EMS Annual Meeting Abstracts
Vol. 13, EMS2016-82, 2016
16th EMS / 11th ECAC

Structure and Evolution Characteristics of Atmospheric Intraseasonal Oscillation during Wet and Dry summers over Yangtze River Basin in China

Yanjun Qi
Chinese Academy of Meteorological Sciences, Beijing, China (qyj198836@sina.com)

Summer rainfall in eastern China exhibits a marked intraseasonal oscillation (ISO). It is found that the interannual relationship between the ISO intensity and the summer mean rainfall over the middle-lower reaches of the Yangtze River Basin (YRB) shows a significant positive correlation during 1979-2007. This indicates that the stronger (weaker) ISO activity is generally associated with a wet (dry) summer over the YRB. The spatial and temporal structures of the ISO during wet and dry summers are investigated based on the gridded rainfall data and NCEP-NCAR reanalysis. The comparison of ISO characteristics between the wet and dry summers shows that the low-level circulation anomalies are quite different. In wet summers, there is an anomalous low-level cyclone to the north of Yangtze River and an anticyclonic anomaly to the south of Yangtze River at the stage of maximum rainfall. This coupled cyclonic-anticyclonic circulation, which propagates alternately northwestward from the western north Pacific, plays a critical role in resulting in strong precipitation over YRB. In contrast, although an anticyclonic anomaly with pronounced southwesterlies appears to the south of YRB, the low-level cyclonic anomaly does not appear in situ during the maximum rainfall phase in dry summers. Due to much weaker moisture and boundary layer wind convergence over YRB in dry summers, the rainfall over YRB is significantly weaker. The vertical motion and specific humidity anomalies associated with ISO exhibit notably northward propagation from the tropics all the way to the latitude of Yangtze River during wet summers. The enhanced upward motion, low-level vorticity and moisture favor for strong precipitation in YRB. However, in dry summers, the upward motion and humidity anomalies do not show clear northward movement, and they appear to develop locally over the YRB region. As a result, the local vorticity and upward motion and associated rainfall are much weaker during dry summers.