Orfeus

Observatories and Research Facilities for European Seismology

EIDA European Integrated Data Archive

The European Integrated Data Archive and other ORFEUS data, services and products

Angelo Strollo, Javier Quinteros, the EIDA Management Board and the ORFEUS community

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ORFEUS Observatories & Research Facilities for European Seismology

ORFEUS is the non-profit foundation to coordinate and promote digital, broadband seismology in the European-Mediterranean area.

EIDA is the European Integrated Data Archive infrastructure within ORFEUS to provide access to seismic waveform data in European archives.

01-09-2016 ORFEUS Annual Workshop 2016 - Reminder for Registration

The 2016 ORFEUS Annual Observatory Coordination meeting is organized together with an **EPOS** sponsored workshop on OBS (Ocean Bottom Seismometers) and Mobile Seismic Pools (MSP), to coordinate efficient integration of data from these communities within the European Integrated Data Archive (**EIDA**). The 2016 ORFEUS Annual Observatory Coordination meeting has a focus on seismology in the Balkans and the **AlpArray** seismic network.

Registration to these workshops is open **until 15 September**. Please consult the **information pages** for more details.

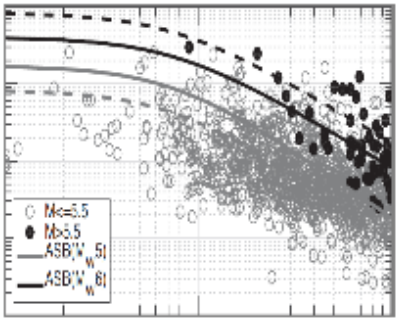
http://www.orfeus-eu.org/

Data Access, Services and Products

EIDA

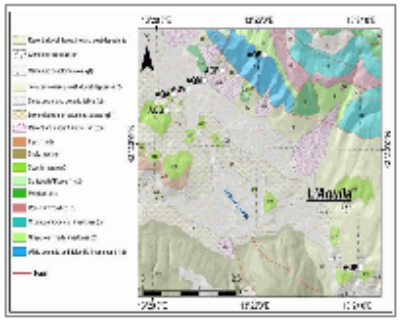
Interactive access to data from EIDA

RRSM



Interactive access to rapid, raw strong motion data

ESM

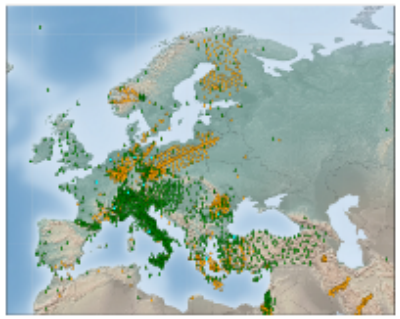


Interactive access to reviewed strong motion data

Web services

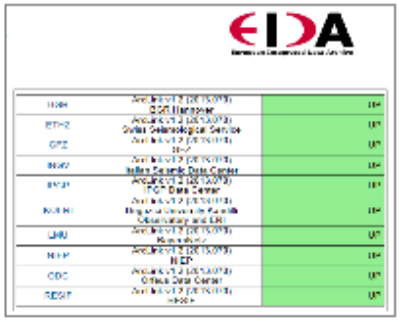
Access to EIDA data through FDSN webservices

Station Book



Station inventory of EIDA stations

Status



Overview of status and usage of EIDA

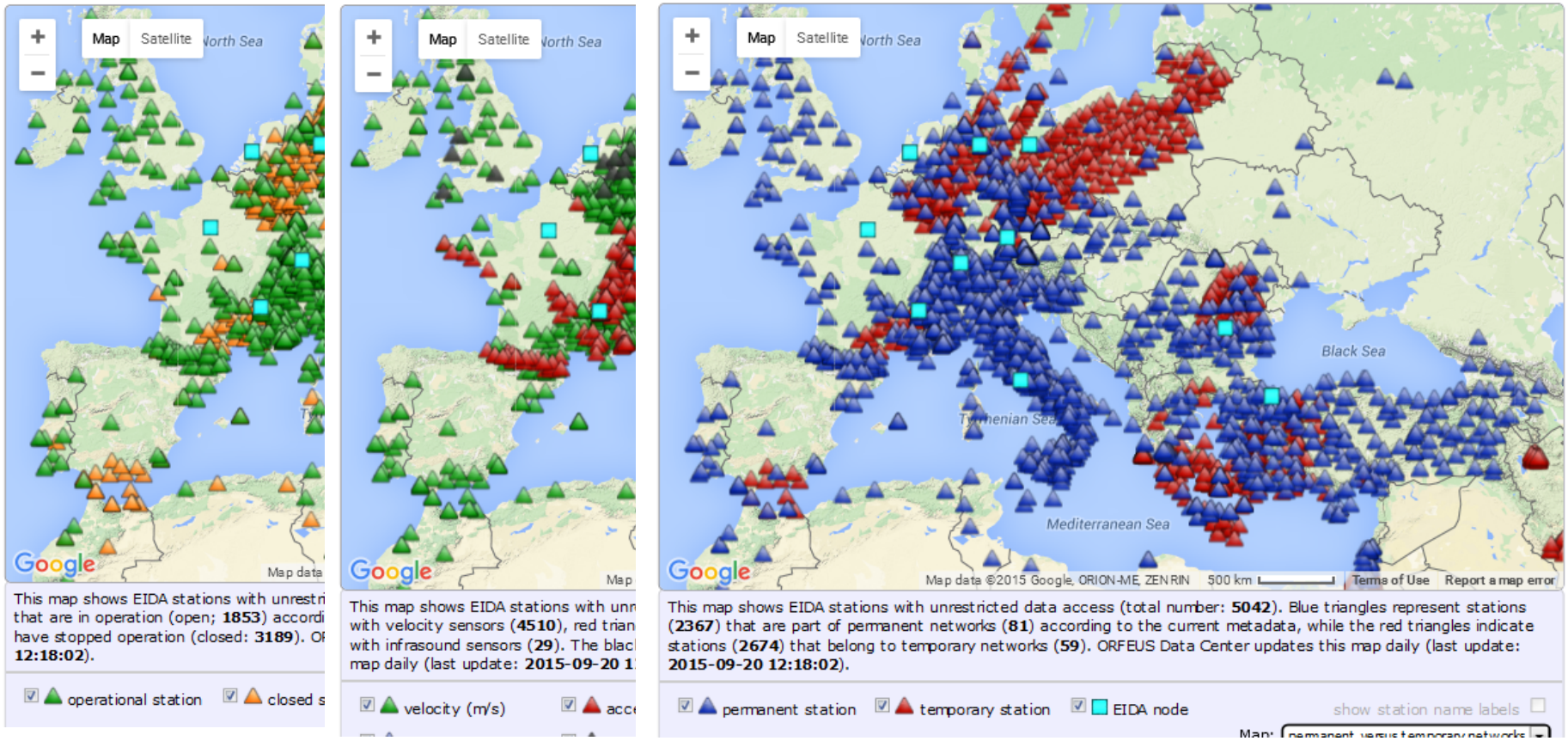
EIDA Goals

- safe, persistent archival and dissemination of high quality seismic waveform data collected by European datacenters via distributed archives
- easy access for scientists - support multiple access methods, standards
- open access where possible, closed / restricted access is possible
- all stations require standardised metadata
- include best datasets available
  - Highest sampling rates of raw data
  - Continuous data (event data is supported)
  - Focus on permanent networks, also include data from temporary deployments, incl. aftershocks, mobile pools
  - Focus on broadband, also includes strong motion, short period
  - Near real-time where possible
  - Focus on data collected on European plate, also include global data collected by European datacenters
  - All data in miniSEED, all metadata in datalessSEED (dB in inventoryXML)
- distributed archives allows robust system independent of each individual node

EIDA data holdings

~6000+ stations

350+ TB distributed via 11 nodes

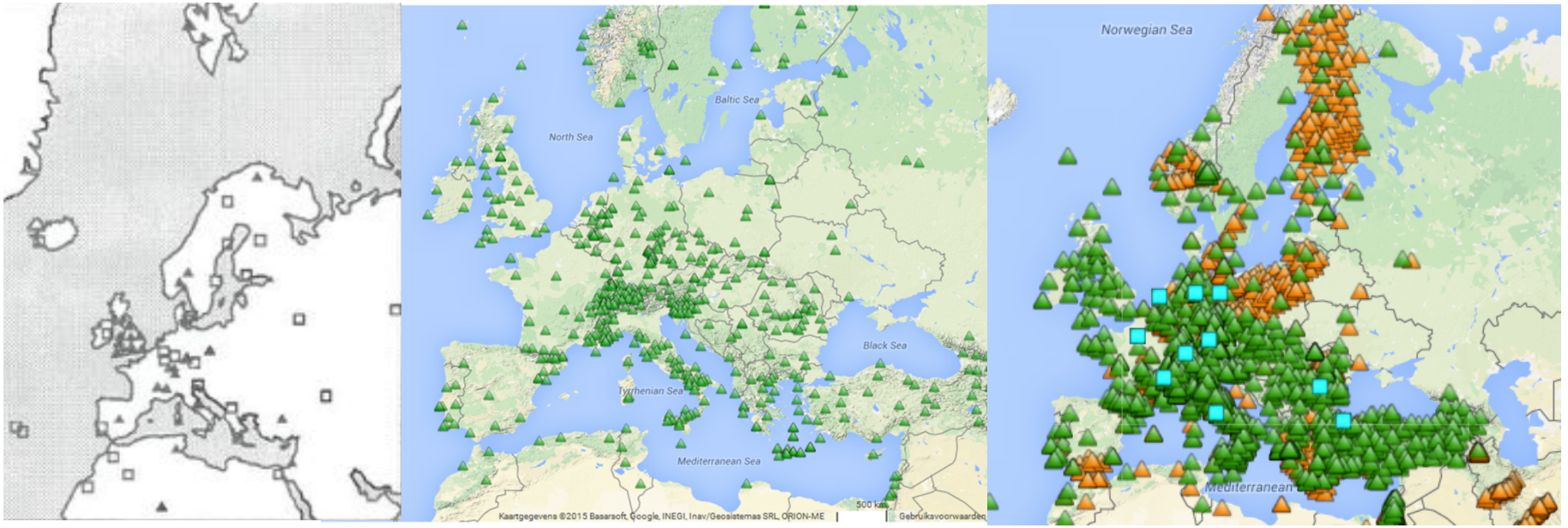


EIDA

From the ORFEUS Data Center (single DC) to EIDA (distributed DC)

- 1986/87: ORFEUS plan launched/realized
- 2012/13: ORFEUS-VEBSN => ORFEUS-EIDA (EIDA = VEBSN + data holdings from 9 European DCs)
- 2016: ORFEUS-EIDA (11 nodes)

1987 - 30 **2013 - 613** **2016 ~6000**



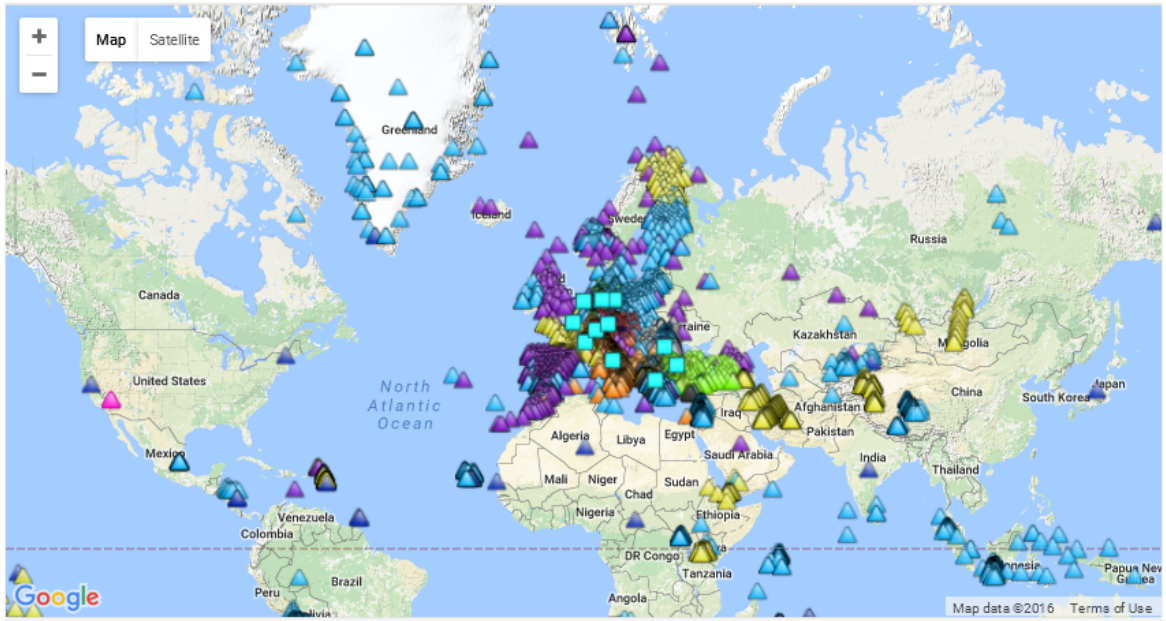
Year - Number of open stations

European Integrated Data Archive EIDA

EIDA, an initiative within ORFEUS, is a distributed data center established to (*a*) securely archive seismic waveform data and metadata gathered by European research infrastructures, and (*b*) to provide transparent access to the archives by the geosciences research communities. EIDA is **organized and managed** by the EIDA Management Board (EMB).

EIDA nodes are data centres which collect and archive data from seismic networks deploying broad-band sensors, short period sensors, accelerometers, infrasound sensors, and other geophysical instruments. Networks and stations contributing data to EIDA are listed in the **EIDA network list** and **station database**. EIDA runs a **monitoring tool** to keep track of the status of the system and the usage in terms of data download.

EIDA Data Portal | FDSN Webservices | Station Book

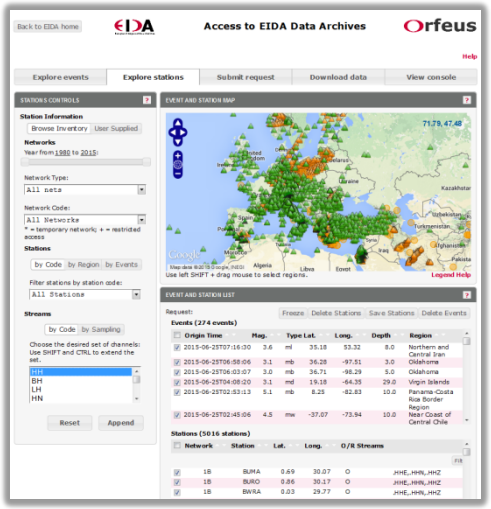


Stations by Archive

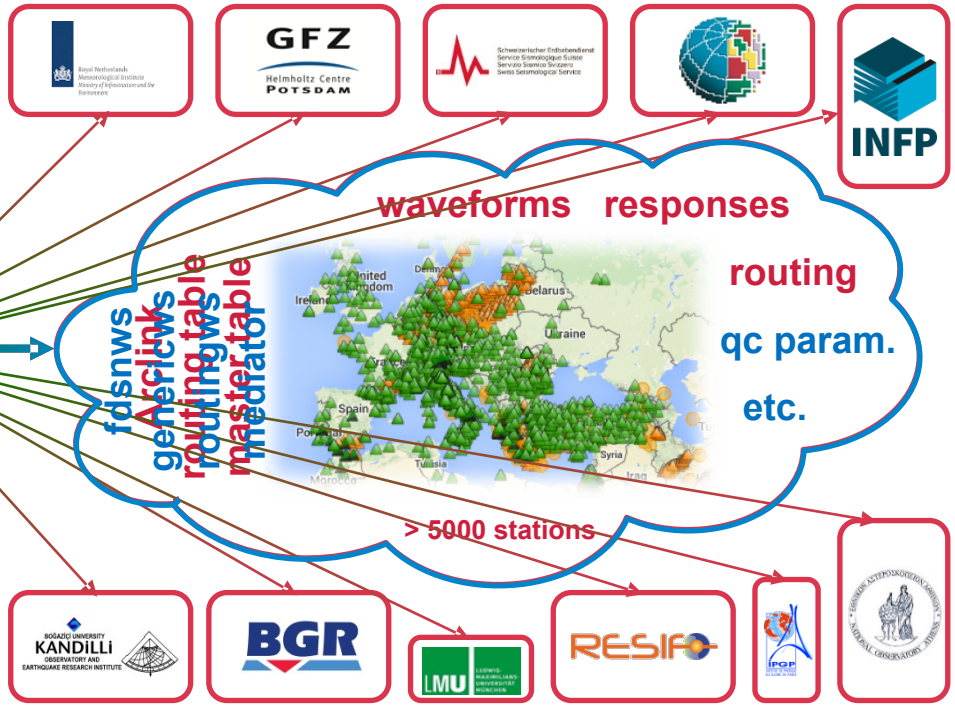
Show station labels (max. 100 stations in window)

BGR ETH GFZ INGV IPGP KOERI
LMU NIEP NOA ODC RESIF EIDA Nodes

EIDA: how it works?

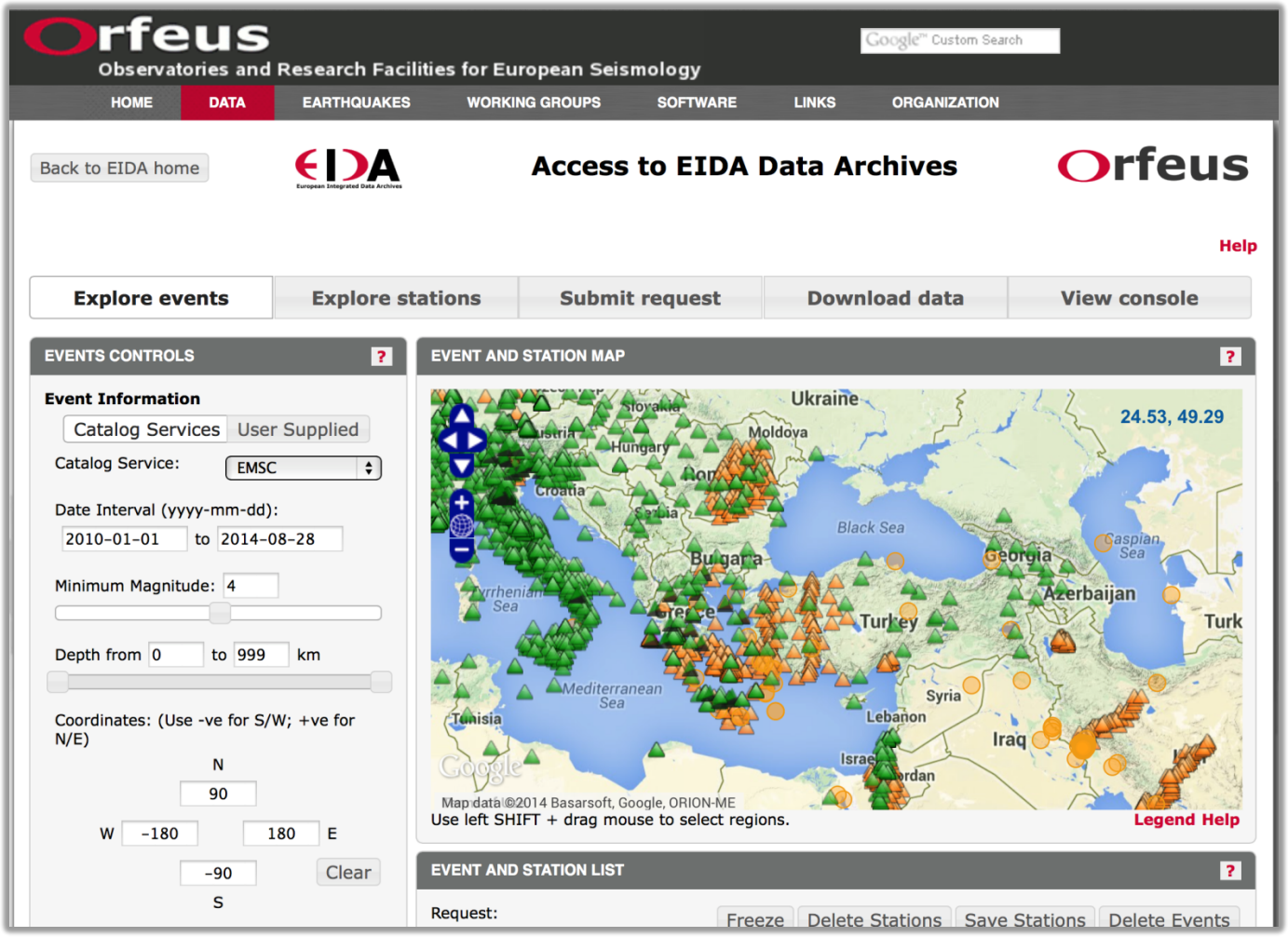


Users:
Geoscientists
Etc…



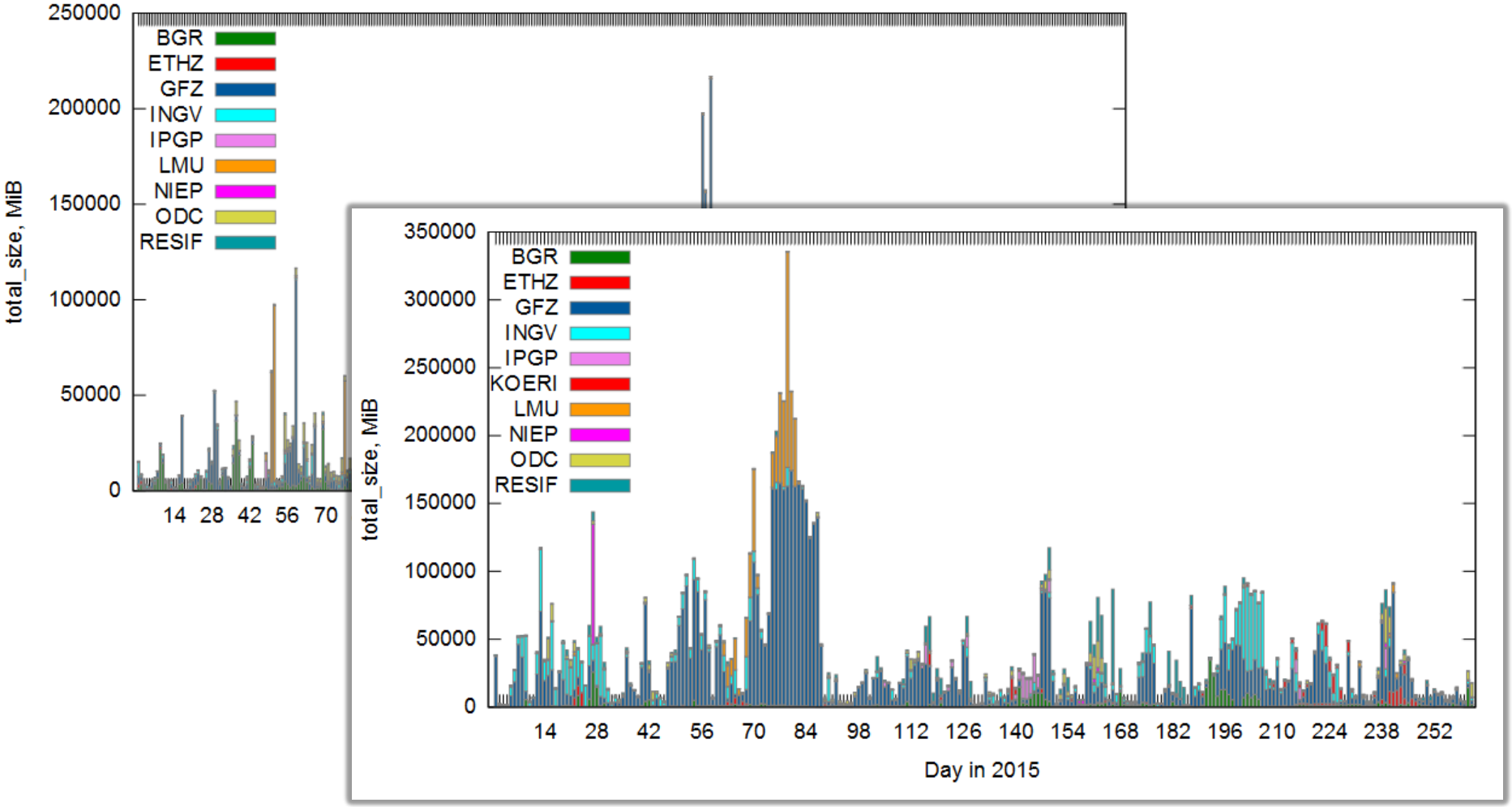
http://www.orfeus-eu.org/eida/eida.html

EIDA dissemination tools



EIDA central portal: http://www.orfeus-eu.org/eida/eida.html

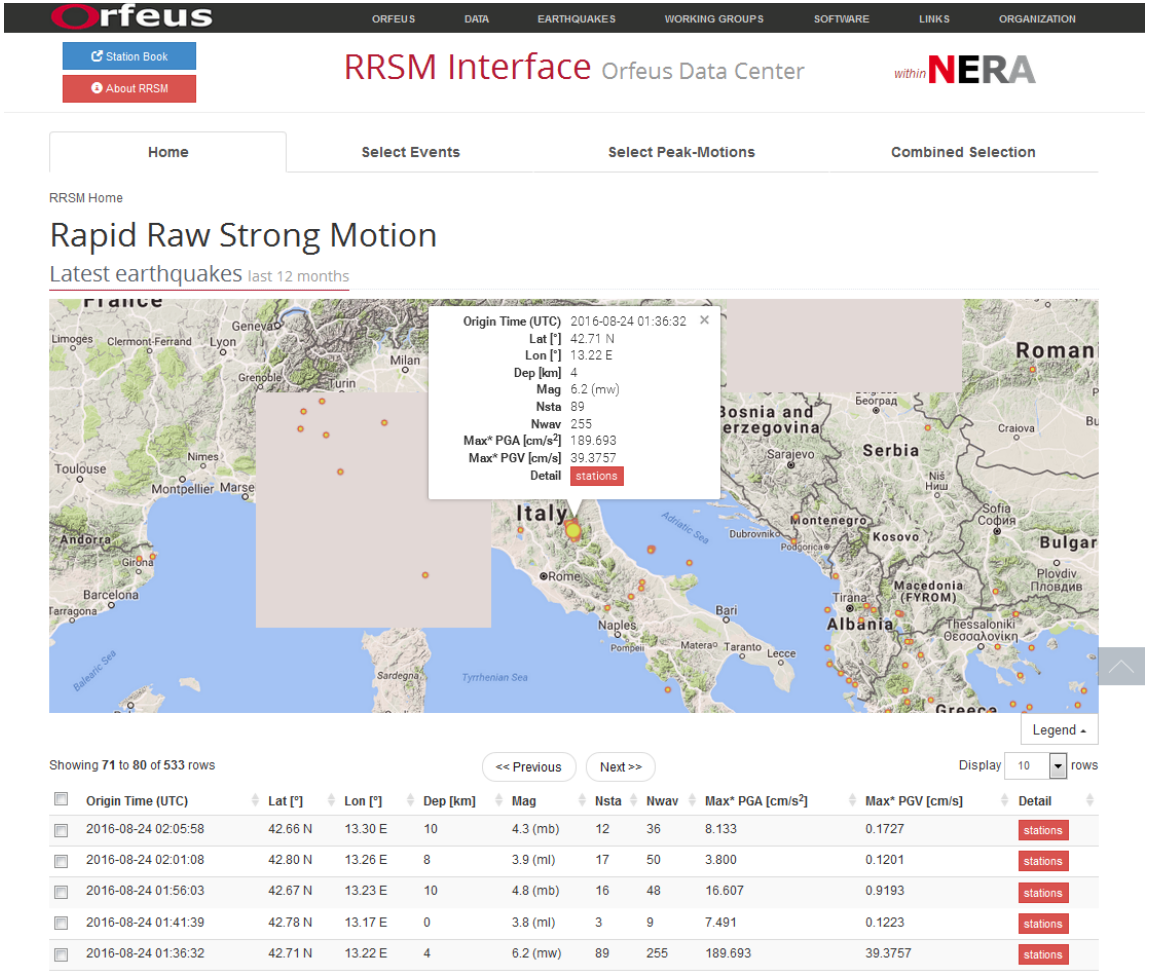
EIDA dissemination tools



EIDA monitoring: http://eida.gfz-potsdam.de/eida/status/

Rapid Raw Strong Motion database (RRSM)

A high-quality, automatically and rapidly filled database build on state-of-the-art data collection and processing software to provide near real-time (web) access to open (unrestricted) strong motion data after a significant earthquake in Europe.



Origin Time (UTC)	Lat [°]	Lon [°]	Dep [km]	Mag	Nsta	Nwav	Max* PGA [cm/s²]	Max* PGV [cm/s]	Detail
2016-08-24 02:05:58	42.66 N	13.30 E	10	4.3 (mb)	12	36	8.133	0.1727	stations
2016-08-24 02:01:08	42.80 N	13.26 E	8	3.9 (ml)	17	50	3.800	0.1201	stations
2016-08-24 01:56:03	42.67 N	13.23 E	10	4.8 (mb)	16	48	16.607	0.9193	stations
2016-08-24 01:41:39	42.78 N	13.17 E	0	3.8 (ml)	3	9	7.491	0.1223	stations
2016-08-24 01:36:32	42.71 N	13.22 E	4	6.2 (mw)	89	255	189.693	39.3757	stations

http://www.orfeus-eu.org/opencms/rrsm/index.html

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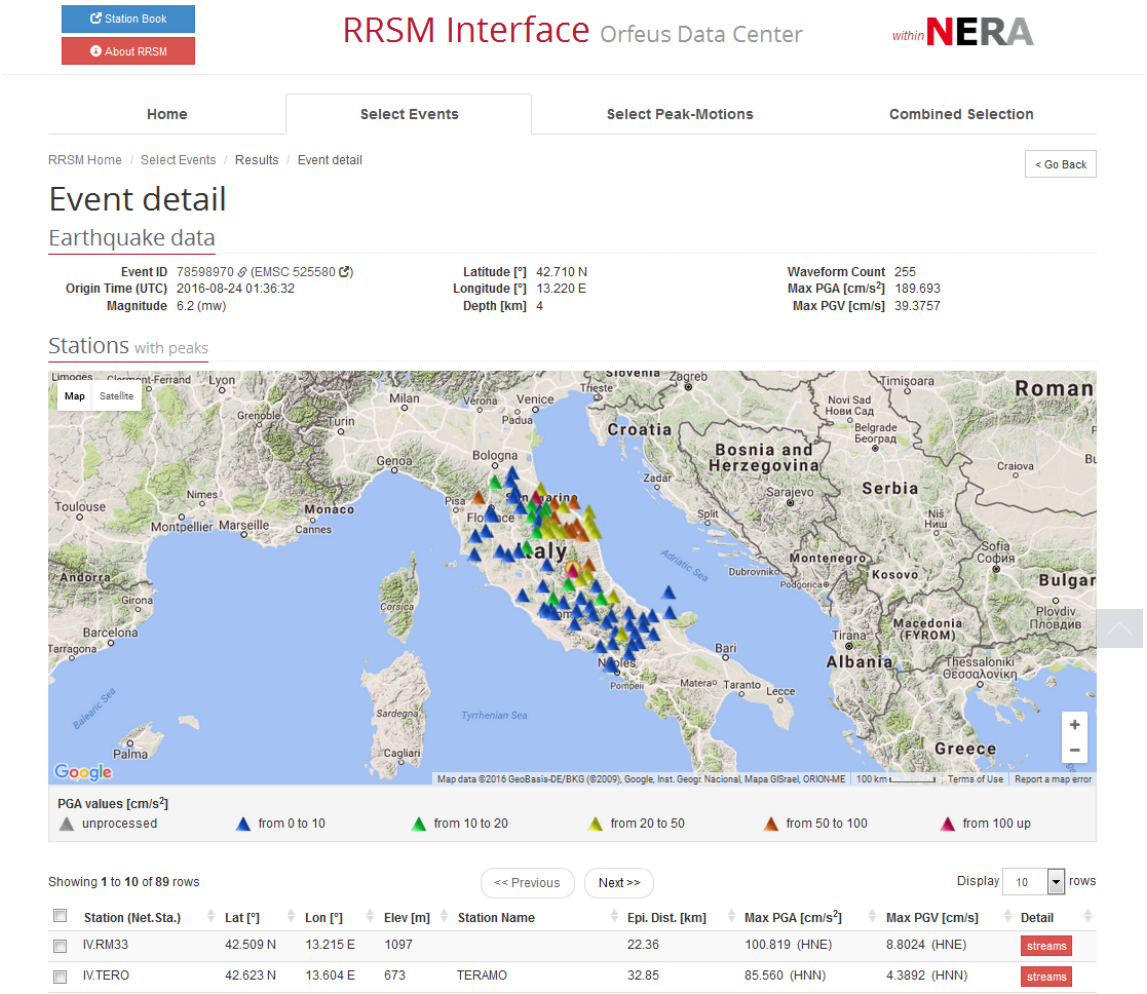

http://www.orfeus-eu.org/opencms/rrsm/index.html

Engineering Strong Motion database (ESM)

A single, high quality database with historical and present time strong motion waveforms and carefully reviewed metadata, dynamically updated with manually processed data when significant new events occur

http://www.orfeus-eu.org/esm

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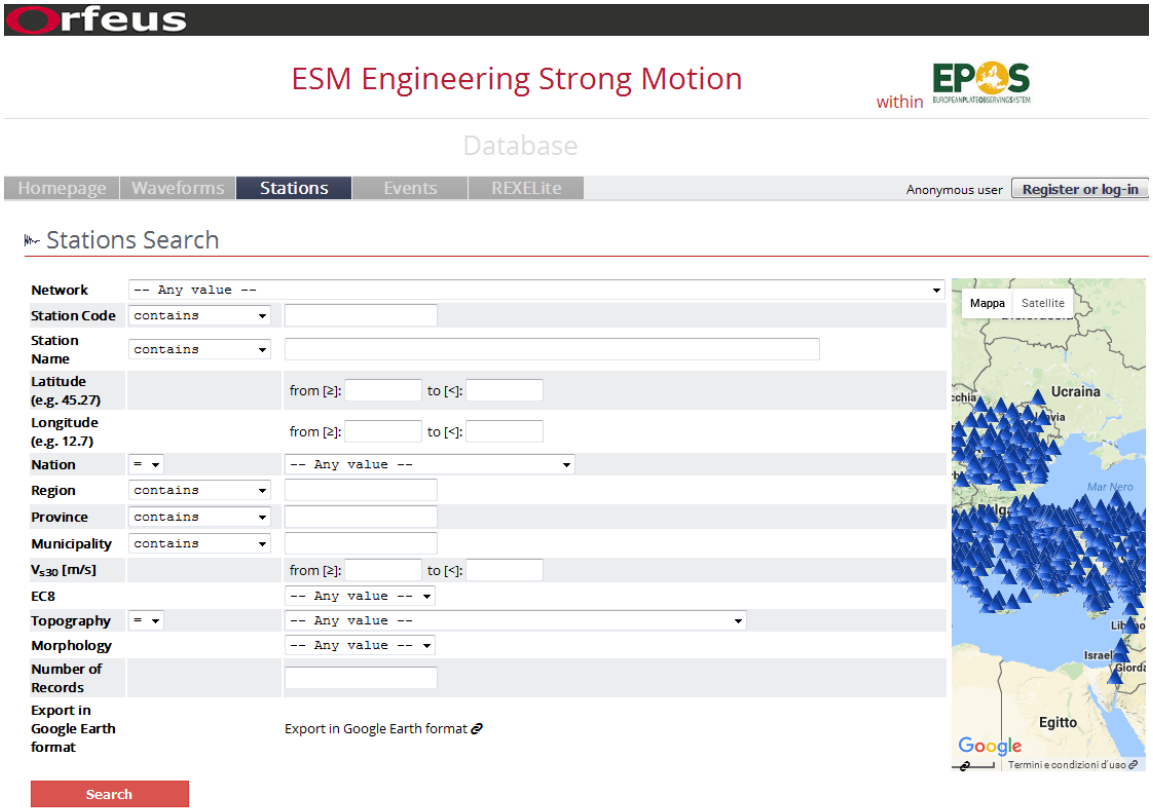


http://www.orfeus-eu.org/esm

RRSM vs ESM

RRSM Rapid Response SM

Collection of accelerometric data from EIDA immediately after an earthquake

- Magnitude threshold: 3.5
- since **2005**
- wfs are processed automatically (software **scwfparam module of SeisComP3**)
- Station and event metadata are not revised
- Input for SHAKEMAPS provided

At 2015-06-15:

- **3700** events
- **>50000** waveforms,
- only digital instruments
- raw wf, DS and PSA (5%-dam.) comp. up to 10s
- PGA and PGV, SA @ 0.1s 0.3s and 1s

ESM Engineering SM

Collection of accelerometric data from EIDA and/ or offline data

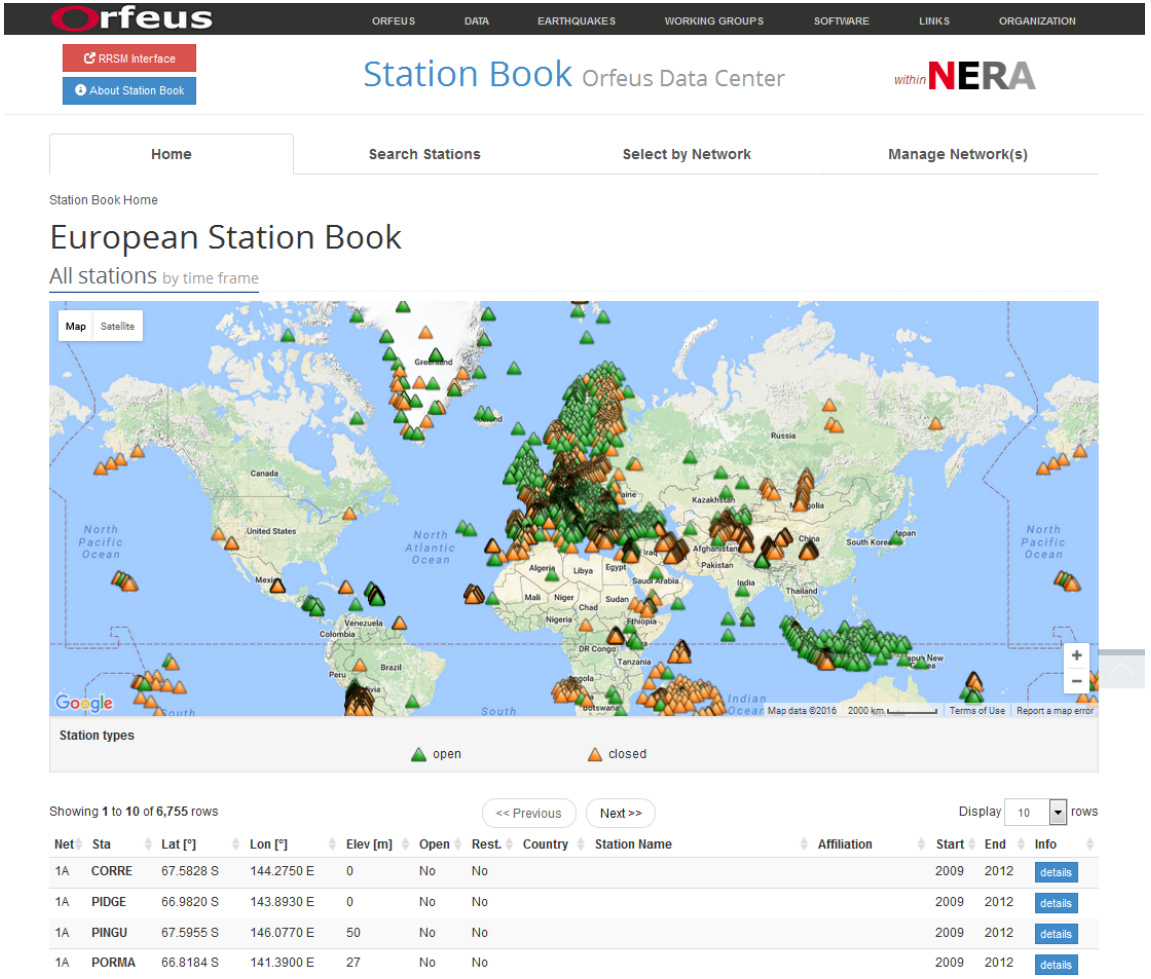
- Magnitude threshold: 4
- since **1969**
- wfs are processed manually (Paolucci et al. 2011)
- Station and event metadata are periodically revised

At 2015-06-15:

- **2345** events
- **2500** stations
- **14800** waveforms including records from analog instruments
- Unpr. acc, vel, DS and PSA (5% damping) PGA, PGV, PGD

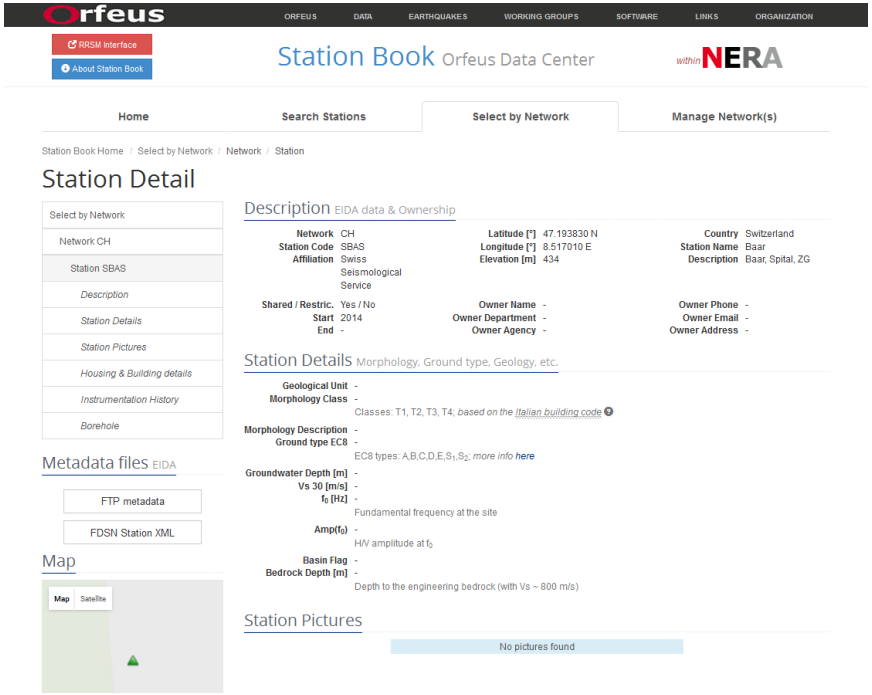
ORFEUS Station Book

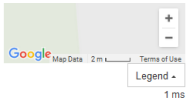
Up-to-date station information ("Station Book") for strong motion and broad-band stations operational in Europe (station metadata, site characterization

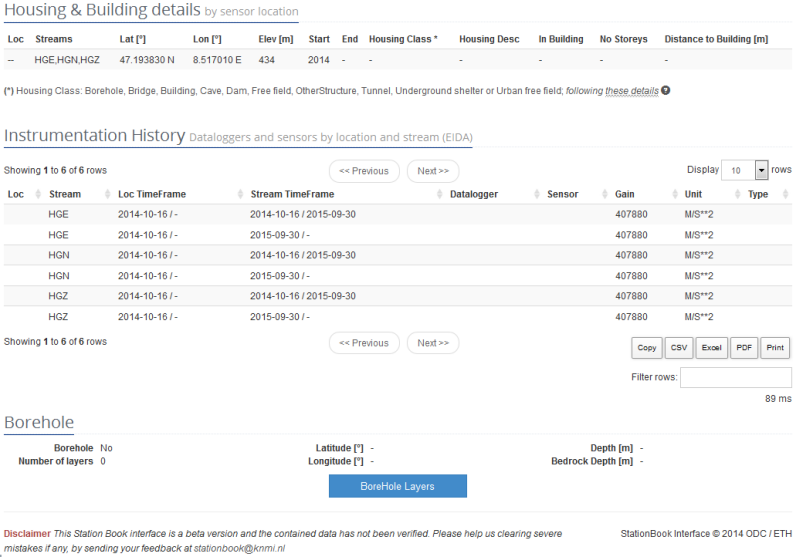


http://www.orfeus-eu.org/data/stationbook/

ORFEUS Station Book







http://www.orfeus-eu.org/data/stationbook/

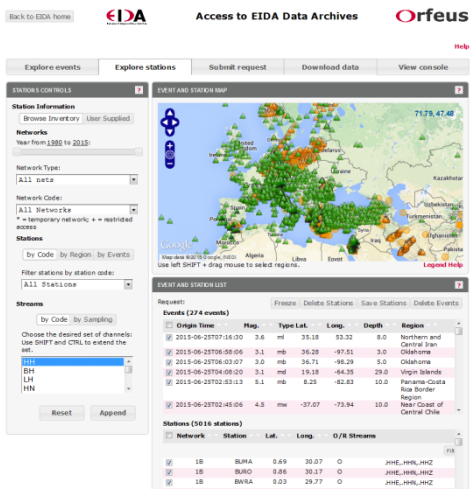
ORFEUS data infrastructure, services and products

EIDA => EIDA-Next Generation

More than just data and federated archive

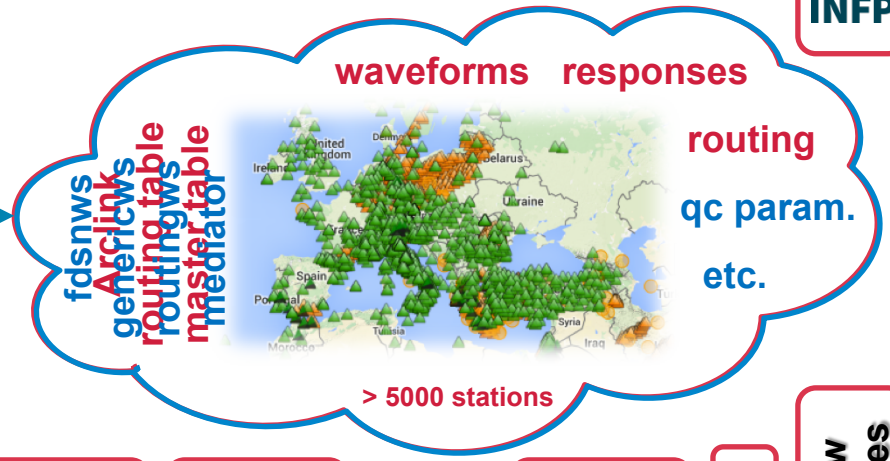
- **Coordination of data holdings and software/strategic developments**
- **Provides quality control of data/ metadata**
- **Helps define seismological center**

http://www.orfeus-eu.org/eida/eida.html



ORFEUS community

Users: Geoscientists Etc…



New nodes

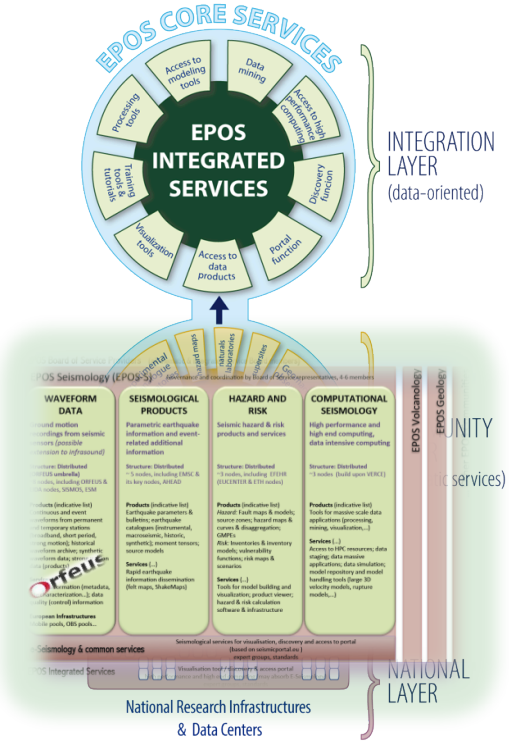
EPOS

The European Plate Observing System (EPOS) is the ESFRI initiative of the Solid Earth sciences:

- **long-term plan to facilitate integrated use of data, models and facilities from pre-existing and newly established research infrastructures for solid Earth science;**
- **represents a scientific vision and approach to enable innovative multidisciplinary research towards a better understanding of the physical processes controlling earthquakes, volcanic eruptions and unrest episodes, tsunamis, as well as those driving tectonics and Earth surface dynamics.**

EPOS-Seismology

Seismology provides Thematic Core Services (TCS) to EPOS. The multidisciplinary integration and interoperability will be ensured by the Integrated Core Services (ICS).



EPOS Integrated Core Services provide simplified access to multidisciplinary data and data-derived products, combine data with modeling results (simulations), processing and visualization tools

Thematic Core Services community-driven infrastructures provide discipline-specific data services, these will build on pre-existing international collaboration/organizations (e.g. **ORFEUS**).

The various communities organize their services. Seismology (**EPOS-S**) will provide and extend waveform data offerings through **ORFEUS/EIDA**.

National Research Infrastructures and facilities provide services at national level and send data to the European thematic data infrastructures.

Thanks for your attention!

Additional information at:
http://www.orfeus-eu.org/index.html

To join ORFEUS contact
orfeus_secretary@knmi.nl