



## **The East Greenland Spill Jet as an important component of the Atlantic Meridional Overturning Circulation**

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The recently discovered East Greenland Spill Jet is a bottom-intensified flow on the upper continental slope of East Greenland in the Irminger Sea, transporting intermediate density water equatorward. Until now the jet has only been observed with limited shipboard measurements, all of them taken in summer. We present the first year-round mooring observations demonstrating that the current is a permanent feature with a southward transport of approximately 2 Sv. It extends from water depths between the shelfbreak and 1200m, and its signature is frequently masked by passing energetic cyclones. Using a high-resolution numerical model we investigate the upstream pathways feeding the Spill Jet by tracing floats backward in time. The majority of the water comes from the Irminger Basin, entrained into the Spill Jet south of Denmark Strait. A portion of the water crosses the deep part of Denmark Strait and enters the Spill Jet via a direct pathway along the continental slope, distinct from the deeper overflow water plume. Another region feeding the Spill Jet is the East Greenland shelf, where parcels spill over the shelfbreak and mix strongly as they enter the jet. This is consistent with shipboard observations showing a significant amount dense shelf water flowing southward through Denmark Strait. Using additional CTD sections near Cape Farewell it is shown that the Spill Jet ultimately merges with the deep portion of the East Greenland/Irminger Current, previously thought to be strictly a lateral circulation. Our study thus reveals a heretofore unrecognized mid-depth component of the Atlantic Meridional Overturning Circulation that has traditionally been attributed to Labrador Sea Water.