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Seismic anisotropy imprint on upper mantle velocity structure beneath the north-eastern Bohemian Massif (central Europe)

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Research of deep structure of the Bohemian Massif (BM) and its surroundings exploits data from dense temporary arrays of seismic stations involved in several passive seismic experiments conducted in central Europe since the 90ties and aims at refining our knowledge on mantle lithosphere structure. Regional high-resolution tomographies of the upper mantle in the western BM (Plomerova et al., 2007) and north-eastern BM (Karousova et al., Tectonophysics, in review) down to about 250 km image perturbations in isotropic velocities. The first tomography maps lower velocities in the upper mantle along the Eger Rift as a result of a lithosphere thinning. Low velocities dominate beneath most of the north-eastern BM in the second one. However, in a study of 3D body-wave anisotropic parameters, shear-wave splitting (fast S polarizations and delay times of the split slow shear waves) and directional terms of relative P-wave residuals, we show that several domains of mantle lithosphere with different fabrics can be modelled also in this part of the BM. The fabric of the northern and north-eastern BM is approximated best by peridotite aggregates with the (a,c) foliations dipping to the NNW and NE, respectively, whereas a model with the westerly dipping a lineation fits best the fabric of the south-eastern domain. The Saxothuringian fabric, NW of the Eger Rift, extends to the east across the Elbe Fault Zone (EFZ) and continues along this zone to the southeast beneath the Cretaceous Basin. The southeastward continuation of the Elbe Fault Zone seems to be related to the boundary between two different fabrics of the northern and southern parts of the Brunovistulian domain underlying the Moravo-Silesian zone. This study shows an underthrusting of the Brunovistulian micro-plate beneath the eastern rim of the BM and indicates that its northern and southern parts might represent lithosphere fragments originally belonged to Baltica and to Gondwana, respectively. According to suppressed anisotropic signals the Brunovistulian micro-plate extends at least about 100 km westward beneath the Moldanubian. With these new findings we update the domain-like mantle structure of the BM and compare the results with inferences from the upper mantle velocity tomography.