

Response of Eurasian Temperature to Barents–Kara Sea Ice: Evaluation by Multi-Model Seasonal Predictions

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Barents–Kara(BK) sea ice anomaly (SIA) are considered a potential source of seasonal predictability in the midlatitudes, but confirmation or refutation of this possibility remains elusive. Especially controversial is the link to the Warm Arctic– Cold Eurasia (WACE) pattern. While the internal atmospheric variability (Ural high pressure system) drives both BK sea ice and WACE pattern, the reinforcing of WACE by sea ice is also argued. The present study pointed out that the prediction of winter Eurasian surface temperature degraded when November BK sea ice conditions are not taken into account. To improve seasonal predictions, the contribution of sea ice forcing to the WACE pattern and model limitations need further investigation.

This study examined the interannual linkages between BK sea ice, winter Eurasian temperature, and WACE in hindcasts of state-of-the-art coupled seasonal prediction models. In addition, this study quantified the amplitudes of sea ice variability and its influence by the models. In the models analyzed, the WACE index is strongly depended on the BK temperature and did not rigorously reflect a sea ice–Eurasia causal link. The autumn BK sea ice anomaly was not a precursor of winter atmospheric conditions over Eurasia. Rather, the winter atmospheric circulation likely drives both winter BK sea ice and Eurasian temperature. However, the predicted winter sea ice–Eurasia links are likely weaker than the observed. This contrast is speciously related to the modest sea ice variance, but the actual influence of BK sea ice variation on Eurasian temperature anomalies is still questionable

References

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