

Modelling runoff quantity and quality in tropical urban catchments using storm water management model

Abstract:

Due to differences in rainfall regimes and management practices, tropical urban catchments are expected to behave differently from temperate catchments in terms of pollutant sources and their transport mechanism. Storm Water Management Model (SWMM) was applied to simulate runoff quantity (peakflow and runoff depth) and quality (total suspended solids and total phosphorous) in residential, commercial and industrial catchments. For each catchment, the model was calibrated using 8-10 storm events and validated using seven new events. The model performance was evaluated based on the relative error, normalized objective function, Nash-Sutcliffe coefficient and 1:1 plots between the simulated and observed values. The calibration and validation results showed good agreement between simulated and measured data. Application of Storm Water Management Model for predicting runoff quantity has been improved by taking into account catchment's antecedent moisture condition. The impervious depression storages obtained for dry and wet conditions were 0.8 and 0.2 mm, respectively. The locally derived build-up and wash-off parameters were used for modelling runoff quality.