I127-002 **Room: 301A** **Time: May 22 9:18-9:33**

Three-dimensional P-wave anisotropic velocity structure of the Japan subduction zone

Motoko Ishise[1]; Kazuki Koketsu[1]; Hiroe Miyake[1]; Hitoshi Oda[2]

[1] Earthq. Res. Inst., Univ. Tokyo; [2] Dept. of Earth Sci., Okayama Univ.

An improved P-wave velocity tomography technique is developed to infer three-dimensional structure of P-wave isotropic and anisotropic velocities from P-arrival time data of local earthquakes. Assuming that the P-wave velocity in the earth is laterally heterogeneous and hexagonally anisotropic, we express residual equations of P-arrival times which are linearized in terms of parameter changes of isotropic velocity, intensity and azimuth of anisotropic velocity and earthquake hypocenter locations. We obtain the optimum solution which satisfies the P-arrival time data, solving the equations by the damped least squares method.

We estimate three-dimensional variations of isotropic and anisotropic velocity structures of P wave in six regions (Hokkaido, Tohoku, Kanto, Tokai-Chubu-Kinki, Chugoku-Shikoku, and Kyushu districts) which cover the entire Japan Islands Arc. The P-wave anisotropic structure indicates that the seismic anisotropy resides in the crust, upper mantle, and subducting oceanic slabs. The features of these P-wave anisotropy are interpreted comparing with results of rock mechanics, shear-wave splitting, GPS observation, and other geophysical and geological studies. Consequently we reach at conclusions describing below, (1) the crustal anisotropy is governed by the present-day stress field arising from interaction between the plates surrounding the Japan Islands Arc, (2) the mantle anisotropy is caused by the present-day mantle flow induced by slab subduction and continental plate motion, (3) the old Pacific slab and the old part of the Philippine Sea slab have been keeping their original slab anisotropy which they obtained when these plates formed, while the youngest part of the Philippine Sea slab has lost the original anisotropy during its subduction and has gained new anisotropy which is controlled by present-day stress field. In the Tohoku district, we compared our P-wave anisotropic structure with S-wave anisotropic structure estimated by shear wave splitting analysis. Both anisotropic structures are in agreement in the upper crust but slightly different from one another in the upper mantle.