Geophysical Research Abstracts
Vol. 20, EGU2018-16393, 2018
EGU General Assembly 2018

Evidence for dynamic changes in the subpolar gyre during Dansgaard-Oeschger cycles

Andreas Born (1,3) and Camille Li (2,3)

(1) Department of Earth Science, University of Bergen, Norway, (2) Geophysical Institute, University of Bergen, Norway, (3) Bjerknes Centre for Climate Research

Our view of Atlantic variability leans heavily on the Atlantic Meridional Overturning Circulation (AMOC), which provides a simple integrated measure for describing climate change. Until recently, this paradigm also guided the bulk of research on Dansgaard-Oeschger events. However, new detailed climate reconstructions indicate important changes on the more regional scale of the subpolar North Atlantic and the Nordic Seas that call for more complex dynamical changes in ocean circulation, its interaction with sea ice and the atmosphere, and a more active role of the Nordic Seas and the Arctic Ocean.
Here, we summarize and review these findings and argue that they are consistent with the detailed understanding of key components based on contemporary observations and numerical modeling. The combined evidence suggests that Dansgaard-Oeschger events are intrinsically tied to coupled ocean-sea ice-atmosphere dynamics and in particular require the circulation of the Atlantic subpolar gyre to change. The revised mechanistic explanation provides insight into why this type of abrupt climate change is only observed in marine isotope stage 3.