



## **Lithospheric structure of the southern Scandes: preliminary results from MAGNUS-REX, new crustal scale refraction profiling of southern Norway.**

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Magnus-Rex, a new lithospheric scale seismic exploration project across the southern Norwegian dome and the Oslo Graben was carried out in October, 2007. Three seismic lines of around 400km in length were deployed across southern Norway. The southern profile crosses east-west through the Oslo Graben and extends into Sweden. The more elevated area of the central southern Scandes was targeted with two profiles in a large X. One arm extends from northeast to southwest from Bergen to just south of Trondheim, and the other arm from northwest to southeast across the northern part of the southern Scandes. Two km instrument spacing was used and a total of 26 shots of 100-400 kg charge size were fired along the three lines. Three key phases are observed on the shot gathers: Pg arrivals with velocities of 6-6.4 km/s (all shot gathers); Strong Pmp or lower crustal reflections at offsets greater than 50 km (all shot gathers); Pn arrivals from 6 of the 26 shots.

Key goals of the Magnus-Rex project are to produce a velocity model for the lithosphere of southern Norway and to establish whether a crustal root is present. The negative Bouguer anomaly of the southern Scandes indicates that the high mountains here are isostatically compensated by a crustal root. However, from coarse refraction profiling of the region, predominantly in the late 1970's, no crustal root was found and a sub-moho density anomaly for compensation of the high topography has been inferred. In contrast, more recent results from receiver function analysis in a profile

across the northern part of the southern Scandes shows a ca. 40-44 km thick crust below the dome and a ca. 34 km thick crust beneath the northernmost part of the Oslo Graben.

New velocity models for the lithosphere from the three new seismic profiles in the southern Scandes will be presented. Preliminary results for the southern profile show a Moho depth of around  $\sim 35$  km that shallows to the east under the middle Oslo Graben. These results are in accord with the velocities and depths determined by the early refraction studies.

There is as of yet, no generally accepted mechanism for the Neogene uplift of the southern Scandes. Formulating a mode of uplift and elevation of southern Norway requires knowledge of the broad density distribution of the lithosphere. Hence the structure of the crust, and the presence or absence of a crustal root here, bears upon the interpretations of the exhumation history of southern Norway.