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Carlos Marques da Silva.

PALEOENVIRONMENTAL INTERPRETATION OF THE MARLS OF MEM MONIZ (ALGARVE, PORTUGAL) BASED ON DIATOMS, CALCAREOUS NANNOFOSSILS AND PLANKTONIC FORAMINIFERA. STRATIGRAPHIC IMPLICATIONS

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Introduction

The whitish marls of Mem Moniz outcrops on the central sector of Algarve (Southern Portugal), around 9 kilometers to the north-northeast of Albufeira. This unit contacts by unconformity with Lower Cretaceous marls and sandstones, being currently limited to a one square kilometer elliptical area, at the present day altitude of 70 to 80 m above mean sea level. This was one of the last units to be recognized as a Miocene marine deposit in the Algarve region because classical authors failed to distinguish its lithofacies from a commonly found weathering product of Jurassic limestones (the “caliço” in Carvalho & Prates, 1983-85). Only in the beginning of the 70's (S. Prates, *verbatim*), during the sedimentological characterization of the Mem Moniz *caliços* a rich microfossil assemblage of Miocene age was surprisingly recognized (Romariz *et al.*, 1979). Since then this unit has received considerable interest due to its lito and biofacies uniqueness, namely the absence of macrofossils (both body and trace fossils) commonly found in all the other Miocene marine units of Algarve. On the other hand its fine marlish texture (Cachão, 1995) together with its inland position relative to the majority of the other shallow marine Miocene deposits, mainly clustered along present day coastal area, seemed to be a paradox.

A significant part of the carbonate content (around 40 %) of the white marls of Mem Moniz is biogenic (calcareous nannofossils, benthic and planktonic foraminifera and rare ostracods) associated to a less important siliceous biogenic component (around 10%) mainly constituted by diatoms and sponge spicules) (Romariz *et al.*, 1979; Antunes & Pais, 1992; Cachão, 1992). Rare fish remains (mainly scales) can also be found (Antunes *et al.*, 1981). In some sectors, the partial diagenetic dissolution of these siliceous microfossils produced several interstratified gray-greenish siliceous nodular thin layers inside the marls.

Stratigraphy

The stratigraphical position of the marls of Mem Moniz and its correlation with other Miocene marine units of Algarve have been subjected to some discussion. Romariz *et al.* (1979) correlate Mem Moniz with the biozonal interval N8 – N9 of Blow, between the Late Burdigalian and the Early Langhian while Antunes *et al.* (1981) refer that its age should be Tortonian, not earlier than biozone N16 of Blow. Cachão (1992, 1995) delimited the temporal distribution of Mem Moniz to the subzone CN5a of Okada & Bukry, compatible with a Middle Serravalian age. Recently Antunes *et al.* (1997) presented a planktonic foraminifera ⁸⁷Sr/⁸⁶Sr isotopic age of 12.5 (+0.7-1.7) Ma referring that similar ones are widespread around the Mediterranean, namely in the Guadalquivir Basin (Antunes *et al.*, *in press*).

Studied section and methods

Although generally subhorizontal an approx. 20° SE tilted section between faults displays more than 17 meters thick continuous sequence that was sampled for this study. The initially collected 41 samples were subsequently treated for Diatoms and Calcareous nannofossils observations following the laboratorial procedure of Barcena & Flores (1990) and for Planktonic Foraminifera. Factorial Analysis was subsequently applied to the quantitative data (diatom valves/gr; nannoliths/mm²/0.01 gr).

Paleoenvironment

Two pulses of siliceous organisms are distinguished. Diatoms are abundant at the base and top, and scarce in the middle part of the section. The calcareous nannofossils are relatively abundant at the base of the section and tend to diminish of abundance towards the top, showing significant oscillations throughout the section.

The siliceous flora is dominated by *Chaetoceros* RS, *Paralia sulcata* and *Thalassionema nitzschioides*, meroplanktonic and planktonic species commonly occurring in coastal upwelling areas. Similar assemblages can still be found in Holocene surface sediments from the Algarve coast (Abrantes, 1988). Calcareous nannofossils are dominated by Noelaerhabdaceae (mainly Reticulofenestrads) followed by Coccolithaceae (mainly *Coccolithus pelagicus*) and Helicosphaeraceae. The absence of asteroliths indicate shallow environmental conditions.

Although other Miocene Diatom-rich sediments occur in the Guadalquivir Basin (namely in the Porcuna section) their Diatom assemblages are dominated by planktonic species such as *T. nitzschioides*, *Thalassiothrix* and small *Thalassiosira* sp., which has been related with an oceanic front more than coastal upwelling. Therefore, by comparing the fossil diatom assemblages from both sections (Mem Moniz and Porcuna), several paleoecological discrepancies have been recorded.

These results are further compared and discussed with results from Planktonic Foraminifera.

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