Geophysical Research Abstracts
Vol. 15, EGU2013-9242, 2013
EGU General Assembly 2013

Lagrangian modelling of OPALE dataset.

Jaime E. Gil (1), Jennie Thomas (1), Slimane Bekki (1), Alexandre Kukui (1,6), Gerad Ancellet (1), Susanne Preunkert (2), Michel Legrand (2), Markus Frey (3), Joel Savarino (2), Bruno Jourdain (2), Michel Kerbrat (2), James France (4), Martin King (4), and Ralf Toumi (5)

(1) UPMC Univ. Paris 06; Université Versailles St-Quentin; CNRS/INSU; UMR 8190, LATMOS-IPSL, Paris, France (gilroca@latmos.ipsl.fr), (2) CNRS / UJF – Grenoble 1, Laboratoire de Glaciologie et Géophysique de l'Environnement (LGGE) UMR 5183, Grenoble, F-38041, France, (3) British Antarctic Survey, Natural Environment Research Council, High Cross, Madingley Road, Cambridge CB3 0ET, UKDepartment of Earth Sciences, Royal Holloway University of London, Egham, Surrey, TW20 0EX, UK, (4) Department of Earth Sciences, Royal Holloway University of London, Egham, Surrey, TW20 0EX, UK, (5) Imperial College, London, UK, (6) Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E), Orléans, France

The OPALE measurement campaign aimed to characterize the atmospheric chemistry of the East Antarctic Plateau making a range of measurements at two sites, a coastal one, Dumont d'Urville (DDU) (From December 2010 until March 2011, 66^o S, 123^{o}E, coastal site) and on top of the Antarctic plateau Dome C (From December 2011 until January 2012 at Dome C, 75^{o}S, 123^o E, 3233 m a.s.l.).

There are relatively few observations of chemistry occurring inland and coastal sites Antarctic sites. During the campaign air masses originating from the marine boundary layer, the free troposphere, the Antarctic continent, and of mixed origins were observed. We present analyses of chemical measurements (including O_3, NO_2, OH, RO_2, hydrocarbons) using the CiTTyCAT photochemical trajectory model. The model simulates the chemistry of air masses over multiple ($\sim$5) days back trajectories provided by a stochastic trajectory model (FLEXPART). In some cases, the initial chemical conditions are taken from a chemistry-transport model (MOZART). The effect of clouds on the photolysis rates is also accounted for using MODIS satellite data. The model results are compared with measurements performed during both OPALE campaign years. Differences between the reactive nitrogen and hydroxyl radical chemistry at DDU and Dome C and the strong influence of reactive exchanges of trace gases between the snow and the atmosphere at Dome C are highlighted. The implications for the oxidizing capacity of the Antarctic boundary layer are also discussed.