# Comparison of noise levels of the JMA and F-net broadband seismographs / strong motion velocity-type seismographs in long-period range for the purpose of magnitude estimation of tsunami earthquakes

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Slow tsunami earthquakes generate tsunamis higher than those expected from conventional magnitude such as surface wave magnitude $M_s$ or the Japan Meteorological Agency (JMA) magnitude $M_J$ (Kanamori, 1972). The 1992 Nicaragua earthquake ($M_s$ :7.2, $M_w$ :7.6) is considered as a typical slow tsunami earthquake because the rupture duration exceeded 100 seconds (e.g., Satake *et al.*, 1993). Therefore, the observation data from the broadband seismograph is very promising in the analyses of mechanism and the magnitude estimation of such an earthquake. In Japan, data from the Full Range Seismograph Network of Japan (F-net) operated by the National Research Institute for Earth Science and Disaster Resilience is utilized. The broadband seismographs are susceptible to temperature changes. Seismometers of the F-net are installed in vaults. According to previous studies, the strong motion velocity-type seismograph of F-net would be helpful for estimating size of tsunami earthquakes (e.g., Tanaka and Katsumata, 2017 SSJ Fall Meeting, Tanaka and Katsumata, JpGU Meeting 2018, Tanaka and Katsumata, 2018 SSJ Fall Meeting). The JMA also installed the broadband seismographs and the strong motion velocity-type seismographs, but it is not necessarily together at the same site. However, the observation environments of the JMA stations are not as good as these of the F-net stations, for example they are not installed in the vaults. We examined the background noise level from the observed continuous waveform data of JMA and F-net. The power spectral densities are calculated for the 1-day length time-window data with moving it with a step of the half day (e.g., McNamara and Buland, 2004). From the results, we investigate whether the broadband seismographs and the strong motion velocity-type seismograph of the JMA can be used for magnitude estimation of tsunami earthquakes. Figure 1 shows the power spectral densities of the vertical component of the strong motion velocity-type seismograph at the Nemuro Toyosato station of the JMA (Red line) and the nearby F-net Nemuro station (Blue line). The period is one hour from 00:00 January 1, 2019. The noise levels of the two recordings are approximately the same.

Acknowledgment
We used waveform data of F-net (NIED).

Keywords: Broadband Seismograph, Strong Motion Velocity-type Seismograph, Power Spectral Density, Noise Level

 

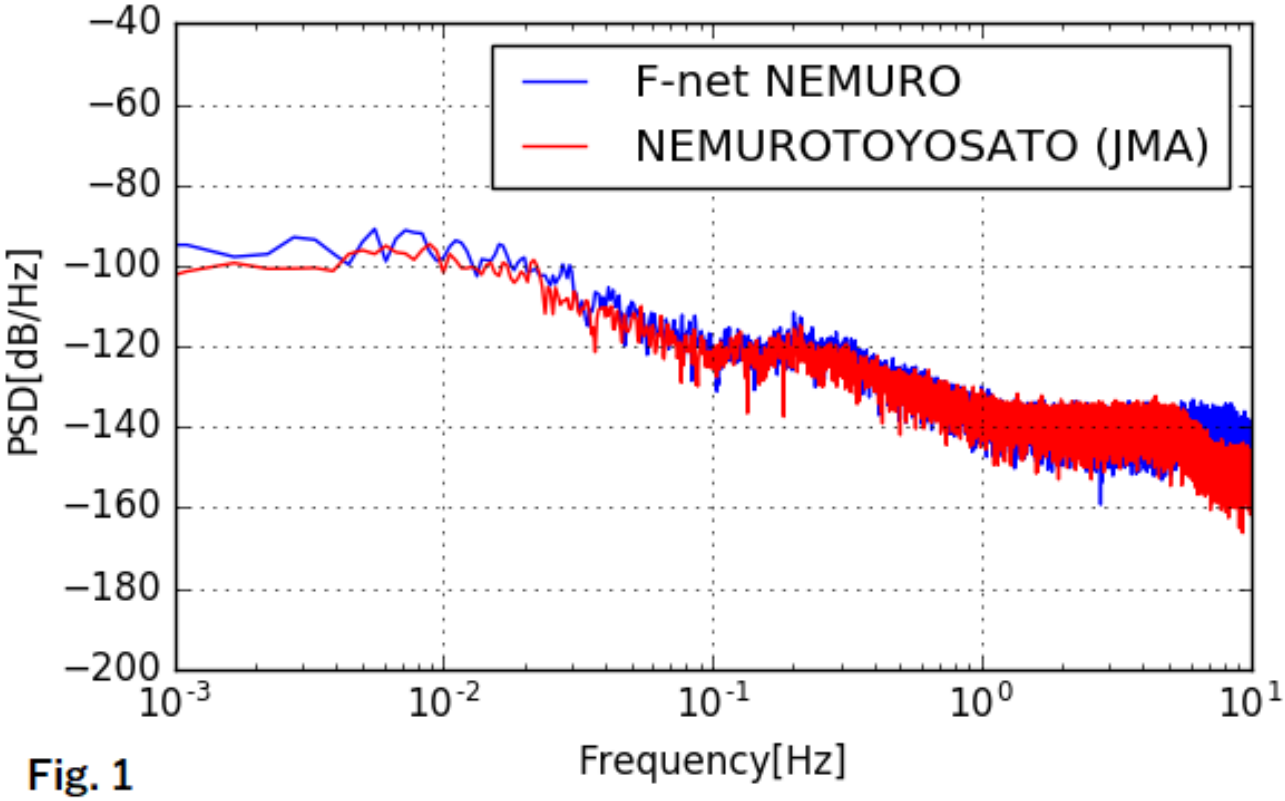


**Fig. 1**

 