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Changes in age structure and freshwater composition in the Switchyard region of the Arctic Ocean

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The Arctic Ocean is undergoing rapid changes linked to system-scale changes in other domains of the Arctic system. Changes in the Arctic freshwater circulation and inventory have significant potential for impacting the Arctic Ocean, as well as the oceans to the south. They can be caused by changes in the Arctic sea ice budget, inflow and export of water from the Atlantic and Pacific oceans, as well as meteoric water (river runoff and P-E). As part of the SEARCH (Study of Environmental Arctic Change) AON (Arctic Observing Network) program we have started long-term observations in the switchyard region of the Arctic Ocean along a section between Alert and the North Pole. We collect hydrographic, age tracer (tritium, helium isotopes, CFCs and sulfur hexafluoride), and freshwater tracer (oxygen isotopes and nutrients) data each May using Twin Otter aircraft equipped with a light-weight winch and a modular CTD/rosette system. Here we report the first full sections of hydrographic, age tracer and freshwater component (Atlantic Water, Pacific Water, meteoric water, and sea-ice meltwater) along the Alert – North Pole section from 2008 and 2009. We interpret the differences in the observed properties (age structure and meltwater fractions) in the context of the changing circulation and water mass distribution and properties in the Arctic Ocean.