Technology and atmospheric mission platform - OPerations (TOP)

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The ongoing rise in missions to observe Earth from space, especially the various Copernicus’ Sentinel systems not only increases the volume of data daily, but also contributes to the variety of data, the velocity of data availability, and its veracity. In this scenario, Sentinel 5P has already changed the way in which chemical atmospheric components are monitored daily, providing data with global coverage and a very detailed spatial resolution.

The discipline of atmospheric sciences poses an additional difficulty in efficiently accessing and analysing all available data: the variety is high as the source of atmospheric data is threefold with data coming from EO systems, models as well as in-situ measurements. The heterogeneity and multidimensionality of the so-called data triangle (EO, model, and in-situ data) make an efficient exploitation of the full potential of the available information even more challenging.

Following the successful experience of the Technology and Atmospheric Mission Platform (TAMP), TOP (http://top-platform.eu/) implements the concept of operational Virtual Research Environment (VRE), allowing data users to access, visualize, process, and download heterogeneous, multidimensional data.

Based on the ADAM datacube technology (https://adamplatform.eu), TOP allows exploiting the following datasets: Sentinel 5P Level 2 products (NO2 and O3 tropospheric columns, SO2, CO, and CH4 total columns, and aerosol index); Copernicus Atmosphere Monitoring Service (CAMS) global (surface PM10, total column NO2, SO2, and O3) and regional (surface PM10, NO2, SO2 and O3) analysis and forecast fields; European Environmental Agency (EEA) measurements (CO, NO2, PM10, SO2).

Users can visualize and process all available data through a web application user interface (Data Analysis and Visualization Environment – DAVE), through a Jupyter notebook interface, and using the ADAM APIs and libraries to directly access available data.

TOP is deployed on the Mundi DIAS infrastructure (https://mundiwebservices.com/). This allows accessing always most recent satellite products (reprocessed, offline, near real time), model output (analyses and forecasts – up to 5 days) and station measurements (full archive, updated daily).
TOP is the first operational platform with the data triangle implemented. By creating an atmospheric multi-source data cube, it stimulates a multi-disciplinary scientific approach and significantly facilitates scientific professional life.