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# 3D active seismic tomography of the Barents Sea.

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The Barents Sea shelf has been coverded by a numerous wide-angle seismic profiles, aiming to resolve the crustal structure of the shelf. However, the overall structural arcitecture of the crystaline crust is still not fully understood, due to limited and sparse distribution of deep-sampling seismic profiles.

The petroleum related seismic exploration in Norwegian waters has been ongoing for decades. The recent increase of the seismic broadband stations onshore (including temporal deployments) provokes the idea to use these stations and the active seismic sources from the regional seismic reflection surveys, including academic and industry seismic projects, to reveal the crustal scale structure of the western Barents Sea.

We have analyzed seismic records from 8 permanent seismic stations from Norway, Sweden and Finland, and 12 temporally deployed broadband seismic stations from the ScanArray seismic network, which recorded more than 100’000 marine airgun shots from academic and oil industry campaigns in the south-western quarter of the Barents Sea.

The overall quality of the seismic records is exceptionally good. We clearly identify phases recorded from the offsets reaching 750 km. The identified phases include refracted crustal and mantle arrivals as well as Moho reflections, including both P and S waves. The overall quantity, quality, and the geometry of the seismic data makes it perfect for the application of the 3D joint refraction/reflection travel time seismic tomography to study the crustal structure of the Barents Sea.

The preliminary results show very complex and laterally inhomogeneous crustal structure of the Barents Sea, which has been known before. However, with the help of 3D seismic tomography we are able to cover the gaps in between isolated deep-sampling seismic profiles and cross-correlate structures identified on them. In this work we would like to present our up-to-date results from the 3D seismic tomography.