



Universität
Münster

dbMISS project meeting:

Attenuation Study in NRW using local earthquake and quarry blasts/induced seismicity

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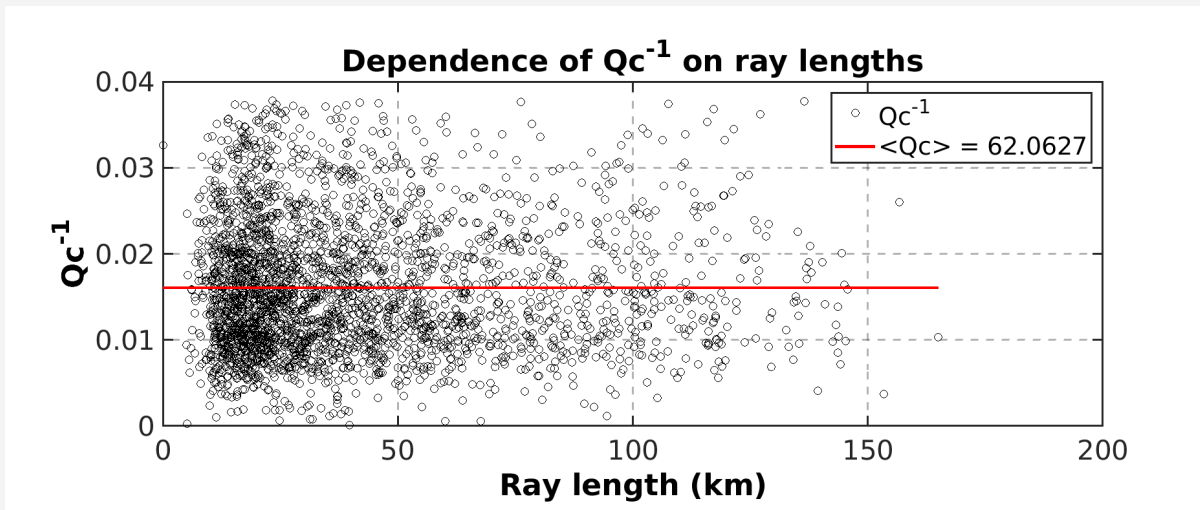
Die Landesregierung
Nordrhein-Westfalen



Recap of Previous Report

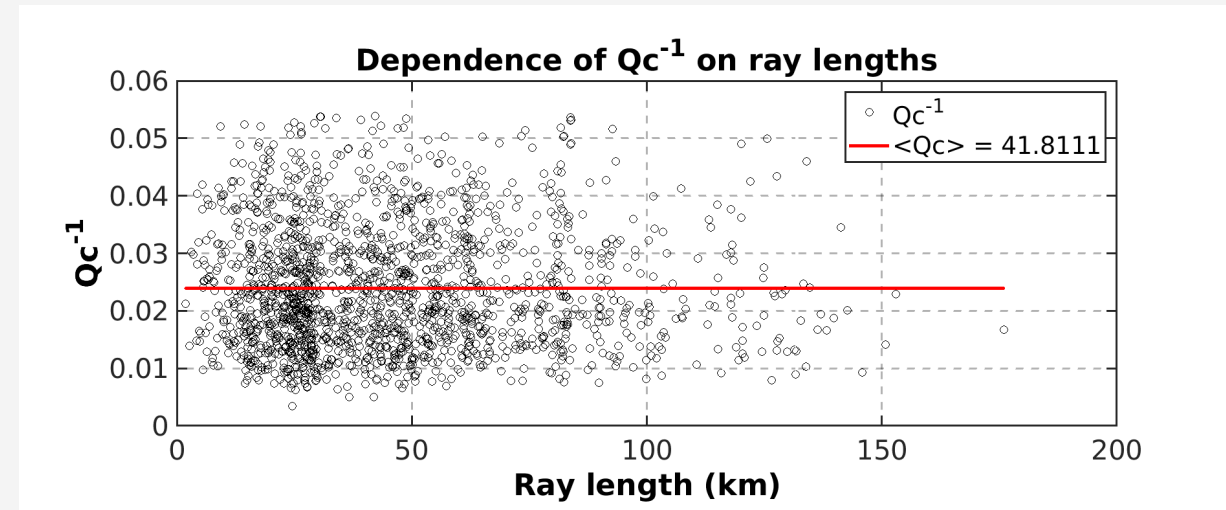
- Comparative analysis of Q_c , Q , and peak delay using earthquake (EQ) vs quarry blast (QB) data.
- QB allowed for higher resolution models at shallower depths (~ 1.3 km) compared to EQ ($\sim 2.5 - 15$ km).
- Both data sets showed an increasing Q_c trend with frequency, reinforcing each other's findings.

Q_c at 1 Hz



Earthquake

Q_c : 25-200

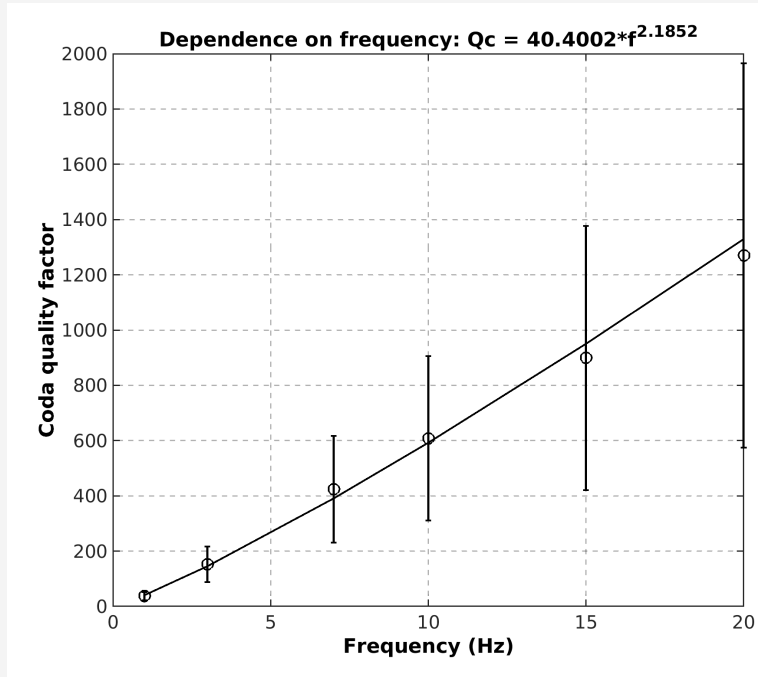


Quarry blast

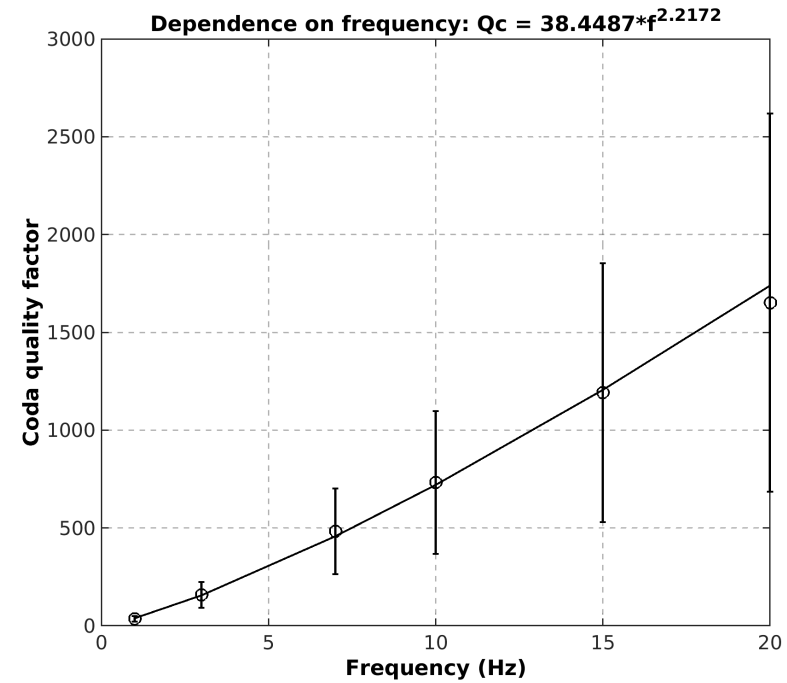
Q_c : 24-100

Average Frequency dependent Q_c

Earthquakes

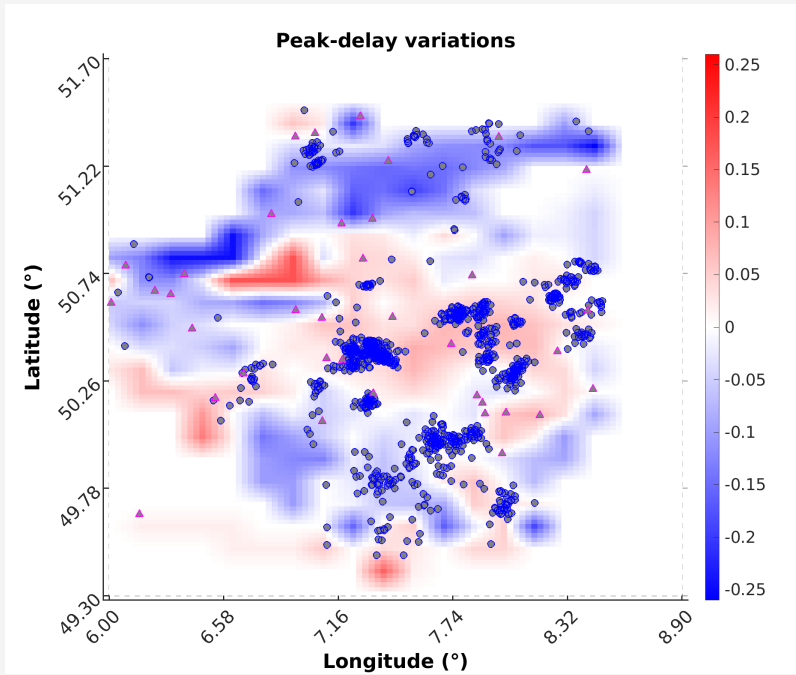


Quarry blasts

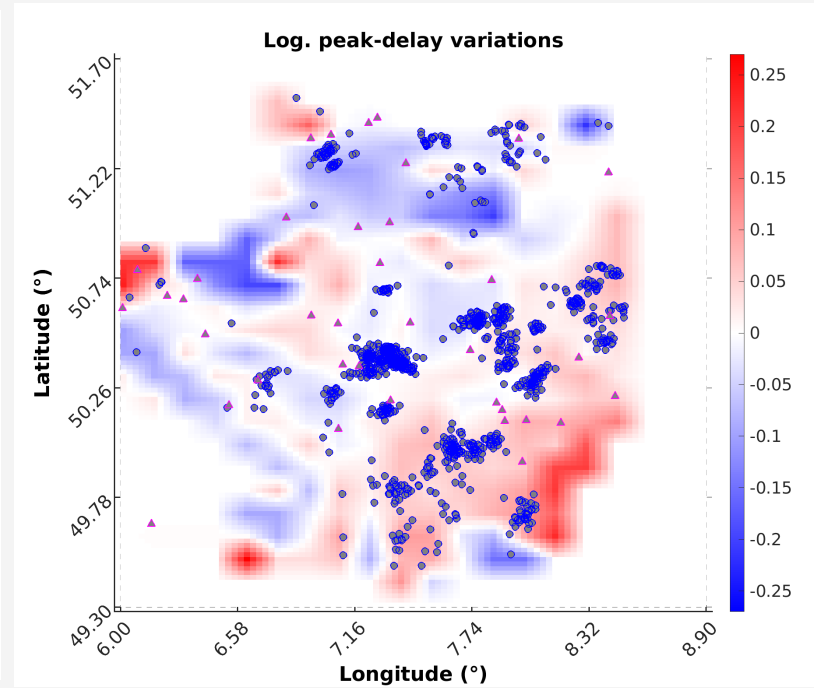


Comparing Peak Delay tomography map

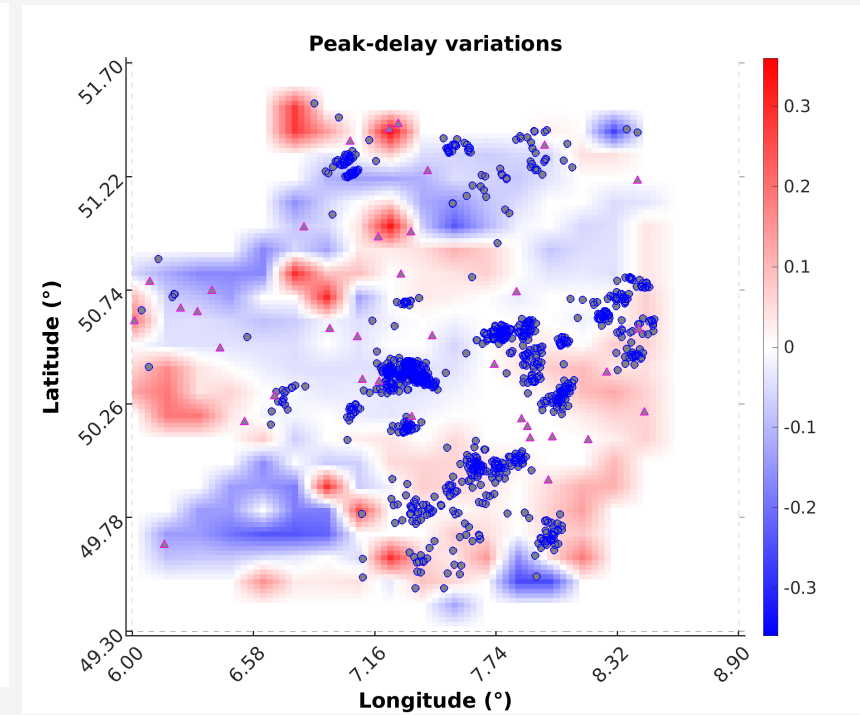
QB- 1-5 Hz 1300 m



QB- 7 Hz 1300 m

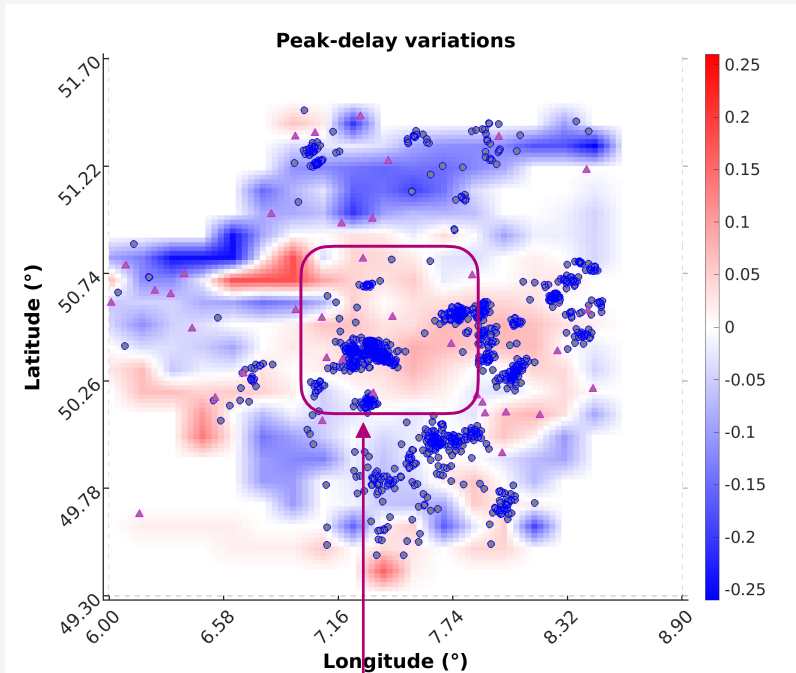


QB- 10 Hz 1300 m

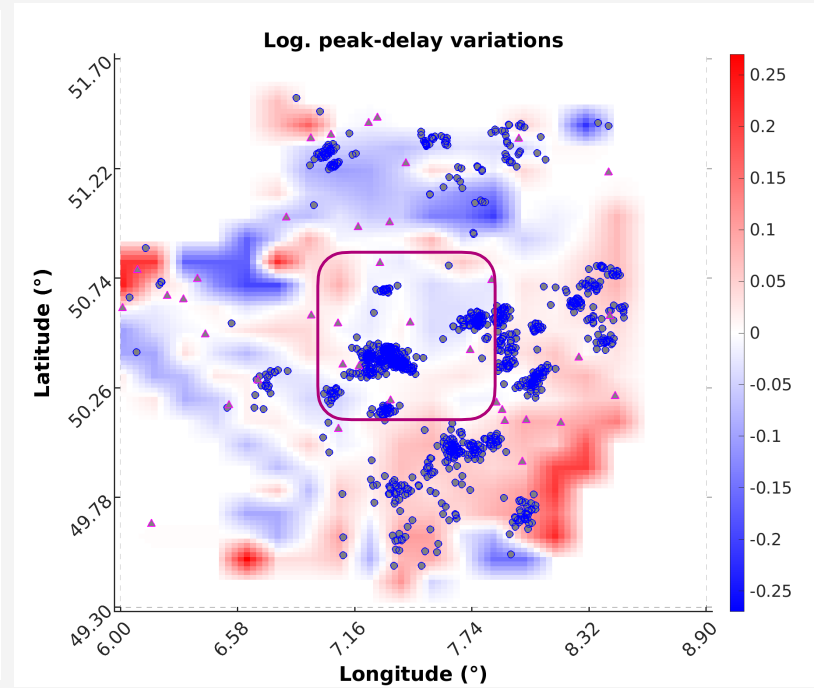


Comparing Peak Delay tomography map

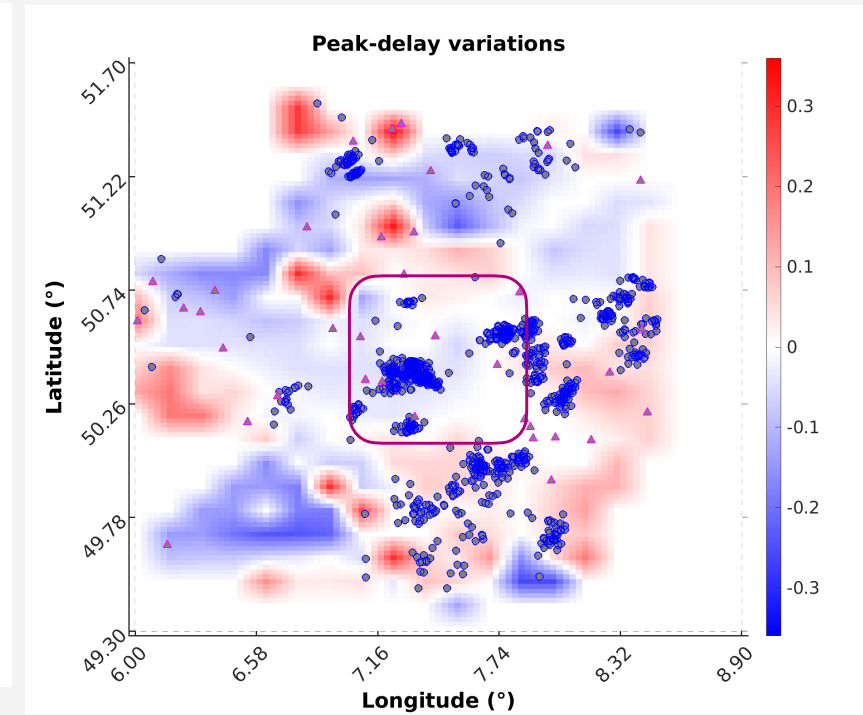
QB- 1-5 Hz 1300 m



QB- 7 Hz 1300 m



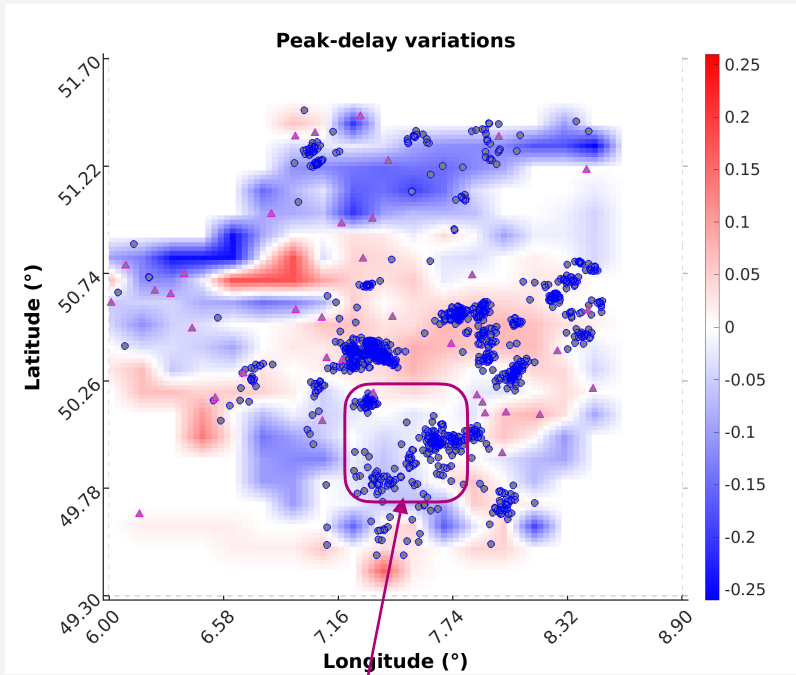
QB- 10 Hz 1300 m



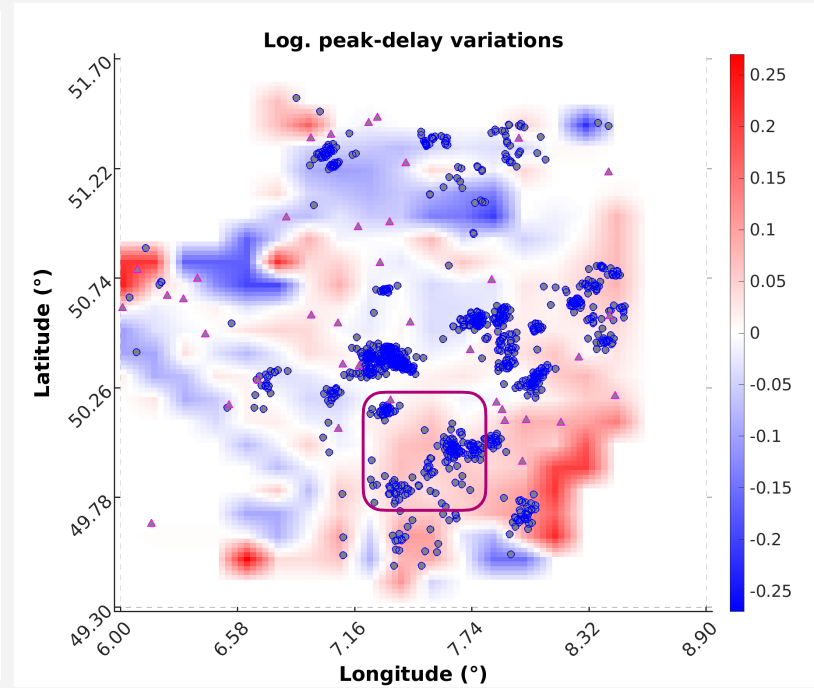
Frequency dependent variations

Comparing Peak Delay tomography map

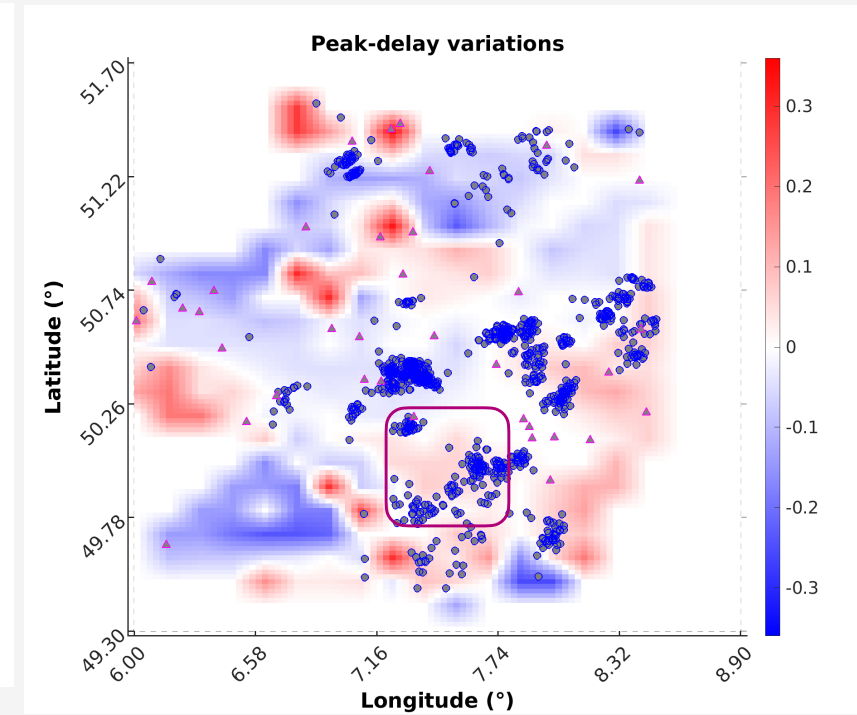
QB- 1-5 Hz 1300 m



QB- 7 Hz 1300 m



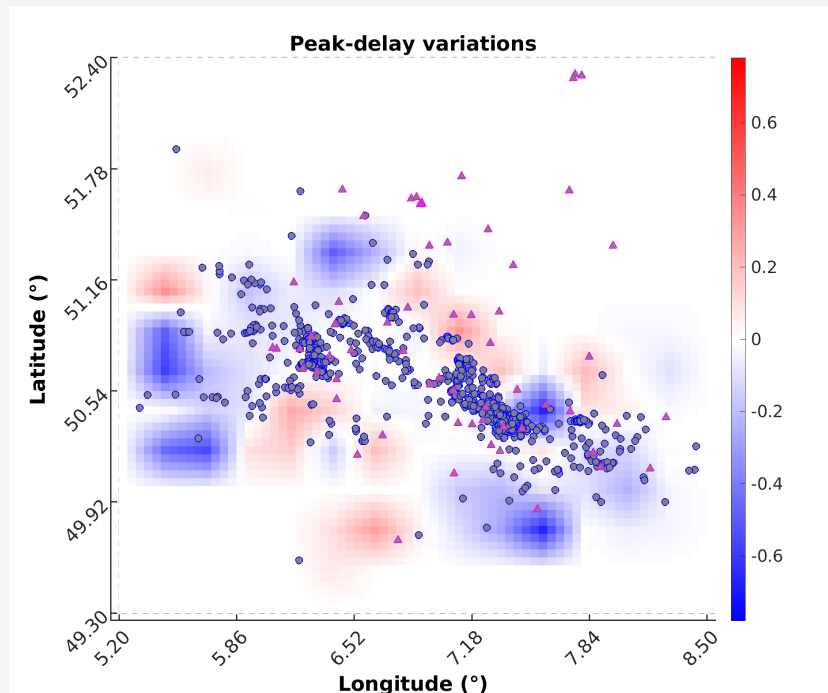
QB- 10 Hz 1300 m



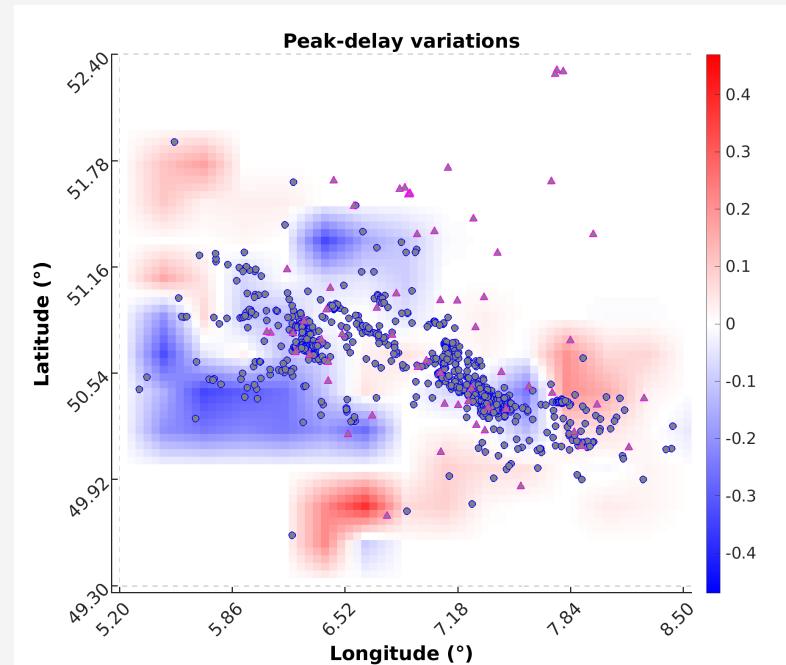
Frequency dependent variations

Comparing Peak Delay

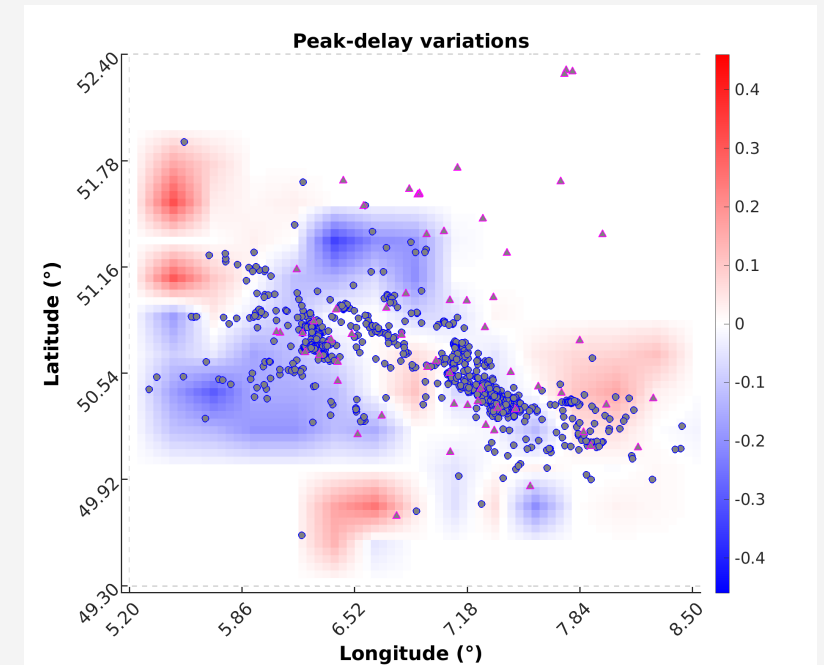
EQ- 1-5 Hz 15000 m



EQ- 6 Hz 15000 m



EQ- 12Hz 15000 m

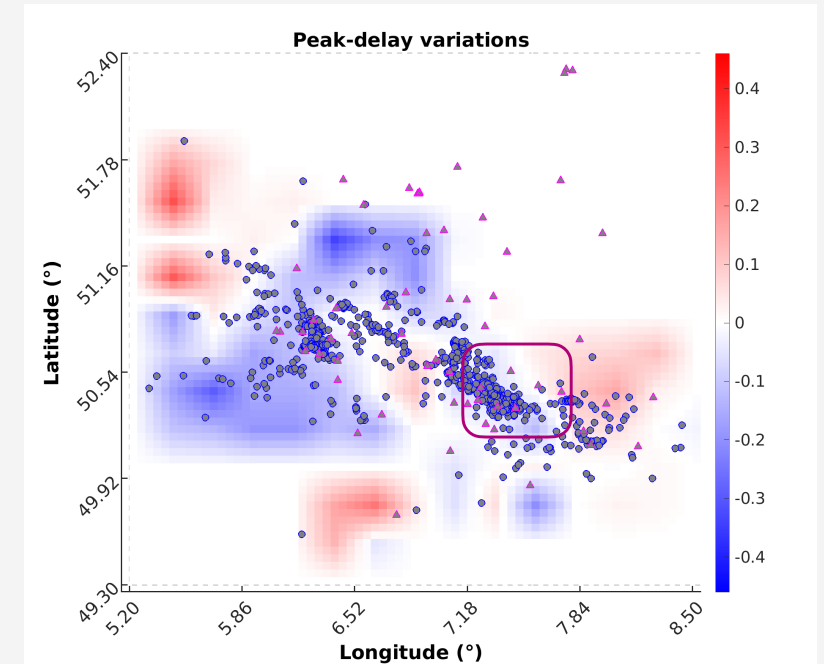
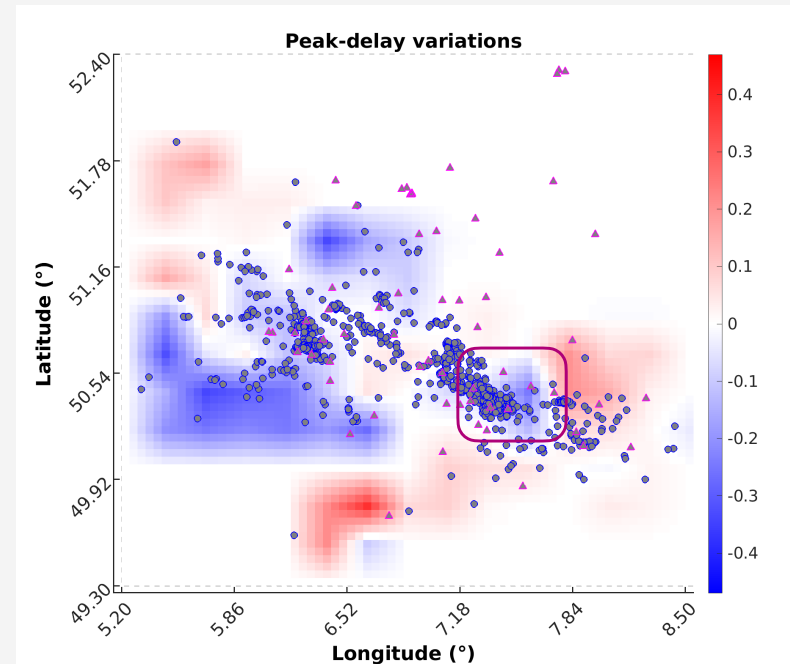
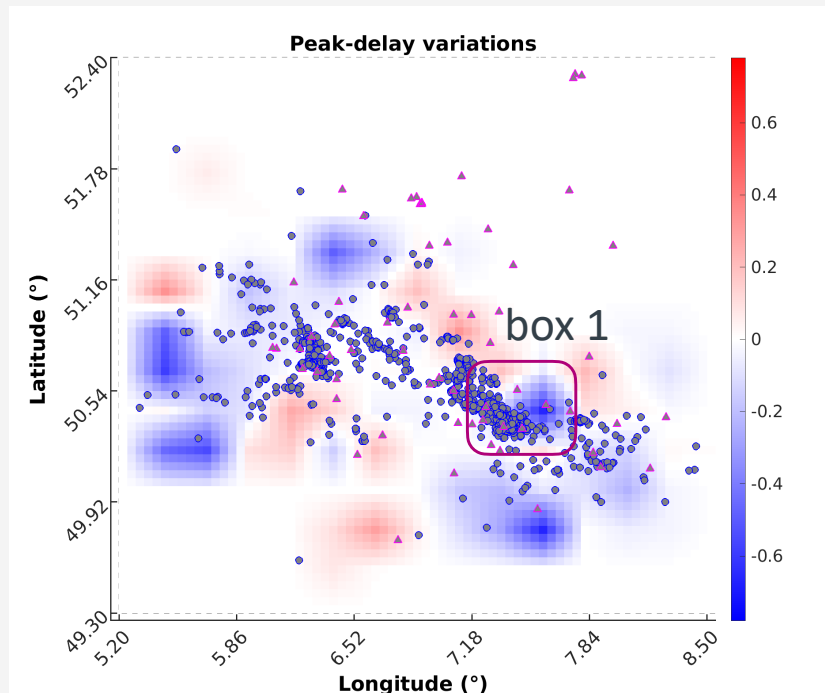


Comparing Peak Delay

EQ- 1-5 Hz 15000 m

EQ- 6 Hz 15000 m

EQ- 12Hz 15000 m



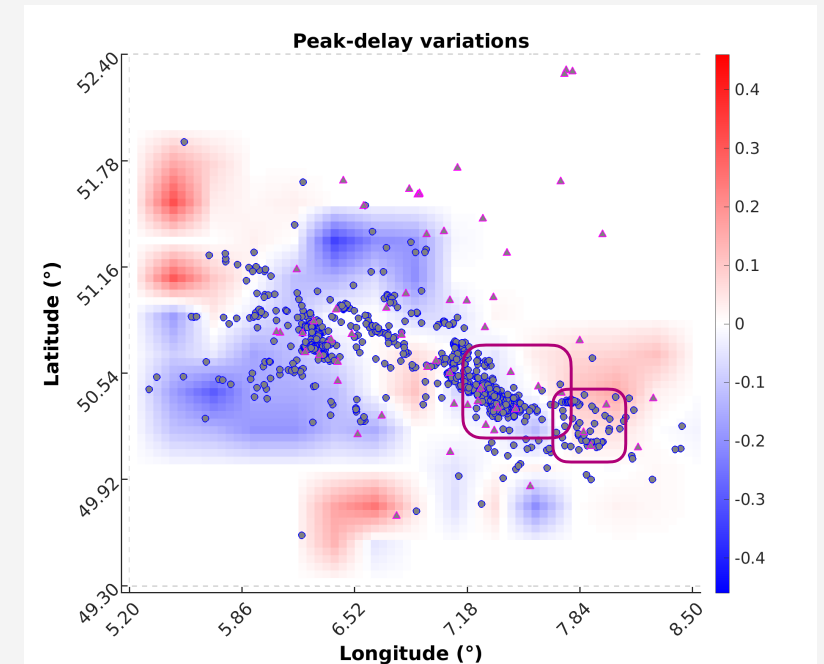
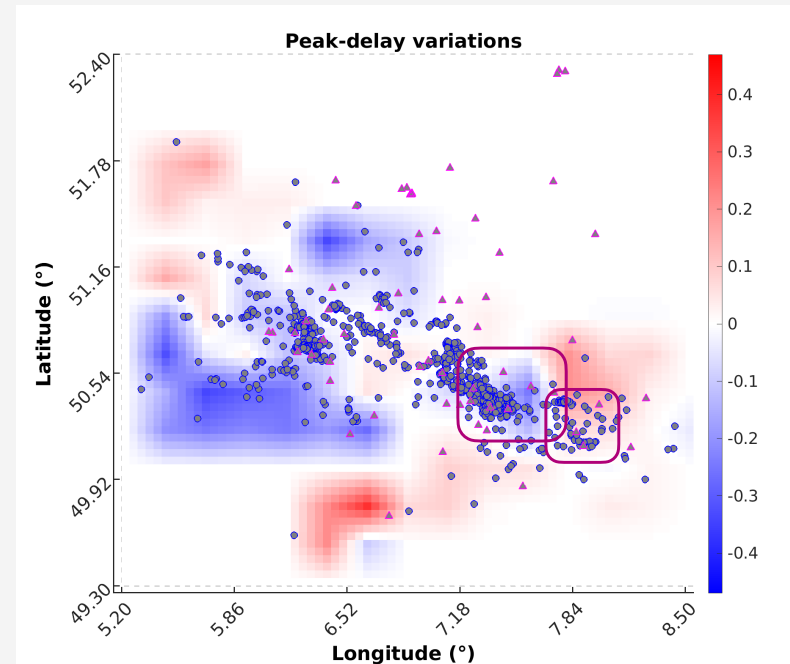
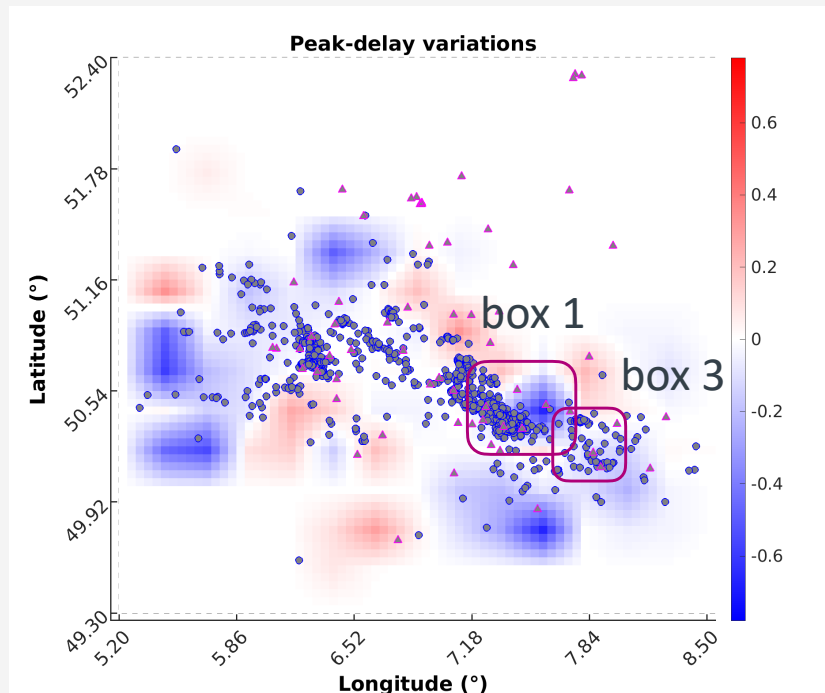
not strong frequency dependent variations

Comparing Peak Delay

EQ- 1-5 Hz 15000 m

EQ- 6 Hz 15000 m

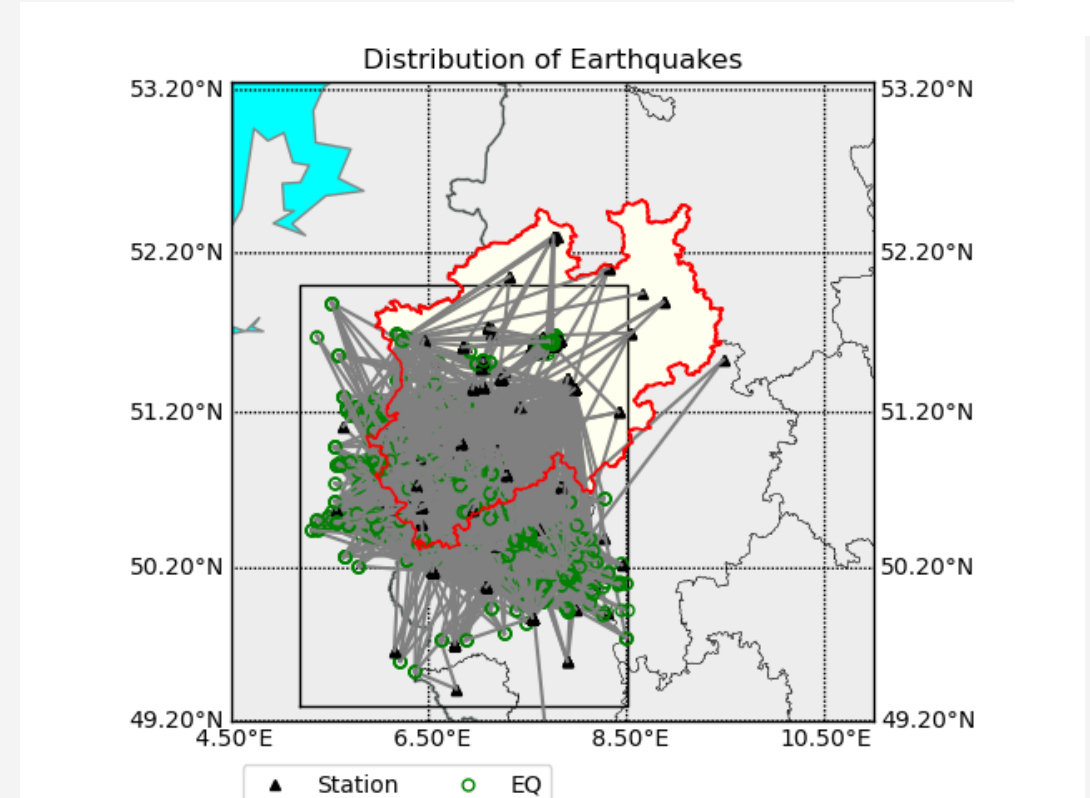
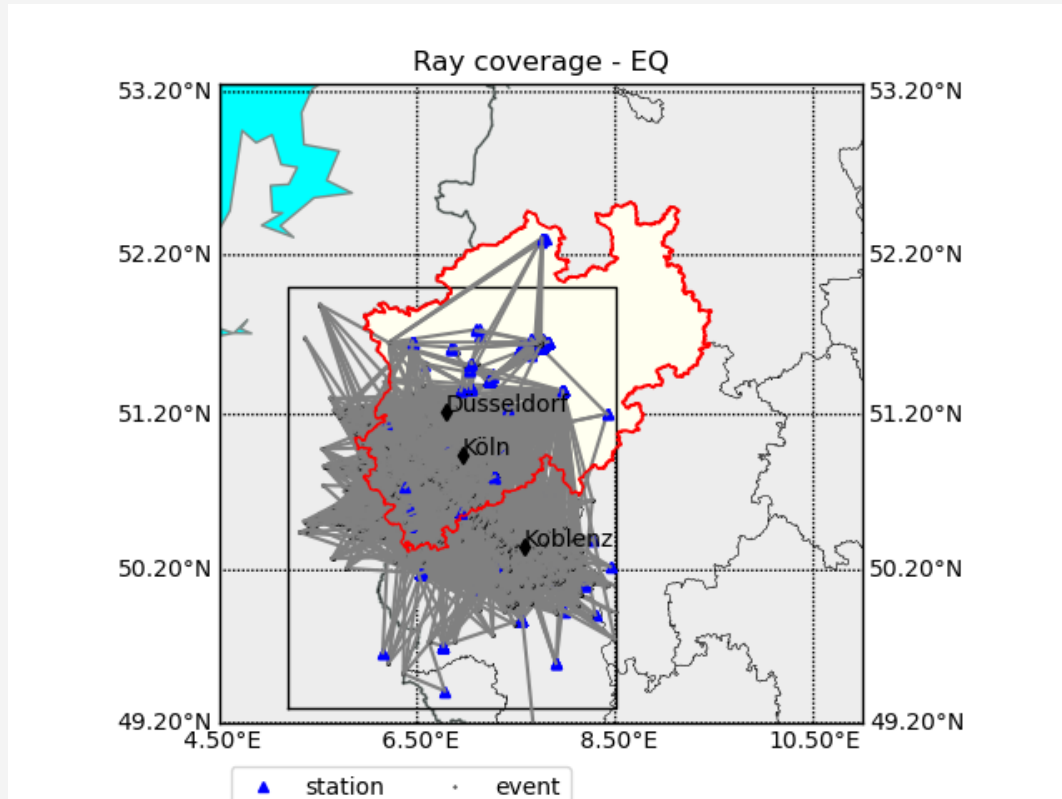
EQ- 12Hz 15000 m



Frequency dependent variations

Update on New Data

- Added 43 (RN), (67 GD) recent earthquakes from the GD and RN network.
- Processed data from a temporary network (5R) installed for 1 year in the northern part of the study area. 26 events were visible
- Considering the initial quality selection criteria, phases of just 15 events is added.



Updated Ray Coverage (Both P and S phases)

Results from New Data

- The temporary network slightly improved data coverage, but the impact on tomographic models was minimal due to limited high-quality rays.
- High noise levels from surface installation and low seismic activity reduced the number of usable picks.
- The short duration of the temporary network and surface installation led to high noise, limiting its effectiveness.
- In the future, better results could be achieved with proper broadband sensor installation and longer operational periods.
- Despite the challenges, the additional data contributes to refining the understanding of the northern area (e.g: using Noice CC method) and can guide future deployments.

Thank you for your attention!