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On the nature and variability of the East Greenland Spill Jet

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Recent evidence suggests that a significant amount of dense water south of Denmark Strait does not participate in the overflow, but instead cascades off the shelf. This phenomenon forms a new component of the boundary current, the East Greenland Spill Jet, and could contribute substantially to the mid-depth portion of the AMOC.

Here we use high-resolution numerical simulations during summer 2003 to investigate the sinking and entrainment process that originates the Jet. The model accurately reproduces the structure and transport of the Denmark Strait Overflow (DSO) as well as the surface fields.

The average model Spill Jet transport is 4.9 $\pm$ 1.7 Sv, in line with recent observations and comparable to the DSO transport at this latitude. Kinematic analysis of the model results suggests two different types of spilling events. In the first case, a local perturbation results in dense waters descending over the shelfbreak. In the second case, surface cyclones associated with DSO deep domes initiate the spilling process. During Summer 2003, more than half of the largest Spill Jet transport values are of the latter type.