

Coccolithophore biogeography in the eastern Mediterranean: surface sediment evidence

Odysseas A. Archontikis

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis 157 84, Athens, Greece; odysseas67@windowslive.com

Margarita D. Dimiza

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis 157 84, Athens, Greece; mdimiza@geol.uoa.gr

Elisa Malinverno

Università degli Studi di Milano-Bicocca, Dipartimento di Scienze dell'Ambiente e della Terra, 20126 Milano, Italy; elisa.malinverno@unimib.it

Maria V. Triantaphyllou

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis 157 84 Athens, Greece; mtriant@geol.uoa.gr

We present coccolithophore abundance (coccoliths/gram, LM counts) and biogeographical distribution patterns that were obtained from eastern Mediterranean Sea surface sediments. *Emiliana huxleyi* was dominant in the coccolithophore assemblages of the entire basin. Dominance of this species has been documented at 70% in the North Aegean and Marmara Seas and about 60% in the Ionian and Levantine Seas. The next most frequently observed species, *Rhabdosphaera clavigera* and *Syracosphaera pulchra*, were present in low percentages (<10%). *Florisphaera profunda* also displayed low values, particularly in the Levantine Sea, whereas *Helicosphaera carteri* had low abundances in the open Aegean Sea. Morphometric evaluation of the dominant species, *E. huxleyi*, using the scanning electron microscope, indicated variability in the degree of calcification. A total of 2,560 coccoliths were analyzed with the use of ImageJ software following the biometric approaches of Young *et al.* (2014). In the Marmara Sea and the relatively deep North Aegean Sea, numerous *E. huxleyi* specimens had characteristically low relative tube width values, whereas typical overcalcified

coccoliths prevailed in the Levantine Basin, the South Aegean Sea, and the deep Ionian Sea. It is probable that the lightly calcified *E. huxleyi* morphotypes in the surface sediments of the North Aegean and Marmara Seas provide evidence of Black Sea water outflow into the NE Mediterranean over the deeper, less saline Levantine water layer.

A previous biometric analysis of *E. huxleyi* in North Aegean water samples (Karatsolis *et al.*, 2017) revealed a bimodal distribution of the coccolith relative tube width, with lower values found in the surface layers, similar to typical Black Sea lightly calcified *E. huxleyi* morphotypes. Lightly calcified morphotypes are also characteristic of the Levantine water masses in the Aegean Sea during the warm season, while more heavily calcified coccoliths are found when surface temperatures are lower (Triantaphyllou *et al.*, 2010). Apparently, processes in the water column and water-sediment interface affect the original coccolithophore assemblage distribution and coccolith primary calcification, resulting in the heavily calcified specimens observed in the sediments of the southeastern Mediterranean.

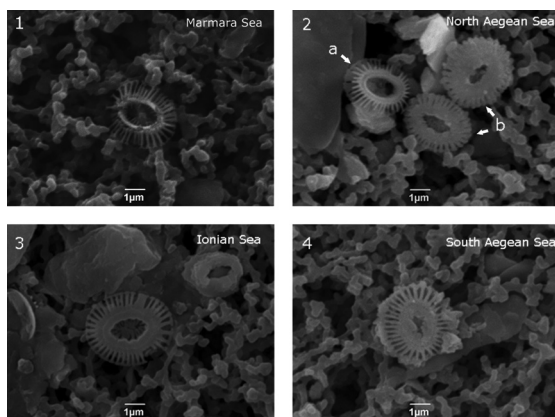


Figure 1: (1), (2a): *Emiliana huxleyi* lightly calcified coccoliths from Marmara Sea and North Aegean Sea assemblages. (2b), (3), (4): *Emiliana huxleyi* heavily calcified morphotypes from North Aegean, Ionian and South Aegean Seas, respectively

References

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