

Response of Summer Precipitation over the Yangtze River Basin to the Equatorial Pacific SST Anomalies: A Simulation Study with CAM3

Hui Li^{1,2}, Er Lu¹, Panmao Zhai², Shunwu Zhou¹, and Yafei Wang²

¹School of Atmospheric Sciences, Nanjing University of Information Science & Technology, Nanjing, China

²State Key Laboratory of Severe Weather, Chinese Academy of Meteorological Sciences, CMA, Beijing, China

Abstract

Corresponding to the strong El Nino that started from September 2009, heavy rainfall occurred over the Yangtze River basin in summer 2010. To better understand whether and how the preceding sea surface temperature anomalies (SSTAs) over the equatorial Pacific can affect the summer rainfall over the basin, three types of sensitive experiments were performed with the NCAR CAM3 model. (1) Positive preceding SSTAs of different durations, ranging from 1 to 10 months, were examined in the model. Results show that the summer precipitation over the basin is sensitive to the duration of the El Nino. The anomaly of precipitation increases with duration, and the strong SSTA that starts from preceding autumn can lead to heavy summer rainfall over the basin. (2) The positive SSTAs were given with different intensities in the model. Tests indicate that the anomaly of precipitation increases with SSTA, but a positive anomaly of precipitation can be obtained only when the SSTAs are greater than 2°C, and small positive SSTAs may lead to negative anomaly of precipitation. (3) Negative SSTAs were also considered in the simulations. It is found that the negative SSTAs may not always lead to negative anomaly of precipitation, suggesting that the mode might not be sensitive to negative SSTAs.

Key words: CAM3 model, sensitive experiments, SSTA, summer precipitation.