Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11306, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11306
EGU General Assembly 2008

Preliminary results on the ROx radicals and ozone budgets during the "Fast Chemistry 2007" field campaign in the suburban Paris

A. Colomb (1), A. Kukui (2), B. Bonsang (3), P. Madec (1), Y.F. Elshorbany (4), J. Kleffmann (4), H. Wortham (5), V. Gros (3), C. Afif (1), P. Cellier (6)

(1) LISA, Créteil, France, (2) Service d'aéronomie, Verriere le buisson, France, (3) LSCE, Gif sur Yvette, France, (4) Bergische Universität Wuppertal, Wuppertal, Germany, (5) LCE, Marseille, France, (6) INRA, Thiverval-Grignon, France

ROx radicals and particularly hydroxyl (OH) and hydroperoxy (HO_2) play a major role in atmospheric chemistry. Previous field campaigns BERLIOZ, ESQUIF (1998-2000) ESCOMPTE (2001), TORCH (2003, 2004) undertaken in suburban areas showed that simple photo-stationary state models were able to generally reproduce the OH and HO_2 concentration levels; however large differences between model and measurements have been obtained for specific conditions (i.e. low light intensities for instance). The presence of oxygenated compounds such as formaldehyde, acetaldehyde or nitrous acid (HONO) may be responsible for this discrepancy. The "Fast chemistry 2007" campaign took place from the 7 June to 11 July 2007 in a suburban site (Thiverval-Grignon) located at 40 km west of Paris. The experimental site was instrumented for the measurements of OH and HO_2 radicals, as well as for the monitoring of the main gaseous species involved in their budget. The aim of the campaign was to understand the ROx budget and especially the OH radical formation, by comparison of 'in situ' measurements and 'chemical closure' approach.

Depending on meteorological situations, measurements were conducted in 'background' conditions in relatively clean air masses (from the West), or under influence of strong anthropogenic sources; i.e. under the influence of Paris agglomeration, mainly in anti-cyclonic conditions.

Ambient mixing ratios of NO, NO_2, NOy, VOCs (C_3-C_{10}), HCHO, HONO (Nitromac instrument), O_3, photolysis frequency of NO_2 (J_{NO2}), and usual meteorological parameters were obtained from the LISA instrumented mobile station MILEAGE. In parallel a field laboratory was equipped for the measurements of OH, HO_2, CO, HONO (LOPAP method), light VOCs (C_2-C_6), acetaldehyde, isoprene, terpenes and ozone photolysis frequency (J O^{1D}). Particularly, HCHO and HONO were quantified by different methods which have been intercompared during this field campaign.

Meteorological parameters coupled to determination of air mass origin by back-trajectories were first used to characterize air masses relative to observed concentrations. Variability of the compounds (diurnal variation and sources) is discussed, with respect to the air masses origin. Contrasted levels of pollutants were observed depending on the wind direction. CO, used as an anthropogenic tracer, showed a variation from 100 to 300 ppbv, NO from 1 to 20 ppbv. HONO concentration increased from 50 to 500 ppbv. Ozone production and OH concentration are determined assuming a photo stationary state and compared with experimental data. The role of HCHO and HONO in the photochemical equilibrium is also discussed.