While politicians may be putting up borders,
scientists are trying even harder to break down national barriers.

EPOS - European Plate Observing System
The European distributed Research Infrastructure for solid Earth science

Lilli Freda
EPOS ERIC Executive Director

EPOS
EUROPEANPLATEOBSERVINGSYSTEM www.epos-eu.org

Solid Earth Science is the key to decipher chemical and physical processes that trigger and control natural phenomena

Natural processes do not respect national boundaries
To be understood, they require cross-disciplinary approaches

Integrated, multidisciplinary research is mandatory
to understand the Earth's chemical and physical processes
to forecast the events
to assess the hazard and mitigate the risk
to sustainably exploit geo-resources

The challenge is to make the enormous wealth of
scientific data generated by many different scientific communities
universally and openly accessible

A long journey from conception to operation

EPOS has been designed and implemented as the only Research Infrastructure in Europe for solid Earth Science

French scientists contributed in setting the vision and the mission of EPOS

Vision

To ensure sustainable and universal use and re-use of multidisciplinary solid Earth science data and products fostering state-of-the-art research and innovation

The EPOS Data Portal is now fully operational

a multi-domain portal that grants **open access to harmonized and interoperable scientific data and products** applying FAIR principles

France plays a crucial role on the operation of the EPOS Data Portal

Mission

To establish a sustainable and long-term access to solid Earth science data and services integrating diverse European Research Infrastructures under a common federated framework

The heterogenous EPOS landscape

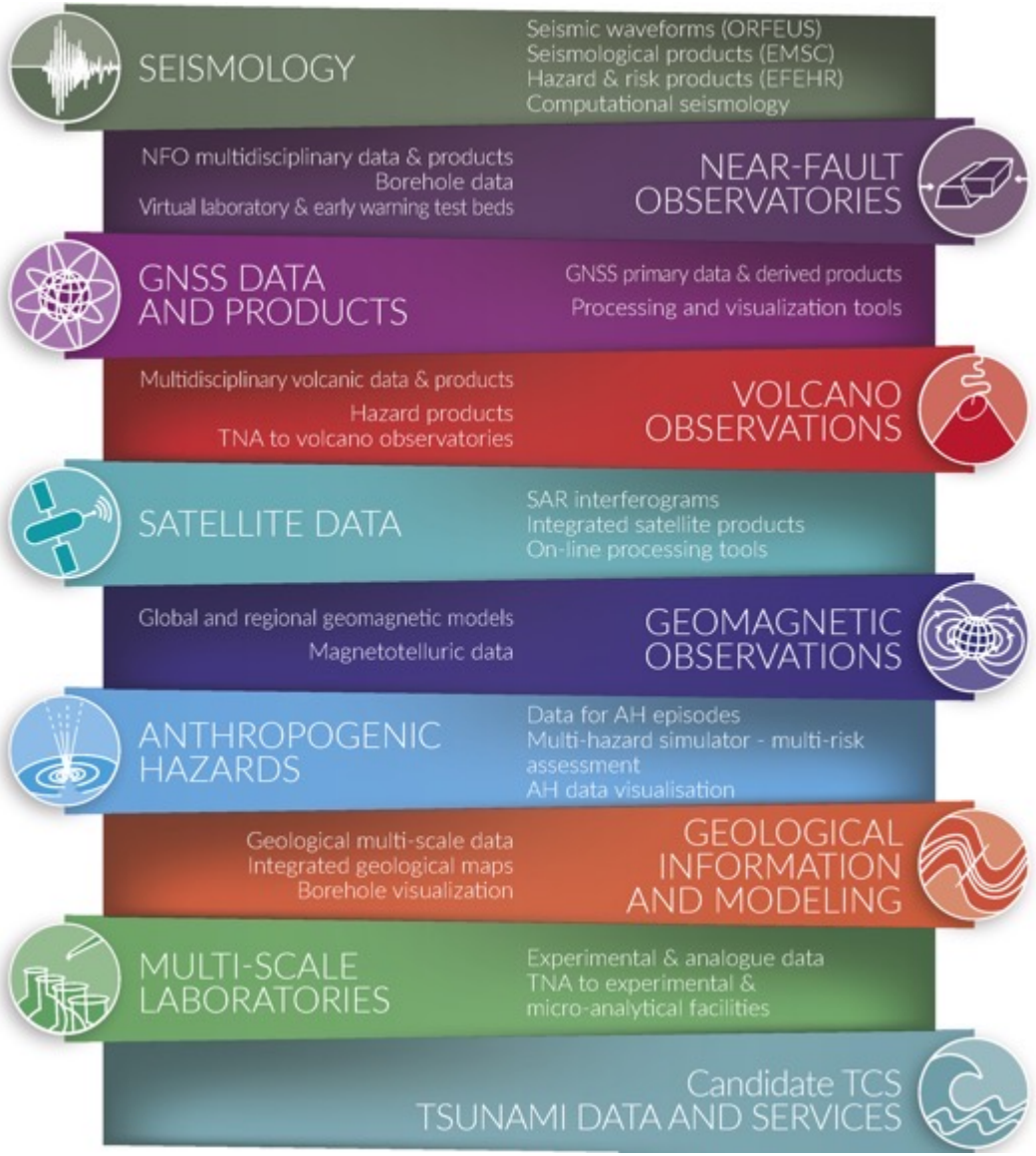
Designed as the only Research Infrastructure for solid Earth science in Europe,
EPOS is, by nature, characterised by a heterogeneous landscape

10	Thematic Core Services
26	Countries in the EPOS Delivery Framework
16	Countries with EPOS in national roadmap
14	Countries with EPOS National Consortia
11	Countries with national funding allocated to EPOS
256	Research organisations providing data
5	International research organisations

EPOS brings together European nations and international organizations and combines hundreds of solid Earth science infrastructures and their capital of human expertise, scientific data and facilities into one integrated system

More than 10% of the research organizations providing data to EPOS are set in France

The heterogenous EPOS landscape (I): scientific domains

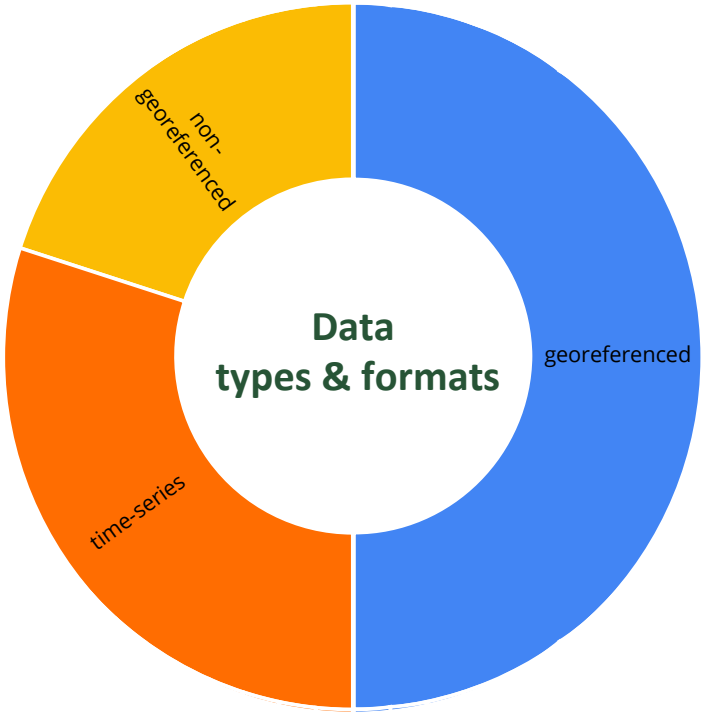


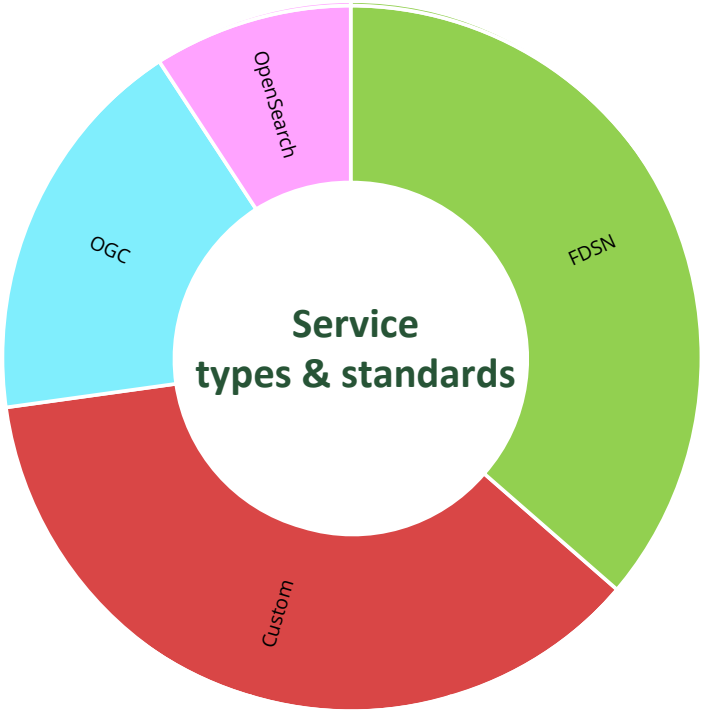
The Thematic Communities drive the evolution of EPOS

- Currently, **10 different solid Earth science domains** are harmonized across EPOS into the **Thematic Core Services.**
  French scientists contribute to all TCS
- Each TCS is established as a Consortium of research organisations across Europe (**Consortium Agreement**), with its own **governance.**
  French research organizations are involved in all Consortia
- TCS connote the **governance framework** to ensure the provision of multidisciplinary, high-quality, standardized data and services.
  France coordinated the activities leading to the current EPOS governance, thus giving strong input to the design of EPOS
- TCS are represented in EPOS ERIC in the **Service Coordination Committee**, an advisory board to the Executive Director.

The heterogenous EPOS landscape (II): scientific data and services

Data and services highly heterogeneous in terms of formats, vocabularies, standards and protocols





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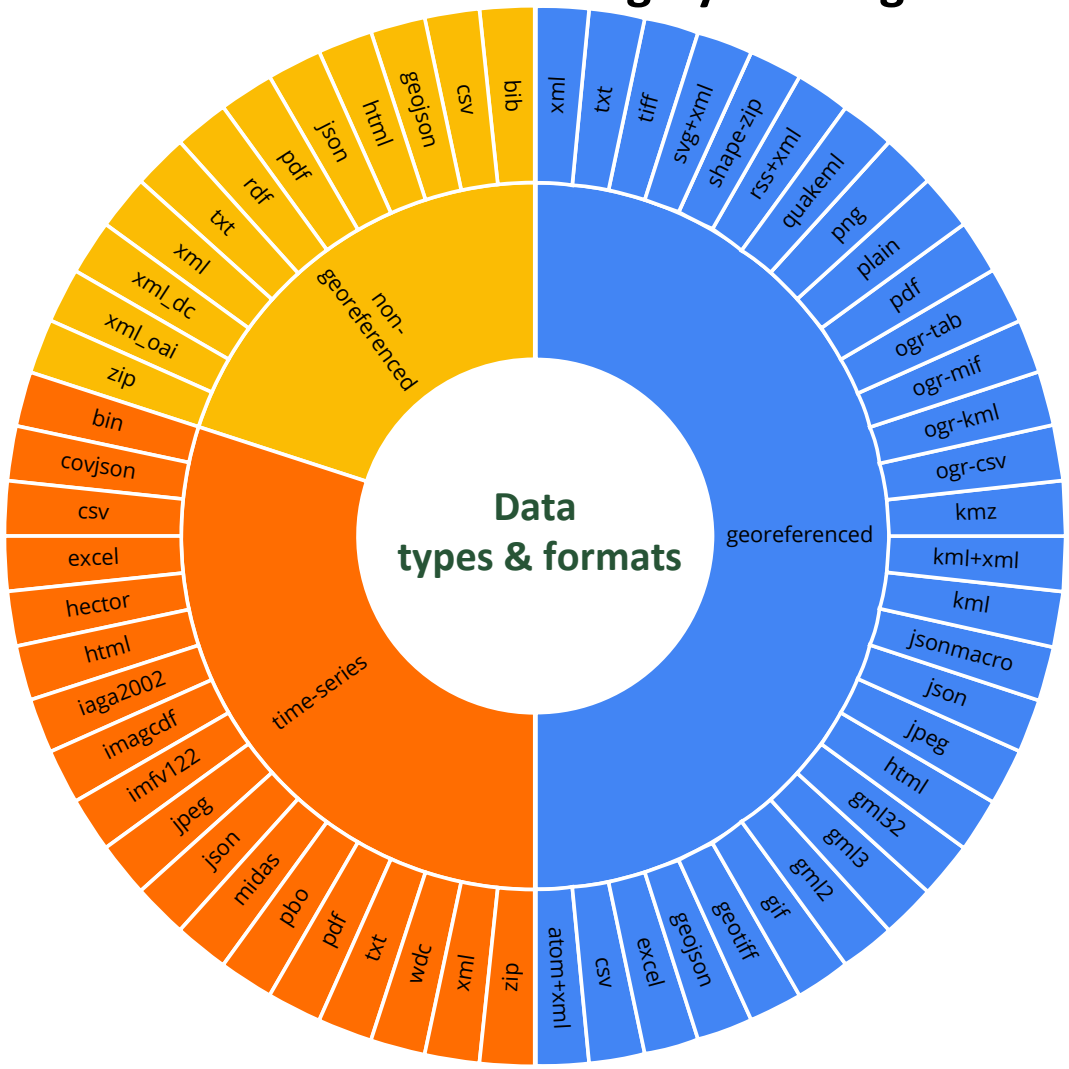

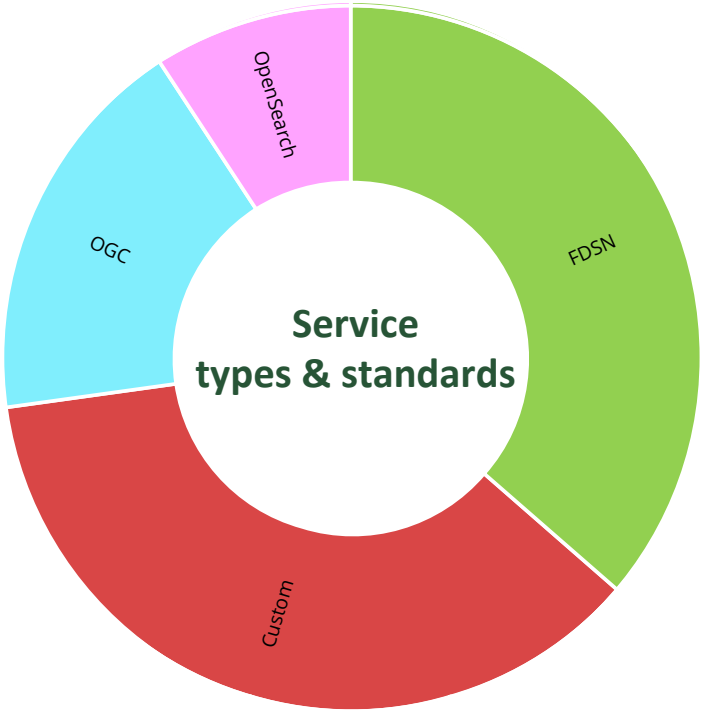

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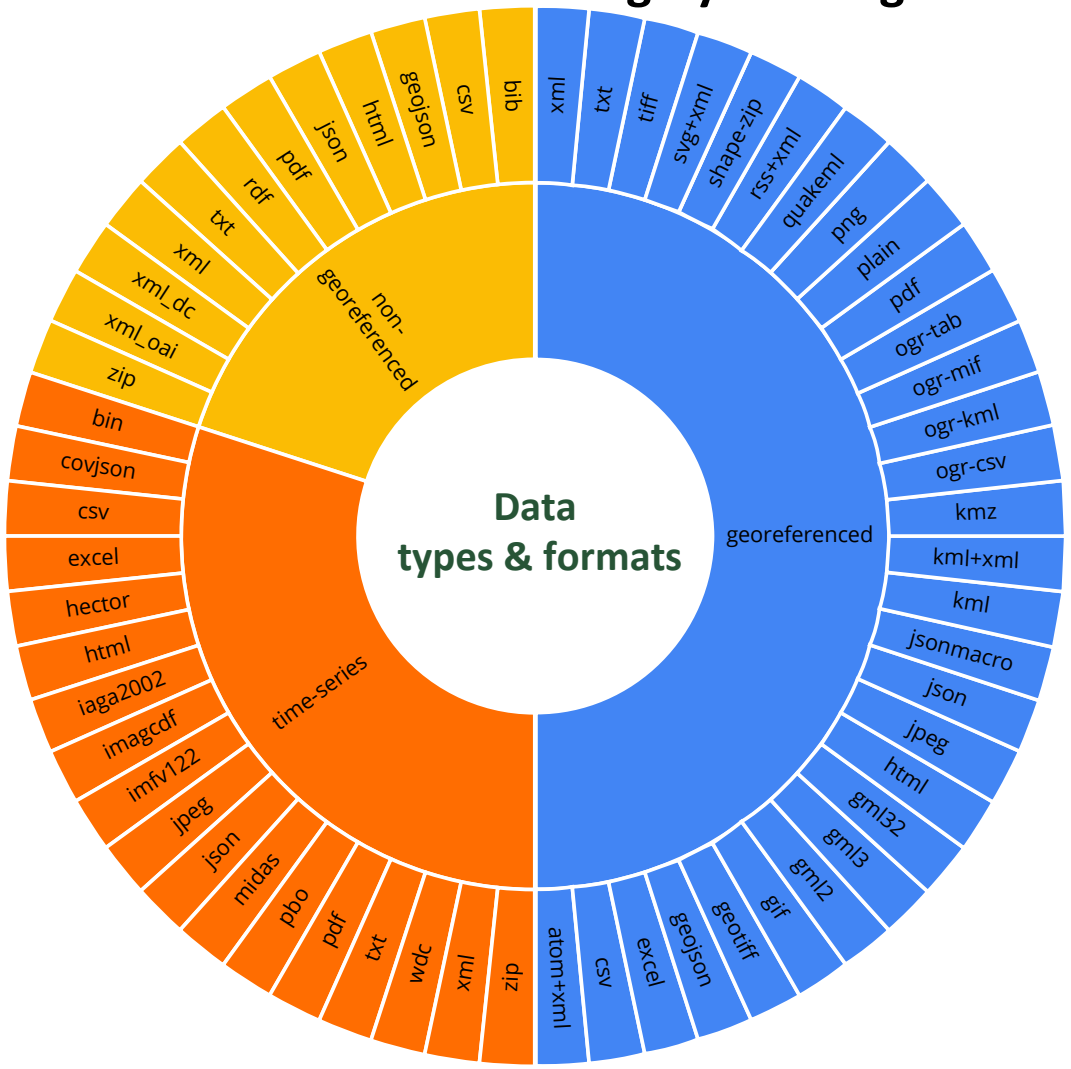

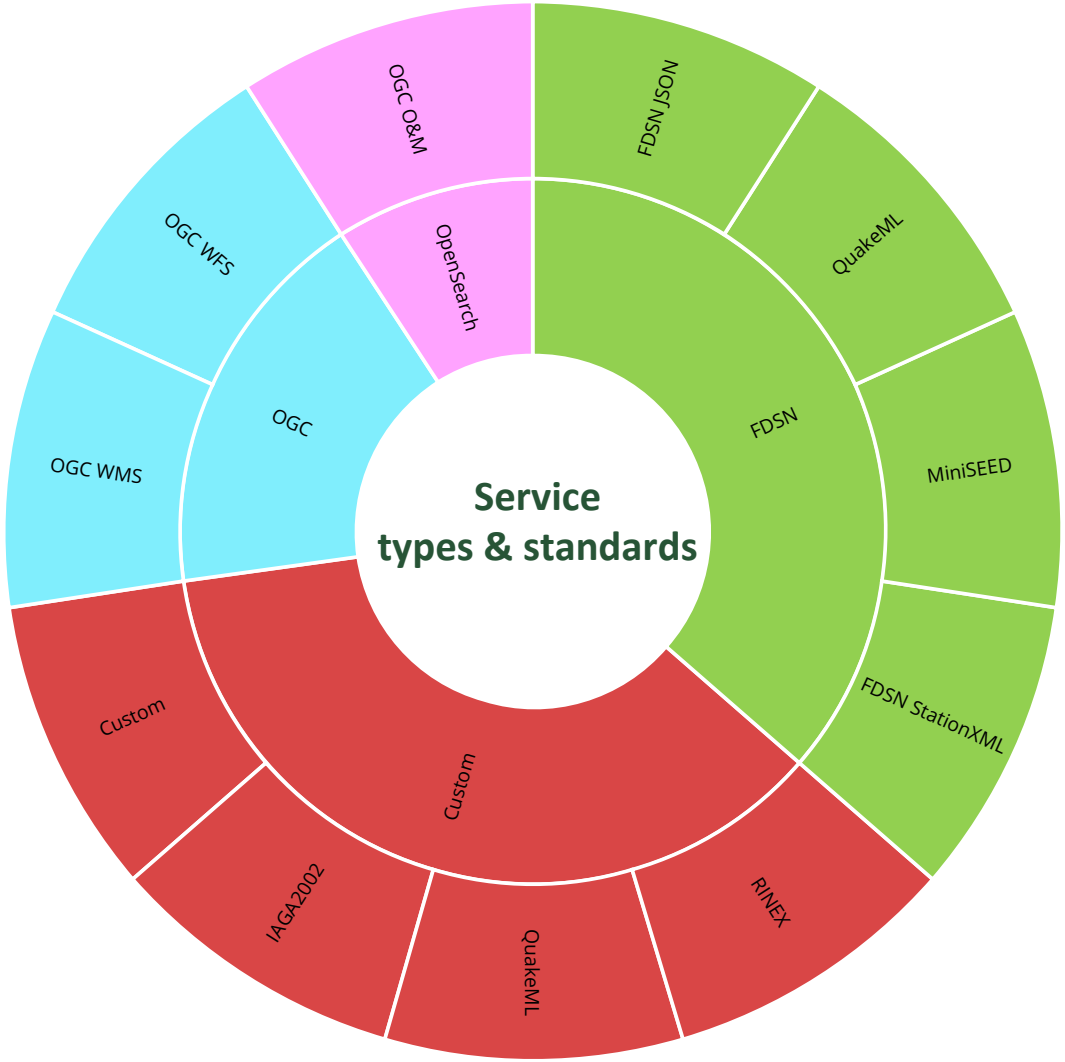

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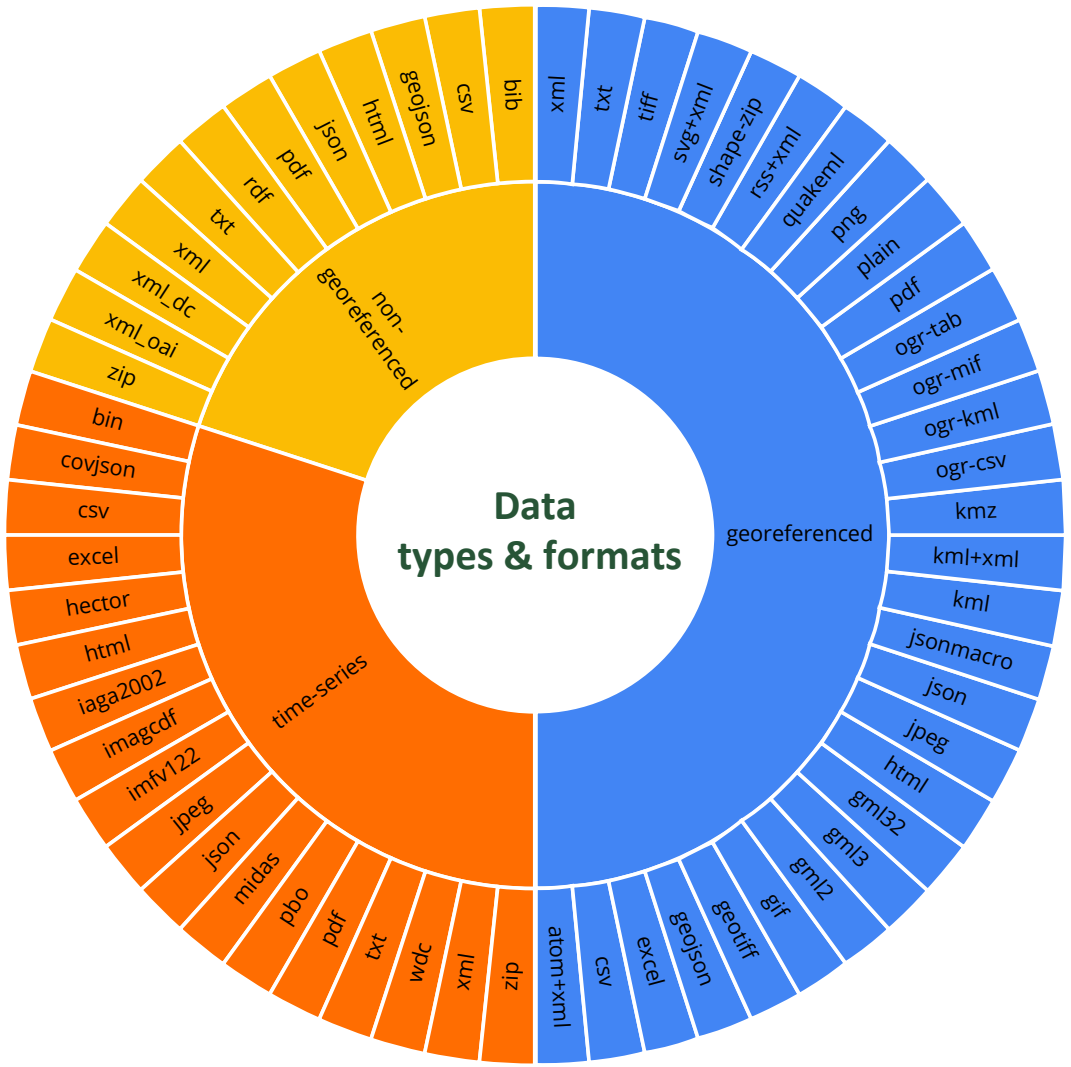
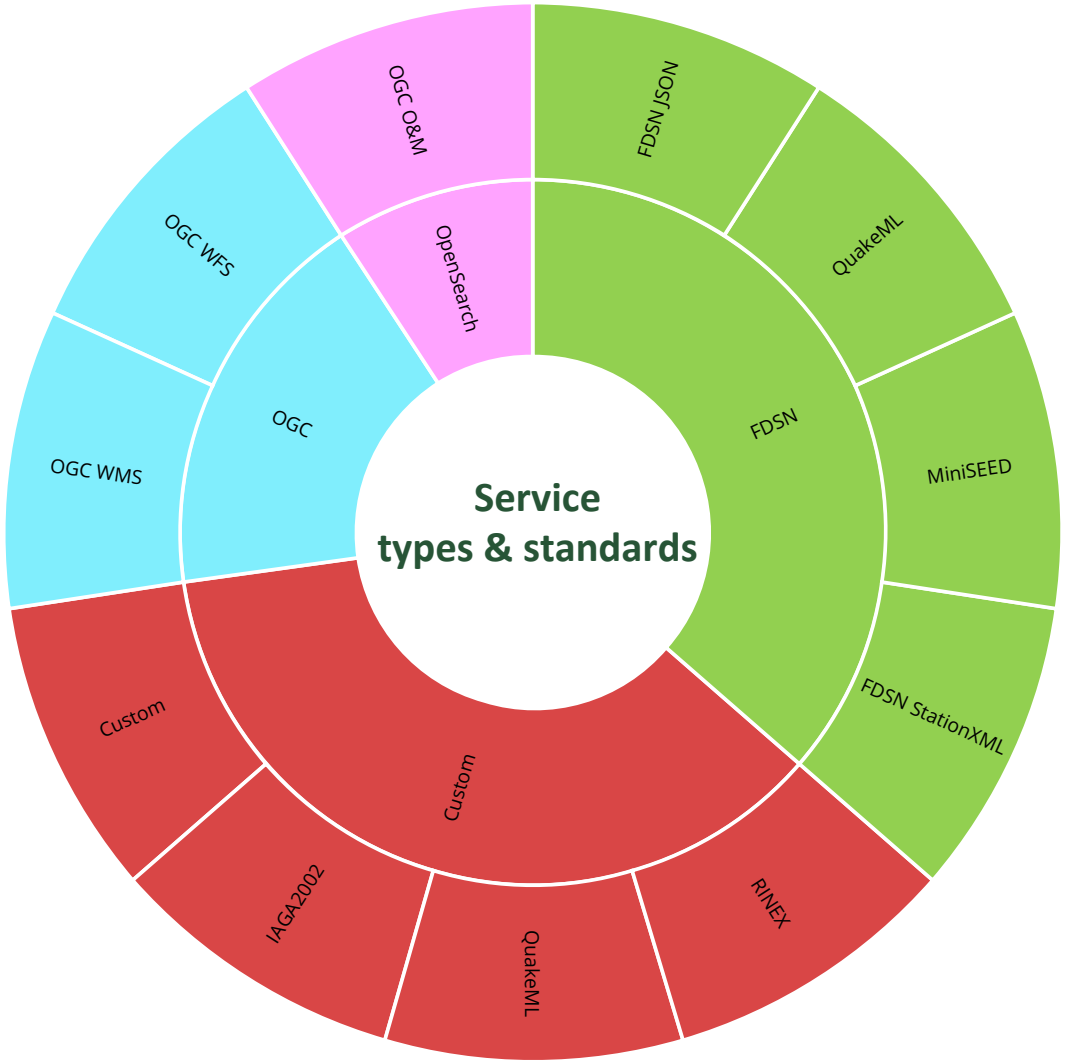


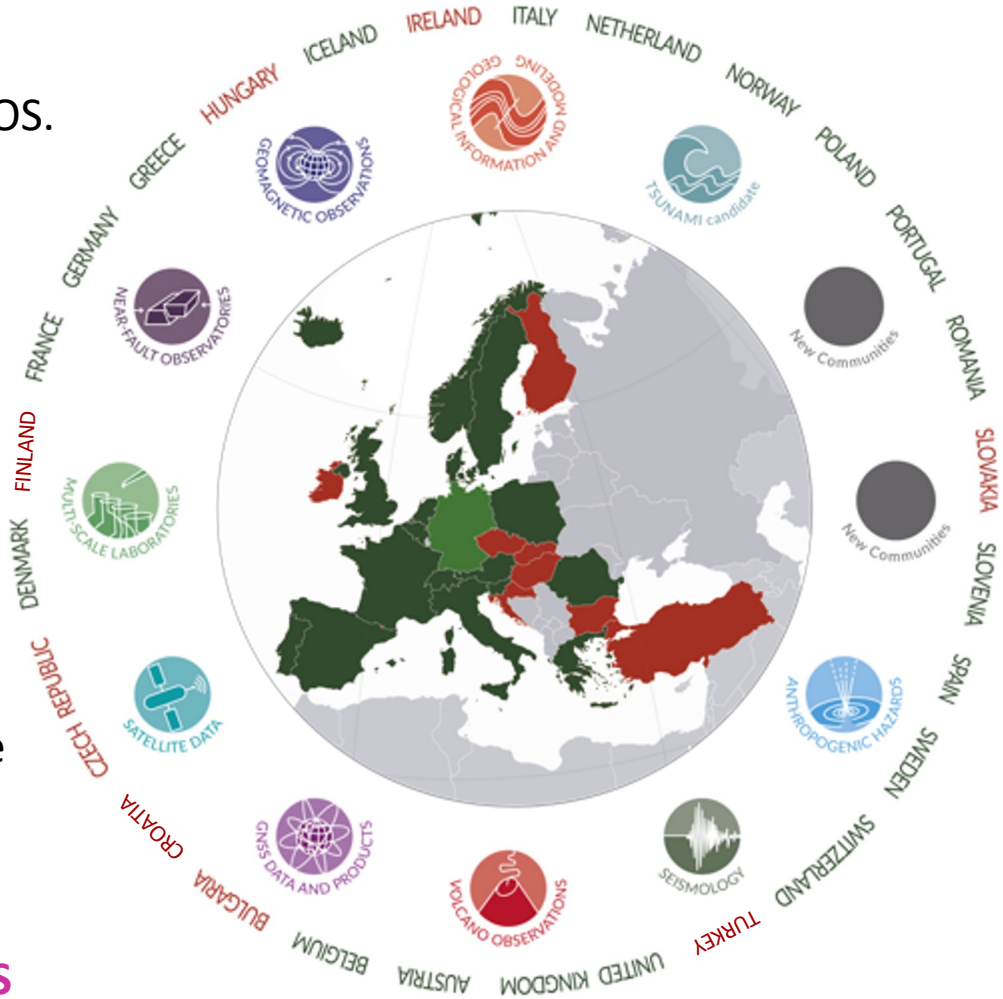


EPOS addressed the challenge of making this enormous wealth of scattered, scientific data interoperable, and universally and openly accessible

EPOS ERIC

- The ERIC, is the tool chosen by the Community to govern and operate EPOS.
- Currently EPOS ERIC is joined by 18 countries.
- The EPOS ERIC decision body is the **General Assembly**, composed of ministry representatives by all Members.
- The EPOS ERIC **legal seat** is in Italy (INGV, Rome), where the Executive Coordination Office is set.
- Overall, EPOS ERIC **ensures joint strategies** to achieve **scientific and technological innovation** across all stakeholders involved, and tackles the **sustainability** challenge with harmonized approaches.

France is one of the 9 founding Members of EPOS ERIC and actively contributes to all strategic decisions to be taken for the operation of EPOS

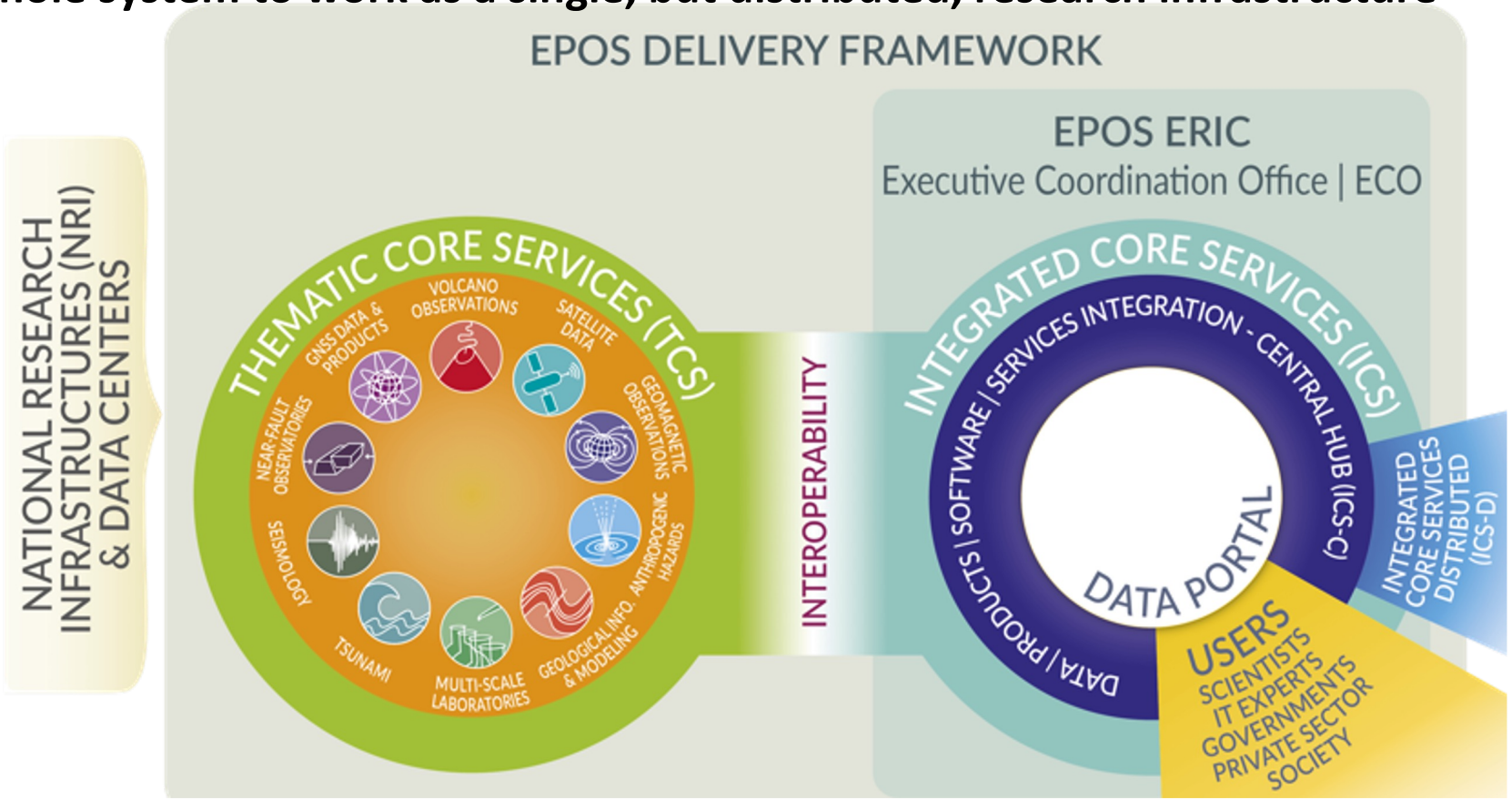


In green country members (dark) and observers (light) of the ERIC
In red, countries not in the ERIC, but still participating to the EPOS Delivery Framework

The EPOS architecture

EPOS has been designed and built by assembling distinctive elements to allow the whole system to work as a single, but distributed, research infrastructure

Data generation



Federated data management **Data integration and access**

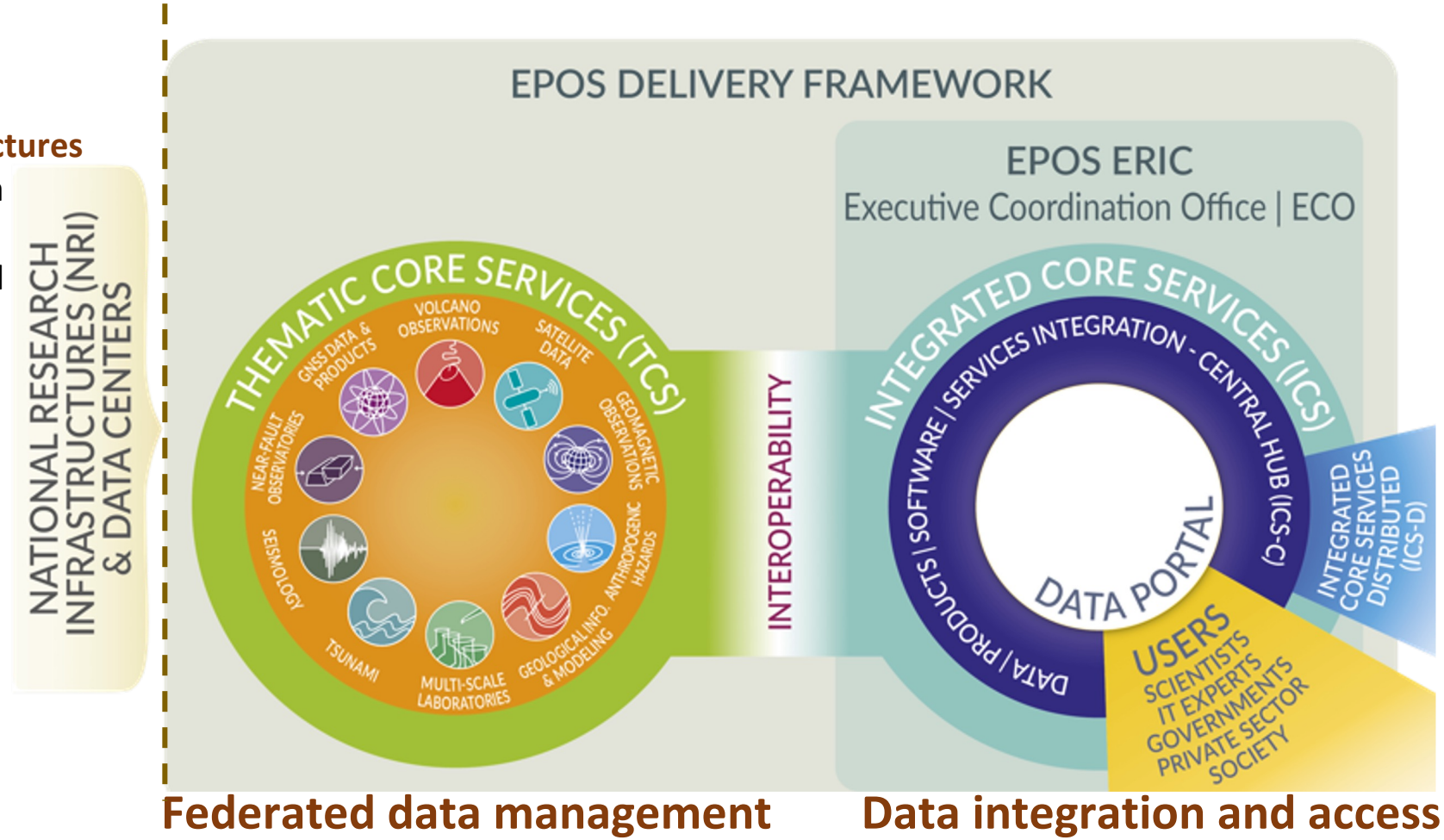
This peculiar architecture guarantees the effective engagement of all actors and stakeholders

The EPOS architecture

Data generation

National Research Infrastructures

- generate and manage data
- guarantee access to them
- supported at national level



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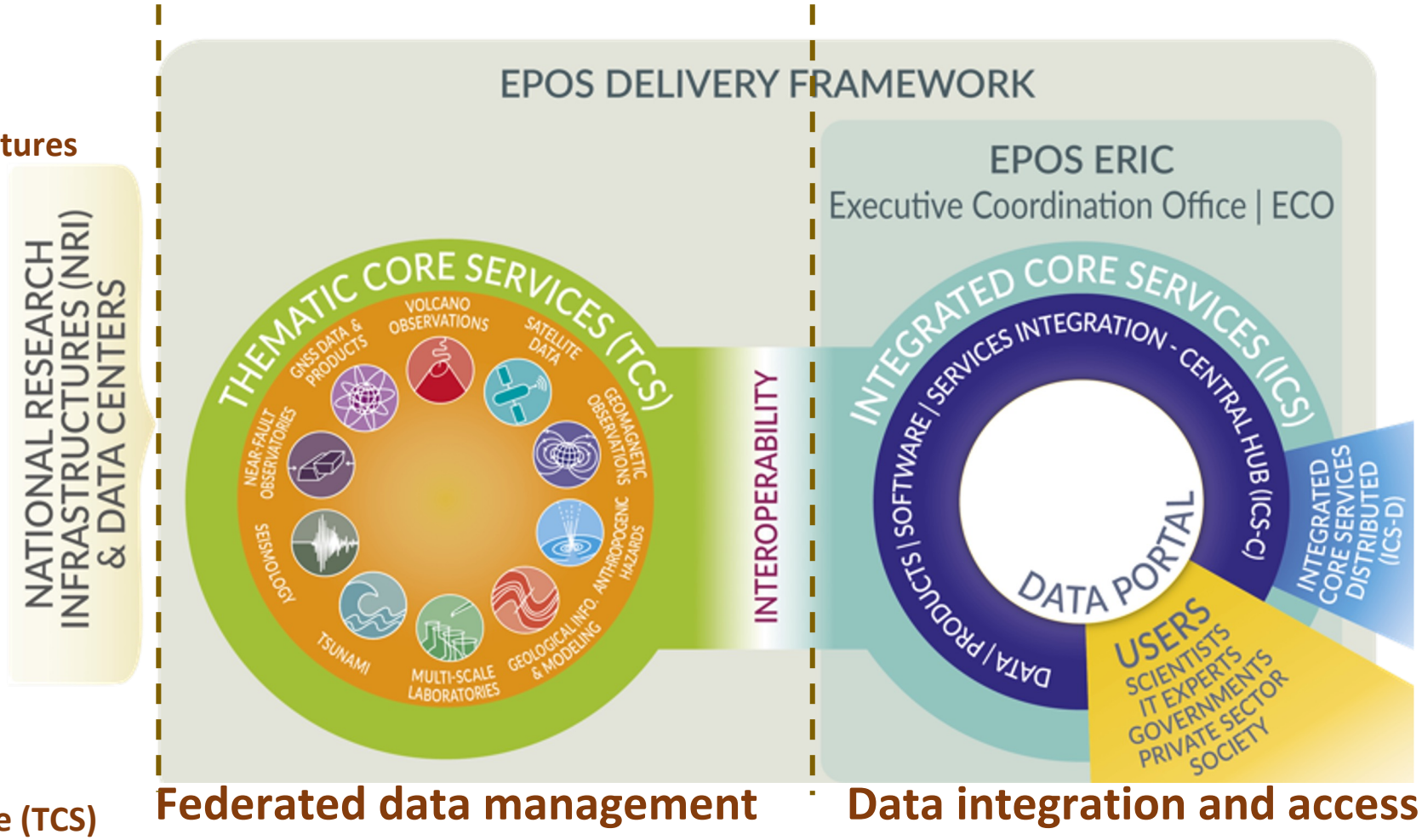

Thematic Core Service (TCS)

- the community governance-layer necessary to ensure effective management of community-specific data and services for their integration and provision within EPOS
- mostly supported in kind, partially through EPOS ERIC fees

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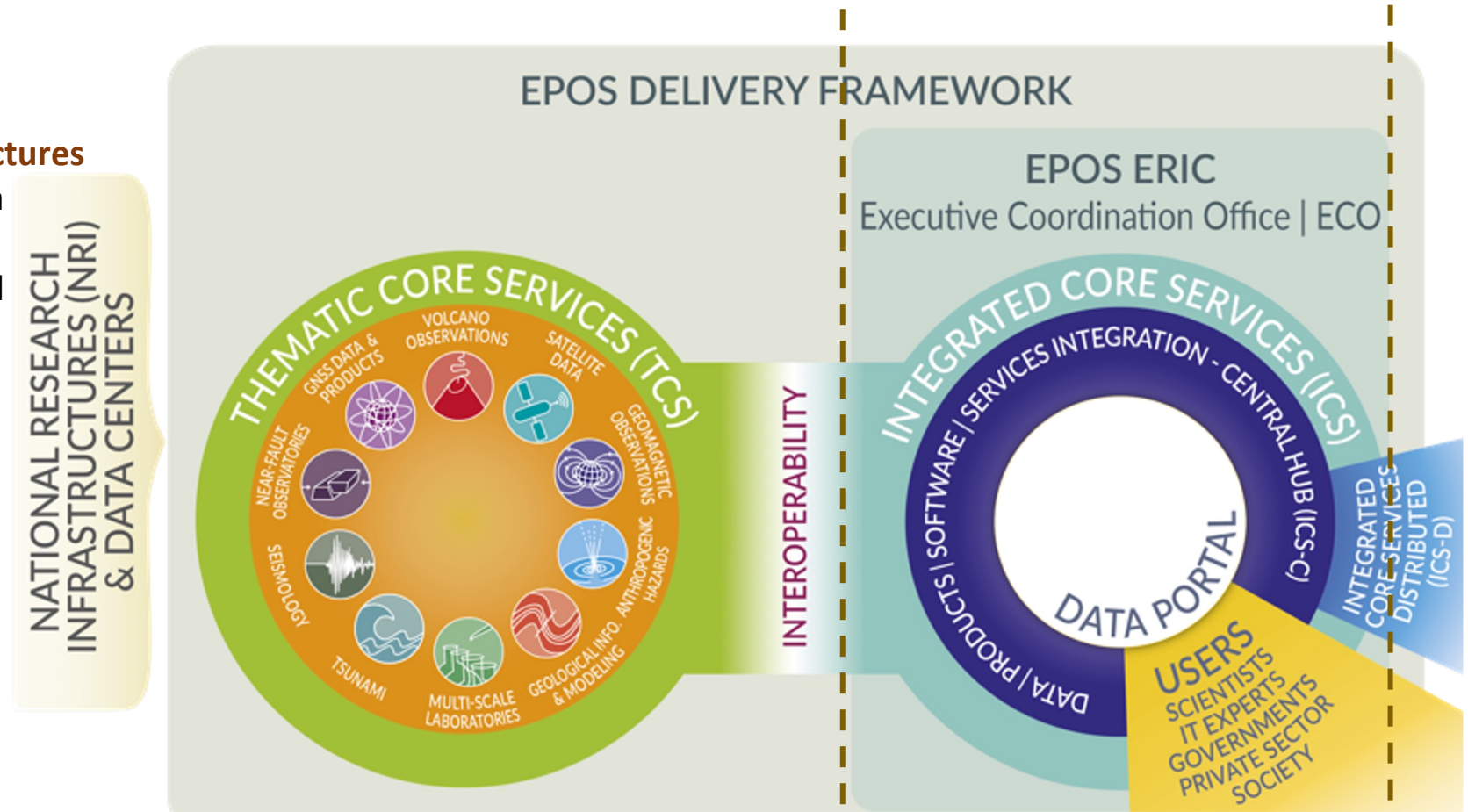

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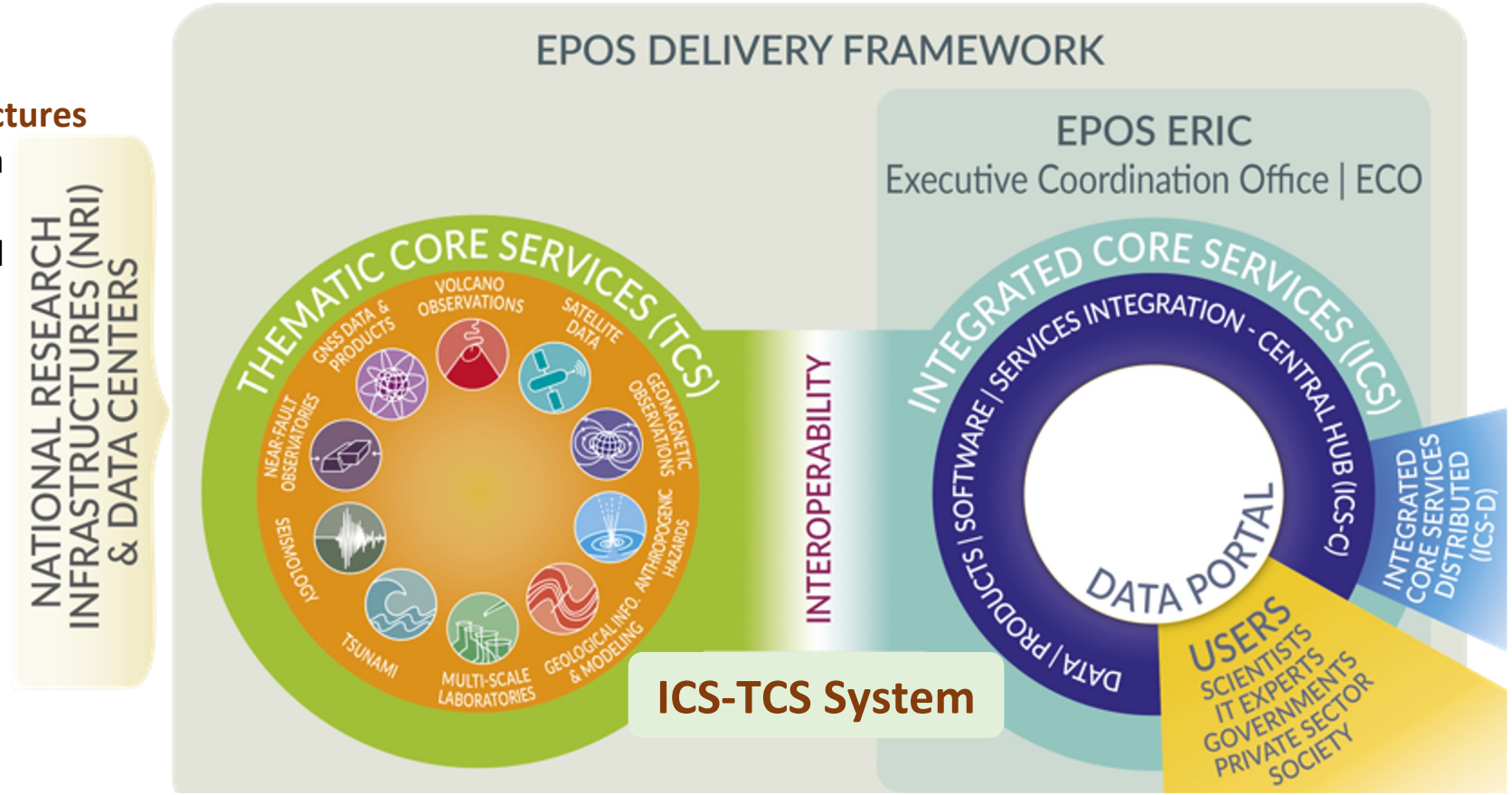

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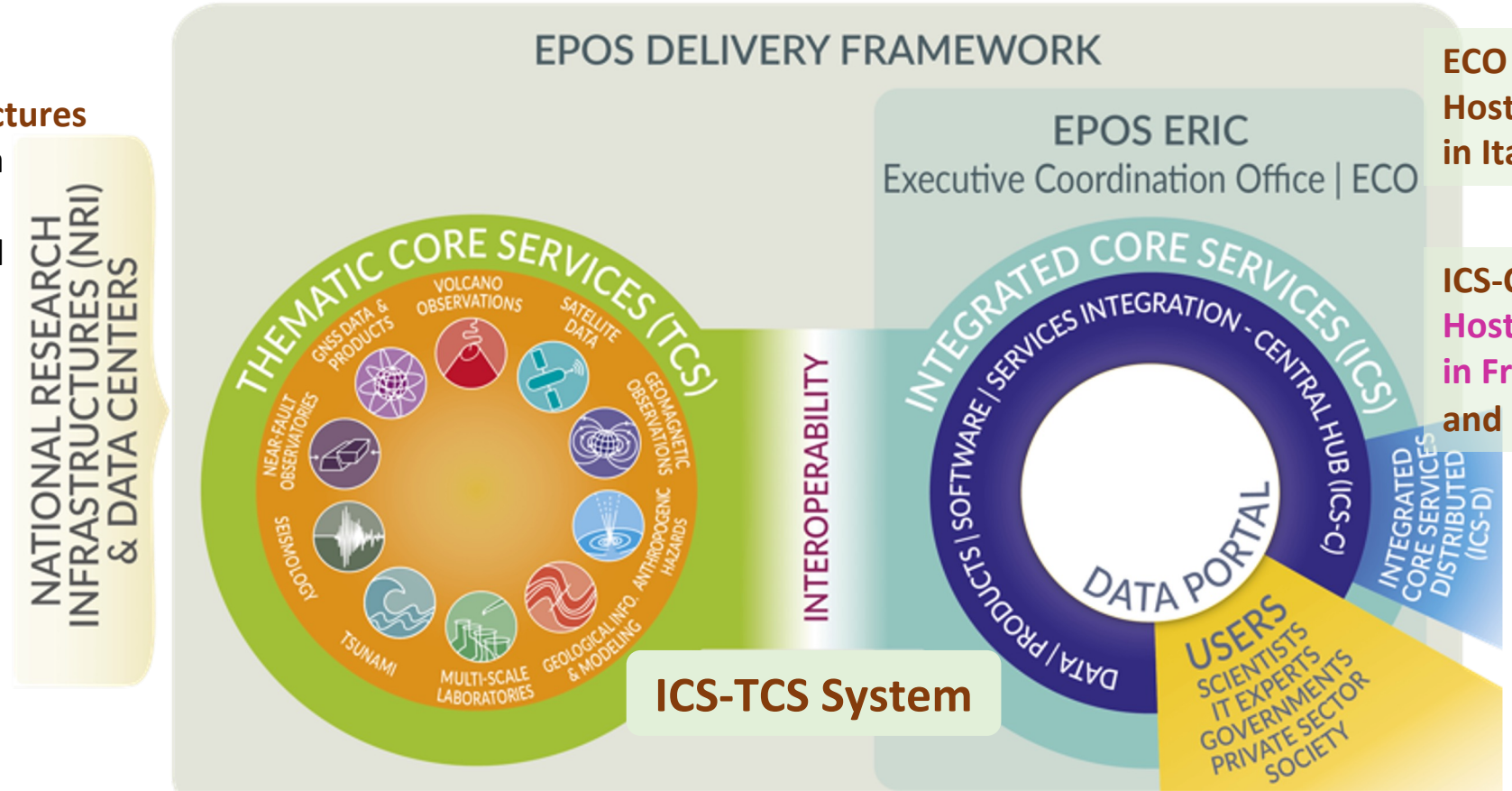

ECO
Hosted and operated in Italy (INGV)

ICS-Central Hub
Hosted and operated in France (BRGM) and UK (BGS)

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The EPOS approach for sharing data and services

Community Building

- **Bottom-up approach**: to ensure scientific and technological strategies are fully shared by the Community
- **Community-driven effort**: scientists, e-scientists, data practitioners, data managers and policy-makers participate in the co-design and co-development of the RI, including its Data Portal
- **Cooperative approach** to established data sharing communities and/or national infrastructures
- **Data and service providers** are an essential part of the user community

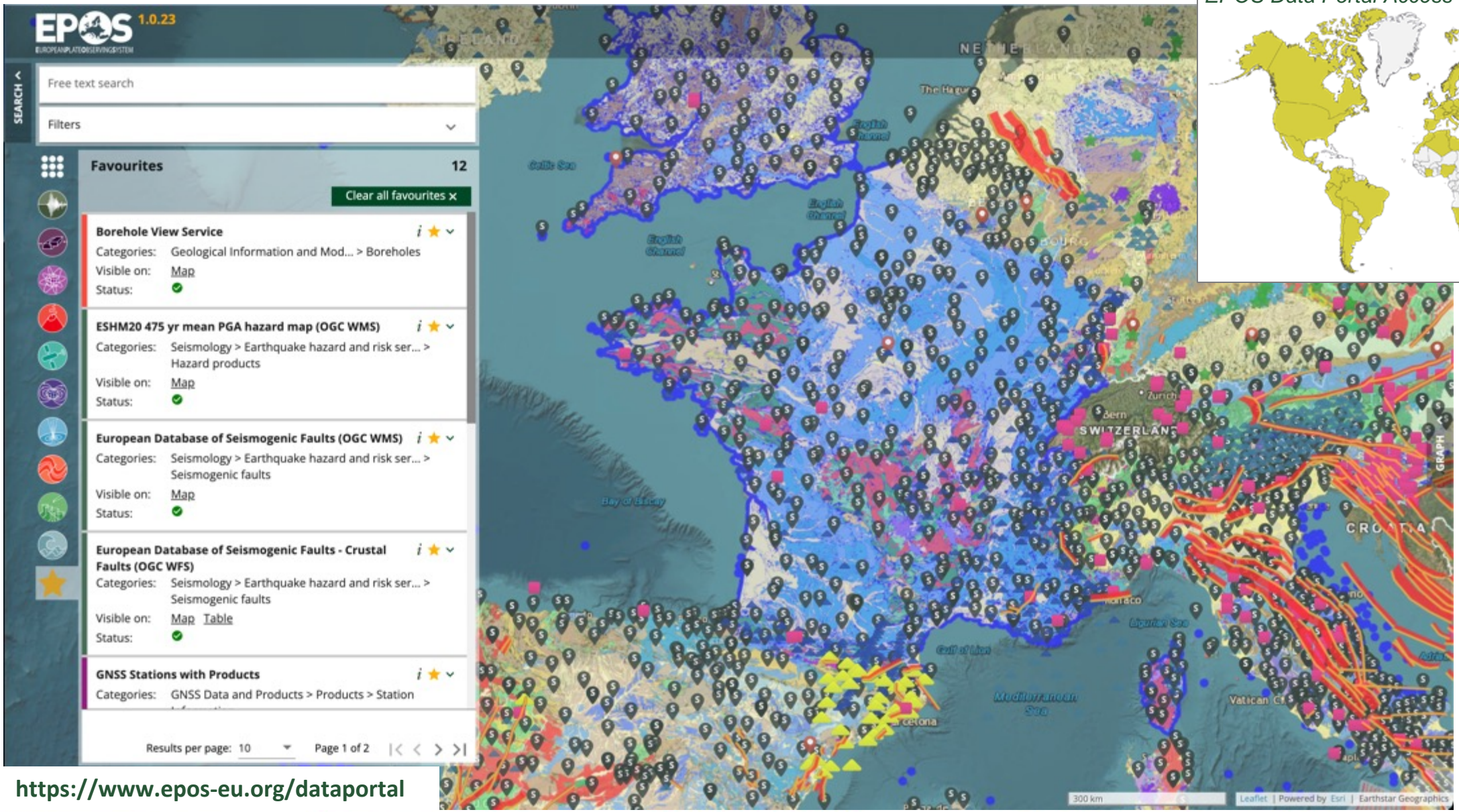
Connecting communities to EPOS

- The TCS are organized in **Consortia for a transparent decision-process**
- Each Consortium has a **decision body where all partners seat** and it is advised by a Scientific User Board
- The TCS are represented in EPOS ERIC in the **Service Coordination Committee**

Integrating data and services into EPOS

- **Open and accessibility of data** is a long tradition in solid Earth Science and at the basis of the EPOS approach
- Data Portal implemented by adopting a **service-based approach** that guarantees data remain where they are generated (NRIs)
- The source code of the Data Portal will be **released under a GPL3 license**

The EPOS Data Portal is now fully operational



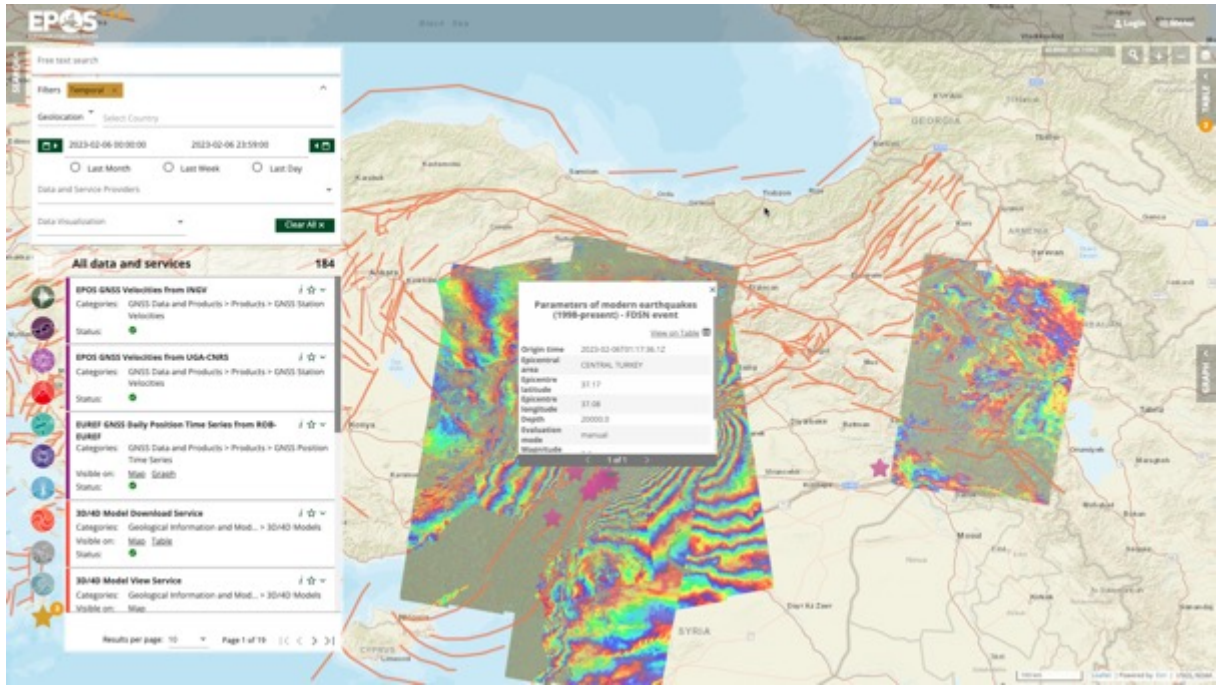
EPOS Data Portal Access Worldwide

https://www.epos-eu.org/dataportal

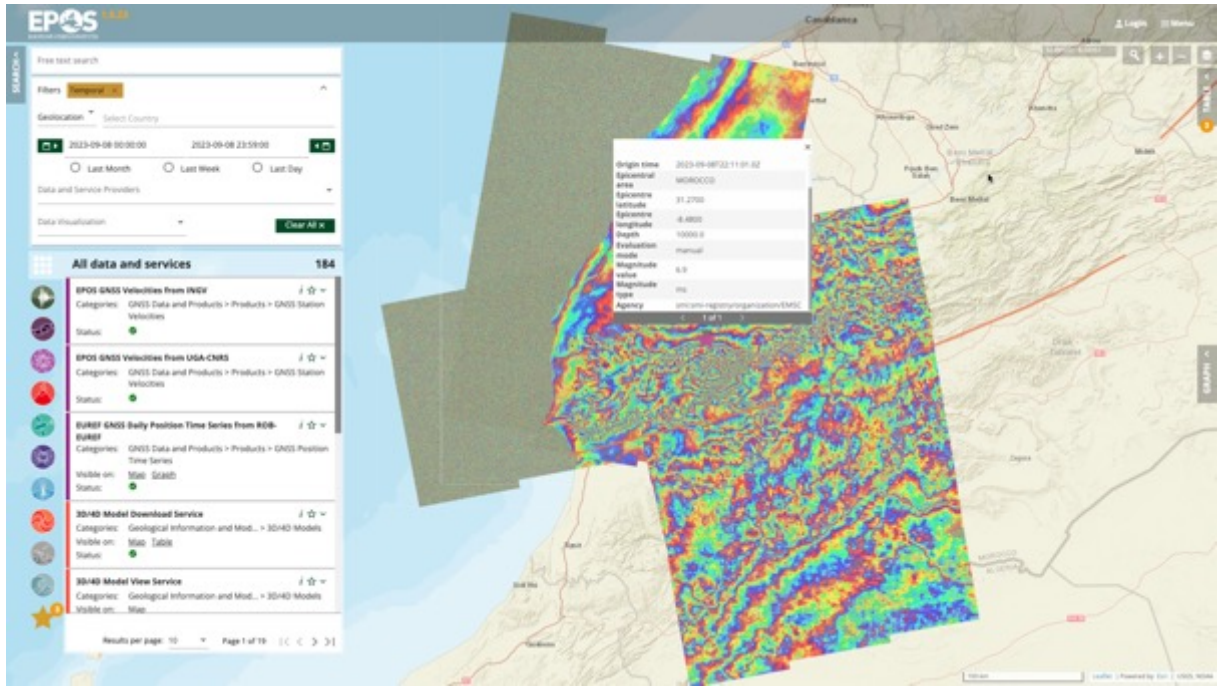
Data and data products rapidly available to scientists

EPOS contributed to shed new light on dramatic phenomena like earthquakes that struck south-eastern Turkey on February the 6th and southern Morocco on September the 8th.
Maps of the surface displacement induced by the earthquakes were automatically generates and immediately made available to the scientific community through the EPOS Data Portal

South-East Turkey – 6th February 2023



Southern Morocco – 8th September 2023



EPOS added value

EPOS

- has been designed and implemented as the **only pan-European research Infrastructure focused on solid Earth Science**
- is based on **a federated approach to data integration**: data, generated and stored at National Research Infrastructure level, are made available via TCS services and made accessible through the EPOS Data Portal where they can be visualized, combined and downloaded upon user query
- is a **community-driven effort**: scientists, IT experts, users and decision-makers participate in the infrastructure **co-design** and **co-development** since the conception phase
- **continuously interacts with scientific users**
- allows **optimizing resources** for data provision at national and EU level, avoiding fragmentation and duplications of efforts and resources
- increases opportunities for **leveraging funds** for national research communities at European level
- **links existing data sharing initiatives** to many disciplines in solid Earth science and beyond
- increases the **impact of the data** by making them globally accessible

Call for abstracts
EGU 2024
Vienna, Austria & Online | 14–19 April 2024

Session "Multi- inter- and transdisciplinary studies in solid Earth science and beyond: challenges and new perspectives»

Convenors
Carine Bruyninx, Federica Tanlongo, Fabio Feriozzi, Kauzar Saleh Contell, Jan Michalek

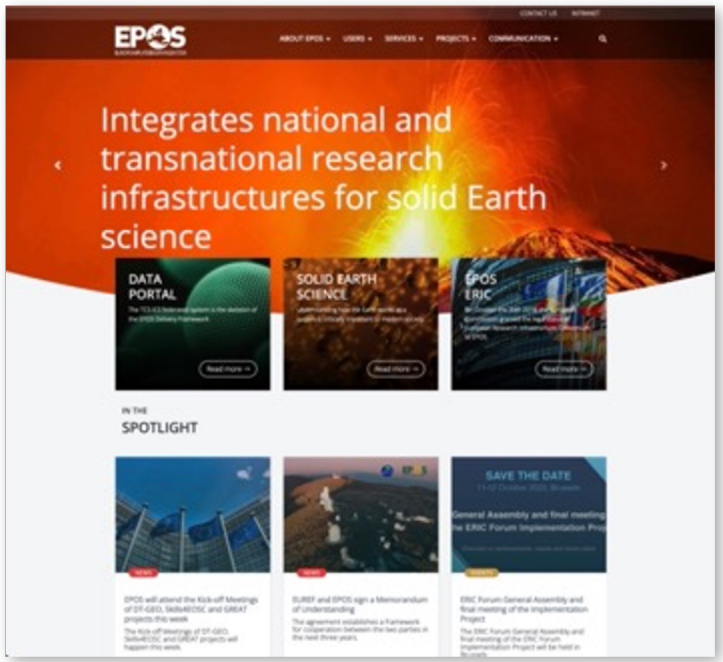
In this session we want to explore real-life scientific studies and research experiences from scientists and young researchers in solid Earth science. We will be focussing not only on results, but also on discussing the way forward to overcome the challenges experienced by these researchers in connection to data availability, collection, processing, and interpretation, and application of inter-disciplinary methods.

The deadline for abstract submission is set to Wednesday, 10 January 2024 13:00 CET

“By making high-quality facilities, resources and services available to everyone, research infrastructures ensure that science is driven by excellence and not by the research capacity of individual countries, economic sectors, or institutions”

Rita Costa Abecasis and Barbara Pintar

Web site



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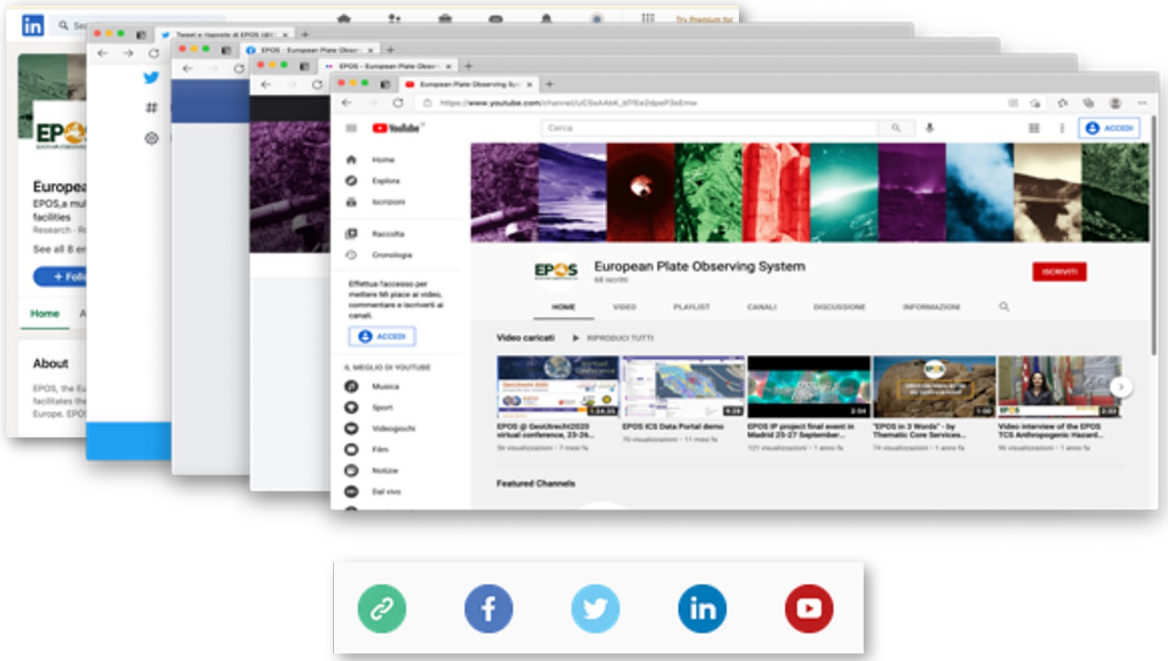
Social media



Thank You!