Geophysical Research Abstracts
Vol. 18, EGU2016-14894, 2016
EGU General Assembly 2016

Salt transport in the Subpolar Gyre amplifies North Atlantic climate variability

Andreas Born (1,2), Thomas F. Stocker (1,2), Anne Britt Sandø (3,4)

(1) University of Bern, Physics, Climate and Environmental Physics, Bern, Switzerland, (2) Oeschger Centre for Climate Change Research, Bern, Switzerland, (3) Institute for Marine Research, Bergen, Norway, (4) Bjerknes Centre for Climate Research, Bergen, Norway

Transport of salt in the Irminger Current, the northern branch of the Atlantic Subpolar Gyre coupling the eastern and western subpolar North Atlantic, plays an important role for climate variability across a wide range of time scales. High-resolution ocean modeling and observations indicate that salinities in the eastern subpolar North Atlantic decrease with enhanced circulation of the North Atlantic subpolar gyre. This has led to the perception that a stronger SPG also transports less salt westward, which would weaken deep convection in the Labrador Sea and thus the gyre itself.
In this study, we analyze a regional ocean model and a comprehensive global coupled climate model, and show that a stronger SPG transports more salt in the Irminger Current irrespective of lower salinities in its source region. The additional salt converges in the Labrador Sea and the Irminger Basin by eddy transports, increases surface salinity in the western SPG, and favors more intense deep convection. This is part of a positive feedback mechanism with large implications for climate variability and predictability.