

EPOS-RO: Regional Seismic and GNSS Node for EPOS infrastructure

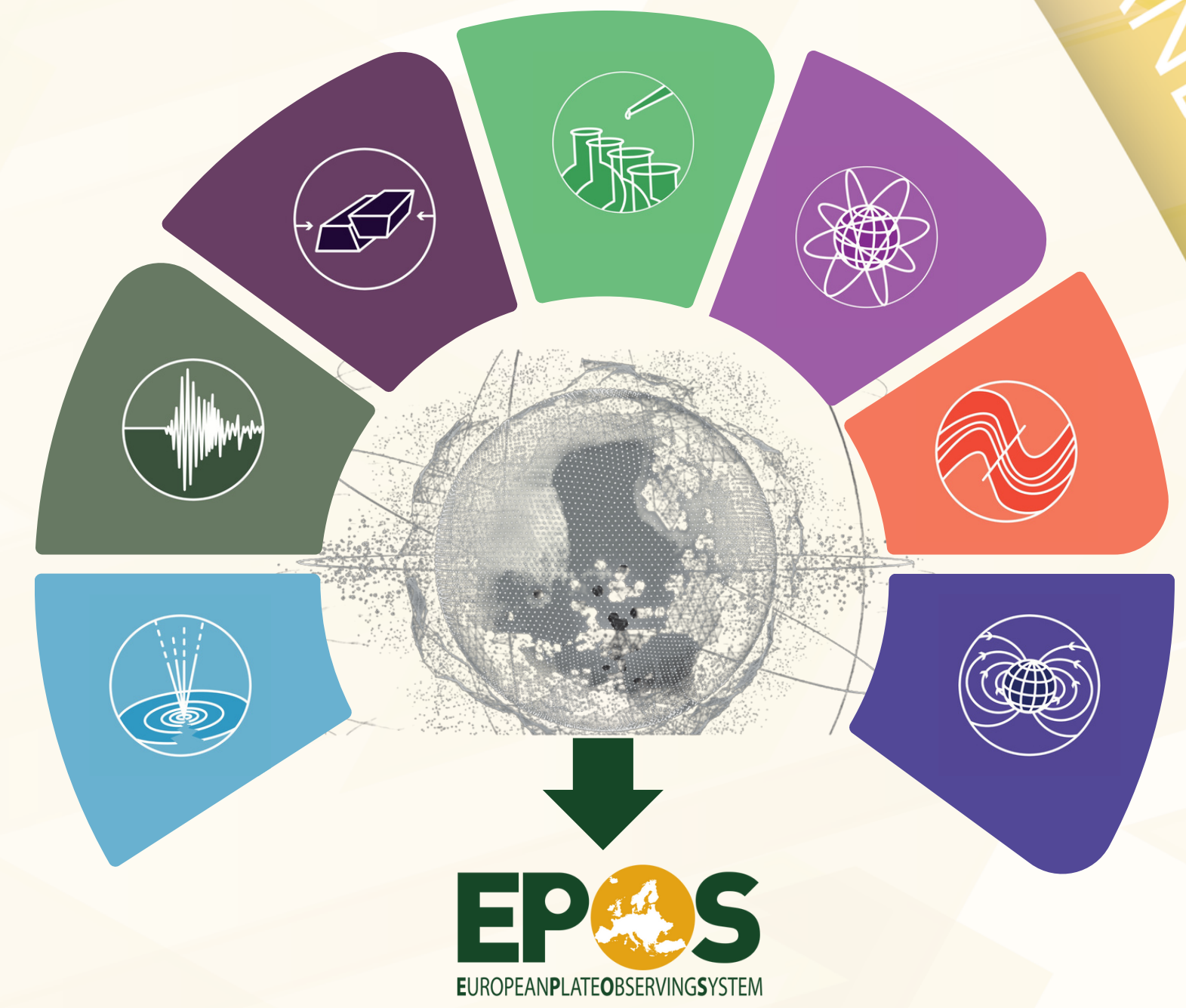
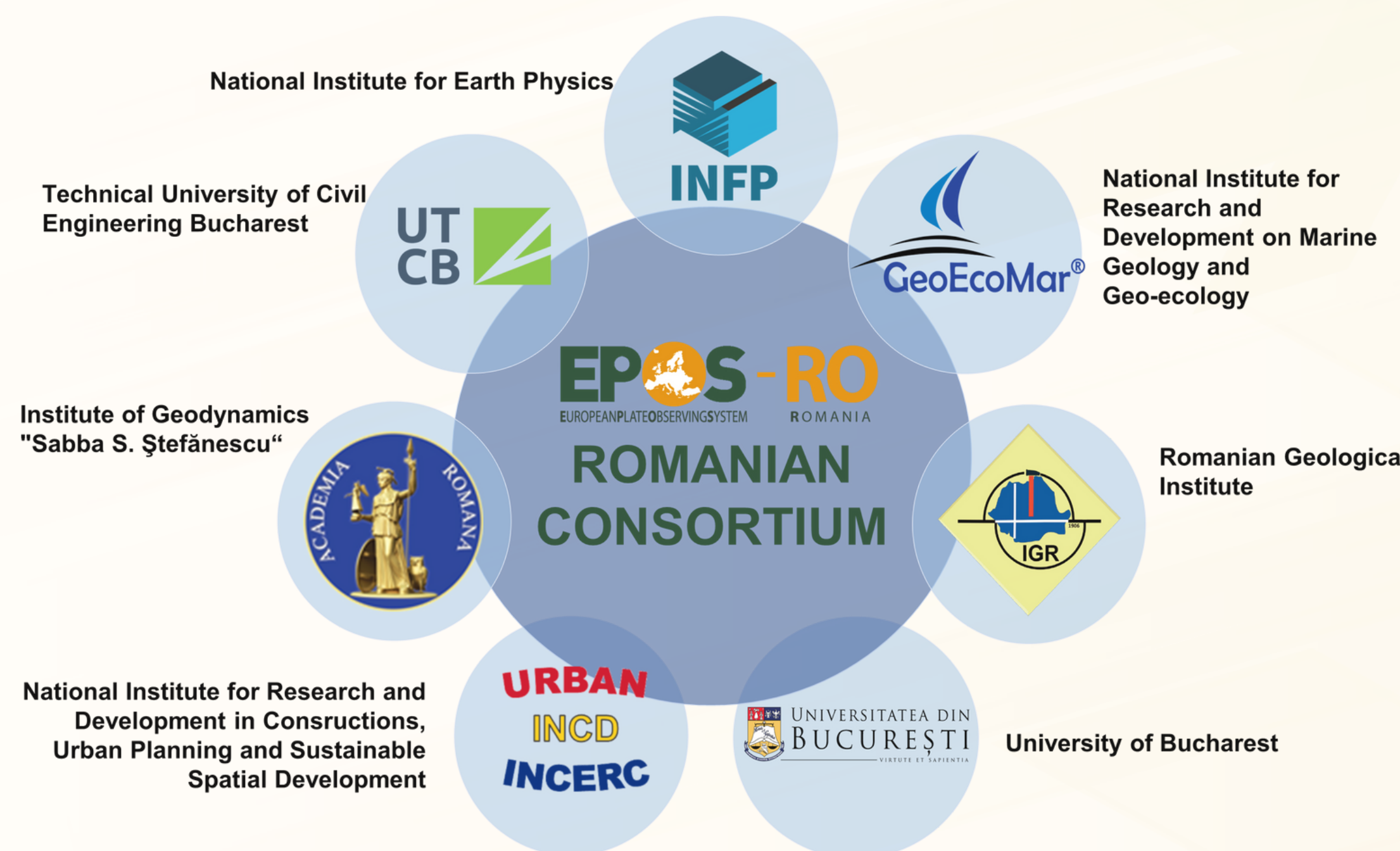
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Romania's contribution to EPOS

Memorandum: Approval of Romania's
membership in EPOS ERIC
December 2020 at the 8th meeting of the EPOS
ERIC General Assembly



Represented by the MINISTRY OF RESEARCH, INNOVATION
AND DIGITALIZATION, Romania contributes financially by
paying the annual membership fee and in kind with data,
products and services from the institutes and universities
signatories of the Memorandum.



Real time seismic stations and seismic stations with acceleration sensors
2 arrays: BURAR with 12 elements and PLOR with 7 elements
Seismic stations located in small, low-medium and high-rise buildings
Sensors placed in free field outside Bucharest and in boreholes and buildings in Bucharest

Network of seismic stations, infrasound and seismic arrays, GPS/GNSS network, Radon monitoring system, meteorological stations, electromagnetic stations and atmospheric ionization monitoring systems
Network of observation points monitoring tectonic stress in active seismic areas

GLASS node – 50 stations (INCDFP, GeoEcoMar, Topgeocart)
GeoPontica network – 13 stations equipped with Topcon GNSS receiver, GNSS antenna, auxiliary sensors, power supply system, communication system

Geophysical data
Geological observation in outcrops
Shallow boreholes geological observation
Mass movements using near surface geophysical data and geotechnical information

Faculty of Geology and Geophysics: Paleomagnetic Laboratory, Rockmagnetism, Paleomagnetism, Environmental magnetism
Experimental & analogue data and soil /rocks samples (resonantcolumn)
Structural Engineering Laboratory

Seismic interpretation
Geological models (maps, cross-section, 3D Models)

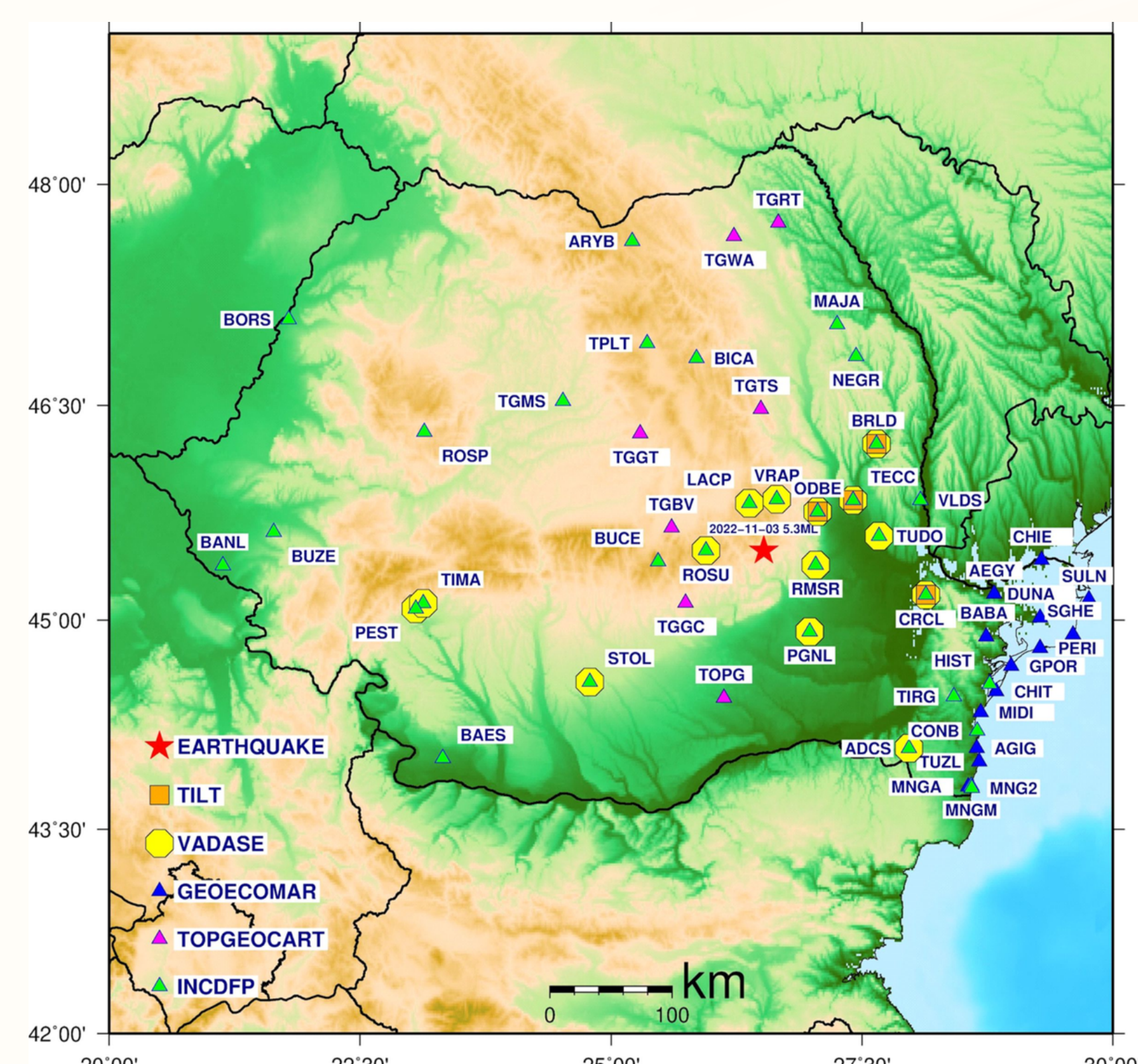
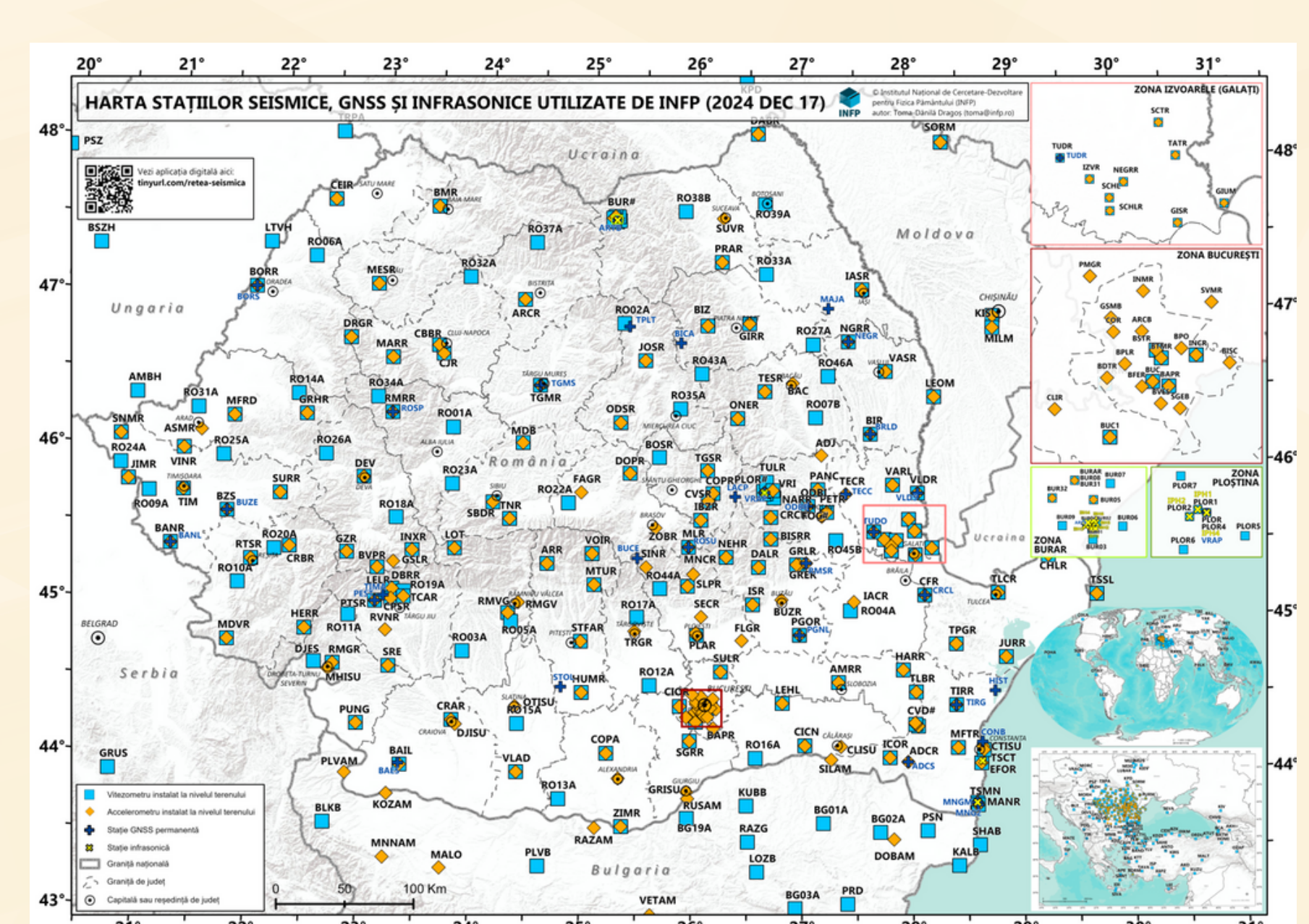
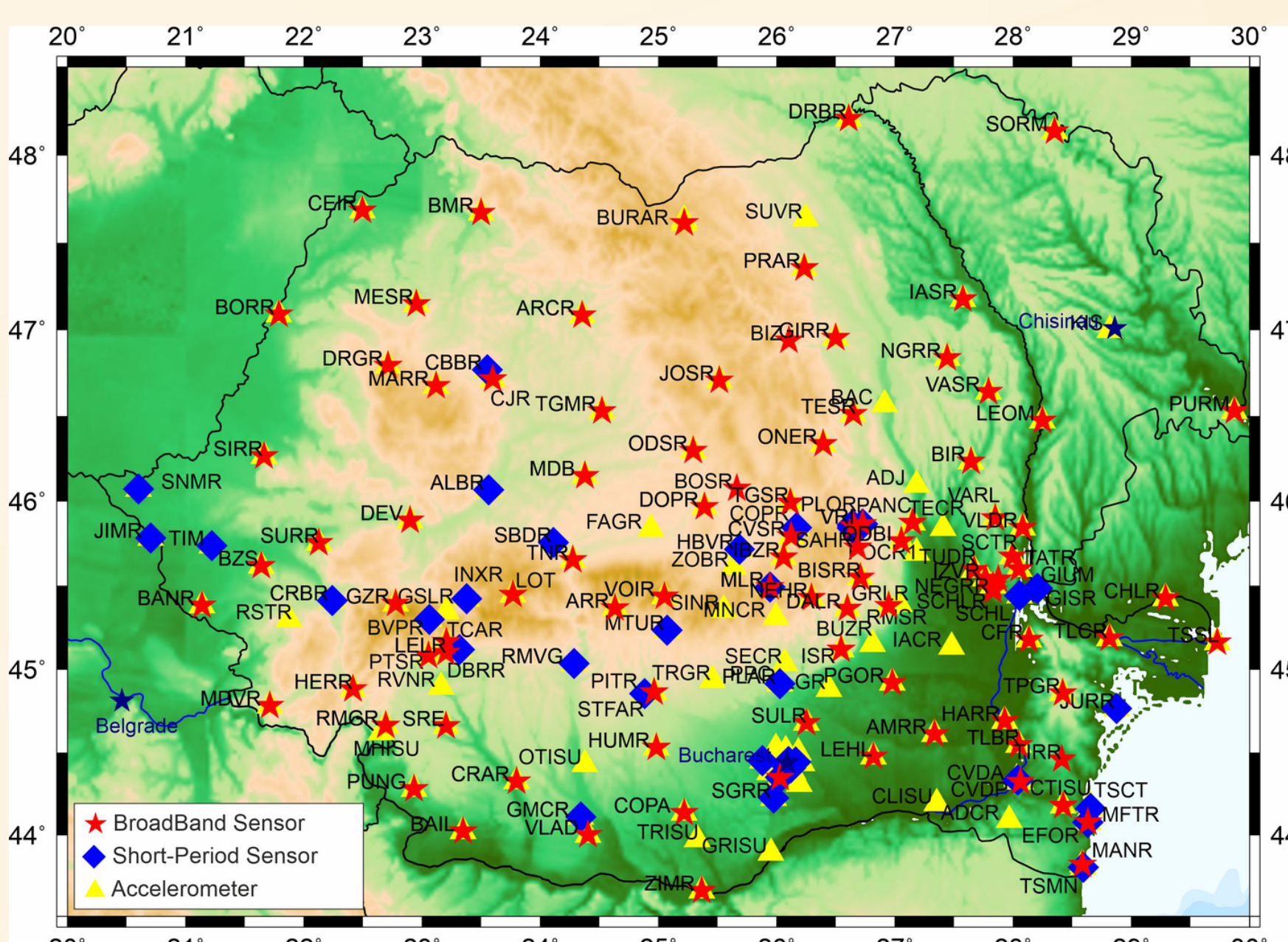
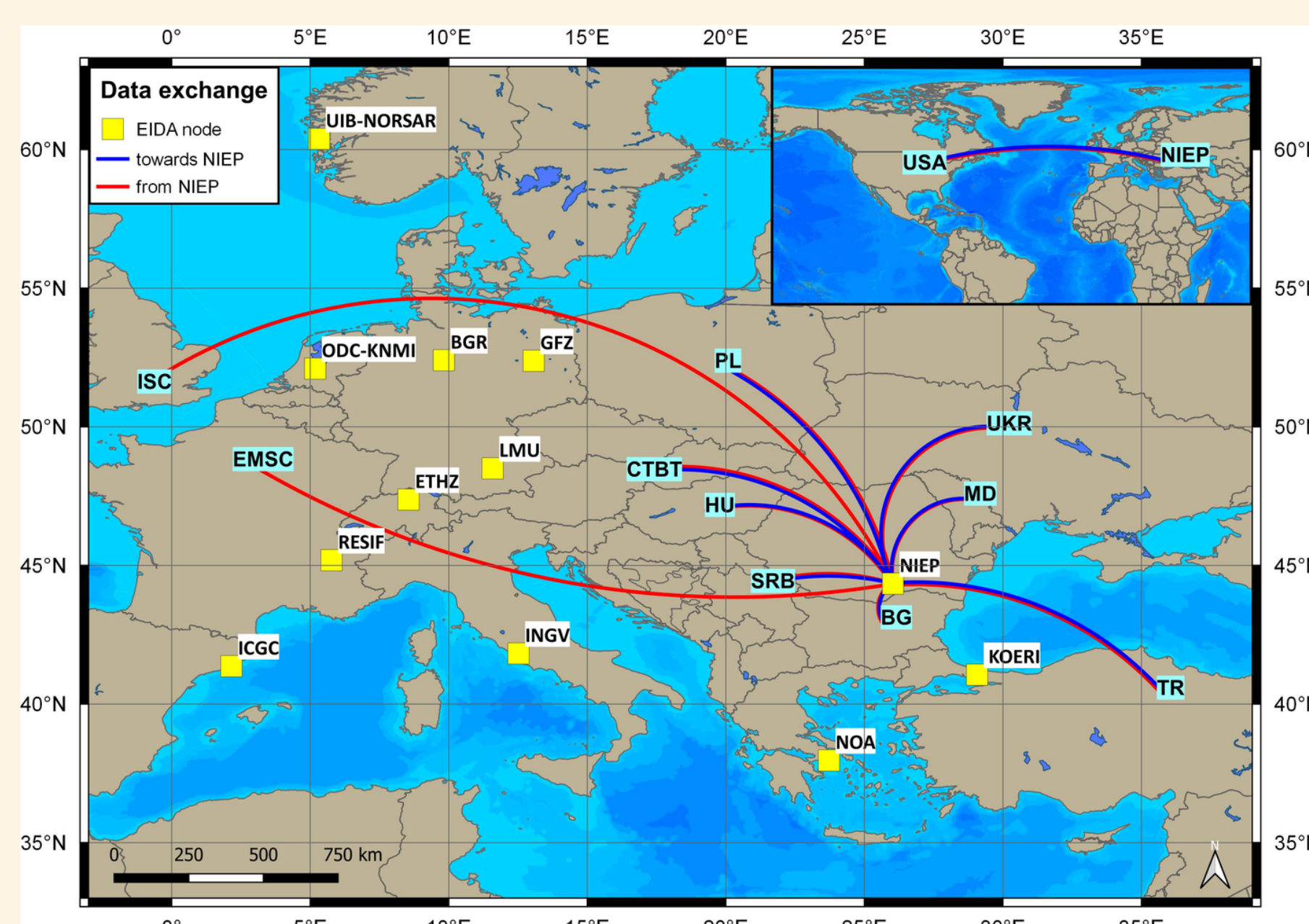
Surlari Geomagnetic National Observatory, contributing also to INTERMAGNET

NIEP - EIDA's regional node

The National Institute for Earth Physics (NIEP) significantly contributes to European seismic monitoring through its EIDA regional node. As a key component of the European Integrated Data Archive (EIDA) infrastructure, NIEP supports the operation, development, and maintenance of seismic data, providing access to over 12,000 European seismic stations. Specifically, NIEP's node delivers real-time seismic waveforms and instrumentation data from Romania, Moldova, Bulgaria, and Ukraine (since 2019), collected from various sensors like seismometers, accelerometers, and pressure sensors. Functioning as an EIDA node since 2014, NIEP also archives data from these countries, plus Slovenia, and ensures seamless integration of regional network data through EIDA's standardized services. Notably, Romanian seismic data has been available on EIDA since 2004.

NIEP's Romanian Seismic Network (RSN)

In the last 15 years, NIEP's RSN has significantly expanded, becoming one of Europe's largest and most advanced seismic networks. The network currently includes 153 digital seismic stations equipped with broadband and short-period sensors, capable of real-time data acquisition, 191 digital seismic stations with acceleration sensors installed in free-field areas across the country, 21 digital seismic stations with acceleration sensors located in Bucharest to monitor seismic activity in the capital, and two seismic arrays located in Bucovina and Ploștina. These arrays offer enhanced capability for detecting and analyzing seismic events in specific regions. Advanced hardware and software enable real-time data acquisition and processing at the National Data Center. International partnerships enhance the RSN by acquiring and archiving seismic data from an additional 116 broadband seismic stations located outside Romania.



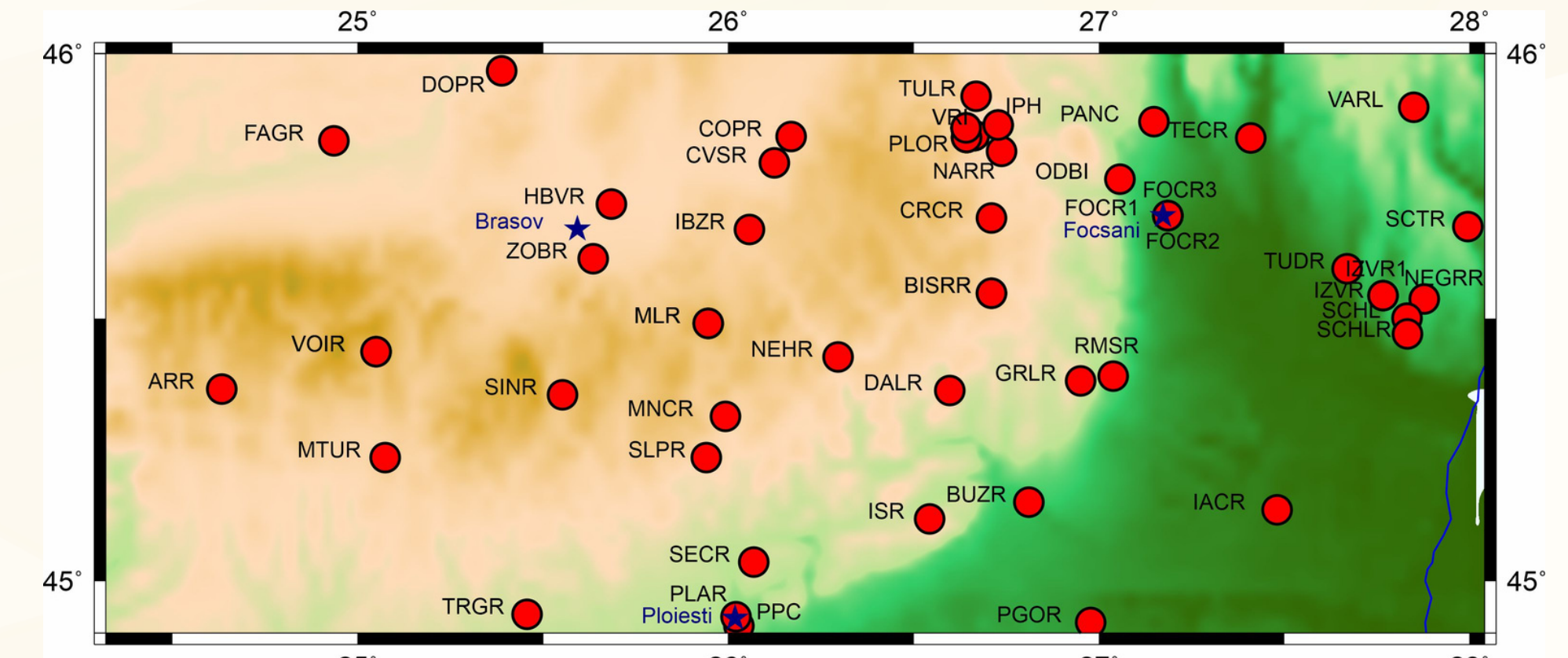
GNSS Network

NIEP set up and implemented the Vrancea near-fault Observatory (NFO), which comprises a permanent GNSS station network, complemented by high-rate campaign GNSS stations, with velocity and displacement autonomous solution engine integrated (10Hz), set for complex multidisciplinary studies in support of the existing seismological network. NIEP's GNSS network uses GPS, GLONASS, Galileo, and BeiDou constellations.

As a national node, NIEP tests and implements the GLASS software for GNSS, providing data for the EPOS platform from another two permanent networks: GeoPontica and TopGeocart. This information is collected through a dedicated web-portal [https://gnss-metadata.eu] running the new M3G "Metadata Management and distribution system for Multiple GNSS Networks" developed in the GNSS TCS. Through M3G, an Operational Centre maintains the GNSS station metadata for its EPOS stations.

Currently, NIEP's network comprises 32 real-time GNSS stations, for which we handle all development, maintenance, and data processing.

NFO Vrancea



- Vp/Vs
- Seismic events
- Historical earthquakes
- Seismic velocity and acceleration waveform
- Radon stations
- Temperature
- Infrasound station information and waveform data
- GNSS stations and GNSS data