
AAS002-07

Room: 301B

Time: May 28 15:30-15:45

Summertime land-atmosphere interactions in northern Eurasia and their influence on Arctic sea ice variability

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A complicated climate system is formed over the Arctic/subarctic. Matsumura et al. (2010) performed a sensitivity experiment using an atmospheric general circulation model (AGCM) to examine the effect of anomalous springtime snow mass in northern Eurasia on the summertime land-atmosphere climate system. They concluded that variations in the springtime Eurasian snow mass result in changes in the summertime northern atmospheric circulation and hydrological cycle. In this study, we have performed a composite analysis based on Siberian snow cover to examine summertime land-atmosphere interactions in northern Eurasia by using observational data. Strong land-sea temperature gradient across the Arctic coast affects the upper tropospheric westerly through the thermal wind relationship in early summer, while in August, the snow-hydrological effect in eastern Siberia appears to form westerly anomalies with the subpolar jet, which is similar to the results of our model study. Furthermore, there is a possibility that changes in the northern atmospheric circulation contribute to Arctic sea ice variability along the Siberian coast.