



Synergetic use of the Mobile-DOAS measurements during CINDI-2

Alexis Merlaud (1), Frederik Tack (1), Michel Van Roozendael (1), Daniel Constantin (2), Adrian Rosu (2), Katharina Riffel (3), Sebastian Donner (3), Thomas Wagner (3), Stefan Schreier (4), Andreas Richter (5), Folkard Wittrock (5), Andreas Hilboll (5), Mihalis Vrekoussis (5), Henk Eskes (6), and Douros John (6)

(1) Belgian Institute for Space Aeronomy, bruxelles, Belgium (alexism@oma.be), (2) University 'Dunarea de Jos' of Galati, Romania, (3) Max Planck Institute for Chemistry, Mainz, Germany, (4) University of Natural Resources and Life Sciences, Wien, Austria, (5) University of Bremen, Germany, (6) Royal Netherlands Meteorological Institute, De Bilt, The Netherlands

The Second Cabauw Intercomparison campaign for Nitrogen Dioxide measuring Instruments (CINDI-2) took place in Cabauw, the Netherlands, in September 2016. The purpose of CINDI-2 was to intercompare state-of-the-art ground-based remote-sensing (e.g. MAX-DOAS, lidar, sun photometers) and in-situ (e.g. NO₂ sonde, Cavity Enhanced systems) air quality instruments in preparation of the Sentinel-5 Precursor validation. Here, we focus on the CINDI-2 Mobile-DOAS NO₂ measurements.

Five Mobile-DOAS systems were operated during the campaign, mainly around Cabauw and between Rotterdam and Utrecht. The instruments are all based on compact grating spectrometers and measure the NO₂ column using its absorption structures in the visible range. However, the exact spectral ranges and spectrometer performances are different for each instrument. In addition, two of the systems follow the MAX-DOAS geometry, while the three other are zenith-only systems. This implies that the NO₂ VCD retrieval scheme is different for each instrument. We present the harmonization work of this Mobile-DOAS database. The NO₂ VCDs from the five systems are intercompared and compared with the BIRA static MAX-DOAS in Cabauw. We investigate the relationship between the horizontal gradients seen in the NO₂ field by the Mobile-DOAS and the MAX-DOAS azimuthal variability. The harmonized Mobile-DOAS database is also compared with the LOTOS-EUROS, CAMS, and WRF-Chem models.