ROMANIA NATIONAL DATA CENTRE

Romania Participation to the CTBT

Since 1976, Romania is an active participant in the technical preparation of the international verification system in support of the Comprehensive Nuclear-Test-Ban Treaty (CTBT)

Romania is a signatory state of the CTBT since September 1996, and a ratifying state since October 1999

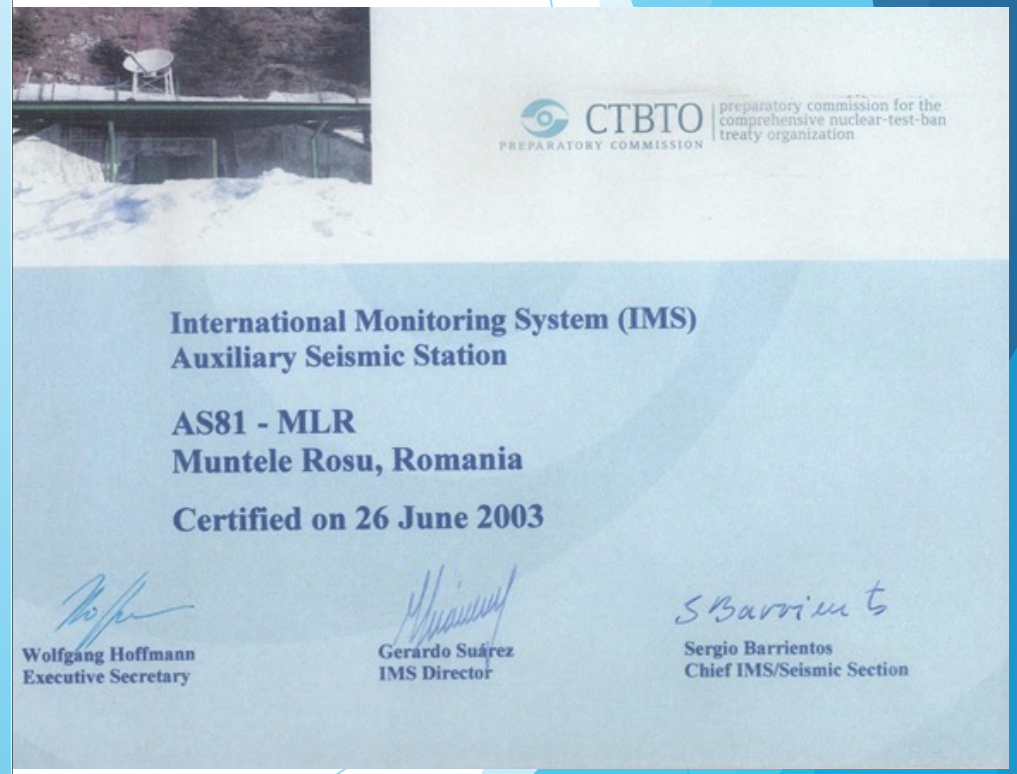
To achieve this mission, the National Institute for Earth Physics (NIEP) hosts the National Data Centre of Romania (N142-ROM NDC), and operates and maintain the auxiliary seismic station Muntele Rosu (AS081, MLR) as part of International Monitoring System (IMS).

Romania Participation to the CTBT (cont.)

On June 26, 2003, the Romanian seismic station Cheia-Muntele Rosu was officially certified as auxiliary seismic station AS081 of the IMS

MLR seismic data are continuously recorded and transmitted in real-time to ROM NDC, in Magurele, and, upon request, to the International Data Centre (IDC) at any time through on-line computer connections and VSAT transmission

Since October 13, 2004, a Facility Agreement between Romania and the Preparatory Commission of CTBTO is in force, granting the legal authority to Preparatory Commission for establishing, testing, operating, upgrading and maintaining IMS facilities on Romanian territory



Romania National Data Center (ROM NDC)

Romanian authorities have designated NIEP as the National Data Centre of Romania (ROM NDC) for implementation and verification of the CTBT

ROM NDC is responsible for operation and maintenance of the auxiliary seismological station Cheia-Muntele Rosu (MLR), included in the IMS

Role

ROM NDC staff ensures station monitoring, data quality checking, transmission and archiving

ROM NDC provides Romanian authorities with technical advice on all aspects of CTBT verification, including assessments of events likely to create concern in the framework of compliance with the CTBT

Romania National Data Center (ROM NDC)

Main activities and functions

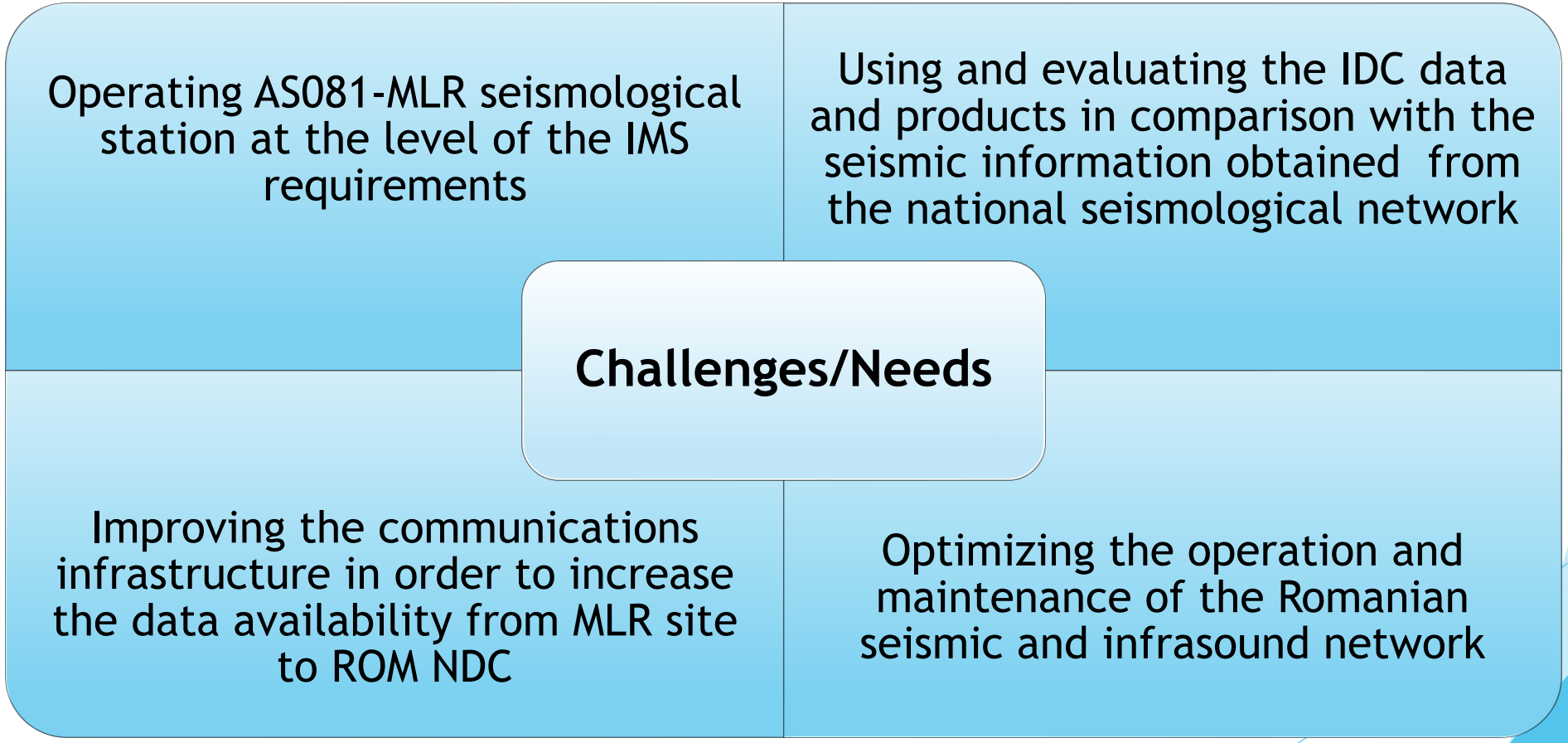
ROM NDC co-operates with CTBT Organization (CTBTO) for upgrading and maintaining of the MLR seismic station at the technical and operational standards required by CTBT

ROM NDC receives, processes and analyzes data recorded by IMS network, as well the products of the IDC from Vienna, Austria

ROM NDC participates to the CTBTO tests exercises and experiments, organized for assessment of the global monitoring system performances

ROM NDC collaborates with National Commission for the Control of Nuclear Activities (CNCAN) (as National Authority in issues related to the CTBT and the CTBTO and with the other authorities for the implementation of the CTBT

Romania National Data Center (ROM NDC)

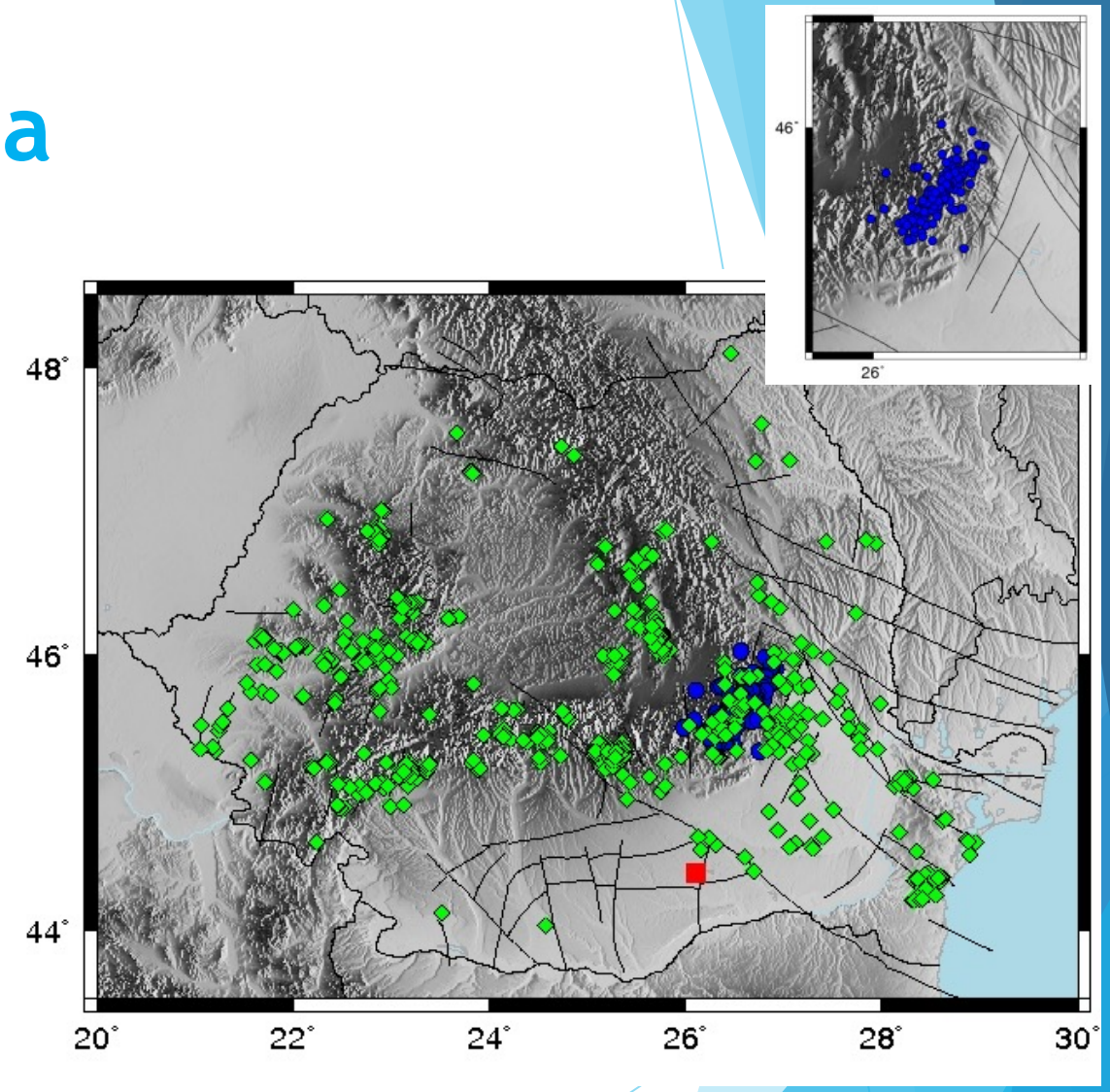


The seismicity of Romania

Romania is a country with significant seismic activity both at crustal and intermediate-depth levels, where the seismic monitoring has been developed since the 19th century

Only in 2022 there were 948 events recorded, 754 surface events and 194 intermediate-depth events

The intermediate-depth events are located in Vrancea region, the area with the most significant seismic activity in Romania.

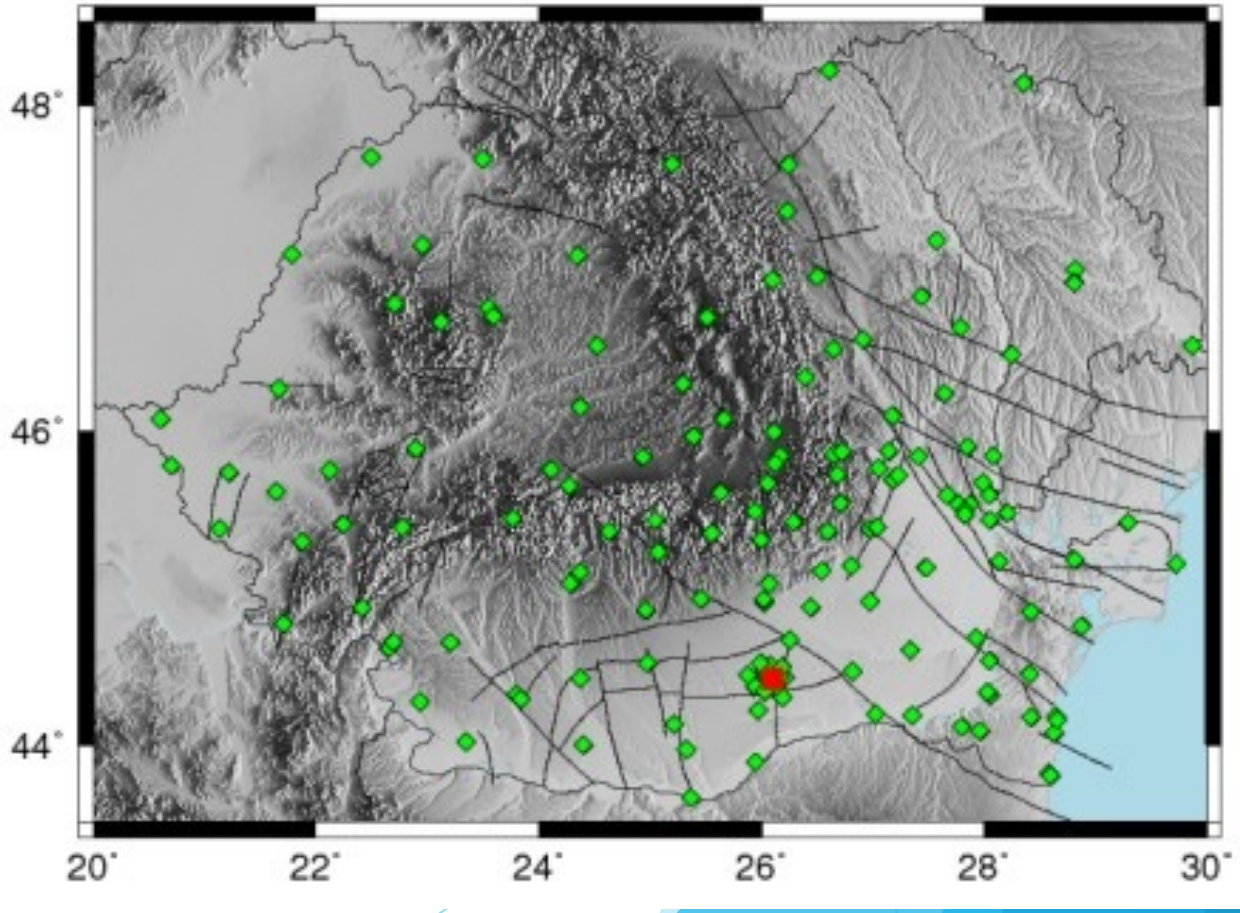


Seismicity of Romania and Vrancea region (up-corner) in 2022 (where green diamonds are surface events and blue dots are intermediate-depth events) (Romplus catalog, Popa et al., 2022)

National Institute for Earth Physics – Romanian Seismic Network

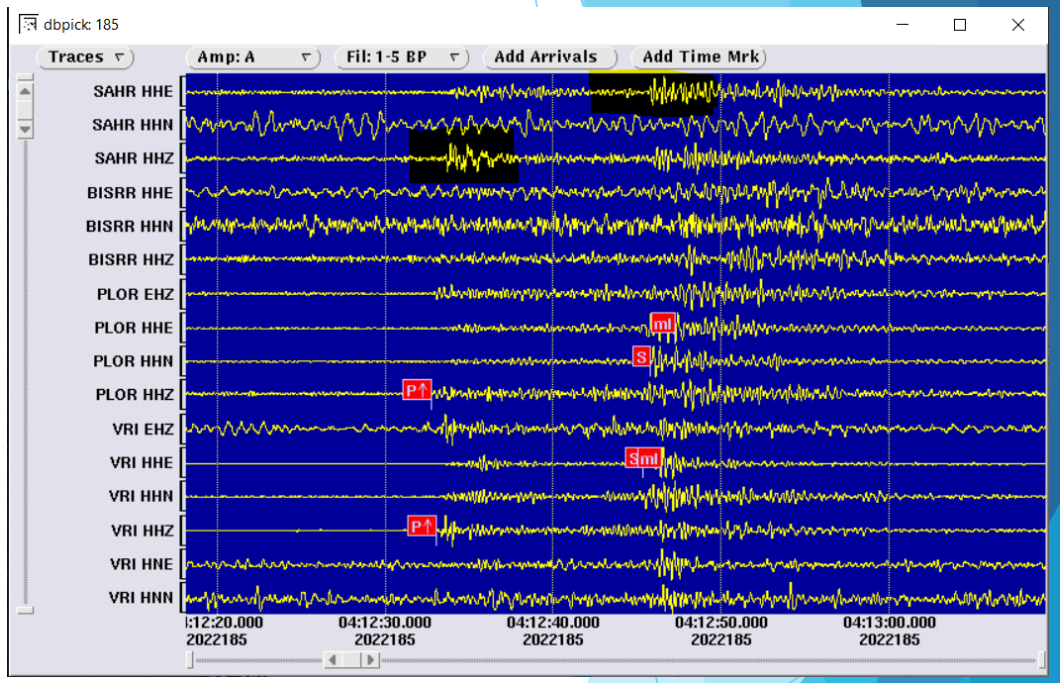
The first instruments were installed in 1889 and then monitoring continued over time both by improving existing measuring instruments and by installing new and more efficient ones

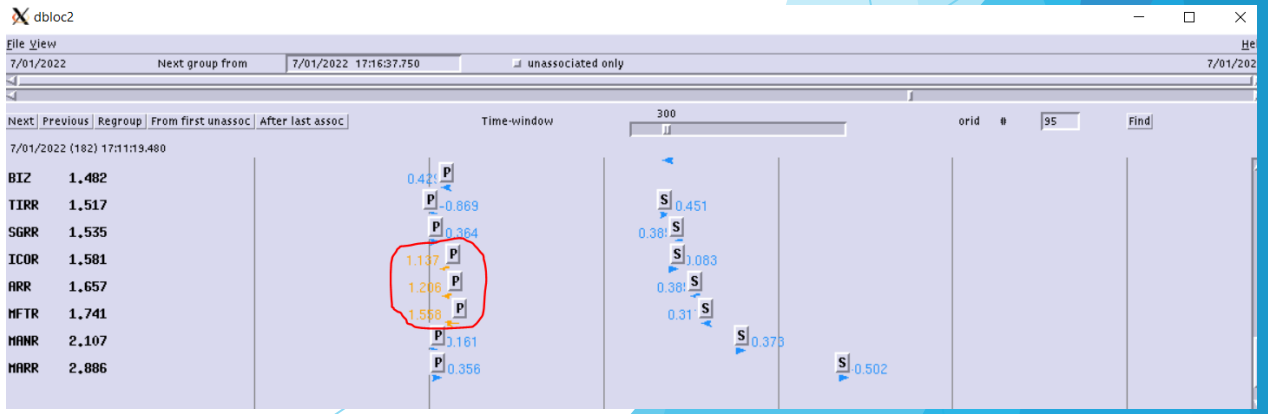
In 2023, the Romanian Seismic Network is operating with 166 seismic stations, most of them broadband and short-period seismic digital stations sending data in real-time, to the National Data Centre.



What are my main tasks at NIEP?

- Earthquake analysis (local, regional and teleseismic events)
- Local seismic events reviewing (using Antelope software)
- Developing and implementing of a new and improved procedure for reviewed local seismic events
- Generating and updating Romplus catalog



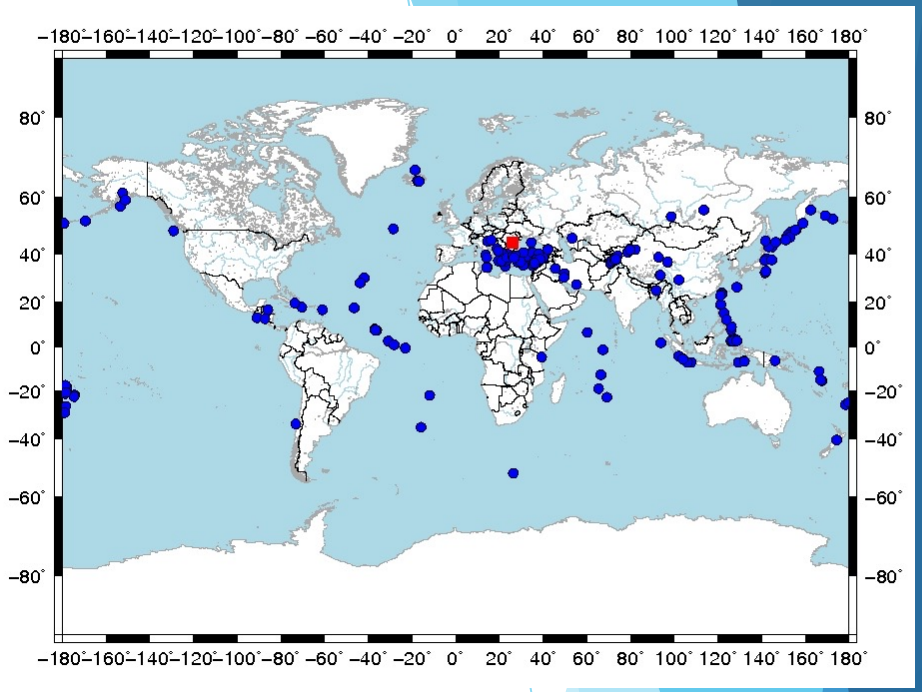


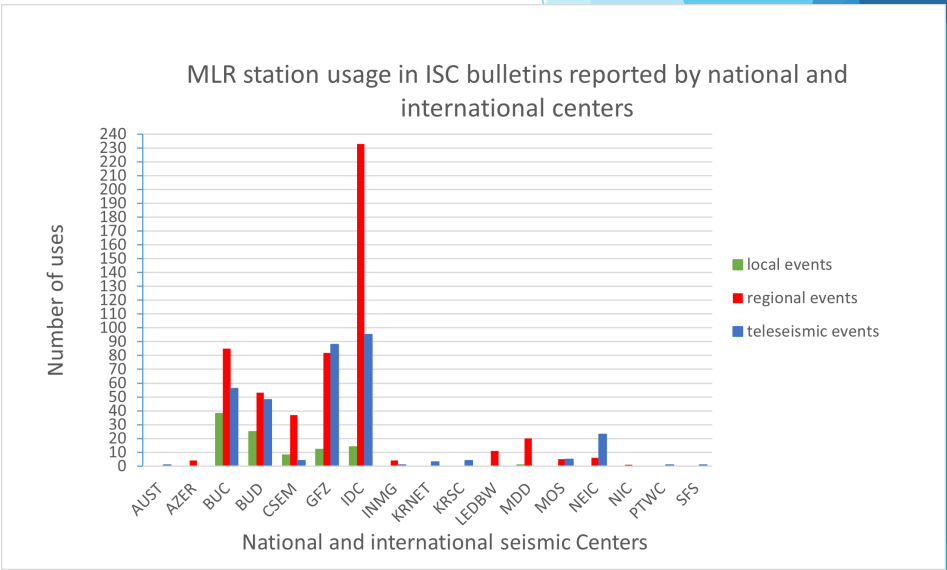
What are my main tasks at NIEP? (cont.)

Reviewing weekly and monthly seismic bulletins

Contributing to the monthly report regarding the contribution of the data registered by the auxiliary station AS081-MLR

Preparing the Monthly Seismicity Report registered on the Romanian territory

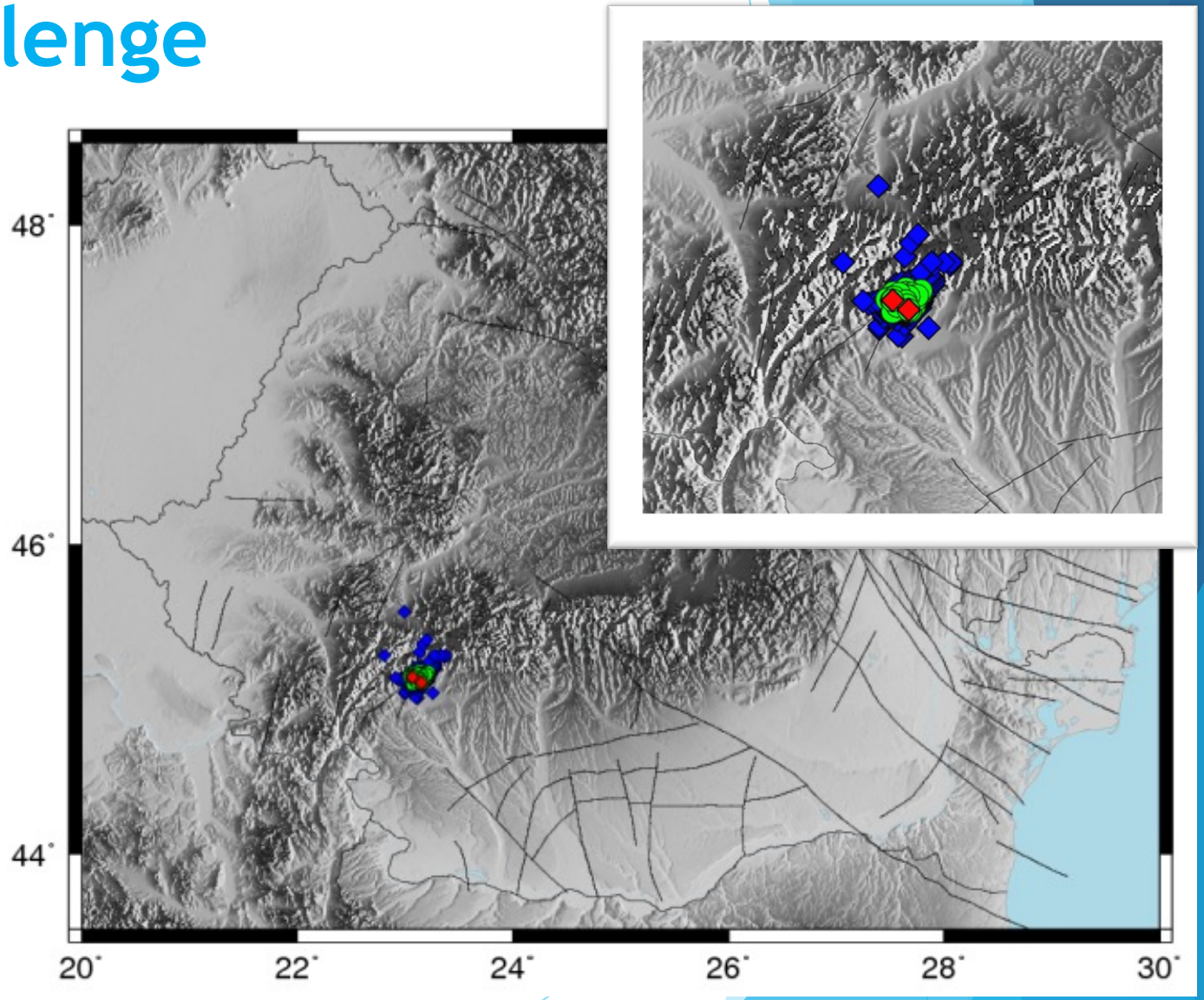




Current task and challenge

In February 2023, a large seismic sequence followed a doublet with magnitudes of 5.2 and 5.7 Ml

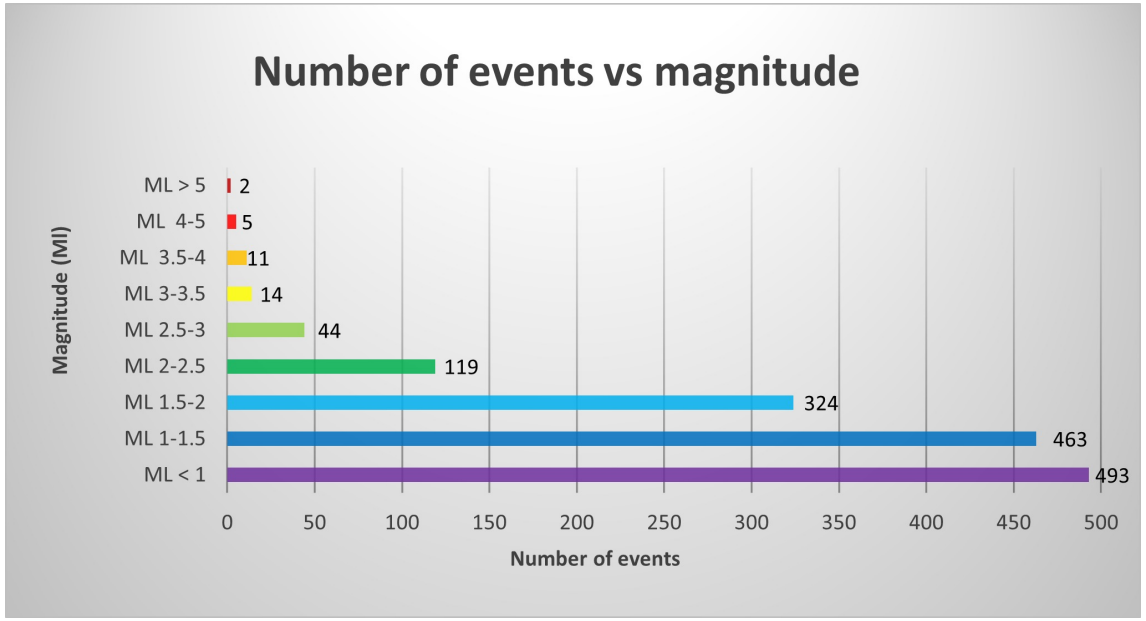
Containing the strongest earthquake recorded so far in that seismic region, this sequence became of main interest for earthquake analysis

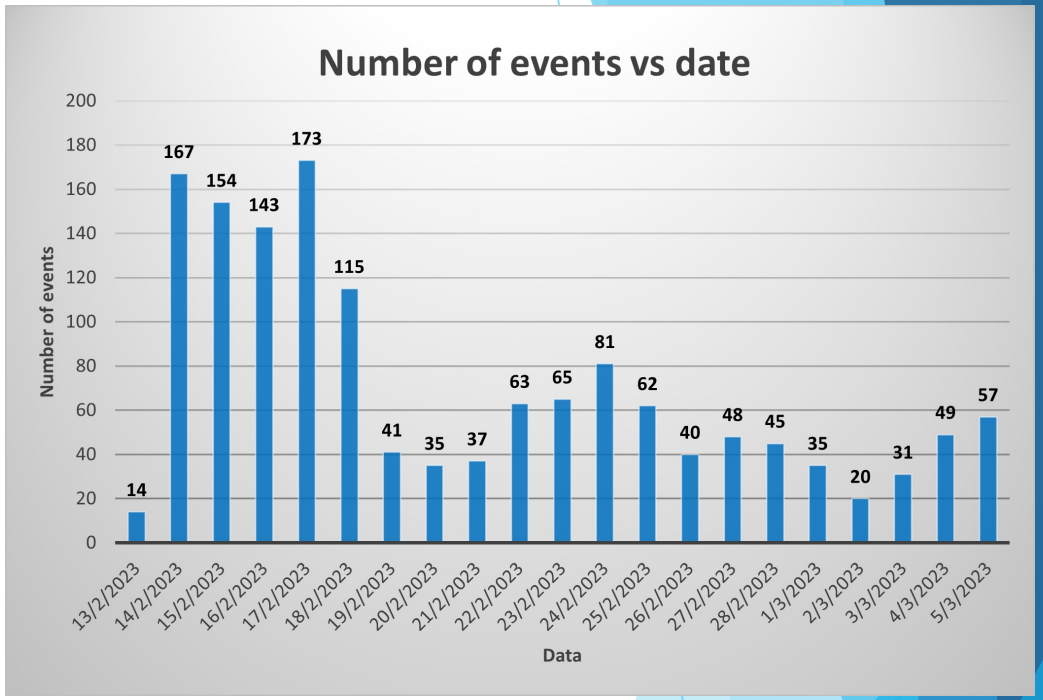


Targu-Jiu seismic sequence – Feb.2023 (Romplus catalog, Popa et al., 2022)

Targu-Jiu seismic sequence comprises over 1400 aftershocks (and still counting), 32 of them having magnitudes above 3 Ml

Following the February 14th earthquake, four new seismic stations were installed in the epicentral area for a better coverage and more precise localization of the events

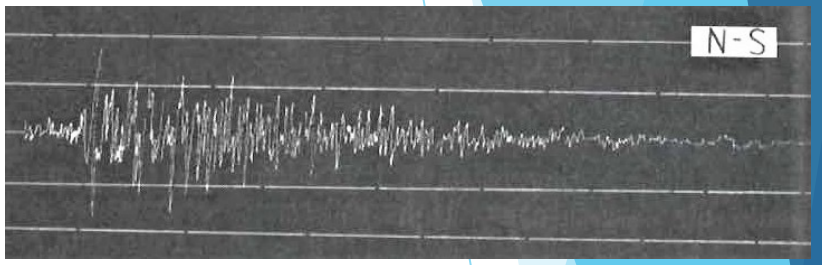




Research fields

Analogous period of seismic measurements in Romania and historical earthquakes

- Begining of seismic monitoring in Romania
- Development of seismic network in recent decades
- Instrument database

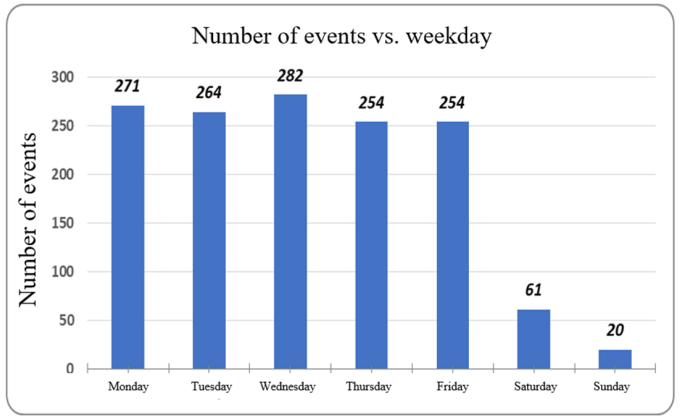


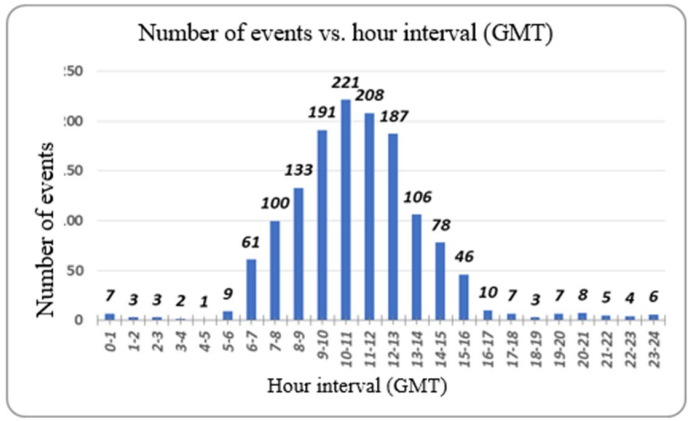
Seismogram of June 24, 1940 Vrancea earthquake (Mw 5.9), Cluj-Napoca seismic station, Mainka modified seismograph (Radu C., 1997)

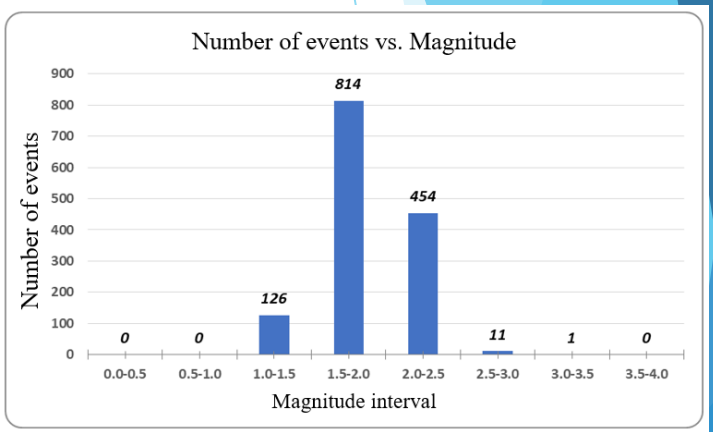
Astronomical Observatory (left); BUC station – first seismic station in Romania (right) (http://www.astro.ro:8080/articles/History/)

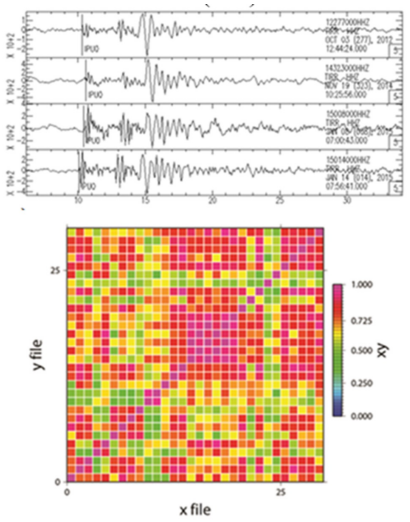
Using automatic detection of seismic signals to identify quarry blasts

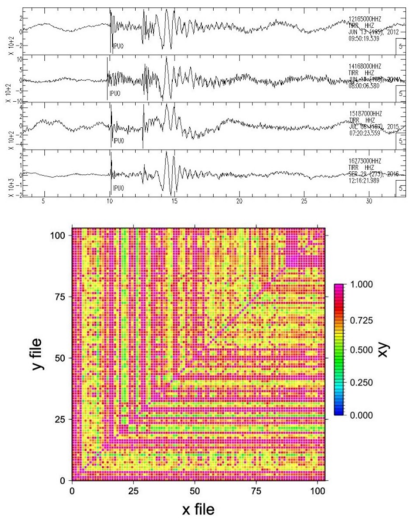
- Discrimination based on statistical methods
- Identifying quarry blasts using the Cross-correlation technique
- Decontaminating Romanian seismic catalog (ROMPLUS)

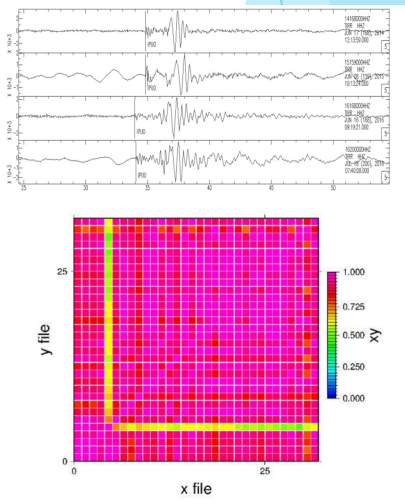












Co-operation between NDCs

ROM NDC co-operates and exchanges data with other National Data Centers of the CTBT state members (Austria, France, USA, Norway, Ukraine etc.)

Thank you for your attention!