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Multi-scale, Finite-frequency Travel-Time Tomography Illuminates 3-D Seismic Velocity Structure beneath Western Tibet

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With a new multi-scale parameterization and advanced finite-frequency theory, we resolve 3-D variations in P- and S-wave speeds (V_P and V_S) in both the crust and the upper mantle beneath Tibet. The resulting V_P and V_S models reveal that regions of low electric resistivity, previously observed along active rifts in southern Tibet, correlate well with regions of both low V_P and V_S wave speeds but such regions are not interconnected, indicating that channel-like crustal flow is inactive. In the upper mantle, there is no indication of down-welling between depths of 100 to 400 km. Instead, a strong, lateral boundary between fast and slow seismic velocities occurs north of 33°N, marking the northern limit of underthrusting Indian lithospheric mantle.