Changes in photic-zone habitats through the equatorial Atlantic Palaeocene/Eocene Thermal Maximum: contributions from species-specific nannofossil geochemistry

Jackie A. Lees, Paul R. Bown, Jeremy R. Young, Stuart Robinson, Ken MacLeod, Darren Gröcke, Fab Minoletti

Stable isotope patterns through the Palaeocene/Eocene Thermal Maximum (PETM) show clear distinctions between per-sample size-fractions that equate to individual species or morphotypes of calcareous nannofossil. Geochemistry of a sequence of size-fractionated samples through the pre- to post-PETM interval of Demerara Rise (equatorial Atlantic) reveals that the *Coccolithus* and *Discoaster* $\delta^{13}C$ curves mimic the positive excursion, but with the *Coccolithus* signal lagging behind that of *Discoaster*. *Toweius* shows increasing $\delta^{18}O$ prior to the PETM, whilst *Discoaster* shows a pre-PETM increase and an intra-PETM decrease. *Coccolithus* appears to split into two morphotypes through the PETM. A 'medium'-sized form is more dominant during the PETM, and shows relatively stable $\delta^{18}O$ values, whilst a 'small' form has a widely variable signal, showing first a decrease, then an increase in $\delta^{18}O$ through the PETM.

These data are complex and mediated by preservation, which in these oceanic oozes is only moderate. Furthermore, data is not available for every species in each sample, due to the limitations of the fractionation technique. Despite this, we will present our first interpretations of the palaeoecologies of these species, based on the stable isotope data, in tandem with elemental data (hopefully), from which we will hypothesise changes in the photic-zone habitats.