Geophysical Research Abstracts
Vol. 14, EGU2012-8656, 2012
EGU General Assembly 2012

Long-term observations of glyoxal and formaldehyde over the Eastern Pacific Ocean

A.S. Mahajan (1), C. Prados-Roman (1), T.D. Hay (1), J.C. Gomez Martin (1), C. Ordoñez (1), S. MacDonald (2), J.M.C. Plane (2), and A. Saiz-Lopez (1)

(1) Laboratory for Atmospheric and Climate Science (CIAC) CSIC, Toledo, Spain, (2) School of Chemistry, University of Leeds, Leeds, UK

Glyoxal ($(CHO)_2$) and formaldehyde (HCHO) are important intermediates in the breakdown of many volatile organic compounds (VOCs). Glyoxal is also a possible source of secondary organic aerosol (SOA) through its condensation and coagulation. A recent study has shown the presence of high levels of glyoxal in the Pacific marine boundary layer (MBL), which cannot be explained by precursors such as isoprene and suggests other unknown oceanic sources of glyoxal (1).

Observations of glyoxal and formaldehyde were made during two field campaigns in the Eastern Pacific MBL, aiming at a better understanding of the chemistry of VOCs and their temporal and geographical distribution in this region. The first campaign, HaloCarbon Air Sea Transect-Pacific (HaloCAST-P), was a one-month ship-based study on a scientific cruise from Chile to Seattle during March-April 2010. The second study, Climate and HAlogen Reactivity tropicaL EXperiment (CHARLEX), is an on going 16-month ground-based study on the Galapagos Islands, Ecuador, from September 2010 to present. Observations of $(CHO)_2$ and HCHO were made using long path differential optical absorption spectrometry (LP-DOAS) and multi axis DOAS (MAX-DOAS). In addition, observations of reactive halogens, ozone, NO_x, meteorological data, radiosondes, ozone sondes and ultrafine and total aerosol number concentration were also obtained enabling deeper understanding of the possible sources and the impacts of $(CHO)_2$ and HCHO in this environment.

We present the temporal evolution of $(CHO)_2$ and HCHO over the entire measurement period. LP-DOAS and MAX-DOAS data are used in conjunction with a radiative transfer model to construct the vertical profile in the MBL. The correlation to biotic and abiotic variables is explored in detail. Additionally, using a one-dimensional model, we try to elucidate the various parameters affecting the strong seasonal variation and calculate the fluxes necessary to explain the observations.

(1) Sinreich R. et al. Atmos. Chem. Phys. (2010) 10, 11359-11371.