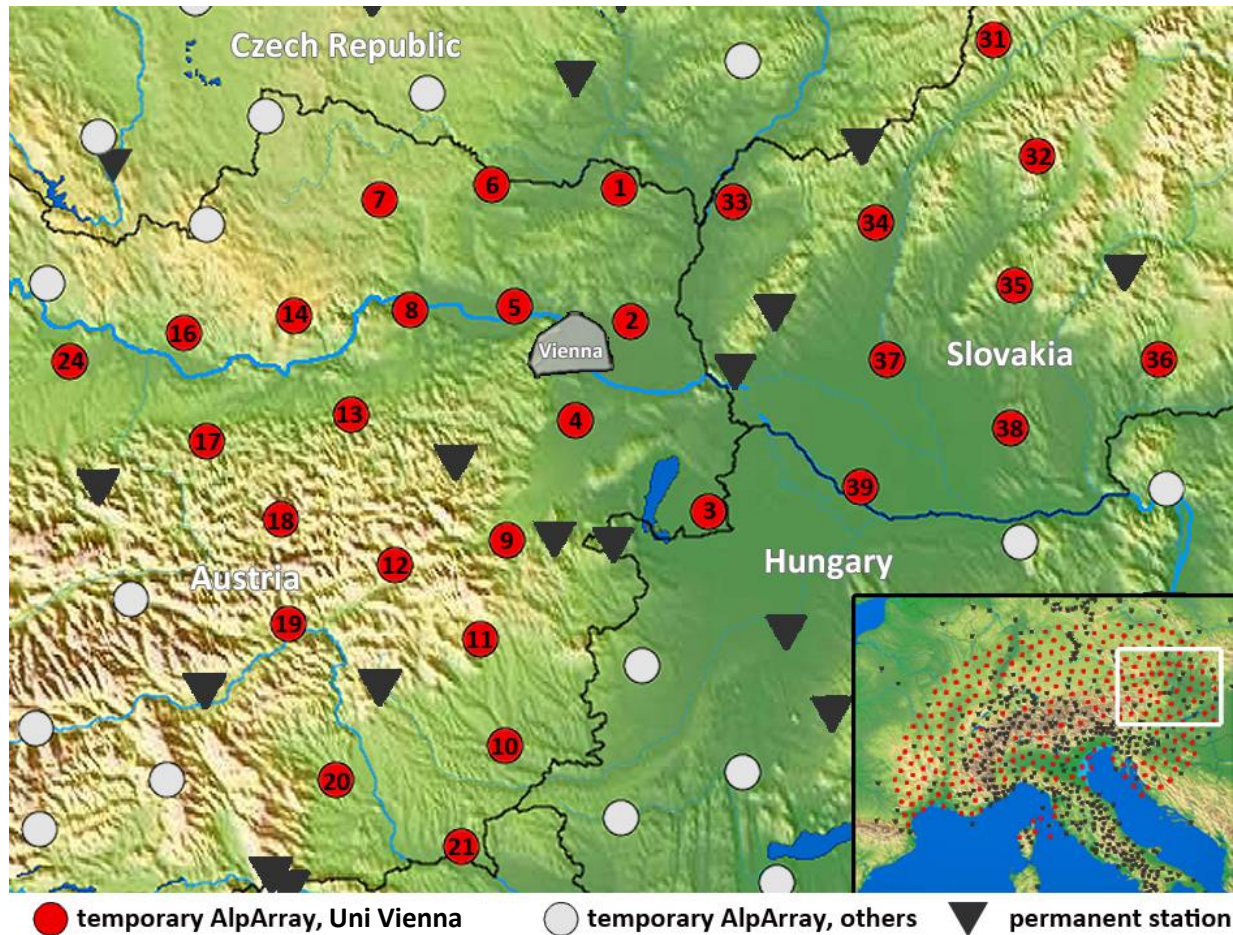




## **AlpArray and EIDA from data supplier and data user perspective**

Florian Fuchs  
University of Vienna

## The deployment – station map



**➔ 30 temporary broadband stations installed in 2015**

# The deployment – equipment

## Instrumentation

The temporary stations are equipped with

**30** instruments from **IMGW**

**Reftek 130(S)**

**Reftek 151**



+



data logger

60s sensor

## Power supply

25 x connected to **grid**



2x 100W



3 x solar panels

2 x fuel cell

## Data acquisition

Live data transmitted via **cellular network**



DIGI WAN 3G

+

stored on memory cards



data streamed in real-time to  
**ORFEUS / ODC**



see the poster for more details on station setup !



AlpArray in Austria and Slovakia

# The deployment – data acquisition

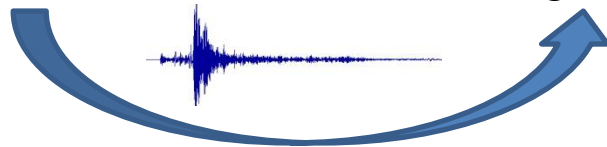
Server initiates VPN connection



DIGI WAN 3G mobile router



Ubuntu Server 14.04 consumer grade hardware



Reftek proprietary RTPD protocol

**Real-time stream:  
100sps (+1sps) & State of Health**

RTPD to Antelope plugin

network monitoring

Reftek software

SoH / station settings

waveform control

Real-time earthquake monitoring for Austria

neighboring seismological services

Seedlink

EIDA node @ ODC



## How to check if data arrives at ODC?

➡ check ZAMG Seedlink stream

➡ check latency at ODC

Convenient, but:

**Not accessible through homepage!**



**Whom to ask if something is wrong?**

**How is the station list updated?  
Can it be automatic (Metadata)?**

<http://www.orfeus-eu.org/data/odc/latency/index2.html>

**ORFEUS** Home Organization Data & Services Other

Home » Data and Services » ODC » Latency Status

### Latency Status

EIDA ODC Stations with restricted access

This page shows color-coded latencies for EIDA stations, with restricted access, archived by the ORFEUS Data Center. By selecting a station, detailed latency information per channel is presented. If no data was received during the last 30 days the station is automatically removed from this page.

**Replacement station missing**

Calendar events

- ORFEUS Annual Workshop  
25 - 28 October 2016  
Dubrovnik, Croatia  
Information
- EIDA Technical Commission  
28 October 2016  
Dubrovnik, Croatia
- ORFEUS ExeCom Meeting  
07 - 08 Februari 2017  
De Bilt, Netherlands
- ORFEUS Board Meeting  
09 Februari 2017  
De Bilt, Netherlands

EIDA news

New networks in EIDA:

- Network 3E (Mauritius)
- Network 8A (Portugal)
- Network 8F (Northern Chile)
- Network X5 (Lefkada)

ODC Data Acquisition  Update latencies dynamically

Low 0 - 60 seconds Medium 1 - 10 minutes High > 10 minutes Sleeping > 1 day

Map showing the ORFEUS Data Center and stations supplying data to the ODC. Average latencies for all channels are shown with colors. Low and high latencies are indicated by green and red lines respectively. More detail about individual channels can be viewed by selecting a station. The latency status is updated every minute.

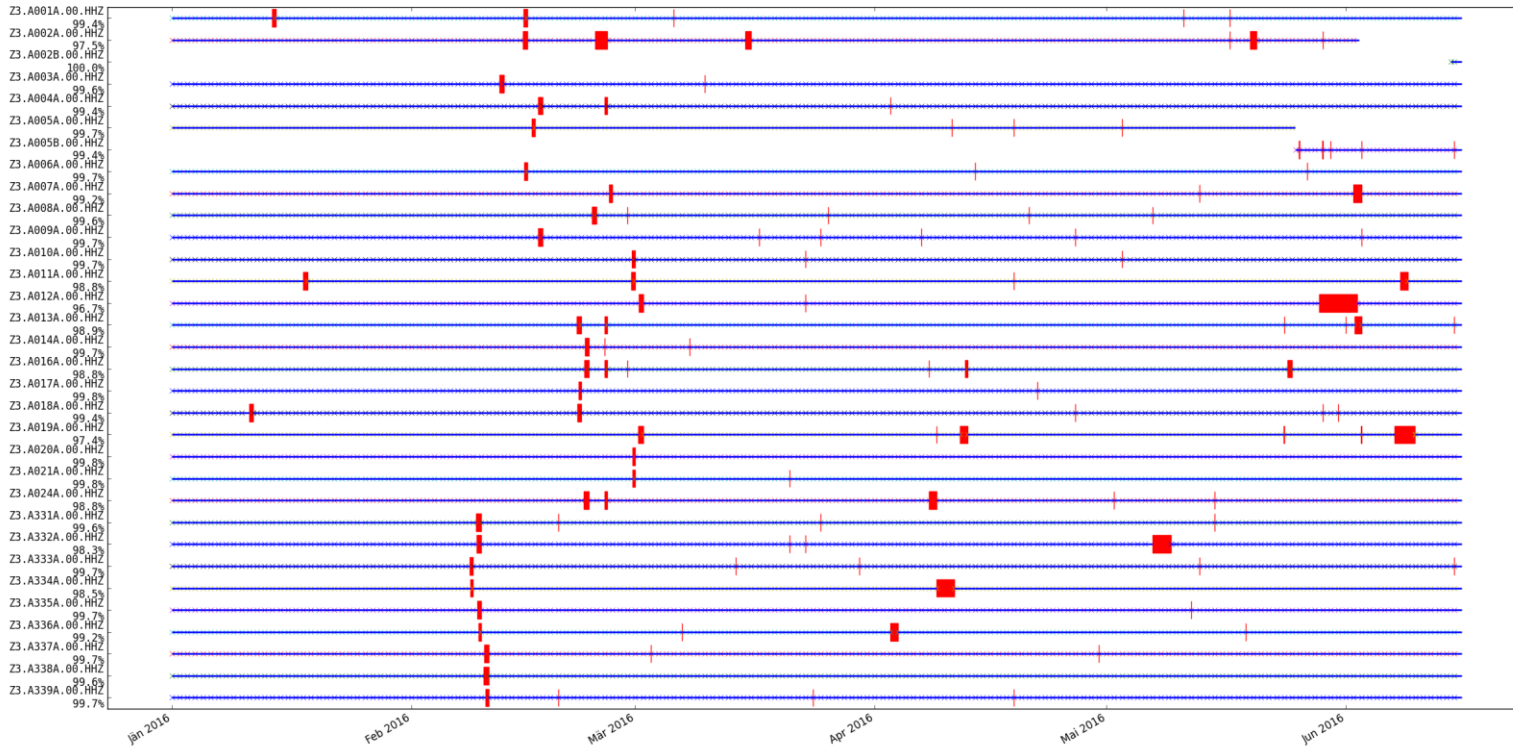
Latencies generated at 2016-10-17 13:17:01

Show 100 entries Search:

Status	Station	Latitude	Longitude	Channels
Low Latency	Z3-A002B	48.362892	16.594215	HH2, HH3, HHZ
Low Latency	Z3-A007A	48.716246	15.528793	HHE, HHN, HHZ
Low Latency	Z3-A011B	47.408959	15.958719	HH2, HH3, HHZ
Low Latency	Z3-A012A	47.603986	15.585996	HH2, HH3, HHZ
Low Latency	Z3-A018A	47.743667	15.077621	HHE, HHN, HHZ
Low Latency	Z3-A019A	47.445667	15.085607	HH2, HH3, HHZ
Low Latency	Z3-A261A	46.95204	17.14856	HHE, HHN, HHZ, SHE, SHN, SHZ, SOH, SOH, SOH, MMZ, MMN, MME
Low Latency	Z3-A262A	46.86419	16.52761	HHE, HHN, HHZ, SHE, SHN, SHZ, MMZ, MMN, MME
Low Latency	Z3-A263A	46.64078	17.31486	HHE, HHN, HHZ, SHE, SHN, SHZ, SOH, SOH, SOH, MMZ, MMN, MME

# Data exchange – waveforms

## Completeness of waveform data transmitted in real-time to ODC



Jan – Jun 2016

■ = telemetry gap

Offline data stored locally is 100% complete  Best practice to fill data gaps at EIDA node?

*Currently achieved by manual download of data from our department server by ODC* 😐

**Possible to implement some upload procedure for data suppliers to fill gaps themselves?**

### Compared metadata downloaded from EIDA to the one provided

Metadata created and maintained in **DATALESS SEED** format using PDCC

**PDCC 3.8.1**



Metadata downloaded from EIDA is missing the following information:

- **Number of channels (3 > 0)**
- **Instrument description (reduced to: 60s)**

How can I provide this info with dataless seed?

Reason? Manual transfer from *Dataless Seed* ➔ *StationXML* ?

Convenient tool to create StationXML from scratch? GEMPA SMP tool?

*A comment: StationXML, InventoryXML, SC3ML, ... is confusing/complicated*



Home

Search Stations

Select by Network

Manage Network(s)

Station Book Home / Select by Network / Network

## Network Detail

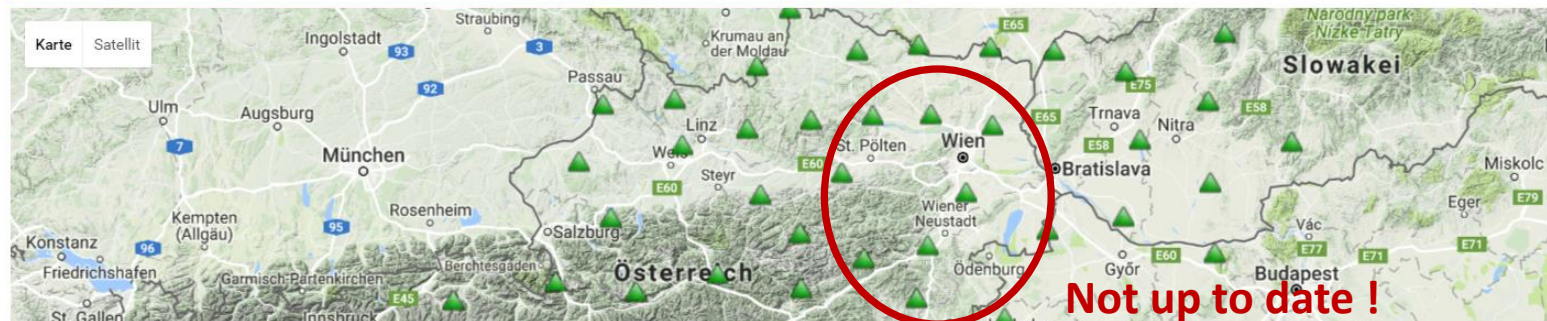
Description [EIDA data & Ownership](#)

<b>Network Code</b> Z3	<b>Institutions</b> AlpArray Seismic Network Core Group	<b>Archive</b> SED
<b>Region</b> greater Alpine region	<b>Type</b> VBB	<b>Start</b> 2015
<b>Description</b> AlpArray backbone temporary stations	<b>Class / Restrict.</b> T / Yes	<b>End</b> 2020
<b>Owner Name</b> -	<b>Owner Phone</b> -	
<b>Owner Department</b> -	<b>Owner Email</b> -	
<b>Owner Agency</b> -	<b>Owner Address</b> -	

Metadata files [EIDA](#)

- FTP metadata
- FDSN Station XML

Stations [EIDA data & Details \(geology, morphology, EC8, Vs 30, housing, building, etc\).](#)






# Station book – station details

## Station Details Morphology, Ground type, Geology, etc.

**Geological Unit** Clay

**Larger unit or immediately beneath sensor?**

**Morphology Class** -

Classes: T1, T2, T3, T4; based on the [Italian building code](#) 

**Morphology Description** Plain

**Not sure which would be the official terms ...**

**Ground type EC8** C

**Morphology of which scale?**

EC8 types: A,B,C,D,E,S<sub>1</sub>,S<sub>2</sub>; [more info here](#)

**Groundwater Depth [m]** -

**Vs 30 [m/s]** -

**f<sub>0</sub> [Hz]** -

Fundamental frequency at the site

**Amp(f<sub>0</sub>)** -

H/V amplitude at f<sub>0</sub>

**Basin Flag** No

**Bedrock Depth [m]** -

Depth to the engineering bedrock (with Vs ~ 800 m/s)

**Recommended to fill**

**Difficult to fill**



# Station book – Sensor & Stream details

## Housing & Building details by sensor location

All good 😊  
Thanks to detailed instructions/examples

Loc	Streams	Lat [°]	Lon [°]	Elev [m]	Start	End	Housing Class *	Housing Desc	In Building	No Storeys	Distance to Building [m]
00	6 streams...	48.378430 N	16.120699 E	176	2015	2020	Urban free field	Sensor on ground floor inside small hut with footprint: 2x2m. Hut type: Brick. Building density: inside village. Hut usage: Electrical controls, occasionally service. Sensor coupling: Sensor placed on concrete floor.	No	-	10

(\*) Housing Class: Borehole, Bridge, Building, Cave, Dam, Free field, OtherStructure, Tunnel, Underground shelter or Urban free field; following these details ?

## Instrumentation History Dataloggers and sensors by location and stream (EIDA)

Showing 1 to 6 of 6 rows

<< Previous    Next >>

Display 10 rows

Loc	Stream	Loc TimeFrame	Stream TimeFrame	Datalogger	Sensor	Gain	Unit	Type
00	HHE	2015-03-25 / 2020-07-01	2015-03-25 / 2020-07-01	A005A.2015.084.HHE00	60s,	721298000	M/S	
00	HHN	2015-03-25 / 2020-07-01	2015-03-25 / 2020-07-01	A005A.2015.084.HHN00	60s,	725848000	M/S	
00	HHZ	2015-03-25 / 2020-07-01	2015-03-25 / 2020-07-01	A005A.2015.084.HHZ00	60s,	721810000	M/S	
00	LHE	2015-03-25 / 2020-07-01	2015-03-25 / 2020-07-01	A005A.2015.084.LHE00	60s,	1236580000	M/S	
00	LHN	2015-03-25 / 2020-07-01	2015-03-25 / 2020-07-01	A005A.2015.084.LHN00	60s,	1244380000	M/S	
00	LHZ	2015-03-25 / 2020-07-01	2015-03-25 / 2020-07-01	A005A.2015.084.LHZ00	60s,	1237460000	M/S	

<< Previous    Next >>

Copy    CSV    Excel    PDF    Print

Filter rows:

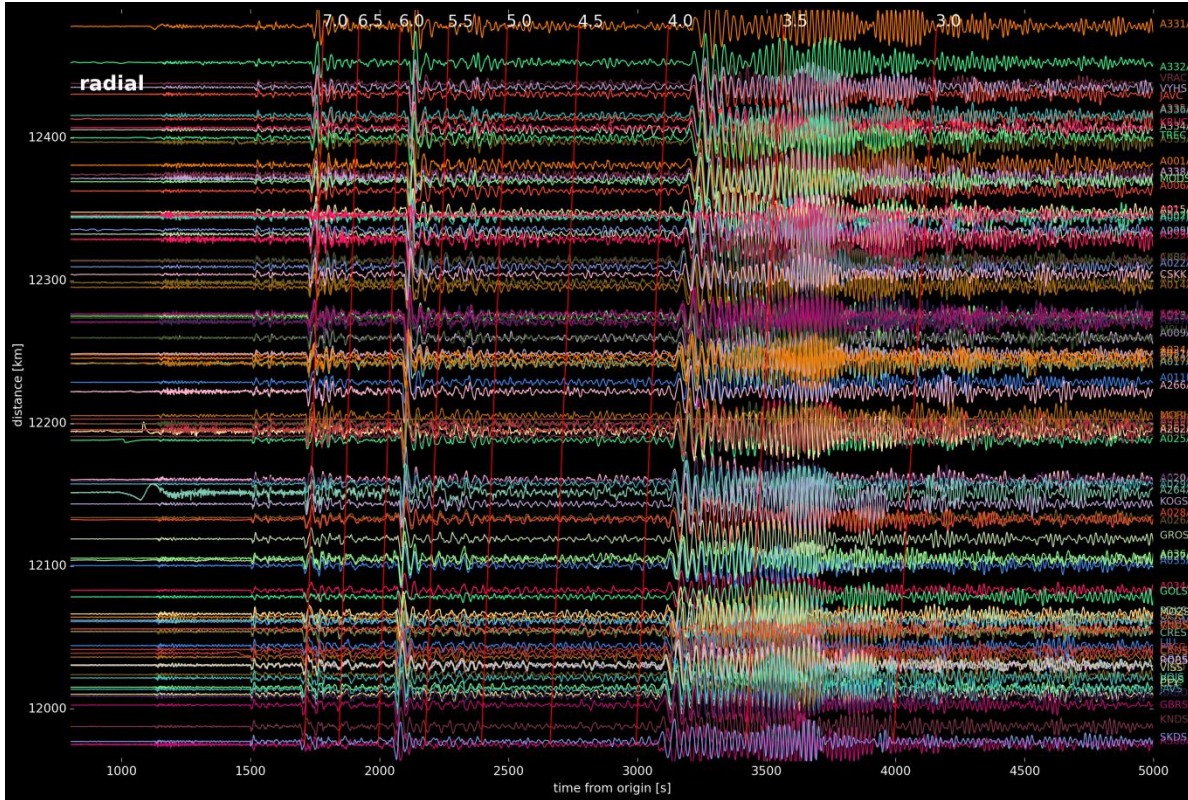
Where is Datalogger and Sensor Information taken from?

This (wrong) information is outdated!

2 ms



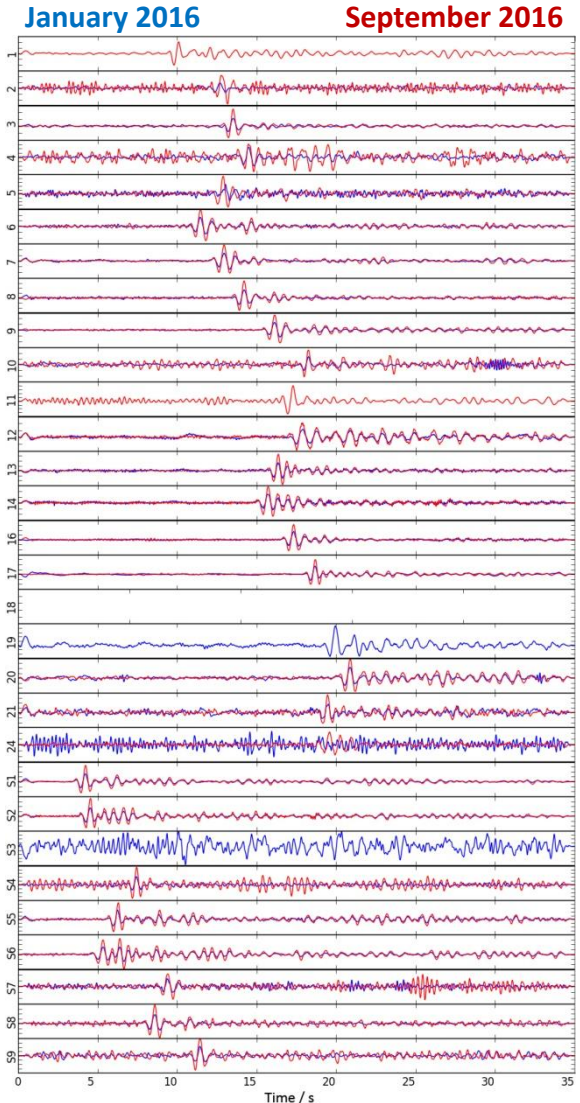
M7.4 South Atlantic, 2016/08/19



Permanent + Z3: Austria, Slovakia, Hungary, Slovenia, Czech Rep.  
(which were available at the time)

**During first months of 2016 some data was missing,  
although stations were listed available on EIDA**

North Korea nuclear tests  
vertical comp. 1 – 5 Hz (Vienna stations only)

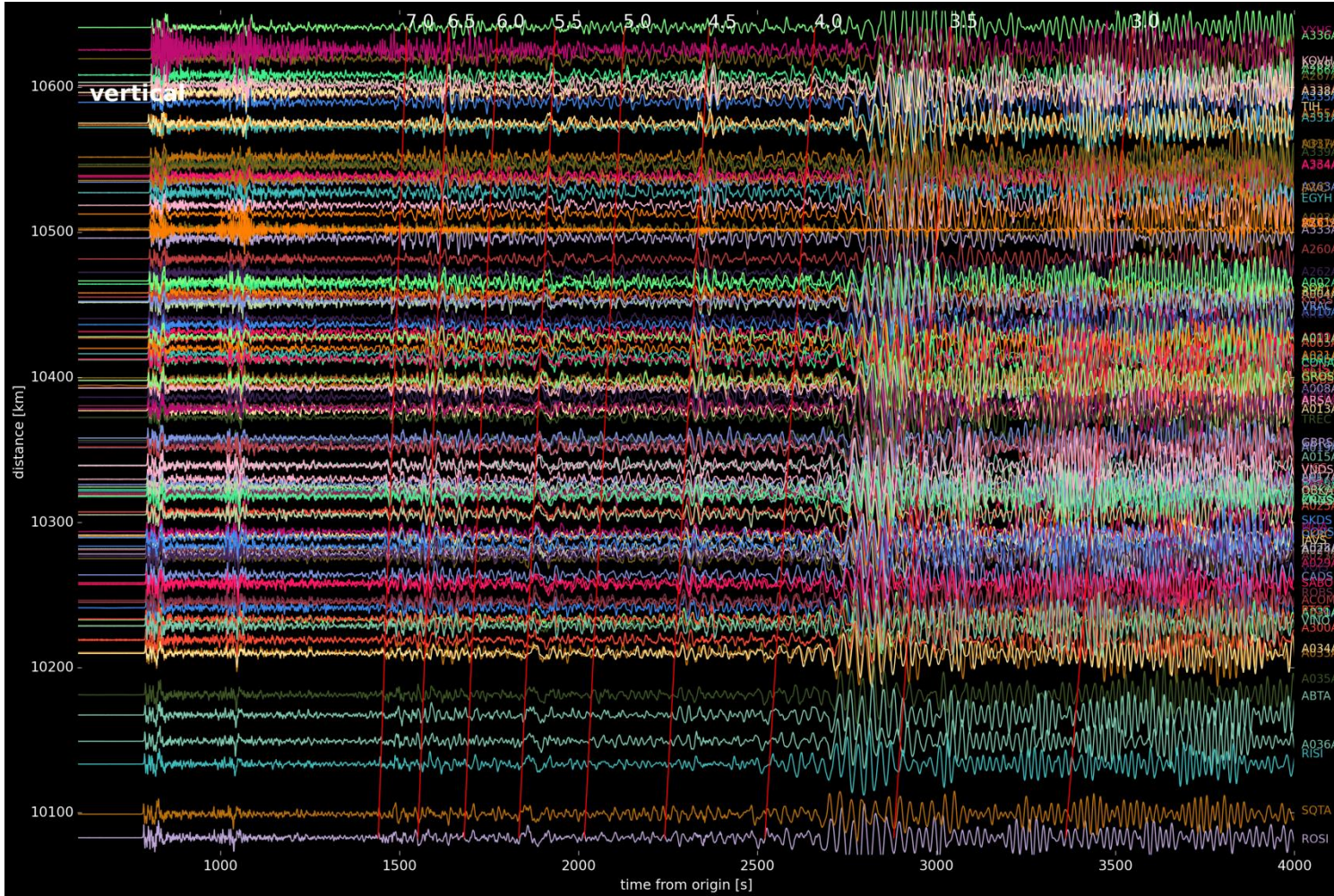




# AlpArray in Austria and Slovakia

## Data usage – waveform quality

M7.8 Ecuador, 2016/04/16



Permanent  
+ Z3 :

Austria, Slovakia,  
Hungary, Slovenia,  
Czech Rep.  
(which were avail.  
at the time)

**Z3 temporary  
look all good!**

(in fact better  
than some  
permanent)



AlpArray in Austria and Slovakia

## Data usage – interest in the community

We presented first applications of AlpArray data at several meetings/departments  
(in particular: Array analysis of teleseismic surface waves by Petr Kolinsky et al.)

EGU 2016, Vienna  
ESC 2016, Trieste  
IPE, Masaryk University Brno  
Czech-Slovak Seismological Days, Slovakia

Some common reactions from the community:

- **I didn't know temporary stations existed in ... [Country] ... !**
- **Where can I get the data?**

➡ Communication of AlpArray project / temporary installations not perfect?

➡ Great interest in the data outside the AlpArray community ➡ How to get them involved?



## EIDA wishlist from supplier and user PoV

### Wishes as a data supplier:

- Data suppliers can upload and maintain Metadata themselves
- Data suppliers can upload missing waveforms to fill gaps
- Quality control tools such as, e.g. Completeness plots & automatic PPSDs

### Wishes as a data user:

- Visualization of data availability for individual stations (bar diagram?)
- Change notes / update tracking for changes in Metadata
- E-Mail notification when previously downloaded Metadata has changed
- E-Mail notification when previously queried but unavailable data is available
- Update station book more regularly & think about the XML Metadata



**Thank you for your attention !**

Florian Fuchs  
University of Vienna