

## **Analysis of the horizontal distributions of trace gases and aerosols in summer 2013 during the MADCAT campaign in Mainz, Germany**

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With the MAX-DOAS technique it is possible to retrieve vertical profiles of trace gases and aerosols in the lower troposphere. Often these instruments monitor the atmosphere in one azimuthal direction only. Therefore horizontal variability is not resolved. Especially the comparison to satellite data close to strong emission sources (one main application of MAX-DOAS) is possibly biased.

Many new developed MAX-DOAS instruments are capable to measure automatically in more than one azimuthal direction. During the MADCAT campaign in summer 2013 in Mainz, Germany, several instruments of this kind were operated simultaneously, which provides the opportunity to monitor the horizontal distribution of trace gases and aerosols with a high temporal and spatial resolution.

The observed variation for different azimuth angles does not only reflect gradients in the trace gas concentrations, but also differences in the light path length, which is affected by sun and viewing geometry as well as aerosol distribution. Information about the aerosol profile, the total AOD and the phase function is gathered from a Ceilometer and an Aeronet sun photometer on the same site. To distinguish between the different effects comparisons with radiative transfer models are performed. Here especially the influence of the simplified model of Henyey-Greenstein phase functions against measured phase functions from Aeronet is investigated. Also the influence on the observed azimuthal gradients of different wind patterns and cloud conditions is studied.