[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

[S-IT28]The lithosphere and the asthenosphere

convener:Catherine Rychert(University of Southampton), Hitoshi Kawakatsu(Earthquake Research Institute, University of Tokyo), Samer Naif(共同), Jessica M Warren (University of Delaware)
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The lithosphere-asthenosphere boundary (LAB) separates Earth's rigid tectonic plates from the underlying convecting mantle. The LAB is fundamental to our understanding of plate tectonics and mantle dynamics, although its depth and defining mechanism are highly debated. How it varies among tectonic environments and its relationship to the Moho, MLD, and anisotropy are also poorly understood. Ocean bottom seismic data is particularly important for constraining the young plate with relatively simple history, although this data is difficult to attain and rare. We will focus on the lithosphere, the asthenosphere, and the lithosphere-asthenosphere system in a variety of settings including but not limited to continents, oceans, margins, rifts, ridges, hotspots, plumes, and subduction zones. We welcome research contributions from diverse fields, including but not limited to seismology, magnetotellurics, petrology/mineralogy, dynamical modelling, and mineral physics.

[SIT28-P03]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.