Geophysical Research Abstracts, Vol. 7, 08565, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08565
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Mechanisms determinining Arctic fresh water export variability

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Available observations indicate large variability of components of the Arctic fresh water balance, namely the halocline and sea ice reservoirs and the export rates of sea ice and liquid fresh water through Fram Strait. The Arctic Ocean is the largest fresh water source for the Atlantic and thus changes in its export rate to lower latitudes have the potential to affect the large scale Atlantic circulation.

Results from a 54-year hindcast experiment with a coupled ocean-sea ice model following the AOMIP (Arctic Ocean Model Intercomparison Project) specifications will be presented. Experiments are designed to avoid excessive damping of anomalies that usually occurs with restoring of surface salinity to climatological values.

Especially the relative importance of water mass properties and volume export for the liquid fresh water will be discussed. The mechanisms determining liquid fresh water export variability will be compared to those governing sea ice export variability. The analysis performed for the hindcast ocean-sea ice model was repeated for climate change scenarios submitted to the next IPCC evaluation.