Geophysical Research Abstracts, Vol. 9, 06135, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06135

Crustal structure of North Greenland – Receiver Function data

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The first information on the deep crustal structure of North Greenland is presented; several earthquake seismological stations have been placed along the ice-free part of the North Greenland coast and earthquake data have been analysed to extract local information using Receiver Function technique.

The deep structure of North Greenland is today completely unknown. The North Greenland fold belt was investigated in the late 1970' and mid 1980' by the Geological Survey of Greenland. The sediments in North Greenland fold belt stretches along the entire north coast and can be subdivided into the Franklinian Basin with an E–W axis and the Wandel Sea Basin with a N–S axis. The Franklinian Basin is interpreted as a passive margin basin. The North Greenland fold belt was formed by the mid–Palaeozoic N–S compress ional Ellesmerian Orogeny. No evidence of an opposing continent is known. Presumably, the Proterozoic and younger sedimentary basins were developed on crystalline basement of Archaean age, but this is based on extrapolation of data from the only outcrops of basement at the head of Victoria Fjord.

Data from two stations in the central part of North Greenland show quite thick crust – pointing to the continuation of the presumably Precambrian crust under the ice to the south continuing further north than the geological work previously assumed. A station on the far eastern end of North Greenland indicate a shallower depth to Moho – possibly influenced by the complex structures related to the closing of the Iapatus Ocean. Two stations to the east – one on either side of the Nares Strait between Greenland and Ellesmere Island (Canada) show shallower depths to Moho.