Geophysical Research Abstracts
Vol. 12, EGU2010-6802-1, 2010
EGU General Assembly 2010

Acquiring data in real time in Italy from the Antarctic Seismographic Argentinean Italian Network (ASAIN): testing the global capabilities of the EarthWorm and Antelope software suites.

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The Italian National Institute for Oceanography and Experimental Geophysics (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, OGS) is running the Antarctic Seismographic Argentinean Italian Network (ASAIN), made of 7 seismic stations located in the Scotia Sea region in Antarctica and in Tierra del Fuego - Argentina: data from these stations are transferred in real time to the OGS headquarters in Trieste (Italy) via satellite links provided by the Instituto Antártico Argentino (IAA).
Data is collected and archived primarily in Güralp Compress Format (GCF) through the Scream! software at OGS and IAA, and transmitted also in real time to the Observatories and Research Facilities for European Seismology (ORFEUS).
The main real time seismic data acquisition and processing system of the ASAIN network is based on the EarthWorm 7.3 (Open Source) software suite installed on a Linux server at the OGS headquarters in Trieste. It runs several software modules for data collection, data archiving, data publication on dedicated web servers: wave_serverV, Winston Wave Server, and data analysis and realtime monitoring through Swarm program.
OGS is also running, in close cooperation with the Friuli-Venezia Giulia Civil Defense, the North East (NI) Italy seismic network, making use of the Antelope commercial software suite from BRTT as the main acquisition system.
As a test to check the global capabilities of the Antelope software suite, we also set up an instance of Antelope acquiring data in real time from both the regional ASAIN seismic network in Antarctica and a subset of the Global Seismic Network (GSN) funded by the Incorporated Research Institution for Seismology (IRIS). The facilities of the IRIS Data Management System, and specifically the IRIS Data Management Center, were used for real time access to waveform required in this study.
The first tests indicated that more than 80% of the earthquakes with magnitude M>5.0 listed in the Preliminary Determination of Epicenters (PDE) catalogue of the National Earthquake Information Center (NEIC) of the United States Geological Survey (USGS) were also correctly automatically detected by Antelope, with an average location error of 0.05 degrees and average body wave magnitude Mb estimation error below 0.1. The average time difference between event origin time and the actual time of event determination by Antelope was of about 45': the comparison with 20', the IASPEI91 P-wave travel time for 180 degrees distance, and 25', the estimate of our test system data latency, indicate that Antelope is a serious candidate for regional and global early warning systems.