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Statistical Modelling of Nonpoint Source Pollution from a Tropical Urban Residential Area

A. MAMUN[1*], M.Z. ALAM[1], D. DARUS[1], A. IDRIS[2]

[1]*Bioenvironmental Engineering Research Unit (BERU), Faculty of Engineering, International Islamic University Malaysia (IIUM), Jalan Gombak, 53100 Kuala Lumpur, Malaysia*
[2]*Department of Chemical & Environmental Engineering, Faculty of Engineering, Universiti Putra Malaysia (UPM), 43400 UPM Serdang, Selangor, Malaysia.*

Quantification of the pollutants generated due to rainfall-runoff process is tedious and expensive. On the other hand, the characteristics of runoff quality also depend on the landuses and rainfall patterns. Such difficulties can be simplified by the development of reliable and easy to use non-point source (NPS) regression models. Information on the statistical models for the estimation of NPS or diffuse pollution loading in many tropical countries, including Malaysia, is not available yet. Therefore, local data was used to develop multivariate statistical models to estimate various pollutants from the NPS or diffuse sources of a residential area. The multivariate regression models were developed for total dissolved solids (TDS), total suspended solids (TSS), zinc (Zn) and copper (Cu), which could be used to estimate pollution loading from the urban residential areas having activities and drainage system similar to the study area. Fifty six storm events of various durations and intensities were monitored for the study. It was observed that the rainfall data followed log-normal distribution at 95% confidence level. About 5% of the events had inter-event dry period of less than 19.5 hours and 95% of the events occurred less than a gap of 169.8 hours. Forty six rain events were used to develop the regression models. Calibration and validation were done using another five rain events for each exercise. Models for other parameters exhibited low coefficients of determinations (less than 0.50) and, therefore, considered not useful for the estimation of pollution load form nonpoint sources of a developed urban residential area.

*Presenting author; mamun@iium.edu.my