Geophysical Research Abstracts
Vol. 19, EGU2017-9098, 2017
EGU General Assembly 2017

Dextral to sinistral switch in dominant coiling of planktic foraminiferal Morozovella during the Early Eocene Climatic Optimum

Valeria Luciani (1), Roberta D'Onofrio (2), Gerald Roy Dickens (3), and Bridget Wade (4)

(1) University of Ferrara, Dipartimento di Fisica e Scienze della Terra, Ferrara, Italy (valeria.luciani@unife.it), (2) University of Ferrara, Dipartimento di Fisica e Scienze della Terra, Ferrara, Italy , (3) Department of Earth Science, Rice University, Houston, TX 77005, USA, (4) Department of Earth Sciences, University College London, Gower Street, London, United Kingdom

The coiling direction of trochospiral planktic foraminifera is a widely investigated morphological feature in living species and in upper Quaternary sediment. However, this morphological trait remains scarcely documented in older marine sediment. Here we investigate the coiling direction within Morozovella populations from sections at two ocean drilling sites in the Atlantic that span the Early Eocene Climatic Optimum (EECO; ∼49-53 Ma). The symbiont-bearing surface-dweller planktic foraminiferal genus Morozovella is of particular interest because of its dominance in tropical-subtropical early Paleogene assemblages, and the time interval is of interest of an abrupt and permanent decline in abundance and taxonomic diversity of Morozovella at the J event, near the beginning of the EECO. Our results demonstrate that morozovellids display a dominant dextral preference during the interval preceding the EECO at both the sites studied. However, all species show a first, prominent flip to sinistral coiling mode starting slightly above the J event. This switch from dextral to sinistral coiling became permanent for most of the Morozovella species slightly after the K/X event. Temporary but significant switches towards sinistral coiled morphotypes also occurred at both sites during several pre-EECO hyperthermal events. We record therefore a remarkable variation in the coiling mode of Morozovella during extreme warming intervals of the early Paleogene. Our record sheds new light on the coiling direction preferences of Paleogene planktic foraminifera. Previous interpretations favour genetic explanations for coiling flips rather than ecological responses. Our present data cannot validate or disprove the former idea, but should stimulate renewed thought on the latter idea.