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Study on seismotectonics in Tokyo Metropolitan area using seismological data recorded at northeast Japan stations

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In order to improve the long-term probability of earthquake occurrence and evaluation of strong ground motion in Tokyo Metropolitan area, it is very important to reconsider earthquake generation mechanism using previous seismological data. 1921 southern Ibaraki prefecture earthquake (M7.0) and 1922 Uraga Channel earthquake (M6.8) may have potential to be reconsidered. We try to search for smoked paper seismograms of these two events recorded at seismic stations in northeast Japan and to make image files of them using a large-scale scanner. Furthermore distribution of small repeating earthquakes on the plate boundary and 3D travel-time tomography are crucial to understand the locations and shapes of subducting Pacific plate and Philippine Sea plate beneath Kanto district. The results of 3D travel-time tomography reveal the low-V area within the Philippine Sea slab and suggest that the low-V area caused by the serpentinized mantle (Nakajima and Hasegawa, 2010). The western boundary of the low-V area is sub-vertical and P- and S-wave velocities vary by 15-20% across it over a short distance of ca. 10 km. Two intraslab earthquakes in 1921 (M7.0) and 1987 (M6.8) are inferred to have occurred along the serpentine boundary accompanied by right-lateral movement, based on analyses of focal mechanisms and aftershock distribution.

Keywords: Tokyo Metropolitan area, past earthquakes, smoked-paper seismograms