



New Mobile Atmospheric Lidar Systems for Spaceborne Instrument Validation

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We present an overview of our different approaches using lidar systems as a tool to validate and develop the new generation of spaceborne missions. We have developed several mini-lidars in order to study the vertical structure, the clouds and the particulate composition of the atmosphere from mobile platforms. Here we focus on three mobile instrumental platforms including a backscatter lidar instrument developed for validation of the Cloud-Aerosol LIDar with Orthogonal Polarization (CALIOP) onboard CALIPSO and of the Interféromètre Atmosphérique de Sondage Infrarouge (IASI) onboard METOP. The first system is operated onboard an ultra-light aircraft (ULA) (Chazette et al., Environ. Sci. Technol., 2007). The second one is operated onboard a stratospheric balloon to study the interest of the measurement synergy with the Infrared Atmospheric Sounding Interferometer (IASI). The third one is part of a truck/car mobile station to be positioned close to the satellite ground-track (e.g. CALIPSO) or inside the area delimited by the instrumental swath (e.g. IASI).

CALIPSO was inserted in the A-Train constellation behind Aqua on 28 April, 2006 (<http://www-calipso.larc.nasa.gov/about/atrain.php>). One of the main objectives of the scientific mission is the study of atmospheric aerosols. Before the CALIOP lidar profiles could be used in an operational way, it has been necessary to validate both the raw and geophysical data of the instrument. For this purpose, we carried out an experiment in south-eastern France in summer 2007 to validate the aerosol product of CALIOP by operating both the ground-based and the airborne mobile lidars in coincidence with CALIOP.

The synergy between the new generation of spaceborne passive and active instruments is promising to assess the concentration of main pollutants as aerosol, O₃ and CO, and greenhouse gases as CO₂ and CH₄ within the planetary boundary layer (PBL) and to increase the accuracy on the vertical profile of temperature. IASI is a key payload element of the METOP series of European meteorological polar-orbit satellites. The MetOp-A satellite was successfully launched from the Baikonur Cosmodrome, Kazakhstan on 19 October 2006 (<http://www.eumetsat.int/>). IASI is a Fourier transform spectrometer dedicated to the operational meteorology and the chemistry of the troposphere. The technological approach for the stratospheric lidar system was tested in south-western France in spring 2007.

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