

Tectonic and crustal evolution of the Black Sea area

by

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Soviet geophysicists, first NEPROCHNOV, have shown a crust of suboceanic type to exist below the central part of the Black Sea. A series of young sediments 10-14 km thick is said to rest immediately on a lower (basaltic) crustal layer reduced to 8 km thickness. But there are objections. More probably the upper (granitic) crustal layer is preserved, even thinned out, below the whole Black Sea.

Anyway, the obvious reduction of the crust poses the problem at what time it took place and by which processes it was formed. Throughout the periods of the Paleozoic and the Older Mesozoic the Black Sea was an erosional area. This « Pontian Land » furnished the material deposited in the troughs bordering the Land, — the Dobrogea-Crimea-Great Caucasus-geosyncline in the North, the North-Anatolian geosynclines in the South. The thickness of the sediments accumulated here accounts for the removal of a considerable part of the crust from the central Black Sea.

During the Younger Mesozoic and the Lower Tertiary the trough axis of the North Anatolian geosyncline shifted towards the North, the area of subsidence passed from Anatolia into the Black Sea. So the Pontian Land was flooded and transformed into the Black Sea basin acting as a foredeep to the North-Anatolian mountain ranges folded in the Eocene. The huge pile of sediments filling the basin consists of deposits of Upper Cretaceous and Cenozoic age.

In this way the reduction of the granitic layer can be explained by denudation. But as to the basaltic layer we have to look for other processes : crustal tension, subsidence by currents in the mantle, magmatic intrusions or metasomatism. In Anatolia during the Younger Mesozoic tensional stresses in meridional direction have opened fissures in the crust through which ultramafic rocks have risen from deeper levels to the surface. This happened in Anatolia within the same interval we have to assume for the formation of the suboceanic crust in the Black Sea. Moreover, the size and the longitudinal extension of both phenomena is similar. Therefore the hypothesis of crustal tension in the Cretaceous period seems to offer the best explanation for the reduction of the basaltic layer in the subsurface of the central Black Sea.

Suboceanic crustal areas also occur in the Western Mediterranean and may be originated under similar conditions. This is especially true for the Tyrrhenian basin. Probably it is the site of a former uplift, its erosional material nourishing the flysch geosynclines in its surrounding.

A full account will be given in the *Report of the Woods Hole Oceanographic Institution* covering the scientific results of the cruise of R/V *Atlantis II* in the Black Sea in 1969, to be published in 1973 as a *Memoir of the American Association of Petrol geologists*.

