



Facilitating Multi-Disciplinary Research via Integrated Access to the Seismological Data & Product Services of EPOS Seismology

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and acknowledging the invaluable contributions of the member institutions and active individuals of our European seismological service initiatives



ANNALS OF GEOPHYSICS

Special Issue

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CURRENT ISSUE

Vol. 65 No. 2 (2022): Special Issue: EPOS a Research Infrastructure in solid Earth: open science and innovation

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Coordinated and Interoperable Seismological Data and Product Services in Europe: the EPOS Thematic Core Service for Seismology

<https://doi.org/10.4401/ag-8767>

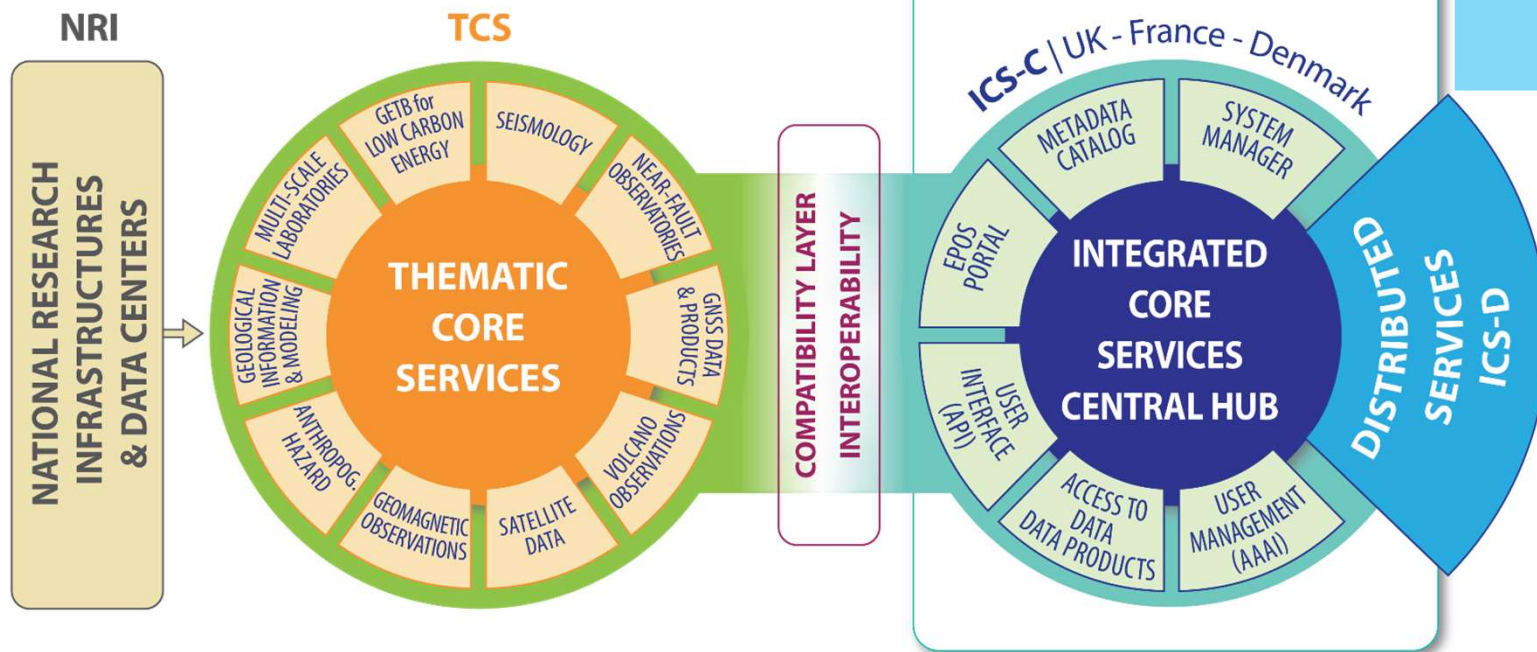
see that article for development, history and governance of EPOS Seismology, EMSC, ORFEUS and EFEHR, and more stuff not covered in these slides



recap : the EPOS Architecture

www.epos-eu.org

National RIs:
The foundation layer



Legal body &
core infrastructure:
EPOS ERIC
including
ECO & ICS

Domain workhorses for the
implementation & coordination of data & service provisioning:
Thematic Core Services TCS



Waveform Services

Orfeus

Waveform selection & access
Waveform metrics & Station Information
Strong Motion parameters
OBS data integration
Mobile Pool coordination & integration
Waveform modeling

Seismological Products

**CSEM
EMSC**

Earthquake Parameter Information
Macroseismic & Historical Event data
Seismological Products Platform
- rupture models / SiteCharTool / MT
- EventID / F-E-Region / ...

Hazard and Risk Services

E F E H R

Seismic Hazard Models
Seismogenic Faults
Ground Shaking Models
Geotechnical Engineering Information
Strong Motion records in buildings
Earthquake Risk Services

Three distinct initiatives coming together ...



born between 1975 - 1983
under ESC (-> link to IASPEI...)
international non-governmental
association under French law
seat initially in Strasbourg,
since 1994 at CEA/LDG Paris

Membership today
almost global:
80+ institutions from 56
countries, providing their own
earthquake information for
further dissemination
Initially rapid earthquake
information collection mainly for
seismologists, today important
for *general public* (**LastQuake**)



born in 1987
from initiative of a group of
high-ranking seismologists
non-profit foundation under
Dutch law
seat at KNMI, NL (with ODC)

Membership today
European (+):
60+ institutions (42 corporate
founders) from 27 countries
EIDA federated European
waveform data archive since
2013 with currently 12 nodes

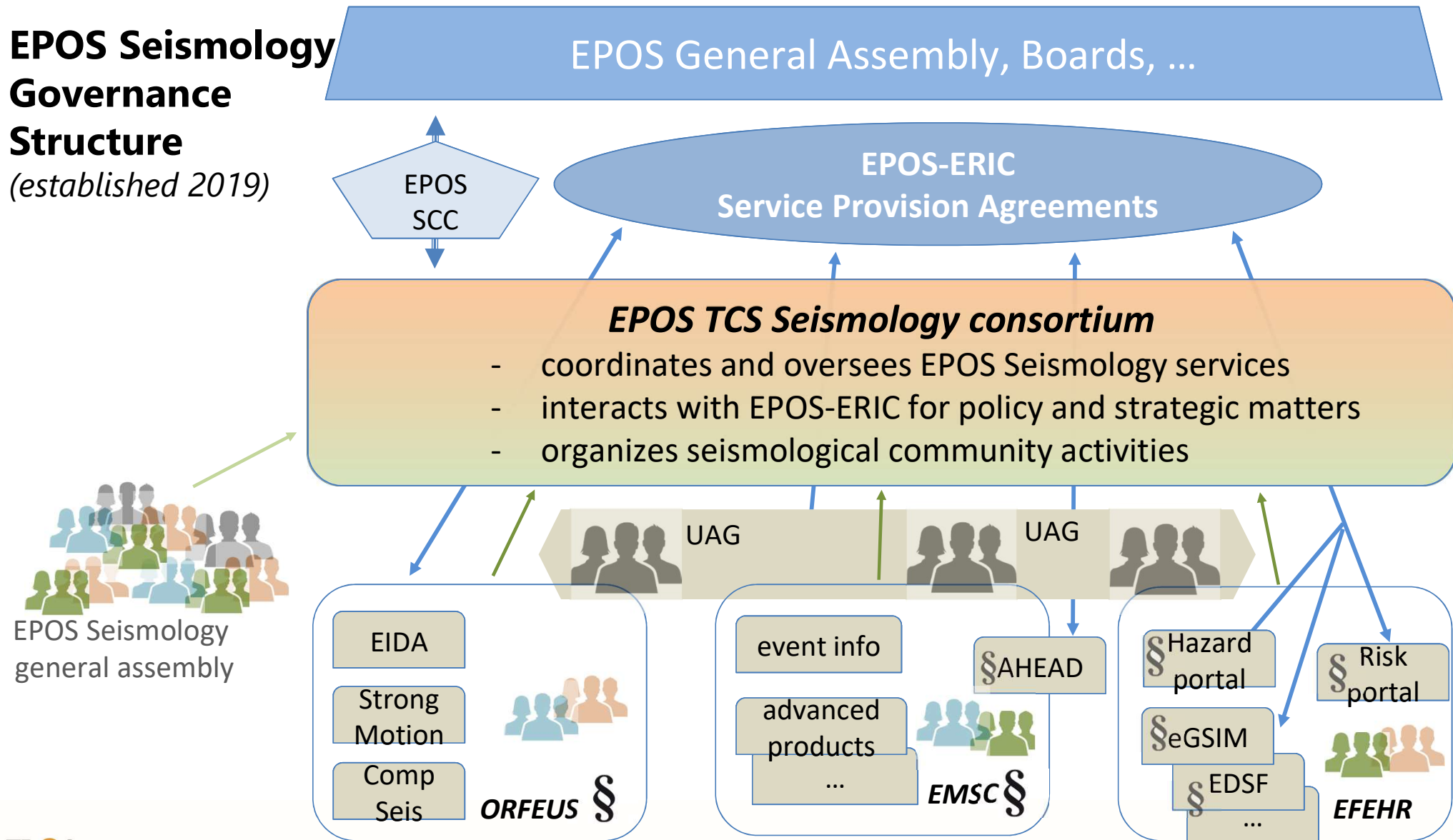


born in 2019
as outcome of 10+ yrs European
projects
consortium of member
institutions (no own legal entity,
no fixed seat)

Membership today
European:
26 institutions from 18 countries
Coordinating harmonized
seismic hazard and risk products
for Europe **ESHM20** / **ESRM20**;
access also to underlying
datasets

EPOS Seismology Governance Structure

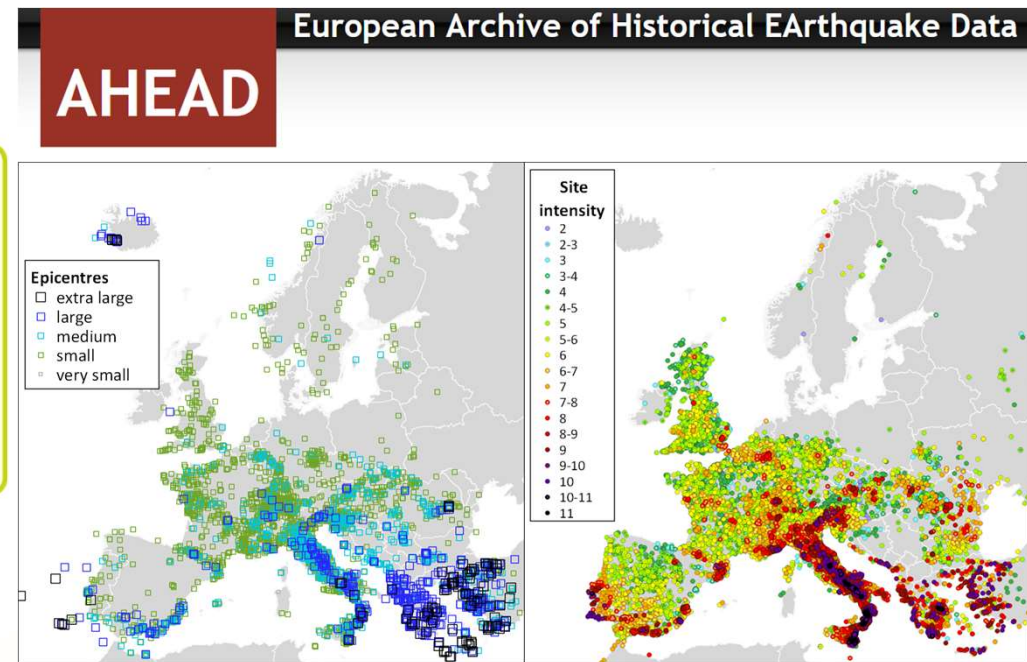
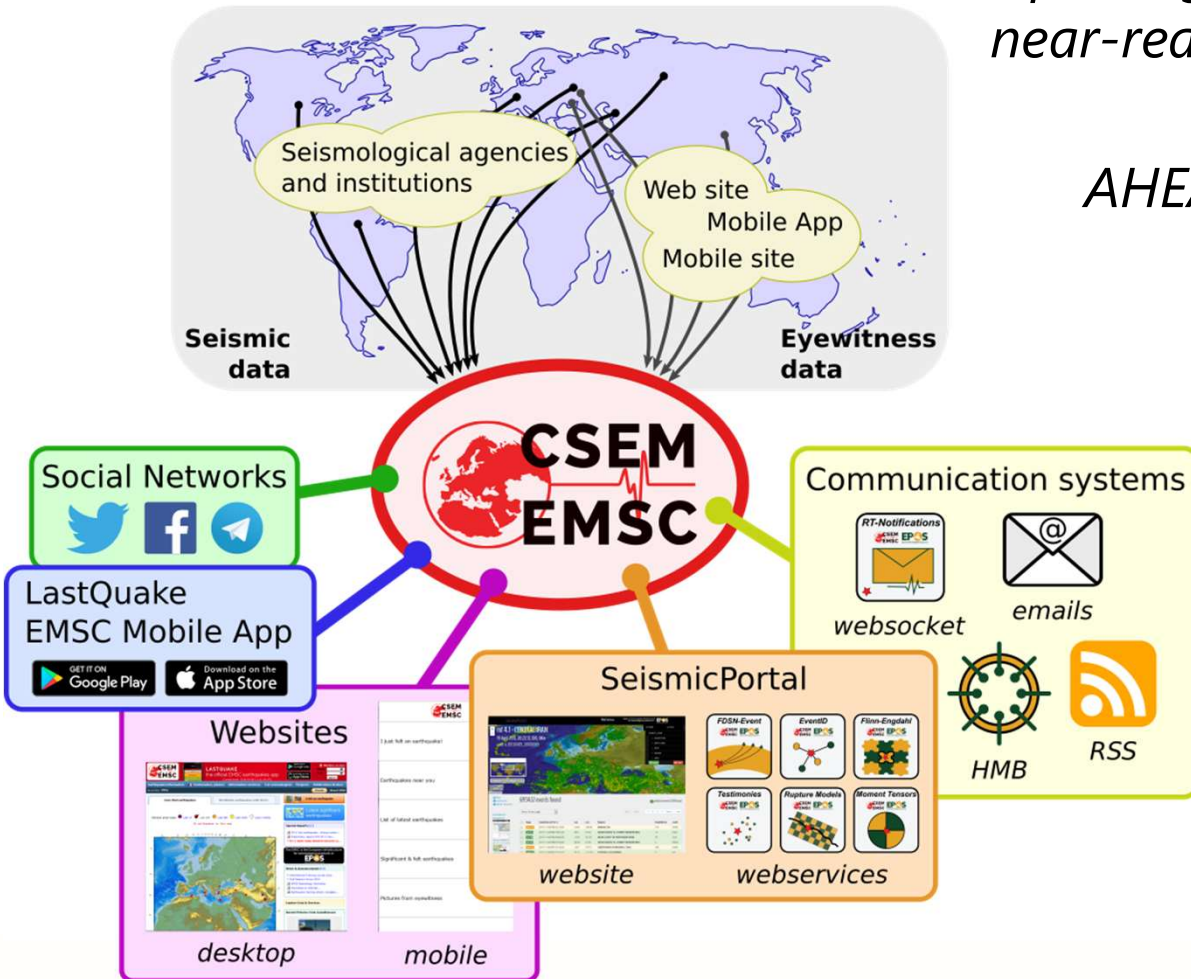
(established 2019)





EMSC: improving services & access to near-real time information

AHEAD: improving of historical (macroseismic) data holdings and access services





new website under development

Centre Sismologique Euro-Méditerranéen
Euro-Mediterranean Seismological Centre

Earthquakes

World map
Latest information
Seismic data
Special reports

LastQuake

How it works
Citizen seismology

About Us

Who we are
What we do
Timeline

Partner with us

Mission & vision
Partners
Support our work

[Donate](#)

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2022-07-10 11:20:09 UTC

Quick access

Search for earthquakes

Data queries

Android & iOS app

Earthquake news

Latest earthquakes

[I felt an earthquake](#)



EMSC global
data contributors

ORFEUS services at a glance

- Coordinated access to more than 16,000 seismic stations (SM, BB, SP – temp. & perm. networks)

- European Integrated Data Archive (EIDA) and associated services

orfeus-eu.org/data/eida/

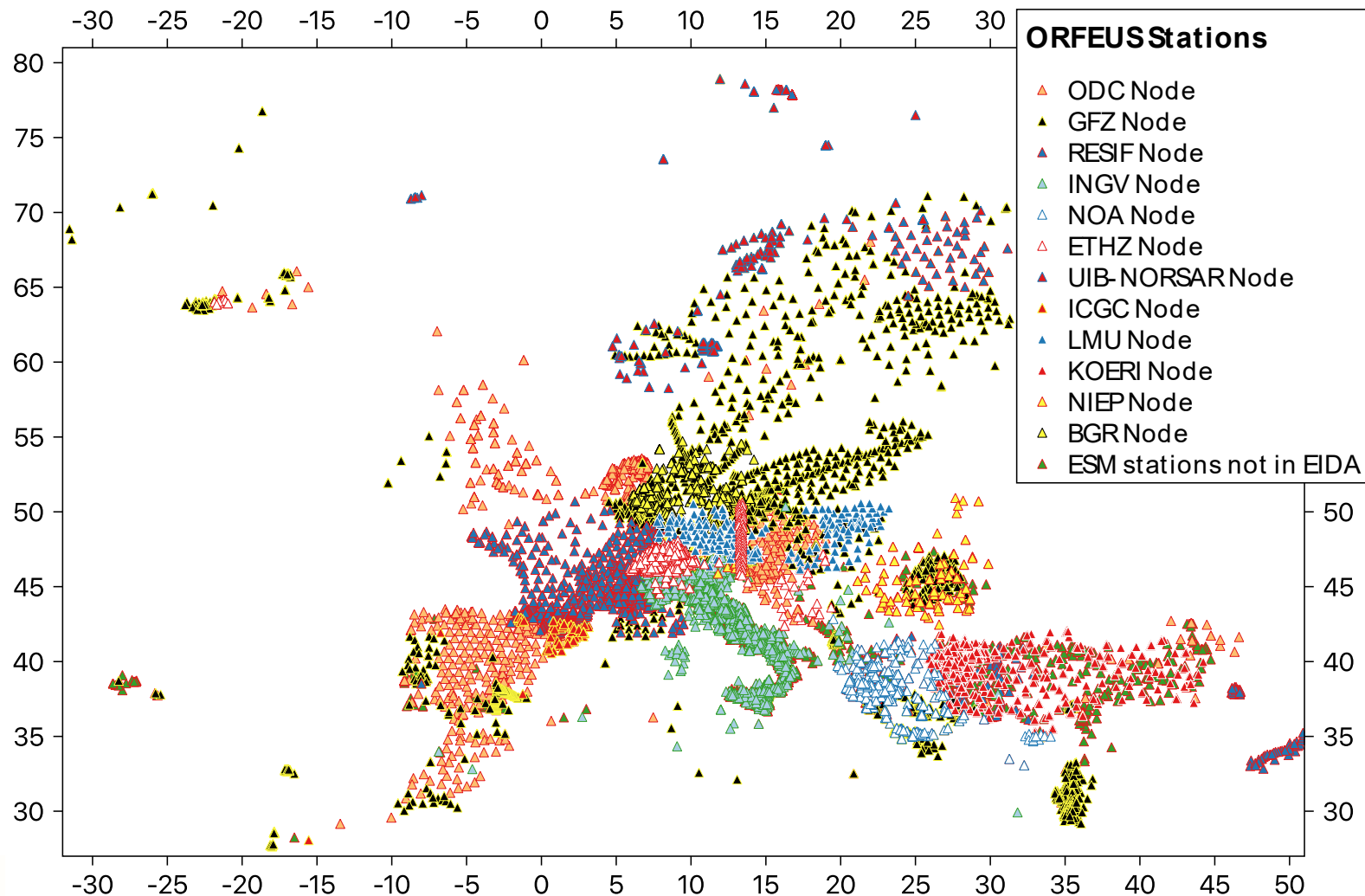
- Strong-motion services (ESM, RRSM)

orfeus-eu.org/data/strong/

- Mobile pools coordination

orfeus-eu.org/data/mobile/

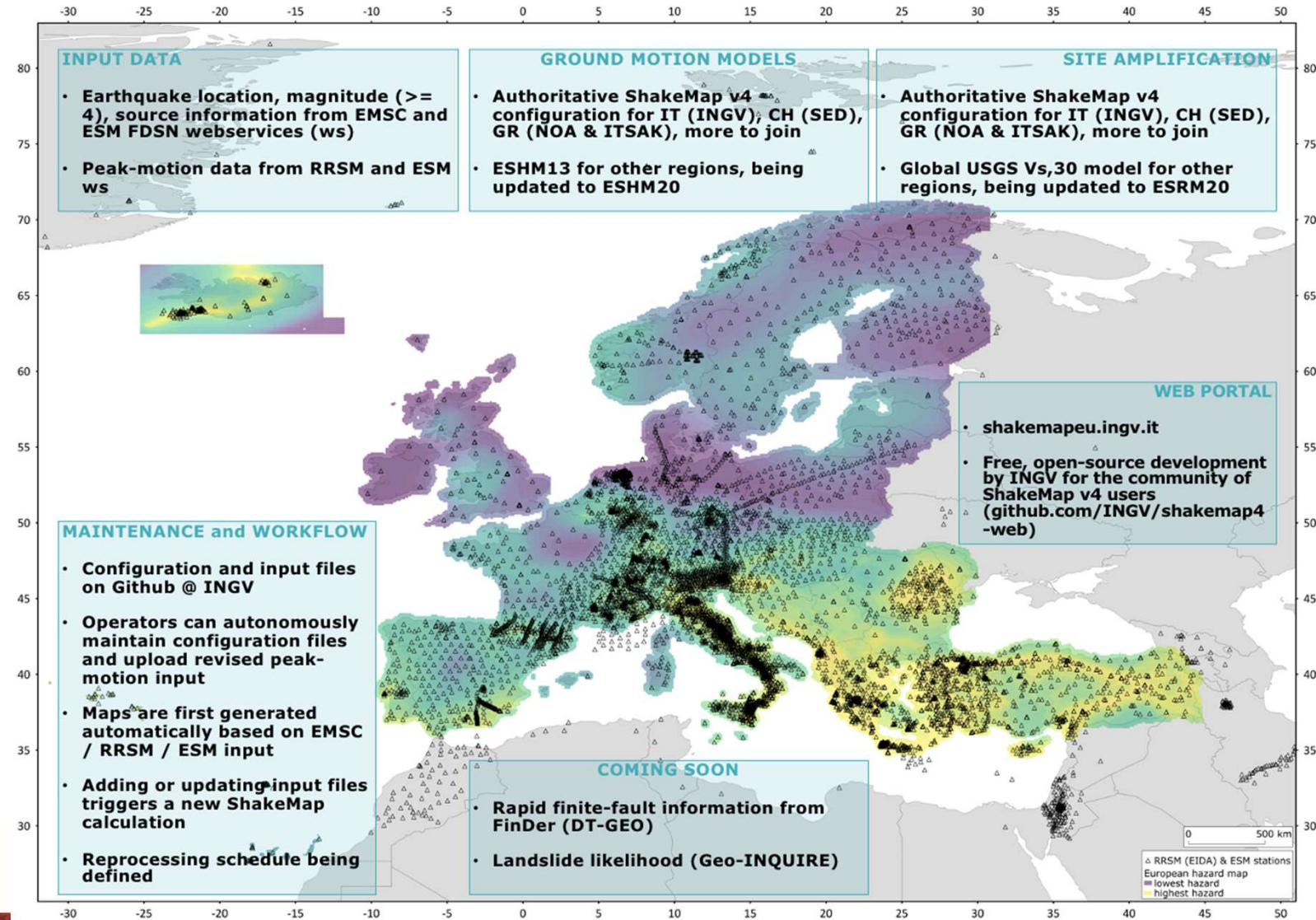
- Community services like workshops, training, grants

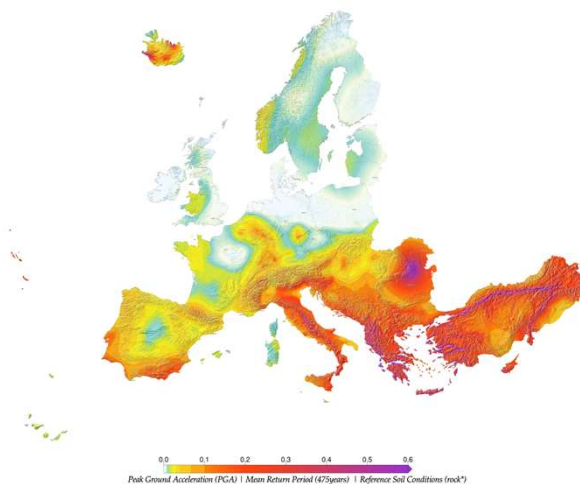


Towards ShakeMap harmonisation in Europe

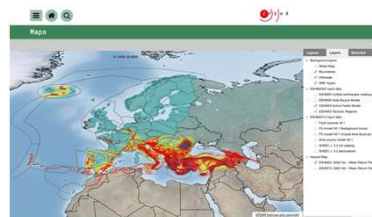
A collaborative framework that:

- optimally exploits the potential of European strong-motion webservices, besides FDSN event /station/datasetselect
- provides a single source for ShakeMaps at the European scale that builds on EIDA & SM and modern future-proof community software and tools
- delivers ShakeMaps for regions where there is no local capability yet & serves as a backup to local authoritative ShakeMap implementations





hazard.efehr.org



The hazard EFHR web platform provides access to interactive tools such as seismic hazard models, products and information. Distributed data, models, products and information are based on research projects carried out by academic and public organisations.

Currently, the seismic hazard models and resources for Europe, the Middle East, the GSHAP global model and the Swiss Seismic Hazard Model are available.

Access the seismic hazard tools below:



Latest uploads:

- The 2020 Euro-Mediterranean Seismic Hazard Model (ESH20) became available in December 2021. Access to all underlying data sets, resources and tools through this web platform or the EFHR GitLab repository.

Specific Hazard Models

The EFHR web-platform provides access to interactive tools such as seismic hazard models, products and information. Distributed data, models, products and information are based on research projects carried out by academic and public organisations. The seismic hazard models are described at the regional and national level.



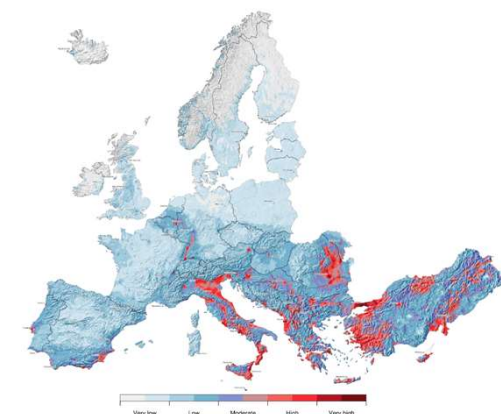
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The hazard EFHR web platform and web services are developed, maintained and hosted by the Swiss Seismological Service (SED) at ETH Zurich under the umbrella of EFHR, in collaboration with the GEM Foundation and EPOS (European Plate Observing System).

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The risk2020 website and web services are developed, maintained and hosted by EUCENTRE, in collaboration with the GEM Foundation and EPOS (European Plate Observing System).

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risk.efehr.org

Updated web services to provide access to the newly released European Seismic Hazard and Risk Models

- New web services to access the Risk data and results, updated web services to access the hazard data, submodels and results.
- GitLab repositories, making use of the GitLab API to distribute the main input files, earthquake catalogues, active faults, site amplification, source models, exposure datasets, input files for OpenQuake
- Documentation and Reports



THE EPOS SP PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N° 871121



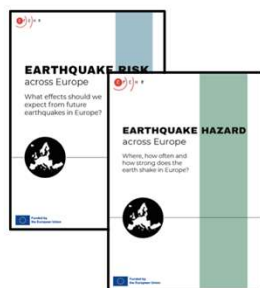


up-to-date earthquake hazard & risk products and services for Europe

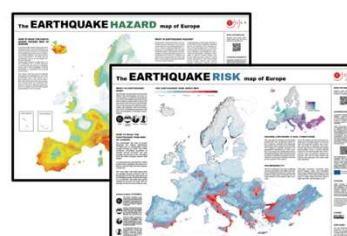
Explainer video



Flyers



Posters



Press release

Incl. maps & figures to download



Fact sheets



Technical report

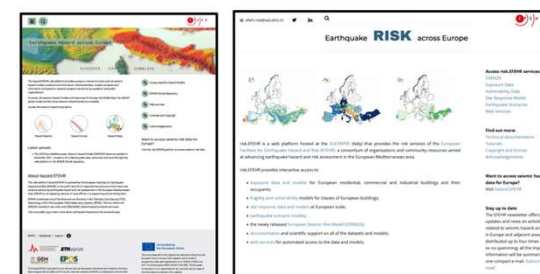


Already available on the EFEHR GitLab Repository: <https://gitlab.seismo.ethz.ch/efehr>

Website



Web platforms



Challenges

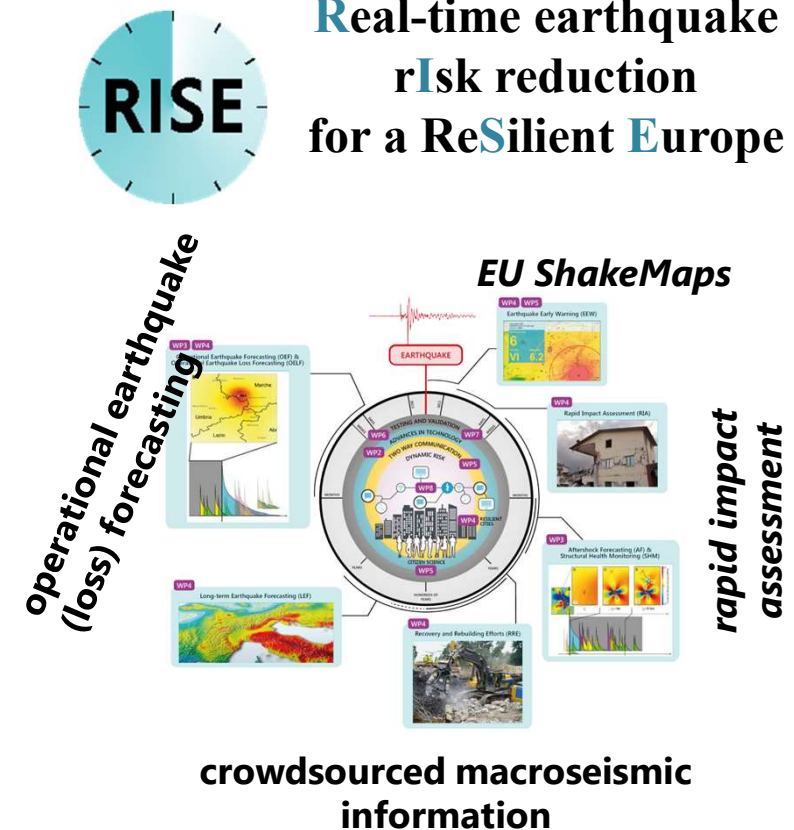
... one of many:

How does a **European Research Infrastructure** deal with (near) real time data and products that may have strong links to **national disaster management** and response?

- dissemination and accessibility
: immediately open to everybody?
- authoritativeness
: conflict with national entities?
- governance
: who decides on content and appearance

... and some more:

licensing, PID assignments and resolution, new (large) data, technological change & adaptation, ...



Wasn't there something else? ...

FAIR and Open data

of course! But – FAIR \neq Open?

Licensing

CC-BY! ... *ah – can raw data be licensed?*

*Google wants to make a disaster info service !
... using my data ???*

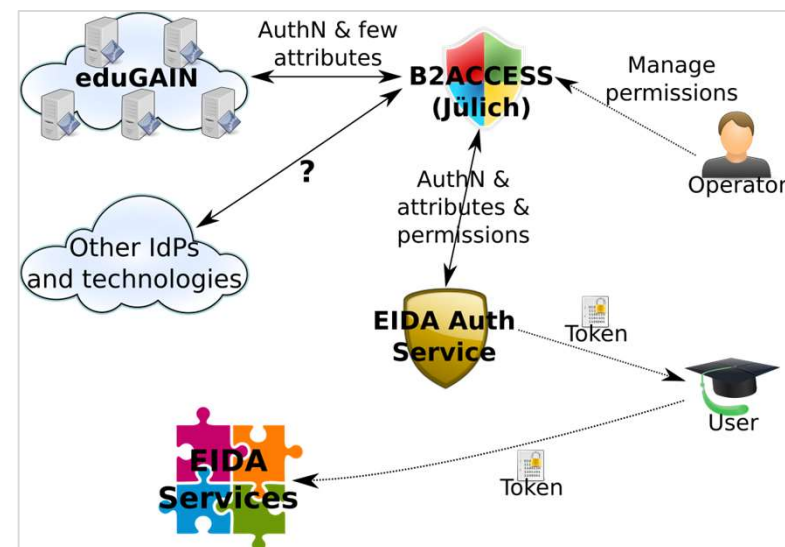
Attribution and provenance tracking

- *dynamic data identification*
- *subset combination & remixing*
- *complex iterative processing*

Metadata and vocabulary harmonization

Let's go global!

Who is in charge?



- *protect embargoed / restricted data & services*
- *comply with GDPR*

