Status and development of the AW network Antarctica

Neumayer Station - Antarctica

- Accessible Nov to Feb
- Winter personnel: 9,
  2 Geophysicists,
  1 Meteorologist,
  1 Airchemist,
  Cook, Doctor, Technicians
- Changing on a yearly base

Who are we?

Bremerhaven (permanent)

Alfons Eckstaller

Tanja Fromm

Joelund Asseng

Antarctica (2018)

Mirco Czerwonka

Katharina Ferstl

What are we doing?

Long term observations

Geomagnetic

Infrasound

Seismology

GPS

Temporary projects

Cryoseismology
Regional seismicity

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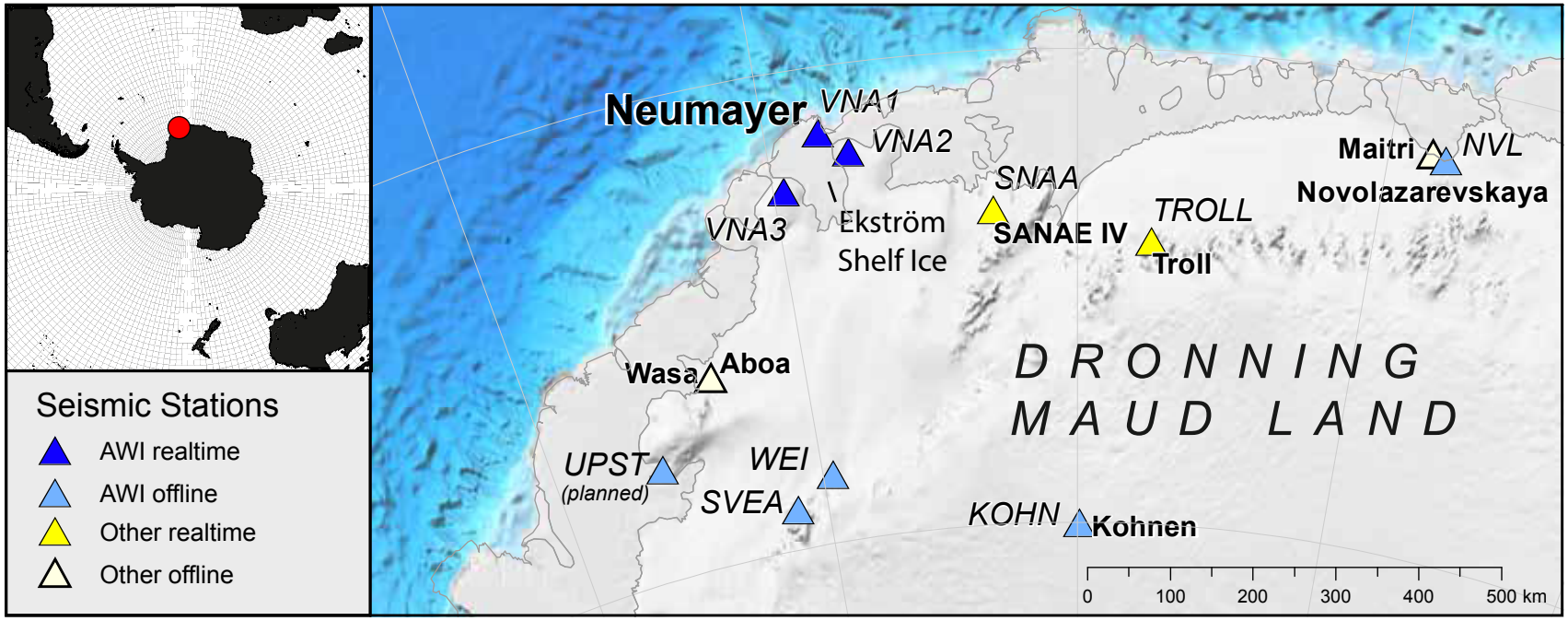
What are we doing?

Seismology

- No rapid hazard response necessary
- Providing data (waveforms, arrivals) for global scientific networks
- Scientific output increasingly important

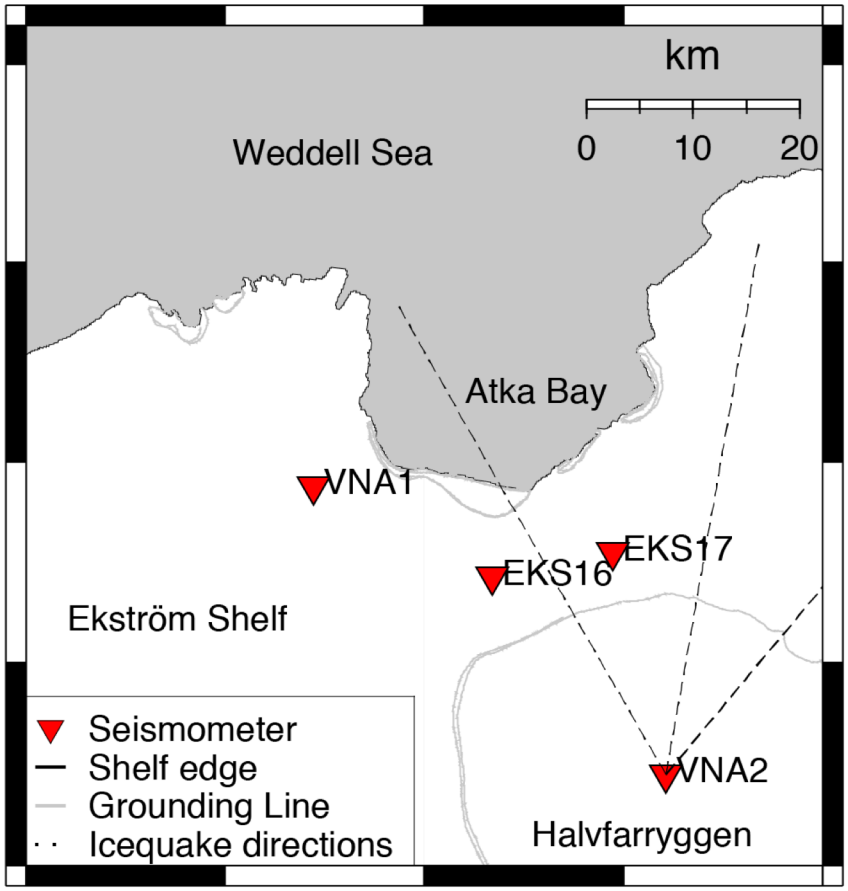
Current network

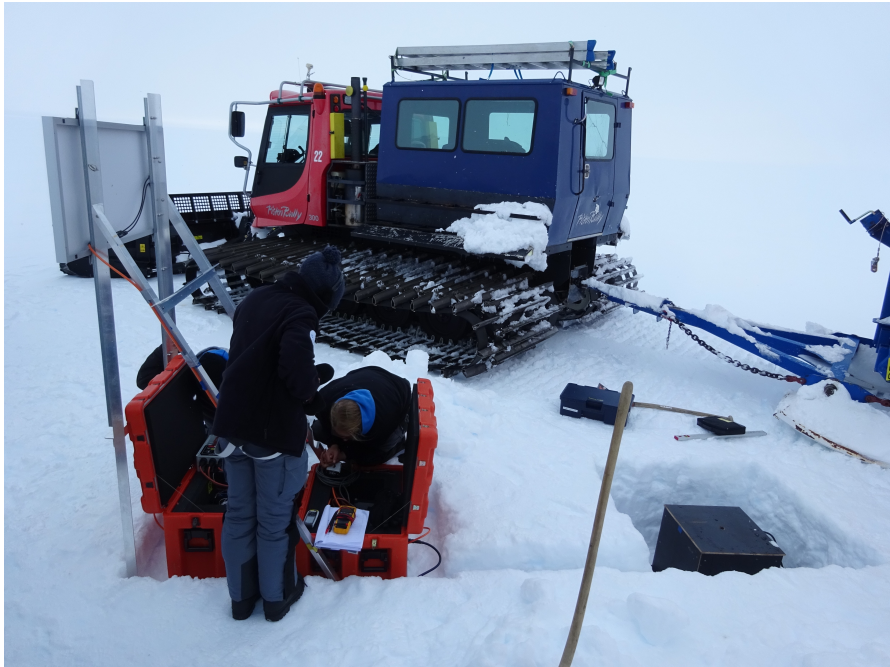


- New permanent station Utpostane setup in January, 2018
- 3 permanent stations with real time data
- 5 permanent stations without real time data
- Q330, Reftek130, Guralp GMC-3ESP 120s, Lennartz LE3D-20s

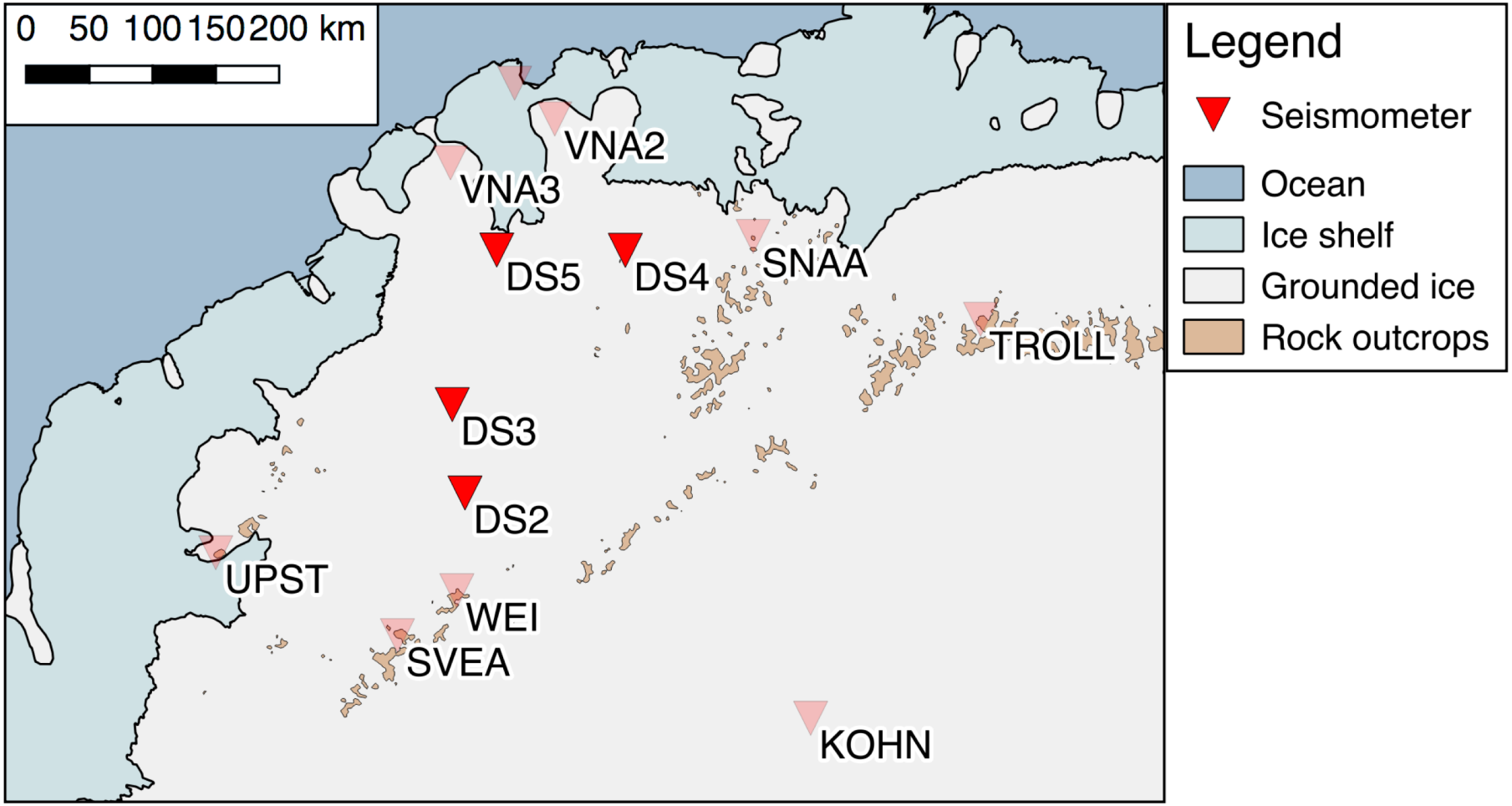
Temporary stations

- Deployed in 2017
- Local ice shelf dynamics
- 3 Stations Mini-Arrays (500m edge length)





Moving array – 1. stage



Deployed austral summer 17/18
Q330, Metrozet MBB-2

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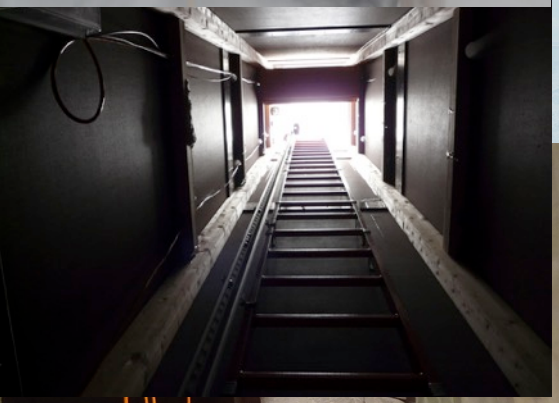
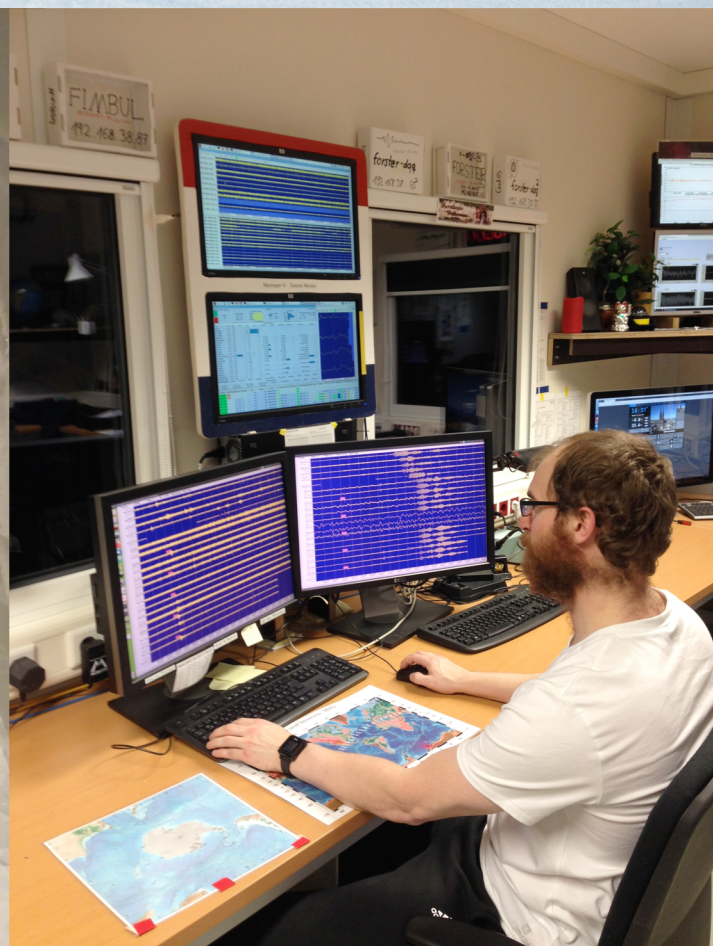
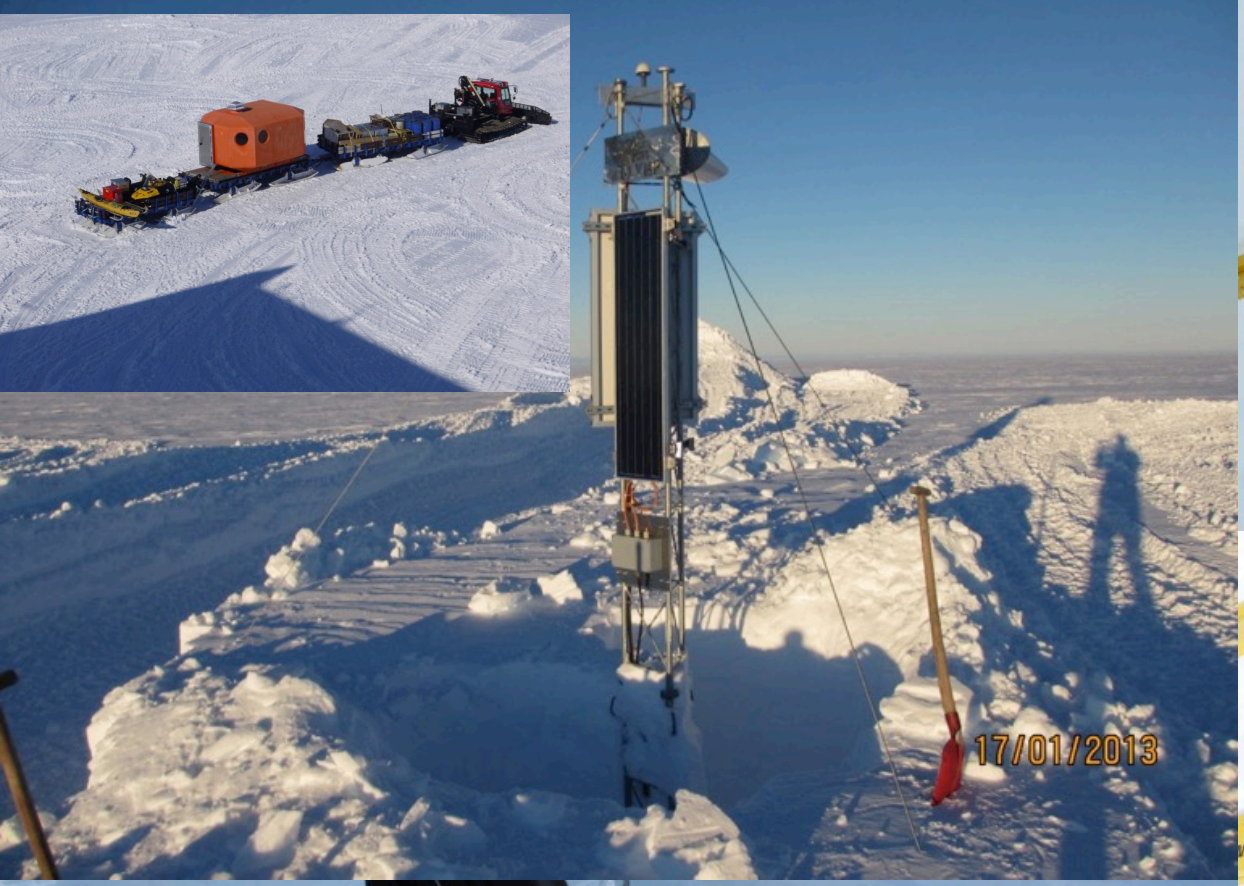


Neumayer-Station
AWI


FIMBUL


17/01/2013

2.45m

What do we use and need?

- Winterer
  - Initial manual picking of 5 online stations (dbpick)
  - Association with catalog events (dbloc2)
  - Event Bulletin to ISC

- Tools for manual analysis, e.g.:
  - Analyse phases in spectrograms
  - Particle motion
  - Programming interfaces

Currently used languages

- Python3
  - – Problems with Antelope interface (python2)
  - + Used at universities
  - + large obspy community
- Perl
  - + Antelope interface
  - – ‚young‘ people can‘t program perl
- tcsh/bash

Obspy and Python2

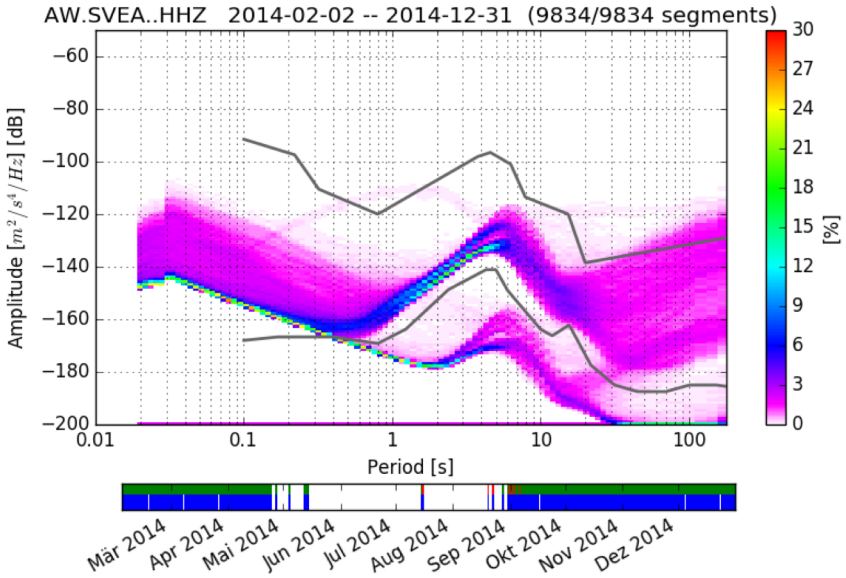
```
Python 2.7.12 (default, Jun 29 2016, 12:52:38)
[GCC 4.2.1 Compatible Apple LLVM 7.0.2 (clang-700.1.81)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> import obspy
>>> Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "/opt/local/Library/Frameworks/Python.framework/Versions/2.7/lib/python2.7/site-packages/obspy/__init__.py", line 44, in <module>
    __version__ = _get_version_string(abbrev=10)
  File "/opt/local/Library/Frameworks/Python.framework/Versions/2.7/lib/python2.7/site-packages/obspy/core/util/version.py", line 141, in get_git_version
    release_version = read_release_version()

  File "/opt/local/Library/Frameworks/Python.framework/Versions/2.7/lib/python2.7/site-packages/obspy/core/util/version.py", line 127, in read_release_version
    with io.open(VERSION_FILE, "rt") as fh:
LookupError: unknown encoding:
```

What have we done?

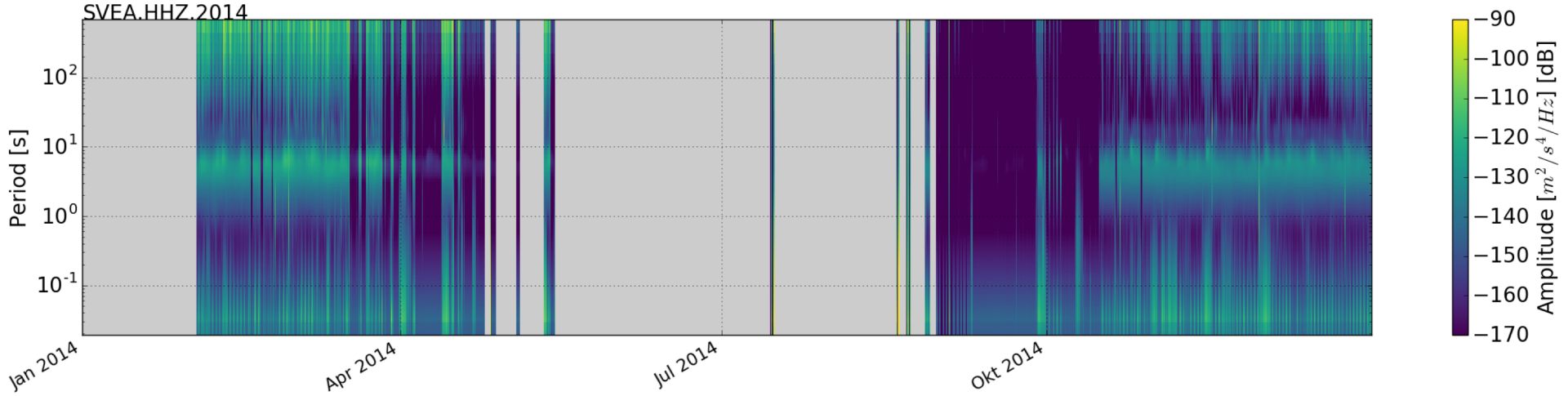
- Cleaned up our database mess
  - Merged overlapping dbs
  - Fixed scrambled event tables
  - Splitted to yearly archive dbs
  - Updated coordinates VNA1 (moving)
- Updated dbbuild batch files
- Included offline stations (Reftek130, Q330)
- Started noise analysis (obspy)
- Build and setup plenty of stations

Noise Analysis -- PPSD



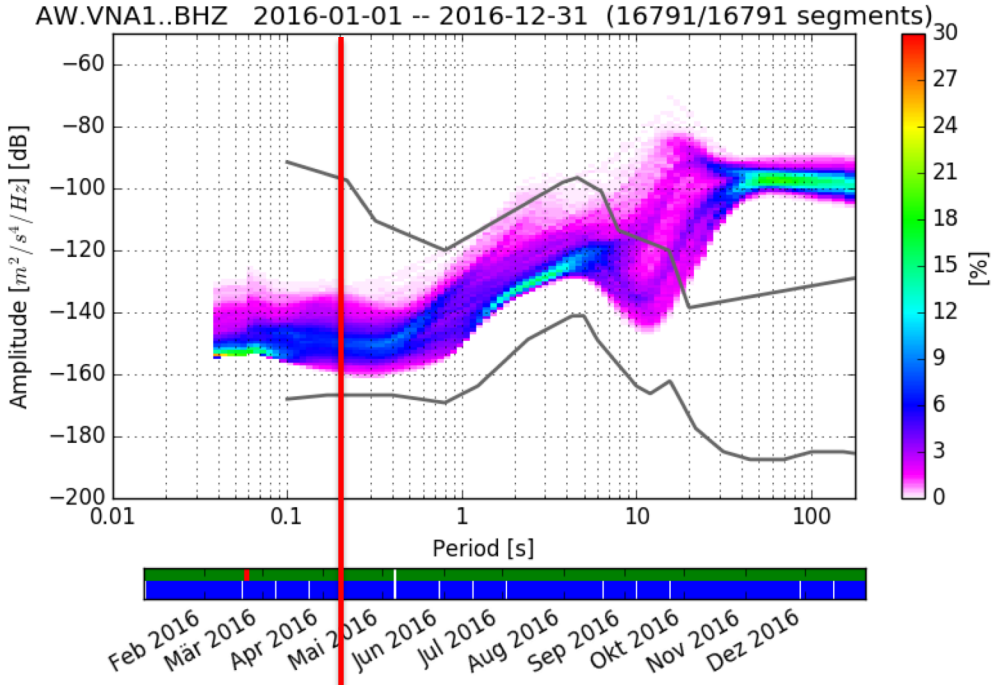
Quality Control

Temporal variation

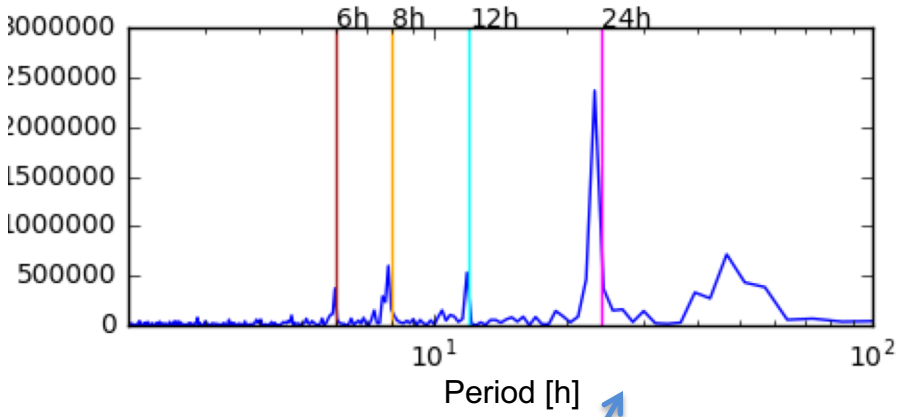


Noise Analysis -- PPSD

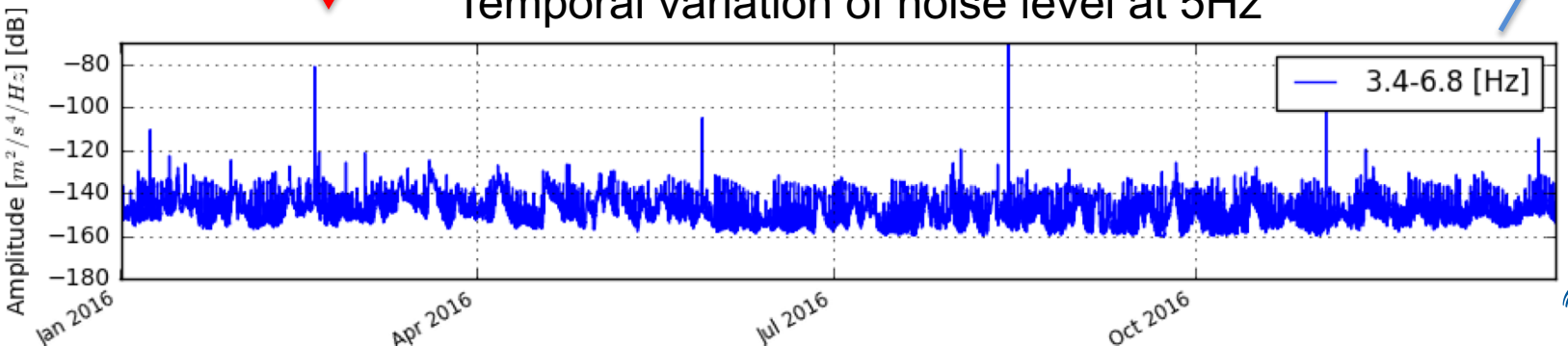
Probability Power Spectral Density



Spectral analysis



Temporal variation of noise level at 5Hz



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What we still need to do

- Merge all old data (mseed, catalog) in Antelope database
- Reassociate events (moving VNA1)
- Detect and associate arrivals of offline data (kind of dbassociate, dbassoc_arrival)
- Relocate local events, moment tensors
  → currently active tectonics?
  → postglacial uplift events?
- Analyse icequakes
  → ice sheet stability?

Thank you
Questions?
Comments?
Remarks?