



How is the Sichuan Basin Stopping the East Tibetan Escape Flow?

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GPS displacement vectors show that Tibetan crust is squeezed in easterly direction by the northward motion of the Indian plate. The Sichuan Basin is resisting this stream and redirecting it towards Indochina. Seismic anisotropy shows that surface deformations continue to greater depth and indicate crust-mantle coupling. Here, we present results from a dense seismic receiver function profile from eastern Tibet across the Longmen-Shan Fault (LMS) into the Sichuan Basin. We find that the LMS extends down to at least 150 km and marks a sharp steplike boundary between the Tibetan and the Sichuan lithospheres (including a sharp step at the boundary between crust and mantle). The mode of collision between east Tibet and the Sichuan craton is thickening the Tibetan lithosphere in contrast to subduction at the India-Tibet boundary. Furthermore we find that the mantle transition zone (MTZ, between 410 and 660 km depth) is beneath the Sichuan Basin 30 km thicker than beneath eastern Tibet. The reason for this is not clear, nor is the possible connection between the change in MTZ thickness and the step of the lithosphere directly above. Receiver function data in eastern China make it unlikely that flat Pacific subduction is the cause of MTZ thickening below the Sichuan Basin, as it was indicated by tomography. We propose that thinning of the MTZ below eastern Tibet could be an indication of a vertical component of the eastern Tibetan escape flow.