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## Sea ice import affects Beaufort Gyre freshwater adjustment

**Sam Cornish**<sup>1</sup>, Morven Muilwijk<sup>2</sup>, Jeffery Scott<sup>3</sup>, Juliana Marson<sup>4,5</sup>, Paul Myers<sup>4</sup>, Wenhao Zhang<sup>6</sup>, Qiang Wang<sup>7</sup>, Yavor Kostov<sup>8</sup>, and Helen Johnson<sup>1</sup>

<sup>1</sup>Dept. Earth Sciences, University of Oxford, Oxford, United Kingdom

<sup>2</sup>Geophysical Institute, University of Bergen and Bjerknes Centre for Climate Research, Bergen, Norway

<sup>3</sup>Massachusetts Institute of Technology, Boston, USA

<sup>4</sup>Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Canada

<sup>5</sup>Centre for Earth Observation Science, University of Manitoba, Winnipeg, Canada

<sup>6</sup>Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China

<sup>7</sup>Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research (AWI), Germany

<sup>8</sup>College of Life and Environmental Sciences, University of Exeter, Exeter, United Kingdom

The Arctic Ocean's Beaufort Gyre is a wind-driven reservoir of relatively fresh seawater, situated beneath time-mean anticyclonic atmospheric circulation, and is covered by mobile pack ice for most of the year. Liquid freshwater accumulation in and expulsion from this gyre is of critical interest to the climate modelling community, due to its potential to affect the Atlantic meridional overturning circulation (AMOC). In this presentation, we investigate the hypothesis that wind-driven sea ice import to/export from the BG region influences the freshwater content of the gyre and its variability. To test this hypothesis, we use the results of a coordinated climate response function (CRF) experiment with four ice-ocean models, in combination with targeted experiments using a regional setup of the MITgcm, in which we apply angular changes to the wind field. Our results show that, via an effect on the net thermodynamic growth rate, anomalies in sea ice import into the BG affect liquid freshwater adjustment. Specifically, increased ice import increases freshwater retention in the gyre, whereas ice export decreases freshwater in the gyre. Our results demonstrate that uncertainty in the cross-isobaric angle of surface winds, and in the dynamic sea ice response to these winds, has important implications for ice thermodynamics and freshwater. This mechanism may explain some of the observed inter-model spread in simulations of Beaufort Gyre freshwater and its adjustment in response to wind forcing.