

Mechanisms of Freshwater Exchange Across the East Greenland Shelf

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The exchange of freshwater between the east Greenland shelf and the interior of the subpolar North Atlantic and Nordic Seas is a key element in the maintenance and variability of the Atlantic Meridional Overturning Circulation and its sensitivity to changes in atmospheric forcing and freshwater outflow from the Arctic Ocean. We plan to combine a realistic, very high resolution, regional model of the east Greenland shelf and adjacent deep ocean together with idealized, process oriented models and *in situ* observations to identify the strength, mechanisms, and sensitivity of this exchange. Processes likely important for this cross-shelf exchange include: surface and bottom Ekman layers; nonlinear eddy fluxes; local and remote wind-forcing; and wind-driven sea ice. We will diagnose the exchange in a series of realistic model runs, design experiments for the idealized model that will isolate the relevant processes for further study and understanding, and make comparisons with *in situ* mooring and hydrographic observations and remotely sensed sea ice data. We seek to gain basic understanding of what controls the flux of freshwater from the shelf to the basin interior and how it depends on external forcing (wind, outflow from the Arctic, Greenland runoff) and environmental conditions such as bottom bathymetry and ambient stratification.