Oral | Symbol S (Solid Earth Sciences) | S-TT Technology & Techniques

[S-TT57_30PM2]Seismometry and monitoring system

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Wed. Apr 30, 2014 4:15 PM - 6:00 PM 423 (4F)
This session aims to bring together geoscientists working on observational techniques and systems for geophysical processes in the Earth and geophysical explorations. Contributions on improvement and development of monitoring networks, new techniques on sensors and monitoring techniques, as well as systems for early disaster warning are highly welcomed.

5:45 PM - 6:00 PM

[STT57-P03_PG]Background noise characteristics of F-net broadband seismograms

3-min talk in an oral session
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National Research Institute for Earth Science and Disaster Prevention (NIED) has operated a broadband seismometer network, F-net. F-net consists of 73 stations in Japan and a broadband seismometer, STS-1/2/2.5 or CMG-1T/3T, has been installed at each station. The seismometers are installed in 30-50 m vault to prevent effects of the temperature and air pressure changes. All the data are openly available on the web, and rapid automated data processing systems, such as AQUA system [Matsumura et al., 2006], have used these data. To evaluate the data quality continually is important for the operation of the observation network, the earthquake monitoring, and the automated analyses. In order to assess the F-net data quality, we investigated the characteristics of their background noise.To quantify the background noise of F-net waveform data, we used probability density functions (PDFs) of power spectral densities (PSDs) [McNamara &Buland, 2004]. For 1996-2013 continuous waveform data with the interval of 1 sec, PSDs of ground acceleration were computed from overlapping (50 %) 1-day time-windows. Each time-window was divided into 13 time segments (6 hours) overlapping by 75 %, and the 1-day PSD estimate was calculated as the average of the 13 segment PSDs. These 1-day PSDs were gathered by binning periods in 1/8 octave intervals and binning power in one-dB intervals.We calculated a new noise model for F-net, based on the statistical mode of the obtained PDFs for vertical component of all the F-net stations [McNamara &Buland, 2004]. The noise model was constructed from the minimum PDF mode value among all the stations at each period. The values of the F-net model is ~5 dB higher than ones of the mode noise model of the continental United States [McNamara &Buland, 2004] around periods of 4 sec and 40 sec. The F-net noise model is mainly defined by the STS-1 mode values. The STS-2 values are ~5 dB larger than STS-1 ones at the periods of 200-800 sec, and the CMG-1T/3T are ~15 and ~10 dB larger than STS-1 at 30-2000 sec and 100-2000 sec, respectively.Recently, we have equipped a styrofoam cover on the broadband sensor for temperature shielding. This cover has reduced the PDF mode values for vertical component of STS-2 by ~5 dB at the periods longer than 500 sec, and is useful to obtain such long-period signals with a good signal/noise ratio.