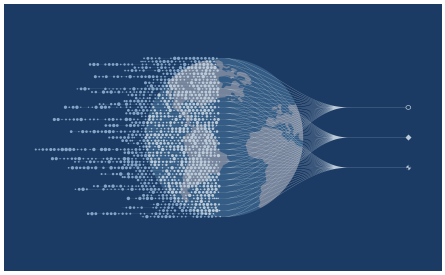

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and Upper Mantle Structure of the Kenyan Rift: Insights from Receiver Function Analysis

The East African Rift System (EARS) is a prominent continental rift zone, extending over 3000 km from the Afar Triple Junction to Mozambique. Its Kenyan segment features fault-bounded basins, volcanic activity and seismicity, making it an ideal site for investigating crustal structure and rifting mechanisms. Previous geophysical studies revealed significant variations in crustal thickness along the rift axis, with thinning toward the north and thicker crust beneath the Tanzanian Craton and Mozambique Belt. However, detailed investigations with broader spatial coverage remain limited. This study utilizes data from 20 broadband seismic stations, including temporary deployments like GRAILS and permanent stations such as KMBO. Receiver function (RF) inversions and apparent S wave velocity analyses reveal localized crustal thinning within the rift zone. A high velocity lower crust (HVLC) beneath the rift is interpreted as modified mantle lithology, suggesting crustal thinning accompanied by anomalous upper mantle material. A regional Moho depth model integrating these findings with prior studies confirms localized thinning along the rift. These results enhance understanding of crustal dynamics in the Kenyan Rift and provide insights into mechanisms driving continental rifting processes.

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