

Systematic monitoring of broadband seismometer and strong-motion velocitometer conditions in F-net

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Broadband seismometer data are essential for the development of seismological studies such as those investigating earthquake sources and the Earth's structure. However, these data types are possible to be contaminated by instrumentation response errors that are often difficult to recognize from visual waveform checks. Kimura et al. [2014] developed a systematic method of assessing the seismometer's conditions for recording ground motions at a period range of 50-200 sec in observation networks whose station intervals are as small as 200 km. The method was based on comparisons between teleseismic surface wave records at a target station and those at multiple surrounding reference stations, from which we calculated three index parameters and evaluate in-situ instrumentation conditions, including amplitude and phase responses against input ground motions. Kimura et al. [2014] applied the proposed method to F-net broadband seismometers covering the Japanese Islands, where station intervals are approximately 100 km, and assessed the sensor conditions. However, instrumentations at stations in isolated islands and edges of network could no be evaluated because the number of surrounding reference stations was insufficient.

In this study, we applied the systematic assessing method to not only the broadband seismometers but also the strong-motion velocitometers which are installed at all the F-net stations. We could evaluate the seismometer conditions using surface wave records with amplitudes larger than $2.0E+4$ nm for VSE-355G3 sensors and $2.0E+5$ nm for TSM-1 sensors at a period range of 50-100 sec, and $1.0E+5$ nm for VSE-355G3 and $5.0E+5$ nm for TSM-1 at a period range of 100-200 sec. This extension made the density of sensors higher, and allowed us to check broadband seismometer conditions at isolated stations and strong-motion velocitometer conditions.

Keywords: broadband seismometer, strong-motion velocitometer, seismometer response