



Stability of Freshwater Runoff in East Greenland Currents

The Greenland Ice Sheet releases freshwater from ice melt, tundra snow melt, and solid ice at an increasing rate resulting in an increasing amount of freshwater runoff into the ocean. This freshwater runoff is changing the density gradients along the east Greenland coast altering the circulation of the continental shelf water and its interaction with the deep ocean. Research has shown that dense water does traverse the Greenland shelf near the bottom, but it is unclear what happens to the freshwater near the surface because of freshwater runoff. Prior research indicates that freshwater exits Greenland fjords near the surface and numerical particle trajectories have shown pathways that can transport water off the shelf, but it is unclear how much freshwater enters the deep ocean. In this presentation, results from nested numerical model simulations, with and without freshwater runoff, will be shown. Experiments were conducted at both 4-km and 1-km resolution for a Nordic Seas domain. Results show the impact that model resolution and the inclusion of freshwater runoff has on the circulation along the East Greenland and Iceland continental shelves. These results suggest that freshwater on the shelf exists in a less stable flow field. While the results indicate that most freshwater remains on the shelf, the increased baroclinicity could contribute to an increased rate of exchange of freshwater with the deep ocean. The large-scale implications include potential freshwater entering the deep layers of the Atlantic Meridional Overturning Circulation.

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