RECENT ADVANCES IN URBAN AIR POLLUTION RESEARCH

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EXTENDED ABSTRACT

The EUROTRAC-2 subproject SATURN aimed at a better understanding of urban air pollution as a prerequisite for finding effective solutions to air quality problems and for a sustainable development in the urban environment. The results of this project, which was concluded at the end of 2002, constitute a significant improvement of the state-of-the-art in the science of urban air pollution:

- Field experiments led to a better insight into the characteristics of air pollution at the urban and local scales. Particular emphasis was put into studies of urban aerosols, including tools for the assessment of contributions from various emission sources.

- Urban scale air pollution models were considerably improved in SATURN. Efficient interfaces were developed for linking such models to suitable regional scale models. In addition, improved parameterisation methods were developed, urban aerosol modules formulated and numerical techniques refined.

- Within the model evaluation framework, validation and intercomparison activities are convenient approaches for gradually and systematically testing model performance. This points in the direction of making models more reliable tools in support of decision making and policy implementation scenario studies.

- Both the concept and the application range of local scale models progressed significantly. Applications include simulations of the air motion, turbulent field and heat fluxes close to building walls as well as their effect on pollution dispersion. Scientific research in SATURN led also to valuable new insight regarding the validation of local scale air pollution models.

The policy relevance of the above scientific achievements is obvious, given their direct influence on the formulation of improved tools for urban air quality assessments. Hence, in the last years new methods to determine the contributions of various sources to air pollution in conurbations were developed and existing ones were improved. Such methods may be utilised by urban authorities wishing to have insight in the possibilities to reduce air pollution levels or to control anticipated increases of levels. Furthermore, methods were refined for predictions of the effect of long-term emission changes. Such methods may considerably help formulating and evaluating air pollution abatement strategies.

Knowledge and tools acquired in the framework of SATURN were integrated in order to make them directly suitable for applications related to environmental policy and to support urban air quality management. Gradually, the integrated modelling tools for modelling and predicting air pollution improve in quality and efficiency, while novel telematics techniques are used for informing the public on air pollution.

Key words: Urban air pollution, particulate matter, source-receptor relationships, air quality management