EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-433, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

The MEGAPOLI Paris campaign for urban aerosol characterisation –first results

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Within the FP7 MEGAPOLI project, an intensive field campaign has been conducted in the Greater Paris region during July 2009. The aim was to quantify sources of primary and secondary aerosol, and the interaction with gaseous precursors, in and around a large agglomeration and to document its evolution in the megacity plume.

Greater Paris has been chosen for such a campaign because it is a major and dense pollution source (more than 10 million inhabitants), surrounded by rural areas and relatively flat terrain. A particular focus is put on organic carbon, for which secondary formation, but also primary emissions are still not well quantified.
Detailed aerosol measurements and gaseous precursor measurements have been conducted at an urban and a sub-urban site, from four mobile platforms and from the French ATR-42 research aircraft (for plume characterisation). State of the art instrumentation has allowed determination of aerosol chemical composition, either with very high frequency (several minutes to half an hour), or with large chemical detail (several dozens of organic compounds from filter samples). In addition, the size distribution, optical and hygroscopic and mixing properties has been determined in order to relate the aerosol chemical composition to its potential radiative and climate impact in the urban region and its plume. Gas phase measurements have focussed especially on detailed VOC measurements in order to relate SOA build-up to gaseous precursor species abundance. A network of backscatter lidars including fixed station (urban, sub-urban) and mobile platforms gives the access to the aerosol vertical distribution in the region and to variations of the boundary layer height at the urban / rural interface.

In this paper, the campaign set-up and objectives, meteorological condition observed during the field experiment, the set of measurements performed, and first scientific results will be presented. In addition, air quality simulations with several models will also be presented and a first evaluation with available measurements tempted.