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## Integrated systems for forecasting urban meteorology, air pollution and population exposure

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**Abstract.** Urban air pollution is associated with significant adverse health effects. Model-based abatement strategies are required and developed for the growing urban populations. In the initial development stage, these are focussed on exceedances of air quality standards caused by high short-term pollutant concentrations. Prediction of health effects and implementation of urban air quality information and abatement systems require accurate forecasting of air pollution episodes and population exposure, including modelling of emissions, meteorology, atmospheric dispersion and chemical reaction of pollutants, population mobility, and indoor-outdoor relationship of the pollutants. In the past, these different areas have been treated separately by different models and even institutions. Progress in computer resources and ensuing improvements in numerical weather prediction, air chemistry, and exposure modelling recently allow a unification and integration of the disjunctive models and approaches. The current work presents a novel approach that integrates the latest developments in meteorological, air quality, and population exposure modelling into Urban Air Quality Information and Forecasting Systems (UAQIFS) in the context of the European Union FUMAPEX project. The suggested integrated strategy is demonstrated for examples of the systems in three Nordic cities: Helsinki and Oslo for assessment and forecasting of urban air pollution and Copenhagen for urban emergency preparedness.

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