オホーツク海の海氷減少に対する大気応答

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Atmospheric response to anomalous sea ice in the Sea of Okhotsk

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Arctic sea ice has been rapidly declining in the current century in association with the global warming. Sea ice in the Sea of Okhotsk has also been declining. Honda et al. (1999) imposed sea ice anomalies in the Sea of Okhotsk on an atmospheric general circulation model (AGCM). They obtained atmospheric circulation anomalies that form a Rossby wave train extending from the Sea of Okhotsk to Alaska via the Bering Sea in winter. However, the horizontal resolution of their AGCM is only about 550 km. In this study, we used an AGCM that has higher horizontal resolution of about 150 km. Our results are partly consistent with the previous study. The atmospheric response to the sea ice reduction in our AGCM in winter (DJF) is characterized by a cyclonic SLP anomaly just over the Sea of Okhotsk, while the response in spring (MAM) shows an anticyclonic SLP anomaly over the Bering Sea. These cyclonic and anticyclonic SLP anomalies vertically extend to cyclonic and anticyclonic anomalies in the mid-troposphere, respectively, with their phases tilting westward with height. The enhancement of upward sensible and latent heat fluxes from the surface is much larger in winter than spring, and positive diabatic heating anomaly in mid and upper troposphere is only observed in association with positive precipitation anomalies over the Sea of Okhotsk.

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References
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