



Deep Lithospheric Structure of the Baltic Shield below the Swedish National Seismological Network (SNSN) Resolved by Teleseismic Tomography

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Upper mantle structure under the Baltic Shield is studied using nonlinear high resolution teleseismic P and S-phase tomography. Observed relative arrival-time residuals from 52 teleseismic earthquakes recorded by the Swedish National Seismological Network (SNSN) are inverted to delineate the structure of the upper mantle. The network consists of 47 (currently working) 3-component broad-band stations located in an area about 450 km wide and 1450 km long. In order to reduce complications due to possible significant three-dimensionality of Earth structure, events chosen for this study lay close to in-line with the long-axis of the array ($\approx 30^\circ$). Results indicate P-wave velocity perturbations of $\approx 3\%$ down to at least 470 km below the network while S-wave velocity perturbations (for both radial and tangential components) vary by $\approx 4\%$. The size of the array allows inversion for structures even at greater depths, and lateral variations of velocity at depths of up to 680 km appear to be resolved. Below the central part of the array ($60^\circ - 64^\circ$ N.), where ray coverage is best, the data reveals a large region of relatively low velocity anomaly at depths of over about 300 km both for P and S phases. At depths less than about 250-300 km, the models include a number of features, including an apparent slab-like structure dipping gently towards the north. Some minor discrepancies between the model obtained at radial and tangential components can give some clues on the seismic anisotropy which has been proposed by previous studies within the upper mantle (Plomerova, et al. 2006; Vecsey et al, 2006).