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Generalised Long Duration Probable Maximum Precipitation (PMP) Isohyetal Map for Peninsular Malaysia

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Abstract

Isohyetal maps were prepared to estimate Probable Maximum Precipitation (PMP) for long duration storms in Peninsular Malaysia. Historical storms of 1, 3 and 5-day durations from 21 rainfall recording stations operated by Malaysian Meteorological Service (MMS) were identified and analysed to calculate the PMP vales. Maximum rainfall for 1, 3 and 5-day storms in the Peninsula were recorded as 809, 1272.9 and 1494 mm, respectively. The widely used and most reliable hydrometeorological method was used to derive and transpose the PMP values from the storm locations to all MMS stations in the Peninsula. Maximum transposed PMP for a particular duration was obtained for six selected historical storms. Rectified Skew Orthomorphic (RSO) coordinates of the rainfall stations and point PMP values were used for the Kriging method to generate the PMP envelop curves. The enveloping isohyetal lines were further adjusted and smoothen to consider the effect of topographical and geographical effect on the PMP values. Calculated point PMP values for 1, 3 and 5-day storms can, respectively, be as high as 1149, 1808 and 2121 mm in West Malaysia. These isohyetal maps shall give direct and fast estimate for PMP values even for the catchments where no rainfall gauging stations are available. However, results obtained in this study is applicable for the catchments located at elevation lower than 200 m mean sea level (MSL), and until any storm larger than the selected (in this study) occur in Peninsular Malaysia.

Keywords

Probable Maximum Precipitation; PMP; Storm Duration; Storm Maximization; Historical Rainfall; Transposition and Isohyetal Map

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