

NE Greenland - an important piece in the NE Atlantic tectonic puzzle

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NE Greenland represents one of the harshest Arctic exploration frontiers. While geologic field work has been conducted for a long time onshore East Greenland, the offshore has only recently started to be investigated. The geologic understanding remains immature. Widely and unevenly spaced seismic data were acquired with short streamers by the Kanumas group in the early 1990's. Following 2008 several larger seismic campaigns have been completed, with various degrees of success. Even today, the NE Greenland seismic grid is very open and unevenly spaced. The first subsurface stratigraphic samples were collected via shallow boreholes by Statoil on behalf of the Kanumas Group in 2008 and provided calibration of the seismic stratigraphy.

Evaluation of the exploration potential has had to rely on a strong integration of data sets and methods, such as the combination of gravity and magnetics with seismic data, linkage of the onshore geology to the offshore, and plate reconstructions of the NE Greenland margin and conjugate SW Barents Sea and mid-Norwegian margins. The evaluation of the NE Greenland margin has benefitted from the transfer of geologic knowledge from the Norwegian side. Most pre-breakup tectonic events known from the Norwegian margins are recognized off NE Greenland, and so are several of the post-breakup events. This is not surprising considering that the conjugate margins constituted a continuous geologic province before breakup.

This presentation will focus on geologic news provided by the NE Greenland margin, and how these have allowed transfer of understanding to the Norwegian conjugate margins. In particular, pronounced Late Cretaceous inversion of the NE Greenland margin represents an essentially overlooked tectonic event in the conjugate Norwegian margins. With the NE Greenland observations in hand, it is possible to suggest alternative interpretations of the Norwegian side in light of Late Cretaceous compressional deformation.

Compressional inversion also took place during the Cenozoic, primarily in the Middle Miocene. Such features are well-known from the mid-Norwegian margin as well as from large parts of the NE Atlantic. For the most part the compressional inversion features formed within a hyperextended Early Cretaceous basin chain, and following breakup they formed within the fragmented parts of this basin chain. The locations of the inversion features were governed by the long-lasting crustal weakness of the hyperextended rift chain.