C07-O08

STATUS & PROSPECTS OF ARCTIC FRESHWATER EXPORT

Thomas Haine *(Johns Hopkins University, United States)*
Beth Curry *(University of Washington, United States)*
Ruediger Gerdes *(Alfred Wegener Institute, Germany)*
Edmond Hansen *(Norwegian Polar Institute, Norway)*
Michael Karcher *(Alfred Wegener Institute, Germany)*
Craig Lee *(University of Washington, United States)*
Bert Rudels *(Finnish Meteorological Institute, Finland)*
Gunnar Spreen *(Norwegian Polar Institute, Norway)*
Laura de Steur *(Norwegian Polar Institute, Norway)*
Kial Stewart *(University of New South Wales, Australia)*
Rebecca Woodgate *(University of Washington, United States)*

Thomas.Haine@jhu.edu

Large freshwater anomalies clearly exist in the Arctic Ocean. For example, liquid freshwater has accumulated in the Beaufort Gyre in the decade of the 2000s compared to 1980-2000, with an extra ~5000 km^3, about 25%, being stored. The sources of freshwater to the Arctic from precipitation and runoff have increased between these periods (most of the evidence comes from models). Despite flux increases from 2001 to 2011, it is uncertain if the marine freshwater source through Bering Strait has changed, as observations in the 1980s and 1990s are incomplete. The marine freshwater fluxes draining the Arctic through Fram and Davis straits are also insignificantly different. In this way, the balance of sources and sinks of freshwater to the Arctic, Canadian Arctic Archipelago (CAA), and Baffin Bay shifted to about 1200+/-730 km^3yr^{-1} freshening the region, on average, during the 2000s. The observed accumulation of liquid freshwater is consistent with this increased supply and the loss of freshwater from sea ice. Coupled climate models project continued freshening of the Arctic during the 21st century, with a total gain of about 50000 km^3 for the Arctic, CAA, and Baffin Bay (an increase of about 50%) by 2100.

---

[1] This paper is based on: Haine, T. W. N., B. Curry, R. Gerdes, E. Hansen, M. Karcher, C. Lee, B. Rudels, G. Spreen, L. de Steur, K. D. Stewart, and R. Woodgate. Arctic freshwater export: Status, mechanisms, and prospects. *Glob. Planet. Change*, in review, 2014.