



Imaging the lithospheric structure across NW Himalaya, India utilizing local seismic tomography

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The crust and upper mantle structure beneath NW Himalaya, India, a region lying in the Central seismic gap, is imaged using the local earthquake tomography. In this work we have estimated the P- and S-wave velocity variations (V_P and V_S , respectively) and the variation in their ratio (V_P/V_S) that would indicate the lithospheric structure of the NW Himalaya and the underlying Indian crust in this part of the Himalayas. Our observations postulate that there is a variation in the strength of the lithosphere along the major structural trends in the Himalayas. This may be due to the presence of complex architecture in the sub-surface marked by crustal level folding and faulting phenomena. The ratio of V_P/V_S has been subsequently dependent on the strength of the lithosphere and it may be concluded from the present study that the entire crust beneath the NW Himalaya is brittle and will produce micro to mega earthquakes in future. Using the recorded waveforms, we show that there are highly attenuating structures at the crustal level and the strength of these attenuating bodies decreases with increasing depth beneath the Indian plate. These observations suggest that the seismic hazard potential in this part of the Himalaya is significantly high and our results will help in minimizing this earthquake hazard in future.

Key words: Seismic tomography; Crustal structure; North-West Himalaya; Attenuation; Seismic hazard