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An overview of the AROMAT campaigns

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The Airborne ROmanian Measurements of Aerosols and Trace gases (AROMAT) campaign and its follow-up AROMAT-2 were held in September 2014 and August 2015, respectively. Both campaigns focused on two geophysical targets: the city of Bucharest and the large power plants of the Jiu Valley, which are located in a rural area 170 km West of Bucharest. These two areas are complementary in terms of emitted chemical species and their spatial distributions.
The objectives of the AROMAT campaigns were (i) to test recently developed airborne observation systems dedicated to air quality satellite validation studies such as the AirMAP imaging DOAS system (University of Bremen), the NO_2 sonde (KNMI), and the compact SWING whiskbroom imager (BIRA), and (ii) to prepare the validation programme of the future Atmospheric Sentinels, starting with Sentinel-5 Precursor (S5P) to be launched in early summer 2016.
We present results from the different airborne instrumentations and from coincident ground-based measurements (lidar, in-situ, and mobile DOAS systems) performed during both campaigns. The AROMAT dataset addresses several of the mandatory products of TROPOMI/S5P, in particular NO_2 and SO_2 (horizontal distribution and profile from aircraft, plume image with ground-based SO_2 and NO_2 cameras, transects with mobile DOAS, in-situ), H2CO (mobile MAX-DOAS), and aerosols (lidar, airborne FUBISS-ASA2 sun-photometer, and aircraft in-situ). We investigate the information content of the AROMAT dataset for satellite validation studies based on co-located OMI and GOME-2 data, and simulations of TROPOMI measurements. The experience gained during AROMAT and AROMAT-2 will be used in support of a large-scale TROPOMI/S5P validation campaign in Romania scheduled for summer 2017.