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A seasonal forecast scheme for Inner Mongolia spring drought, Part-I: Dynamic characteristics of the atmospheric circulation and forecast signals

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This study analyzed the atmospheric evolutionary characteristics of insufficient rainfall that leads to spring drought in Inner Mongolia, China. The results revealed that a weakened western Pacific subtropical high and an enlarged North Polar vortex with a western position of the East Asian trough generally result in unfavorable moisture transportation for spring precipitation in IM. It was found that abnormal sea surface temperature in several crucial ocean areas triggers an irregular atmospheric circulation over the Eurasian continent and the Pacific region. Lower SST during the previous autumn over tropical regions of the central-eastern Pacific and Indian oceans induce a strong Walker circulation, corresponding to a weak and southeastward-retreating subtropical high over the western Pacific during the following winter and spring. Another

crucial area is the central region of the North Atlantic Ocean. Abnormally low SST of the ocean area during the preceding autumn causes the Scandinavian teleconnection pattern (the index of which is issued on the website of the Climate Prediction Center, USA) changes to a positive phase, which leads to a weak westerly over the Eurasian continent. In this case, the easterly over the North Pole becomes stronger than normal, resulting in an extended North Polar vortex during the following spring. In addition, SST differences during the previous December between the middle-eastern tropical and northwestern regions of the Pacific Ocean reflect variations of the Pacific Decadal Oscillation, causing the East Asian trough to move to a western position during the following spring.

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 scholars supported by China Scholarship Council.

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