ACTA PALAEONTOLOGICA POLONICA

Post Cretaceous/Paleogene boundary recovery of the deep marine ecosystem recorded by benthic foraminiferal morphogroups

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Acta Palaeontologica Polonica 70 (4), 2025: 641-648 doi:10.4202/app.01227.2024

The uppermost 2 meters of the Maastrichtian Scaglia Rossa Fm. (Gubbio, Italy) record a notable change in the proportions of morphogroups of deep-water agglutinated foraminifera beginning about 1.4 m below the boundary, where we observe a gradual decrease in the abundance of the morphotype M4 (infauna) and a concurrent increase in the morphotype M1 (suspension feeders). This trend suggests a reduction in the flux of organic matter to the sea floor began approximately 114 k.y. before the boundary event. The abundance of M4 shows an abrupt decline from around 13% below the Cretaceous/Paleogene boundary, to a minimum of 7% in the beds directly above the boundary. This trend suggests a modest, but temporary reduction in organic matter flux to the sea floor following the Cretaceous/Paleogene boundary event, though not in the category of a “Strangelove Ocean”. Morphotype M1 shows a marked decrease across the boundary, with values decreasing from >70% to around 11%. The lower Paleocene displays strong fluctuations in the M4 morphogroup. In the same interval we observe a rise in Morphotype M2 (epifaunal detritivores) from values below 10% in the Maastrichtian to over 50% in the basal Paleocene, and a short-lived maximum in Morphotype M3, indicating a decline in particulate organic matter input from suspension and a concurrent increase in bacterial-derived organic matter in the early recovery phase of the Paleocene. The deep-marine ecosystem as witnessed by deep-water agglutinated foraminiferal morphogroups shows a prolonged recovery, with M1 abundance returning to Maastrichtian values approximately 2.8 meters above the Cretaceous/Paleogene boundary clay, corresponding to an age of 810 k.y. after the event. These findings support previous research from calcareous nannofossil studies, which suggested a prolonged recovery of the marine food web following the Cretaceous/Paleogene boundary event.

Key words: Foraminifera, ecology, Strangelove Ocean, Cretaceous, Paleogene, Apennines, Italy.

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