

## WP 4: Access to European seismological waveform data infrastructure

R. Sleeman, J. Quinteros, H. Pedersen, J. Clinton, C. Evangelidis, K. Ionescu

### Keywords

Seismological waveforms, ORFEUS, EIDA, data access web services

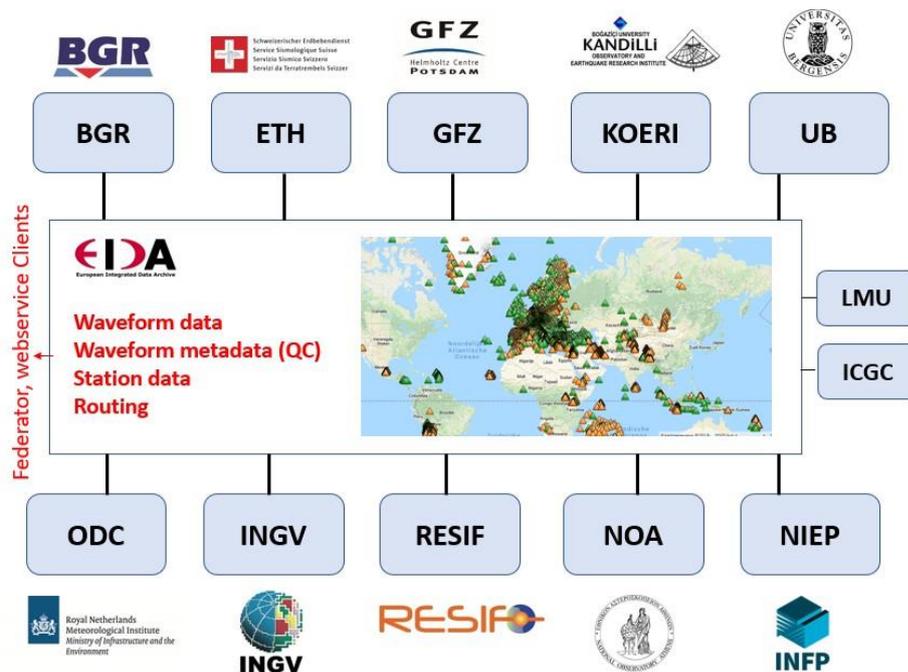


Figure 1. European Integrated Data Archive (EIDA) – the European Infrastructure for open access to seismological waveform data

### Main Results

ORFEUS (Observatories & Research Facilities for European Seismology) is the European infrastructure for seismic waveform data, station metadata and products. Within ORFEUS, the European Integrated Data Archive (EIDA) is the federated infrastructure of seismological data archives that provides access to seismic waveform data from seismological networks. ORFEUS is the infrastructure for seismic waveform data in EPOS and provides access to high quality seismic waveforms and station metadata from EIDA and strong motion products.

SERA fostered the collaboration and cooperation between seismological observatories and ORFEUS in regions like the Balkans and South-West Europe. The number of seismic stations providing data to the European seismological data infrastructure impressively increased from about 7'000 to over 11'000 during the SERA project, with an increase of nearly 100 stations in the Balkans. Currently, EIDA holds beyond 450 TB of data of 107 permanent networks and 190 temporary networks, with a total of more than 10'500 velocity sensors, over 1'600 accelerometers and about 160 infrasound sensors. Also, two new archives, representing seismic networks deployed by Norway and Catalunya, were added to EIDA.

Access to EIDA vastly improved during SERA through a) the implementation of standardized web services and formats across EIDA, b) the implementation of DOIs in metadata and c) the development and deployment of the Federator. Standardization of services and formats and the use of DOIs are in line with the FDSN (International Federation of Digital Seismograph Networks). Current standard web services are: fdsnws-dataselect, fdsnws-station, eidaws-wfcatalog and eidaws-routing.

The development and implementation of the EIDA Federator provide a single, unified access point to the waveform archives and the station and quality control information from the entire EIDA data holdings, i.e. from all the datacenters in EIDA. Access is through standard FDSN and EIDA web services. The Federator enables transparent and homogeneous access to EIDA by users and clients (e.g. ObsPy, EIDA StationBook, RRSN (Rapid Raw Strong Motion database - the European system to expose strong motion products close to realtime for earthquake scientists and earthquake engineers).

EIDA aims at sustainable high quality of services by a) the establishment of a User Advisory Group within ORFEUS, b) a ticketing system for reporting issues and providing feedback to EIDA and c) the implementation of a new authentication system for restricted data (e.g. AlpArray). Data quality is provided by the eidaws\_wfcatalog web service; however new tools are being developed and tested.

Within SERA a comprehensive overview of metadata for other geophysical measurements was made to prepare EIDA, although tailored for seismological waveform data, potentially ready to serve other types of time series data (e.g. Distributed Acoustic Sensing, Near Fault Observatories). Finally, SERA facilitated long-term sustainability of EIDA by building up extensive documentation, best practice guidelines for data acquisition and distribution, as well as technical support.

## List of Publications

Pedersen, H. A., Leroy, N., Zigone, D., Vallée, M., Ringler, A. T., and Wilson, D. C., 2020. Using Component Ratios to Detect Metadata and Instrument Problems of Seismic Stations: Examples from 18 Yr of GEOSCOPE Data, *Seismological Research Letters* 91 (1), 272-286

## Access to Data and Services

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

<http://www.orfeus-eu.org/eida>

<http://www.orfeus-eu.org/data/eida/webservices/>

<http://www.orfeus-eu.org/webdc3/>

<http://www.orfeus-eu.org/stationbook>

<http://www.orfeus-eu.org/data/eida/quality/> <http://www.orfeus-eu.org/rrsm>

### Liability claim

The European Commission is not responsible for any use that may be made of the information contained in this document. Also, responsibility for the information and views expressed in this document lies entirely with the author(s).