



Seismological and gravity evidence for a crustal root beneath the highlands of Southern Norway.

N. Balling (1), B.H. Jacobsen (1), L. Svenningsen (1), R. Kind (2)

(1) Department of Earth Sciences, University of Aarhus, Denmark (niels.balling@geo.au.dk),

(2) GeoForschungsZentrum Potsdam, Germany

The origin of the high topography of the western part of the Scandinavian Peninsula including the highlands of Southern Norway (regional topography up to 1200 m, local peak heights about 2000 m) is a matter of debate. Significant Cenozoic/Neogene uplift has been suggested. Successful explanatory models must include information on deep structures, consistency with gravity data and information on the state of isostasy.

We present new determinations of depth to Moho from teleseismic receiver functions and a new crustal thickness map of Southern Norway based on new and previous seismological results. Crustal thickness variations in the range of 32 - 43 km are analysed in relation to regional Bouguer gravity anomalies (range 30 to -90 mgal) and regional topography. We observe close correlations with deep crust correlating with low Bouguer gravity and high surface elevation. The region of elevated topography in Southern Norway seems isostatically supported by the buoyancy of a crustal root.

The various models of the formation of the Scandinavian mountains (asthenospheric plume, crustal underplating, lithospheric delamination, remnants of the Caledonian Mountain Range etc.) are discussed. Our new observations together with other geophysical and geological observations impose important constraints on which are the most likely models.