Geophysical Research Abstracts, Vol. 7, 04422, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04422

P-wave modelling of the continent – ocean transition of the East Greenland volcanic margin north of Jan Mayen Fracture Zone

M. Schroeder, W. Jokat

Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany
(maschroeder@awi-bremerhaven.de / Fax: +49 471 4831 1926 / Phone: +49 471 4831 1237)

The volcanic rifted margin off Norway between the Jan Mayen and Greenland-Senya Fracture Zone is a very well explored and studied by academia and industry. The geophysical and geological data reveal important vertical and lateral variations in crustal structure and composition resulting from a complex history of rifting prior to and during the Late Cretaceous- Early Tertiary rift episodes that led to break-up and volcanic margin formation. OBS data modelling on the Vøring and Lofoten margin show a high velocity body in the lower crust along and across the margin with varying thickness.

The continent – ocean transition off East Greenland is less well known. The existence of a conjugate volcanic feature to the "Vøring Marginal High" at the Norwegian margin is of special interest. Gravity and magnetic data off East Greenland do not support the presence of such a feature.

Although MCS and potential field data exist along the East Greenland margin, the data density is insufficient to image lateral variations in deeper structure, which can be expected from comparison with the conjugate margin off Norway.

In 2003, new seismic refraction data were acquired on four profiles by "RV Polarstern" to investigate the deep structure of the east Greenland continental margin and its transition from continental to oceanic crust. Most transects were located in the prolongations of the fjord profiles of earlier investigations between 72˚N and 76˚N. Parallel to the deployment of ocean-bottom-hydrophones and seismometers, MCS data were recorded with a 3000m streamer along the 300 - 450 km long profiles. Recording units in the onshore prolongation of the seismic transects, a high resolution aeromag-

netic survey and ship borne gravity measurements, yielded new information on the source of the pronounced negative magnetic anomaly that runs parallel to the shore. All recorded data are of excellent quality and provide a clear and detailed insight into the crustal structure and architecture.

On the two southern profiles, 29 (30) OBS/OBH and 4 (7) Reftek land stations were deployed, and data were obtained with 100 to 180km offsets. The first breaks from deep sea recording stations are mostly clear, while from recording stations on the shelf the data are more ambiguous. On both profiles, the data indicate a complex continent – ocean transition zone.

Preliminary results of p-wave modelling of the profile in the prolongation of the Godhåb Golf show a basement high, which almost reaches the seafloor close to the coast. The thickness of the continental crust is 19 km, while the thinned oceanic crust has a thickness of only 3 to 4 km. Beneath the transition zone, a lower crustal body with velocities of 7 km/s extends to a thickness of up to 9 km, which is direct evidence of rift-related magmatism.

The standard corrected aeromagnetic data show high frequency variations in the area of the almost 50 km wide negative anomaly close to the coast of the Godhåb Golf. The anomaly's position correlates with the basement high derived from the seismic refraction data, and the high frequency changes in the magnetic field suggest the presence of shallow dykes in the basement high.