Airborne measurements of different trace gases during the AROMAT-2 campaign with an Avantes spectrometer

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Differential **O**ptical **A**bsorption **S**pectroscopy (DOAS) is a well-known, versatile, and frequently used technique for the analysis of trace gases within the atmosphere. Although DOAS has been used for several decades, airborne DOAS has become more popular during the last years because of the possibility of measuring in high lateral resolutions with the help of imaging instruments.

Here, we present results of the AROMAT-2 campaign in Romania in summer 2015. The introduced measurements were taken using a nadir viewing Avantes spectrometer on board of a Cessna aircraft which flew over Bucharest and the Turceni power plant in Romania.

The instrument covers the wavelength region of 287 – 551nm at a spectral resolution of 0.13nm and has a temporal resolution of 0.5s, translating to about 450m in flight direction at 3000m flight attitude. The field of view of the instrument was set to 8.1 degrees, resulting in a pixel size across track of about 420m.

Compared to the imaging DOAS instrument AirMAP which was also operated from the aircraft, the signal to noise ratio of the simple nadir viewing spectrometer is slightly better, which allows an analysis of less abundant species and interesting spectral features.

The results show a day-to-day variation of NO_2 over the city of Bucharest as well as spectral features over lakes in the city, which can be attributed to algae. Furthermore, we were able to measure large emission plumes of NO_2 and SO_2 over the Turceni power plant, which could be observed over long spatial distances.

In addition, the results from the Avantes instrument were used for comparison with measurements of the imaging spectrometer AirMAP and good agreement was found, providing independent verification of the imager data.