

Receiver Function study in Northeast Tibet and adjacent boundaries

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ABSTRACT

As part of the NorthEast Tibetan plateau Seismic (NETS) project, we performed receiver functions analysis across the northeastern Tibetan plateau and adjacent boundaries. Using the data of about 500 events obtained from 61 broad-band stations, we provided a detailed image of the Moho geometry and constraints on the lithosphere-asthenosphere boundaries (LAB).

The average crustal thickness is about 50km for the northeastern corner of the Tibetan plateau. The deepest Moho is found along the Kunlun Fault zone in the northern Tibetan plateau. We also observed the presence of a double Moho phase in this region which suggests that there may be an overlap of the Qaidam crust above the Kunlun crust. The crustal deformation is complex between the Kunlun fault and Haiyuan fault. We observed a double converting layer at ~35km and ~45km separately in the North Qilian suture zone, which might be the evidence of a remnant subduction zone from the Early Paleozoic oceanic lithosphere beneath the North China Craton. The Lithosphere-Asthenosphere boundary (LAB) for the western part of the study region is consistent with previous surface wave studies which found a lithospheric thickness of ~130km. In easternmost Tibet, the LAB is unclear and has two major layers around 120km and 200km. The lack of a clear LAB phase in this region might also indicate that the velocity gradient associated with the LAB occurs over a very large depth range (~50 km).