

Arctic Ocean inter-annual variability

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Arctic Ocean halocline (HL) disappearance in Amundsen basin in mid 90s is an event of great importance for Arctic climate because this layer works as screen insulating upper mixed layer and ice cap from heat flux from below. Inter-annual study of HL behavior using database that includes a century-long instrumental observations in Arctic is complicated due to absence of generalized layer condition characteristics. In the scope of this work methods for developing of such characteristics were proposed and HL variability research was performed.

The database was compiled from WODB (1998, 2001, 2005), data from several Russian drifting stations and some recent observations, which were carried out in central part of Arctic Basin.

The most common way for determining halocline layer variability was calculating difference in salinity on HL borders that were estimated in different ways described in recent literature. Besides, some new methods were used: cotangents method, gradient method, calculation of freshwater content (FW) etc. The most universal method of HL state consideration is the FW in the layer. It is calculated in layer between 50 meter depth and HL bottom salinity isohaline surface (defined in the way proposed in *Rudels et al 2004*). Reference salinity was taken 34.8 psu. This method is weakly influenced by vertical data resolution and allows researching HL variability on data received not only from recent CTD observations but from historical data. It also allows observing spatial and temporal variability of frontal area between two different HL types (between Atlantic and Pacific origin upper layer waters) using International Arctic Buoy Program and Some transarctic cruise datasets.