

The IUP-Bremen imaging DOAS Instrument IMPACT: Characterization and first application

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Tropospheric nitrogen dioxide (NO_2) pollution has been measured for many years using various techniques. While for example in situ observations in urban monitoring networks detect the NO_2 concentration continuously at a particular location, remote sensing techniques provide a larger-spatial scale image of the NO_2 distribution but mostly with a smaller temporal coverage. Moreover, the concentration is integrated along the light path.

Here, we introduce the novel ground-based IMPACT (Imaging MaPper for AtmospheriC observaTions) instrument, which is based on the passive Differential Optical Absorption Spectroscopy (DOAS) method. In contrast to traditional MAX-DOAS instruments measuring in only one direction per time, the new imaging instrument is measuring simultaneously in 50 elevation angles. In addition, the azimuth is adjustable from 0° - 360° due to installation of the telescope on a Pan-tilt-head. As a result, complete hemispheric images of NO_2 as well as the oxygen dimer O_4 around the measurement site are obtained with a temporal resolution of ca. 15 minutes. This provides a detailed insight into the regional NO_2 distribution, local sources, transport and diurnal variation.

In addition to instrumental characterization, first data and results are presented from the international CINDI-2 field campaign, which took place in Cabauw, The Netherlands, in summer 2016.