



## **Characteristics of the Extreme Low Temperature Events in Winter Half Year in China and Its Relationship to East Asian Winter Monsoon**

Yongqiu Han (1,2) and Lian-Tong Zhou (2)

(1) University of Chinese Academy of Sciences, Beijing, China (yqhan@mail.iap.ac.cn), (2) Center for Monsoon System Research, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China (zlt@mail.iap.ac.cn)

Based on daily minimum temperature dataset from 553 stations from 1961 to 2012 in China, extreme low temperature (ELT) thresholds are determined for different stations and occurrence frequency of ELT events in winter half year for each station is estimated and analyzed. And then several partitions in China are divided by empirical orthogonal function and it is verified to be credible by correlation analysis. Meanwhile, the spatial and temporal distribution of ELT events in each sub-region is diagnosed. Finally, the relationship between ELT events and East Asian winter monsoon (EAWM) circulation is studied by doing some correlation analysis. The results suggest that: the ELT events in winter half year in China are remarkably decreased in recent 51 years, but there are some differences between southern and northern areas. From 1964 to 1980, the ELT events in northeast, north and northwest of China are more than average and that are less than average in south, east and southwest of China, while it is just the reverse from 1981 to 1996. Moreover, the distribution of ELT events also shows a longitudinal oscillation. The correlation analysis between the frequency of ELT events in winter half year and EAWM index indicates that the two has good correlation with each other. And meanwhile, the correlation analysis between the frequency of ELT events in winter half year and sea level pressure shows that the former has a good positive correlation with Siberian High. Besides, the distribution of the difference between two period mean sea level pressure, from 1961 to 1979 and from 1980 to 2011, shows that Siberian High has an obviously southwardly movement and a trend of weakening after 1980, which go against the outbreak of the cold, that is why the ELT events in winter half year in most areas of China have an abrupt decrease.