

An Analysis of Climate Characteristic of Area rainfall of the Huaihe River Basin in Recent 50 Years

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The Huaihe River Basin is an overlapped district of three kinds of transition zone, which are south and north climate, high and low latitude, interaction between land and sea. The Huaihe River is one of 7 long rivers of the most frequent and the most serious flood disaster in the whole country. In this paper, using the daily rainfall data of 170 stations from 1960 to 2008, the area rainfall of the 15 sub-units of Huaihe River Basin is calculated with Tasion polygon method. Based on the monthly, seasonal and annual area-rainfall data during 1960-2008, the climate characteristics and spatial distribution of area-rainfall in recent 50 years are studied using 5-year moving average, linear regression, wavelet analysis, and so on. The Mann-Kendall trend analysis was used to test the trend in change. The results are summarized as below:

1. The results indicate that slight increase in trend has been detected in annual charge since 1960s. However, the increasing tendency is not obvious. The trend is also uneven with the decrease during 1960s-1990s, while there is a significant increase in trend since 2000. The change trend of the two water systems is different. Annual area-rainfall is a little upward in Huaihe Water System and Huaihe River Basin, while annual area-rainfall is downward in Yishusi Water System. The area rainfall is abundant with larger variability and water resources are more instable since 2000.

2. The temporal and spatial patterns of summer and annual area rainfall in Huaihe River Basin are similar. The most annual precipitation focused in summer, accounted for 60%-80% of the total. For seasonal area rainfall, increasing tendencies mainly occurred in summer and winter, while spring and autumn area-rainfall experienced a slight decreasing tendency, and the trend was unapparent.

3. The spatial distribution of the precipitation showed that there was more precipitation in the area of the low reaches Yihe and Shuhe in summer, while it was

less in the Northwest. In other seasons, precipitation was more in the South and it was less in the area of Nansihu.

4. Based on analyses of climatic characteristics of area rainfall in the Huaihe River Basin, the inter-annual, the inter-decadal and the periodic variations of seasonal precipitation anomalies and the circulation features in both more precipitation years and less precipitation years are focally investigated in the basin. It is found that the summer precipitation is more than normal during 2003-2008. Spring precipitation is less than normal from 1978 to 1989. The two increasing time areas in winter were 1989-1993 and 2001-2008, while that will be less than normal after 2008. Autumn precipitation is less than normal during 1988-1995 and after 2001.

5. Annual area-rainfall series with quasi-2, 4-8 years oscillation period are composed over Huaihe River Basin. Quasi-2 year oscillation period is the best notable in annual area rainfall series, especially from 1995 to 2005. The periodic oscillation of area rainfall variation is difference in various seasonal. There are obvious periodic oscillation of 2 years and secondary period of 8 years in summer. In winter, Quasi-16 years period variations is mainly found notable, and Quasi-4 years period in spring and autumn.

6. The points of abrupt change along the time series are discovered and the main period of every series are confirmed. The analysis of the abrupt change reveals an abrupt change in 1956 on annual scale with the Mann-Kendall rank statistical test. The Huaihe River Basin underwent two rainy periods from 1962 to 1965 and after 2002. The change trend is comparatively stability from 1965 to 2002.

Key words: Huaihe River Basin; Area rainfall; Trend of climate variation;