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Stress field under the Metropolitan area estimated by the MeSO-net

Aitaro Kato[1*], Shin'ichi Sakai[1], Keiji Kasahara[1], Kazuyoshi Nanjo[1], Shigeki Nakagawa[1], Hiroshi Tsuruoka[1], Eiji Kurashimo[1], Toshihiro Igarashi[1], Takashi Iidaka[1], Yuichi Morita[1], Naoshi Hirata[1], Toshikazu Tanada[2], Shutaro Sekine[3], Kazushige Obara[3]

[1]ERI, University of Tokyo, [2]HSR, Institute of Kanagawa Prefecture, [3]NIED

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 (PP) is subducting from the east beneath the PSP. It has been supposed that two plates collide under the Metropolitan area. However, the detailed geometries and interactions between 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 estimated the stress field under the Metropolitan area. We applied a stress tensor inversion code (SATSI) developed by Hardebeck and Michael (2006) to focal mechanism solutions determined by P-wave first-motion polarities. The present study area was divided into small subareas, and a damped inversion method was applied to simultaneously invert for stress in all subareas while minimizing the difference in stress between adjacent subareas. Stress orientation uncertainty was estimated using 2000 bootstrap resampling of the entire data. Generally, the maximum principle stress axis within the PSP plate is horizontally oriented to NNW -SSE direction. The stress regime is characterized as thrusting fault type. However, plunges of the maximum principle stress axis increase from the center to the north of the Chiba region, which prefers normal faulting stress regime. This lateral variation of the stress field might be derived from a mechanical interaction of two subducting plates. In contrast, the maximum principle stress axis within the PP is horizontally oriented to E-W direction at the eastern part of the Kanto (shallow depths within the PP). The azimuth of the maximum principle stress axis, however, tends to rotate at deeper depths.