

GEOLOGICAL EXPLORATION OF AN AREA OF THE MEDITERRANEAN
RIDGE AROUND 35°50'N, 20°50'E

Scientific staff, BANNOCK 81 Cruise:

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RESUME' - Quatre dragages et huit carottages effectués dans une partie de la Dorsale Méditerranéenne explorée préalablement avec l'instrumentation "deep-tow" ont révélé la présence de sédiments pélagiques d'âge Pliocène inférieur et moyen sur les flancs du cratère d'Ares et de la Fosse d'Ariadne. La brèche à éléments crétacés découverte dans le dôme de Prometheus a été retrouvée aussi au N de la structure diapirique.

The survey of the area in 1978 with the Deep-tow instrumentation of Scripps Institution of Oceanography, followed by an intensive transponder-navigated coring program revealed (a) a well defined facies change in the Late Pleistocene and Holocene, supporting strong neotectonic activity in the area; (b) a thick, basin-filling, near-surface, homogeneous graded layer (homogenite) interpreted as a result of a tsunami-induced sediment transport; (c) a deeply incised depression (Aphrodite Crater) whose walls yielded Pliocene fossiliferous sediments and dolomitic mudstones of inferred Messinian age; (d) a circular dome (Prometheus Dome) made of a mud breccia containing early Cretaceous, Aptian clasts and (e) a north-south trending trough (Ariadne Trough) which was tentatively interpreted as the expression of a thrust fault. Prometheus Dome was interpreted as a mud diapir emplaced during the latest Quaternary.

The area was re-visited in 1981 with R/V BANNOCK. Purpose of the new exploration was to sample the walls of Ares Crater and Ariadne Trough, to further our understanding of sedimentation, erosion and resedimentation in complex topography, and to clarify the areal extent of Prometheus Mud Breccia as well as the time of emplacement of this unusual unit.

We recorded Early Pleistocene, Early and Late Pliocene sediments, all in pelagic facies, on the flanks of Ares Crater and of Ariadne Trough. No substantial difference in age was recorded on opposite walls of the trough, which fails to support but does not rule out a fault-related origin of the trough.

A E-W trending core transect in the northern part of the area confirmed that sedimentation processes are drastically influenced by morphology in the rugged cobblestone topography. Plateaus are regions of normal pelagic sedimentation and occasional hiatuses. Basin walls are regions of slumping, sedimentary faulting, and erosion. Basin floors are characterized by anomalously high rates of sedimentation.

The Prometheus Mud Breccia was found to extend at least 2 Km from the center of the dome, outside the limits of the physiographic dome. In this farthest position, the pelagic cover, perfectly undisturbed, is approximately 9m thick, and extends back in time to approximately 300 000 y BP.

The diachronous upper contact of Prometheus Mud Breccia is discussed in terms of the emplacement mechanisms of the mud diapir (intrusion versus extrusion, hydrotectonic model).