Geophysical Research Abstracts
Vol. 12, EGU2010-13535, 2010
EGU General Assembly 2010

Benthic foraminiferal microhabitat selection and sediment pore water geochemical gradients

Iryna Yavorska (1), Paul Loubere (1), Brittani Jacobsen (1), and Katrine Husum (2)

(1) Northern Illinois University, Geology and Environmental Geosciences, DeKalb, United States (ploubere@niu.edu), (2) Department of Geology, Tromso University, Norway

Benthic foraminiferal shell geochemistry has supplied proxies for a range of paleo-environmental variables. This geochemistry reflects the immediate microenvironment in which shell material is calcified. In many ways, the ideal, from a proxy point of view, would be that species consistently stratify themselves in the sediment column and that each records geochemical conditions from a particular depth. To evaluate the incorporation of geochemical proxies we examined habitats and geochemical conditions in marine sediments on the microscale experienced by the foraminifera. We used sites down the continental margin of the European Arctic where the only significant forcing variable was flux of organic carbon to the seabed. Multicores were maintained at in-situ conditions while we collected oxygen microprofiles, pore waters and micro-sampled for foraminifera. We used the geochemical data to define microenvironments directly where we collected foraminifera and to determine the local organic flux. We found that species abundance and distribution in the sediments was strongly influenced by the flux, as were the sedimentary geochemical gradients. However, species abundances and vertical distributions also were strongly influenced by the presence and structures of larger fauna. Foraminifera were most abundant where macrofauna were common and had bio-irrigated the sediments producing a complex mosaic of geochemical microenvironments. Species responded to this with variable distribution in the sediment profile, likely a result of seeking niches defined by chemical and biotic cues. This behavior could well explain such phenomena as the ‘Mackensen effect’ in foraminiferal shell geochemistry.