

Quaternary carbonate sedimentation in the Western Sardinian shelf

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The presence on the sea bottom of reliefs of tabular form was detected at depths varying from about -40 to -130 meters along the continental shelf of western Sardinia by means of S.B.P. (3.5 KHz) and Sparker (0.5 + 1 KJ) recordings. These morphological structures are especially extensive in the sector facing the Sinis Peninsula (Mesa de Maluentu) as well as in the sector facing Alghero in the north and the Sulcis Archipelago in the south.

The Mesa de Maluentu (LECCA, 1982; LECCA *et al.*, 1983), following the study grabbed, cored and dredged samples, was found to be a strictly carbonate bioconstructed and bioclastic shelf area (CARBONI *et al.*, 1989). The structure of Maluentu, at depths from about -40 to about -75 meters, is characterized by the presence of grooves and extends towards the greater depths (75 + 135 meters) over steps and spurs, usually terminating in sharp drops. Moreover minor structures are found to a depth of about -120 + -135 meters. A non-systematic sampling of the summits and slopes of these structures produced not recent *Lithophyllum* bindstones and recent coralline crusts; in the grooves, recent, almost exclusively bioclastic-algal sediments were found.

The non-recent *Lithophyllum* bindstones present polyphase micritic fillings with Brachiopods and Foraminifers and have a framework porosity. This lithotype constitutes a buildup, now partially eroded, that developed over an undetermined period of time in the Quaternary, without excluding a Pliocene age.

Recent products overlying the limestones mentioned above are also prevalently made up of encrusting red Algae (*Lithophyllum*, *Lithothamnium* and other crustose Coralline Algae. ADEY & MACINTYRE, 1973) both *in situ* and in the detritus. The presence of *Halimeda tuna* was also observed, but this does not contribute in this context to the coarse bioclastic fractions, perhaps because of the low degree of calcification.

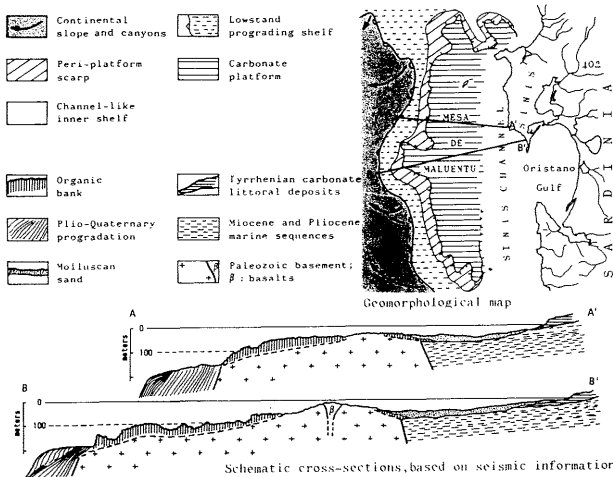
Landwards, the Mesa de Maluentu delimits a canal-like depression down to about -50 meters, where the algal bioclastic feeds with Mollusks now accumulate together with lesser amounts of inland terrigenous contributions.

The shelf-slope transition on the seaward side of the Mesa is formed by a narrow complex oblique-parallel-sigmoid progradation which grew lately during the Quaternary regressive phases, with contribution from the Mesa as well as from the innermost parts of the shelf, and to a lesser degree during the transgressive phases with a draping of carbonate mud and bioclastic contribution from the Mesa seaward scarps.

The dredging, southwards of the Mesa, to a depth of about -120 + -140 meters of Vermetidae limestones and quartzose bioclastic beach sandstones referring to the last Würmian lowstand bears witness to the importance of the boundstone and bioclastic carbonate facies even during the Quaternary regression phases.

On the other hand, the outcropping along the present-day coastline of various bioclastic carbonate facies bearing Mollusks and red Algae, which can be referred to the Tyrrhenian sea level, demonstrates the high carbonate organogenic production that took place in the phases of greatest Quaternary transgression.

The whole of the depositional systems with a high carbonate component found in this shelf segment, in the Western Mediterranean Sea, is an example of a medium latitude carbonate platform that functioned at the variable glacio-eustatic sea levels of the Quaternary, with also variable carbonate facies productivity. The carbonate character of this shelf is enhanced by a tectonic high, made-up of Paleozoic basement and Tertiary overburden and basalts, situated longitudinally on the present-day medium shelf on which the carbonate framework of the Mesa de Maluentu formed. Another favorable factor is given by the poor contribution of terrigenous sediments along the Sinis coasts; these sediments are deviated into adjacent areas by the special tectonic configuration of western part of central Sardinia.



REFERENCES

- ADEY W. and MACINTYRE I., 1973. - Crustose coralline algae : a re-evaluation in the geological sciences. *Bull. Geol. Soc. Am.*, 84, 883-904.
- LECCA L., 1982. - La piattaforma continentale della Sardegna occidentale. Nota preliminare. *Rend. Soc. Geol. It.*, 5, 93-97.
- LECCA L., SCARTEDDU R., and SECHI F., 1983. - La piattaforma continentale sarda da Capo Mannu a Capo Marrargiu. *Boll. Soc. Geol. It.*, 102, 57-86.
- CARBONI S., LECCA L. and FERRARA C., 1989. - La discordanza versiliana sulla piattaforma cont. occidentale della Sardegna. *Boll. Soc. Geol. It.*, 108, 503-519.