

NO_x emissions of various sources in Romania and the Rhein-Main region in Germany based on mobile MAX-DOAS measurements of NO₂.

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The MAX DOAS-Method (Multi-AXis Differential Optical Absorption Spectroscopy) is used to analyze different trace gases (e.g. NO₂, SO₂, HCHO) at the same time and to determine the trace gas vertical column density (vertically integrated concentration). In summer 2015 we performed car-MAX-DOAS measurements in Romania during the AROMAT2 campaign. We encircled Bucharest at different weather situations and different times of the day. Afterwards the total NO_x emissions were derived from the mobile MAX-DOAS observations in combination with wind data. In Germany we performed the same measurement procedure in fall/ winter/ spring 2015 /2016 by encircling the cities Mainz and Frankfurt. For the setting we mounted two MAX-DOAS instruments with different viewing directions (forward and backward) on the roof of a car. One instrument is a commercial mini MAX-DOAS that is built by the German company Hoffmann Messtechnik. The second one was built at the MPI in Mainz. This so-called Tube MAX-DOAS uses an AVANTES spectrometer with better optical characteristics than Hoffmann's mini MAX-DOAS.

The advantage of two instruments working at the same time is (besides redundancy) that localized emission plumes can be measured from different directions at different locations. Thus, especially for emission plumes from power plants, tomographic methods can be applied to derive information about the plume altitude. Car-MAX-DOAS observations can cover large areas at a short time with reasonable resolution (depending on the speed of the car and the instruments integration time).

Thus these measurements are well suited to validate satellites observations.

This work will show the first AROMAT2 results of NO_x emissions derived in Romania and in the Rhein-Main region, which is one of the most polluted area in Germany.