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Microtremor Measurement at Large Seismic Intensity Regions of the 1828 Sanjo Earthquake

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The 1828 Sanjo earthquake is considered to be a crustal event with around M6.9 (Usami, 2003). The source region seems to be located in the Niigata-Kobe tectonic zone. The numbers of fatalities and damaging houses were 1,681 and 13,149, respectively (Usami, 2003). The Sanjo earthquake is one of the well documented historical earthquakes to validate strong ground motions using the seismic intensities.

According to the historical seismic intensities by Yada and Urabe (2010), large seismic intensities were estimated inside and eastern edge of the Echigo basin. Senna et al. (2011) performed dense microtremor measurement and constructed deep and shallow velocity structure models inside the basin. Therefore, we set our objective to measure microtremor in large seismic intensity regions located at the basin edge near the Higashiyama hill in Mitsuke, along the eastern edge of the basin from Mitsuke to Sanjo, and western part of the basin near Yahiko.

We performed microtremor measurement during the daytime between 28 to 30 Novmeber 2011. The portable strong motion seismometer consists of three components of acceleration sensor SMAR-6A3P with data logger LS-7000XT. We surveyed 30 min for each station and recorded the data with 100 Hz sapling. From the preliminary analyses of H/V spectral ratios, there were several stations of seismic intensity 7 with a dominant frequency of 1 Hz. Other stations with less seismic intensity showed dominant frequencies of 3-5 Hz. Although most stations were located in the back marsh, variations were significantly seen in the amplification factors.

Keywords: Sanjo earthquake, historical earthquake, microtremor measurement, H/V spectral ratio