



Crustal anisotropy in the European Alps inferred from crustal phases in receiver functions and first implications for the mantle dynamics

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Mantle flow is commonly inferred from SKS-splitting observations with the assumption that the measured fast axes directly reflect the flow direction. In the European Alps SKS-splitting results show a relatively simple pattern with the fast axes following the strike of the mountain belt (Kummerow & Kind 2006; Barruol et al. 2011; Bokelmann et al. 2013; Quorbani et al. 2015). However, the convergence of the European and African plates, with the Adriatic plate trapped in between, may suggest a more complex pattern of mantle flow, possibly disturbed by the subducting slabs.

The direct inference of the mantle-flow field from SKS-splitting might be misleading due to a possible crustal contribution. Therefore, we isolate the crustal anisotropy in the Alpine region using an improved receiver-function method that allows to discriminate between anisotropic and structural properties with similar azimuthal patterns in the waveforms.

The method used here is based on developments by Kaviani & Rümpker (2015), who extended the H- κ -stacking algorithm of Zhu and Kanamori (2000) to anisotropic media. We modify their approach by introducing a splitting analysis of crustal phases and correct for the anisotropic effect before the stacking is performed. This allows for a robust retrieval of the model parameters: crustal thickness, H, P to S-wave velocity ratio, κ , percentage of anisotropy, a, and fast-axis orientation, φ . In addition, we take into account the considerable Moho topography in the Alpine region, which deflects the crustal phases and correct for the effect in our analysis. We apply this method to all stations of the AlpArray network obtaining a detailed image of the pattern of crustal anisotropy in the Alps.

We also show first results of corrected SKS-splitting measurements by taking into account the crustal anisotropy to isolate the anisotropy of the mantle. The results are discussed in view of the crustal influence on SKS-measurements.