



Intercomparison of HONO profiles derived from MAX-DOAS observations during the CINDI-2 campaign

Yang Wang and the CINDI-2 HONO Team

Max-Planck institute for Chemistry, satellite group, Mainz, Germany (y.wang@mpic.de)

Nitrous acid (HONO) is an important precursor of the OH radical, which controls the self-cleaning capacity of the atmosphere. Measurements of the vertical distribution of HONO are very valuable to understand the dominant sources of HONO. For approximately the last 15 years, the MAX-DOAS technique has been widely used to retrieve the vertical distribution of trace gases and aerosols in the lower part of the troposphere. However, it is still a challenge to derive credible HONO results from MAX-DOAS measurements due to the weak absorption signal of HONO. During the MAD-CAT campaign held in Mainz, Germany from June to July 2013, we investigated the uncertainties of the MAX-DOAS retrievals of HONO slant column densities (SCDs) by comparison of results from different instruments and DOAS fits, by sensitivity studies on the influence of various parameters of the DOAS fit, and the analysis of synthetic spectra. In this study, we further constrain the uncertainties of the vertical profile retrievals of HONO during the CINDI-2 campaign held in Cabauw, Netherlands in September 2016. We compare the HONO profiles retrieved from different instruments and using different profile retrieval algorithms for different sky conditions. We also investigate the uncertainties of the HONO profiles in relation to the errors of the aerosol profiles and other parameters of inversion algorithm. In addition the near-surface HONO concentrations derived from the profile retrievals of MAX-DOAS measurements are compared with the nearby long-path DOAS measurements. Good agreement of the two independent techniques is found.