Geophysical Research Abstracts
Vol. 19, EGU2017-2377, 2017
EGU General Assembly 2017

Preferred atmospheric circulation patterns of winter Arctic sea ice decline

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In this paper, the impact of the Ural blocking (UB) with the positive North Atlantic Oscillation (NAO+), negative NAO (NAO-) and neutral NAO on the sea ice variability over the Barents-Kara Sea (BKS) is examined, respectively, to understand what type of atmospheric circulation patterns can lead to the strongest sea ice decline. A water vapor reservoir as a richest moisture region is found to exist over the mid-latitude North Atlantic south of the Gulf Stream Extension due to strong positive sea surface temperature anomalies for the NAO+ winter. When the UB occurs together with the NAO+, the strongest BKS ice decline is seen due to the strongest BKS warming associated with the strongest moisture intrusion because the combined UB and NAO+ pattern is an optimal circulation pattern that favors the moisture intrusion into the BKS from the mid-latitude North Atlantic, as revealed from the trajectory tracking method.