



Relationship between Ural–Siberian Blocking and the East Asian Winter Monsoon in Relation to the Arctic Oscillation and the El Niño/Southern Oscillation

Hoffman Cheung and Wen Zhou

Guy Carpenter Asia-Pacific Climate Impact Centre, School of Energy and Environment, City University of Hong Kong

This study attempts to assess the possible linkage between Ural–Siberian blocking and the East Asian winter monsoon (EAWM). During the boreal winter, the dominance of blocking thermally enhances cold advection downstream. The frequent occurrence of Ural–Siberian blocking potentially promotes a cold EAWM and vice versa. The seasonal blocking activity can be regarded as the combined effect of the Arctic Oscillation (AO) and the El Niño/Southern Oscillation (ENSO). Weakened (strengthened) meridional flow in the positive (negative) phase of the AO is unfavorable (favorable) for the formation of blocking highs. Because the AO shows a close relationship with the North Atlantic Oscillation (NAO), its teleconnection with Ural–Siberian blocking may exist in the form of an eastward-propagating wavetrain. Be that as it may, the wavetrain signal across East Asia may be disturbed by the external effect of a strong ENSO event, which probably enhances (weakens) the westerlies near Siberia in its warm (cold) phase. Consequently, the blocking–EAWM relationship is stronger (weaker) when the AO and ENSO are in phase (out of phase). If both the AO and ENSO attain the positive (negative) phase, the Siberian high tends to be weaker (stronger) and the temperature tends to be higher (lower) in East Asia, with less (more) Ural–Siberian blocking. On the other hand, if they are out of phase, they are not strongly linked to the intensity of the Siberian high, and the blocking activity over Ural–Siberia is unclear.