The influences of the preceding winter Northern Hemisphere Annular Mode to the spring extreme low temperature events in the north of eastern China

Shan Yin[†]; Jianping Li; Juan Feng [†] Institute of Atmospheric Physics, CAS, China, People's Republic of Leading author: <u>vinshan@mail.iap.ac.cn</u>

The relationship between the preceding boreal winter Northern Hemisphere Annular Mode (NAM, also called Arctic Oscillation) and the spring extreme low temperature events in the north of eastern China during 1959-2008 was examined in this study. The results show that there exists a significantly inverse relationship between the preceding winter (December-February) NAM and the following spring (March-May) extreme low temperature events in the north of eastern China. When the preceding winter NAM is stronger, negative and positive geopotential height anomalies are associated in the upper and lower level over the north of eastern China in the following spring, respectively. Accordingly, there is anomalous sinking motion and vertical heating accompanied, resulting in less low temperature events. The opposite circumstance is obviously observed in the weaker preceding winter NAM years. Furthermore, the possible physical mechanism associated is explored. The results indicate that the Eurasian snow cover is the potential bridge connecting the signals in the two seasons with each other. During the stronger preceding winter NAM years, the Eurasian spring snow cover area becomes smaller, as a result? Cmost part of Northern Asian is warmer than normal, which offers a counteract background for the occurrence of spring extreme low temperature events in the north of eastern China. Therefore, the preceding winter NAM contributes to the frequency and strength of the following springtime extreme low temperature in the north of eastern China, yielding a potential valuable signal in predicting the springtime extreme low temperature events in the above-mentioned region.