Geophysical Research Abstracts
Vol. 19, EGU2017-7514, 2017
EGU General Assembly 2017

Three ways of elevation calibration of MAX-DOAS instruments during the CINDI-2 campaign

Sebastian Donner (1), Jonas Kuhn (1,2), Michel Van Roozendael (3), Yang Wang (1), and Thomas Wagner (1)

(1) Max Planck Institute for Chemistry, Mainz, Germany, (2) Institute of Environmental Physics, University of Heidelberg, Heidelberg, Germany, (3) BIRA-IASB – Belgian Institute for Space Aeronomy, Brussels, Belgium

The Differential Optical Absorption Spectroscopy (DOAS)-method allows to analyse the absorptions of different atmospheric trace gases (e.g. NO_2, SO_2, HCHO...) in spectra of scattered sunlight simultaneously. Multi-AXis (MAX)-DOAS measurements observe scattered sun light under different elevation angles. From such measurements tropospheric vertical column densities (VCDs) and even vertical profiles of the measured trace gases and aerosols can be determined. In order to do so, the elevation angle has to be calibrated as precisely as possible. Even small deviations in the viewing elevation lead to inaccuracies in the obtained trace gas results. Therefore in order to harmonise MAX-DOAS measurements which are performed all over the world also a harmonisation of the elevation calibration is needed. Three different methods of performing an elevation angle calibration were applied to several different MAX-DOAS systems during the CINDI-2 campaign which took place in the Netherlands in September 2016. The first way to calibrate the elevation of a MAX-DOAS system is a so-called horizon scan which was performed automatically by most of the instruments every day around noon time. Further, measurements using an artificial light source at a far distance (>1km) were performed several times during night time. Lastly, scanning a white stripe in front of a dark background can be used to calibrate the elevation angles. During the CINDI-2 campaign differences between the MAX-DOAS instruments of around 1° were found for the horizon scans. Consistent deviations of around 0.4° were found for the three different methods for the MPIC MAX-DOAS system.

We present the three different methods used during CINDI-2. Further, results for the different methods and a comparison between them are shown for the MPIC MAX-DOAS instrument.