

=====

Title - Urban air quality simulation
Vivien Mallet – City Lab

Air quality simulation at urban scale can be carried out by a numerical model (ADMS Urban) that approximates the stationary solutions of reactive transport equations. The model essentially requires a few meteorological variables, the background pollution levels and the spatial distribution of emissions. It computes the concentrations of several pollutants, including nitrogen dioxide and particulate matter, down to the streets. However it is limited by large uncertainties originating from its numerical and physical formulations, as well as from its input data. In order to reduce the uncertainty of the output concentrations, we combine these output concentrations with observations from monitoring stations. This allows to reduce the errors by 30-50% where the station density is high enough, as we will illustrate over part of Paris.

In order to improve these results, there is a need for a better estimation of the uncertainties in the simulated concentrations. However, the computational costs of an urban model are so high that uncertainty estimation is a difficult task. One solution to this problem is to apply model reduction. We will explain our reduction approach and demonstrate the performance of the reduced model.

=====