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Poster title (brief) Long-term changes of the Arctic Ocean surface layer parameters as an indicator of the climate change

Abstract - text box

The Arctic Ocean is very sensitive to changing environmental conditions. Its surface layer is the most dynamical and changeable part and serves as the link between the atmosphere and the underlying waters. 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 in the Arctic. The thermohaline structure of the Arctic Ocean surface layer has undergone significant changes in the recent years that are associated mainly with decreasing of the sea ice cover, air temperature rising and changes in the atmospheric circulation.

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 is investigated. We note increasing of the mixed layer thickness 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 also noted that salinity gradients in the halocline layer substantially increased, that could led to more active baroclinic instability and intensification the eddy formation within the halocline.