



The Scandes: Isostatic state and a review of geophysical information

J. Ebbing and O. Olesen

Geological Survey of Norway (NGU), Trondheim, Norway (Joerg.Ebbing@ngu.no)

During the last decades various efforts have been made to unveil the lithospheric structure of the Scandinavian mountain chain. However, a careful review shows that a need exists for new, detailed seismic and seismological investigations of the deep crust and upper mantle. The Norwegian mainland and offshore areas are covered by high-quality potential field data sets. The offshore continental margin of Norway is in addition well investigated by scientific and commercial seismic studies. However, the onshore-offshore correlation of lithospheric structures is not well known. Onshore-offshore studies are often well constrained in the offshore part by a combination of potential field data and seismics, while the investigation of the onshore part bases mainly on the ambiguous potential field data, due to the sparse distribution and resolution of the available deep seismic lines. Using existing deep seismic lines different authors compiled a map of the crust-mantle boundary below Fennoscandia. Since then a variety of passive and active experiments have been carried out in the central Baltic Shield, which increased the quality of the available lithosphere information (e.g. FIRE, TOR). However, in Norway few significant improvements have been achieved in the last twenty years.

The analysis of gravity data to provide an estimate on the crust-mantle boundary in Fennoscandia is very limited. Comparison between maps of the seismic Moho and a simple isostatic Moho show nearly no correlation. Density models based on seismic data in most cases do not provide sufficient constraints to allow secure interpretations of lithospheric structures. This is especially true in areas where the old seismic experiments had not the quality to resolve crustal structures. Even where information of the crustal configuration is known, considerable uncertainties exist which justify new, detailed study of the lithosphere structure in Norway. New, cooperative efforts should be made to accomplish an integrated study composed of both passive and active seismic

experiments, also in combination with magnetotellurics. Such studies are necessary to close the gap between the well-known offshore areas and the central Fennoscandian shield and provide the critical "missing link" between the onshore and offshore domains.