Hydroinformatics in Hydrology, Hydrogeology and Water Resources (Proc. of Symposium JS.4 at the Joint IAHS & IAH Convention, Hyderabad, India, September 2009). IAHS Publ. 331, 2009, 154-162.

The robust detection of outlying rainfall observations

ZHAO CHAO[1,2,3], BAO WEI-MIN[2] & HONG HUA-SHENG[3]

1 *Water Resources and Environmental Institute, Xiamen University of Technology, Xiamen 361005, China*
zhaochao@xmut.edu.cn

2 *State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, College of Hydrology and Water Resources , Hohai University, Nanjing 210098, China*

3 *State Key Laboratory of Marine Environmental Science, Environmental Science Research Center, Xiamen University, Xiamen 361005, China*

Abstract The detection of outliers is important for telemetric rainfall observations because outliers significantly distort the results of most hydrological models. In this paper a three-step robust statistical method combining robust statistical theory with distribution features of precipitation for the detection of outliers in a telemetry system is described. The proposed robust statistical method adopts the Tukey fence insensitive to outliers as identification bounds, and presents a three-step pattern to adapt the distribution of rainfall data. Moreover, the modified method based on dividing precipitation data into several groups further improves detection efficiency. Synthetic data are given to test the performance of the proposed method. The results illustrate that the proposed method produces reliable detection results. It is shown that the new method, based on distribution of the statistical features of rainfall, is suitable for hydrological needs.

Key words telemetry system; outlier; Tukey fence; distribution feature; three-stepwise robust detection