

PRELIMINARY RESULTS OF A DREDGING AND CORING CAMPAIGN ON THE

MALTA ESCARPMENT

(BAN-80 CRUISE)

MARIA BIANCA CITA (1), BIAGIO BIGIOGGERO (2), ALESSANDRO BOSSIO (3), CRISTINA BROGLIA (1), HENRY CHEZAR (4), GEORGES CLAUZON (5), ANNITA COLOMBO (2), MASSIMO GIAMBASTIANI (1), LUCIANO LECCA (6), LUCIANO LENAZ (7), ALBERTO MALINVERNO (1), ELIZABETH L. MILLER (8), ELISABETTA PARISI (1), ADELIO ROSSI (9), GIANFRANCO SALVATORINI (3), PIERO VERCESI (10)

Cruise BAN-80, with the Italian R/V BANNOCK, was dedicated to explore the Malta Escarpment in order to hopefully complete the results previously obtained in 1978 with the American R/V EASTWARD (see CHAYES et al., 1979; CITA et al., 1979; SCANDONE et al., in press), and in 1979 with the Italian Cableship SALERNUM (CITA et al., 1980).

In seven working days we accomplished sixteen dredging stations, fifteen of which were successful (one dredge was empty), and raised seven gravity cores and one piston core.

Most of the activity (five working days) was concentrated in the northern sector of the escarpment, from 36°12' to 36°32' lat.N, from 15°28' to 15°42' long.E, which displays a regional dip of some 20°. From the west (continental shelf) to the east (Messina abyssal plain) we can distinguish (a) a N-S trending, straight and steep upper slope (from 350 to approximately 1000 m), (b) a ramp incised by several canyons (from 1000 to approximately 2300 m), and (c) a very steep escarpment at the base,

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- (1) Istituto di Geologia, Università di Milano, Italy
  - (2) Istituto di Mineralogia, Università di Milano, Italy
  - (3) Istituto di Geologia, Università di Pisa, Italy
  - (4) Lamont-Doherty Geological Observatory, Palisades, N.Y., U.S.A.
  - (5) Laboratoire de Géographie, Université d'Aix-Marseille, France
  - (6) Istituto di Geologia, Università di Cagliari, Italy
  - (7) Istituto di Geologia Marina CNR, Bologna, Italy
  - (8) Department of Geology, Stanford University, Stanford, Calif., U.S.A.
  - (9) GIE, Milano, Italy
  - (10) Istituto di Geologia, Università di Pavia, Italy

with regional dips up to 60°, from 2300 to the abyssal plain, which is here around 3500 m deep. The lower escarpment (c) is dissected by three indentations, into which one or more canyons debouche. Small basins (one km or less across) or depressions some 100 deep, separated from the abyssal plain by hills with a relief of 150-200 m are developed at the base of these amphitheaters.

The best results with the dredging operations were obtained from the lower escarpment, where we recovered in abundance freshly cut limestones. Shallow water fenestral limestones and boundstones are the dominant lithology, along with pellettiferous wackestones: typical intertidal and subtidal facies could be recognized. These findings support the existence of a shallow-water carbonate platform in the area presently occupied by the Malta Escarpment in late Triassic-Jurassic time (see SCANDONE et al., in press).

The shape of rock fragments, well bedded, entirely encrusted by Mn oxydes with the only exception of the broken surface, which is fresh, suggests that the rock ledges are overhanging in a vertical cliff. A distinct polarity was observed, with solitary corals (Desmophillum cristagalli) growing on one side, Chaetopods on the opposite side.

Rock types recovered in dredges include an Ammonite and Aptychus bearing lumachella with Neolyssoceras, indicative of the late Jurassic (BAN-30, 23 D, lit.B); volcanoclastic sandstones and conglomerates (25 D) so far undated; basalts of submarine origin, similar in petrographic fabric to those previously dredged on the Malta Escarpment with SALERNUM and EASTWARD, and to those outcropping in Sicily, associated with Cretaceous sediments.

Not all the rocks recovered in dredges are lithified. We recovered marls, both indurated and soft, of various ages, indicative of a pelagic environment.

A telling piece of evidence supporting the existence of a pelagic drape unconformably overlying the shallow-water carbonates was provided by dredge 31 D, lit.F. An Eocene age pelagic marl, grey-greenish, was found encrusting a fenestral limestone of so far unidentified, certainly Mesozoic age.

The cores raised from this sector form a E-W transect shelf (21 GC)-slope (23 GC)-abyssal plain (24 PC) and a N-S transect intercanyon (33 GC)-canyon (34 GC)-intercanyon (23 GC). They contain hemipelagic marls as dominant lithology, tephtras and turbidites as minor lithology. There is a good relationship between core location (setting) and their lithology. A third core transect encompasses the abyssal plain Piston Core 24, Core 30 - precisely located on the 150 m elevation separating a small basin from the abyssal plain - and Core 29, located in the center of the small basin of the southern amphitheater. The last two cores yield debris flows.

Core 38, beneath an undisturbed Holocene cover, contains a spectacular debris flow. The matrix is a late Pleistocene olive-gray marl: dozens of clasts up to 6 cm in size provide an inventory of the lithologies exposed along the Malta Escarpment. They include late Triassic-early Jurassic shallow-water limestones; middle-late Liassic deep-sea marls; basalts; volcanoclastic breccias; middle Jurassic pelagic limestones; late Cretaceous (Campanian and Maastrichtian) pelagic marls; early and middle Eocene pelagic marls; early Miocene and early Pliocene pelagic marls.

In the two working days dedicated to the southern sector (35°45'-36°02' lat.N; 15°42'-15°54' long.E) we accomplished three dredging stations in the lower escarpment, two dredges in the upper escarpment and raised a gravity core in the abyssal plain at the base of the escarpment. The separation between lower and upper escarpment is here at approximately -2000 m, and no connecting ramp is developed. We recovered Neogene sediments, basalts, volcanoclastic sandstones, numerous pelagic encrustations and very few limestones.

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