Antelope in Austria

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AUG 2013
Sultan Qaboos University
Muscat / Oman

how many stations do you operate?

- 13 Broadband Stations In Austria

ARSA, CONA, DAVA, KBA, MOA,OBKA, WTTA, SQTA, ABTA, FETA, RETA, MYKA, SOKA

CSNA and a few more instruments in the Conrad Observatory

- 2 short period instruments waiting for upgrade

WATA, MOTA

- 3 Stations in Czech Republic with Support from Austria

JAVC, KRUC, MORC

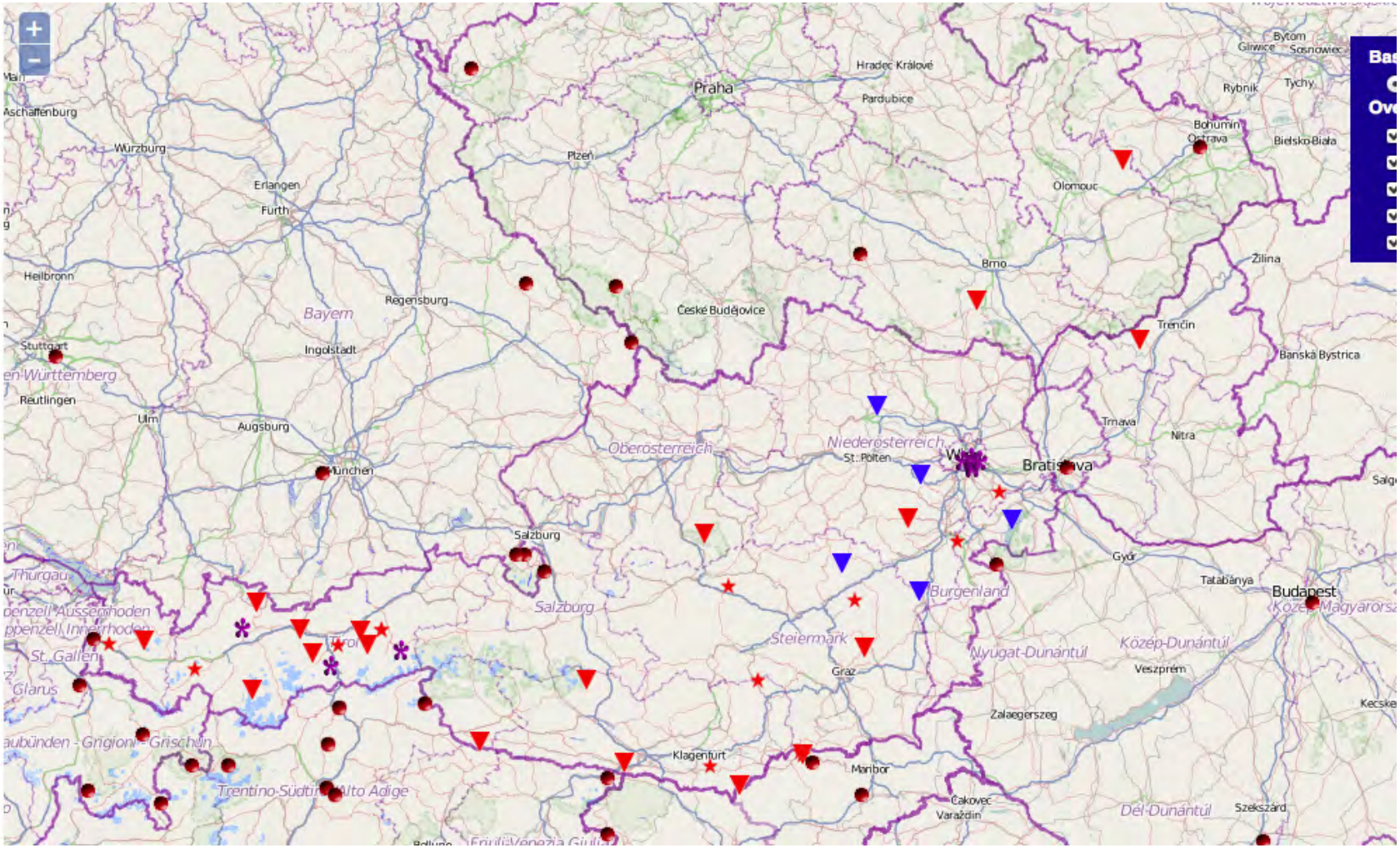
How many stations do you operate?

only Instruments in Austria are listed here

- 2 ancient SPCMU + S13
- 10 Q380 + STS-2 (+1 Episensor + 1 FBA23)
- 1 Q4120 + STS-2 + S-13
- 8 Q330 + a few more on the Conrad Observatory – all STS-2 + Episensor
- 13 K2 + FBA23 (+2 S-13)
- 8 Basalt + Episensor

1 STS-1 still not in operation. No Q330HR on Conrad yet.

Stations


Praha
Hradec Králové
Pardubice
Plzeň
Olomouc
Brno
České Budějovice
Regensburg
Bayern
Ingolstadt
Stuttgart
Heilbronn
Würzburg
Erlangen
Fürth
Aschaffenburg
Reutlingen
Ulm
Augsburg
München
Oberösterreich
Niederösterreich
St. Pölten
Wien
Bratislava
Trnava
Nitra
Trenčín
Banská Bystrica
Žilina
Bielsko-Biała
Ostrava
Bohumín
Rybnik
Tychy
Gliwice
Sosnowiec
Bytom
Salzburg
Tirol
Thurgau
St. Gallen
Glarus
Graubünden - Grigioni - Grischun
Trentino-Südtirol - Alto Adige
Klagenfurt
Steiermark
Graz
Burgenland
Győr
Tatabánya
Budapest
Közép-Dunántúl
Nyugat-Dunántúl
Veszprém
Zalaegerszeg
Maribor
Čakovec
Varaždin
Dél-Dunántúl
Szekszárd

what's your operating budget and staffing ?

2 technical staff (Rudi, Richard)

4 analysts (2 of them parttime) (Yan, Helmut, Nani, Rita)

2 software etc. (Niko, Toni)

1 boss (all geohysics within ZAMG, 23 staff) (Wolfgang)

6 of the staff members share call-on duty 24/7

(Yan, Helmut, Rita, Niko, Toni, Wolfgang)

current hardware platform
future hardware plans

- Mac for analyst review – want to keep that!
- Sun Solaris for data acquisition and automatic processing – will die soon

  Will move to Linux in the future

  as virtual as possible

  keep T5120 for some time
- Linux based storage (DRBD)

  future still a bit unclear, NETAPP based SAN/NAS
- Linux for webserver, NDC processing, various other services – no alternative in sight

what is the generall allocation of dataloggers / sensor types ?

- Most BB instruments in newly build galleries / vaults
- Most SM instruments in public buildings
- new BB instruments equipped with accelerometers
  - little extra cost
  - backup sensor
  - even in austria, there might be a stronger event

failover procedures

- 1 spare server for data acquisition
- identicl computers where possible
- 1 spare analysis machine
- some spare networking equipment
- local station support for each broadband station
- motivated technicians
- clustered webserver
- orbxchange for data forwarding
- diskserver for data from Conrad Observatory

mechanisms for bringing in data

- Dedicated leased line for most Broadbands

  modem access for maintenance when possible
- private radio links
- private networks of power company
- triggered dial-up for K2
- manual dial-in for Basalts in Austria

mechanisms for bringing in data

- cs2orb (now with a pf to change the time correction, at the moment we add 16 years)
- qt2orb – as long as the old instruments survive
- q3302orb
- altus2orb
- dlcollector ?
- orb2orb, slink2orb
- cd2orb, hopefully soon slink2orb
- bulletins via emscd, neicd, reb2db

do you organize regular network operations meetings ?

- regular meetings

  Analysts – Maintenance

- we should restart with regional meetings

- Austria is not yet participating in EPOS

funny enaough, the Austrian GEO secretary is located at ZAMG and run by a meteorologist

What are the principal telemetry mechanisms ? How are they funded

- dedicated leased lines
- extremely expensive, funded by operational budget

experiments with Satellite startet again on low level

no gprs

What are your obligations as a network?

- ZAMG is a gouvernmental agency
- we report to civil protection
- participate in comitee on dam safety, building code
- NDC – deliver information to ministry of foreign affairs

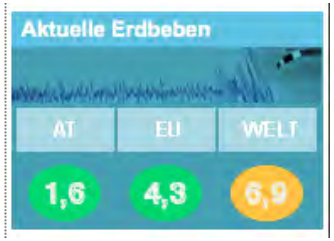
products - web

Übersicht der Erdbeben in Österreich

Die Karte und die Liste zeigen die mit dem seismischen Stationsnetz der ZAMG registrierten Beben in Österreich der letzten 14 Tage.

Beben der letzten 14 Tage in Österreich

Datum	Weltzeit	Lokalzeit	Mag.	Breite	Länge	Tiefe	Region
1. Mar 2013	01:53	02:53	0.8	47.33°N	11.04°O	11 km	Telfs / Tirol
28. Feb 2013	22:20	23:20	0.4	47.27°N	11.71°O	9 km	Schwaz / Tirol
28. Feb 2013	05:18	06:18	1.6	47.22°N	14.80°O	4 km	Judenburg / Steiermark
26. Feb 2013	20:32	21:32	-0.1	47.28°N	11.25°O	4 km	Seefeld / Tirol
26. Feb 2013	06:16	07:16	0.8	47.38°N	11.29°O	9 km	Seefeld / Tirol
24. Feb 2013	23:21	00:21*	0.6	47.30°N	11.77°O	8 km	Schwaz / Tirol
24. Feb 2013	19:33	20:33	2.2	47.27°N	11.71°O	10 km	Schwaz / Tirol
24. Feb 2013	19:05	20:05	1.0	47.27°N	11.72°O	10 km	Schwaz / Tirol
24. Feb 2013	15:50	16:50	0.5	47.09°N	10.74°O	4 km	Serfaus / Tirol



realtime products

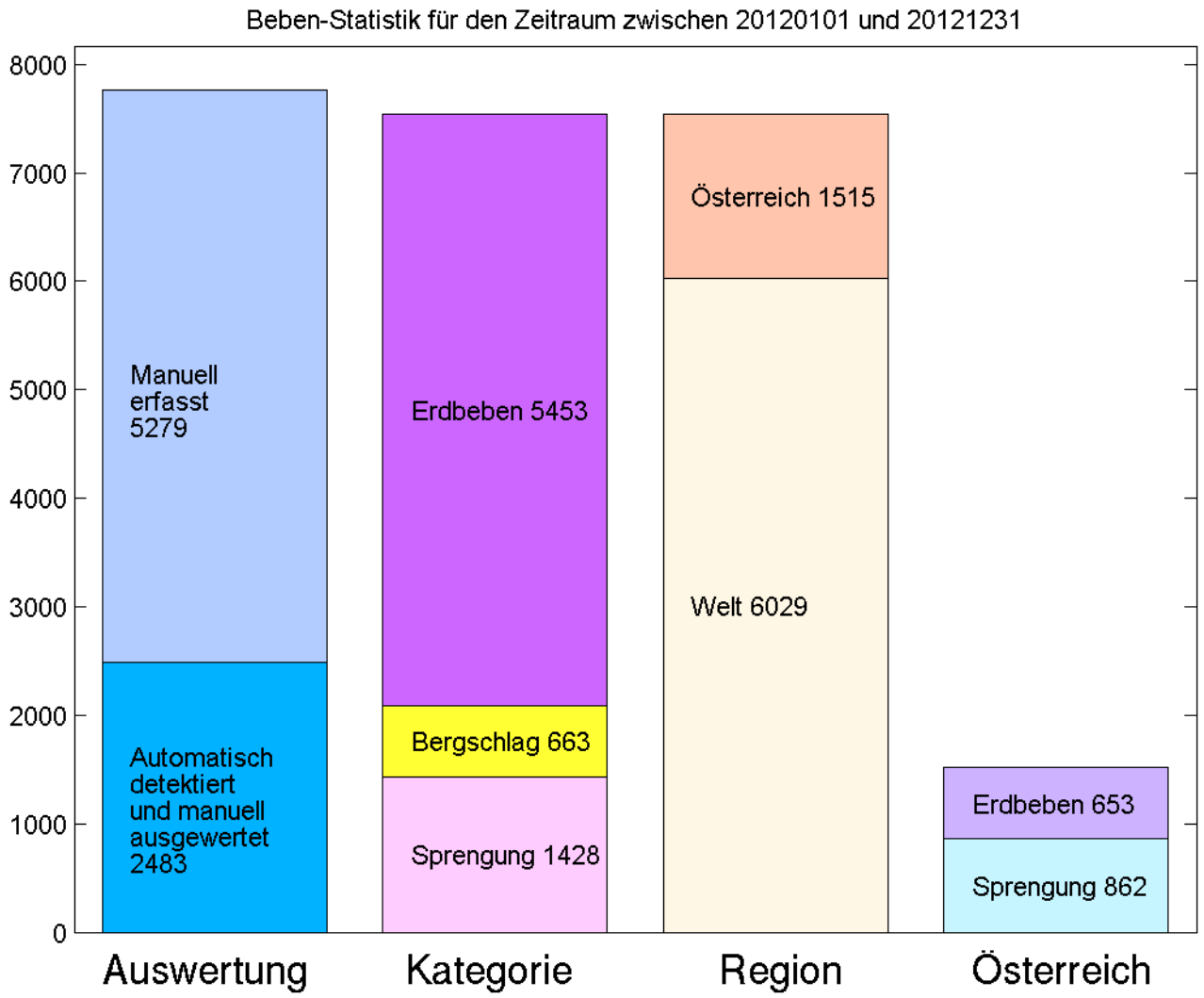
- the only hard duty is to reply to questions from the civil protection within 30 minutes (24/7).
- realtime alerts to on-duty staff
  - threshold increases with distance
  - revied alerts to civil protection
- automatic threshold reports to a mine operator and a hydro-power dam

  revied updates with office hours
- unreviewed locations to EMSC/SED
- webpage with revied events only (to be changed)

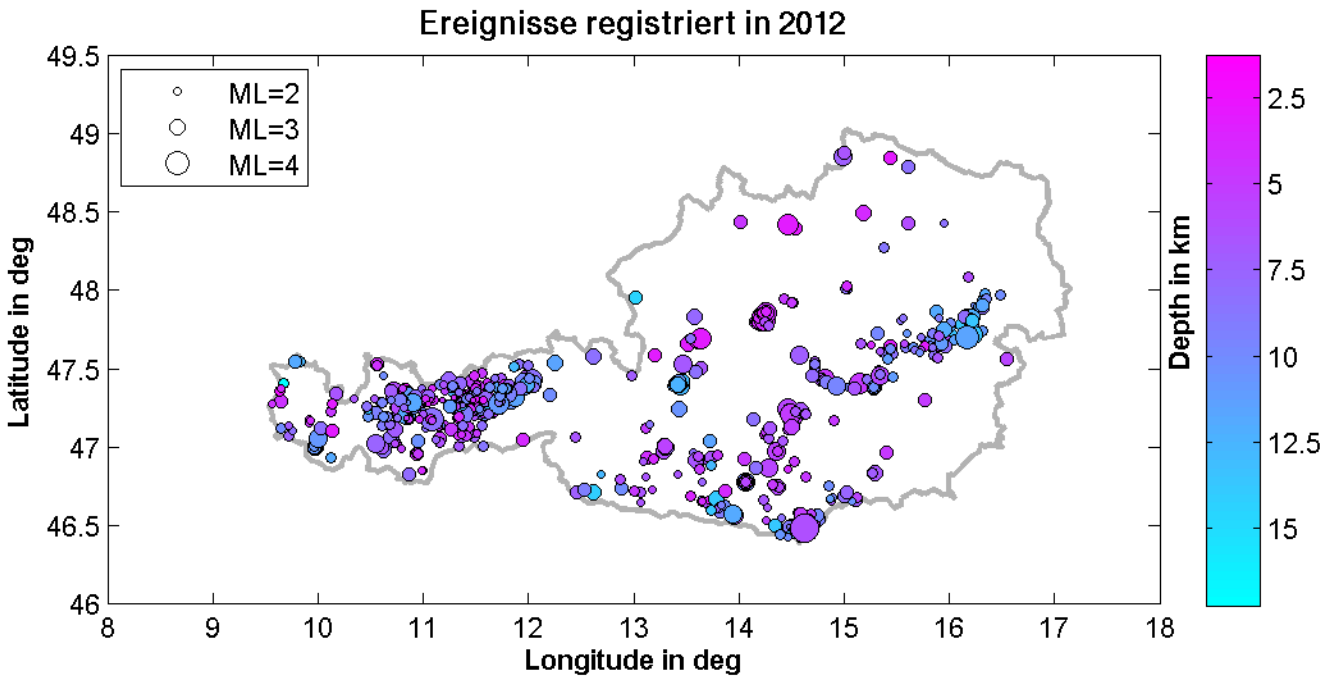
reviewed products

- revied origins to ISC / EMSC
- various waveform data including accelleration data to scientific community upon request
- acceleration map (hazard map) – Eurocode 8
- expertises on seismic hazard
- maps
- NDC related expertise

processing statistics



processing results



how do you process the catalog ?

- automatic processing location + magnitudes
- every pick reviewed
- visual scan of all waveforms for missed events
- associate with QED/EMSC/CTBT/neighbours
- flag -/sm/km/fe/sr/de/kl/kx – (ISF- IASPEI Seismic Format)

distribute catalog in 2 stages, inital and reviewed with a longer delay (wait for PDE and REB)

what are the features of your local archive

- all waveforms online
- 3 way online mirror + offline copies

  future maybe big SAN-Cloud
- autodrm access to all BB waveforms
- current waveforms replicated
- database producs replicated in realtime

what about remote archive such as IRIS / ORFEUS

- waveforms go to most neighbours – not archived everywhere
- 20sps for some stations to IRIS/ORFEUS

  maybe higher sample rates accepted?
- bulletins to ISC/EMSC/neighbours

- would be nice to have realtime backup of EVERYTHING at some well funded datacenter

What other products are produced what are you working on short term needs/challenges

- automatic felt report processing
- more mapping / reports / event-summary plots
- Python templates to replace Matlab code
- Python GUIs
- realtime distribution of everything
  - antelope databases
  - felt reports
- more schemas / extension tables

what research tools do you rely on? what development would be most valuable for research?

Used at the moment

- matlab
- dbmoment
- seismon
- local focmec rewrite

would be Useful

- ObsPy native antelope Interface

what is a 5 year vision for your network

- Happy staff because the routine work is clear and simple – enough time for interesting stuff
- Happy public because our information is cool
- Happy bosses because they like our products and love to support us

- at least 2 more BB stations
  - Vienna Basin / Hungary
  - Salzburg / Germany
- move stations with increased noise level