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Spatial Variations of Shallow Very Low-Frequency Earthquakes in the Nankai Subduction Zone based on CMT Inversion using 3D Velocity Structure Model

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We conducted centroid moment tensor (CMT) inversions of shallow very low-frequency earthquakes (SVLFEs) occurred in the region from off the Kii peninsula to off the Cape Muroto, Japan. A set of Green's functions was evaluated by FDM simulations of seismic wave propagation in the 3D velocity structure model. Source grids were assumed on the Philippine Sea Plate (PHS) boundary at a horizontal interval of 0.1° . We used observed F-net velocity seismograms for periods of 20-50 s. Details of 3D model, methods for simulation and CMT inversion are described in Takemura et al. (2018). After CMT inversion, we evaluated variance reduction between observed and synthetic seismograms. The solution with maximum variance reduction between observed and synthetic seismograms is the optimal solution.

Figure 1 shows examples of CMT solutions for SVLFEs that occurred in 2004-2016. Gray focal spheres are CMT solutions in Takemura et al. (2018). Our CMT solutions were also characterized by low-angle thrust faulting with strike angles parallel to the trench axis and were concentrated around the accretionary prism toe. These results suggest seismic slip occurred on or near very shallower part of the PHS boundary. Our CMT method enables us to investigate spatial variation and long-term activity of SVLFEs in the Nankai subduction zone.

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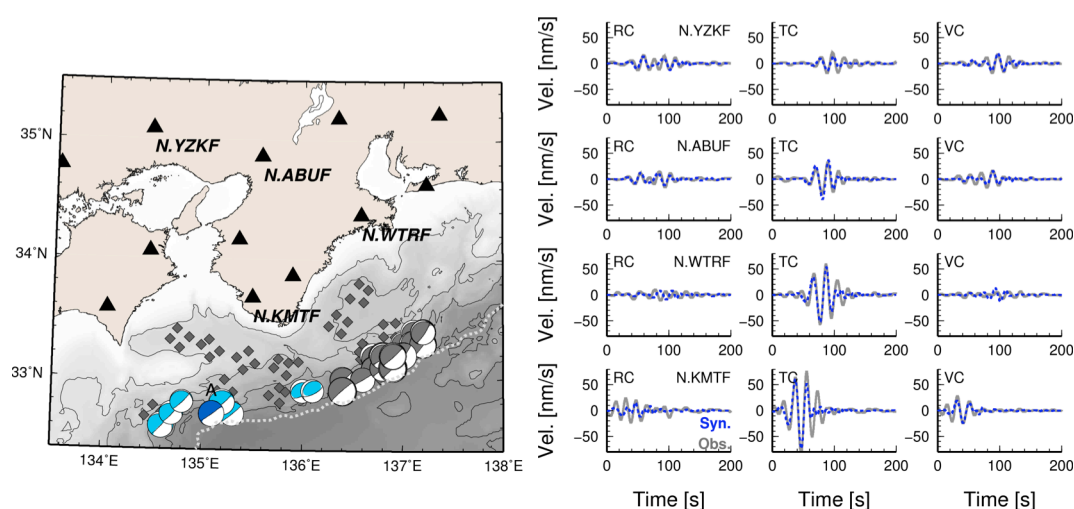


Figure 1. Examples of obtained CMT solutions. Grey focal spheres are CMT results in Takemura et al. (2018). Light blue ones are examples of CMT solutions in this study. Black triangles and gray diamonds are F-net and DONET stations, respectively. Right panel shows examples of waveform fittings of a SVLFE occurred on (marked A in the map).