

Modelling the efficiency of stormwater source-control systems - Effect of uncertainties in pollutant wash-off dynamics

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This study investigates the effect of uncertainties associated with pollutant wash-off dynamics in the context of stormwater management practices modelling. A formal Bayesian approach is adopted for the calibration and the uncertainty analysis of a commonly used wash-off model, under (1) the unverified assumption of homoscedastic, independent and normally distributed residuals and (2) using a more correct heteroscedastic and autoregressive error model. The results obtained for each of these approaches are compared and the uncertainty associated with water quality modelling is later propagated through a conceptual Best Management Practices (BMP) model, for various stormwater management scenarios, so as to assess the effect of this uncertainty for BMP modelling and clarify the benefits of a robust description of error structure. This study indicates that the violation of the statistical assumptions about the residuals may result in unreliable estimation of model parameters and total predictive uncertainty. The effect of the uncertainty in the intra-event variability of concentrations in runoff is however found to have only a limited effect on the outputs of the BMP model, regardless of the error model adopted for calibration.