Activity	Title	Org.	Department	Coordinators
11.1	Development of the Italian Platform for Solid Earth Science (IPSES)	INGV	Milano Bologna	Mario Locati, Gabriele Tarabusi
11.2	Physical and Remote Access to Italian Earth Science facilities	INGV	Oss. Etneo	Danilo Reitano
11.3	Access to historical macroseismic archives	INGV	Oss. Etneo Bologna	Raffaele Azzaro, Cecilia Ciuccarelli
11.4	Structural test data from Italian laboratories for vulnerability assessment of buildings and infrastructure to natural hazards	Eucentre, INGV	Pavia, Milano	Rui Pinho, Mario Locati
11.5	Italian North-Eastern OGS Observatory for Seismology - INEOOS	OGS		Carla Barnaba
11.6	Access to GNSS data	INGV	Irpinia	Annamaria Vicari
11.7	Digital services for strong motion data	INGV	Milano	Giovanni Lanzano
11.8	Development of interoperable data access services for exploration seismics	OGS		Paolo Diviacco
11.9a	Services and interoperability layers for distributing earthquake faulting data in 4D	INGV	Roma 1	Roberto Basili
11.9b	Geological data and services provision and fault geometries interoperability layers	ISPRA		Maria Pia Congi
11.10a	Web service for seismic source parameters dissemination	UniGE		Daniele Spallarossa
11.10b	Web service for seismic source parameters dissemination: INGV contribution	INGV	Milano	Francesca Pacor
11.10c	Rapid estimate and dissemination of source parameters in Italian target areas	OGS		Angela Saraò
11.10d	Web service for seismic source parameters dissemination: UNITS contribution	UniTS		Giovanni Costa
11.11a	Virtual Access to Italian volcanological services	INGV	Oss. Etneo	Giuseppe Puglisi
11.11b	Access to volcanological archives recorded by the ash dispersion	INGV	Oss. Vesuviano	Mauro Di Vito
11.11c	Text corpora for volcanic eruption forecasting, impact assess. and resilience planning	CNR	CNR-IGG	Claudia Principe

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WP11.1 IPSES - Italian Platform for Solid Earth Science

Coord. Mario Locati, Gabriele Tarabusi - INGV, Milano and Bologna
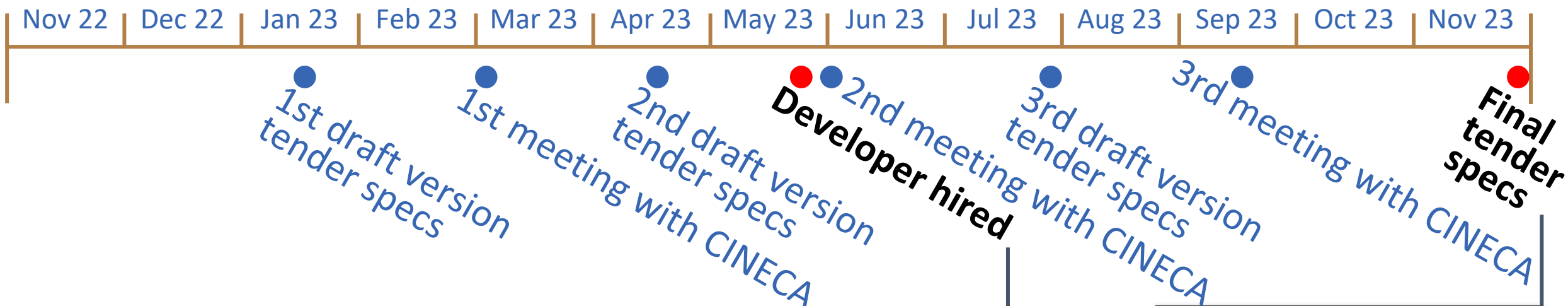
| Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 | Oct 23 | Nov 23 |

WP11 meeting

Survey on data & services

D11.1 Requirements

D11.2 Access to labs and TNA

Next steps

February 2024
Survey on data & services

March/April 2024
Meeting about data & services

October 2024
D11.3 Phase 3: Design and prototypes
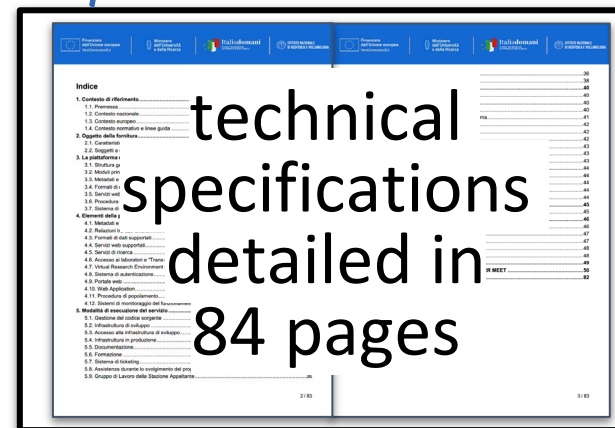
A11.2 Physical and Remote Access to Italian Earth Science facilities
Danilo Reitano - INGV, Osservatorio Etneo

November 2023

First dynamic prototype of a catalogue listing all ILGE facilities is available at

http://meet.ingv.it/attivita/transnational-access

In coordination with WP3
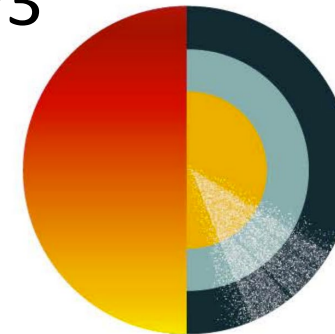
and

A11.3 Access to historical macroseismic archives

Raffaele Azzaro - INGV, Osservatorio Etneo | Cecilia Ciuccarelli, INGV Sezione di Bologna

Timeline: Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 | Oct 23 | Nov 23

- Scientific agreement defined
- Conceptual draft (structure) of the archive
- Main requirements of data
- Administrative procedures started
- Scientific agreement approved
- Scientific agreement signed
- **Funds transfer**

Funding management
- Funds transferred to UNI-CT (November 2023)
- 1 unit personnel to be hired (early 2024).

Scientific work
- Main requirements defined and first conceptual draft of the macroseismic archive.

A11.4 Structural test data from Italian laboratories for vulnerability assessment of buildings and infrastructure to natural hazards

Rui Pinho - EUCENTRE (and the coordinators of the WP11)

| Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 | Oct 23 | Nov 23 |

Drafting of tender specs

Public invitation to tender

D11.1 Requirements

Job assigned to EUCENTRE

Meeting with WP11 coords

Scientific work
Main technical requirements of the online platform/service have been defined.
Development of a first prototype has been started already.

A11.5 Italian North-Eastern OGS Observatory for Seismology - INEOOS

Carla Barnaba - OGS

1. Data & Services to be included in the database → D11.1
2. Providing a data/service prototype for each item requested/decided → D11.2
3. Development of procedures to produce data/services → D11.3

Defined in the Deliverable 11.1 – June 2023

4. Prototype publication → D11.3
5. Prototype testing → D11.4
6. Final version development → D11.4
7. Final version publication → D11.4
8. Final version testing → D11.4
9. Transfer and publication on the final infrastructure → D11.4
10. Documentation release → D11.4

Italian Platform for Solid Earth Science (IPSES) Milestones

Year	2022		2023														2024												2025			
Month	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Progressive month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Bimester	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
Deliverables								D11.1				D11.2												D11.3						D11.4

- technological infrastructure typologies to be purchased;
- professional profile of the personnel to be recruited;
- Tenders and calls for application

- technical infrastructure acquired and now being tested;
- 2 computer technicians hired;
- Software Company develops web portal and services to connect to the IPSES platform

A11.6 Access to GNSS data

Annamaria Vicari - INGV, Irpinia | David Zuliani - OGS

Personnel

- **INGV:** CTER hired. Roberto Schena started on 16/6/2023.
- **OGS:** CTER hired, shared with INEOOS (A11.5). Andrea Prassel will start on 01/02/2024.

Resources to build the service

- **INGV**
- Hardware specifications have been fully defined and submitted. Waiting for the purchase.
- The user requirements and the technical specifications have been fully described.
- New RING (Rete Integrata Nazionale GNSS) website by next spring (hopefully), interoperable with IPSES.

- **OGS**
- Servers purchase, virtual machine and storage shared with INEOOS,
  has been completed and most of the hardware has been delivered to OGS.
- An OGS GLASS node for GNSS data sharing is under development.
  The node, developed within the EPOS-Italy programme, will provide GNSS data to the IPSES platform.

A11.7 Digital services for strong motion data
Giovanni Lanzano - INGV, Milano

https://esm-db.eu/webservices/

Funding management
- Contract with an IT company for front-end development of web services.
  Joint acquisition procedure with activity 11.10b -> expression of interest in the pipeline, company identified, pending transfer of funds (progress **75%**)
- 2 servers for database redundancy -> products and supplier identified, quotation obtained, preparation of documentation in progress (progress **60%**)

Scientific work
- Identification of the web services to be included in IPSES among those available for ITACA and ESM databases (progress **100%**)
- Design and programming of new web services (progress **80%**)
- Scientific paper describing the web services (progress **10%**)

Technical work
- Finalization of the back-end of services for IPSES (progress **90%**)
- Compliance with FAIR principles (progress **90%**)
- Web-service debugging (progress **70%**)

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https://esm-db.eu/webservices/

ESM Web-Services

The ESM Web-Services provide machine-friendly access to data and metadata included in the ESM Database.

Available URLs

Authentication
- ESM Authentication Token Generator Web-Service

FDSN Services
- FDSNWS Event Web-Service
- FDSNWS Station Web-Service

Event Metadata
- ESM Event Web-Service
- ESM Event IDs Web-Service
- ESM Fault Web-Service

Waveform Metadata
- ESM Waveform-Quality Web-Service
- ESM Waveform-Distances Web-Service
- ESM P-S Arrivals Web-Service
- ESM Credits Web-Service

A11.8 Development of interoperable data access services for exploration seismics
Paolo Diviacco - OGS

| Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 | Oct 23 | Nov 23 |

HW and personnel recruitment defined

Administrative procedures started personnel defined

D11.1

Tenders assigned

1 unit personnel position assigned

Funding management
- Personnel assigned but not yet hired (April 24).
- Computer equipment acquisition: 1/2 completed, 1/2 approx Jan 24.

Technical and scientific work
- Requirements defined and first draft development of new interoperable services ongoing.

A11.9a Services and interoperability layers for distributing earthquake faulting data in 4D

Roberto Basili - INGV, Roma 1

Funding management
- Funding (~146 kEur): 82% allocated; 72% committed; 0.3% spent.
- Drafted agreements with four Universities (Trieste, Pavia, Naples, and Catania), 100 kEur investment, Status: waiting for approvals and signatures. Duration ~12 months each, starting early 2024.
- Computer equipment acquisition: 1/3 completed, 2/3 in due course.

Technical and scientific work

Defined requirements for four new datasets (main table structure and attributes) and started populating with proof-of-concept datasets:
- SF3D, Seismogenic Faults in Three Dimensions;
- Interoperability layer between the DISS and ITHACA databases;
- SF.IT - Surface Faulting of Italy;
- DIP - Database of Italian Paleo Earthquakes.

- Interaction with A11.9b: import/export tool of 3D data (GOCAD .ts format in QGIS); preliminary workflow for DISS-ITHACA databases interoperability; definition of SF.IT structure and data preparation.
- Completed workflow for 3D fault-mesh creation, QGIS tool under testing (in-kind contribution)
- Tested platform for OGC web service publication

A11.9b Geological data and services provision and fault geometries interoperability layers

Maria Pia Congi - ISPRA

HIKE **Hazard and Impact Knowledge for Europe**

All required administrative tasks have been completed
✓ Tender for IT development
✓ Hiring personnel (inPA platform https://www.inpa.gov.it/) 1 Researcher, 24 months
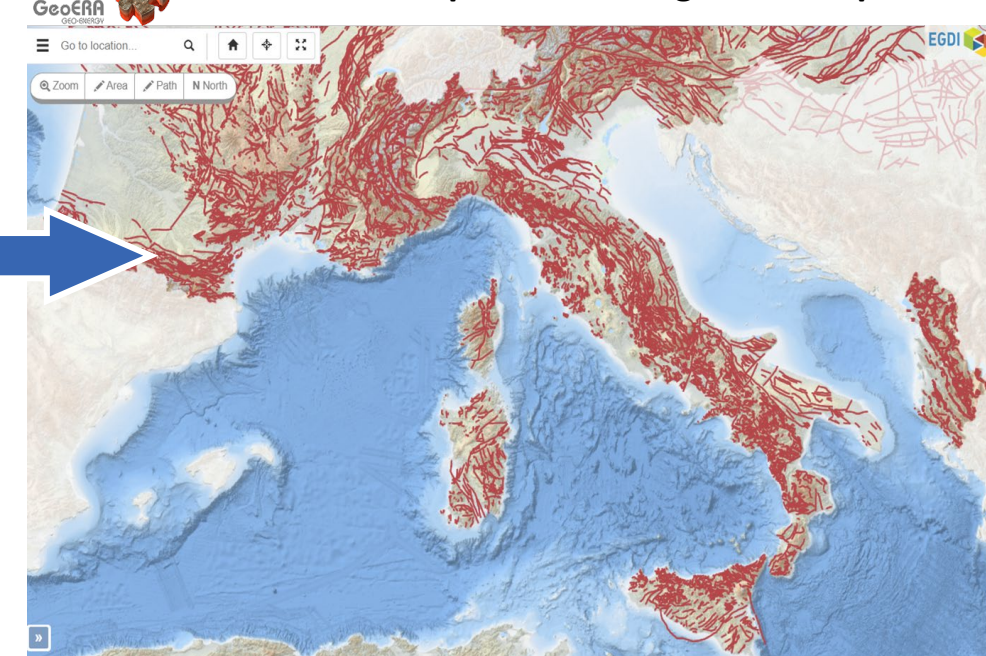 ICT hardware equipment:

Priority analysis on the procedures for a proper and standardised data sharing. HIKE faults 1° dataset

A workflow was designed with pre-established required steps to reach the goal.
The entire dataset and metadata sharing process is composed by the following phases:

1. Source Data Model Analysis
2. INSPIRE-GeoSciML Target Data Model Analysis (could be more than 1)
3. Identification of correspondence attributes
4. Code list (vocabulary analysis and terms integration where missing in accordance with 11.9b)
5. Final Data model design
6. Dataset transformation
7. Dataset validation (INSPIRE DATASET VALIDATOR)
8. Metadata creation
9. Metadata validation (INSPIRE METADATA VALIDATOR)
10. Metadata sharing
11. Geoserver instance to share dataset (OGC standard service included OFAPI)

4968 - 2D faults + **180** - 3D faults

ATTRIBUTES
- Name, concept, structural domain
- Type (i.e. Kinematic)
- Dip, Azimuth
- Age (first/last faulted/deformed horizon)

A11.10 a,b,c,d Web service for seismic source parameters dissemination

Daniele Spallarossa - University of Genova | Francesca Pacor - INGV, Milano
Angela Saraò - OGS | Giovanni Costa - University of Trieste

Database

Definition of the dataset area (Italy).
Definition of the parameters and format specifications of the data to be fed into the database.

Implementation of algorithms

Customization of procedures for estimating Mw, Er and ground motion parameters.

Data fairness

Computer equipment acquisition (New data storage and switch, Upgrade existing cluster)
Recruitment of a software company to develop services for feeding and harmonising datasets.
Recruitment of a technician (cat. C) to develop webservices (now in the public selection phase)

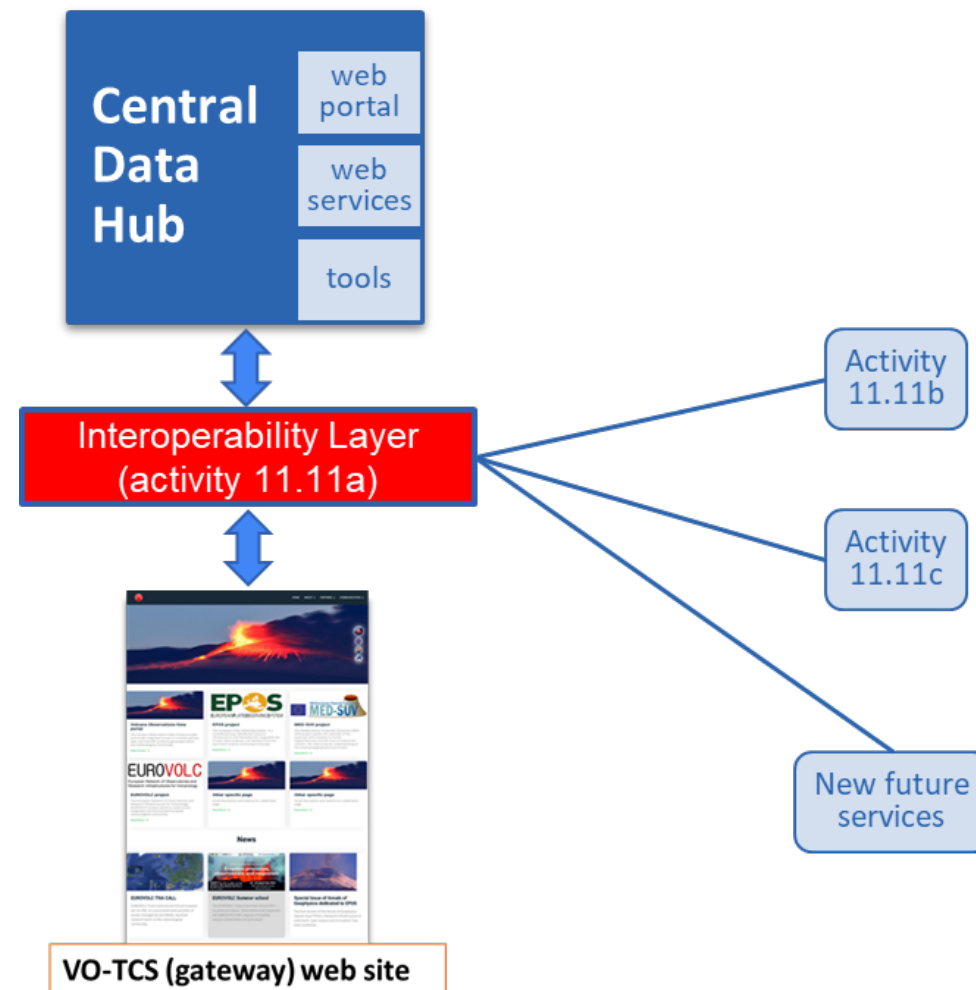## Training Activities

1 PhD position filled

A11.11a Virtual Access to Italian volcanological services
Giuseppe Puglisi - INGV, Osservatorio Etneo

Objective: *harmonize the virtual access to existing and new Italian volcanological services through IPSES, in compliance with EPOS Volcano Observations TCS (VO-TCS).*

The work of the activity 11.11a is in progress for:
- Defining two Interoperability Layer on the two points:
  - System Requirement definition: surveys of the existing and foreseen VA services in the INGV branches
  - Analysis of the service payload improvement
- Analysing the key aspects of the DMP to be implemented

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A11.11b Access to volcanological archives recorded by the ash dispersion

Mauro Antonio Di Vito - INGV, Osservatorio Vesuviano

Goals

● Build a database about volcanic ash dispersal for selected eruptions

● Compliance with European Catalogue of Volcanoes (activity 11.11a)

● Relevant parameters

  ○ Timing of eruptions

  ○ Dispersal

  ○ Pyroclastic product features

  ○ Impacts

  ○ Secondary phenomena (lahars, seismicity, tsunami)

The impact of explosive eruptions has an important relapse in hazard and risk assessment.

Challenges

Global view definition of hazard and risk accounting for multiple eruptions in global areas

Open issue: the activity will be done after remodulation and coordination activity with Università degli Studi di Napoli Federico II

A11.11c Text corpora for volcanic eruption forecasting, impact assessment and resilience planning

Claudia Principe - CNR IGG

- ✓ Hardware specifications have been fully defined and submitted
- ✓ Hardware has been purchased
- ✓ The lists of documents have been completed (about 1000 items)
- ✓ Digitization specification have been fully defined and submitted
- ✓ The digitization service has been assigned (.pdf and .txt format)
- ✓ Interface specification have been fully defined
- ■ We are waiting for the completion of the interface building assignment procedure

Document selection (DB + other sources) — 1 Nov 2022

DB digitisation & annotation (OCR + NLP)

Tool development (Graphical User Interface)

Tool testing in cooperation with other MEET units

Dissemination (Civil Protection testing) — 1 May 2025