Seismic anisotropy from shear wave splitting across east Kunlun fault

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The northeastern Tibetan plateau is dominated by the Kunlun strike-slip fault system and adjacent Kunlun concealed thrust. In order to investigate the link between surface and internal deformation in the context of crust and mantle structure, we present shear wave splitting results obtained from the analysis of teleseismic SKS and direct S waves from regional earthquakes. We find a contrast in the splitting pattern complexity beneath different parts across the Kunlun fault. The fast directions in the southwest of Kunlun fault trending NW-SE are generally consistent with the strike of Kunlun fault, suggesting that the anisotropy in the lithosphere contributes significantly to the observed shear-wave splitting. While in northeast of Kunlun fault, the anisotropy shows azimuthal dependence of splitting parameters that can be modeled by two anisotropic layers. The fast direction in the upper layer is consistent with the surface movement determined from GPS, and could be associated with middle or lower crustal flow. The fast direction in the lower layer could be related to the flow in the asthenosphere related to the absolute motion of Eurasia. The complexity of seismic anisotropy pattern suggests that no unique geodynamic model can fit all the splitting results suitably.

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