Gas leakage in the NW Russian Barents Sea

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The Barents Sea region is an area of extensive erosion that occurred during the Cenozoic due to a tectonic uplift followed by several Quaternary glaciations. Several hydrocarbon fields have been discovered in the region where gas leakage through the seafloor is widespread. One of the promising regions of hydrocarbon occurrence is the north-western sector of the Russian Barents Sea. This poorly studied region has been recently targeted for scientific studies by several expeditions conducted in the framework of the Training Through Research program (TTR). The obtained geophysical and geological data revealed the presence of numerous acoustic and bathymetry anomalies (e.g., gas chimneys, bright spots, pockmarks) that are associated with higher gas content in the sampled sediments.

Here we combine (i) a set of shallow seismic data acquired during recent TTR expeditions (sparker seismic and sub-bottom profiling sections) with (ii) conventional deep seismic sections and (iii) a database of geochemical surveys of cored sediments. These merged data are used to compile a comprehensive database for the north-western sector of the Russian Barents Sea providing information on:

- the area of the potential Mesozoic reservoirs reaching the seafloor
- distribution of the seismically interpreted fluid pathways reaching the surface
- the position of the known or inferred seafloor seepage sites

One of the major goals is to correlate the geology of the outcropping strata with the variations of gas and water geochemistry, and ultimately to link the mapped/inferred fluid migration pathways to the Triassic-Jurassic reservoirs which are known to have high hydrocarbon potential in this region. Finally, the compiled database may represent a useful tool to geochemically characterize so far undiscovered hydrocarbon fields.