InSAR on-demand services and data processing pipelines for deformation modelling

Herve Caumont¹, Fabrice Brito¹, Manuela Sagona¹, Panteha Pishehvar¹, Danilo Reitano², and Francesco Guglielmino²

¹Terradue, Roma, Italy (herve.caumont@terradue.com)
²Istituto Nazionale di Geofisica e Vulcanologia (INGV), Catania, Italy (danilo.reitano@ingv.it)

EUROVOLC is developing case studies over European Volcanoes in Iceland, Italy, Spanish Canary islands and Portuguese Azores island. For the case of Etna, data access and processing automation levels for simultaneous and integrated strain tensor estimation from GNSS and satellite-based InSAR are applied to the modelling of deformation and seismicity data.

A Cloud platform environment is configured to this end for the EUROVOLC community. A community gathers its members around common thematic areas, in this case volcanoes. The EUROVOLC community includes several “Thematic Apps” per European country volcanoes. For instance, the Italian Volcanoes Thematic App is focussed on the Etna, Vesuvius, Campi Flegrei and Stromboli volcanoes.

Each “Thematic App” includes a Geobrowser which is the access point to several services related to the Earth Observation (EO) data exploitation. The services include data discovery, access, processing and exploitation/visualization.

The data discovery service provides the EUROVOLC community with custom and tailored catalogue access for several EO missions. At this stage, the platform provides access to Sentinel-1, Sentinel-2, Sentinel-3, Envisat ASAR, Landsat-8 and ASTER. The EO data discovered can be downloaded if needed.

The access to on-demand data processing services exploiting such EO missions is available from the Thematic Apps. This includes several services according to the nature of the EO data used. For Sentinel-1, there are InSAR processing services for interferometry (e.g. DIAPASON and SNAP) and for coherence and backscatter generation. For Sentinel-2, Sentinel-3, Landsat-8 and ASTER, there are the INGV Hot Spot detection services.

In the scope of the simultaneous and integrated strain tensor estimation from GNSS and InSAR data activities, the access to Envisat ASAR IMS data is feeding an InSAR data processing pipeline, to generate and deliver interferogram stacks used as inputs to INGV’s strain tensor estimation tool.