of the Right to the City and Spatial Justice to critically examine the corporeographies of Delhi.

3691-Twin Cities as Complex Urban Systems and the State of the Art in Twin City Research

Ekaterina Mikhailova¹

*University of Geneva, Geneva Department of Geography and Environment Kaliningrad-Switzerland*¹

The presentation relies on author's editorial experience in preparation of "Twin Cities: Urban Communities, Borders and Relationships over Time" (Routledge, 2019) and "Twin Cities across Five Continents: Interactions and Tensions on Urban Borders" (Routledge, forthcoming in 2021), both co-edited with John Garrard. The two volumes treat twin cities on internal (municipal) and external (international) borders as a twin city family with significant resemblances defined as twin-city features. They are: 1) interdependence; (2) tensions between inwardness and openness; (3) mostly unequal relationships; (4) ongoing formal and informal negotiation; and (5) persistence.

In the presentation I will argue that the two volumes provide a long-awaited solid theoretical and empirical foundation for the twin-city study in general and in relation to the ongoing global pressures. First, both edited volumes follow the same theoretical framework that makes case-studies presented there analytically fine-tuned and comparable. Second, both volumes shed light on areas underrepresented in the literature in English with particular attention to South America, Africa, the Middle East and Asia, alongside historical and fictional examples, thus supporting the theory with the empirical material from very diverse contexts. Third, both volumes showcase methodological novelties and comparative approaches to twin-city study. Finally, the second volume of "Twin Cities..." directly relates to the main theme of the panel – the impact of global challenges on cross-border twin cities and their strategies to cope with them. Volume 2 suggests that twin cities are intense thermometers, even barometers, for what is happening in the wider urban world globally, around and across international borders.



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C.32. Urban commission Urban Challenges in a Complex World New concepts and methods in urban studies

1318-Integrating concepts and methods for planning green cities

Santiago Bonilla-Bedoya¹, Anabel Estrella², Miguel Ángel Herrera³

Universidad Tecnológica Indoamérica Research Center for the Territory and Sustainable Habitat Quito-Ecuador¹ Universidad de Córdoba Departament of Agrarian Economy. -Spain² Universidad de Córdoba Departament of Forest Engineering -Spain³

The rapid process of global urbanization generates changes in urban social-ecological systems and in the structure of the landscape. However, the future processes of urban expansion in Latin American high-rise cities have been little studied despite the fact that the well-being of their citizens will depend on territorial management and planning for the provision of ecosystem benefits and services. This research intertwines concepts and proposes a methodology that integrates different socio-ecological dimensions in a high-rise city. The purpose is to generate useful knowledge for the formulation of urban planning policies and some guidelines aimed at closing the information gaps in cities in developing countries.

Through a structural equation model, three factors that make up the urban socio-ecological system were integrated. Geographic, forest and psychological dimensions were represented through different latent variables that consider urban forests, spatial segregation, perceived restoration and subjective well-being. These variables were constructed considering a set of variables measured through different methodological procedures such as land use classifications based on data collected through remote sensors, analysis of census data and surveys.

It was found that urban forests and green areas have a direct and indirect effect on restoration as perceived by citizens. This highlights the indirect relationship between urban forests and green areas through the reduction of the dynamics of socio-economic segregation and perceived restoration.

This research corroborates the relationships between forests and urban vegetation with urban spatial segregation and psychological restoration. In this sense, our results are useful as new information and decision-making tools to improve the spatial design of urban forests and green areas in the region, which could bring us closer to environmental justice and well-being.



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3114-Geographically and temporally weighted Colocation Quotients (GTWCLQ) analysis

Jianquan Cheng Cheng¹, Lin Li Li²

Manchester Metropolitan University Department of Natural Sciences Manchester-United Kingdom¹ Nanning Normal University Key Laboratory of Environment Change and Resources Use in Beibu Gulf 459975531@qq.com-China²

Background:

Co-location quotient (CLQ) aims to quantify spatial association between categories of a population that may itself exhibit spatial autocorrelation. CLQ particularly can detect symmetry and asymmetry in spatial dependence. A local version of CLQ, geographically weighted CLQ, is able to explore the spatial non-stationarity of such dependence. Both global and local CLQs have been extensively applied for urban analysis. However, with the increasing availability of categorical data with high spatial and temporal resolutions, such as frequently updated POI or open data, there is a new need of simultaneously incorporating spatial and temporal dimensions.

Materials and methods:

This paper aims to develop a geospatial approach of Geographically and temporally weighted Colocation Quotients (GTWCLQ) and apply it to urban crime pattern analysis by using open crime data of Greater Manchester in the past ten years. The development includes the measurements of spatial and temporal distance, spatio-temporal weighting matrix, global and local CLQ values and significance test by Monte Carlo simulation. All these methods have been efficiently implemented by Mat lab programming and GIS.

Results:

By taking 14 categories of crime incidence as case study, this paper has found that the strong spatial auto-correlation of the three categories: shoplifting, robbery, and bicycle theft, demonstrates temporally scale-independent. As shown in Figure 1, shop lifting, as one example, has heterogeneous level of significant spatial dependence across the study area, lower in city center.

Conclusions:

The novel approach of GTWCLG is able to explore the joint spatio-temporal effects present in the categorical variables, which makes remarkable contributions to urban analytics.



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VIRTUAL

C.32. Urban commission Urban Challenges in a Complex World Shrinking and aging Cities

1410-New Zealand's Shrinking Urban Centres Catalytic Factors and Local and National Response

Etienne Nel¹

*University of Otago Geography Dunedin-New Zealand*¹

The study of 'shrinking towns' and cities is well-embedded in urban geographical studies of Europe and of Eastern Europe in particular. Less well researched are the 10% of cities and towns globally which are believed to be shrinking in population terms. Drawing on both quantitative and qualitative data this paper examines the situation in New Zealand and uses an evolutionary economic lens to draw attention to the impact of resource cycles, globalization, neo-liberal restructuring, post-productivism and changing rural-urban dynamics on small urban centres and their hinterlands, which have been the most affected urban cohort by these trends. Statistical analysis is then used to illustrate how significant demographic and economic change and decline have been, with some 30% of the smaller urban settlements now experiencing population loss. The challenges facing smaller centres now feature in national discourse and in both new national and local endeavours to stabilise, and ideally, reverse the fortunes of declining settlements. The paper examines how selected shrinking towns have responded to the context in which they now find themselves and with what measure of success. The findings illustrate the importance of place-based leadership, local resilience and social capital and the reasonably modest impact of external support to date in trying to reverse decline and address path dependency. In the context of limited state support, the New Zealand case provides insight into the selective capacity of smaller urban centres to pursue diverse growth trajectories associated with market shifts and/or locally driven initiatives. The research on which the presentation is based forms part of National Science Challenge 11 Building Better Homes and Cities in New Zealand.

2717-Shrinking Cities in Croatia

Vedran Prelogovic¹, Ivan Zupanc¹

*University of Zagreb, Faculty of Science Department of Geography Zagreb-Croatia*¹

During the last two and a half decades, the development of urban areas in Croatia has become increasingly diverse. A significant number of cities are shrinking. The major symptom of urban shrinkage is population decline, which is a consequence of complex social, economic and political changes from global to local level. Urbanization in Croatia was significantly modified by wider social and economic factors along with already unfavorable demographic processes and structures. Many cities, especially the largest, are losing population and in some cases, it has been a sharp decline. Census data show that the decrease was present in 2/3 of Croatian cities between 1991 and 2011. Only 1/3 of the cities had an increase, and these are mainly small and medium-sized cities in suburban areas and tourist centers on the coast. There are several factors detected that led to population decline: demographic change (low birth rates, ageing population, negative migration balance, declining number of married couples, increasing divorce rates, and higher median marriage rate), economic transformation (declining economic activity, closure of industrial plants, loss of competitiveness), structural changes (collapse of the political systems, riots, wars), suburbanization and changes in the natural environment.

Depopulation of old urban cores is also becoming an important issue, due to the relocation of numerous services (particularly retailing) in suburban zones, higher costs of living, problems with accessibility and touristification in coastal cities. At the same time, in general, the number of inhabitants is still increasing in urban regions and surrounding rural areas.

In the research we analyze dynamics and intensity of shrinkage process and its impact on socio-demographic structures. The focus is also on the regional differences within the urban system.



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VIRTUAL

2966-Student geographies and transformations of urban spaces in Japan Focusing on demand and supply of apartments for students

Azusa Kuribayashi¹

*Nagoya university Graduate school of environmental studies Nagoya city-Japan*¹

The purpose of this study is to examine the process of 'de-studentification,' which means the transformations of urban spaces by decreasing the number of students. There are many universities both in central cities and the suburbs of metropolitan areas in Japan. However, recently, universities have increasingly begun to relocate their campuses to central cities from the suburbs to attract the students. Therefore, the student population has tended to decrease in the suburbs.

The author surveyed the effects of campus relocation on the housing market for students in Kyotanabe city, Kyoto prefecture, which is in the suburbs of the Keihannshin metropolitan area. Two universities partly withdrew from the city in 2013, reducing the number of students by about 7,000. The author used the apartments lists of university cooperatives and four real estate companies to gain property information. Moreover, the author conducted semi-structured interviews with the main actors (university, local government, real estate companies, and landlords) to understand the process of supplying apartments, changes in student demand for apartments, and the impact of the withdrawal of universities on the housing market.

This study reveals that both the decrease in the number of students and the changing of student preferences for apartments influenced business strategies on the housing market. The reason why the decline in demand for apartments to rent stopped and the vacancy rate improved following the withdrawals is down to three factors. The first is the recruitment of non-student residents by landlords and recruiters, the second is commuters leaving home to move to the city due to a fall in rent, and the third is population inflow due to new company location near the city. The results indicated that regions which have none of the above-mentioned factors will experience economic and physical decline rapidly as a result of de-studentification.



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3672-SPATIAL EQUITY OF COMMUNITY FACILITY PROVISION TO SUPPORT AGING IN PLACE A CASE STUDY IN URBAN OLD DISTRICT IN HONG KONG

Siqiang WANG ¹, Esther Hiu Kwan YUNG ¹

The Hong Kong Polytechnic University Department of Building and Real Estate siqiang-clarence.wang@connect.polyu.hk
Hong Kong ¹

Background

Community facility is recognized as an important element to support aging-in-place. However, the provision of community facilities may not be equitably distributed between neighborhoods with high- and low-socioeconomic status. Such phenomenon would be more apparent in urban old districts, due to the urban renewal process. This study aims to evaluate the spatial equity of the provision of different community facility type in urban old district in Hong Kong, highlighting the effects of urban renewal process.

Materials and methods

This study selected Kwun Tong district in Hong Kong as case study, as it is one of the old district under urban renewal process. Furthermore, it is also the district with highest elderly proportion and one of the poor district in Hong Kong. This study applied spatial analysis to explore the distribution of community facilities by using ArcGIS. Independent t-test and paired sample t-test were used to investigate whether there is a difference of community facilities provision between neighborhoods with high- and low-socioeconomic status.

Results

This study found that there was visible spatial inequitable distribution of community facilities in Kwun Tong district. The proportion of elderly people for using the community facilities in low-socioeconomic status neighborhoods is higher than in high-socioeconomic status neighborhoods. In particular, insufficient provision of specific cultural facilities was found. Furthermore, the findings reveal that urban renewal process has not improved the spatial inequity of community facility provision, but exacerbated such spatial inequality in the past six years, especially for community hall/centre density.

Conclusions

This study illustrated that the need to address the issue of spatial inequity of community facility provision in an old urban district. The urban renewal process makes the spatial inequity more severe, creating problem of supply-demand mismatch of resource. The findings could be helpful to make better planning of community facilities to support aging-in-place.



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VIRTUAL

C.32. Urban commission Urban Challenges in a Complex World Subjective Objective well being in cities

2649-CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN AS A GUIDELINE ENSURING SAFETY. THE CASE OF PUBLIC TRANSPORT STOPS IN POZNAŃ POLAND

Emilia Bogacka¹

Adam Mickiewicz University, Poznań Social Geography Department Poznań-Poland ¹

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN AS A GUIDELINE ENSURING SAFETY. THE CASE OF PUBLIC TRANSPORT STOPS IN POZNAŃ, POLAND

Safety is one of the issues influencing well-being of the city inhabitants. The aim of this work is to present safety perceptions of public transport stops users with use of principles of Crime Prevention Through Environmental Design (CPTED). CPTED is a strategy that aims at reducing crime and improving the sense of safety (Iqbal & Ceccato 2016) and was used in works on transportation systems (Abenoza et al. 2018, Ceccato 2013, Ceccato & Uittenbogard 2014), but not in Poland. A survey with 470 respondents was conducted from October 2017 to January 2018 in Poznań, Poland. The research allowed the analysis of safety perceptions including time of the day and physical and social environment of the public transport stops. Respondents feel safer during the day. Declared safety is positively affected by appropriate lighting, video surveillance and short waiting time for public transport. Social environment is also important for safety, the respondents value especially presence of police or municipal police, company of other person/other people and good knowledge of the stop area.

Abenoza, R., Ceccato, V., Susilo, Y., Cats, O., 2018, Individual, Travel, and Bus Stop Characteristics Influencing Travelers' Safety Perceptions, Transportation Research Record, doi: <https://doi.org/10.1177/0361198118758677>

Ceccato, V., 2013, Moving safely: crime and perceived safety in Stockholm's subway stations, Plymouth: Lexington

Ceccato, V., Uittenbogaard, A.C., 2014, Space-Time Dynamics of Crime in Transport Nodes, Annals of the Association of the American Geographers, 105: 131-150

Iqbal A., Ceccato V., 2016, Is CPTED useful to guide the inventory of safety in parks? A study case in Stockholm, Sweden, International Criminal Justice Review, 26:150-168

3638-Identifying key determinants for the dispersal patterns of small urban green spaces

Athanasios-Alexandru Gavrilidis¹, Diana-Andreea Onose¹, Simona-Raluca Gradinaru¹, Ana-Maria Popa¹, Andreea-Raluca Slave¹

University of Bucharest Center for Environmental Research and Impact Studies Bucharest-Romania ¹

The role of urban green spaces related with the provision of a high quality of life is largely supported both by high level policy and research. In this context, the compact cities concept which is promoted as an example of sustainable urbanization must consider alternative ways of satisfying their need for green spaces, since wider urban settlement are considered overrated and unsustainable. Therefore, there is an increasing interest in the field of qualitative and quantitative analysis of small urban green spaces. Through this study we aim to identify the key determinants for small urban green spaces dispersal patterns by analyzing their relation with the urban structure and functional areas. We used spatial databases for case study cities containing social and economic characteristics of the urban areas. We applied spatial analysis, spatial statistics and connectivity analysis in order to identify whether social, economic, cultural or natural aspects play any role in the design the distribution of small urban green features throughout the the Romanian cities. Our results have emphasized how the amount and distribution of small urban green features is connected with socio-economic characteristics of the neighbourhoods, and how areas initially rich in a natural assets have attracted and boosted real estate projects designated for the upper class. The importance of the analysis resides in its potential of highlighting the imbalances in the distribution of small urban green spaces at city level and spatially exposing the urban areas deprived of the benefits provided by this broader category of green infrastructure.



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VIRTUAL

C.32. Urban commission Urban Challenges in a Complex World Sustainable to resilient cities

1938-A COMPARISON STUDY ON REGIONAL SUSTAINABILITY PERFORMANCE BETWEEN 6 METROPOLITAN AREAS IN JAVA

*Andrea Emma Pravitasari*¹, Ernani Rustiadi¹, Setyardi Pratika Mulya², Candraningratri Ekaputri Widodo³, Galuh Syahbana Indraprahasta⁴, Lutfia Nursetya Fuadina⁵, Nur Etika Karyati¹, Alfin Murtadho¹

*IPB University Center for Regional Systems, Analysis, Planning and Development (P4W/CRESTPENT) Bogor-Indonesia*¹ *IPB*

*University Regional Development Planning Division, Department of Soil Science and Land Resource -Indonesia*² *Kyoto*

*University Graduate School of Global Environmental Studies (GSGES) -Japan*³ *LIPI The Indonesian Institute of Sciences (LIPI)*

*-Indonesia*⁴ *IPB University Regional Planning Science -Indonesia*⁵

Java is widely known as the economic center as well as the most populous (main) island in Indonesia with 60% inhabitants and contributes almost 60% to National Gross Domestic Product (GDP). Rapid urbanization process and economic development in Java are mostly concentrated in six major metropolitan areas (MA): "Jabodetabek" (Jakarta MA), "Bandung Raya" (Bandung MA), "Kedungsempur" (Semarang MA), "Kartamantul" (Jogjakarta MA), "Gerbangkertosusila" (Surabaya MA), and "Solo Raya" (Surakarta MA). Due to its extensive development progress over the past decades, Java is now facing environmental crisis and declining carrying capacity. This paper aims to measure urban and regional sustainability performance in these metropolitan areas in particular and in all regencies/municipalities in Java more generally by drawing on the so-called Regional Sustainability Index (RSI). RSI was developed using Factor Analysis (FA) method based on some indicators in 3 dimensions (economy, social, and environment), covering: physical condition, public services and infrastructure, economic and social welfare, community health and education, social capital, regional environmental sustainability and disaster resilience. The results show that every regency/municipality in Java has diverse regional development condition and sustainability performance. In addition to this, most of the localities (regencies/municipalities) being part of the metropolitan areas have a relatively better economic, social, and environmental condition than that of other localities. Measuring RSI is a simple approach for evaluating and reporting economic, social, and environmental conditions at the regional level to support the integration of three dimensions of sustainability, as well as to increase people's awareness about the importance of sustainable development.



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VIRTUAL

2261-Are Sustainability Indices Comparable An Exploratory Study for Turkey and India

Şirin Gülcen Eren¹, Seema Mehra Parihar²

Süleyman Demirel University Faculty of Architecture City and Regional Planning Isparta-Turkey¹ University of Delhi Kirti Mal College -India²

Agenda 2030 has strengthened the momentum towards 'Sustainability' and 'Sustainable Development' – the concept initiated 33 years ago in the Brundtland Report, 'Our Common Future'. In order to make cities sustainable, their current situations must be ascertained, their development and planning visions, aims and objectives must be defined, and strategies and action plans must be developed according to Sustainable Development Goals (SDGs). A variety of indices of sustainability indicators have been created in order to measure the performance of the strategies and actions plans, and so to inform further actions and interventions.

The content of these indices depends on the location of the country, the sustainability strategies of the cities, the aims and intentions of policy and decision makers and the index drafters. There is a need to determine the indices that can be taken as a basis for comparative analyses of cities in different geographies, and for administrative decision-making about urban development and planning. The issue goes beyond how to measure sustainability and centres on which index should be adopted, and why.

In line with this need, the present paper, in an attempt to bridge geographies, raises a key question: 'Are Sustainability Indices Comparable?' It unveils missing gaps by exploring data of international indices referring to Turkey and India. It is supported by a descriptive study based on a literature survey and internet search regarding sustainability evaluation systems.

This paper aims to analyse reliability and vertical and horizontal (internal) comparability of available international indices prepared. The objective here is to create awareness about indices and to contribute to the effective implementation of decisions and strategies in meeting SDGs. While critically evaluating the comparability of the degrees of sustainability of cities, the study argues that the robust data collected across geographies should support interoperable and internally comparable indices, well adhered to and accepted by the different nations that recognize 'sustainability' as a key goal.

3015-Advocating for socially just municipal regulations the case of Ashbury Bloemfontein South Africa.

Mischka Dunn¹, Verna Nel²

University of the Free State Geography Department Bloemfontein-South Africa¹ University of the Free State Urban and Regional Planning Department nelvj@ufs.ac.za-South Africa²

Conventional Euclidean zoning approaches in South African have failed to address the needs of the urban poor; therefore, more appropriate and inclusive zoning regulations and land use management systems have captured the interests of various academics. Planning law in South Africa has been criticized for being as 'an oppressive force for the poor' that bring about no significant form of societal benefits for the poor. Hence, municipal regulations impede the genuine attempts of the urban poor to support and sustain themselves. Consequently, people living in lower income areas purposefully ignore the land use regulations because they do not support or encourage activities that will support their livelihoods. Regulations emerged in an era when populations were small and wealthy and the growth rates were low; however, growth rates have escalated and populations nowadays are predominantly poor. Therefore, it is even more crucial for regulatory frameworks to be reviewed and assessed to change regulations which no longer reflect the current realities. Regulatory frameworks have a considerable bearing on urban development, specifically on planning aspects such as zoning, land development, standards and infrastructure. Given this, regulations are one of the tools the government utilises to influence the social, economic and physical environments of the poor. This paper examines the inappropriateness of the planning regulations and the resulting contraventions from a social justice perspective in a historical township called Ashbury in Heidedal in Bloemfontein, using a mixed methods approach. It reveals how land use regulations result in a lack of social justice, thus impeding community's livelihoods. The paper concludes with recommendations for a more just approach to the regulation of development that will be more just and sustainable.



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3216-URBANIZATION AHEAD OF URBANISM IN IRAN

Ali asghar Pilehvar¹

*university of Bojnord city planning bojnord-Iran*¹

Growth and development of urbanization and urbanism in Iran has created a wide socioeconomic gap in urban areas. Rapid population growth and lack of socioeconomic growth programs and urban development strategies have deteriorated unemployment, inflation, housing price, traffic congestion and marginalization in cities, particularly in metropolises of Iran. This paper with descriptive-analytic research method and draws on the meta-analysis technique addresses the urbanization and urbanism changes in Iran. The research data was gathered from a statistical analysis of documents and techniques in a systematic review (over 50 year). The results of the study demonstrated that cities of Iran had undergone an unsustainable growth trend and urbanization is ahead of urbanism. Over the past 5 decades, cities have been facing rapid growth and development in Iran so that development-oriented governments can play a significant role in tackling growth and urbanization problems. These problems are especially evident in the socio-economic, urban planning and urban ecology. The rapid growth of urbanization (74% in 2016) has culminated in the emergence of metropolitan areas in an unstable process. Also in metropolitan areas of Iran, environmental and ecological threats, rural-urban migration and marginalization have posed a serious national-regional and local challenge. The structural-functional reforms in Iran have been accompanied with skeletal-spatial and socio-economic changes in cities, giving rise to a new social class called the low-income characterized with non-formal businesses and informal settlements in the outskirts of cities special metropolitan areas. This has provoked unsustainability in important indicators of urban development such as security, building density, environmental threats and centralization, among other things. This analysis is based on indicators such as density and centralization, collapse of urban tissues, informal settlement and urban security.

3513-Healthy landscapes evaluating the influence of urban landscapes over health and wellbeing

Athanasios-Alexandru Gavrilidis¹, **Mihai-Razvan Nita**¹, **Diana-Andreea Onose**¹

*University of Bucharest Center for Environmental Research and Impact Studies Bucharest-Romania*¹

Modern society has developed towards an urban society as the urbanization processes reached a high pace. Thus, more individuals are spending their lives within cities or urban agglomeration, therefore within urban or urbanized landscapes. The complexity of processes and interactions between individuals and urban environments projects various impacts over their wellbeing. In this study we realized a review of research papers published in the past decade on the topic of healthy urban landscape. We focused on two main objectives: (i) identifying what types of urban landscapes have been acknowledged to provide health benefits and (ii) determining the scientific methods most used in assessing the amount of health benefits generated by urban landscapes. We realized an in-depth analysis of 270 scientific articles and used descriptive statistics and MeaningCloud API's to process the extracted data. The analysis helped us to cluster urban landscapes according to the provided health benefits. Results emphasized the types of urban landscape having direct and indirect impact over human wellbeing. Landscapes including natural features have been acknowledged to provide more benefits, especially towards citizen's mental wellbeing, while natural homogenous landscapes have been highlighted to encourage outdoor activities. The findings exposed through our study provide valuable criteria in mapping the healthy landscapes of a city, helping practitioners and policy makers to identify deficient areas, and taking the proper measures to have a balanced wellbeing throughout their cities. The dispersal of healthy urban landscape throughout cities could also be further used in establishing sets of indexes for assessing the sustainability of urban settlements.



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VIRTUAL

C.32. Urban commission Urban Challenges in a Complex World Technological innovations creative activities in cities

1950-THE CONCEPT AND IMPLEMENTATION OF SMART CITY TO SUPPORT THE CAPITAL CITY

Rini Rachmawati¹

*Faculty of Geography, Universitas Gadjah Mada Development Geography Yogyakarta-Indonesia*¹

Smart city constitutes a concept of smart urban development and city management, much of which has been implemented in many countries. Smart city is intended to achieve efficiency, service improvement and use of information and communication technology (ICT) in city management. The implementation of smart city is to make a city smarter than before, being smart in the aspects of administration, community, social life, economy and environment. Smart city in Indonesia, among others, has been implemented through the 100 Smart City Movement Program held by Ministry of Communication and Information Technology. Many various ICT-based applications are currently applied in Indonesian cities to enable services to be more efficient. In addition, they are also intended to create the 'branding' of a city. This paper discusses the concept and implementation of smart city to support the capital city from the case of Indonesia, Malaysia and Myanmar from the results of field and literature studies. Indonesia is currently preparing the new capital. The movement of capital city is due to the condition of the present capital that faces lots of problems related to carrying capacity and environmental capacity as well as disaster vulnerability. Therefore, the new capital needs to be prepared from now on, especially in implementing smart living and smart environment. The success story of Malaysia is exemplified through Putra Jaya and Cyber Jaya. This can be a good lesson in implementing smart city to the development of new administration and business center which is located outside the capital, Kuala Lumpur. Meanwhile, the case of the success story of Myanmar that moves its capital from Yangon to Nay Pyi Taw is an example of the successful development of smart living and smart environment.

3556-Smart Cities in Developing Countries Conceptualization and Contextualization

Galuh Syahbana Indraprahasta¹, Purnama Alamsyah¹

*Indonesian Institute of Sciences STI Policy & Management Jakarta-Indonesia*¹

The notion of smart city has attracted an increasing scholarly attention for the last decade, while its initial emergence could be, indeed, traced back to the early 1990s. While there are many definitions of smart city, most studies do agree that this concept refers to the incorporation of digital technologies into urban systems. This paper departs from the need to understand the different contexts in which smart cities are conceptualized and interpreted. We are specifically interested in understanding the intellectual map of smart city research in the context of developing countries which tends to be obscured within the current smart city literature. Our recent screening of articles from Scopus database from 1990 to 1 September 2020 shows that research articles on smart city having focus on developing countries only constitutes less than 10% of total articles in the database. To this end, scientometric analysis was used to map the trend, geographical origins, subject areas, and research hotspots. Our analysis reveals that, from a social-technical perspective, in developing countries the technological dimension has received less attention as indicated in the citation and thematic analysis. This relates to the current state of technological progress in many developing economies. While the attention to the broader dimensions, notably the social-human-centric reading, of cities has been broadly recognized in the developed world, the specificities in developing countries are more intricate. Many of these countries are still on the way to meeting the basic needs of all citizens. As such, smart cities in the developing world are not merely about adopting the most cutting-edge technological advances, but, more importantly, to find the balance adoption between the technical solution available and the actual needs and priorities of cities.



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VIRTUAL

C.32. Urban commission Urban Challenges in a Complex World Urban Governance planning and participative democracy

1379-Spatial Disparities among Housing Submarkets in Seoul and Scale Politics in Korean Housing Policies

Yeon-Taek Ryu¹

*Chungbuk National University Department of Geography Education Cheongju-Korea, South*¹

In the late 1990s, South Korea experienced drastic changes in economic and political conditions that in turn influenced the way in which the Korean urban housing markets are spatially reorganized. The financial crisis in 1997 in Korea caused the Korean housing market as well as financial market to severely dwindle. In this sense, I examined how the financial crisis at the national and multinational scales has been carved in different Korean urban housing sub-markets at the local and intra-urban scales. Comparing the spatial variations in the change rates of house prices and rent levels before and after the financial crisis, I investigated how the financial crisis and subsequent economic recession have unevenly affected different housing sub-markets in the city of Seoul. In so doing, I attempted to figure out both the spatiality and temporality of the Seoul housing market by examining the (re)alignment of spatial housing sub-markets. Then, I sought to explain why and how such changes have occurred both over time and in different housing sub-markets. I explored how housing policies and economic and social processes in Korea over the last two decades have affected the spatial outcomes of the housing market, and what implications can be drawn from these trends in terms of their impact on urban restructuring. Furthermore, attention has been drawn to how the scale politics of the Korean governments over the last two decades have affected and reinforced the spatial inequalities in real estate wealth within the city of Seoul.

2332-Social and citizen implications in territorial governance key elements in democratic governance

Ramon López-Rodríguez¹, María José Piñeira-Mantiñán¹, Daniel Barreiro-Quintáns¹, Rubén Camilo Lois-González¹

*University of Santiago de Compostela Geography ramonlopez.rodriguez@usc.es-Spain*¹

In 2001 the commission of the European Union initiates a profound reform of the governance so that it becomes a more democratic process, betting on 5 basic principles: openness, participation, responsibility, effectiveness and coherence. In Spain it was not until the crisis (2008) and citizen movements (2011), when these premises began to take consistency. In the 2015 elections, territorial and social inequalities marked political programs. Urge to end corruption, unite the territories and address the most vulnerable spaces and groups. The coordination between different levels of government and the involvement of all territorial actors, became indispensable. After a legislature, we asked ourselves to what extent these objectives were achieved. Throughout this article we will approach the new models of governance applied in some Spanish cities such as Madrid, Barcelona, Valencia, Sevilla, A Coruña y Cádiz, specifically, the initiatives that have promoted citizen participation in the design of urban policies and social cohesion. The method is based on a mixed approach. On the one hand, documentation regarding the new models of urban governance and the challenge of achieving greater social cohesion in our cities has been consulted; while the electoral programs presented for the 2015 municipal elections have been reviewed in order to analyse the initiatives that the different political forces proposed to mitigate the effects of the crisis, vulnerability and promote social cohesion. In parallel, a field work has been carried out consisting of conducting semi-structured interviews with policy makers and technicians of local administrations, citizen platforms and social groups that took place between September 2018 and April 2019. For each one a different model of questionnaire was designed.



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3081-Urban governance tested by the armed crisis in Côte d'Ivoire through the city of Bouake

SANALIOU KAMAGATE¹, KEVIN KONAN¹

UNIVERSITE FHB GEOGRAPHIE abidjan-Cote d'Ivoire¹

The urban phenomenon has consecrated the predominant role of certain cities in the Ivorian urban system. This is the case of Bouake, the second largest Ivorian city located in the center of the country. By its geographical position and the importance of the economic exchanges, this locality knew a prodigious development. A significant flow of populations from inside and outside the country settled there. Thanks to the military-political crisis in Côte d'Ivoire from 2002 to 2011, it was the capital of the rebellion that occupied the northern half of the country. During the armed occupation of the city, the state and its institutional branches were absent. The same was true of civil servants and the private administration (diplomatic representations, development aid organizations, international organizations, etc.). A new form of local governance has been put in place by the rebels. This situation has amplified urban problems: deterioration of the living environment, deterioration of basic infrastructure and equipment, unhealthy conditions, insecurity, sanitation problem. The end of the politico-military crisis in 2011 led to the reunification of the country and opened up vast projects for post-crisis development. With the return of the state to Bouaké, the challenges are enormous. Several forms of governance are put into practice: centralized development, local development, participative development, international cooperation. The balance sheet is mixed. Indeed, the city has returned to normal operation with the establishment of state symbols. However, the scale of the needs is enormous and the authorities are unable to meet all the challenges of urban governance.

3369-From pandemics of 19th century to COVID19 the model's change of the cities

Bárbara Polo-Martin¹

Universidad Internacional de Valencia Geography Barcelona-Spain¹

During centuries, the pandemics were something very natural to the human being, but as result of the industrialisation during the 19th century, they became a problem. The arrival of population to big cities provoked the development of irregular and overpopulated quarters with any measures of safety, and facilitated the expansion of tiny diseases. The problem resided in the sanitation's problems. As for example happened in London and Paris. As solution, in different cities, and as starter point Paris with the Haussman's proposals, different inner reforms and extension plans (Nadal, 2017, 357-385). Humanity believed that these extension plans would give us a healthy density and an ordered expansion. We opened with scalpel big boulevards to believe that we had a wide city to walk. But nothing further from reality. At the beginning of 20th century, the history repeats. A new pandemic crisis has raised and has shown that cities have, again, a crisis of congestion. But in this time, in comparison with 19th century, town halls have acted very quickly in order to enhance the welfare of their citizens. Green and out of cars cities. Cities for citizens and not for economy. Governments have known how to recover the previous state of the city and to promote spaces of quality. We find different cities that have found solutions after different disasters: New York, London, Paris, Barcelona, etc...

But, the question here is, is this experiment temporal or permanent? Which is in charge of this change: governments or citizens? Has covid19 acted as a real trigger for the change?



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VIRTUAL

C.33. Water Sustainability Human pressures on water causes and consequences

1078-MOUNTAIN STREAMS HABITAT QUALITY ASSESSMENT IN DIFFERENT CLIMATE ZONES

Lukasz Wiejaczka ¹, Małgorzata Kijowska-Strugała ², Jarosław Cebulski ², Eliza Płaczowska ², Zofia Rączkowska ², Paweł Prokop ², Qiang Zou ³, Yongqiang Guo ³, Jiang Hu ⁴

Institute of Geography and Spatial Organization Department of geoenvironmental Research Krakow-Poland ¹ Institute of Geography and Spatial Organization Department of geoenvironmental Research -Poland ² Chinese Academy of Sciences, Institute of Mountain Hazards and Environment -China ³ Southwest University of Science and Technology -China ⁴

Streams are important habitats, providing shelter and feeding opportunities for a wide range of organisms. Habitat quality of streams depends on the diversity and abundance of natural and anthropogenic elements within channels and their vicinity.

The aim of the study is comparison of habitat quality of mountain streams on the sections without visible anthropopressure and those transformed by human activity between mountain areas with different climates. Three small streams (with catchments from 10 to 20 km²) were selected for comparative research: Bystrzanka (Polish Carpathians), Peshok (Darjeeling Himalaya) and Fanshen (Hengduan mountains). Selected catchments reflect a typical environment for a given mountain area.

Field studies were conducted with using the British River Habitat Survey (RHS) method on the sections located in lower and upper reaches of the streams. The collected data were used to compare the quality of the stream habitats with using two synthetic indicators: HQA (Habitat Quality Assessment) and HMS (Habitat Modification Score). Sections of mountain streams located in the upper catchment areas show the greater naturalness of habitat in relation to sections in the lower parts. It results from a greater variety and number of natural hydromorphological features of streams and their close vicinity. The upper sections of mountain streams present HQA values between 55 and 64 and HMS values between 0 and 6. The lower sections of streams revealed HQA between 37 and 49 and HMS from 25 to 39. The comparison of HQA and HMS values showed that the upper sections are characterized by very good (Bystrzanka and Peshok streams) and good (Fanshen stream) habitat quality while the lower sections have a poor habitat quality.

Similar degree of naturalness and anthropogenic modifications of the habitat between the upper and lower reaches of streams can be also expected in other mountain areas, apart from pristine areas.



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VIRTUAL

1099-BLUFFS DEVELOPMENT ON THE MOUNTAIN RESERVOIR (THE POLISH CARPATHIANS)

Malgorzata Kijowska-Strugala¹, Łukasz Wiejaczka¹, Jarosław Cebulski¹

*Institute of Geography and Spatial Organization Polish Academy of Sciences Department of Geoenvironmental Research
Szymbark-Poland¹*

The main effect of abrasion within shore zone of the reservoirs is cutting hillsides what leads to the development of bluffs. The spatial and temporal evolution of bluffs is dependent on many environmental factors. In this study, characterisation of bluffs is presented with reference to the mountain reservoir with a focus on determining the relationship between the height of bluffs and selected environmental factors.

The field research was conducted on the Czorsztyn reservoir located on the Dunajec river (upper Vistula basin). It is one of the largest dam reservoir within the Polish Carpathians, created in 1997. The analysis was based on the field studies conducted with the use of Terrestrial Laser Scanning (TLS). The importance of environmental factors in bluff development has been determined using statistical methods, Beta factors and Principal Component Analysis (PCA). The results of the analysis indicate that after 18 years of Czorsztyn reservoir operation, bluffs cover 89% of the shoreline. The maximum bluffs height often does not exceed 2.00 m and decreased from the backwater area towards the dam. The most developed bluffs (considering the height) are observed in the south-western and western exposures of the shoreline.

Amongst the analysed factors affecting the development of bluffs on the Czorsztyn reservoir, wave height, water level, the position of bluffs within the shoreline, slope inclination and exposure were identified as the dominant factors. Due to the fact that there are multiple factors acting together, the distinction of the dominant factor affecting bluff development is difficult.

The results obtained may be useful in the search for hydrotechnical solutions aimed at stabilising the shoreline of reservoirs. At the planning stage, rational management should already include identification of the environmental factors that can affect bluff development around the reservoir and prevent potential economic losses.

2351-Coal mining in the Jiu River basin (Romania). Impact on the sedimentary dynamics and implication on water management

Gabriela Adina Morosanu¹, Liliana Zaharia², Philippe Belleudy³, Eugen Traistă⁴, Mihaela Sima¹, Jurchescu Marta¹, Irena Mocanu¹, Bianca Mitrică¹

Romanian Academy Institut of Geography Bucharest-Romania¹ University of Bucharest Centre for the Study of Regional Development -Romania² University of Grenoble Alpes Civil Engineering -Romania³ University of Petroșani Faculty of Mines -France⁴

In the framework of integrated watershed management, the present work aims to investigate the impact of coal mining on the sedimentary dynamics in the Jiu River basin (JRB). Extended on 10,080 sq.km in SE Romania, the JRB is noteworthy for its coal reserves exploited in several areas in the upper and middle sectors (bituminous coal in the Petroșani Basin and lignite, in the Motru - Rovinari Basin). The presence of coal led to the rapid development of the mining industry since the first half of the last century, impacting the quality of the water and, consequently, the sedimentary flux. Due to its high sediment load, the Jiu River basin is one of the main suppliers of alluvia to Lower Danube.

In the research we analyzed the coal content in the sediment samples collected from the alluvial deposits of the Jiu riverbanks in its lower sector, as well as from the riverbeds of the main rivers. Following several types of laboratory analyses based on coal geochemical properties, variable concentrations of bituminous coal and lignite were found, indicating the importance of coal mining industry as a main source of fine sediments in JRB, even in the current context of its decline imposed by national economic issues and by the tendency to replace the classical energy industry with the "green" one.

We appreciate that the coal tracing may well support hydrological studies and it can be embraced in the future by the institutions in charge of managing the river basins in Romania and other countries owing such mineral resources. The research may be a reflection for a more oriented approach using innovative interdisciplinary methods to identify the sediment sources and upstream to downstream pathways.



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2362-EFFICIENCY ASSESSMENT OF ADAPTIVE MANAGEMENT OF WATER RESOURCES IN THE SAO PAULO METROPOLITAN AREA BRAZIL

Leandro Fernandes Miyazaki¹, Luis Antonio Bittar Venturi¹

University of Sao Paulo Geography Sao Paulo-Brazil¹

The Sao Paulo Metropolitan Region (RMSP), which houses 21.2 million inhabitants, being one of the most populous in the world, faced between 2014 and 2016 a period that was known common sense as a water crisis, that affected the lives of a large part of the population. However, a large amount of water was available in the RMSP's rivers and reservoirs featuring in fact a water management crisis, not a simple water crisis. Although since the 1990s integrated water resources management has been globally recognized and employed, including the state of Sao Paulo, new ways of management have begun to be discussed, such as adaptive management. In this sense, the objective of this research is to demonstrate the hypothesis that adaptive management could make integrated management more efficient as it reduces its uncertainty. To verify the hypothesis, we are analysing 6 parameters according to the literature: variety; learning capacity; room for autonomous change; leadership; resources and fair governance. The method will consist of an experimental analysis of the 6 established parameters, which will result in the Adaptive Capacity Wheel. It will then consist of a dynamic and integrated analysis of these 6 parameters, which may be independent or interdependent (if one interferes with the other), verifying if they reduce the uncertainty of integrated management. Regarding the results, preliminary analysis shows that the parameters variety (institution's ability to allow for a variety of problem frames and solutions) and resources (ability to encourage authorities and social actors to take part on it) plays a strong role when it comes to reduce uncertainty of integrated management corroborating the hypothesis.

3039-CHALLENGES OF SUPPORT FOR ROHINGYA REFUGEES AND HOST COMMUNITY IN BANGLADESH A FOCUS ON WATER RESOURCES IN THE TEKNAF PENINSULA

Khan Shakil¹, Ai Sugie²

Chubu Manufacturing Quality Control Nagoya-Japan¹ Nagoya University Institute for Advanced Research agnes2aisha@gmail.com-Japan²

Background: This presentation seeks to reconsider the support system of Rohingya refugees and host community in Bangladesh through an examination of the water resource problem in the Teknaf Peninsula. Over 700,000 Rohingya refugees have flooded into Bangladesh since August 2017. More than 40 per cent of Rohingya refugees in the four camps (Ali Khali, Leda, Nayapara, and Jadimura), in the middle southern part of the Teknaf Peninsula, live in private land nearby their host community. In this area, potable water is scarce because of the geomorphological and geological conditions. The shortage of potable water has become a significant issue considering the large influx of refugees.

Materials and Methods: The presenters interviewed 49 Rohingya refugee households and 49 host community households, in and around the Leda and Nayapara camps, regarding the difficulties in their lives and water usage. The survey was conducted from February to March and in August 2019. Although it is difficult to distinguish Rohingya refugees from the host communities in actual situations, this presentation considers Rohingya refugees as those who have refugee status or the "Myanmar National's Registration Card" issued by the government of Bangladesh. **Results:** Most of the refugee and host community households have been suffering from water shortage, particularly during the dry season. Although some host community households shared their water sources with refugees (e.g. electric water pump), the collection of sufficient potable water remained difficult for most refugees because the host community households had priority to take water supplied by aid agencies.

Conclusions: The conflicts and struggles surrounding potable water resources demonstrate the limitation of the present support system by the international refugee regime. Not only the public water supply from aid agencies, but also household and community level water resource management, are necessary in resolving their water shortage crisis and sustainable water usage problem.



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VIRTUAL

3218-WATER SCARCITY AND SEASONALITY OF OVER TOURISM – CASE OF SANTORINI ISLAND

Itri Atay¹, Barış Seyhan¹

Rovira i Virgili University Geography Tarragona-Turkey¹

BACKGROUND / HYPOTHESIS

In the Mediterranean, international and domestic tourism have been significantly increased in the last 30 years and seasonality has started to play a significant role. The rising temperatures will prolong the tourist seasons which will mean more tourist arrivals and revenues. Hence, the growth and sustainability of any tourist destination is ultimately dependent upon an adequate water supply and it is a regulating factor in the tourism life cycle model. It is estimated that a luxury hotel consumes around 500 - 800 liters of fresh water per guest per overnight stay. Hence, this paper aims to analyse the impact of the tourism seasonality on the water resources of Santorini Island.

Materials And Methods

Both quantitative and qualitative methods have been used. For quantitative analysis, statistical data related to annual rainfall, annual temperature changes and annual tourist arrivals to Santorini Island have been collected from the Hellenic Statistical Center.

Results

It has been observed that, more than half million international tourists arrived to Santorini in 2019 which means that the international tourist arrivals have increased by %14, 5 from 2018 to 2019. It has to be noted that, domestic tourist arrivals as well as arrivals through cruise ships are not added to the scheme. On the contrary, water resources of Santorini have already started decrease due to less precipitation levels and changing climate conditions even if "over tourism" phenomenon is not taken into consideration. The driest period and the lowest precipitation levels of rainfall is actually at the same time of the high season of tourism in the island.

Conclusion

Santorini Island may face certain difficulties with water resources availability due to the longer tourism seasonality in the long run. Climate change can also make the water scarcity more chaotic.



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VIRTUAL

C.33. Water Sustainability Socio economic aspects of water sustainability

1083-COMPARISON OF DAM PROJECT PERCEPTION BY RESETTLED AND NON RESETTLED COMMUNITIES

Lukasz Wiejaczka¹, Danuta Piróg², Joanna Fidelus-Orzechowska²

Institute of Geography and Spatial Organization Department of geoenvironmental Research Krakow-Poland¹ Pedagogical University of Cracow Institute of Geography -Poland²

Studies on the social impact of dams have been conducted for the past 50 years, but there are still many research gaps which require explanation. The majority of studies show social impact of dams from the perspective of the resettled populations and not the non-resettled communities.

The general aim of the analysis is to compare a social assessment of the dam construction by resettled and non-resettled people. The population involved in the study is the community affected by the Świnna Poręba dam project located on the Skawa River in the Polish Carpathian Mountains. Its construction started in 1985 and the dam was formally inaugurated in 2018. We used in-depth interviews with a non-resettled and resettled local population. The multivariate analysis of variance (MANOVA) was used to explore individual, non-monetary self-assessment of costs and benefits related to the dam project for each respondent.

The results state that social assessment of dam projects differs significantly depending on whether one belongs to the resettled or non-resettled population group. Displaced people view the dam project more negatively than people who did not have to move. The biggest differences concerned the assessment of the balance of changes in the natural environment. Statistically significant differences in assessing the private benefits or costs of dam project have also shown that the non-resettled population rated their own profits higher than losses, while the resettled population did the opposite. Gender, age and education do not significantly differentiate the assessment of a dam project.

The findings show that MANOVA is an effective tool for the study of social impact assessment (SIA) of dam projects because it can be used to quantify which independent variables have a statistically significant impact in the local population's assessment of and attitude towards dam projects.

2009-The role of coal in the Water Energy Food nexus

Csaba Vaszkó¹, Jai Krishna²

Greenstreams; Szent István University Doctoral School of Environmental Sciences Gyomaendrőd-Hungary¹ Greenpeace Greenpeace International -India²

Water, energy and food are interconnected and these interlinkages are often amplified by climate change. Nevertheless, the role of coal generation (power plants and mines) in the water-energy-food nexus has consistently been underestimated. Water stress is recognized in many countries. Currently, 17 countries—home to 1/4 of the world's population—experience extreme water stress. By 2025, half of the world's population will be living in water-stressed areas. The industry sector accounts for 19% of annual water withdrawal globally and 75% of all industrial water withdrawals are used for energy production. Every year, the world's coal-fired power plants and coal mines consume enough water (mainly for cooling) to meet the most basic needs of over one billion people. Food production requires roughly 70 percent freshwater and the competition for water with users like coal fired power plants is inevitable. On the other hand, climate change has impacts on the availability and quality of water and has effects on agricultural productivity, especially where food security is already a problem. Coal-fired power plants and coal mines contaminate water resources with unsafe levels of toxic pollution, sometimes for decades. As coal has regional impacts, the role of coal in the water-energy-food nexus can be also addressed through region or river basin scale case study analyses. This research is based on case studies where water-energy-food interconnections include conflicts and explores the role of coal in these trade-offs. Case studies include regions from affected countries such as India (Tamil Nadu, Maharashtra), Indonesia (Kalimantan), Australia (Sydney catchment), South Africa (Mpumalanga) and Turkey (Konya Closed Basin and/or Buyuk Menderes) where cooling water withdrawal and consumption for coal power plants and mine operation and expansion create or would increase conflicts between water allocation, biodiversity, food supply and energy.



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2397-Water sustainability and agricultural management and in Globally Important Agricultural Heritage Systems the case study in Osaki City Miyagi Prefecture Japan

Masatoshi MOTOKI¹, Toru SASAKI²

*Tokiwa University Faculty of Management and Administration Mito, Ibaraki-Japan*¹ *Miyagi University of Education Faculty of Education -Japan*²

The purpose of this study is to verify what kind of effect it has brought after the recognition of Globally Important Agricultural Heritage Systems (GIHAS) in Osaki City, Miyagi Prefecture. And to clarify the actual situation of water sustainability and water management in Osaki City and related issues.

Osaki city is located in the northwestern part of Miyagi prefecture. In Osaki City, the Ai River and the Naruse River flow from the Ou Mountains on the west. These rivers form a vast alluvial plain. The main agriculture in this area is paddy field cultivation.

One of the reasons that the region has been recognized as a World Agricultural Heritage is that the traditional water management system and its social organizations have been maintained despite the topographical and severe climatic conditions. Although, most of the water management in Osaki City has established an irrigation water system for each land improvement district through infrastructure development. At present, water management in this area has been limited to opening and closing the water taps since the infrastructure development project. In fact, land improvement zones manage the water in this area. In fact, land improvement zones manage the water in this area. As a result, in this area, the convenience of using irrigation water has increased, and agricultural management has become relatively easy. Thus, water management and agricultural management in this area have been continued due to the development of sustainable water use, but the number of farmers has been decreasing. Also, farmers are faced with the burden of costs, such as water management.

We need to continually understand how the acquisition of World Agricultural Heritage affects sustainable water use and water management, and even agricultural management.

2874-Which way forward Building up a water security system for China's city of the future

Wenjing Zhang¹

*University of Melbourne Geography Melbourne-Australia*¹

Water-related concerns from the process of urbanization remains a challenge around the world. This study contributes to the current pathways of discussing water security in the urban context, its realization has been pushed to the forefront of chasing sustainable development goals. We analyze how a centralized political regime frames its mission statement informing its approach to build up a water security system. We argue that the current scholarship around urban water security is not different from the debate around water security, as both discussions emphasize equity, environment conditions, accessibility, and governance, with the former put emphasis on the urban area and urban region. Further, current research and policy documents put too much emphasis on the "congenital deficiency" of water resources, which in many cases is due to the lack of political interpretation. We develop a comprehensive framework to start bridging the gaps. We suggest that the "water security" in China is framed as urban water security which largely motivated by the urbanization process. In light of such framing, large-scale, supply-oriented water transfer projects are emphasized in the policies. The practice of the statement thus poses incentives to continue expanding urban regions as creating a continuous core-periphery structure. This paper interprets the practice process of using an existing water regime to fulfill the needs of urban development through an analysis of a future model city- Xiong'an. Our study will expand understandings of, and policy approaches to, urban water security by attending to temporal dimension and regional implications, especially in developing economies.



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VIRTUAL

C.33. Water Sustainability Water resource variability monitoring hydrological hazards and risk management

1161-CLIMATE CHANGE IMPACTS ON ADRIATIC SEA BASIN RIVERS IN SLOVENIA

Gregor Kovačič¹, Valentina Brečko Grubar¹

University of Primorska Department of Geography Koper-Slovenia¹

Worldwide, numerous studies show significant impact of climate change on water bodies, from rising of ocean temperatures, ocean acidification, bleaching of coral reefs, melting of glaciers and ice sheets, drying of lakes and wetlands to changes of river regimes. Various meteorological variables show obvious increasing and decreasing trends, which are reflected in changes in river regimes. In this study, we focused on long-term variations of six rivers of the Adriatic Sea basin in Slovenia in relation to long-term variations in meteorological variables (precipitation, air temperature, evapotranspiration). The significant trends of change in climate and hydrological variables were determined using the non-parametric Sen's slope test. We also calculated several other parameters, e.g. variation between the initial and final values of variables during the study period, differences between the mean values recorded in the latest 20-year period and those recorded over the entire study period. The trend analysis was conducted for the longest available data series, from 24 to 53 years.

The analysis determined decreasing annual precipitation trend, statistically significant increasing mean annual air temperature trend and increasing annual evapotranspiration trend. These climate change factors are reflected in decreasing mean annual discharge trends of the studied rivers. The high values of linear correlation coefficients between different pairs of the studied meteorological and hydrological variables confirm mutual relationship. The most noticeable is a decreasing trend in precipitation during the summer months, when also the most evident and statistically significant increase in evapotranspiration is recorded, both resulting in lower runoff values and consequently lower mean monthly discharges in the summer period when the need for water increases significantly. Decreasing trends in characteristic river discharges are an important factor that must be considered very seriously in order to ensure the sustainable management of water resources in the Adriatic sea basin

1483-Predicting environmental uptake of mining related uranium using human scalp hair and a VGE based exposure model

Frank Winde¹, Emile Hoffmann², Gerhard Geipel³, Joachim Schüz⁴

Wismut GmbH Monitoring and Radiation Protection Chemnitz-Germany¹ North-West University Geography and Environmental Studies emile.hoffmann@nwu.ac.za-South Africa² HZDR Institute for Resource Ecology g.geipele@hzdr.de-Germany³ IARC Radiation and Environment j.schuz@iarc.fr-France⁴

Following longstanding concerns about possible adverse health effects of uraniferous mine waste deposits in densely populated gold mining areas of South Africa a screening survey on uranium (U) levels in scalp hair of residents was conducted analysing 87 composite samples from a total of 1340 clients sampled at local barber shops. The selection of barber shops considered ethnicity and sex aspects as well as a pre-determined intensity of exposure derived from a geospatial model in a GIS-supported virtual geographical environment (VGE) using six parameterised factors for the different exposure pathways. Based on the model nine areas of presumed high exposure intensity (HE) and three of low exposure intensity (LE) were selected for sampling human scalp hair. Uranium levels in hair are used as bio-indicator for environmental uranium uptake by residents. Modelled exposure intensity and measured uranium concentrations in hair of HE-areas residents correlate significantly. However, distinct differences between the predictive power of individual exposure factors exist with factors largely controlled by source proximity such as water and dust pollution being less relevant than originally anticipated. In contrast, uranium uptake via food and occupational exposure appeared to be important than expected. Generally, sex-adjusted averages of uranium levels in hair correlate better than sex-unweighted arithmetic means, medians or extremes (minima/ maxima). Possible reasons for higher than expected uranium levels in hair from barbers in White and Indian low exposure wards are also discussed. Based on these preliminary results it is recommended to conduct a high-confidence epidemiological follow-up study informed by the presented exposure model.



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1553-Modern water regime of the rivers of the European territory of Russia and its mapping

Natalia Frolova¹, Maria Kireeva¹, Timofey Samsonov², Andrey Entin², Aleksey Sazonov¹, Vladimir Semin², Elena Povalishnikova¹, Vadim Grigor'ev¹, Maksim Kharlamov¹

*Lomonosov Moscow State University Land Hydrology Moscow-Russia*¹ *Lomonosov Moscow State University Cartography and Geoinformatics iamste@yandex.ru-Russia*²

The daily and specific water discharges were analyzed for more than 600 hydrometric stations in 237 river basins of the European Russia for the entire observation period. The main hydrological characteristics of the runoff are calculated to analyze the current hydrological regime of rivers in the allocated time intervals of 1945–1977 and 1978–2015. Complex and synthetic parameters characterizing the trends of modern water regime transformation have been proposed and calculated. According to them, about 60 maps were drawn to make a spatio-temporal analysis of the river flow regime for more than half a century. As a result of the study, it was found that due to an increase in the amount of liquid precipitation in the summer period and mild winters, accompanied by frequent thaws, the rivers' flow in the European Russia has increased on average of 15–30% and its seasonal redistribution has changed. With a noticeable reduction in spring runoff, its significant increase occurred during the low-water period in winter and summer, which led to smoothing out its intra-annual unevenness. The most transformed water regime were observed in the rivers of the Don, Oka basin and left-bank tributaries of the Middle Volga, where the part of spring runoff in recent decades has fallen to 50% of annual or less, and the part of the rain runoff has increased by 70–90% in some rivers.

The created cartographic web application "The Modern Water Regime of the Rivers in the European Part of Russia and Its Hazardous Events" provides access to databases and maps prepared within the research. Maps' access is carried out through cartographic web services. Within the web application the requests of gauging stations data are organized through the cartographic interface.

The reported study was funded by RFBR according to the research project № 18-05-60021-Arctic.

1861-FLOOD RISK MANAGEMENT IN ROMANIA WAYS AND ACTIONS FOR PUBLIC INFORMING. FROM LEGISLATION TO PRACTICE

Liliana Zaharia¹, Gabriela Ioana-Toroimac¹

*University of Bucharest, Faculty of Geography Dep. of Meteorology- Hydrology Bucharest-Romania*¹

In the context of climate change, where extreme hydrological events are expected to be more frequent and intense, flood risk mitigation is a major concern of water policies and sustainable development strategies at different spatial scales (from European Union, to national, regional and local scale). This work highlights relevant issues on the flood risk management in Romania, country having one of the highest flood risks in Europe, focusing on measures, ways and tools for public informing and awareness, aiming to reduce the negative consequences of floods. The study is based mainly on data and information synthesized from bibliographical research, as well as collected by field investigations in several areas in Romania affected by damaging floods in the last two decades. The field investigations were performed in many campaigns, in a period of over 10 years, which included observations and interviews with residents and local authorities on flood hazard and its management. In the first part, an overview on the flood risk management at national scale is presented, with special focus on public informing ways, measures and actions. In the second part, we show some examples of actions for public informing on the flood risk that we have identified at local scale, in settlements hit by large floods.

The results of our study revealed significant progress in the last decade towards the design and implementation of strategies/plans for flood risk management in Romania. Several types of actions for people informing and awareness on the flood risk have been identified at both national and local level. However, we consider it is necessary to transpose into practice more measures included in the legislative documents and to make them better known by the people.



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1949-QUANTITATIVE ANALYSIS OF THE AREAL AND RELIEF PROPERTIES OF ASU RIVER BASIN SOUTHEAST NIGERIA.

Precious Chidera Igboanugo¹, Emma Emeka Ezenwaji¹, Chukwudi Peter Nzoiwu¹

Nnamdi Azikiwe University, Awka, Nigeria Geography and Meteorology Awka South -Nigeria¹

Background/Hypothesis

Morphometric analysis of a drainage basin expresses fully the state of dynamic balance that has been attained due to dealings between matter and energy. These analyses are essentially quantitative, importantly useful for the comparison and statistical analysis of drainage basins. The objective of the study is to determine the optimal areal and relief morphometric parameters of Asu River basin, Southeast Nigeria.

Materials and Methods

In this study, data were obtained from the digitalized map of the basin sourced from the 302SE, 302SW, 315NE AND 315NE topographic sheets on the scale 1: 50,000 using ArcGIS 10.2 software, as well as calculation using relevant formula. The remodeled regression approach was used to determine the optimal areal and relief properties of Asu River basin, Southeastern Nigeria employing the variance inflation factor as a test for multicollinearity.

Results

Results showed that the p-value of the models were 0.043 and 0.049, therefore the models for the areal and relief parameters are significant. Results showed that the areal parameters (Circulatory Ratio, Elongation Ratio, Form Factor, Compaction Coefficient, Texture of Drainage) are the optimal variables shaping the basin, whereas the basin slope was identified as the most contributory relief parameter in the basin which indicates a possibility of soil erosion, sediment yield and transportation on a relative low relief.

Conclusion

The study suggests that as Asu River basin lies on a moderately low relief and very much regular terrain, proper and controlled urban development by government agencies should be promulgated to reduce the magnitude of flooding within the basin.

1952-LOCAL SPATIO TEMPORAL FOG WATER AVAILABILITY AND GRADIENTS IN THE NORTHERN CHILEAN COASTAL ATACAMA DESERT

Juan Carlos Pastene¹, Alexander Siegmund¹, Camilo del Río², Pablo Osses²

Department of Geography - Research Group for Earth Observation Heidelberg University of Education & Heidelberg University, Heidelberg-Germany¹ Instituto de Geografía & Centro Desierto de Atacama, Pontificia Universidad Católica de Chile -Chile²

Background

Fog plays an important role as natural water resource in the coastal Chilean Atacama Desert, one of the world's most arid places. During the last decades studies about fog have been carried out, especially to understand the presence and environmental conditions of local fog ecosystems like Tillandsia lomas. Nevertheless the understanding of fog climate characteristics and its driving parameters on local level is still poor as the data availability is very limited and the spatio-temporal dynamics of the fog climatology are divers.

Materials and methods

Various parameters of fog climate in a northern Chilean Atacama Desert are analysed and characterized on the basis of a local station network. From 2016 onwards, a network of Standard Fog Collectors (SFC) have been installed, added by several high quality climatological stations, located in a transect from ca. 550 to 1,350 m in a distance between 4.5 to 10.7 km from the coast. The local network is generating a high temporal and spatial acquisition of climatological data of fog water by SFCs (2 m), air temperature & humidity (2 m), surface temperature (5 cm), wind speed & direction (10 & 2 m), air pressure, global radiation, leaf wetness and dew every 10 minutes until nowadays. Additionally, ten mini standard fog collectors have been installed at the beginning of 2019 generating a monthly data of ground fog water (50 cm) in the main study area "Oyarbide".

Results

The first results show a high correlation of fog water amount with distance to the coast, altitude and the inversion layer seasonal variation on different spatial scales, as well as multitemporal variability.

Conclusions

The new results gives a more detailed understanding of the local fog climatology at Atacama Desert and allows to model the spatio-temporal gradients on a higher accuracy, as a bases for future related investigations.



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2117-The use of modeling for evidence based planning to deal with the possible consequences of spring floods on lowland rivers

Farida Akiyanova¹, Nurlan Ongdas¹, Yergali Karakulov¹, Altynay Shaimerdenova¹, Zhanbota Mussagaliyeva¹, Nurlybek Zinabdin¹, Aksholpan Atalikhova¹, Adlet Nazhbiyev¹, Arman Kabdeshev¹, Aliya Simbatova¹
*International Science Complex "Astana" Institute of Geography and Environmental Research Nur-Sultan-Kazakhstan*¹

Lowland rivers are the dominant river-form in Kazakhstan. These are characterized by spring floods, when up to 98% of the annual runoff passes through in a short period. As a result, 919 settlements, 2,000 km of roads, 841 bridges and other structures are at risk from flooding. There is an increase in damage caused by growing economic development in areas at risk of flooding. For evidence-based planning aimed at contending with the possible consequences of floods, hydrological modeling is necessary.

Hydrological modeling was carried out by means of the Hec-Ras program and using as subjects the lowland rivers Yesil and Nura during the flood period and within the suburban area of the city of Nur-Sultan. The main input parameters of the program were: a detailed digital elevation model with the inclusion of the bathymetry of water bodies and data from water-control structures, as well as preset river hydrographs. Two scenarios were modeled: 1) estimated maximum river discharges for the rivers Yesil and Nura; 2) the actual water discharges during the flood of 2017.

For both modeling scenarios, there is a decrease in the peaks of the floods of the rivers downstream. With discharges from the protective dam of more than 45m³/s, the River Esil begins to flood the urban areas of Nur-Sultan. During the flood period of a high-water year, the River Nura flows into the Esil and floods the settlements that are within the interstream area. It was also revealed that, in high-water years, there is a high risk of flooding for the surrounding settlements and some sections of the city of Nur-Sultan.

Based on the simulation, recommendations were developed to increase the capacity of the riverbeds and improve protective structures at settlements and infrastructure, especially in the interstream area of the rivers Yesil and Nura.

2342-Response of global climate change on the Great Asian Watershed territory

Endon Garmaev¹

*Laboratory of geocology Baikal Institute of Nature Management SB RAS Ulan-Ude-Russia*¹

Introduction. The global climate change observed in recent decades has been clearly manifested in the Trans-Baikal and northern part of Central Asia. The climate change affected the temperature of the surface layer of the atmosphere, the moisture content of the territory, permafrost soils and the condition of water bodies.

Materials and methods. Data from periodic hydrometeorological directories, meteorological database Reanalysis NOAA and personal data of long-term monitoring of water levels and discharges in water bodies in different phases of water regime of the territory under consideration were used.

Results. Average annual air temperature in Transbaikalia has increased by 1.9 Celsius degrees for the last 100 years, in Mongolian part of Selenga river basin – by 2.3 Celsius degrees. This is significantly higher than in other regions of the temperate latitudes of Eurasia. Two periods of humidification have been identified: humid – from 1980 to 1998, and arid in the northwestern part of the region – from 1999 to 2017. Perennial permafrost of soil is widespread here, and the southern border of the cryolithic zone passes through this area. At the border of transition from island permafrost to continuous permafrost, the depth of soil thawing has increased from 210 to 280 cm. Over the past 20 years, climate change and low water levels have reduced and dried up a number of water bodies. The prolonged low water period has led to strong deformations of river beds. Suspended sediment deposition on rolls and braid bars has led to the redirection of channel-forming watercourses and thus to strong meandering along the length of the river.

The work was carried out within the framework of the State task of the Baikal Institute of Nature Management SB RAS and the project of the Russian Science Foundation No. 20-17-00207.



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2493-Climatic and anthropogenic influence on freshwater availability for agriculture in the Sundarbans region of West Bengal India

Alexandre Gagnon¹, Lalu Das², Gautam Saha²

Liverpool John Moores University School of Biological and Environmental Sciences Liverpool-United Kingdom¹ Bidhan Chandra Krishi Viswavidyalaya Department of Agricultural Meteorology and Physics daslalu@yahoo.co.in -India²

Freshwater availability is a major problem in the Sundarbans region of India, where communities struggle to have year-round access to a sufficient water supply for domestic use and irrigation. The latter is particularly important, as agriculture is the main activity supporting livelihoods in this region. This paper examines changes in the availability of freshwater resources in Sundarbans, the factors influencing recent changes in availability and their impacts on people's livelihoods, as well as adaptive responses. For this purpose, hindcasts of surface water resource availability were developed using climatic data and a reanalysis data set. Then, four interactive sessions were conducted with farmers and other water resource stakeholders. The majority of precipitation in Sundarbans falls during the southwest monsoon, allowing cultivation to take place during that season. Farmers have perceived a delay in the onset of the monsoon, together with a decrease in monsoon rainfall and warmer temperatures. Such perceptions were put in the context of the quantitative assessment of changes in freshwater availability, which indicates that the decreasing trends in freshwater availability are mainly as a result of increasing trends in evapo-transpiration, as precipitation was observed to have increased in half the blocks of the region. As a way to increase agricultural production, farmers have been pumping groundwater to irrigate land to harvest a second annual rice crop in the spring, resulting in a lowering of the water table and reducing access to water for domestic users. This man-made pressure on the groundwater resource when compounded with decreasing trends in freshwater availability is causing what the locals describe as a water crisis. Current and proposed adaptive actions, including physical, managerial, technological and behavioral were examined, and put in the context of current adaptive capacity to increase the resilience of the studied communities to future climate change and sea level rise.

2542-Rain and thaw peak flow on the rivers of Russian plain in XX XXI century

Maria Kireeva¹, Ekaterina Rets², Timopheev Samsonov³, Natalia Frolova¹, Andrey Entin³

Lomonosov Moscow State University Land Hydrology Moscow-Russia¹ Water Problem Institute, RAS Water resources retska@mail.ru-Russia² Lomonosov Moscow State University Cartography and Geoinformatics tsamsonov@geogr.msu.ru-Russia³

The runoff of rain and thawing floods into the formation of the water regime over the past 50 years has been substantially transformed. There are hypotheses that this transformation is associated with a change in the stock-forming processes in this region. This paper presents estimates of the runoff characteristics of winter and summer-autumn flood peaks, obtained using an automatic hydrograph separation (GrWat V2.0) for 50 catchments of large and medium rivers.

For the most rivers of the Russian Plain, there is an intensive reduction in volumes and snow-melt maximum flood discharge and increase in base flow component. The main for this process is presumably associated with the influence of more intense and prolonged mid-Atlantic air-mass invasion. The increase in the base flow component affects the increased pre-flood discharge, which creates favorable conditions for the formation of superimposed peaks. With extreme precipitation on over-moisture soil, historical maximums may form. Such case realized in November 2019 in the Upper Volga basin.

The picture of changes in peak-flow characteristics does not have clearly pronounced patterns. In the central part of the region, an increase in the volume of rainfall by 15 -20 percent is noticeable. At the same time, the most significant increase in the volume of thaw runoff is observed here too (10-35%). Throughout the Russian Plain, the number of flood peaks varies in wide range. If in the West 5-8 peaks can form in a year, in the arid southeastern part this number not exceeds one per season. The rivers of the western half of the study area - have the largest number of local rain maximum. Also, a large number of peaks are formed on the left-bank tributaries of the Upper Volga. The study was supported by the Russian Science Foundation grant No. 19-77-10032



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2884-A NEW MULTIPLE RETURN PERIOD MODEL OF FLOOD REGULATION SERVICE—A CASE STUDY IN YANGTZE RIVER BASIN

Ju Shen¹, Shiqiang Du¹

*Shanghai Normal University School of Environmental & Geographical Sciences Shanghai-China*¹

An Ecosystem's flood regulation service (EFRS) is important for alleviating flood risk. Both the supply and demand of EFRS probably change from lower- to larger-return period (probability) floods. However, previous studies have only assessed the EFRS associated with a single return-period flood. To fill this knowledge gap, we present a new model integrating multiple return periods to assess the expected annual EFRS supply and demand. A case study in the Yangtze River Basin (YRB), China, shows that the total EFRS demand and its spatial pattern vary across different return periods while the EFRS supply remains relatively consistent from 20- to 200-year return period floods. Moreover, the EFRS supply-demand relationship is also dependent on the return periods. These results suggest that EFRS studies, particularly of the EFRS demand, should consider the influence of return periods (probabilities). Based on the model results, the rivers and lakes, dams, and forests contribute to the expected annual EFRS supply most, by 22.22%, 11.45%, and 31.54%, respectively. Moreover, the alleviation of the EFRS demand in a sub-basin is found to rely on its upstream EFRS supplies, which reduce the sub-basins with high demand-low supply from a number 29 (26.61%) to 22 (20.18%). These findings imply the importance of a basin system management of the EFRS supplies, particularly protecting the upstream forests and middle-downstream waterbodies, as well as properly regulating the dams. The proposed model can be easily applied in other basins and potentially help to enlighten a comprehensive understanding and management of the EFRSs.

2886-New dataset revealing lower flood protection for vulnerable population in China

Dan Wang¹, Paolo Scussolini², Shiqiang Du¹, Jiahong Wen¹, Ruishan Chen³

*Shanghai Normal University School of Environmental and Geographical Sciences Shanghai-China*¹ *Vrije Universiteit*

*Amsterdam Institute for Environmental Studies -Netherlands Antilles*² *East China Normal University School of Geographic Sciences -China*³

China is one of the most flood-prone countries, and development within floodplains is intensive. However, flood protection levels (FPL) across the country are unknown, hampering the present assertive efforts on flood risk management. Based on the flood-protection prescriptions contained in the most recent national flood policies, we develop a spatially explicit dataset of river FPL of China, and investigate the implications in terms of exposed population and its demographics. The new FPL dataset agrees with protection design documents in 18 of selected 27 counties, with a match rate of 66.7%. Based on census data of 2015, the analysis shows that majority (55.1%, 231 million people) of the population exposed to floods resides in counties with relatively high FPL (i.e., FPL>50 years return period). However, most counties (1955 out of 2237, or 87.4%) have low FPL (FPL<50 years return period). Because these counties are less populated, they host only 44.9% of the exposed population, but they host a disproportionate share (52.3%, 38 million) of the exposed vulnerable population (children and elders). Moreover, the proportion of elders has increased more rapidly in the low-FPL counties than in the high-FPL counties. These results from the combination of flood management policy and ongoing social dynamics reveal less protection for vulnerable people and reveal that the protection status is possibly caused by labor migration. These findings suggest that flood risk management should not only consider population and economy to ensure economic efficiency of the protection investment, but also include the demographic characteristics to reduce vulnerability.



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3387-Groundwater level changes and hydrological drought analysis in Konya Endorheic Basin

Furkan Gedik ¹, Faize Sarış ²

Çanakkale Onsekiz Mart University Geography -Turkey ¹ Çanakkale Onsekiz Mart University Geography Çanakkale -Turkey ²

The Konya Endorheic Basin is the biggest internal drainage basin of the Turkey and also it is one of the driest basin of the country. Surface water is very limited over the basin and groundwater stands out as an indispensable resource. We consider that the number of water wells in Konya Basin has increased over time due to water demand and this increase is more in sub-basins where agricultural production is considerably intense. In addition to this, we also suggest that the groundwater levels started to decrease significantly and the drought effect became more severe. Based on these hypotheses, this study aims to explain the temporal and spatial variability in groundwater levels and hydrological drought patterns; and also evaluate variability at sub-basins scale to be able to reveal hot spots in terms of water management. We will use the long-term observation data of the groundwater wells operating by State Hydraulic Works as the main data in this study. Both the Standardized Precipitation Index (SPI) and Groundwater Level Index (GWI) will be evaluated together as the hydrological drought analysis approach. Results of drought analysis, meteorological data related to dry conditions and well density information will be mapped with the Kriging Interpolation method and the areal distribution will be revealed. We think that characterizing the spatial and temporal variability of groundwater resources in Konya Basin with drought analysis will contribute to water users and policy/ decision-makers for implementing rational and sustainable water management plans in order to reduce the effects of water scarcity in Konya Basin.

3426-Modeling flood regulation in support of ecosystem accounting in Bulgaria

Stoyan Nedkov ¹, Petar Nikolov ², Desislava Hristova ², Hristina Prodanova ²

National Institute of Geophysics, Geodesy and Geography Sofia-Bulgaria ¹ National Institute of Geophysics, Geodesy and Geography petar.nik91@gmail.com-Bulgaria ²

The EU Biodiversity Strategy to 2020 provided an important push to the implementation of ecosystem services concept by the initiative for mapping and assessment of ecosystems and their services (MAES). Water regulation is considered as one of the main regulating ecosystem services. The water flow regulation to mitigate extreme events is the process of vegetation or other ecosystem structures acting as a barrier or buffer to water flow and thereby reducing the frequency and severity of flood events. The main scope of the MAIA project is to mainstream natural capital and ecosystem accounting in EU Member States based on the SEEA-EEA framework. The main objective of our work is to apply GIS-based modeling of flood regulation for the needs of ecosystem accounting.

Materials and methods

The most relevant modules for river-related water flow regulation are the hydrological models which can be used to derive different parameters of the water cycle. These parameters are used as indicators to represent the prevention or mitigation function of the ecosystems in cases of flood events. In this work we use surface runoff, peak flow and soil infiltration derived from GIS-based hydrologic tool ArcSWAT as indicators to define water flow regulation in three mountain watersheds in Bulgaria.

Results and conclusions

We examined how water regulation can be quantified at different scales and defined the appropriate mapping units for quantification of water regulation for the need of ecosystem accounting. The modeling results in form of Hydrological Response Units (HRU) enable to define the areas of ES supply in high resolution.

The integration of several indicators into a uniform approach for water regulation accounting is the biggest challenge. The preliminary results are encouraging but the accuracy is still far not enough for the accounting needs. Further work in other case studies is required.



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C.34.Sustainability Of Rural Systems Food Market From Local To Global And Vice Versa

1940-A food relocation strategy for everyone everywhere Reflections on Walloon initiatives (Belgium)

Serge Schmitz¹, Antonia Bousbaine²

University of Liège Geography Liège-Belgium¹ University of Liège Geography -Belgium²

A process of food relocation is developing in Wallonia, especially in Liège, where the first “Food Belt” is born. This innovative concept tends to bring consumers closer to producers. Initiated by groups of citizens, regional and local authorities have recently paid attention to this dynamic and want to support this revival of food belts.

Based on the PhD research of Antonia Bousbaine who, during five years, followed the emerging of two food belts in Wallonia, the paper analyses the governance and spatial issues of Food Belt creation. In addition to participating in public meetings, she conducted 33 semi-structured interviews with key players, like mayors and local development agencies. She also surveyed 98 farmers and 399 citizens. This information enabled us to list agri-urban projects in both urban areas, to analyse the conditions of emergence, and the economic, political, cultural and geographical constraints of their implementation.

If a Walloon food strategy based on the relocation of production and consumption is underway, it was initiated by small groups of citizens concerned not only about the quality of their food but also about the impact of current agricultural systems on both environment and rural societies. The political world was slow to react and many local politicians are still not aware of the issue. Yet, if the idea of food relocation and territorial food governance is based on commendable motivations, implementation addresses, on one side, the path dependency of farms and agricultural lands and, on the other side, a necessary reversal in values. The comparison of the municipalities within the two urban areas points out the places where people are concerned about the local origin of their food and areas that are more suitable, depending to agricultural structure, to supply local communities.

3421-Study on crop classification in Southern area of Shanghai based on multi source and multi temporal remote sensing images

Wenting Feng¹

East China Normal University School of geographic sciences ShangHai-China¹

With the launch of various remote sensing satellites, the comprehensive analysis of multi-source remote sensing images not only increases the spatial dimension information of the study, but also increases the time dimension information. This article focuses on how to use multi-source and multi-temporal remote sensing images to improve the classification accuracy of crops. The article chooses two southern districts of Shanghai, China as the research area, and Landsat-8 and Sentinel-2A multispectral images as data sources. The article uses three supervised classification methods, combined with the growth characteristics of crops in the Yangtze River Delta, to carry out crop classification research in the study area. The article focuses on how to use multi-source and multi-temporal remote sensing images combined with a variety of supervised classification methods to explore the most effective methods for extracting fine crops in Shanghai. The main research content includes: (1) Choose the best classification time based on image data and crop growth cycle. (2) SVM method based on multi-dimensional feature space, method of establishing decision tree based on time series NDVI data, and maximum likelihood method based on NDVI mask for crop classification. (4) Evaluation of classification accuracy and selection of the best classification scheme. Classification results: the classification accuracy of the maximum likelihood method is the worst, the overall accuracy is 84.5274%, the Kappa coefficient is 0.57, the svm classification accuracy is the second, the overall accuracy is 83.74%, the Kappa coefficient is 0.7871, and the time series NDVI decision tree has the best accuracy. The accuracy is 90.27%, and the Kappa coefficient is 0.8737. Finally, the article chooses method of establishing decision tree based on time series NDVI data, which has high classification accuracy and moderate algorithm complexity, and the algorithm is easy to implement.



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3531-Channeling Short Food Supply Chains An Assessment of the Agricultural Parks in Spain

Valerià Paül¹, Ana Zazo Moratalla²

Universidade de Santiago de Compostela Geography Santiago de Compostela-Spain¹ Universidad del Bio-Bío Planning and Urban Design azazo@ubiobio.cl-Chile²

The so-called Agricultural Parks (APs) have gained momentum in Spain in recent years. Roughly speaking, APs refer to specific farmland areas that are demarcated, protected and managed to keep their agricultural character vibrant. Most of the Spanish APs are located in metropolitan areas. Because of their proximity to neighbouring cities, short food supply chains should predictably be strengthened and/or (re)generated. Furthermore, horticulture, typically the dominant land-use in cities' countryside in Spain, is potentially more suitable for generating short food supply chains with consuming areas located nearby.

This presentation develops a set of criteria to select which APs in Spain can be considered as worth analysing. Applying these criteria, 18 APs have been selected. The analysis of the existing APs in Spain shows that they are not consistent despite making use of the same name. Indeed, we document a vast heterogeneity of situations under the AP denomination, including various approaches with regard to the development and management of short food supply chains. While most of the original APs — mainly developed in Catalonia — where more inattentive to food management policies and more focused on land-use planning protecting farmlands from urban encroachment, the recent ones are more oriented to implementing networks of local producers and local consumers, developing direct sales facilities (e.g. farmers' markets), promoting local products brands, etc. Our research concludes that the Food and Agriculture Organisation of the United Nations (FAO) should facilitate specific farmland preservation tools and frameworks at an international level, including fostering APs.

Methodologically, the research is based on a comparative evaluation. Hence, we make use of qualitative sources such as existing documents, public records and archival materials.

3541-FROM LOCAL TO GLOBAL COLLECTIVE GOVERNANCE AND PARTICIPATORY TOOLS FOR DEVELOPPING A COLLECTIVE TRADEMARK FOR ANDEAN QUINO

Didier BAZILE¹, Federico ANDREOTTI², Marco Allan CHEVARRIA LAZO³

CIRAD ES MONTPELLIER-France¹ CIRAD & WUR federico.andreotti@wur.nl-Italy² Freelance Lawyer mcheva@yahoo.com-Peru³

Quinoa (*Chenopodium quinoa* Willd.) was domesticated more than 7000 years ago in the Andes. Its potential was promoted during the International Year of Quinoa in 2013 (IYQ-2013) by the United Nations (UN). Quinoa gained global importance due to its high nutritional value and tolerance of abiotic stresses passing from smallholder in the Andes (minor crop) to worldwide farming systems (major crop). Today, more than 125 countries are testing or cultivating quinoa crop in all the continents.

There is a new challenge today for promoting and maintaining the recognition of the Andes as the center of origin of quinoa crop against the competition from new areas of production. The attributes and the values for the recognition and the promotion of the Andean quinoa have to be co-constructed from the village, to the region, to the States of the Andes territory (Peru, Bolivia, Chile, Ecuador, Argentina).

The three main objectives of this research are to recall the place of origin of quinoa, to valorise the systems diversity with local agroecological practices, and to accompany the farmers' organizations of the Andean Altiplano for connecting them to the global market through a Collective Trademark (CT). Using geographical participatory tools and approaches for categorizing the key actors of the sustainable food system, we develop common perspectives among producers for promoting inclusive development, collective governance and organizational tools as key factors for redefining local/global foodscape approaches through singularities at each scale from local to global. Concretizing innovation pathways with the establishment of a collective trademark for the Andean quinoa, farmers discussed different viewpoints regarding the future that they would like to develop. Farmers consider at the same time their biocultural heritage and landscape, their collective organizations and introduced novel technologies. Designing innovations pathway from their values and production practices facilitates the agroecological transition that many stakeholders currently predict,

3616-GENDER SPACE AND EVERYDAY LIFE IN RURAL INDIA A GEOGRAPHICAL STUDY THROUGH THE LENSES

Puja Sardar ¹

University of Calcutta Department of Geography Kolkata-India ¹

Space is a key aspect of our everyday life. Access in both private and public spaces in everyday life is immensely gender-specific. The gender-specific behavior and activities generated different spaces in a different way. The cultural aspect of a region has a considerable influence on gender-specific behavior. Gender, public space, and everyday life are widely discussed issues for policymaking in the context of urban whereas rural everyday space is equally important for the same but it is overlooked. In India, access to private and public rural space for men and women varies to a great extent and raised a question of equality. Particularly to women, rural public spaces like market space, meeting space even common drawing-room in domestic space are limited for access. So, the limitation on the accessibility of everyday spaces is a great concern in rural India. Though, the limitation on gender-specific accessibility of everyday spaces varies from different cultural zones. This paper attempts to understand how access and use of everyday rural space vary and create differences through gender identity in rural India and how it is impacted everyday life. For this research, two representative villages, from different cultural zones of India, have been studied. The visual method is adopted for this study to accentuate the visual aspect of gender-specific behaviour in everyday rural space. Observations, focus-group discussions, and interviews are also recorded and analyzed for the in-depth detailed study about everyday life and practices. This paper may contribute significantly to policymakers and planners of the rural sector.



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C.34.Sustainability Of Rural Systems Global Countryside And Local Development.Facing Rural Problematics.Complexity And Hibridization Of Rural Areas

1305-An Ecological Risk Assessment of Landscape under the Effects of Typical Human Activities on the Loess Plateau in Northern Shaanxi China

Wei FU¹

*BUCEA Architecture and urban planning beijing-China*¹

Vegetation recovery promotes changes to landscape patterns and ecological processes. Ecological risk assessments of landscape can help reveal the landscape-scale, potentially harmful ecological effects produced by ecosystem structure and function under human intervention. Due to the weak ecosystem and long history of sensitive interaction between humans and the ecological environment, the Loess Plateau in Northern Shaanxi, China, is targeted as the study object. According to night remote sensing photomaps, vegetation net primary productivity (NPP), and land use data for 2000, 2005, 2010, and 2015, risk indexes of landscape ecology are established to quantitatively assess the status and variations of comprehensive risk to the Loess Plateau in Northern Shaanxi and to analyze the correlations of landscape ecological risk with vegetation change and urbanization. As a result, the change of the landscape pattern produces potential effects on ecological stability. The area with low risk is reduced, whereas the areas with other levels of risks are increased. Vegetation change and urban expansion are positively correlated with landscape ecological risk variation in the energy source mining area in the northwest and new district at the rural/urban interface. Those areas are all shown fast development without considering local typical river and gully landform and human settlement environment. In the area with increased risk, the vegetation displays a trend of degradation. In the area with low risk, that is, in the extended area of the Grain-to-Green Project (GTGP), vegetation recovery promotes the reduction of ecological risk. However, this was last long. Planting patterns will be crucial factors influencing the effectiveness of vegetation restoration and eco-environment reconstruction. Our results have a certain reference value for the comprehensive regulation of regional development and ecological recovery.



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1336-ATTEMPS AND PROJECTS OF NEOENDOGENOUS DEVELOPMENT FOR RURAL AREAS IN THE SOUTH OF SPAIN

Francisco Navarro¹, Ana Nieto², Eugenio Cejudo¹, Gema Cárdenas², José Antonio Cañete¹

University of Granada Human Geography Granada-Spain¹ University of Extremadura Art and Territory Sciences -Spain²

Background/hypothesis

The aim of this study is to analyze the practice of neoendogenous rural development, through projects executed and the ones weren't carried out, if the geographical component has conditioned the reasons for not being carried out. The presence of a "project class" stands out (Dargan and Schucksmith, 2008: 285, High and Nemes, 2007; Esparcia et al., 2015). These entrepreneurs have high financing capacity, knowledge and ability to innovate and they are well informed. On the contrary, other socially and territorially disadvantaged groups have great obstacles to access this type of aid.

Materials and methods

For the municipalities of the rural areas of Andalucía and Extremadura, two southern Spanish regions, the executed and proposed but finally not made LEADER approach projects have been studied in the 2007-2013 programming period. Within the "failed" projects, "denied projects" (those that did not have the subsidy approved) and "approved or awarded projects" (those whose subsidy was approved by their LAG and a contract was signed but finally they were not carried out) are identified.

Results

The different role and leadership played by each type of promoter, attending to each LAG, and to the greater or lesser condition of periphery and economic development of each territory. If in marginal rural areas the leadership in LEADER approach has been developed by the public sector -municipalities mainly- and LAGs -in a second position-, in the rest of LAGs has been searched the leadership and control of the private sector (small and medium business and self-employed). This explains the higher success rates in the deep rural areas compared to the rest of the territories.

Conclusions

The role of territorial structures is a factor of differentiation/specialization in development strategies but does not entirely determine the success or failure of the LEADER approach.

1457-"BEWEEN EAST AND WEST". A GEOGRAPHIC INTERPRETATION OF THE RUSSIAN POLAR SPACE BY GIS APPROACH

Vladimir Bocharnikov¹

Pacific Geographical Institute FEBRAS Wildlife Ecology and Conservation Lab Vladivostok-Russia¹

The selection of geographical axes "centre-periphery", the justification of "nodal areas" and "zones of advanced development" presents now as relevant geographical research. Provided by the center and the periphery relations, the geographical analysis can show the asymmetry of the spatial structure of the country and the possible options for regional development. Russia is the first among the world's countries-giants, this same fact is the main reason that the country is a state very uneven in its structure, and the distinguished within the spatial extent and degree of regional mosaic. The presentation defines that the dialectic of discontinuity and of these forms for each country continuum of development, clearly separated as opposite poles of its - metropolis and industrial-rural-urban clusters, with one side from a holistic wild areas (wilderness), on other side. Vast and sparsely populated territories of Siberia, the North and the Far East of Russia for a long time had the official status of "reserve" and "pioneer areas". Only since late in the XIX and throughout the twentieth century the total number of inhabitants of "Beyond the Urals" has tripled as a result of an active policy of development of the state, despite the fact that there is still the main feature of settlement in Russia, where it is known that the entire population of the Asian part of Russia is only about 20% of all residents. The focus is on the development of actual economic Russian space as the specific and result of Russia mediate, which summarizes all political, economic and cultural relationships with society, creating a unpick Eurasian Space, located between the East and the West. The paper discusses wilderness scientific assessment and rising as the result some questions, pointed out why wild nature have been considering such important feature. "Wilderness index" allows



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1758-Development strategies of rural municipalities adhered to the Cittaslow network The case of Spain.

Juan Carlos Maroto-Martos¹, Aida Pinos-Navarrete¹, Francisco Antonio Navarro-Valverde¹

*University of Granada. Spain PhD Professor in Human Geography Granada-Spain*¹

In the eighties of the twentieth century, the Slow Food movement emerged in Italy, as a reaction against Fast Food, which extended the claim of slowness, tranquility, the good work of everyday things that demand attention and time, facing to the tyranny of haste and the offer of standardized products, soulless products. This movement was the defense of a less materialistic rationality and excessively focused on competitiveness, advocating more equitable societies interested in intangible and symbolic values. In short, particular looks that Urry 2002 and Urry & Larsen 2011. would say. The commitment to the defense of a more human and less mechanical lifestyle is considered the best way to achieve higher levels of individual satisfaction in different facets of reality, coinciding with the principles of "sustainable decline (Schneider et al. 2010). In this context, we believe that the Cittaslow network, which imposes demanding conditions on the localities that aspire to integrate into the network, must be a model of territorial sustainability. To try to verify if this is true, the development strategies of the Spanish rural municipalities adhering to this network, which integrates 262 cities in more than 30 countries, are analyzed. Applying quantitative and qualitative techniques to the information contained in the official websites of the Spanish Cittaslow, we show that their development strategies do not always promote sustainability (Blanco A, 2011, Maroto, JC & Pinos, A. 2018). The study of coherence / inconsistency between theory and practice, allows us to present a set of recommendations to encourage Spanish rural Cittaslow to advance in their sustainable development strategies (SDGs), as the 2030 agenda marks.

1832-INTER AND INTRA REGIONAL DISPARITIES OF CROP PRODUCTIVITY PATTERN IN THE AGRO ECOLOGICAL ZONES OF THE BRAHMAPUTRA VALLEY ASSAM INDIA

Bimal Sharma¹, Michael Jasper¹, Charles Lemckert¹, Milica Muminovic¹

*University of Canberra Faculty of Arts and Design Canberra-Australia*¹

The agricultural sector dominates the economy of the Brahmaputra Valley, India, with more than 50 per cent of the total gross domestic product and employs about 70 per cent of the workforce in the region. Despite favourable agro-ecological conditions for agricultural development and growth, the observed trend is one of stagnation. There are many dimensions of viewing intensification in the agricultural practices as studied by Nath (1969), Bhat and Learnmonth (1968), Singh (1974), Bhalla and Tyagi (1989) and Singh (1994) giving regional account of Indian agriculture for its development and planning. Such studies seek and search the weakness of agricultural growth and development processes in its regional context highlighting the areas of weak infrastructure, suitable cropping pattern in relation to existing agro-ecological conditions, the emerging production pattern in its socio-economic setup and the optimal spatial organisation of agricultural land uses. The present paper addresses the emerging pattern of crop yield in the Brahmaputra Valley by analysing its inter and intrazonal disparities therein. In order to describe the pattern of crop productivity the entire Brahmaputra valley is divided into three agro-ecological zones, namely, the Lower, Middle and Upper Brahmaputra valley (Taher, 1975 and 1986, Gopalakrishnan, 2000). The administrative district is considered as an areal unit to show crop productivity patterns in general and also to visualise their changes between and within the agro-ecological zones. The pattern of crop productivity are analysed by considering two points of time: base year (triennial average 2007-08, 2008-09 and 2009-10) and the current year (triennial average 2015-16, 2016-17 and 2017-18) of major crops (rice, wheat, maize, sugarcane, potatoes, pulses and jute). The cause-effect relationship is analysed to consider the variables relating to irrigation and pressure of agricultural workforce. Increasing inter and intra zonal differences of crop productivity provide evidence of the emergence of obliterated productivity patterns.



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1841-Spatial patterns and socioeconomic activities of urbanized rural areas Fujian Province China

Zhichao He¹, Qinghai Guo²

Swiss Federal Institute for Forest, Snow and Landscape Research WSL Landscape change Zurich-Switzerland ¹ Zhejiang Sci-Tech University School of Civil Engineering and Architecture -China²

Rapid urbanization in China has drastically transformed rural areas over the past 40 years. Town villages are one of the most prominent and recapitulative paradigms for achieving urban-rural integration and sustainable rural development. They are characterized by concentrated populations, local pervasive off-farm employment, and a considerable amount of built-up area. However, research on the development of China's town villages has been based primarily on case studies that have not quantitatively analyzed town villages, so their spatial distribution and socioeconomic characteristics remain unknown. Here, we first identified the locations of town villages in Fujian Province from 1995 to 2015. Town villages were defined as villages where the total population, size of the economy, and area of built-up land were all higher than the average values of urban area. We then analyzed their spatiotemporal patterns and socioeconomic characteristics using point of interest (POI) data. Our results show that 1) town villages in Fujian Province were rare and clustered. We identified 91 town villages in 1995, 277 in 2000, 179 in 2005, 330 in 2010, and 257 in 2015. 2) The agglomerated town villages were mainly located in Quanzhou, Fuzhou, and Zhangzhou prefecture-level cities where the private economy or investment was intensive and vigorous. 3) Well-developed transportation infrastructure and close proximity to urban centers encouraged development of town villages. 4) In terms of socioeconomic characteristics, town villages displayed well-developed urban functions, including an urban residential housing mode, prosperous non-agricultural economies, transportation infrastructure, and medical services. Our findings contribute to a better understanding of the town village that can help guide rural planners. Future studies should necessarily focus on the environmental impact of town villages due to their urban-like socioeconomic characteristics.

2188-Developmental Neoliberalism and the State led Farmland Dispossession The Case of Taiwan Sugar Corporation

Cassidy I-Chih Lan¹

Quanzhou Normal University School of Resource and Environmental Science New Taipei City-Taiwan¹

In the context of global neoliberalism, the Taiwan government has often designated industrial parks as a new spatial development strategy. Investigating the designation of industrial parks and urbanization in Taiwan, this study argues that even if the policy discourses have expressed the importance of economic competitiveness, the planning practice has been the extension of entrepreneurialism since the 1990s to produce the new industrial space while stimulating the speculative land development and the dispossession of agri-environment. The emergence of privatization in the spatial planning system of Taiwan has further intensified this market-led transformation and has promoted several initiatives of farmland liberalization and state-owned property revitalization. Leasing and selling out the public (farm) land or the property of state-owned enterprises to assist the development of industrial parks is a state-led measure of land dispossession, which alleviates the state fiscal crisis circulates the over-accumulated capital in Taiwan. Taking the farmland revitalization program of Taiwan Sugar Corporation as a case, this study uses the concept of accumulation by dispossession to explore how the state institution, in the name of 'land revitalization', has incorporated the ideology of neoliberalism with the specific context of Taiwan's developmentalism while readjusting spatial planning, public finance, and land policy contributing to the remix of developmental neoliberalism. These efforts have not renovated local economy in the rural areas but have destroyed the agri-environment, food security, and rural commons. Developmental neoliberalism has caused land grabbing while contributing to the short-cut for circulating property capital. Based on the policy of privatization in Taiwan, the study reviews the program of land revitalization of Taiwan Sugar Corporation and finds that Taiwan Sugar Corporation manipulates its pro-business intention through land revitalization and intensifies the contestation of agricultural depletion.



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2388-IMPACT OF EASE OF CONNECTIVITY OF RURAL ROAD ON AGRICULTURE IN JAIPUR DISTRICT OF RAJASTHAN.

RICHA SINGH¹, **SARINA KALIA**¹, **K.K. MISHRA**²

*UNIVERSITY OF RAJASTHAN GEOGRAPHY JAIPUR-India*¹ *PWD JAIPUR PWD -India*²

Transport has established a long distance geographical relationship in movement of goods and services across India. In particular rural areas, the connecting road plays a crucial role by linking the villages to mainstream and developing its overall economy. Realizing the role of rural road connectivity, Government of India, launched its ambitious programme Pradhan Mantri Gram Sadak Yojana (PMGSY) in the year 2000. The scheme introduced the concept of core network which provides at least single all- weather road connectivity to eligible unconnected habitations through minimal network of roads. One of the key objectives is to link the habitations of rural areas directly to the market centers for timely delivery of goods and services.

The hypothesis of the study is to establish a positive relationship between rural road construction and agriculture growth in Jaipur district. The study measures the connectivity in relation to average travel time and speed of rural roads to nearest market centers in rural areas. The complete network density of all the blocks of Jaipur district from the year 2003 to 2014 is analyzed. Normalization technique is used in construction of the indices of both roads and agriculture and through Arc GIS software spatial relationship is studied. The resulted outcome showed increased density of roads which resulted in improve connectivity in overall district. Both speed and time of rural roads have increased from the year 2003 to 2014, thus assuring timely arrival of agriculture products to nearest market centers. Moreover, new market centers have come up on All- weather roads connecting habitations resulting in positive development.

2406-Depopulation and revival current transformations of rural areas in the Sudetes Mountains SW Poland

Agnieszka Latocha¹, **Katarzyna Kajdanek**², **Paulina Miodońska**¹, **Dominik Sikorski**¹, **Robert Szmytkie**¹, **Przemysław Tomczak**¹

*University of Wrocław Institute of Geography and Regional Development Wrocław-Poland*¹ *University of Wrocław Institute of Sociology* katarzyna.kajdanek@uwr.edu.pl-Poland²

The aim of the research was to identify the recent changes of the socio-economic and spatial/landscape processes in the peripheral rural areas in the Sudetes Mountains in southwestern Poland, based on the Kłodzko County case study. The study area has for many decades been classified as a marginal and problem region, mainly due to a substantial trend of the long-term depopulation. However, in recent years the signs of economic revival have been observed. The analysis are based on diverse sources, including statistical data, official state databases, cartographic materials from different time periods and field surveys, including inventories of land use and interviews with local inhabitants. The results show that there are some symptoms of socio-economic revival which can be noted in some villages in the study area in the recent 15-20 years. The phenomenon includes various types of transformations, such as demographic (local increase in the number of inhabitants), economic and functional (increase in the number of economic entities, and especially these ones related to services and tourism development), spatial and landscape (new investments, especially an increase in the number of tourist infrastructure and single-family houses, including "second homes") as well as social (i.e. increase in the number of the local NGOs and the general activity of local societies). The findings allow for proposing a new category of a "reviving village". The study presents the key trends in the current revival processes, with particular focus on the most depopulated areas and on the spatial differences in the observed processes of the socio-economic and landscape transformations.



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3215-Dynamics of Land Uses Changes on the Coast of Galicia How Abandonment Modifies Land Use and Land Cover in a Peripheral Rural Area from the North West of Spain

Maria Romar Gomez¹, Rubén Boga González²

*Universidade Santiago de Compostela Geography A Coruña-Spain*¹ *Universidade de Santiago de Compostela Geography*
*rubg19@gmail.com-Spain*²

The territorial dynamics of the Costa da Morte have undergone significant changes in land use / coverage linked to diverse drivers that have influenced the characterization of the Galician coast. This article pretends to analyze the changes in this rural areas through a diachronic perspective taking as a reference the key episodes that caused the changes in land cover and uses: 1956 (year of the first aerial photography available), 1976 (end of the Franco dictatorship) 2008 (beginning of the economic crisis in Spain) and at present, 2019. Besides, we also try to make a qualitative and quantitative balance of the main drivers, the direct and indirect causes to be able to create a model that allows us to prospectively make decisions.

The methodology applied is based on a detailed analysis of photointerpretation during the different years using a Geographic Information System. Furthermore, we decided to add direct population data based on surveys and interviews with stakeholders. From it, we establish a system of cause-effect flows that justifies territorial dynamics. Finally, the impact of the regulations on urban planning and Spatial Planning in the study area will be evaluated. Conclusions will focus on the landscape transformations of the Galician rural and on the measures to be taken in terms of postulates of the Spatial Planning. We also try to shed light over increasing land abandonment and its future consequences linked to the marginalization of the rural periphery and the lack of economic dynamism that causes a significant demographic loss. All of this, without discarding the perspective of economical viability and sustainability.

3482-Transformation of agricultural employment as a spatio temporal process global map of post agricultural transition

Alexandra Potapova¹, Alexey Naumov¹

Lomonosov Moscow State University Department of Socio-Economic Geography of Foreign Countries, Faculty of Geography
*Moscow-Russia*¹

Since the second half of the 20th century, the world agricultural sector has undergone significant structural changes, which lead to shifts in the structure of employment in agriculture and rural economy as a whole. Modern agriculture is highly diverse, combining both wage labor and family farming. The widespread use of technical innovation significantly increases labor productivity. Therefore, more and more farmers are switching to non-agricultural employment or combining agricultural activities with other kinds of job. The outflow of labor from agriculture also happens due to the socio-demographic factor. Industrialization of agricultural production contributes not only to shrinking of traditional employment, but also imposes changes in the qualitative composition of workers. Technical innovations in agriculture demand new skills and require highly qualified specialists. However, branches of agriculture that employ manual labor and use low-skilled workers during peak season remain. On the other hand, shifts in the structure of rural employment from agriculture to non-agricultural occupation is seen as a source of economic growth in rural areas. Due to geographical diversity, countries and regions go through this transformation at different times. This spatio-temporal process involves several stages, which could be detected as an analogue to demographic transition. In general, most developed countries, rural economy already has reached the post-industrial stage. In rural areas nearby large cities, the integration of rural labor markets into urban ones is common. In remote rural areas employment is supported by relocation of industrial plants, or expansion of local agricultural products oriented to urban markets. In developing countries, transformation of rural employment pushes labor force from traditional agriculture, which promotes migration from rural areas. Detailed analysis of dynamics of agricultural employment by countries since 1990, based on different statistical indicators (FAO, ILO) allowed to design world map of post-agricultural transition and outline its main drivers and consequences.



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C.35. Karst Commission Global Karst Critical Zone

2470-CARBON SEQUESTRATION CAPACITY IN TROPICAL EPIKARST AQUIFER BASED ON HYDROCHEM DISCHARGE METHODS

*Pipit Wijayanti*¹, *Eko Haryono*², *Pramono Hadi*²

*University Sebelas Maret Geography Education Central Java-Indonesia*¹ *University Gadjah Mada Geography* e.haryono@geo.ugm.ac.id-Indonesia²

Karst land has an important contribution to carbon sequestration. This study aims to determine the temporal variation of carbon sequestration in the epikarst aquifer. The research was conducted at Kakap Springs, which is an important spring in the eastern karst of Gunungsewu Indonesia. We use the Hydrochem-discharge method. There are three parameters used, i.e., alkalinity, specific conductivity (SPC), and spring discharge. We measured Ca^{2+} and HCO_3^- in the field using the titration method. We installed SPC and water level loggers in this spring, which measure every 30 minutes for one year. Discharge using the floating method, which is done 16 times during the rainy and dry seasons. The result of this (discharge properties was used to make the stage rating curve - a curve that shows the relationship between the discharge and water level. The results revealed that The Kakap spring is a karstic spring dominated by HCO_3^- and Ca^{2+} that has perennial flow with varying discharge and wide discharge fluctuation between rainy and dry seasons. Carbon sequestration varies both seasonally and daily. During the study, carbon sequestration was 42.57-105.325.14 mg / s with an average of 19.461.79 mg / s. The total carbon sequestration in Kakap Spring was 2.2×10^7 g/yr/km². The conduit system dominates the flow during the rainy season. Therefore, the carbon sequestration in this season strongly depends on discharge. This condition is different in the dry season, where the base flow or diffusion determines the flow so that the carbon sequestration becomes small. The daily variation of carbon sequestration has the same pattern as alkalinity. While the daily pattern in the rainy season is not visible, the one in the dry season is distinctive.

2661-Possibility of applying the magnetotelluric method to the study of karst processes

*Svetlana Riabova*¹

*Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences Near Surface Geophysics Moscow-Russia*¹

Karst areas are characterized by landforms of dissolution such as sinkholes, caves, broken bedrock surface, dry valleys and this causes considerable difficulties for planning and development. Karst aquifers are particularly vulnerable to pollution and karst features can also give rise to flooding. Karsts are characterized by an increased amount of water. It can be expected that the electrical conductivity in the karst areas is different compared to the electrical environment conductivity. The development of magnetotelluric methods allows us to find places with different electrical conductivity and obtain a temporary dynamics of its changes, which makes it possible to identify regions with karst processes, and also evaluate the dynamics of karst processes. In this work, the variations of the magnetotelluric transfer function (magnetic tipper) with a change in the groundwater level in a heavily flooded region are researched. Research area is located 85 km south of Moscow, near Mikhnevo settlement. A feature of the research area is the presence of a multi-layered system of separated aquifers. As initial data, data of monitoring of groundwater level of the Kashira aquifer and geomagnetic variations in near-surface layer of Earth are used. Based on the magnetic field registration data, the time variations of the components of the magnetic tipper are estimated. Data processing and analysis, including using the cross-regression method, are shown a statistically significant correlation between the magnitude of the magnetic tipper and the groundwater level of the free-flow horizon (Kashira aquifer). Moreover, a linear regression model between the magnitude of the magnetic tipper and the groundwater level of Kashira aquifer was constructed.



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C.35. Karst Commission Land Use Planning in Karst Region

1495-VARIATION CHARACTERISTICS OF PETROLEUM HYDROCARBONS AND THEIR INFLUENCES ON GROUNDWATER ENVIRONMENT IN A TYPICAL KARST FRACTURED AQUIFEROUS NORTH CHINA

Yongli Guo¹

*Institute of Karst Geology, CAGS Key Laboratory of Karst Dynamics, MNR and GZAR Guilin-China*¹

The water source located in Linzi District of Zibo City, Shandong Province, China is a typical karst fractured aquiferous system in the world. Dynamic variation characteristics of presentative water parameters and compounds along the flow path can explain human activities' features and development trend of groundwater environment situation in different periods. Groundwater environment was affected by anthropogenic activities continuously for the detection of petroleum hydrocarbons in groundwater and different recharging features of NO₃⁻, SO₄²⁻ along groundwater flow paths. Sources and transportation processes of petroleum hydrocarbons have been one of the main reasons influencing hydrogeochemical field by means of ion ratio analysis, correlation analysis and main factor analysis methods. Early warning subareas of petroleum hydrocarbons polluted groundwater were conducted based on extension theory with the help of GIS, ENVI+IDL by fusing five indexes of groundwater vulnerability, types of land use, groundwater abundance, transmissivity and spatial-temporal variation of petroleum hydrocarbons. Serious and tremendous warning areas are mainly located in northwest and east with high or relatively high transmissivity and groundwater pollutant loading, and obviously deteriorated or deteriorated trend of petroleum hydrocarbons. Petroleum hydrocarbons had an obvious decreasing trend in the tremendous warning subareas in the last three decades due to the natural attenuation in the karst fractured aquiferous system, which met with the first-order decay model. The first-order decay rate in the noncontinuous karst fractured network was a bit higher than that in porous media for the stronger hydrodynamics in the water source. The biodegradation processes of petroleum hydrocarbons were proved by analyzing groundwater chemistries and environmental isotopes.

1983-MORPHO HYDROGEOLOGICAL APPROACH IN LIMESTONE QUARRY SITE SELECTION IN CENTRAL JAVA

Eko Haryono¹

*Universitas Gadjah Mada Environmental Geography YOGYAKARTA-Indonesia*¹

Karst area has been experiencing a long history of human habitation and conflict of land uses. Since karst landscape is well known for its unique geomorphological and hydrogeological properties, those two characteristics are the essential consideration to address karst management. This paper aims at introducing a new scheme and framework for assigning karst area for mining purposes. The scheme for site selection involves three steps. The first step is to define a protected area and cultivation area, whereas the second and third phases are used to select the most suitable site for limestone quarry within the cultivation area. The first step employs a reconnaissance survey. The fundamental principle for designating protected areas is the uniqueness of morphological and hydrogeological properties of the karst area. The hydrogeological uniqueness used in the scheme is the development of the cave network with the subterranean river. The second step is identifying the potential site for the mining area. These steps consider existing land use and spatial planning. The preferential site will be in the limestone formation with already utilized for limestone quarry. The third step is detail field survey to find the best site in terms of the least potential negative environmental impact. Field survey includes cave survey and hydrological survey. All the cave entrances are identified. Some important cave is mapped in search for the underground river. The hydrological survey includes spring identification and field hydrochemistry test. Central Java karst has two different karst morphological features. Those two differences correspond to the physiographic units, i.e. the southern and the northern zone. The southern zone has severe morphological and hydrological karst development. The northern zone is less developed karst morphology. Therefore northern zone is more suitable site for limestone quarry.



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COVID 19 Session Bridging In A Covidian World(Of Still) Increasing Inequalities Construire Des Ponts Dans Un Monde Covidien Aux Inégalités (Toujours) Croissantes

3475-COVID 19 PANDEMIC IMPLICATIONS ON TOURISM PREFERENCES POTENTIALLY NEW CHALLENGES FOR MARGINAL AREAS

Borna Fuerst-Bjelic¹, Ivan Sulc¹

University of Zagreb, Faculty of Science Department of Geography -Croatia¹

This paper analyses impact of the COVID-19 pandemic on Croatian tourism and questions the possible new chances of marginal areas in this context. The analysis is based on data on tourism arrivals, overnight stays and tourist beds in the period January – September in 2019 and 2020, as later data for 2020 was not available at the moment of writing. Generated from the online-registering system data was specially prepared by the Croatian Tourist Boards. Apart from an immense decline in all tourism parameters, which goes in line with global trends, the results of our research reveal changes that occurred in terms of seasonality, spatial distribution of tourism, average stay, organization of arrival, age, origin and type of accommodation used, according to the data available. The paper further discusses the global context of the pandemic situation and local and personal responses that have an important impact on re-directing and tracing eventually new tourism trajectories of the (post) pandemic time. Two principal groups of factors have been recognized as mostly affecting the processes, trends and possible future trajectories have been identified: on the one hand global movement and travel bans and restrictions, on the other hand personal responses reflected in motivation and behavioural changes. Changes that occurred in pandemic time are seen as catalysts for re-enforcement and raised interest in escapism and slow movements in tourism. Based on findings from available quantitative and qualitative data, authors are questioning the possibility of emerging new chances (or challenges) for marginalized areas in the context of observed developing new trajectories of tourism. Instead of seeking to 'go back to business as usual', the authors argue to reconsider the trajectories that emerged during the time of the pandemic and to envisage other approaches towards more sustainable tourism.

3481-Réponses communautaires des pêcheurs côtiers pendant la pandémie de COVID 19 dans l'État de Yucatán (Mexique)

José Manuel Crespo-Guerrero¹, Araceli Jiménez-Pelcastre²

Instituto de Geografía, Universidad Nacional Autónoma de México Geografía Económica Coyoacán-Mexico¹ Instituto de Ciencias Sociales y Humanidades Trabajo Social -Mexico²

Le secteur pêcheur au Mexique est important pour le développement socio-économique de ses régions côtières : l'extension de son littoral (15 069 km) on fait le troisième pays de l'Amérique. En 2018, la flotte de navires de pêche était constituée de 76 307 embarcations, dont 97.4% côtières. On estime à 300 000 les pêcheurs (79%) et les aquaculteurs (21%) mexicains. Ces données soulignent l'important rôle territorial de la pêche dans l'économie côtière. L'état de Yucatán qui rassemble 17 000 pêcheurs occupe la dixième position en production nationale. Les espèces yucatèques de plus grande valeur économique sont : le homard, le pulpe et le mérou.

La pandémie de la COVID-19 a affecté grandement le secteur pêcheur yucatèque : la réduction de la production et la chute de prix sont les conséquences du ralentissement du commerce international, la diminution du tourisme balnéaire ainsi que la prolongation des interdictions de pêche. Parallèlement, les événements hydrométéorologiques survenus en 2020 ont contribué à aggraver la situation. On peut se demander actuellement : quelle stratégie a-t-elle été adoptée pour soutenir le secteur en Yucatan ? Les données quantitatives fournies par les institutions de la pêche et les informations qualitatives obtenues sur place (à la fin du 2020) permettent de répondre à la question. Les résultats de l'analyse (inductive et axiale) des questionnaires appliqués (semi-structurés et non-structurés) ont été complétés avec les données quantitatives.

Notre recherche démontre l'absence de moyens complémentaires venant des autorités nationale et régionale, sans oublier, la fragilité du secteur à cause de sa dépendance exportatrice, en particulier des produits de haute valeur économique. Les initiatives des autorités locales et des organisations de pêcheurs ont ouvert de nouvelles formules de collaboration qui ont contribué à diminuer les ravages socioéconomiques du virus Sars-CoV-2.



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3507-COVID 19 lockdown and education The risk of increasing marginalization. Reflections on distance schooling in Switzerland

Leimgruber Walter¹

Univ. of Fribourg/CH Geosciences, Geography Fribourg-Switzerland¹

The COVID-19 pandemic has taken the entire world by surprise. Within a few weeks, life came to an almost complete standstill. Lockdowns were enacted in many countries, boundaries were closed, and international travel became next to impossible. In March 2020, the Swiss Federal Government used the power given in the law on epidemics and proclaimed the 'extraordinary situation'. Thereby it could shut down almost the entire country in order to fight the diffusion of the novel coronavirus (SARS-CoV-2) and the resulting COVID-19 disease. This pandemic hit the economy particularly hard, but also social interaction suffered heavily. The skiing season came to a premature end, hotels and restaurants had to close, even construction sites were temporarily halted. This measure boosted distance-working with a proliferation of home office activities and resulted in a decline in commuter traffic. It also involved the entire educational sector, from play-school to universities. Face-to-face teaching was replaced by distance teaching, a major transformation of how young people were to be prepared for life. The computer and working-sheets replaced the spontaneous contacts with the teachers, and social interaction in school gave way to isolation at home. Parents suddenly had to assume the role of supervisors and even teachers. The existence of computers and sufficient access to teaching programmes became a crucial issue. The restrictions were eventually lifted in May and hopes were high in summer that the nightmare was over.

However, the virus had not miraculously disappeared, and a second wave of the pandemic arrived in autumn and winter. This time the decision was taken to keep the schools open, respecting security measures had such as face-masks, hygiene, physical distancing.

3618-Peasant adaptations to global market integration in Southern Việt Nam

Antoine Beaulieu¹

Université Laval Geography Gatineau-Canada¹

Extreme poverty endures globally despite attempts at every administrative level (international, national, regional, local) to eradicate it. The situation has even worsened since the start of the COVID-19 pandemic in 2020, with millions of people worldwide expected to fall into a situation of extreme poverty due to the effects of the pandemic over the course of the current decade. This global crisis – the scale of individual and collective effects of which is still difficult to estimate – has triggered considerable disruptions to supply chains, fuelling existing concerns about food insecurity and worsening social inequalities, particularly in countries experiencing an accelerated global market integration, such as Việt Nam. Despite medium-high economic "growth", a widening of social inequalities between the city and the countryside is noticeable in Việt Nam since the 1990s, arguably a consequence of the country's recent and precipitous integration into the globalized economy. Little remains known on how peasants cope with the rapid sociogeographic transformations associated with the relentless rhythm of an increasingly productivist and commercially-orientated global agricultural sector, particularly in the specific context of post-collectivist farming systems, such as in Việt Nam. Given the significance of the changes expected in the agri-food and manufacturing sectors (e.g.: new trade agreements in 2019-2020, disruption of supply chains in the context of COVID-19, and the increasing and cumulative effects of climate change), better understanding of how peasants cope with such changes appears critical. How then have Vietnamese peasants adjusted to tensions caused – at the international level since the mid-1990s – by their country's increasingly rapid integration into the global economy? How are they coping with current tensions? This communication is exploratory and presents the first results of doctoral fieldwork analyzing peasant adaptation strategies (i.e.: livelihood diversification, including farming and non-farming activities) in rural areas of Việt Nam's Southern region.



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COVID 19 Session Human Mobility in Times Of Pandemicis Going Local

3390-Covid 19 and inter provincial migration in China

Jianfa Shen¹

*The Chinese University of Hong Kong Department of Geography and Resource Management Hong Kong-Hong Kong*¹

There is great concern on the growth and spread of covid-19 which affects the public health and economy enormously. Migration, urban population growth and high population density are considered major factors. Covid-19 pandemic started in Wuhan in December 2019 and then spread to the rest of China and the world. This paper examines the relationship between inter-provincial migration and the diffusion of covid-19 outbreak in Mainland China from 26 January to 6 March 2020. Statistical analysis shows that the migrants who moved into Hubei in 2010-2015 is a good indicator of the population flow from Hubei to other provinces that caused the spread of covid-19 in early 2020. Many migrants travelled back to hometown before the traffic ban of Wuhan city for the spring holiday. Thus the migration flow from a province to Hubei in the period 2010-2015 had the highest correlation coefficient with the number of covid-19 cases in four selected dates. The population flow based on the big data from the Baidu map on 20 January 2020 was also highly correlated with the number of cases, but not as good as above migration data. The finding demonstrates the role of established migrant networks in the spread of covid-19. The results of this research have important policy implications to respond to the covid-19 pandemic. In the time of new virus outbreak, proper advice should be given to those people who are likely to travel. In the case of China, many migrants had returned to hometown before the traffic ban in Wuhan on 23 January 2020. The traffic control in Wuhan and in many other places in China prevented further movement and return of migrants to their working cities and regions after the spring festival. These measures had been proven to be effective by March 2020.

3502-Liqueflying the Solid Switching Hong Kong from International to Inter Cation al city under COVID 19 Pandemic

Wing Ho Michael Chan¹

*Hang Seng Univiersity of Hong Kong Social Science Hong Kong-Hong Kong*¹

Hong Kong people are revealed to be the world's most prolific travellers, with taking an average of 11.4 international tourist trips per year. Inauspiciously, the outbreak of COVID-19 pandemic has rendered millions of Hongkongers immobile. This especially affects the city as it is so compact and lacking of hinterland and destinations for local tours.

For coping the huge demand of travel and vacation, the concept of "Cationalisation" have been developed. Activities like Staycation (local hotel Stay-Vacation), Shopcation (Outbound-like shopping activities), Hikecation (Local hiking, camping and tours) and even Flycation (Simply going round flights to "nowhere") are springing up in 2020. This paper is aimed to study the forms of this new "Cationalisation" and its effects to tourism and community development.

Three keys questions are examined: 1) The forms and patterns of Cationsiatonal development in Hong Kong; 2) The upholding effcts of cationization to conventional tourism sector; and 3) The impacts of cationalisation for enriching the community.

Case studies of 25 hotel staycation, flycation plans and local hikecation Youtubers interviews are conducted. It is found that Cationisations can act as a upholding agent to the tourism industry, especially to the high-end hotels, boutique hotels and fine-dinning resturants, some hotels and restudants have recorded weeks of overbooking by Staycation even in the times of pandemic climax. Also, Staycation and Hikecation are always associated with festive activities to the city's nature, history and intangibale heritages, enriching people's interests and understanding the long-forgotten natural gems and local culture of Hong Kong, and gaining love and awareness to their home city.

It is believed that such an assessment can offer insights to the future management of cationization and related tourism development, as to enhance and inform better planning and management in times of padnemic.



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3534-COVID 19 pandemic and human mobility in island spaces the case of the Canary Islands (Spain)

Josefina Domínguez-Mujica¹, Claudio Moreno-Medina¹, Juan Manuel Parreño-Castellano¹

*University of Las Palmas de Gran Canaria Geography Las Palmas de Gran Canaria-Spain*¹

Several academics, who conduct studies regarding the islands, have pointed out the importance of these territories in analysing human mobility. Their original settlement is explained by the arrival of the population from continental areas and, later on, emigration processes prevail in them, since there has been a shortage of available resources to guarantee the survival of their residents. Recently, tourism development has transformed their migration trends and has turned them, again, into places of attraction for tourists, labour migrants, and lifestyle migrants. Eventually, depending on their location with respect to international trade routes and their geopolitical belonging, some have become strategic places of arrival for irregular migrants.

These processes are those that have characterised the external mobility of the Canary Islands throughout history. However, the unusual pandemic and the subsequent health, economic and social crisis have transformed this mobility scheme. Four characteristics can be observed in the mobility in times of pandemic, that differs significantly from the rest of Spain. Firstly, the incidence of the disease has been lower. Secondly, the paralysis of tourist activity has caused an economic recession greater than that of other Spanish regions. Thirdly, the economic crisis, which has affected many less developed countries, such as its neighbours in North-western Africa, has favoured a revitalisation of irregular migration by sea, because of the strategy of many families, who decided to send their children in search of a less uncertain future (young men and women, as well as unaccompanied minors). Finally, internal connectivity has suffered, but it has resisted much better, since travel has acquired a much more intense local dimension: local commerce and tourism.

The aim of this presentation is, therefore, to describe and interpret the differentiated behaviour of mobility in island spaces, in times of pandemic, based on the case study of the Canary Islands.

3623-Grapes of wrath revisited

Birgit Glorius¹

*Chemnitz University of Technology European Studies Chemnitz-Germany*¹

The first lockdown to contain the Corona pandemic in Germany in spring 2020 coincided with the start of the semester at universities, the beginning of the asparagus harvest, and the ongoing arrival of refugees, some of them as part of relocation measures. The lockdown led to border closures and restrictive measures of mobility: cross-border commuters were no longer able to get to work, relocation measures were stopped, Erasmus places were cancelled – but a total of around 80,000 seasonal workers were flown in by charter machines to secure the harvest of seasonal crops and other forms of food production which are highly dependent on labour migration (particularly slaughterhouses). These examples already show the stratification of international mobility during the pandemic. The aim of this paper is to analyse the effects of the pandemic mitigation measures for different groups of migrant workers. It will do so by using central building blocks of social theory and geographical theory, in particular the considerations suggested by the mobility turn, as they reflect the links between social and spatial mobility and their interdependencies with respect to goods, images and information, as well as their consequences.

With reference to the famous novel “grapes of wrath” of John Steinbeck, this paper aims to highlight continuities of migrant workers seeking jobs, dignity, and a future, and holds their destiny against the structures of a dual labour market, and multiple (im)mobility policies, respectively. The central argument of this paper is that the Corona pandemic has not only exposed, but deepened, existing social inequalities in the context of international labour migration. In the discussion, the paper asks whether greater public awareness of these forms of social inequality could lead to policies that promote fair labour migration in Europe in the near future.



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3639-Territorial implications of human mobility in times of COVID 19 pandemic the case of Latvia

Zaiga Krisjane¹, Elina Apsite_Berina¹, Maris Berzins¹, Toms Skadins¹, Girts Burgmanis¹

University of Latvia Human Geography Riga-Latvia¹

The turbulent times of COVID-19 pandemic have changed society and conventional approaches to everyday life globally and locally.

One of the most urgent policy issues related to the COVID-19 pandemic in Latvia is related to the impact that socio-demographics has on different patterns of behaviours, attitudes, employment changes and mobility. The COVID-19 pandemic is laying bare socio-economic inequalities and could exacerbate them in the near future. The virus is a risk factor particularly for elderly (above healthy life years) and those at the lower end of the socioeconomic and income distribution. The aim of the paper is to assess the impact of pandemic on population well-being, immobility and advance solutions on socio-demographic processes to promote regional resilience outcomes. Research methodology is based on multi-layered approach on data triangulation achieved by consistent analysis of socio-demographic spatial data and survey results. The study contain analyse an existing survey dataset "Behaviours and attitudes in response to the Covid-19 pandemic" and statistical data on confirmed cases.

Results show that the COVID-19 pandemic has led to new forms of immobility and changing behavioural patterns. In addition, demographics are key to consider the way in which different age groups interact in societies to understand the spread of the virus. Important are co-residence patterns and the age structure of households. There are geographical differences among regions as well as urban and rural areas. As a result of the travel restrictions and the closing of borders, population migration has largely become affected. These include different kinds of mobility (international and internal migration, commuting patterns).

Category : COVID 19SessionLocalGovernmentResponseTowardsCOVID 19Pandemic

Presentation Type : Oral Presentation

3448-The immediate and subsequent effects of public health interventions for COVID 19 on the leisure and recreation industry

Yan Fang¹, Lijun Zhu²

Beijing Sport University School of Recreational Sports and Tourism Beijing-China¹ Peking University Institute of New Structural Economics -China²

Public health interventions to combat COVID-19 can be viewed as an exogenous shock to the economy, especially for industries—such as outdoor leisure, recreation, and tourism—that rely heavily on human mobility. However, no studies have addressed the question of whether this economic impact varies over time. For generating systematic evidence that would support effective policy decisions under the grim situation arising from pandemic of COVID-19—and in similar, future global emergencies, it is necessary to carefully evaluate the economic impact of public health measures during this pandemic. Focusing on the leisure and recreation industry, we use data for 131 countries/regions from February to May 2020 and employ generalized difference-in-differences models to investigate the short- and longer-term economic effects of public health policies. To the best of our knowledge, this paper is the first to estimate the full impact of public health interventions for COVID-19 at various time intervals. Results show that stricter policies lead, on average, to an immediate 9.2-percentage-point drop in the participation of individuals in leisure and recreation activities. Even so, that industry recovers in about 7 weeks after a COVID outbreak in countries that undertake active public health interventions, or nearly one month earlier than in countries without any intervention. After 13 weeks, leisure and recreation involvement recovers to 70% of pre-pandemic levels in the former countries but stagnates at about 40% in the latter. This finding provides a new look at the economic impact of public health measures and significant implications for leisure and recreation operators and policymakers in crisis management.

Category : COVID 19SessionLocalGovernmentResponseTowardsCOVID 19Pandemic

Presentation Type : Oral Presentation



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VIRTUAL

3466-Coping with COVID 19 Pandemic in the Greek Context A Joint Effort at the National and Urban Level

Anastasia Stratigea¹, Andreas Alexopoulos², Spyros Sapounas³, Angie Bistaraki⁴

National Technical University of Athens Geography and Regional Planning ATHENS-Greece¹ University of West Attica Dept. of Finance and Accounting a.alexopoulos@uniwa.gr-Greece² National Public Health Organization Directorate of Preparedness and Response s.sapounas@eody.gov.gr-Greece³ University of Peloponnese Dept. of Sport Management abistaraki@gmail.com-Greece⁴

Within the scenery of the unprecedented global crisis of COVID-19 pandemic, still challenging the planet's social, economic and political limits, the issue of urban/regional resilience to external shocks comes to the forefront as a core property of relevant systems and a distinct feature for effectively coping with unexpected and highly impacting, of global and multiple nature events. Different reactions to this pandemic, unfolded so far by countries and cities around the globe, form a rich canvas of policy responses and provide valuable evidence-based results. These are critical for further handling COVID-19 pandemic health, social, economic and political repercussions; while they also establish a lesson-drawing mechanism, enriching the arsenal, understanding and preparedness of policy makers for confronting this pandemic, but also other catastrophic unforeseeable situations. The present paper attempts to illuminate policy responses against COVID-19 pandemic in the Greek context, being by many admitted as a 'success' story in terms of handling the two coronavirus waves. Since handling of COVID-19 pandemic is perceived both as an issue of national emergency and respective policy responsibility as well as one affecting mainly urban constellations, work carried out in this paper is accordingly structured. More specifically, the core policies as well as the COVID-19-forced ICT reforms with reference to the national level are first roughly sketched, framing in a way potential response at the urban level. Then relevant efforts and policy actions at the urban level are discussed – both as counterparts of national directions and locally-driven initiatives – by highlighting efforts in three city examples, namely the cities of Piraeus, Trikala and Larisa. Finally, a critical comparison of COVID-19 policy actions of the three city examples is carried out in an effort to identify similarities, city-specific initiatives, linkages/interactions with state policies, level of mobilization of local communities, to name a few.

Category : COVID 19SessionLocalGovernmentResponseTowardsCOVID 19Pandemic

Presentation Type : Oral Presentation

3473-Local Government response to the COVID 19 Pandemic insights from the case of Portugal

Carlos Nunes Silva¹

University of Lisbon Institute of Geography and Spatial Planning Lisbon-Portugal¹

In the first months of 2020 the world witnessed the quick spread of the coronavirus SARS-CoV-2. On 11 March the WHO informed that the COVID-19 could be characterized as a pandemic. On 4 April the WHO reported that over 1 million cases of COVID-19 had been confirmed worldwide. It spread at a much faster rate, and geographically more extensively, than two previous related coronavirus. It had so far and to a large extent an overwhelming urban incidence, since urban environments are more favourable to the spread of the virus. The pandemic impacted on public health, in the well-being of citizens, in the economy, on civic life, on the adoption of surveillance technologies in cities, in the provision of public services, in national and local public finance sustainability, and in the governance of cities and other human settlements, although in an uneven form across countries, cities and local communities. The resulting global crisis, is being dealt with by national policies, which have been implemented to a large extent by local / city governments, according to the different local conditions and varying levels of health, social and economic disruption. This oral presentation explores local government responses to the Covid-19 Pandemic in Portugal and discusses this in comparison to other European countries. The analysis is focused on the several waves of the pandemic, comparing the challenges in each of these periods and the role of local government in each of them. The paper explores inter and intra regional differences in sub-national government responses to the pandemic.



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VIRTUAL

Category : COVID 19SessionLocalGovernmentResponseTowardsCOVID 19Pandemic

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3489-Jalisco against COVID 19 local governance and response to the health and economic emergency

Katia Magdalena Lozano Uvario¹, Rocio Rosales Ortega²

University of Guadalajara Department of Geography GUADALAJARA-Mexico¹ UAM Iztapalapa Department of Sociology -Mexico²

In March 2020, due to the health emergency caused by the pandemic COVID-19, the government of the state of Jalisco was one of the first in the country to implement precautionary measures and specific actions. Some measures have an apparent independence from strategies dictated by the Federal Government, giving place to political disagreements between both levels of government.

At the state level, two strategies were implemented: 1) a hierarchical governance with municipal governments, which were subordinated to the state ordinance; and 2) round tables with participation of state government, businessmen, universities and members of civil associations for the definition of health and economic actions of general impact. These strategies supported the development of an epidemiological detection system, hospital conversion, the economic reactivation plan, as well as health protocols, establishing the capacity to respond to the health and economic crisis.

Based on this, the objective of this paper is to analyze the policies, strategies and actions in health and economics taken by the Government of Jalisco and other actors related to the pandemic COVID-19, through the alliances, negotiations and conflicts that were faced from March to December 2020. To do this, events from the first case detected in the country were reconstructed, with the elaboration of a trajectory of the actions undertaken according to the phases of epidemiological contingency, using both primary information from official sources, newspapers and documents prepared by civil associations and institutions. This in order to analysis the inventory of the main strategies, public policies and financial instruments, from which it has been organized the governance model of State of Jalisco. Research make possible to identifies successful actions from those which have been palliative.

Category : COVID 19SessionLocalGovernmentResponseTowardsCOVID 19Pandemic

Presentation Type : Oral Presentation

3497-German Local Authorities in the COVID 19 Pandemic. Challenges impacts and adaptionns

Franzke Jochen¹

Institute of Local Government Studies University of Potsdam Berlin-Germany¹

This paper will evaluate the challenges, institutional impacts and responses of German local authorities to the COVID-19 pandemic from a political science point of view. The main research question is, how they have contributed to combat the Covid-19 pandemic and to what extent the strengths and weaknesses of the German model of municipal autonomy have influenced their actions. The paper analyses the adaptation strategies of German local authorities and assesses the effectiveness of their actions up to now. Their implementation is then evaluated in five selected issues e.g., adjustment organization and staff, challenges for local finances, local politics and citizen's participation. Particular attention should be paid to content-related innovations in local politics during this time. The stakeholder level should also be included in the analyses by examining the specific role of mayors, council members, local administration and local civil society in containing the pandemic. This analysis is reflecting the scientific debate in Germany since the beginning of 2020, based on the available analyses of political science, law, economics, sociology and geography.

The German political-administrative system proved to be stable, resilient, adaptable and, above all, capable of action in the Covid-19 crisis. The vast majority of the population has supported the joint course of the German federal and Länder governments in the pandemic so far. Nevertheless, political and administrative steering during the crisis remains very difficult because of the variety of health, social, political and economic conflicting goals and under constantly changing uncertain framework conditions. In general, the German local governments have proved to be viable actors or backbones in managing the changing challenges the pandemic up to now.

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3526-Tourism in pandemic times – the case of São Paulo State Brazil

*Rita de Cássia Ariza da Cruz*¹, *Thiago Allis*², *Daniel Barretti*³

*University of São Paulo Department of Geography São Paulo-Brazil*¹ *University of São Paulo School of Arts, Science and Humanities -Brazil*² *University of São Paulo Department of Geography -Brazil*³

Tourism in Brazil, as in other countries, was severely affected by the pandemic of COVID 19, but national, regional and local particularities influence quantitatively and qualitatively the results of this process, as well as the form, pace and possibilities for its recovering. This work analyzes the impacts of the pandemic in tourism by comparing selected data from 2019 and 2020 (first semester mainly), considering the city of São Paulo (capital of São Paulo State), the biggest in the country, and eight municipalities in Baixada Santista Metropolitan Region. This research is based on the collection and analysis of public data of flows of travelers; tourism related tax collection; employment and unemployment in the sector; hotel occupancy rates, and public measures aimed at controlling the health crisis and recovering the economy in general and tourism specifically. This analysis reveals that despite common impacts, like losses of direct and indirect for tourism businesses, these vary substantially: municipalities with more dynamic economies, as São Paulo and Santos (a port city) display better indicators due to the diversity of their economic environment; on the other hand, for coastal destinations, where tourism is based on second- homes tourism, there is a higher dependency on tourism and a greater deficit in jobs and a drop in tax collection. Nevertheless, destinations at the coast outline a faster recovery than the city of São Paulo, where business and events are key segments, which recovery is still uncertain. We conclude pointing to the need to consider different dimensions and scales involving the impacts of this pandemic for tourism, in face of the formulation of public policies aimed at overcoming the crises as well as the reformulating practices and processes.



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VIRTUAL

COVID 19 Session Local Government Response Towards COVID 19 Pandemic

3642-IDENTIFYING SPATIAL PATTERNS RELATED TO COVID 19 PANDEMIC. CASE STUDY IN THE REGION OF GALICIA (SPAIN)

*Jose Balsa-Barreiro*¹, Angel Miramontes¹

*Galician Studies and Development Institute (IDEGA), University of Santiago de Compostela, 15782 Santiago de Compostela (Spain) Galician Studies and Development Institute (IDEGA), University of Santiago de Compostela, 15782 Santiago de Compostela (Spain) Spain-Spain*¹

IDENTIFYING SPATIAL PATTERNS RELATED TO COVID-19 PANDEMIC. CASE STUDY IN THE REGION OF GALICIA (SPAIN)

Abstract: The CoVID-19 pandemic is provoking a very negative impact around the world. In addition to the elevated number of fatalities, it has caused a great uncertainty in our lives. The region of Galicia, located in northwestern Spain, is one of the regions with a better behavior against the CoVID-19 pandemic by showing the lowest levels of infected cases in Spain. This region has a very marked territorial idiosyncrasy of its own, with important differences from the rest of Spain. Among them, a traditional settlement model dominated by a great spatial dispersion of its population and a peripheral location in Spain.

Background/Hypothesis: Identifying spatial patterns related to the virus spreading at different spatio-temporal scales for understanding how the territory can explain the behavior and impact of the CoVID-19 in this region.

Materials and Methods: In this paper, we will represent fine-grained data by using Geographic Information Systems (GIS) at different spatial scales. This allows us to identify spatial patterns of propagation of the virus across this region.

Results: Final outputs expected in this paper will be presented like maps. In addition, we will estimate some relevant statistical indicators by comparing patterns at different spatial scales.

Conclusions: This study shows the importance of cartography and geography as essential tools for achieving a better understanding of the CoVID-19 virus. This knowledge will serve as the basis for taking appropriate countermeasures and policy actions by the health managers and governmental authorities.



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3645-The new geography of post Covid 19 spatial relationships the rediscovery of proximity agriculture and the value of traditional rural landscapes

Pierluigi De Felice¹, Maria Gemma Grillotti Di Giacomo²

*University of Salerno humanities studies Salerno-Italy*¹ *Campus Bio-Medico University of Rome Faculty of Science and Technology for Human and Environment mariagemma.grillotti@gmail.com -Italy*²

The pandemic known as severe acute coronavirus respiratory syndrome (COVID-19), also an expression of an unbalanced relationship between man and environment, is redesigning a new geography of space where, on one hand, there is the globalization of a viral spread that knows no limits, metaphor and warning for a new ecology, while on the other hand the revitalization of the national and local dimension are emerging. The new global dialectic can be easily understood and interpreted in the agri-food sector where following the pandemic and the norms and decrees of social distancing imposed in many European States, the strengthening and revitalization of the short supply chain, in recent decades, swallowed up by large-scale organized distribution together with the rediscovery of environmental, economic, cultural and social values, expressed and embodied in traditional rural landscapes. The authors reflect on the importance of family farming, the sustainability of its production and the values of the rural landscape, guarantor of food quality and safety and, today, able to offer housing models and better living conditions. It is a pleasure to observe that in this post-globalist and post-productivist perspective, even micro and small agricultural companies, the most committed to meeting the needs of a niche market (typical, organic, artisanal products), will be able to reaffirm their social, economic and territorial functionality which until yesterday was denied by commercial agriculture of large numbers, which enhanced the process of capitalization of the countryside, minimizing the workforce and investment in working capital. A new culture of the rural landscape, in addition to defining and delimiting the territorial identities of each single quality agricultural product, therefore becomes the necessary tool for building new housing models and lifestyles. The landscape with its forms expresses the cultural tradition that enhances values and emotions.

3648-Mexico City COVID 19 pandemic and challenges for local governance.

Rocio Rosales Ortega¹, Victoria Ixshel Delgado Campos¹

*Universidad Autónoma Metropolitana Ciencias Sociales y Humanidades Ciudad de México-Mexico*¹

At the beginning of the Covid-19 pandemic, the national government had to improvise containment strategies, based on the experience of the countries that previously handled the situation. Once more information was available, the federal and local governments organized different strategies over time.

The objective of this paper is to analyze the plan of federal and local government in order to contain the Covid-19 pandemic on Mexico City, as one of the main metropolitan areas of Mexico. The government of Mexico City, in coordination with the federal government, implemented a program characterized by a comprehensive detection, isolation and financial support plan for families to stay at home. Some of the first strategies were the implementation of a reaction traffic light, informing the public and adjusting the strategies to the specific territorial characteristics. Given the decrease or increase of the curve of infections, hospitalizations and deaths, the city government expands their plans. Some of the main principles that guide Mexico City government strategy are: 1. Health and transparency of information are rights, 2. Strengthening of health institution towards a unique and coordinate system, and 3. Innovation and organization of information based on scientific research.

Despite local government plan implementation, some of the main criticisms were; demand of application of more tests, promotion of the use of mouth guards and implementation of bills against disobedience of the population. Now a day, together with previous strategies there are new challenges on the local vaccination plan. The methodology of this research is based on consultancy of official documents, official web page of national and local health system and news paper information. As part of the findings of the research are the innovating strategies implemented by local government, the population response to government recommendations given the economic and social inequalities and the coordination among health institutions.



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VIRTUAL

COVID 19 Session Post COVID 19 Global Pandemic And New World Economic Order

3404-The determinants of the geography of COVID19 in Europe

Bourdin Sebastien¹

*EM Normandie Business School Regional Economics and sustainable development caen-France*¹

More than ever, the epidemic of coronavirus infection makes the social facts that geography questions visible through space and at all scales: worldwide, European, national, local and even the finest one. The epidemic acts here as a powerful indicator of the organization of geographical space. It highlights the multiple interactions between territories at different scales.

In Germany as in France, there are significant geographical contrasts in the density of confirmed cases and deaths. However, these inequalities correspond to very different patterns of spatial organization in the two countries. This example reinforces the usefulness and interest of conducting a comparative and multiscale study to understand the drivers of the spread of the disease and its impacts fully. By compiling the data produced by the national statistical institutes in Europe at a fine scale, we retraced the Covid19 geography from the beginning of the pandemic until the end of August.

By cross-referencing data on mortality with socio-economic, demographic, and institutional data, we were able to understand why some territories were more affected than others.

we apply spatial regression models to our data, to capture the diffusion effect of the epidemic between neighbouring regions and the role exerted by territorial determinants in the spread of Covid-19. Spatial and geostatistical techniques have been used widely in several contributions dedicated to viruses, such as Hepatitis C infection, MERS-CoV, H1N1 influenza, HIV, dengue, and recently Covid-19 (Bourdin et al., 2020; Amdaoud et al., 2020).

This paper is part of an ESPON project on COVID19 that is analysing the GEOGRAPHY of COVID19 and LOCAL POLICY ANSWERS

3661-GEOGRAPHIC IMPACTS OF COVID 19 ON THE 2020 UNITED STATES PRESIDENTIAL ELECTION

Matthew Balentine¹, Michael Pretes¹

*University of North Alabama Geography -United States*¹

The global COVID-19 (coronavirus) pandemic and government responses to it were a major issue in the 2020 United States presidential election. Voters dissatisfied with the government's responses to the pandemic may have changed their political allegiance between the 2016 and 2020 presidential elections, leading to the victory of Joe Biden of the Democratic Party and the defeat of Donald Trump of the Republican Party. Were there geospatial patterns to these voting shifts? Our research examines geographical changes in voting in all United States counties (a third-level political unit, the level below state governments). Can changes in voting from Republican to Democrat be detected at the county level, and are these correlated with the severity of COVID-19 in those counties? Using data sourced from the COVID-19 database at Johns Hopkins University as well as from election databases, we apply geographically-weighted regression analysis to identify whether voters in counties with severe COVID-19 outbreaks shifted their votes from Trump to Biden. We also identify spatial variability in regions of the United States, to determine if some regions of the country (such as the South) remained steadfast in their support for Trump. In addition to identifying changes in spatial voting patterns between 2016 and 2020, our results identify counties that did not change their support for Trump, despite his party's mishandling of responses to the pandemic. Our results give insight into the geographic regions of the county that retain blind loyalty to Trump and consequently may become locations of intense political protest and violence.



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COVID 19 Session Transforming Human Lifescapes Enviroscapes Soundscapes And Psychscapes And The Urban Rural Cityscapes Impact Of COVID 19 And The Urgency Of Achieve

3379-Covid 19 crisis management questioning the rising involvement of the military in environmental crises
Angélique Palte¹, Florian Opilard¹

French Ministry of Armed forces Institute for strategic research Paris-France¹

Most EU countries have used their military forces to deal with the covid-19 crisis. What are the armies used for in this peculiar “war” that some European leaders either qualify or disqualify as such? What are these missions saying about the crisis management? Going beyond the sole covid-19 crisis, this paper explores what this resort to armies changes to their traditional missions and their relation to societies. Against a background where armed forces are more and more appealed to in order to cope with environmental disasters, and have started to take into account climate change issues in their strategic plans, this specific sanitary disaster is linked to environmental issues and the interaction between human societies and wildlife (Courtin et al., 2015 ; Keck, 2010). As such it questions the actual missions carried out by the armed forces in the crisis, how it marks an evolution of their societal role and the types of vulnerability they highlight. Acknowledging the link made by scientific literature between pandemic outbreaks and environmental issues, it explores the relation of armies to environmental catastrophes, their increasing involvement in their management, and how it affects their traditional missions. It then turns to the types of missions carried out by the armed forces in the covid-19 crisis. Drawing from land-use planning framework (Subra, 2018 [2007]), it analyses how they act as a territorial equalizer, thus revealing the vulnerabilities they aim at addressing.

The analysis is based on empirical data on the involvement of armed forces (type and number of missions carried out, number of military personnel involved, location of missions, etc.) collected between march and april 2020. The sources encompass international press (Europresse database) and press briefings from the Ministry of defense of EU countries. They have been analysed through quantitative and qualitative cartography.



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3656- 'Catch the sun coming up wave it off as it goes down' A qualitative exploration of later life therapeutic landscapes during the first wave of the COVID 19 pandemic

Viveka Guzman¹, Gabriela Bustamante², Lindsay Kobayashi³, Jessica Finlay⁴

Royal College of Surgeons in Ireland Division of Population Health Dublin-Ireland¹ University of Minnesota Program in Health Disparities Research busta027@umn.edu-United States² University of Michigan Centre for Social Epidemiology and Population Health lkob@umich.edu-United States³ University of Michigan Social Environment and Health, Institute for Social Research jmf@umich.edu-United States⁴

Background

Therapeutic landscapes can function as spaces of sanctuary and retreat often offering simultaneous opportunities to exercise and interact with others. During the COVID-19 pandemic, movement restrictions to contain the virus have been more stringent for populations in risk of developing severe symptoms, such as older adults. The aim of this study was to advance the concept of therapeutic landscapes by exploring how contact with nature and outdoor spaces influenced older adults' health and well-being during the first months of the COVID-19 pandemic in the US.

Methods

We utilized data from the COVID-19 Coping Study, a longitudinal mixed-methods study of US adults aged over 55. Participants were recruited between April and May 2020 using online multi-frame non-probability sampling (n= 6938). A list of key words screened open-ended questions and created a qualitative database for the present study, including all responses that relate to participants' experiences, attitudes and behaviours about engaging with green spaces and nature during the pandemic (n=769). Analysis is ongoing utilizing NVivo12 software following Braun and Clarke's steps for thematic analysis.

Findings

Preliminary results suggest that older adults purposefully engaged with nature in a multi-scalar fashion, ranging from the household (through garden views and tending potted flowers) to the broader community (talking long walks or photographing wildlife in the local park). Participants appreciated that outdoor spaces provided opportunities for exercising, community engagement and maintaining a routine at a safe physical distance from others, which boosted their social, mental and physical well-being.

Interpretation

Therapeutic landscapes have been scarcely investigated during collective trauma. Understanding the role of nature and outdoor spaces provides opportunities to identify and magnify community and environmental interventions that promote health and well-being of older adults during pandemics and their aftermath.



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VIRTUAL

COVID 19 Session Urban Planning After COVID 19

3480-The '15 minute city' a feasible model Reflections on the case of the Milan metro region Italy

Maria Antonietta Clerici¹

*Polytechnic University of Milan Department of Architecture and Urban Studies Milan-Italy*¹

In Italy, as in many other countries, the public authorities restricted the freedom of movement of individuals in 2020 in an attempt to stem the Covid-19 pandemic. In this situation and with respect to the broader issue of sustainable development, interest has grown in Milan in the '15-minute city', which is already being tested in other metropolises (notably Paris and Barcelona). The urban organisation is being rethought in order to guarantee access in a reasonable time, on foot or by bicycle, to a wide range of activities essential to daily life. The importance of neighbourhoods, self-sufficiency of local communities, the quality of public spaces and functional mix are rediscovered. It valorises neighbourhood relations, long relegated to the background by exaggerated mobility that has encouraged urban sprawl. All this is important to redefine the model of urban development towards a polycentric, equitable and sustainable city.

We will reflect on th

e potential of the '15-minute city' and its practical feasibility. Milan is at the heart of one of the most developed metropolitan regions in Europe, but with many problems in terms of 'quality of life'. The '15-minute city' may be an opportunity to overcome the centre/periphery hierarchy and to strengthen polycentrism. However, we must consider different urban morphologies. Within Milan, neighbourhoods are in very different conditions. Even if we only consider the presence of commercial activities – an essential part of neighbourhood services – the differences are marked. The '15-minute city' is more difficult to apply in the small cities of the Milanese crown. Here there are many mono-specialised areas and commercial services are scarce (food deserts). As Origlia (2020) points out, this plurality of situations must be kept in mind to move from theory to practice. We will highlight it by presenting an atlas of case studies.

3604-Tactical Urbanism and Urban Mobility in Barcelona in Times of Pandemia

Dolores Sánchez-Aguilera¹, Jaime Martínez-Ruiz¹, Ángela Martínez-Rivas¹

*University of Barcelona Geography Barcelona-Spain*¹

In recent years, all cities have been developing plans with the aim of achieving more sustainable mobility patterns that contribute to reduce the environmental impacts of urban mobility on climate change. Barcelona is no stranger to these concerns. However, the transformations detected in mobility during the lockdown and the pandemic period (such as the reduction of flows as a consequence of the diffusion of telework, the increasing use of individual sustainable transportation modes like bicycles or electric scooters, the increase of intraurban walking journeys) have precipitated some trends that were previously noted. Beyond the measures provided for in the last Urban Mobility Plan (2019-2024), the municipal administration has implemented some actions within the framework of the new context imposed by COVID-19. The consequence has been the deployment of public strategies classified as tactical urban planning that could –if consolidated– be established as structural measures. Among the most outstanding measures we can mention the reduction of lanes for road traffic, improving the efficiency of freight distribution systems, pedestrianization, the incorporation of new forms of micromobility, establishment of road terraces to create safe and comfortable spaces, promote the shared use of private vehicles, incorporation of new technologies in mobility management, etc.

The objective of this paper is to analyze the changes in mobility that are implemented during the pandemic period and collect the perceptions of the different actors involved. The study is based on the analysis of the press and official documents, field work and conducting interviews with representatives of different sectors.



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VIRTUAL

COVID 19 Session Women in COVID 19

3450-THE SPATIAL DIMENSION OF DOMESTIC VIOLENCE & THE COVID 19 CRISIS

*Tillous Marion*¹, Rodriguez John Esteban¹, San Martin Zapatero Eva¹, Bulteau Julie², Delage Pauline³
Université Paris 8 LEGS Saint-Denis-France¹ Université de Versailles Saint-Quentin-en-Yvelines CEARC julie.bulteau@uvsq.fr-France² CNRS CRESPPA-CSU ppauline.delage@gmail.com-France³

The lockdown implemented in response to the Covid-19 health crisis had the immediate effect of a considerable increase in domestic violence against women. From the first week of its implementation in France, reports to law enforcement agencies increased by more than 30% (Ministry of Home Affairs, March 26 2020). The obligation to stay at home or to carry a certificate of exit, the closure of schools, public services and facilities and most businesses, all these measures constitute what is above all a spatial policy, and this policy has reinforced the spatial control exercised by violent men over their (ex-)intimate partner, and thus the shrinkage of the victims' everyday space. At the same time, however, unprecedented measures have been implemented to deal with violence, again mainly spatial, with the possibility of denouncing the violence by going to the pharmacy or the shopping center, and the isolation of the aggressors in independent housing. At the time of assessment, it is crucial to ask whether these policies have succeeded in restoring spatial power to the victims.

The paper will present the results of an on-going research project on the spatial impact of public policies implemented during the covid-19 crisis on domestic violence. The methodology is threefold with (1) the collection of the stories of victims by conducting semi-structured interviews; (2) the analysis of public policies their connection with the action of associations that fights violence against women and civil society, by the reading of grey literature and the conducting of actor interviews ; and (3) the measurement of the impact of the covid-19 crisis on the mobility of women, especially the ones concerned by intimate-partner surveillance.

3636-SITUATION OF FEMALE PATIENTS INFECTED BY COVID 19 AN ANALYSIS FOR THE CITY OF BOGOTÁ (COLOMBIA) DISCRIMINATED BY LOCALITIES

Angel David Mendoza Sanchez¹, Hector J Fuentes L¹, Valentina Mendoza Morales¹, Maria Alejandra Bermudez Ayala¹
District University Francisco José de Caldas in Bogota Faculty of Engineering -Colombia¹

In this article, it is proposed to estimate the probability that a woman in Bogotá has of dying when contracting the SARS COV-2 virus, this estimate is made from probabilistic econometric models and different socioeconomic variables are proposed that can directly influence women who reside in the different localities of the city of Bogotá. Likewise, a comparison is made in the social and economic effects that women may obtain due to the current crisis, in comparison with men who reside in the city, such as the loss of employment or the inability to obtain necessary resources for the daily subsistence of his family nucleus with whom he lives, also causing the inability to isolate himself due to the need to obtain basic resources for daily subsistence. The database is provided by the Bogotá Health Observatory (SALUDATA) for a specific cut-off date, for this case, for January 11, 2021, the date on which a growing number of cases is evidenced, causing a second highest peak of the pandemic and other social variables that can directly affect women are incorporated into the model. In the same way, it is analyzed how women are a vulnerable sector in a society, however, they have a lower probability of dying when contracting the COVID-19 disease caused by the SARS COV-2 virus, however they present the highest rates of poverty and unemployment in the population. Finally, a spatial analysis is carried out and it is possible to show how the families that have women as heads of the family, may be the most affected by this type of social situation and the possible social and economic consequences that will occur after the current one are presented. crisis.



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3651-SENSITIVE BODIES IN THE MIRROR OF PANDEMIC LOCAL ORDER

Ivaldo Lima¹

*Fluminense Federal University Geography Rio de Janeiro-Brazil*¹

In this paper, we would suggest a geopolitical interpretation for the purposes of moral sensitization. Our reflection is based on a combination of the keywords space, body, power, life, and death. When we speak of geopolitics, what immediately springs to mind is images of war, military tactics in the field of battle. When it comes to the relationship between space and power, it is true that geopolitics has to do with strategic and tactical statecraft, but it also has to do with legitimizing the actions of social movements, anti-colonial groups, and anti-globalization activists, this last phenomenon often being referred to as anti-geopolitics. In an article from 2005, Joanne Sharp takes inspiration from Ó Tuathail's concept of the "anti-geopolitical eye" which represents a geographical, embodied, situated worldview, together with an acknowledgement of the inherent embodiment of geographical processes and geopolitical relations on multiple scales. Her concern here is with a geographical and geopolitical imagination that takes the dimension of the body into account. During an epidemic course, how should the geopolitical condition of the sensitive bodies of older residents of urban peripheries and favelas be understood? How to promote a carescape? For these sensitive bodies, are active ageing with territorial justice still an option or are they simply facing death? How the elder women are facing their newly geopolitical condition? Ethical networks, which propagate values like solidarity, respect, hospitality, and responsibility, are guided by the moral emotion of empathy, reinforcing the social inclusion of the urban senescope. So geopolitical condition of sensitive bodies is intimately linked with emancipatory and ethically situated socio-spatial practices.



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Geography Education Future Ready Geographical Education

1312-THE ROLES OF THE UNIVERSITY AND ACADEMICS IN MEETING THE GOALS AND NEEDS OF SOCIETY

Mihkel Kangur¹, Liisa Puusepp¹, Toomas Trapido²

Tallinn University/Estonian Geographical Society Institute of Ecology Tallinn-Estonia¹ Gaia Academy Gaia Academy -Estonia²

Challenges related to the environment, economics, culture and human relationships are increasingly threatening our societies. To cope with these challenges the UN has proposed Sustainable Development Goals. Moving towards these goals requires cooperation from many different groups in society, and universities play a major role here. Coping with these global issues requires understanding of their roots, connections, potential solutions, and responsibilities. The coping is more difficult since the solutions for global challenges are basing on local actions and results are often unnoticeable and also unpredictable and they are therefore considered to have minor importance. The role of higher education is to explain and describe the global processes in systemic way. New knowledge and innovation born at universities creates an environment of development for students that enables them to take responsibility for their own wellbeing and also create added value for society in the future.

The current presentation discusses how societal needs and sustainable development are integrated into the teaching practices of academics at one Estonian university. Analysing the strategic documents that state the role of universities and the relationship between universities and society and interviews with academics, we can argue that the aims of the university as influential in society may not coincide with its teaching approaches and the aims of academics as individuals. Most academics see their role only in terms of teaching general competences and the specific knowledge of their field. Only a few academics mentioned the needs of society in the context of their teaching and bringing relevant topics into the classroom. Better communication at the university about its mission is needed to make global challenges meaningful for students, help them to make their personal behavior more environmentally friendly, raising awareness and developing the general competencies they need to act locally.

1666-Changing US educational landscape in geography

MELVIN JOHNSON¹

UNIVERSITY OF WISCONSIN SYSTEM GEOGRAPHY MANITOWOC-United States¹

The educational landscape in the United States is changing. Because the economy is doing well, there are fewer people going to colleges and universities. But coupled with that decline, another change or challenge is the rapidly declining number of males entering and graduating from colleges and universities. For the past decade or so the number of males attending colleges and universities has declined to the extent that now there are more females than males in higher education. Traditional male bastions of higher education, i.e. Harvard and Yale, now frequently admit more females than males into their freshmen classes. Currently there are more than 100,000 fewer male students in colleges and universities than females. This number is in direct contrast to the actual ratio of males to females in the 18-24 year age cohort (approximately 51-49%). A typical example is the school at which I teach, the University of Wisconsin Green Bay, the student body is approximately 69% female. The population of the 16 county area from which most of the students are drawn is 53% male. The other institutions of higher education in the same region are also seeing similar scenarios with a larger female student population than male. The other interesting aspect is that this disparity in the number of males versus females in college and university enrollment is common among all recognized ethnic groups: European-American, African-American, Asian-American, Native American, Latin American, and Pacific Islander American. As a professor, this change has also required some adjustment to my teaching of geography and research. Also the political, social, and economic ramifications are tremendous with undereducated males having greater influence in the political arena.



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1778-Synergies between geographical thinking citizen training and virtual education for the understanding management of problems of the society territory complex

Carlos Hernan Castro Ortega¹

*Universidad Distrital Francisco José de Caldas Engineering Bogotá-Colombia*¹

Progress and partial results of a continuous process of migration and updating of educational contents and practices are shown, which enrich the management of teaching-learning processes of geographical thinking in higher education. Ideas also constitute axes of work in the process of constructing the idea of research as a doctoral student in geography.

Geographic thinking supported by virtual education is a powerful tool to navigate the world. It can positively shape human culture (conceived as adaptation). It can guide the formation and exercise of citizenship, which claims spatiality, synthesis, heuristics and critical thinking, for analysis, management and hermeneutics, regarding uncertainties arising from the society-territory complex.

Three moments of the experience/process: First, an analytical dismantling of fundamental concepts, categories and structures of geographical science, to propose new couplings and assemblies for geographical thinking. Second, the examinations and discussion on the relevance, opportunities and variants to consider in geographic literacy for its application in citizen training and the analysis of socio-spatial problems. Finally, the review and application with critical sense of some of the most representative techniques, methodologies, technologies and strategies of practical and applied work in geography (eg field work, chorematic, social cartography, representation, display-visualization, systematization, analysis, geoprocessing).

Partial results taking into account the positioning of virtual education towards the future: Virtual learning environments, activities and resources such as databases, questionnaires, surveys, forums, glossaries, games (designed in Ardora and Hotpotatoes), virtual learning objects (exelearning) and activities designed under scorm standards.

A continuous review and vindication of the important role of information, management and appropriation of geographic knowledge for interpretive readings of the territory in context is highlighted.

Keywords: Geographical thinking, virtual education, citizenship, society, territory

1886-PREPARING SECONDARY SCHOOL STUDENTS FOR THE UNCERTAIN FUTURE INVESTIGATING ANTHROPOGENIC ENVIRONMENTAL CHANGES IN GEOGRAPHY LEARNING

Xi Xiang¹, Michael Meadows²

*East China Normal University School of Geographic Sciences Shanghai-China*¹ *University of Cape Town Department of Environmental and Geographical Science* michael.meadows@uct.ac.za-South Africa²

Humankind is increasingly being challenged by environmental changes and society needs to be better equipped with knowledge, skills and values to cope with these changes. This poses new challenges for geography education. Three questions in the realm of school geography are addressed in this paper: a) how can the geography curriculum be reframed to take account of anthropogenic environmental changes? b) what difficulties do students encounter when learning about these changes? c) what pedagogical approaches are best suited to effectively and efficiently teach about environmental changes in geography learning. Having reviewing the existing geography syllabi of many countries, we argue that the school geography curriculum should focus not only on the earth's dynamic physical environment but also deal explicitly with the interdependency of people and nature through offering students opportunities to apply ecological perspectives into real life situations. Besides, it has been found that secondary students have problems in perceiving and analyzing changes possibly due to their limited life experience and reasoning ability. To effectively support the learning process of studying environmental changes three pedagogical approaches are proposed, which are linking the studying of 'change' to life experience, integrating history and geography and utilizing geospatial technology as a learning tool. An example of these pedagogical ideas is proposed, whereby students engage with the topic of deforestation in Southeast Asia using Google Earth. The findings of this study inform curriculum makers and geography educators in providing education that enhances secondary school students' understanding of our uncertain world and increases their ability to be proactive, rather than merely responding to change.



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2051-TEACHING GEOGRAPHY AT THE UNIVERSITIES IN RUSSIA CURRENT CHALLENGES AND PROSPECTS

Nina Alekseeva¹, Yulia Greenfeldt¹

*Lomonosov Moscow State University Geography Moscow-Russia*¹

New versions of university educational standards for undergraduate and postgraduate programs on Geography are to be introduced at the universities of the Russian Federation at September, 2020. Educational programs are being updated taking into account professional standards and European methodological approaches. There are more than 50 universities in Russia offering programs in Geography, but there is no distinct profession "Geographer" in the national Classification of Occupations (2014) as well as in the International Standard Classification of Occupations (ISCO-2008). In the emerging system of professional standards, describing the skills and labor functions of the employees, the place of graduates from the Departments of Geography is very unclear. Perhaps, it is one of the reasons of gradual loss of position of Geography programs at Russian universities in favor of Environmental studies, Tourism, etc. Are the professional competencies of the graduates from the Departments of Geography matching the requirements of relevant industries and institutions in the labor market? Universal competencies (social communication, setting goals, team work, etc.) and general professional competences (like basics in Earth sciences, geography, cartography, etc.) are delivered at each university. Professional profiling is provided by the courses of the variable part of the Curriculum, therefore, the number and subjects of profiles are determined by the universities themselves, based on the regional labor market demands and, additionally, by the fields of knowledge and scientific schools developing in a particular university. Many experts emphasize the importance of expanding training in practice-oriented profiles aimed at spatial planning and design activities, environmental engineering surveys, geographic information technologies, environmental impact assessment, etc. The paper discusses the status of university Geography in Russian universities and the activities needed to effective adaptation to changing social and economic conditions as well as labor market requirements in the coming decade.

2704-Seamless education developing and monitoring education programs for sustainable development in cooperation with formal and non formal education institutions and universities

Liisa Puusepp¹, Mihkel Kangur¹, Grete Arro², Elina Malleus³

*Tallinn University Institute of Ecology Tallinn-Estonia*¹ *Tallinn University School of Educational Sciences* grete.arro@tlu.ee-Estonia² *Tallinn University School of Natural Sciences and Health* elina.malleus@tlu.ee-Estonia³

The complexity of issues related to the environment, economy, culture, human relationships requires integrated approach in all levels of education. Cooperation between formal and non-formal education institutions (herein we are focusing on environmental education centres (EECs)) plays an essential role in fulfilling the SDGs through programs that are focusing on ideas and methods of education for sustainable development (ESD). Additionally, in order to ensure valid assessment of the effectiveness of these programs, it is crucial to involve universities in monitoring process. According to the Estonian National Curricula, sustainable development was recognized at all school levels as a cross-curricular objective in 2002. Since then more than a hundred EECs have collectively been one of the main partners for schools helping to cover the elements of sustainable development raised in the curricula as well as the topics of the SDGs. However, our teachers from basic schools and educators in the EECs lack skills to use the full potential that collaboration might offer. To increase collaboration between formal and non-formal education institutions, the quality of education programs and to create a basis for the program effectiveness assessment system, a pilot study was developed. A living lab model was applied to bring together schools, EECs, Tallinn University. A list of main elements (aspects to support motivation, conceptual change, and long-term learning that teachers should keep in mind when designing and conducting the course) that should be included in the program was created. These main elements can be also used as a frame for monitoring. Additionally, how does the program fulfil the SDGs and the National Curricula. The presentation gives an overview of the study, programs created and ways how to assess their effectiveness and describes ways in which ESD and the SDGs can be collaboratively integrated in teaching programs in schools and EECs.



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3312-THE SOUTH AFRICAN NATIONAL GEOGRAPHY OLYMPIAD A GROWING ONLINE OLYMPIAD

Milton Milaras¹, Tracey McKay¹

*The University of South Africa Environmental Science Johannesburg-South Africa*¹

Background

In 2016, the Society of South African Geographers (SSAG) launched a nationwide online secondary school Geography Olympiad (South African National Geography Olympiad (SANGO)). SANGO aims to foster a love of Geography and grow the discipline in secondary schools, and in the long-term capacitate sending a team to the International Geography Olympiad. This paper details the advantages, challenges and learnings of running an entirely online Olympiad. SANGO comprises of 40 Multiple Choice Questions with graphics, and covers the entire Geography curriculum. Additionally learners are asked 5 feedback questions. Top 1% (platinum), 5% (Gold), 10% (Silver), 15% (Bronze) and 'Participation' e-certificates are emailed to learners and teachers.

Materials and Methods

The 2017 SANGO used Google Forms and received overwhelmingly positive feedback from participants. 946 students from 60 schools across seven provinces took part. Challenges included fraudulent participation and a Google bug. To overcome these issues, a professional IT company was appointed in 2018. The 2018 SANGO had 1144 learners from 55 schools. Unfortunately, the 2018 WordPress-based IT platform catastrophically failed due to server load issues, resulting in significant data loss. Thus, in 2019 a custom-made IT platform was commissioned. In 2019 1535 learners from 72 schools took part. The 2019 Olympiad ran excellently with no load issues, but some dishonesty was noted. For 2020, anti-cheating measures will be implemented.

Results and conclusion

The necessity for ongoing IT development aside, SANGO was not able to generate sufficient funds to cover costs, making external funding essential. We are grateful to the SSAG and Royal Geography Society (RSG) for funding assistance. We are also hopeful that in 2020/1 we will receive financial support from the South African government and the IGU.

3540- Impressions and beliefs on landscapes development of an innovative and integrated learning methodology for secondary school education

Patricia Honvári¹, Tamás Hardi¹

*Centre for Economic and Regional Studies Institute for Regional Studies Győr-Hungary*¹

According to the European Landscape Convention (Council of Europe, 2000) "landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. Focusing on the territory as a whole, not distinguishing between the urban, peri-urban, rural and natural parts, landscapes are not limited to cultural, artificial and natural elements. This concept expresses the theme of the quality of the surroundings where people live. Taking into account the above definition, it is interesting to analyse what are young students' and secondary school teachers' beliefs, impressions and perceptions on landscapes. The presentation will focus on students' and teachers' attitudes and existing knowledge on landscapes, water surfaces and other global environmental issues. Furthermore, the role of landscape in formal education will also be examined. How is it possible to develop an innovative and integrated learning methodology, focusing on the European landscape and the role of water in shaping it? Empirical data was collected through a questionnaire survey among secondary education teachers and students, as well as specific stakeholder organisations in four involved countries: Greece, Hungary, Italy and Turkey. The online questionnaires were available from May to June 2020, and they were completed altogether by 515 respondents. The presentation will address the main findings of the survey, focusing on the impression and perception of landscapes. Differences and similarities among participating countries will be highlighted, however, aggregated data was also analyzed, in order to measure current and general tendencies. The survey was carried out in the frame of the Erasmus+ WaterSTEAM project ("Landscape, water and active citizenship: a nature-based STEAM teaching methodology").



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Geography Education Powerful Geographical Education For The Future

1283-USE OF NEW TECHNOLOGIES FOR TEACHING GEOGRAPHY IN THE CLASSROOM

José Jesús Reyes Nunez¹

Eötvös Loránd University Cartography and Geoinformatics Budapest-Hungary¹

In the last 30 years cartographers and geographers organized and participated in research projects on the use of computer technologies for geography teaching in elementary and secondary schools. Specialists classify the projects related to this topic into three main research areas:

1st area: It started in the 1990s, when projects began to be developed to study the possible use of computer-based solutions and specifically GIS in schools

2nd area: It started in the second half of the 1990s to study how the emerging and rapidly spreading web can be used in the teaching activities

3rd area: It started in 2005 with the appearance of the first web mapping services, which strengthened and accelerated the process of democratization of the use of maps.

Current work will present some of these projects developed in different countries, trying to answer questions as: Can be the tools offered by the GIS exploited in the teaching of Geography in schools? Can open-source GIS software plays a more relevant role during these teaching activities? Can the web mapping services substitute the "more traditional" GIS in schools? How could they be used in e.g. secondary schools?

Finally, a research project testing how collaborative cartography and web mapping services can support geography teaching at secondary level in Hungary is also presented. The survey was divided into three parts: a short questionnaire to determine pupils' knowledge on web mapping services; an introduction to the Google World in general and in special to the use of Google My Maps and finally a practical lesson to make together a map. The final result was a series of maps made by the pupils organized in teams, which confirmed the effectiveness of these activities to complement and deepen the geographic knowledge acquired in the classrooms.



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1761-Geographical Outdoor Education

Andrea Guaran¹

University of Udine ^aDepartment of Languages and Literatures, Communication, Education and Society Udine-Italy ¹

Abstract

Background/hypothesis

Outdoor education experiences in Italy have become less isolated, especially at nursery level, trying to align the situation of the Italian school with the most advanced European models in terms of educational offer. Today outdoor spaces are identified as the most suitable learning environments. The practice is preceded and accompanied by a theoretical and methodological reflection which refers to the classics of international literature on the theme (Rousseau, Fröbel, Dewey...) and to what has been elaborated more recently by the main schools (Outdoor and Environmental Education, University of Edinburgh, Center for Environmental and Outdoor Education, Linköping University, ...).

The research aims to deepen the wide and multidimensional theme related to outdoor education using the lens of spatial-geographic reflection and its theoretical-epistemological assumptions, having as field of investigation the Italian school system.

Materials and methods

Direct observation and the interview (in depth) shape the modalities of the research and guarantee the collection of documentation and information data that are essential for the activity of analysis.

Results

The results of the research provide some clear indications on how open spaces, with a strong natural component, mixed composition and artificial, constitute stages of extraordinary effectiveness to promote the acquisition of the geographical habitus.

Conclusion

The research supports the importance of different forms of outdoor education, requiring a more widespread and intense application, identifying in particular the values related to spatial and geographical learning. These last ones are understood as fundamental elements for the maturation of a solid and effective territorial citizenship, able to express in everyday life the principles of sustainability and care of natural environments and landscapes.



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1978-GEOSPATIAL LIFE LONG LEARNING INDIA DIGITAL LEARNING CHALLENGES AND OPPORTUNITIES

SEEMA MEHRA PARIHAR¹, PREMENDRA KUMAR PARIHAR²

KIRORI MAL COLLEGE, UNIVERSITY OF DELHI, DELHI, INDIA Geography DELHI-India¹ DYAL SINGH COLLEGE (Retd.) DU Geography
pkparihar@gmail.com-India²

Life-Long Learning has become an important focal point of deliberations and discussions in the portals of the Higher Education and educational forums. Even educational policy frameworks are illustrating its importance. Geoinformatics is one such course; both as a partial component of a main course and an additional singular add-on course with an interdisciplinary bearing that need continuous renewal and growth (Parihar, 2001, 2002, 2009, 2019). Supply driven and demand driven requirements makes the curriculum obsolete soon. The pace of their existence in the fixed curriculum in a structured University Curriculum in the Higher Education finds it difficult or for that matter impossible to match with. Seven related e-learning courses coordinated by the authors related to geospatial (Remote Sensing, GIS and/or GPS) teaching and learning in existing higher education set-up from 2002 to 2019 and the emerging challenges forms the backdrop of the paper. Present paper explores considerations, contingencies and challenges in the introduction of the geospatial life-long learning courses in the existing Higher Education Set-ups. Through simple observations, mapping the behaviour pattern of all three pillars of education (students, teachers and administration) and the related feed backs, it has been attempted to unveil the deterrents in real university set-up. Largely the learnings' are drawn from the direct interactions with the central university with vast expanse of learning space and learnings drawn through digital mode. However, one fear that looms is that slowness of the change in the process may make it too late for collaborative synergies among faculties and students to group together in higher education setups in India. However, not anticipating too many expectations the academic space looks richer, bright and with life-long learning promise. Greater faculty participation with life-long concomitant accountability and new pedagogies is the only solution.

2017-Conceptual (un)understanding of climate content at the end of primary education in Croatia

Ružica Vuk¹, Hrvoje Grofelnik², Biljana Vranković³

University of Zagreb, Faculty of Science, Zagreb, Croatia Department of Geography rvuk@geog.pmf.hr-Croatia¹ University of Rijeka, Faculty of Tourism and Hospitality Management, Opatija, Croatia Institute for Multidisciplinary Areas Opatija-Croatia² National Center for External Evaluation of Education, Zagreb, Croatia Publishing Department biljana.vrankovic@ncvvo.hr-Croatia³

Today, climate change topics are in the public and science focus. Relevant geographic education is important for decision-making process for climate change mitigation. Understanding climate change depends on the level of adoption of the basic climate concepts taught in geography. In order to determine the level of geographical literacy at the completion of primary education on the sample of eighth (final) year of elementary school students in Croatia in school year 2019/2020 a national examination was conducted. The examination was conducted on a sample of 1669 respondents by a trial exam in 2018/2019. This paper analyses the accomplishments of the respondents on the trial exam. The paper tests the following hypotheses: 1) students have a basic level of geographical knowledge and skills about the composition of the atmosphere, climatic factors and elements, ways of collecting data on climate elements, types of climate on Earth, the interdependence of climate, water and vegetation cover and the impact of climate on spatial distribution of the population; 2) the level of geographical knowledge and skills is influenced by misconcepts about processes in the atmosphere; 3) students are able to draw conclusions by analysing climate diagrams, thematic maps and photographs. The study found the following conclusions: 1) students have acquired a basic level of geographical knowledge and skills (average of accurately resolved tasks is 41.7%), but they do not recognize to a satisfactory level the interdependence of climate and other natural-geographical factors or the impact of climate on socio-geographical factors; 2) achievements are significantly influenced by climate change misconceptions; 3) achievements are also influenced by the low level of reading literacy in geography. Students are more successful in solving tasks that examine recognition of literal meaning than tasks that examine inference based on information presented on climate diagrams, thematic maps, and photographs.



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2425-The Role of Geography Education in Disaster Risk Reduction Evidence from Indonesia

Furqan Ishak Aksa Aksa¹, Ramdan Afrian Afrian¹

Samudra University Geography Education Langsa-Indonesia¹

Disaster risk reduction has become an important issue for scientists and stakeholders. Because the incidence of disasters tends to increase every year. According to the International Disaster Database (EM-DAT) released in 2018, there were 315 natural disaster events worldwide with 11,804 fatalities and more than 68 million affected in various parts of the world. Most fatalities were caused by earthquakes (45%) followed by floods (24%). The Asian region accounts for 45% of disaster events with the death toll reaching 80%. Globally, Indonesia accounts for almost half of the total death toll. Therefore, serious efforts are needed in disaster risk reduction. Disaster studies must be carried out with a multidisciplinary approach. As a science that examines physical and social aspects, geography has a big role to play in reducing disaster risk. One of the mandates of the Lucerne Declaration on Geographic Education for Sustainable Development in 2007 is the suggestion to integrate the theme of disaster risk reduction into the teaching of geography throughout the world. Therefore, by examining literature and case studies in Indonesia, this article tries to describe the role of geography education in disaster risk reduction. The discussion will begin by explaining specifically the conceptual framework of disaster studies in geography education. The final section of this paper outlines the contribution that geography education can make, especially in preparing future geography education teacher candidates who have comprehensive knowledge about disaster risk reduction so that they can play a role in transferring knowledge to students, the community and society.

2981-A review of Geographical Information Systems Content in the Geography Curriculum of Pre service Student Teachers in South Africa

Maureen Kapute¹

North West University Faculty of Education Potchefstroom-South Africa¹

Geographical information systems (GIS) are one of the technologies widely used at tertiary level. GIS have in recent years, become one of the technologies that have progressed and gained greater significance in education worldwide. It is one of the tools that permit students to discover, examine, and interpret from a spatial point of view. It also help to increase the participation of students during the teaching and learning process, thereby increasing students' performance in the classroom. Incorporating GIS into geography education and other subjects is thus a fundamental element in the design of the 21st century education system.

This article systematically reviews the availability of GIS content in the geography curriculum of the training of pre-service student teachers at universities in South Africa.

The results show that not all teacher-training universities include geography/GIS in faculties of education in South Africa. Instead, students learn geography/GIS in other departments/faculties. This is due to institutional/structural differences. The findings further show that the curricula of most universities that include GIS in geography curricula are designed according to the secondary school GIS concepts.

South Africa include GIS content in the Bachelor of Education (BE) in the Senior Phase and Further Education and Training (FET), and not in the BE in the Foundation and Intermediate Phase. A need exists for policymakers and educators to consider the inclusion of GIS content in Foundation and Intermediate Phase. This study also recommend inclusion of GIS in all core subjects in teacher education and allowed academicians to incorporate different content and improve the curriculum or course design while working as a team.



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2985-PRESERVICE GEOGRAPHY TEACHERS' ASSESSMENT OF THE IMPACT OF SCAFFOLDS IN PROBLEM BASED LEARNING ACTIVITIES ON THEIR LEARNING

Aubrey Golightly¹

North-West University Geography and Environmental Education Potchefstroom-South Africa¹

Background

With the implementation of PBL in geography education, geography educators have to design, plan and implement scaffolds to guide students in adjusting to the new learning environment and to ensure successful student learning. In this study preservice geography teachers in a B.Ed. programme in South Africa were involved (five weeks) in two PBL activities.

Methods

This study explores the preservice geography teachers' assessment of the impact of different hard and soft scaffolds implemented in the PBL activities on their learning. A self-constructed "Scaffolds in geography PBL" questionnaire was developed based on the scaffolds implemented in the PBL activities. The respondents completed the self-constructed questionnaire at the end of the PBL activities. A written comments and feedback section forms part of the questionnaire, where the respondents could elaborate on why specific scaffolds had the most impact on their learning, so as to get a deeper understanding of the quantitative data.

Results

The respondents rated most of the scaffolds used in the PBL activities to be effective in supporting their learning in PBL. The soft scaffolds were perceived to have slightly higher statistically significant impact on their learning compared to the hard scaffolds. The following scaffolds: "The facilitator provided hints and cues to the different groups" and "The assessment rubrics on how the PBL report will be assessed" received the highest scores from the respondents regarding the impact on their learning. The influence of the respondents' academic performances in geography and gender on their assessment of the impact of the scaffolds on their learning was also reported in the study.

Conclusions

The geography preservice teachers revealed the importance of scaffolds in PBL activities. Interestingly, the preservice teachers in this study highlighted the soft scaffolds dealing with the facilitator's guidance through the PBL activities, to reduce task complexity and promote independent learning.



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VIRTUAL

3067-Teaching and learning sustainable development with fieldwork A Practical Example of Geography Education in Macau

Tat-In Tam¹

*Geography and Education Research Association of Macau Macau-Macau*¹

Sustainable development has been a pivotal topic in the geography curriculum. However, learning the topic on textbooks as a traditional way may be too preservative to response to the challenges that the students may face in the future. Fieldwork, also used in the International Geography Olympiad, is a practical means in geography education which let students to have the opportunity to solve problems in their everyday life through assigned tasks from teachers.

This paper aims to illustrate a practical example of geography education in Macau with the topic of sustainable development, in the means of a fieldwork project based in a local secondary school. The project focused on secondary school students whose ages ranging from 16 to 18 years old. This was the first school-based, curriculum-oriented fieldwork that had ever launched in Macau, as a response to the recent curriculum reformation. The project was carried out in 2015, 2017 and 2019 in different selected fieldwork zones for each year respectively. Students were grouped into three or four to finish several assigned tasks and need to submit worksheets in group-basis.

The fieldworks aimed to enhance the students' geo-capability as well as their geo-literacy through implementing knowledges and skills in certain situations that they would encounter with in real life, rather than solving problems on textbooks. With problem-oriented tasks, the fieldwork tried to facilitate a new approach of geography education through the pedagogical ideas of learning by doing. The results of the fieldworks show that the majority of the students can utilise the concept of sustainable development in finishing the tasks in the fieldworks. The use of skills can be observed and reflected on the accomplishment of worksheets, which also worked as the indicator of the student's geo-capability and geo-literacy. Several suggestions were raised by the implementers for improvement in the future.

3305-Development of Map Skills of Students with Orienteering Social Studies Course in Secondary School

Eyüp Artvinli¹

*Eskişehir Osmangazi University Faculty of Education Eskişehir-Turkey*¹

It is aimed to provide students with the skills of research, environmental literacy, perception of change and continuity, observation, map literacy and location perception through the learning area "People, Places and Environments" at all grade levels where the Social Studies course is taught in Turkey. Map literacy, which is one of the skills that the social studies course aims to provide in secondary school, is one of the skills that can be best developed in the fourth, fifth and sixth grade attainment of people, places and environments learning area. In this study the orienteering game has been used to improve the map literacy skills of the grade students 6. Grade of social studies. After it was determined that the total of 4 attainments in the People, Places and environments learning area of this class were suitable for improving map literacy, the orienteering game was played for 2 weeks and a test measuring map skills was applied to the students. Before the orienteering game, there is a significant difference between the test results before and after playing orienteering according to the result compared to the same test results. This difference is less in female students than in male students. According to this result, map literacy skills are developed more permanently if students complete a process that they have learned by doing and living, as well as psycho-motor skills such as orienteering in addition to theoretical activities and course processing in class. For this purpose, in order to develop the same skills in different class groups in a more permanent way, it is recommended that teachers practice by developing examples of orienteering applications suitable for student levels.



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VIRTUAL

3307-HOW TO USE LANDSCAPE IMAGES IN GEOGRAPHY TEXTBOOKS EXAMPLE OF SOME COUNTRIES

Eyüp Artvinli¹

*Eskişehir Osmangazi University Faculty of Education Eskişehir-Turkey*¹

The aim of this study is to compare the landscape images in geography textbooks of Turkey and some other countries. Comparison will give an understanding about the presentation of different landscapes of different countries and cultures of people. Geographical imagination of landscape often gives an idea to people about that place or phenomena and it create a positive or negative opinion about that place, city or country. The methodology of this research based on content analysis. As the first step the landscape photos are determined and categorized in the geography textbooks of countries. In this way it can be possible to demonstrate the kinds of landscapes imagination to people in countries. After that researchers focused on to determine about to find how to interpret inside of the texts. In this way it is possible to link to different appearance of physio-geography dimension in countries. It is concluded that landscape imagination given in geography textbooks have different effect in different countries and people. Thus, it is important to choose right landscape photos in geography textbook in order to give right message and leave a positive imagination for the people. According to using landscape photos in geography textbooks often reflect the term of social life and viewpoint of that society about human-nature interaction and relations between them. In this way, by comparing or analyzing geography textbooks, it can be observed and conclude the changes and development of the ideas of societies about nature and environment and its use by human.

3309-Developing Map Literacy of University Students with the Fieldwork An example of Human Geography Course

Eyüp Artvinli¹

*Eskişehir Osmangazi University Faculty of Education Eskişehir-Turkey*¹

The aim of this study is to evaluate and define map literacy level of students' in the first year of social sciences education program. And the second aim is try to develop map literacy of students during 4 weeks in the course of Human Geography two hours per week. Map skills and literacy map interpretation in social sciences course at secondary school-level are highlighted as being important in furthering map literacy, which is required by social sciences student teachers at university. It is need to develop map skills of university students in order to make them active about teaching map literacy to students in secondary school when they become teachers. In this study it was used a ready map literacy scale published by Koc and Demir (2014) in order to define the level of map literacy of students. Then it was organized 4 weeks activities in order to develop of different types of map skills on students. Two of activities based on GIS activities to develop map interpretation. Normally it should have spent only 2 weeks to develop map skills of students according to schedule of Geography course. But we extended it in order to develop map literacy of students. At the end of four weeks, interviews and survey were used to determine whether map skills developed after taking the class. Survey were conducted in a pretest, posttest fashion at the beginning and the end of the 4 weeks class. The students were found to deepen their map literacy after taking the class and especially fieldwork.



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VIRTUAL

3669-Improving on the inclusivity of History textbooks with environmental history. The case of the Araucanía occupation (Chile 1859 1884)

Matías González-Marilicán¹, Elizabeth Montanares², Daniel LLancavil², Gabriela Vásquez³

University of Bristol Department of History Brixham-United Kingdom¹ Universidad Católica de Temuco Faculty of Education emontanares@uct.cl-Chile² Universidad Andrés Bello Faculty of Education and Social Science gabriela.vasquez@unab.cl-Chile³

In Chile, History textbooks have been criticized for not portraying or including indigenous worldviews and history correctly. This can be seen in the treatment of the Chilean occupation of the Araucanía region at the end of the nineteenth century, a territory historically inhabited by the Mapuche people. Intercultural studies have already tackled this problem from political and social points of view, but the environmental historical side of the situation has not been adequately debated. This is noteworthy since nature has been an important actor between the relationship of modern and traditional societies. Thus, the following research has analyzed the History textbooks used by the government in Chilean high schools, from 2008 to 2020, and their inclusion of the relationship between nature, the Mapuche and the Chilean state within the topic of the Chilean occupation of the Araucanía region. A mixed research strategy has been used, with content analysis and textual analysis used for collecting and analyzing data. The sample was comprised by thirteen textbooks. It was found that the natural environment is poorly represented, mainly through praries and cattle. More importantly, it was found that the environment is, in general, observed from a Western point of view. This means that nature is represented in a dualistic and extractivistic manner. On the contrary, the ecological relationship that Mapuche normally have with the environment is not included. The subdiscipline of environmental history can help to correct this bias by showing the cultural differences that exist in the interaction with nature. This would give us more inclusive history books that would contribute more actively to the search for social peace, since they would address, from a historical perspective, one of the main problems that still exists between the Chilean state and the Mapuche; namely, the misunderstanding of how each society relates with the environment.

3679-HOW APT IS THE GEOGRAPHY CURRICULUM TO WHICH LEARNING STYLES OF STUDENTS

Eyüp Artvinli¹

Eskişehir Osmangazi University Spcial Studies education ESKİŞEHİR-Turkey¹

The aim of this study is to investigate how the attainments in the geography course curriculum are predisposed to which of the learning styles of the students. As a sample, the attainments in the ninth and tenth grade geography course curriculum were discussed. Learning styles are divided into three as visual, auditory and kinesthetic learning styles. Visual learning involves using things that include demonstrations, movies, pictures, diagrams, what is seen and observed. People with this learning style learn best when information is presented visually and in writing. Auditory learning; auditory learners learn by listening and repeating self-knowledge. These individuals learn best when information is presented verbally. People with kinesthetic learning styles include physical experience, that is, experiences obtained through touch, feeling, holding, making, and practicing. In other words, they learn well when they use and experiment with materials in or outside the classroom environment.

The attainments in the geography course curriculum were analyzed through document review. According to the findings, there are 22 attainments in the curriculum of the 9. classroom geography course. 60% of these attainments are addressed to auditory learning style. The remaining 25% are focused on visual learning style. About 15% of the cross-section is the attainments appropriate to the kinesthetic learning style. There are 34 attainments in the curriculum of the 10. classroom geography course. 50% of these attainments are auditory, 40% are visual, and the remaining 10% are called kinesthetic learning styles. Life as a geography lesson to take part in a natural motion for you to find application in the field, even very simple because of the nature of this course overlaps with kinesthetic learning style, but more of the attainments in auditory and visual learning style based on the program, this course hampers the development of the size of the application.



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VIRTUAL

3680-SPATIAL COGNITION LEVEL AND GEOGRAPHICAL EDUCATION IN CHILDREN

LEYLA DÖNMEZ¹

ESKİŞEHİR OSMANGAZİ UNIVERSITY SOCIAL STUDIES EDUCATION ESKİŞEHİR-Turkey¹

The aim of this research is to determine the processes and levels involved in Jean Piaget's spatial development stages of a child through geographical learning theory. It is very important that spatial perception is formed during the child's development process. Geographical education begins to be given to the child in early childhood. Looking at Piaget's theory of development, it is possible to reach the same conclusion again. In determining when children are ready for the introduction of geographic concepts in school, geographic education has been more concerned with the sequence of children's development than with their learning, in a psychological sense. The dominant theoretical paradigm in geographic education is that provided by the noted theorist and researcher in child development, Jean Piaget. In Piaget's view, all cognitive development, including spatial cognition, goes from lower to higher levels of conceptual and symbolic functioning, part of a more general set of competencies acquired in a stagewise, lock-step fashion. For some reason, spatial cognition is important in geography. First of all, spatial cognition provides questions of geographic interest in their own right, given that cognition about space and place is an expression of human-environment or human-world relations. If these queries are asked and questioned by the mind of a child who is still a young mind, it is actually a result of natural selection. For this reason, it is also important for the child to have spatial cognition skills. This research was created to express how spatial cognition levels can be acquired in children in early childhood.

3681-ANALYSIS OF SOCIAL STUDIES COURSE IN TERMS OF GEOGRAPHICAL EDUCATION ACCORDING TO LEARNING STYLES IN THE CURRICULUM

LEYLA DÖNMEZ¹

Eskişehir Osmangazi University Social Sciences Education Eskişehir-Turkey¹

The aim of this study was to determine what kind of learning style the Geographical Education acquisitions in the social studies course curriculum allow students to learn. As a sample, 6. and 7. classroom social studies course curriculum includes achievements. The learning style provides information about how an individual learns, but also shows at what taxonomical level an individual's learning develops. When we look at learning styles, visual, auditory and kinesthetic learning styles appear. Visual learning involves using things that include demonstrations, movies, pictures, diagrams, that is, what is seen and observed. People with this learning style learn best when information is presented visually and in writing. Auditory learning; auditory learners learn by listening and repeating self-knowledge. These individuals learn best when information is presented verbally. People with kinesthetic learning styles include physical experience, that is, experiences obtained through touch, feeling, holding, making, and practicing. In other words, they learn well when they use and experiment with materials in or outside the classroom environment. When the acquisitions in the social studies course curriculum are examined, the following results appear. There are 34 acquisition expressions in the curriculum of the 6. classroom Social Studies course. And 58% of these acquisitions are addressed to auditory learning style. The acquisitions of 32% were focused on visual learning style. The remaining 10% section was included as acquisitions in accordance with the kinesthetic learning style. In the curriculum of the 7. class Social Studies course, there are 31 achievements. 37% of these acquisitions are auditory, 45% visual, and the remaining 18% call for kinesthetic learning style. The contribution of the social studies course to the meaning of a person's life is undeniably great.



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3682-APPLICABILITY OF THE ACQUISITIONS IN THE 2018 GEOGRAPHY COURSE CURRICULUM IN TERMS OF GEOGRAPHIC INFORMATION SYSTEMS

Leyla Dönmez¹

Eskişehir Osmangazi University Social Sciences Education Eskişehir-Turkey¹

The aim of this research was to analyze the applicability of the acquisitions in the 2018 geography course curriculum in terms of geographic information systems. The availability of geographic information systems in geographical education is of great importance for the content and evaluation of the objectives of the geography course. Looking at the geography curriculum, it was determined that the program was based on the ability of geographical inquiry. Creative thinking skills, problem solving skills, decision making skills, as well as the skills of using information technologies are also among the skills that the program brings. But what increases the importance of actual research is the ability to use evidence with map skills, observation skills, land work skills, geographical inquiry skills, ability to prepare and interpret tables, graphs and diagrams, ability to perceive time, ability to perceive change and continuity. The main mechanism of this research is the applicability of these skills in terms of geographic information systems. A GIS-supported geographical education will reflect the existence of the capacity to increase the functionality of the course. Geography lesson in the curriculum the acquisitions for the year 2018 are evaluated in terms of geographical skills when these skills to work in the field especially, tables, graphs, and diagrams to interpret the level of applicability for CBS and map skills is quite high. Acquiring these skills with GIS will give the student the opportunity to work in the field. In this way, one of the main functions of learning, the theory of reflecting what you have learned into life, will also be activated.



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VIRTUAL

S.1 Symposium of Mountain Studies

1313-Phytotopographic interactions in three mountain environments and potential pathways for ecosystem development

Lynn M. Resler¹

*Virginia Tech Geography Blacksburg-United States*¹

Mountain ecosystems are typically characterized by a high degree of topographic heterogeneity. Plant responses to environmental change thus are likely to be spatially heterogeneous. Combined with active disturbance processes and disturbance legacy, topography will be important in pathways of ecosystem development and vegetation shifts. The objective of this presentation is to discuss how terrain, at macro-micro spatial scales, may influence future vegetation scenarios at three North American mountain systems. These systems include 1) alpine treelines of the US and Canadian Rocky Mountains, 2) glacier forelands of the Northern US Rocky Mountains, and 3) upland heath barrens of the Central Appalachian Highlands. All case studies are based on the results of empirical studies conducted at each location. At treelines, macrotopography influences many variables that impact spatial pattern of treeline (e.g., abrupt or gradual), treeline species composition (of both tundra and tree species) and factors governing nature of treeline advance (such as climate). Climate warming will drive most treelines to higher elevations, but terrain factors at multiple scales may generate lags. At glacier forelands where plant colonization is occurring on deglaciated terrain, colonization and successional spatial patterns are not likely to follow predictable chronosequences due to combined micro-macro topographic effects, that will create spatial variability. Topographic profile, (e.g., slope, cirque, or flat) will have an influence on these spatial patterns. Finally, at heathlands of West Virginia's Central Appalachian Highlands, land use and land use legacy, coupled with climate change, may result in unpredictable ecosystem pathways. Overall, for all mountain ecosystems examined here, fine scale topographic heterogeneity seems to be important for early life stage plant processes (such as germination and establishment), but these must be contextualized within a broader spatial context to understand landscape scale variability and future vegetation change in mountains.

2217-CURRENT TRENDS OF LANDSCAPE LAND COVER CHANGE OF PROTECTED AREAS OF NORTH CAUCASUS (CASE STUDY OF ALANYA NATIONAL PARK)

Nina Alekseeva¹, Anna Cherkasova²

*Lomonosov Moscow State University Geography Moscow-Russia*¹ *Russian Geographical Society* anna.cherkasova@rgo.ru-Russia²

The mountains of North Caucasus represent various altitudinal landscape belts subject to rapid changes under human and climate-related impacts. The study is focused on the landscapes and land use/land cover of the Alanya National Park, the Republic North Ossetia-Alanya, under the impact of climatic and anthropogenic factors in 1988-2017. Land use systems within altitudinal belts were analyzed on the base on field studies, remote sensing data, statistical information. The assignment of the status of a specially protected natural area in 1998 affected the economic activity of the area. The decrease of cultivation within the valleys and grazing at the lower and middle parts of mountain slopes resulted in the outflow of population and degradation of the traditional land use. The climate change over the past 30 years led to the increase of average summer temperatures by 2.8° and of average winter temperatures by 2.2° with no pronounced change in precipitation. The major trends in land use and land cover change were identified for 4 altitudinal belts within the range 1250–4640 m. There were various changes in landscape succession processes with slope-specific rates, changes in the forest cover, as well as a continued reduction of cultivated land. The largest areas of land cover change were traced in the high mountain glacial zone within the glaciers and snowfields. Under the influence of climatic factors, glaciers degrade, thereby exposing rocky outcrops and moraine deposits. With the activation of succession processes, there is a restoration of forests in the middle belts, as well as the advancement of the upper border of the forest. The maintenance of traditional land uses should be a priority for the national park development. Since 2008, ecological tourism has been developing which in the future may become a new type of economic stability.



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2445-Contemporary transhumance in the North Caucasus chances and risks for sustainable development

Alexey Gunya¹, Ibragim Kerimov², Umar Gairabekov³, Hava Zaburaeva⁴, Zulfira Gagaeva³, Yuri Karaev⁵, Ruslan Elmursaev³

Russian Academy of Sciences Institute of Geography Moscow-Russia¹ Chechen Academy of Sciences -Russia² Chechen State University Department of geography and geoecology -Russia³ Russian Academy of Sciences integrated research institute -Russia⁴ North Caucasian Mining and Metallurgical Institute (State Technological University) -Russia⁵

The North Caucasus is characterized by a multi-ethnic composition of the population and an extremely uneven distribution of land: mountain ethnic groups have vast summer pastures, and low-lying ethnic groups have winter pastures. Therefore, transhumance as a system of seasonal cattle movements has a long history in the North Caucasus and indicates conflict-free relations in the region. Transhumance had a particularly large scale in Soviet times. After the collapse of the USSR and the weakening of state institutions, transhumance ceased or became the subject of conflicts between lowland and mountainous ethnic groups, as well as between the state and local communities. Currently, transhumance is starting to reborn. The hypothesis of the study is: the chances of transhumance depend on the effectiveness of institutions to regulate different conflicts, where combinations of formal and informal, old traditional and new (for example, market) institutions will occupy an important place. The materials were collected during field studies in the North Caucasus in 2014-2019. We investigated geographical features of transhumance (where and in what seasons grazing occurs, livestock migration routes), institutional mechanisms for regulating access to pastures, the role of the state and ethnicity of actors involved in transhumance. Based on these groups of indicators, we selected statistics, performed mapping, and also selected people for interviews. As shown by the results, the new socio-political conditions have led to the destruction of the Soviet collective farm system of transhumance. The magnitude of transhumance has declined sharply. Modern transhumance is based on family-related and family-tribal associations using traditional and market institutions. Recently, however, the centralization of power has been intensifying, and agricultural development is increasingly dependent on government subsidies. As a result of this, institutional hybrids are formed with a different ratio of formal and informal institutions.

2769-Applied Montology Critical Biogeography of Andean Treelines and the Humboldtian Paradigm on Satoyama Landscapes.

Fausto Sarmiento¹

University of Georgia Geography Athens-United States¹

Background: Recent advances in critical biogeography propels mountain scholars to seek acceptance of the transdisciplinary science of mountain studies as applied to understanding the problematized notions of mountain ecology, in particular the Andean treeline, that traditionally have been seen with the lenses of the contested Humboldtian paradigm of mountain altitudinal zonation. New approaches to the mountain episteme requires to consider socio-ecological systems as the most effective way to manage the nature-culture hybrid of manufactured landscapes. I seek to elaborate evidence favoring Montology as the appropriate epistemology of mountains.

Materials and methods: By using examples from the tropical Andes, I posit the need to do integrative conservation by using Montology tenants for knowledge sharing, WEK and TEK, to fully grasp the meaningful mountainscapes and their protection as socioecological production landscapes. I use critical discourse analysis to contest paradigmatic notions of mountain ecology. I also use field surveys of biocultural diversity heritage in microrefugia to establish the environmental perception about mountain biodiversity and the concomitant culture that have created these hybrid mountainscapes.

Results: Several evidence points to realize the transdisciplinary nature of mountain cognition, making them exemplars of the hybridity of cultural influence over the domesticated nature prevalent over many Andean mountains.

Conclusion: Neotropical mountains are syncretic landscapes that require transdisciplinary pedagogies to better comprehend the socio-ecological system and its adaptations to environmental change. I affirm the need of further research incorporating the changing narratives of conservation and suggest a way forward for the regenerative development of the tropandean landscapes.



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2796-Perspectives of mountain studies in the coming world of extreme weather

Kenichi Ueno¹

*University of Tsukuba Life and environmental sciences Tsukuba-Japan*¹

Beside long-term socio-ecological impacts in the mountain environments that are of worldwide concern, recent extreme weather/climate impacts on inhabited areas are of greater concern in Japan. For instance, in former climate conditions, mountains prospected inland society by blocking typhoon or Baiyu fronts and mitigated severe disturbances. With the recent extreme weather, mountains collect more precipitation, causing flash floods in remote areas. Aging and depopulation with over-tourism are changing the social capacity in the mountain areas. How can we protect travelers who do not have experience dealing with extreme events? Traffic obstacles in mountain ranges also actualize the weakness of remote areas. Advances in satellite observation and forecast/nowcast technology are expected to mitigate natural hazards; however, the way in which local societies can adapt to future hazardous environments are still unknown and need to be diagnosed in interdisciplinary ways. From the point of view of an atmospheric scientist, the structure of extreme weather, nowcast efforts, and impacts on society by arguments of local people are introduced.

Education toward sustainable mountain development is also very important, not only for younger generations, but as a part of lifelong learning for hazard mitigation. Universities are also expected to contribution by changing the curriculum system. Since 2017, four national universities have started a joint degree program of mountain science as master's degree program. However, the curriculum still maintains classical science components, and cross-cutting topics such as climate change and adaptation are not fully taught because, with traditional teaching staff, too many classical subdivisions in research topics remain. Technical issues must be resolved to enable better mountain education, such as improving the remote lecture system to save/share budgets and resources. Challenges to archiving a comprehensive educational system regarding updated mountain environmental issues are introduced.

2891-Community based management of "Himalayan gold" (caterpillar fungus) in remote landscapes of Dhorpatan Hunting reserve Nepal

Sanjeev Poudel¹

*University of Western Australia UWA School of Agriculture and Environment Australia-Australia*¹

Caterpillar fungus aka Himalayan gold is a major livelihood source (>70% of income) for people living across Tibetan plateau. The market value of the fungus is three times the market price of gold making it multimillion industry in mountain region. As a result, sustainable management of this fungus in the highland pastures of Nepal has become an emerging issue.

In 2016 the local management committee launched a new strategy dubbed as 'one home, one security' (Ek Ghar Ek Surakshya) in the study area. The strategy entails that each local (Maikot) household sends one representative in the pasture before allowing people residing outside the local area in order to harvest caterpillar fungus. The rationale for is to stop illegal pickings of caterpillar fungus by outside collectors; and also initiate caterpillar fungus collection by local households before allowing access to general public.

This study aims to examine the management practice of the indigenous communities in remote landscapes (pasture) of Nepal.

The research follows a case study approach by purposively selecting a site for detailed study. Pupal pasture in East Rukum (Maikot village) is chosen for the case study. In May/June 2019, an in-depth interview was conducted with the executive of the management committee to learn about the management practices. Altogether, 223 collectors were also interviewed in the pasture itself during the same time.

The collectors and the management committee reported that 'one home one security' strategy has reduced the number of collectors from outside by half compared to previous years. The implication of this strategy has economic implications on outside harvesters. However could enhance the sustainability of this vitally important resource for local livelihood.



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2987-IDEAS ON URBAN MONTOLGY PERIURBANIZATION VERTICALITY AND ECOLOGICAL COMPLEMENTARITY IN THE PERUVIAN ANDES

Andreas Haller¹, Domenico Branca¹

Austrian Academy of Sciences Institute for Interdisciplinary Mountain Research Innsbruck-Austria¹

Background

Montology is a transdisciplinary field of research committed to the sustainable development of the world's mountain regions. While most studies have focused on purely rural areas, often considering cities as the antithesis of mountains, urbanization processes in mountains have been little investigated. One key to understanding urbanization in mountains is the cities' specific geographic position within natural and cultural space and their topographic location. Related to this are environmental and/or sociocultural challenges.

Methods

Periurbanization in valleys of the central Andes is one such challenge. The still dominant dichotomic perspective on "the urban" and "the rural" is losing in importance—as a "planetary urbanization" is taking place. Rural-urban interactions in the central Andes—important to approaches like city-region food systems or ecosystem services—are influenced by periurbanization and call for the inclusion of notions like verticality and ecological complementarity. Bridging empiricist and humanist approaches is a necessary endeavor. Analyses of land cover change and environmental perception offer potential for a mixed-methods approach.

Results

In urbanizing mountain valleys in the Peruvian Andes this is particularly evident. First, because valley floors are irrigated while the slopes and high plains of the hinterland are mostly not irrigated; periurban smallholders depend on irrigated land to produce crops—and to generate monetary income—during the dry season. Second, because land cultivated on the valley floor is often leased by smallholders and owned by nonagrarian land owners, who expect rising land prices and prefer to sell lots for real-estate projects. Consequently, periurban smallholders adapt their vertical land use system—or abandon agriculture and migrate to the city.

Drawing on Peruvian examples from the FWF projects P 24692 and P 31855, the present contribution aims to advance an urban montological perspective on the study of mountains.

3172-Mountain Research in China

Dunlian QIU¹

Institute of Mountain Hazards and Environment, Chinese Academy of Sciences Journal of Mountain Science Chengdu-China¹

China is a mountainous country with 69% of land area composed of mountains, hills and plateaus. In Chinese literature and art works, especially ancient poets and paintings, mountains are very important element. Mountain travelling, climbing and hiking are very popular leisure, entertainment, or holy activities in China for hundreds of years. Chinese people have long history to use mountain resources for food, drug, fibre, decoration, building. However, if not considering the detailed herb usage recorded in the Herbal Classic of Shen Nong (Shen Nong Ben Cao Jing) two thousand years ago, and the classic medicinal book Compendium of Materia Medica, mountain research has a much shorter history and mountain science (or montology) has not really been considered as an independent subject or mountain research is not taken as an integrated part till now. IMHE (Institute of Mountain Hazards and Environment, Chinese Academy of Sciences) as a national-level research institute, specially focusing on mountain science research, derived its name after decades' institutional evolution and finally took this name in 2002, which indicated the gradual recognition of the importance of mountain research in China.

Here I reviewed the key mountain research topics conducted in China in recent years, listed the key mountain research institutions and laboratories, important mountain research projects funded by the government in the recent decades, major international cooperation projects in mountain science research between China and other countries or international organizations, especially under the Chinese government's Belts and Roads initiative, introduced the mountain societies or organizations in China or sponsored or participated in by China, and the influential publications and science journals of mountain science in China.

As the executive editor in chief, I'll make a brief introduction on the science journal-Journal of Mountain Science, including the development history, editorial board, major topics, OA policy, manuscript preparation and



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3354-Description of Mountains and Mountainous Areas Mountains and Mountainous Areas in Turkey

Neslihan Dal¹, Barbaros Gönençgil²

Mehmet Akif Ersoy Üniversitesi Geography Burdur -Turkey¹ The International Geographical Union, Turkish Geographical Society Geography -Turkey²

The complexity of the answers given to the questions of what mountain is and where mountainous areas are located is mainly derived from the existence of inconsistent and inaccurate responses in defining these concepts. The reason is that mountains have no defined universal criteria. Defining mountain and mountainous areas can be considered as the first stage of understanding natural and anthropic relations in these regions. Mountains and mountainous areas create geographical isolation zones. This feature offers different environmental conditions in terms of morphology and climatology. For this reason, the criteria to be used for the definition of mountains should be determined according to the morphological characteristics of the field. It is seen in a small number of studies that elevation and slope characteristics are used as a common topographic criterion for the identification of mountains and mountainous areas. In this study, definitional framework of mountains in Turkey and the areas which they occupy have been examined by using DEM with the application of UNEP-WCMC mountain classification criteria. In order to reveal the differences between geographical formations, it is necessary to identify features of the topographical structure and generate particular parameters accordingly. When considering the morphological structure of Turkey, the presence of plateaus and lowlands with high elevation ratios draw attention. This creates some difficulties in defining and distinguishing mountainous areas from these areas. In this respect, works will be made on different criteria values for Turkey as the continuation of this study. According to this study, the area covered by the mountains in Turkey is 76.6%.

3498-Caucasus mountain agricultural terraces

Idris Idrisov¹, Natalia Ryabogina², Aleksandr Borisov³

Dagestan Scientific Centre RAS Institute of Geology Makhachkala-Russia¹ Tyumen Scientific Center of the SB RAS Department of Archaeological and Environmental Reconstructions nataly.ryabogina@gmail.com-Russia² Pushchino Scientific Center for Biological Research RAS Institute of Physicochemical and Biological Problems of Soil Science a.v.borisovv@gmail.com -Russia³

The Caucasus as a mountainous region has a thousand-year agricultural history, closely connected with other South-West Asia regions. Agriculture development in the mountains determined a specific lifestyle of residents, they needed to find a balance for simultaneously use the resources and reduce the dangers associated with farming in the highlands. The creation of agricultural terraces in the Caucasus was able to solve problems of adaptation to mountain conditions and has become a unique land-use option. Residents of other mountainous regions of the Earth also adopted similar practices.

Our research has shown that Caucasus terraces cover several thousand square kilometres and this phenomenon is presented in the most pronounced form in the Eastern Caucasus (Dagestan). Terraces here form vast complexes, hundreds of steps are closely connected with each other and completely cover the slopes. By terracing, people fundamentally changed most of the components and process in mountain landscapes. It led to a significant reduction in erosion, an increase in moisture reserves in the soil, destruction of huge volumes of rocks, transformation of vegetation and the creation of new anthropogenic soils of terraces. People have always used natural features and local capabilities, and transformed landscapes only to the required level. Ancient farmers applied organic fertilizers, and use specific agricultural practices for maintaining high soil fertility on the terraces. The terraces have considerable stability in landscapes and have existed for thousands of years, even after the termination of their use as arable land. Terraces can be repeatedly involved in new environmental or land-use models, with minimal effort. There are similar examples both in historical data and in modern Dagestan, wherein less than 100 years terraces have been used in several types of exploitation: cereal cultivation, gardening, pasture, vegetable growing.

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3683-A holistic approach to high latitude and high altitude regions of the world

Yuri Golubchikov¹

Moscow State University Geographical Moscow-Russia¹

Substantiates the new scientific direction - periglacial geography as a science of contemporary periglacial environments. A huge number of fundamental publications and issues have devoted to global reviews of glacial regions of the globe. However, the adjacent periglacial extraglacial woodless space fell out of regarding reviews in a complex planetary context. The snowline and cold limits of forest represent limits of the periglacial environment. Essentially, it is a single periglaciosphere extending from high-latitudinal planes and low mountains to high mountains of low latitudes. The life beyond the cold limits of forest loses its vertical stratification; however, it acquires instead the exceptional horizontal variability and level of contrast of micro-environments created by symmetric forms of the cryogenic micro-relief. Nowhere in the world are there such contrasts of habitats and ecological niches as in subtropical and tropical mountains. If water emerges in a hot desert, life develops the same multi-tier formations in the oases as in the corresponding forests. In periglacial environments, life cannot achieve such abundance and diversity, even where heat is no longer a limiting factor, as near the hot springs of Iceland or Chukotka. Specifically there the convergence and interaction of such contrastive layers as the biosphere and the glaciosphere occur. These young landscapes are saturated with many relict and archaic elements not stable under modern conditions. Among them are surviving from ancient times and adapting to extreme conditions ethnoses. Now we can see how the most archaic models of habitation patterns and the ancient population are preserved in difficult-to-access mountains and the Arctic. In these most severe environments where humans can still function, tourism is becoming the main factor of human presence in the perioglacioshere, changing the paradigm of development from the categories of overcoming and risk to adaptation and beauty.



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VIRTUAL

T.1. Anthropocene Reconnecting with the geohistorical roots of environmental hazards forest fires floods meteorological events and climate related issues

1453-Human driven landscape changes and environmental hazards in Ukraine

Leonid Rudenko ¹, *Olena Dronova* ², Oleksandr Golubtsov ³

Institute of Geography of National Academy of Science Cartography Department -Ukraine ¹ *Institute of Geography of National Academy of Science Department of Sustainable Development and Environmental Assessment Kyiv-Ukraine* ² *Institute of Geography of National Academy of Science Department of Landscape Studies -Ukraine* ³

The growing rate of resource consumption in recent years caused a significant deterioration in the nature components properties and a decrease in the biota species composition, which leads to irreversible changes in the biosphere. The deregulation and liberalization of the economy allows business to get short-term economic benefits, often accompanied by neglect of social and environmental values. After the Soviet Union collapse such situation is typical for Ukraine, where the economic priorities of various political elites still hinder the adoption of a national sustainable development strategy. Ignoring the ecological aspects of development led to the new environmental hazards in the country. This research is based methodologically on the assesment of land use and land cover dynamics in the forest-steppe zone of Ukraine (more than 30% of the country's area) using the space images analysis. The structure of changes in the landscapes diversity and their human-driven transformations are monitored for 1992-2018. The interdependence between socio-economic drivers and land use and land cover changes is tracked with help of interactive maps and graphs. This allows authors to identify the patterns of human-driven impacts and their consequences in different regions of Ukraine. For the central regions, there is a decrease in agricultural land, but simultaneously, an increase in irreversible soil degradation. The western regions are characterized by uncontrolled deforestation and loss of biological and landscape diversity, changes in hydrological regimes which contributes to significant environmental hazards including floods. The special attention is paid to the assessment of landscape changes and environmental risks caused by the military conflict in eastern Ukraine.

1456-Socio spatial factors of historical fire regimes the case study of Iruelas valley (Spain)

Cristina Montiel Molina ¹, María Teresa Palacios Estremera ¹

Complutense University of Madrid Geography Madrid-Spain ¹

Fire has historically been a common tool for land management and likewise wildfires have been a major natural hazard in the inner montain regions of the Iberian Peninsula. On the other hand, fire propagate throughout the landscape, having evolved together both landscape and fire. Hence, the historical interaction of fire and its contextual factors is a key issue for understanding the current conditions of wildfire risk. Our hypothesis is that any disruption within the socio-spatial system trigger an abrupt shift in fire regime.

The Iruelas valley is one of the main fire-prone areas in the Iberian Central Mountain System. We have applied methods of historical geography and systemic analysis for reconstructing and connecting fire regime change and landscape dynamics at the long-term scale in this local case study. Data were collected from an intense search of administrative, judicial, police and press documents, as well as historical cartography in several archival sources. Besides, statistical records and geospatial data were used for completing the recent fire regime variation.

The main results obtained are an accurate geo-referenced dataset of 479 historical fire records since the 16th century and a set of land use/ land cover maps for three time points (1890s-1930s, 1956-1957, and the 2000s). We have proved that the main influencing factors of fire regime variation have been the land management practices, the land ownership and administrative structure, and the societal organization and lifestyles. Furthermore, we have identified two tipping-points in fire history, namely pyrotransitions, that are linked to the landscape change in the late 1800s and through the 1980s. Our main conclusions relate to the non-linear evolution of fire regime in Iruelas valley and the importance of the local scale when assessing the interaction of landscape dynamics and fire regime variation.



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1945-Climatic and anthropogenic factors in the development of natural and anthropogenic processes in coastal landscapes of the northeastern Caspian Sea and the Aral Sea

Aida Tabelinova¹

*"QazaqGeography" Republican Public Association, Institute of Geography, Kazakhstan branch of Moscow State University named after M.V.Lomonosov Research and Expedition, Ecology and nature management Nur-Sultan-Kazakhstan*¹

Description. Based on the example of the northeastern Caspian Sea and the Aral Sea, synchronous and asynchronous fluctuations in sea levels were analyzed in connection with the following factors and indicators: climatic fluctuations, the value of the North Atlantic Oscillation (NAO) index, morphotectonic features of the region and the influence of economic activity. The author's methodology of geoecological zoning in coastal regions to optimize nature management was described.

Hypothesis. The dynamic change of vegetation cover, salinization, and hydromorphization of the land cover in coastal landscapes correlates with seasonal, annual and decadal changes in the sea level and can be used as indicators of global climate fluctuations and correlation of the NAO index.

Materials and methods. The classification of natural and anthropogenic processes is carried out on the basis of field studies and remote methods for spatial distribution and the intensity of their development using the identified factors and a set of criteria for their determination in the reference areas (1: 500 000) and in the entire territory of the north-eastern Caspian region (1:1 500 000).

Results. Increased hydromorphization of soil and vegetation cover and coastal abrasion over the period from 1978 to 1993 identified a sharp rise in the sea level due to increased cyclonic activity, while increased salinization, degradation of vegetation cover and deflation after 1993 are associated with a weakening of cyclonic activity and a subsequent decrease in the Caspian Sea level.

Conclusions. Geoecological zoning carried out on the basis of the altitude-landscape layering analysis and the combination of the same type anthropogenic modifications of landscapes with prevailing natural and anthropogenic processes is the basis for environmental-landscape assessment and optimization of nature management in the region.

2668-HISTORICAL LANDSCAPE BASED FIRE SCENARIOS IN VICTORIA STATE AUSTRALIA

Cristina Montiel-Molina¹, Ruth Beilin²

*Complutense University of Madrid Department of Geography Melbourne-Spain*¹ *The University of Melbourne School of Ecosystem and Forest Sciences -Australia*²

Wildfires occur in an intrinsic relationship with the landscape, and both landscape and fire regime have historically evolved together. Australia has been a fire adapted continent for milenia. In fact, fire is part of the landscape for Aboriginal communities. However, wildfire risk has steadily grown since the late 19th century. It is well documented now, that human-driven landscape changes of European origin have brought about a fire regime shift and an increasing vulnerability of people and environment. The originality of our contribution lies on identifying the landscape character units related to the various stages of those historical processes and connected to different fire spread patterns.

This research is founded on the cognitive theory from a systemic approach. We discuss the geohistorical roots of fire hazard with methods of qualitative analysis of landscapes, document and narrative analysis, and techniques of GIS. The aim is to assess how policy and socio-economic dynamics have triggered a landscape change and influenced a fire regime shift since the late 19th century in the case study of Victoria State.

As a result, we present the driving forces of landscape dynamics and fire regime interactions, namely (i) the land management changes related to economy efficiency and according to physical constraints, (ii) the socio-spatial consequences of land-use policies, (iii) and the demographic and settlement model shift. We also discuss the limitations of the geohistorical basis of the current bushfire risk landscape units. We conclude that the land-use and land management practices, together with the fire exclusion policies introduced by the European settlers, have destabilized the Australian social-ecological systems leading to new fire regimes characterized by catastrophic megafires.



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2815-SUESCA BETWEEN TERRITORIAL TRANSFORMATIONS AND ECOLOGICAL RESTORATION

Nohra Leon Rodriguez¹

*Universidad Nacional de Colombia Geography Bogotá-Colombia*¹

This interdisciplinary research, organized by the National University of Colombia, was developed in the municipality of Suesca, in particular the middle basin of the Bogotá river. The theoretical approach of the socio-ecosystems was assumed by this project, as a potential model for the management and management of the interactions between natural systems and human beings making them part of these systems. Thus, the integration of ecological and social processes are configured on the basis of the understanding of socio-ecosystem services which must be integrated to guarantee the management, governance and sustainability of these territories.

In this context, the deep territorial transformations that the middle Bogotá river basin has undergone, particularly in the municipality of Suesca during the last 50 years, derived from the forms of appropriation and use of the resources that the different societies present in the territory has led to territorial conflicts, imbalances in ecosystems, the loss of biodiversity, natural resources and sustainability of these geographical spaces. These processes were identified through the field work that was led by the group of researchers from the National University and the different social actors; In the same way, the workshops with the community and the application of qualitative methods, together with secondary information.

Once the current state of these ecosystems, of their benefits, is recognized, the need to establish real comprehensive strategies focused on the search for territorial sustainability is demonstrated, through governance processes supported by ecological restoration. Finally, it is concluded that the socio-ecosystem approach is relevant for this type of space studies; secondly, that the pedagogical strategy defined from the interdisciplinary vision of the academy with the participation of the different social actors, becomes a support point for the resolution of territorial conflicts in complex systems such as those that characterize the area of this research



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VIRTUAL

T.1. Anthropocene Thinking Geographies from the South

1070-Expanding geo information theories the geo individuals and the geo socials

Pablo Cabrera-Barona¹

*FLACSO Public Affairs Quito-Ecuador*¹

Goodchild, Yuan and Cova (2007) proposed the concepts of geo-atoms, geo-objects and geo-dipoles in order to represent the complexity of geo-information. I present the concept of the geo-individual, a human-based equivalent of the geo-atom. The geo-individual can be expressed as follows: $\langle v, A, a(v) \rangle$, where "v" is a vector that describes the position of the individual in the space-time dimension, "A" represents the life-ability of the individual, and "a(v)" represents her/his life-ability at a specific location in the space-time dimension. The interactions of neighbouring geo-individuals construct a geo-social. A set of geo-socials can represent a phenomenon associated with specific organization levels and temporal and spatial scales. The organization levels could be expressed as different senses of places. This new approach contributes to the general theory of geographic representation and facilitate a conceptual framework to incorporate the sense of place in geo-spatial analyses. Thus, the concepts of geo-socials and geo-atoms could support the future operationalization of GIS for non-traditional spatialities such as the multiple meanings that a single space can have. I believe that we need to re-think our views and concepts of the real, perceived and virtual worlds, and explore different possibilities of connecting these worlds. Potential applications of geo-socials and geo-atoms could be associated with advances of cognitive sciences, economics and machine learning to better understand and represent human behavior.

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1280-CAPITALISM IN BOLIVIA IN THE ANTHROPOCENE

Vladimir Diaz-Cuellar¹

*Carleton University Geography and Environmental Studies Ottawa-Canada*¹

Background

The study of a national case can shed light onto the global discussions about the relationship between the Anthropocene and the economic processes that created it in the last centuries. One particular approach to thinking such connection is to look at the historical transformations that took place in the patterns of production and consumption of goods (Agricultural and Industrial revolutions), their consequent impact on the social relationships across space (urbanization and the revolution transportation and communication), and how such patterns altered the long-established metabolic articulation between societies and the natural world. By looking at the specific case of Bolivia, I argue, it is possible to identify relatively similar historical patterns shaping the economic space and the relationship to nature: reduction of fallow to a minimum, dependency of fertilizers, mechanization of agriculture and manufacturing, dependency of fossil fuels as source of energy, and urbanization, among others, impacting the forest/savannah covered-land, biodiversity and transferring carbon to the atmosphere.

Methods

The research uses primarily quantitative methods. Both the economic and environmental indicators are extracted from national statistics. However, in the future it will include qualitative variables.

Results and Conclusions

The preliminary results show a non-mechanical but substantial correlation between the global economic and environmental transformations at the global scale with those taking place at the national scale -Bolivia-. The economic transformations in the Andes and Amazonian regions of the country present similar -not identical- trajectories to those seen in different latitudes of the globe and initially in Europe. In Bolivia too, modern agriculture, industry and transportation are intimately connected to the decrease in forest surface, biodiversity and the increased emission of CO₂, although with some particular characteristics. Thus, this research also helps us thinking the different scales that link the Anthropocene to the global economic transformation by looking at them from the South.



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2063-ANTHROPOCENE CONCEPTUALIZATION MODELING AND STRATIFICATION OF THE AGES OF POLLUTION CAUSED BY HUMANS

Marc-Louis ROPIVIA¹, Jean Bernard MOMBO¹, Jean Pamphile KOUMBA¹

Université Omar Bongo Geography LIBREVILLE-Gabon¹

The geochronological characterization of the Anthropocene is not yet clearly established and continues to fuel a passionate debate within the international scientific community, in particular on the question of the sequencing of this supposedly geological period by classic markers of Earth sciences. . The interest of our contribution is to propose a new approach to conceptualization and chronostratigraphic modeling from an original geographic approach taking into account the different forms of pollution generated by humanity as new stratigraphic markers. The impacts of climate change and the abusive exploitation of natural resources, in particular forestry, mining and petroleum in intertropical Africa have started to produce "ecocide" effects on biodiversity and question, through the accentuation of aridity and desertification and their geopolitical consequences, political stability and the development model of African states. Indeed, the impacts caused by the Anthropocene raise two major concerns. First, a geopolitical concern due to the effects of global warming on agricultural production and the livability of certain territories; which could be a factor of destabilization of African States through mass immigration. Then, an economic concern which questions the development model of African countries, based on the predation of natural resources, is called into question here and poses the problematic of the advent of the advent of an alternative model that these States are struggling to find lack of technological innovations. How to reconcile the legitimate aspirations of African people for development in a context of demographic boom and urban explosion with a sanctuarization of natural resources ? Can the examples of economic development carried by emerging countries like Brazil or Malaysia serve as an economic model for African states in terms of their impact on the environment ?



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VIRTUAL

T.2. Climate Change Climate Induced Migration Global Scope Regional Impacts And National Policy Frameworks

1327-Migration as one of a livelihood strategies in the drought affected rural areas in Madhya Pradesh and Rajasthan An application of life history analysis

Badsha Sarkar¹

*TERI School of Advanced Studies Department of Policy Studies New Delhi-India*¹

Studies confirm that while long-term migration is gradually getting restricted to socio-economically well off sections, but the seasonal migration is becoming more common among the rural poor. On the other hand, by 2050 AD, 200 million people is supposed to be displaced by climate change in the world and most of that phenomena will take place in the developing countries like India. Despite the implementation of a host of governmental policies to check seasonal migration, this number is on rise. Therefore, the focus of the literature investigating the causes of migration in India should be reoriented from identification of factors to the development of effective conceptual frameworks that will operationalise the multi-criteria decision making process of seasonal migration and help making effective policies.

The volume of literature on the nexus between drought and migration is very small in India. Whatever conceptual frameworks have been tested or developed, if there is any, are very simple and are based on a linear relation between drought and migration intervened by some other socio-economic constructs. This present study tries to address this research gap by testing the Sustainable Livelihood Framework to deconstruct the process that leads to migration at the drought affected areas. This paper is part of a broader field based PhD research on migration phenomena where migration is considered as one of a livelihood strategies at household level. The two districts of Shahdol in Madhya Pradesh and Dungarpur in Rajasthan are selected because based on their high frequency of drought occurrence and presence of huge number of people with high vulnerability. Both easily accessible and nearby villages are taken into consideration. A sample of migrants, with a well representation from different socio-economic-demographic groups, are selected and their life histories are recorded analysed in the light of the framework.

1498-Climate Change Related Relocation in Fiji – From Policy to Practice

Andreas Neef¹

*The University of Auckland Development Studies, School of Social Sciences Auckland-New Zealand*¹

Background. Climate change is increasingly recognised as a key factor in decisions to migrate, with more than 24 million people displaced annually between 2008 and 2018 due to climate-related hazards, within and across borders, according to the Internal Displacement Monitoring Centre (2019). Planned relocation in response to climate change has become a hotly debated issue in small island countries in the South Pacific that are particularly prone to both slow-onset and sudden climate-related hazards. In Fiji, as many as 45 communities are expected to be relocated in response to various climatic hazards over the next 5-10 years.

Material and methods. This paper provides an analysis of rights-based guidelines on planned relocation as issued by the United Nations Refugee Agency as well as Fiji's planned relocation guidelines to explore how relocation has been increasingly framed as a 'voluntary' form of climate change adaptation in international and national policy spaces. Through a comparison of these global and national 'best practice' guidelines with implementation realities in Fiji, this research examines the ways in which policy solutions transform as they travel across socially and culturally diverse spaces.

Results. The findings from this study highlight the challenges of translating 'best practice' across policy space and the need for more value-inclusive approaches towards understanding migration in the context of climate change. The results scrutinise the notion of 'voluntary relocation' in the face of increasingly frequent climatic hazards, due to (1) the differences across and within communities in conceptualising various types of risk, (2) the potentially adverse impact of planned relocation on people's livelihood opportunities and attachment to place, and (3) the top-down nature of relocation practice.

Conclusion. The findings call for opening space for new ways of framing the 'problem' of climate-induced migration and its 'solution'.



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2072-RESHAPING TIES TO LAND A SYSTEMATIC REVIEW OF THE PSYCHOSOCIAL AND CULTURAL IMPACTS OF PACIFIC CLIMATE CHANGE RELATED MOBILITY

Olivia Yates¹, Manuela Sam¹

*The University of Auckland Psychology Auckland-New Zealand*¹

Background

Global inaction on climate change is leading Pacific island nations towards a reality in which climate change forces people from their ancestral lands. Yet, legal and academic discussions of Pacific climate change-related mobility sideline Pacific understandings of well-being, which consider the cultural, physical, spiritual, and psychological spheres as inseparable. This systematic review synthesizes the literature to date on the psychosocial and cultural impacts of mobility in the context of climate change in the Pacific.

Materials and Methods

Studies of cross-border or internal mobility from 1979-2019 were identified from EBSCO, Ovid, Science Direct, JSTOR, SCOPUS, Proquest, Web of Science and Google Scholar, and citations. Empirical studies mentioning climate change as an explanation for mobility, psychosocial impacts and Pacific peoples were included. Quality assessment was undertaken following the Critical Appraisal Skill Programme protocol and a thematic synthesis was conducted to identify descriptive and analytical themes. 36 studies fulfilled the inclusion criteria, covering 28 different cases of climate change-related mobility.

Results

Two main themes were identified: social factors that influence acculturation, and relationship to land. For cross-border mobility, there were five sub-themes: resettlement expectations, cultural adjustments, community support, ties to place/land; land and loss. For internal mobility, there were six sub-themes: community structure, affective response to relocation, governance of relocation, community support, ties to place/land; ancestral connection.

Conclusions

Climate change-related mobility shifts communities' relationships with their homelands, potentially disrupting community structure, culture, identity, and livelihoods. These disruptions are experienced as losses, but are resisted by following traditional governance structures and by maintaining cultural and spiritual ties to the land. Findings additionally reveal a lack of Pasifika-led research, of importance given the differences between Pacific and Western concepts of land and belonging.



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2917-CLIMATE CHANGE MIGRATION AND ADAPTATION IN DELTAS KEY FINDINGS FROM THE DELTAS VULNERABILITY & CLIMATE CHANGE MIGRATION AND ADAPTATION (DECCMA)

Craig Hutton¹, Katherine Vincent², Attila Lazar¹, Robert Nicholls³, Riccardo Safrá De Campos⁴, Munsur Rahman⁵, Neil Adger⁴, Sugata Hazra⁶, Samuel Codjoe⁷

University of Southampton School of Geography and environmental Science Southampton-United Kingdom¹ Kulima Kulima -South Africa² University of East Anglia Tyndall Centre -United Kingdom³ University of Exeter Geography -United Kingdom⁴ Bangladesh University of Engineering & Technology IWFM -Bangladesh⁵ Jadavpur University School of Oceanography -India⁶ University of Ghana RIPS -Ghana⁷

Deltas are home to 500 million people worldwide and known as a climate change “hotspots” – a place where high exposure to climate stresses coincides with high levels of vulnerability. DECCMA has been undertaking research on climate and environmental change, migration and adaptation in three delta systems: the transboundary Ganges-Brahmaputra-Meghna mega delta (comprising the Indian Bengal delta, as well as the bulk in Bangladesh), the Mahanadi delta in India, and the Volta in Ghana. In each delta the project i) Analysed how environmental shocks and change affects economic output, employment and linkages, using macro-economic models and scenarios, ii) Investigated migration behaviour and adaptation strategies across the deltas through surveys of women and men in more than 5000 households in areas from low to high exposure to natural hazards, iii) Investigated the multiple dimensions of well-being and the lived experience of migrants in cities of the deltas through surveys of more than 2500 migrants in seven destination cities and towns, iv) Compiled inventories of documented adaptation, and v) provided reviews of governance and policy

This approach is achieved by the development of a conceptual model to investigate plausible future household migration and adaptation patterns based upon combined bio-physical and socio-economic models in a quantitative framework to investigate the causal relationships resulting in migration and/or adaptation. This approach links across scales, from the high level (national and regional interventions and economy) down to the household level and individual decisions. It uses the (empirical and simulated) knowledge generated within DECCMA. Our hybrid model framework is designed to be computationally efficient utilising both process-based and statistical methods. The outputs of the integrative model are designed to inform the consequences of different adaptation policy directions on household behaviour.



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T.2.Climate Change Climate Change and Land Use Dynamics

1124-RESPONSE OF SOUTHERN AFRICAN VEGETATION TO CLIMATE CHANGE AT 1.5 AND 2.0 DEGREES GLOBAL WARMING ABOVE THE PRE INDUSTRIAL LEVEL

Shakirudeen Lawal¹, Christopher Lennard¹, Bruce Hewitson¹

Climate System Analysis Group-University of Cape Town Department of Environmental and Geographical Science Cape Town-South Africa¹

Climate change has severely impacted southern African vegetation over the last decades. Recent studies have shown that limiting the global warming level to well below 2oC above pre-industrial level may reduce the catastrophic effects of anthropogenic climate change. However, there is limited knowledge on the response of vegetation to climate change at different global warming levels. This study examines how southern African vegetation may respond to climate change at 1.5oC and 2oC warming. An ensemble of climate projections from the CESM model were analyzed to evaluate the potential changes in timing and magnitude of vegetation index and parameters across southern African biomes for a global warming of 1.5oC and 2oC under the RCP8.5 scenario. The results show that vegetation productivity is projected to likely increase over some parts of Madagascar and South Africa. The results further show that there is a similarity in the response of vegetation parameters at 1.5oC and 2oC warming. The difference in projected changes of the above ground net primary production, soil carbon and surface run-off is negligible between 1.5oC and 2oC warming. While the model ensemble members show a range in the magnitude of changes, they all project an increase in below ground net primary production, soil carbon and photosynthesis over the southern African biomes while projecting a decline in canopy transpiration over all the biomes. Furthermore, the CESM projects an increase in drought intensity as temperature increases over the southern African biomes. The projected changes in the drought intensity appears more pronounced with the Standardized Precipitation Evapotranspiration Index (SPEI) than with the Standardized Precipitation Index (SPI). The results of the study are important in informing policy makers for climate change mitigation and adaptation efforts in southern Africa.

1462-OLS modelling of urban heat island intensity based on landscape composition and configuration A comparative study among three megacities along the Yangtze River

Hao Hou¹, Luoyang Wang²

Hangzhou Norma University Institute of Remote Sensing and Earth Sciences Hangzhou-China¹ Hangzhou Norma University Graduate School of Science 2017210214023@stu.hznu.edu.cn-China²

The urban heat island (UHI) phenomenon, arising from rapid urbanization, has attracted both social and academic attention because of its strong effects on citizens' daily life. This study investigated the relationship between landscape composition and configuration, population and land surface temperature (LST) in three megacities along the Yangtze River, aiming at providing useful information for urban planning to reduce the effect of UHI. Landsat data were used to calculate LST and derive indices of landscape composition and configuration. A correlation analysis and ordinary least squares (OLS) model were used to discover the relationship between these indices. The results showed that the impact of landscape composition on mean LST was greater than that of landscape configuration. The effects of landscape composition, especially impervious surfaces (IS), on the LST increased obviously from 2000 to 2019. The correlation coefficients of the density of IS increased from 0.608 to 0.839 in Nanjing, from 0.368 to 0.777 in Wuhan, and from 0.416 to 0.874 in Chongqing, respectively. On contrast, the effects of landscape configuration on LST differs in different cities. The OLS results revealed that in Nanjing, the mean area and mean shape index of non-forest green space play a significant role. In Wuhan, from 2000 to 2019, the influence of the largest patch index of water on LST was weakened. Meanwhile, the mean area and mean shape index of non-forest green space become more important in cooling. In Chongqing, small and scattered patches of forest with irregular shapes showed the highest potential in cooling effect. The findings indicated that reorganizing landscape configuration was applicable in relieving UHI, but the ideal configuration needed to be analyzed city by city.



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T.2. Climate Change Sustainability Processes In The Low Carbon Economy. Territories And Renewable Energies

1216-Adaptation to sustainable energy transition in Spain good and bad practices for siting renewable energy projects

Marina Frolova¹, Javier Liñan-Chacon¹

University of Granada Institute for Regional development Granada-Spain¹

Background

Spain has experienced a massive development of renewable energy (RE) projects, which peaked in 2000-2010, dominated by large-scale wind and solar systems. As RE projects were spreading and shaping the present-day Spanish landscape, different problems and malpractices related with their siting have become an important factor in the perception of renewables in Spain.

Objective

The aim of this paper is to identify criteria by which RE projects development in Spain can be considered as bad or good practices and to explore the lessons that can be learned from their implementation in order to achieve a transition to more sustainable energy systems.

Material and methods

Our study is based, first, on an analysis of energy policy documents for the whole of Spain, and regional data on the institutional contexts of development of RE projects. Secondly, through textual analyses of a range of sources at regional and local scale we studied about 30 RE projects developed in Spain, their social-spatial contexts, and identified key actors, good practices or social conflicts related to each project. The paper was elaborated in the scope of the project "Adaptation to sustainable energy transition in Europe: Environmental, socio-economic and cultural aspects (ADAPTAS)" (Ministry of Economy, Industry and Competitiveness and State Research Agency of Spain, and European Regional Development Fund, CSO2017-86975-R).

Results

Through qualitative analysis we identified criteria by which the RE projects can be considered as good or bad practices and established their typology.

Conclusions

We conclude with the presentation of the main outcomes of these practices, which can be learnt in order to promote sustainable RE planning in Spain.



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VIRTUAL

1408-Soundscapes of wind turbines A socio ecological study of the impacts of noise

Naama Teschner¹

*Ben-Gurion University of the Negev Geography Beer-Sheva-Jamaica*¹

Soundscapes of wind turbines: A socio-ecological study of the impacts of noise

The increasing global demand for renewable energy has made the planning of wind-energy infrastructure very popular world-wide. Yet, while there is a growing realization that wind turbines also entail environmental and landscape concerns, some considerations still not fully incorporated in planning wind farms' technological features or site locations. One of the most important knowledge gaps we currently have regarding wind-turbines' effects on biodiversity is the impact of the noise generated by the turbines on wildlife distribution, behavior, and physiology. Noise pollution from infrastructure is an intense, widespread pollutant, which affects countless species worldwide by degrading the quality of habitats and deterring many species from utilizing these habitats. We aim to address the emerging global problem of noise pollution generated by wind-turbines using a socio-ecological approach that will define, frame and evaluate the soundscape of wind turbines (taking into account also ongoing debates on noise restrictions and the impact on human health). The study will ultimately result in "best practice" recommendations to be implemented by policy-makers and spatial planners.

One of the most important knowledge gaps we currently have regarding wind-turbines' effects on biodiversity is the impact of the noise generated by the turbines on wildlife distribution, behavior, and physiology. Noise pollution from infrastructure is an intense, widespread pollutant, which affects countless species worldwide by degrading the quality of habitats and deterring many species from utilizing these habitats. We aim to address the emerging global problem of noise pollution generated by wind-turbines using a socio-ecological approach that will define, frame and evaluate the soundscape of wind turbines (taking into account

1875-Utilization of invasive alien plants to improve local renewable energy landscape an example of public private community mechanisms

Csaba Vaszkó¹

*Greenstreams; Szent István University Doctoral School of Environmental Sciences Gyomaendrőd-Hungary*¹

Is it possible to improve floodplain habitat quality and ecological connectivity through local bioenergy production? How can public-private-community partnerships be formulated in a marginal rural community to promote renewable energy as driver of local development? What does the right governance structure look like and how can socio-economic and environmental changes be evaluated? A marginal rural community in Northern-Hungary successfully implemented a nature and business type mechanism to generate local bioenergy. A local municipality next to the beautiful river Tisza, together with local community members, a multinational energy company and other stakeholders built a partnership to support sustainable bioenergy generation, enhance flood security, and prevent floodplain habitat destruction caused by invasive alien plants. The community is a peripheral village with uncertain income sources, seriously hit by the increasing fossil fuel and firewood prices. As a result of climate change and mismanagement of land and water, invasive alien plants have colonized the floodplain and caused habitat loss and fragmentation, increased land management costs and significantly reduced flood retention capacity in the Tisza floodplain. On the other hand, invasive plants have energy potential. As a solution, the community began to utilize invasive shrubs as energy source for heating local public buildings and transport to the energy company that needed sustainable biomass. A public-private-community driven market based mechanism was tested in a pilot project. The local municipality and other community members actively participated in the renewable energy generation and the governance of the new land and water management. Bioenergy generation has delivered measurable positive changes for the community, such as better floodplain habitat quality, increased flood retention capacity, invasive species reduction, substitution of natural gas, CO₂ emissions reduction, energy poverty reduction and local job creation. Bioenergy was proved to be a key driver for a small rural community.



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2645-COMPARATIVE STUDY OF THE VISUAL IMPACT OF SOLAR FARMS ON SOUTHERN SPAIN RURAL LANDSCAPES.

Ángeles Barral Muñoz¹, Alba Ruiz Díez², Juan José González López³

University of Huelva History, Geography and Anthropology Huelva-Spain¹ University of Seville Human Geography albruidie@alum.us.es-Spain² University of Sevilla Human Geography proyectos@territorial.es-Spain³

The world is in the midst of an energy transition towards the predominance of renewable energies as the most effective way to progressively reduce greenhouse emissions. In the Mediterranean countries the new facilities are colonising the territories previously devoted mainly to agriculture.

The enormous diversity and richness of Mediterranean landscapes derived from the long historical process of human management is well known. The indiscriminate proliferation of photovoltaic power plants which, due to the low height of their panels, are not usually associated with a serious visual impact, represent, however, a lasting transformation of the landscapes in which they are installed.

This communication seeks to draw attention to the impact that the construction of solar power plants, specifically photovoltaic, is currently having on Mediterranean landscapes. Two landscape units have been selected from the Autonomous Communities of Andalusia and Murcia in southern Spain. These are the Vega Sevillana of Guadalquivir (Seville) and the Campo of Cartagena (Murcia). Photovoltaic power plants built until 2018 in these units have been compiled from data from state and regional administrations.

The visual basins of all of them have been calculated using the Arcgis software and the FME Desktop spatial data conversion, transformation and integration program. The startling information for obtaining the Digital Surface Model (MDS) has been the LIDAR files of the National Air Orthophotography Plan (PNOA) and a maximum visibility limit of 10 km radius has been established.

The results obtained indicate that the landscape of the "Campo of Cartagena", of great extension (1182,80 km²), is already visually altered in 22.07%, while the landscape of the "Vega of Guadalquivir" (524,41 km²) has already been altered in 9,29% of its surface area.

2756-BUSINESS MODEL ON A LOCAL RURAL DEVELOPMENT BASIS IN SPANISH RENEWABLE ENERGY PLANTS

Marta Pallares-Blanch¹, Ramon García Marín², Carolina del Valle Ramos³

Collaborator Geography la Seu d'Urgell-Spain¹ Senior Lecturer/Associate Professor Geography -Spain² Assistant Lecturer Human Geography -Spain³

Despite the vast literature available on the social acceptance of specific renewable energy technologies, existing research lacks assessments regarding comprehensive transformations to local energy systems. Besides, most of the research done on public acceptance shows high levels of general public acceptance of renewable energy technologies but many reluctant attitudes at a local scale. Insufficient social acceptance is seen as the main barriers to expand the implementation of renewable plants and to foster a rapid and socially acceptable low carbon transition needed to accomplish EU renewable targets. However, some studies found that utilities have developed viable business models for large-scale utility-side renewable energy generation but these have been mainly based on potential community benefits rather than experienced benefits. Aimed to contribute to filling this gap our research seeks to identify patterns associated with positive externalities among different renewable energy technologies. By using in-depth semi-structured interviews we compare and analyse the business models that have emerged after or during the installation of renewable energy plants across distinct Spanish areas. One of the main points to look at, are the business models' trajectories. Thereby, the study cases also include different enterprises' size and have been settled in different moments of time.

Results show; first; that utilities lack adequate business models to commercialize small-scale customer-side renewable energy technologies. Second, better communication plans are required for widespread good practices. Third, to improve energy decision-making a better understanding of renewable energy perceptions and preferences is demanded before the installation begins. Finally, more research needs to be done in this line to let developers explore the market for a customer-side generation.



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3226-All Possible Worlds The Future of Energy Security and the Role of India

Niraj Kumar Das¹

Jawaharlal Nehru University New Delhi School of International Studies New Delhi-India¹

The proposed paper has the following objective- to understand the possible geopolitical dynamics arising as a result of India's interest, involvement and investment in Thorium as opposed to Uranium. Housing about a quarter of the world's reserves of the former, India plans to meet as much as 30 percent of its energy requirements through Thorium based reactors by 2050. India's Thorium Based reactors are under construction which uses three-stage reactor technology. Apart from this the Indian Molten Salt Breeder Reactor (MSBR) is liquid fuel injected reactor having no chances of a reactor meltdown and nullifying the possibilities of accidents like Chernobyl and Fukushima. The paper, keeping in mind these figures prognosticates large scale geopolitical upheavals, as switching from Uranium to Thorium would inevitably involve commitments to be made at both national as well as international scales. At the other end of the spectrum, Thorium based diplomacy offers India an opportunity to build networks of technology, information and reciprocity at both the regional and the international levels. This essay, by drawing reference to existing literatures, will examine the potentiality of the above to transform into reality. The research is consequential as it concerns itself with energy and in particular- nuclear energy, which in turn brings on board diverse questions, such as- what would the future energy scenario look like? What would the international agencies' role be? How would India with various states, align, organize and band around this issue? How would the landscape of nuclear energy be affected in this possible tug-of-war between Uranium and Thorium? Although this piece in no way claims to possess answers to all the above questions, it does hope to initiate a discussion- a dialogue between groups and parties that would be influential in determining the future of energy security.



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VIRTUAL

T.3. Earth and Disasters Earth and Disasters 1

1314-Extreme weather events in Ireland from 2009 2020

Kieran Hickey¹

University College Cork Geography Cork-Ireland¹

Since the exceptional wet summer of 2009 Ireland has experienced a severe weather event on average every eight to nine months. Many of these 14 events have caused fatalities and injuries, all have caused significant damage and destruction. Fatalities do not exceed 30 in total but injuries run into the thousand and damage was estimated at between 2.5 and 3 billion euro based on insurance costs, estimates of non-insured costs, loss of production and others.

The 14 events include wet spells, river, estuarine and coastal flooding, cold spells, heat waves and drought, exceptional stormy winters with exceptional individual mid-latitude storms within them, the extra-tropical remnants of Atlantic hurricanes (Table 1). Many of these events have produced new meteorological and water level records for Ireland and had calculated return intervals in excess of 500 years.

This paper will contextualise the current sequence of extreme weather events in the context of Ireland's climate and weather history. It will also assess the meteorological and climatological conditions underlying this sequence of extreme weather events and will provide an assessment of Ireland's future vulnerability to extreme weather in the context of likely climate change.

Table 1 List of major weather disaster which have affected Ireland since 2009

2009 Summer record wet
2009 November record wet with major river flooding
2009-2010 Winter cold spell
2010 November to December record cold spell
2011 October flooding
2013 March to July fodder crises due to cold spell
2013-2014 Winter record stormy season with estuarine and coastal flooding
2015-2016 Winter stormy and very wet with record major river flooding
2017 October ex-hurricane Ophelia record NE Atlantic category 3 hurricane
2018 January record flooding
2018 March blizzard named 'the beast from the east' and Storm Emma
2018 April record wet with major river flooding
2018 Summer heatwave and drought leading to a fodder crises
2019 October ex-hurricane Lorenzo record NE Atlantic category 5 hurricane



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1781-THE GREAT ENVIRONMENTAL DISASTER IN BRAZIL

BENEDITO TADEU DE OLIVEIRA¹, LEONARDO BARCI CASTRIOTA²

Fundação Oswaldo Cruz- Fiocruz Instituto René Rachou Belo Horizonte-Brazil¹ Universidade Federal de Minas Gerais - UFMG Escola de Arquitetura leocastriota@yahoo.com.br-²

Antecedents

Bento Rodrigues – a 17th century village in the municipality of Mariana, State of Minas Gerais, Brazil – had the organic morphology of settlements of the economic Gold Cycle. The architectural ensemble had 180 buildings besides two Catholic chapels - Mercês and São Bento – situated at the extremities of the “trunk way” (main street). The village was surrounded by an exuberant natural landscape and had 600 inhabitants who kept strong social bonds and a bucolic way of life.

This was until 5th November, 2015, when the Dam of Fundão belonging to the mining company Samarco Mineração S.A. burst and Bento Rodrigues was devastated by the mineral reject, resulting in profound changes in the landscape and its inhabitants' lives. The disaster destroyed the Doce River basin and its ecosystem, damaging dozens of human settlements. Images of the tragedy registering the worse socio-environmental disaster in Brazil were seen throughout the world and the ruined Bento Rodrigues became the representation of something that transcends the place.

Materials and methods

To avoid oblivion, it was decided to provide the Legal Protection of the remnants of Bento Rodrigues. Not only the physical dimension in its materiality was considered for the site's protection, but also the perspective of the “conservation-based-on-values” and the idea of “cultural significance” guided by the precepts of the Burra Charter. After the tragedy that was the central event in the protection process, Bento Rodrigues turns from “Environment of Memory” to “Place of Memory” and “Site of Sensitive Memory”.

Results and conclusions

With the Legal Protection of the place that keeps pain and suffering in its materiality, a Museum of the Territory was proposed so that it becomes a “Site of Conscience”, to stimulate reflection about the social questions posed by the event and to promote justice and human rights culture.

1821-Tsunami hazard and buildings risk assessment in the coastal area of Bandar Lampung Lampung Province Indonesia

Maryadi Budi Wiyono¹, Dandi Arianto Pelly¹, Muh Aris Marfai¹

Universitas Gadjah Mada Geography Faculty -Indonesia¹

The coastal area of Bandar Lampung in Lampung Province currently has a high potential of hazard due to the volcanic activities of Child of Krakatoa, fault, and fractures along the Sunda Strait. This study aimed to create a tsunami hazard zone model with scenarios of 10 m and 20m-high wave inundated and predict the number of buildings at risk in the coastal area of Bandar Lampung City based on the tsunami hazard wave height model. The parameters observed were the shoreline, river network, landuse, slope, and surface relief. This study used McSaveny and Ratenburry equation to simulate tsunamis with the heights of 10 and 20 m and to produce the tsunami hazard map and assessed the risk of buildings by semi-quantitative and overlay methods. The results showed that the area affected in the first scenario 10 meter wave height was 1110.60 hectares covering 13 villages in 5 districts with 19,369 buildings at risk. Whereas in the second scenario with a wave height of 20 meters, it produces inundation area of 1700.98 hectares with flooded villages totaling 14 villages, and potentially damaging 23,987 buildings. 6 out of 14 villages, namely Bumi Waras (2705 units), Kota Karang (2877 units), Pesawahan (2017 units), Kangkung (2274 units), Resolution (2145 units), and Sukaraja (1911 units), have the highest value of the number of buildings risky. Therefore, from the two-tsunami inundation scenarios, villages that have severe impacts in terms of inundation area are Pesawahan and Karang Cities, whereas in terms of the number of public buildings and facilities, the villages of Keteguhan, Kangkung, Sukaraja, Pidada, Panjang Utara and Panjang Selatan are the worst.



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T.3. Earth and Disasters Environmental and Socio economic Vulnerability and Resilience to Natural Disasters in Developing Countries

1184-Spatial and temporal dynamics of social ecological resilience in Nepal from 2000 2015

Zhihui Li¹, Xiangzheng Deng¹, Yue Zhang²

Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences Key Laboratory of Land Surface Pattern and Simulation Beijing-China¹ Capital Normal University College of Resource Environment and Tourism zhangyue_simlab@163.com-China²

Social-ecological resilience (SER) is the ability to recover from disasters from both social and ecological perspectives. Exploring the resilience of regions that have vulnerable ecosystem and are at high risk of natural disasters is of great significance to effective disaster risk reduction and sustainable development. Nepal has frequently experienced various natural disasters, such as earthquakes, mountain torrents and landslides in recent decades, which have tremendous impacts on the livelihood and socioeconomic development of local residents. This study seeks to generate more information about the spatial and temporal dynamics of SER in Nepal. Here, a SER assessment index was constructed at the village level for the entire country between 2000 and 2015 using the entropy weight method. The study further clarified the mechanisms of driving factors affecting SER based on the Obstacle Degree Model. The results showed that the SER in Nepal presented an uneven spatial distribution, where the northwest was generally lower than that in the east and south. The high-value areas were Kathmandu and areas surrounding Lake Rara in the northwest. The low-value areas were mainly located in mid-western Nepal near the Himalayas. Over the years, the maximum values of SER increased from 0.350 to 0.361, while the minimum reduced from -0.014 to -0.019. The main factors affecting the local SER were the proportion of built-up areas, cultivated land and surface water area. Therefore, it is important to promote agricultural modernization and rational land use planning, in order to reduce the pressure on land resources and enhance agricultural income.

1435-A comprehensive assessment of resilience and its spatial differentiation in countries along "One Belt and One Road"

Shuai Zhang¹, Fan Zhang², ChengXin Wang¹

Shandong Normal University College of Geography and Environment -China¹ Institute of Geographic Sciences and Natural Resources Research, CAS Research Lab of Environmental Management Beijing-China²

In September and October 2013, China's President Xi Jinping called for construction of the "Silk Road Economic Belt" and the "Twenty-First-Century Maritime Silk Road" successively during visits to Central and Southeast Asia; together, these two proposals are officially referred to as the Belt and Road Initiative (BRI), a strategy which has attracted much attention in China and the rest of the world. The One Belt and One Road initiative is an important way to realize a community of Shared future for mankind and is also can strengthen exchanges and cooperation among countries around the world. In this study, We select 24 indicators from the three dimensions of ecology, economy and society to construct the comprehensive resilience evaluation index system of countries along the One Belt And One Road line, using the entropy evaluation method and the multi-index comprehensive evaluation model, we evaluated the ecological, economic and social resilience of countries along the belt and road, together with analyzing the influencing factors. The results showed that: (1) From the perspective of comprehensive resilience levels, except for China, Singapore, Israel, Czech Republic, Estonia, Slovakia, and Slovenia were at the moderate resilience levels, other countries were at the low or lower resilience levels; (2) From the perspective of spatial differentiation of resilience, it shown a significant "aggregation" spatial differentiation characteristics; (3) From the perspective of ecological resilience, economic resilience and social resilience, the resilience level of each country is quite different, and the spatial differentiation was significantly. (4) The main factors that affecting the resilience were the state of natural resources, the level of economic development, economic innovation capacity, and infrastructure level. The results provided scientifically spatial guidance for implementing resilient planning, in order to realize sustainable development of One Belt and One Road areas.



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1517-Spatiotemporal patterns and interactive effects for urban land use efficiency industrial transformation and carbon emissions in the Yangtze River Economic Belt

Yin Dong¹, Gui Jin², Xiangzheng Deng³

*School of Public Administration China University of Geosciences, Wuhan Wuhan-China*¹ *College of Urban and Environmental Science Central China Normal University jing_simlab@163.com-China*² *Institute of Geographic Sciences and Natural Resources Research Chinese Academy of Sciences dengxz@igsnrr.ac.cn-China*³

Determining the spatiotemporal relationships between land use, industrial transformation, and carbon emissions is important to promote the coordinated development of a regional 'resources-economy-environment.' This study used the stochastic frontier analysis (SFA), nighttime light remote sensing inversion, and a panel vector autoregressive (PVAR) model to reveal the spatiotemporal pattern characteristics and dynamic interactions for the urban land use efficiency (ULUE), the industry transformation degree (ITD), and the carbon emission intensity (CEI) for 108 cities in the Yangtze River Economic Belt (YREB) from 2005–2017. The results suggest the following. (i) During the study period, the ULUE and ITD of the YREB increased year-by-year, showing the pattern characteristics of high in the eastern regions and low in the western regions and point-to-area, respectively. The CEI decreased by 50.20% cumulatively, and the low-value areas spread from the center of the urban agglomeration towards the periphery. The generalized moment estimation (GMM) shows that there is a significant dynamic dependence between the ULUE, ITD, and CEI. The first-period lag of the ITD has a significant negative impact on the CEI, while the first- and second-period lags have a positive driving effect on the ULUE. From the results of the impulse response function (IRF), the ULUE and ITD show a synergistic effect of interactive growth. The improvements to the ULUE and the transformation and upgrading the industrial structure drive down the CEI. The research framework and results will provides a scientific basis to promote urban green development, which breaks through the bottleneck of resource shortage, economic restructuring, and environmental climate constraints throughout China.

1578-VULNERABILITY ASSESSMENT OF FLOODING IN LOWER REACHES OF SHILAI RIVER OF WEST MIDNAPORE DISTRICT OF WEST BENGAL INDIA

PINKI MANDAL SAHOO¹, LAKSHMI SIVARAMAKRISHNAN²

*Mirik College, University of North Bengal DEPARTMENT OF GEOGRAPHY Kolkata-India*¹ *JADAVPUR UNIVERSITY DEPARTMENT OF GEOGRAPHY -India*²

Destructive natural events occur regularly across the world; among those floods are the most common and widespread of all natural disasters. India is among one of the top ranking countries, prone to flood in the world. Floods cause damage to houses, industries, public utilities and property resulting in huge economic losses, apart from loss of lives. Therefore for a recurrent flood event, vulnerability assessments are necessary. The present study area is the lower reaches of Shilai River in West Midnapore district of West Bengal, India. Shilai River is a tributary of Hooghly River with sedimented flow path and it is responsible for recurrent destructive flood in every year in Ghatal subdivision of West Midnapore District, which is double or triple cropped region. For this research, the hypotheses taken as flooding in the lower reaches of Shilai River is responsible for creating environmental, physical and socio-economic vulnerability in the study area. Under materials and methods, multiple databases, both primary and secondary data are being utilized and all are processed to develop as database and maps through SPSS, EXCEL, ARC GIS 10.3, ERDAS 9.5 etc. Both quantitative and qualitative analyses, in addition to the application of remote sensing and GIS techniques are the major tools to drive the present research work. In results, it is found that flooding in Shilai River is a regular and recurrent phenomenon which is neither possible to totally stop nor to completely eliminate flood damages. However, it is possible to minimize the flood vulnerability adopting various resilience strategies rationally. Since Indian Space Research Organisation (ISRO) under the Disaster Management Support (DMS) programme, carry out airborne and space borne data acquisition for the flood basins in the country, therefore the application of geoinformation science is apt for assessing the flood vulnerability and flood management in the study area.



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1602-Vulnerability of tribal communities to climate variability Lahaul and Spiti Himachal Pradesh India

Pankaj Kumar¹

*University of Delhi Department of Geography Delhi-India*¹

Tribal household vulnerability to climate change in mountainous regions are threatened by geological hazards, particularly in Greater Himalayan and Trans Himalayan of India. Lahaul and Spiti is a part of the cold deserts in western Himalaya. It is the largest district of Himachal Pradesh with an area of 13835 km², situated between 31° 44' 57" N and 32° 59' 57" N latitude and 76° 29' 46" E and 78° 41' 34" E longitude. This region, sparsely populated and relatively less developed, is one of the most fragile and vulnerable ecosystems in the world. Using tribal household data for this study are selected from three subdivisions Udaipur, Lahaul and Spiti respectively. This study is calculated by Tribal Livelihood Vulnerability Index (TLVI) by using those major factors exposure, sensitivity and adaptive capacity. The LVI uses a balanced weighted average approach, where each subcomponent contributes equally to the overall index even though each major component is comprised of a different number of sub-components. Indicators for schedule are selected from various literature review, observation and discussion with indigenous people. Data for TLVI was collected from 200 random proportionately selected household from 60 villages Lahaul and Spiti district of India through schedule survey of indigenous people. This study shows that tribal livelihood vulnerability between different socio-economic and ecological characteristics is far from equivalent because of uneven adaptivity, sensitivity and exposure of climate change. Among three subdivision Lahaul, Udaipur and Spiti, the vulnerability of social networks, water and Health of Lahaul sub districts are 0.390, 0.262, 0.545 and Udaipur sub-districts are 0.525, 0.514, 0.512, respectively. The values of TLVI are in between -1 (least vulnerable) to +1 (most vulnerable). TLVI will help in the making sustainable policies for livelihood security of mountain dwellers of developing countries.

1833-Do protected areas improve ecosystem services A case study of Hoh Xil Nature Reserve in Qinghai Tibetan Plateau

Jie Zeng¹, Xiaowei Yao², Tianyang Chen³

School of Geography and Information Engineering, China University of Geosciences Department of Geography Wuhan-China

¹ School of Public Administration, China University of Geosciences Department of Land Resource Management -China ² The University of North Carolina at Charlotte Department of Geography and Earth Science -United States ³

Although there is a consensus that protected areas (PAs) can provide various ecosystem services, it is unclear whether protected areas effectively contribute to the preservation and enhancement of ecosystem services. We conducted a case study of the Hoh Xil Nature Reserve (HXNR) in Qinghai-Tibetan Plateau, China, in order to examine the effectiveness of PA in the conservation of ecosystem services. First, the dynamics of land use/ land cover (LULC) were analyzed based on remotely sensed data sets. Then, the ecosystem service value (ESV) in the PA and non-PA were evaluated using a modified benefit transfer method that had been adjusted using normalized difference vegetation index (NDVI). Finally, hotspot analysis was implemented to reveal the ESV changes for the different districts of the PA. The results of the comparison experiment indicate that: (1) The ESV of the HXNR has considerably increased after it was designated as protected, which had been in decline in the previous stage. The ESVs in a near-by non-PA showed opposite results where the values initially increased but have since dropped due to urban expansion and desertification. (2) The areas in HXNR with increased ESV significantly outnumbered the areas that had declining values from 1980 to 2018. For the non-PA, the areas that had increased ESV in 1980-1995 saw a decline in value in 1995-2008; moreover, new areas with decreasing ESV emerged in 2008-2018. (3) The HXNR was found to be more effective than non-PA in improving ecosystem services. (4) The core zone of the nature reserve demonstrated better effectiveness in ecosystem service preservation.



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1904-Safe and Sound New Tools to Assess Hazard Preventive Information

David Chionne¹, Élise Beck², Isabelle Andre-Poyaud³, Aurélie Arnaud⁴, Audrey Borelly², Sarah Duche², Christelle Gaidatzis⁵, Delphine Grancher⁶, Étienne Jacquement², Céline Lutoff², Claire Revol², Nicolas Robinet², Pascal Servet⁷

Université Paris-Est Créteil Laboratoire de Géographie Physique Grenoble-France¹ Université Grenoble Alpes Laboratoire Pacte -France² Centre National de la Recherche Scientifique Laboratoire Pacte -France³ Université Aix-Marseille Laboratoire Interdisciplinaire Environnement Urbanisme -France⁴ Association Comet Geography -France⁵ Centre National de la Recherche Scientifique Laboratoire de Géographie Physique -France⁶ Pascal Servet Conceptions Geography -France⁷

French municipalities have the legal obligation to inform their inhabitants on natural and technological hazards that occur on their territory, as well as on the best actions to take in the event of disasters. Notwithstanding, both scientists and authorities know really few about the impact of preventive information and on how it improves the risk culture. Some door-to-door surveys have already been carried out but have shown their limits: they were able to assess the proportion of the population which has received that information, but it is still difficult to determine if inhabitants would make the appropriate choices within the stress of an extreme event. In this context, the I²PRI project (Impact of Preventive Information) has been developed with the aim to find new solutions to appraise the impact of preventive information. For that, we set up two innovative tools aiming to put volunteer inhabitants into earthquake and flood situations. The first one is a short theatrical representation. The second, a small serious video game. These methods have been experienced with 211 people in six french mountain cities in 2019. After a short description of these tools and methods, the aim of our presentation is to discuss their different strengths and weaknesses. Thanks to collected data, we will show that the theatre play has been widely acclaimed by the participants. Indeed, they told us that it helped them to be immersed in a critical event and sometimes had strong emotions which, we think, led them to more spontaneous reactions. On the contrary, the serious game was less involving and had too many technical flaws to be fully operative. However, a set of debriefing questions allowed us to appraise the impact of preventive information and it led us to a better knowledge of people's behaviours during dramatic situations.



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2182-MULTI HAZARD RISK ASSESSMENT IN THE COASTAL PLAINS OF TAMIL NADU A SPATIAL MULTI CRITERIA APPROACH

Balasubramani Karuppusamy¹

Central University of Tamil Nadu Department of Geography Thiruvavur-India¹

Background

The coastal plains of Tamil Nadu are the most productive ecosystem of the State which hosts several unique ecosystems which are ecologically and socio-economically fragile when compared to other upland regions. The common understanding of overall disaster risks in a micro-administrative unit is of paramount importance to improve individual and community resilience and to manage the consequences. Therefore, an integrated assessment of multi-hazard risks in a village/ward unit through spatial multi-criteria analysis is an ideal context for evaluating the disaster risks in coastal Tamil Nadu.

Materials and Methods

The study area is delineated as natural units (coastal watersheds) and then divided into micro administrative units (villages, towns/wards) for practical pursuance. A sum of 5,048 micro units covering 26,881 sq.km with inhabitants of 245 lakhs has been identified to assess multi-hazard risks. All the hazard and vulnerability parameters generated as thematic layers with the help of remote sensing images and quantitative models/indices in GIS. A Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS) was used to compute multi-hazard and vulnerability index.

Results

The study area has experienced several extreme events that cause human losses and severe economic damages in the past. The study considered 1) hazards such as Cyclone, Shoreline Erosion, Earthquake, Storm Surge, Tsunami, Flood, Drought, Transport and Industrial Accidents; 2) vulnerability indicators viz. Population Density, Illiteracy, Weaker Population, Crowded Spots and Wetlands; 4) coping capacity parameters such as Health/Sanitation Services, Communication, Education and Community Shelters and Working Population for multi-hazard risk analysis. The generated hazard and vulnerability values were compared in a micro unit and overall risk values were calculated.

Conclusion

The comparison of hazard and vulnerability indices in a normalized scale and computation of overall risks offer a viable and integrative practical guide to authorities and policymakers. This could enhance the development of policies and action plans for improving resilience.



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VIRTUAL

2932-Multi scale Modelling of Flood Vulnerability and Resilience in Southern Districts of West Bengal India with Special Reference to 2017 Flood

Kapil Ghosh¹, Sunil Kumar De²

Diamond Harbour Women's University Geography South 24 Parganas-India¹ North Eastern Hill University Geography
desunil@gmail.com-India²

The present research is focused to assess the flood hazard scenario along with vulnerability and their resilience capacity in southern districts of West Bengal. Flood inundated area was delineated by using remote sensing data (Radersat 2). Flood danger level and warning level was identified by using maximum instantaneous discharge data and gauge height of various Gauge stations. Socio-economic elements i.e. population density, female population ratio, 0-6 age group population, literacy rate, income were considered for assessing the vulnerability at district level. Village level flood vulnerability was carried out by considering the parameter like height of the water level, damage, house type, preparedness, income, emergency service etc. Rainfall, river and dam discharge data were analyzed for assessing the flood scenario. Damage related data were collected to assessing the spatial variation of hazard intensity.

The result shows that 42.4% of the total geographical area of the southern districts of West Bengal was affected by flood. Rainfall data analysis revealed that south Bengal district received excess rainfall from 31% to 72% during July 2017. Apart from excess rainfall, release of water from different reservoirs created flood havoc in the vulnerable blocks of Hooghly and Howrah districts during last week of July. From 25th July to 8th August, the cumulative discharge from Durgapur barrage was 26,57,750 acre-feet of water with the peak discharge of 2,49,450 cusecs on 27th July. Vulnerability assessment at district level of Hooghly district shows that the PolbaDadpur and Arambagh block have very high socio-economic vulnerability. Village level vulnerability assessment at Kalipur Village of Arambagh block of Hooghly district shows that 11% of surveyed houses are made up with bamboo and earth materials and 28% of households are equipped with good emergency services whereas, only 15% of households have safe drinking water availability during flood.

3043-Residents' perception of eco urbanization at community in China

Chen Zeng¹, Xiangzheng Deng¹

Chinese Academy of Sciences Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences Beijing-China¹

Community is important to reflect resident's perception of eco-urbanization in China. In the context of rapid urbanization, investigations on residents' environmental satisfaction of eco- communities and its influencing factors are important for community governance and improvement of people's welfare. In this study, we assess the residents' environmental satisfaction and explore the influencing factors by a field survey in 64 typical eco-communities with 669 questionnaires from the community residents and 100 semi-structured interviews from neighborhood communities in five major urban agglomerations in China. The assessment of residents' environmental satisfaction is conducted with respect to green space, sanitation, landscape, noise pollution treatment, and optic pollution control. We use the ordered logistic regression model to explore the influencing factors regionally and globally. The influencing factors are divided into three dimensions, namely, individual characteristics, management, and facilities. We also include dummy variables, such as regional characteristics and community type, to embed the difference of the communities in different urban agglomerations and the difference between new and traditional communities. Residents' environmental satisfaction in the community indicates considerable differences in different community types with traditional or new groups and in different regions. The property management and the safety sense greatly influence the residents' perceptions, whereas facilities appear to have less influence, and public participation in the urban community governance needs to be reinforced. To improve the environmental satisfaction of the community and people's welfare comprehensively, several recommendations are proposed regarding the advancement of eco-community, the enhancement of community management, and the promotion of a human-oriented community.



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VIRTUAL

3159-Generation and Analysis of Socioeconomic Vulnerability Indices Estimated Danger and Flood Risk for Disaster Management

FLAVIA C FARINA¹, TAMIRIS S ALVES¹, JENIFFER R KUNZLER¹, FILIPE A ROCHA¹, NATALIA MS JOHANN¹, TATIANA S SILVA¹
UFRGS Institute of Geosciences Porto Alegre-Brazil¹

This study demonstrates the methodology developed for generating and analyzing socioeconomic vulnerability indices, estimated danger and flood risk, applied to the municipality of São Lourenço do Sul-Brazil. The area susceptible to flooding was simulated in a previous stage, through hydrological/hydrodynamic modeling. For each census section defined by IBGE, which coincides with the flooding area, the socioeconomic characterization of its population and infrastructure was carried out. Data from public and private establishments were acquired from official websites and Google-StreetView. The Socioeconomic Vulnerability Index (VI) was calculated as follows: $Pop + Dd + Mr + Nd + Ip + Br + Ag + Ci + Md / IDHM$; where, total population of the section (Pop); demographic density (Dd); residents/household (Mr); number of dependents-children and elderly (Nd); % of illiterate persons over 12 years old (Ip); % of households with low per capita income (Br); households with waste accumulation (Ag); % of inadequate housing (Cm); number of families with disabled members (Md); and Municipal Human Development Index (IDHM). The Estimated Danger considered the total area of the census section (At) and flooded area of each section (Ai): $ED = Ai / At$. The Flood Risk (FR) was estimated through the following relationship: $FR = VI \cdot ED$. The GIS spatialization and analysis of data and indices showed that 23% of the municipality's population is affected in the scenario at hand: 30% are dependent; 113 families have disabled members; and 52% of the inhabitants have low income, that is, the economic vulnerability of this population impacts on their resilience against the occurrence of this type of event. Regarding the economic losses, 125 commercial/service establishments would be affected, including Fire Department, schools and health establishments. Also, 52% of the area is classified as a very high vulnerability and 23% as a very high risk. The dissemination of information, structured in a webmap on the GoogleMaps platform, can help managers and civil defense authorities make decisions, defining actions/priorities.

3617-SOCIO ECOLOGICAL RESILIENCE TO CYCLONE VULNERABILITY IN COASTAL ODISHA

Subhakanta Mohapatra¹

Indira Gandhi National Open University (IGNOU) Geography New Delhi-India¹

The state of Odisha situated in the eastern part of India having a 480 km long stretch of coastline has been one of the most cyclone vulnerable regions in the world. Between 1891 and 2018, the state was hit by about 110 cyclones. Therefore, there is a need for a detailed vulnerability assessment at micro-level to identify the socio-ecological vulnerability as well as planning for enhancing resilience to cyclone disaster. This would be helpful in identifying and devising better strategies for the adaptive measures that can be provided at the last mile. Major objectives of the study was to assess the levels of socio-ecological vulnerability to cyclone disaster at micro-level i.e. Community Development Blocks and identified the factors that need to be strengthened at community and household level to enhance socio-ecological resilience to cyclone vulnerability. 21 indicators were selected to construct micro-level cyclone disaster vulnerability index taking Community Development Blocks as a unit area of analysis. The indicators include five major components namely bio-physical, socio-economic, built environment and institutional environment. In the second stage data were collected at household and community level in coastal Odisha to identify the weaknesses. Amongst the five components built environment needs to be improved to make it more cyclone resilient. There is also a need to improve socio-economic indicators like reducing poverty and increasing education level. Restoration of mangrove along the coast is another area which needs to be prioritized. These findings would contribute in understanding the social, economic and ecological vulnerability of space and society in coastal Odisha to cyclone disaster that would help in mitigating and adapting cyclone vulnerability and creating disaster resilience in Coastal Odisha.



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VIRTUAL

T.4.Eurasia and Middle East Studies Human Environmental Interactions along the Ancient Silk Road

1608-Prehistoric human environment interaction in eastern Ancient Silk Road

Guanghui Dong¹, Ruo Li¹, Minxia Lu¹, Linyao Du¹, Aifeng Zhou¹

Lanzhou University MOE Key Laboratory of Western China's Environmental System, College of Earth & Environmental Sciences Lanzhou-China¹

Human-environment interaction in the past is an important scientific issue in geographical research. The history and patterns for the evolution of human-environment interactions during prehistoric and historical periods has been increasingly discussed in recent years. Transcontinental cultural exchange is attributed as one of the most important influencing factors for the alteration of the relationship between human and their living environment in both historical and prehistoric times. The eastern Ancient Silk Road extends from Xi'an in the east to Dunhuang in the west, playing an important role in prehistoric trans-Eurasia exchange. Situated in northwest China, the natural environment in this area is sensitive to global climate change. Here we review and compare updating evidence from archaeological and paleoclimatic studies in eastern Ancient Silk Road, and detect different trajectories of man-land relation evolution in western Loess Plateau (WLP), and northeast Tibetan Plateau and Hexi Corridor (NETP-HC). Our results suggest that culture evolution in WLP was influenced by climate change between ~7000-3500 BP, human settlement intensity basically increased in warm and wet periods while declined when temperature and precipitation dropped. However, human settlement intensity in NETP-HC reached maximum between 4000-3500 BP when climate turned to cold and dry, the adoption of new staples (barley and wheat) and sheep brought by trans-Eurasia exchange might have improved social resilience to climate deterioration in that area. With the application of our new model for explaining the mechanism of past human-environment interactions (Fulcrum Conceptual Model), we try to demonstrate the trajectory and dynamics for human-environment interaction between 7000-2000 BP along the eastern Ancient Silk Road.

2267-Climate change and Silk Road civilization in the arid central Asia

Fahu Chen¹, Jianhui Chen², Guanghui Dong², Wei Huang², Juzhi Hou¹, Tao Wang¹

Key Laboratory of Alpine Ecology (LAE), CAS Center for Excellence in Tibetan Plateau Earth Sciences and Institute of Tibetan Plateau Research Chinese Academy of Sciences Beijing-China¹ Key Laboratory of Western China's Environmental Systems (Ministry of Education), College of Earth and Environmental Sciences Lanzhou University -China²

The arid central Asia is one of the most arid regions in the mid-latitudes and also the core area of the Silk Road civilization. Climate have dramatically changed during Holocene in the region. Prior to 6 ka, moisture increased gradually, and then rapidly, with the most humid period occurring during the late Holocene. Over the last millennium, a dry climate during the Medieval Warm Period and a wet climate during the Little Ice Age is present. Instrumental observations showed that precipitation, moisture, and stream runoff all have gradually increased on the decadal scale under global warming. Comparing these results to those in the mid-latitude monsoonal Asia and Mediterranean, the moisture evolution since the Holocene over westerlies Asia featured unique characteristics on various timescales. We proposed the theoretical framework of a 'westerlies-dominated climatic regime' (WDCR) for hydroclimatic changes. Further physical mechanisms studies showed that a circum-global teleconnection/Silk Road pattern was the most important factor responsible for WDCR on the centennial and decadal timescales. Climate change has impacted on the civilization along the Silk road. The oasis route in this region played a significant role in the development of trans-Eurasia exchange since the late third Millennium BCE. Such route laid the foundation for the formation of ancient Silk Road during the second century BCE that accounted for the most important center for civilization evolution in the planet till the sixteenth century CE. Multi-discipline studies suggest that special warm-humid climate might have facilitated the rise and development of ancient empires in the Tibetan Plateau. However, severe droughts lasting decades-centuries, triggered the expansion of deserts, shrinkage of oases, and collapse of civilizations along the Silk Road. Further analysis proposed that the evolution of ancient civilizations was likely influenced by precipitation variation in surrounding mountains instead of basins in arid areas of the Silk Road.



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2483-New evidence for early inhabitants of Nyingchi the Southeastern Tibet

Yanren Wang¹, Zhiyong Ling², Xuke Shen³, Yunyao Tan⁴, Dongju Zhang³, Xiaoyan Yang¹

Institute of Tibetan Plateau Research, Chinese Academy of Sciences Key Laboratory of Alpine Ecology Beijing-China¹ Qinghai Institute of Salt Lakes, Chinese Academy of Sciences Key Laboratory of Comprehensive and Highly Efficient Utilization of Salt Lake Resources -China² Lanzhou University Key Laboratory of Western China's Environmental Systems -China³ Tibetan Cultural Relics Conservation Institute -China⁴

The Tibetan Plateau is one of the harshest living condition on the planet. However, there are still millions of people living on the Plateau today. When and how human peopling the plateau are of great interest. Recent years, there has been many studies about ancient people occupied the northern Tibetan Plateau. Little is known about the timing, route and mechanisms of human migrating onto the southeastern Tibetan Plateau due to the lack of archaeological data. Here we present 32 radiocarbon data from 12 archaeological sites in Lyingchi, the southeastern Tibetan Plateau to indicate that the earliest human occupied this region was no later than the third millennium BC who might migrate by ancient road between Qamdo and Bomê recorded in Bomê county annals. We also use the summed probability distribution of radiocarbon dates to reconstruct the variation and intensity of human activity and proposal the intensive human activity was shown between 2700 to 2000 cal. yr BP as the climate become colder and drier. Based on archaeobotanical remains comprising barley (*Hordeum vulgare*), wheat (*Triticum aestivum*), pea (*Pisum sativum*) and foxtail millet (*Setaria italica*) remains and archaeological evidence including pottery shards, stone tools and net pendants, we suggest these multi-resources might facilitate early inhabitants of Lyingchi living in the colder and drier climate, which is quite similar with the pattern in the northeastern Tibetan Plateau. Also the coexist of grey pottery shards, stone tools from East Asia and pea from West Asia in Lyingchi is new evidence of the Painted Pottery Road and the Highland Silk Road that promoted the cross-cultural communication in eastern Eurasia.



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VIRTUAL

T.6. Geography Bridging the Continents Geography society and environment in Central America

1074-Coffee production in Central America configuration of diverse territories

Lilliam Quirós Arias¹

*Universidad Nacional de Costa Rica Escuela de Ciencias Geográficas Heredia-Costa Rica*¹

Coffee production in Central America: configuration of diverse territories

Agroecological biodiversity, the richness of its volcanic soils, climatic diversity and the presence of various altitudinal floors, the Central American countries since their early formation as independent countries were incorporated into coffee cultivation, which favored their insertion in the international market. Despite fluctuations and low international prices, high competition for land uses (residential, commercial and industrial), climate change and disease (rust), coffee remains the main export crop from Central America; although at a general level countries have seen regional coffee production reduced; with a contribution close to 10% of the world total according to the International Coffee Organization data for 2017. Production in the region shows different realities, while the coffee cultivated area has decreased considerably in Guatemala, Costa Rica and El Salvador; Nicaragua and Panama remain stable, Honduras increases its exports. The excellent cup quality and the manufacturing process have given it international coffee recognition in countries such as Costa Rica and Guatemala, allowing them to obtain better market prices. The consumption of coffee in the world increases, to the traditional United States markets and the countries of the European Union, the interest of Asian countries is added to acquire high quality coffee. The recognition in the quality of the coffee of the Central American region has given a turn to the production and commercialization with differentials of prices of exclusive and high-quality exclusive productions. Buyers are guided by their origin, integration with the environment, production and artisanal elaboration, aromatic distinctions and exclusive flavors. This communication shows the geographical distribution of coffee in the Central American region, the emerging strategies developed by the producers to maintain their contribution to the markets, with a differential quality that allows the economic sustainability of the coffee activity; also promoting

2961-Interurban Biological Corridors as a Nature Conservancy Strategy in Metropolitan Regions. A Costa Rican experience

Marilyn Romero-Vargas¹, Sergio Feolli-Boraschi²

*Universidad Nacional de Costa Rica Ciencias Geográficas Heredia-Costa Rica*¹ *Compañía Nacional de Fuerza y Luz sfeoli@cnfl.go.cr-Costa Rica*²

Costa Rica, with an internationally recognized environmental policy and with approximately 26% of the national territory under some protection status, presents great environmental and conservation contrasts in its cities, mainly in the Greater Metropolitan Area (GAM), a region that concentrates more than half (52%; 2,268,248 inhabitants) of the total population of the country. The urban development model of the GAM has lacked environmental priority in the way of planning land occupation, which has had an impact on natural resources and their ecosystem services, mainly the water resource and the premontane wet forest. The current GAM-2013 Plan suggests laying the foundations of a future model of dense, diverse and integrated cities, rather than a horizontal and socio-spatially segregated growth and with serious problems of territorial planning. In addition, the country commitment of the Sustainable Development Goals (SDGs), currently develops instruments and actions of responsibility with the environmental variable. Likewise, the interurban biological corridors (CBI) are a natural capital management tool that the country has recently adopted, through the Ministry of Environment (MINAEC), through its legislation and its National Biological Corridors Program (PNCB). The CBI not only seek the ecological connectivity of the natural landscape, connecting protected wild areas, productive landscapes (agricultural, livestock, forestry) and public or private urban green areas, but also to carry out restoration and ecosystem rehabilitation actions, thus contributing to the health of the ecosystem and the human well-being of the inhabitants of the city. The GAM currently has 5 CBI: Cobri Surá, Garci Muñoz, Río María Aguilar, Río Torres and Pará-Toyopán, all with different experiences of creation and local participatory management as well as differentiated challenges and achievements within the same regional urban context and the short physical distance between them



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3332-INDIGENOUS LIVELIHOODS LAND TENURE AND FOREST CONSERVATION AFTER BOTCHED BIOSPHERES IN CENTRAL AMERICA A CASE STUDY FROM COSTA RICA'S CHIRRIPO RESERVE

Taylor Tappan¹

University of Kansas Geography and Atmospheric Science Lawrence-United States¹

In recent decades Central American governments have responded to indigenous peoples' claims to territory and natural resources through land titling initiatives. These changes are emblematic of a broader "territorial turn" throughout Latin America in which many new categories of formal land tenure have been created to accommodate indigenous communities' extensive land use areas—often encompassing vast expanses of tropical rainforest—within common property arrangements. The proliferation of these decentralized "indigenous territorial jurisdictions" (ITJs) represents a significant departure from unsuccessful, top-down conservation models of the 1980s-90s that consolidated core rainforest areas and indigenous homelands into biosphere reserves under state oversight. Today ITJs rely on resident indigenous communities to provide critically important environmental services, notably geographical buffers against the aggressive expansion of cattle ranching, plantation agriculture, and other extractive industries into Central America's core rainforest areas. Yet relatively little scholarship has taken a grounded perspective to evaluate the efficacy of ITJs in strengthening indigenous peoples' land rights while promoting forest conservation. This presentation draws attention to the Chirripó Indigenous Cabécar Reserve—the largest of Costa Rica's 24 indigenous reserves—as a case study for describing the human-environment ecologies, land tenure practices, and forest conservation outcomes in one ITJ located in a core rainforest area of Central America. Thirteen months of in-situ, collaborative research with the Cabécar Indigenous Association inform this study. Findings demonstrate that within the limits of Chirripó (a common property ITJ) lies a complicated mosaic of land tenure arrangements and land use practices that produce unique forest conservation outcomes that are articulated at different scales.



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T.6. Geography Bridging the Continents Totalitarianism in the researches of political and historical geography new problems and approaches

1297-URBAN PLANNING AND ARCHITECTURE IN DUTY OF TOTALITARIAN SYSTEMS. THE INFLUENCE OF POLITICAL IDEOLOGY ON CITY PLANNING AND BUILDING. CASE STUDY OF POLAND

Magdalena Deptuła¹, Marek Sobczyński¹

University of Lodz, Faculty of Geographical Sciences Dep. of Political and Historical Geography and Regional Studies Lodz-Poland¹

The impact of totalitarian political systems on the layout of cities and settlements and their architecture has been many times discussed in geographical terms (Mullin 1979, 1981; Caprotti 2007; Zarecor 2017; Griffin 2018). However, the influence of Nazi ideology on spatial and urban planning especially in those areas of Germany which have been annexed to Poland as a result of the Potsdam Treaty in 1945, was rather a rare subject of analyses, therefore its presentation seems to be justified. The aim of the authors was also to present the impact of communist ideology in Poland, particularly strong in 1948-1955, on city planning, including the construction of new cities and the architecture of state administration buildings. For this purpose chosen urban projects were presented, such as the reconstruction of the centre of Warsaw in the socio-realistic style which was destroyed during the war, the construction of new cities such as Nowa Huta and Nowe Tychy and other buildings which role was to consolidate the totalitarian ideology in the urban landscape in order to propaganda influence on society.

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1332-EUROGEO 40 years bridging geographers across Europe

Rafael de Miguel González¹

EUROGEO . Waardamme-Belgium¹

EUROGEO is the European Association of Geographers created in 1979. During these forty years, it has been a key stakeholder for promoting collaboration between geographers across the different European countries. This Conference is an opportunity to present some of the important achievements done by EUROGEO in order to raise awareness about Geography in and about Europe.

The principal aims of EUROGEO are to advance the status of geography by:

- organising events and activities for members
- undertaking research
- producing publications for members
- supporting geographers in their jobs and careers
- identifying and promoting good practise
- lobbying at international, European and national level
- giving advice on geography
- making recommendations to decision makers

EUROGEO is concerned with the effective use of open geographic information and to use this to contribute to areas such as demography and migration, sustainability, economic development and urban and rural challenges, hazards, landscape, poverty, democracy and citizen engagement.

EUROGEO promotes the importance of geographical education and spatial thinking as a contribution towards the development of a better understanding of our world and therefore global citizenship. By doing so, EUROGEO encourages the development of a greater global awareness through the medium of geography and an increase in mutual knowledge and understanding.

EUROGEO, in affiliation with other organisations as the International geographical Union, has produced a large number of publications and has organised geography conferences, meetings and workshops on a regular basis. Representatives of national and regional professional educational associations have been actively involved in EUROGEO.

EUROGEO also supports those seeking to establish or organize national geography associations and those that promote geography as an academic discipline and geographers in the workplace.



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3239-Producing and communicating geographic knowledge questions and issues from French Experiences

Nathalie Lemarchand¹

*U. Paris8 / LADYSS Geography Saint-Denis-France*¹

Cette communication vient d'une réflexion issue d'une expérience, partagée par beaucoup d'entre vous, de ma participation à un comité éditorial de revue de géographie, ce qui m'a permis de participer à des rencontres consacrées aux revues de géographie en langue française. Des questions se sont posées : quelle langue de diffusion pour les revues de géographie nationale ? Quelle valeur internationale à des articles publiés dans une langue nationale ? Comment conserver la valeur de l'originalité d'un savoir géographique régional ? Faut-il encoder la connaissance scientifique régionalisée dans une mise en forme globalisée ? Quelles conséquences ? Cette communication n'a pas pour but de répondre à toutes ces questions, mais d'aborder en géographie la question des savoirs locaux, régionaux et leur transfert dans l'encodage d'un savoir normalisé et standardisé. A cet effet, cette communication focalisera sur les débats entourant les formes de diffusion du savoir géographique, incluant la revue, mais aussi des formes originales, comme le Festival International de Géographie (un festival à la fois populaire et scientifique).

This paper is the result of an experience, shared by many of you, of my participation in an editorial committee of a geography journal, which has enabled me to take part in meetings devoted to French-language geography journals. Questions arose: what language of distribution for national geography journals? What is the international value of articles published in a national language? How to preserve the value of the originality of regional geographical knowledge? Should regionalized scientific knowledge be encoded in a globalized format? What are the consequences? The aim of this paper is not to answer all these questions but to address in geography the question of local and regional knowledge and its transfer in the encoding of standardized and standardised knowledge. To this end, this paper will focus on the debates



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VIRTUAL

T.8.Globalization vs Localization Eco Tourism And Sustainable Local Development

3496-The Campanian Airports and the Ecotourism Challenge

Clara Di Fazio¹

*University of Naples "L Social Science Castello Di Cisterna (NA)-Italy*¹

The purpose of this paper is to show the way Naples International Airport represents the continuous creation of added value and territorial requalification, establishing a great number of interventions also to protect the environment for its sustainable. Today, this airport represents a significant attraction for the development of sustainable tourism, as well as for the local territorial requalification. The modern tourist is searching complex products through which live participative experiences.

Considering the importance of tourism today on an economic level and for the logistic implications that it creates as well as the increase of the areas of origin and destination of the generated fluxes, this sector has become one of the phenomena that is under a global interest especially in consideration of its impact on the environment and sustainable development. Within the ecotourism studies, that aim to a better sustainable development of ecosystem services as well as community development, the case of Naples International airport and its sustainability within the territorial context in the Campania region, which hosts touristic sites of international interest, aims to identify the best practices which can hold together the territorial marketing, the tourist attractiveness and the respect for the environment.

In the last few years, the airport's management company has implemented a strong project intended to improve the enhancement of the archaeological and cultural treasure of the Region that has created a better image of the airport and the City, has contributed to the increase of the number of visitors in the regions' museums and it was the basis for the recognition of the prestigious ACI "Best Airport Award" in 2017. This airport is one of the 200 airports in the world that has voluntarily decided to act in the fight for climate changes, participating in the international program of ACI Europe "Airport Carbon Accreditation".

3535-STRENGTHENING COHESION IN CROSS BORDER CULTURAL TOURISM DESTINATIONS THROUGH DIGITALISATION

Marcell Kupi¹, Eszter Szemerédi¹, Tamás Dr. Hardi¹

*KRTK RKI Győr-Hungary*¹

STRENGTHENING COHESION IN CROSS BORDER CULTURAL TOURISM DESTINATIONS THROUGH DIGITALISATION

Marcell Kupi – Eszter Szemerédi – Dr. Tamás Hardi

There are numerous examples of cross-border regions in Europe, which are regions not properly demarcated by national borders. In our research, we examine tourist destinations in these cross-border regions, and hypothesize, that cross-border tourist destinations have many potentials to attract tourists as a single cultural destination. We also hypothesize that, digitalization (and digital devices) may be the number one tool of the 21st century to be used in attracting tourists. Digitization is evolving at an accelerated pace these days. In our study, we sought to answer the question of how digitalization can help to bring a large, significant destination falling within the territory of two countries, closer to tourists. During our research, we distributed questionnaires in the case study areas, and we asked the relevant stakeholders, the visitors and tourists, and even inhabitants and residents to complete our survey. To this end, we conducted an empirical survey within the framework of the SPOT Horizon 2020 project (means Social and Innovative Platform on Cultural Tourism and its potential towards deepening Europeanisation), with comparative possibilities in 14 case study areas of the European Union and Israel (Czech Republic, Beith Sh'ean Valley in Israel, Romania, Germany, Hungary, Slovakia, Netherlands, Estonia, Austria, Scotland, Greece, Spain, Italy, Poland, Slovenia). We are also looking for the answer to the question of how European identity can be realized in cultural tourism through the mediation of digitalisation.

Keywords: digital tourism, cultural tourism, regional tourism, tourism, European tourism



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VIRTUAL

T.8. Globalization vs Localization Geopolitical imaginations and creation of Space(s)

1918-Challenges for Democracy in Egypt lessons learned from the January 25th Revolution

Borna Zguric¹

*Faculty of Political Science, University of Zagreb Department of International Relations and Security Studies Zagreb-Croatia*¹

The main question this paper tries to provide an answer to is why democratic transformation was not successful in Egypt? The research approach is primarily rooted in descriptive-empirical actor theories; however, it also utilizes a culturalist approach for better understanding the secularist vs. Islamist division. The research strategy is a focused case-study of Egypt. Nevertheless, since it is a study of Egypt in a regional context, it is also an intra-regional study. The proposed hypothesis claims that Egypt had a "tougher" military authoritarian regime which did not permit interaction and cooperation of opposition and regime elites, which in the end did not result in a political agreement and, thus, a successful democratic transition. In a way this is an implicit comparative study because we have to keep in mind that in the case of Tunisia quite the opposite happened – the opposition and the former political elites in the end sat down around the negotiation table, cooperated and made a political agreement that saved Tunisia's young democracy. This was possible because Tunisia had a more "softer" civilian regime. This paper examines the divisions between the opposition and the regime's elites from the beginning of the January 25th Revolution, and people occupying the public spaces of Egypt, up until the time when regime "struck back" and restored the old order. The paper shows, in sequences, how first the people of Egypt took the streets and squares, only later for the revolution to be "hijacked" by the new and old political elites.

1992-CREATION OF SPACES BIG DATA AND IMAGE OF TOURIST LOCATIONS IN MEDITERRANEAN

Hrvoje Jakopović¹, Ivana Cesarec¹, Marta Zorko¹

*University of Zagreb Faculty of Political Science Zagreb-Croatia*¹

Big data, although is a quite new and wide term, has already been introduced to human geography (Kitchin, 2013). It has been stated that big data poses great challenges and risks for geography related research to epistemological, methodological and ethical issues. User-generated content is usually produced as a textual, photo or video data. The authors are especially focused on users, as a big data source, therefore they are observing user sentiment associated with certain geolocations. This paper considers the role of big data in geopolitics and public relations research. Sentiment analysis on Croatian news websites from the perspective of public relations has already been done by Jakopović and Mikelić Preradović (2016). This is why the aim of this paper is twofold. First, to explain the process of space creation in contemporary world through three different disciplines and four paradigms streaming to create basis for new interdisciplinary view on geopolitics, geolocations, tourism, communication and public relations. Secondly, it sets the perimeter for methodological framework in tourist locations branding by user-created and user-generated content online. This paper analyses mechanism for creation of new maps of spaces with added values or deprived meanings through the processes of place creation and place consumption. Arguing that those two processes could not be separated in globalized world; rather form a circular place-time knot; first goal is to determine paradigms in which such processes function with added parameters of potential big data influence. Second goal is to suggest methodological principles for a framework in user-generated content influence in location branding practice.



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VIRTUAL

T.8. Globalization vs Localization Global countryside and local development. Facing rural problematics. Complexity and hybridization of rural areas

1546- Uncovering the Role of Globalization in Transforming the Status of Women in Asansol Durgapur Planning Area India

Dr Mohana Basu¹, Dr Debajit Datta²

*Prafulla Chandra College, Under University of Calcutta Geography Kolkata-India*¹ *Jadavpur University Geography debajit. geo@gmail.com-India*²

Globalization seems to play a significant role in transforming the status of women, especially those belonging to the developing countries. The present study investigates the role of globalization in improving the status of women in Asansol Durgapur Planning Area in the state of West Bengal in India by investigating the type of relationship that exists between the level of globalization and the status of women residing in this region. The study integrates multiple sources of qualitative and quantitative data collected from various reports, field-based measurements, questionnaire survey and community based participatory appraisals. Results reveal that the status of women varies significantly across the rural, sub-urban and urban areas under the study area. Moreover, the women of the region are relatively disempowered and enjoy lower socioeconomic clout than their male counterparts in spite of the several remedial efforts taken by the government and NGOs to elevate their position in the society. A considerable gender gap seems to exist with regards to access to education and employment. The decision-making power at the household level and freedom of movement of women primarily vary according to their age group, educational level, employment, income status and also across the rural, sub-urban and urban regions. Although the study area is an industrial cluster with huge employment generating scopes, yet, the existence of these disparities turns out to be alarming and indicates that mere economic development does not always usher in socially justifiable rights and access to resources for men and women alike in it awake. Nevertheless, it has been noted that in the regions where globalization has cast its influence depicts a better status of women. Based on the findings, this study also recommends few realistic as well as implementable measures towards the enhancement of the status of women in this area.

1633- "I knew early on I wanted to be a plumber. And it worked out." Education as a way out of marginality

Walter Leimgruber¹

*University of Fribourg/CH Geosciences, Geography Fribourg-Switzerland*¹

Education is vital for all living beings to cope with the challenges of life. This holds particularly good for people living in marginal situations. A major task of development policy is therefore to promote education. Development means to change (improve) a situation that is judged as unsatisfactory, either through personal (internal) efforts or with outside help.

For years, development assistance has been a push for economic growth. The so-called developed world in a way wanted to compensate the injustice done to the former colonies, and huge sums were transferred to the so-called underdeveloped world, but the true meaning of development was not considered. It was simply equated with growth of production and GDP. The sums were important, but the money usually disappeared in private pockets viz. bank accounts.

True development, however, requires capacity building enabling the actors to find ways of improvement themselves, stimulating their potential. The primary way to achieve this is education, the skills to read (what are one's rights, what is written in a contract), to write (a complaint to the authorities or a request for a job), and to be able to do the sums and not be drawn across the table when it comes to be paid for a job. To this we add professional training, providing the skills to build a house, mend a motorbike or a car, or improve farming techniques.

This paper looks at the issue of (intellectual) education and (vocational) training as means of development, helping people and regions out of marginality.



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2015-EXPLORING THE DEVELOPMENT PATTERN OF SPECIALIZED VILLAGES AND ITS DETERMINING FACTORS USING MULTI SOURCE DATA

Li Li¹, Ning Niu², Xiaojian Li³

Institute of Geographic Sciences and Natural Resources Research International Ecosystem Management Partnership Beijing-China¹ Henan University of Economics and Law College of Resources and Environment niuning@huel.edu.cn-China² Henan University College of Environment and Planning xjli@henu.edu.cn-China³

Specialized villages represent new forms of livelihoods in Chinese rurals. By analyzing the spatial-temporal development patterns of specialized villages in Henan Province, China in 2008 and 2017, we tested the hypothesis that the development of specialization can be determined by the availability of local assets such as natural and social elements, we also explored the determining factors of these development patterns using geographic detector tools. A total of eleven factors were entered into the analysis, covering aspects such as topography, environmental conditions, location and market. Results showed that topography, environmental conditions (water and soil), location, and market each played unique roles in the evolution of specialized villages. The specialized villages in the study region could be categorized into four main types, which were emerging, growing, shrinking, and vanishing. The emerging and growing villages demonstrated superior location and market conditions compared to those of the shrinking and vanishing villages. More specifically, location was the main determining factor for the development of specialized cash-crop cultivation and livestock production villages, environmental assets such as water and soil conditions were the main determining factors for the development of specialized traditional cultivation, the joint influences of topography and location affected the development of specialized high-value crop productions such as Chinese medicinal herbs and tobacco. These findings indicate a close link between the availability of local assets and the potentials for specialization. It can also assist in the strategic planning of specialized villages in and beyond the region, and contribute to rural development in the changing global context.

2737-Opportunity or Challenge Research on Rural Revitalization under the Perspective of Urban Shrinkage

HAO HE¹, SHISHI GUO¹, ZIWEN HUO¹, KEXIAN PENG¹

Guangzhou Urban Planning and Design Survey Research Institute Beijing Office GUANGZHOU-China¹

While economic globalization has tightly linked out planet, urban shrinkage crisis caused by structural unemployment and industrial capital outflow swept the world. While urban shrinkage is quietly taking place in the rapidly developing China, the relationship between urban and rural areas has gradually developed from rural areas support urban areas to coordinated development. In such context, there are opportunities for manpower and social capital factors flow to rural areas, which bring new possibilities for rural revitalization. This study focuses on Shi Zuishan, a resource exhausted shrinking city. By studying the urban-rural interaction features under its shrinking crisis, we try to reveal the impact mechanism of its rural development through OLS model and GWR model, and finally find practicable paths for rural revitalization. This study found that, against the background of urban shrinkage crisis, rural areas with good development endowments have seen increases in their production and living activities. On global scale, the development of rural villages in Shi Zuishan City has spatial autocorrelation. Meanwhile, on local scale, the impacts of human resources, land resources, land intensiveness, and land use efficiency on rural development are spatially heterogeneous. Further, by understanding interactive features of urban and rural factors and development endowments of different rural areas, the four patterns of rural development in Shi Zuishan were identified—characteristic-agriculture-led, ecology-led, traditional-agriculture-led and mixed-agriculture-led. In addition, specific rural revitalization strategies were proposed from the aspects of continuing rural values and improving factors flow efficiency, land use efficiency. Under the values of urbanism, the revitalization of the rural areas is premised on the decline of rural areas. Thus, researching on the paradigm of rural revitalization in this new context will be very instructive.



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3214-Peppers from Padrón or Herbón The territorial construction of an emblematic spanish PDO

Rubén Boga González¹, María Romar Gómez¹

*Universidade de Santiago de Compostela Geography Padrón-Spain*¹

Is very common among the tourist who visit Spain taste Padrón peppers, an emblematic dish of galician gastronomy. From a small region close to Santiago de Compostela this vegetable has reached great notoriety, as crops in California (USA) or Queensland (Australia) demonstrate. While the product was expanding through the international market, more difficult was to establish a connection with its origin. Indeed, in colloquial language seems obvious that many people unknow Padrón is a place and use the name as it was a 'type', completely de-territorialised. Notwithstanding, is little known that from the area of origin people is trying to reivindicat the origin of the pepper under the formula of a PDO (Protected Designation of Origin). Notwithstanding many literature talks about the benefits of this seal for the promotion and development of rural areas, is curious that peppers' producers complain they have many problems to sell their productions while the market is crowded with peppers from far regions. In this study we review the long process of adoption of the PDO, emphasising the role of different actors such as the market, the 'terroir', the producers or the administrative institutions. We also try to shed light over the strategies deployed by different producers to use or not this quality distinctive. For that, we interviewed many producers about topics related with notions of quality, tradition and territoriality. Likewise, we analyzed data of pepper production volumes since the adoption of the seal until 2019. The results show that the conceptualizations of quality, the institutional ecosystem and the ability of the producers to organise themselves and to innovate are key elements in the success of a PDO.

3425-The Role of Place Brands in the Development of Rural Areas in Slovenia

Erik Logar¹

*ZRC SAZU Anton Melik Geographical Institute Ljubljana-Slovenia*¹

In last decade, there is growing number of researches in different scientific disciplines, which analyse process of place branding from viewpoint of its influence on territorial cohesion, local communities and their socio-economic development on diverse spatial levels (local, regional, national). I will present place brands as mechanisms to enhance territorial development on local and regional level in rural areas of Slovenia.

First, results of survey, which involves all Slovenian municipalities (N=212), point more than 40 place brands are established in Slovenian rural areas by LEADER/CLLD development mechanism. Thereof, only 8 place brands are currently identified as active (managed and developed by brand manager) and other brands are non-active. Main emphasis will be on analysing of factors, which contribute to (un)even spatial distribution of territorial brands.

Second, structure and activities of 8 active place brands were than analysed by in-depth interviews (N=120) with main brand actors. Results point out some common developmental tendencies:

- Each territory of active place brands is unique in its socio-economic features and thus no any uniformed way to develop place brands should be applied. However, most of analysed place brands are connected to production of local food, traditional gastronomy, tourism and craftsmanship.
- Most of active place brands face unstable financing, which depends on EU call for projects and tenders of cohesion funds. This disables to shape a long-term vision and sustainable development of place brands.
- Place brands are effective only with long-term developmental perspective (i.e. at least 5 years) and their contribution to territorial prosperity is thus not immediate. This is a challenge for brand managers: they must convince actors to take part in development of place brand, but not to expect immediate results.

Third, I will present also some recommendations to efficient development of place brands and point out some further research questions.



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**3509-GLOBAL GEOGRAPHICAL STUDY FOR SAFEGUARDING THE TANGIBLE AND INTANGIBLE CULTURAL HERITAGE
MULETEER AND CARTER AS AN ALTERNATIVE FOR BRIDGE BUILDING AND INTERCULTURAL DIALOGUES BETWEEN
CONTINENTS FOR INTEGRAL SUSTAINABILITY**

Jesús Moreno Arriba¹

*University of Salamanca Geography Salamanca-Spain*¹

Background/hypothesis: A review traditional transport and commerce activities should not ignore the geo-historical leading role by the socio-territorial and eco-cultural practices muleteers and carters. However, since the 19th century, with the improvement of the road network and means of transport, these forms have been diluted: Research objectives: Consequently, this paper offer, an approach to the geo-historical and geo-anthropological memory, in its different socio-spatial scales, of the professions and trans-territorial routes of muleteers and carters, with the aim of offering a more alternative to build bridges and dialogues knowledge between nations and continents. Better knowledge of these activities it will favour other interventions that promote its safeguarding, enhancement and transmission and continuity in time and in space: Materials and methods: To do this, it starts from the preliminary documentation and study actions of this significant expression of the diverse material and intangible cultural heritage -local and global-, linked to these activities in the world geographic space, implemented on the initiative of the author of this abstract, as geo-anthropologist and direct descendant of transhumant shepherds from the great mountains of the interior of Spain. From a transdisciplinary perspective, a research methodology based on sciences such as Geography, History, Anthropology, Geography or Cultural Ecology is being implemented: Results: The historical evolution of this transport-commercial processes not only they provided the peasantry of the poorer territories with an indispensable means-way of life, but contributed to the pillars of contemporary progress sprouted from their socio-territorial and socio-economic practices. Conclusions: Therefore, in the wake of new legislative-normative frameworks, among others, the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003), it is urgent to address the safeguarding and valorisation of muleteers and carter memory, as geo-tourist resource, privileged factor of local, interregional, state, European and intercontinental socio-territorial and geo-anthropological cohesion for integral sustainability.



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T.8. Globalization vs Localization Re positioning Cities with City Branding in Global Era

1229-PLACE MARKETING & CITY BRANDING RE INVENTING A POST INDUSTRIAL CITY FARIDABAD

Anuja Yadav¹, Anjan Sen¹

University of Delhi Department of Geography Delhi-India¹

Place branding, both as a necessity and a phenomenon, is mainly provoked by the globalisation processes, by the appearance and wider utilisation of human technologies, typical of post-industrial economies (Kotler, 2004). City branding implies how a place can market & portray itself better. Each city has a unique attraction factor, which sets it apart from other competing ones. The present research tries to focus on city branding of satellite city Faridabad. It is nestled in Aravalli Hills, situated in NCR (National Capital Region). This city speculated, as "city of hope" by Pandit Jawaharlal Nehru was at the epitome of power during 1960's. It is the leading industrial city of state Haryana, Government of India included it in the second list of Smart Cities Mission on 24 May 2016. The main objective of this study is to uncover hidden pearls and potentials, which will help in revival of this city. This industrial city tries to reinforce positive tertiary communication & as a result it will enhance the city's image through city branding. For this purpose Geohistorical, cultural landscape of Faridabad is significant to be mapped. History is peering in to the past consists temporal aspect while Geography carries spatial content with its characteristics (natural, social, economic etc.) there linkages & relationships with other locations. Regarding this participant observation technique, questionnaire surveys as well as to fulfil the gap in research in-depth interviews of the selected people has been used. The present paper tries to identify the mechanisms through which city branding works and integrating these ideas into the development of future initiatives.

2285-RE INVENTING THE IDENTITY OF TRADITIONAL HANDLOOM SAREE HERITAGE OF GADWAL CLUSTER HAVING GI TAG

Sakshi Yadav¹, Anuja Yadav²

NIFT Faculty of Management Studies Hyderabad-India¹ University of Delhi Department of Geography -India²

Gadwal is a town and the district Headquarter of Jogulamba-Gadwal district in the Indian state of Telangana. It is located 188 km (117 miles) from the state capital of Hyderabad and is a state assembly constituency. Gadwal existed long before the foundation of the Hyderabad State. Historically it served as the capital of Gadwal Samsthanam, a vassal of the Nizam of Hyderabad. Gadwal is renowned all over the world for its exclusive handloom zari sarees. It is a small town with highly professional weavers having rich traditional values of weaving techniques and one of the salient feature of these saree is the Kuttu (a joining) at the border that helps recognize it and all sarees whether cotton or silk, always has a silk border. The best part of a Gadwal sari is that it can be folded to match the size of a match box without ruining any part of the sari. Gadwal sarees has the Geographical Indications of Goods (Registration and Protection Act 1999)

The type of research is descriptive as well as exploratory. As it explores and seeks to understand more about clusters in Gadwal. Also, it provides additional information and suggestion for them. Visitation to Gadwal clusters to understand the geography; interviewing weavers and their families, masters weavers, dyers, members of corporate societies and local retailers. More information has been gathered from other stakeholders like governmental institutions, local banks and customers. To cover all the aspects, detailed questionnaires have been formed which included both objective and subjective questions to retrieve as much information as possible. This study is aimed at understanding the life cycle of the Gadwal saree, appreciating the rural craft of Gadwal and suggesting necessary marketing practices to uplift this cluster economically and socially.



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VIRTUAL

T.8.Globalization vs Localization Urban and regional planning in the context of changing world

1261-Does population shrinking hinder the service industry in mountainous area A case study of the greater Changbai mountains in China

Hang Du¹, Yanggang Fang¹

Northeast Normal University School of Geographical Sciences Changchun-China¹

The development even survival of service industry in mountain areas is a challenging issue due to its relatively closed socio-economic environment and the inconvenient transportation which is quite different from plain areas. With the outflow of population in mountain areas, some service industries have been restructured or even disappeared forever. However, the impact of population shrinking on service industry in mountain areas has been paid less attention in transitional countries. Taking the greater Changbai mountains in China as a study area, this study has explored the basic situation and changing trend of service industry in mountain areas, and has measured the agglomeration degrees of service industry and its 14 internal categories at the prefecture city level by using Location Entropy and Herfindahl-index. Results show that although the agglomeration of service industry in mountainous areas is not obvious, the degree of agglomeration is increasing. The degree of agglomeration of social service industries are growing, while accommodation and catering industry, real estate industry, scientific research and technical service industry are decreasing. Population shrinking and other factors which influencing the agglomeration of service industry in mountain areas are discussed in depth. This research could contribute to make effective policies about the high-quality development in mountain areas. This study suggest that it will be necessary to develop new models that allow for the coexistence of traditional and new activities. Local government should establish a multi-level mountain policy system which guiding the development of mountain areas, from direct poverty alleviation to comprehensive development, from traditional agriculture to folk tourism or ecological tourism. Governments should promote regional cooperation to support the development of mountain areas.

1741-STRATEGIC CITY PROJECTS IN SPATIAL AND PLANNING DOCUMENTS OF THE CITY OF ZAGREB – DIFFERENCES IN PERCEPTION OF THE TERM DEFINITION THEME AND SELECTION CRITERIA

Jadranka Veselic Bruvo¹, Martina Jakovcic¹

Faculty of Science Department of Geography jadranka.veselic-bruvo@zagreb.hr-Croatia¹

Over the past decades, traditional sectoral spatial planning slowly gives way to strategic planning which gives attention to decisions, activities, evaluation of results and offers more coordinated and coherent spatial logic in development and transformation of a city.

Strategic city projects as a tool enable us to control the space, rise the quality and image of a city, generate development, attract investments and economic growth (Grodach, 2008; Carrière i Demazière, 2002; Doucet i dr., 2011). Strategic city projects, in time, enter spatial and planning documents. i.e. a master plan, a core document and an instrument for planning and management of a city. Strategic city projects have an exclusive position in master plans by virtue of vast impact of projects and its potential for generating urban transformation through partnership between city (public sector) and investors (private sector) as core actors, and with active presence of the urban public.

In 1990's planning professionals in Zagreb started to discuss the term "strategic city project". Starting from the year 2000 the term appears in different spatial and planning documents and strategic documents of the City of Zagreb. However, despite the 30-years presence in spatial and planning documents there is still no clear and unambiguous definition of the term.

The starting hypothesis of the paper is that different actors of the process of participative planning differently perceive the term and definition of strategic city project and its role in development of the city. The aim of the paper is to research and present importance and role of strategic city projects in spatial-planning documents of the city of Zagreb. In the second part, by usage of Delphi method and in-depth interviews among representatives of quadruple helix paper will show the difference in perception of definition, topic and criteria for selection of strategic city project.



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1776-Ensuring sustainable planning of capital cities in globalizing world (obstacles and opportunities on case of Kyiv)

Sergiy Lisovskyi¹, Eugenia Maruniak²

*Institute of Geography, NAS of Ukraine Human Geography Kyiv-Ukraine*¹ *Institute of Geography, NAS of Ukraine Sustainable Development and Environmental Assessment emgeooffice@gmail.com-Ukraine*²

Among Sustainable Development Goals 2030, the eleventh one claims to “make cities and human settlements inclusive, safe, resilient and sustainable”. Modern cities, where about 55% of the world’s population is concentrated within the area of 2.7% of the inhabited land, producing more than 80% of the world GDP, are the real “hot spots” of the planet.

In globalized world, the importance of positioning cities by nature of their involvement in a wide range of international connections has been increased, however with certain contradictions. Both the city, and then the country, win by taking a prominent place at the top of the global economic landscape and joining the global networks. On the other hand, such participation brings risks for regional and local sustainability. Those contradictions enhance the importance of effective planning based on integrated approach and indicators.

Moreover, the capital is usually the largest city which concentrates resources, represents existing problems, spreads innovations, practices, challenges, subsequently defining opportunities for sustainable development at different levels. Also there is a correlation between the level of capital city’s sustainability and the level of socio-economic development of the country.

Kyiv formally is not a global one, but every day the city is increasingly aware of the impact of global connections, projecting them on Ukraine’s development as a whole. And according to the results of different rankings, Kyiv ranks pretty low in terms of sustainability. This makes it especially important to ensure sustainable planning process for urban development. However there are significant legislative, methodological and practical gaps in this context. Based on conducted research, analyzed strengths and weaknesses, the authors have provided considerations for ensuring Kyiv sustainable development. With regard to geographical aspects, this approach, in particular, includes implementation of landscape planning tools, strategic environmental assessment, as well as comprehensive analyses of urban territorial capital.



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2032-Smart cities and adaption to climate changes

Antonina Atanasova¹, Kliment Naydenov¹

Sofia University Geography Sofia city-Bulgaria¹

In the recent years our cities are facing more devastating natural disasters: record-breaking temperatures, fires in California and Australia, rising sea levels, water floods in Europe and Africa, a heat waves, EL Nino effects are becoming more and more frequently and etc. Urbanization and human activity are the main factors for climate changes.

Smart city is a new concept that measures the city's efforts to make itself smart – sustainable development, sound economic growth, and when the urban system adapts itself to the users' needs and climate changes. Nowadays urban methods and urban policies are not able to cope with all kinds of climate changes. Our cities are not resilient enough to ensure safety and sustainable development of the community and ecosystems, because climate changes posed different challenges for urban infrastructure, urban management and planning.

That's why in order to make our cities more responsible for the future, more sustainable and responding of the new challenges, it is necessary to apply different innovative approaches and solutions to manage natural resources more efficiently and we have to put focus on adapting to climate change, because in this way cities will have capacity for disaster prevention and mitigation.

In this report we will discuss good practices from different cities which use technologies in order to adapt to climate changes and become more smart, safe and responsible for future generations.

The report is presented in 5 sections, including the foregoing introduction. Section 2 introduces what is the impact of climate changes to urban systems. Section 3 exposes the cases of development of good practices for adaption to climate changes from smart cities in Europe and Asia. Section 4 highlights the policy innovation aspect for smart cities and their adaption to climate changes. Section 5 is for conclusion.

2539-The new contemporary urbanization problems in the planning of the cities in Bulgaria

Metodi Ivanov - Valeriew¹

Sofia University „St. Kliment Ohridski“ Regional development Sofia-Bulgaria¹

The presentation of new contemporary urbanization problems in urban planning in Bulgaria can be linked to the development and implementation of information and communication technologies in the process of urban development planning and management. When presenting the problems related to urbanization on the territory of the country, the problems caused by depopulation should be considered, which requires that they be monitored and analyzed, both at national, regional and local level, in order to describe in detail the state of urbanization and depopulation on the territory of the country. For the purpose of this study, data on the number of urban population will be presented as the main criteria and indicators for the ongoing urbanization process in the country, which will be compared with the ratio of urban to rural population and will present in retrospect the territorial urban sprawl and distribution urban lifestyle. In addition, attention will be paid to the planning and development of smart cities in Bulgaria through the prism of solving the contemporary problems caused by the ongoing urbanization process in the country and the concentration of population in one city, namely the capital of Bulgaria, presenting futuristic possibilities for the formation of urban agglomeration Sofia with the adjacent and urbanized zones of influence and impact in the axis of Pernik - Botevgrad and Ihtiman - Dragoman. The major problems in the planning and development of modern cities can be identified in addition to the outdated and polluted urban environment, which is congested and at the same time inefficient infrastructure, and the lack of a functioning urban economy that will offers opportunities for improving the quality of life of the population in the city. In addition, due attention must also be paid to the non-functioning social environment, which leads to both stress and increased levels of crime.



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2557-Integrated approach to ecosystem services in a relation with urban business entities

Nikolay Katsarski¹

*Sofia univeristy St. Kliment Ohridski Regional development Sofia-Bulgaria*¹

The integrated approach in ecosystem services will be in great priority in the future. As consumers of various goods produced by business, we neglect the scarcity of natural resources, in particular their scarcity in pure form. The economic effect is generally considered only from one point of view, profit, lack of unemployment, economic growth, increase in market share, etc. This necessitates a new approach in calculating business processes, including non-financial / tangible / elements. Creating conditions for ecosystem reproduction has business entities. Business entities will increasingly have a responsibility to nature, creating opportunities for its natural recovery, on the one hand. On the other hand, the calculation of these non-financial procedures creates the opportunity for long-term use of the natural resource and profit in the long run. All of this will take a lot time. It will be needed new law regulation which can be used for both financial and non-financial aspects. Using the normative approach is the only way to make business more responsible than now. In the same direction all statistics institutions should prepare methodology for gathering information from every business entity. In that way can be made analysis by region, branch, natural resource and etc. This information can be used for financial analysis too. It will be an advantage for the science offer new indicators for assessing the ecosystem accounting services and the reflection of it to the business entities financial positions. Therefore, information from the financial and non-financial positions must be presented together in new type financial report.

3227-Glocalization of border town An integrated regional planning and area based development approach of a Special Economic Zone city in Thai Lao frontier

Ratchada Arpornsilp¹

*Australian National University College of Asia and Pacific Bangkok-Thailand*¹

Development discourses, including the Special Economic Zone establishment, are integral to the forces of globalization. When implemented in a centralized or top-down manner, it risks being a machinery of unequal wealth accumulation for global capitalists, dismantling social and natural capital of the locals. In 2014, upon the authoritative turn in Thailand, the military government approved the promotion of Special Economic Zone in 10 border provinces. Chiang Khong in Chiang Rai province, a small city adjacent to the Mekong River located in the border of Thailand and Lao PDR, is one of them. One City Two Styles (Green City) initiative of Chiang Khong is a people-centered effort to mobilize participatory process in the design of area-based development that acknowledge the importance of globalized economic integration compatible with the socio-cultural contexts and natural profile of each locality. Through the conceptual framework of cultural ecology, this paper examines how globalization and localization can be synchronized, transcending their confrontational characteristics, and manifested within the multi-stakeholders' engagement and advocacy to formulate the Strategic Regional Plan of Sustainable and Balanced Development of Chiang Khong City 2015-2019. I adopt cultural ecology to study and understand the shared interests of the relationship between human and environment – how every day's living is interwoven with the natural environments. Using the qualitative case study of Chiang Khong city, the data is collected from the literature review of One City Two Styles (Green City) vision and semi-structured interviews with key actors who lead and involve in forming or implementing this initiative. The finding helps build an understanding of glocalised regional plan and its political processes which support the grassroots advocacy and mobilization to protect the local commons from natural resource accumulation and conversion under the globalized Special Economic Zone policy.



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3476-COASTAL URBAN REGIONS

Gabriel Fabian Bautista¹

*Instituto Superior Profesorado Joaquín V. Gonzalez Geography Buenos Aires-Argentina*¹

COASTAL URBAN REGIONS

Gabriel Fabián Bautista, PhD.

Instituto Superior Profesorado Joaquín V. González, Departamento de Geografía, Buenos Aires, Argentina

gabriel.bautista@bue.edu.ar

Abstract

Background/hypothesis

The hypothesis assumes continents are moving towards a planet of coastal urban regions [CURs]. In 1957, Jean Gottmann's arrival in the USA struck him by experiencing a huge region, that he properly named BosWash; so designating the economic corridor from Boston to Washington as a spatial phenomenon, dealing with vast urban regions along the atlantic seacoast. CURs progressively develop complex functional interdependencies, simultaneous processes encircling urban territories, rural space, and natural or protected areas with diverse economic activities and land use types, involving the land, land-water and the water phase itself as integral parts of the territory.

Materials and methods

CURs are carefully studied in their formation, present relevance, and perspectives, by analysing published empirical research and geographic literature, in the area of human and physical geography, sustainability and ecological studies.

Results

CURs dense infrastructures in land and water demand public policy efforts to appreciably diminish coastal vulnerability, establishing land use compatibility, particularly the conundrum conservation-development. There are two possible restrictions for successful CURs development on every continent: one relating to physical geography and the other to economic geography, i.e., the essential fluxes of world trade patterns. These restrictions refer to the limits of the terrestrial ecosystem and the socioeconomic system. Perspectives focus on public policy issues as sustainable development goals, considering climate change.

Conclusions

CURs typically constitute economic growth engines in the context globalization with two restrictions: physical and economic. Future perspectives are positively related to likely climate change and sea level rise. These CURs articulate global networks of production-consumption, even imposing over national states.

Keywords: coastal urban regions, physical system, world trade, public policy, integrated management

3673-Can Local Governments Become Global Pipelines

Naaki Fujiwara¹

*Otemon Gakuin University Faculty of Regional Development Ibaraki-Japan*¹

Research from the perspective of clusters and innovation systems indicates that networks support the competitiveness of regions (Tödtling and Trippel 2005). Regional actors serve as a “global pipeline” (Bathelt et al. 2004) and as “gatekeepers” (Rychen and Zimmermann 2008) to smooth the transfer of knowledge and information for increased regional development. However, when no companies can fulfill this role, the ways in which municipalities can accomplish these functions lacks in-depth study. Therefore, this research aims to fill this gap. Municipalities not only act as coordinators for regional economic development but also disseminate information about local companies and technologies and introduce new external knowledge and information (Asheim et al. 2011). Many municipalities in Japan are now pursuing internationalization policies to globalize the region. In addition, it is assumed that the international strategies that are adopted by municipalities differ, depending on the population size and the centrality of the region. Therefore, this study examines what kind of regional development policies concerning internationalization are possible for municipalities by scale. The methods include text analysis of international strategies that were established by Japanese municipalities and semi-structured interviews with some of them. As a result, we divided the typology of municipal international regional development policies into three categories by scale. It was found that, for regional cities in Japan, where declining birth rates and aging populations are rapidly advancing, not only large cities but also some small and medium cities are keen to implement strategies to benefit from internationalization.



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T.12. Young and Early Career Geographers Taskforce (IGU YECG) IGUYECG and IAYG Young and Early Career Geographers Paper Session(s) and Award Competition

1188-The Trilemma of Energy Justice – Insights from India's Solar Mission

Komali Yenneti¹

*University of Melbourne Australia India Institute Ahmedabad-India*¹

In the recent years, social issues around renewable energy implementation have been gaining prominence both in developed and developing countries. Though researchers in developed countries have started dealing with this issue, there is a dearth of literature in developing countries. It is essential that justice issues are re-examined in this new arena that will increasingly affect the livelihoods of thousands of people in densely populated and socio-economically unequal developing country regions. In this paper, I explore the 'trilemma of energy justice' using the case study of a large scale 'Solar Park' implementation in India. The energy justice framework used in this paper corresponds to the theoretical knowledge on a) procedural justice, b) distributional justice and c) recognition principles based in social, environmental, spatial and energy justice literatures. The findings of this research provides new insights into how social justice issues, such as recognition of marginalised communities, equal and democratic participation and just distribution of project outcomes, are intrinsically interconnected to implementation of 'environmentally good' projects. In order to envisage a 'socially just' condition that addresses both cultural and economic injustices, it is imperative to adopt an approach that integrates procedures, distribution, and recognition with an understanding of socio-cultural diversities and differences in power relations of a society/community. This work is unique and timely as global leaders scale-up sustainable energy policies to meet the targets of the Paris Agreement and Sustainable Development Goals (SDGs). The application of multiple theories of justice – regarding procedures, recognition, and distribution – in solar energy development in India proved to be a significant and useful instrument for analysing controversies over the implementation of renewable energy policies.

1550-Visceral leishmaniasis and poverty in a high endemic area of São Paulo State Brazil

Patricia Sayuri Silvestre Matsumoto¹, Raul Borges Guimarães², José Eduardo Tolezano¹

*Adolfo Lutz Institute (IAL/SP) Parasitology and Mycology Sao Paulo-Brazil*¹ *São Paulo State University (UNESP) Geography -Brazil*²

Background: Visceral leishmaniasis (VL) is a severe disease that affects people and animals in Brazil, where the dogs are the main reservoir in the urban area. VL is fatal if not diagnosed and treated. Dogs are mainly euthanized. Thus, VL affects people and their animals in the space differently. This paper aims to discuss the disease and poverty in the Brazilian reality, mainly in small cities of the State of São Paulo. Materials and methods: We conducted a case-study from 2014 to 2015 in Votuporanga, a high-endemic city for VL. We correlated canine cases disease and social variables, such as the number of inhabitants, number of households, income, and age. We then mapped our data and applied spatial analysis based on geoprocessing, using Geographical Information System (GIS) tools. Results: We found a positive correlation ($p < 0.05$) between the number of cases and the number of people, households, and children.

On the other hand, it is negative for income ($p < 0.05$). The spatial distribution of VL presents that even in a small city, the spatial distribution of the disease is unequal. Its spatial pattern is clustered in poor areas, usually the borders of the urban area, where there are more people, households, children, and low- income.

We discussed what poverty is in this city and how it is related to VL, a reality faced by Brazilians in São Paulo State, in which there is an economical and sociocultural disadvantage. Conclusions: Maps can make visible places that suffer from neglected diseases, a valuable tool to achieve spaces less unequal.



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VIRTUAL

2370-Moving Beyond Economic Analysis Assessing the Socio Cultural Impacts of Displacement and Resettlement by Sardar Sarovar Project India

GAURAV SIKKA¹

L.N. Mithila University P.G. Department of Geography Darbhanga-India¹

Development projects have become synonymous with land acquisition leading to dispossession and forced migration of a large number of people and their involuntary resettlement in an alien environment. Contemporary studies on forced migration and displacement have been developed primarily on the basis of economic analysis. However, many relevant intangible social and cultural aspects were omitted and ignored. Many scholars like Reddy, 1990; Vyas, 1995 etc. have highlighted that there have been few studies on assessing socio-economic impacts of displacement due to development projects. In fact, economic and tangible impacts have been the focus of scholars for many years.

The present paper asserts to move beyond the 'limited' economic analysis and includes the critical social and cultural aspects of forced migration. The resettlement caused by the Sardar Sarovar Project has led to a change in dress patterns and marriage customs, loss of tribal folk art and destroyed the existing social networks and hindered access to new ones. The cultural differences were disregarded and traditional art forms like Phithora paintings were discontinued. The manuscript presents a juxtaposition of conditions at the original villages and resettlement sites. The insights in the work are based upon the fieldwork in select resettlement sites in Gujarat. Majority of the resettlers are tribals belonging to tribal communities like the Tadvi, Vasava, Raathwa and Bhilala. The author adopted mixed-methods approach and has employed field surveys, participant observations, focus group discussions and key informant interviews as a means for data collection in the study area. As a matter of fact, the findings shall be useful to have a just and fair resettlement and rehabilitation.

2385-STATE OF URBAN RURAL CLEAVAGE IN ELECTORAL PREFERENCES CAUSED BY SOCIO POLITICAL SITUATION IN PATNA INDIA

Prerna Bharti¹

Patna University Geography Patna-India¹

Abstract

The electoral choice of individuals is modified by a wide range of social, economic, political, institutional legislative and psychological factors. Indian elections are mind bogglingly complex. The spatial pattern of electoral preferences based upon the various socio-political background creates a space for geographical research. Most societies are split along some fault lines which shapes political attitude and perception. There are several dimensions along which the social fault lines or cleaves are manifested. Such as social class, religion, gender, occupation, age etc. One of the classic cleavages is framed by urban- rural conflict line.

As city dwellers are usually politically different from countryside people in terms of source of income, living condition, education and social and economic priorities. The characteristics of rural- urban cleavage is to be evaluated in present paper using example of Patna district located in eastern India. The time period of upcoming analysis is from 2005 to 2015. Indians in urban and rural communities have different views when it comes to social and political issues.

The objective of the study is to find out how geographical locality of a voter predicts her political attitude? Secondly, to compare voting motivation and restraints among the urban and rural areas. Lastly, to study gender perspective of rural urban cleavage in electoral preferences. The research is based upon the field survey, primary data and secondary data as well as newspaper reports and articles. Apart from that government data from Election Commission of India, District Election Portal itself has been used to enrich the work.



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VIRTUAL

2666-The 'Pagdi System' An Urban Developmental Challenge

Sujayita Bhattacharjee¹

*University of Mumbai Geography Mumbai-India*¹

The 'pagdi system' is a form of property renting system that has been prevalent in India even before the independence of the country. There are many old buildings and chawls in the city of Mumbai that are under this system. The peculiarity of the system is that the tenant of a property is also a part-owner of the house (not the land though), and has the right to even sell the house, provided a fixed certain percentage of amount is paid to the landlord. Besides, such properties are covered under the Rent Control Act and the tenants are only required to give minimum rents to the landlords, which are usually meager amounts. The prevalence of the system is found in many old properties of Mumbai. These existing pagdi properties of Mumbai are no longer in good shape as they were built a long time ago, needing severe repairs to even redevelopment. Yet, the conflicting ownership pattern prevents any easy solution to the problem, compelling people to reside in these properties even under risky conditions compromising their safety and security. This has not only emerged as a housing crisis but also as a developmental issue. However, the issue has not gained sufficient attention and as a result, studies concerning it are practically non-existent. Based on this understanding, the study attempts to gain an indebt understanding on the developmental challenges posed by the prevalence of the pagdi properties in Mumbai. Considering the major findings derived, the study also forwards viable solutions to tackle the existing scenario, thereby, contributing to the reduction of the urban developmental challenges.

3197-ERGONOMIC IMPLICATIONS AND HUMAN HEALTH IN TEXTILE INDUSTRY OF AMBEDKARNAGAR DISTRICT INDIA

MAHVISH ANJUM¹

*Prof. Rajendra Singh (Rajju Bhaiya) University GEOGRAPHY PRAYAGRAJ-India*¹

Background: Textile sector plays an important role in raising the economy of developing countries and provide employment opportunities to many people in urban as well as rural areas. Powerloom sector is one of the pivotal but unorganized part of textile industry in India and mainly run by private establishment. Powerloom industry generally seen as a safe place to work compared to other industries. The major health risk in this industry do not arise from immediate, potentially fatal hazards. Instead, the risk that powerloom workers face come from more subtle hazard whose effects accumulate over time. Ergonomic is the system under which fatigue and safety is analysed. Ergonomic study focuses of identifying and understanding occupational health and safety risk aspects of the powerloom industry workers in Ambedkarnagar district.

Material and methods: Present study aims to identify ergonomic problems, the cause of injurie and recommended practices in powerloom industry. The study is mainly based on primary sources of data which were collected through field survey at household level in Ambedkarnagar district. On the basis of Purposive random sampling total 300 workers from 4 blocks have been surveyed with the help of questionnaire interview in August 2019. The data has been analysed by using Karl Pearson Correlation technique and Student t-test. GIS techniques have been used for preparing location maps.

Result: Results show that the productivity of industry decreased due to various ergonomics factors. The study further reveals that injuries, muscle pain affecting back shoulder, wrist and neck are common problems for the workers in power loom industry due to repetitive nature of job and poor design of spinning wheel.

Conclusion: The study conclude that work related discomfort and pains are major occupational health problems among the workers engaged in powerloom industry.



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VIRTUAL

3520-What is Neighbour in Post Corona Era Tracking the changes of its Definition in Sharing Economy

Eva KWON¹

Konkuk University Dept. of Cultural Contents and Communications Seoul-Korea, South¹

Living in cities, visiting neighbours is becoming an extraordinary event. We hardly know who lives next door. In this research, we first investigate how lifestyles and social networks have been changed after Covid-19 and figure out how it has affected the meanings of neighbour. We investigate how neighbors and neighborhood have been defined geographically and how they have functioned traditionally compared to its new concepts. Assuming sharing spaces through digital platforms can be an alternative solution in quarantined lives, this research has begun. Accordingly, we examined opinions of 200 users participated in using space-sharing applications. After Covid-19, people seldom have chance to go on a long-distanced trip, but still have desires to be travel. This inspires people to use space-sharing service such as Airbnb. While Airbnb depends on a full-fledged trip, sharing only living rooms for several hours could be another solution to people quarantined in one city. Therefore, we have chosen a digital platform 'Nameezip' offering living-room-sharing service. We used the grounded theory and coded each answer according to five axis which are physical/geographical distance, empathy, privacy, trust, anonymity. We also suggest analytical clarity can be obtained by grouping descriptive statements of respondents based on quantitative methodology. Finally, we suggest a possible general definition: "Neighbour" is a person having intimacy in common through cultural contents such as hobbies/tastes but geographically and socially distanced which keeps privacy and anonymity. We conclude that to understand neighbors in Post-Corona era, one must focus on the combinations of distance, intimacy, privacy, trust, anonymity in each case. The geographical scope of neighborhood has been expanding, however, psychological distance has become closer gaining empathy and sharing cultural contents. As the meaning of neighbor is becoming flexible mixing with five categories, it should be regarded as a new type of social networks in Post-Corona era.



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VIRTUAL

W.1 Geospatial Open Source Software And Data For Solution Oriented Geographical Research And Education

2043-Constructing the Integrated Portal Site of Japanese Old Maps

Keiji Yano¹, Satoshi Imamura², Ryo Kamata³

Ritsumeikan University Geography Kyoto-Japan¹ Ritsumeikan University DMUCH imamuramami285@gmail.com-Japan²

Freelance programmer Freelance programmer kamata.y.ryo@gmail.com-Japan³

Digital humanities promoting the collaboration and uniting of research fields from both the humanities and sciences has gestated in the world since the middle of the 2000s. It involves investigation, analysis, synthesis and presentation of knowledge through the use of ICT. "Spatial turns" are referred to throughout the academic disciplines, often with reference to historical GIS at the same time. To ensure a leaping development in the new project-based research style through interdisciplinary and international collaboration within Historical GIS in Japan, and by extension traditional humanities in Japan, it is of primary importance to build portal sites that can provide comprehensive and lateral search of Japanese old maps which are fundamental materials, while making GIS analysis possible.

The purpose of this paper is to develop the integrated portal site of Japanese old maps. The portal site we develop consists of three parts; 1) Web-based searching and browsing system for Japanese old maps with no georeference, 2) Web-based searching and browsing system for Japanese old maps with the georeference tool (Map Warper), and 3) Web-based searching and browsing system for georeferenced Japanese old maps.

Regarding constructing the integrated portal site of Japanese old maps. We are gathering a lot of Japanese old maps which are owned by libraries from Japan and abroad; International Research Center for Japanese Studies, British Library, East Asian Library at UC Berkeley, and so on. The Japanese Map Warper belongs to the last part embedding the web georeferenced system as well as searching and browsing system. The georeferenced maps can also be converted to GeoTiff, KLM and MapTiles. Using these exported images and Map services. the integrated portal sites would provide an effective tool for comprehensive research of Japanese old maps, and also, should promote the digital humanities using GIS and the spatial humanities.



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2474-CROP PRODUCTIONS VARIABILITY UNDER RECENT CLIMATIC CONDITIONS AND SOCIOECONOMIC TRANSFORMATIONS IN THE ROMANIAN PLAIN BASED ON AVAILABLE GEOSPATIAL DATA

Diana Dogaru¹, Mihaela Sima¹, Laura Lupu², Claudiu Angearu³, Dan Balteanu¹

Institute of Geography, Romanian Academy Environmental Geography and GIS Bucharest-Romania¹ Institute of Geography, Romanian Academy Human Geography and Regional Development laura_lepadatu1990@yahoo.com-Romania² National Meteorological Administration Remote Sensing and GIS angearuclaudiu@gmail.com-Romania³

Agricultural sector in Romania has been highly impacted by major political and socioeconomic transformations over the last three decades, which marked the transition toward market economy and beyond. The drivers of change and their consequences for agriculture are strongly interconnected and relate to: land restitution and ownership, land use structure changes, significant damages of the irrigation systems, national and European Union agricultural policies and land market. Furthermore, the agriculture in Romania is strongly dependent on climatic conditions and affected by climate variability and change, particularly by increased frequency and duration of droughts. In this paper, we accounted for land use common practices and for crop responses to climatic variability to assess the crop production fluctuations throughout the Romanian Plain (~ 52 600 sq. km) during 1997-2018 period. Our analyses include agricultural land fragmentation metrics derived from COPERNICUS suite of data and yield simulations obtained with an EPIC-based crop growth model. The results show the high level of land fragmentation on the one hand, and the degree of climate-induced yield variability, on the other. Specifically, the observed weather variation can explain more than 50% of the yield variability for the main crops (i.e. wheat and maize) in most of the counties of the study area. Furthermore, avoiding water stress by simulating yields under full irrigation conditions, it is shown that water limitation is a major driver of the observed yield variations and that water use efficiency can be maximized under irrigation only. The quantification and deeper understanding of crop responses to climate variability is necessary for designing integrative solutions, including adaptation measures and sustainable economic growth of farms. Freely available softwares and data represent useful tools for accounting weather influences on crop yields and exploring various pathways to reduce the negative consequences of (potential) forms of climate impacts on agriculture.



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3264-The story of open source geospatial ecosystem & the geography community a love affair

Vasile Craciunescu¹, Codrina Ilie²

Romanian National Meteorological Administration Remote Sensing & GIS Laboratory Bucharest-Romania¹ OSGeo board of directors codrina.ilie@terrasigna.com-Romania²

The Free and Open Source paradigm is no longer a novelty in the geospatial world. There are numerous, stable and powerful solutions, services, libraries built and maintained in the spirit of FOSS. The movement has long overcome the status of a garage hobby, infiltrating all sectors: private, public and academia. It is safe to say that, today, the open source for geospatial ecosystem is a healthy, mature environment with solutions that cover all cycles of geospatial data processing and visualisation. There are hundreds of relevant events around the world each year, from conferences to hackathons, workshops and seminars, studies and reports analysing open source business models, funding schemas and explicit request for projects that built software to make it open source. In short, there has already been tremendous growth in the adoption and use of open source software and geographers represent a large percent of the user community. However, there is still room for improvement. The talk aims to present the ecosystem of open source software for geospatial and the benefits of using such tools in our daily work. A special attention will be given to the projects developed under the umbrella of the Open Source Geospatial Foundation (OSGeo) whose mission is to foster global adoption of open geospatial technology by being an inclusive software foundation devoted to an open philosophy and participatory community driven development. The foundation provides financial, organizational and legal support to the broader open source geospatial community. It also serves as an independent legal entity to which community members can contribute code, funding and other resources, secure in the knowledge that their contributions will be maintained for public benefit. OSGeo also serves as an outreach and advocacy organization for the open source geospatial community, and provides a common forum and shared infrastructure for improving cross-project collaboration.

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VIRTUAL

C.O. African Studies Africa and Natural Resource Use Management

1854-Relationships between the Livelihood of Local Residents and Vegetation in Bwabwata National Park Northeastern Namibia

Atsuki Shibata¹

*Kyoto University Graduate School of Letters Kyoto-Japan*¹

Africa's policy on nature conservation changed in the 1980s from "conservation of wilderness" to "community-based conservation," where the local residents manage conservation. Following this policy change, many studies have made assessments of community-based conservation and its influence on local residents. Bwabwata National Park in northeastern Namibia has also been studied in detail because of the fact that local residents settle in the protected central region of the park. However, few quantitative studies have been conducted on the relationship between local residents and Bwabwata's natural environment. In particular, there is no research on the relationship between the livelihood of local residents and the vegetation in the national park from the viewpoint of the landscape. It is necessary to understand this aspect of community-based conservation to clarify how the practice works.

The relationship between the livelihood of local residents and the natural environment of the national park became clear through observation, interviews, and other quantitative methods. Surveys also made clear the state of the vegetation including the impact to vegetation on a special, local topographical feature called "old drainage," the difference between the vegetation structure in the multiple use area and in Bwabwata's core area, and the unequal distribution of useful trees in villages which are diversified by population and settlement time. From these results, this study suggests that, even though the livelihood of the local residents impacts the vegetation and landscape of Bwabwata National Park, this livelihood is based on deep knowledge and experience of the park's natural environment, and is a crucial part of its conservation and management.



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C.O.African Studies African and Climate Change

1957-Impact of Glacial Reduction and Change in the Water Environment on a Local Community on Mt. Kenya

YUYA OTANI¹

Kyoto University Geography Kyoto-Japan¹

Glaciers on Mt. Kenya have been shrinking rapidly during recent decades due mainly to global climate change. In the south-facing upper watershed on Mt. Kenya, the water supply is insufficient for the farmland and daily lives of the inhabitants because of the shortage of water available from both the Naromoru River and precipitation, with large interannual and seasonal fluctuations. No observational field research has been conducted to determine the contribution of glacial meltwater to the water environment in this watershed. Thus, the present study aimed to elucidate the current conditions of the water environment in the upper part of the Mt. Kenya watershed through hydrogeochemical field observations and interviews with local residents. The range of $\delta^{18}\text{O}$ values of the spring at the foot of Mt. Kenya (ca. 2,000 m) was -4.12‰ to -3.33‰, and δD values ranged from -20.66‰ to -15.91‰. In addition, $\delta^{18}\text{O}$ values of the Naromoru River water (ca. 2,000 m) ranged from -3.29‰ to -2.85‰, and δD values from -13.42‰ to -7.58‰. Both of these values were similar to those of the glacier ice melt water ($\delta^{18}\text{O}$ = -4.35‰ to -1.88‰, δD = -27.44‰ to -9.83‰). We also calculated the high altitude effect and thus estimated the altitude of water sources for the spring and river which are utilized at the foot of the mountain. That is, by substituting the average $\delta^{18}\text{O}$ value of the river water (-3.03‰; range 1,858–2,090 m) into the high-altitude effect line ($E [\text{m}] = -380.96 \cdot \delta^{18}\text{O} + 3496.4$), the source altitude was estimated to be 4,650 m. On the other hand, the source altitude for the spring water (altitude: 1,943–2,089 m) was estimated to be 4,718 m. These results suggest that the glacier and snowfall on the higher elevations contribute greatly to the Naromoru River and spring at the foot of Mt. Kenya.



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C.O.African Studies African Development Challenges and Trajectories

2708-South Sudanese Refugee Survivors of Sexual and Gender Based Violence and Torture Health and Justice Service Responses in Northern Uganda

Hazel Barrett¹, Helen Liebling¹, Lillian Artz²

Coventry University CTPSR Coventry-United Kingdom¹ University of Cape Town Institute of Criminology -South Africa²

Background

This British Academy/Leverhulme-funded research investigated the health and justice service responses to the needs of South Sudanese refugees living in refugee settlements in Northern Uganda who had been subjected to sexual and gender-based violence (SGBV) and torture.

Methods

The research involved the collection and thematic analysis of the narratives of 20 men and 41 women refugee survivors of SGBV and torture including their experiences in South Sudan, their journeys to Uganda and experiences in refugee settlements, in particular their access to health and justice services. Thirty-seven key stakeholders including international, government, non-government organisations and community groups were also interviewed regarding their experiences of providing health and justice services to refugees. Research was undertaken between May and June 2018 in Adjumani and Bidi Bidi Refugee Settlements.

Results

All refugees had survived human rights abuses mainly carried out in South Sudan but also on route to Uganda and within Uganda. Despite the significant impact of their experiences, the analysis indicated there was limited service response in refugee settlements in Northern Uganda. The thematic analysis indicated five main themes coming from the interviews. These included: the range of SGBV and torture experiences of the refugees, including domestic violence and child abduction and marriage; issues associated with service provision such as lack of adequate screening and under resourcing of health and justice services; a lack of gender sensitivity and specialist services particularly for men; the involvement of Faith-Based Organisations in providing counselling and offering emotional support and hope to survivors; and recommendations to improve health and justice responses and services to improve refugee recovery, dignity and resilience.

Conclusion

The authors recommend an integrated service provision should be adopted, which brings together formal and informal health and justice provision. Such provision should include regular screening, a gender sensitive approach and consultation with refugee survivors.



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C.2. Biogeography and Biodiversity Mountain Ecosystems Responses to Climate Change

2624-Dynamics of Silver Fir at a central Himalayan treeline ecotone

Niels Schwab¹, Karolina Janecka², Ryszard J. Kaczka³, Jürgen Böhner¹, Ram Prasad Chaudhary⁴, Thomas Scholten⁵, Udo Schickhoff¹

CEN Center for Earth System Research and Sustainability, Institute of Geography Universität Hamburg Hamburg-Germany

¹ Institute of Botany and Landscape Ecology University of Greifswald --Germany ² Faculty of Earth Sciences University of Silesia in Katowice --Poland ³ Research Centre for Applied Science and Technology (ReCAST) Tribhuvan University --Nepal ⁴ Department of Geosciences, Chair of Soil Science and Geomorphology University of Tübingen --Germany ⁵

The Himalayan Mountains have been most affected by climate change over the last century. At higher elevations, low temperatures during the growing season result in tree growth limitations, which determine the elevation of natural upper treelines. It is assumed that climate change induced temperature increase causes treelines to advance to higher elevations. However, empirical studies of diverse mountain ranges have yielded evidence of both advancing alpine treelines as well as rather insignificant responses. The reasons for this discrepancy are not well understood. We, therefore, selected the Rolwaling valley in east-central Nepal comprising a treeline ecotone with negligible human impact. Such treeline in near-natural condition offers an opportunity to study the dynamics caused by climate change. To address the aforementioned research deficits, we mapped the elevational position of Himalayan Silver Fir (*Abies spectabilis*) trees across the Rolwaling treeline ecotone and measured their diameter at breast height. We took tree-ring cores from some trees of all diameter classes along the elevational gradient and applied standard dendroecological methods. A regression model was developed between diameter and age of the sampled trees as derived from their cores. We used this regression model to estimate the age of those trees, which we did not take the cores from. Results indicate intense, sustainable regeneration in recent decades and, thus, a potential for upward migration. However, we found only few individuals above the current treeline. We conclude that ecological conditions of the dense *Rhododendron krummholz* belt above the treeline most likely control the upward migration. A treeline shift is to be expected in the mid- to long-term only.



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VIRTUAL

C.3. Climatology Climate Variability and Change from Global to Local Scales

1839-IMPACT OF TEMPERATURE AND RAINFALL VARIATION ON RICE PRODUCTIVITY IN AGRO ECOLOGICAL ZONES OF BRAHMAPUTRA VALLEY ASSAM INDIA

Bimal Sharma¹, Michael Jasper¹, Charles Lemckert¹, Milica Muminovic¹

University of Canberra Faculty of Arts and Design Canberra-Australia¹

The Brahmaputra valley, a north eastern part of the great plains of India, is surrounded by the Bhutan and Arunachal Himalaya in the north, Meghalaya plateau in the south and the Patkai and Naga Hills in the east. About 30% of the Brahmaputra basin is covered by forest. The rural lives are basically linked mainly with the subsistence mode of farming, livestock rearing, and traditional fishing closely connected with the wetlands (Bhuyan, M. J. 2016). The agricultural sector dominates the economy of the Brahmaputra Valley, India, with more than 50 per cent to the total gross domestic product and employs about 70 per cent of the workforce in the region. The annual flood and erosion is shattering the fragile agro-economic base of the region. As a result, thousands of acres of cultivable lands are lost. Due to flood hazards many farmer have become landless and have been forced to migrate. Rural agrarian livelihood is in threats due to natural hazards. In spite of favourable agro-ecological conditions for agricultural development and growth, the trend is observed general trend is one of stagnation. This present research examines the effect of temperature and rainfall on rice productivity patterns of the valley for a duration of 11 years (2007 to 2018), using rice yield, temperature and rainfall data collected from the Government agencies of Assam, India. Coefficient of variation and multiple regression techniques were used to examine the data and it was found that there exists a relationship between the climate variables and rice productivity patterns in the valley. It is observed that there exists significant inter and intra regional variability and trend of rainfall and rice productivity pattern.

1885-Characteristics on seasonal marches of rainfall and surface wind at Manila for the late 19th century

Ikumi Akasaka¹, Masumi Zaiki², Hisayuki Kubota³, Jun Matsumoto⁴

Senshu Univ. Department of Geography Kanagawa-Japan¹ Seikei Univ. Faculty of Economics -Japan² Hokkaido Univ.

Department of Earth and Planetary Sciences -Japan³ Tokyo Metropolitan Univ. Department of Geography -Japan⁴

In the Philippines, the meteorological observation was started by Spanish Jesuits in 1865 and was conducted by the U.S. administration for the early 20th century. We have collected these records, archived in different places (e.g. the UK, Spain and Japan), and digitized under the data rescue projects in Japan. These records are essential to study climate changes in the Southeast Asian countries where have no enough meteorological data before the mid-20th century. Particularly, this study focuses on seasonal marches in wind direction and rainfall at Manila, where has the oldest and continuous data in the Philippines, for the late 19th century.

We mainly used hourly wind direction and speed, and daily rainfall from 1890 to 1900 and calculated the appearance frequencies of the prevailing wind directions in each pentad and pentad rainfall. We also determined the onset and withdrawal pentads of summer rainy season: the onset (withdrawal) pentad denotes the first pentad when the pentad rainfall exceeds (falls below) 25 mm since April (August).

As the results, the onset of the rainy season occurred around mid-May when the frequencies of the southwesterly wind continuously exceeded to 20%. Those high frequencies appeared all day from May to September. Around October, frequencies of the northerly and northeasterly winds started to increase from evening to morning and rainy season also started to withdraw. These characteristics on the seasonal marches of rainfall and wind are quite similar to those since the late 20th century. This means that these old records are useful to clarify the long-term variability in the Philippine climate and the Asian monsoon. In our presentation, we will discuss those longer-term variability by adding the meteorological data from 1868 to 1883.

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VIRTUAL

2851-Newly discovered long term freezing breaking up dates record of Lake Juhsan in Northern Japan during 1705-1860 as compared with those of Lake Suwa

Naoko HASEGAWA¹, Takehiko MIKAMI², Junpei HIRANO³

*Ochanomizu University geography tokyo-Japan*¹ *Tokyo metropolitan University geography -Japan*² *Teikyo University geography -Japan*³

Long-term freezing dates record of Lake Suwa in Central Japan since 15th century would be well-known among the historical climatologists as a valuable documentary data for the winter climate reconstruction (e.g., Gray, 1974; Lamb, 1977; Tanaka and Yoshino, 1982; Mikami, 2008; Sharma et al., 2016). Recently, we newly discovered a long-term continuous records of lake freezing/breaking-up dates of Lake Juhsan in Northern Japan during 1705-1860, which were described in the official diaries of "Hirosaki" clan in Northern Japan during the Tokugawa Edo Period. Our previous studies for Lake Suwa freezing records indicate high correlations between the lake freezing dates and the winter temperatures, and we attempted to reconstruct winter temperatures in Japan since mid-15th century (e.g., Mikami, 2008).

Preliminary analysis for the 155 year time-series of the freezing and breaking-up dates since 1705 shows large year-to-year variations and long-term trends. Regarding the freezing dates, it was the earliest around 1740, and the latest around 1820s. As for the breaking-up dates, it was the earliest around 1720, and gradually became late until 1830s. The duration of ice freezing on Lake Juhsan shows no clear trend for 155 years.

In addition, we compared freezing/breaking-up dates with simultaneous estimated air temperature in Tokyo. The result shows highly negative correlation between breaking-up date and February air temperature in Tokyo. This result seems air temperature in Tokyo correspond to that in Lake Juhsan, and that might influence the thickness of lake ice. This result suggests freezing/breaking-up date in Lake Juhsan is useful to estimate winter climate condition in Northern part of Japan, including Tokyo.

These results are compared with our previous studies on the winter climate reconstruction based on Lake Suwa freezing records and daily weather records in old diaries since 18th century.



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VIRTUAL

C.3.Climatology Synoptic Climatology

2919-Seasonal cycle and “seasonal feeling” in northern Europe including the day to day variability at the comparative view point with those in East Asia (Toward an interdisciplinary lesson study on climate and cultural understanding for promoting the fundamental ESD literacy)

*Kuranoshin Kato*¹, *Haruko Kato*², *Yusuke Kuwana*¹, *Kengo Matsumoto*³

*Okayama University Graduate School of Education Okayama-city-Japan*¹ *Gifu Shotoku Gakuen University Faculty of Education (music)* hkato@gifu.shotoku.ac.jp-Japan² *Okayama University Graduate School of Natural Science and Technology* yusuke.himawari.0311@gmail.com-Japan³

Although the significant seasonal cycle is commonly seen in the middle or higher latitude region, it presents rather different characteristics from region to region, also influenced by the global-scale monsoon systems in some regions, such as the Asian monsoon, and so on. Furthermore, features of the day-to-day, interannual and intraseasonal variabilities characterize the regional difference of the seasonal cycles. This results in the rather different “seasonal feelings” from region to region within the middle and higher latitudes, even for the season called the same word, such as “summer”.

For example, climatological analyses showed that the intermittent appearance of the extremely cold days accompanied by the large day-to-day variations and the early appearance of rather cold day already in September characterize the north European climate, while the much higher temperature with its relatively small day-to-day variation in midsummer around Japan, except for the northern Japan. Also the dominant pressure pattern in summer between the regions around northern Europe and Japan are rather different.

By the way, climate education is not only important for the scientific backgrounds for the individual ESD activities (studies on environment, disaster prevention and climate variability), but also it could contribute greatly to promoting the students’ and teachers’ fundamental “ESD Literacy” itself, such as thinking of various complex relations, diversity, etc., among the ESD targets, including the understanding of “Heterogeneous others”. We will introduce some integrated knowledge on the seasonal cycle and “seasonal feeling” (as for the latter, such as those seen in a traditional event “Juhannus” (Summer Solstice Festival), and the seasonal songs in Finland, etc.) around the northern Europe including our further analyses, toward development of an interdisciplinary lesson study on climate and cultural understanding for promoting the fundamental ESD literacy.



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VIRTUAL

C.3.Climatology Urban Climate

2001-Preliminary results from analysis of data of air temperature monitoring carried out at Center for geophysical monitoring of Moscow and Geophysical observatory Mikhnevo of Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences

Svetlana Riabova¹

*Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences Near-Surface Geophysics Moscow-Russia*¹

As urbanization increases over time, monitoring the urban microclimate becomes crucial. The urban microclimate is influenced by surface materials, city structure, introduction of heat, air pollution, disposition of precipitation and urban vegetation. In addition, urban microclimates are affected by external factors such as the topographic features, cloud cover, season, city and population size, and time of day. Urban microclimates are often characterized by urban heat islands, phenomena that cause city atmospheres to be consistently warmer than surrounding non-urbanized areas. The climate of an urban area often differs from that of the surrounding countryside. Increased temperature in cities (termed the urban heat island effect) is present all around the world and contributes to global climate change and, in turn, is exacerbated by global climate change. Urban heat island effect increases the risks of climatic and biophysical hazards in the urban environment, including heat stress and heightened exposure to air pollutants. In this work we analyze time variations of temperature which are registered approximately in the center of Moscow (Center for geophysical monitoring of Moscow of Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences, Russian Federation, Moscow, Leninky prospect), the largest city (by area) on the European continent, and 85 km south of Moscow, rural area (Geophysical observatory «Mikhnevo» of Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences, Russian Federation, Moscow Area, Mikhnevo settlement). During processing and analysis of the results of recording of air temperature by Davis Vantage Pro2 weather station seasonal and diurnal variations of air temperature at both sites are established. The findings show a difference between time variations of temperature in Moscow (urban area) and at observatory «Mikhnevo» (rural area).



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C.4.Coastal Systems Sustaining Coastal and Marine Environments in the Anthropocene

2198-Getting Along With The “Fever” Micro Scale Differences In Response To Sea Cucumber Market Pressure In Western Hokkaido Northern Japan

Ayumu Matsui¹, Seishiro Sakita²

Nagoya University Geography Nagoya-Japan¹ National Museum of Ethnology Modern Society and Civilization -Japan²

The rapid expansion of the global sea cucumber market since the late 1980s has changed the landscape of local fisheries and their livelihood. Since the 1980s, Japanese sea cucumber (*Apostichopus japonicus*) exports have rapidly increased with the economic growth of China, a major consumer country. Previous studies reported negative aspects, such as the rise of market pressure lead depletion of sea cucumber resources in the short period, the deterioration of the living environment due to the influx of fishers/poachers from outside. On the other hand, in western Hokkaido, northern Japan, where is our study area, the new scheme of sea cucumber fishery was constructed. In which, local fishermen outsource operation on fishing grounds to a professional diver, and the profit was distributed among them. In our presentation, we examine how the new scheme —introduced in relation to the increasing external demand— spread and was accepted/ or rejected with micro-scale differences in local fishing areas. We use the results of open-ended interviews conducted for the fishery cooperative association's staff, officers, and local fishermen as crucial data. Although sea cucumbers in the case area had been exploited by small-scale trolling in the study area until the 1980s, it has become almost unused resources in the 1990s. When the new scheme was first introduced in one district in the mid-1990s, it spread to other neighboring districts after the 2000s. However, the new scheme has not been introduced uniformly in each district. We can see the difference among districts in profit sharing and resource management systems. Local fishermen, that is, constructed the new scheme on their diverse strategies while reflecting the micro-scale social, economic, and natural environmental conditions. We conclude that it is essential to note that local fishermen are not only passively affected by market pressure.

2994-Holocene Evolution and Cultural Imprints in the Krishna and Godavari twin Deltas the East Coast of India

Sumiko KUBO¹, K. NAGESWARA RAO², P. VIJAYA PRAKASH³, Noboru SADAKATA⁴

Waseda Univ. Dept of Geography Tokyo-Japan¹ Andhra Univ. Dept of Geo-Engineering -India² Andhra Univ. Dept of Anthropology -India³ Yamaguchi Univ. -Japan⁴

River deltas, at the interface between the land and oceans, are sensitive to changes in the fluvial and marine regimes. Therefore, deltas carry in their sediment archives the imprints of the climatic, geomorphological and cultural history of the region. The Krishna and Godavari rivers originate in the Western Ghats and flow eastward across the Indian peninsula for 1,400 km and 1,465 km, respectively, before decanting into the Bay of Bengal. With the drainage areas of 258,948 km² and 312,812 km², respectively, the Krishna and Godavari are the third and second largest river basins in India, after the River Ganga (Ganges). Both these adjacent rivers built extensive deltas on the east coast of India, which are coalesced into one large delta complex covering 12,700 km² characterized by extensive beach-ridge plains, lagoons, mudflats and mangrove swamps. We conducted the study to reconstruct the Holecene evolution by number of drilled cores in the Krishna and Godavari Deltas. Micro-scale topography and modern land use changes in coastal area were studied by time series satellite images. We surveyed several archaeological sites in the delta plain and obtained radiocarbon dates for the cultural material. The results include: 1) the stages in the evolution of the Krishna--Godavari delta plain through coastline progradation and depocentre shifts in the Middle-Late Holocene, which indicated an accelerated delta growth since the Neolithic period predominantly due to increased sediment supply through the rivers as a consequence of deforestation and soil erosion owing to increased sedentary agriculture in central and south India, 2) Human impacts on the coastal lowlands and wetlands in recent decades, and 3) The Buddhist and Jain cultural evolution in the prograding delta plain during the past 2,000 years.



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C.5. Cold and High Altitude Regions Cold Regions at the Crossroads II Changing Climate and its Environmental Social Impacts

3014-The impact of climate change and technogenesis on the sustainability of infrastructure in the Arctic

Valery Grebenets¹, Ali Kerimov², Fedor Iurov¹

*Lomonosov Moscow State University, Faculty of Geography Department of Cryolithology and Glaciology Moscow-Russia*¹

*Research and Production Association "Foundation" agk@npofundament.com-Russia*²

Climatic parameters and anthropogenic impact actively influence the change in permafrost properties. In the last 30–40 years in the Arctic regions, virtually maximum trends have been observed in increasing air temperatures; precipitation regime changes significantly. In recent years, the demand for natural resources has increased, which has increased the pace of development of the Arctic, however, complex multi-scale, multi-simultaneous and multidirectional physical and economic geographic conditions impose restrictions on this process; Correct forecasts of behavior in the system of "external influences - permafrost" are required.

Our field observations and analysis of information about the state of infrastructure in the permafrost zone showed that there are very negative changes in the geocryological situation. Currently deformed: about 25% of buildings and structures in Norilsk, 80% - in Vorkuta, 48% - in Yakutsk, 60% - in Igarka and Chita, 80 - 100% - in small settlements of the Arctic, etc. When assessing the contribution of climatic factors and technological impact on the reduction of stability, emphasis is placed on three main parameters: a) reduction in bearing capacity; b) an increase in the forces of frost heaving in a changing active layer; c) activation of dangerous cryogenic processes. According to our assessment, in the instability of the permafrost infrastructure, the "contribution" to climate warming is noticeable, especially in the southern regions of the permafrost zone. However, for example, in the Norilsk industrial region (Taimyr Peninsula) it does not exceed 10-15%.

Ensuring the sustainability of infrastructure in the Arctic, which is currently a key region for the well-being of the northern regions, is impossible without permafrost, which reacts sharply to changing climatic factors and anthropogenic impact in various landscape and geographical conditions.

This work was supported by the RFBR grant 18-05-60080 "Dangerous nival-glacial and cryogenic processes and their impact on infrastructure in the Arctic"



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3018-Features of the conduct of transport systems in permafrost during climate changes. Regional geographic factors.

Fedor Iurov¹, Valery Grebenets¹, Sergey Sokratov¹, Vasily Tolmanov¹, Ali Kerimov²

*Lomonosov Moscow State University, Faculty of Geography Department of Cryolithology and Glaciology Moscow-Russia¹
Research and Production Association "Foundation" -Russia²*

Permafrost is a key characteristic of the natural environment of the Arctic regions, which are areas of prospective development and are rich in hydrocarbon deposits and ore minerals. Climate changes lead to the warming and degradation of frozen soils and a change in engineering-geocryological parameters.

The most vulnerable are the objects of transport infrastructure: roads, pipelines, communications, airport complexes, etc. This is due to the main characteristic of such objects - continuity and long extent. In addition, the construction and operation of linear industrial systems often activates hazardous cryogenic processes.

Complex field studies, numerical modeling of the properties of frozen soils for a number of regions of the Arctic (Vorkuta, Norilsk, North West Siberia, Svalbard) and a forecast of the state of transport infrastructure in changing conditions were carried out.

Studies have shown that in selected regions, the degree of impact of various cryolithological factors on the stability of transport systems has a different weight. On the Svalbard the greatest danger is drawdown of heavy-ice soils during thawing, stimulated by anthropogenic flooding. In the Vorkuta - uneven deformation of linear objects during soil drawdown, thermal erosion processes. For the North of Western Siberia, the main danger is frost heaving and activation of dangerous natural processes (waterlogging, thermal erosion, etc.) as a result of changes in the natural environment and human activity. Thermal karst, slope processes, and "cold" cryogenic processes are actively operating in the Norilsk industrial region.

Global climate change has a negative impact on frozen foundations, leading to the loss of stability of transport facilities. However, in many ways, the conduct of the infrastructure is determined by regional geographic factors and the characteristics of anthropogenic impact.

This work was supported by the RFBR grant 18-05-60080 "Dangerous nival-glacial and cryogenic processes and their impact on infrastructure in the Arctic"



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C.7.Dynamics of Economic Spaces Dynamics of Economic Spaces Economic Geography and Regional Development

1043-SITUATION OF THE FOREST INDUSTRY OF SPAIN IN THE CIRCULAR ECONOMY

ANGEL MIRAMONTES CARBALLADA ¹

USC GEOGRAPHY Santiago de Compostela-Spain ¹

One of the initiatives that is being supported from different organizations and administrations with a greater degree of consensus is the circular economy. An initiative whose main objective is to unite the economy with sustainability, generating added value to the raw material. At the same time it favors recycling or the creation of little waste. Globally, it is intended to constitute a political framework aimed at generating sustainable, inclusive growth that allows for growth and employment. In Spain there are already several documents on circular economy, in which certain sectors have a series of characteristics that link them more directly, such as the forest industry, where wood is its main raw material and is a renewable, reusable and recyclable material. So in this work a first evaluation of the situation in which the forest industry of Spain is within the circular economy is carried out. In order to achieve this objective, an initial presentation of the strategy of the circular economy will be started to advance later in a hierarchical and multiscale way towards the consideration of the circular economy in Spain and in the Spanish forestry industry. Macroeconomic data prepared by public and private organizations will be handled at international level that will allow us to justify our interpretations and conclusions such as the evolution of the tons of waste generated and waste recovered in Spain, the evolution of the estimate and demand for wood in Europe or number of forest owners who made wood cuts.

1249-Land Use in Municipality of Rahovec

Ferim Gashi ¹

University of Prishtina Geography Prishtina-Albania ¹

This study reflects a detailed description of "Land Use in Municipality of Rahovec". In this case, the natural, socio-economic characteristics of the municipality concerned the are analyzed.

The purpose of this paper is to better present the existing situation of the Municipality of Rahovec, geographical, climatic, hydrological, population, land use, transformations and their functions. The low standard, higher unemployment of the rural population, irrational land use, degradation of agricultural land, construction of buildings on agricultural land and overall lack of awareness and a sustainable urban and rural development plan have motivated me to do so Survey

Then the aim of the paper is to update the data, present the past and present situation, and compare the current and past situation, in which aspects Municipality of Rahovec has undergone more changes over the years, more rational use of space, recommendations etc.

Land Use, Rahovec, agricultural land, construction of buildings, socio-economic

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2757-When the peripheries become center the case of Western Paulista

João Victor Moré Ramos¹, José Messias Bastos¹

*Federal University of Santa Catarina Postgraduate Program in Geography Florianópolis-Brazil*¹

Abstract

This article is part of the research project on economic and social geography entitled "Socio-spatial formation: World, Brazil and regions", with particular interest in regional development studies that seek to decipher the ongoing transformations in the third world through the economic relations of center-peripheries, and their combinations derived from the process of uneven and combined development. In the face of the category socio-spatial formation expounded by Milton Santos as a theory and method for human geography, which starts from a totality (political, economic, legal, and cultural) historically determined in the continuities and discontinuities of time and space given concrete reality, the article seeks to unravel from the peculiarities and complexities of Brazilian economic and social development formulated by Ignácio Rangel, the recent transformations arising from the industrialization process in the middle cities of the western state of São Paulo. In a way of introduction, it is noted that the effects of "globalization" still face serious territorial obstacles to the promotion of high technology-intensive (R&D) sectors in their local productive structures, despite the western plateau region having a vigorous regional market, as well as real economic dynamism in sectors of low technological intensity such as biofuels, food, footwear, beverages, furniture, footwear, leather, rubber, facilitated by the complex urban network with its transport and communication routes. In this sense, the focus of the article is on the recent formation in the region of the natural rubber complex, which currently concentrates 70% of the national production in its space, and which in recent years has increased massive investments in genetic improvements in material of rubber tree clones through Agronomical Institute of Campinas (IAC), in partnership with the Center for International Cooperation in Recherche Agronomique pour le Développement (CIRAD).

2784-Spatial Development geographic analysis levels and evaluation

Baklanov Petr¹

*Pacific Institute of Geography FEBRAS Economic Geography Lab Vladivostok-Russia*¹

Territorial organization is considered here as a process of a certain ordering of socio-economic components within comparatively small compact territories. At the same time, it is necessary to embrace the emerging relationships, both between separate social economic components and their conjugations with the natural resource environment. A separate territory of a settlement with a belt of its natural resource surroundings should be considered as the primary level of the territorial organization. At this level, the first stage of spatial development is also realized as qualitative-quantitative increments in certain spatial structures and its links. At this level, economic, social, environmental and aesthetic criteria of the quality of the territorial organization can be used. The next levels of spatial development should be defined as fractional, meso-regional, and macro-regional ones, with a corresponding increase in generalizations of the characteristics of the territorial organization and spatial structures. For each of these levels, it is advisable to identify and assess various characteristics and properties towards their specification to fractional areas. The latter level requires identifying and assessing of spatial structures of nature management. The linking structural link between local levels of analysis, settlements and districts, is proposed to consider as the territorial socio-economic systems (TSES) in the form of a combination of settlements tied by direct transport links with a certain central settlement. This system should include all spatial structures of nature management directly tied with its components, including land use, forest use, water use, etc. At levels of districts, the spatial development occurs in the form of qualitative and quantitative increments of regional spatial structures with their generalized characteristics and boundaries. The analysis of spatial development at these levels is carried out on the basis of integral zoning and assessments of district structures and inter-district links and relations.



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2907-GEOGRAPHICAL FEATURES OF GREEN ECONOMY DEVELOPMENT IN UKRAINE RESEARCH BASED ON THE STUDY OF GREEN JOBS

Olena Kononenko¹

*Taras Shevchenko National University of Kyiv Department of Economic and Social Geography Kyiv-Ukraine*¹

The creation of green jobs is seen as a part of the concept of green economy growth and is an important task in implementing sustainable development ideas. In this study, we use the theoretical developments of Renner M., Kouri R., Clarke A., Stern N., Bezdek R. and al., as well as the UN requirements and recommendations on the essence and structure of green jobs. Green jobs help to reduce the consumption of energy, raw materials and water through efficient strategies to decarbonize the economy and cut emissions of greenhouse gases, to diminish or completely avoid all forms of waste and contamination.

Climate change is causing the degradation of brown sectors that will inevitably lead to the strength in the national labor market, and in particular in the some regional labor markets, where resource-intensive production forms the basis of the regional economy.

The purpose of this study is to identify the green sectors in the economy of the regions of Ukraine and to estimate the share of those employed in the green economy. There are many uncertainties about green jobs, namely there is no clear list of activities that can be classified in this category, also some of the employed people work in the shadow sector and are not accounted for in the employment statistics. It has been identified several blocks in Ukrainian economy that we attribute to the green sectors of the economy: renewable energy, waste management, green forestry and fish breeding, as well as activities related to the repair of machinery, household appliances etc. The study presents the arguments that made it possible to attribute them to the green economy. According to our estimates, green jobs come up to 4.2% of all jobs in Ukraine and tend to increase.



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VIRTUAL

C.8.Environment Evolution Climate Vegetation Interaction Under Present and Projected Future Climate Conditions

2317-Combined effect over hydric resources of land use change after depopulation temperature warming and snowfall reduction in Cantabrian Mountains Spain.

Alfonso Pisabarro¹, Enrique Serrano¹

University of Valladolid Geography Valladolid-Spain¹

The mountains of the Iberian Peninsula are undergoing a process of abandonment resulting from emigration to large cities during the twentieth century and the aging of the few inhabitants who remained. This is the case in the Cantabrian Mountains, to the Northwest of the Peninsula where the cessation of forest management, the disappearance of subsistence agriculture and the reduction of livestock have led to a rewilding of pastures and crops. A closed basin of 233 km² has been analyzed under the methodology of the Integral Analysis of the Physical Environment at the head of the Pisuerga river. In it the agrarian area has been reduced from 70 to 18% since the 18th century until today.

Other environmental changes that have occurred in parallel have been detected after investigating the consequences of changes in land use on the physical environment, such as the increase in temperatures of 1.5° C since the late 1950s, the drastic reduction of snowfall in the 80s and 90s and especially, the reduction of river water resources above 20% since 1960 without the volume of rainfall having fallen.

Under the hypothesis that everything is related, the statistical correlation of the series of temperatures, rainfall and flow rates report a hydrological deficit retained in the basin independent of these variables that in the absence of significant human extractions or karst losses points directly to the vegetation. Then, data on flows and snowfalls have been compared to justify the interannual variability. The proportion of precipitation of water and snow falling in different years compared to the flows indicates that the snow is much more efficient producing runoff. Therefore, it is concluded that the snow controls the effects of the increase in vegetation and the increase in evapotranspiration produced by global warming annually.



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C.8.Environment Evolution Environment Evolution and Human Activity in the Holocene and Anthropocene

1472-Extreme values of soil erosion on agricultural slopes in the Polish Flysch Carpathians

Malgorzata Kijowska-Strugala¹, Eugeniusz Gil², Piotr Demczuk³

*Institute of Geography and Spatial Organization Polish Academy of Sciences Department of Geoenvironmental Research Szymbark-Poland*¹ - - Poland² *Maria Curie-Skłodowska University Faculty of Earth Sciences and Spatial Management -Poland*³

Soil erosion is a current problem in many regions of the world, especially in mountain areas. Soil erosion causes adverse and mostly permanent changes in natural condition and economic conditions. Extreme soil erosion on agriculture slopes in the Flysch Carpathians are associated with high sum and intensity of rainfall as well as lack, or insufficient density of vegetation (e.g. potatoes, beetroot). Extreme soil erosion values in Polish Carpathians are noted in the summer hydrological half-year (May-July) and is closely associated with land use and land cover as well as agrotechnical practices. The study was conducted on experimental slope in Bystrzanka catchment (49°38'04"N, 21°07'08"E) (Flysch Carpathians) in the period 1969-2000. The annual soil erosion recorded on plots with potatoes was 340 times higher than soil erosion on grassland. For the first time in the Carpathians the threshold of extreme erosion event on agricultural slopes was determined. Soil erosion above 20 Mg ha⁻¹, with a repeatability of once every 3.6 years, was assumed as a single extreme event. For the annual period, soil erosion above 48 Mg ha⁻¹, with a repeatability of once every 8 years, was calculated as the extreme value. In addition cover-management factor (C factor) was estimated based on the longest study of soil erosion conducted at the Research Station in Szymbark (Institute of Geography and Spatial Organization Polish Academy of Sciences). The Cover-management factor is one of the component in the Universal Soil Loss Equation/Revised Universal Soil Loss Equation and is the most important factor in policy and land use decisions. The results are a key to agricultural production and sustainable development.

2033-ENVIRONMENTAL DYNAMICS IN MURGAB RIVER DELTA AND ITS ROLE IN UNDERSTANDING THE DEVELOPMENT OF MARGIANA CIVILIZATION (GONUR DEPE TURKMENISTAN)

Margarita Shangina¹, R.N. Kurbanov¹, R.M. Sataev², N.A. Dubova²

*RAS Institute of Geography Moscow-Russia*¹ *RAS Institute of Ethnology and Anthropology* rob-sataev@mail.ru-Russia²

Introduction. A huge necropolis, dating back to the III Millennium BC, was excavated in the Mary oasis, south of Karakum desert (Turkmenistan) during the Margiana archaeological expedition under the leadership of V.I. Sarianidi in 1972. The monumental cult complex, excavated at Gonur-Depe settlement, was a large regional Zoroastrian centre in Margiana. The complex was located on a low hill on the right bank of the Murgab riverbed. The temple city existed until the end of XVI century BC. Almost all the authors agree that the important factors determining the historical processes during III-II thousand B.C., are intense aridization in the middle III Millennium B.C. and high population density in the. This situation definitely influenced the increase in mobility of the population. But to date the reason of the population decrease and abandonment of the Gonur-Depe have not been fully studied. Our understanding of the possibilities of extensive migrations from the Eurasian steppes to the southern agricultural areas, limited to reconstruction of hydrological regime of large rivers in the region. We have analyzed the space images of the Murgab river delta, performed a field geomorphological study of ancient channels.

Results. We highlighted the two possible paleochannels active at the time when Gonur-Depe were populated. First is located to the West of the settlement from which in ancient times there was a canal to a large receiving pool, second, smaller one is located to the south of the city. We performed drilling, section description, lithological and palynological analysis and luminescence dating. In general we identified series of paleochannels that together with different aeolian forms create a pattern allowing reconstructing the history of delta development. New data on the morphology and age of Murgab delta system will allow forming a new understanding of the Margiana civilization. This research was supported by RFBR (18-09-40082).



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2641-GEOMORPHOLOGICAL IMPLICATIONS ON THE EVOLUTION OF VEMBAND LAKE AND ITS ENVIRONS

Chinni V Naga Kumar Kommireddi¹

*Centre for Water Resources Development and Management Geomatics Division Kozhikode-India*¹

Vemband lake is the longest lake in India, was identified as one of the wetlands of International Importance by the Ministry of Environment Forest and Climate Change, Government of India, and was also designated as Ramsar site, is situated along the west coast of India. There are eight rivers draining into the Vemband lake, which are flowing from north, east and southern directions, and Arabian sea on its west direction. In the present study, based on the interpretation of satellite imagery and GIS technology, has revealed new insights to understand the evolution of the Vembanad lake and its environs. Satellite Imagery pertaining to Landsat Multi Spectral Scanner (MSS) from 1970s, ALOS Palsar Digital Elevation Model (DEM), and Synthetic Aperture Radar (SAR) Microwave remote sensing satellite imagery are used to interpret and map various landforms in the Vembanad lake regions and its environs, the study revealed several beach ridges, swales, paleo mudflat, paleo lagoon, paleo channels, backwaters, etc. Interpretation of the entire system including the Vemband lake and the lower reaches of the eight rivers draining into the Vemband lake will help further to understand the stages of evolution. During 2018 severe flood along this region, helped to interpret such landforms, as most of those were flooded (for example, paleo lagoon, paleo channels, etc). The above mentioned study on flood was carried using Synthetic Aperture Radar (SAR) Microwave remote sensing imagery, which is designed to capture the earth features even during overcast conditions. Further, studies based on sediment cores at high resolution supported by AMS 14C from the beach ridges will help to understand the evolution, paleo-environment reconstruction, and sea-level changes during Holocene.

C.9.Geographic Information Science Geographical Distances Measuring Mapping Theorizing

3428-MAPPING TOOLS AND THEIR ROLE IN COMMUNITY DEVELOPMENT AMID COVID 19

Sumac Cardenas Oleas¹, Angela Johnson¹, Justin Krohn¹

*University of Missouri CARES Extension Columbia-United States*¹

In this COVID-19 virus times, access to reliable and up-to-date information related to healthcare, education, and the economy is crucial for the planning and engagement of local, state, national, and international communities. The Center for Applied Research and Engagement Systems (CARES) has a team of geographers, and data and geographic information specialists who collect, analyze, and distribute reliable and current information at no cost to assist with community development and resilience in the United States of America. This poster describes CARES initiatives and the lessons learned from creating and providing mapping tools through ArcGIS and other visualizing platforms. We created informative Dashboards that illustrate the importance of broadband access and food distribution during a pandemic. For example, our FoodFinder mapping tool facilitates the sharing of information for and about farmers and local food providers to promote their products, services, purchasing options, and days of operation. We also created Story Maps to demonstrate the significance of accessing mental health resources as well as tools for recovery such as Opportunity Zones to bring investments to low-income communities. Access to timely and reliable information that is easily visualized through ArcGIS and other tools can help communities find and understand their own social and economic opportunities as well as areas for improvement, which in turn can guide governments and organizations to better engage and distribute resources. Overall, this poster contributes to community development efforts by small organizations, such as CARES, to assist with the long-term well-being of communities in the United States and globally.



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VIRTUAL

C.10. Geography for Future Earth Coupled Human Earth Systems for Sustainability Coupling Human and Environment System for Sustainability Theory and Practice

1694-Analysis on Characteristics of Regional Development Patterns and Water Utilization Structure in Beijing Tianjin Hebei Region

Lijuan Li¹, Yang Liu²

*Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences Department of Water Resources, Key Laboratory of Water Cycle and Related Land Surface Processes Beijing-China*¹ *Department of Water Resources, Key Laboratory of Water Cycle and Related Land Surface Processes Department of Water Resources, Key Laboratory of Water Cycle and Related Land Surface Processes* - ²

Water resources are of vital importance to social and economic development. Under the background of coordinated development of Beijing, Tianjin and Hebei, studying the rule of industrial structure evolution and water utilization structure in the three regions is the first step to plan future development. This paper tries to reveal the link between regional development patterns and water resources utilization of Beijing, Tianjin and Hebei by making full use of statistical data. The first part of the research is the path of regional development. The ternary plots are used to describe the general trend of industrial structure evolution in the Beijing-Tianjin-Hebei region from 1978 to 2016. There were advanced change and spatial difference of industrial structure. Based on the Shift-Share Method, four periods of 1978-1985, 1986-1995, 1996-2005, and 2006-2016 are selected to analyze the process of industrial structure evolution. The results show obvious difference of regional development patterns among the three regions. The other part of the research is the relationship between industrial structure and water utilization structure. This part uses the industrial structure and water consumed structure data of Beijing, Tianjin and Hebei Province from 2002 to 2016. Adopting indicators such as the coordination degree of industrial structure and water consumed structure to carry out the evolution trend of industrial structure and water consumed structure of Beijing-Tianjin-Hebei region. Using the linear regression method based on the component data to establish a linear regression model of industrial structure and water utilization structure can be helpful for prediction. In addition, this paper studies the correlation between industrial structure and water structure.

1981-Influence of megalopolis on the regime of physical fields on the example of the city of Moscow

Svetlana Riabova¹, Alexander Spivak¹

*Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences Near-Surface Geophysics Moscow-Russia*¹

Humans have been interacting with their environment since people first walked the Earth. For example, humans have been cutting down forests to clear land to grow crops for centuries and by doing so we have altered the environment. Conversely, the environment affects us as well. Prior to industrialisation, the impacts of human activity were not very significant because the technologies used were not capable of modifying the environment on a large scale. Today big cities have a particularly strong impact not only on a change in the natural landscape and consequently on the hydrogeological regime of the underground waters and water reservoirs, as well as the variations of natural physical field. The presented researches are aimed at constant geophysical monitoring the life environment in Moscow (typical megalopolis) and establishing the sources of physical fields, in particular those of technogenic origin, as well as their spatial and time variations determining the negative effect of natural and technogenic factors on the life environment and the infrastructure in the megalopolis. The comparative analysis is carried out using data obtained at the Center for geophysical monitoring of Moscow of Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences (Moscow, Leninsky prospect) and at the Geophysical observatory «Mikhnevo» of Sadovsky Institute of Geosphere Dynamics of Russian Academy of Sciences (85 km south of Moscow, outside the zone of megalopolis influence). During processing and analysis of the results of synchronous recording of seismic oscillations, electric and acoustic fields, as well as meteorological parameters, it was found that megalopolises noticeably affect the amplitudes of the physical field, the change in their spectra, lead to the disruption of natural periodicities. A technogenic component that has a considerable impact on the natural physical processes in the surface atmosphere is an important factor that characterizes a megalopolis.



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2853-ASSESSING ENVIRONMENTAL EFFECTS OF RIVER SAND MINING USING ARTIFICIAL NEURAL NETWORK AND SATELLITE IMAGES

Seyed Kazem Alavipanah¹, Mohsen Makki², Mahdi Sheybani Amin¹, Najmeh Neysani Samani¹, Saied Hamzeh¹
University of Tehran Department of Remote Sensing and GIS Tehran-Iran¹ Humboldt-Universität zu Berlin Geography Department makki@hu-berlin.de-Germany²

In the previous few decades, the demand for structure grade sand is growing in many parts of the world because of rapid economic progress and consequent development of modern building constructions. Thus, in many of the cases, has caused in indiscriminate mining of sand from in-rivers and floodplain zones leading to severe damages to the river basin environment including impairment to coral reefs, reduced river water levels, flooding, soil erosion, demolition of canals and bridges, roads, vegetation, fishing activities, and etc. The value of this natural resource is related to the fact that, nowadays, after fresh water, sand is considered to be the second most consumed natural resource on the earth. This paper aims to assess the environmental effects of river sand and gravel mining. The main contribution of this paper is developing an (Artificial Neural Network) ANN-based method in order to assess the relationships between river sand mining and environmental changes using satellite images and geographical field data. The proposed method is able to predict and monitor the environmental effects of sand river mining. All the required data have been collected and analyzed over a 20-year period since 2000. The proposed method has been implemented in southwest Iranian rivers. Based on achieved results, different criteria were recommended to be followed to reduce damaging impacts. Sand mining should be done in a way that restricts environmental impairment during exploitation and restores the land after mining processes are finished. Also, the incorporation of geographical field data and satellite images provided an efficient approach at both spatial and temporal scales.



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VIRTUAL

C.11. Geography of Governance Citizen Participation in Urban Governance Formal and Informal Community Engagement in Local Government Policies

3557-„Meaningful participation” – engaging marginalized groups in civic participation. The case of Łódź Poland.

Patrycja Grzys¹

University of Łódź Department of Regional and Social Geography Łódź-Poland¹

The New Urban Agenda adopted on 2016 at Habitat III in Quito presents four core dimensions of new transformative commitments. These are social, economic, environmental and spatial sustainability. In this paper, the author focuses on the social dimension of sustainability, undertaking the problem of marginalized groups' empowerment through civic participation. This topic is related to the increasing activity of informal groups of action (i.e. urban activists and urban movements) as a new actor on the local urban scene and at the same time as an alternative to formalized civil society organizations (NGOs). In Poland in the last decade there has been a significant increase in the number of grassroots initiatives, especially in large cities. This work will focus on the example of Łódź, a city that adopted a new development strategy in 2020, which places particular emphasis on socially inclusive growth.

Using the bottom-up approach, the author analyzed a particular urban participation tool which are urban microgrants and the effects of its implementation. Microgrants are a relatively new tool implemented by a local government to include informal groups in decision-making processes.

Preliminary results of the research allow to indicate that this tool is brings positive effects within the context of strengthening urban democracy. It entails active involvement of local communities in the implementation of the project, which enhance a sense of belonging and sense of ownership. Furthermore, it allows for participation of informal groups (including children, foreigners, people with disabilities, etc.), which until now were marginalized within the process of social participation.

According to the author, the application of this tool in urban development can be used to achieve the SDG 11 in the spirit of the principle of this document – “leave no one behind” while contributing to improving the quality of life for urban residents.



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VIRTUAL

C.12. Geography of Information Innovation and Technology Information Innovation and Communication Geography

1521-Estimation of Time Delay Cost of Hub Airports in China and the Comparison of Air Flow Operating Structure with USA

Xinru Du¹, Zi Lu¹

Hebei Normal University School of Resource and Environment Sciences Shijiazhuang-China¹

The application of ICTs made structure change and effective utilization of airspace. It is available to track aircraft around the world in real time to obtain continuous air trajectories data based on ICTs. Aircraft configuration ratio and flight stages are introduced into EC estimated model as impact parameters. The paper estimates the time delay cost and the total time delay cost of China hub airports in 24 hours with the improved EC estimated model. Then the analyzation of air routes effect of time delay cost and the comparison with USA are carried out. The conclusions are as follows: 1) Time delay cost of the compound hub airports is generally higher than that of the regional hub airports while per minute delay cost and gating cost of regional hub airports are higher. This is caused by the centrality of the network structure of air routes, the need of aero geographic market and the influence on the transmission efficiency of the aviation network in China. 2) The air flow operation structure of the total cost of time delay between hub airport and hub airport to non-hub airport is caused by air routes attributes, which lies in the joint action of geographical market demand and the location of participated airports in air-corridors in the sky. 3) The time delay cost difference of hub airports and the air routes between China and USA is mainly manifested in the different proportion of the flight stages, which is determined by the width of characteristic path and the number of track intersections in air-corridors in the sky.



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C.13. Geography of Tourism Leisure and Global Change Tourism and the Sustainable Development Goals

2148-The Potential of Kazakhstan's Natural Parks as a Resource for the Development of Ecological Tourism

*Farida Akiyanova*¹, Aksholpan Atalikhova¹, Adlet Nazhbiyev¹, Aliya Simbatova¹, Zhanbota Mussagaliyeva¹, Yergali Karakulov¹, Arman Kabdeshev¹

International Science Complex Astana Institute of geography and environmental research Nur-Sultan-Kazakhstan¹

Ecotourism development in Kazakhstan is guided by the General Plans for the Development of Tourism Infrastructure. These encompass a network of thirteen national parks. The plans include the zoning of the national parks for tourism and recreation.

Source data is made up of publications, maps, statistical information, satellite images and data from field studies. Well-tested scientific methods were used, including the interpretation of satellite images and the creation of maps based on geographic information mapping.

A complex assessment of national parks included an analysis of spatial confinedness to latitudinal zonation; altitudinal zonation; the uniqueness of biodiversity.

It is shown that natural parks have been created in areas with mainly mountain (73.4% of the area of all parks); low-mountain-shallow (15.9%); and shallow (5.9%) relief; and are made up of landscapes with three natural zones and six high-altitude zones.

The analysis of biodiversity shows that a greater number of species of higher plants and vertebrates are confined to the natural parks of the mountain ranges in the South and East of Kazakhstan. Here, there are from 1000 to 2200 species of higher plants; and from 300 to 440 vertebrates.

About 500 species of rare animals are found in natural parks. 125 of them are included in the Red Book of Kazakhstan. There are 415 species of rare plants, of which 140 species are red-listed and 126 are endemic. Analysis of biodiversity in terms of the presence of rare species shows that the highest indices of valuable species are typical composed of island low-mountain and small-scale massifs (22% of the total number).

It is thus shown that the natural parks of Kazakhstan have a rich resource potential, diverse landscapes; a rich diversity of flora and faunal; and a high level of wildlife conservation, all of which indicate the possibilities of ecotourism development.



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2181-Constraints and cultural heritage conservation behavior The moderating effect of immersive technology

Honglei Zhang¹, Yifan Xu¹, Xue Chen¹, Yuan Tian¹, Xinying Xia¹, Jie Zhang¹

Nanjing University School of Geography and Ocean Science Nanjing-China¹

Endowed with unique and universal values, cultural and natural heritage represent precious treasures of mankind. In the cultural arena, heritage usually encompasses material and immaterial forms, such as tangible sculptures and paintings and the intangible culture behind them. Tourists play dual roles as visitors and protectors when visiting cultural heritage sites, although their positions as protectors are generally less dominant given site-related regulations or constraints. Nevertheless, few studies appear to have investigated tourists' constraints in the context of cultural heritage tourism. It is therefore essential to identify and decipher these constraints relative to heritage conservation behavior. Furthermore, modern technology has become a powerful tool in heritage conservation and management around the world. Advances in immersive technology enable mixed-reality experiences by creating a sense of immersion, and such technology could effectively mitigate the negative effects of various constraints when visiting heritage sites. Therefore, heritage conservation in the context of tourism development has attracted substantial attention from practitioners and scholars worldwide. This study proposes a leisure constraints model vis-à-vis cultural heritage tourism. The model is tested using data from 495 tourists visiting the Mogao Grottoes, a well-known cultural heritage tourism site in China. Results suggest that interpersonal and structural constraints both negatively influence tourists' satisfaction. The study further divided tourists' conservation behavior into low- and high-effort behavior, revealing that satisfaction has a larger impact on high-effort behavior. Moreover, interpersonal and structural constraints were both found to adversely affect visitors' heritage conservation behavior via satisfaction, and these indirect effects were moderated by the content quality of immersive technology. The results expand current understanding of heritage conservation behavior from a tourist perspective and, more importantly, underscore the importance of immersive technology in alleviating constraints at cultural heritage sites.

2379-Present situation and Possibilities of Spread Expansion of the Farmhouse Accommodation in Japan

Kosei Yamada¹

Chiba University of Commerce Faculty of Service innovation Saitama-Japan¹

A farmhouse Accommodation has been drawing attention as a base of agri-tourism of the rural areas with the introduction of the green-tourism policy in Japan after the 1990s, and the opening of business occurred successively. However, in the present 30 years passed, it isn't established as accommodation for travelers in the rural areas. In this study, it is clarified the tendency of farmhouse accommodation facilities and the personal visitor by an interview investigation. In addition, it is examined a problem for the spread expansion of farmhouse accommodation in future Japan.

On the management aspect, all farmhouse accommodations are operated by family- owned. The general case, it accepts only one set of guest a day, it is focused on the communication with the farmhouse accommodation guests, and it is provided a detached guest room with kitchen function independent of the main building while reducing stress to occur between guests and farmhouse family.

The number of the annual guest has many 100 - 300. The attribute of the guest has many family visitors with children from the urban area. As for the number of nights, it is mostly one night stay. In addition, it is concentrated on guests from April through October. By the action during a farmhouse accommodation guest staying, the guests performing an agriculture experience is very few.

A key of the further spread expansion of Japanese farmhouse accommodation guest houses is to raise the quality in the guest room as the accommodations. At the same time, it may be considered that it became to maintain the stable pulling in guests and accommodations management by setting the standard of the rate highly.



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3635-Recruiting volunteer tourist. Reshaping vacation models the answer for travel shaming or just the last resort to bring tourists back

Weronika Lis¹

*Nicolaus Copernicus University in Torun Interdisciplinary Doctoral School of Social Sciences - Academia Rerum Socialium (Socio-Economic Geography) Torun-Poland*¹

Negative impacts of tourism had made us reconsider the way we travel long before the COVID-19 crisis emerged, and so the sustainable development approach constitutes a growing trend in the industry. Additionally, many signalize that the global pandemic is also the best moment to work on valuable changes in order to meet SDG goals in tourism. In fact, before and during the crisis we can observe cross-sector programs and initiatives that, while helping to promote a given destination, might also suggest certain models of tourist behaviors that are considered sustainable. The cases that will be discussed show that nowadays travelers are encouraged to dedicate time to activities that support local environments and that include their, tourists, direct participation.

Studying case examples of fostering volunteer tourism during this particular time in history can help us explore how this phenomenon works as well as if, and to what extent the proposed solutions will prove to be durable. Particular consideration will be dedicated to various motivations of project initiators that might include a desire to shape sustainable behavior of tourists, but also a search for an economic gain. The same attention is given to tourists, their motivations, possible commitment, and perception of a given location following their introduction to the project. However, as today traveling freely is not so easy as it used to be, there's also another question: do people need to have additional justification for their travel decisions?

The research is conducted using online questionnaires and interviews with tourists and tourism industry representatives. Useful information will be gathered through analysis of official data on tourist flows in a given region as well as by the means of participant observation.

The proposed topic constitutes a part of extensive, long-term research on volunteer tourism conducted by the author.



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C.13. Geography of Tourism Leisure and Global Change Tourism Shaping Places

1300-Spatial temporal Evolution of AIMS certified Marathon Events in China

Kunlun Chen¹

*China University of Geosciences Department of Physical Education Wuhan-China*¹

AIMS (Association of International Marathons and Distance Races) is one of the three most credible marathon event organizations in the world. Based on ArcGIS, this study uses the data of China AIMS-certified marathon events from 2005 to 2017, analyzes the characteristics of spatio-temporal evolution of marathon events and influencing factors by employing Kernel Density analysis method, Standard Deviational Ellipse(SDE) and mathematical statistics methods. The results: (1) The number of AIMS-certified marathon events and the number of host city both exhibited fluctuating uprising tendency. They have experienced three stages: a steady-rising period, a fluctuating-rising period, and a fast-rising period. (2) The host cities for the AIMS-certified marathon events are mainly located in the eastern coastal areas and Taiwan, and they showed spatial agglomeration, forming four agglomerations: Yangtze River delta, the Pearl River delta, Hercynian and Taiwan. (3) In terms of dynamic evolution, the number of cities which has hosted AIMS-certified marathon events in China has continuously expanding from 2005 to 2017. According to the evolution status, they can be divided into four types: stability, growth, new arrival, and suspension; the distribution of cities which has held AIMS-certified marathon events has obvious directionality and shifts with time. (4) The differences of Mainland-Hong Kong-Macao-Taiwan over time show periodic characteristics. The dominant position of the marathon events in mainland and Taiwan has been continuously strengthening, and Hong Kong and Macao have shown steady declines. (5) The number and distribution of marathon events are affected by the city's international level, economic development level, policy support, and cross-strait situation. In the future, it is advised to speed up marathon events' application for accreditation of international event organizations such as AIMS and IAAF, to enhance the influence and competitiveness of Chinese marathon events, in order to better show the cultural soft power and national image of China.

2344-Possibilities for Using Traditional Japanese theatre to Develop International tourism in Rural Areas of Japan A Case Study of Shimane Prefecture

Cheng-Hung WU¹, Kenta YAMAMOTO²

*Waseda University Graduate School of Education Shinjuku-ku-Japan*¹ *Kokugakuin University the Faculty of Economics -Japan*²

For the past few years, Japan has dedicated in the development of its tourism. Through fostering policies such as loosening visa restrictions and Japanese currency devaluation, foreign visitors have increased dramatically. However, these visitors are still gathered in routine traveling sites and routes instead of spreading out to other Japanese local tourist destinations, causing regional lodging and tourist bus are insufficiency. Nevertheless, the Japanese local governments still have high expectation on the economic benefits of international inbound tourism. Therefore, spreading out international tourists in a way to equally profit each and every region has been a great task. At the same time, research regarding the abovementioned issue is also rapidly rising among the Japanese academic circle. However, the existing researches are mostly focused on traditional traveling routes, and are inapt references for areas with less traveling resources or geographic disadvantages.

Although some areas have successfully attracted foreign visitors by utilizing local resources to provide various "experiences," these are still fresh attempts and relatively researches and investigations are still in progress. Shimane Prefecture is not well known in Japan and lack of tourism resources. But there are many Kagura teams at here. The purpose of this study is to clarify the consciousness for Shimane and Kagura by Taiwanese tourists, and to explore their consumer confidence for the Kagura. A questionnaire survey was conducted to 500 college students of the Department of Japanese, Tamkang University (Taiwan) in 2020 and attempts to observe consumption trends of Taiwanese foreign independent tourists. The result of the questionnaire will be presenting at conference.



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C.15. Global Change and Human Mobility Human Mobility and Regional Disparities Patterns of Migration from a Comparative Perspective

1511-The impacts of gender on seasonal retirement mobility and wellbeing

Honggang Xu ¹, Yuting Wang ¹

Sun Yat-sen University School of tourism management xuhonggg@mail.sysu.edu.cn-China ¹

With the increase in personal mobility and improvements in living standards, seasonal mobility for health reasons is a well-observed phenomenon among retired people worldwide. Existing studies have shown that there are relationships between seasonal retirement mobility and wellbeing, and this study attempts to explore the effects of gender on these relationships. The framework of therapeutic mobility, which includes daily activities, sociality and context, was used to analyze this relationship. Qualitative methods including semi-structured interviews, non-participatory observation and mobile ethnography were used to collect data. This study finds that the wellbeing of older people is strengthened through seasonal retirement mobility but gender has impacts on that relationship. Gender not only influences their daily activities, sociality and environmental interaction, and therefore affects their wellbeing, but also moderates the relationship between mobility and wellbeing. Many of the differences result from the formative influence of gender roles. Firstly, the lives of female 'snowbirds' in Sanya are more fulfilling and positive if they are accompanied by their husbands. Compared with their hometowns, female seasonal senior migrants are more willing to explore outdoor spaces and spend more time on recreation in Sanya, where the infrastructure and natural environment encourage public activities. Secondly, housework is still mainly undertaken by women in Sanya, which makes the lives of women more substantial and meaningful, while men often have nothing to do. Thirdly, female seasonal senior migrants receive more emotional supports through stronger ties. As a result, women, especially those who are accompanied by their husbands, get more benefits from seasonal retirement mobility. Furthermore, while gender itself cannot explain all the differences, it works within the intersection of economic condition, age and family support. This study has enriched the literature on therapeutic mobility and has practical implications.



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VIRTUAL

C.15.Global Change and Human Mobility The 'Human Mobility Career' Circular onward and Return Migrations

2118-Migrations and Careers of Thai workers A Case Study in the biggest industrial estate in Thailand

Takahito NIWA¹

*Teikyo University Faculty of Economics Utsunomiya-Japan*¹

Thai economy has been developing rapidly since mid-1980s mainly due to industrialization by Foreign Direct Investments from the developed countries, especially from Japan. Foreign companies place their factories in industrial estates around the Bangkok metropolitan region. Labor demand of these companies might have been making changes on internal migration flows and on Thai workers' careers in Thailand. The aim of this study is to clarify features of the labor market of Japanese companies by focusing on job histories of migrants. "Amata City, Chonburi industrial estate" was set as a field study, where is the largest industrial estate in Thailand with approximately 700 companies and 200,000 workers. Around 160 answers of Thai workers by a questionnaire survey at September 2019 are analyzed in this study.

Majority of Thai workers had come from outside of Chonburi province, especially from northeast region from where the largest number of migrants departure. They had come to Chonburi to find jobs in factories that pay higher salary than that of their hometowns. However, there is little opportunity to find jobs for foreign unskilled workers from Cambodia, Laos and Myanmar because most of them don't have a educational requirement from the companies though ASEAN countries start to integrate their economies nowadays. In addition, Thai workers have work experience of many factories in the industrial estate. It is considered that the reason for them is not only to step up their positions by changing their job, but also to make their salary higher because amount of salary is so different among companies even if in same industrial estate.

Category : C.17.HazardandRiskContributionofGeographytoUnderstandingNaturalDisasters Research Education andSociety

Presentation Type : Poster Presentation



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2296-UNDERSTANDING RISKS TO SUSTAINABILITY WITH IMPROVED TOPOGRAPHIC ANALYSES IN HILLY AND MOUNTAINOUS COMMUNITIES A CASE STUDY OF NISHI AWA JAPAN

Roxanne Lai ¹, Takashi Oguchi ²

The University of Tokyo Graduate School of Frontier Sciences roxanne.lai@s.k.u-tokyo.ac.jp-Japan ¹ The University of Tokyo Center for Spatial Information Science SAITAMA-Japan ²

Hilly and mountainous communities face environmental hazards and social vulnerabilities such as landslides and depopulation due to their geographical location. Conversely, they can affect the mountain environment through anthropogenic activities. Mountain topography significantly defines these communities and understanding topography within the context of social and environmental risks such as depopulation is important for communities' sustainability. However, although topographic studies have been done for individual communities or on country-scales, few regional studies have focused on the distribution of topographic characteristics across multiple settlements due to difficulties in obtaining multiple accurate settlement-level topographic data. In Japan, such studies tend to utilize government-provided shapefile data, which do not always capture the smaller-scale communities.

To clarify the differences of using topographical characteristics at different scales to understand risks faced by these communities, the objective of this study is to apply medium-resolution topographic data and geospatial analyses to quantify finer-scale topographic characteristics (slope, profile curvature, elevation, and aspect) of the communities in Nishi-Awa, Japan, and then to compare these characteristics with those calculated from government-designated boundaries. Thereafter, correlation calculations are performed using the calculated topographical characteristics and other geographic variables to explore their relationship with depopulation.

The results show that aspects and profile curvatures of the settlements indicate directional tendencies most likely based on preferential agriculture conditions. Significant heterogeneity of topographical characteristics within the Nishi-Awa administrative area implies governance needs to account for the variety of environmental and social risks occurring. Furthermore, slope angle calculated from broader boundaries tends to overestimate actual mean slope angle of the settlements, resulting in exaggerated relationships between topography and depopulation. However, results also emphasize that even within mountainous settlements, slope remains a major driver of depopulation, compared to other topographical variables. This implies that other factors such as aging population may exacerbate slope influence on depopulation.



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C.17. Hazard and Risk Contribution of Geography to Understanding Natural Disasters Research Education and Society

2727-THE UTILIZATION OF NEAR VERTICAL AND OBLIQUE SMALL FORMAT AERIAL PHOTOGRAPHY USING UNMANNED AIR VEHICLE FOR LANDSLIDE IDENTIFICATION IN A PART OF BOMPON WATERSHED AREA IN MAGELANG

Dony Octa Setyawan¹, Barandi Sapta Widartono¹

Universitas Gadjah Mada Sains Informasi Geografis donyocta@gmail.com-Indonesia¹

Landslides spatial information is required as part of early warning system. Identify landslides using satellite imagery is not optimal yet because of the constraints of cloud cover, vegetation canopy, and small landslides. In addition, the need for rapid assessment to identify the object of study requires a technology that is able to provide up-to-date, reliable, quite accurate and measurable information. Unmanned Air Vehicle (UAV) is one of platform that can bring remote sensing technology efficient in time, mobilization, cost, and measurable. Therefore, the aim of this study are (1) Knowing the ability of small format near-vertical and oblique view aerial photo systems using Unmanned Air Vehicles in terms of data acquisition for the identification of landslides in parts of the Bompon watershed; (2) Knowing the distribution, characteristics, and types of landslides in some Bompon watersheds. The acquisition method is near-vertical and oblique small format aerial photography system with UAV and Global Positioning Systems as the tool. The bundling adjustment photogrammetry process produces a points cloud model as the basis for making DSM and DEM, and visualized in 3 dimensions. Landslides are not identified directly but several derivatives are carried out, such as morphological, vegetation and drainage characteristics that can indicate landslides. Its also can be distinguished according to the type of material and the type of movement. The results show that landslides can be identified with varying levels of confidence. The resulting image of aerial photo has a vertical RMSE 0.14m and horizontal 0.37m. Derived data that can be used is orhtophoto, Digital Surface Models (DSM), Digital Elevation Models (DEM), 3 Dimensional (3D) models, and oblique photo. Observable characteristics of landslides are size and landslide sections. The measurable size landslides are landslide altitude, main scarp altitude, height of main scarp, slope, depth estimation, direction of movement, area landslide, and area landslide



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C.18. Joint Session Cultural Approaches In Geography(IGU) And Working Group On Cultural Geography(AGA) Asian and European geographical perspectives and practices

3052-The Behavior of Female Entrepreneurship and their Supportive Environment in Hiroshima City

Zi Tao¹

Hiroshima University Graduate School of Education Yokohama-Japan¹

In Japan, the creation of female entrepreneurs has contributed to the solution of the economic slump and the decrease in the labor force due to the declining birthrate and aging. In order to maintain the activeness of female entrepreneurship, it is essential to develop the supportive environment that makes easy for women to start a business. To understand the overview of the entrepreneurial support environment in a specific region and identify the characteristics of female entrepreneurial activities is important. According to the information on the website and requested materials of each support organizations in Hiroshima City, there are only a limited number of them play a core role. Support for women by public institutions is deficiency, especially after starting a business. And the private enterprise plays an important role in the connection making of female entrepreneurs. As a result of interview investigation of 18 female entrepreneurs in Hiroshima City, most of them work as individuals or family business, the role of job creation is not fulfilled enough. The dissatisfaction with the working environment of Japanese companies among women who also take care of childcare, housework and work is the main reason for female entrepreneurship. The richness of their career and study abroad experience makes them seek mental satisfaction rather than financial satisfaction. They often commercialize things of interest by utilizing their experiences and qualifications when they start a business. When looking at the type of business and the location of the business, a tendency to avoid risk has been found.



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C.19. Joint Session Global Change and Human Mobility Tourism Leisure and Global Change International tourism and residential mobilities global and local perspectives

1270-International mobility tourism investment and architectural heritage in Cienfuegos Cuba

*Mercedes Rodríguez-Rodríguez*¹, Josefina Domínguez-Mujica¹, Manuel González-Herrera²

*University of Las Palmas de Gran Canaria Geography Las Palmas de Gran Canaria-Spain*¹ *Autonomous University of Ciudad Juárez Managerial Sciences manuel.gonzalez@uacj.mx-Mexico*²

Small tourism entrepreneurs have had a decisive role in the conservation and revitalization of the architectural heritage of the Cuban city of Cienfuegos, a World Heritage Site, who have not hesitated to invest in the conservation and rehabilitation of real-estate of the recognized architectural value to establish different types of hotel and restaurant businesses. These investments generally come from remittances of Cuban emigrants, and capitals that these people have gathered outside of Cuba, especially in the United States, who have been able to use these resources in tourist activities due to the modifications in Cuban legislation, particularly in relation to the permits granted to those enterprising dedicated to rent their own private houses (hostales).

Accordingly with this premise, the aim of this communication is to develop a geographical analysis of mobility both people and capitals related to these small tourism enterprises, and of their potential for the conservation and valorization of this World Heritage City. For this purpose, an exhaustive inventory of a significant sample of accommodation in private rental houses was made, by conducting structured interviews with their owners. The most outstanding variables selected for the analysis were opening of the business and origin of the investment, as well as others related to the tourist activity that takes place in the real-estate, and other data related to its architectural characteristics. From a methodological point of view, a grouping of cases was carried out using the hierarchical cluster technique and the non-parametric Mann-Whitney U test. As result, it is possible to confirm the decisive influence of international mobility on tourism investment and the important contribution to the capital revitalization of the cultural heritage of the urban entities in countries with low-income levels.



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VIRTUAL

C.20. Joint Session History of Geography Gender and Geography Political Geography Bridging differences East West seas and Mediterranean worlds

3304-The Behavior of Female Entrepreneurship and their Supportive Environment in Hiroshima City

Zi Tao¹

*Hiroshima University Graduate School of Education Yokohama-Japan*¹

In Japan, the creation of female entrepreneurs has contributed to the solution of the economic slump and the decrease in the labor force due to the declining birthrate and aging. In order to maintain the activeness of female entrepreneurship, it is essential to develop the supportive environment that makes easy for women to start a business. To understand the overview of the entrepreneurial support environment in a specific region and identify the characteristics of female entrepreneurial activities is important. According to the information on the website and requested materials of each support organizations in Hiroshima City, there are only a limited number of them play a core role. Support for women by public institutions is deficiency, especially after starting a business. And the private enterprise plays an important role in the connection making of female entrepreneurs. As a result of interview investigation of 18 female entrepreneurs in Hiroshima City, most of them work as individuals or family business, the role of job creation is not fulfilled enough. The dissatisfaction with the working environment of Japanese companies among women who also take care of childcare, housework and work is the main reason for female entrepreneurship. The richness of their career and study abroad experience makes them seek mental satisfaction rather than financial satisfaction. They often commercialize things of interest by utilizing their experiences and qualifications when they start a business. When looking at the type of business and the location of the business, a tendency to avoid risk has been found.



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VIRTUAL

C.22. Joint Session IGU IAG Commission Working Group on Geomorphology and Society Past Present and Future Co production and evolution between geomorphological dynamics and human influence

1998-Geomorphological map in very dynamic Holocene hillsides. Upper Pisuerga Cantabrian Mountains Spain.

Alfonso Pisabarro¹, Enrique Serrano¹

*University of Valladolid Geography Valladolid-Spain*¹

Geomorphological cartography is based on fieldwork and the use of visualization tools - aerial images, 3D ortho-images or LiDAR models -. In order for the map to be usable in environmental reconstruction, it is important to know the origin of the landforms represented. The morphogenetic reading of the elements has been treated by different cartographic systems as developed by Swiss tradition, for example. However, in spaces where landforms appear blurred by dense vegetation or by dynamism on the hillsides it is necessary to individualize the study of landforms which entails doing chronostratigraphic detailed analysis adding techniques laboratory to know the deposition environment and dating.

The Cantabrian Mountains is paradigmatic, where repeatedly snowfalls have alternated with warm episodes during the Holocene that have produced rapid melting of large thicknesses saturating and mobilizing slopes. In consequence a common morphogenetic framework for whole area was difficult to establish. River terraces, valley bottoms or glacia appear totally covered.

To solve this, a deposit has been studied at the interface between the hillside and the valley floor that partly explains the evolution of the hydrographic network in one of the most characteristic valleys in the area. The integration of processes into that interface during the Holocene has been understood through the granulometric analysis and radiocarbon dating of each level of an alluvial fan deposited on a river terrace. It has been determined that sedimentation and erosion is marked jointly by anthropic action or abandonment of this (at present), reduction of river capacity and increase in temperatures after the maximum glacier. From this knowledge, the Upper Pisuerga could be elaborated with greater ease the geomorphological map that is presented with landforms of structural, river, glacier, periglacial, coluvial and anthropic origin, which supposes a synthesis of the environmental reconstruction of the valleys during the Quaternary.



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VIRTUAL

C.23. Land Degradation and Desertification Land degradation and desertification new research and its implications for monitoring and mitigation

3483-Techniques and Methods for Monitoring Morphological Changes in Mediterranean Ephemeral Channels

*Pedro Pérez-Cutillas*¹, Carmelo Conesa-García¹, Alfredo Ollero-Ojeda², Roberto Tomás-Jover³, Francisco Martínez-Capel⁴, Francisca Navarro-Hervás¹, Askoa Ibasate-González de Matauco⁵, Demetrio Antonio Zema⁶, Giuseppe Bombino⁶, Alvaro Gómez-Gutiérrez⁷

*University of Murcia Department of Geography Murcia-Spain*¹ *University of Zaragoza Department of Geography -Spain*² *University of Alicante Department of Civil Engineering -Spain*³ *Universitat Politècnica de València Research Institute for Integrated Management of Coastal Areas -Spain*⁴ *University of the Basque Country Department of Geography, Prehistory and Archaeology -Spain*⁵ *Mediterranean University of Reggio Calabria Department AGRARIA -Italy*⁶ *University of Extremadura Department of Art and Territory Sciences -Spain*⁷

A methodological approach for monitoring hydromorphological processes and changes in Mediterranean ephemeral streams has been proposed within the framework of the CCAMICEM project (Morphological and Systemic Response of Ephemeral Channels to Climate Change). This approach is focused on the combined use of specific methods and techniques in order to analyze the morphological channel adjustments caused by Climate Change in several areas located in Murcia region (southeastern Spain), the Ebro River Basin (northeastern Spain), and Calabria region (southern Italy). For this purpose, different reference channel reaches (RCRs) and representative cross-sections (RCSs) along ephemeral channels were monitored. To quantify and analyze the current changes in bed elevation and variations in sediment budgets, Very High-Resolution Digital Elevation Models (VHR-DEM), orthophotographs, and 3D point clouds, generated from structure-from-motion (SfM) photogrammetry and terrestrial laser scanning (TLS) before and after each peak flow, were used in a pilot area during the period 2018-2020. These high-resolution 3D models also served to calibrate a hydrodynamic model, which provided hydraulic data for each monitored event, as well as for evaluating the flow competence, bed stability, and armoring ratio. General transitory bed scouring was determined by placing vertical batteries of wooden disks arranged numerically in the bed. To detect changes in alluvial deposition, 2D and 3D electric resistivity tomography and shallow borehole logs were performed in the same RCRs. The changes in sediment yield at the event scale during the last two decades were estimated from a geospatial erosion prediction model, the results of which were calibrated with data of suspended sediment samplers and direct bedload transport measurements. Information about the incipient bedload motion was also obtained using impact plates geophones in gravel-bed ephemeral streams. Finally, it is planned to apply a morphodynamic model to define patterns of morphological adjustments in relation to future climate change scenarios.



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VIRTUAL

3484-Relationships between Changes in Stream Power Flow Competence and Bed Elevation along a Gravel Bed Ephemeral Stream Monitored from High Resolution 3D Models

Carmelo Conesa-García¹, Adrián Riquelme², Carlos Puig-Mengual³, Francisco Martínez-Capel³, Roberto Tomás², Rafael García-Lorenzo¹, Miguel Cano², Pedro Pérez-Cutillas¹, José Luis Pastor²

University of Murcia Department of Geography Murcia-Spain¹ University of Alicante Department of Civil Engineering -Spain²

Universitat Politècnica de València Research Institute for Integrated Management of Coastal Areas -Spain³

Morphological adjustments in gravel-bed ephemeral streams generally are associated with a great bed load mobility, subjected to strong variations in stream power, flow competence, and sediment budgets. In this study, the relationships among these variables were analyzed along an ephemeral gravel-bed stream located in the southeastern Spain (Rambla de la Azohía), using field data and high-resolution topographic models, upon which a 1-D hydrodynamic model was calibrated and sediment budgets calculated. High-resolution datasets, orthophotographs and 3D point clouds were obtained by combining structure-from-motion (SfM) photogrammetry and terrestrial laser scanning (TLS) after each peak flow, during the period 2018-2020, at two levels of spatial analysis: reference channel reaches (RCRs) and pilot bed survey areas (PBSAs) of 120-240 and 70 m in length, respectively. Specifically, stream power (ω), critical power (ω_c), and energy gradients ($\partial\omega/\partial s$) were related for both types of stretches to flow thresholds necessary to entrain bed -above critical stress-, substrate stability indices (Relative Bed Stability -RBS-, Bed-Form Stability -BFS-), net sediment fluxes and differences in bed elevation (Δe). The spatial variability of ω was found to be consistent with other significant hydraulic variables, such as shear stress, hydraulic radius, Froude number and mean stream power gradient in direction downstream along the upper and middle channel reaches. The results suggest that a higher relationship of Δe with excess energy (ϵ) and bed stability were maintained, especially from the SfM data, which provided the best fit (r^2 of 0.56 to 0.60 for Δe versus ϵ , and around 0.65 for Δe versus RBS). However, the TLS technique showed good results, with some statistical significance, when associating Δe with RBS, mainly along the upper reach ($r^2 = 0.61$ and a p-value < 0.05). The higher correlation established with RBS reflected the close influence that flow competence exerted to selectively carry inhomogeneous granular sediments.

3485-Critical Shear Stress as an Indicator of Changes in Bedload along a Gravel Bed Ephemeral Stream Monitored from Borehole Logs

Carmelo Conesa-García¹, Pedro Pérez-Cutillas¹, Alberto Martínez-Salvador¹, Francisca Navarro-Hervás¹

University of Murcia Department of Geography Murcia-Spain¹

The critical flow threshold for bed material entrainment is often used as an indicator of flow competence in gravel bed streams. Approaches focusing on estimates of the critical shear stress and the critical unit discharge are commonly applied, but results in gravel bed streams remain uncertain, since mixed-size bed sediments are abundant in this type of channels, and load transport is size selective over a significant range of flow. The main purposes of this study was to determine the flow competence relationships for an ephemeral gravel bed stream using borehole datasets and verify if the critical shear stress or the critical unit discharge model is an appropriate indicator of changes in bed load under such conditions. For this aim to be achieved, we used 8 borehole logs of 3 m in depth, located in two reference channel cross-sections along the Rambla de la Azohía (southeastern Spain). Sediment samples were collected at different depths, and grouped into two classes of representative facies: Matrix-supported gravel and clast-supported gravel. A sensitivity analysis of flow competence models to characteristic grain-sizes was carried out in order to assess their effects on the variability in bed load transport. The results showed various patterns of flow competence based on different thresholds of critical shear stress (τ_c) and critical stream power (ω_c). The most common pattern, developed in the central bars, indicated an increase from bottom to top of the minimum τ_c threshold necessary to mobilize the coarsest particles under submerged conditions: $43 < \tau_c < 49$ N m⁻² for the near-surface alluvial deposits and $30 < \tau_c < 38$ N m⁻² for the lower detrital layers. The current armored gravel-bed deposits recorded the highest values of ω_c (86.4 W m⁻²), which suggests a greater energy expenditure beyond this threshold and, consequently a higher bedload transport capacity than earlier stages.



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**3653-THE INCREASE IN DESERTIFICATION BY AGRO SYLVO PASTORAL PRACTICES IN THE HIGH ALGERIAN STEPPE PLAINS
THE WAYS OF LIVING IN THE WILAYA OF DJELFA**

Serge Schmitz¹, adel boussaid²

university of liège departement of geography liège-Belgium¹ university of djelfa Department of Earth and Universe Science
boussaidboussaid15@yahoo.fr-Algeria²

This study analyses the ways of inhabiting and the agro-sylvo-pastoral practices of 188 families in a steppe region of the Saharan Atlas in Algeria. The rural population is henceforth sedentary. The case of the District of Djelfa allows scrutinizing how these ways of inhabiting are anchored in the local environment and their potential impact on desertification. Based on field observations, oral survey and statistical analyses, this study points out that the householders in the four different environments (forest, matorral, steppe, dunes and chott) utilize supplementation to feed their herd. Consequently, this practice increases the size of the herds and contributes to overgrazing. Similarly, the access to water is no more traditional; while some overexploit the aquifers; most agro-pastoralists utilize tanker trucks. The adaptation of the way of inhabiting and exploitation are greatly determined by the capital of the household, which allows compensating local shortages. Nevertheless, these practices cause important damage and increased desertification.

To deepen the analysis of agro-sylvo-pastoral practices and their impacts on desertification, a socio-economic survey was conducted in spring 2015 on a representative sample of sedentary agro-pastoral household heads (Bourbouze, 2000)

The sampling is random stratified according to the living environment. Among the 188 heads of households of different families questioned, 94 live in a forest environment, 24 live in the scrub, 26 live in steppe environments, and 44 live in the dune cordon or the chott. The population density can be estimated from the distances between neighboring family groups. For our study area, they vary from 100 to 800 m in a forest environment, which is the most densely populated, from 3000m to 6000m in the matorral, from 5000m to 9000m in the steppe, the least populated environment, and from 800m to 2000m in the dunes and salted areas (Chott).



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VIRTUAL

C.24. Land Use and Land Cover Change Driving forces of land use changes

2679-Beyond mapping deforestation in Ecuador

Andrea Urgilez-Clavijo ¹, Juan de la Riva ², Ana Maria Tarquis ³

Zaragoza University Department of Geography and Land Management Cuenca-Ecuador ¹ Zaragoza University Department of Geography and Land Management, GEOFOREST delariva@unizar.es-Spain ² Universidad politecnica de Madrid Complex System Group, CEIGRAM anamaria.tarquis@upm.e-Spain ³

Most of developing countries in last decades have faced a race to produce basic mapping to support the pillars of applied research in relation to environmental management in each country. Mapping the environment is a complex task for geographers and scientist when natural systems have been perturbed and anthropogenic managed systems coexists. The spatial heterogeneity of land cover maps and its dynamics is giving us a trend to shift classical mapping into correlated mapping structures. Deforestation in Ecuador is an example of a complex process that exemplifies the interaction between different spatial objects as water courses, soils, land use and, transportation network among others. This process is not randomly produced and those objects are correlated through complex spatial systems. In this study we demonstrate the spatial patterns of deforestation in two biosphere reserves of Ecuador using the fractal analysis and spatial indicators as a tool to correlate spatial objects to deforestation process. The major findings of this study indicated that the drivers of deforestation patterns obey to a spatial relation between: agricultural soil suitability, road proximity network and navigable rivers. This is showed through the multifractal spectrum of the patterns and this can be mapped using the indicators as mapping strategy. These relations serve to decision makers the possibility to overlap deforesting process mapping in relation to other spatial variables. In conclusion, the fractal analysis and the proposed indicators provide a novel approach to map deforestation as a complex system to understand the spatial effect of this process in the territory and how it could be addressed.



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VIRTUAL

C.24. Land Use and Land Cover Change Land cover land use and its change data-valuable source of information about landscape dynamics

1501-Aerial Photographic Films Archived at US National Archives Records and Administration at College Park (NARA Archives) Where When and How Many Were They Photographed

Ren'ya SATO¹

*Osaka University Human Geography Toyonaka-Japan*¹

In this session, I will show outlines of the aerial photographic film collection archived at National Archives, Records and Administration at College Park, USA (NARA, Archives) using digital overlay files made and released at NARA recently. In NARA Archives, enormous amount of aerial photographic films, which had been photographed and collected by US federal organizations such as Central Intelligence Agency (CIA) and Defense Intelligence Agency (DIA) for the purpose of military affairs, reconnaissance and surveys, are archived and released for use. Recently digitizing of overlays and catalogues for users' search has been proceeded and convenience for archival research has been greatly improved. However, current search system at the NARA website doesn't have function to search target photographs on a map and the whole picture of the NARA aerial photo archive is difficult to grasp. In 2018, the author began works for processing, arranging and aggregating digital overlays data using GIS, to visualize the whole picture and regional details of the NARA aerial photograph archive. By December of 2019, the author completed to count the number of overlays by every latitude / longitude one degree mesh and to input them to GIS files. In the session, the author will show the GIS world map, in which photographing locations and quantity of flights for aerial photographing in each location will be shown by every latitude / longitude one degree mesh, and discuss current findings and future prospects for using these aerial photographs in historical / environmental / land cover / land use studies.

1536-Relationship Between Urban Heat Island and Land Use Land Cover Changes Case Study from Slovakia

Monika Kopecka¹, Daniel Szatmári¹, Ján Feranec¹, Juraj Holec²

*Institute of Geography Slovak Academy of Sciences Department of Geoinformatics Bratislava-Slovakia*¹ *Slovak Hydrometeorological Institute -Slovakia*²

In built up areas, temperatures are commonly observed to be higher than those in surrounding rural areas, due to the Urban Heat Island (UHI) effect. It is one of the causes why many research activities focus on identification, analysis and assessment of the relationship between the density of urban fabric represented by land use/land cover (LU/LC) classes. The aim of poster presentation is to document identification and delimitation of LU/LC classes in urban areas in three cities in Slovakia: the capital Bratislava (BA) and two regional centres Trnava (TA) and Žilina (ZA). Due to intensive industrial and commercial development, these cities experienced the greatest rates of LU/LC change (urban expansion: BA – 662.95 ha, TA – 527.25 ha, ZA – 448.03 ha and cultivated land reduction: BA – 671.78 ha, TA – 527.25 ha, ZA – 444.15 ha) in the last two decades in the country. Special attention was paid to the development of LU/LC changes in the years 1998-2016 in the study areas. LU/LC classes based on the Local Climate Zones (LCZ) concept were used as an input for the UHI modelling by application of the Mikroskaliges Urbanes KLima MOdell (MUKLIMO), which makes it possible to simulate and forecast heat characteristics of UHI and other climate characteristics. Changes of LU/LC classes between the years 1998 and 2016 have shown their effect on the temperature change. The results indicate that the trends of UHI intensity are spatially correlated with urban LU and its change pattern. The graphic outputs improved the perception and evaluation of the LU/LC and UHI relationship. The results are outputs of the projects supported by Grant APVV-15-0136 and Grant VEGA 2/0023/19.



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2143-The historical dynamics of the development of land tenure in the landscapes of Central Russia

Viacheslav Nizovtsev¹, Natalia Erman²

*Lomonosov Moscow State University Geographical faculty Moscow-Russia*¹ *S.I. Vavilov Institute for the History of Science and Technology of the Russian Academy of Sciences The Department of history of Earth Sciences* - ²

Already at the early stages of socio-ecological history, the natural landscapes of Central Russia were subjected to various types of economic impact: agricultural activity, water management, recreational use, transportation, etc. This study was carried out at the junction of the humanities and natural sciences, and it is based on the original combination of landscape, historical, archaeological and environmental research methods using GIS technologies. Over the period of formation of land use there is a clear determinacy of the settlement structure and environmental management systems from specific landscape conditions. During the period of the appropriating type of economy, a balanced equilibrium system "human-nature" is established. Human settlements are clearly confined to the resource base of certain types of landscape complexes.

Anthropogenic-derivative and even anthropogenic landscape complexes appeared in the Bronze Age. Some of them have survived to the present day. These are pasture and meadow (grassland) agro-geosystems in floodplains of rivers and lakes.

At the turn of IX-VIII BC tribes of the Iron Age (Dyakovo culture) were spreading. A permanent settlement and agricultural structure was developing; anthropogenic landscapes began to form: those were villages and settlements with adjacent arable and pasture plots. Large areas were occupied by natural-anthropogenic forest-pasture-arable landscapes associated with slash-and-burn agriculture.

The Slavic colonization of the region (VIII-XII centuries AD) led to yet another change in land use. Anthropogenic landscapes of that time were the first cities and villages surrounded by an array of permanent arable land in river valleys and on well-drained sections of inter-river plains with loamy soils of increased fertility. Arable farming freed the Old Russian settlers from the "attachment" to river valleys and allowed them to develop inter-river landscapes.

This work was financially supported by the RFBR (Russian Foundation of Basic Research) grant: Project No. 19-05-00233.

2797-The history of economic development of the Upper Volga segment of the historical Volga route

Natalia Erman¹, Viacheslav Nizovtsev²

*S.I. Vavilov Institute for the History of Science and Technology of the Russian Academy of Sciences The Department of history of Earth Sciences Moscow-Russia*¹ *Lomonosov Moscow State University Geographical faculty -Russia*²

The following main periods can be distinguished in the history of the development of the Upper Volga section of the ancient historical Volga waterway. In the Neolithic period this area was quite densely populated. In the Bronze Age (II millennium BC) in landscapes there appeared first stable elements of anthropogenic origin: floodplain meadows. In the Iron Age (at the turn of the era) with the development of slash-and-burn agriculture, temporary fields, small-leaved forests, and meadows of anthropogenic origin appeared.

In the Old Russian period, a constant and rather dense settlement network was formed along the shores of lakes, the Volga and its tributaries. This region was becoming one of the key regions of the Slavic settlement and the formation of the Old Russian state. In the XIII century large cities of that time appeared on the Volga river: Rzhev, Zubtsov, Staritsa. Starting from this period, almost complete replacement of indigenous forests with secondary small-leaved ones, depletion of soils, and activation of erosion processes took place. The valley landscapes were explored and developed: floodplains, floodplain terraces, sinking slopes of valleys and riverine water-ice plains.

The strongest impact on the landscapes was provided by the construction of the Verkhnevolzhsky reservoir (1843), when large areas of forest and agricultural lands were flooded, and lake-like reservoirs formed. After the transition to industrial capitalism in the second half of the XIX century major structural adjustment in agriculture, significant development of industry, massive construction of cities, etc. took place and were accompanied by a dramatic transformation of the landscape structure. And it is only in the post-Soviet time during the economic crisis that the abandonment of land and the rehabilitation of many disturbed landscapes are taking place.

This work was financially supported by the RFBR (Russian Foundation of Basic Research) grant: Project No. 19-05-00233.



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C.24. Land Use and Land Cover Change Long term land use and land cover changes

1926-Scenario simulation of land use cover changes in the Tokyo metropolitan area Towards sustainable development

Ruci Wang¹, Yuji Murayama²

University of Tsukuba Graduate School of Life and Environmental Science Tsukuba-Japan¹ University of Tsukuba Faculty of Life and Environmental Science mura@geoenv.tsukuba.ac.jp-Japan²

Land use/cover changes have been getting great interest for governments and city planners due to the limited land use/cover resources, high recovery cost, and people's production and living conditions. Furthermore, urbanization and industrialization have placed a lot of pressure on natural resources, environmental protection, and sustainable development. To overcome these problems, ecological protection organizations and local governments have proposed several policies to control the land use/cover transformation for sustainable development.

Based on this situation, the primary objective of this study is to employ remote sensing data and geographical information systems techniques to examine the spatiotemporal pattern of land use/cover change in the Tokyo metropolitan area from 2001 to 2017 and simulate the future land use/cover in 2030 and 2050 by considering the allocation of urban functions, environmental protection, and food demand. The Land Change Modeler and Markov chain model are applied for the three future scenarios: spontaneous scenario, ecological security pattern construction scenario, and food system localization scenario. The results of the analysis provided three alternative distributions of land use/cover to accommodate population structure, urban development, and government policy. Scenario simulation is a crucial method of foreseeing future land use/cover distribution using accurate and realistic simulation outcomes. The advantage of scenario simulation is that modeling variables can calculate the highly suitable areas of each LULC category. The scenarios' results could help decision-makers with future LULC planning and maintain the balance between ecological development, food security, and economic growth under the background of population decreasing and improvement of urban vitality. This study is significant as it uses the current land use/cover change to discuss future sustainability in the Tokyo metropolitan area.

2651-LAND COVER CHANGES AND INCREASING TREND OF DEFORESTATION RATE IN WEST PAPUA A REGIONAL CHALLENGES AS CONSERVATION PROVINCE

Andrea Emma Pravitasari¹, Isabela Nor Aslamiah², Muhammad Wahid², Candraningratri Ekaputri Widodo³, Nassat Idris⁴, Iman Santoso⁴, Audrie Siahainenia⁴

IPB University Center for Regional, Systems, Analysis, Planning and Development (CRESTPENT/P4W) Bogor-Indonesia¹ IPB University Division of Regional Development Planning, Dept. of Soil Science and Land Resources -Indonesia² Kyoto University Laboratory of Regional Planning, Graduate School of Global Environmental Studies -Japan³ Conservation International Indonesia -Indonesia⁴

West Papua is known as a province with abundant natural resources with good natural conditions and high biodiversity. More than 90% of the total area of West Papua is dominated by forest land cover. Based on the structure of land cover and environmental condition, West Papua declared themselves as Conservation Province, and has a commitment to protect 70% of its territory as conservation areas. However, regional development and spatial planning in West Papua caused land cover change over the time, especially after the latest national development plan established through the Revised National Spatial Plan. This study aims to: (1) analyze the dynamics of land cover change in West Papua Province from 1990 to 2018 and (2) make a projected change in land cover in 2024 and 2033 based on 2 scenarios, namely (a) business as usual (BAU) scenario and (b) scenario based on the spatial plan (RTRW) of West Papua Province. Dynamics and projected land cover changes was analyzed using LANDSAT images obtained from the Ministry of Environment and Forestry. The analysis was conducted by Land Change Modeler (LCM) method using Idrisi Selva software. The results showed that from 1990 to 2018 the area of forest land cover (mainly primary dry land forest) turned into secondary dry land forest. The projected land cover results also showed a trend of increasing deforestation rates in West Papua. Meanwhile, the land cover that continues to increase and has potential to expand in 2033 is plantations, settlements and open land. The results of projected land cover changes based on spatial plan scenario are potentially increase the conversion of forest area to other uses (mainly settlements and plantations). Increasing deforestation rate in this area were affected by new road construction, development of new railways, growth centers, industrial zones and other infrastructures.



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2842-Measuring mapping and projecting Chilean mid sized cities

Cristian Henríquez¹, Jorge Qüense¹, Paulina Contreras¹, Mauricio Morales¹, Camila Aguayo¹, Rodrigo Hidalgo¹
*Pontificia Universidad Catolica de Chile Geography Santiago-Chile*¹

Fast worldwide urban growth is generating relevant challenges for land use planning and environmental management, especially in Latin America, where urban cover is increasing more quickly than demographic growth. Many cities are replying to the model of huge metropolitan areas, like Santiago, Sao Paulo, among others. Still, the mid-sized cities have the chance do not repeat the same mistakes from big cities. In this context, to create land use scenarios to prevent future unsustainable urban pattern is a crucial feature for planning and environmental assessment. The aim of this work is measuring, mapping, and projecting the Chilean urban system and specific cases of mid-sized cities. It uses remote sensing, GIS analyses, qualitative data, and software modeling (Dyna-CLUE and Terrset) to integrate the driving forces, land use demands, the restrictions, and forecast the land use change. The simulating maps (2050 and 2065) it validated with indicators (Figure of merit), stakeholders and fieldwork. The results show the emergence of new conurbations, like Quillota province by urban growth of Quillota, La Calera and La Cruz cities, and consequently loss of agricultural land. We evaluated impacts of low urban density and peri urbanization process, linked to the legal instrument (DL 3516, Art. 50 LGUC) and illegal dynamics (irregular settlements at coastline). We observed the effects of transport infrastructure at the regional level in Villarrica surrounding, regarding a tourist boom and areas exposed to volcanic hazard zone. In the case of Temuco city, we detected a particular influence of driving forces as indigenous property factor to explain future growth. In all cases, we observed the weakness of land use instruments, Regulatory Land Use Plan, in terms of the legal urban boundary is not able to control the urban sprawl. We highlight the great potential to include this approach into the Environmental Strategic Assessment.

3538-ANALYZING AND DETECTING THE LAND USE AND LAND COVER CHANGES IN THE REGION OF DOBROGEA ROMANIA

Cristina Elena Mihalache¹

*Romanian Academy Institute of Geography, Bucharest, Romania Bucharest-Romania*¹

Monitoring the progress of changes in the Land Use Land Cover (LULC) is a vital analysis used to identify features and for a quantitative understanding of the spatiotemporal dynamics of land use land cover changes caused by diverse natural or man-made factors. The purpose of this study is to analyze and monitoring the land use in the south-eastern of Romania over three important periods in Romania, the communist period (between 1965-1989), the post-communist period, and after the 2007 year when Romania has joined the European Union. This analysis helps to identify and understand the changes in correlation with these socioeconomic, political, or natural events and quantify how each period changes the structure of agricultural land use and the adverse effects on soil productivity and quality. Under the impact of these factors, there have been significant changes in the agriculture field, especially in the early 1990s, because of land fragmentation practices and abandonment of agricultural lands. Furthermore, in recent times the urban sprawl had intense dynamics, a phenomenon that leads to complex land cover changes. For identification, examination, and quantification of land cover changes, the Geographic Information Systems (GIS) and Remote Sensing have been used, based on supervised classification realized for Landsat and Sentinel-2 satellite images acquired between 1965 and 2020. Accuracy of the classification results has been assessed by error matrices that presenting the overall accuracy, the user and producer accuracies, and the kappa coefficients. The results could be used for further analyses for monitoring and in order to adopt a sustainable management plan.



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C.25.Landscape Analysis and Landscape Planning Trans Boundary Landscapes Conditions And Planning

1943-METHODOLOGY OF LANDSCAPE SURROUNDINGS AN EXAMPLE BY TELŠIAI DISTRICT MUNICIPALITY

Giedre Kurmilaviciene¹

*Vilnius University Department of Geography and Land management Vilnius-Lithuania*¹

The common goal of the research is to contribute to scientific knowledge of Lithuanian landscape. The concrete goal is to create a methodology of the division of landscape surroundings. In Lithuania there is no unanimous methodology of the division of landscape surroundings so far. So this methodology offers new and summarized method of how to divide landscape surroundings. To realize the concrete goal, these tasks have been set: 1. To analyze literature sources; 2. To present conception of landscape surroundings; 3. To present territory parameters of landscape surroundings; 4. To present the classification of landscape surroundings; 5. To present the examples of landscape surroundings territorial differentiation; 6. To present visual potential of landscape surroundings; 7. To make typological analysis of landscape surroundings. The following methods were used in this work: literature analysis, cartographic analysis, database analysis, mapping method.

Considering that the concept of landscape surroundings is not completely clear, this work aims to present the concretized concept of landscape surroundings and to identify landscape features that define the size and boundaries of landscape surroundings. Having discussed all the above mentioned aspects, the author introduces the classification and methodology of the division of landscape surroundings. Based on this methodology, author makes and presents cartoschemes of landscape surroundings of Telšiai district municipality.

Also the work discusses the diversity of landscape surroundings in Telšiai district. This area is characterized by landscape features. Thus, this methodology makes it easier to identify and delineate landscape boundaries, define its boundaries and identify landscape differences, and provides landscape cartographic visualization capabilities that could be used to represent different landscape features, such as natural and anthropogenic parts of the landscape. The results of the work are reflected in the maps of Telšiai landscape areas.



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C.27. Local and Regional Development Dilemmas of regional and local development

1613-Regional development factors in the European Union

Paweł Churski ¹, Barbara Konecka-Szydłowska ¹, Tomasz Herodowicz ¹, Robert Perdał ¹

Adam Mickiewicz University in Poznań Faculty of Socio-Economic Geography and Spatial Management chur@amu.edu.pl-Poland ¹

The analysis aim is to identify factors influencing the socio-economic development level of the European Union regions to the greatest degree. The research was conducted for the years 2004-2016 and the spatial scope covered 205 regions belonging to the 26 EU member states. The analysis is consisted of three main stages. The first one involves the identification and the authors' systematisation of the most important regional development factors today. The second phase concerns an analysis of multivariate differences in the EU regions and the determination of their position on the scale of the social and economic development level which led to formulating relevant classifications based on the synthetic indicator values. In the third stage the model pattern of factors initially adopted was empirically verified and its different variants concerning each of the previously identified development classes of European regions were estimated. The obtained results confirm the persisting noticeable disparities between EU regions both in terms of the development level and the dynamics of changes. The relation between these two aspects is characterised by a high degree of "reversed similarities" in the pattern of Western Europe – East-Central Europe. The analysis conducted indicates a diverse impact of regional development factors depending on the development level of an area they concern. This allows formulating variant systematisations of regional development factors dedicated to regions with a different socio-economic development level. However, regardless of the level of development as well as the pace and direction of its changes, the most significant development factors remain undoubtedly soft determinants, i.e. human and social capital.

2044-HUMAN RIGHT AS DEVELOPMENT SOUTHERN PERSPECTIVES TO COMBAT FOOD INSECURITY

Tatiana Cardoso Squeff ¹

Federal University of Uberlândia Law School Uberlândia-Brazil ¹

The guarantee of the food security of the population means reaching three large dimensions, which are the biological (ingestion of nutritious foods according to the biotype and the environment of the individual), material (availability and distribution of nutritious and safe foods) and economic (guarantee of means for access to nutritious food). It is an arduous task that developing countries face, even when various international documents recognize the right to food as a human right. Given this situation, the great question that emerges is how to combat this problem. In the end, it is not enough to produce food, if they are not safe for consumption or do not meet the nutritional needs of the population that will consume it; In addition, it is not enough to produce it if access to food is hindered, whether due to logistical or financial reasons. And an example of the outline is the creation of the Zero Hunger Program for Brazil, which, during the first term of José Graziano da Silva at the head of the Food and Agriculture Organization, was considered a success prototype of the Global South and whose experience has It has been disseminated among nations that are experiencing food insecurity. The program, which even opens a new vision of the human right to food, which is the 'right to food as development', which, based on the teachings of Amartya Sen and Josué de Castro, fights for the guarantee of three dimensions of food security and adapts to the will of countries of the Global South.



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C.29. Political Geography Resources Space and Power How do Resources produce Territories

2100-THE THREE SEAS INITIATIVE CHANGING POWER BALANCES AND GEOPOLITICAL REPRESENTATIONS AROUND GAS SUPPLY IN CENTRAL AND EASTERN EUROPE

Sami Ramdani¹

*Université Paris 8 French Institute of Geopolitics (IFG) Saint-Denis-France*¹

Background

Russian-Ukrainian gas conflicts and the global development of the liquefied natural gas (LNG) sector have prompted Europeans to imagine a diversification project benefiting the countries of Central and Eastern Europe (CEE) which are the most vulnerable to disruptions of the Russian supply. This project is a North-South gas Corridor which would connect the Lithuanian and Polish LNG terminals to the future Croatian terminal via bidirectional interconnectors.

Hypothesis

The evolution of global gas flows resulting from the development of LNG technology supported by the USA and the Three Seas Initiative (TSI), a political platform established in 2016 by twelve EU member states, leads to a reorganisation of European regional flows. This process alters the power balance with Russia in CEE.

Materials and methods

A 6 months fieldwork (participant observation) in the NATO Energy Security Centre of Excellence. An analysis of the official positioning of the different players and of the technical reports issued by the energy sectors' actors. The commonalities and differences in the energy policies of TSI countries will be analysed through diatopical analysis (Lacoste, 2014). Discursive analysis will help to understand the role of geopolitical representations (Loyer, 2019) mobilized by actors defending competing projects.

Results

The North-South Corridor project is strongly supported by the United States as it aspires to become the world leader in LNG exports. However, the current construction of Nord Stream 2 raises concerns about the viability of the region's LNG terminals. Indeed, with Nord Stream 2, Russian gas more competitive than LNG could supply the North-South Corridor by the Czech Republic. Some TSI Member States see Nord Stream 2 as an opportunity, others as a risk (Siddi, 2019). These geopolitical representations nourish multiple conceptions of energy security (Szulecki, 2018) that justify the desire to integrate or isolate certain states within the regional energy Policy (Rebière, 2019).



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2900-Women land and environmental defenders in Latin America

Mariana Tafur Rueda¹, Mireia Baylina Ferré¹

*Autonomous University of Barcelona Geography Bogotá -Colombia*¹

In the last two decades, the defense of land and the environment has endangered rural women from Latin America. In fact, two of the countries in this region top the list of the most dangerous on earth to defend environmental and land rights. Colombia is the second and Brazil the third. Therefore, defending rivers, badlands, mountains, forests and the jungle is to protect the resources that are in dispute throughout the world. Although it is important referring to what they advocate, it is also key to talk about them. These Afro-descendant, small farmers and indigenous women are not activists, they are defenders -because activism is a choice, defense is not-, which implies that every day they are risking their lives for what they are defending. In that sense, this article aims to know what has been written about rural women defenders of the environment and the land from an intersectional and gender perspective in Latin America, in general, and in Colombia, in particular. For this, a systematic analysis of academic articles in the fields of geography, feminist studies, rural studies and Latin American studies was made. The main results obtained show that there are very few research on this subject. It is evident that when researching rural women's organizations, at least in Latin America, there is a tendency to focus, on the one hand, on how being part of a social organization empowers rural women and, on the other, how land rights also empower rural women. It is important to give visibility to rural women defenders since their agency goes besides empowerment and beyond.

3051-The Impact of Nationalist Mobilization on Re Ethnicization and Spatial Polarization of Independence Support in Catalonia

Martin Lepic¹

*Charles University in Prague Department of Social Geography and Regional Development Prague-Czechia*¹

Triggered by the attempts of Catalan nationalists to carry out the independence referendum and by the repressive measures of the Spanish state, the intense nationalist mobilization has recently unfolded in Catalonia. This article examines whether and how the effect of mobilization reinforced the ethno-cultural basis of independence support and polarized its geography. As secession is currently the ultimate goal of the Catalan nationalist endeavour, it is used as a proxy indicator of national belonging. In this respect, the article proposes a reconceptualization of the typology of national belonging, introduces a new category of ethnically spurned nationalism, and builds a model explaining changes in national belonging over the periods of nationalist mobilization and across the territory. The logic of the geo-nested research design requires a multi-method approach and combination of individual-level survey data for measuring the effects of social cleavages and municipal-level electoral data from the 2017 regional election in Catalonia for measuring the level of spatial polarization and fragmentation into territorial blocs. The results indicate that Catalan nationalism is a cultural-linguistic phenomenon which becomes increasingly spurned based on individual's ethnic descent when the nationalist mobilization unfolds. As the mobilization dynamics is uneven across space, the territory remains polarized and fragmented, and the re-ethnicization of independence preference occurs mainly in the nationalist heartland area. At the same time, the findings indicate that people of a mixed ethnic descent are prone to be attracted by the Catalan nationalist project in this area during mobilization, presumably due to contextual effects of interpersonal networking.



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3194-Water and power outside the realm of the state A case study of the Jordan and Tigris Euphrates river basins

Alexandra Caplan¹

*Oregon State University Geography Corvallis-United States*¹

Both the Jordan and Tigris-Euphrates rivers are shared by riparian states that maintain tense political relations, despite the existence of a number of international treaties governing the management of these rivers. A growing field of literature has suggested that the power relations between states sharing transboundary rivers influences transboundary water management policies. Indeed, both Israel and Turkey are considered to be hydro-hegemons due to their favorable geographical locations and superior arsenals of military, economic, and social power. However, hydro-hegemonic analyses have tended to focus on the interplay of power and politics occurring at the realm of the state, excluding the contributions that non-state actors can have on transboundary water management. This study seeks to examine how power dynamics are manifested within transboundary water management practices across different scales of governance by analyzing how interactions between hydropolitics and broader political relations between riparian states can play out at the non-state level. To do so, the Transboundary Waters Interaction NexuS (TWINS) and Framework of Hydro-Hegemony (FHH) will be reconceptualized and applied across scales of water governance to examine how non-state actors can influence transboundary water management outcomes. By highlighting instances of local-scale cooperation along the Jordan River and the influence of anti-dam advocates on Turkey's Southeastern Anatolian Project, this study demonstrates the utility of incorporating non-state actors into analyses of power and politics within transboundary watersheds. Results from the study suggest that non-state actors utilize discursive forms of power to influence transboundary water management, but their overall influence is limited by broader political relations and distributions of power.



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C.30. Population Geography Processes of population change migration and development

1027-Future Prospects of Population Aging in Japan A Cluster Analysis Using Small Area Population Projection Data

Takashi Inoue¹, Nozomu Inoue²

Aoyama Gakuin University College of Economics Tokyo-Japan¹ National Institute of Population and Social Security Research
Department of Theoretical Social Security Research kou_nozo2@yahoo.co.jp-Japan²

As is well known, population aging in Japan is proceeding most rapidly in the world, and nevertheless no geographer nor demographer has performed nationwide studies on Japan's aging by using small area population projection data. This is because until quite recently, such projection data had not been provided in Japan, as well as other countries. Meanwhile, the first author released the original website of "The Web System of Small Area Population Projections for the Whole Japan" in 2016 (hereafter referred to as SAPP). SAPP opened small-area (about 217 thousand areas), long-time (2015 - 60), and nationwide projected population of Japan for the first time on internet (<http://arcg.is/1GkdZTX>). To develop SAPP, the author proposed a new method for smoothing small area demographics. The purpose of this study is to demonstrate future prospects of Japan's aging population using data from the latest version of SAPP, which was released in 2019. The method used in this study was a nonhierarchical cluster analysis where we input aging rates and elderly population indices at 11 time points. As a result of the analysis, more than 98 percent of small areas were classified into 7 clusters. The main conclusion is that clusters with a higher aging rate as of 2015 indicate a lower elderly population index as of 2065. This is caused by the fact that small areas belonging to such clusters had experienced low fertility and depopulation for a longer time until 2015 and that, consequently, the size of cohorts newly entering elderly population in those areas will decrease more remarkably than in other areas.



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C.30. Population Geography Transnational Migration and Social Diversity

2882-Turkish minority from Romania

Vasile SURD¹, Nicolae Bogdan PACURAR¹, Nicolae BOAR¹, Alexandru Sabin NICULA¹, Nicolae Rusalin SICOE²
university Babes-Bolyai Geography Cluj Napoca-Romania¹ Ciuruleasa, Alba County General School -Romania²

Turkish settlements has a long history in the Dobruja region, various groups such as bulgars, pechenegs, cumnans and turkmen settling in the region between the 7th and 13 th century, and probably contributing to the formation of a christian autonomous polity. In the 14th century an important event in the history of the Turkish population was however the ottoman conquest of the region in the early 15th century hence by 17th century. Most of the settlements in Dobruja had Turkish name, either due to colonization or through assimilation of the Islamized pre-ottoman Turkish population. In the 19th century Turks and Tatars were more numerous in Dobruja than Romanians. The first Turkish community that settled in Romania was the one who founded the town Babadag in the year 1264. Nowadays, according to the last national census (2011) the total number of Turkish people living in Romania is 27,698, mostly located (over 95 percent) in three administrative units: Dobromir, Baneasa and Independenta communes (commune is rural administrative unit from Romania), which count 20 villages. The Turkish minority established its own political party (The Turkish Democratic Union of Romania) represented in Romania Parliament by a single member, Mr. IUSEIM IBRAM. The entire Turkish community is recognized and appreciated in Romania especially for its culture and gastronomy. From religious point of view, Romania host now a total number of 72 mosques, nine being under construction. Romania Turks enjoy full democratic rights and form the main human bridge for connection Romania and Turkey. Until 1975 in Romania lived one important Turkish community on the island Ada -Kaleh, in the middle of the Danube on the sector Iron Gate were was built the huge dam for electric plant in collaboration with the former Iugoslavia. From here all Turkish population migrated in the mother country.

3066-The research of migration of Kazakhstan's population as a factor of economic security of the country

Gulnara Nuysupova¹, Roza Kelinbayeva¹

Al-Farabi Kazakh National University Department of Geography, Land Management and Cadastre Almaty-Kazakhstan¹

Economic security of country is basis of sustainable socio-economic development and welfare of nation. Saving economic security on modern step is possible in case of intensive way of developing economy, that can be achieved only by high quality level of human capital.

One of the factors forming human capital is migration, whose tendencies of development during the 30 years period of independence of the Republic of Kazakhstan had different directions showing changes, that took place in the society's life. For the country with huge, underpopulated territory, that has cross-border position in Eurasia, significant ethnic diversity and spatial differentiation of socio-economic development's tempo's level migration processes play important role.

After the destruction of the USSR external migration had high rate of negative balance, it was especially true for East and North region, where a big percentage of Slavic population live. Negative consequences of this loss affect the economy and social sphere of Kazakhstan: there is an outflow of qualified workforce and working-age population, that affects a labour market, it's structure and quality. At the same time growing economic role of China in the development of Kazakhstan's economy leads to chinese labour immigration in Kazakhstan. Spontaneous work immigration from Central Asian countries, which is usually uncontrolled, is alarming. It creates serious competition in internal labour market.

Internal migration is the movement of people from countryside to big cities, whose tempo increased twice in the last 5 years. The main reasons for internal migration are dysfunctional socio-economic situation in the former places of residence, remoteness of cities, a lack of work and a low level of infrastructure's development.

All this tendencies talk about a need to regulate tempo and geography of migration flows, stimulate qualitative structure of migration by using effective migration procedures and improvement of population's quality of life.



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C.31. Transport and Geography General

2365-ASSESSING THE EFFICIENCY OF REGIONAL AIRPORT SURFACE ACCESS

Dimitrios DIMITRIOU ¹, Maria SARTZETAKI ¹, Aristi KARAGKOUNI ¹

Democritus University of Thrace Department of Economics -Greece ¹

Transport industry spends considerable amounts of resources and capitals to improve accessibility and meet the needs of different market segments. Different transportation modes have key operational advantages and properties. However, contemporary demand is influenced by integrated transportation systems that require maximum flexibility in the use of each mode. As a result, modal competition exists at various levels and takes different dimensions. Modes can compete one another in terms of cost, speed, accessibility, frequency, safety, comfort, etc. For a similar market and accessibility, two modes that offer a different level of service will tend to compete another. The most prevailing competition concerns costs versus time and level of service.

The methodology framework is based on the competitor analysis and presents generalized transport costs indicators for decision making, which incorporates financial costs, travel times, level of service. The results highlight the level of competitiveness between the different modes in an Origin-Destination corridor. The case study presents the output of a such analysis for the OD corridor in Greece that connects the Capital city (Athens) with a regional, tourist airport's (Kavala) catchment area.

Numerical example derived from Greek transportation market highlight the purpose and application of this model. Competing modes and carriers in the numerical example include air transport, road, a conventional rail system and a high-speed rail system. The computational results are in line with expectations.

The contribution of the research is that it provides a flexible and easy to handle modeling framework to determine the competition level on high demanded corridor. The results highlight that in some cases the air transport option is more beneficial, and this affects the transport mode pricing policy efficiency and the price elasticity, highlighting important messages to planners, managers and decision makers especially towards pricing policy.



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C.31. Transport and Geography Urban Transport Geography

1597-Changes of residents' transport behaviours and spatial mobility within a large post socialist city resulting from the introduction of statutory Sunday trading restrictions – through the example of Łódź

Michał Kowalski¹, Marta Borowska-Stefańska¹, Szymon Wiśniewski¹

University of Lodz INSTITUTE OF THE BUILT ENVIRONMENT AND SPATIAL POLICY Łódź-Poland¹

In Poland attempts to introduce statutory Sunday trading restrictions have been made on a number of occasions over recent years. The issue resurfaced in 2016 with the submission of a bill initiated by citizens over Sunday trading restrictions (supported by Solidarity). Consequently, an act on trading restrictions on Sundays and public holidays as well as some certain other days was introduced in Poland in March 2018. In accordance, the trading ban will be introduced gradually.

The main purpose of the research is to determine the impact of the statutory Sunday trading restrictions on the transport behaviours of people living in a large Polish post-socialist city (Łódź). One carrier of information on journeys undertaken within the city is data from induction loops - being a part of the city's Intelligent Transportation System (ITS). The second source of data is the results of a two-stage questionnaire survey (concerning trading and non-trading Sundays) of the city's inhabitants, aimed at defining the changes in their transport behaviour with reference to the introduction of trading restrictions. The research was to assess the way in which the new statutory restrictions affect transport behaviour discharged after the political transformation. The results of the research conducted on the transport behaviours of Łódź residents indicate that the majority of their transport behaviours clearly depend on whether a given Sunday is a trading or non-trading day. What is more, time (daily and hourly) and spatial differentiation of residents' mobility, the expression of which is the load of the urban road network, is also characterised by clear distinction related to the said statutory trading restrictions. The study also proves that the time previously devoted to Sunday shopping is currently spent not only at home, but also allocated to new (and until now unperformed) activities that often require travelling.

2533-Istanbul Metrobüs an inspiring model for reconverting major european highways

Pierre HELWIG¹

Independent consultant Public transport Paris-France¹

The ecologic and climatic context urge every city and country in the world to find the best ways to reach very ambitious global engagements to cut CO2 emissions. Without doubt, this issue ask to decrease everywhere the use of individual motorised vehicles and to invert sharply the modal split in a very short delay, probably a few years only.

As many "well developed countries" are promoting expensive solutions based on very high investment costs and an uncertain efficiency (as for example "Grand Paris Express" in the Parisian Region), Istanbul has implemented since 2007 a bus rapid system (BRT) called "Metrobüs" on its main highway "O-1", which is plays the role of first ring road of Istanbul and the major link between European and Asian side of the Bosphorus.

"Metrobüs" of Istanbul is a very special BRT system due to many choices.

On a first hand, Metrobüs is characterised by a very efficient service, close to heavy railways solutions: high frequency, high availability, high commercial speed and high capacity.

On a second hand, its technical infrastructures are also very simple and easy to implement: no specific vehicles but low-entry and articulated busses, two middle lanes of an existing highway converted to isolated bus lanes, long and central platforms located on the medial strip of the highway (as busses are running on the left side of the road) with pedestrian access by crossing bridges and ramps.

Seen as an easy and fast way to improve public transport capacity on existing highways and to optimise the cost-benefit analysis of public transport development, Metrobüs system might become a inspiring "low tech solution" for many large or growing metropolis.

Especially in the Parisian Region, known for its eavy metro network but where a large part of the suburbs remain dependant to individual mobility and need efficient alternatives.



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C.32. Urban commission Urban Challenges in a Complex World Complex Urban Systems and processes of cities transformation

1424-Scaling Law Reveals Unbalanced Development in Rapidly Urbanizing China

Zheyi Liu¹

*Sun Yat-sen University School of Life Sciences Guangzhou-China*¹

Managing complex cities requires coordinating the development of different urban functional dimensions during urban evolution, especially in the process of rapid urbanization, for sustainability. Urban scaling theory provides a quantitative framework to explore the temporal evolution of urban properties against city size, disentangle their interlinked dynamics, and inspect balance in different dimensions of development. In this project, we first comprehensively characterized the temporal evolution of allometric scaling behaviors for multiple urban functions of nearly 300 Chinese major cities from 1984 to 2016. We found the Chinese urban system showed less scaling properties than other developed urban systems but is approaching the urban scaling law in the process of rapid urbanization in China. The allometric scaling exponents for most urban functions changed over time but without convergence to empirical exponents regimes of other urban systems, especially for infrastructure variables. An unbalanced development between socioeconomic function and urban services in urban China has been revealed by the enlarging divergence in their evolutionary trajectories of scaling exponents. We summarized the Chinese urban development into four stages according to the phase change of the scaling behavior and discussed the potential influence of government intervention and macro events on urban scaling behavior. These results exhibit a unique historic evolution of the Chinese urban system which accompanied by the emergence of scaling behavior and an enlarging imbalance in urban functional dimensions. Our work demonstrates the utility of scaling relationship in introspecting the balance and sustainability of urban development, and also enriched the understanding of the emergence and variation of urban scaling behavior in the context of rapid urbanization.

2278-Suburbanization and intra urban suburbanization of a post socialist city. The case study of Wrocław (Poland CEE)

Robert Szmytkie¹

*University of Wrocław Department of Human Geography Wrocław-Poland*¹

One of the most spectacular socio-economic processes in post-socialist countries of Central and Eastern Europe (CEE) is suburbanisation occurring in the surroundings of large cities. The development and scale of suburbanisation in Europe in the post-war period was strongly dependent on the political system and level of socio-economic development of individual countries, and the Iron Curtain turned out to be a barrier to the expansion of this phenomenon. The second phase of urban sprawl in CEE started with the political transformation of the 1990s and caused rapid and uncontrolled spatial growth of large cities and the development of suburban zones, which was accompanied by a population decline in city centres and migration to the suburbs. Research on construction movement in Wrocław and other large cities in Poland indicates the presence of intensive construction activity not only in suburban areas, but also within the cities. Interestingly, intensive construction activity within the boundaries of large cities does not correspond to a growth of population there, at least according to official statistical data. The above findings allow the proposal of a research hypothesis as follows: in the case of large cities in post-socialist countries of Central and Eastern Europe, suburbanisation outside the city (in the suburban areas) is accompanied by processes of intra-urban suburbanisation that have a similar character and intensity and occurs in the peripheral and weakly urbanised districts of the city. The main objective of this study is to identify the processes of suburbanization and intra-urban suburbanisation based on the example of Wrocław.



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C.32. Urban commission Urban Challenges in a Complex World Subjective Objective well being in cities

1172-Citizens' perceptions regarding urban livability comparing the cities of Quito and Salzburg

Pablo Cabrera-Barona¹, Anna Kovacs-Györi²

FLACSO Public Affairs Quito-Ecuador¹ University of Salzburg Applied Geoinformatics anna.gyori@sbg.ac.at-Austria²

Urban livability can be considered as a useful conceptual and analytical framework to improve the quality of life in a city and is a concept that is dependent of subjective variation among urban residents. Additionally, analyzing the links between citizens' perceptions and functional aspects of urban livability could support a better understanding of urban life patterns. In this context, it is also interesting to compare citizens' preferences between cities of developing countries and cities of developed countries. Extracting data obtained from an international survey, we compared urban residents' perceptions linked to urban livability between the cities of Quito (Ecuador) and Salzburg (Austria). The survey used a questionnaire that included questions regarding sense of community, urban form and functions, mobility, housing and general satisfaction. We obtained 53 responses in Quito and 51 responses in Salzburg. There are more people completely satisfied with their neighborhood and with a sense of belonging to the community in the city of Salzburg than in the city of Quito. Around 55 % of interviewees in Quito and an equivalent percentage in Salzburg, consider their neighborhoods' streets as places with trees. 20 residents of Salzburg responded that their neighborhoods have public spaces, an only 13 respondents of Quito considered that there are public spaces in their neighborhoods. Regarding the question about if the available urban functions in neighborhoods fulfilled residents' needs, chi-squared test showed significant differences between Salzburg and Quito. We also identified significant differences between safety perceptions of neighborhoods' cycling and walking conditions between the two cities of study. The mentioned results are examples of a wide range of important differences of citizens' perceptions of urban livability between the city of Quito and the city of Salzburg that we identified in our study.



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VIRTUAL

1294-HIGH DENSITY LIVING AND RESIDENTIAL SATISFACTION HOW JUVENILES IN HONG KONG EXPERIENCE THEIR RESIDENTIAL ENVIRONMENTS

Pu Hao¹

*Hong Kong Baptist University Department of Geography Kowloon-Hong Kong*¹

Background

Being one of the world's densest cities and the most expensive to buy a home, Hong Kong is famed for inadequate housing and small living spaces. Living under such crowded conditions is often accused of aggravating stress and social problems. However, the effect of high living density on juveniles remain ambiguous.

Materials and methods

Based on a survey in 2017, the paper examines how young people in Hong Kong perceive and experience the density of their living environments and how such perceptions contribute to residential (dis)satisfaction. Data were obtained from questionnaires distributed to a sample of 1213 respondents from four public middle schools in Hong Kong. The data comprised objective measures of the physical attributes of the homes of the students as well as subjective measures of how they perceive and evaluate their living environments. These data, which are analyzed using frequencies, correlation analysis and regression models, yield important evidence about the mechanism of how density is perceived at home and how environmental and social conditions moderate the effect of density on crowding.

Results

The results suggest for juveniles in Hong Kong high living densities do not necessarily lead to the perception of crowding. In addition, residential crowding, if perceived by the juveniles, is not directly translated into dissatisfaction. The variables which explain the residential (dis)satisfaction of juveniles are the composition and ethnic and socioeconomic backgrounds of their families.

Conclusions

The paper argues that family composition and ethnic and socioeconomic backgrounds contribute to juveniles' varying degrees of tolerance to high living density, which affects the perception of crowding. The effect of perceived crowding on residential satisfaction is further moderated by the interactions of family members and the overall quality of family life.



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VIRTUAL

C.32. Urban commission Urban Challenges in a Complex World Urban Heritage and Conservation

1256-Urban Change survey of Medieval Alexandria (Evolution Destinations and Shrinkage Factors via Remote Sensing and GIS)

Mohamed Soliman¹, Keiji Yano¹

Ritsumeikan University Institute of Disaster Mitigation for Urban Cultural Heritage (R-DMUCH) Kyoto-Japan¹

In 332 BC a Greek architect Deinocrates of Rhodes was asked to build Alexander's new city. The streets lay in Hypodermic pattern planned into five quarters. The Island Pharos was joined to the mainland by a thick wall built in the sea called the Heptastadium encompassed with the Great Harbor to east and the Eunostos Harbor or "Harbor of Safe Return" to west. A 17 km long canal was dug from the nearest branch of the River Nile to conduct fresh water into a complicated underground network. Alexandria became capital of Ptolemaic Egypt until 31 BC, when converted to be a state under the Roman Empire.

Urban change phenomena struck the city as a result of natural and human disaster. Human disaster is represented in overlapped reasons concluded in the Roman invasion 31 BC and the Christian religious persecution in the third century, while Amr ibn al-As, the Islamic conqueror, converted the capital from Alexandria to el-Fustat in 641 CE and demolished its fortifications, adding to migration of the elite to Europe later, during the successive Islamic periods Alexandria exposed to reconstruction until the modern period that changed the urban fabric, extremely. In the fifteenth century, Alexandria lost its world trade position due to the geographical exploration, followed by the Ottoman invasion 1517 CE.

On the other hand, destructive earthquakes struck the shoreline, frequently leaving destruction in the most prominent buildings of the city, adding to, sunken the royal district under the sea water of the Great harbor. This contribution discusses digitizing the historic map via remote sensing and GIS for investigating and visualizing the urban transformation in the medieval Alexandria.



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VIRTUAL

C.33. Water Sustainability Human pressures on water causes and consequences

1077-INFLUENCE OF SMALL RESERVOIRS ON THE METALS CONTENT IN SEDIMENTS OF EPHEMERAL RIVERS (THE NEGEV DESERT)

Małgorzata Kijowska-Strugała ¹, Lukasz Wiejaczka ², Rafał Kozłowski ³, Judith Lekach ⁴

Institute of Geography and Spatial Organization Department of geoenvironmental Research -Poland ¹ Institute of Geography and Spatial Organization Department of geoenvironmental Research Krakow-Poland ² The Jan Kochanowski University Department of Environment Protection and Modelling -Poland ³ Bar-Ilan University Department of Geography and Environment -Israel ⁴

Metals are a group of pollutants that play an important role in ecosystems due to the high ecological significance. This study presents an analysis of the metals content in bottom sediments of the Negev desert rivers affected by small reservoirs (Nahal Sansana, Nahal Revivim and Nahal Pura). The article compares chemical differences of bottom sediments in the rivers located downstream and upstream the dam reservoirs and into reservoirs.

The following metals: Al, Fe, Mg play a dominant role among all 19 analyzed metals (Pb, Cd, Cr, Co, Cu, Mn, Ni, Zn, Sr, As, Mg, Al, Ba, Cs, Fe, Ga, Rb, U, V) as they constitute 99%. The statistical analysis (PCA and HCA) showed that sediments in the rivers above the reservoirs in the Negev desert demonstrate similar concentrations of metals. In bottom sediments of the reservoirs, an increase in the concentration of metals was observed in relation to the rivers above and below them. A comparison of metal concentrations in the rivers above and below the reservoirs does not show any unambiguous change trends as the concentrations of metals below the reservoir are not always lower than above the reservoir.

The lowest enrichment factor (EF) values were recorded below the analyzed reservoirs and the highest in the reservoirs. The absence of water enrichment with ions after passing through the reservoir indicates that their sources are areas located above the reservoir, and the reservoir itself has a small influence on the concentrations of metal ions below their locations. At the same time, the lower EF values recorded in the river below the dam result from the process of self-cleaning in the reservoir.

The concentration of most metals in the analyzed sediments in the rivers and the reservoirs of the Negev desert does not show a potential ecological risk (SQG).



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2303-ANALYSIS OF ENVIRONMENTAL DEGRADATION WATER STRESS PRODUCTION VULNERABILITY AND INSECURITY AND RISKS OF WATER RATIONALS IN THE METROPOLITAN REGION OF SÃO PAULO.

Joemar Jodita da Silva¹, Luis Antonio Bittar Venturi¹

University of São Paulo Physical geography São Paulo-Brazil¹

The São Paulo Metropolitan Region - RMSP, the most populated, rich and developed in Brazil, was treated in the Alto Tietê Watershed area, where there is great water availability compared to other areas of the world; However, the formation of the metropolis and its urbanization process will not be accepted as natural space and landscape resources, such as decharacterizing and degrading, causing changes in the water regime that was historically mild and constant, and which has been intense in some cases and in some countries, under others.

The high population density and the consequent high consumption, coupled with the impossibility of making full use of the availability, face a degradation, generated by water stress in parts of the region, or that, due to contemporary occurrences of periods with prolonged drought, are causing vulnerability and insecurity, with risks of lack of water and its consequent relationship in these parts, as occurred between 2013 and 2016.

The government has taken steps to contain a situation in the period mentioned above and has been promoting actions to recover degradation and increase availability; however, much work remains to be done until water stress is overcome and water security is achieved.

This research aims to investigate water security situations in the region, verifying and statistically comparing the difference between availability and consumption by collecting data from management bodies, or classification by the AHP - Analytical Hierarchy Process matrix as major or minor vulnerabilities, and risks, mapping with ArcGIS software to facilitate responses and read data and to analyze vulnerabilities and reasoning risks in parts of the region, with the aim of making available the results obtained for those that can be discussed with society and government, thus subsidizing or directing actions aimed at resolving an issue.

3125-Environmental Degradation for Irrigation Agriculture and its Impact on Groundwater Depletion in the State of Guanajuato Mexico

Azucena Pérez-Vega¹, Yann Ramos¹, Miguel González¹

University of Guanajuat Geomatics and Hydraulics Guanajuato-Mexico¹

The state of Guanajuato is among the states with the highest percentage of transformed land in Mexico. The main modifications are carried out by Agri (R) irrigation agriculture (21.5%), Agri (T) temporary agriculture (25.7%) and induced pastures (9.7%). Irrigation agriculture is supplied with up to 80% by groundwater. The state of Guanajuato has 20 aquifers, among them 18 are overexploited.

In the present work land cover maps of 2002, 2007, 2011 and 2014 (INEGI), were used to calculate the intensity of change at the period and category level. The change matrices were obtained through the DINAMICA EGO program and the trajectory sequence analysis was carried out using the R and TraMiner programs. Standardized piezometric data (N.P.) of 581 wells from the period 2002-2014 were used. Based on municipal information from the statistical and geographical yearbooks about irrigated agricultural areas during 2002-2014, surface area or the amount of water of three crops, corn, sorghum and alfalfa, were considered. Information concerning the technification of irrigation by groundwater extraction during the period 2006-2011 from the Ministry of Agricultural Development was analyzed. A correlation analysis was carried out between the N.P. from the wells and the distance to the Agriculture area (R) and another one, at the municipal level, between the Agriculture area (R) and its technification.

The relative exchange rate of Agri (R) showed very low percentages but a very high absolute exchange rate, the exchange sequences occur frequently from Agri (T) to Agri (R) and in some cases returning to Agri (T). The correlation between the N.P. and the distance to areas of Agri (R) exceeded 0.8 and was significant for the three periods. The dynamics of the Agri (R) is closely linked to the availability of water



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VIRTUAL

C.33. Water Sustainability Water source variability monitoring hydrological hazards and risk management

2087-INTEGRATED ANALYSIS OF WATER VULNERABILITY IN THE CITY OF SÃO PAULO BY ADDRESSES

Vinicius Siqueira Braga Ramos¹, Luis Antonio Bittar Venturi¹

University of São Paulo Physical geography Santo André-Brazil¹

The city of São Paulo, with 14 million inhabitants and 11% of the Brazilian GDP, has water vulnerability, that is, unstable access to drinking water, subject to seasonal interruptions. As the city has large amounts of water in its rivers and reservoirs, the water vulnerability is usually associated with inefficient management, a valid explanation. However, rare studies provide more specific data that may help explain this problem. In this sense, this research aimed to relate water vulnerability with two new variables: relief and number of artesian wells. We also investigate all the water supply infrastructure (dams, treatment, water mains), its operation, having as an initial premise that the supply is irregular and not homogeneous for all addresses. We validated this irregularity with the number of user complaints by addresses, throughout 2018, the year which the precipitation index was within the historical average, which forced us to discard the inclusion of climate aspects in the study.

We use the urban phenomenon management system (Patent Solicitation No. 870180055653), which integrates theory, method and technique. Theoretically, we consider the concept of water vulnerability and its indicators (frequency and duration of supply cuts). Methodologically, the data were entered into the AHP (Analytical Hierarchy Process) matrix and then entered into the technical mapping base (ArcGis) to identify vulnerability classes and how they are distributed in the city. We overlay this map with the hypsometric map and the well map of São Paulo. We conclude that the correlation between relief and water vulnerability is mean. Besides this, vulnerability decreases as population density decreases and the number of wells increases. The most important variable in explaining São Paulo's water vulnerability, however, was the poor distribution of the network.



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VIRTUAL

C.35. Karst Commission Land Use Planning in Karst Region

3303-Vulnerability assessment of karst aquifers using EPIK model (case study the Khorin mountain west of Iran)

sasan zangenehtabar¹, mehrnoosh ghadimi¹

tehran university tehran university tehran-Iran¹

Conservation of karst water resources as a water supplier 25% of the world's population and its high reactivity to pollution are of paramount importance. In this regard, vulnerability assessment for groundwater resources can be a rather favorable and cost-effective way for identifying regions susceptible of contamination. The Khorin karst aquifer is situated 36 km to the north-west of Kermanshah province in west of Iran. This Aquifer is feeder to 5 karst springs having high water levels including Sabzali, Mir-Ahmad, Jaberi, Marab, and Bi-Abr. The main data of this research are 1:50000 topographic maps, 1:100000 geological maps, 10 m DEM, qualitative and quantitative data of springs and field visits. This paper seeks to estimate the vulnerability of the Khorin karst aquifer to contamination propagation using the EPIK model. The EPIK implements 4 parameters of Epikarst (E), Protective cover (P), Infiltration condition (I), and Karst network development (K). The Arc GIS software was used to prepare the layers and execute the model. After running the EPIK model it was determined that 23.38%, 14.56%, 35.31%, and 26.75% of the study area were tagged in the categories of low, moderate, high, and very high vulnerability, respectively. Results of the model implementations showed that areas with low vulnerability mainly include marginal plains of the Khorin karst mass mainly with quaternary deposits. Areas classified as highly vulnerable also lack soil and are primarily composed of carbonate outcrops. The dominant lithology of these regions mainly include thick-layer Bisetun limestone. This area also enjoys the highest amount of precipitation, and the vegetation mainly includes poor pasturelands. Considering the location of these regions, with respect to water sources within the study area, a higher contamination rate is expected for the Marab, Mir-Ahmad, and Bi-Abr mineral water springs.



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VIRTUAL

Geography Education Powerful Geographical Education For The Future

1954-CLIMATE CHANGE ISSUES AND METHODS FOR THEIR TEACHING IN RUSSIA MONGOLIA UKRAINE AND CHINA

Olga Khlebosolova¹, Butchuluun Yembuu², Nella Munich³, Fengtao Guo⁴, Anastasia Mashkova⁵, Daria Shchedrova⁵

Sergo Ordzhonikidze Russian State University for Geological Prospecting Ecology Moscow-Russia¹ Mongolian National University of Education Geography -Mongolia² Geography -Ukraine³ The School of Geographic Sciences The School of Geographic Sciences -China⁴ Sergo Ordzhonikidze Russian State University for Geological Prospecting International Department -Russia⁵

The knowledge formation about climate change is the most important task of geographical education. However, its content and teaching methods vary from country to country. The aim of our study was to identify the teacher's attitude of different countries towards climate change issues and analyse the most effective and popular methods for their teaching in geographical education. The following main tasks were considered and solved: (1) Conduct a comparative analysis of the standard, program, geography textbooks and describe the features of knowledge formation about climate and its change in the school geography education; (2) Carry out a survey of geography teachers, describe their view points on teaching climate change issues in school geography education; (3) Describe the examples of lessons (best educational practices) on studying climate change, its causes and consequences; (4) Compare the results countries wise, identify common approaches and national priorities, outline priority areas. The study was conducted in 2019-2020 in Russia, Mongolia, Ukraine and China under a single program. The study actively used a comparative approach to analyze general trends and national characteristics, as well as methods of questionnaires and experts' assessments. The results show a variety of methods used in practice and difficulties in preparing teachers for the analysis of climate change and their causes. The findings also reveal the perspective areas of teachers' education. We believe that improving geographic education in the field of climate change is impossible without answers to three main questions: (1) How do you assess the content of school geography on climate change? What needs to be changed? (2) How do you evaluate teaching methods and the need to change them in the future? (3) How do you assess the professionalism of geography teachers? What areas are the most important ones for its improvement? We hope that together we can give these

2457-The didactic application of the holistic study of Physical Geography in the field. The case of Cantabrian Mountains with students of Geography Technics.

Alfonso Pisabarro¹, Alberto Merino¹

University of Valladolid Geography Valladolid-Spain¹

The experience of the Geography Technics subject during three academic courses has confirmed the benefits of field trips using instruments and applying theoretical concepts. The direct application of techniques and small experiments reinforces learning, as well as group collaboration. These have been carried out based on the Cantabrian Mountains.

In the field of biogeography, students have carried out actions such as the creation of an experimental forest plot in order to make a phytogeographic inventory, they have extracted rings from the trees, measured their height and thickness. Even, they have measured the soil pH and moisture to characterize that biotope. In the field of hydrogeography, various methods have measured flow rates, pH, temperature or load. In geomorphology they have drawn geological and geomorphological sections, described deposits and landforms or collected samples for analysis in the laboratory. All this is integrated through a global conception of space with the analysis of the landscape from point views or the orientation tools and management of cartography and scientific. Pre-planning requires that students have to prepare a sampling sheet to fill in the data and calculations obtained in the field along the different stops. The route is desirable that it is connected and that it is the students themselves who move from one place to another. They have also been approached to senior research, being able to take measures and use instruments from research groups such as DGPS, mechanical flowmeters or thermal sensors while explaining the fundamentals of those investigations. The result of the experience has been very satisfactory in terms of motivation, improves the willingness to participate of the most passive students and an integrated approach based on data from the different components of the geographical space is achieved. In addition, the interest makes them interested in the scientific research.



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VIRTUAL

T.2.Climate Change Climate Change and Land Use Dynamics

2654-An alternative to fight with the climate change and its effects on soil salinity The use of Extremophile Plant growth promoting bacteria

Ana Paula Santos ¹, Maria Eugenia Farías ², Carolina Belfiore ³

Planta Piloto de Procesos Industriales y Microbiológicos (PROIMI-CONICET) Laboratorio de Investigaciones Microbiológicas de Lagunas Andinas (LIMLA) San Miguel de Tucumán-Argentina ¹ Planta Piloto de Procesos Industriales y Microbiológicos Laboratorio de Investigaciones Microbiológicas de Lagunas Andinas (LIMLA) mefarias2009@gmail.com-Argentina ² Planta Piloto de Procesos Industriales y Microbiológico Laboratorio de Investigaciones Microbiológicas de Lagunas Andinas (LIMLA) carobelfiore@hotmail.com-Argentina ³

Soil salinization and alkalinization are influenced to a high degree by the greenhouse effect and subsequent climate changes. The climate change leads to the spread of soil salinity and the development of soil properties unfavorable impact on agricultural production. Salinization affect almost 1 billion hectares worldwide representing about 7% of earth's continental extent. Therefore, if we do not solve this problem, we will have to face low agricultural productivity, soil erosions and negative economic impacts.

In this work we propose and eco-friendly alternative: the use of extremophile Plant growth promoting bacteria (PGPB) to alleviate plant stress caused by salinity. We have been isolated, identifying and characterize Extremophile PGPB bacteria from Andean wetlands with abilities of colonize the plant rhizosphere and confer beneficial effects under salt stress conditions. The bacteria were able to tolerate high concentrations of salt (up to 1000 mM NaCl), fix nitrogen, solubilize phosphorus, produce siderophore, synthesize plant hormones and protective osmolytes such as: proline, saccharose and polyphenols. These beneficial effects lead the bacteria to induce salt tolerance increasing the leaf and root area, height and dry weight of plants growth under laboratory conditions. Besides, under electron microscopy we evidenced that bacteria were able to form biofilm and exopolysaccharides on plant roots, an important strategy that protects the plant against desiccation. These proprieties bind soil particles to aggregates, stabilizing soil structures, and increasing water holding capacity and cation exchange capacity.

These results show that the use of Extremophile PGPB may represent an important biotechnological approach to decrease the impact of salinity occasioned by climate changes and the excessive use of soil.



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VIRTUAL

T.2. Climate Change Rising Asia and related changes of the climate and environment

2155-EAST ASIAN MONSOON ENHANCING CARBON DIOXIDE CONSUMPTION EVIDENCE FROM SOUTHERN CHINA UPPER CRUST WEATHERING

Yibo Yang¹, Albert Galy², Xiaomin Fang¹, Christian France-Lanord², Shiming Wan³, Rongsheng Yang¹, Jian Zhang¹, Ran Zhang⁴, Yunfa Miao⁵, Chengcheng Ye¹

*Institute of Tibetan Plateau Research, Chinese Academy of Sciences Key Laboratory of Continental Collision and Plateau Uplift Beijing-China*¹ *Centre de Recherches Pétrographiques et Géochimiques, UMR7358, CNRS - Université de Lorraine Cycles, Atmosphere, Climates -France*² *Institute of Oceanology, Chinese Academy of Sciences Key Laboratory of Marine Geology and Environment -China*³ *Institute of Atmospheric Physics, Chinese Academy of Sciences Climate Change Research Center -China*⁴ *Cold and Arid Regions Environmental and Engineering Institute, Chinese Academy of Sciences Key Laboratory of Desert and Desertification -China*⁵

The impact of Cenozoic uplift of Himalayas/Tibetan Plateau on geological carbon cycle has been extensively studied for both silicate chemical weathering and organic carbon burial. However, climatic impacts on geological carbon cycle have less been tackled. The Oligocene-Miocene boundary climatic reorganisation linked to the northward advance of the East Asian monsoon in subtropical China, a potentially important but poorly constrained atmospheric carbon dioxide (CO₂) sink, provides a good chance to view the climatic impacts on carbon cycle. Here we have performed a first-order estimate of the difference in CO₂ consumption induced by silicate chemical weathering and organic carbon burial in subtropical China related to the monsoon advance. The results between the modern analogue and the sedimentary record are consistent and highlight the significant role of the weathering of the Mg-rich upper continental crust in Southern and Eastern China that would contribute to the rise in the Mg content of the ocean during the Neogene. Our results show an increase of CO₂ consumption by silicate weathering as large as ~5% of the current global silicate sink, but a negligible increase in the global organic carbon burial. The carbon impact of the northward advance of the East Asian monsoon is therefore significant but strongly related to the Mg-rich nature of the crust affected by such climatic change. Thus, the uplift of Tibetan Plateau can lead to modification of the carbon cycle, and the global climate, indirectly by changing the regional hydrological cycle in areas of tectonically inactive East Asia and by the direct impact through high erosion and organic carbon burial along the orogenic belt in South Asia.



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VIRTUAL

T.2. Climate Change Sustainability Processes In The Low Carbon Economy. Territories And Renewable Energies

2236-PHOTOVOLTAIC ENERGY. VISIBILITY ANALYSIS (VA) OF PHOTOVOLTAIC FARMS IN THE MUNICIPALITY OF CANTILLANA (SEVILLE).

ALBA RUIZ DÍEZ¹

UNIVERSITY OF SEVILLE UNIVERSITY OF SEVILLE SEVILLE-Spain¹

The stage of climatic alarm and the worry for the depletion of the energy fossil resources has revealed the need for a change towards a more sustainable age, characterized by a low carbon model. In the last decade, the renewable sector in Spain has experienced an important development, in which he has emphasized the proliferation and expansion of the photovoltaic farms. In spite of the positive image that offers this technology, it presents disadvantages mainly linked to the impact and the visual contamination. The present work centers the attention on this complex issue, with the achievement of a visibility analysis (VA) that attempts to determine the degree of incidence and visual impact generated by three photovoltaic farms in a specific study area. It is located in the municipality of Cantillana, in the province of Seville (Andalusia, Spain). The sources used for the analysis have been the set of LIDAR files corresponding to the study area, from the National Plan of Aerial Orthophotography (PNOA), the spatial data conversion, transformation and integration program FME Desktop and the Geographical Information System ArcGIS. The methodology has involved obtaining the Digital Surface Model (DSM) from the processing of LIDAR data. The methodology has implied obtaining the Digital Surface Model (DSM) from the processing of LIDAR data. Through the application of GIS tools, and with the DSM as a base, the zone of visual influence (ZVI) has been generated, as a result of the calculation of the visual basins obtained for each photovoltaic farm with a radius of 10 km. Three distance thresholds have been applied to determine the degree of average visual impact to which the study area is submitted. The obtained results indicate that the municipality of Cantillana presents a low visual incidence, with a medium-low degree of impact.



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VIRTUAL

T.3. Earth and Disasters Earth and Disasters 1

3037-Simulation of Flood Scenarios Based on Hydrological and Hydrodynamic Modeling

FLAVIA FARINA¹, FERNANDO PETERSEN CARDOSO², GABRIELA FIABANE DA ROSA³, TAMIRIS DA SILVA ALVES¹, EDSON PRESTES⁴

*Federal University of Rio Grande do Sul Institute of Geosciences Porto Alegre-Brazil*¹ *Federal University of Rio Grande do Sul Hydraulic Institute Research* nando.petersen@hotmail.com-Brazil² *Federal University of Rio Grande do Sul School of Engineering* gabifrosa@hotmail.com-Brazil³ *Federal University of Rio Grande do Sul Informatics Institute* prestes@inf.ufrgs.br-Brazil⁴

Official records of recent years show an increase in the number of extreme events in southern Brazil and, consequently, of social, economic and environmental damages. In this sense, the purpose of this study is to present the modeling of areas subject to flooding, applied to the São Lourenço river basin. This proposal began with the construction of a GIS database of relevant variables to model the test area. The methodology was operationalized by the application of the SCS hydrological model with the HEC-HMS software, which calculates surplus rainfall or surface runoff. The discretization of the microbasin and the processing of the physical data were conducted in the ArcMap 10.4. Primary information (satellite images, pedology, geomorphology, hydrography..) was entered and adjusted in the database. For hydrological modeling purposes, a set of derived information was produced, including land cover and use, a digital elevation model, slope.. The hydrological variables of the model were then obtained through the integrated processing of numerical and spatial/thematic variables (historical series of rainfall data, basin concentration time, mean CN, intensity-duration-frequency curve, spatial rainfall distribution hyetographs). Based on these variables, the peak flows of a design rain were calculated and simulated for different return periods-RP, at any point in the microbasin. Using a pseudo-two-dimensional hydrodynamic model based on the solution of energy losses in the flow through the path, using the HEC-RAS, flood surfaces derived from rains with three different RP (10, 25 e 50 years) were simulated. The main input data were the geometry of the river/channel, the Manning's roughness coefficient and the maximum flow rates obtained in the hydrological model. It is concluded that the São Lourenço River cannot drain the flow of the simulated rainfalls, so it is expected that the generation of these scenarios subsidizes preventive measures in the case of extreme events.



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VIRTUAL

T.4.Eurasia and Middle East Studies Human Environmental Interactions along the Ancient Silk Road

2360-Changes in the hydrodynamic intensity of Bosten Lake and its impact on early human settlement in the northeastern Tarim Basin eastern Arid Central Asia

Haichao Xie¹, Xiaozhong Huang², Shengqian Chen², Richard S. Vachula³, James M. Russell³, Mengjing Guo⁴, Xin Wang², Fahu Chen¹

*Institute of Tibetan Plateau Research Chinese Academy of Sciences Beijing-China*¹ *College of Earth and Environmental Sciences, Lanzhou University -China*² *Department of Earth, Environmental, and Planetary Sciences, Brown University -China*³ *State Key Laboratory of Eco-hydraulics in Northwest Arid Region, Xi'an University of Technology -China*⁴

The climate of eastern arid central Asia (ACA) is extremely dry and early human settlement and civilization in the region were dependent upon a potentially unstable water supply. Thus, knowledge of the history of hydrological fluctuations is essential for understanding the relationship between humans and the environment in the region. Here we present a record of variation in lake hydrodynamic intensity based on the grain size of suspended lacustrine silt isolated from the sediments of Bosten Lake, which feeds a river flowing to the northeastern Tarim Basin. The results show that lake hydrodynamic intensity was very weak, and/or that the lake dried-out completely, during the early Holocene (12.0–8.2 ka). Then it increased with two distinct centennial-millennial-scale intervals of weak intensity occurring during 4.7–3.5 ka and 1.2–0.5 ka. Notably, increases in lake hydrodynamic intensity occurred some 2.2 kyr prior to an increase in local precipitation and effective moisture. We speculate that this was a consequence of relatively high early summer temperatures during 8.2–6.0 ka that resulted in an increased water supply from melting snow and ice in mountainous areas of the catchment. Thus, we conclude that changes in the hydrodynamic intensity of Bosten Lake during the Holocene were affected by changes in both temperature and precipitation. The variations in the hydrodynamic intensity of Bosten Lake since the middle Holocene also influenced water availability for the human population that occupied the downstream area of the northeastern Tarim Basin. A persistent increase in hydrodynamic intensity during 2123–1450 B.C. may have been responsible for human occupation of the region that contains the noted archaeological sites of Xiaohe and Gumugou Cemetery. In addition, a drastic decrease in hydrodynamic intensity at around 400 A.D. likely caused the emigration of the inhabitants of Loulan.



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VIRTUAL

T.8.Globalization vs Localization Glocalization

1072-Expansion of Violence in modern times

ADRIANO ANDRADE ¹

MINISTÉRIO DA DEFESA CMB BRASÍLIA-Brazil ¹

The modern times tensions are taking part on the voiceless people that cause “disorder” and the “guardians” of order that try to “avoid” bigger crisis. It seems ironic when considered in this format but it is exactly how it is shown in the international global channels. Media informs but it does from its perspectives which brings ideological marks and positioning at the power relations controlled by the hegemonic agents, of which, the media, is included. The contemporary scenario crisis, always mentioned from the economical focus is clearly an induction built from the discourse of practices coming from the State and from the world big entrepreneurs searching for the continuous profit expansion. In short, there is not lack of money. On the contrary, there was never a time in history in which there was so much money in the world, but it is definitely badly distributed. In this contemporary context the violence expressions, necessarily, also reveal themselves in the territory and they are reflexes of produced tensions by the power relations among the agents that produce the space along with the unequal forces and from games of interests which are in some moments close and in some moments, contradictories. This problematic situation is the start point to the discussion of this paper which brings the different faces of the violence and of what, beyond the chaos, can represent a spark of hope. The violence as a signal to something that can not be sustained anymore and, in a scale of tension, seems to break with the modern structures allowing a new social spatial arrangement.

3373-Expansion of Violence in modern times

ADRIANO BITTENCOURT ANDRADE ¹

MINISTÉRIO DA DEFESA CMB Brasília-Brazil ¹

The modern times tensions are taking part on the voiceless people that cause “disorder” and the “guardians” of order that try to “avoid” bigger crisis. It seems ironic when considered in this format but it is exactly how it is shown in the international global channels. Media informs but it does from its perspectives which brings ideological marks and positioning at the power relations controlled by the hegemonic agents, of which, the media, is included. The contemporary scenario crisis, always mentioned from the economical focus is clearly an induction built from the discourse of practices coming from the State and from the world big entrepreneurs searching for the continuous profit expansion. In short, there is not lack of money. On the contrary, there was never a time in history in which there was so much money in the world, but it is definitely badly distributed. In this contemporary context the violence expressions, necessarily, also reveal themselves in the territory and they are reflexes of produced tensions by the power relations among the agents that produce the space along with the unequal forces and from games of interests which are in some moments close and in some moments, contradictories. This problematic situation is the start point to the discussion of this paper which brings the different faces of the violence and of what, beyond the chaos, can represent a spark of hope. The violence as a signal to something that can not be sustained anymore and, in a scale of tension, seems to break with the modern structures allowing a new social spatial arrangement.



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T.8. Globalization vs Localization Urban and regional planning in the context of changing world

1846-Cities of tomorrow and healthy urban planning

Kliment Naydenov¹

Sofia University "St. Kliment Ohridski", Regional Development Sofia-Bulgaria¹

The urban world is changing rapidly. Whether in the west or in countries in transition, the changes taking place in our cities are of revolutionary proportions. It thus becomes vitally important to look at how cities develop and how they are planned. The technological revolutions, or the information and communication revolutions, have, along with increased transport, transformed our communities. For many, these tools have resulted in many of us living in a "virtual world," unlimited by geography, unbounded by specific professions – a truly global world.

Healthy urban planning means planning for people. Urban planning offers the opportunity to anticipate and implement sustainable settlement models. It promotes the idea that the city is much more than buildings, streets and open spaces, but a living, breathing organism, the health of which is closely linked to that of its citizens. Grouping homes around green spaces, well-planned pedestrian and bicycle paths and efficient public transportation promote air quality, child mobility and reduce road injuries. Modern town planning has its roots in the unhealthy industrial cities of the nineteenth century: endemic problems of poor water supply, sanitation, light and air triggered a response in terms of not only infrastructure engineering but also urban design. Healthy urban planning focuses on the positive impact that urban planning can have on human health, wellbeing and quality of life, and reflects WHO's broad definition of health. Meeting the new urban health challenges depends upon reuniting public health and urban planning in the academic world, in the professional arena, in community development and in government.



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W.1 Geospatial Open Source Software And Data For Solution Oriented Geographical Research And Education

1810-STUDY ON SHARING AND REUSING GEOGRAPHIC ANALYSIS MODELS IN WEB ENVIRONMENT

Min Chen¹

Nanjing Normal University College of Geography Nanjing-China¹

Modelling is an effective method to simulate geographic phenomena and processes and solve geographic problems. To date, many experts and scholars have constructed massive geographic analysis models to meet the requirement for simulation of different geographical scenarios. For complex geographic problem solving, collaborative modelling and integration is becoming more popular. As a key factor for collection, how to share geo-analysis models become a new trend in geographic research. Due to the heterogeneous of geographic analysis models, diverse models have different methods of description, different structures and different using processes, it's hard to recognize, share and reuse models in a common way. In order to reduce the difficulty of sharing geographic analysis models, related research achieve model sharing and reusing in different levels and kinds of requirement, such as model knowledge acquiring, model building and model using. However, a single function is difficult to meet the needs of the composite role, and complex application scenarios still restrict the sharing of geographic analysis models. This paper summarizes the process of geographic analysis models' building and using, and divides it into four parts: model item, conceptual model, logical model and computable model, which can give a structural description of basic informations, mechanisms, structures and running processes of geographic analysis models, and satisfy different users' requirement for model recognizing, model building and model invoking. Finally, we present a web system to show different levels of model achievement would benefit geographic analysis models' sharing and reusing, in which people can recognize and invoke geographic analysis models as web services.

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CONTACT

For Scientific Inquiries:

Prof. Dr. Barbaros Gönençgil (İstanbul University)

barbaros@istanbul.edu.tr

scientific@igc2021.org

For General Inquiries:

secretariat@igc2021.org

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