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Palaeocene-Eocene evolution of a specific group of extinct deep-sea benthic foraminifera.

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To increase the understanding of global evolution and extinction drivers in the deep sea, we study the enigmatic extinction of a distinctive group of cosmopolitan deep-sea benthic foraminifera during the late Pliocene-Middle Pleistocene "Last Global Extinction" (LGE) (3 – 0.12 Ma). The LGE was coeval with the pulsed expansion of the northern hemisphere ice cap, rendering deep-sea conditions colder and more oxygenated during increasingly severe glacials. The so-called "Extinction Group", comprising nearly 100 species (c. 25% of deep-sea foraminiferal diversity at that time), all shared a similar morphology of elongate, cylindrical and uniserial tests with small, specialised apertures.

To elucidate the factors driving their evolution and ultimate extinction, we extend the studies back in time. During the Cenozoic, the deep-sea benthic foraminiferal community was stirred up by three more intervals of increased turnover (late Palaeocene-early Eocene, Late Eocene-earliest Oligocene and middle Miocene) all of which seem to have coincided with intervals of major climatic change. In a first stage of the research, we performed a low-resolution study of ODP Sites 689 and 1211 to obtain a record of the occurrence and abundance of the "Extinction Group" species throughout the Cenozoic. In a second phase, here presented, the research focuses on a high-resolution study of the "Extinction Group" species in ODP Sites 689 and 690 (Southern Ocean) through the Palaeocene-Eocene warm event, during which 30 to 50 % of benthic foraminiferal species went extinct. Focus on the Palaeocene-Eocene warm period, and investigation of whether this warm event had any impact on the "Extinction Group" species, indicates whether only the cold related events caused the loss of "Extinction Group" taxa and helps us to understand the extent to which the LGE was stress-related or temperature-related.