



Property change of the Atlantic water around the Chukchi Borderland, western Arctic Ocean

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The Atlantic water 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 °C) 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 collected during 2002-2017 are analyzed to investigate interannual to decadal variation of the Atlantic water around the Chukchi Borderland. The T-S structures of Atlantic water layer vary depending on locations, which appears to be related with the degree of ocean mixing. We selected CTD data showing smooth T-S curve and analyzed to focus on the effect of ocean mixing on time-varying Atlantic water property modification. Time series of the temperature and salinity averaged by year show a tendency to decrease and increase by -0.006 ± 0.003 °C and 0.0003 ± 0.0009 psu, respectively, during the last 15 years. These results are consistent with the tendency of water property change in the Nordic Sea, where the Atlantic water originates, although the Nordic Sea shows about 4 times larger changing trends than the Chukchi Borderland. Our results demonstrate that the modulation of Atlantic water property in the eastern Arctic can affect that in the western Arctic about 4000 km away.