



Exploring the variability of freshwater inputs from tidewater glacier-ocean systems in the Canadian Arctic Archipelago

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Tidewater glaciers, numerous in the Canadian Arctic Archipelago (CAA), are an important and dynamic source of freshwater to the Arctic freshwater system, with glacial inputs modifying ocean structure, stimulating vertical mixing, enhancing biogeochemical delivery near-terminus, as well as contributing to regional freshwater budgets, storage, transport and export. Despite their abundance, we lack important knowledge regarding glacier-ocean systems across the CAA, and these systems are often omitted in regional studies of freshwater transport or storage.

In this study, we examine the nature and spatial extent of glacial meltwater influence on freshwater dynamics in Jones Sound, a tidewater glacier-rich region in the CAA. Our goals are to better understand the influences of glacier inputs on upper ocean water column structure and mixing processes near the glacier terminus, as well as the role of tidewater glaciers in the regional oceanic freshwater system. We use summertime, near-shore in situ observations at both glacierized and non-glacierized sites, collected using the sailing yacht Vagabond and local vessels operated by community members from Ausuttuq (Grise Fiord, NU) over a 4-year timespan. This novel dataset provides fjord-scale and interannual resolution of water column properties from glacier terminus to open ocean. Further, we employ a high-resolution regional model (Nucleus for European Modelling of the Ocean (NEMO) framework of the Arctic and Northern Hemisphere Atlantic at 1/12 degree resolution) to examine regional freshwater transport and storage.

In this presentation we will present results detailing notable year-to-year and site-to-site variation in upper ocean structure at the glacierized sites. These results suggest that there is important spatial and temporal variability of the influences of glacially-sourced freshwater to Jones Sound that should be considered in near-shore ocean functioning and the regional freshwater budget.