Antelope in Austria

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Antelope Users Meeting 2018, ARSO, Ljubljana

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ZAMG Geophysics - Structure

Geophysical Department

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

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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

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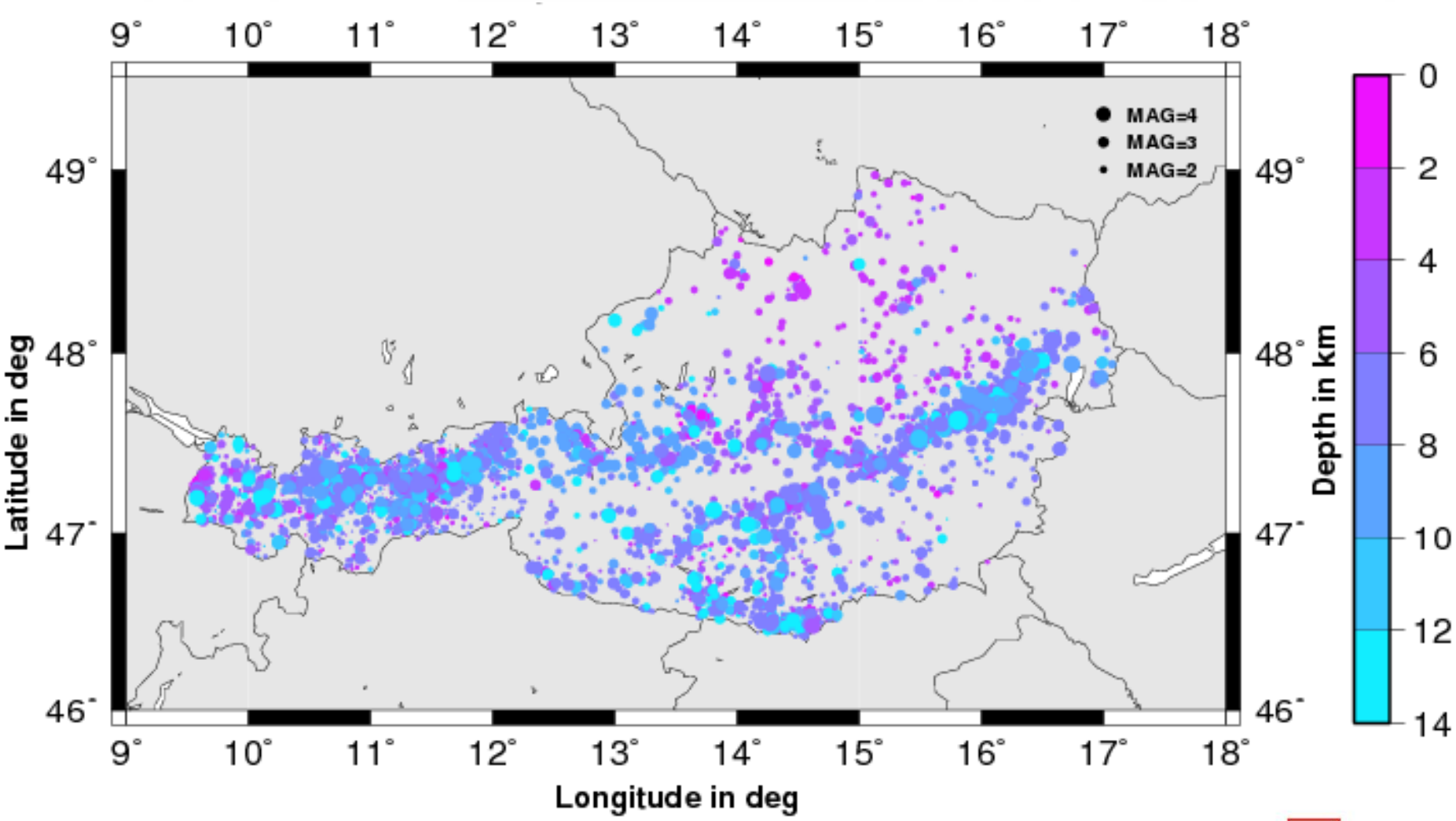
Earthquakes located in Austria since 1900



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

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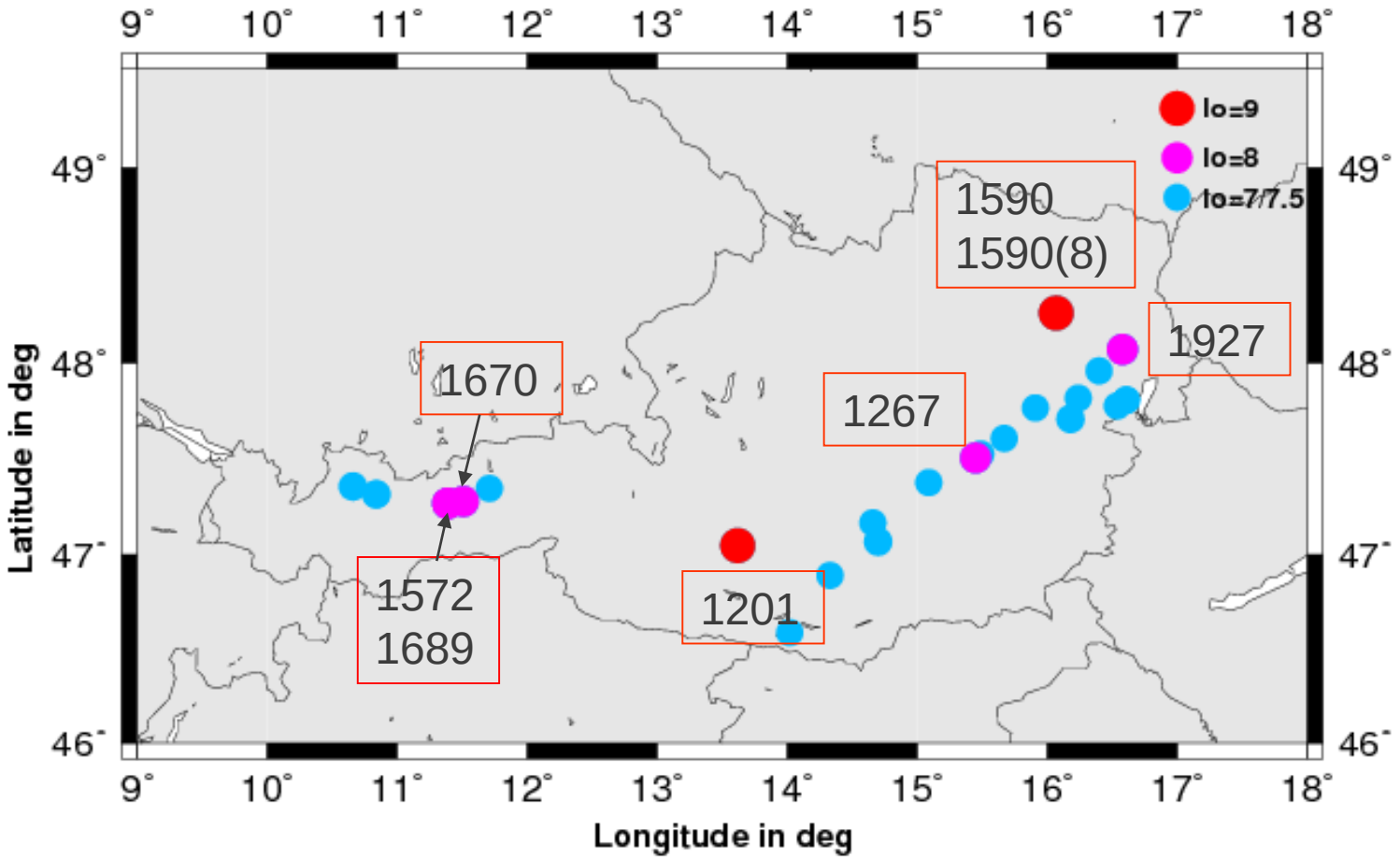
Historic Earthquakes with Heavy Damages



I_o=9
1201 Katschberg
1590 Ried/Riederberg

I_o=8
1267 Kindberg
1572 Innsbruck
1590 Ried/Riederberg
1670 Hall in Tyrol
1689 Innsbruck
1927 Schwadorf

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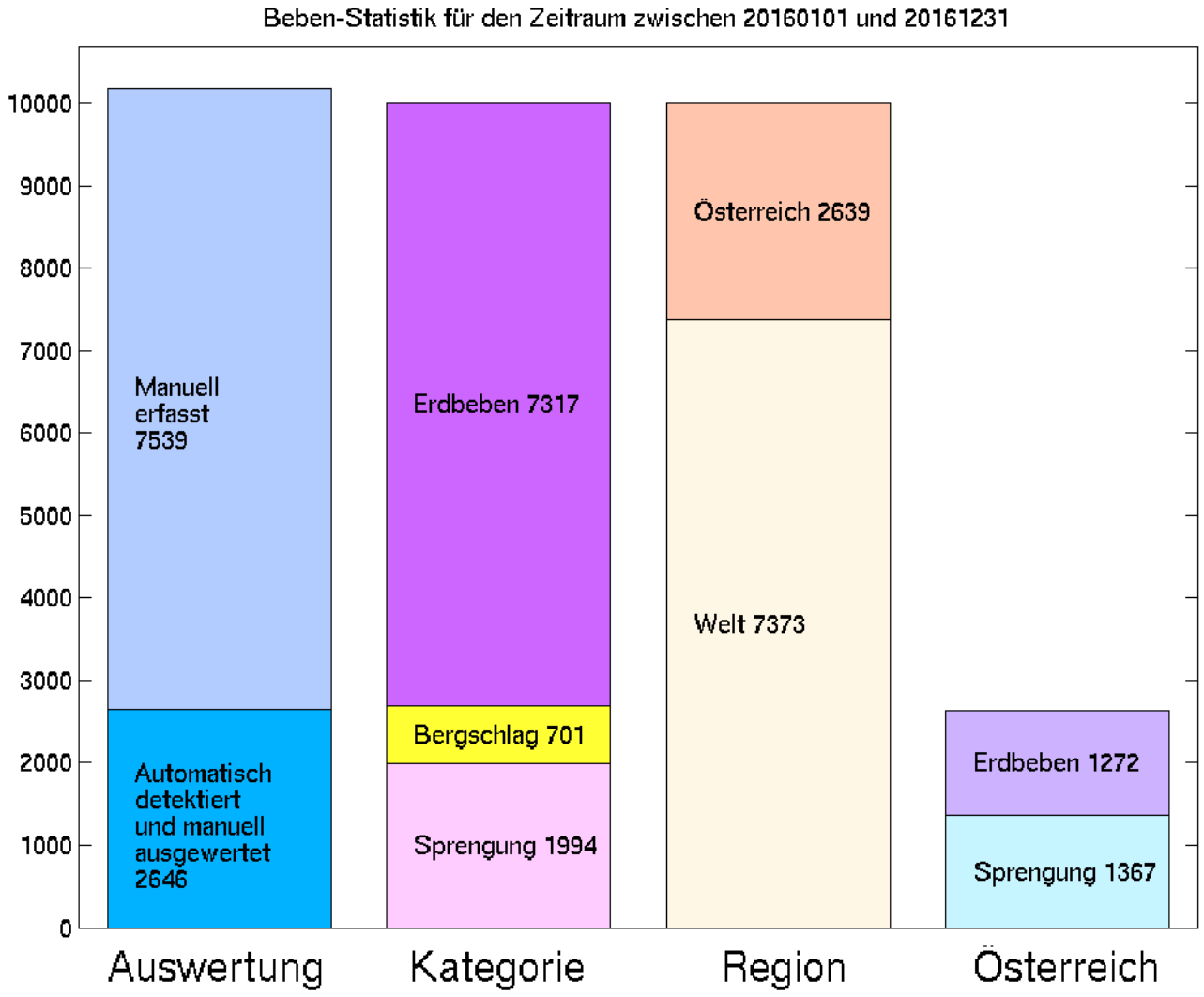
processing - statistics



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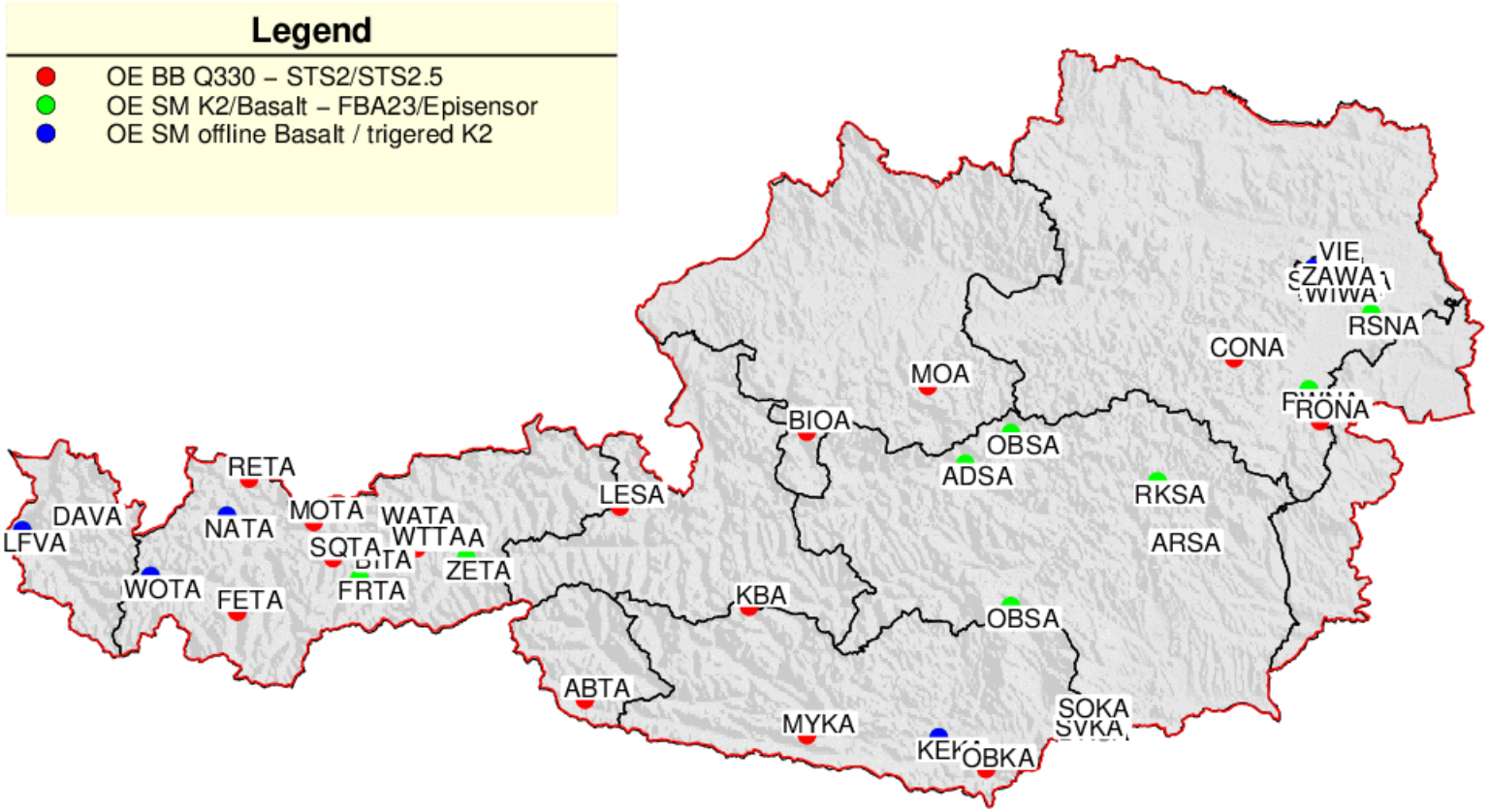
current network



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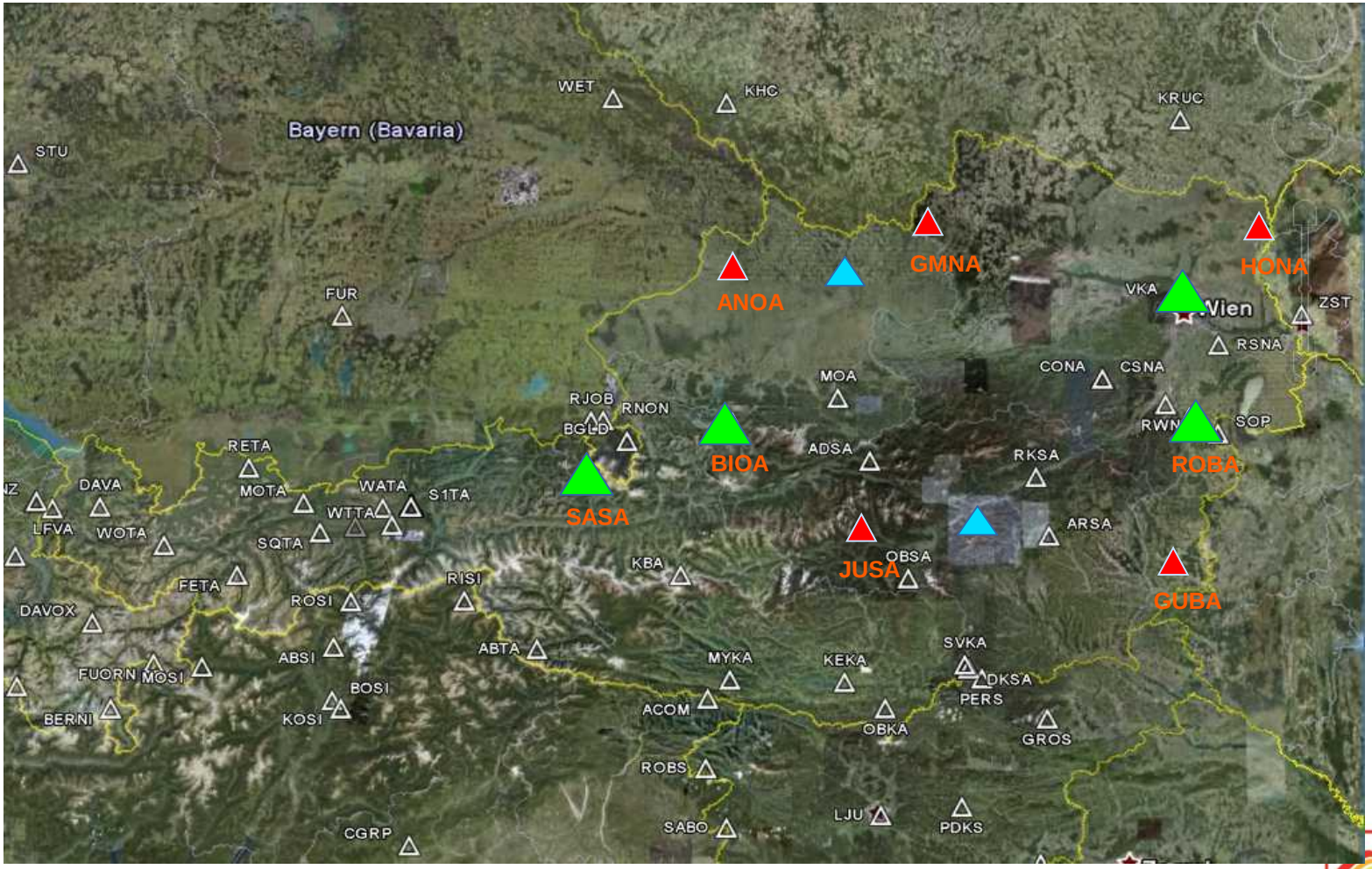
planned stations / upgraded stations



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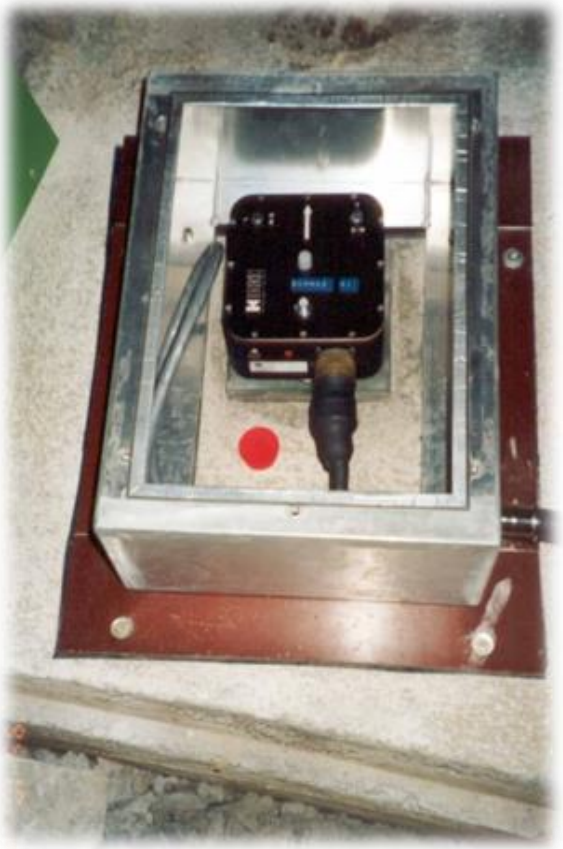
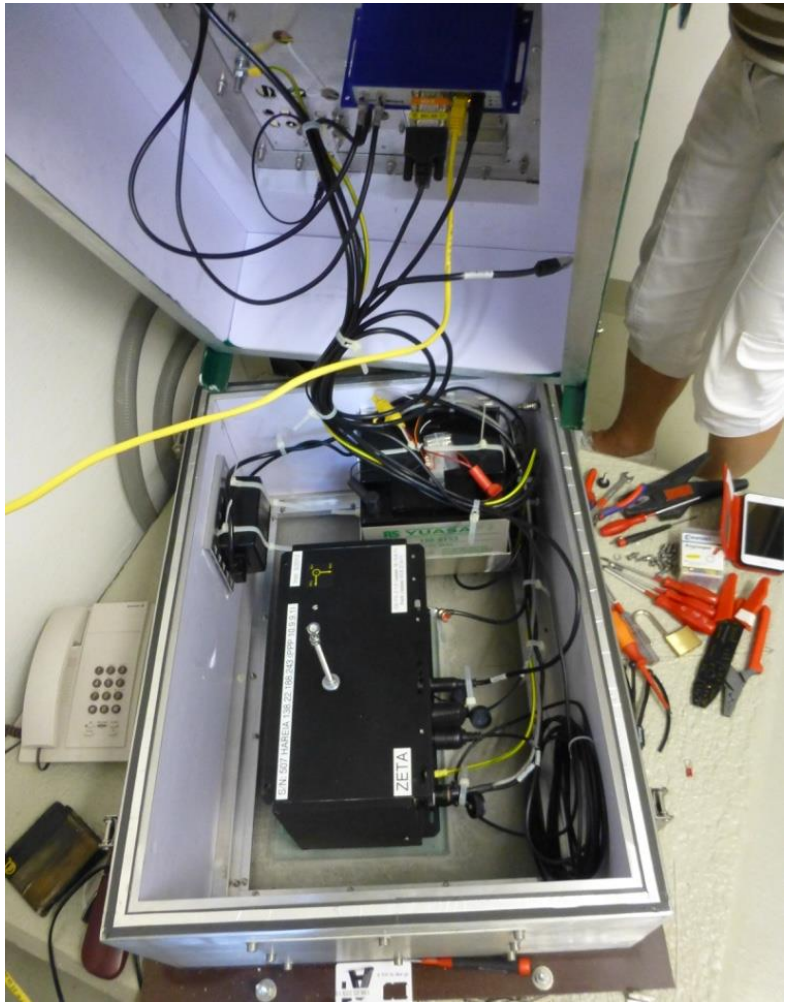
station design - broadband

new design - RONA

station design – strong motion



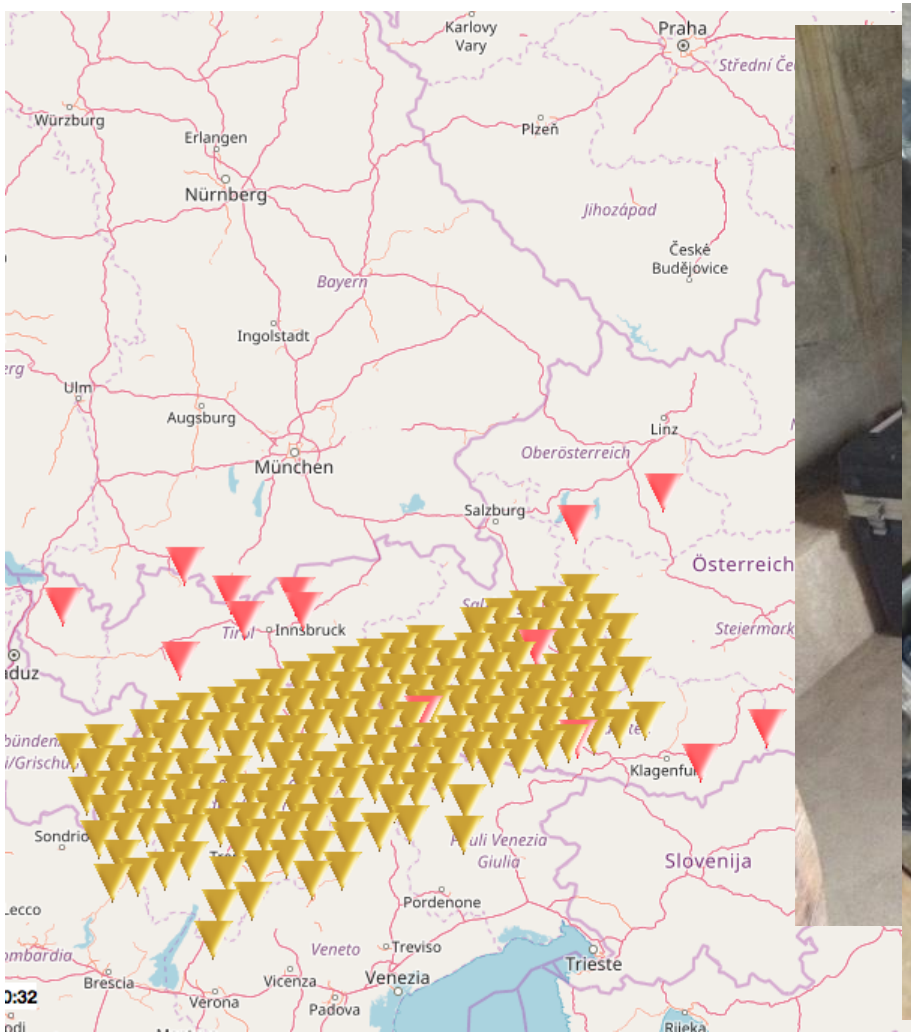
station design – strong motion

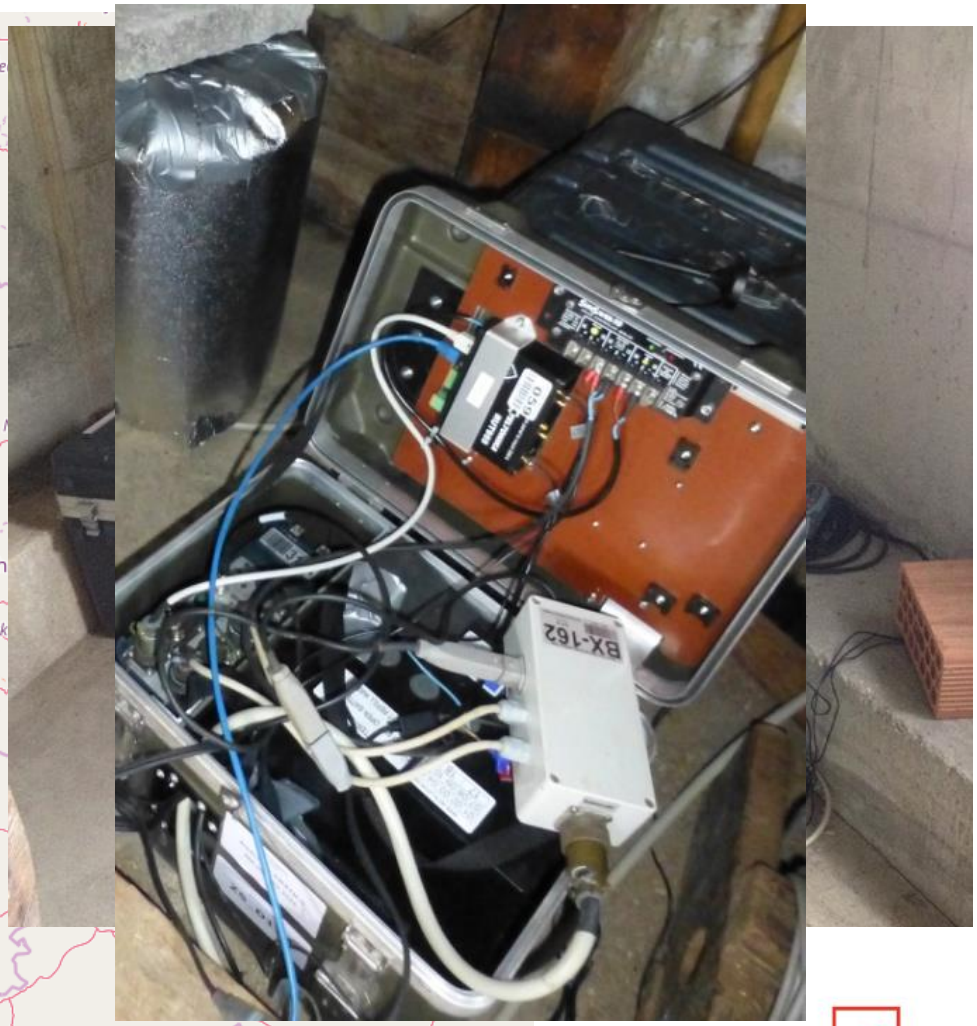


station design – strong motion

complete design during ARMONIA project

swath-D





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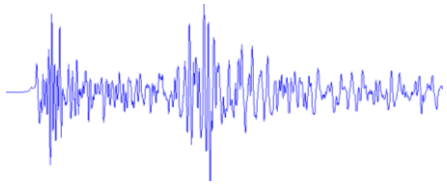
Seismic Data Processing

Waveform Data

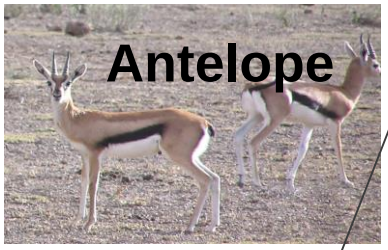


Automatic Processing

Output: event location and magnitude

Manual Reviewing

Output: reviewed event location and magnitude



Standby Service

Output: quickly reviewed event location and mangitude

ZAMG Homepage

Alerting authorities and other necessary parties.

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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

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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

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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

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NDC

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)

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IT – restructuring

currently, most IT services managed within geophysical group

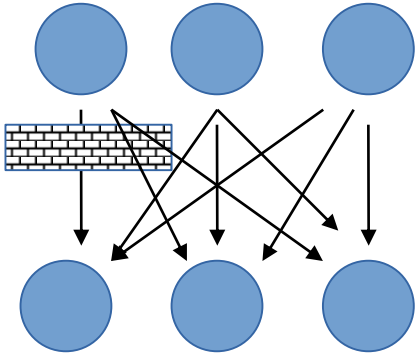
(except web-server and firewall)

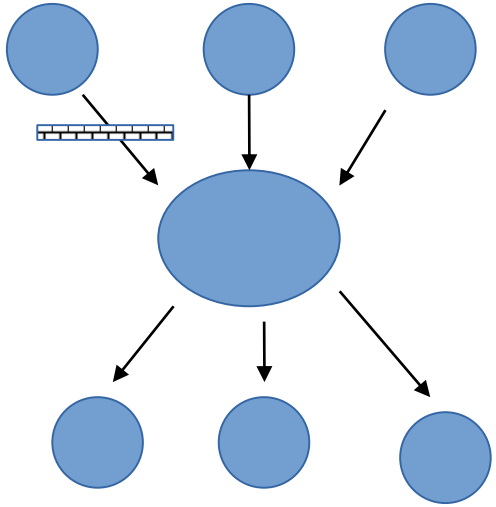
IT department tasked to take over

move from VMware to KVM

only one firewall

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





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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

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Computer

minimum

- data exchange

- data acquisition
- automatic analysis
- manual analysis
- products

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data exchange
CTBT data exchange

data acquisition
legacy data acquisistion
conrad observatory

automatic analysis

data products

webserver

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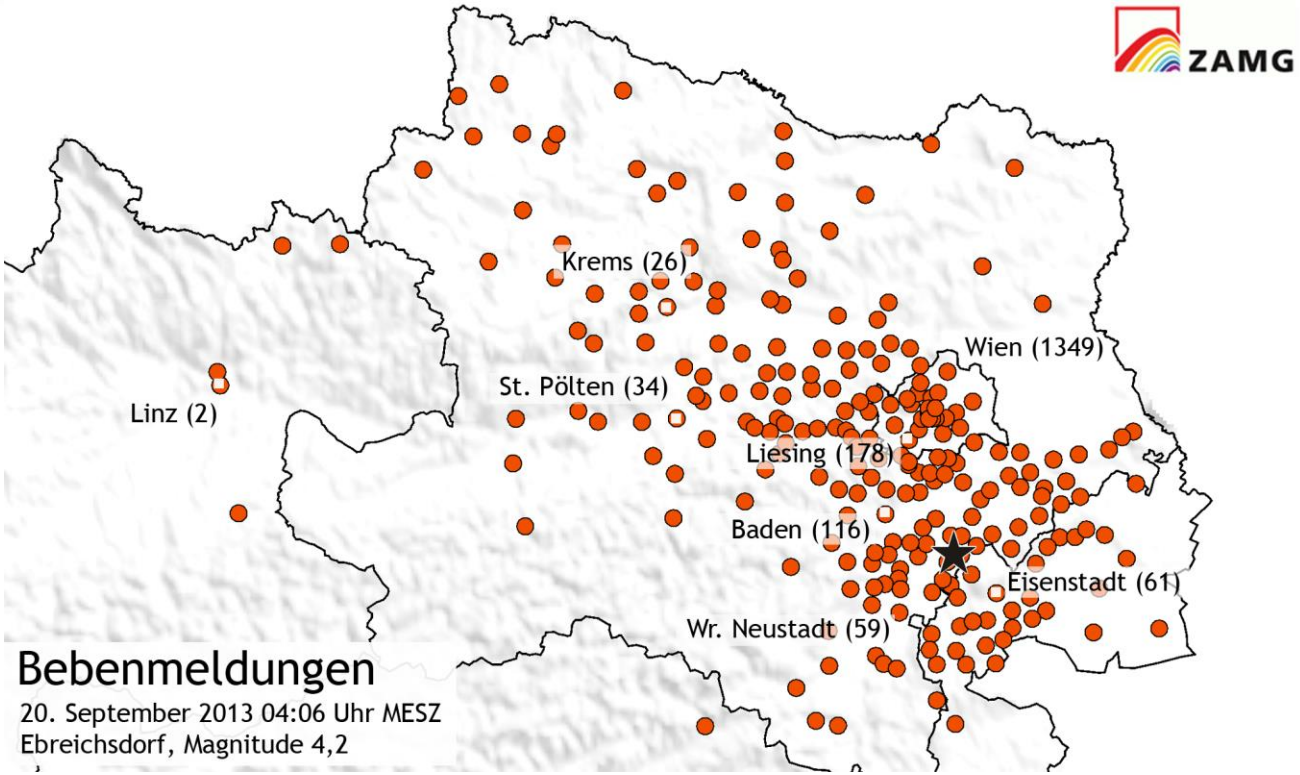
data exchange – macroseismic data



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

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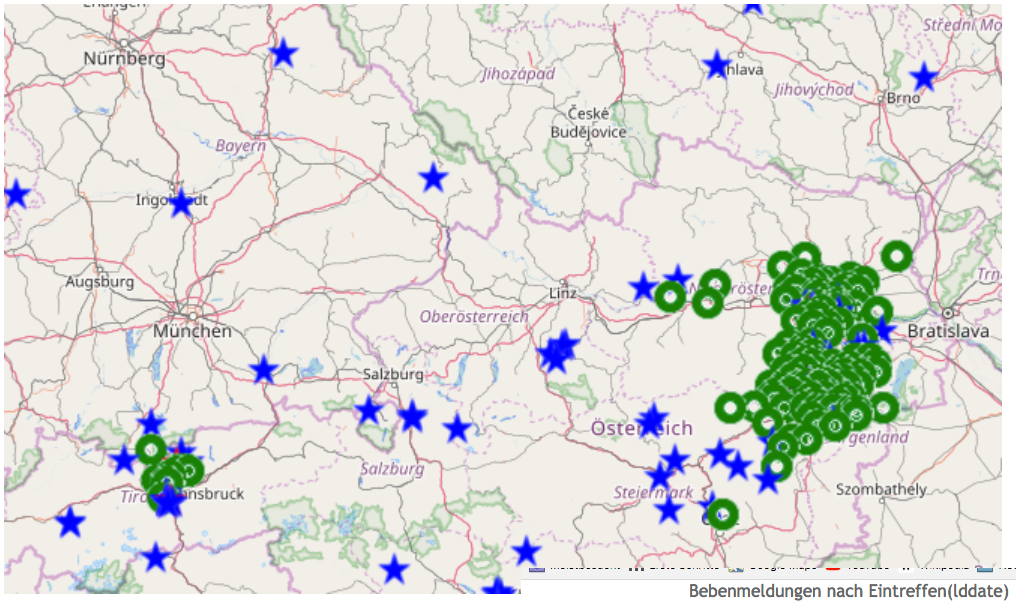
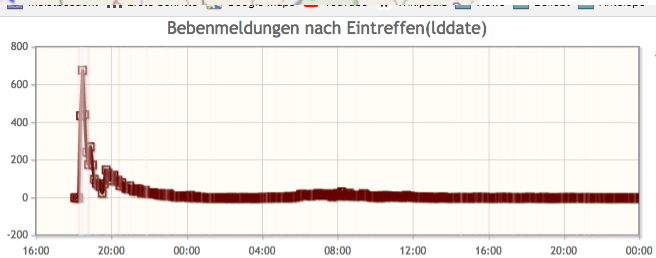
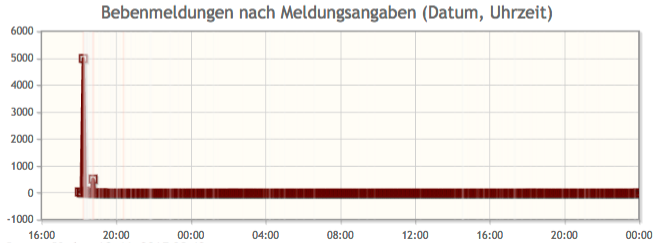
data exchange – macroseismic data







Anzahl der Meldungen: 5815
aus 115 Orten
Erdbeben in der Datenbank: 160
davon verspuert: 3

Letztes Update:13. 11. 2017 08:42

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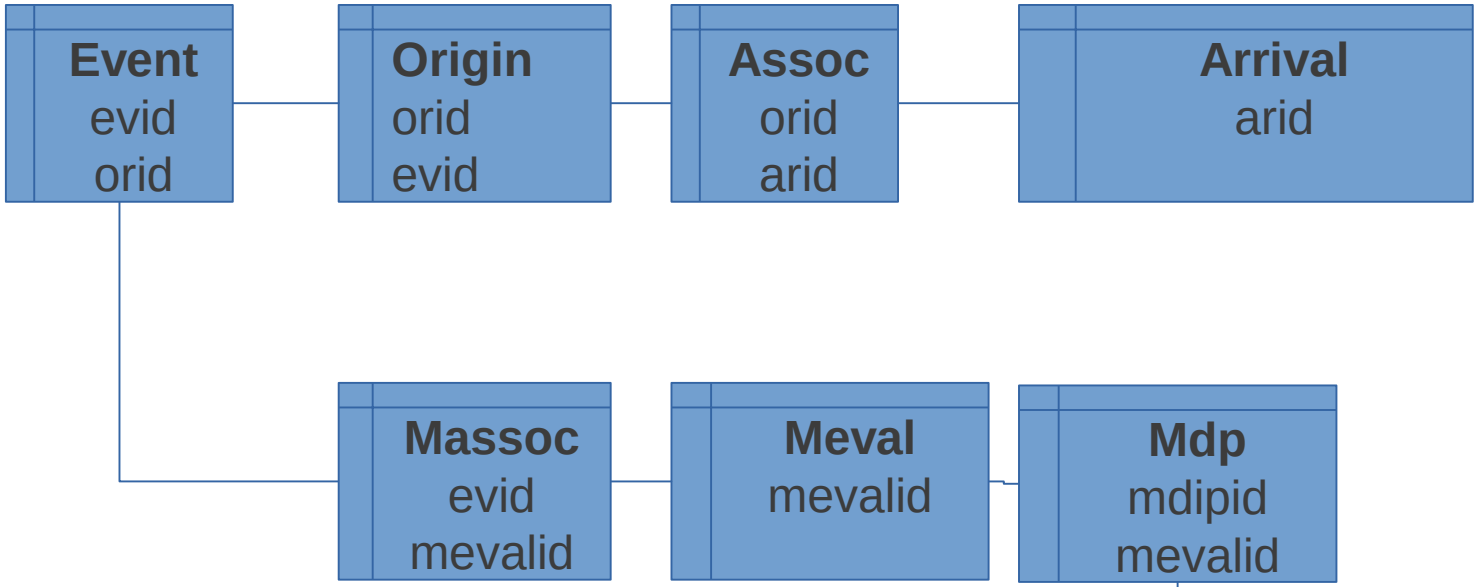
data exchange – macroseismic data



allows for multiple macroseismic solutions

various methods for grouping reports into MDP

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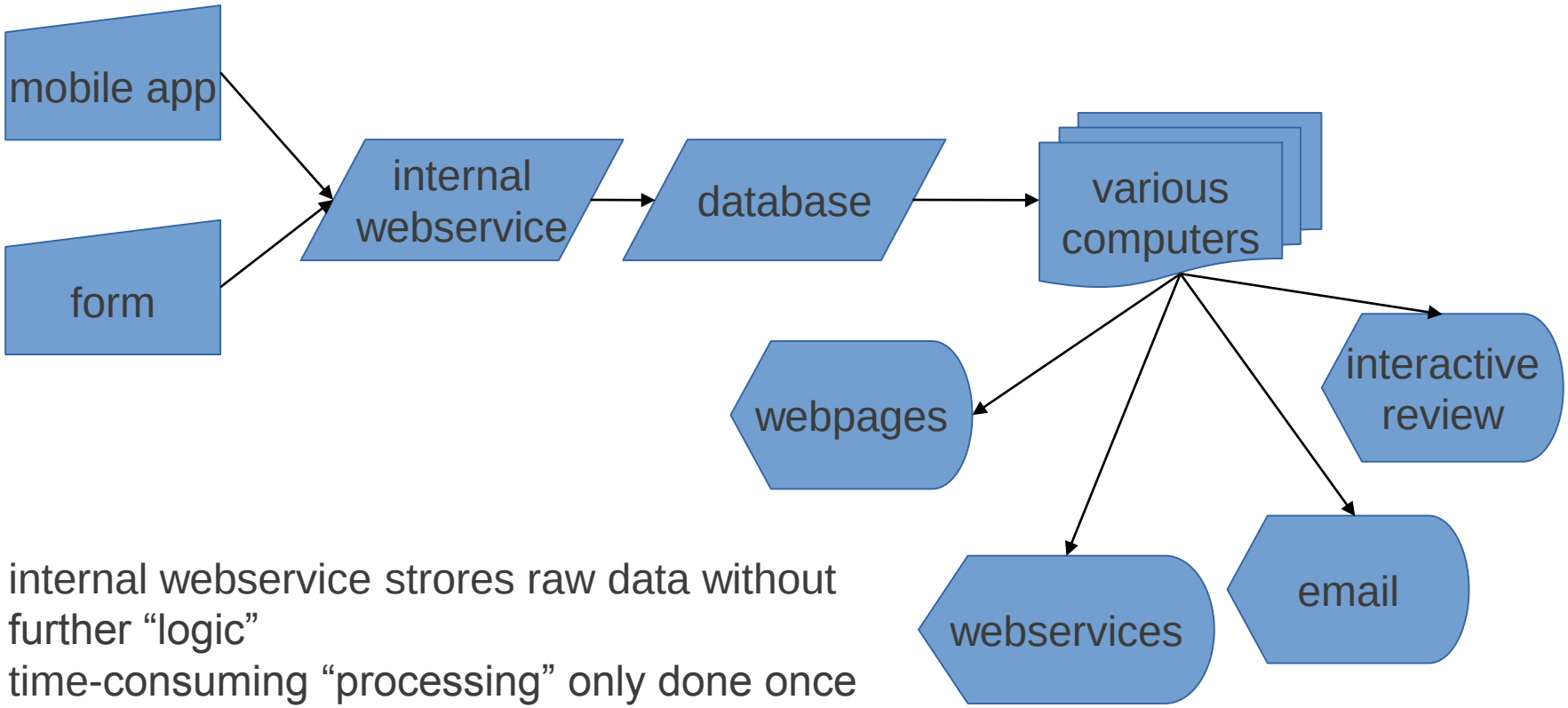
data exchange – macroseismic data



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

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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

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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)

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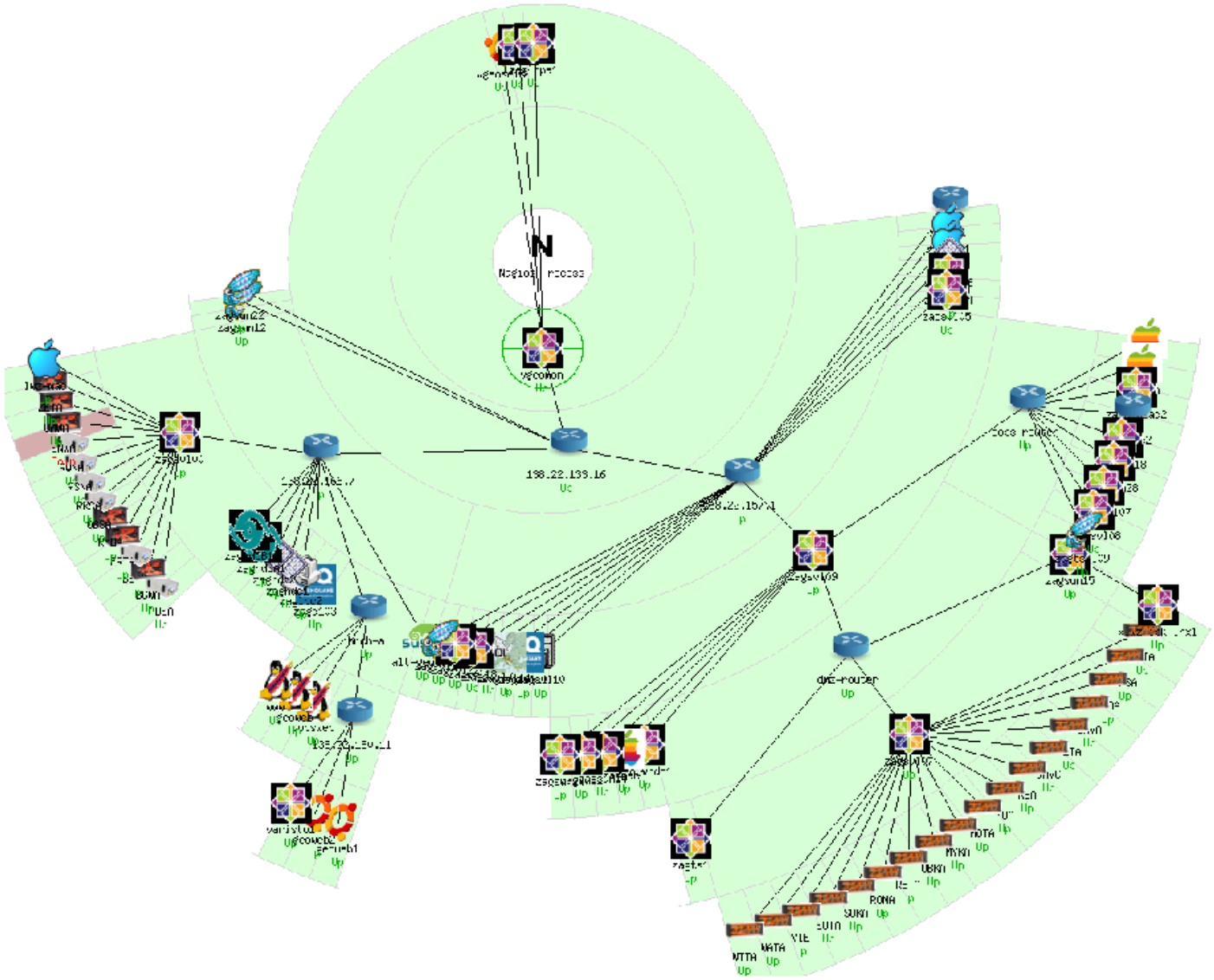
monitoring



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monitoring

Nagios
check_orbclients
- check lag or number
- lag: moitor time lag of orbsources
- number: monitor number of clients

check_orbsources
- check latency or throughput
- latency: monitor latency of selected sources
- troughput: 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 readble by dlmon

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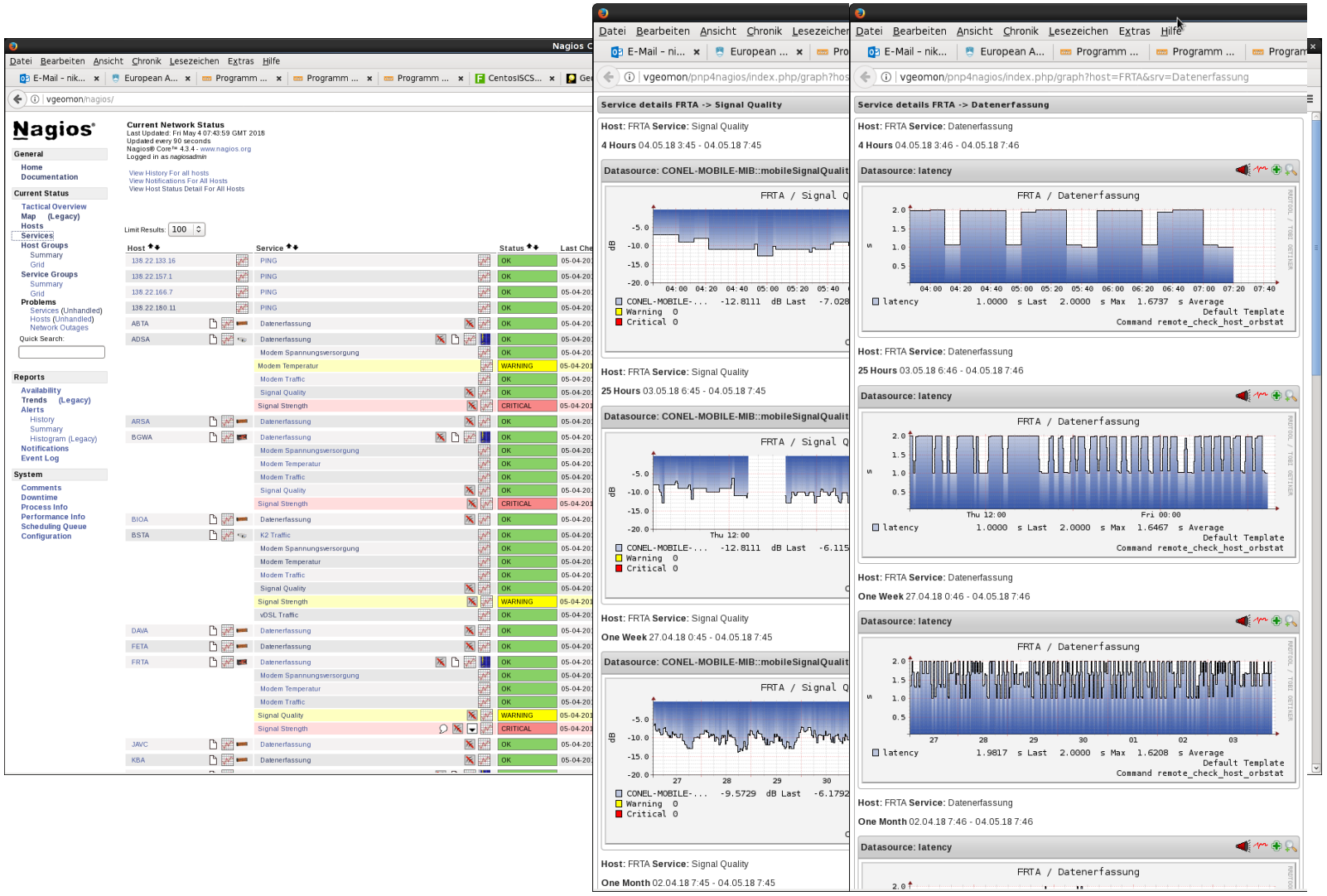
monitoring



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www.zamg.ac.at/cms/de/geophysik/erdbeben/aktuelle-erdbeben/karten-und-listen/bebendetails/welt/quakes/2016138_evid52701431

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Suche

Website durchsuchen
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
Herdzeit:	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:

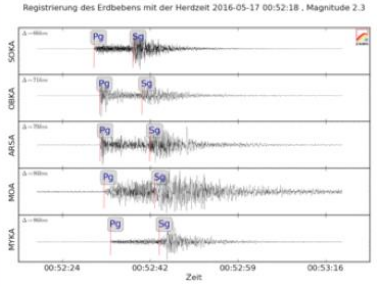
Am Dienstag, den 17. Mai 2016 ereignete sich nachts um 02:52 Uhr MESZ südlich von Unzmarkt, Steiermark, ein Erdbeben der Magnitude 2,3. Es wurde von einigen Personen leicht verspürt.

Schäden an Gebäuden sind bei dieser Stärke nicht zu erwarten.

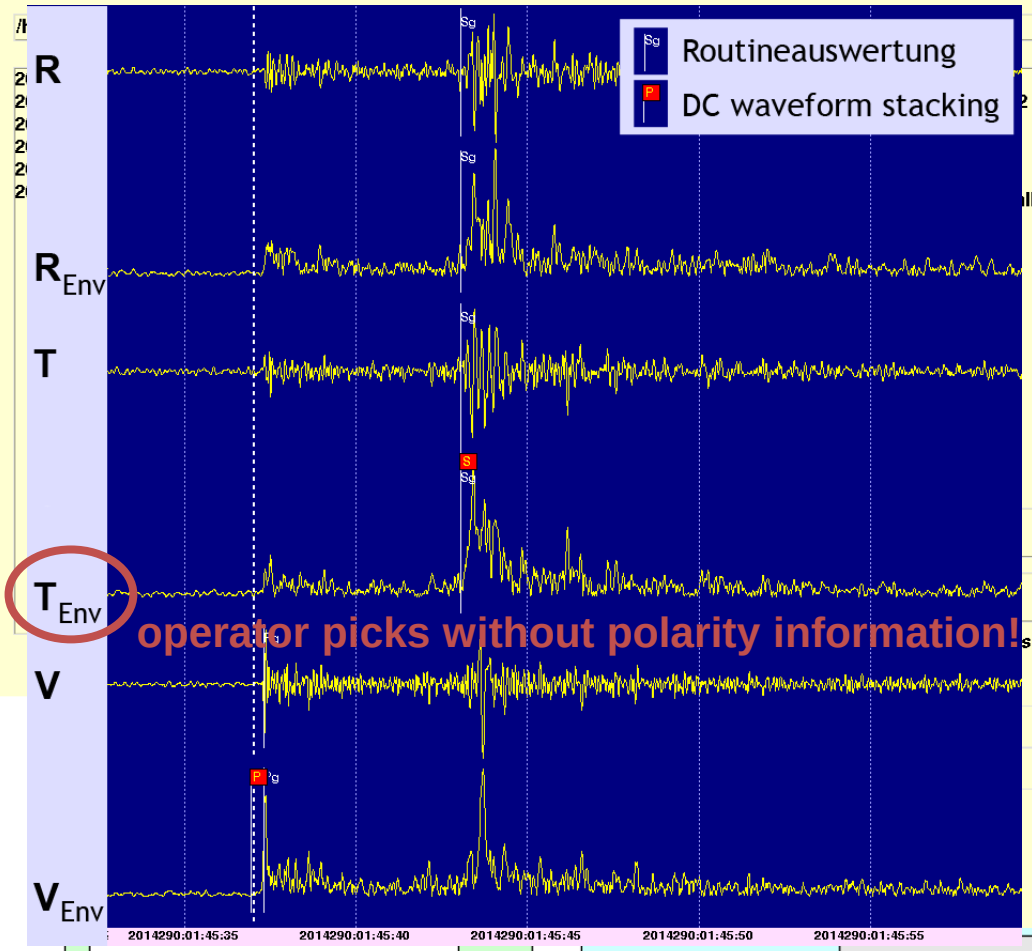
Verfasserin: Mag. Rita Meurers/Seismologin

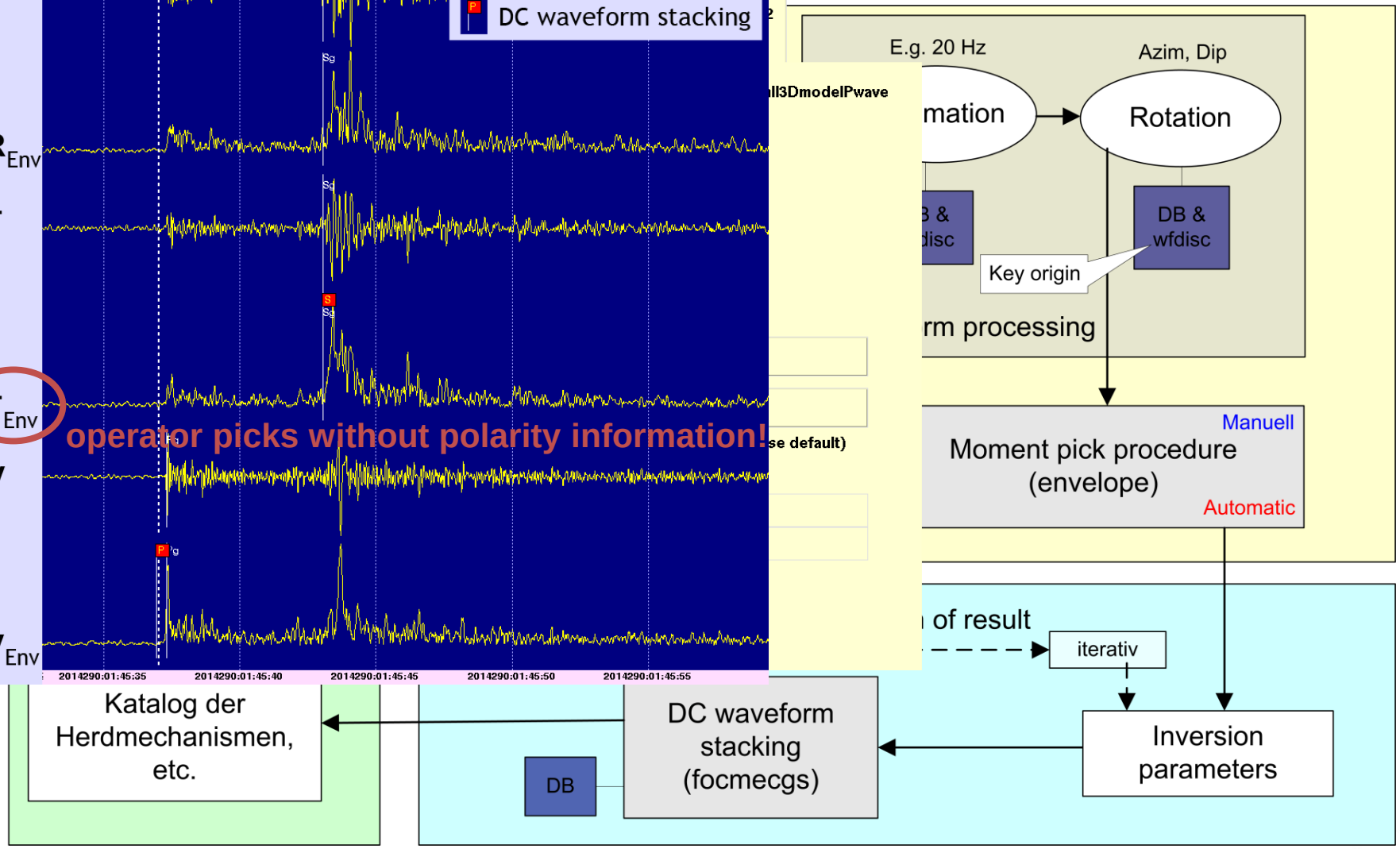
Berichten Sie uns über Ihre Erdbebenwahrnehmung

Seismogramm



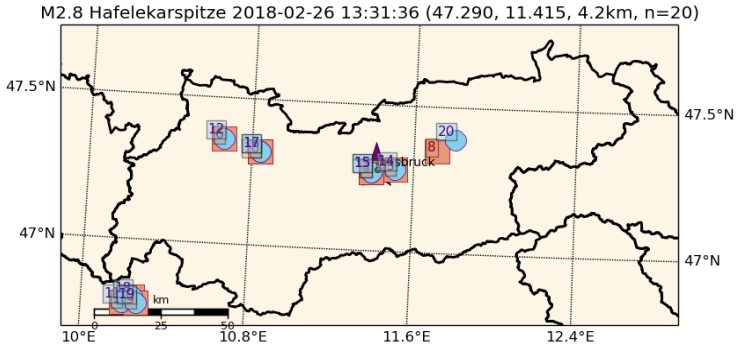
trace manipulation – focal mechanism determination





developments

AEC Information



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)

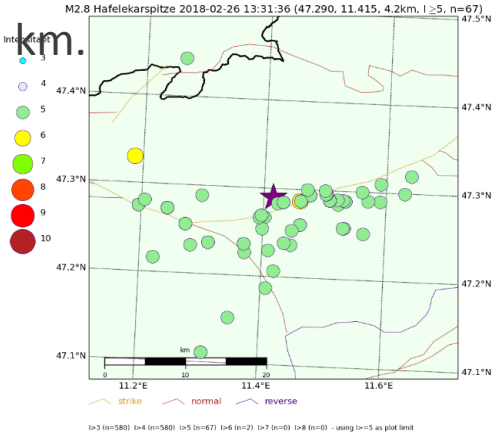
12..M5.3 1930-10-07 TIR Namlos(57.7km,78108)

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 Ml and I0

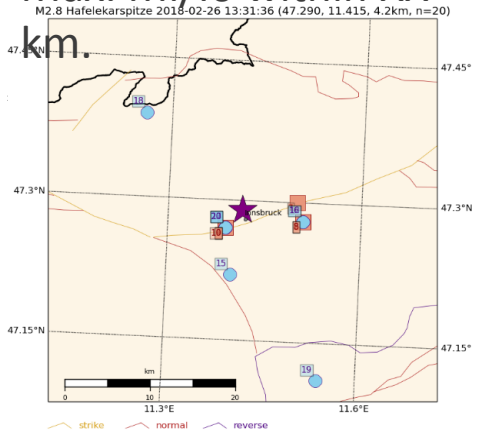
Largest MDP‘s

Max. MDP‘s within XX km.



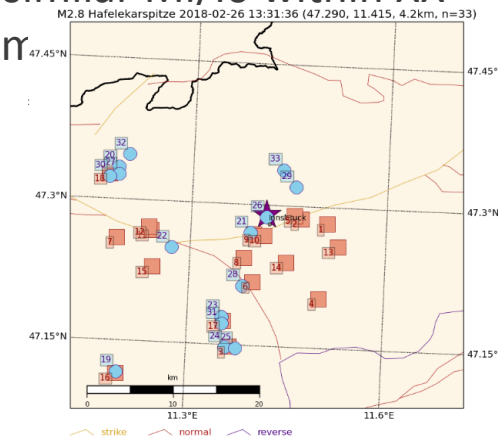
Largest Events

Max. Ml/I0 within XX km.



Similar Events

..similar Ml/I0 within XX km



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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")
```

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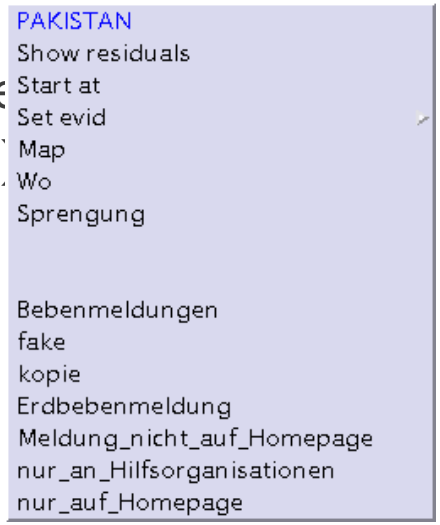
things we are working on

- 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

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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