

Characteristics of the Precipitation Diurnal Variation over Jiangsu, Eastern China during Warm Season

*Xiyu Mu¹, Qi Xu², Yang Wu³, Anning Huang³

1. Key Laboratory of Transportation Meteorology of CMA; Jiangsu Institute of Meteorological Sciences; Nanjing Joint Institute for Atmospheric Sciences, 2. Jiangsu Air Traffic Management Branch Bureau of CAAC, 3. School of Atmospheric Sciences, Nanjing University

Based on the hourly precipitation data observed from ~1800 gauge stations during 2013-2017, the characteristics of precipitation diurnal variation over Jiangsu Province in Eastern China during warm season (May to September) have been revealed in this study. Results show that the precipitation amount (PA), frequency (PF) and intensity (PI) are zonally distributed over Jiangsu. The large PA center is located over the south side of the west end of Jiangsu Section of Yangtze River (JSYR). The PA shows distinct diurnal cycles. From midnight to noon, the PA center expands westwards and northwards from east JSYR to west JSYR with the PA increased. Hereafter the PA center shrinks eastwards and southwards with the PA decreased from noon to midnight. The strongest diurnal Peak of PA (PPA) is located over the south side of the west end of JSYR and the diurnal PPA gradually decreases northwards and eastwards from morning to midnight. The PA is larger in the daytime than in the nighttime over most Jiangsu. The PA shows two diurnal peaks with one in the early morning and the other in the afternoon contributed by the long duration rainfall and the short duration rainfall, respectively. The total rainfall is largely contributed by the long duration rainfall, which is determined by the summer monsoon circulation. The short duration rainfall is mainly affected by the local thermal conditions resulted from the underlying surface. The contribution of the rainfall with long (short) duration to the total rainfall over most areas shows very distinct sub-seasonal variations with a clear decreasing (increasing) trend from pre-Meiyu through Meiyu to post Meiyu. Among the three sub-periods, the PA and diurnal cycle of the total rainfall are mostly contributed by those during Meiyu period. The results of the cluster analysis show that the representative patterns of precipitation diurnal variation and their spatial distributions are closely connected with the underlying surface, such as the Yangtze River, big cities, Lake Taihu, Lake Hongze and coastal. The diurnal variation of the rainfall influenced by different underlying surface shows respective features.

Keywords: precipitation diurnal cycle, underlying surface, different duration rainfall, warm season

