

Spatial features of hypocenters and focal mechanisms under the Metropolitan area determined by the MeSO-net

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In central Japan, the Philippine Sea plate (PSP) subducts beneath the Tokyo Metropolitan area, the Kanto region, where it causes mega-thrust earthquakes, such as the 1703 Genroku earthquake (M 8.0) and the 1923 Kanto earthquake (M 7.9) which had 105,000 fatalities. In addition to the PSP, the Pacific Plate is subducting from the east beneath the PSP. It has been supposed that two plates collide under the Metropolitan area. However, the detailed geometries of two plates are not elucidated, due to a lack of dense seismic network.

We thus had started the Special Project for Earthquake Disaster Mitigation in Tokyo Metropolitan area (2007-2011). We have continued to deploy a dense seismic network in the Metropolitan area. Using this data set, we relocated hypocenters applying hypoDD-code [Waldhauser and Ellsworth, 2000] with accurate double difference arrival times obtained from waveform cross-correlation method. Furthermore, we estimated focal mechanisms using the polarities of first arrivals applying the HASH-code [Hardebeck and Shearer, 2002]. Beneath the Chiba-city, complex distributions of earthquakes and focal mechanisms are observed. Thrust type events with low-dipping angle plane, which is consistent with the down-going Pacific Plate, exist in the northern area. In contrast, normal-faulting type focal mechanisms are found at the southern area. Although they are closely located, the stress field steeply changes. Beneath the Ibaragi, earthquakes associated with the Pacific Plate show thrust type events with low-dipping angle plane, of which P-axis aligned along E-W directions. Similarly, earthquakes associated with the PSP show thrust-type events with low-dipping angle plane. However, the P-axis is aligned along NWN-ESE direction.