



High-resolution records of Early Holocene Atlantic Water advection to the Arctic Ocean

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The Arctic is among the the areas which are responding most rapidly to global warming. In search of an analog for the Arctic under future warm and possibly ice-free conditions, the Early Holocene is often considered as a candidate. There is evidence from marine archives in the Nordic Seas that Atlantic Water advection to the Arctic Ocean was particularly strong after ca. 10 ka, although maximum sea surface temperatures were reached only after 9 ka (Risebrobakken et al., 2011). We present preliminary foraminiferal and isotope data from four sediment cores along a transect from 79°N in the eastern Fram Strait along the western Yermak Plateau to 83°N on the westernmost Gakkel Ridge (Arctic Ocean) which allow to trace the subsurface advection of Atlantic Water to the interior Arctic on centennial timescales during the so-called "Holocene Thermal Maximum" (HTM). While the planktic foraminiferal associations in the eastern Fram Strait are strongly dominated by subpolar specimens over the entire HTM interval (ca. 10.5 – 8.5 ka), the more northerly sites tend to show only short intervals with abundant supolar specimens within the HTM. The Gakkel Ridge core record (with lower temporal resolution) eventually has only one sample in the Early Holocene with significant numbers of subpolar foraminifers (15%). Planktic foraminifer contents (specimens/g) and calculated fluxes are highly variable for the Early Holocene in the four cores. Peak-to-peak correlation is not always possible and has to be improved by further radiocarbon datings. The oxygen isotope data from polar planktic foraminifers *Neogloboquadrina pachyderma* are low (ca. 3 permille) both in the eastern Fram Strait and on the Gakkel Ridge, but relatively high on the western Yermak Plateau. Considering also the change from low carbon isotope values in the south and high values on the Gakkel Ridge, we conclude on variable habitats of planktic foraminifers along the transect in the HTM. Our preliminary results suggest that the advection of Atlantic Water to the interior Arctic during the Early Holocene was rather variable on centennial timescales, similar to what is known for the last two millennia.

Reference: Risebrobakken, B. et al. (2011) Early Holocene temperature variability in the Nordic Seas: The role of oceanic heat advection versus changes in orbital forcing. *Paleoceanography* 26: PA4206, doi:10.1029/2011PA002117.