ACQUIRING DATA IN REAL TIME IN ITALY FROM ANTARCTIC SEISMOGRAPHIC ARGENTINEAN ITALIAN NETWORK (ASAIN): TESTING THE GLOBAL CAPABILITIES OF EARTHWORM AND ANTELOPE SOFTWARE SUITES

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Abstract

The Italian National Institute for Oceanography and Experimental Geophysics-OGS is running the Antarctic Seismographic Argentinean Italian Network (ASAIN), made of 7 seismic stations located in Antarctica and Tierra del Fuego (TFI) - Argentina data from these stations are transferred in real time to the OGS in Trieste (Italy) via satellite links provided by the Direzione Nazionale dell’Antartico (DINAX) - Instituto Antartico Argentino (IAA) and the Estación Astronómica Rio Grande (TFI). Data is collected and archived primarily in Gnu/L Compressed Format (GCF) through the Swarm® software at OGS and DNA-IAA, and transmitted also in real time to the Observatories and Research Facilities for European Seismology (ORFEUS). The main real time data acquisition and processing system of the ASAIN network is based on the EarthWorm software installed on a Linux server at the OGS in Trieste. It runs several modules for data collection, archiving, publication on dedicated ASAIN network is based on the EarthWorm software installed on a Linux server at the OGS in Trieste. It runs several modules for data collection, archiving, publication on dedicated

5.0 listed in the Preliminary Determination of Epicenters

BELA at Belgrano II (77°47’S, 34°37’W); Antarctica. PQLX (PASUAL Quick Look eXcelled) is open-source software for evaluating seismic station performance and data quality. Given waveform data and instrument response files, PQLX server calculates trace statistics, Power Spectral Densities (PSD), PDF and writes to a MySQL database for quick access.

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Figure 1: Antarctic seismological station location of ASAIN and GSN networks. Green triangles: Antelope stations; Black triangles: GSN stations. Seismicity from NERC Catalog, 1974-2009, red circles by depth less than 60 km and green circles between 60 and 300 km. Bathymetry from General Bathymetric Chart of the Oceans - GEBCO Grid a global 30 arc-second grid.

Figure 2: The Antelope software is used at OGS as the main data acquisition tool in the northeast Italy (NI). Data are acquired in real time also from neighboring networks in Italy, Switzerland, Austria, and Slovenia for a total of 95 stations. An instance of Antelope has been set up to acquire data in real time of the antarctic ASAIN Network through the Swarm® server, this also send data to the EarthWorm for postprocessing and archiving in mainSEED format.

Figure 3: Overall performance of the ASAIN Network since 1995. From 2003, all ASAIN 20 and 2 samples/s data channels are transmitted in real-time to the OGS server. Each night the complete 40, 20, and 2 sample/s ASAIN data set, recorded during the previous 24 hours, is retransmitted to the OGS server to eliminate possible gaps in the real-time data.

Figure 4: Probability Density Functions (PDF), (McNamara D. E. & Boaz R. I., 2005), for BELA at Belgrano II (77°47’S, 34°37’W); Antarctica. PQLX (PASUAL Quick Look eXcelled) is open-source software for evaluating seismic station performance and data quality. Given waveform data and instrument response files, PQLX server calculates trace statistics, Power Spectral Densities (PSD), PDF and writes to a MySQL database for quick access.

Figure 5: ASAIN records of Chile Earthquake Magnitude 8.8 - Offshore Muka Chile, 2010 February 27 06:14:14 UTC, obtained with the ShakeWave Analysis Real-Time Monitoring - SWARM software connected to EarthWorm system through Winstone Wave Server (WWS).

BIBLIOGRAPHY


