



Insight into NE Tibet expansion from SKS splitting: Missed mid-lower crustal flow in the frontier

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Two end member hypotheses for the expansion of the Tibetan plateau focus on either the deformation of the whole lithosphere or ductile flow in the mid-lower crust. Here, we analyse SKS shear-wave splitting at ChinArray stations in NE Tibet. Within the high plateau, the splitting measurements indicate two-layer anisotropy. The upper-layer anisotropy (with NE-SW fast axis) is caused by ductile-flow in the mid-lower crust while the lower-layer anisotropy (with NW-SE fast axis) reflects deformation in the upper mantle. In contrast, near the expansion frontier, the measurements indicate single layer splitting with a NW-SE fast axis that correlates with the strikes of most faults and the trend of the orogen. The results thus suggest different dynamics in the plateau and its NE margin. In the high plateau mid-lower crustal flow plays a dominant role while in the expansion frontier in the NE margin the initial tectonic uplift is induced by crustal thrust faulting.