

WP 17: Transnational access to the research infrastructure of NORSAR

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Keywords

Seismic arrays, signal processing, near-real time analysis, Earth structure, seismicity

Figure

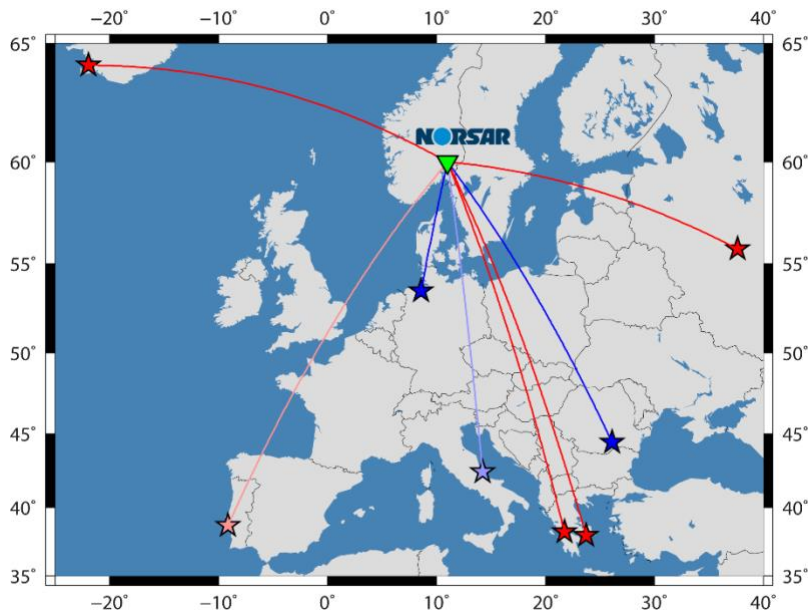


Figure 1. Map of European affiliation locations of TA visitors at NORSAR (blue: female, red: male; lighter colours: visits in progress or planned for January 2020).

Main Results

Until now, six of planned eight TA projects at NORSAR have been finalized. The six users visiting NORSAR for these projects are all early career scientists either working on their PhDs (3) or with recently finalized PhDs (3). All finalized projects focused on different aspects of array-data analysis. Four visitors came with their own data, observed with different arrays in different environments:

- infrasound array data from the Romanian infrasound station, to be used as classifier to distinguish between earthquakes and explosions (quarries, mines)
- short period data from a temporary small aperture array in Russia, to detect and locate low magnitude seismicity in the Lena trough region, Siberia
- strong motion accelerometer near field observations from an array in Iceland, to investigate the characteristics of mainshock and aftershock sequence of a magnitude 6.3 earthquake in the South Iceland Seismic Zone

- broadband data from a small aperture array-like installation on the Peloponnese in Greece, to search for seismic tremor signals caused by slow motion earthquakes in the Ionian subduction zone
- The two other projects were about:
- the investigation of Moho depth and structure of the mantle transition zone (receiver function method) below southern Norway, with data observed by the large NORSAR array and other permanent and temporary seismic stations in southern Norway.
- testing a theoretically developed blind beamforming algorithm, with data from NORSAR's small aperture array ARCES in northern Norway

During the about one month long stays at NORSAR, all TA users became familiar with different aspects of seismic array-data processing: the influence of array geometry and instrumentation, the resolution of array specific measurements (backazimuth and slowness), different beamforming techniques, the influence of frequency contents on signal processing results, the separation of seismic signals from noise with arrays, and the importance of including the entire wavefield (vertical and horizontal components) in the analysis.

All users continue the analysis at their home institutions after the research visits. Most of the analysis was performed with NORSAR's array processing software package, which the TA users could freely copy for later usage at their home institutions.

(Status December 2019)

List of Publications

- Dinescu, R., Ghica, D., Schweitzer, J., Näsholm, S.P., Popa, M., & Ionescu, C. (2019). Monitoring man-made hazards using data recorded with the Romanian seismic and infrasonic arrays. 16th EGU General Assembly, Vienna, Austria, April 2019
- Dinescu, R., Ghica, D., Borleanu, F., Popa, M., Rogozea, M., & Chircea, A. (2019). Monitoring regional explosions with Romanian seismo-acoustic arrays. Case study: 09th of October 2018, Ukraine. Balkan Geophysical Society (BGS), Albena, Bulgaria September 2019
- Goev, A.G. (2019). PhD thesis to be defended 24 December 2019.
- Goev, A.G., Kosarev, G.L., Sanina, I.A., Riznichenko, O.Y. (2019). On the stability of modelling a velocity discontinuity with the receiver function method, Proceedings of the 7th Scientific and Technical Conference "Problems of the complex geophysical monitoring of the Far East of Russia", Petropavlovsk-Kamchatsky, 29 Sep – 5 Oct, 2019
- Greco, B., Ghica, D., Borleanu, F., Neagoe, C., & Dinescu, R. (2019). On the Use of Seismo-Acoustic Arrays for Environmental Monitoring in Romania. 27th IUGG General Assembly, Montreal, July 2019
- Pikoulis, E.-V., Psarakis, E. & Schweitzer, J. (2018). Joint signal detection and parameter estimation in seismic arrays. 36th General Assembly, ESC, Malta, September 2018
- Plötz, A. (2019). Local seismicity in the SW Laptev Sea Rift. AGU Chapman Conference on "Large-scale Volcanism in the Arctic: The Role of the Mantle and Tectonics", Selfoss, Iceland, October 2019

Access to Data and Services

All TA users had free access to NORSAR's database during their visits and these data are openly accessible via the Norwegian EIDA node (<http://eida.geo.uib.no/fdsnws/dataselect/1/>).

Liability claim

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