Geophysical Research Abstracts
Vol. 20, EGU2018-9655, 2018
EGU General Assembly 2018

OCTAVE: First PTR-MS measurements at La Réunion Island: Influences of biomass burning and backtrajectory calculations

Bert Verreyken (1,2,3), Crist Amelynck (2,3), Jerome Brioude (1), Maité Bauwens (2), Aurélie Colomb (4), Martine De Mazière (2), Stephanie Evan (1), Christian Hermans (2), Nicolas Kumps (2), Jean-Marc Metzger (1), Jean-François Müller (2), Niels Schoon (2), Trissevgeni Stavrakou (2), Pierre Tulet (1), and Corinne Vigouroux (2)

(1) LACy, Laboratoire de l'Atmosphère et des Cyclones, UMR8105 CNRS, Université de La Réunion, Météo-France, Saint-Denis de La Réunion, France, (2) Royal Belgian Institute for Space Aeronomy, Ringlaan 3, B-1180 Brussels, Belgium, (3) Ghent University, Department of Analytical Chemistry, Faculty of Sciences, Campus Sterre, Krijgslaan 281 S12, B-9000 Gent, Belgium, (4) Laboratoire de Météorologie Physique, UMR 6016 Université Blaise Pascal/CNRS, Clermont-Ferrand, France

The atmosphere's total oxidative capacity and climate is greatly impacted by oxygenated volatile organic compound (OVOC) trace species. One of the issues in global OVOC budget estimations are the uncertainties in terrestrial and oceanic sources of these compounds. In an attempt to reduce these uncertainties, a high sensitivity PTR-MS analyser has recently been deployed at the high altitude Maïdo station at La Réunion, a remote tropical island in the Southern Indian Ocean, in the framework of the OCTAVE project. With this in situ instrument a two-year dataset of OVOC and precursor species concentrations will be collected and analyzed using multivariate statistical methods and backtrajectory calculations from a newly coupled FLEXPART-AROME configuration to both identify local sources and isolate impact on the OVOC budgets from the ocean.

The station is located at ∼2200m above sea level. During the day, upslope transport results in observation of air masses originating from the oceanic boundary layer, transported along the surface to the observatory. This meteorological behaviour allows for identifying both anthropogenic and biogenic compounds over a background of maritime species. At night the observatory measures air masses coming from the free troposphere.

At the beginning of November, elevated concentrations of biomass burning markers have been observed at night by the PTR-MS and are confirmed by trace gas measurements from other instruments at the Maïdo observatory. Since these signatures were measured at night, we don't expect their source to be local.

The data will be analysed using backtrajectory calculations performed by the Lagrangian transport model FLEXPART and its new configuration FLEXPART-AROME. The new software is developed for the OCTAVE project and allows for simulations with higher horizontal resolution. It is able to generate the well-known upslope transport which is not found in FLEXPART simulations. FLEXPART-AROME also handles vertical turbulence differently compared to the original FLEXPART. While the traditional FLEXPART simulation software depends on parametrisations to calculate the planetary boundary layer, FLEXPART-AROME takes 3D turbulent kinetic energy fields from AROME as a direct input to characterise turbulence. We will show how these models perform compared to each other when trying to identify sources beyond the local scale.