

THE DEEP STRUCTURE OF THE KENYA RIFT FROM SEISMIC, GRAVITY AND MT MEASUREMENTS

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Seismic refraction - wide-angle Reflection experiments show major crustal thickness variations along and across the Kenya rift. Along the rift axis the crustal thickness varies from 35 km in the south beneath and to the south of the Kenya dome to 20 km in the north beneath the Turkana region. Profiles across the central and southern parts of the rift north show that the low uppermost mantle Pn velocity of 7.5-7.8 km/s and crustal thinning up to 10 km are confined to below the surface expression of the rift. An abrupt change in Moho depths and Pn velocities occurs as the rift boundaries are crossed. Beneath the rift flanks except for the Chyulu Hills area normal Pn velocities of 8.0-8.3 km/s occur. Beneath the Chyulu Hills Quaternary volcanic field east of the rift the thickest crust (38-44 km) is encountered so far beneath Kenya over a distance of about 300 km. Here, the Pn velocity is 7.9-8.0 km/s. Below the whole of 600 km long axial rift profile, Pn velocities are low being 7.5-7.8 km/s. The above results taken together with results from teleseismic studies, gravity, MT, petrology and surface geology indicate anomalously hot mantle material appearing below the present site of the Kenya rift about 20-30 Ma ago. This gave rise to volcanism along the whole length of the rift and modification of the underlying crust by mafic igneous underplating and intrusion.