Mulvaney Equation

The Mulvaney Equation was proposed by the Irish engineer Thomas James Mulvaney (1822-1892). The equation was first published in 1851. The model predicts the peak discharge Q as a function of an empirical constant C, the average rainfall intensity of the catchment I and the area of the catchment A:

$$Q [m^3/s] = C \left[\frac{1E+6}{1E+3*3.6E+3}\right] * I \left[\frac{mm}{hour}\right] * A [km^2]$$

The intensity being given in $mm/hour$ and the area in km^2, the constant C accounts for the transformation of units from $mm/hour$ and km^2 to m^3/s. This equation is only valid for small catchments in which storage and losses are not significant! This rather the case in urban (small) catchments:

This equation in commonly used units reads:

$$Q_{peak} = 0.278 * C * I * A$$

where

Q_{peak} = peak discharge in cubic meters per second

I = Intensity of rainfall in mm/hour

A = Area in square kilometers

C is a runoff coefficient.