

SCG058-05

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Detection of P-waves and migrations of non-volcanic deep low-frequency tremors recorded by the Horai seismic array

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Non-volcanic deep low frequency tremors (LFTs) occur at regular intervals of about 4~6 months beneath the Tokai region. LFT signals are weak and lack of clear onsets of P and S waves. Therefore, it is difficult to estimate source locations of LFTs by ordinary methods. Array observations have been conducted to detect LFTs and estimate locations of LFTs (e.g., La Rocca et al., 2008).

We deployed a seismic array of short-period 3-component sensors at Horai near the Tokai tremors zone from September, 2008. We applied the zero-lag cross-correlation method (ZLC) to LFT records in the period from February 5 to 15, 2009 to estimate the apparent velocities and back-azimuths of LFTs. The LFT records were band-pass filtered and windowed with 2 sec windows to apply the ZLC.

We successfully detected several P wave phases for each LFT episode with apparent velocities of 8 km/s by the ZLC analysis of vertical waveforms. We estimated source locations of LFTs S-P times, apparent velocities and back-azimuth, and obtained the locations near the reported hypocenters by JMA. We also estimated source locations of LFTs without clear P arrivals using only apparent velocities and back-azimuths for S waves and assuming that the sources are located on the subducting plate boundary (Hashimoto et al., 2004). The migration of tremor location is detected by this location procedure for the LFTs episode in February, 2009.