



Arctic Freshwater Export: Prospects, Impacts, and Challenges

T. W. N. Haine and K. Stewart

Johns Hopkins University, Earth and Planetary Sciences, Baltimore, MD, United States (Thomas.Haine@jhu.edu)

Large freshwater anomalies clearly exist in the Arctic Ocean. They are due to enhanced melting of sea ice, increased runoff, and changes in atmospheric circulation that lead to surface convergence of freshwater. For example, freshwater has accumulated in the Beaufort Sea over the last 30 years, with an extra $\approx 5000 \text{ km}^3$ —about 25%—being stored. It is likely that this extra freshwater will be released from the Arctic via the Fram Strait and/or the Canadian Archipelago, perhaps as another “Great Salinity Anomaly”. The freshwater discharge will likely have impacts on subpolar Atlantic circulation and ecosystems for several years. In light of coupled climate model forecasts, it may herald a new regime for the Arctic/sub-Arctic ocean. An unprecedented opportunity exists to anticipate and observe this discharge process. This contribution will review the state of knowledge about Arctic freshwater anomalies, and outline potential scenarios for future Arctic freshwater export. Key uncertainties in estimating the timing, rates, and pathways of freshwater export will be identified. Challenges for observing systems to monitor the progress of anomalous freshwater will also be discussed.