



Romanian Data Center: A modern way for seismic monitoring

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The main seismic survey of Romania is performed by the National Institute for Earth Physics (NIEP) which operates a real-time digital seismic network. The NIEP real-time network currently consists of 102 stations and two seismic arrays equipped with different high quality digitizers (Kinematics K2, Quanterra Q330, Quanterra Q330HR, PS6-26, Basalt), broadband and short period seismometers (CMG3ESP, CMG40T, KS2000, KS54000, KS2000, CMG3T, STS2, SH-1, S13, Mark 14c, Ranger, gs21, Mark 122) and acceleration sensors (Episensor Kinematics). The data are transmitted at the National Data Center (NDC) and Eforie Nord (EFOR) Seismic Observatory. EFOR is the back-up for the NDC and also a monitoring center for the Black Sea tsunami events.

NIEP is a data acquisition node for the seismic network of Moldova (FDSN code MD) composed of five seismic stations. NIEP has installed in the northern part of Bulgaria eight seismic stations equipped with broadband sensors and Episensors and nine accelerometers (Episensors) installed in nine districts along the Danube River. All the data are acquired at NIEP for Early Warning System and for primary estimation of the earthquake parameters. The real-time acquisition (RT) and data exchange is done by Antelope software and Seedlink (from Seiscomp3). The real-time data communication is ensured by different types of transmission: GPRS, satellite, radio, Internet and a dedicated line provided by a governmental network.

For data processing and analysis at the two data centers Antelope 5.2 TM is being used running on 3 workstations: one from a CentOS platform and two on MacOS. Also a Seiscomp3 server stands as back-up for Antelope 5.2

Both acquisition and analysis of seismic data systems produce information about local and global parameters of earthquakes. In addition, Antelope is used for manual processing (event association, calculation of magnitude, creating a database, sending seismic bulletins, calculation of PGA and PGV, etc.), generating ShakeMap products and interaction with global data centers.

National Data Center developed tools to enable centralizing of data from software like Antelope and Seiscomp3. These tools allow rapid distribution of information about damages observed after an earthquake to the public. Another feature of the developed application is the alerting of designated persons, via email and SMS, based on the earthquake parameters. In parallel, Seiscomp3 sends automatic notifications (emails) with the earthquake parameters.

The real-time seismic network and software acquisition and data processing used in the National Data Center development have increased the number of events detected locally and globally, the increase of the quality parameters obtained by data processing and potentially increasing visibility on the national and internationally.