



e-Infrastructures interoperability: the Geohazards Exploitation Platform for the use of satellite earth observations in Geosciences

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We present recent achievements with the Geohazards Exploitation Platform (GEP), a European contribution to the GEO SuperSites, and its interoperability with the MEDiterranean SUPersite Volcanoes (MED-SUV) e- infrastructure. The GEP is a catalyst for the use of satellite Earth observation missions, providing data to initiatives such as the GEO Geohazard Supersites and Natural Laboratories (GSNL), the Volcano and Seismic Hazards CEOS Pilots or the European Plate Observing System (EPOS).

As satellite sensors are delivering increasing amounts of data, researchers need more computational science tools and services. The GEP contribution in this regard allows scientists to access different data types, relevant to the same area and phenomena and to directly stage selected inputs to scalable processing applications that deliver EO-based science products. With the GEP concept of operation for improved collaboration, a partner can bring its processing tools, use from his workspace other shared toolboxes and access large data repositories. GEP is based on Open Source Software components, on a Cloud Services architecture inheriting a range of ESA and EC funded innovations, and is associating the scientific community and SMEs in implementing new capabilities.

Via MED-SUV, we are making discoverable and accessible a large number of products over the Mt. Etna, Vesuvius/Campi Flegrei volcanic areas, which are of broader interest for Geosciences researchers, so they can process ENVISAT MERIS, ENVISAT ASAR, and ERS SAR data (both Level 1 and Level 2) hosted in the ESA clusters and in ESA's Virtual Archive, TerraSAR-X data hosted in DLR's Virtual Archive, as well as data hosted in other dedicated MED-SUV Virtual Archives (e.g. for LANDSAT, EOS-1). GEP will gradually access Sentinel-1A data, other space agencies data and value-added products. Processed products can also be published and archived on the MED-SUV e-Infrastructure. In this effort, data policy rules applied to the acquisitions are verified against the GEOSS Data Collection of Open Resources for Everyone (GEOSS Data-CORE) principles. The resulting infrastructure repositories include connectivity to the GEOSS Data Access Broker (DAB), through the "OGC CS-W OpenSearch Geo and Time extensions" interface standard, a key interoperability arrangement used by the MED-SUV systems, making EO data products available to both the project partners and the broader initiatives.

GEP is also proposing and further developing hosted processing, aimed at MED-SUV researchers' work on new methods to integrate in-situ and satellite sensors data: a set of users services (concept of Platform-as-a-Service, or PaaS) for generating value-added products, including tools to design and develop Hadoop-enabled processing chains. The PaaS core engine is the Developer Cloud Sandboxes service, where scalable processing chains are prepared and validated. The PaaS makes use of Virtual Machines technology, and of middleware for scaling-out processing tasks via interfaces to commercial Cloud Providers, or through research agreements to academic resources like EGI.eu. After integration, processors are deployed and invoked 'as-a-Service' by partners via OGC Web Processing Service standard interface, or shared as reusable virtualized resources. Recent integration work covered e.g. ROI_PAC, GMTSAR and DORIS ADORE toolboxes along with supporting processing services such as DEM generation. Such approach has been discussed also with the MARSite project, ensuring the adopted solutions are aligned.

As part of the MED-SUV project, we are developing tools and services supporting researchers working on new data fusion methods, and fostering collaboration between different end users and partners, including towards the GEO communities. Overall, the approach provides an integrated European contribution for the exploitation of decades of scientific data gathered from Earth observation satellites.