

Keynote lecture

Origination and evolution of calcareous nannoplankton during the Mesozoic: Causes and consequences

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The geological history of calcareous nannoplankton indicates that the Mesozoic evolution of this group has been characterised by a general increase in diversity, punctuated by speciations, mass extinctions and turnovers. Times of accelerated rates and/or drops in nannofossil diversification partly correlate with global changes in the geosphere, hydrosphere and atmosphere, suggesting that these evolutionary patterns are intimately linked to environmental modifications. In particular, the most significant events in Mesozoic nannoplankton origination and evolution are correlatable with changes in pCO₂, nutrient availability, the chemistry of the oceans, climate and sea-level fluctuations. However, it is difficult, if not impossible, to separate single causes that have triggered and/or inhibited coccolithophore production and evolution. Rather, a combination of various environmental modifications seems to have been responsible for evolutionary innovations and stability. Global environmental changes are intimately interconnected with, and determined by, processes operating inside the earth and, therefore, we should link biosphere evolution to Earth's interior. Calcareous nannofossil diversity, diversification and extinction rates represent an incomplete record of nannoplankton history and potential environmental impacts/pressures. Species richness alone cannot measure the productivity-production of coccolithophores through time. Moreover, improved dating (high-resolution stratigraphy and more precise radiometric ages) of various geological events is crucial for timings and correlations, and will greatly contribute to the understanding of the Mesozoic evolutionary history of calcareous nannoplankton.