Geophysical Research Abstracts
Vol. 19, EGU2017-12141, 2017
EGU General Assembly 2017

British-Irish ice sheet during the LGM consistent with a reduced northward ocean heat transport

André Paul (1), Matthias Prange (1), Irina Rogozhina (1), Pepijn Bakker (1), Michal Kucera (1), Stefan Mulitza (1), Michael Schulz (1), and Julien Seguinot (2)

(1) MARUM - Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany (apaul@marum.de), (2) Laboratory of Hydraulics, Hydrology and Glaciology, ETH Zürich, Zürich, Switzerland

The strength of the northward ocean heat transport during the Last Glacial Maximum (LGM) remains a topic of considerable debate. Reconstructions and simulations of the climate, Atlantic meridional overturning circulation (AMOC) and implied ocean heat transport during this period are still inconclusive. We provide new, ice sheet-based evidence that supports a reduced ocean heat transport into the North Atlantic region and confront it with existing spatially explicit paleoclimatic evidence, in particular the sea-surface temperature (SST) reconstruction by the Multiproxy Approach for the Reconstruction of the Glacial Ocean Surface (MARGO) project.

The British-Irish Ice Sheet was situated in a region that is assumed to be critically sensitive to the northward heat transport by the North Atlantic Ocean. We employ the results of two global climate simulations by the Community Climate System Model (CCSM) versions 3 and 4 at $\sim 1^\circ$ resolution that feature a weak and a strong state of the AMOC during the LGM. The corresponding North Atlantic climate conditions are compared to marine and terrestrial paleoclimatic reconstructions and used to force ice-sheet simulations with the Parallel Ice Sheet Model (PISM). The results show that a reduced northward ocean heat transport that is associated with a weakened AMOC is consistent with extensive ice sheet cover over the British-Irish Isles during the LGM as inferred from independent geological evidence, as well as with the paleoclimatic reconstructions.