Calcareous nannoplankton in a changing paleoworld, a tale of size variations

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In modern oceans, the size structure of marine phytoplankton communities greatly affects food web structure and organic/inorganic carbon export into the ocean interior. This last mechanism plays a fundamental role in the transfer of carbon from the surface oceanic reservoir to the carbonate sediments that belong to the lithospheric reservoir. Yet evolutionary patterns through time in the size structure of calcareous nannoplankton have been poorly investigated, especially in the Mesozoic.

Of the fossil coccolithophorids, *Watznaueria barnesiae* (the most abundant coccolith taxon in Cretaceous rocks) shows a peculiar size pattern in the interval Valanginian-Aptian. In this study, a trend of increasing size (1μm) followed by steady size values was observed in the Vocontian Basin, as well as in other localities (Bornemann & Mutterlose, 2006; Erba *et al*., 2010). This trend appears to be mainly evolutionarily driven, although a transient perturbation in the size trend was observed during the Valanginian Weissert event.

Climatically induced changes in oceanic mixing may have altered nutrient availability in the euphotic zone and driven evolutionary shifts in the size of calcareous nannoplankton through geological time. Evolutionary patterns in the size distribution of calcareous nannoplankton can thus be a useful complement to geochemical or sedimentological proxies for interpreting the effects of climate change on marine ecosystems.

References

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