



## Interest of Bayesian learning principle for stormwater quality modelling based on turbidity time series

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### ABSTRACT

Since the 1990's the number of applications of Bayesian method for the test of environmental models have kept increasing. It is only recently that it was applied for the improvement of stormwater quality models. This is partly related to the development of continuous measurement techniques which allows getting more representative datasets, such as turbidity which is used as a surrogate for the assessment of Total Suspended Solids. However, the high potential of the learning principle of the Bayesian method has until now been under-used in most urban drainage studies. This paper presents the formal Bayesian based methodology that was applied for the first tests of a simple conceptual storm water quality model, on the basis of a two years continuous turbidity database. Attention was paid to the proper tuning of the method: i) the Global Likelihood Function was used to represent the residual distribution, ii) the DREAM algorithm enabled an effective and efficient sampling of the parameters *a posteriori* distribution and iii) a two steps learning process was applied to optimize the iterative improvement of the model structure. First results evidenced the limits of this latter, however offering an encouraging perspective for its improvement, thus confirming the high interest of Bayesian learning principle.

### KEYWORDS

Bayesian approach, learning principle, modelling, stormwater quality, turbidity time series