Crustal Structure of Eastern Himalayan Syntaxis Derived from Receiver Function Analysis

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At the eastern end of the extended Himalayan arc, the east-west trending Indian plate seems to swerves around Namcha Barwa antiform basement massif to connect to the elongated Indo Burmese arc to form the Eastern Himalayan Syntaxis (EHS). The EHS is viewed complex triple junction that joins Indian and Eurasian plates with the northern end of the Burma platelet. The present paper is an attempt to image the crustal and lithospheric structure of the EHS based on receiver function analysis of teleseismic earthquakes recorded by linear array of broadband seismic stations established along the Lohit valley, cutting across eastern most part of the syntaxis. The receiver functions show an azimuthally varying lithosphere structure in the region. The majority of receiver functions for the events of NE back azimuths (30o to 90o) do not show clear Moho converted phase (Ps) depicting a very complex structure of the crust and upper mantle. In contrast to it, receiver functions from other back azimuths clearly shows Moho converted phase. The time section plot of radial receiver functions from all the stations shows a dipping structure of Moho towards east and north. The inverse and forward modelling of receiver functions yield S-wave velocity profiles marked by near surface and intra-crustal low-velocity zones. The results obtained from modelling confirms the gradual increase of Moho depth in the NE-SW profile, from ~45 km at Brahmaputra valley (near Mahadevpur) to ~63 km further east of tiding suture zone (near Walong). The dipping structure of the Moho to the north and east is consistent with the underthrusting of the Indian plate beneath Eurasia plate to the north and beneath Burma platelet to the east. The absence of Moho converted phase for the NE back azimuth support the indenter hypothesis where due to the intense crust mental interaction, the character of Moho is lost beneath the syntaxis.