The Problem : need for a biomagnetostratigraphic reference section representing a marine miocene mid-latitude environment.
The Answer : re-occupation of DSDP Site 372 (Balearic Basin)

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The correlation of biostratigraphic events to the geomagnetic polarity scale forms a basic element in most attempts to develop a Cenozoic geochronology. It suffices to combine biostratigraphic and magnetostratigraphic data within the framework of a single time scale in order to establish a reliable chronology for deep-sea sediment sequences. The degree of accuracy of such chronology depends largerly on the proper identification of the reversal sequences. Uncertainties arise chiefly from the difficulty of retrieving complete magnetostratigraphic sequences that represent long periods of time. But once adequate magnetostratigraphic sequences are established, we can use biostratigraphy as a key to unravel chronologic relationships.

The need for improved chronological control has increased vastly over the past few decades, and the continous success of modern paleoceanography is closely linked to our ability to understand chronology.

A reasonable number of deep-sea sections is now available from low and mid-latitude environments that possess adequate magnetostratigraphies, encompassing the past few million years. Thus, many Pliocene and Pleistocene biostratigraphic events are tied directly to the magnetic polarity zones. In contrast to this latest Neogene situation, it is surpsising to note that we still do not possess a single continous Miocene section with adequate magnetostratigraphy. The most problematic Miocene interval in this respect covers the interval from the basal Tortonian stage to the Upper Burdigalian stage, or between Anomaly 5 time and Anomaly 6 time in terms of the marine magnetic anomaly time scale. On a geochronometric scale, this interval represents the time span between about 10 Ma and 20 Ma. Even when viewing the entire Cenozoic stratigraphic column, this particular Miocene interval is associated with some of the least precise, or least accurate, bio- and magnetostratigraphic correlations. The Miocene correlation problem presumably results from several interacting phenomena, such as :

(a) short duration of the polarity zones,
(b) existence of large scale hiatuses and unconformities,
(c) low sedimentation rates and loss of biostratigraphic resolution because of dissolution problems (deposition close or below the lysocline).

The solution to the stratigraphic problem lies in the retrieval of continously deposited sedimentary successions representing primarily the Burdigalian-Langhian-Serravallian-Tortonian stages, from a deep-sea depositional setting. These sections should display sedimentation rates in excess of 10 cm/1000 years in order to avoid the pitfalls that resolution problems may cause.

DSDP Site 372, drilled in 1975 in the western Balearic Basin (HSU, MONTADERT *et al.*, 1978) has the potential to solve the problems outlined above.

The succession (Fig. 1) is continuous underneath a major gap related to a Messinian erosional surface.

Nannofossil zones NN1 to NN7 and foraminiferal zones N5 to N1 have been identified (BIZON, CITA & MULLER, 1978). This expanded preMessinian hemipelagic section is 700 m thick, and is potentially well suited for magnetostratigraphic studies.

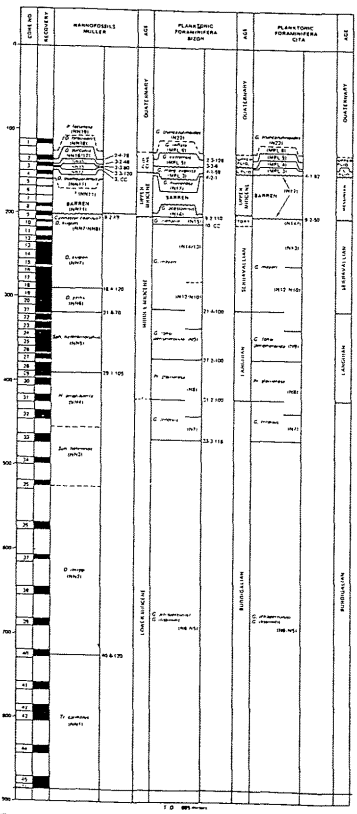

Figure 1 . *Relative planktonic microfossil zonations, Site 372.*

No continuous coring was accomplished, and no magnetostratigraphic investigations were carried out. With deeper penetration, even the Oligocene/Miocene boundary could be reached, since the initial rifting of the Balearic Basin should have started in the late Oligocene.

This mid latitude Miocene succession is very close to the typesections of the Langhian, Serravallian and Tortonian stages, originally defined in Italy, and of the Aquitanian and Burdigalian stages, defined in France. Thus, it has the advantage of offering easy correlations with the type sections (same bioprovince, similar paleoclimatic situations), but a depositional continuity that no landbased section deposited in an epicontinental marginal basin can provide.

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REFERENCES

HSU, MONTADERT *et al.*, 1978.- Initial Reports of the Deep Sea Drilling Project, Vol. XLII Part 1, p. 1-1249

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