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Mantle anisotropy from shear-wave splitting across the Eastern Alps – Bohemian Massif contact zone

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Splitting of core-mantle refracted shear waves is considered as a proof of their propagation through an anisotropic medium and a tool to model upper mantle large-scale anisotropic structures. The anisotropic models of the continental mantle lithosphere exhibit often sharply bounded domains of uniform fossil fabrics. Deciphering the structure of paleo-plates in the Alpine area requires sufficiently dense and uniformly spaced network of broad-band stations. We analyse data recorded in the AlpArray-EASI (2014-2015) and AlpArray (2016+) backbone passive experiments. Twenty broadband stations of our MOBNET pool have been involved in each of them.

We have evaluated splitting parameters of shear waves (SKS) together with their particle motions (PM). An advantage of using the PM analysis is its ability to employ events with lower signal-to-noise ratio (SNR) that are otherwise not usable for splitting analysis. Moreover, shear-wave splitting parameters can be spoiled by seismometer misorientations and/or deviations of incoming wave directions from their theoretical back azimuths. To improve results of splitting analysis, we also include SKS wave propagations with null or close to null splitting and carefully check signals for seismometer misorientations. Corrections for dynamical back azimuths are determined from the orientations of narrow PMs together with comparisons of splitting parameters obtained from both transverse energy and eigenvalue methods in case of elliptical PMs. We discuss lateral variations of shear-wave splitting in relation to boundaries of major tectonic units in the region.