

Imaging of Heterogeneous Structure beneath the Metropolitan Tokyo Area (3)

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Beneath the metropolitan Tokyo area, the Philippine Sea Plate (PSP) subducts and causes damaged mega-thrust earthquakes. The Dai-Dai-Toku Project revealed the geometry of the upper surface of PSP, and estimated a rupture process and a ground motion of the 1923 Kanto earthquake [Sato et al., 2005]. However, these results are not sufficient for the assessment of the entire picture of the seismic hazards beneath the metropolitan Tokyo area including those due to an intra-slab M7+ earthquake. So, we have started a new project, the Special Project for Earthquake Disaster Mitigation in the Metropolitan Tokyo area. Proving the more detailed geometry and physical properties (e.g. velocities, densities, attenuation) of PSP is very important to attain this issue.

The core item of this project is the dense seismic array observation in metropolitan area, which is called the MeSO-net (Metropolitan Seismic Observation network). In order to obtain the high resolution images of a velocity and Q structure, it is requested to construct a seismic network with a spacing of 2-5 km. The total number of seismic stations of the MeSO-net will be about 400 and will be deployed in 4 years. We deployed the 178 seismic stations at the end of fiscal year 2008. The MeSO-net data are quasi-real-time transferred to the data center at ERI [Kasahara et al., 2007; Nakagawa et al., 2007]. In this study, we applied the tomography method and the natural earthquake reflection profiling method to image the heterogeneous structure under the metropolitan Tokyo area.

In DaiDaiToku project, former project, Hagiwara et al. (2006) estimated the velocity structure of Boso peninsula using the double-difference tomography method [Zhang and Thurber, 2003]. We also applied this method to the MeSO-net data and estimated the fine-scale velocity structure. Since the MeSO-net data is not sufficient for this analysis, we selected events from the catalogue by Hagiwara et al. (2006) and added the new event data observed by MeSO-net. The initial velocity structure and grid nodes for tomography are the same in Hagiwara et al. (2006). We imaged the subducting PSP along the Tsukuba-Fujisawa array. More fine image will be expected with increases in seismic stations and events.