



Exposing Norwegian seismological data to the world

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University of Bergen, Norway

Ocean Data Dojo - Building competence in FAIR data
management in marine research and citizen science

15 December 2022

SEARCH

Free text search
uib

Filters

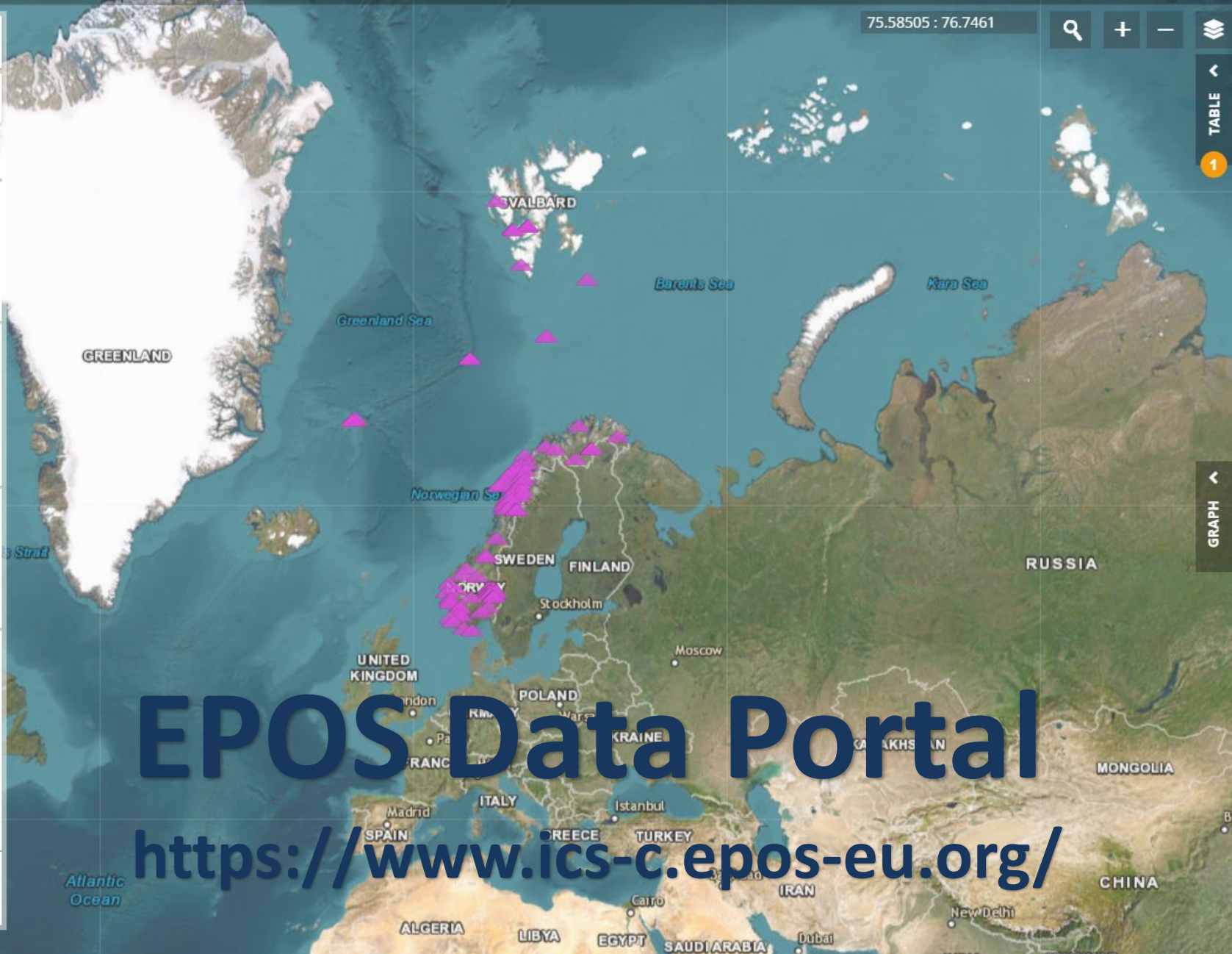
Seismology 3

Seismic waveforms distributed by UIB-NORSAR (University of Bergen & NORSAR)
Categories: [Waveform and peak-motion servi...](#) > [Waveform data](#) > [Seismic waveforms distributed ...](#)
Status: ✓

Station metadata distributed by UIB-NORSAR (University of Bergen & NORSAR)
Categories: [Waveform and peak-motion servi...](#) > [Waveform metadata](#) > [Seismic metadata distributed b...](#)
Visible on: [Map](#) [Table](#)
Status: ✓

Waveform quality and availability metrics distributed by UIB-NORSAR (University of Bergen & NORSAR)
Categories: [Waveform and peak-motion servi...](#) > [Waveform metrics](#) > [Quality metrics distributed by...](#)
Status: ✓

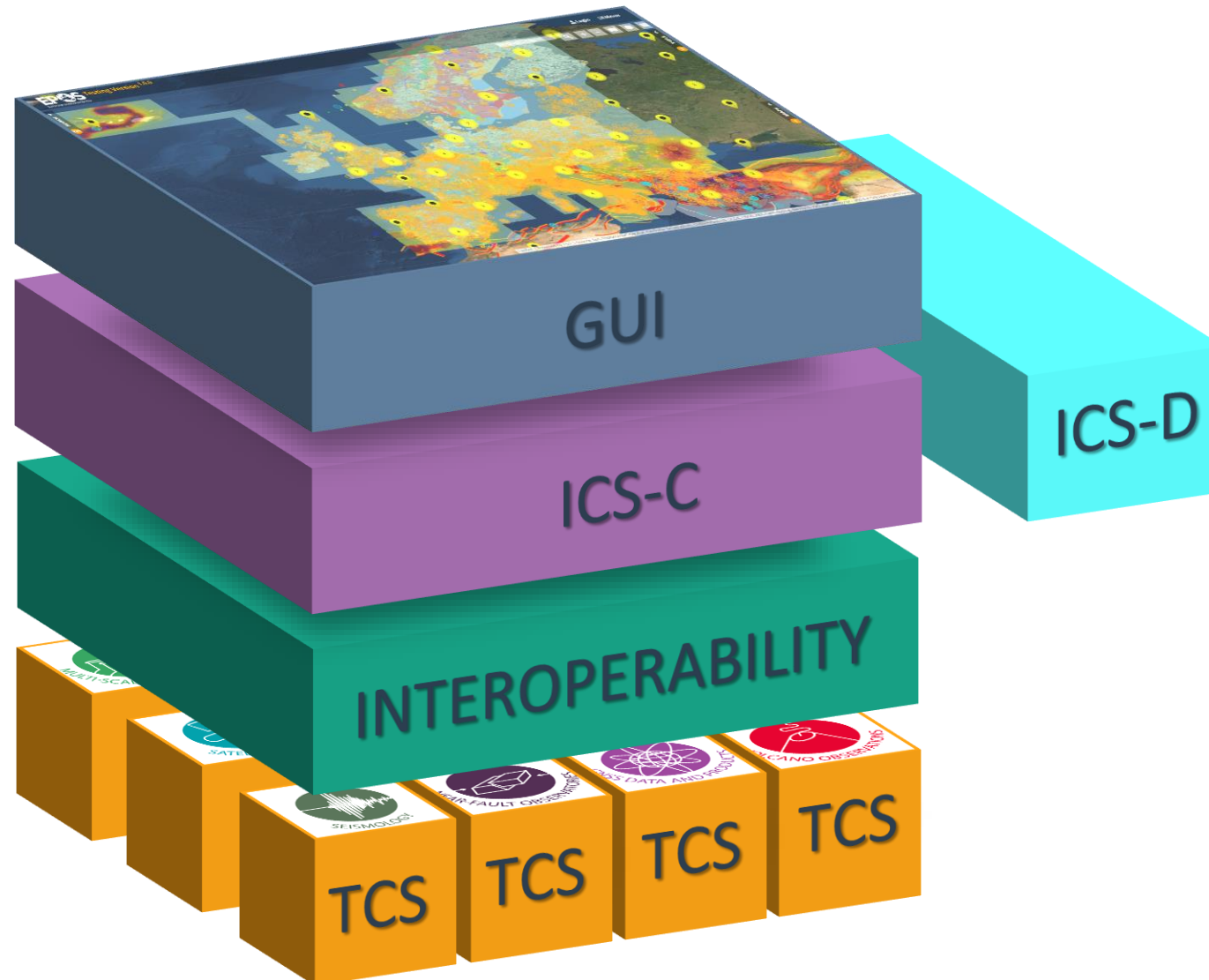
Results per page: 10 Page 1 of 1



EPOS Data Portal

<https://www.ics-c.epos-eu.org/>

EPOS Technical Architecture



EPOS-N

EUROPEAN PLATE OBSERVING SYSTEM - NORWAY

OUR PARTNERS



EPOS-Norway (2016-2020), Project No. 245763 funded by Research Council of Norway

Norwegian National Seismic Network

Norsk Nasjonalt Seismisk Nettverk

Døgnåpen vakttelefon - 55 58 26 17

English



Hjem Jordskjelv ▼ Nyheter Overvåking Følt jordskjelv? Data ▼ Informasjon ▼

Jordskjelvstasjoner (57)

Stasjonskode: AKN

[Seismogrammer](#)

Stasjonskode: ARA0

[Seismogrammer](#)

Stasjonskode: ARA0

[Seismogrammer](#)

Stasjonskode: ASK

[Seismogrammer](#)

[Sanntid plott](#)

Stasjonskode: BER

[Seismogrammer](#)

[Sanntid plott](#)

Stasjonskode: BJO1

[Seismogrammer](#)

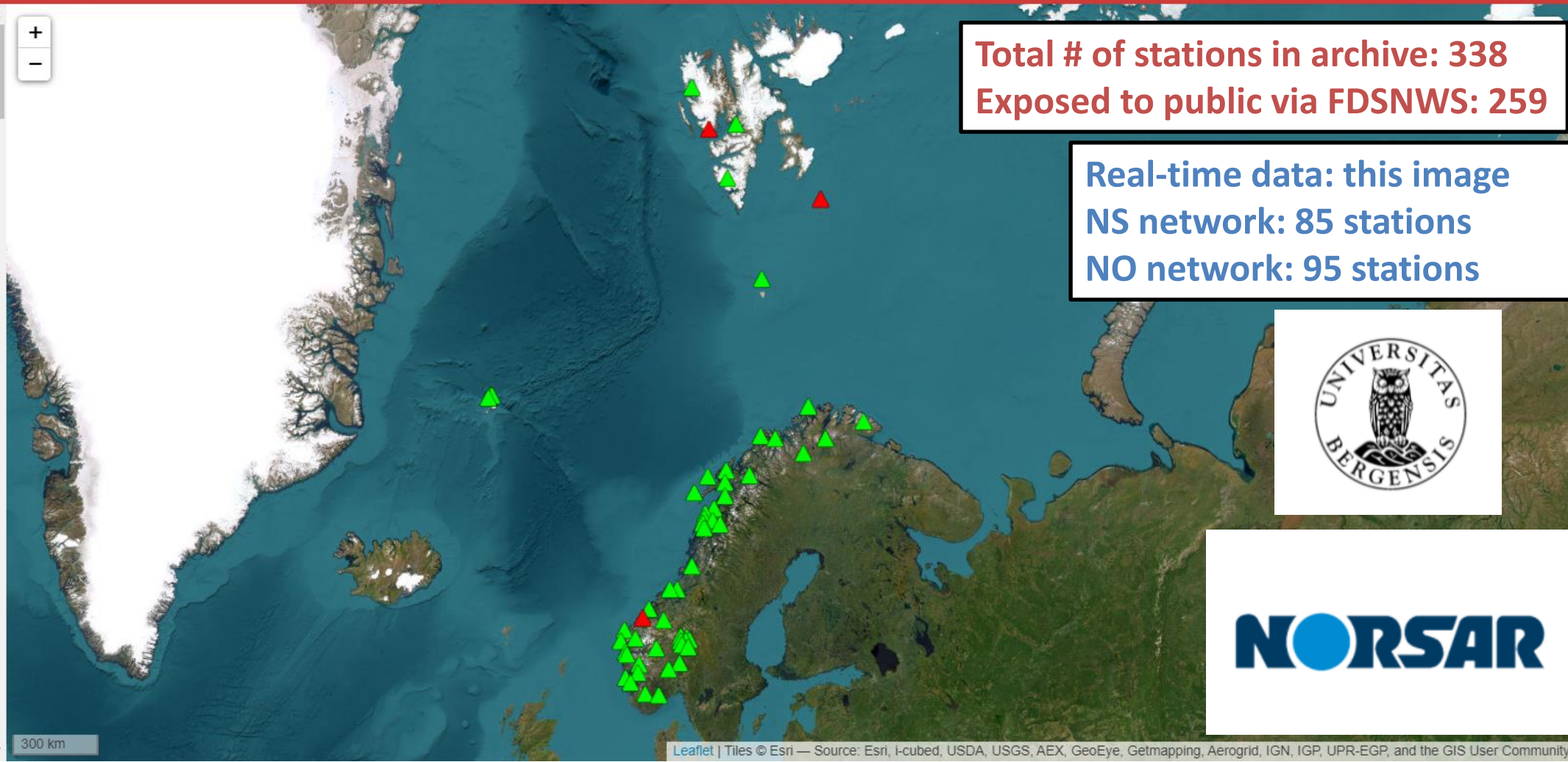
[Sanntid plott](#)

Stasjonskode: BLS5

[Seismogrammer](#)

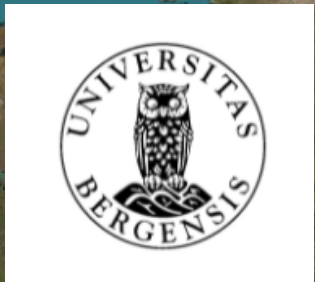
[Sanntid plott](#)

Stasjonskode: DOMB

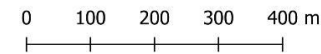
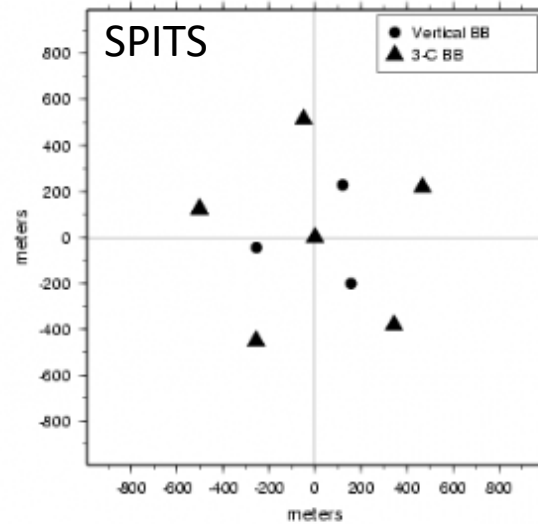
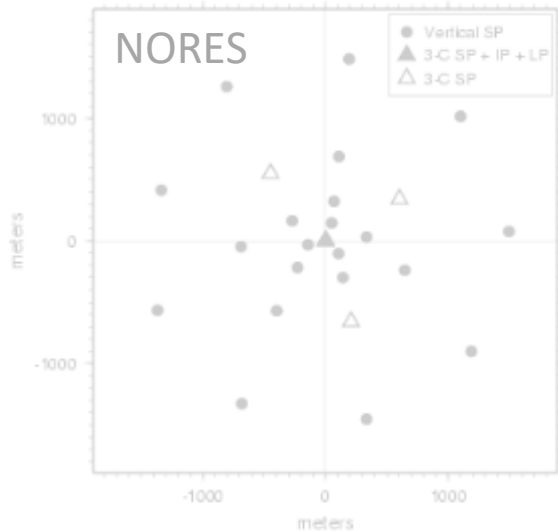
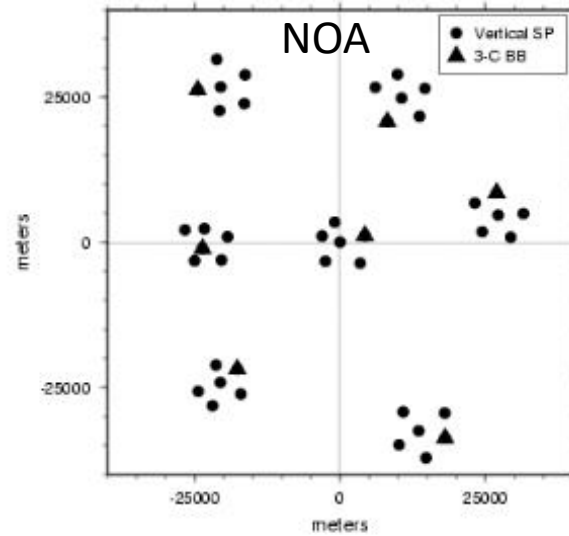
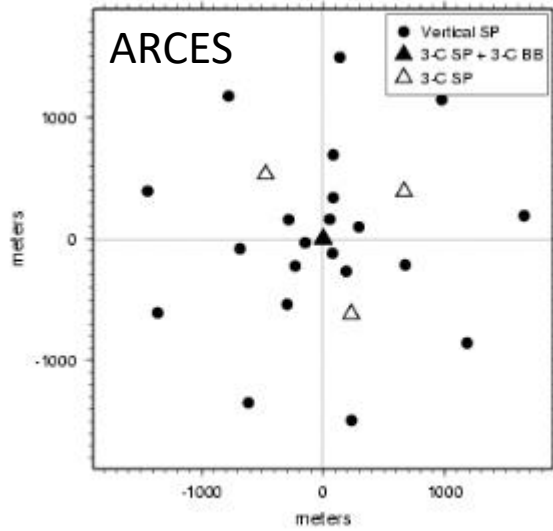


Total # of stations in archive: 338
Exposed to public via FDSNWS: 259

Real-time data: this image
NS network: 85 stations
NO network: 95 stations



NORSAR arrays



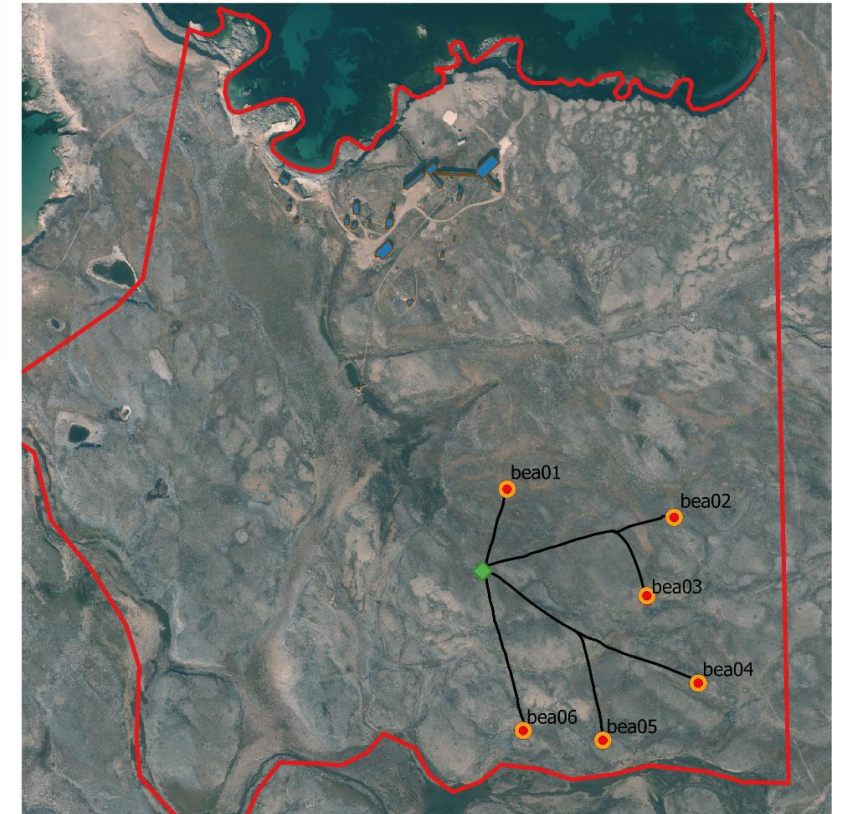
Installation

- Cable
- Instrument

Infrastructure

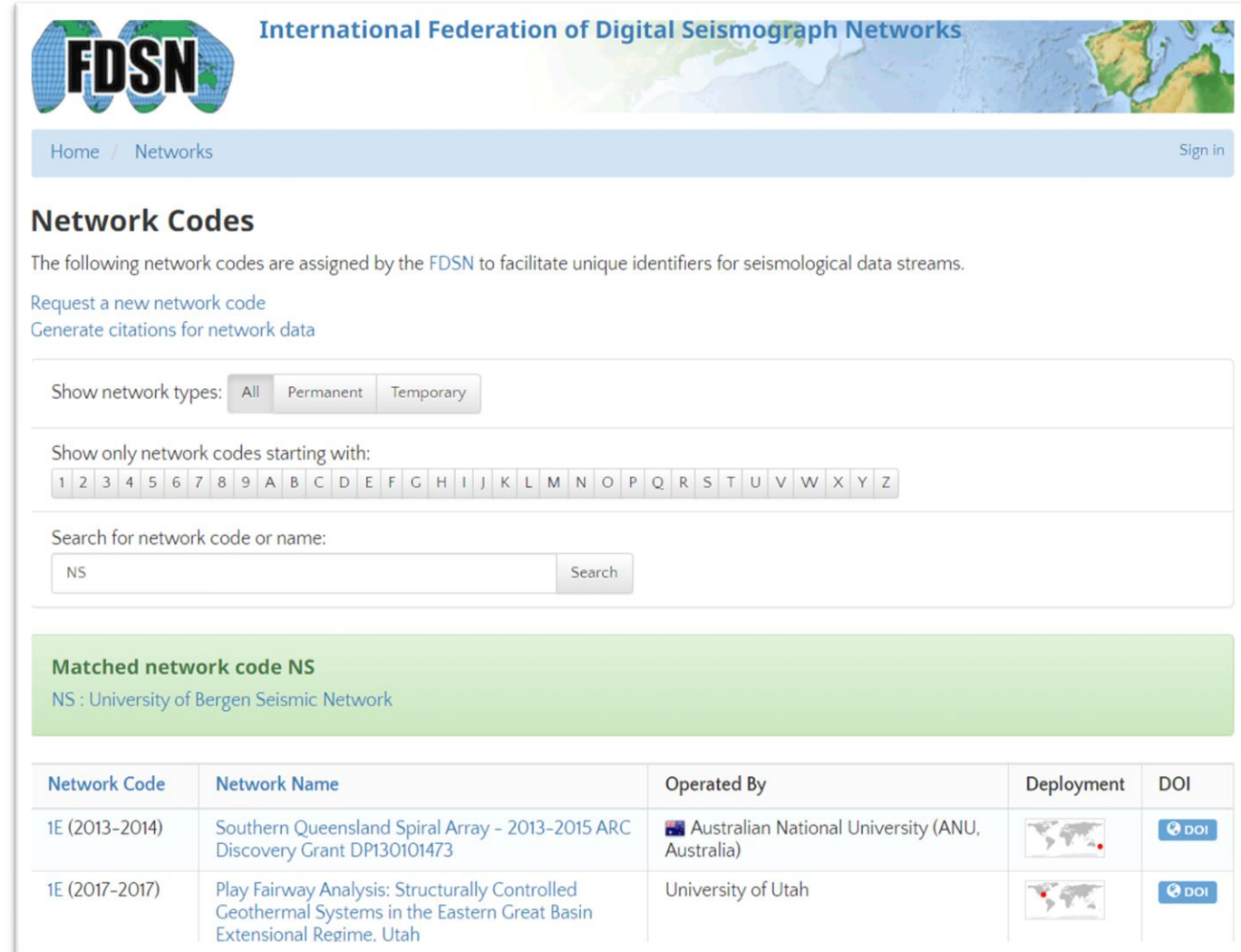
- ◆ CRF
- Meteorological station
- Station area

NORSAR, oktober 2019
Projection: WGS84 / UTM sone 33N





Metadata

- All seismic networks are registered in International Federation of Digital Seismograph Networks (FDSN)
- DOI should be associated to each seismic network
 - FDSN DOI
 - Another DOI

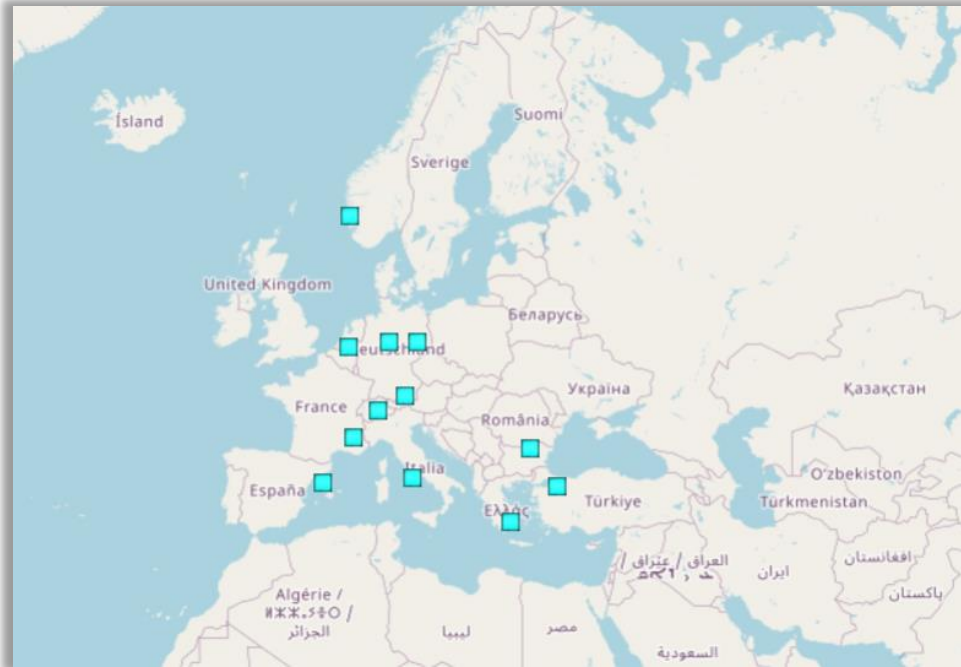


The screenshot shows the FDSN website interface. At the top, there is a logo for FDSN (International Federation of Digital Seismograph Networks) and a navigation bar with 'Home / Networks' and a 'Sign in' link. Below the navigation bar, the page title is 'Network Codes'. A descriptive text states: 'The following network codes are assigned by the FDSN to facilitate unique identifiers for seismological data streams.' There are two links: 'Request a new network code' and 'Generate citations for network data'. A search filter section shows 'Show network types:' with buttons for 'All', 'Permanent', and 'Temporary'. Below that, 'Show only network codes starting with:' is followed by a row of buttons for digits 1-9 and letters A-Z. A search box contains the text 'NS' and a 'Search' button. A green banner highlights the search result: 'Matched network code NS' with a link to 'NS : University of Bergen Seismic Network'. At the bottom, a table lists network codes and their details.

Network Code	Network Name	Operated By	Deployment	DOI
1E (2013-2014)	Southern Queensland Spiral Array - 2013-2015 ARC Discovery Grant DP130101473	Australian National University (ANU, Australia)		DOI
1E (2017-2017)	Play Fairway Analysis: Structurally Controlled Geothermal Systems in the Eastern Great Basin Extensional Regime. Utah	University of Utah		DOI

European Integrated Data Archive (EIDA)

- Is an initiative within ORFEUS
- Distributed federation of datacenters
- Currently there are 12 EIDA nodes



Datcenter ID	Description and Focus Region	Since
ODC - KNMI	European-Mediterranean, Netherlands	2013
GFZ	European, Global, temporary deployments	2013
RESIF	France + Global temporary deployments	2013
INGV	Italy, European-Mediterranean (MedNet)	2013
ETHZ	Switzerland	2013
BGR	Germany	2013
LMU	Germany (BayernNetz)	2013
NIEP	Romania	2014
KOERI	Turkey	2014
NOA	Greece	2016
UIB - NORSAR	Norway	2019
ICGC	Spain	2020

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

ORFEUS = Observatories & Research Facilities for European Seismology

European Integrated Data Archive (EIDA)

Current status and availability of services

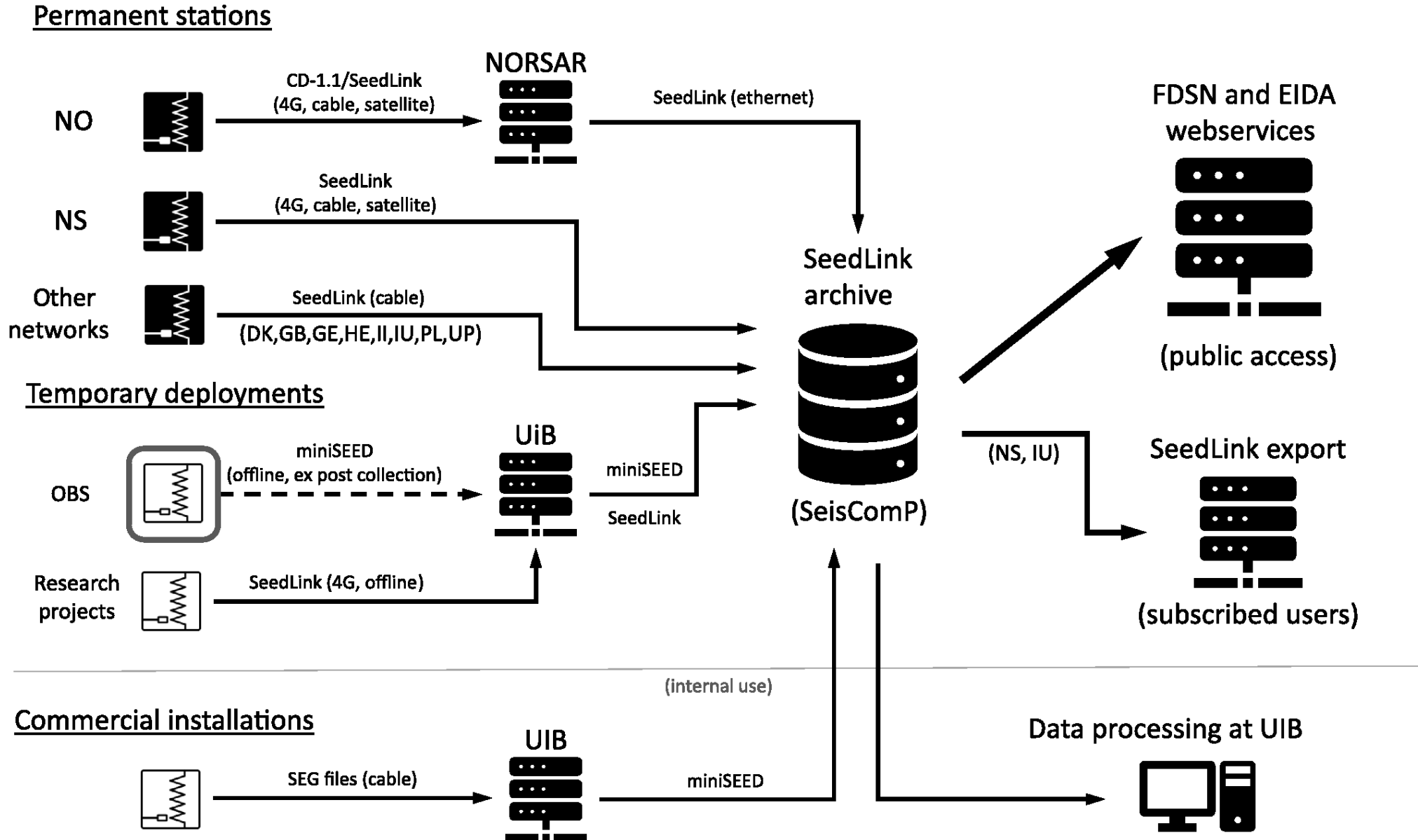
	FDSNWS-Dataselect	FDSNWS-Station	EIDAWS-WFCatalog
FEDERATOR	Online 1.1.0	Online 1.1.2	Online 1.0.0

Table showing current status, service versions, and response times for the FDSN and EIDA Webservices. **Visit the individual node pages to discover the webservice addresses for each node.**

EIDA Node	FDSNWS-Dataselect	FDSNWS-Station	EIDAWS-WFCatalog	EIDAWS-Routing
ODC	Online (v1.1.1)	Online (v1.1.4)	Online (v1.0.0)	Online (v1.2.1-b2)
GFZ	Online (v1.1.1)	Online (v1.1.4)	Online (v1.0.0)	Online (v1.2.1-b1)
RESIF	Online (v1.1.1)	Online (v1.1.0)	Online (v1.0.0)	Static config
INGV	Online (v1.1.0)	Online (v1.1.53)	Online (v1.0.0)	Online (v1.2.1)
ETHZ	Online (v1.1.1)	Online (v1.1.4)	Online (v1.0.0)	Online (v1.2.0-b1)
BGR	Online (v1.1.0)	Online (v1.1.2)	Online (v1.0.0)	Online (v1.2.1)
NIEP	Online (v1.1.0)	Online (v1.1.2)	Online (v1.0.0)	Online (v1.1.1)
KOERI	Online (v1.1.0)	Online (v1.1.3)	Online (v1.0.0)	Online (v1.1.1)
LMU	Online (v1.1.1)	Online (v1.1.4)	Online (v1.0.0)	Online (v1.2.1)
NOA	Online (v1.1.0)	Online (v1.1.2)	Online (v1.0.0)	Online (v1.2.1-b2)
UIB-NORSAR	Online (v1.1.0)	Online (v1.1.2)	Online (v1.0.0)	Static config
ICGC	Online (v1.1.1)	Online (v1.1.4)	Online (v1.0.0)	Online (v1.2.1-b1)

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

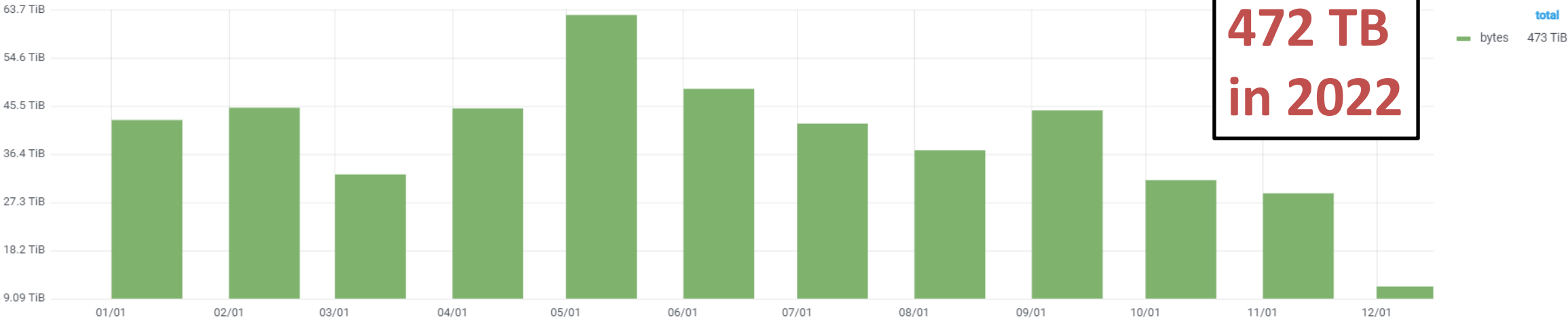
Seismic waveforms – data flow



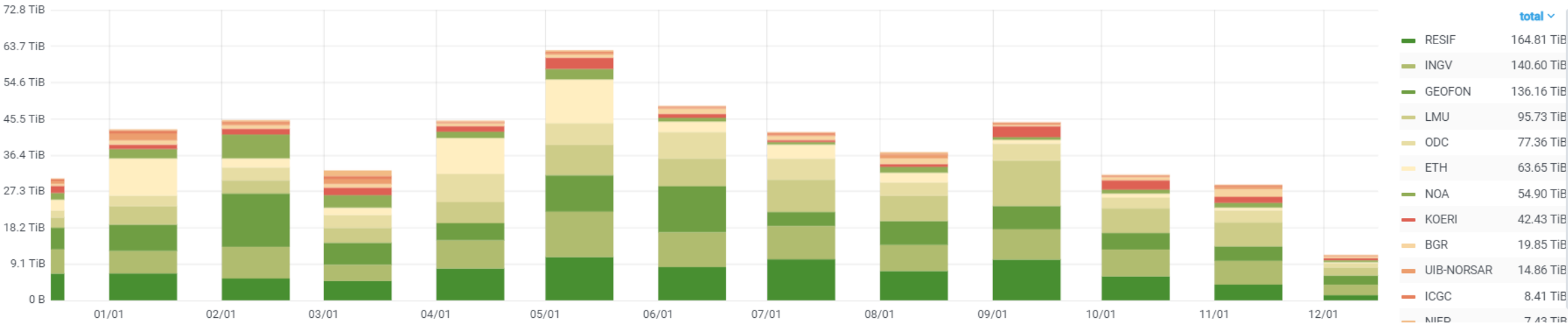
<https://doi.org/10.1785/0220200369>

EIDA data usage

Data distributed by dataset monthly

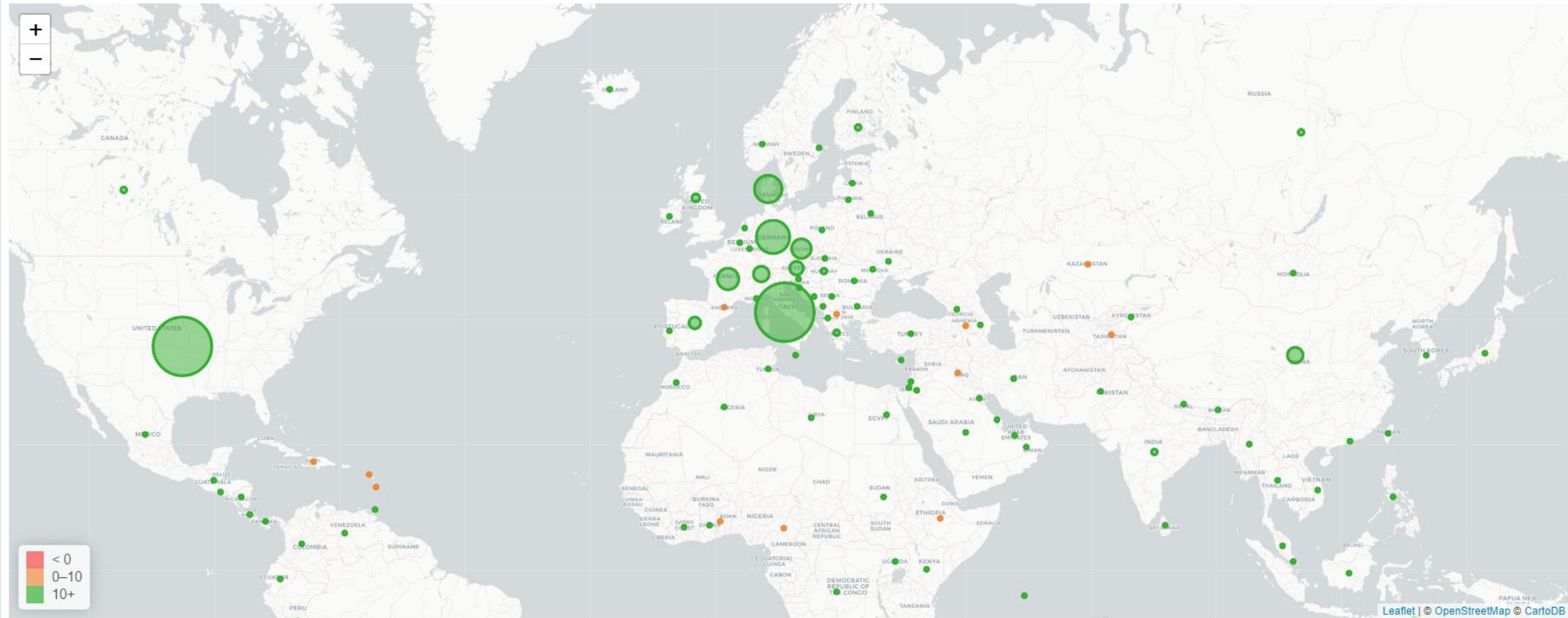


Data distributed by dataset per node



EIDA data usage - requests

Map of the requests ▾



Leaflet | © OpenStreetMap © CartoDB

Integration of seismic waveforms

- **FDSN web services**

- **DATASELECT** for waveforms:

- [http://SERVER/fdsnws/dataselect/1/query?](http://SERVER/fdsnws/dataselect/1/query?net=NS&sta=BER&cha=HHZ&starttime=2011-03-11T06:00:00Z&endtime=2011-03-11T06:05:00Z)
net=NS&sta=BER&cha=HHZ&
starttime=2011-03-11T06:00:00Z
&endtime=2011-03-11T06:05:00Z

SERVER = eida.geo.uib.no

=> response: MSEED file

- Alternative – command line (e.g. wget, curl):

- curl -X GET "QUERY" -H "accept: application/vnd.fdsn.mseed"

- **STATIONS** for station metadata:

- [http://SERVER/fdsnws/station/1/query?](http://SERVER/fdsnws/station/1/query?net=NS&level=station)
net=NS&level=station

=> response: StationXML file

SERVER = FEDERATOR = eida-federator.ethz.ch

Integration of seismic waveforms

- **EIDA web services**

SERVER = eida.geo.uib.no

- **WFCatalog for waveform metadata:**

- contents of waveform data including quality parameters

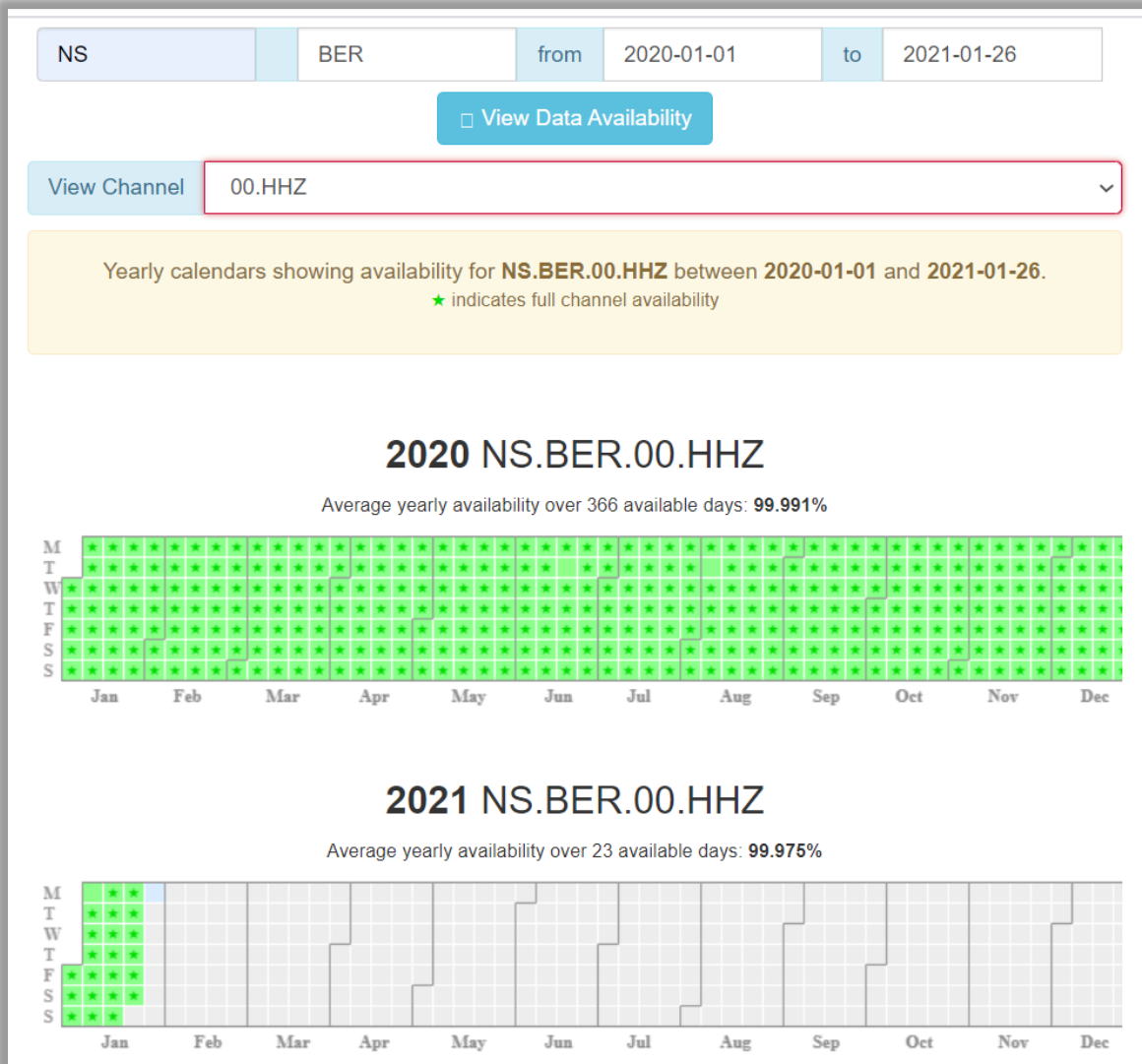
<http://SERVER/eidaws/wfcatalog/1/query?>

network=**NS**&start=**2017-01-01**&end=**2017-01-07**

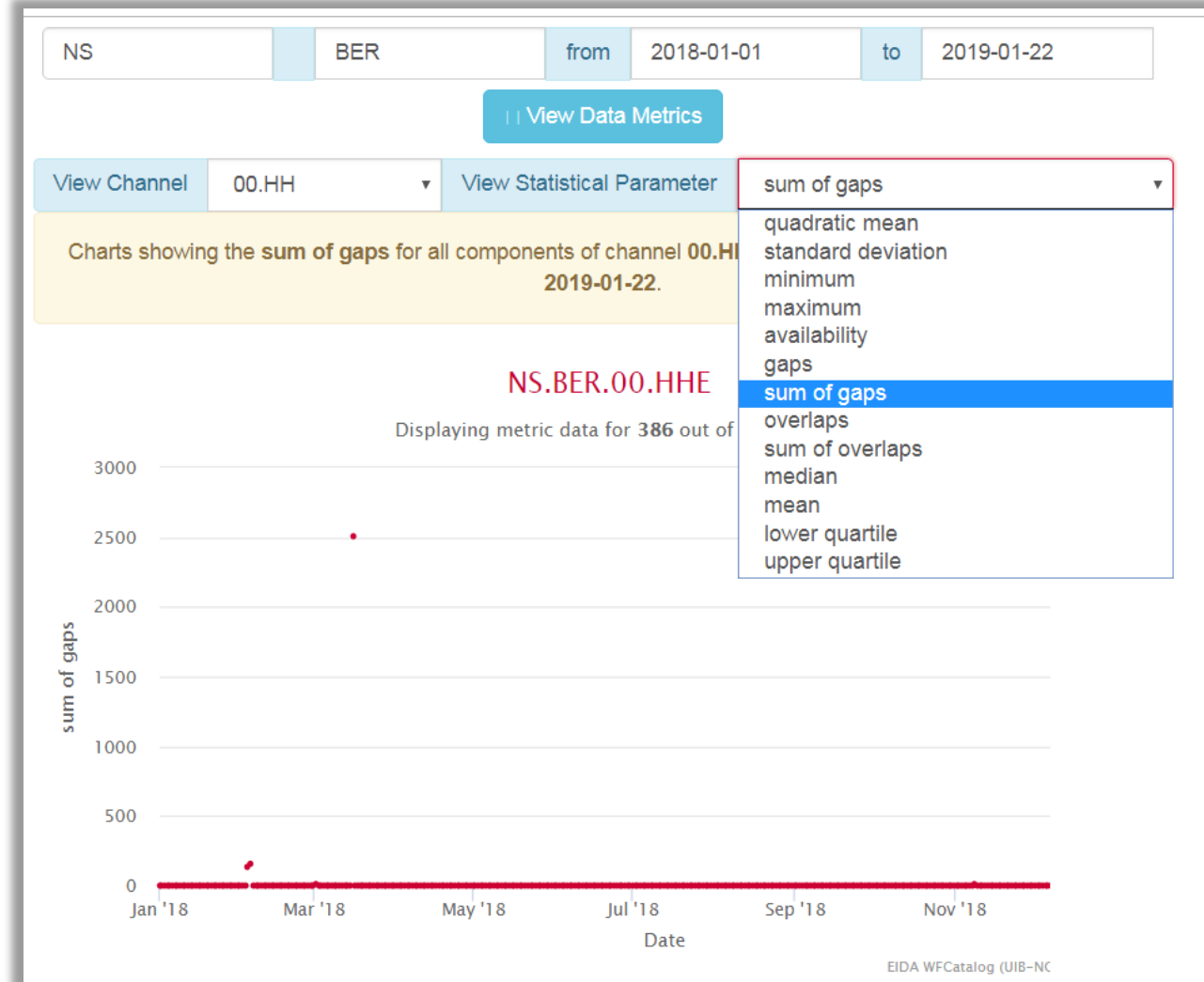
=> response: JSON file with stations/channels

SERVER = FEDERATOR = eida-federator.ethz.ch

WFCatalog – Availability + Metrics



<http://eida.geo.uib.no/wfcatalog/availability/>



<http://eida.geo.uib.no/wfcatalog/metrics/>

GUI for access to waveforms for events

UNIVERSITAS BERGENSIS

EIDA
European Integrated Data Archive

NORSAR

UIB-NORSAR EIDA node web interface

Explore events | Explore stations | Submit request | Download data | View console [Help](#)

Events Controls
Use this to select events to compose your request.

Event Information

Catalog Services
User Supplied

Catalog Service:

Date Interval (yyyy-mm-dd):
 -

Minimum Magnitude:

Depth from to km

Coordinates: (Use -ve for S/W; +ve for N/E)

Event and Station Map
Here the events and stations you choose will be displayed. Use the mouse to drag the map around. Use the Ctrl-Mouse to draw areas for limiting the search of events and stations when the appropriate modules are enabled.

Use left SHIFT + drag mouse to select regions. [Legend](#) [Help](#)

Event and Station List
Use these tables to check which events and stations have been selected by your search criteria. You can interactively remove unwanted items. Your final request will be built from the currently displayed information.

<https://eida.geo.uib.no/webdc3/>



Projects ^

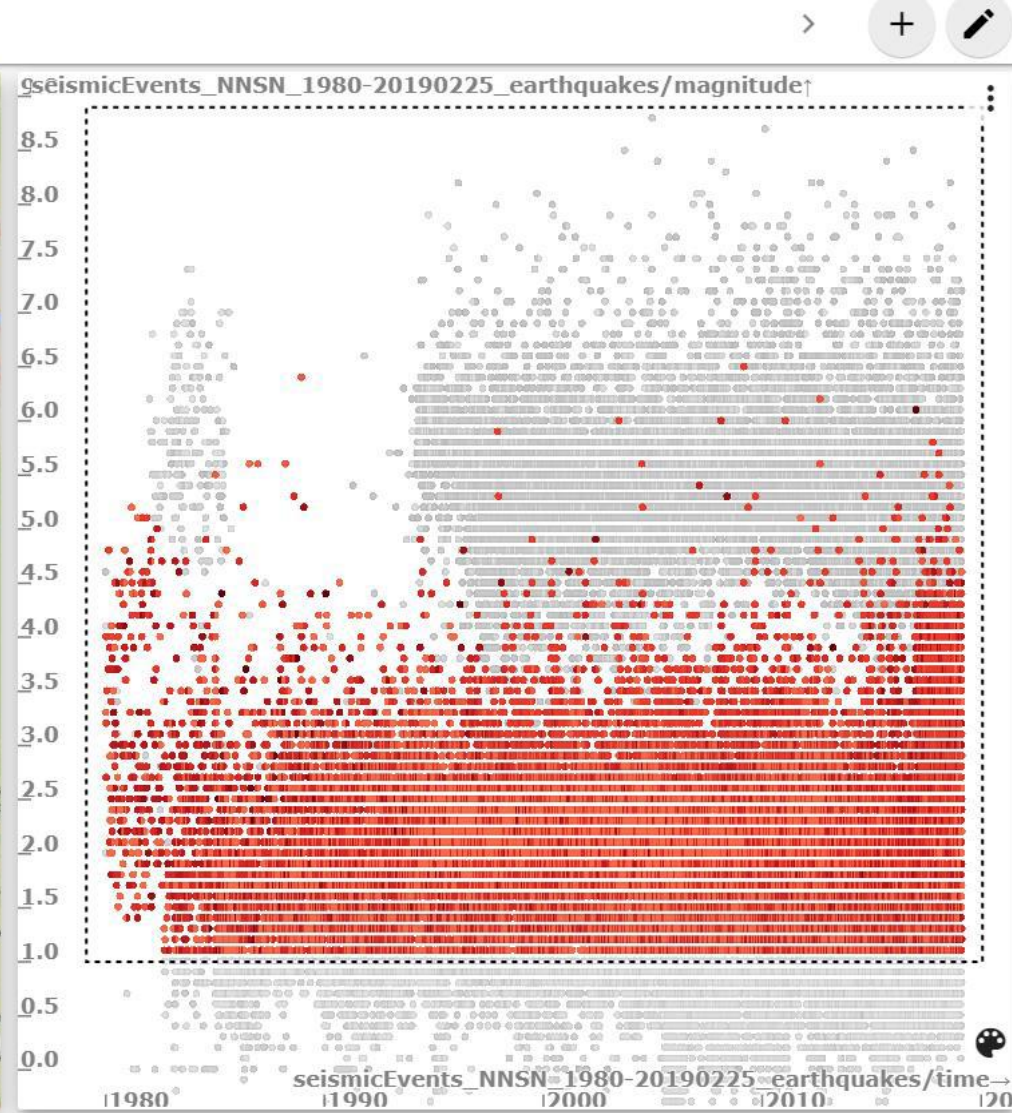
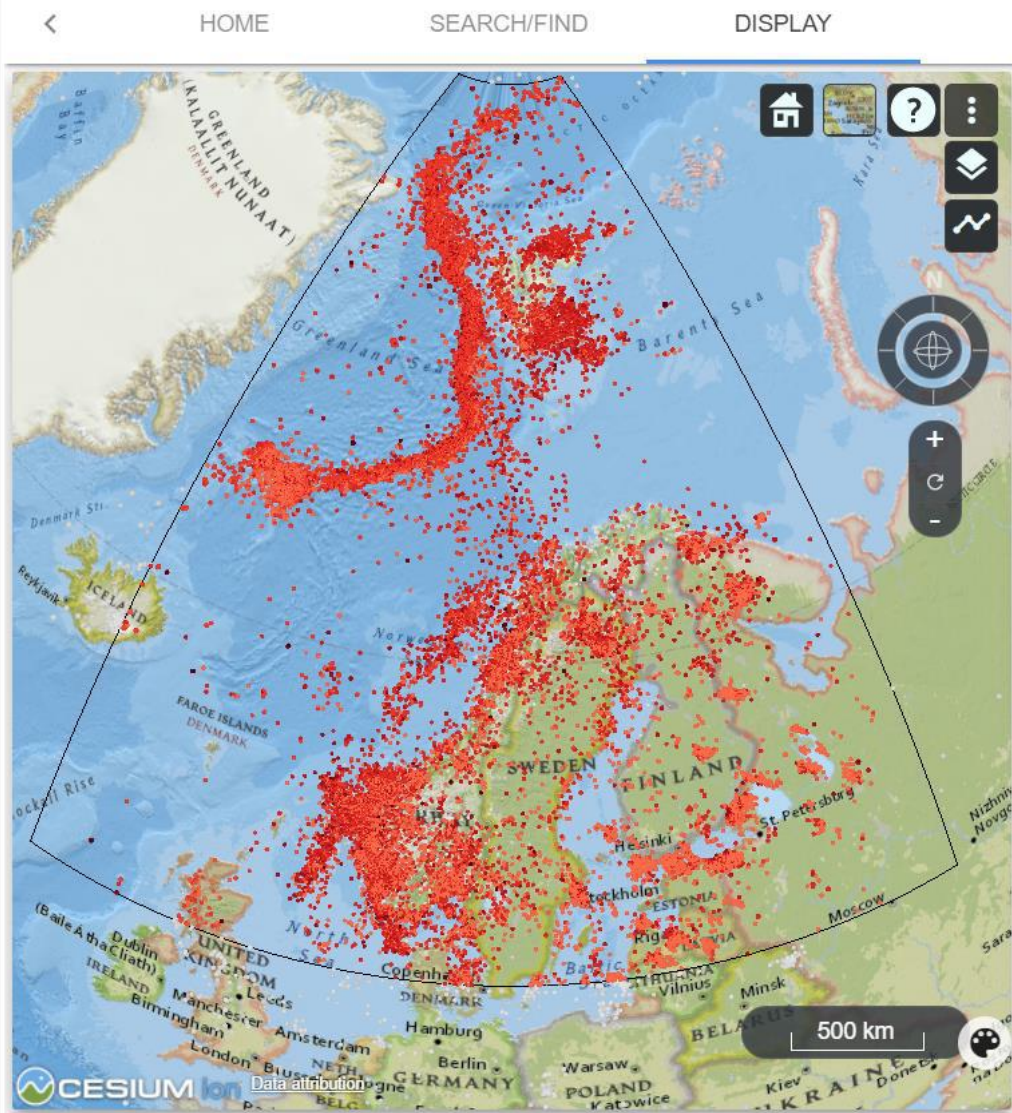
Select dataset/service v

Dataset	Size
seismicEvents_NNSN_1980-20190225_earthquakes	
GeofysikkWMS2	

Dataset/service contents v

seismicEvents_NNSN_1980-20190225_earthquakes

Column	Type
index	int64
time	datetime64[ns]
latitude	float64
longitude	float64
depth	float64
magnitude	float64



Free text search

Filters

70.01556 : 80.78906

Favourites 8

Clear all favourites

EMSS21 Euro-Mediterranean Submarine landslide database - Arctic deposits (OGC WMS)

Categories: Tsunami > Submarine Landslide Catalogue > The Euro-Mediterranean Submari...
Visible on: Map

EMSS21 Euro-Mediterranean Submarine landslide database - Mediterranean deposits (OGC WMS)

Categories: Tsunami > Submarine Landslide Catalogue > The Euro-Mediterranean Submari...
Visible on: Map

European Database of Seismogenic Faults (OGC WMS)

Categories: Seismology > Earthquake hazard and risk ser... > Seismogenic faults
Status: ✓

Geological Feature View Service (EGDI Geological Map 1:1,000,000)

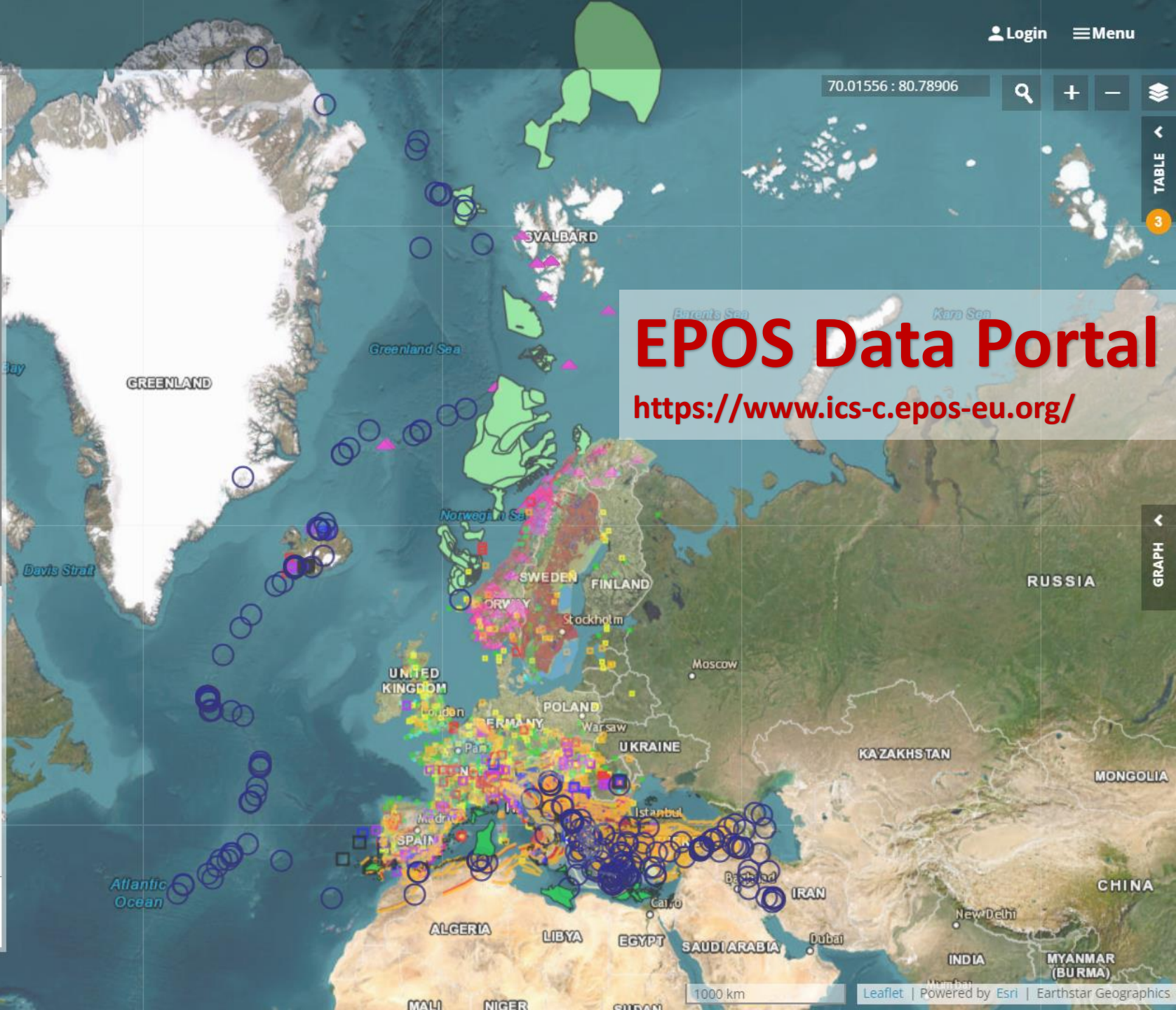
Categories: Geology > Geological Maps
Visible on: Map
Status: ✓

LOS Displacement Time Series

Categories: Satellite Observations > InSAR

Results per page: 10 Page 1 of 1

EPOS Data Portal
<https://www.ics-c.epos-eu.org/>



SEARCH

TABLE

GRAPH

UIB-NORSAR EIDA node

eida.geo.uib.no

NS network from 2005

NO network from 1999

Lars Ottemöller, Jan Michalek, Jon-Magnus Christensen, Ulf Baadshaug, Felix Halpaap, Øyvind Natvik, Tormod Kværna, Volker Oye; UiB-NORSAR EIDA Node: Integration of Seismological Data in Norway. *Seismological Research Letters* 2021; doi: <https://doi.org/10.1785/0220200369>