

## **Long-term variability of termohaline characteristics in the Greenland Sea in 1950-2012**

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The North European Basin of the Arctic Ocean and especially the Fram Strait are key regions for understanding the climatic processes in Northern Hemisphere. The Greenland Sea is one of the main areas of deep water formation. Waters formed here are important part of the global ocean conveyor. As deep waters are a link in the long-term fluctuations of atmosphere – ice – deep ocean system, the research of long-term variability of this area is an important contribution to understanding the modern climate change.

The main area of discussion is the area of "dome" of intermediate and bottom waters. Water temperature varies from  $0^{\circ}$  to  $-1^{\circ}$  for intermediate waters, bottom water are restricted by  $-1^{\circ}$  isotherm. The dome form of this formation is explained by cyclonic circulation in this area. The using data is water temperature and salinity mainly from World Ocean Database for the period 1950-2012 were processed with annual average with winter and summer division. The visual representation of temporal variability of water thermohaline characteristics and linear trends were obtained. The analysis of the autocorrelation functions and spectral density data was carried, which allowed to identify the main periods of temperature and salinity variability for the surface layer.

TS analysis and analysis of spatial sections were received to study comprehensively the processes of salinization and water warming occurring in the last two decades comparing with previous available data. According to the results, significant changes took place in the dynamic structure of the Greenland cyclonic gyre in the last decade. Based on the spatial sections the degradation (since 1991) and the complete disappearance (since 1996) of the "dome" structure of bottom waters limited by isotherm  $-1^{\circ}$  C was revealed. This resulted in blocking of convective processes, and it presumably occurred due to increase in surface temperature, rather than freshening of the surface layer, as it was in the previous period (1960-1970).

The possible causes of the observed variability of the thermohaline characteristics in the area of bottom waters formation were considered: the influence of advection - connection with the North Atlantic current and the Norwegian current and interrelation with atmospheric processes, for which AO and NAO indexes have been used. Cross-correlation and wavelet analysis revealed the possible relationship at different time shifts and similar variability periods for some of the mentioned characteristics.