TREND AND STATISTICAL ANALYSIS OF ANNUAL MAXIMUM DAILY RAINFALL (AMDR) FOR SARAWAK RIVER BASIN, SARAWAK, MALAYSIA

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ABSTRACT

The Sarawak River Basin is one of the major river basins located in the southern part of Sarawak, Malaysia, and has experienced frequent extreme rainfall resulting in flash floods in recent years. This study aims to carry out trend and statistical analysis of annual maximum daily rainfall (AMDR) for 10 rainfall stations distributed evenly in the basin from 1975 to 2020. From the analysis, the AMDR records high variability for most of the rainfall stations, with the month of January having the highest occurrence of AMDR events. The linear regression plot of the mean AMDR showed a slight decreasing trend over the past four decades. The threshold rainfall value of 180 mm was used to perform frequency analysis, and the result shows that the return period for daily rainfall exceeding 180 mm was 2.71 years. The occurrence probability of the flood event at least once in 1, 2, 3, 4 and 5 years was 0.37, 0.60, 0.75, 0.84 and 0.90, respectively. A frequency curve based on the mean AMDR data with Gumbel distribution fitting was also developed from the current study and can be applied to the planning and design of flood infrastructures in the basin.

Keywords: Annual maximum daily rainfall, Extreme events, Frequency analysis, Rainfall trend, Urban drainage