

Coccolithophore biogeography and its relationship to environmental variables in western South Atlantic surface sediments

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In this study, the coccolithophore assemblages from 44 marine surface-sediment samples from the western South Atlantic were analysed and compared with local oceanographic variables in order to determine their biogeographical and ecological affinities. In addition, the analyses of 36 samples from the study of Boeckel et al. (2006) were included. *Emiliania huxleyi*, *Florisphaera profunda* and *Gephyrocapsa* spp. were the most abundant species. *Emiliania huxleyi* dominated the assemblages of cold and nutrient-rich waters, while *Gephyrocapsa* spp. were more abundant in regions with lower mixed-layer depths. These species demonstrate a preference for environments with a shallower nutricline. On the other hand, *F. profunda* was more abundant in the warm and oligotrophic environments of subtropical regions, revealing its preference for a deeper nutricline. The correlation results between the water parameters and the relative abundances of the species revealed an affinity of *Calcidiscus leptoporus*, *E. huxleyi*, *Coccolithus pelagicus* and *Gephyrocapsa ericsonii* with waters more enriched in nutrients. In contrast, *Gephyrocapsa* spp., *Gephyrocapsa oceanica* and *Helicosphaera* spp. were associated with coastal and mesotrophic regions. Because *Gladiolithus flabellatus* and *Discosphaera tubifera* appear to be associated with waters from deeper mixed layers in the tropical region, they may be used, together with *F. profunda*, as indicators of a deeper thermocline/nutricline. Using principal component analysis, we identified four different biogeographic provinces that reflect the oceanographic characteristics of the photic zone: 1) *G. flabellatus* and *D. tubifera* were characteristic of the North Brazil Current region; 2) *F. profunda* and the subtropical species were more abundant in the Brazil Current region of the subtropical gyre; 3) higher abundances of *Gephyrocapsa* spp. occurred in the shallower environments of the Brazil Current; and 4) *E. huxleyi* dominated the cold, eutrophic southern regions.

References

- Boeckel, B., Baumann, K.-H., Henrich, R. & Kinkel, H. 2006. Coccolith distribution patterns in South Atlantic and Southern Ocean surface sediments in relation to environmental gradients. *Deep-Sea Research I: Oceanographic Research Papers*, **53**: 1073–1099.