



## European Campaign Activities planned in 2019-2020 for Calibration and Validation of the S-5p Operational Products

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Sentinel 5 Precursor (S-5p), launched on 13 October 2017, is the first mission of the Copernicus Programme dedicated to the monitoring of air quality, climate, ozone and UV radiation. The S-5p characteristics, such as the fine spatial resolution, introduce many new opportunities and challenges, requiring to carefully assess the quality and validity of the generated data products by comparison with independent measurements and analyses.

While the routine validation and QA/QC of the S-5p operational products is performed within the ESA Mission Performance Center (MPC) based on a limited number of Fiducial Reference Measurements (FRM), additional validation activities including field campaigns are conducted in research mode as part of the S-5p Validation Team (S5PVT). The field campaigns bring together various teams and instruments and provide a more in-depth, complete insight into the S-5p instrument performance and the fitness for purpose of its data products.

Here, we present a series of campaign activities planned to take place in 2019-2020. Activities have been identified to address key priorities for S5-p validation and are subject of the S-5p Campaign Implementation Plan (S5PCIP).

A first set of activities concentrates on the main S-5p UV-Vis tropospheric products (NO<sub>2</sub>, HCHO and SO<sub>2</sub>). Airborne deployment, including both in-situ spiral and remote sensing mapping flights, is planned over cities and industrial areas in Romania (Bucharest; Jiu valley), the German Ruhr area (Cologne; Duisburg; Dusseldorf), Belgium (Antwerp (port); Brussels), The Netherlands (Rotterdam (port); Cabauw), and the southern part of The Persian Gulf. Airborne operations will be complemented with various deployments at the ground (MAX-DOAS, car-DOAS, sun-photometer, ceilometer, lidar, etc.). NASA will complement the European infrastructure with additional instruments, such as an airborne HCHO analyser, several Pandora spectrometers and a TOLNet tropospheric ozone lidar.

A second set of activities will focus on the validation of the SWIR data products (CO and CH<sub>4</sub>). COCCON (Collaborative Carbon Column Observing Network) portable low-resolution EM27/SUN FTIR spectrometers will be deployed for an extended period at 15 different sites in order to obtain a good coverage of geophysical parameters and different ground scenes. Additionally, CO and CH<sub>4</sub> columns and vertical profiles will be measured by aircraft, drone- and balloon-based AirCore and FTIR spectrometers at the CESAR super-site of Cabauw (The Netherlands) and super-sites in France (Aire-sur-l'Adour and Trainou).

The various airborne and GB instrument deployments will produce a key ensemble of independent reference datasets. For each product, a core team will coordinate validation tasks, making use of data collected in all relevant instrumental deployments.