

Antelope in Austria

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Antelope Users Meeting 2018, ARSO, Ljubljana



ZAMG

Zentralanstalt für
Meteorologie und
Geodynamik



Geophysical Department

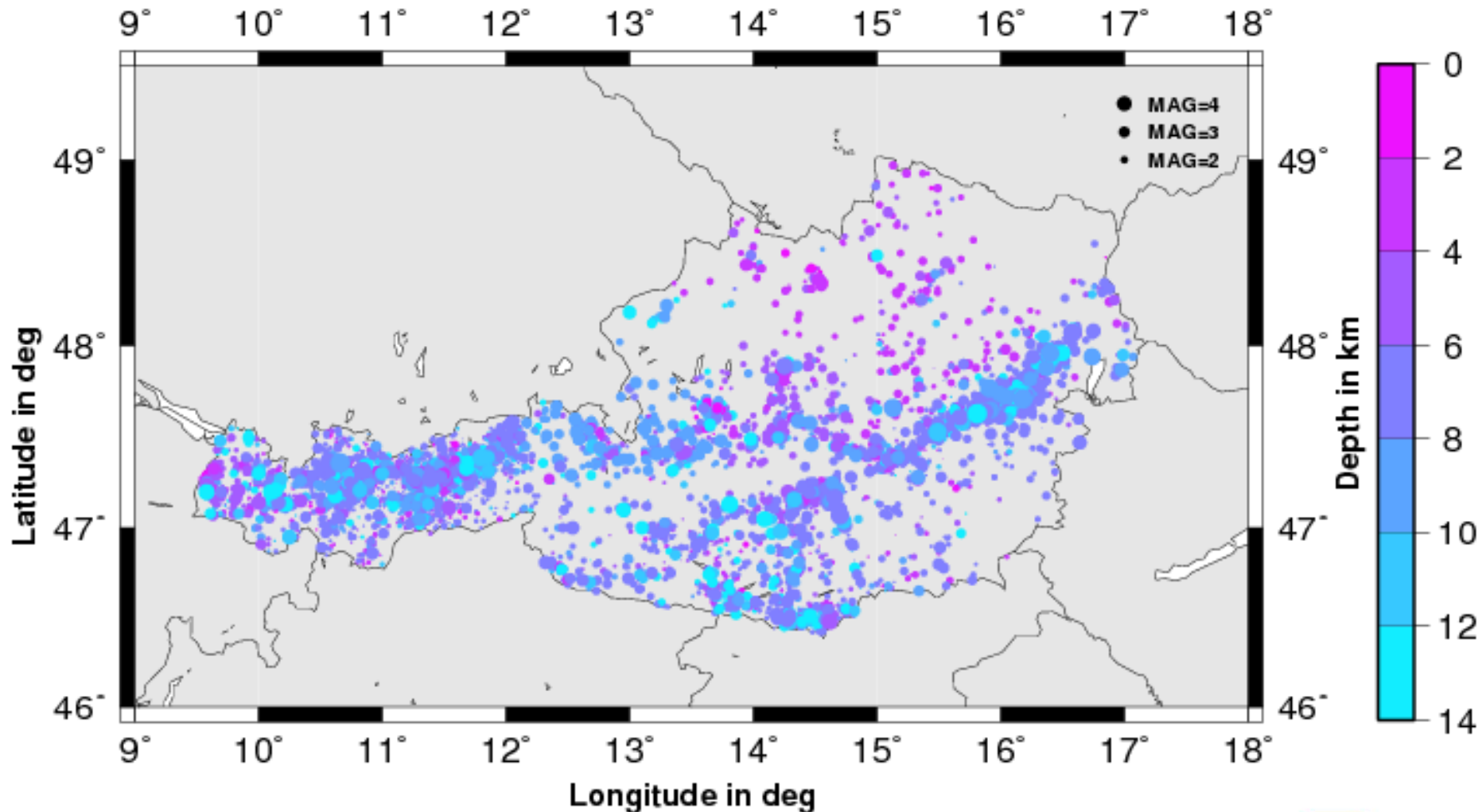
- Conrad Observatory
- Geomagnetism and Gravimetry
- Applied Geophysics – Engineering Geophysics and Archeology
- Geophysical Electronics – maintain seismic stations
- Seismology
 - NDC
 - Historical Research
 - Earthquake Service

Seismology Group - tasks



- 24/7 on-call – group of 7
- advise austrian civil protection
- ARISTOTLE – Advise ERCC on Seismic Hazard
- NDC
- provide earthquake information to the public
- maintain a seismic network
- maintain a seismological archive
- (help to) operate the seismic network in Bolzano
- monitoring of dam, underground mine
- share data and products

Earthquakes located in Austria since 1900

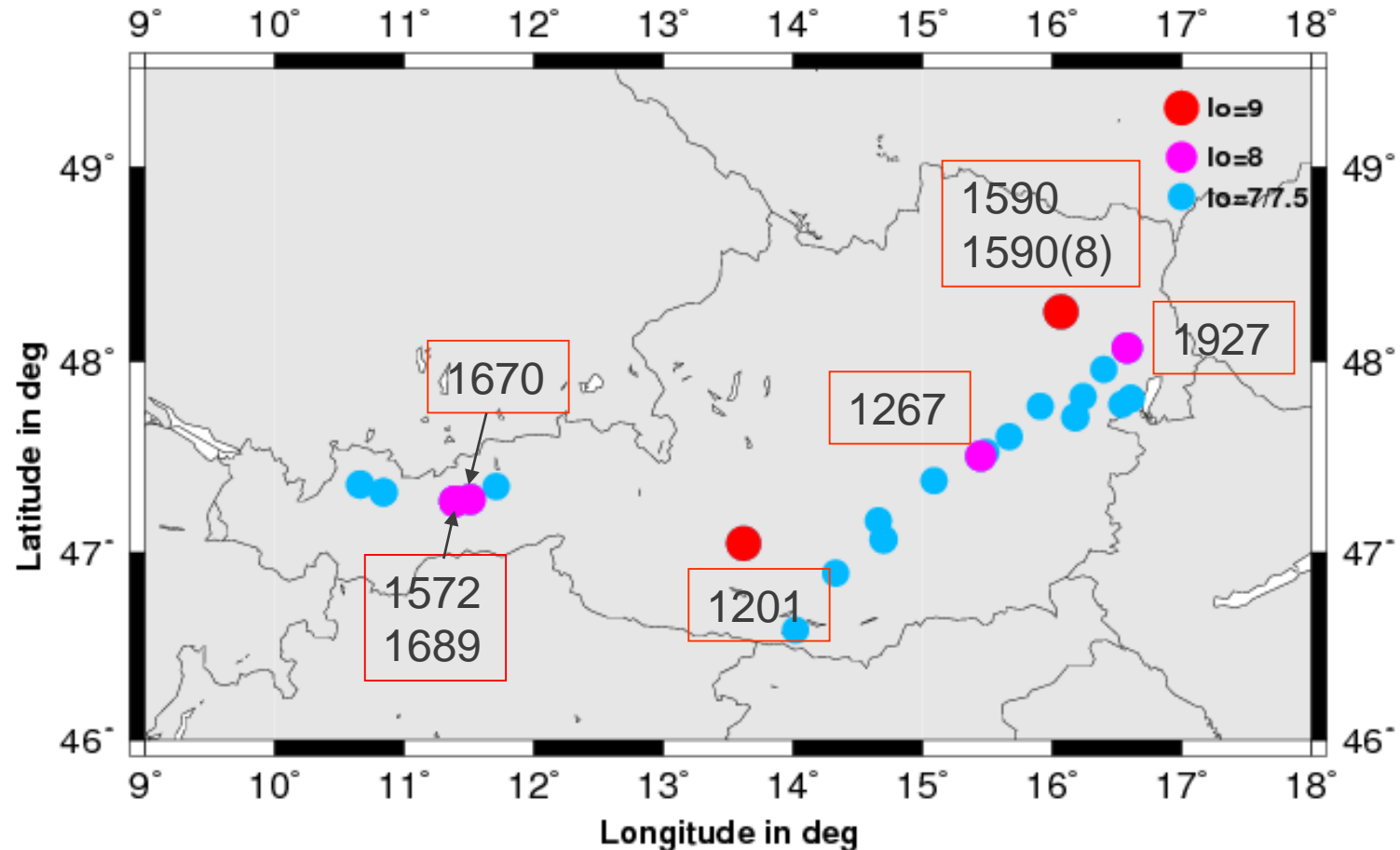


Over 9000 earthquakes located in Austria and recorded at ZAMG since 1900.

Historic Earthquakes with Heavy Damages

27.05.17

Folie 5



$I_0=9$

1201 Katschberg
1590 Ried/Riederberg

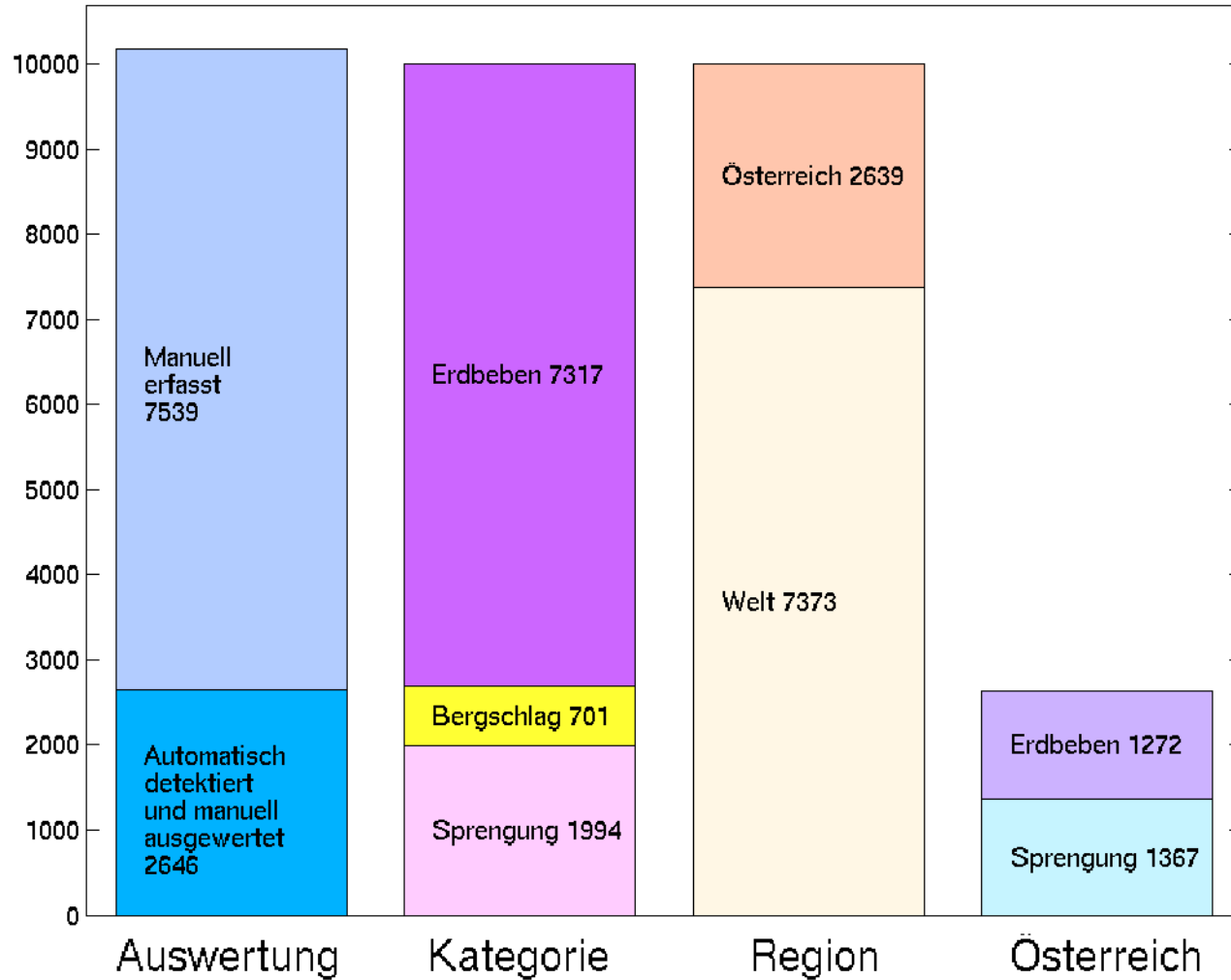
$I_0=8$

1267 Kindberg
1572 Innsbruck
1590 Ried/Riederberg

1670 Hall in Tyrol
1689 Innsbruck
1927 Schwadorf



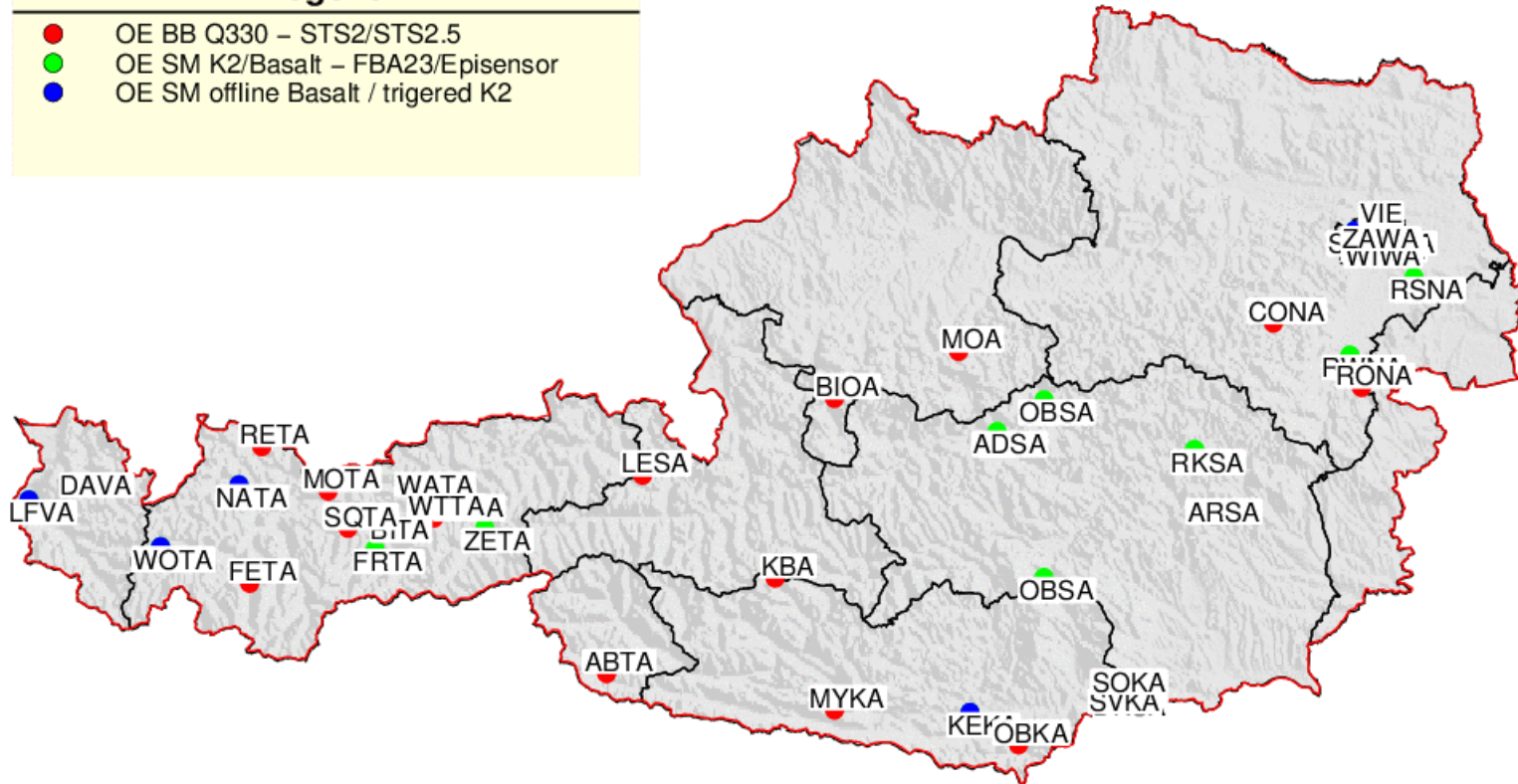
Beben-Statistik für den Zeitraum zwischen 20160101 und 20161231



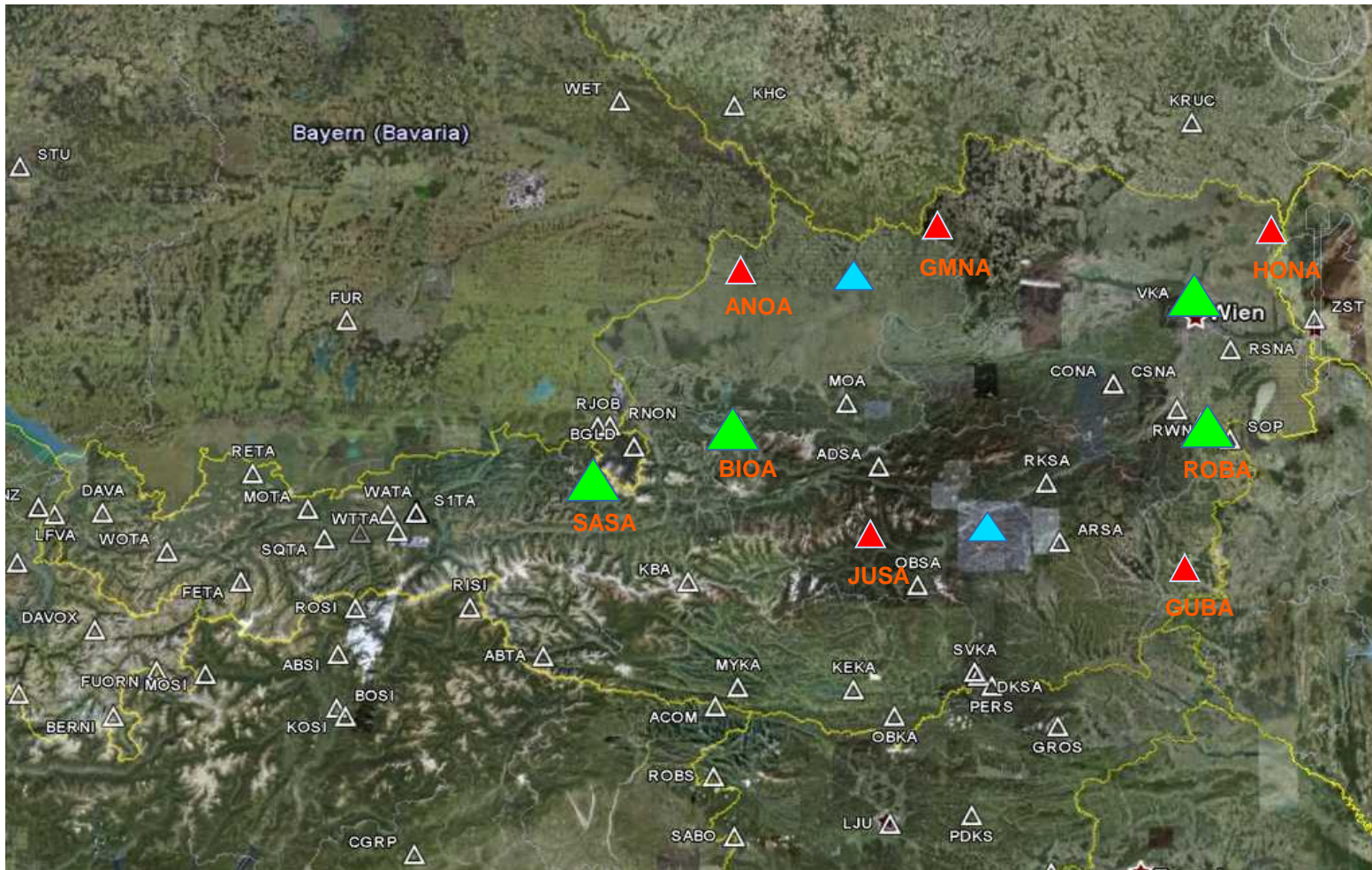
current network

Legend

- OE BB Q330 – STS2/STS2.5
- OE SM K2/Basalt – FBA23/Episensor
- OE SM offline Basalt / trigered K2



planned stations / upgraded stations



station design - broadband

5/28/14
Folie 7



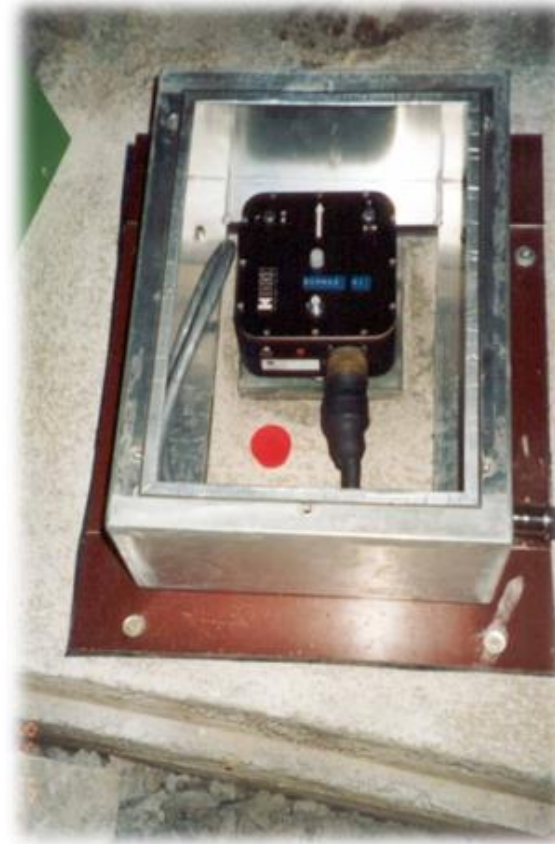
new design - RONA

5/28/14
Folie 7



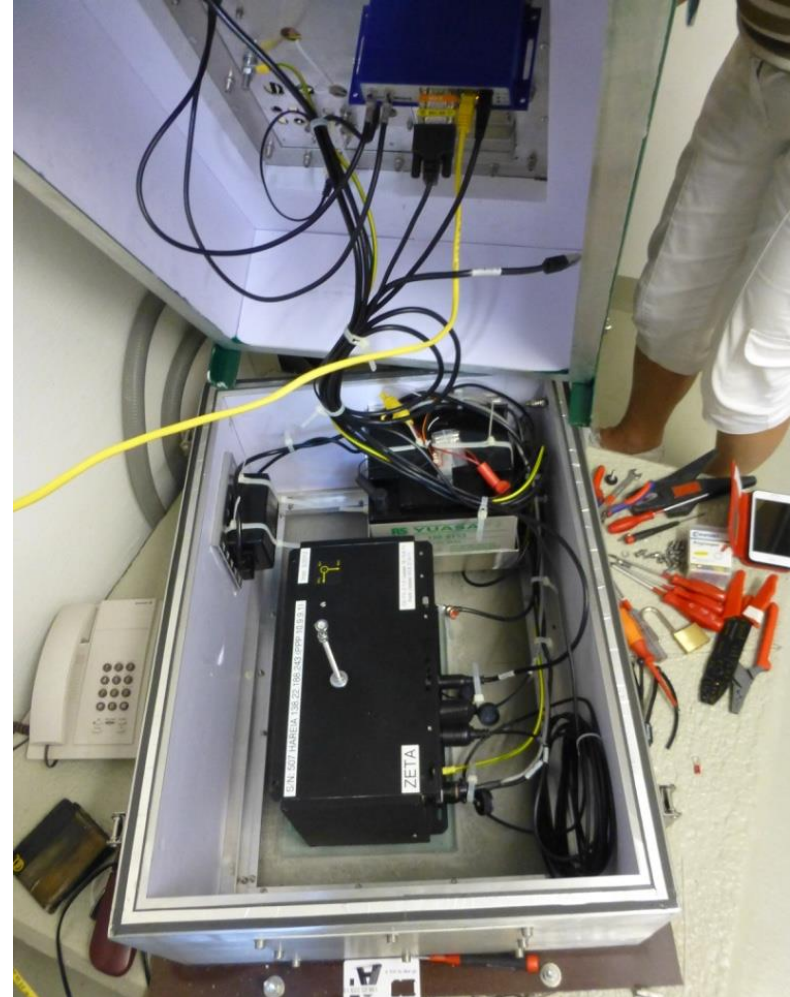
station design – strong motion

5/28/14
Folie 7



station design – strong motion

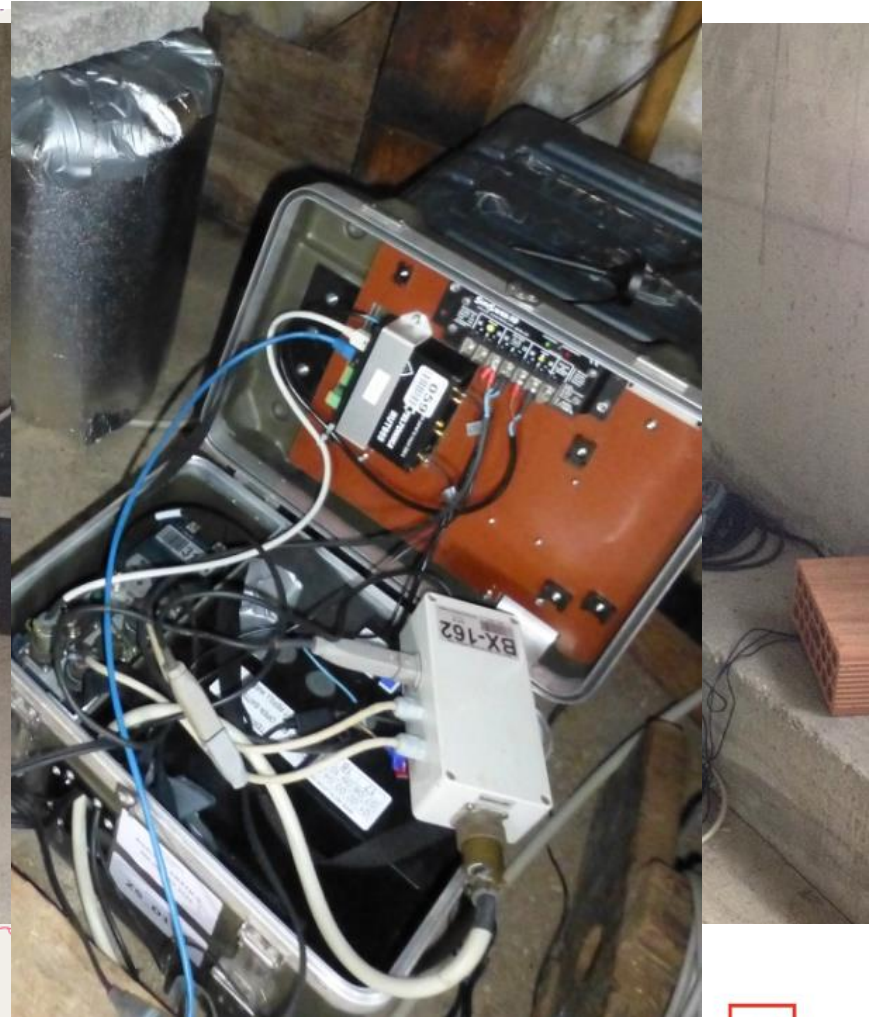
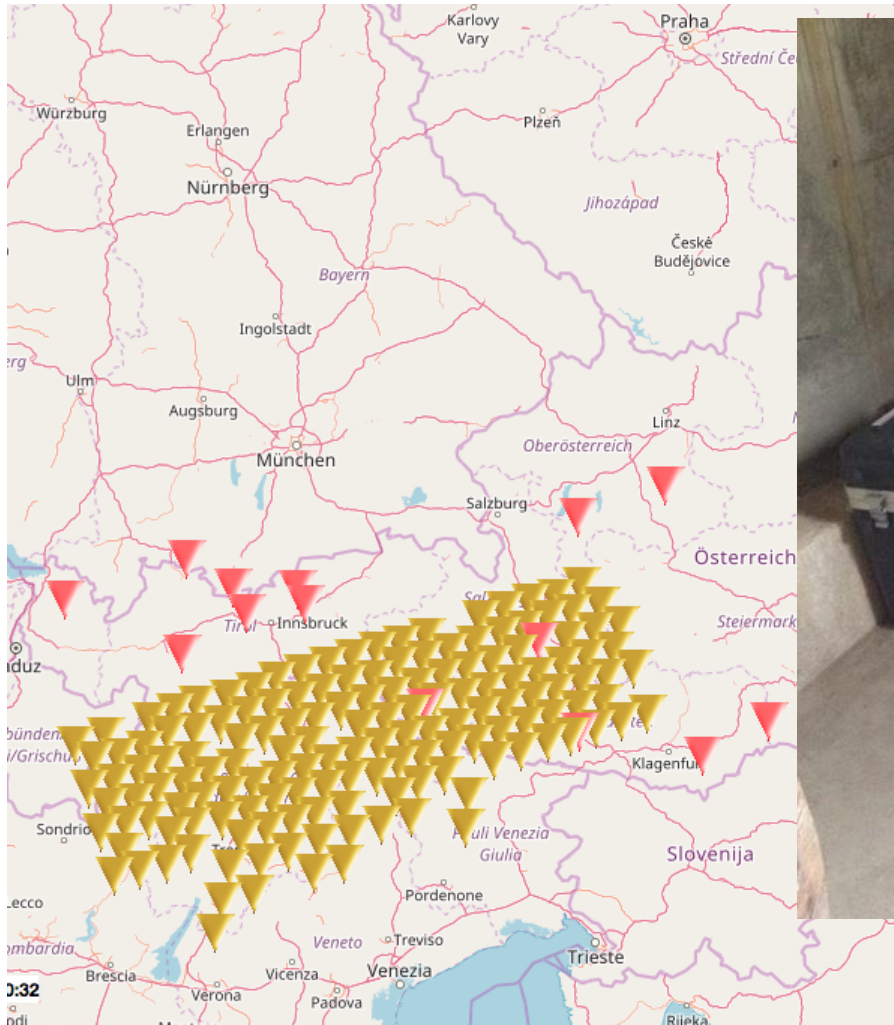
5/28/14
Folie 7



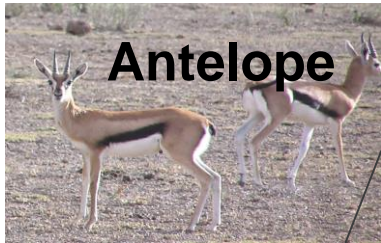
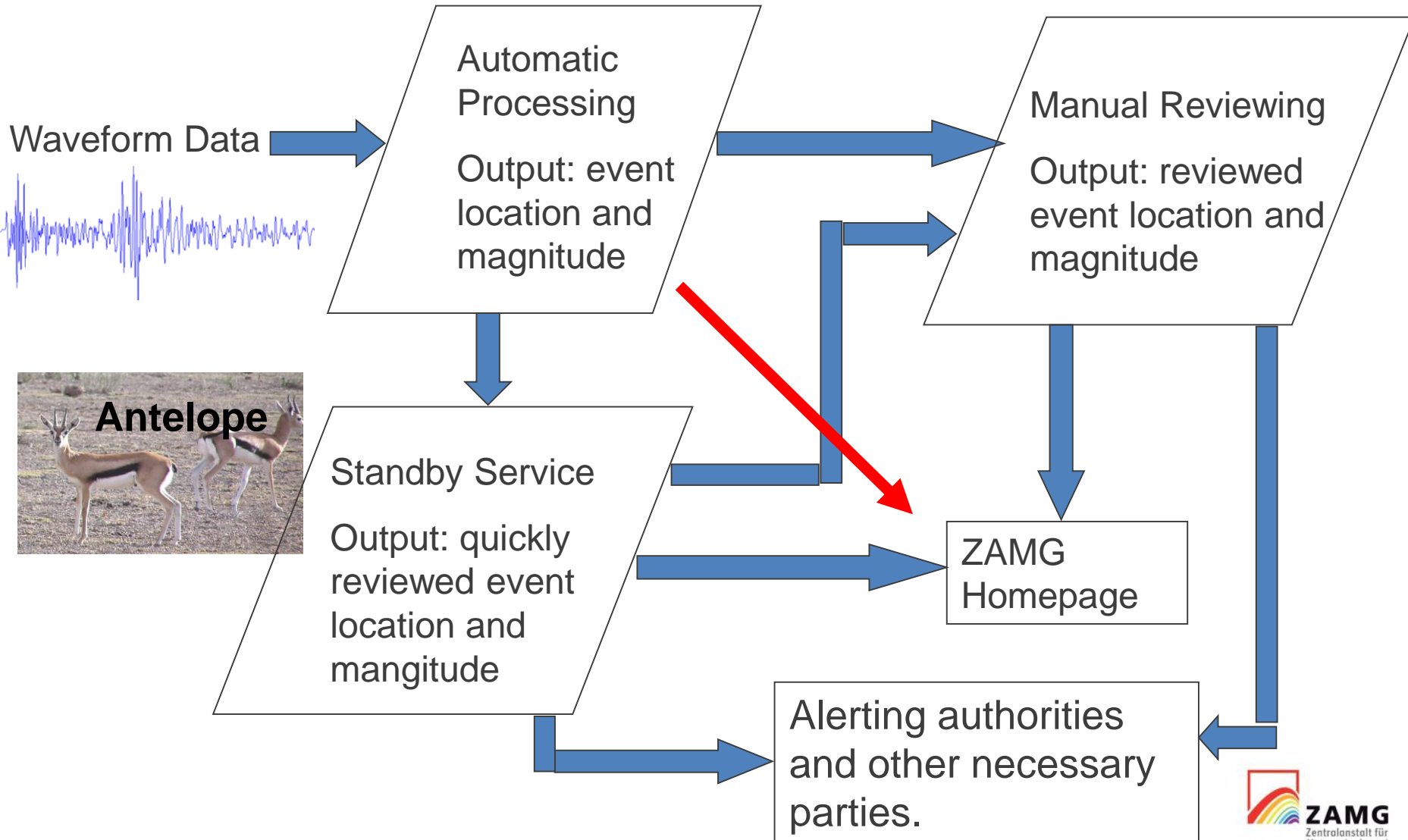


complete design
during ARMONIA
project

swath-D



Seismic Data Processing



processing

- standard antelope processing
- selfwritten magnitude code based on velocity amplitudes (mB)
- redundant data acquisition where possible (Conrad Observatory)
- redundant data forwarding where possible
(Satelite Backup Vienna/Udine/Bolzano)
- redundant automated processing
standby machine, no automated failover
- no redundancy for automated products
- redundant manual processing
selfwritten synchronization over antelope orb
central idserver needed
- synchronize in real-time to displays in Bolzano and Innsbruck

data flow

automatic and manual result merged in transport orb

automatic results from orb2dbt -orbdbout

manual results using dbnew2orb

dbloc2 does not always update lddate

on the receiving site: orb2dbt – overwrite

good:

allows for redundant manual review

immediate copy using orb2orb – multiple remote mirrors

distribute processing without common storage

bad:

requires idserver

remote **delete** needs rtorbcmd or similar mechanism

rtorbcmd disappeared – back to ssh/dbdelete

data exchange

- redundancy: 3 machines for data exchange

VM / CentOS 6 138.22.184.20

Sun / Solaris8 138.22.184.21 - will be replaced by VM soon

Sun / Solaris10 138.22.184.22 - needed for rtp2orb – thanks to Luisa, we can get rid of this

port range 40100 to 40120 open to partners

please make sure you allow traffic to all 3 machines

- data distribution

orb2orb, seedlink, autodrm, fdsn webservices, email, sms, website

- data acquisition

orb2orb, seedlink

q3302orb, altus2orb, rtp2orb



Antelope where possible

eNIAB – Seiscomp3 / Geotool / cdtools / seedlink

realtime data

CD1.1 / cdtools (replace with cd11recv2orb)

bulletins

seismic bulletins (SEL1, REB, SSREB)

arid requires css3.1

used for association

alerts / webtools

radionuclide bulletins (ARR, RRR)

alerts for level4 / 5

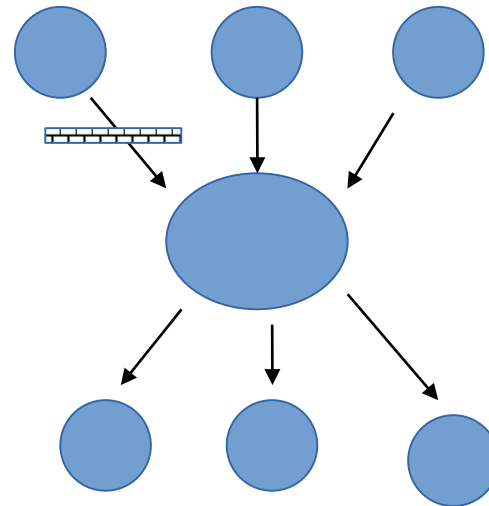
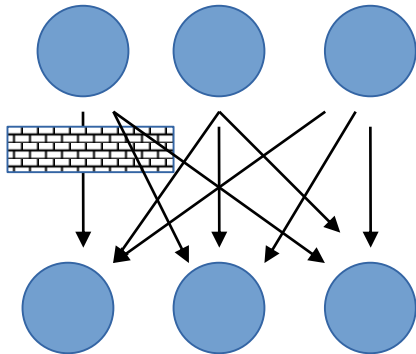
meteorological data (met)

IT – restructuring

currently, most IT services managed within geophysical group
(except web-server and firewall)

IT department tasked to take over
move from VMware to KVM
only one firewall

new design, one big data concentrator will hopefully make things easier



system setup

- init script, shell script, package selection commands and basic configuration
 - default users
 - basic nagios setup
 - network storage
- (very few) different types of computer
 - Antelope/non-Antelope
 - special applications like webserver
- stored on wiki, easy to adapt with every installation
- as much as possible package managers
 - yum on CentOS, apt on Ubuntu, macports on Macs

Computer



minimum

- data exchange
- data acquisition
- automatic analysis
- manual analysis
- products

ZAMG

data exchange
CTBT data exchange

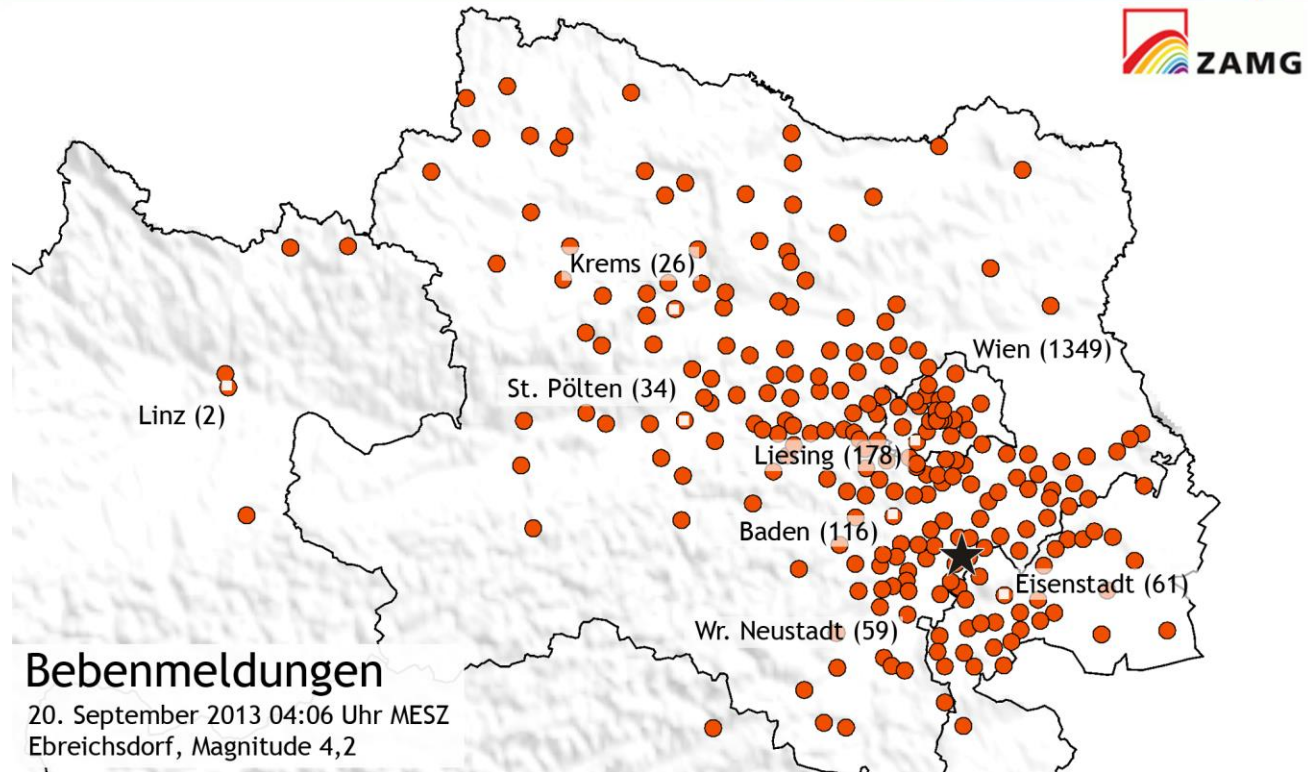
data acquisition
legacy data acquisition
conrad observatory

automatic analysis

data products

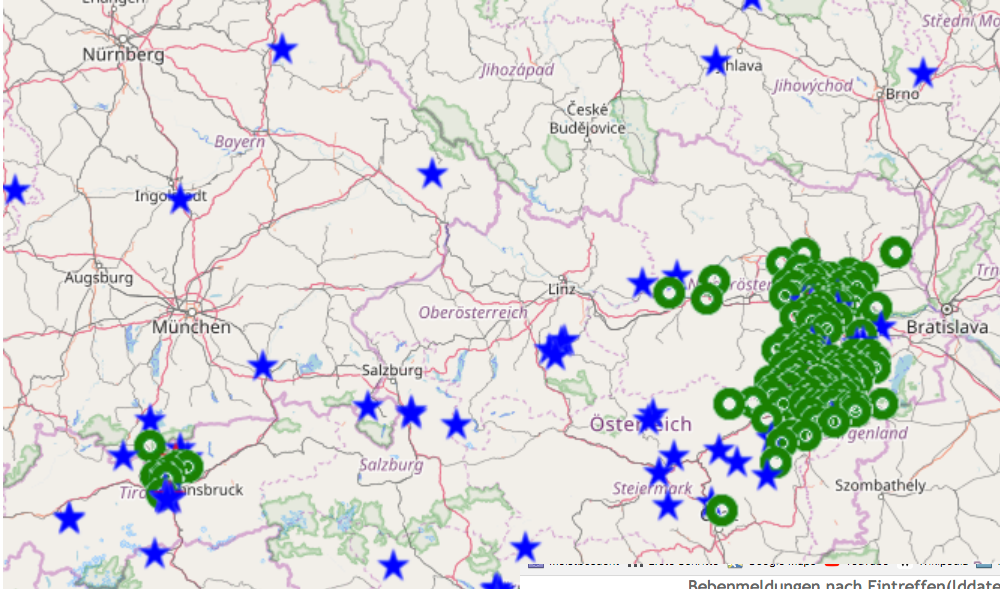
webserver

data exchange – macroseismic data

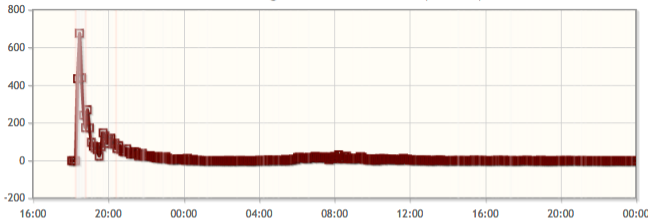


- QuakeML2.0 / Macroseismic Package for data exchange
- email / webservice / webpage ?
- raw data and interpretation results ?

data exchange – macroseismic data

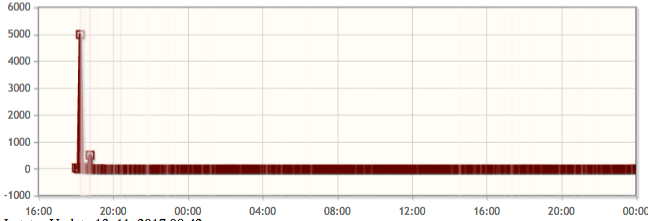


Bebenmeldungen nach Eintreffen(lldate)



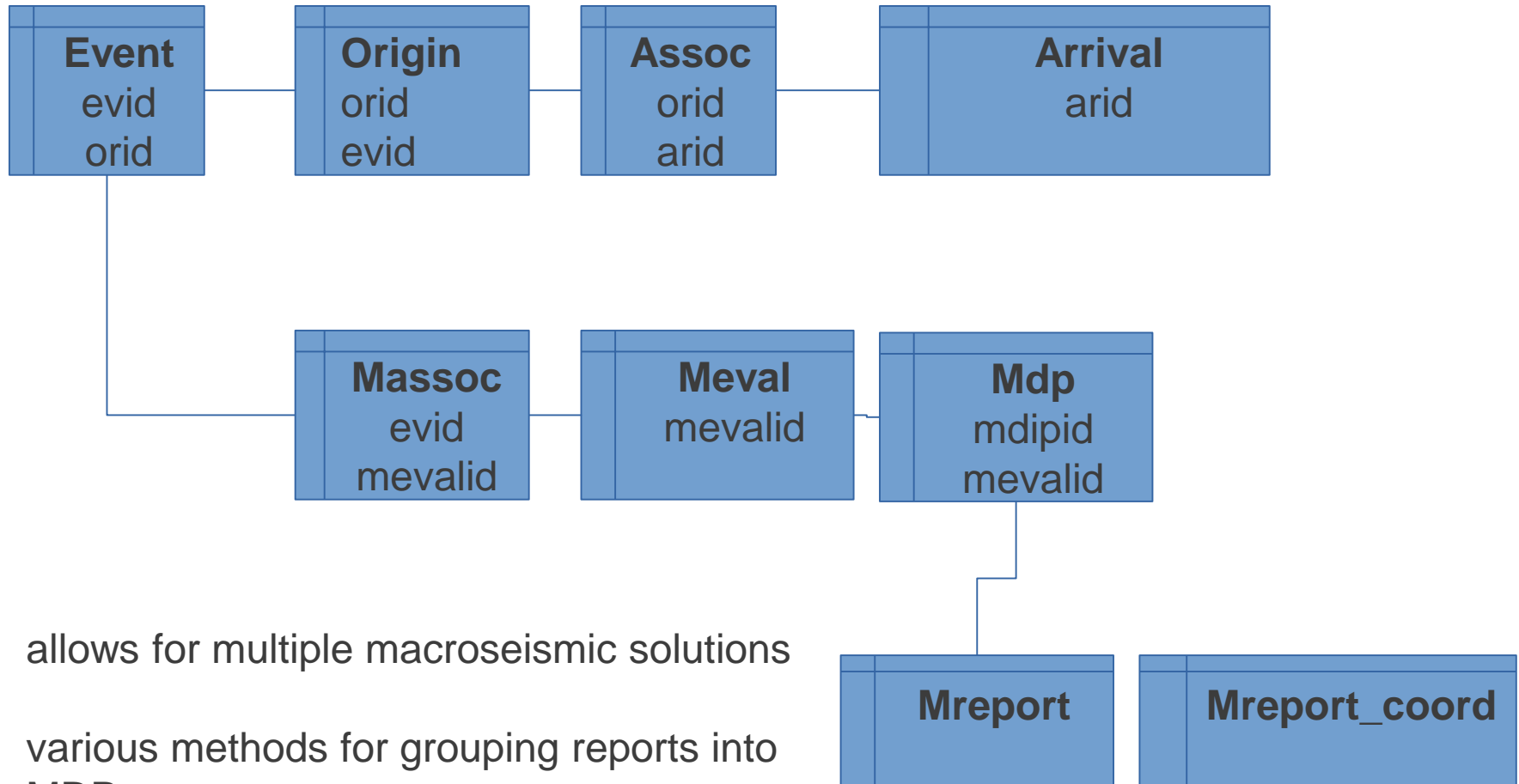
- Anzahl der Meldungen: 5815 aus 115 Orten
- ★ Erdbeben in der Datenbank: 160
- ★ davon verspürt: 3

Bebenmeldungen nach Meldungsangaben (Datum, Uhrzeit)



Letztes Update: 13. 11. 2017 08:42

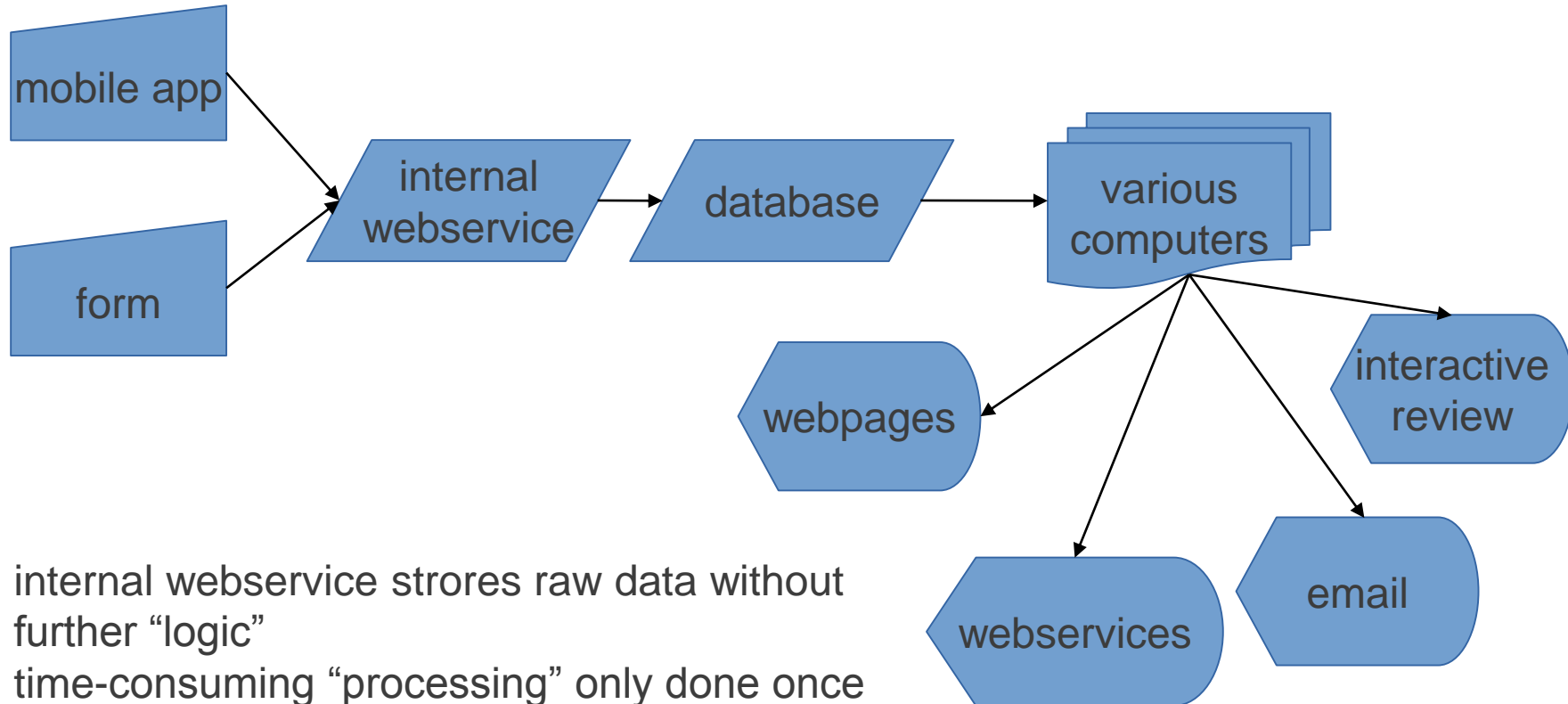
data exchange – macroseismic data



allows for multiple macroseismic solutions

various methods for grouping reports into MDP

data exchange – macroseismic data



- internal webservice stores raw data without further “logic”
- time-consuming “processing” only done once
- data quickly distributed to various machines

webservices

new app online since last AUG – iOS version still needs some fixes

redesigned webform for felt-reports online for 1 year

database schema change frozen last week

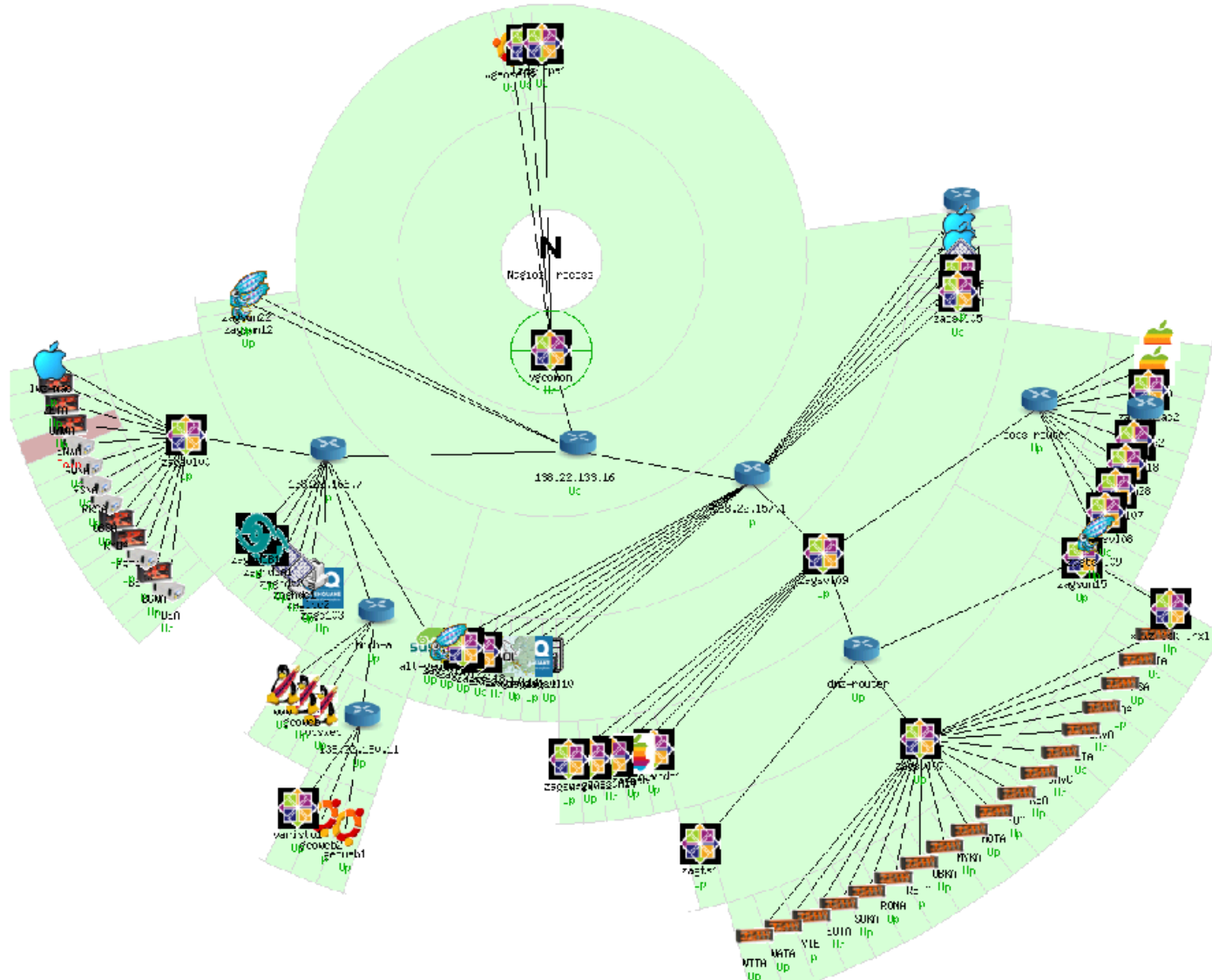
FDSN-type webservices

- station
- event
- dataselect
- app (homepage reformatted in GeoJSON)
- shakemap – introduced by Stefan Weginger for ARISTOTLE
- felt reports

databases

- metadata – sensors / digitizers
- AEC – Austrian Event Catalogue
- continuous waveforms – since late 1997, ~12T now, ~5G/day
- triggered events for strong-motion instruments
 - continuous data acquisition wherever possible
- event based subsets
- special datasets (EASI, AlpArray, SWATH-D)
- macroseismic data – felt reports, maps, MDPs
- historic paper records
- extensions to css3.0 (missing stuff like azimuth gap, rms) – css3.1 compatibility
- gis
 - nearest places, enclosing polygons, distance to borders
 - languages / encoding (slowly moving to UTF8)

monitoring



monitoring

Nagios

check_orbclients

check lag or number

lag: monitor time lag of orb sources

number: monitor number of clients

check_orbsources

check latency or throughput

latency: monitor latency of selected sources

throughput: monitor packets per second

Nagios syntax in configuration files makes Antelope-Style selections difficult

SNMP

snmp2orb

execute configurable commands and output results in a format readable by dlmmon

monitoring

Nagios
Current Network Status
Last Update: Fri May 4 07:43:59 GMT 2018
Updated every 90 seconds
Nagios® Core™ 4.3.4 - www.nagios.org
Logged in as nagiosadm

General
Home
Documentation

Current Status
Tactical Overview
Map (Legacy)

Hosts
Limit Results: 100

| Host | Service | Status | Last Chk |
|---------------|---------------------------|----------|----------|
| 138.22.133.16 | PING | OK | 05-04-20 |
| 138.22.157.1 | PING | OK | 05-04-20 |
| 138.22.166.7 | PING | OK | 05-04-20 |
| 138.22.180.11 | PING | OK | 05-04-20 |
| ABTA | Datenerfassung | OK | 05-04-20 |
| ADSA | Datenerfassung | OK | 05-04-20 |
| | Modem Spannungsversorgung | OK | 05-04-20 |
| | Modem Temperatur | WARNING | 05-04-20 |
| | Modem Traffic | OK | 05-04-20 |
| | Signal Quality | OK | 05-04-20 |
| | Signal Strength | CRITICAL | 05-04-20 |
| ARSA | Datenerfassung | OK | 05-04-20 |
| BGWA | Datenerfassung | OK | 05-04-20 |
| | Modem Spannungsversorgung | OK | 05-04-20 |
| | Modem Temperatur | OK | 05-04-20 |
| | Modem Traffic | OK | 05-04-20 |
| | Signal Quality | OK | 05-04-20 |
| | Signal Strength | CRITICAL | 05-04-20 |
| BIOA | Datenerfassung | OK | 05-04-20 |
| BSTA | K2 Traffic | OK | 05-04-20 |
| | Modem Spannungsversorgung | OK | 05-04-20 |
| | Modem Temperatur | OK | 05-04-20 |
| | Modem Traffic | OK | 05-04-20 |
| | Signal Quality | OK | 05-04-20 |
| | Signal Strength | WARNING | 05-04-20 |
| | vDSL Traffic | OK | 05-04-20 |
| DAJA | Datenerfassung | OK | 05-04-20 |
| FETA | Datenerfassung | OK | 05-04-20 |
| FRTA | Datenerfassung | OK | 05-04-20 |
| | Modem Spannungsversorgung | OK | 05-04-20 |
| | Modem Temperatur | OK | 05-04-20 |
| | Modem Traffic | OK | 05-04-20 |
| | Signal Quality | WARNING | 05-04-20 |
| | Signal Strength | CRITICAL | 05-04-20 |
| JAVC | Datenerfassung | OK | 05-04-20 |
| KBA | Datenerfassung | OK | 05-04-20 |

Service details FRTA -> Signal Quality
Host: FRTA Service: Signal Quality
4 Hours 04.05.18 3:45 - 04.05.18 7:45

Datasource: CONEL-MOBILE-MIB::mobileSignalQuality

FRTA / Signal Quality

dB

04:00 04:20 04:40 05:00 05:20 05:40

CONEL-MOBILE-... -12.8111 dB Last -7.028

Warning 0
Critical 0

Host: FRTA Service: Signal Quality
25 Hours 03.05.18 6:45 - 04.05.18 7:45

Datasource: CONEL-MOBILE-MIB::mobileSignalQuality

FRTA / Signal Quality

dB

Thu 12:00

CONEL-MOBILE-... -12.8111 dB Last -6.115

Warning 0
Critical 0

Host: FRTA Service: Signal Quality
One Week 27.04.18 0:45 - 04.05.18 7:45

Datasource: CONEL-MOBILE-MIB::mobileSignalQuality

FRTA / Signal Quality

dB

27 28 29 30

CONEL-MOBILE-... -9.5729 dB Last -6.1792

Warning 0
Critical 0

Host: FRTA Service: Signal Quality
One Month 02.04.18 7:45 - 04.05.18 7:45

Service details FRTA -> Datenerfassung
Host: FRTA Service: Datenerfassung
4 Hours 04.05.18 3:46 - 04.05.18 7:46

Datasource: latency

FRTA / Datenerfassung

latency

04:00 04:20 04:40 05:00 05:20 05:40 06:00 06:20 06:40 07:00 07:20 07:40

latency 1.0000 s Last 2.0000 s Max 1.6737 s Average

Default Template
Command remote_check_host_orbstat

Host: FRTA Service: Datenerfassung
25 Hours 03.05.18 6:46 - 04.05.18 7:46

Datasource: latency

FRTA / Datenerfassung

latency

Thu 12:00 Fri 00:00

latency 1.0000 s Last 2.0000 s Max 1.6467 s Average

Default Template
Command remote_check_host_orbstat

Host: FRTA Service: Datenerfassung
One Week 27.04.18 0:46 - 04.05.18 7:46

Datasource: latency

FRTA / Datenerfassung

latency

27 28 29 30 01 02 03

latency 1.9617 s Last 2.0000 s Max 1.6208 s Average

Default Template
Command remote_check_host_orbstat

Host: FRTA Service: Datenerfassung
One Month 02.04.18 7:46 - 04.05.18 7:46

Datasource: latency

FRTA / Datenerfassung

latency

2.0



- Ihr Wetterfoto
- Ihre Unwettermeldung
- Ihr Erdbebenbericht
- Ihre Meinung
- News

Suche

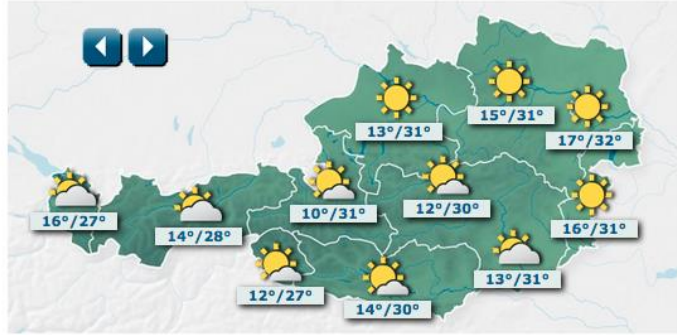
Erweiterte Suche...

Die ZAMG ist eine
Forschungseinrichtung des
bmwfw
Bundesministerium für
Wissenschaft, Forschung und Wirtschaft

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Meteorologie und Geodynamik
1190 Wien, Hohe Warte 38
Telefon: +43 1 36 0 26
E-Mail ***

Aktuell

Prognose für heute Vormittag



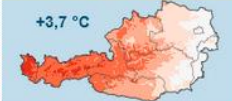
Wetterwarnungen



Aktuelle Erdbeben



Klimatothek



Webcam Wien Hohe Warte



Conrad Observatorium



Ausstellung: Museum NÖ



Hello to the Antelope Users

ZAMG /// NEWS

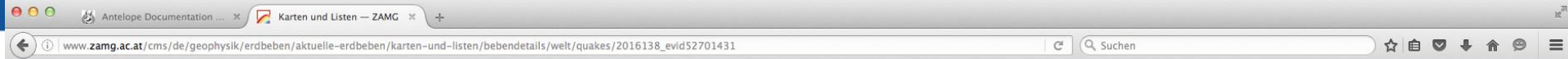
29.05.2017
Frühling 2017: einer der zehn wärmsten der Messgeschichte
Vorläufige Frühlingbilanz: Temperatur 1,5°C über dem vieljährigen Mittel. Niederschlag -10 Prozent, Sonne +15 Prozent. [mehr](#) ***

23.05.2017
Klimaschutz als Chance für wirtschaftliche und gesellschaftliche Entwicklung
Forscherinnen und Forscher des Climate Change Centre Austria (CCCA) appellierten am 18. Österreichischen Klimatag an die Politik. [mehr](#) ***

17.05.2017
Ein neuer online-Fragebogen für Erdbeben-Wahrnehmungen
Das Formular ist auf dem aktuellsten Stand von Wissenschaft und Technik. [mehr](#) ***

16.05.2017
Klimawandel in Städten: neue internationale Kooperation
13 internationale Institutionen starteten eine Zusammenarbeit, um Maßnahmen zur Anpassung an den Klimawandel in Großstädten zu untersuchen. [mehr](#) ***

Homepage



- Aktuell
- Wetter
- Klima
- Umwelt
- Geophysik**
- Forschung
- Produkte
- Facebook

- Erdbeben
 - :: Aktuelle Erdbeben
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 - :: Erdbebenmeldung
 - :: NEWS und Beiträge
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 - :: Ihr Erdbebenbericht
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 - :: Erdbeben in Österreich
 - :: Der Erdbebendienst
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 - :: Erdbebenarchiv
 - :: Informationsmaterial
 - :: Live-Seismogramm
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- Angewandte Geophysik
- Conrad Observatorium
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- Produkte und Services
- Lexikon
- Live - Seismogramm
- News
- Team und Kontakte

Suche

Erweiterte Suche...

Die ZAMG ist eine Forschungseinrichtung des **bmwfw**

Geophysik / Erdbeben / Aktuelle Erdbeben / Karten und Listen

Erdbeben - Karten und Listen

- Österreich
- Europa
- Welt**
- Legende

Erdbeben bei Unzmarkt / Steiermark, M 2.3



| | |
|---------------|---|
| Datum: | 17. Mai 2016 |
| Herzzeit: | 00:52:18 UTC (02:52 MESZ) |
| Magnitude: | 2.3 (ml) |
| Herdtiefe: | 3 km |
| Epizentrum: | 47.15°N, 14.49°O (GoogleMaps) |
| Entfernungen: | 6 km SSO von Unzmarkt 13 km W von Judenburg 23 km NNO von Friesach 24 km O von Murau 61 km NNO von Klagenfurt |
| Quelle: | ZAMG |

Erdbebenmeldung

Der Österreichische Erdbebendienst der Zentralanstalt für Meteorologie und Geodynamik meldet:

Am Dienstag, den 17. Mai 2016 ereignete sich nachts um 02:52 Uhr MESZ südlich von Unzmarkt, Steiermark, ein Erdbeben der Magnitude 2.3. Es wurde von einigen Personen leicht verspürt.

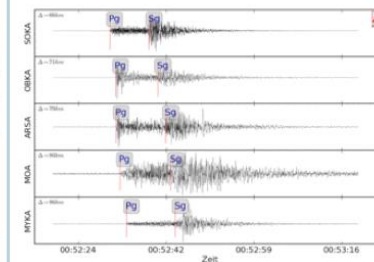
Schäden an Gebäuden sind bei dieser Stärke nicht zu erwarten.

Verfasserin: Mag. Rita Meurers/Seismologin

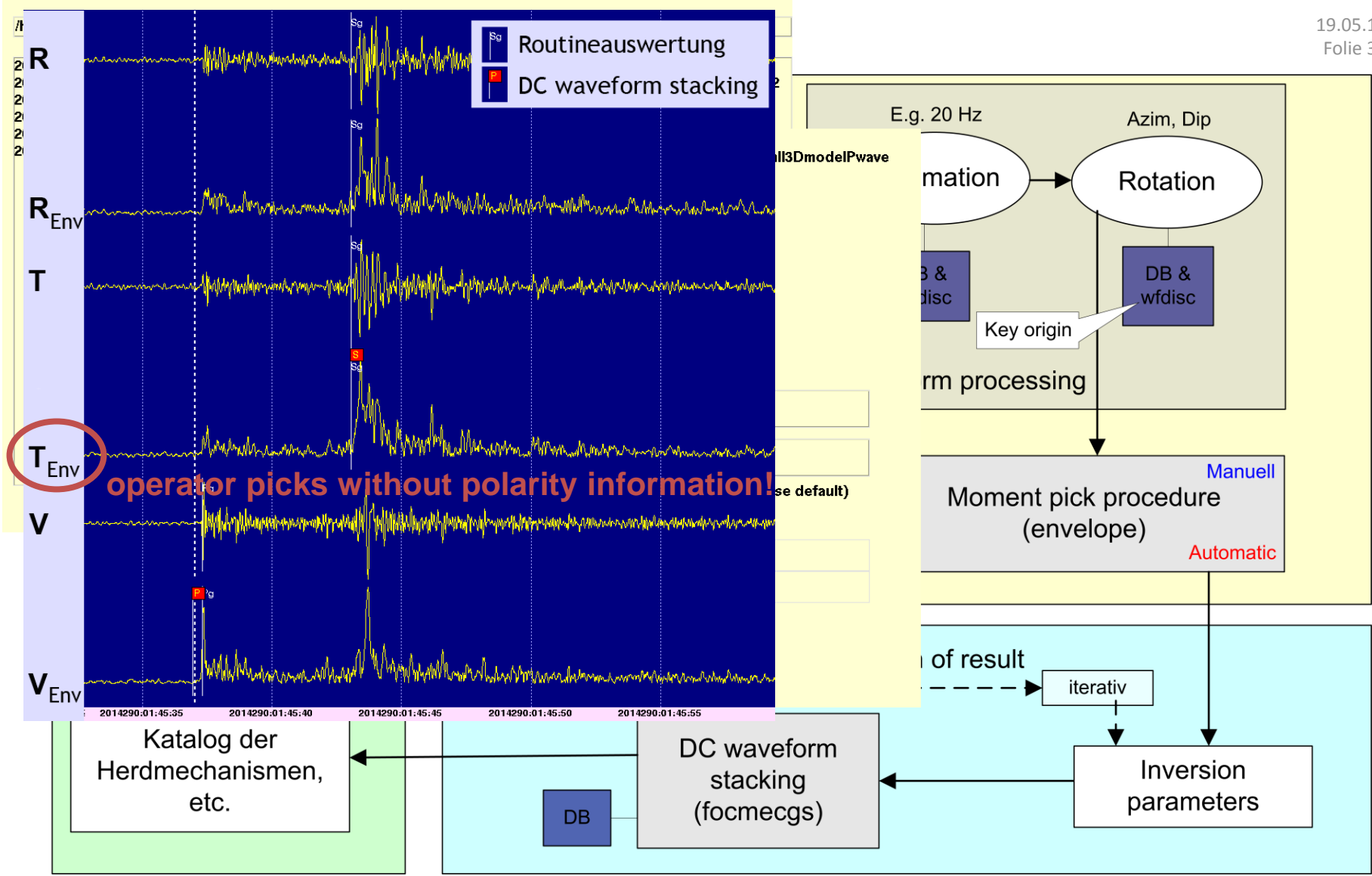
[Berichten Sie uns über Ihre Erdbebenwahrnehmung](#)

Seismogramm

Registrierung des Erdbebens mit der Herzzeit 2016-05-17 00:52:18, Magnitude 2.3



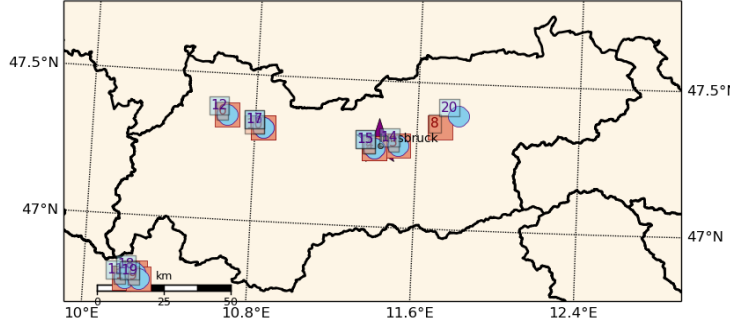
trace manipulation – focal mechanism determination



developments

AEC Information

M2.8 Hafelekarspitze 2018-02-26 13:31:36 (47.290, 11.415, 4.2km, n=20)



Magnitude



Intensitaet



10 strongest events in TIR (n=20)

1..I8.0 1504-02-29 CHE Scuol(108.5km,77132)

2..I8.0 1572-01-04 TIR Innsbruck(2.9km,77144)

11..M5.4 1504-02-29 CHE Scuol(108.5km,77132)

12..M5.3 1930-10-07 TIR Namlos(57.7km,78108)

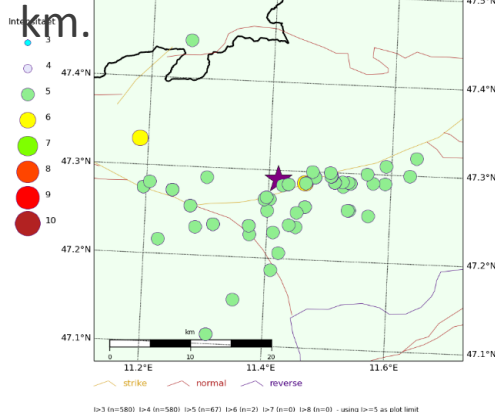
13..M5.2 1572-01-04 TIR Innsbruck(2.9km,77144)

Max. EQs next to the country where the epicentre is located - in terms of MI and IO

Largest MDP's

Max. MDP's within XX

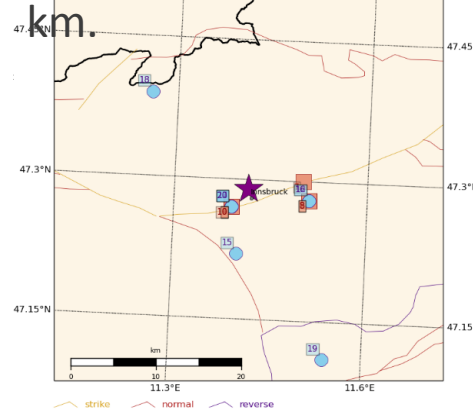
M2.8 Hafelekarspitze 2018-02-26 13:31:36 (47.290, 11.415, 4.2km, I >= 5, n=67)



Largest Events

Max. MI/IO within XX

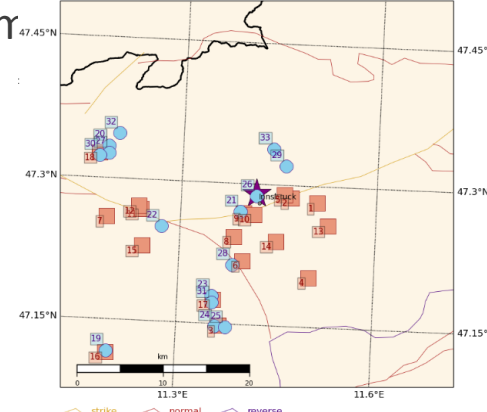
M2.8 Hafelekarspitze 2018-02-26 13:31:36 (47.290, 11.415, 4.2km, n=20)



Similar Events

..similar MI/IO within XX

M2.8 Hafelekarspitze 2018-02-26 13:31:36 (47.290, 11.415, 4.2km, n=33)



alien Python packets

popular packets not included in Antelope

- SciPy
- ObsPy
- matplotlib.basemap

easy_install (coming with Antelope) has no uninstall

easy_install pip

pip install obspy

still very easy to break Python

good to have a copy of `/opt/antelope/python2.7.8`

try to avoid alien packets on production systems

alien Python packets - conda

```
#!/opt/conda/envs/obspy/bin/python
```

```
import os
```

```
import sys
```

```
import signal
```

```
signal.signal(signal.SIGINT, signal.SIG_DFL)
```

```
sys.path.append(os.environ['ANTELOPE'] + "/data/python")
```

```
# Import Antelope modules
```

```
import antelope.datascope as ds
```

```
import antelope.stock as stock
```

```
print("we could load antelope packages ;-)")
```

```
try:
```

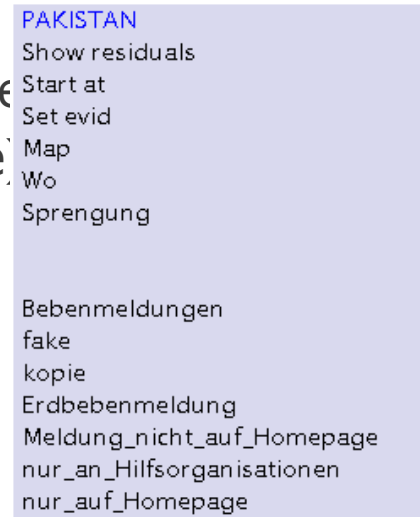
```
    from obspy.imaging.beachball import beach
```

```
except:
```

```
    print("error loading obspy: could not load obspy.imaging.beachball")
```

things we are working on

- responsive redesign of internal website
- homegrown picker (rotation, envelope)
- rewrite dbloc2 plugins
- need to rewrite homegrown alerting tool based on orbtrigger
- more strong motion sites
- improve monitoring and especially alerting
- metadata



wishes

inspect_assoc

images from son-of-orbrtd, son-of-dlmon

plugins for dbloc2 / dbe

filesize for external files when calling stuffPkt (internally Packet.dfile)

stationXML2db

clients for webservices – import waveforms, catalogs, metadata

Thank you for your attention

