CHARACTERIZATION OF CONVECTIVE RAIN IN KLANG VALLEY, MALAYSIA

NORDILA BINTI AHMAD

UNIVERSITI TEKNOLOGI MALAYSIA

ABSTRACT

Storms of convective origin are generally known to be responsible for most of flash flood events in Malaysia. Flood problems are aggravated by rapid urbanization which modified the hydrological processes of a catchment. This study is aimed to evaluate the characteristic of convective rain in Klang Valley. The characteristics are based on short rainfall interval data between years 2000 and 2004. The convective events were analysed in terms of timing and spatial distribution. The spatial distributions of convective rainfall, derived from meteorological radar data and those observed on the ground are compared. Convective storm occurred most frequently during intermonsoon months which made up about 44%. A variety of storm shape is evident. Most of the convective events occurred over short durations. The convective storms were further classified into slightly convective, moderately convective and strongly convective by using β parameter values. A 35 mm/hr threshold intensity is used for separating convective from non convective storms for local conditions. The areal distributions derived from radar and those from raingauge are poorly correlated. Each storm is unique in term of the movement of its storm centre. Some have long paths while others are circling within a limited area. The Aerial Reduction Factor (ARF) obtained from this study is comparable with ARF values obtained earlier by other researchers. A new Intensity Duration Frequency (IDF) curve is plotted based only on convective storms. For a given duration and return period, the new IDF generally results in higher storm intensity compared to the existing IDF curve. However, the new IDF curves are more appropriate for determining design storms for areas experiencing high occurrence of convective events. It is found that, a threshold value of 35 mm/hr could be used in developing IDF of Peak Over Threshold (POT) series.

ABSTRAK

Ribut perolakan boleh menyebabkan pelbagai kejadian banjir kilat di Malaysia. Masalah banjir diburukkan lagi dengan proses perbandaran yang pantas dan telah mengubah proses hidrologi bagi suatu kawasan tadahan. Kajian ini bertujuan untuk menilai ciri-ciri ribut perolakan di Lembah Klang. Ciri-ciri tersebut adalah berdasarkan kepada data sela hujan yang pendek di antara tahun 2000 hingga 2004. Peristiwa ribut perolakan telah dianalisis untuk aspek masa dan taburan ruang. Taburan ruang hujan perolakan yang diperoleh dari data radar meteorologi dan semua data yang dicerap di permukaan bumi (tolok hujan) telah dibandingkan. Ribut perolakan yang paling kerap berlaku dalam bulan perantaraan monsun iaitu kira-kira 44% daripada keseluruhan hujan perolakan. Pelbagai bentuk taburan hujan boleh diamati. Kebanyakan hujan perolakan berlaku dalam tempoh yang pendek. Ribut perolakan seterusnya diklasifikasikan kepada perolakan sedikit, perolakan sederhana dan perolakan kuat dengan menggunakan nilai parameter β. Nilai ambang keamatan hujan, 35mm/jam digunakan untuk mengasingkan ribut perolakan daripada ribut bukan perolakan untuk keadaan tempatan. Taburan ruang yang diterbit daripada radar dan tolok hujan mempamerkan perbezaan yang sangat ketara. Setiap ribut adalah unik dalam aspek pergerakan titik pusat ribut. Sebilangannya mempunyai laluan yang panjang sementara yang lain bergerak secara berkitar dalam laluan yang terhad. Lengkung '*Areal Reduction Factor*' (ARF) yang diperoleh daripada kajian ini boleh dibanding dengan nilai *ARF* yang diperoleh daripada pengkaji terdahulu. Lengkung Keamatan-Tempoh-Frekuensi (IDF) baru telah diplot berdasarkan ribut perolakan sahaja. Bagi tempoh dan kala kembali diberi, lengkung IDF yang baru berupaya menghasilkan keamatan ribut yang lebih tinggi berbanding lengkung IDF sedia ada. Didapati, nilai ambang 35 mm/hr boleh diguna dalam membina IDF dari siri '*Peak Over Threshold*' (POT).

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