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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 connect the extension of the North Polar vortex, which generally results in a small weak vortex and a shallow East Asian trough.

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