



## Impact of the Arctic warming on extratropical climate variation

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In recent three years, the extremely cold winters continuously took place over Eurasian continent, while there was distinctive Arctic warming. In this study, we examined a role of the Arctic warming/cooling on the extratropical climate variation. It is demonstrated that the Arctic surface temperature variation is negatively correlated to the extratropical surface temperature over Eurasian continent, implying that Arctic warming is related to the cooling over Eurasian continent. We found that most climate models tend to simulate the observational relation, supporting the robustness of our finding. It is hypothesized that the weakened westerlies due to the weakened meridional temperature gradient provides a favorable condition for intrusion of the coldest polar air to extratropical regions. It is also demonstrated that the Arctic temperature variation is independent of the Arctic Oscillation, so that the two phenomena originated from the polar region can be used for understanding and predicting extratropical climate variation.