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Deep-sea environments across the Cretaceous/Paleogene boundary in the SE Atlantic Ocean (ODP Leg 208 Hole 1262C, Walvis Ridge)

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Benthic foraminifera did not suffer significant extinction across the Cretaceous/Paleogene (K/Pg) boundary, one of the largest mass extinctions in the Phanerozoic, at a time when planktic foraminifera and calcareous nannoplankton underwent severe extinction. In lowermost Paleocene sediments planktic microfossil groups thus have a low abundance and their assemblages are strongly affected by the extinction, whereas benthic foraminifera show changes in assemblage composition but remain common. Analysis of this microfossil group can therefore provide information on the changes in deep-sea environments.

A continuous, well-preserved Cretaceous/Paleogene transition was recovered on ODP Leg 208 (Site 1262, Walvis Ridge, eastern South Atlantic Ocean, present depth 4755m). The K/Pg boundary is marked by a sharp transition from Maastrichtian clay-bearing nannofossil ooze with abundant planktic foraminifera to Danian dark reddish to brown, clay-rich nannofossil-ooze and clay. In the lowermost cm of the Danian, green microspherules (interpreted as microtektites) occur, and clays and mineral oxides are abundant. Up-section, sediments grade into brown clays with abundant nannofossils and planktic foraminifera, but the carbonate content of sediments did not return to Maastrichtian values for several million years. Detailed quantitative analysis of benthic foraminifera from the uppermost 5m of the Maastrichtian (a:*A. mayaroensis* Zone) and the lowermost 1.6m of the Paleogene (Zone Pα and lower P1a) in Hole 1262C indicates an upper abyssal paleodepth.

Both Maastrichtian and Danian assemblages consist of about 50% infaunal (suggestive of higher food supply) and 50% epifaunal (suggestive of lower food supply) morphotypes, with common trochospiral taxa including *Paralabamina lunata, P. hillebrandti, Nuttallides* spp., *Nuttallinella* spp., *Oridorsalis umbonatus*, and *Stensioeina beccariiformis*. Infaunal taxa such as buliminids show more substantial differences in Maastrichtian and Paleogene

sediments. In the Maastrichtian, buliminid species such as *Bolivinoides decoratus* and *Praebulimina reussi* were common. Their abundance as well as the heterogeneity of the assemblages start to decrease a few cm below the K/Pg boundary. At the boundary, diversity and heterogeneity drop dramatically, but there are no major changes in morphogroup composition. The interval directly above the boundary has low abundances of laevidentalinids, and high abundances of *Paralabamina* spp. and *Quadrimorphina allomorphinoides*; the relative abundance of buliminid taxa decreases drastically and does not recover in the studied interval. About midway into Zone Pα the agglutinated taxa *Spiroplectammina spectabilis* and *Clavulinoides* spp. increase in abundance. The former bloomed after the K/Pg boundary at many locations, and is seen as a disaster taxon, which may indicate increased organic carbon flux (Kaminski & Gradstein, 2005. *Grzybowski Found. Spec. Publ. 10)*. Diversity and heterogeneity of the assemblages fluctuate throughout the studied interval above the K/Pg boundary. These data suggest that the food supply to the deep-sea floor started to decline slightly before the K/Pg boundary, decreased more strongly at the boundary, and started to recover in the upper part of Zone Pα, as suggested by the increase in diversity of the assemblages and in the percentage of *S. spectabilis* The drop in calcium carbonate delivery, probably resulting from the extinction of calcareous planktic groups, may have influenced the benthic faunal composition, leading to the replacement of infaunal carbonate taxa (buliminids) by agglutinated groups when the food supply recovered. Benthic foraminiferal assemblages did not stabilize throughout the studied Paleogene interval, suggesting that food supply to the seafloor remained unstable in quality and/or quantity.

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