

# Complex Seismic Discontinuities in the Mantle Transition Zone beneath NW Himalaya and Ladakh- Karakoram

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Analyses of mantle converted Ps phase in 957 teleseismic receiver functions calculated from broadband seismograms deployed at 19 sites along a 700 km long N-S profile from the exposed northern edge of the Indian shield near Delhi to the Ladakh-Karakoram reveal complex features in the underlying Mantle Transition Zone (MTZ). Beneath the Gangetic plain and the Himalaya south of the Indus Zangbo Suture (IZS), the 410-km discontinuity is shallow (~392 km) and the mantle transition zone is relatively thicker (~260 km). To the north of the IZS beneath the Ladakh the 410-km discontinuity lies near

its normal depth but the transition zone is thinner (~242 km) and includes an interface at ~475 km depth. The base of the transition zone is complex as revealed in dominant converted phase from 660 depth and a weaker one at ~715 km. These observations suggest the presence of a high velocity slab within the MTZ beneath the Ladakh region, most likely a broken off segment of the subducted Indian Lithosphere, and the other deeper one beneath Himalaya and Ladakh which is likely the sunken delaminated oceanic lithosphere that was rolled back across the mantle transition zone.