



Influence of the North Atlantic on climate change in the Barents Sea

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This study is based on the observations taken from the meteorological archives, satellite and historic visual observations of sea ice, global SST, data of water temperature in the upper layer on the section in the Barents Sea. For processing data was used factor analysis, calculation of correlation matrices with different delay between the Barents Sea and selected areas in North Atlantic. It is shown that the inflow of Atlantic water into the Barents Sea has a major influence on the climate of the region and its changes affect the variations of all climate characteristics. Decadal and interannual changes of air temperature in the Barents Sea are closely related (correlation over 0.8) with temperature of water, coming from the Norwegian Sea. The effect of these changes is seen in the air temperature in the Kara Sea. Atlantic water inflow especially impact on winter sea ice in the Barents Sea. The correlation between the average water temperature at section along the Kola meridian and sea ice extent in the Barents Sea in May reaches values of -0.86. To enhance the predictive capability established dependence, the study was extended to the area of the North Atlantic, where temperature anomalies are formed. In the North Atlantic from the equator to 80 ° N were identified 6 areas where the average annual SST anomalies are associated with SST anomalies and sea ice extent (SIE) in the Barents Sea. Detailed analysis with monthly SST from HadISST for 1951 - 2013 identified two areas with the greatest influence on the Barents Sea. One area is the northern region of the Gulf Stream and other is the equatorial region. The corresponding delays amounted to 26 months and 4-5 years. The relationship between changes AMO index, averaged over August-October, and SIE in the Barents Sea in January is evaluated. Correlation coefficient between them with 3 year delay is -0.54. Implemented study revealed the importance of teleconnection between SST anomalies in the North Atlantic and SST and SIE in the Barents Sea with a delay of several months to several years, which have prognostic significance. This research is supported by Ministry of Education and Science of the Russia (project RFMEFI61014X0006)