Real time seismic monitoring in South-Central Europe: data sharing, cooperation and improvements of the OGS NI Seismic Network

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SUMMARY

Seismology of North-East Italy during 1977-2008 (courtesy of B. Urbino) The ISM-Mod in action for the most severe earthquake.
The Centro di Ricerche Sismologiche (CRS), Seismological Research Center) of the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS, Italian National Institute for Oceanography and Experimental Geophysics) in Udine (Italy) after the strong earthquake of magnitude Mw=6.4 occurred in 1976 in the Italian Friuli-Venezia Giulia region, started to operate the North-eastern Italy (NI) Seismic Network. It currently consists of 12 very sensitive broadband and 21 simpler short period seismic stations, all telelocated to and acquired in real time at the OGS-CRS data centre in Udine. Real-time data exchange agreements in place with neighboring Italian, Slovenian, Austrian and Swiss seismological institutes lead to a total number of 34 seismic stations acquired in real-time, which makes the OGS the reference institute for seismic monitoring of North-East Italy. Since 2002 OGS-CRS is using the Antelope software suite on a SUN SPARC cluster as the main tool for collecting, analyzing, archiving and exchanging seismic data, initially in the framework of the EU Interreg BIA project, “Trans-national seismic networks in the South-Eastern Alps”. At OGS-CRS we spent a considerable amount of efforts in improving the long-period performances of the broadband seismic stations, either by carrying out full re-installations and/or applying thermal insulations to the seismometers; the example of the new PRED broadband-seismic station installation in the cave tunnel of Cave del Predil using a Quanterra G300HP high resolution digitizer and a Stredewheel STS-2 broadband seismometer will be illustrated. Efforts have been also put in strengthening the reliability of data links, either from stations to data centre by exploring the use of redundant satellite/radio/OPERA links, and between different data centres by exploring the usage of the Antelope “interopchange” module.

DATA MANAGEMENT

Near real-time data are automatically sent to the OGS-CRS data centre in Udine, where they are processed following Antelope@OGS

Antelope@OGS

Daily plot of the power supply voltage of the stations and their radio link devices.

The Antelope software suite is used at OGS-CRS as the main data acquisition tool for the Northeastern Italy Seismic Network run by OGS. The main OGS-CRS Antelope server is running in Udine on a 2 nodes SUN Fire V240 cluster: the main module does data acquisition, automatic locations, data archiving and exchange, plus the alert system via Short Message Service (SMS), email, fax and web. Another 2 stations are on Linux and a new Mac Pro, running Antelope at the OGS-CRS headquarters in Palmanova and for convenience to a Linux Antelope workstation at OGS headquarters in Trieste. Data is shared on the main Antelope cluster in Udine with a SeisComP server for data exchange.

REAL TIME ANALYSIS

Earthquake detection and notification

New “Real Time Seismology” OGS-CRS web page

BRRT Antelope

CRS procedures

Since 2004 for bulletin production we use the Antelope@OGS interface to supply visualization and signal processing. Such program yields plots and waveforms from the Antelope system through an ad hoc Java interface created at our department (Biucapec).

STATIONS

At OGS-CRS we also spent a considerable amount of efforts in improving the long-period performances of broadband seismic stations, either by carrying out full re-installations and/or applying thermal insulations to the seismometers. Efforts have been also put in strengthening the reliability of data links, exploring the use of redundant satellite/radio/OPERA links.

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REFERENCES