

Consistency of MAX-DOAS aerosol and trace gas profiling results during the CINDI-2 intercomparison campaign

Jan-Lukas Tirpitz (1), Francois Hendrick (2), Udo Frieß (1), and the CINDI-2 Profiling Task

(1) Institute of Environmental Physics, University of Heidelberg, Heidelberg, Germany (jtirpitz@iup.uni-heidelberg.de), (2) Royal Belgian Institute for Space Aeronomy, Brussels, Belgium

Multi-AXis Differential Optical Absorption Spectroscopy (MAX-DOAS) is a well established ground based method for the measurement of tropospheric aerosols and trace gases: UV- and visible radiation spectra of skylight are analyzed to obtain information on different atmospheric parameters, integrated over the light path from space to the instrument. An appropriate set of spectra recorded under different viewing geometries (Multi-Axis geometry) allows to retrieve tropospheric aerosol and trace gas vertical distributions by applying numerical inversion methods.

The second Cabauw Intercomparison of Nitrogen Dioxide measuring Instruments (CINDI-2) took place in Cabauw (Utrecht area, Netherlands) in September 2016. The aim of this intensive measurement campaign was to assess the consistency of MAX-DOAS measurements of tropospheric species (NO_2 , HCHO , O_3 , and O_4) relevant for the validation of future ESA atmospheric Sentinel satellite missions. This was achieved through the coordinated operation of a large number of MAX-DOAS instruments from all over the world, together with a wide range of ancillary reference observations (in-situ analyzers, balloon sondes, LIDARs, Long-Path DOAS, sun photometer and others). In the presented study, retrieved MAX-DOAS trace gas and aerosol profiles of more than twenty participating groups are compared and validated against correlative ancillary observations. The results are discussed considering individual instrument performances and retrieval approaches, but also with respect to variable visibility and cloud conditions encountered during the campaign.