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Title: *Anomaly decrease of sea ice extent and increase of water temperature in the Kara Sea in summer 2012*

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Well pronounced increase of the warming has been observed in the Arctic since the middle of 20th century and especially during several last decades. These changes are evident in earlier ice melting, extra-heating of the surface water with solar radiation and, hence, it leads to the more intensive thermal degradation of the coastline and shallow areas of Arctic seas. On September 2012 Arctic sea ice has reached its minimum extent in the satellite record since 1979 and reinforces the long-term downward trend. In addition already in June all south-west part of the Kara Sea was sea ice-free. The long-term climate variability may also affect the bottom waters and result in thermal degradation of vast submarine cryolithozone at the depths below the pycnocline, enhancing the positive feedback of warming through greenhouse gases release.

Based on temperature and salinity data obtained by expedition “Yamal-Arctica” in summer 2012 aboard R/V “Professor Molchanov” we compared surface and bottom thermal regime of the Kara Sea with historical oceanographic data sets over a period from 1947 to 1994. Our results revealed an increase of surface temperature in summer 2012 by 3^{o}C in the south-west part and by 2^{o}C in the north part of the Kara Sea as compared with historical time series. The bottom temperatures in summer 2012 were higher climatic means by 1^{o}C in the south-west part of the Kara Sea, while bottom temperature in the central and northern parts of the Kara Sea demonstrated an increase by 1-1.5^{o}C caused by increase of temperature of Atlantic waters inflowing from the North and the West. Also we revealed the role of wind force on observed changes. Thus the anomaly fast sea-ice retreat in the south-west part of the Kara Sea besides water temperature increase was caused by steady South-West wind in June.