



Crustal structure across the land-ocean transition off Møre, mid-Norway

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The mid-Norwegian Møre Margin offers a 12-15 km deep sedimentary basin offshore, and alpine peaks onshore. The Western Gneiss Region (WGR), which dominates the onshore geology, was subducted during the Caledonian orogeny. The WGR is the exposed remnants of the deeper parts of the Caledonides, and is therefore in some areas high-grade metamorphosed. In order to study this transition between the deep offshore basins and the WGR in detail, three ocean bottom seismometer profiles with deep seismic reflection and refraction data were acquired in 2009; two dip-profiles which were extended by land stations into the WGR, and one tie-profile parallel to the strike of the Møre-Trøndelag Fault Complex. Velocity and gravity modeling of the geophysical data indicates the presence of an intra-crustal reflector under the Trøndelag Platform, but not under the Slørebotn Sub-basin. Furthermore, two lower crustal high-velocity bodies are modeled, one located near the Møre Marginal High and one beneath the Slørebotn Sub-basin. While the outer lower crustal body is modeled with a density allowing an interpretation as magmatic underplating, the inner body has a density close to mantle density which might suggest an origin as a metamorphosed remnant of the Caledonian orogeny. The difference in velocity and extent of the lower crustal bodies seems to be controlled by the Jan Mayen Lineament, suggesting that the lineament represents an old (Caledonian) structural grain in the basement. The V_p/V_s -ratio is constructed from the modelled P- and S-velocities in order to explore the mineralogical composition. The results for the crystalline crust show a V_p/V_s -ratio between 1.73-1.75, which is typical for a dominantly felsic lithology. We see no significant variation in V_p/V_s -ratio with increasing depth. There is, however, an increase in the average V_p/V_s -ratio from the west towards the east. This indicates a more mafic dominated composition in the eastern part of the WGR compared to the western part.