



The Eurasian pattern-Pacific/North American pattern pathway: how does the East Asian winter monsoon influence the weather over North America on a weekly scale?

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Based on daily data from the National Centers for Environmental Prediction/National Center for Atmospheric Research (NCEP/NCAR) reanalysis, this study examines the connection of the weather over East Asia and North America for extended winters (December-March) from 1948/49 to 2014/15. First, two daily indices describing the surface air temperature (SAT) over East Asia (90E-150E, 20N-50N), TEAI, and North America (150W-60W, 40N-70N), TNAI, are defined. These two indices show significant inverse correlation when TNAI lags TEAI by approximately six days. This implies that when a cold (warm) event occurs over East Asia, a warm (cold) event over North America is expected one week later. Then, the mechanism underlying this inverse SAT relationship between East Asia and North America is further investigated. It is found that the teleconnection is established through the Eurasian pattern-Pacific/North American pattern (EU-PNA) pathway: when a positive (negative) phase of the EU pattern occurs over Europe and propagates into East Asia, which causes a cold (warm) event over East Asia, the convergence (divergence) associated with the southern center of the EU pattern over the subtropical western Pacific excites (or enhances) an anomalous structure resembling the positive (negative) phase of the PNA pattern. This positive (negative) PNA-like anomaly then grows up rapidly and induces a warm (cold) event over North America. Quantitatively, about 40% of the EU events are followed by in-phase PNA events. This result provides a useful hint for the weather prediction over North America.