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Title: *Extension of Pacific summer waters in the Arctic Ocean caused by large-scale atmospheric circulation*

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During the last decades we observe fast climatic changes. These changes are well expressed in the Polar Region that is more sensitive to all environmental shifts. The temperature and salinity anomalies were observed not only on the surface but also in the Pacific origin halocline layer.

Due to hydrostatic imbalance and atmospheric circulation, water from the North Pacific flows through the Bering Strait, transits the upper levels of the Arctic Ocean, and penetrates to the North Atlantic. Pacific Summer Water (PSW) (flows through the Bering Strait in summer) is a main freshwater source in the Canadian Basin and influences thermohaline structure of the whole Arctic Ocean.

Based on the oceanographic data obtained during 1991-2012 we found the high interannual variability of PSW extent and boundaries positions. Since 1991 the area of PSW decreased and the boundary of PSW extension shifted from the Makarov Basin towards the Canada Basin. At the end of the 2000s the PSW boundary extension returned to approximately early 1990s conditions. Rapid changes in the Arctic wind forcing regime occurred in 2007 led to anomaly extension of the PSW boundary towards the Lomonosov Ridge in 2008. According to our results the circulation of the PSW is strongly influenced by wind force over the Canadian Basin and depends on the position and intensity of the Beaufort Gyre anticyclonic circulation. We found the time lag of PSW circulation response on wind activity to be one year.