Geophysical Research Abstracts, Vol. 8, 01806, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01806

Moho character and depth in the Danish Basin: new indications from seismic data of project ESTRID

A. Sandrin, A. Lassen, C. Nielsen, H. Thybo
Geological Institute, University of Copenhagen
alsa@geol.ku.dk / Fax: +45 33148322 / Phone: +45 35322477

It is widely accepted that the evolution of rift basins is strongly influenced by tectonic processes that involve the large part of the lithosphere. New results emphasize the importance of processes in the lower crust and uppermost mantle around rift zones (e.g. mantle underplating and dykes injections). We study the Moho depth and the variation in seismic character of the Moho in the Danish Basin by analysis of the new seismic data from project ESTRID. All existing seismic lines in the area are used to compile a map of the Moho depth, and the new seismic data are modelled by travel time analysis. Synthetic seismograms are utilized for characterisation of velocity variations in the lower crust, with special emphasis on the Moho.

The Danish Basin is located close to the southwestern limit of the Fennoscandian Shield and has developed on top of relatively thin Baltica crust.

The project ESTRID (Explosion Seismic Transect around a Rift In Denmark) has carried out two seismic surveys in 2004 and 2005 in the Jutland Peninsula (central Denmark). The project ESTRID-2004 is a 240 km long seismic refraction/wide angle EW-striking profile across the peninsula with ca. 240 recording stations and 6 shots detonated inland and off-shore. The project ESTRID-2005 is a combined seismic refraction/wide angle – seismic reflection survey along a 185 km long, N-S directed profile, with 180 stations used for the refraction recording. In addition 740 stations are used for the reflection profiling to record seismic waves from the 94 shots.

Our data show great variability in the depth to the Moho along the profile ESTRID-2004. This variation in depth is also accompanied by a strong lateral variation in estimated seismic velocities. The velocity in the lower crust is much higher (6.8 km/s at

12 km depth) below the known Silkeborg Gravity High than outside (6.2 km/s at 12 km depth). The body of extremely high velocity is almost non-reflective, also in the lower crust. Further, strong variation in Moho reflectivity is observed. The most pronounced feature is the absence of Moho reflections in a ca. 25 km wide zone below the highest velocities in the lower crust. We find that these observations must be related to the rifting processes, and that the high-velocity and high-density body probably represents a 20 km thick, 30 km wide and $>$80 km long mafic intrusion in the crust below the Silkeborg Gravity High.