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The Paleocene/Eocene boundary event: Inferences from the benthic foraminiferal turnover

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A global extinction event of deep-sea benthic foraminifera at the Paleocene/Eocene (P/E) boundary was coeval with a period of rapid global warming that has been called the Initial Eocene Thermal Maximum (IETM), and with a several per mille negative excursion in marine and terrestrial ^{13}C values (Carbon Isotope Excursion, CIE). Whereas deep-sea benthic foraminifera from many bathyal through upper abyssal sites suffered major extinction, benthic foraminifera from marginal and epicontinental basins show lesser extinctions or temporary assemblage changes. Evidence from shallow seas indicates increasing productivity and low oxygen conditions during the IETM, but data from open ocean sites do not support the presence of global hypoxia, and are not consistent as to globally increasing or decreasing productivity. Further studies are thus needed to look into the cause/s of the extinctions. In order to investigate the cause/s of the benthic foraminiferal turnover across the IETM, we compared the faunal turnover in the outer neritic Dababiya Quarry section (Egypt), where the Global Stratotype Section and Point (GSSP) for the P/E boundary was defined, with existing records from the deep sea.

The extinction of *Angulogavelinella avnimelechi* at the P/E boundary at Dababiya, making up only 2.2% of the species, confirms that extinctions in shallow settings were considerably less severe than in the deep sea. This extinction was coeval with the main phase of extinction of deep-sea benthic foraminifera, and with the extinction of *Stensioeina beccariiformis*. Moreover, dramatic changes in the composition and in the diversity of the assemblages have been identified in bathyal sections from the northeastern Atlantic and Tethys at the base of the CIE, as in Dababiya. Benthic foraminiferal assemblages from the lower part of the CIE in all these sections are dominated by opportunistic taxa that indicate environmental stress and, in some sections, increased dissolution of calcite (Alegret *et al.*, 2005. *Terra Nova*, *17*: 526-536; Alegret & Ortiz, submitted to *Marine Micropaleontology*). The comparison of the faunal turnover, and the analysis of the paleoecological preferences of the taxa that dominated the assemblages across the CIE, are thus of great importance to infer the paleoenvironmental changes that caused the benthic foraminiferal turnover across the IETM.

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