



AOTF-based NO₂ camera, results from the AROMAT-2 campaign

Emmanuel Dekemper (1), Didier Fussen (1), Jurgen Vanhamel (1), Bert Van Opstal (1), Jeroen Maes (1), Alexis Merlaud (1), Kerstin Stebel (2), and Dirk Schuettemeyer (3)

(1) BIRA-IASB, Brussels, Belgium, (2) NILU, Kjeller, Norway, (3) ESA/ESTEC, Noordwijk, The Netherlands

A hyperspectral imager based on an acousto-optical tunable filter (AOTF) has been developed in the frame of the ALTIUS mission (atmospheric limb tracker for the investigation of the upcoming stratosphere). ALTIUS is a three-channel (UV, VIS, NIR) space-borne limb sounder aiming at the retrieval of concentration profiles of important trace species (O₃, NO₂, aerosols and more) with a good vertical resolution. An optical breadboard was built from the VIS channel concept and is now serving as a ground-based remote sensing instrument. Its good spectral resolution (0.6nm) coupled to its natural imaging capabilities (6° square field of view sampled by a 512x512 pixels sensor) make it suitable for the measurement of 2D fields of NO₂, similarly to what is nowadays achieved with SO₂ cameras.

Our NO₂ camera was one of the instruments that took part to the second Airborne Romanian Measurements of Aerosols and Trace gases (AROMAT-2) campaign in August 2015. It was pointed to the smokestacks of the coal and oil burning power plant of Turceni (Romania) in order to image the exhausted field of NO₂ and derive slant columns and instantaneous emission fluxes. The ultimate goal of the AROMAT campaigns is to prepare the validation of TROPOMI onboard Sentinel-5P.

We will briefly describe the instrumental concept of the NO₂ camera, its heritage from the ALTIUS mission, and its advantages compared to previous attempts of reaching the same goal. Key results obtained with the camera during the AROMAT-2 campaign will be presented and further improvements will be discussed.