



## **The Tri-pole Relation among the Daily Mean Temperature, the Atmospheric Moisture and the Precipitation Intensity over China**

Peiwen Yan (1) and Danqing Huang (2)

(1) Nanjing University, School of Atmospheric Sciences, Nanjing, China (594866340@qq.com), (2) Nanjing University, School of Atmospheric Sciences, Nanjing, China (huangdq@nju.edu.cn)

Governed by the Clausius-Clapeyron (CC) equation, the daily mean temperature ( $T_m$ ) and precipitation extremes would be theoretically linked by the atmospheric moisture. However, precipitation extremes cannot systematically follow the CC rate of 7% per warming degree, due to moisture limitations. In this study, the observational tri-pole relation among  $T_m$ , the atmospheric moisture and the precipitation intensity over China have been investigated. The results indicate that the atmospheric moisture (the specific humidity and the dew point temperature) is positively linked with  $T_m$  across the four seasons at the interannual timescale. The atmospheric moisture and the precipitation are also positively linked at the interannual timescale. Particularly, the increase in the extreme precipitation is accompanied by the high atmospheric moisture, but it is different in four seasons. In comparison, the relation between temperature and atmospheric moisture is stronger than that between atmospheric moisture and the precipitation. Linking by the atmospheric moisture,  $T_m$  is highly associated with precipitation extremes, while the relation shows seasonal differences. These differences may be attributed to the negative scaling of precipitation extremes with precipitation efficiency (defined as the percentage of moisture in the air converting into the precipitation) with  $T_m$ , as it exceeds  $\sim 25^\circ\text{C}$ .