



The role of subpolar atmosphere-ice-ocean interactions in D-O cycles

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Sea ice has long been thought to play an important role in D-O cycles because of its strong influence on regional temperature and its ability to grow and melt rapidly in response to relatively weak forcings. One recent idea based on modelling experiments is that D-O-related sea ice displacements are part of an unforced, coupled oscillation of the North Atlantic atmosphere-ice-ocean system. Here, we present an overview of key components of this system, as well as observational and modelling results addressing how they function in today's climate, and how glacial climate conditions might alter their functioning to allow D-O cycles to occur. Of specific interest are the necessary changes in the subpolar gyre, the thermohaline structure and stratification of the Nordic Seas, the existence of an Arctic-like cold halocline at subpolar latitudes, and the accessibility of the subsurface ocean heat reservoir to the atmosphere. Broader consequences for the Atlantic thermohaline circulation and Southern Hemisphere climate signals will be discussed.