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Modeling Moho dip and crustal anisotropy using receiver function analysis beneath Jammu and Kashmir Himalaya

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A possibility of dipping Moho and layered anisotropic structure in Jammu Kashmir Himalaya has been investigated in this work. Teleseismic events of magnitude greater than 5, recorded by a network of 16-stations broadband stations have been used for the study. Receiver functions are stacked by back-azimuth for all the sites and the transverse-components are used to identify the pulses that appear at the same lag time and over a broad range of back azimuth. We performed trial-and-error forward modeling of these phases with an aim to capture their polarity and timingas a function of back azimuth directions. We computed synthetics receiver functions using layered velocity models with dipping Moho and anisotropic layer parameters. Choice for azimuth direction in dipping Moho model and anisotropic symmetric axes in anisotropic model are dictated by the location of observed polarity changes in the transverse component RF gathers. We analyzed receiver functions for all the 16 sites, to capture the evidence of dipping interface effect and anisotropic layer effects. Out of these 16 site, two sites, namely BADR and SMVD, supports purely dipping Moho structure and three sites, namely TAPN, PHAG and GALR, are found to support anisotropic crust structure. The BADR and SMVD transverse stacks are modeled to matched for the polarity flipping pattern of dipping Moho and it is found to match identically with 30º dip angle with 40º and 250º azimuth direction respectively. The pattern of transverse as well as radial receiver functions for those sites, which has anisotropic structures, are comparatively more complex. It is difficult to model the direction of anisotropic symmetric axes and percentage anisotropy. Preliminary findings from the transverse receiver functions at stations TAPN, PHAG and GALR, it is observed that the crust is anisotropic with horizontal symmetric axes.