

Structure of Ethiopian Plateaus and the Main Ethiopian Rift from Receiver Function Analysis

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P-to-S receiver functions of 10 broad-band seismographs installed along the geologically complicated edge of the Ethiopian plateau and the active Main Ethiopian Rift were examined to image the crustal structure beneath the region. Receiver functions were determined using the time domain iterative deconvolution method to calculate the Moho depth and V_p/V_s of the crust. Results indicate that the Moho depth beneath the Northwest plateau, the Central Main Ethiopian rift, and the Southeastern plateau is 36–44 km, 36–38 km, and 40–44 km, respectively. A very high $V_p/V_s > 2.0$ is observed beneath the Enewari depression at the NW plateau at the depth range of ~ 30–40 km under a high velocity material. Likewise, a similar high V_p/V_s material is also found beneath the rift axis at the depth range of ~ 30–46 km beneath a high velocity solidified material. These high V_p/V_s ratios at the top of the lower crust in the Northwest plateau and MER are inferred to be seismic signatures of a low V_s partial melt material. The high V_s and the low V_p/V_s material above these high V_p/V_s materials might be solidified magmatic material.

Promotional text

Crustal structure of the Northwestern and Southeastern plateau from the analysis of Shear wave velocity obtained from the P- to -S wave receiver function analysis.

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