



Complex pattern of seismic anisotropy beneath the Iranian plateau and Zagros

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We performed shear wave splitting analyses on core-refracted teleseismic shear waveforms from 150 broad-band stations across the Iranian plateau and Zagros to investigate seismic anisotropy in the region. Seismic anisotropy is quantified by shear-wave splitting parameters, i.e. fast polarization direction and split delay time.

Our measurements revealed a complex pattern of splitting parameters with variations in the trend and strength of anisotropy across the tectonic boundaries. This complex pattern implies that a system of simple asthenospheric flow related to the absolute plate motion cannot alone explain our observations and that the lithosphere also has a significant contribution in many parts. We compare our results to the surface deformation and velocity fields inferred from geodetic measurements to assess the role of the mantle in continental deformation. The rotational pattern of the fast directions around the collision zone in Central Zagros may indicate the presence of a mantle flow around a continental keel beneath the Zagros. The agreement between the crustal and mantle deformation field in Central Iran implies a vertically coherent deformation in this region, whereas the azimuthal variations in splitting parameters in the collision zone may suggest multi-layered anisotropy with different contributions from the crust and mantle.