

Changes in Paleocene ostracodes at IODP Site U1407, off Newfoundland, with special reference to the hyperthermal events

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During the Paleogene greenhouse period, a series of global warming events called the hyperthermal events occurred. The events may be driven by the orbital forcing of carbon cycling alike the Oligocene and Miocene climates (Kirtland Turner et al., 2014, Nat. Geosci., 7, 748-751). A primary objective of IODP Expedition 342 is to answer questions about the rate and magnitude of ecosystem changes during the greenhouse period with the hyperthermal events. Exp 342 drilled off Newfoundland and obtained successive cores of the Paleogene sediments that formed in high sedimentation rates (Exp 342 Scientists, 2012, IODP Prel. Rep., 342, 1-263).

We study benthic ostracodes from the Paleocene cores (146-218 mcd) at Site U1407 to understand changes in ostracode faunas during the Paleocene hyperthermal events such as the Latest Danian Event (LDE; 61.8 Ma) and the Mid-Paleocene Biotic Event (MPBE; 59.2 Ma). The core sediments are calcareous nannofossil ooze with radiolarians. They show light greenish grey to radish brown in color. The carbonate content ranges from 54 to 92%. The sediment color reflects the carbonate content. Using the calcareous nannofossil biostratigraphy, the sediments were dated to 66.3-57.4 Ma. The sedimentation rates were estimated as 1.3 to 2.4 cm/kyr. We obtained 3353 ostracode specimens from 226 samples and identified 37 species.

The ostracode faunas are composed mainly of *Krithe crassicaudata*, *Krithe dolichodeira*, *Krithe pernoides*, *Cytherella* sp., and *Neonesidea* sp. Species richness and abundance range from one to twelve and from one to 75, respectively. We binned samples in the interval of 100 kyrs and calculated expected species richness at 30 specimens, $E(S30)$, and equitability, $Eq.$, of 50 binned samples, following Hurlbert (1971, Ecology, 52, 577-586) and Buzas and Gibson (1969, Science, 163, 72-75). $E(S30)$ values fluctuate between 5.4 and 10.5, whereas $Eq.$ values amplify between 0.62 and 0.91. During the LDE, both $E(S30)$ and $Eq.$ dropped off, indicating stressful condition (e.g., Graham et al., 2009, Ecol. Indic., 9, 866-877). During the MPBE, $E(S30)$ decreased, but $Eq.$ did not drop. The LDE switched seafloors into stressful condition for benthic communities alike the Paleocene-Eocene Thermal Maximum (Webb et al., 2009, Geology, 37, 783-786).

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