I131-P019 **Room: Poster Session Hall** **Time: May 18**

A new model for lithosphere-asthenosphere boundary and asthenosphere of oceanic plates

Hitoshi Kawakatsu[1]; Yasuko Takei[2]; Prakash Kumar[3]

[1] ERI, Univ of Tokyo; [2] ERI, Univ. Tokyo; [3] ERI, Univ of Tokyo (also NGRI, India)

We reported last year seismic evidence for sharp lithosphere-asthenosphere boundaries (LABs) of oceanic plates revealed by borehole broadband ocean bottom seismometry (Kumar et al., JpGU, 2008).

The presence of a sharp boundary (a transition thickness of less than 10-15km) indicates the oceanic LAB has a chemical or fabric origin, and one possibility to explain it is the partial melting in the asthenosphere.

Waveform modeling, however, indicates the shear-wave velocity reduction at LAB is large (7-8%).

For a texturally equilibrated partially molten region, this translates into the melt fraction of 3.5-4.0% (Takei, JGR, 2002), which is one order magnitude larger than commonly accepted amount of melt at mid-oceanic ridges and may be unrealistically high.

Therefore, some additional mechanism other than the conventional view of the partially-molten asthenosphere is required.

We propose a model of partially molten asthenosphere consisting of horizontal melt-rich layers embedded in melt-less mantle.

Such layered melt efficiently reduces vertically propagating shear wave velocity (Backus, JGR, 1962), and explains well the strong LAB signals reported here and elsewhere, as well as other properties expected for the asthenosphere, such as radial anisotropy (transverse isotropy with a radial symmetry axis) inferred from long-period surface waves, high electrical conductivity, high attenuation, etc.

The proposed model, therefore, may offer a universal view for the oceanic lithosphere-asthenosphere system, which should be further tested with broadband ocean bottom seismometry together with other geophysical measurements (i.e., electro-magnetics for electric conductivity).