Geophysical Research Abstracts
Vol. 21, EGU2019-6700, 2019
EGU General Assembly 2019

Nonlinear Relationship of Air temperature and Precipitation in China: Asymmetry of Mean Air temperature

Fenghua Xie

China University of Geosciences, School of Environmental Studies, Department of Atmospheric Science, China (xfh5577@126.com)

The average temperature (AG) time series has significant asymmetry, which may be due to the difference in time which required for the recovery of the radial relaxation to the average state in positive anomalies and negative anomalies. Different authors have used different methods to study the asymmetry of mean temperature. However, the practical application of temperature asymmetry has not been well studied. Due to the existence of the Clausius–Clapeyron relation, water vapor has a significant effect on the air temperature.

In my work, we study the four type substructure of AG (SAG). It is found that precipitation tends to occur in continuous cooling (Type3 and Type4), and has obvious spatial distribution characteristics, most of which exceed 40% of the precipitation is occurring at Type3. In addition to SON, the precipitation have obvious spatial distribution characteristics. In general, precipitation mainly occurs during the cooling process.

We define asymmetry index I (warming-steps/cooling-steps), and there is a strong correlation between I and the frequency of precipitation. It is found that the first and second spatial-temporal decomposition (Principal Components Analysis) of the precipitation frequency and the index I are very consistent, and the spatial correlation coefficients are 0.4 and 0.67.

This result studies the relationship between precipitation and temperature from a new perspective and helps predict.