MEDITERRANEAN RIDGE PROJECT: PHASE TWO PRELIMINARY RESULTS

Scientific staff, BANNOCK 82-10:

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RE'SUME' - Deux séries de carottages effectués à travers le front de déformation de la Dorsale Méditerranéenne ont révelé des différences accentuées entre le secteur ouest (Plaine abyssale de Messina) et le secteur est (Plaine abyssale de Herodote). Les différences concernent l'origine des sédiments, les processus sédimentaires et les taux de sédimentation.

Two transects across the deformation front of the Mediterranean Ridge were investigated in detail by echo-sounding and coring during a cruise accomplished in the fall of 1982.

A western transect, from 35°45' lat.N, 18°30' long.E to 35°49'N, 18°52'E started from the Messina abyssal Plain; a southeastern transect, from 32°21' lat.N, 26°59' long. E to 32°43'N, 26°45'E started from the Herodotus abyssal Plain.

Purpose of the experiment was to obtain enough observational data as to calculate the rate of advancement of the deformation front of the ridge towards the abyssal plains, and the rate of uplift of the ridge itself.

The two transects are 26.5 nm and 25.25 nm long respectively: they contain evenly spaced cores at horizontal distances ranging from 2.5 to 5 nm (average 3.75) for the western one, and from 2 to 6.75 (average 4.2) for the southeastern one. The maximum elevation above the abyssal plain is respectively 354 and 287 meters.

Six piston cores were recovered from the western transect: they consist of high-sedimentation-rate hemipelagic marls, turbidites and homogenites, and include sapropels and tephras as minor lithologies.

Sediments are Holocene and late Pleistocene in age: none is older than approximately 70 000 y BP.

Correlation horizons are the base of the Minoan homogenite (approximately 3500 y BP), sapropel S-1, a still unidentified tephra layer (possibly Y-3), and tephra Y-5.

Mean sedimentation rates - excluding the Homogenite event - range from 6 to 24 cm/1000 y; they tend to decrease from the abyssal plain to the ridge.

The noise of the Homogenite event is superimposed on the signal we were looking for. Only the cores that are farthest from the abyssal plain (BAN 82-7 and 82-8) show a trend from higher sedimentation rates in the lower part of the column to lower sedimentation rates upcore, but the signal is weak.

Nine cores were recovered from the southeastern transect. No Minoan homogenites were recovered in any of the cores, as predicted by the tsunami triggering model. No tephra layers were recorded either. The core-to-core correlation was based on sapropel stratigraphy and on turbiditic key beds.

Sedimentation rates are unusually low, of the order of 2 to 2.5 cm/1000 y in the pelagic successions. Hiatuses are also unusually frequent, and sometimes difficult to detect. The oldest sediments recovered in Core BAN 82-15 from the extreme of the transect upslope are approximately 500 000 y old.

Two well characterized types of turbidites were discovered: (A) type A are distal turbidites, dark colored, fine grained, mostly detrital in composition (Nile source area); (B) type B are more proximal, whitish in color, essentially bioclastic in composition, and are interpreted as deriving from the North African shelf immediately to the south of Herodotus abyssal Plain.

Main turbiditic events of both the Nile source and the African shelf source are recorded in cores from the inner part of the transect, associated with low-sedimentation-rate pelagic sediments, thus supporting the hypothesis that large size turbid flows can cross a narrow abyssal plain and climb a few hunderd meters uphill.