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CRUSTAL STRUCTURE IN SOUTHERN SPAIN DERIVED FROM DEEP SEISMIC SOUNDING PROFILES

Under the auspices of the International Geodynamics Project a research program was initiated to determine the structure of the crust and upper mantle in southern Spain in the fall of 1974 and 1975. A network of crustal seismic refraction profiles was established originating from shotpoints at sea close to Cadiz, Adra and Cartagena and on land at Alquife near Guadix. The lengths of the profiles range from 50 km near Alquife to 440 km between Cartagena and Cadiz parallel to the general strike of the Betic and Sub-Betic zones. The main profile was supplemented by observations along a profile close to the coast between Adra and Cartagena and perpendicular to the main tectonic strike from Adra to Ubeda. The first evaluation of the data indicates strong variations of the crustal thickness. A preliminary interpretation leads to a three layered model of the crust. The mean compressional velocity lies between 4.7 and 5.1 km down to a depth of 4 km. Below this the velocity has a value of 6.1 km/s from 4 to 16 km where it increases to about 7.1 km/s. The P_n-velocity is 8.18 km/s. The crust - mantle boundary is reached at a depth of 28 km near Cartagena and 32 km near Adra. Underneath the gravity minimum of the Cordillera Betica the Moho lies at a depth of around 36 km. A more detailed crustal model includes a zone of reduced velocity in the lower crust with a velocity of 6.4 to 6.7 km/s. A much more pronounced zone of low velocity seems to exist in the depth range from 40 to 60 km below the Betic zone with a P-wave velocity of 7.7 km/s.