Geophysical Research Abstracts
Vol. 12, EGU2010-7699, 2010
EGU General Assembly 2010

Davis Strait Transport and Freshwater Fluxes, 2004-2009

Craig Lee (1), Brian Petrie (2), Beth Curry (1), Jason Gobat (1), and Kumiko Azetsu-Scott (2)

(1) University of Washington, Applied Physics Laboratory, Seattle, United States (craig@apl.washington.edu), (2) Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

Davis Strait is a critical site for investigating freshwater exchange between the Arctic and North Atlantic Oceans and an ideal location for monitoring temporal and spatial variability of the critical upstream boundary condition for Labrador Sea convection. Fluxes through the Strait represent the net integrated Canadian Archipelago throughflow, over 50% of the Arctic's liquid freshwater discharge, modified by terrestrial inputs and oceanic processes during its southward transit through Baffin Bay. By the time they reach Davis Strait, Arctic waters already embody most of the transformations they undergo prior to exerting their influence on the deepwater formation sites in the Labrador Sea.

An ongoing program has characterized Davis Strait volume, freshwater and heat flux since September 2004. Measurements include continuous velocity, temperature and salinity time series collected by a moored array, autumn ship-based hydrographic sections and high-resolution sections occupied by autonomous gliders. Moored instrumentation includes novel new instruments that provide temperature and salinity measurements in the critical region neat the ice-ocean interface and measurements over the shallow Baffin and West Greenland shelves, while gliders have captured the first high-resolution wintertime sections across the Strait. Here we summarize results from the first five years of measurements (2004-2009), contrasted against climatological conditions and fluxes calculated from extensive measurements collected in 1987 – 1990. Volume and freshwater fluxes suggest a seasonal cycle with minima in autumn, maxima in winter and a hint of secondary maxima in summer. The time series also reveals striking interannual variability in strength and phase, suggesting caution when drawing conclusions from fluxes based on annual hydrographic surveys. Over the five-year span, volume and freshwater fluxes show neither clear trends nor robust correlation with Arctic Oscillation indices.