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Diurnal variations of organic aerosols in a suburban area of Greater Paris (France):

First results of the AEROCOV program

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An exhaustive and fast chemical characterization of fine aerosols ($<$2.5 μm A.D.) has been performed in a suburban area of Greater Paris (France) for a 2-week period (Dec. 2006) in order to identify the major chemical contributors to PM2.5 and to the Light scattering coefficient.

Measurements of the major inorganic salts (ammonium nitrate, ammonium sulfate) were obtained from a Particle-Into-Liquid-Sampler and Ion Chromatography (PILS-IC) with a time resolution of 5 min. Black carbon (BC) concentrations were obtained every 5 min from an Aethalometer (Magee Scientific). Semi-continuous measurements of organic carbon (OC) and black carbon (BC) were performed every 1h using a Sunset lab EC-OC Field Instrument (equipped with a VOC denuder). Fast-measurements of PM2.5 were obtained every 6 min from a R&P TEOM-FDMS and every 1 min from a calibrated Optical counter (GRIMM). Light scattering coefficient measurements were performed at RH$<$40% every 1 min.

Two indirect methods for estimating real-time (5 minutes) concentrations of particulate organic matter (POM) has been used here based on 1) the reconstruction of the light scattering coefficient, and 2) the reconstruction of particulate matter (PM) of fine aerosols.

These POM concentrations were compared with semi-continuous OC measurements to derive a 1-h time resolution of the conversion factor OC-to-POM, which can be related to the oxidation rate of organics. Diurnal variations of carbonaceous aerosols

(BC, OC, POM) and related key parameters (BC/OC ratio and OC-to-POM conversion factor) have shown contrasted daytime / nighttime behaviors which are discussed here from the diurnal variations of fossil fuel combustion tracers measured in gas phase.