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Barents Sea Inflow as control of the North Atlantic Oscillation during the onset of the Little Ice Age

F. Lehner (1,2), A. Born (1,2), C. C. Raible (1,2), T. F. Stocker (1,2)

(1) Climate and Environmental Physics, University of Bern, Switzerland, (2) Oeschger Centre for Climate Change Research, University of Bern, Switzerland

The transition from the Medieval Climate Anomaly (MCA) to the Little Ice Age (LIA) is believed to have been driven by an interplay of external forcing and internal variability. While the hemispheric cooling signal was clearly dominated by decreasing solar irradiance, the understanding of mechanisms shaping the climate on continental scale is less robust. A recent reconstruction proposes that a shift from a persistent positive North Atlantic Oscillation (NAO), orchestrated by tropical sea surface temperatures and atmospheric teleconnection, dominated the North Atlantic-European area during the transition phase. We test this hypothesis in an ensemble of transient simulations with a comprehensive climate model, covering the transition phase of 1150-1500 AD. Preliminary results from this ensemble suggest an alternative mechanism, in which the atmosphere is not the leading component: a decrease in the Barents Sea Inflow, favored by a weak Atlantic Overturning and decreasing solar irradiation, leads to local sea ice growth and consequently the alteration of the atmospheric pressure pattern above the Barents Sea. This in turn further favors the growth of sea ice, representing a positive feedback. The increased pressure at high latitude is then reflected in a decreasing NAO index, however, the simulated amplitude of this NAO drop is much smaller than in the reconstruction.