Quantification of influence of Arctic sea-ice decline and natural variability to recent Eurasian cooling

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During the recent decades, severe winters occurred frequently in mid-latitude central Eurasia, which making long-term cooling trend over there. Remote influence from remarkable Arctic sea-ice decline to the Eurasian cooling have been proposed based on observational and modelling studies (e.g., Mori et al. 2014), but its significance remains controversial due to discrepant estimation among studies (e.g., Screen 2017).

In this research, we succeeded to detect and quantify sea-ice-forced Eurasian cooling signal contained in observational data and simulated historical large ensemble data based on 7 different atmospheric general circulation model (AGCM) driven by observed sea surface temperature and sea ice. The sea-ice reduction tends to increase occurrence frequency of cold winter in the central Eurasia, but the sea-ice-forced signal is underestimated in the AGCMs, and its extent is dependent on model. We conclude that this model bias can be potential cause of the diverse estimate of sea-ice loss influence among modelling studies.

Key words: Arctic, sea ice, teleconnection, cold winter

References

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