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## Anisotropic structures of the upper mantle beneath the northern Philippine Sea region from surface wave tomography

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We have analyzed the isotropic and anisotropic shear wave velocity structures in the northern Philippine Sea region using Rayleigh and Love waves recorded by land and seafloor observations. Seismic anisotropy provides fundamental information on past and present-day deformation processes in the upper mantle. We found that fast directions of azimuthal anisotropies are parallel to the directions of ancient seafloor spreadings in the lithosphere of the Shikoku and West Philippine Basins and Pacific Ocean, while they are parallel to the direction of the present-day absolute plate motion (APM) in the asthenosphere of the Shikoku Basin, and oblique at about 30 and 45 degrees from the direction of the APM in the Pacific Ocean and the northern part of the West Philippine Basin, respectively. In the subduction zone around the Philippine Sea plate, the fast direction of the azimuthal anisotropy is trench-parallel in the Ryukyu arc, perpendicular to the trench in the Nankai Trough, and small in the mantle wedge and NW-SE directions in the Izu-Ogasawara island arc. The Philippine Sea plate, which is a single plate, has very large lateral variations of azimuthal and radial anisotropies in contrast with the Pacific plate.

**Keywords:** anisotropy, upper mantle structures, surface wave tomography, ocean bottom seismometer, Philippine Sea