Geophysical Research Abstracts
Vol. 15, EGU2013-608, 2013
EGU General Assembly 2013

Airborne profiles of NO_2, total peroxy nitrates and total alkyl nitrates: analysis of forest fire plumes during BORTAS campaign.

Marcella Busilacchio (1), Piero Di Carlo (1,2), Eleonora Aruffo (1,2), Fabio Biancofiore (1,2), Cesare Dari Salisburgo (1), Franco Giammaria (2), Stephane Bauguitte (3), James Lee (4), Sarah Moller (4), Ally Lewis (4), Mark Parrington (5), and Paul Palmer (5)

(1) Center of Excellence CETEMPS, Universita' degli Studi di L'Aquila, Via Vetoio, 67010 Coppito, L'Aquila, Italy (marcella.busilacchio@aquila.infn.it), (2) Department of Physical and Chemical Sciences, Universita' degli Studi di L'Aquila, Via Vetoio , 67010 Coppito L'Aquila, Italy, (3) Facility for Airborne Atmospheric Measurements, Bedfordshire, UK, (4) Department of Chemistry, University of York, York, UK, (5) School of GeoSciences, University of Edinburgh, UK

Boreal forest fire emissions impact the concentrations and chemistry of nitrogen oxides species locally and across long distance. During the Quantifying the impact of BOReal forest fires on Tropospheric oxidants over the Atlantic using Aircraft and Satellites (BORTAS) campaign (Canada, summer 2011), were carried out several profiles from ground up to 10 km with the BAe-146 aircraft. In those profiles the concentrations of NO_2, total peroxy nitrates ($\sum$PNs, $\sum RO_2NO_2$), total alkyl nitrates ($\sum$ANs, $\sum RONO_2$) and other compounds (i.e. CO, O_3, VOC) were measured. The analysis of the profiles, selecting those effected by Boreal forest fire emissions (CO > 200 ppbv), show an increase of $\sum$PNs (that include PAN) compared with background profiles (CO < 200 ppbv) from 2 to 10 times at altitude between 2 and 4 km, and 6 times above 5 km. The increase of NO_2 ranges from 2 and 3.5 and it is peaked at 6 km where the CO shows the highest increase. $\sum$ANs concentrations in fire plumes is from 2 to 12 times higher than background plumes, from ground to 5 km, above their concentrations growth is less evident. The increases of NO_2 and $\sum$PNs as function of the altitude are matched by the increases of methanol, a VOC emitted by forest fire. Looking at O_3 profiles its concentration increase is peaked at 2 km with a factor of 1.2, whereas at higher altitude is negligible. Here will be show possible reasons of the different impact on nitrogen oxides of the boreal forest fire emissions, their different behavior with altitude and the role of the distance from the emission region.