High Resolution late neogene Paleoceanography and climatic variability in a critical area of the Central Mediterranean

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A drilling proposal aiming at a reconstruction of the depositional history and environmental development during the deposition of sapropels in the eastern Mediterranean has recently been submitted (ZAHN *et al.*, 1991). To assist in this effort and to add a wider geological perspective, we propose here a location in the Sicily Channel that is ideally suited to investigate the paleocirculation of the Mediterranean since the Pliocene. The Sicily channel is an area critical for the connections among the western basins and the deeper, more distal eastern basins.

Current reversals that may have changed the present-day nutrient-desert to a highly productive nutrient trap are believed to have happened throughout the Plio-Quaternary. They must be recorded at the bottle neck of circulation, the sill in the Sicily Strait.

Water depth at the proposed drillsite is approximately 600 m. Coring should be continuous (APC and XCB) to the base of the Pliocene (top of the Messinian or Horizon M) that has an estimated depth of approximately 500 m

This expanded hemipelagic section lies some 30 km seaward of the classic exposure of Capo Rossello in Sicily, where the early Pliocene Zanclean stage has been defined (CITA & GARTNER, 1973), the Miocene/Pliocene boundary type section has been proposed (CITA, 1975) and the Rossellian superstage as well (CITA & DECIMA, 1975). Further detailed biostratigraphic, cyclostratigraphic and magnetostratigraphic investigations confirmed the excellent continuity and resolution of the land section, so that the "Rossello composite" is now considered a Mediterranean and global reference section for the Early and early Late Pliocene (LANGEREIS & HILGEN, 1991).

Cyclic bedding, interpreted as an expression of orbital forcing on sedimentation, is pervasive in the Trubi Formation of Zanclean age (HILGEN, 1987) and in the overlying M.Narbone Formation. The latter, as exposed on land, documents a progressive shallowing accompanied by increase in terrigenous input and sedimentation rate. Manganese-rich interbeds characterize the basal part of the M.Narbone Formation, and dark layers (?sapropels?) its upper part. Both types of sediments indicate periodic deposition at orbital frequencies.

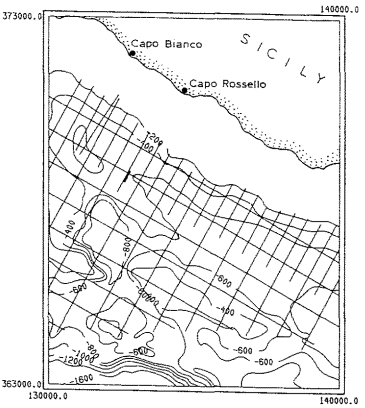
The proposed location is ideally suited also to investigate the PlioPleistocene boundary in an undisturbed equivalent of the Vrica section of Calabria.

Seismic profiles suggest that the sedimentary strata have not been affected by tectonism because the drilling target lies landward of the Strait of Sicily rift zone, in a fairly undeformed belt of the foreland basin (ARGNANI, 1990).

The rift system is considered to be of Pliocene age and, on its northern side, contains two small foredeep basins related to the Maghrebian fold-and-thrust belt (ARGNANI *et al.*, 1987). The Gela foredeep has a NW-SE trend (fig.1): its outer ramp where the proposed drillsite is located should allow the sedimentary record to be continuous: the parallel, low-amplitude, continuous reflectors seen on the seismics (fig.2) suggest that the ramp was out of the turbidite reach.

This drilling proposal is strongly supported by the Subcommission of Neogene Stratigraphy of IUGS.

Fig. 1 - Location of the study area with bathymetry and seismic grid. Line of fig. 2 indicated in bold.



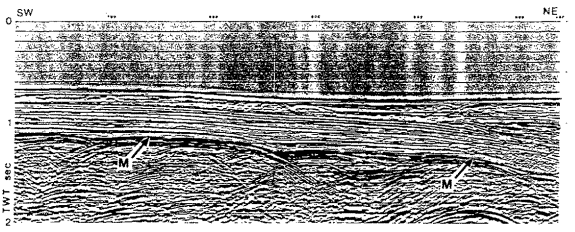


Fig.2 - Profile G82-122. Seismic facies of the outer ramp of the Gela Foredeep situated to the NE of the line. M is the top of Messinian evaporites.

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