Spatial and temporal variability of precipitation maxima during 1960-2005 in the Yangtze River basin and possible association with large-scale circulation

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Abstract
This study investigated spatial and temporal patterns of trends of the precipitation maxima (defined as the annual/seasonal maximum precipitation) in the Yangtze River basin for 1960-2005 using Mann-Kendall trend test, and explored association of changing patterns of the precipitation maxima with large-scale circulation using NCEP/NCAR reanalysis data. The research results indicate changes of precipitation maxima from relative stable patterns to the significant increasing/decreasing trend in the middle 1970s. With respect to annual variability, the rainy days are decreasing and precipitation intensity is increasing, and significant increasing trend of precipitation intensity was detected in the middle and lower Yangtze River basin. Number of rain days with daily precipitation exceeding 95th and 99th percentiles and related precipitation intensities are in increasing tendency in summer. Large-scale atmospheric circulation analysis indicates decreasing strength of East Asian summer monsoon during 1975-2005 as compared to that during 1961-1974 and increasing geopotential height in the north China, South China Sea and west Pacific regions, all of which combine to negatively impact the northward propagation of the vapor flux. This circulation pattern will be beneficial for the longer stay of the Meiyu front in the Yangtze River basin, leading to more precipitation in the middle and lower Yangtze River basin in summer months. The significant increasing summer precipitation intensity and changing frequency in the rain/no-rain days in the middle and lower Yangtze River basin have potential to result in higher occurrence probability of flood and drought hazards in the region. (c) 2007 Published by Elsevier B.V.

Keywords
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in the Loess Plateau (China) during 1960-2013 under global warming.

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