

Abrupt Change in Deep Water Formation in the Greenland Sea: Results from Hydrographic and Tracer Time Series

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Long-term measurements of temperature, salinity, as well as the transient tracers tritium, ³He, CFC-11, and CFC-12 have been used to study the renewal rates of deep water in the Greenland Sea. Early evaluation of the data sets revealed an abrupt change in deep water formation around 1980 with a drop in the deep water formation rate from ca. 0.5 Sv to 0.1 Sv. Whereas the data before 1990 were compiled from cruises of opportunity, annual cruises were conducted during the 1990s. The resulting time series allows us to deduce information on the change in water mass properties throughout the water column. In this contribution we explore if and how the observed changes in the hydrographic and tracer properties of the Greenland Sea are related to the forcing at the atmosphere/ocean interface. Additionally, we derive average and single-event related deep water formation rates during the 1990s. Finally, we discuss the impact of the change in deep water formation on the hydrography and the exchange of deep water between the Nordic Seas and the Arctic Ocean.

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