

Temperatures and water content of the stagnant slab beneath the Philippine Sea

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We determined temperature anomalies and water content of the stagnant slab beneath the Philippine Sea by analyzing seismic parameters in terms of mineralogical data. The seismic data are P-wave velocity anomalies at the bottom of the mantle transition zone and depths of the 660-km seismic discontinuity (Obayashi and Fukao, 2006; Suetsugu et al., 2006). The mineralogical data are temperature and water-content dependence of a P-wave velocity and the post-spinel phase change (Inoue et al., 1995, 1998, 2004; Higo et al., 2001; Irifune et al., 2008). The depths of the discontinuity was determined with receiver function method using P-waveform data recorded by the Philippine Sea broadband ocean bottom seismograph network deployed by the Stagnant Slab Project. The P-wave velocity anomalies and the discontinuity depths were estimated to be +2 % and 695 km in the stagnant slab, respectively. The estimated temperature anomalies are -500 ~ -600 K with water content less than an uncertainty level. In contrast, Suetsugu et al. (2006) suggested a significant amount of water (0.5 ~ 1.0 wt.%) in the vicinity of the stagnant slab. Little water content in the stagnant slab may indicate that the subducted slab were dehydrated and water is added to minerals surrounding the slab.