



## **The satellite component of the EPOS infrastructure: Thematic Core Service Satellite Data**

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EPOS (European Plate Observing System) is a pan-European Research Infrastructure in the field of Solid Earth Science (SES); EPOS has recently been established with an ERIC (European Research Infrastructure Consortium) hosted by INGV in Italy and supported by 25 European countries and several international organizations.

EPOS integrates a large number of existing European RIs belonging to several fields of Solid Earth Science, from seismology to geodesy, near fault and volcanic observatories as well as satellite observations. EPOS wants to integrate the existing national and trans-national research infrastructures to increase the access, use and reuse of multidisciplinary data recorded by monitoring networks, acquired in laboratory experiments and/or produced by computational simulations.

This work intends to present the EPOS Thematic Core Services (TCS) Satellite Data (SATD). The TCS SATD is going to deploy three services (EPOSAR, GDM, COMET), developed to generate advanced Differential Synthetic Aperture Radar Interferometry (DInSAR) products (interferograms, deformation maps, deformation time series, and velocity maps), based on the exploitation of Sentinel-1 images. These services can work in two different operative scenarios: systematic processing and on-demand processing. In the first case, the satellite products are automatically generated on specific and defined areas when new satellite acquisitions are available; the users can discover the available products directly in the EPOS central hub and integrate them with other EPOS products (GPS measurements, geological information, seismological observations, etc.). In the second case, the users can benefit from advanced web-tools made available by the TCS to process the DInSAR datasets of interest. With the on-demand services, the users exploit, through user-friendly interfaces, the availability, in the same environment, of SAR archives, Earth Observation tools, and Cloud Computing resources.

TCS SATD is also working on value-added tools and services able to provide synoptic information on the Earth surface displacements, their source mechanisms and their impacts. In particular, 3D-Def and MOD services, together with EPOSAR and COMET, will distribute source models, 3D displacement maps, and seismic hazard maps derived from satellite products. These latter services integrate satellite measurements, in situ observations and modelling techniques to extract information on the source mechanisms that have generated the surface deformation phenomena.

The TCS SATD is integrated within the EPOS infrastructure through the ESA Geohazards Exploitation Platform (GEP), a new cloud-based platform for the satellite Earth Observations. The TCS will use GEP as interface toward the EPOS portal, benefiting from community-recognized data and metadata formats and standards as well as machine-to-machine protocols. Moreover, GEP can host on-demand processing tools implemented in a cloud-based environment, thus allowing users to process on a cloud-computing infrastructure large DInSAR datasets without any need to download them locally and install desktop applications.

Finally, all the products provided by the TCS SATD respect the FAIR principles. In particular, they are findable, accessible, interoperable and reusable, since the TCS uses formats and standard accepted by the community (e.g., ISO 19119, GEOTIFF, ASCII) and guarantees the open and free access to its products and results by applying CC-by and CC-by-NC licences.