

PAMIP Webinar Series

Influence of future +2°C regional sea-ice loss on Arctic stratospheric polar vortex

Mian Xu

University of Exeter

Date: September 29th, 2022

Time: 3:00 pm (GMT)

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Or contact Lantao Sun:

lantao.sun@colostate.edu

Abstract

Using multi-model large-ensemble simulations from Polar Amplification Model Intercomparison Project (PAMIP), this study investigated the response of stratospheric polar vortex (SPV) to future +2°C sea-ice loss over Barents-Kara-Seas (BKS) and Okhotsk Sea. Results showed future BKS sea-ice loss could induce a weakened SPV during winter (Nov-Feb) through enhancing planetary wave-1, while Okhotsk sea-ice loss could induce a strengthened SPV in late winter/early spring (Jan-Apr) through weakening planetary wave-2. Further analysis showed that divergent SPV responses among PAMIP participants to BKS sea-ice loss are highly consistent with the divergent planetary-scale wave responses, while there is no such strong consistency in Okhotsk case. Moreover, the linkage between local warming induced by sea-ice loss over the two regions and near-surface wave source is validated. Our study could help clarify the role of future sea-ice loss in SPV variability, favorable for improving our understanding of Arctic-mid-latitude connection.



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