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Technology and atmospheric mission platform - OPerations (TOP)

Stefano Natali (1), Clemens Rendl (1), Gerhard Triebnig (2), Daniel Santillan (2), Marcus Hirtl (3), and Barbara Scherllin-Pirscher (3)

(1) SISTEMA GmbH, Vienna, Austria (natali@sistema.at), (2) EOX IT Services GmbH, Vienna, Austria (gerhard.triebnig@eox.at), (3) ZAMG, Vienna, Austria (marcus.hirtl@zamg.ac.at)

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 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 more challenging.
Initially a demonstration platform (Technology and Atmospheric Mission Platform (TAMP)) to show atmospheric science users the possibility to access, visualize, process and download heterogeneous, multidimensional data was implemented. The concept of the Virtual Research Environment (VRE) was further developed through VEEDAM (Virtual Exploitation Environment Demonstration for Atmospheric Missions), which involved a larger user-base, more data sources and processing functionalities and the possibility to make use of a Jupyter notebook interface. Being the second evolution of the platform, TOP aims at reaching an operational and commercially viable status through enlarging the data offer to all Copernicus atmospheric and climate data products (CAMS, C3S, Sentinel 4, 5, 5p) while allowing dynamic computational resources allocation.
For TOP to achieve largest reach, the deployment on a Copernicus Data and Information Access Service (DIAS) is foreseen. Deployed on a DIAS, TOP would be the first operational platform implementing the data triangle and hence create an atmospheric multi-source data cube, stimulating a multidisciplinary scientific approach due to the availability of various collections. Data access barriers would be broken down: based on OGC-standardised (Open Geospatial Consortium) data discovery and access, multiple heterogeneous datasets can be explored simultaneously, without the need to have any knowledge of the original products. Moreover, as (new) data available on the DIAS will be directly accessible through TOP, the time to collect and prepare data would be omitted. As a consequence, also local storage space and personal computer resources would be saved, since all data will reside in the remote environment (DIAS) and the processing can be performed remotely.