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Calcareous nannofossils from Eastbourne (southeastern England) and the paleoceanography of the Cenomanian–Turonian Boundary interval

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ABSTRACT

The Cenomanian–Turonian (C–T) boundary interval is marked by one of the most prominent perturbations of the Mesozoic carbon cycle, Oceanic Anoxic Event 2 (OAE2). Increased fertilization of surface waters caused by greater fluvial input of nutrients may have caused the widespread deposition of organic-rich black shales during the OAE2 (productivity model). Alternatively, sluggish oceanic circulation may have enhanced stratification of the water column favoring the preservation of organic matter due to anoxic bottom-water conditions (preservation model). In order to gather evidence for the driving mechanism behind the deposition of the OAE2 black shales, calcareous nannofossils from the midlatitudinal Holywell section (Eastbourne, southeastern England) were studied. Ten bioevents, including last occurrences of six species and first occurrences of four, were recognized throughout the 11-m-thick interval. Preservation of calcareous nannofossils was moderate to good in all studied samples. The C–T interval here contains an abundant (mean 2.4×10^9 specimens/g sediment) and highly diverse (mean 58 spp./sample) calcareous nannoflora, with *Watznaueria*, *Zeugrhabdotus*, *Biscutum*, and *Prediscosphaera* the most common taxa. The most remarkable change in assemblage composition through the OAE2 is the decrease of *Biscutum* spp. Low abundances of *Biscutum*, combined with elevated numbers of *Watznaueria* spp. and/or Polycyclolithaceae, indicate reduced surface-water fertility during the OAE2 in midlatitudinal European shelf areas. A reduction of primary productivity seems to be quite common in midlatitudinal sections, whereas calcareous nannofossils and geochemistry indicate an increase in primary productivity in low-latitudinal sections. It is therefore likely that the origin of the OAE2 in mid latitudes was caused by sluggish ocean circulation, which intensified stratification. Reduced rates of mixing prevented the oxygenation of bottom waters in these regions, causing black shale deposition.