

## Interannual Variability of the GIN Sea in the 1985-1997 Period as Deduced From Models and Observations

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To further understand the origin of the warming episodes of the Arctic Ocean in the last 20 years, attributed mainly due to increased inflows of warmer Atlantic-origin water, we have investigated the changes in the GIN (Greenland -Iceland-Norwegian) Sea from models and hydrographic observations. The GIN Sea serves as the principal passageway between the North Atlantic and the Arctic Ocean, as well as the dominant location of deep water formation feeding the North Atlantic. Large, in-situ hydrographic data sets representing 10 years of measurements, as well as results from a global 20-year simulation, have been applied toward evaluating these changes. The model results were obtained with a 1/3 degree, 32 level global configuration of the Parallel Ocean Program (POP) model that was forced by daily GCM reanalysis fluxes obtained from ECMWF for 1979-1997. The data sets included CTD's, XCT's and AXBT's. Interannual variability was computed mainly from changes in the heat content of selected boxes, and from mass and heat transports across the straits connecting the GIN Sea to the North Atlantic and the Arctic. A principal component analysis of the mean temperature of the straits was also performed. The boxes were selected to contain a reasonably dense data coverage, and averages at both the CTD locations and over the selected boxes were computed. The model results revealed that the mean temperature of the Fram Strait peaked significantly in the 1990-91 and 1996-97 periods, exceeding the mean values of the other years by factors of 1.8 and 2.2, respectively. Both model output and observations revealed a decrease of Atlantic Water in 1989 in the southeastern Norwegian Sea.