



## **Methodology for Air Quality Forecast Downscaling from Regional- to Street-Scale**

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The most serious air pollution events occur in cities where there is a combination of high population density and air pollution, e.g. from vehicles. The pollutants can lead to serious human health problems, including asthma, irritation of the lungs, bronchitis, pneumonia, decreased resistance to respiratory infections, and premature death. In particular air pollution is associated with increase in cardiovascular disease and lung cancer. In 2000 WHO estimated that between 2.5 % and 11 % of total annual deaths are caused by exposure to air pollution. However, European-scale air quality models are not suited for local forecasts, as their grid-cell is typically of the order of 5 to 10km and they generally lack detailed representation of urban effects.

Two suites are used in the framework of the EC FP7 project MACC (Monitoring of Atmosphere Composition and Climate) to demonstrate how downscaling from the European MACC ensemble to local-scale air quality forecast will be carried out: one will illustrate capabilities for the city of Copenhagen (Denmark); the second will focus on the city of Bucharest (Romania). This work is devoted to the first suite, where methodological aspects of downscaling from regional (European/ Denmark) to urban scale (Copenhagen), and from the urban down to street scale. The first results of downscaling according to the proposed methodology are presented. The potential for downscaling of European air quality forecasts by operating urban and street-level forecast models is evaluated. This will bring a strong support for continuous improvement of the regional forecast modelling systems for air quality in Europe, and underline clear perspectives for the future regional air quality core and downstream services for end-users.

At the end of the MACC project, requirements on “how-to-do” downscaling of European air-quality forecasts to the city and street levels with different approaches will be formulated.