Calcareous nannofossils from the Paleocene–Eocene Thermal Maximum, IODP Site U1557, South Atlantic Ocean

Claire M. Routledge
Christian-Albrechts-University of Kiel, Institute of Geosciences, Kiel, Germany; claire.routledge@ifg.uni-kiel.de

Chiara Borrelli
University of Rochester, Department of Earth & Environmental Sciences, Rochester, NY, 14627, USA; cborrelli@ur.rochester.edu

Christopher M. Lowery
University of Texas at Austin, Institute for Geophysics, Austen, TX, 78712, USA; cmlowery@utexas.edu

Andrew J. McIntyre
University of Leicester, School of Geography, Geology and the Environment, Leicester, UK; am1422@leicester.ac.uk

https://doi.org/10.58998/jnr3274

Calcareous nannoplankton are the most abundant calcifying organisms in the modern ocean. They are widespread and evolve rapidly, making them ideal for assessing biotic changes during periods of transient climate change. The Paleocene–Eocene Thermal Maximum (PETM, ~56 Ma) was an abrupt and dramatic global warming event that resulted from huge amounts of isotopically light carbon being released into the atmosphere, and which had profound effects on the biosphere. The PETM is also considered to be a partial analog to modern rates of greenhouse gas emissions. Here, we utilize material from a newly recovered PETM section from International Ocean Discovery Program (IODP) Site U1557, the first such record from the western South Atlantic. Initially identified by a distinct layer of reddish-brown clay with a significant increase in magnetic susceptibility, species of *Rhomboaster* that are restricted to the PETM interval have also been identified.

Across the PETM interval at Site U1557, sedimentation rates are extremely high (11.53 cm/kyr; normal pelagic sedimentation rates are generally <1 cm/ky), and total organic carbon values are also unusually high, indicating high overall surface water productivity at that time. Nannofossil analyses show a relatively well-preserved and diverse assemblage with the presence of the PETM-specific taxa *Rhomboaster calcitrapa* and *Rhomboaster cuspis*, although forms of the *Discoaster araneus* group are noticeably absent. Instead, we record slightly deformed specimens of the *Discoaster multiradiatus* group across this interval. This new record from the western South Atlantic will be compared with other South Atlantic records from Walvis Ridge, Maud Rise, and Agulhas Plateau to improve our understanding of surface water conditions and the relationship between plankton and climate during a period of extreme environmental stress where few records exist.