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Scientific navigation, drilling and microfossils: a key to reconstruct the ocean history

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ABSTRACT

Microfossils, and particularly coccolithophores and related organisms (calcareous nanofossils), have been used recurrently in the biostratigraphic analysis, revealing themselves as an extremely useful tool for the last 100 Myr. The use of these techniques were determinant in the development of succeed programs such as DSDP, ODP, or the present day active IODP, here reviewed.

With the development of the Paleoceanography, micro and nannofossils acquired a new role, being used in paleoenvironmental reconstruction. Their cosmopolitanism and richness in the sedimentary record have determined their potential. Here we consider some research cases in which calcareous nanofossils and biochemical information are used, relating their morphology with variations in the concentration of CO₂, to the possibility of perform estimation of primary productivity, temperature or salinity, at orbital, millenarian or submillennial resolution, in regions covering high and low latitudes. Some examples from the equatorial Pacific, Indian and Atlantic oceans, Subantarctic and Mediterranean sea are discussed. Likewise, we present new techniques for the morphological analysis of coccoliths and their potential for the estimation of dissolution or overgrowth, in fact linked to the variability of chemical patterns.