



The Arctic Ocean surface layer is an indicator of climate change

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It is known that the surface layer of the Arctic Ocean and the ice cover are closely connected by dynamic and thermal processes. The stability and development of the ice cover are associated with the thermohaline properties of the upper ocean, such as the depth of the mixed layer and halocline. In this context, the Arctic Ocean surface layer is a critical indicator of climate change.

Significant decreasing of the Arctic Ocean ice area over the recent years, as well as air temperature rising in the Arctic affect the Arctic Ocean surface layer. Observations show the great salinification of the surface layer of the Eurasian and Makarov Basins and surface layer freshening in the Canada Basin that have never been observed in this region since 1950.

Due to substantial climatic changes recently occurred in the Arctic, there is a question about the scenarios for the Arctic region future.

This study was based on an extensive gridded data set of the Arctic Ocean winter salinity for the periods 1950-1993 and 2007-2013, obtained from approximately 20,000 profiles. As there were too few observational data for the winter period of 1994-2006, the salinity data for this period were taken from the CMEMS global ocean reanalysis to construct reliable gridding fields.

Different parameters of the Arctic Ocean surface layer, such as mean salinity of the mixed layer, mixed layer thickness, salinity gradient in the halocline layer, thickness of halocline layer and its mean salinity were calculated. Spatiotemporal variability of listed parameters are investigated. Preliminary results show that mixed layer thickness increased in recent years from 30-35m in 1950-70s to 40-44m in 1980-2000s. Halocline thickness, vice a versa, decreased from 65m in 1950-90s to 50 in 2000s. At the same time mixed layer salinity and salinity of halocline layer in 2000s became lower for about 0.5 psu compared with 1950-90s. We assume that these changes are related to atlantification of the Eurasian Basin and freshening of the Canada Basin.