

# **Impact of runoff forcing on ocean model simulations in the Pan-Arctic region**

Tahya Weiss-Gibbons<sup>1</sup>, Paul Myers<sup>1</sup>, Tricia Stadnyk<sup>2</sup>, Andrew Tefs<sup>2</sup>

<sup>1</sup> *Department of Earth and Atmospheric Science, University of Alberta, AB, Canada*

<sup>2</sup> *Department of Geography, University of Calgary, AB, Canada*

The Arctic is warming faster than the rest of the planet, impacting the Arctic Ocean and its sources of freshwater. Changes in freshwater distributions and stratification affect Arctic Ocean circulation, and may impact deep water formation in the Atlantic after its export to that basin. Thus, understanding the impact of freshwater sources is an important question to examine in ocean general circulation models. We use version 3.6 of the NEMO model, with the Arctic and Northern Hemisphere Atlantic (ANHA) configuration, run at 1/4 degree resolution, to examine the role of river runoff into the Pan-Arctic domain. River runoff is a major source of freshwater to the high-latitude ocean, and has been increasing recently. Yet, traditionally, ocean models have used a runoff dataset based on climatology that has limitations in the Arctic, as well as lacks the recent changes in river runoff. Here we collaborate with the Hydrological Analysis Lab at the University of Calgary who have produced runoff scenarios for the Arctic Ocean using the Swedish Hydrological Predictions for the Environment (HYPE) hydrological model that now extend to the present day. Differences between the two runoff datasets are significant, and comparing the model results from the different experiments will help to show the sensitivity of the model to freshwater input changes. Results show large differences in the freshwater content, particularly in the Canadian Arctic Archipelago, which can have impacts on modelling within the region, as well as transport of freshwater out of Arctic gateways to lower latitudes.

Corresponding author: [weissgib@ualberta.ca](mailto:weissgib@ualberta.ca)