GEOMETRY OF DEEP VELOCITY DISCONTINUITIES IN THE WESTERN MAKRAN USING RECEIVER FUNCTIONS

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ABSTRACT

The western Makran is an active subduction in SE Iran in which Arabian plate is subducting northward under the Eurasia. Low taper angle, thick sediments on accretionary prism and different seismicity and convergence velocity in west and east parts of the subduction zone are interesting features that encourage Earth Scientists to consider it as an important study region. Despite of question galore in Makran, studies of this region are in minority. Some deep velocity models imaged the subducted slab dipping northward beneath the study region. A very low Pn velocity anomaly has been reported beneath the region indicating a hot unstable lithospheric mantle beneath the Makran. These studies are all regional and their resolution is low, so the local studies are necessary. Geometry of the subduction and depth of discontinuities are important inquiries that have not answered yet.

In this study, we analysed the teleseismic data gathered by a broad-band and five short-period seismometers, located in western Makran, north of Chabahar city. The data gathered by the roughly north-south direction quasi-linear profile are used to calculate P and S receiver functions by iterative deconvolution technique of Ligorria and Ammon (1991). P receiver functions are migrated to depth to clarify the shallow velocity boundaries at the base of sediments, Moho and Lithosphere – Asthenosphere Boundary (LAB). We use forward modelling to calculate synthetic PRFs to explain periodic amplitude variation of P to S converted phases with back-azimuths in each station which could be a signature for anisotropic velocity features.

Our results show an anisotropic layer between depth of ~1 and 10 km, probably caused by the accretionary prism's imbricate zone. P receiver functions migrated section shows Moho depth variation from 22 km to 28 km, increasing toward the north. Migration of S receiver functions reveals a deep velocity discontinuity at depth of 80 km which might be considered as the thin lithosphere-asthenosphere boundary beneath the study area.

Keywords: *Makran, receiver function, Moho, LAB*