

NOVEL TOOL FOR URBAN AIR QUALITY MONITORING – AIRQ

Goal of the project

- to parameterise some particular mechanisms of turbulent mass and momentum transfer that are likely to happen in specific urban forms named hereafter street-half-canyon. Those mechanisms are not addressed by the current models;
- to introduce that parameterisation in an existing air quality model used for regulatory purpose in France, SIRANE, so as to make this code able to address the question of industrial emissions in densely populated areas located directly around city centres;
- to investigate the responses given by the model with emissions cadastre of different resolutions. That point is of particular interest to evaluate the quality of the simulations when traffic data remain poorly documented (current situation for several European Union members);
- to validate the new version of SIRANE with real life data provided by measurements taken in an urban environment submitted to industrial emissions;
- to apply SIRANE for the city of Timișoara.

Short description of the project

Air quality is a pressing issue, especially in high population density areas, where several sources of pollutant emissions can result in exceeding the limits imposed on admissible concentrations. Environmental laws stipulate acceptable levels of pollutant concentrations, as well as the number of allowed instances where concentrations are higher than imposed maximum limits, within one year timeframe. If an European Union member reports too many cases when pollutant concentrations exceed imposed limits, the infringement procedure can be triggered, with severe penalties for local authorities. The project is the cooperation between France and Romania. The main goal of the research team in France is to investigate the turbulent mechanisms responsible for dispersion over street-half-canyon, to develop the new module for the dispersion model, to provide an adapted methodology for the building of an emission cadastre, to configure the dispersion model for a specific domain of Timișoara, and to provide the results for the specific case of the city of Timișoara. The team in Romania provides the data required for running the software and perform measurements for validation of the calculated data. Expected results include an environmental cadastre of emissions, including anthropogenic and natural pollution sources. Three dimensional maps of pollutant species concentrations would be available as a result of the research developed in this project. The novel version of SIRANE developed during the project would allow decision factors to identify the most likely reason for exceeding imposed limits. Also, based on the results provided by this new tool, a better urban planning would be possible, and a higher air quality can be ensured.

Implementation period

03.01.2012-30.12.2014

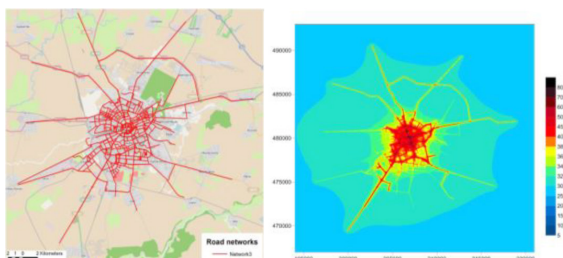


Main activities

- parameterization of turbulent mechanisms responsible for pollution dispersion in specific urban forms;
- implementation of that parameterization in an existing urban air quality model;
- validation of the entire modeling chain by measurements in the city of Timișoara;
- quantification of uncertainty in the results resulting from the quality of the emission cadastre;
- development of a warning system that identifies episodes of exceeding imposed concentrations limits;
- development of improved urban planning strategies.

Financed through/by:

UEFISCDI (Unitatea Executivă pentru Finanțarea Învățământului Superior a Cercetării Dezvoltării și Inovării), as Ideas, in cooperation with ANR (Agence National de Recherche), as a Blanc International II project.



Project implemented by

Politehnica University of Timisoara (€240,000), in partnership with École Centrale Lyon and NUMTECH from France (€258,245).



Research centre

Research Centre for Thermal Machines and Equipment, Transportation and Pollution

Results

A new dispersion model, new air quality monitoring tool for urban air quality, database containing pollutants concentrations.

Research team

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Applicability and transferability of the results

Authorities, research for the urban development, air quality control, traffic analysis, corrective measures for existing infrastructure, epidemiologic and social analysis, etc.

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