Geophysical Research Abstracts
Vol. 13, EGU2011-10525, 2011
EGU General Assembly 2011

DOAS measurements of NO_2 from an ultralight aircraft between Thailand and Belgium

Alexis Merlaud (1), Caroline Fayt (1), Xavier Toledo (2), Jeroen van Gent (1), Olivier Ronveaux (3), and Michel Van Roozendael (1)

(1) Belgian Insitute for Space Aeronomy (BIRA-IASB), Brussels, Belgium (alexis.merlaud@oma.be), (2) University of Namur (FUNDP), Namur, Belgium, (3) USF - Free Sky asbl, Brussels, Belgium

Nitrogen dioxide (NO_2) is a major air pollutant in urban and peri-urban areas, where traffic, power plants, industries and other fuel burning activities are its dominant sources. At high concentration it leads to respiratory problems. NO_2 also contributes to the photochemical smog forming above many cities and to aerosols and tropospheric ozone production. NO_2 is monitored continuously from ground-based networks and satellite-borne instruments such as the Ozone Monitoring Instrument (OMI). However, ground-based stations are sparse and mainly installed in rich countries, whereas satellite data suffers a lack of horizontal resolution compared to the current grids of the Chemistry and Transport Models (CTM). Local measurements are necessary to improve our knowledge of the NO_2 distribution in countries with few ground-based stations.

The Earth Challenge project consisted in an expedition of seven pilots onboard four ultralight aircraft between Australia and Belgium, with the aim of drawing the public attention on environmental issues. The flights were performed in two parts, mainly during April and November 2009 with a break in Thailand due to the monsoon. We took opportunity of this mission, covering 27000 km above e.g. Bangladesh, Pakistan and Saudi Arabia, to install a compact DOAS instrument onboard one of the aircraft, primarily dedicated to NO_2 measurements. The instrument recorded spectra in limb geometry. We present the data analysis strategy, interesting parts of the flights and comparisons with satellite NO_2 measurements. For large sources like megacities both data sets are quantitatively consistent but our method enables us to detect more detailed variations in NO_2 content than can be observed by satellites.