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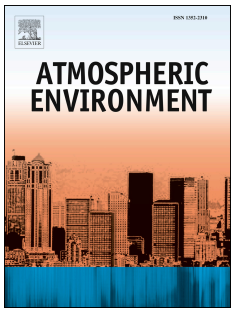

The model SIRANE for atmospheric urban pollutant dispersion. PART III: Validation against NO_2 yearly concentration measurements in a large urban agglomeration

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Research paper

The model SIRANE for atmospheric urban pollutant dispersion. PART III: validation against NO_2 yearly concentration measurements in a large urban agglomeration

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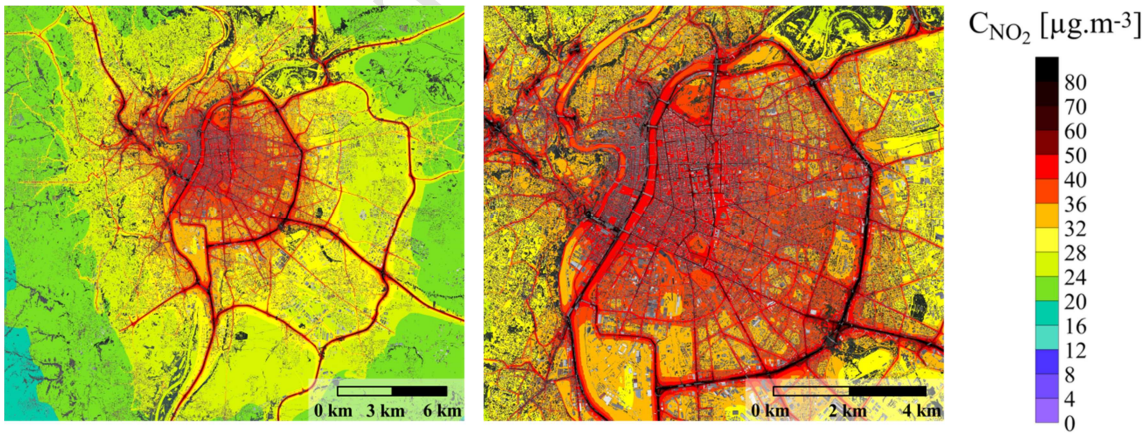
Abstract

We present a validation study of an updated version of the SIRANE model, whose results have been systematically compared to concentrations of nitrogen dioxide collected over the whole urban agglomeration of Lyon. We model atmospheric dispersion of nitrogen oxides emitted by road traffic, industries and domestic heating. The meteorological wind field is computed by a pre-processor using data collected at a ground level monitoring station. Model results are compared with hourly concentrations measured at 15 monitoring stations over the whole year (2008). Further 75 passive diffusion samplers were used during 3 periods of 2 weeks to get a detailed spatial distribution over the west part of the city. An analysis of the model results depending on the variability of the meteorological input allows us to identify the causes for peculiar bad performances of the model and to identify possible improvements of the parameterisations implemented in it.

Graphical abstract



Map of the NO_2 annual mean concentration [µg.m^{-3}] simulated with the SIRANE model (left: Lyon agglomeration; right: Lyon centre)

Keywords: urban air quality, atmospheric dispersion, street network, dispersion model