



## **Changes in the Amplitude and Phase of the Annual Cycle: quantifying from surface wind series in China**

Tao Feng

Peking University, Department of Atmospheric and Oceanic Science, Beijing, China (taofeng@pku.edu.cn)

Climate change is not only reflected in the changes in annual means of climate variables but also in the changes in their annual cycles (seasonality), especially in the regions outside the tropics. Changes in the timing of seasons, especially the wind season, have gained much attention worldwide in recent decade or so. We introduce long-range correlated surrogate data to Ensemble Empirical Mode Decomposition method, which represent the statistic characteristics of data better than white noise. The new method we named Ensemble Empirical Mode Decomposition with Long-range Correlated noise (EEMD-LRC) and applied to 600 station wind speed records. This new method is applied to investigate the trend in the amplitude of the annual cycle of China's daily mean surface wind speed for the period 1971–2005. The amplitude of seasonal variation decrease significantly in the past half century over China, which can be well explained by Annual Cycle component from EEMD-LRC. Furthermore, the phase change of annual cycle lead to strongly shorten of wind season in spring, and corresponding with strong windy day frequency change over Northern China.