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Petrological crust-mantle boundary vs. seismic Moho in the central Fennoscandian Shield: constraints from collocated wide-angle and near-vertical seismic profiles

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We presents analysis of the crust-mantle boundary in the Precambrian Fennoscandian shield based on comparison of P- and S-wave 2-D velocity models of wide-angle reflection and refraction profiles to correspondent collocated new reflection profiles in Finland (FIRE). Lateral variations of Vp, Vp/Vs and reflectivity show that the crust-mantle transition is very complex there. The lower crust above the seismic Moho is composed of very different rocks, including mafic granulites and garnet granulites, eclogites and pyroxenites. Below the seismic Moho, both mantle peridotites and high-density eclogites can be distinguished. As a consequence, the seismic Moho boundary does not always coinsides with the petrological crust-mantle boundary and the 'reflection Moho', if seen, differs from the 'wide-angle Moho' in several places. Different types of crust-mantle transition can be classified into several major groups. However, no simple correlation between tectonothermal age of crustal terrains and seismic signatures of the correspondent crust-mantle boundary has been found. Significant differences in composition, density and mechanical properties of rocks of the lower crust and upper mantle should be taken into consideration, when estimating rheology of the lithosphere of the shield and response of the lithosphere to glacial isostatic adjustement.