Influences of stagnant slab on mantle discontinuities below Chinese mainland

Yuan Gao[1]; Daisuke Suetsugu[2]; Masayuki Obayashi[3]; Yoshio Fukao[4]

[1] IES, CEA; [2] IFREE; [3] IFREE, JAMSTEC; [4] IFREE/JAMSTEC

Two main global discontinuities in the mantle are located at depths of 410-km and 660-km, although the depths slightly vary with different tectonic zones. Recent P-wave tomographic images show that the Pacific plate dives westwards below Japan to form a stagnant slab under the northeastern Chinese mainland in the mantle transition zone. There were some studies on the mantle discontinuities below eastern or northeastern China, using data of temporary small-aperture seismic networks (such as Li & Yuan, 2003; Ai & Zheng, 2003). In the present study we used broadband data from the National Seismograph Network of China (NSNC). The NSNC, composed of 48 stations, spreads over most of zones in China. In order to study an interaction of the stagnant slab below Chinese mainland with the mantle discontinuities, we preliminarily selected three stations: DL2, which is located above the stagnant slab; TIY, which is above the front edge of the stagnant slab; HHC, which is away from the stagnant slab. The selection is made on a basis of the recent tomographic model by Obayashi et al. (2006) and seismic anisotropy by Liu et al. (2008). The Ps receiver function analysis with data in 2005 and 2006 at the three NSNC stations shows that the 410-km and 660-km discontinuity depths at HHC are 421-km and 669-km, respectively, which are close to the global average. However, it is different at the other stations. A clear 424-km transition is seen at TIY, but the 660-km is not detected reliably. At DL2, the 660-km depth is determined clearly at 666-km, although the 410-km discontinuity was not detected at DL2. The normal 660-km discontinuity depth (666 km) at DL2 suggests that the stagnant slab does not seem to affect the discontinuity in spite that the DL2 station is apparently located above the stagnant slab in the tomographic image. In the presentation, we will show topography on the discontinuities beneath the entire eastern Chinese region to see the interaction of the stagnant slab and the discontinuities using broadband data from more NSNC stations. Seismic anisotropy in the mantle from SKS splitting will be also presented.