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MECHANISMS OF POLAR SURFACE WATER AND THEIR PROSPECTS WITH LOSS OF SUMMER ICE COVER

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Present understanding of the mechanisms controlling Arctic freshwater emphasizes the importance of surface winds. The wind can modify the storage, release, and pathways of freshwater on timescales of $O(1-10)$ months. Discharges of excess freshwater through Fram or Davis straits appear possible, triggered by changes in the wind, but are hard to predict. Changes in the sources of freshwater are also important, and have occurred in the the past 20 years. They have a characteristic timescale of $O(10)$ years, much longer than the wind.

This contribution reviews our understanding of these issues. It also presents solutions from idealized circulation models to speculate on how the upper Arctic ocean will change in the coming years as sea ice cover declines.

¹ This paper is based partly 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.