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Near Fault Observatories (NFO) services and integration plan for European Plate Observing System (EPOS) Implementation Phase

Lauro Chiaraluce and the EPOS NFO Team
INGV, Centro Nazionale Terremoti, Rome, Italy (lauro.chiaraluce@ingv.it)

Coherently with the EPOS vision aimed at creating a pan-European infrastructure for Earth Sciences supporting research for a more sustainable society, we are working on the integration of NFOs and services implementation facilitating their data and products discovery and usage.

NFOs are National Research Infrastructures (NRI) consisting of advanced networks of multi-parametric sensors continuously monitoring the chemical and physical processes related to the common underlying Earth instabilities governing active faults evolution and the genesis of earthquakes. These infrastructures will enable advancements in understanding of earthquakes generation processes and associated ground shaking due to their high-quality near-source multidisciplinary data.

In EPOS-IP seven NFOs are going to be linked: 1) the Altotiberina and 2) Irpinia Observatories in Italy, 3) Corinth in Greece, 4) South-Iceland Seismic Zone, 5) Valais in Switzerland, 6) Marmara Sea (GEO Supersite) in Turkey and 7) Vrancea in Romania.

EPOS-IP aims to implement integrated services from a technical, legal, governance and financial point of view. Accordingly, our first effort within this first core group of NFOs will be establishing legal governance for such a young community to ensure a long-term sustainability of the envisaged services including the full adoption of the EPOS data policy. The establishment of a Board including representatives of each NFO formally appointed by the Institutions supporting the NRI is a basic requirement to provide and validate a stable governance mechanism supporting the initiatives finalised to the services provision.

Extremely dense networks and less common instruments deserve an extraordinary work on data quality control and description. We will work on linking all the NFOs in a single distributed network of observatories with instrumental and monitoring standards based on common protocols for observation, analysis, and data access and distributed channels. We will rely on the services provided by other Thematic Core Services for the standard data (e.g. seismic and geodetic) and on the direct access to the e-infrastructures of individual NFOs via the Integrated Core Services web services for access and distribution of non standard data (e.g. strain- and tilt-meters, geochemical and electro- magneto-telluric data). We will collaborate with the other groups possessing the same data on data harmonization in terms of both format and metadata description to optimise and facilitate the integration and interoperability processes.

The services will include a Virtual Laboratory, novel visualization tools for data and products describing the anatomy of active faults and the physical processes governing earthquake generation. VL is an online engagement and knowledge sharing initiative for communicating to the other scientists, stockholders and the public the state of scientific knowledge concerning earthquake source and tectonic processes generating catastrophic events.

The availability of real-time data provides the unique opportunity of observing all phases of the earthquake rupture. It is thus of crucial importance developing methodologies to follow in real-time the evolution of the event (e.g. Earthquake Early Warning systems). NFOs are ideal infrastructures for hosting testing centers where a variety of scientific algorithms for real-time monitoring can be independently evaluated. Besides the interest for fundamental science, such developments have a societal impact and can attract new stakeholders such as industry partners who are interested in adopting in such (e.g. EEW) technologies.