

Size changes of calcareous nannofossils during the Weissert Event (Early Cretaceous)

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Recent biometric studies have observed size reductions in certain calcareous nannofossil species that can be linked to global environmental perturbations in the Cretaceous. Dwarfism has specifically been ascribed to the mid-Cretaceous (~125–90Ma) oceanic anoxic event (OAE) 1a and OAE2 (Erba *et al.*, 2010; Lübke & Mutterlose, 2016; Faucher *et al.*, 2017). Possible causes for these size reductions, which were found in the current study, include light attenuation due to increased continental weathering and runoff, and input of toxic trace metals to the oceans from submarine volcanism.

Our biometric analyses of selected nannofossil taxa in samples from northern Germany and the western Atlantic revealed an average size reduction of *Biscutum constans* coccoliths throughout the late Valanginian (~136–133Ma) that parallels the Weissert Event. This event is marked by a 1.5‰ positive carbon isotope excursion and coincided with volcanic activity in the Paraná-Etendeka continental flood basalt province. A humid climate in the late Valanginian, probably linked to volcanic CO₂ outgassing, caused increased weathering and the transport of large

amounts of detrital material into ocean basins. This supports a scenario of light attenuation in the surface waters that gave the smaller varieties of *B. constans*, which were adapted to lower light availability, an advantage over the larger forms that thrived in the clear waters of open-ocean settings (Lübke *et al.*, 2015).

References

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