Mantle Transition Zone Discontinuities through India, the Himalaya and the Western Tibet along 80°E

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We image the mantle transition zone discontinuities across India, the western Himalaya and western Tibet, along the 80°E, from 8°-36°N, using P to S converted phases abstracted from ~6400 teleseismic waveforms recorded by 130 broadband seismographs deployed in the region between 1999-2009. The 410 km discontinuity is clearly defined throughout but varies in depth from 405±5 km beneath the Indian shield to 392±5 km beneath the western Himalaya and south-western Tibet. Further north of the Bangong suture, beyond 33° N, the 410 is diffused and marginally depressed by \sim 5 km. The 660 km discontinuity is mapped at 660±10 km beneath the Indian shield and closely follows the 410 discontinuity, rising to \sim 650± 5 and \sim 640 ± 5 km respectively, beneath the western Himalaya and Tibet. Additionally, a short high velocity interface is mapped at a depth of ~475 km beneath the western Tibet. The thickness of the mantle transition zone, 252±10 km, is uniform along the entire profile, equal to the global average. These observations suggest (i) a progressive cooling or thickening of the lithosphere from south India towards the northern margin of the Indian plate right up to the Bangong suture; and (ii) a nearly uniform mantle transition zone underneath, from southern India to the western Tibet, suggesting the absence of any detectable high velocity anomaly in the transition zone to reflect the anticipated existence, somewhere in the regional mantle, of the sinking Tethyan slab.