Publishing of information about F-net waveform data quality

*Takeshi Kimura[1], Masatoshi Habu[2]

1. National Research Institute for Earth Science and Disaster Resilience, 2. Association for the Development of Earthquake Prediction

In Japan, the National Research Institute for Earth Science and Disaster Resilience (NIED) began the construction of a regional broadband seismograph network in 1995. At present, the network is referred to as F-net and consists of 73 stations positioned throughout the archipelago at intervals of approximately 100 km (Fukuyama et al. 1996; Okada et al. 2004; Matsumoto et al. 2009). Data acquired from F-net stations enable researchers to perform routine centroid moment tensor (CMT) analyses at regional distances (e.g., Fukuyama et al. 1998; Matsumura et al. 2006), image detailed velocity structures beneath and around the Japan Islands (e.g., Yoshizawa et al. 2010), and conduct studies of very low frequency earthquakes (e.g., Ito et al. 2007). All of the collected data is freely available on the NIED F-net website (http://www.fnet.bosai.go.jp/top.php?LANG=en).
We have been developing two systems to routinely evaluate the quality of the F-net continuous waveform data and to show the results to the public. One is the power levels of background noises in observed continuous waveform data (e.g., McNamara and Buland, 2004). The power spectral densities (PSDs) at the periods of 3-2000 s are calculated for the 1-day length time-window data moving with the step of the half day. In July 2017, we began showing the probability density functions of the PSDs and their temporal changes on the F-net website. The other is the instrument responses against ground motion over the periods of 50-200 s evaluated based on the comparison of the observed teleseismic waveform data (Kimura et al. 2015). Teleseismic waveform data due to earthquakes with the magnitudes of 6.5 or larger and with the centroid depths shallower than 50 km are used in this system, and enables us to evaluate the responses at least once each 60 days for 95 % of the observing period from 1995 to 2013.
By referring the information on the data quality, researchers can avoid using data that has been contaminated by abnormally large noises and/or instrumentation errors, and thus prevent misleading analyses.

Keywords: Seismic data quality, Broadband seismograph network

