7-19 - NORTH AEGEAN SEA TROUGH : 1972 JEAN CHARCOT CRUISE -

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Note lue par M. MASCLE -

The Jean Charcot spent 9 days over the steep-walled, 300 km-long North Aegean Sea trough during April 1972. The trough is enclosed by the 400 m isobath and maximum depths exceed 1 450 m. The width of the western basin is about 45 km ant that of the eastern basin less than 20 km. The western basin strikes SW-NE and the eastern basin WSW-ENE. Morphological features cut across the western basin approximately normal to the axis, and the basin is divided into two parts along one of these trends near 24° E. East of 24°E, a ridge is known to run across the floor of the western basin parallel to its axis. On the basin floor west of 24° E, the Charcot echo-sounding records reveal a topographic high with a local relief of about 150 metres.

Seismic reflection records show a penetration of about 1.5 secs (double travel time) and provide evidence of normal faulting, and of folding. Sparker and 4.0 Kc echo-sounding records show that faulting and folding has affected the uppermost layers of sediment and shapes the morphology of the sea-floor surface where sedimentation has not kept pace with deformation.

Bare rock photographed up on the northwestern wall of the trough may be evidence of recent faulting. Other sea-floor photographs display tranquil conditions and local sediment smoothing.

The near-surface sediments of the trough below about 800 meters water depth are predominantly fine grained, hemipelagic muds containing about 20% total carbonate and less than 5% coarse ($> 63\ \mu$) components, except in the eastern basin where faecal pellets are abundant. In shallower water on the saddle between the western and eastern basins, the sediments are much coarser and contain many molluscan shells and fragments. There is no conspicuous contribution at the present time of terrigenous sands to the floor of the trough. Below 200 - 400 cm in the cores from the western basin, a stronger terrigenous influence is represented in three cores by several layers containing up to more than 40% coarse inorganic detritus.

Seismic refraction results show that the shallow structure below parts of the floor of the western basin is represented by less than 1 km of unconsolidated sediment with an assumed compressional velocity (Vp) of 2.0 km/sec. over about 0.7 km of sediment of Vp = 2.4 - 2.7 km/sec and about 1.0 km of sediment of Vp = 3.5 - 4.1 km/sec. These layers rest on basement rocks of Vp > 5.0 km/sec.

The trough is known to be associated with positive Bouguer gravity anomalies and with magnetic anomalies. We measured a free-air gravity anomaly minimum of - 50 milligals in the eastern basin but on the two gravity profiles in the western basin the minimum free-air gravity anomaly was - 12 mgals. Preliminary two dimensional model calculations indicate that Bouguer anomalies are significantly more positive in the western basin. The magnetic profile over the eastern shows a 250 gamma positive anomaly over the northern wall; in the western basin a similar positive anomaly was found approximately in the center of the basin.

The width of the North Aegean Sea trough suggests that it is a graben in continental crust. The gravity and magnetic anomalies over the western basin floor indicate the presence at depth of a denser and more magnetic body than the adjacent continental crust, and lend some support for entertaining the interpretation that the western basin is a site of recent accretion with accompanying extension. The narrower eastern basin is evidently different. The present day stage in the evolution of the trough is represented by deformation of surface sediments.

Intervention à la suite du 7-19 -

Pr. PAPAZACHOS : Although there are similar geophysical features between northern anatolian and northern aegean sea, Mc KENZIE'S model assumes extension in the northern aegean but not in the northern anatolian.