Seismic interferometry imaging of subsurface structure in the southernmost area of Southern Japanese Alps

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The Philippine Sea (PHS) plate is subducting beneath the Japanese island arc toward northwest direction in the Tokai district. The eastern Tokai area is a transition zone from the collision zone of Izu arc to the subduction dominated area. To understand the subsurface structure in this area, a 4-month seismic observation using a dense seismic linear array was conducted in the southernmost area of Southern Japanese Alps in 2013. In this study, seismic interferometry imaging was applied to the seismic records of the array observation. Seismic interferometry retrieves the zero-offset reflection response at a receiver by calculating the autocorrelation of the transmission response of normal incidence at the receiver (Claerbout, 1968). We used the regional deep earthquakes occurred at the Pacific Ocean slab as seismic sources to image the PHS plate and crustal structures.
Some clear, coherent reflectors were imaged at the depth of 10 km and 20 km in theS-wave reflection depth profile. These reflectors correspond to the S-wave velocity contrast in the S-wave velocity structure obtained by seismic tomography (Kawasaki, 2015). The reflector at the depth of 20 km shows a good match with the upper boundary of PHS plate estimated by previous studies (Matsu'ura et al., 1991, Hirose et al., 2008, and Kawasaki, 2015). For the reflectors at the depth of 10 km, our current interpretation is a boundary between geological units of accretionary deposits in the crust.

Keywords: seismic array observation, Seismic interferometry imaging, reflection depth profile

