



Decadal link of Arctic and subarctic North Atlantic freshwater variability

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Significant freshwater changes have recently been observed both in the Arctic Ocean and the subpolar North Atlantic. To investigate possible links, we compared the liquid freshwater content of the subarctic North Atlantic with the sum of liquid and solid freshwater content of the Arctic Ocean from observations. We found a distinct decadal anti-correlation of the freshwater anomalies in these two regions with anomalies of almost the same magnitude. An analysis of freshwater fluxes from the global Finite Element Sea ice Ocean Model (FESOM) and the CORE2 atmospheric forcing data set revealed that the observed freshwater variations resulted from changing freshwater transports. Furthermore these changes are correlated with the Arctic and North Atlantic Oscillation indices. We suggest that changing freshwater export from the Arctic Ocean to the subarctic North Atlantic responds to multidecadal alternations of the dominant large-scale atmospheric variability. According to the present phase of this large-scale atmospheric variability, the freshwater accumulated during the previous decades in the Arctic Ocean might be released into the sub-Arctic Seas in the coming years. This has the potential to impact the North Atlantic meridional overturning circulation. To further investigate the involved processes, find the driver of freshwater transport changes and proof our hypotheses we show further results from the FESOM simulation and an analysis of the atmospheric forcing.