Seismic Investigations of Crustal and Upper Mantle Structure of the Northern Apennines and Corsica

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ABSTRACT - Corsica shows a normal crust, 30 km thick. Crust in the Ligurian shelf region is 30 km thick and increases to N and NE. Under Western Tuscany and Elba a crustal doubling could be detected. The upper boundary (20 km) is isolated whereas the deeper one (40-60 km) is correlated with that of Corsica.

RESUME - La Corse a une structure normale avec une épaisseur de croûte de 30 km. Dans la région de plateau de la mer ligurienne, l'épaisseur est environ 20 km, croissant à 30-35 km en direction des Apennins. Sous l'île d'Elbe existent deux M-discontinuités, la supérieure (20-25 km) et la inférieure (40-60 km). La discontinuité supérieure paraît être isolée tandis que la discontinuité inférieure paut être mise en rapport avec la discontinuité de la Corse.

In 1974 a combined land-sea seismic refraction program between the Northern Apennines, Elba, and Corsica was carried out.

Corsica has a typical continental structure with a

crustal thickness of 30 km [HIRN et al. 1976]. The transition to the oceanic crust in the Balearic Sea takes place within 40 km offshore. Between Corsica and Elba more than 5 km postorogenetic sediments have been deposited [FINETTI et al. 1970]. A weak uplift of the mantle is present not only E of Corsica but also N of this island.

Under Elba and the region of the NE Ligurian Sea, two boundaries could be detected showing the characteristics typical for the crust/mantle boundary. The upper interface (7.5-8.0 km/s) is at 20-25 km depth, having connection to the discontinuity previously describes for the Corsica area. This shallow boundary vanishes under the Corsica-Elba channel. Such a shallow boundary could also be discovered in the NE part of the Ligurian Sea. It dips down towards the coast, being here at a depth of 35 km.

From the shots W of Corsica, first arrivals penetrating the upper mantle were recorded on Elba and in the western Tuscany. The constructed boundary, beginning under Corsica at 30 km depth, shows the uplift under the Corsica-Elba channel and, in eastern continuation, plunges under Elba.

A late reflection yields a depth of about 60 km E of Elba and an average velocity of 6.3-6.4 km/s. This horizon can be associated with the deep crust/mantle boundary. In the NE-part of the Ligurian Sea, the same structure is existing but it has not been cleared up in detail up to now.

REFERENCES

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