



## Road traffic impact on water quality in an urban catchment (Grigny, France): a step towards integrated traffic, air and stormwater modelling

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### ABSTRACT

Methods for simulating air quality due to vehicles and the associated effects on stormwater runoff quality in an urban environment and their coupling are examined. To achieve this aim, the models (traffic, emission, atmospheric dispersion, and stormwater) must be carefully selected according to the special requirements and the level of details needed for the integrated system. The present study focuses on the interface between the air quality and stormwater models. The development of this interface raises questions concerning the processes treated between the atmosphere and stormwater. Moreover, other pollutant sources are added to road pollutants in an urban context: the evaluation of this new modelling chain with observations needs to distinguish between pollutants linked to traffic emissions and other pollutants. To assess the contamination of water runoff induced by traffic, heavy metal, cadmium (Cd), lead (Pb), and zinc (Zn) concentrations of the Grigny catchment in France were simulated using pollutant deposition measured at the roadside. The highest simulated concentrations of Cd, Pb, and Zn at the outlet were 2.12, 284.61, and 1757  $\mu\text{g L}^{-1}$  respectively. These results show relative concentration of pollutants are increased up to three times with an explicit description of road contaminant sources. Therefore, an exhaustive knowledge of the spatial distribution of trafficked roads seems to be important to predict water quality. Urban design may integrate these aspects in the future, in order to improve water quality in urban areas.

### KEYWORDS

Integrated modeling; Stormwater ; Traffic; Emissions; Air pollution; Runoff.