

## Robust estimation of Arctic sea-ice loss impact on Eurasian cooling

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Despite increasing global-mean temperature, mid-latitude central Eurasia in wintertime is cooling year by year, reflecting a frequent occurrence of severe winter in recent years. This counterintuitive regional cooling trend contrasts with remarkable warming in the Arctic region accompanied by rapid sea-ice decline, referred to as Arctic amplification. Remote influence from the Arctic warming to the mid-latitude cooling has been investigated by many observational and modelling studies, but its causality and extent is in controversial due to contradictive conclusions among studies.

In this research, we successfully detected a signature of Eurasian cooling excited by sea-ice decline in the Barents-Kara Sea, by generating a four kind of historical large ensemble simulation based on atmospheric general circulation model (AGCM), and also by using historical large ensemble of 6 different AGCM. We will conclude that a certain part of the Eurasian cooling trend has been driven by sea-ice loss, but the sea-ice forced effect may be underestimated in the AGCM than real.

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