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Crustal structure of the Oslo graben: preliminary results from MAGNUS-REX, new crustal scale refraction profiling across southern Norway.

W. Stratford (1), H. Thybo (1), J. Faleide (2), O. Olesen (3) and A. Tryggvason (4).

(1) Department of Geography and Geology, University of Copenhagen, (2) Department of Geosciences, University of Oslo, (3) Geological survey of Norway, (4) Department of Earth Sciences, Uppsala University. (ws@geol.ku.dk)

A new crustal scale seismic profile was recorded in October, 2007, across the Oslo Graben as part of the Magnus-Rex seismic project. This profile crosses east-west through the graben, extends to the west coast of Norway and $\sim$ 100 km east of the graben into Sweden. The Olso line passes through the middle of the graben, through the region of lowest gravity anomaly and across the lowest gravity gradients at the margins. Single component seismographs were deployed along the line at 2 km spacing, except for a 120 km wide section across the graben where the instrument spacing was reduced to 750 metres. Seven shots of 100-400 kg charge size were fired along the Oslo line. Key phases observed on the shot gathers are: Pg arrivals with velocities of 6-6.4 km/s (all shot gathers); Pn phases from beneath western Norway and beneath the graben itself; strong PmP or lower crustal reflections at offsets greater than 50 km (all shot gathers). PmP reflections are characteristically different in and out of the graben with higher frequency, ringing reflections recorded to the west and lower frequency reflections recorded from beneath the graben. Preliminary results for the Oslo line show a Moho depth of around $\sim$35 km in western Norway 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.

Previous crustal models for the Oslo Graben, based on the interpretation of the gravity data, have inferred the $\sim$20 mgal positive gravity anomaly is due to a high-density

mafic-ultramafic underplate at the base of the crust. This underplate would be the source zone for the differentiation of the Oslo igneous series. More recently, a different model has been inferred whereby the graben structure is made up of normal Baltica crust and the gravity anomalies are attributed to shallow, over-thrusted high-density, rocks. The new seismic data presented here best concurs with the later model as no significant changes in Pg velocity are seen as waves enter the graben and no crustal first arrivals with velocities > 7 km/s, which might indicate underplating, are observed.