Geophysical Research Abstracts
Vol. 16, EGU2014-7418-1, 2014
EGU General Assembly 2014
© Author(s) 2014. CC Attribution 3.0 License.

Impact of paleoceanographic changes at glacial/interglacial transitions on benthic foraminiferal faunas of the eastern North Atlantic (IODP Expedition 339, Site U1385)

Patrick Grunert (1), David Hodell (2), Carlos Alvarez Zarikian (3), F. Javier Hernández-Molina (4), Dorrik A.V. Stow (5), and the IODP Expedition 339 Scientists Team

(1) Institute for Earth Sciences, University of Graz, Austria (patrick.grunert@uni-graz.at), (2) Department of Earth Sciences, University of Cambridge, United Kingdom, (3) Integrated Ocean Drilling Program, Texas A&M University, College Station, Texas, USA, (4) Department of Earth Sciences, Royal Holloway University London, United Kingdom, (5) Institute of Petroleum Engineering, Heriot-Watt University, Edinburgh, Scotland, United Kingdom

Communities of deep-sea foraminifera are sensitive recorders of environmental conditions. Consequently, the actualistic interpretation of fossil foraminiferal assemblages has become a valuable tool for the reconstruction of paleoceanographic conditions at the sea-floor. For the present study, a quantitative data-set of benthic foraminifera >125μm from the eastern North Atlantic has been analysed to understand paleoceanographic changes (AMOC, ventilation, productivity) associated with glacial/interglacial transitions in more detail. The data-set consists of a series of samples from IODP Site U1385 spanning Terminations I, II and IV and several short-term (millennial-scale) climatic events including the Younger Dryas (YD), Heinrich (H) 1, and H 11.

On the family and generic levels, a characteristic succession of foraminiferal assemblages can be recognized at all studied glacial/interglacial transitions: a glacial fauna with abundant occurrences of cassidulinids (*Cassidulina*, *Globocassidulina*); a fauna characterized by high abundances of buliminds (*Bulimina*, *Globobulimina*) and/or bolivinellids (*Bolivinita*) that is associated with H-events and the beginning of each termination; a fauna with high abundances of miliolids (mainly *Pyrgo*) and cibicidids at the end of the termination; an interglacial fauna composed of buliminds (*Bulimina*), gavellinellids (*Gyroidinoides*), and pseudoparrellids (*Epistominella*). For the glacial and interglacial endmembers, this succession indicates a moderately oxygenated environment at the seafloor with mesotrophic conditions due to moderate export productivity. For the early phase of the terminations as well as the short-term events, the dominance of infaunal taxa and high abundances of deep infaunal taxa indicate an environment with high export productivity that is mainly controlled by oxygen. Conversely, the absence of these taxa and the presence of miliolids suggests well-ventilated environments and decreasing export productivity during the later phase of the terminations.

While the evaluation on the generic level indicates repetitive paleoenvironmental changes for the studied transitions, the taxonomic analysis on the species level reveals significant differences between the terminations. These differences primarily concern the H-events and the early phase of the terminations. H 1 differs from other such events by showing the highest abundances of deep infaunal like *Globobulimina affinis*. In contrast, H 11 is characterized by high abundances of *Bulimina marginata* and *Cassidulina laevigata/teretis* which are rare to absent during H 1. A similar pattern is observed for a H-event associated with the onset of Termination IV. In contrast, the H-event preceding Termination IV shows high abundances of *Bolivinita quadrilatera*, a species absent all other samples.

The explanation of the faunal differences between the terminations despite a rather comparable environmental framework (poor ventilation and/or high export productivity) indicates that the nature of short-term events is fairly diverse and an individual perspective has to be put on each these events. E.g., in the case of H 1, increased primary productivity and/or severely reduced AMOC compared to other such events might provide explanations. For the other, less well known events new isotopic results are expected to help with the explanation.