

Multivariate Rainfall Disaggregation Using MuDRain Model: Malaysia Experience

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Abstract : Disaggregation daily rainfall using stochastic models formulated based on multivariate approach (MuDRain) is discussed in this paper. Seven rain gauge stations are considered in this study for different distances from the referred station starting from 4 km to 160 km in Peninsular Malaysia. The hourly rainfall data used are covered the period from 1973 to 2008 and July and November months are considered as an example of dry and wet periods. The cross-correlation among the rain gauges is considered for the available hourly rainfall information at the neighboring stations or not. This paper discussed the applicability of the MuDRain model for disaggregation daily rainfall to hourly rainfall for both sources of cross-correlation. The goodness of fit of the model was based on the reproduction of fitting statistics like the means, variances, coefficients of skewness, lag zero cross-correlation of coefficients and the lag one auto correlation of coefficients. It is found the correlation coefficients based on extracted correlations that was based on daily are slightly higher than correlations based on available hourly rainfall especially for neighboring stations not more than 28 km. The results showed also the MuDRain model did not reproduce statistics very well. In addition, a bad reproduction of the actual hyetographs comparing to the synthetic hourly rainfall data. Mean while, it is showed a good fit between the distribution function of the historical and synthetic hourly rainfall. These discrepancies are unavoidable because of the lowest cross correlation of hourly rainfall. The overall performance indicated that the MuDRain model would not be appropriate choice for disaggregation daily rainfall.

Keywords : rainfall disaggregation, multivariate disaggregation rainfall model, correlation, stochastic model

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