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## *Short Communications*

# Crustal Structure under the Ionian Sea

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*Key words:* Refractional Seismics on Sea – Sono Buoys, Ionian Sea – Crustal Structure.

The presented crustal section under the Ionian Sea is the result of refractional seismic work on two cruises of the research ship "Meteor" in 1969 und 1971 under the coordination of Prof. Closs[1], and of three seismic stations on the Peloponnes near the coast in 1971. In that year 25 seismic land stations and four sono buoy sea stations have recorded explosions at sea on a profile line which crossed the Mediterranean Ridge, the Hellenic Trench and the Peloponnes and ended in the East near Ägina. The program of 1969 was carried out in cooperation of Italian and German Institutions and that of 1971 by German, Italian and Grecian Institutions. Both expeditions were financially supported by the Deutsche Forschungsgemeinschaft.

The presented Bouguer Anomaly relies on a European map, published by the Bureau Gravimétrique International, Paris. The sea bottom topography in the area of the crustal section shows four main geological structures: the shelf of Malta, the deep Ionian Sea (Ionian Abyssal Plain), the Mediterranean Ridge and the Ionian Trench, which is not very clear marked by the bottom topography in this area. Also the Mediterranean Ridge differs not very much in water depths from the Ionian Abyssal Plain, but is characterized by its rough topography (Hieke, 1972; Ryan, 1969), which scatters and reflects the seismic energy. — The mentioned four units given by the sea bottom topography are also represented by the deeper structure from the seismic survey. The Malta Shelf area, which belongs to the African plate, shows a typically continental crust with consolidated sediments near the surface (Weigel and Hinz, 1970).

There are no informations about the Moho course, but the Bouguer anomaly points to a depression compared with the smaller depths of the

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1 Professor Dr. H. Closs, Bundesanstalt für Bodenforschung, Hannover.

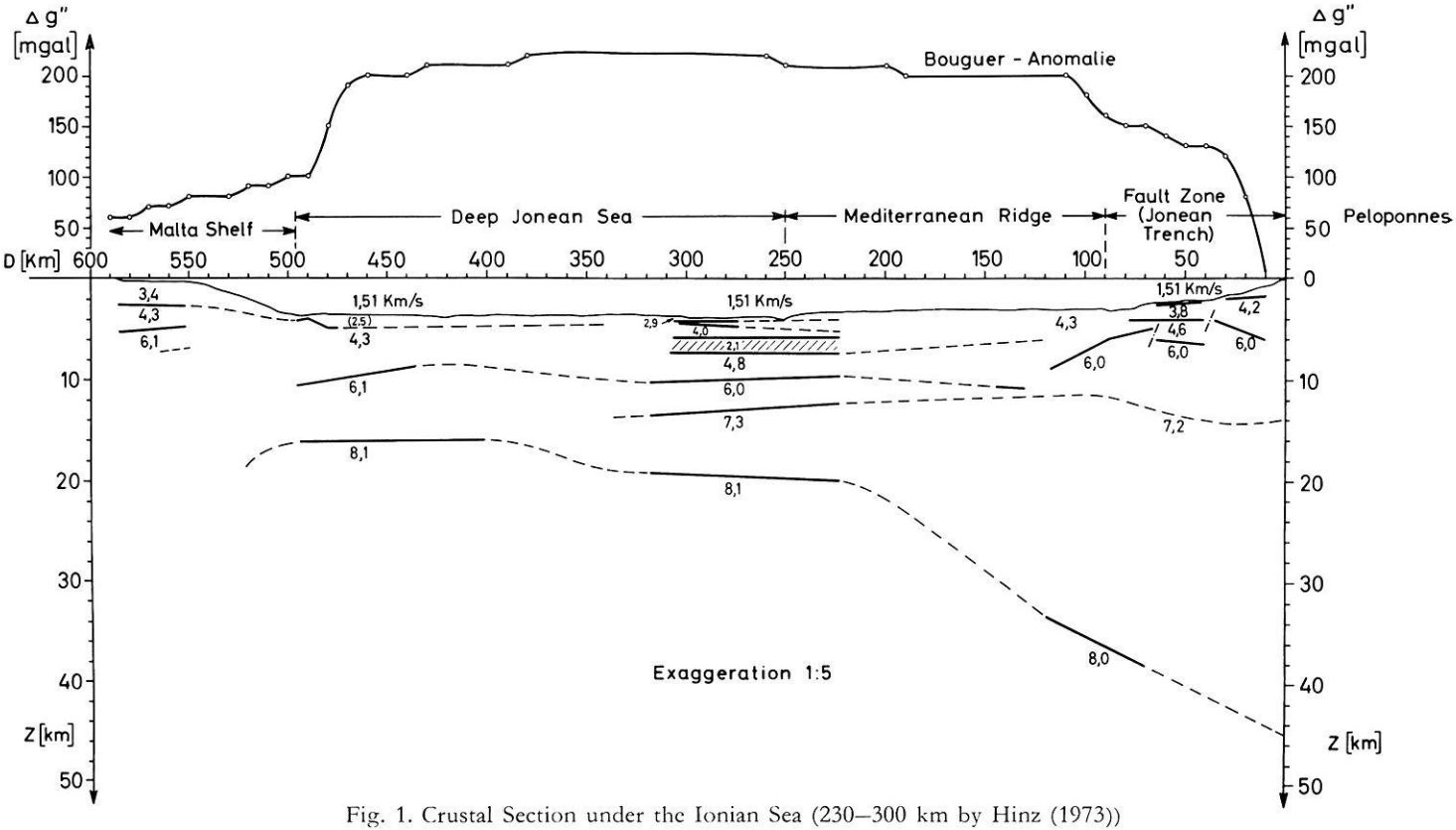


Fig. 1. Crustal Section under the Ionian Sea (230–300 km by Hinz (1973))

Moho in the Ionian Abyssal plain. The seismic results under the margin of the Malta shelf show strong fractured horizons, which point to a fault zone in which the cristalline ($V_p = 6{,}1$ km/s) has been vertically shifted about 5000 m. The crustal type in the area of the Ionian Sea is quite different from that in the Western and Eastern continental areas. Also under the Western Peloponnes the cristalline reaches about 6000 m and is overlain by consolidated sediments (5,2—5,5 km/s). A very strong fault zone is indicated by an unsteady course of the sea bottom and seismically identified fractures in sediments and cristalline in the area of the Hellenic Trench. A p-velocity of intermediate crustal material (about 7.0—7.2 km/s) is not clear in all sections of the profile. Under the coast of the Peloponnes the Moho reaches about 46 km depth, which agrees with the Bouguer anomaly (Lort, 1971). Under the Mediterranean Ridge the transition zone to the upper mantle rises till 18 km under the Western part of the Ridge and the Ionian Abyssal plain. Here it is not clearely marked by a discontinuity (Weigel and Hinz, 1970). Under the Malta-Marginal Trough the Moho reaches about 17 km.

The great depth of the cristalline in the deep Ionian basin and under the western part of the Mediterranean Ridge and the low depth of the Moho points to a sunken area of a formerly continental crust which presently may be in a process of oceanisation.

The slope of the Moho from the Ionian Sea to the East and the great depth under the coast of the Peloponnes agrees with the zones of Moho depression under the young mountain systems of the Alps and the Dinarides. Whether the subduction of the Moho is connected with a subduction zone, as it was ascertained in the Pacific island arcs, is not clear. Indications for such a Benioff zone are the earthquakes in that area (Galanopoulos, 1972) and studies of earthquake mechanisms (Gertig, 1972) which show compressions in about ENE direction. This points to a recent relative movement of the Ionian/Ägäan area. From the presented crustal section vertical crust movements are sure but also recent horizontal movements cannot be excluded.

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