



The AIRPARIF-AEROSOL project: A comprehensive source apportionment study of fine aerosols (PM_{2.5}) in the region of Paris (France)

JEAN SCIARE (1), VERONIQUE GHERSI (2), MICHAEL BRESSI (1), PHILIPPE LAMELOISE (2), NICOLAS BONNAIRE (1), AMANDINE ROSSO (2), JOSE NICOLAS (1), SOPHIE MOUKHTAR (2), ANAIS FERRON (1), and DOMINIQUE BAUMIER (1)

(1) LSCE (CNRS-CEA), GIF/YVETTE, France (jean.sciare@lsce.ipsl.fr, +33169087716), (2) AIRPARIF, PARIS, France (veronique.ghersi@airparif.asso.fr, +330144594767)

With a population of about 12 millions inhabitants (20% of the French population), Greater Paris (France) is one of the most populated megacity in Europe and among the few located in developed countries. Due to its favorable geographical situation (far from other big European cities and influenced very often by clean oceanic air masses), it may be considered as a good candidate for investigating the build-up of urban air pollution from temperate industrialized countries.

Particulate mass of fine aerosols with aerodynamic diameter below 2.5 μ m (PM_{2.5}) is continuously monitored at several stations from great Paris for almost 8 years by the local air quality network (AIRPARIF), using a conventional on-line automatic system (R&P TEOM; see Patashnik and Rupprecht, 1991). During the period 2000-2006, levels of PM_{2.5} in the region of Paris have shown rather stable yearly mean values ranging 13 to 16 μ g/m³ whereas most of the other pollutants monitored by AIRPARIF have shown a net decrease during this period (<http://www.airparif.asso.fr>). Since the year 2007, this situation has becoming worse for particulate pollution with a net increase of the yearly mean concentration of PM_{2.5} (up to 21 μ g/m³), which increase is partly due to the use of a new PM_{2.5} measurement technique (R&P TEOM-FDMS instrument) enabling a proper determination of the semi-volatile fraction of fine aerosols. Although this new method greatly improves the determination of PM_{2.5}, it has also brought PM_{2.5} levels in the region of Paris closer to the 25 μ g/m³ yearly mean targeted value recommended by Europe for 2010 (limit value for 2015). Efficient abatement policies aiming at reducing levels of PM_{2.5} in the region of Paris will have to be fed by preliminary PM_{2.5} source apportionment studies and exhaustive aerosol chemistry studies (chemical mass balance) allowing a better separation between regional to continental aerosol sources.

The objective of the AIRPARIF-AEROSOL project aims to perform a spatially- and temporally- resolved source apportionment study of fine aerosols (PM_{2.5}) in the region of Paris (France). This study will be using a large aerosol sampling network composed by 3 rural, 1 suburban, 1 urban, and 1 traffic stations covering the region of Paris (100x100km). Daily (24-H) sampling are conducted at each station for a period of 1 year (11/09/2009 – 11/09/2010) and comprise two samplers running at 2.3m³/h in PM_{2.5}. Aerosol composition is performed at each site and includes gravimetry, ion composition, metal analyses, carbon measurements (EC, BC, OC, WSOC), and few organic tracers (incl. levoglucosan, MSA, ...).

This large dataset will offer us the opportunity to test different source apportionment technique that will help to better characterize the major PM_{2.5} sources in the region of Paris as well to better discriminate between regional against continental (EU) contributions. This dataset will also allow a better understanding of the primary/secondary sources of carbonaceous aerosols at a regional scale.

This poster is a general presentation of the AIRPARIF-AEROSOL project and will include the first results coming out from aerosol chemical analyses (incl. chemical mass balance) for the first 3 months for the 1-year measurement program.