



The role of AO and the mid-latitude height anomalies center to the regionalextrême low temperature event in January 2011

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The regional low temperature extreme event (RELTE) during 31Dec.2010 to 2Feb. 2011 is detected, which is the very rare and protracted cold event. Three meteorological factors could be responsible for this extreme winter event. First, a persistent blocking pattern existed in the mid-latitudes. This not only allowed cold air to persist in southern China, but also enabled each perturbation from the west propagating around the blocking high to trigger downstream cold-air intrusions from the north. Second, the consistent negative surface AO in January and February is closely associated with the downward propagating EP flux anomalies from the stratosphere, which force the Arctic cold air move into the mid-latitude. Third, the eastward movement of anomalies centers in the zonal wind anomalies in lower height, and most China is controlled by the positive anomaly center in January. Among these three factors, the blocking pattern and the movement of positive anomalies in lower height field is likely to be the direct reasons, the consistent downward propagating EP flux anomalies from the stratosphere and form the strong negative AO might be the prophase factor.