



## **Arctic Ocean and Hudson Bay Freshwater Exports: New Estimates from 7 Decades of Hydrographic Surveys in the Labrador Sea**

Sheldon Bacon (1), Cristian Florindo-Lopez (2), Penny Holliday (3), Yevgeny Aksenov (4), and Eugene Colbourne (5)

(1) National Oceanography Centre, Southampton, United Kingdom (s.bacon@noc.ac.uk), (2) National Oceanography Centre, Southampton, United Kingdom (criflor@noc.ac.uk), (3) National Oceanography Centre, Southampton, United Kingdom (nph@noc.ac.uk), (4) National Oceanography Centre, Southampton, United Kingdom (yka@noc.ac.uk), (5) Fisheries and Oceans Canada, Northwest Atlantic Fisheries Centre, St. John's, NL, Canada (Eugene.Colbourne@dfo-mpo.gc.ca)

A hydrographic time series from

the Labrador Shelf that spans seven decades at annual resolution is used to quantify Arctic Ocean freshwater export variability west of Greenland. Clear multi-annual to decadal variability emerges, with high freshwater transports during the 1950s and 1970s–80s, and low transports in the 1960s, and from the mid-1990s to the present, with typical (smoothed) amplitudes of 30 mSv (1 Sv = 10<sup>6</sup> m<sup>3</sup>/s). The variability in both the transports and cumulative volumes correlates well both with Arctic and North Atlantic freshwater storage changes on the same timescale. We also isolate and name the Labrador Coastal Current, a dynamically- and geographically-distinct feature that originates as the Hudson Bay outflow, and preserves variability from river runoff into the Hudson Bay catchment. Significant research questions arise from these results, which include the need for parallel, long-term freshwater transport measurements from Fram and Davis Straits, to better understand Arctic freshwater export control mechanisms and partitioning of variability between routes west and east of Greenland, and also the need for better knowledge and understanding of freshwater fluxes on the Labrador shelf, in the context of ongoing efforts to monitor ocean fluxes across the North Atlantic sub-polar gyre.