Geophysical Research Abstracts
Vol. 15, EGU2013-423, 2013
EGU General Assembly 2013

Aircraft observations above London city during a day and a night: ozone and alkyl nitrate formation

Eleonora Aruffo (1,2), Piero Di Carlo (1,2), Cesare Dari Salisburgo (2), Fabio Biancofiore (1,2), Franco Giammaria (1), Marcella Busilacchio (2), James Lee (3), Sarah Moller (3), Stephane Bauguitte (4), Debbie O'Sullivan (5), Will Morgan (6), Bin Ouyang (7), Oliver Kennedy (7), Rod Jones (7), Grant Forster (8), Claire Reeves (8), Stewart Vaughan (9), and Dwayne Heard (9)

(1) Università degli Studi dell'Aquila, Dipartimento di Fisica, Italy (eleonora.aruffo@aquila.infn.it), (2) Center of Excellence CETEMPS Università dell'Aquila, Via Vetoio, 67010 Coppito, L'Aquila, Italy, (3) Departement of Chemistry, University of York, UK, (4) FAAM, Cranfileld University, UK, (5) Observation Based Reasearch (OBR), Met Office, FitRoy Road Exeter EX1 3PB, UK, (6) School of Earth, Atmospheric and Environmental Science, The University of Manchester, UK, (7) Department of Chemistry, University of Cambridge, UK, (8) School of Environmental Sciences, University of East Anglia, UK, (9) School of Chemistry, University of Leeds, UK

Measurements of NO_2, ΣPNs, ΣANs and HNO_3 have been done using a TD-LIF instrument, installed on board the FAAM BAe-146 research aircraft, during the RONOCO (ROle of Nighttime chemistry in controlling the Oxidising Capacity) campaign. We analyse in detail the chemical mechanisms that have been established during two flights (B536 and B548) characterized by a similar track (flying above the M25 highway around London) and carried out during a day (B548) and a night (B536). In the daytime flight, the chemical species around London present a net spatial distribution defining two distinct areas: the East London region (up-wind) with an older and less polluted (lowest concentrations of NO_x) air masses and the West London region (down-wind) with fresh emissions and more polluted (highest concentrations of NO_x with peaks of about 30 ppb). In correspondence of these peaks strong ozone tritation phenomena due to the high NO_x levels are verified with a corresponding increase of the ΣANs concentrations. In order to verify the impact of the high concentrations of alkyl nitrate (with maximum values of about 3 ppb) on the tropospheric ozone budget, the production and loss of ozone and ΣANs has been studied. The slopes between the production of ozone and alkyl nitrates confirm that around London the ΣANs formation on one side and the relative ozone loss on the other side represent significant processes. Moreover, the loss of the O_3 during the nocturnal flight (B536) is less evident that during the B548 flight.