Geophysical Research Abstracts
Vol. 20, EGU2018-9221-2, 2018
EGU General Assembly 2018

The role of glacial sea ice variability in the Norwegian Sea during abrupt Dansgaard-Oeschger climate changes

Henrik Sadatzki (1), Trond M. Dokken (2), Sarah M. P. Berben (1), Francesco Muschitiello (2,3), Ruediger Stein (4,5), Kirsten Fahl (4), Laurie Menviel (6,7,8), Axel Timmermann (9,10), Eystein Jansen (1,2)

(1) Department of Earth Science and Bjerknes Centre for Climate Research, University of Bergen, Bergen, Norway (Henrik.Sadatzki@uib.no), (2) Uni Research Climate, Bjerknes Centre for Climate Research, Bergen, Norway, (3) Lamont-Doherty Earth Observatory of Columbia University, Palisades, United States, (4) Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Bremerhaven, Germany, (5) Department of Geosciences, University of Bremen, Bremen, Germany, (6) Climate Change Research Centre and PANGEA Research Centre, University of New South Wales, Sydney, Australia, (7) ARC Centre of Excellence for Climate System Science, Sydney, Australia, (8) Department of Earth and Planetary Sciences, Macquarie University, Sydney, Australia, (9) IBS Center for Climate Physics, Pusan National University, Busan, Republic of Korea, (10) International Pacific Research Center, University of Hawaii, Honolulu, United States

Changes in sea ice cover in the Nordic Seas likely played a crucial role in amplifying ocean circulation and climate changes of the Dansgaard-Oeschger (D-O) cycles during the last glacial. We investigate the role of sea ice for abrupt Greenland climate changes, using a high-resolution sea ice record from the Norwegian Sea core MD99-2284 covering four D-O cycles at 32–40 ka. The sea ice reconstruction is based on the sea ice diatom biomarker IP25, open-water phytoplankton biomarkers (sterols) and semi-quantitative phytoplankton-IP25 (PIP25) sea ice estimates. Our results are consistent with model evidence and indicate that an extended, near-perennial sea ice cover characterized the Norwegian Sea during cold stadials, while enhanced open-ocean conditions prevailed during warmer interstadials. Moreover, we find that initiation of sea ice retreat systematically preceded the onset of major deep-water formation in the Nordic Seas and probably the abrupt D-O warming in Greenland. We thus conclude that the glacial sea ice variability acted as precursor and feedback mechanism for abrupt changes in ocean circulation and Greenland climate during D-O cycles.