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Radial anisotropy across Northeastern and Northwestern Himalaya

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We jointly model Rayleigh and Love wave group velocity dispersion data along two 2-D profiles across the India-Eurasian continent-continent collision zone, to estimate the transversely isotropic shear wave velocity structure of the lithosphere. The first profile is south-north across the Bengal Basin, the Shillong Plateau, the Eastern Himalaya and the southern Tibetan Plateau. The second profile is southwest-northeast across the NW Himalayan foreland, the Kashmir Himalaya and the western Tibetan Plateau. For the inversion, we have developed a scheme using Genetic Algorithms (GA). Theoretical dispersion curves are calculated using the algorithm of Bhattacharya (2017). The starting model for the inversion is built from existing 1-D models eg. CRUST 1.0 and PREM, for the crustal and upper mantle layers, respectively. The free parameters in the inversion are layer thickness $(H), V_{SH}, \xi, V_{PH}$. The corresponding ϕ and η in each layer is used through empirical relations with later three free parameters. GA performs a global search of the model space and optimize the misfit between observed and calculated dispersion data using a jointly weighted objective function. We run GA for 40 generations and repeat this process 20 times to obtain 20 best fitting models. The final model is obtained by computing the mean and standard deviation of these 20 best fit models. The variations in the best fitting models provide a qualitative measure of the trade-offs between parameters. We perform synthetic tests along the above mentioned 2-D profiles to ascertain the model recovery and estimate the uncertainties. Results of the synthetic tests reveal less than 10% uncertainties on the layer thickness and velocities. This procedure is being applied to observed data obtained from the Rayleigh and Love wave group velocity tomography of the India-Eurasia region, and will be presented.