



Trend analysis of drought in southern Taiwan

P. S. Yu (1), C. C. Kuo (2), C. J. Lu (3), and T. C. Yang (4)

(1)Department of Hydraulic and Ocean Engineering, National Cheng Kung University, e-mail: yups@mail.ncku.edu.tw, Tel:+886-6-2757575-63248, (2)Department of Hydraulic and Ocean Engineering, National Cheng Kung University, (3)Department of Hydraulic and Ocean Engineering, National Cheng Kung University, (4)Department of Information Management, Hsing Kuo University

This paper aims at analyzing the tendency of long term historical meteorological series and the drought frequency in southern Taiwan. Ten observed gauges which data are at least 80 years are used for meteorological tendency analysis in the study. Three statistical tests, Cumulative deviations, Mann-Whitney-Pettitt tests, and Kruskal-Wallis tests, are applied to meteorological tendency analysis. The results reveal that these annual rainfall series in southern Taiwan have the same changing point, in 1950s and have a significantly decreasing tendency. The average annual temperature has a tendency to increase and the changing point is in 1940s. Analyzing the route of typhoons, the third route of typhoons which significantly influences rainfall in southern Taiwan has decreased a lot after 1950s. To understand the variations and tendencies of the drought events, Standardized Precipitation Index (SPI) is applied to analyze the effects of drought frequency and the duration from the long term precipitation variation. The results show that the drought becomes severer after approximately 1956. The mean numbers of moderate drought (six-month $SPI \leq -1.0$) and severe drought (six-month $SPI \leq -1.5$) increase from 0.47 to 0.88 per year and 0.18 to 0.48 per year, respectively. The average duration of moderate drought and severe drought is becoming longer from 2.1 to 2.9 months and 2.1 to 2.6 months, respectively. The analytical results conclude that the water shortage problems in Southern Taiwan could be stricter than before.