HE44A-2079 - Property change of the Atlantic water observed around the Chukchi borderland of the western arctic ocean

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Abstract

The Atlantic water (AW) flows along topographic slopes cyclonically around the Arctic after entering the basin through the Fram Straits and Barents Sea. It keeps its warmer (> 0.5 ºC) and saltier (> 34.75 psu) property until reaching to the western Arctic Ocean to occupy an intermediate layer between 200 and 1000 m with a temperature maximum at 300-500 m. Due to its substantial heat content large enough to melt out all the sea ice in the Arctic, understanding the modification of Atlantic water property would be crucial for better prediction of Arctic Ocean change induced by climate change. In this study, hydrographic data for the last 15 years, obtained from shipboard surveys and a vertical profiler mooring were analyzed to investigate interannual to decadal variations in AW core temperature around the Chukchi Borderland of the western Arctic Ocean. An annual time-series of the Atlantic water core temperature layer (AWCTL) shows a decreasing trend for data from both the hydrographic surveys (0.09 °C) over the last 15 years and mooring (0.13 °C) over the last 14 years. Water temperature in the lower halocline layer, upper layer of the AWCTL, shows a warming trend (~0.1 °C increase). Comparison of temperature-salinity (T-S) diagrams of the AWCTL reveals that the recent T-S structures have smoother curves than past T-S structures. The vertical eddy diffusivity of the AWCTL shows an increasing trend from the hydrographic surveys data. It is believed that active vertical mixing around the Chukchi Borderland increases thermal diffusion to the vertical adjacent layers around the AW.

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