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Regional Characterization of Tokyo Metropolitan area using a highly-dense seismic network (MeSO-net)

Naoshi Hirata (1), Shigeki Nakagawa (1), Shin'ichi Sakai (1), Yannis Panayotopoulos (1), Masahiro Ishikawa (2), Takeo Ishibe (1), Hisanori Kimura (3), and Ryou Honda (4)

(1) Earthquake Research Institute, University of Tokyo, Tokyo, Japan (hirata@eri.u-tokyo.ac.jp), (2) Yokohama National University, Yokohama, Japan, (ishikawa@ynu.ac.jp), (3) NIED, Tsukuba, Japan, (kimura@bosai.go.jp), (4) Hot Springs Research Inst., Kanagawa, Japan(ryou@onken.odawara.kanagawa.jp)

We have developed a dense seismic network, MeSO-net (Metropolitan Seismic Observation network), which consists of about 300 seismic stations, since 2007 in the greater Tokyo urban region(Hirata et al., 2009).

Using MeSO-net data, we obtain P- and S- wave velocity tomograms (Nakagawa et al., 2010) and Qp, Qs tomograms (Panayotopoulos et al., 2014) which show a clear image of Philippine Sea Plate (PSP) and PAcific Plate (PAP). A depth to the top of PSP, 20 to 30 km beneath northern part of Tokyo bay, is about 10 km shallower than previous estimates based on the hypocenter distribution (Ishida, 1992).

Based on elastic wave velocities of rocks and minerals, we constructed a petrologic model. The Vp steps in subducting Izu forearc crust occurs at a depth of 30km (blueschist or greenschist to garnet amphibolite transformation) and a depth of 50km (garnet amphibolite to eclogite transformation). Both temperatures are estimated to be 500 and 600 degree C, respectively. The high Vp/Vs anomaly (>1.9) implies large amounts of fluid H_2O released by garnet amphibolite to eclogite dehydration reactions.

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