



Volatile organic compounds source apportionment in Paris in spring 2007

V. Gros (1), C Gaimoz (1), B. Bonsang (1), F. Herrmann (2), J. Williams (2), S. Sauvage (3), N. Locoge (3), O. d'Argouges (1), R. Sarda-esteve (1), and J. Sciare (1)

(1) LSCE, Unite mixte CNRS-CEA-UVSQ, Gif sur Yvette, France, (valerie.gros@lsce.ipsl.fr, 33169087716), (2) MPI for chemistry, Mainz, Germany, (3) Ecole des Mines de Douai, Departement Chimie et Environnement, Douai, France

Volatile Organic Compounds and PM 2.5 aerosols fast measurements were performed during an intensive campaign in Paris (May-June 2007) within the framework of the French ANR-AEROCV project. Volatile organic compounds were measured in-situ every 30 minutes with GF-FID and every 5 minutes with a PTR-MS. The Positive Matrix Factorization (PMF) model was applied to the VOC dataset in order to determine the number of influencing sources and source profiles were identified by using known literature profiles and by the help of measured tracers (carbon monoxide, aerosols. . .).

The campaign was characterized by two different air mass origins regimes: oceanic air masses (only local/regional pollution is observed) and continental air masses (in addition continental pollution is observed) (see Sciare et al. this session). Results from PMF simulations showed that the main contributing sources were traffic exhaust, gasoline evaporation, natural gas, industry and biogenic sources (this last source has a very small contribution probably slightly underestimated as isoprene was the only measured biogenic compound). Then the Chemical Mass Balance model was applied on the two periods (oceanic/continental air masses) to quantify the respective source contributions. During the oceanic period, where “only” local/regional pollution was monitored, the main contributing source was traffic related (about 60% for traffic exhaust and evaporation) whereas natural gas and industry sources were about 20% each. This is a significantly different from the local emission inventory which attributes about 40% VOC emissions in Paris to traffic, 30% to solvent industry and 30% to residential (equivalent to our natural gas source). During the continental air masses period, industrial sources then play a major role, about 45% (versus 40% to traffic related sources and 15% for natural gas). This industrial source, which is associated with large amounts of oxygenated compound, is attributed to non-local emissions as suggested by the variability of this source contribution.

This study give first results about VOCs polluting sources in Paris and give some preliminary information for the future EU-MEGAPOLI field campaigns (Paris, July 2009 and January 2010) which aim to quantify sources of primary and secondary aerosol, and the interaction with gaseous precursors (see Beekmann et al., this session).