GEUS's activities in Northeast Greenland 2008-2012

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In 2011, two licensing rounds in the offshore areas of Northeast Greenland were announced. In late 2007, GEUS had initiated a major Industry–GEUS collaborative project in Northeast Greenland in preparation for such a future licensing round, although its location and timing were unknown when work began. It was clear, however, that the licensing round would take place in the areas off Northeast Greenland, and since the shelf was (and still is) untested by exploration wells, and the seismic coverage was poor, analogy studies based on the onshore geology would be of paramount importance. A project was thus designed with a "backbone" consisting of a GIS compilation of all available onshore information relevant for petroleum exploration (as of end 2007) plus three separate studies of petroleum systems, uplift, and seabed features. The project was designed after years of discussion with the oil industry, primarily in Norway, but an important impetus also came from GEUS's participation in the USGS "Circum-Arctic Resource Appraisal" (CARA). The compilation of the GIS-product and the process of designing the project served to focus attention on "white areas" in our knowledge of the region, so from the start a number of field activities were planned with the aim of addressing such shortcomings. The project is ongoing and open for participation for all oil companies whereas consultant companies are not admitted. The project activities will continue for as long as industry interest lasts, and current participation is ≈20 companies, supermajors, majors, and minors alike, that all regularly meet for semiannual workshops hosted by GEUS in Copenhagen.

The current version of the GIS-compilation features data on close to 18000 samples, an "active" geological map, various types of cultural data, cross-sections, corehole data, key sedimentary profiles, palaeogeographic "timeslices", organic geochemical data on thousands of samples, source rock distribution maps, information on oils stains and seepages, publicly available potential field data from the on- and offshore, navigation and survey information for geophysical data, a comprehensive bibliography (including hotlinks to many publications), and a plethora of additional information.

Fieldwork and core drilling, including up to 30+ participants, have been carried out in the region from ≈70°N to ≈82°N every summer since 2008; this has formed the basis for the definition of a number of additional projects which the participating companies can opt to join or stay out of at their discretion. A coredrilling program targeting the Upper Jurassic – Lower Cretaceous Kimmeridge Clay equivalent source rock succession has been carried out. Three stratigraphically slightly overlapping coreholes with a combined recovery close to 700 metres represent the source rock succession from the Oxfordian to the Ryazanian; amongst other important results, this drilling campaign has thoroughly discredited the long-held notion that the KCF-equivalent source rocks north of Jameson Land are only gas-prone. A sand provenance study of potential reservoir units and sediment source areas, including several hundred samples, has been carried out based on the ages of detrital zircons and garnet compositions, and provided important input to our understanding of temporal and spatial changes in sediment dispersal patterns in the region. An extended uplift and landform analysis study, including ≈200 apatite fission track analyses covers the region up to 78°N. A comprehensive study of the hitherto very poorly understood Cretaceous succession has resulted in the erection of a coherent regional lithostratigraphy (to be formalized by publication in the near future) and a robust integrated biostratigraphic subdivision of the succession, a 3D photogeological and sedimentological description of a potential reservoir analog, analysis of tectonostratigraphic scenarios, a compilation of more than 1000 organic geochemical screening analyses, and a large volume of other information. Moreover, a corehole targeting unexposed Cenomanian–Turonian parts of the Cretaceous succession has been drilled, and reveal interesting details of the sedimentary environment and the petroleum potential. A comprehensive study, including a corehole, of the Mesozoic succession on Store Koldewey, which is situated within 10 kilometres of the nearest seismic lines in the licensing area has produced important information of relevance for the offshore basins.

In the summer of 2013, fieldwork will be carried out in the Wandel Sea basin and surrounding areas, in continuation of the activities initiated in the area in 2012. The focus of the these activities will be the Jurassic–Cretaceous succession, the Triassic, the overall tectonic evolution, and a continuation of the previous uplift studies south of the region to ensure a continuous coverage from 70°N to 83°N. These activities will be important for exploration both in the Northeast Greenland offshore and in the Barents Shelf area.
The future of the project beyond the deadlines of the licensing rounds in 2012 and 2013 relies heavily on the industry's willingness to engage in petroleum exploration in this difficult, but promising part of the World, but activities will continue at least until the outcome of the licensing rounds is known.