



OH reactivity measurements in Paris during the winter campaign of the MEGAPOLI project (January-February 2010)

Cristina Dolgorouky (1), Valerie Gros (1), Roland Sarda-Esteve (1), Vinayak Sinha (2), and Jonathan Williams (2)
(1) LSCE, CNRS-CEA-UVSQ, Gif sur Yvette, France (valerie.gros@lsce.ipsl.fr, +33 1 69 08 77 16), (2) Max Planck Institute for chemistry, Mainz, Germany

Hydroxyl radical is the main oxidant of the troposphere and the main sink of most volatile organic compounds (VOCs). In spite of the unique information OH reactivity measurements can provide about the oxidation capacity of the atmosphere, it has hitherto been rather difficult to quantify by means of direct measurements. A new “light” method developed by Sinha et al. (ACP, 2008) provides a promising alternative for quantifying the total OH reactivity of ambient air. The principle is based on the fast measurements (e.g. using a PTR-MS instrument) of a molecule not normally present in the atmosphere (here pyrrole, C₄H₅N) which reacts at a known rate with artificially generated OH radicals. Comparing the measured signals of pyrrole in the absence and presence of ambient air within a constant OH field permits the quantification of the total OH reactivity of ambient air. For the first time, this method was deployed in Paris to measure the total OH reactivity in a large urban center along with simultaneous measurements of individual VOCs performed during the EU-MEGAPOLI (Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation) winter campaign (January 15-February 15, 2010).

The campaign took place in Paris downtown in a site classified as an urban background site, being therefore representative of the atmospheric composition of Paris. Experimental details of the OH reactivity system will be presented and results of characterizing the new OH reactivity system will be shown. Among the various characterization tests, special focus will be given to the study of NO interferences, as NO typically varies over a day by two orders of magnitude (from 1 to 100 ppb).

Finally, first results of diel variations in the measured total OH reactivity and its variability during the campaign will be analyzed.