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Observation of fast and short-time scale migration of non-volcanic low-frequency tremors by using vertical seismic array

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Recently, some observations of a fast and short-time scale migration of non-volcanic low-frequency tremors (LFTs) were reported (e.g., Shelly et al. 2007, Imanishi et al. 2009, Vidale et al. 2009). In these migrations, hypocenters of LFTs move to a down-dip or up-dip direction of subducting plate with a velocity of about 100km/hour. In this study, we report an observation of a fast and short-time scale migration of LFTs in Tokai region by using a vertical seismic array of AIST.
Because the apparent velocity deduced from the semblance analysis increases with increasing epicentral distance, we can obtain an empirical relationship between apparent velocity and epicentral distance (Takeda et al., 2009). Together with a source region of LFTs activity inferred from an envelope cross correlation method, it is possible to roughly estimate a migration of the LFTs based on a temporal change of apparent velocity. We applied this approach to a LFTs activity in Tokai region that occurred on August 31 to September 1, 2009. Under a simple assumption of a migration direction, the migration velocity was estimated about 50-400 km/hour.

Keywords: non-volcanic low frequency tremor, seismic array, tremor migration