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Campanian-Maastrichtian intermediate- to deep-water changes in the high latitudes: benthic foraminiferal evidence

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During the latest Cretaceous cooling phase, a positive shift in benthic foraminiferal δ^{18}O values lasting about 1.5 Ma (71.5-70 Ma) can be observed at a global scale (Campanian-Maastrichtian Boundary Event, CMBE). This δ^{18}O excursion is interpreted as being influenced by a change in intermediate- to deep-water circulation or by temporal build-up of Antarctic ice sheets. Here we test if benthic foraminiferal assemblages (BFA) from a southern high-latitudinal site near Antarctica (Ocean Drilling Program Site 690, Maud Rise, Weddell Sea, southern South Atlantic) are influenced by the CMBE. If the δ^{18}O transition reflects a change in intermediate- to deep-water circulation from low-latitude to high-latitude water masses, this change would result in cooler temperatures, higher oxygen concentration, and possibly lower organic-matter flux at the seafloor, resulting in a major BFA change. If, however, the δ^{18}O transition has mainly been triggered by ice formation, no considerable compositional difference in BFA would be expected. Our data show a separation of the studied succession into two parts with distinctly different BFA. Species dominating the older part (73.0 to 70.5 Ma) tolerate less bottom-water oxygenation (e.g. *Paralabamina hillebrandti*) and are typical components of low-latitude assemblages (e.g. *Reussella szajnochae*). In contrast, the younger part (70.0 to 68.0 Ma) is characterized by species that indicate well-oxygenated bottom waters (e.g. *Nuttallides truempyi*) and species common in high-latitude assemblages (*Pullenia* spp.). We interpret the observed change in BFA towards a well-oxygenated environment to reflect the onset of a shift from low-latitude towards high-latitude dominated intermediate- to deep-water sources. This implies that a change in oceanic circulation rather than ice volume was at least a major component of the CMBE.