Profile Measurements of Aerosols and Trace Gases by DOAS during the POLARCAT Kiruna campaign

A. Merlaud, C. Fayt, C. Hermans, N. Theys and M. Van Roozendael
Belgian Institute for Space Aeronomy, Brussels, Belgium
Correspondance to: A. Merlaud (alexism@oma.be)

3. Data Analysis

1. Context

The CNRS-spring campaign took place in Kiruna, Sweden, between March the 27th and April the 14th of 2008. It was dedicated to microphysics and satellite validation. The ATR-42 from SAFIRE performed 12 flights above the Norway Sea from Kiruna and Enna airport.

2. Scientific objective

BIRA-IASB participated to this campaign with a new instrument, namely the Airborne Limb Scattering Differential Optical Absorption Spectrometer (ALS-DOAS). Our objective was to retrieve vertical distributions of several trace gases playing a key-role in the troposphere, N2O, O3, H2CO and BrO.

Simulations with a radiative transfer model, UV-SPEC/DISORT were performed for both BrO and NO2 and shows that limb geometry is well suited to retrieve profile of small absorbers like BrO thanks to large air mass factors.

3. The Airborne Limb Scattering DOAS (ALS-DOAS)

Wavelength range : 332-450 nm
Spectral resolution: 0.4 to 0.6 nm
Field of View : 1.2 °
Scanning from +5 to -5° around the horizontal of the plane with a stepper motor

Pixis CCD 2048*500

The acquisition software controls the telescope and the CCD, calculating the integration time and saving the spectra. The program runs automatically once started. An operator is practically not needed during the flight for the ALS-DOAS.

4. Future work

1. Optimize the O3 retrieval and compare it with in-situ data
2. Work on the flight of the April 11th, when long-range transport pollution was detected in the LIDAR data

Aknowledgements

POLARCAT-France gratefully acknowledges funding from the following French research agencies - ANR, CNES, CNRS-INSU, IPEV and from U. Mainz/MPH-Mainz and EUPAR.
We also thank SAFIRE for their support during the planning and execution of the French ATR-42 campaigns and, together with DT-INSU, for help with instrument integration.