S157-002 **Room: 303** **Time: May 18 9:15-9:30**

Effect of 3-D heterogeneous structures on observed Receiver Functions inferred from Gaussian Beam synthetics

Kazuro Hirahara[1]

[1] Geophysics, Grad. School of Sciences, Kyoto Univ.

http://www-seis.kugi.kyoto-u.ac.jp/~hirahara/

Beneath the Japan islands, a lot of travel time tomography studies have been executed to reveal 3-D seismic velocity structure of the subducting Pacific and Philippine Sea plate. Compiling these published results, there has been a trail for constructing a standard 3-D seismic velocity model beneath Japan (Tsuruoka et al., 2008). On the other hand, Receiver Function (RF) analyses have revealed the detailed configuration of seismic velocity layers such as the continental Moho, the slab top, the oceanic Moho and the bottom of the slab. In general, the travel time tomography using arrivals of direct phases of P and S waves provides the smooth 3-D velocity structure, even though some studies employ the initial model including velocity discontinuities. Therefore, the Receiver Function tomography combining the travel time tomography with the RF analysis has been proposed (Hirahara,2006), which obtains both the 3-D seismic velocity structure and the seismic velocity discontinuities.

In the proposed RF tomography method (Hirahara,2006); 1) we obtain a smooth 3-D seismic velocity structure with travel time tomography, 2) referring to the obtained 3-D velocity structure, we execute RF imaging to obtain an initial model of velocity discontinuities, 3) starting from the initial model, we use observed RFs (radial, transverse and vertical ones) to estimate both the configuration of velocity discontinuities and the velocity contrasts between their upper and lower layers in a nonlinear inversion method. Then we iterate the processes of 1)-3).

In this paper, in order to develop the efficient method of the above step 3), we examine the effect of the perturbation of the configuration and of the velocity contrast of the velocity discontinuity layers, and of the 3-D structure obtained by travel time tomography on the observed RFs through Gaussian Beam RF synthetics (Hirahara,2006).

Here, we choose the northeast Japan as a model region. Beneath northeast Japan, there have been some travel time tomography studies which revealed the 3-D structure of the crust and the upper mantle in which the Pacific plate is subducting (e.g., Zhao eta l., 1992). Recently DD tomography has revealed the detailed structure of the subducting oceanic crust (Tsuji et al, 2008; Nakajima et al.,2009). While RF imaging seemed to give somewhat deeper continental Moho. it clearly shows the top of the subducting slab and the oceanic Moho with negative and positive RF polarities, respectively. And the longer period RF shows the polarity of the slab top changes to be positive in the deeper portion (Kawakatsu and Watada, 2007). Furthermore, the negative RF polarity corresponding to the bottom of the slab has also been reported (Tonegawa et al., 2006). We have examined the effect of the 3-D structures on these observed RF phases by synthesizing RFs with Gaussian Beam method.