



Freshwater sources, distribution, and temporal variability in the Canadian Basin of the Arctic Ocean: Results from US Arctic GEOTRACES 2015 and comparison with 1994 and 2005 sections

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We present and discuss freshwater components calculated from measurements of stable isotopes of water, salinity and nutrients along the US Arctic Geotraces section completed across the Canadian Basin of the Arctic Ocean in 2015. Samples were collected at 66 CTD/rosette stations (22 GEOTRACES and 44 repeat hydrography program) along two transects extending from the continental shelf to the North Pole roughly along longitudes 180°W and 150°W. Stable isotope measurements ($H_2^{18}O/H_2^{16}O$ and $^2HHO/H_2O$ ratios) were performed on 1020 water samples covering the entire water column at GEOTRACES stations and the upper 500 m at Repeat Hydrography stations.

In combination with salinity and nutrient data, the oxygen isotope ratios were used to calculate the individual freshwater components for the upper Arctic Ocean (mixed layer through Atlantic Water layer) including Pacific Water, Meteoric Water and Sea Ice Meltwater. The fractions are integrated through the water column to obtain inventories of the individual freshwater components. The water column is characterized by sea ice meltwater and meteoric water in the upper 50 to 100 meters. Below this layer Pacific water dominates the freshwater budget along the 2015 Arctic GEOTRACES section. The water column below ca. 100 meters also carries the signal of brine rejection during sea ice formation, reflected in negative sea ice meltwater fractions.

The 2015 results are placed into the context of the 1994 and 2005 Arctic Ocean Sections and discussed in the framework of the processes governing the dynamics of the upper layers in the Arctic Ocean.