



Airborne measurements of spatial NO₂ distributions during AROMAT

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Nitrogen oxides, NO_x (NO_x = NO + NO₂) play a key role in tropospheric chemistry. In addition to their directly harmful effects on the respiratory system of living organisms, they influence the levels of tropospheric ozone and contribute to acid rain and eutrophication of ecosystems. As they are produced in combustion processes, they can serve as an indicator for anthropogenic air pollution.

In September 2014 several European research groups conducted the ESA funded Airborne Romanian Measurements of Aerosols and Trace gases (AROMAT) campaign to test and intercompare newly developed airborne observation systems dedicated to air quality satellite validation studies.

The IUP Bremen contributed to this campaign with its Airborne imaging DOAS instrument for Measurements of Atmospheric Pollution (AirMAP) on board a Cessna 207 turbo, operated by the FU Berlin. AirMAP allows the retrieval of integrated NO₂ column densities in a stripe below the aircraft at a fine spatial resolution of up to 30 x 80 m², at a typical flight altitude. Measurements have been performed over the city of Bucharest, creating for the first time high spatial resolution maps of Bucharest's NO₂ distribution in a time window of approx. 2 hours. The observations were synchronised with ground-based car MAX-DOAS measurements for comparison. In addition, measurements were taken over the city of Berlin, Germany and at the Rovinari power plant, Romania.

In this work the results of the research flights will be presented and conclusions will be drawn on the quality of the measurements, their applicability for satellite data validation and possible improvements for future measurements.