[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)
Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
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-P04]Upper mantle structure beneath the Pacific Ocean revealed from seafloor and land broadband seismic observations

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Using broadband seismic data recorded on seafloor by more than 200 BBOBSs, as well as those on land, we measured phase speed dispersions of Love and Rayleigh wave up to 4th higher mode to determine the three-dimensional radially anisotropic shear wave speed structure in the upper mantle beneath the Pacific Ocean by surface wave tomography. Our model shows that the fastest anomalies at depths shallower than 100 km is located beneath southeastward of the Shatsky Rise and that strong radial anisotropy is located in the central Pacific at depths of 100 - 200 km and weak anisotropy is around the subduction zone. Isotropic shear wave speed structures show age dependence. Synthetic tests suggest that negative gradient of shear wave speed is not a reliable estimate for an absolute depth of discontinuity but may useful for relative depths. Negative peaks of the gradient are located nearly the same depths except for regions beneath the Ontong Java Plateau, the Mid Pacific Mountains, and the Daito ridges. From age-averaged shear wave speed profiles and the half-space cooling model, we estimate a thermo-speed relationship of the Pacific plate. We construct deviation maps in the Pacific Ocean from a reference shear wave speed model by using that relationship. The deviation maps indicate that large negative residuals, which may be due to partial melt, anelasticity, and/or extra-heat from mantle plumes, are located along the ridge and beneath hostpots, and that large positive residuals beneath the northwestern Pacific Ocean.