VTI mantle structure under the northeast Pacific ocean

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The existence of seismic anisotropy in the lithosphere-asthenosphere system (LAS) has been well established. Especially, strong radial anisotropy (transverse isotropy with vertical symmetric axis, VTI) under the Pacific ocean have been observed (Nettles and Dziewonski, 2008) and it is important to understand the formation and evolution process of the LAS. In order to describe the VTI of earth’s interior, 5 elastic parameters are needed. Kawakatsu et al. (2015) suggest a new representation of the parameters, α_H, α_V, β_H, β_V, η_κ, based on the elliptic condition of slowness. In this representation, α_H, α_V, β_H, β_V mean velocity of P or S wave which oscillate in horizontal or vertical plane and η_κ has change of incident angle dependence of P-SV wave velocities. In this study, we investigate the relationship between VTI parameters and traveltime of surface wave and various body waves and estimate an 1-D VTI mantle structure under the Pacific ocean using seismic waveform data. The events occurred near Japan and observed at the pacific islands, Hawaii, Midway, and broad-band ocean bottom seismometers (BBOBSs) on the northwest pacific seafloor. Because the effect of η_κ on a body wave traveltime depends on a incident angle in the LAS, a distance dependence of direct body wave traveltime is affected by η_κ and the traveltime of vertically propagating wave such as ScS is independent on η_κ. Then the 1-D structure of a corridor which has observation points and seismic source on the same line will be estimated in detail.

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