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Does Baltic Shield mantle anisotropy in Sweden resemble the fabric of the Archean-Proterozoic domains in central Finland?

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Studies of the deep lithospheric structure of the Baltic Shield have increased over the last decade especially due to two large passive seismic arrays (TOR and SVEKALAPKO) operated during 1996-1999. A new seismic network is now being operated by Uppsala University along the Swedish part of the shield area with 60 modern 3-component broadband stations. The already completed teleseismic studies have made a significant contribution to our understanding of the 3-D upper mantle structure of the Baltic Shield. The results include: i) A slab-shaped high P-velocity anomaly dipping towards the Archean domain, separated from the Proterozoic domain by a relatively low-velocity anomaly; the Proterozoic domain dominated by relatively high velocities; sharp discrepancies between the upper mantle S models (SH and SV models), coincident with the near-surface Proterozoic-Archean boundary and interpreted as different anisotropic characteristics in the two regions. (Eken et al. 2007a,b). ii) P and S anisotropy variations in the mantle lithosphere related to the Archean-Proterozoic tectonic suture in central Finland and a model of the deep transition between the Archean and Proterozoic domains (Plomerova et al. 2006, Vecsey et al., 2007); whereas SVEKALAPKO isotropic velocity models (e.g., Sandoval et al. 2004; Bruneton et al. 2004) indicated no clear deep boundary between the Archean and Proterozoic provinces. iii) Significant anisotropic structure of the upper mantle below Sweden derived from P-to-S waves converted at the 410km discontinuity (Olsson,

2007). The current project aims at studying lateral variations of seismic anisotropy along the Swedish part of the shield through a joint inversion of SKS splitting measurements and P-wave residuals. Initial results are in accord with a domain-like structure of the mantle lithosphere, retaining large-scale fabric related to the origin of the Precamrian continental fragments (Plomerova et al. 2001; 2002). Preliminary SKS splitting measurements, with up to now evaluated split delay times ˜1sec, support the presence of anisotropy below several stations. Our specific target is more refined analysis of anisotropy within the Proterozoic and Archean lithospheres of the northern part of the Baltic Shield.