

CHANGE OF THE SEA WATER DENSITY DUE TO MIXING OF DIFFERENT SALINITY SEA WATERS AND APPLICATION TO HALOCLINE FORMATION IN THE EASTERN ARCTIC

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The influence of the thermodynamic nonlinear properties of seawater on the Arctic basin salinity field formation is discussed. The oceanographic database of POI FEB RAS is used. The non-linear property of the international thermodynamic equation of seawater, when due to mixing the components average density is not equal to the density of the mixture, is considered. The process of mixing the different salinity waters at a constant temperature is shown. If the components are when mixing desalinated and slightly saline waters, then the density of the mixed water is higher than the weighted average density of the initial components. There is a compaction effect during mixing and below this effect will be called cabbelling. The result of the mixing of two different highly saline sea waters is the water and its density is less than the average value of the component densities. We call this process decompaction. The quantitative examples of calculations for water mixing at low temperatures are presented. It is noted that the effect is of the same order as the cabelling of fresh water at 4°C temperature. The application to the formation of the vertical haline structure of the Arctic Basin waters, which receives significant volumes of fresh water, is shown. The discussed effect is concentrated in the halocline depth. Above the core of the halocline there are weakly saline waters and cabbelling occurs. There is a tendency for the water to sink. Below the halocline are more saline waters mixing. In this depth there is the decompaction effect and waters get some trend to rise. The vertical convergence is an additional mechanism for maintaining a sharp boundary between surface desalinated and underlying saline waters. There is confirmation for salinity profiles in the Gulf of Ob, the Kara Sea, the Laptev Sea and the East Siberian Sea.

Keywords: monitoring of the water area, surface fresh water of the Eastern Arctic, halocline, international thermodynamic equation of sea water, cabbelling, decompaction

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