

Arctic heat and freshwater transports variability: a model based study with data assimilation

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We investigate the variability of Arctic freshwater content (FWC) and heat budget during the 1989-2009 period by using a high-resolution global coupled ice-ocean model implemented with a state-of-the-art data assimilation scheme. A comparison with recent mooring sections (NABOS) shows that by assimilating hydrographic data in and near the Arctic basin model reproduces a circulation pattern with realistic vertical and horizontal structure. The separate contributions of the main advective exchanges with the Arctic basin through Bering, Fram and Davis Straits, and the Barent Sea Open are investigated. The interannual variability of the FWC in the Beaufort Gyre (BG) shows a significant change in the mid of 1990s, associated with atmospheric circulation regime change and a downward trend in the freshwater export at the Canadian Straits and Fram straits. A correlation between the heat/FW transport anomalies through the Fram/Barent straits and the Arctic Oscillation (AO) index can be identified.