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Salt transport in the Irminger Current: a regional and a global model

A. Born (1,2), T.F. Stocker (1,2), A.B. Sandø (3,4)

(1) Climate and Environmental Physics, University of Bern, Bern, Switzerland (andreas.born@climate.unibe.ch), (2) Oeschger Centre for Climate Change Research, Bern, Switzerland, (3) Institute for Marine Research, Bergen, Norway, (4) Bjerknes Centre for Climate Research, Bergen, Norway

Salt transport in the Irminger Current and thus the coupling between eastern and western subpolar North Atlantic play 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 correlate negatively with the circulation of the North Atlantic subpolar gyre (SPG). This has led to the perception that a weaker SPG also transports less salt. In contrast, global climate models simulate enhanced salt transport with a stronger gyre that acts as an important positive feedback mechanism for climate variability. Is this an artifact of insufficient model resolution or sub-grid parametrizations?

We find that one of the current generation of global climate models shows good agreement with a regional ocean model in the simulated dynamics of the SPG. Enhanced salt transport in the Irminger Current is a robust feature of both models, because the increase in volume transport overcompensates the decrease in salinity.