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Short report on dbMISS project status

towards attenuation tomography in NRW

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The DATA collection status (Seismic Networks):

GD (events catalog 1980-2023, SEISAN S-files), for a selected sample of events waveforms data are received, but for the whole dataset, waveforms should be picked up.

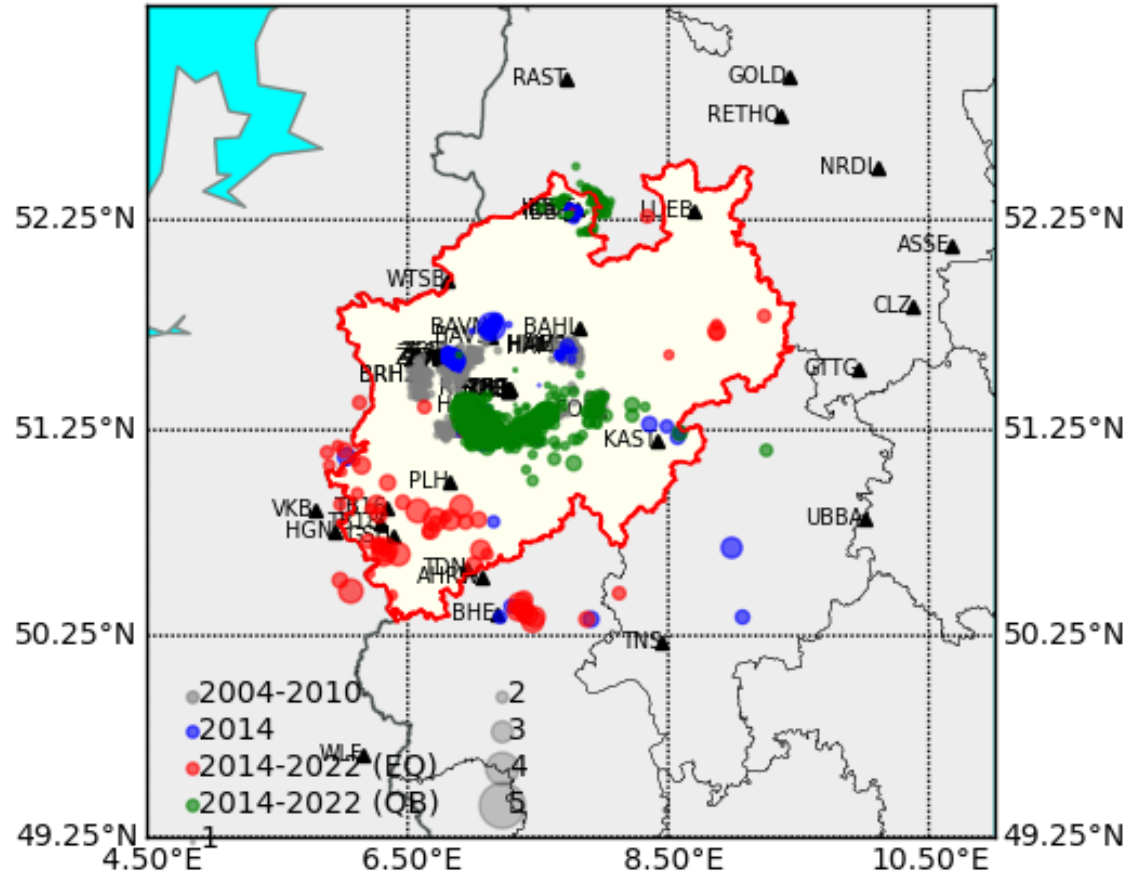
available **Depth**

- Earthquake (**3805**/7144)
- Not defined (**1658**/1770)
- Explosion (**34**/1161)

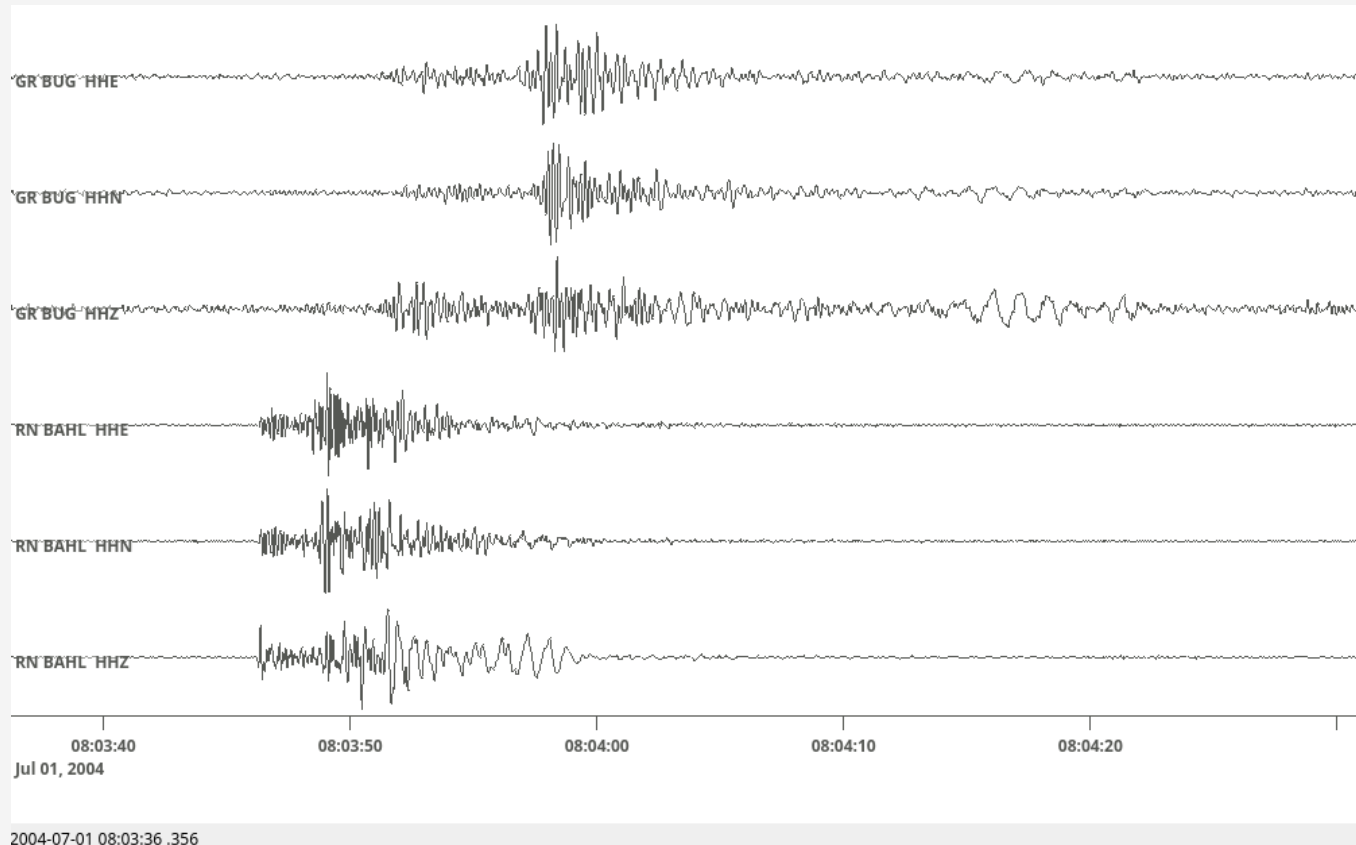
RN (events catalog 2002-2022 gap: 2010-2014), waveforms available from FDSN

- 2004-2010 (catalog from 2002, but bull. Since 2004), **1614 events**.
- Mostly located with 2 - 4 stations, (BUG, BAHL, ZERL, BPFI) (events located with 1 station are not included), Type of events are induced (this is assumption, shallow depth) Magnitude range above 1.3 ML.
- 2014 (obspy catalog) type of events are not defined, **1133 events?**
- 2015-2022 (bulletin data), **64 earthquake** and **2393 Quarry Blasts**

all events distribution - RN catalog



Example of data quality 2004-07-01



• Challenges:

- Uneven distribution of earthquakes and QB.
- Uneven distribution of stations at NRW
- Lack of earthquakes in the northern part.
- Regarding to the set up of the input parameters for running MuRAT tool, both QB and EQ can not be used together to make one Q tomography model.
- The hypocentral information of the common events in both catalogs should be updated.

- MuRAT, Matlab software package for seismic attenuation tomography,

De Siena, L., C. Thomas, and R. Aster. "Multi-scale reasonable attenuation tomography analysis (MuRAT): An imaging algorithm designed for volcanic regions." *Journal of Volcanology and Geothermal Research* 277 (2014): 22-35. - Older release that discusses the code for coda-normalisation, also used in the early works of Prudencio et al. 2015, a,b, GJI

• Suggestions:

- Individual attenuation model for explosion and Earthquake sources
- The MuRAT package is compatible for all 3 kinds of data, earthquake, explosions, and noise.
- Ambient Noise Measurement, coda quality factors (Q_c) of Rayleigh waves, from interstation cross-correlograms (Borleanu et al, GJI 2024) (period range of 3-30 s)
- Installation of temporary seismic stations in the Northern part, and at least 6 months of noise measurement.

To have an idea about the output of MuRAT

Q (Total Attenuation)

2 Hz

