

Consideration of site amplification and data stability of OBS for magnitude estimation of earthquake early warning

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In Japan, large-scale ocean bottom seismographs (OBSs) network, such as DONET and DONET2 (JAMSTEC) and S-net (NIED), are now under construction to make use of those data for real-time monitoring, and it is expected to utilize those systems for Earthquake Early Warning (EEW). However, since OBSs are installed on unconsolidated sedimentary layer, the installation environment of OBSs may be different from that of land stations.

Site amplification of OBS is one of the important factors. Magnitude of EEW (M_{eeW}) at Tonankai OBS estimated from maximum displacement amplitudes of three component vector waveforms was generally larger than M_j by about 0.6 because of site amplification of OBS (Hayashimoto and Hoshiba, 2013). Similar amplification is also found at DONET (JAMSTEC, Nakamura *et al.* (2014)). From the relative site amplification factor of OBS estimated from spectral ratio in frequency domain, it is found that amplification of horizontal component is remarkably larger than that of vertical component at less than 1 Hz.

Stability of OBS data exposed strong shaking is also essential factor. Yamamoto *et al.* (2004) pointed out that one of Off-Kushiro OBS (JAMSTEC) was rotated about 5 degree by strong ground motion during the 2003 Tokachi-oki earthquake of Mjma8.0. The inclination of OBS causes baseline offset change in acceleration waveform on the gravitational acceleration component. We investigate the characteristics of OBS data during strong shaking at the Off-Kushiro OBSs, and it is found that the acceleration offsets are larger on the horizontal component (perpendicular to the cable line) than the other horizontal component (along the cable line). Furthermore, it is found that the S-wave H/V ratio for strong motion at OBS has typical features of non-linear response, which is similar with that of land stations.

In this presentation, we discuss influence for EEW magnitude estimation. To avoid their influence, we will propose a new stable magnitude estimation method by using vertical component.

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