



Evolution of the East Greenland Current from Fram Strait to Denmark Strait: Synoptic measurements from summer 2012

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We present measurements from two shipboard surveys conducted in summer 2012 that sampled the rim current system around the Nordic Seas from Fram Strait to Denmark Strait. The data reveal that, along a portion of the western boundary of the Nordic Seas, the East Greenland Current (EGC) has three distinct components. In addition to the well-known shelfbreak branch, there is an inshore branch on the continental shelf as well as a separate core offshore of the shelfbreak. The inner branch contributes significantly to the overall freshwater transport of the rim current system, and the outer branch transports a substantial amount of Atlantic-origin Water equatorward. Supplementing our measurements with historical hydrographic data, we argue that the offshore branch is a direct recirculation of the western branch of the West Spitsbergen Current in Fram Strait. The total transport of the shelfbreak branch of the EGC decreased towards Denmark Strait. The average transport of dense overflow water ($\sigma_{\theta} > 27.8 \text{ kg/m}^3$ and $T > 0 \text{ }^{\circ}\text{C}$) in the shelfbreak EGC was $2.8 \pm 0.7 \text{ Sv}$, consistent with previous moored measurements. For the three sections that crossed the entire EGC system the mean freshwater flux was $97 \pm 17 \text{ mSv}$ relative to a reference salinity of 34.8.