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### SEASONALITY AND TRENDS OF FRESHWATER EXCHANGES BETWEEN THE ICE AND OCEAN IN THE CANADA BASIN

Richard Krishfield (*Woods Hole Oceanographic Institution, United States*)

Andrey Proshutinsky (*Woods Hole Oceanographic Institution, United States*)

Bill Williams (*Fisheries and Oceans Canada, Canada*)

Kazu Tateyama (*Kitami Institute of Technology, Japan*)

Mary Louise Timmermans (*Yale University, United States*)

John Toole (*Woods Hole Oceanographic Institution, United States*)

rkrishfield@whoi.edu

One of the most striking observations in the past decade has been a reduction in both Arctic sea-ice extent and thickness, particularly in the Beaufort Gyre (BG) region of the Canada Basin. Ocean changes have been as prominent as the reduction of ice volume - between 2003-2013 the BG accumulated more than 5000 km<sup>3</sup> of liquid freshwater, an increase of approximately 25% relative to the climatology of the 1970s. The magnitude of the liquid freshwater increased remarkably from 2003 to 2008 (from 17,000 to 22,000 km<sup>3</sup>), after which it appears to have largely stabilized through 2012. Combining both solid (ice) and liquid (seawater) fresh water components indicated that a modest net export of 320 km<sup>3</sup> of fresh water from the region occurred between 2010 and 2012, suggesting that the ocean anticyclonic circulation regime may have weakened. In 2013, the liquid fresh water component was at its lowest value since 2007, however in 2014, the BG freshwater volume rebounded to its 2008-2012 mean. Here, seasonal cycles in the region are analyzed for the decade from 2003-2014, the volumes of freshwater exchanged between the ice and ocean are calculated, and the contributions from other seawater sources are estimated from the residual. Solid freshwater is determined on a monthly-averaged basis from ice draft measurements and grids derived from satellite data. Liquid freshwater is determined from summer CTD sections, drifting and bottom-anchored profilers, and estimated by optimally interpolating observations to mean seasonal cycles. Anomalies are computed from the time series, and trends are determined. While indications last year were that the Arctic may have been entering a cyclonic circulation regime, which would be expected from past behavior of the climate system, this year's data showing a return to anticyclonic conditions poses the question of whether the climate system may have exceeded a "tipping point" where the decadal patterns of the past no longer apply.