

Characteristics of temporal and spatial distribution of regional rainstorm processes to the east of 95°E in China during 1981-2015

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The events of the regional rainstorm processes (RRP) to the east of 95°E in China over 1981-2015 are constructed based on intensive daily observations of precipitation in China and NCEP/NCAR reanalysis data by means of subjective and objective analyses. Temporal and spatial characteristic distribution of RRP in China are further investigated using the methods of wavelet power spectrum, nine-point binomial smoothing and Ward cluster analysis. The main conclusions are as follows. (1) The annual average number of RRP to the east of 95°E in China is nearly 30. RRP in the Yangtze-Huaihe River valley occur most frequently among the six subareas with an annual average number of about 19, followed by that in South China and the eastern part of Southwest China with the annual average number of RRP 10.5 and 5.8 times respectively. Annual average number of RRP are only about 1-3 times in other subareas. (2) The inter-annual and inter-decadal variations of the annual number of RRP exhibit distinct fluctuation characteristics. The inter-annual and inter-decadal fluctuating variation in the Yangtze-Huaihe River valley is the most consistent with that to the east of 95E in China. Moreover, the fluctuating variations have a significant positive correlation between South China and eastern part of Southwest China, and also between Northeast China and North China. The annual number of RRP over the east of 95E in China and its subareas demonstrates a periodic variation of 2-4a, and also shows a periodic variation of 6-10a in the Yangtze-Huaihe River valley and South China and eastern part of Northwest China, while a 13-17a oscillation can be found in North China.(3) On the whole, the occurrence frequency of RRP to the east of 95E in China is the most in summer (especially in July), the least in winter, and higher in spring than in autumn. The months when RRP occur most frequently are June and July in the Yangtze-Huaihe River valley and eastern part of Southwest China, and May and June in South China. RRP mainly appear in July and August in other subareas.(4) The distribution patterns of RRP to the east of 95E in China are divided into 7 types. The heavy precipitation areas for pattern I -IV migrate northward step by step from South China and southern part of Yangtze River valley to Huanghuai Basin and eastern part of Sichuan Basin. The heavy precipitation areas of pattern V-VII all are located at the Coastal region of Southeast China.

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