5-7. - THE RESULTS OF REFRACTION AND REFLECTION SEISMIC SURVEYS OF THE F. S. METEOR IN THE IONIAN SEA

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In 1969 and 1971 the research vessel METEOR carried out refraction and reflection seismic surveys in the Ionian Sea. The refraction seismic profiles lie on a traverse between 35°N and 37°N.

In the West, in the area of the Sicilian-Malta platform, 5000 m of sediment (WEIGEL et alt 1970) overlie rocks having a velocity of 6.1 km/sec. East of there, within the Malta marginal trough, the upper surface of the crystalline rocks is 10 km deep indicating a definite subsidence of the Ionian Sea.

In the region of the Messina abyssal plain, a 1.5 km thick layer (Miocene evaporites) with velocities between 4 ans 4.5 km/sec was observed beneath 0.5 km of Plio-Pleistocene sediments. Beneath the evaporites is a 1.4 km thick velocity inversion zone with an average velocity of 2.2 km/sec, which is interpreted as uncompacted sediments. The possible significance of this velocity inversion zone for the development of the "cobble stone province" is discussed.

Beneath the inversion zone the velocity increases steadily. A velocity of 6 km/sec, typical for crystalline rocks, is reached at 10 km depth, 8 km/sec at 19 km depth. There is no velocity break at the top of the upper mantle which indicates that the Moho discontinuity is probably not developed in this part of the Ionian Sea. The crustal model ascertained for the Messina abyssal plain could be explained through rifting and/or erosion together with subsidence of an originally continental crust. Possible mechanisms for the formation of this anomalous crust are discussed.

The sedimentary crust has a thickness of only 4 to 5 km in the parts of the Mediterranean ridge studied. Crystalline rocks with a velocity v_p = 6 km/sec lie at depths of 6 to 10 km in the investigated part of the Mediterranean ridge.

The refraction seismic results did not substantiate the frequently accepted interpretation that the Mediterranean ridge can be explained as a thick and intensively folded sediment accumulation resulting from crustal shortening.

From the reflection seismic records it can be determined that no unambiguous indications of crustal shortening are recognizable. Recent tectonic movements of Plio-Pleistocene age are significant. The depositional features of the Plio-Pleistocene sediments, which are, with local exceptions, 200 to 400 m thick over broad areas of the Ionian Sea, show vertical faulting and subsidence.