

## Lithospheric foundering and underthrusting imaged beneath Tibet

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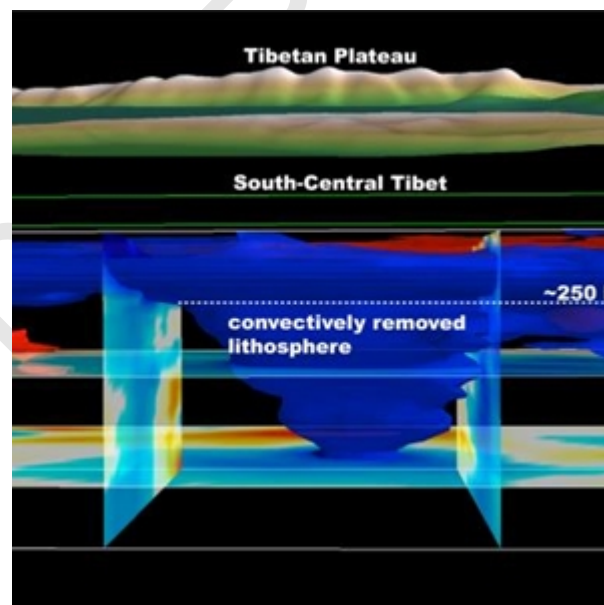
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Long-standing debates exist over the timing and mechanism of uplift of the Tibetan Plateau and, more specifically, over the connection between lithospheric evolution and surface expressions of plateau uplift and volcanism. Here we show a T-shaped high wave speed structure in our new tomographic model beneath South-Central Tibet, interpreted as an upper-mantle remnant from earlier lithospheric foundering. Its spatial correlation with ultrapotassic and adakitic magmatism supports the hypothesis of convective removal of thickened Tibetan lithosphere causing major uplift of Southern Tibet during the Oligocene. Lithospheric foundering induces an asthenospheric drag force, which drives continued underthrusting of the Indian continental lithosphere and shortening and thickening of the Northern Tibetan lithosphere. Surface uplift of Northern Tibet is subject to more recent asthenospheric upwelling and thermal erosion of thickened lithosphere, which is spatially consistent with recent potassic volcanism and an imaged narrow low wave speed zone in the uppermost mantle.



**Figure 1.** Three-dimensional visualization of the lithospheric foundering under the Tibetan Plateau, with 2% (blue) isosurface of shear wave speed anomalies rendered from model EARA2014 (Chen et al., 2015 JGR).