P-Wave Modelling of the Continent–Ocean Transition of the East Greenland Volcanic Margin North of Jan Mayen Fracture Zone

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Between the Jan Mayen and the Greenland Senya Fracture Zone the continent–ocean transition off East Greenland is less well known in contrast to the well explored and studied volcanic rifted margin off Norway. The geophysical and geological data at the Norwegian Vøring and Lofoten margin reveal important vertical and lateral variations in crustal structure and composition. The deeper structure of the East Greenland margin conjugate to the Vøring Plateau is therefore of special interest.
One of the main targets is to estimate the amount of magmatic material which intruded and/or underplated the crust compared to the Vøring Plateau, which is a huge magmatic complex. Existing gravity and magnetic data off East Greenland do not support the presence of a feature like the "Vøring Marginal High" yet. Although MCS and potential field data exist along the East Greenland margin, the data density is insufficient to image lateral variations in the deeper structure. One striking feature of the East Greenland margin, which most likely was connected with the initial tertiary break-up, is marked by a pronounced negative magnetic anomaly. It runs parallel to the coast for more than 400 km between Kong Oscar Fjord at 72° N and south of Shannon Island at 75° N. Its shallow and deeper structure was not known so far.

In 2003, new seismic refraction data were acquired on four 300 – 450 km long profiles by "RV Polarstern" to investigate the deep structure of the East Greenland continental margin. In addition, ship borne gravity data as well as aeromagnetic data, which cover the area over the two southern seismic refraction profiles (AWI-20030400 and AWI-20030500), were gathered to provide constraints on the extent of the magnetic anomaly.
The new acquired aeromagnetic data yield high frequent variations within the pronounced negative anomaly and eastward. The wavelengths of the variations are approx. 5 km. The p-wave model of the seismic refraction profile AWI-20030400 shows a striking correlation with the potential field data, e.g. a basement high on the western continental side with the negative magnetic anomaly and a change of 30 mGal in the free air gravity data.
The entire profile AWI-20030400 can be divided into three parts. In the western part appears the continental crust with a thickness of 29 km. MCS data and refraction data reveal a 190 km long transitional crust, overlain by a Cenocoic/Mesocoic sediment basin and a basement high in west and a little magmatic high in the east. The profile ends in the east with an 8 km thin oceanic crust. The evidence of a strong magmatic activity can be assumed due to the strong variations in the velocity-depth function and a huge high velocity body extending under the entire transitional zone.
The results of the two southern profiles AWI-20030400 and AWI-20030500 will be presented in a first order comparison with a model off Norway.