

Oceanic fluxes of freshwater across 26°N

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Here a combination of hydrographic data from full depth transatlantic cruises, Argo float data and information from the 26°N mooring array is used to quantify a 7-year time series (from April 2004 to April 2011) of the freshwater flux at 26°N every ten days. The time-series shows no significant trend with time although there is significant seasonal variability. The equivalent freshwater flux – or the freshwater divergence (including air-sea fluxes and storage) between 26°N and Bering Strait - has a mean value of $-0.35 \text{ Sv} \pm$ standard deviation of 0.22 Sv . A negative divergence is consistent with a freshwater input to the ocean between Bering Strait and 26°N. This equivalent freshwater flux is decomposed into its horizontal gyre component ($0.35 \text{ Sv} \pm 0.04 \text{ Sv}$), its vertical overturning component (mean = $-0.76 \text{ Sv} \pm 0.23 \text{ Sv}$) and the throughflow component ($0.06 \text{ Sv} \pm 0.00 \text{ Sv}$). The strength, sign and variability of the freshwater flux are dominated by the overturning component. The horizontal gyre component is a balance between the relatively fresh northward flow in the Florida Straits and southward flow of the high salinity pool in the centre of the subtropical gyre.

The heat and freshwater fluxes across 26°N are further related to anomalies of heat and salt storage in the North Atlantic. The focus of this analysis is on the AMOC slow-down event observed by the 26°N mooring array in 2009-2010.