Geophysical Research Abstracts
Vol. 17, EGU2015-7196, 2015
EGU General Assembly 2015

Foraminiferal stable isotope constraints on salinity changes in the deglacial and early Holocene Baltic Sea region

Nadine Quintana Krupinski (1), Helena Filipsson (1), Yasmin Bokhari-Friberg (1), Karen-Luise Knudsen (2), Andreas Mackensen (3), Jeroen Groeneveld (4), William Austin (5,6)

(1) Lund University, Geology, Lund, Sweden (nadine.krupinski@geol.lu.se), (2) Aarhus University, Aarhus, Denmark, (3) Alfred Wegener Institute, Bremerhaven, Germany, (4) University of Bremen, Germany, (5) University of St Andrews, UK, (6) Scottish Association for Marine Science, UK

The northern European Baltic Sea shows evidence of strong coupling with North Atlantic climate over recent glacial-interglacial cycles, but existing climate proxy evidence from regional sediment records suggest that the coupling may occur through non-linear processes. High-resolution regional climate records in Europe and from the Baltic Sea are critical for evaluating this coupling and the regional sensitivity to North Atlantic and global climate signals. However, evaluating the drivers and mechanisms of proposed links between the North Atlantic and Baltic Sea climate has often been hampered by a lack of long, continuous, high-resolution climate records from this area. New high-resolution sediment cores collected by IODP/ECORD Expedition 347 (Baltic Sea Paleoenvironment) allow such records to be generated, including foraminiferal geochemistry records of Baltic Sea hydrographic conditions during the most recent deglaciation and early Holocene (∼19-7 cal. ka). The dramatic changes in salinity, sea level, circulation, temperature, and oxygenation during this period, e.g. through massive meltwater release from proglacial lakes and the early Holocene inundation of the Baltic by seawater highlight these non-linear links between the Baltic and North Atlantic.
This work uses benthic foraminiferal stable isotope records (δ18O and δ13C) from sites in the western Baltic (M0059, Lillebælt, early Holocene marine stage (Littorina Sea)) and Kattegat (M0060, Anholt, deglaciation) to constrain salinity changes during these intervals. Because of the dramatic changes in salinity this region experiences today and during the study periods, oxygen isotope records (δ18O) here primarily reflect a signal of changing salinity, with a reduced temperature effect. Early δ18O results from the western Baltic (M0059) show a trend of declining δ18O/salinity during the first several kyr of the Littorina Sea stage, in agreement with previous work indicating declining salinity due to gradual shoaling over the entrance sills to the Baltic after the initial seawater inundation. Initial results from the Kattegat (M0060) demonstrate moderate or sometimes large changes in δ18O/salinity during deglaciation, highlighting the potential at this site to link new, high-resolution data to regional changes in ice sheet position and meltwater release and/or North Atlantic or global climate fluctuations.