

Towards a high-resolution seismic image of the lithospheric structure of the Himalayan orogenic wedge beneath Bhutan

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In the Eastern Himalaya the main lithospheric structure of the orogenic wedge across and perpendicular to the Himalayan range is only poorly constrained compared to the Western and Central Himalaya. Neither the detailed geometry of the dipping crust-mantle boundary (Moho) of the Indian lithosphere, nor the major crustal detachment of the Main Himalayan Thrust (MHT) have been yet well resolved for this region. For a better understanding of the orogenic wedge kinematics in this part of the Himalaya, like crustal exhumation rates or thrust faulting the geometry of these structures is essential.

We use data from a temporary seismological network in Bhutan (GANSSEER project) to determine the first order lithospheric and seismic structure in the Eastern Himalaya with receiver functions and a minimum 1-D velocity model. First results of the receiver function study show a significant variation in their characteristics across the network, between Western and Eastern Bhutan, and across the Himalaya. This indicates a non-uniform dipping geometry of the Indian Moho beneath the Eastern Himalaya and an intra-crustal interface with a major velocity contrast, likely corresponding to the MHT. In combination with the minimum 1-D velocity model we provide first insights into the crustal velocity structure of the Bhutan Himalaya and physical properties of the crustal wedge material.

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