



Estimates of liquid freshwater and heat transports through Fram Strait using varying reference salinity & temperature

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The freshwater transports from the Arctic Ocean to the Nordic Seas, and to the North Atlantic, are considered crucial, by their possible impact on convection, for the Atlantic Meridional Overturning Circulation. The fluxes of liquid freshwater have proven difficult to determine. Apart from the obvious difficulties connected with measuring a low salinity upper layer flow one obstacle is to obtain realistic estimates of sources and sinks, another to choose reference salinity. Ideally freshwater transports should be determined from the salt and volume (mass) fluxes. The most important, and the best monitored, passage for the Arctic Ocean freshwater export is Fram Strait. An attempt to estimate the variability of the freshwater fluxes across synoptic hydrographic sections in Fram Strait using varying reference salinity is presented. The mean salinity of the inflow to the Arctic Ocean on each section is taken as reference. Two estimates are obtained. When the inflow volume is used, the amount of freshwater required to dilute the inflow to outflow salinity is obtained. The outflow volume also includes contributions from other passages, volume as well as freshwater, and gives bounds on the fluxes through these passages. By also displaying the total in- and outflow and the mean in- and outflow salinities factors influencing the variability of the freshwater transport can be assessed. A similar approach is also used for the heat transport. In this case the mean temperature of the outflowing waters is taken as reference. Climatologically the changes in water mass properties are important, not volume transports in physical space. TS properties of the inflowing and outflowing waters are therefore estimated. The volume transports are determined from geostrophic computations. The results of 11 sections taken between 1980 and 2002 are shown.