

# Intensified linkage between the Arctic warming and the Eurasian cooling

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An interdecadal shift in the relationship between Arctic air temperature and midlatitude atmospheric circulations during boreal winter is investigated. During the recent Arctic warming period (1997–2014), tropospheric warm anomalies (from the surface to 300 hPa) in the Barents-Kara Seas are associated with statistically significant stronger Siberian high (SH) and anomalous anticyclonic circulation over Eurasia. At the same time, the East Asian jet stream extends westward and an apparent Rossby wave propagates from the Arctic to East Asia, suggesting a potential atmospheric teleconnection between the midlatitudes and Arctic. In contrast, the midlatitude atmospheric circulation anomalies associated with warm anomalies over the Barents-Kara Seas during 1979–1996 are barely statistically significant. Further observational analysis suggests that rapid tropospheric warming over the Arctic since the late-1990s might be responsible for the recent strengthening of the midlatitude-Arctic teleconnection. Due to the interdecadal change of background state, warm anomalies in the Barents-Kara Seas are associated with stronger local ascending anomalies. This is concurrent with stronger divergence and convergence anomalies in the upper and lower troposphere respectively, which reinforce the descending motion over Siberia and lead to an intensification of the SH. This configuration with vertical motions and divergent anomalies promotes the midlatitude-Arctic teleconnection after the late-1990s. Multi-models' simulations further suggest that the Arctic middle tropospheric warming (not near-surface warming) plays the dominant role in the recent intensified midlatitude-Arctic teleconnection

Key words: Arctic warming, Siberian high, Multi-models