Agulhas Current leakage could stabilize Atlantic overturning circulation

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A major focus of concern for the coming century is understanding how the Atlantic Meridional Overturning Circulation (AMOC) will respond to the changing temperatures and wind patterns brought on by global climate change. Because the AMOC plays an important role in transporting heat to northern latitudes and modulating storm tracks, temperatures, and precipitation patterns in the surrounding continents, changes in its strength will have far-reaching consequences.

Scientists expect the AMOC's flows to weaken as Arctic ice melting reduces surface ocean salinities in the North Atlantic, hindering the production of cold deep water. The magnitude of that freshening depends, however, on the amount of warm, salty water brought northward by the Gulf Stream system, a northward flow predominantly fed by the warm salty waters that leak around the southern tip of Africa. After flowing down and around the southeastern coast of Africa, the Agulhas Current water turns and flows east into the Indian Ocean. However, some of this water streams, or leaks, into the South Atlantic, feeding the northward flow in the Atlantic Ocean.

Using modeled ocean circulation patterns, Biastoch and Böning find that if Southern Hemispheric westerly winds shift and strengthen, as projected in future climate scenarios, the Agulhas Current leakage would increase by one-third of the current rate. This elevated leakage, they find, would drive an increase in the temperature and salinity of South Atlantic waters. Within a few decades, the additional salt would flow toward the North Atlantic. The authors suggest that the corresponding

increase in density could potentially stabilize the strength of the AMOC.

More information: Anthropogenic Impact on Agulhas Leakage, *Geophysical Research Letters*, doi:10.1002/grl.50243, 2013 onlinelibrary.wiley.com/doi/10 … 2/grl.50243/abstract

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