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Impacts of four northern-hemisphere teleconnection patterns on atmospheric circulations over Eurasia and the Pacific

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The impacts of four teleconnection patterns on atmospheric circulation components over Eurasia and the Pacific region, from low to high latitudes in the Northern Hemisphere (NH), were investigated comprehensively in this study. The patterns, as identified by the Climate Prediction Center (USA), were the East Atlantic (EA), East Atlantic/Western Russia (EAWR), Polar/Eurasia (POLEUR), and Scandinavian (SCAND) teleconnections. Results indicate that the EA pattern is closely related to the intensity of the subtropical high over different sectors of the NH in all seasons, especially boreal winter. The wave train associated with this pattern serves as an atmospheric bridge that transfers Atlantic influence into the low-latitude region of the Pacific. In addition, the amplitudes of the EAWR, SCAND, and POLEUR patterns were found to have considerable control on the 'Vangengeim-Girs' circulation that forms over the Atlantic-Eurasian region in winter or spring. The EA and EAWR mainly affect the westerlies in winter and spring and the POLEUR and SCAND, respectively in summer and winter. Strong westerlies confine the extension of the North Polar vortex, which generally results in a small weak vortex and a shallow East Asian trough located in a position further east than normal. Furthermore, the North Polar vortex presents significant connections with the patterns during winter and summer. Analyses in this work suggest that the teleconnection patterns in summer could be driven, at least partly, by the Atlantic Multidecadal Oscillation, which to some degree might transmit the influence of the Atlantic Ocean to Eurasia and the Pacific region.

Biography

Tao Gao is now working in the Meteorological Institute of Inner Mongolia, CMA and has her expertise in climate variations and regional climate prediction research direction, especially in dust storm and drought studies for northern China and Inner Mongolia, China. She had visited the Institute of Meteorological and Physics, Agricultural and Science University of Vienna, Austria, Climate Research Division, Science & Technology Branch, Environment Canada, and the Department of Earth System Science, University of California, Irvine, USA as a visiting or a Senior Visiting Scholar supported by China Scholarship Council.

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