

EGU2020-880

<https://doi.org/10.5194/egusphere-egu2020-880>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Land-Ocean interactions at the southwest Greenland margin during the Holocene

Estelle Allan¹, Anne de Vernal¹, Marit-Solveig Seidenkrantz^{2,3}, Claude Hillaire-Marcel¹, Christof Pearce^{2,3}, Lorenz Meire³, Hans Røyg^{3,4}, Anders Møller Mathiasen², Mikkel Thy Nielsen², Jane Lund Plesner², and Kerstin Perner⁴

¹Research Centre on the Dynamics of the Earth System (Geotop) Université du Québec à Montréal, Montréal, Québec, Canada

²Paleoceanography and Paleoclimate Group, Arctic Research Centre, and the iClimate Aarhus University Interdisciplinary Centre for Climate Change, Department of Geoscience, Aarhus University, Aarhus, Denmark

³Arctic Research Centre, Department of Bioscience Aarhus University

⁴Center for Geomicrobiology, Department of Bioscience, Aarhus University, Aarhus, Denmark

Palynomorph analysis of marine cores raised off Nuuk (southwestern Greenland) provided records of sea-surface conditions and climate-ocean-ice dynamics at centennial resolution over the last 12,000 years. Transfer functions using dinocyst assemblages provided information about the sea-ice cover, seasonal sea-surface temperature (SST) and salinity (SSS), as well as primary productivity. At about 10,000 cal. years ago, an increase in species diversity and the rapid increase of phototrophic taxa (light-dependent), marks the onset of interglacial conditions, with summer temperature increasing up to ~10°C during the Holocene Thermal Maximum (HTM). Low SSS and high productivity conditions are recorded during the interval, which we associate to increased meltwater and nutrient input from the Greenland Ice Sheet. After ~5000 cal. years BP, the decrease of phototrophic taxa marks a two-steps cooling associated with the Neoglacial trend. Since ~2000 cal. years BP, an increase in the high-frequency variability of sea surface conditions is noticeable. The second step change towards colder and more unstable conditions starting about 3000 cal. years BP coincides with the disappearance of the Saqqaq culture. The gap of human occupation in western Greenland, between the Dorset and the Norse settlements, i.e., from ca. 2000 to 1000 cal. years BP, may thus be linked to the highly unstable conditions in surface waters.