



## **Remote tomographic measurements of 2D trace gas distributions with LP-DOAS technique above the city of Heidelberg, Germany**

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LP-DOAS (Long Path-Differential Optical Absorption Spectroscopy) is a well known remote sensing technique for measuring the average concentration of tropospheric trace gases along extended light paths in the open atmosphere. In order to retrieve information of the spatial trace gas distribution tomographic LP-DOAS measurements are useful. They combine the measurement along several intersecting light paths with tomographic inversion techniques and allow 2 and 3 dimensional retrieval of trace gas distributions. For the first time a set-up for horizontal tomographic field measurements was tested in Heidelberg, Germany. It encompasses a total of 18 horizontal light paths by using three "Multibeam" LP-DOAS instruments. The investigated area of about  $4 * 4 \text{ km}^2$  above the city centre covers different urban areas with different emission sources. In the wavelength range from 285nm to 365nm the average concentrations of the trace gases NO<sub>2</sub>, SO<sub>2</sub>, O<sub>3</sub>, HCHO and HONO along each light path could be retrieved with a temporal resolution below 15 minutes. The first evaluated data from winter 2005/06 show high accuracy for NO<sub>2</sub> and SO<sub>2</sub> mean concentrations. They allow deriving for these trace gases time series of two-dimensional distributions above the city. Different emission sources varying strongly in space and time can be identified. The results demonstrate that tomographic DOAS measurements can be used to study emissions and transport of trace gases and they can be used to evaluate models predicting the air quality. From improved measurements in summer / autumn 2006 we expect to retrieve the trace distributions of additional components.