Retrieval of vertical profiles of multiple trace gases from MAX-DOAS observations during the MADCAT Campaign in Mainz, Germany

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In order to promote the development of passive DOAS technique and solve some critical problems including e.g. accurate retrievals of trace gas slant column densities (SCD), profile retrievals of trace gases and aerosol, and the effects of cloud, the Multi Axis DOAS-Comparison campaign for Aerosols and Trace gases (MAD-CAT) was held at the Max-Planck institute for Chemistry in Mainz, Germany from June to August 2013. Within this campaign, spectra of scattered sun light were taken by our two-dimensional scanning MAX-DOAS (2D-MAX-DOAS) instrument and a Mini-MAX-DOAS instrument from the Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences. In this presentation, firstly we show the retrieved differential SCDs of O_4, NO_2, HCHO, HONO and CHOCHO based on the observations of the 2D-MAX-DOAS. Based on these dSCDs we acquired the vertical profiles of these trace gases and aerosol extinction using optimal estimation method. We compare the aerosol optical depth (AOD) from MAX-DOAS with simultaneous observations from an AERONET instrument as well as the near surface volume mixing ratio (VMR) of NO_2 from MAX-DOAS with those from a CE-DOAS instrument from the IUP Heidelberg group and found in general good agreement. In addition we apply a cloud classification scheme based on our MAX-DOAS observations to identify different kinds of weather during the MAD-CAT campaign.