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Mantle lithosphere fabrics around the TESZ

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Though the lithosphere-asthenosphere boundary (LAB) represents the first order structural interface in the upper mantle, its nature remains puzzling. By modelling structure of the mantle lithosphere we aim at contributing to endeavours to better understand what the LAB represents.

We examine lateral variations of shear-wave splitting evaluated from data recorded during the PASSEQ (2006-2008) passive seismic experiment spanning across the Trans-European suture Zone (TESZ). SKS waves split in the Bohemian Massif (BM) with an average delay time of the slow shear wave $\sim$1.2 s., while null splits were evaluated for waves from the NE at stations located in the Polish Platform between the BM and TESZ. Further to the NE, eastward of the TESZ, a weak splitting with the fast shear-wave polarized in the SW azimuth was detected.

The TESZ represents a distinct $\sim$3500 km long tectonic feature, which can be traced through north-western to south-eastern Europe in various seismic velocity (e.g., Bijwaard et al., JGR 1998, Goes et al., JGR 2000) as well as in seismic anisotropy (e.g., Babuska et al., PAGEOPH 1998). Models of seismic anisotropy around the western part of TESZ (Plomerova et al., 2002; Babuska and Plomerova, 2004) delimited three lithospheric domains with different structures and thickness: (1) north of the TESZ, the high velocities of the anisotropic structures dip to the NE in the thick lithosphere of Fennoscandia; (2) the sharply bounded fragment of a thinner lithosphere between the northern (Sorgenfrei-Tornquist Zone) and southern branch (Thor Suture) of the TESZ, where anisotropic structures dip to the WNW; (3) south of the TESZ, a domain belonging to a very thin lithosphere of Avalonia exhibits the high velocities dipping to the SW-W. In this contribution we present 3D self-consistent anisotropic models of the upper mantle around the central part of TESZ. The models meet both the spatial variations of the teleseismic shear-wave splitting and P-wave travel time residuals.