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Overview of the 2019 Sentinel-5p TROPomi vaLidation eXperiment (TROLIX)

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For the validation of Sentinel-5p/TROPOMI the TROPomi vaLidation eXperiment (TROLIX) was held in the Netherlands based at the Cabauw Experimental Site for Atmospheric Research during September 2019. TROLIX consisted of active and passive remote sensing platforms in conjunction with several balloon-borne and surface measurements.

The intensive observations will serve to establish the quality of TROPOMI L2 main data products (UVAI, Aerosol Layer Height, NO₂, O₃, HCHO, Clouds) under realistic conditions with varying cloud cover and a wide range of atmospheric conditions.

Since TROPOMI is a hyperspectral imager with a very high spatial resolution of 3.6 x 5.6 km², understanding local effects such as inhomogeneous sources of pollution, sub-pixel clouds and variations in ground albedo is important to interpret TROPOMI results. Therefore, the campaign included sub-pixel resolution local networks of sensors, involving MAXDOAS and Pandora instruments, around Cabauw (rural) and within the city of Rotterdam (urban). Utilising its comprehensive in-situ and remote sensing observation program in and around the 213 m meteorological tower, Cabauw was the main site of the campaign with focus on vertical profiling using lidar instruments for aerosols, clouds, water vapor, tropospheric and stratospheric ozone, as well as balloon-borne sensors for NO₂ and ozone.

The data set collected can be directly compared to the TROPOMI L2 data products, while measurements of parameters related to a-priori data and auxiliary parameters that influence the quality of the L2 products such as aerosol and cloud profiles and in-situ aerosol and atmospheric chemistry were also collected.

This paper gives an overview of the campaign, and an overview of the participating main and ancillary instrumentation and preliminary results.

Future activities include the deployment in 2020 of an airborne hyperspectral imager.

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