

Changes in the seasonal cycle of precipitation under global warmingChia Chou[†]; Chia-Wei Lan[†] Academia Sinica, TaiwanLeading author: chiachou@rcec.sinica.edu.tw

The annual range of precipitation, which is the difference between maximum and minimum precipitation within a year, is examined in climate model simulations under global warming. For global averages, the annual range of precipitation tends to increase as the globe warms. On a regional basis, this enhancement is found over most areas in the world, except for the bands along 30oS and 30oN, respectively. The enhancement in the annual range of precipitation is mainly associated with larger upward trends of maximum precipitation and smaller upward trends or downward trends of minimum precipitation. Based on the moisture budget analysis, the dominant mechanism is vertical moisture advection, both on a global average and on a regional scale. The vertical moisture advection includes the thermodynamic component, which is associated with increased water vapor, and the dynamic component, which is associated with changes in circulation. The thermodynamic component enhances the annual range of precipitation, while the dynamic component tends to reduce it. Other effects, such as horizontal moisture advection and evaporation, are small for a global average, but could be important on a regional basis.