S157-016 **Room: 303** **Time: May 18 14:30-14:45**

Global surface wave tomography using seismic hum

Kiwamu Nishida[1]; Jean-Paul Montagner[2]; Hitoshi Kawakatsu[3]

[1] ERI, Univ. Tokyo; [2] IPGP; [3] ERI, Univ of Tokyo

Global tomographic models are primarily limited by the uneven distribution of seismic sources and stations. Most earthquakes are located along plate boundaries and almost all seismic stations are on emerged lands. Recently, Shapiro et al. [2005] used ambient noise around 0.1 Hz as seismic sources. They obtained group velocity maps of Rayleigh waves in Southern California by cross-correlation analysis of long sequences of ambient seismic noise. This method is named ambient noise surface wave tomography. After this study, group-velocity maps have been obtained at local and regional scales but not at global scale. In addition, only the uppermost mantle structure (crust and lithosphere) can be derived from these datasets. The global surface wave tomography requires low frequency data below 20 mHz. In this frequency range, background Rayleigh waves, known as seismic hum, have now been firmly observed and established. Statistical examination of them shows that these waves must be excited randomly and persistently by globally distributed sources. This feature suggests that we can apply the technique of ambient noise tomography for dataset of seismic hum. In this study we estimate phase velocity anomalies using data of seismic hum, and we invert them for 3-D S wave velocity structure in the upper mantle. We analyzed 10-sec continuous sampling records from 1988 to 2000 at quiet 54 FDSN (Federation of Digital seismic networks) stations. We calculated cross-correlation functions between every pair of different stations on seismically quiet days [Nishida and Fukao, 2007]. We measured phase difference between the observed cross-correlation functions and synthetic ones [Nishida and Fukao, 2007] for 906 R1 paths and 777 R2 paths. We inverted the observed phase velocity anomalies for phase velocity maps from 3 to 10 mHz. Then, we inverted obtaining phase velocity maps for retrieving the 3-D S-wave velocity structure in the upper mantle. At depths shallower than 200 km, our results show low velocity anomalies associated with mid-ocean ridges and back arcs, and fast velocity anomalies in continental shields and platform areas. Below 200 km our results show high velocity anomalies in subduction zones. These features are consistent with past studies. This new exploration method may be applicable for other terrestrial planets.