Geophysical Research Abstracts
Vol. 13, EGU2011-5054, 2011
EGU General Assembly 2011
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The Spatial-Temporal Pattern of Extreme Rainfall over Haihe River Basin, China: 1958 – 2008

Jianting Chu
University of Queensland, Brisbane, Australia (jiantingchu@gmail.com)

Temporal and spatial variances of extreme precipitation trends in the Haihe River basin are studied. Daily precipitation from 29 weather stations is scrutinized for the following extreme indices: monthly, seasonal, and annual maximum 1 (3, 5, 7) day's precipitation, and maximum dry spell.
With non-parametric trend tests, i.e. simple linear regression, 5-year moving average, and Mann-Kendall methods, it is showed that: 1) statistics for maximum 1 (3, 5, 7) day's precipitation has the similar tendencies; 2) the monthly characteristics for average and standard deviation in extreme precipitation have the similar patterns, i.e. both of them peak at July and August, but reach the lowest value in January and December; in contrast, the average and standard deviation of maximum dry spell reaches its lowest point in July and peak in January and December; 3) in summer, there is obvious decreasing trend before the Yan mountain, but obvious increasing trend in max dry spell along the Bo Sea coast and its northern part; in autumn, similar obvious increasing trend is witnessed in the large southern part of Haihe River basin; 4) during the whole time period and for annual series, except for some stations before the Yan Mountain, extreme precipitation and drought experience stable decline and incline trend, respectively.
Taking longitude, latitude and altitude as reference parameters, with Ward's and k-means method, the whole river basin is been further divided into four sub-regions. Part NE part has the largest maximum precipitation, while Part NW is the minimum; in addition, Part NE also has the most obvious standard deviation, coefficient of variation and coefficient of skew when compared with other three regions.