

## Productivity of calcareous nannoplankton during hyperthermal events: results from Sr/Ca ratios and biometry

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Reconstructing the productivity of calcareous nannoplankton during hyperthermal events can contribute to our understanding of feedbacks to the high atmospheric CO<sub>2</sub> concentrations that characterized these events. Increased primary productivity resulting from increased weathering and consequently an increased nutrient availability has been suggested as an important negative feedback (Bains *et al.*, 2000).

The Sr/Ca ratio in coccolith calcite has been shown to be related to the productivity of calcareous nannoplankton (Stoll & Schrag, 2000; Rickaby *et al.*, 2002). We have measured Sr/Ca ratios in monogeneric samples of five different genera, covering the Paleocene Eocene Thermal Maximum (PETM) and the Early Eocene Hyperthermal Event (ETM2) Elmo, in order to reconstruct the productivity response of calcareous nannoplankton to these events. Nannofossils were isolated from ODP Cores 1263C and 1265A, located on the Walvis Ridge, using the method described by Stoll *et al.* (2007).

During the PETM, the Sr/Ca ratios in both *C. pelagicus* and *Toweius* increased, suggesting a high nutrient availability. Initial Sr/Ca ratio measurements in individual discoasters and *Zygrhablithus bijugatus* revealed a different ecological response, with *Discoaster* increasing in productivity at the onset of the PETM, followed by an increase in productivity of *Zygrhablithus*. The cold-water taxon *Chiasmolithus* did not show a response to the event, except for a small increase in productivity at the onset of the PETM.

We will compare the PETM Sr/Ca record with the Sr/Ca and oxygen isotope record covering the Early Eocene Hyperthermal Event (ETM2) Elmo at ODP Site 1265, which is closely located to Site 1263. The oxygen isotopes were measured in size fractions that are dominated by pelagic nannofossil carbonate. The warming trend found in the O-isotope signal coincides with the increase in Sr/Ca ratios in two dominating genera, *C. pelagicus* and *Toweius*.

Biometric analyses of *C. pelagicus* and *Toweius* demonstrate an increase in average coccolith size. These increases correlate with the Sr/Ca productivity and O-isotope warming signal, and could indicate an ecological response.

### References

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