Diachroneity in early Eocene planktic foraminiferal biohorizons

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Abstract

The increasing planktic foraminiferal research on early Paleogene climate provides significant insights into past global warming, essential in the perspective of future climate changes. At the same time, the recent studies, as focused on paleoclimate, overlooked the requirement of reliable biostratigraphic schemes, in turn essential for reconstructions based on micropaleontological data. Here we highlight significant diachronism with respect to the current zonal scheme (Wade et al., 2011, ESR) for a number of Eocene planktic foraminiferal biohorizons. We realized temporal offsets in early Eocene planktic foraminiferal occurrences when detailed stratigraphy was available, such as through carbon isotopes records besides magnetostratigraphy, and adopting quantitative abundance of marker species at multiple locations. The datums are constrained by carbon isotopes as identifying Carbon Isotope Excursions (CIEs) related to early Eocene hyperthermals. The globally recognized CIEs offer indeed very useful constrains of the bioevents, as providing higher timing resolution than magnetostratigraphy but not yet adopted to characterize the biohorizons. We have conducted high resolution biostratigraphic analyses on lower Eocene sediments for the Pacific, Indian and Atlantic oceans together with the Tethyan Possagno section. Independent age control is provided by both magneto and carbon isotope stratigraphies. We find the *Morozovella aragonensis, Acarinina cuneicamerata* and *Guembelitrioides nuttalli* Bases and *Morozovella subbotinae* Top to be diachronous. The observed offsets clearly demonstrate the need of a revision of the Eocene planktic foraminiferal standard zonation. Quantitative knowledge of the species markers, a practice commonly adopted for calcareous nannofossil biostratigraphy, is critical to identify rare and common occurrences of species and can provide insight into their biogeography and ultimately into their biostratigraphic effectiveness.

Keywords: Early Eocene, planktic foraminifera, biostratigraphy, dischronism

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