

Evidence for a chemical heterogeneity in the lowermost mantle using short-period array data

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I present the evidence for a fine-scale heterogeneity at the base of the mantle beneath the East of Philippine Islands. Observations of short-period ScP phases from earthquakes in Halmahera Islands and Minahassa Peninsula recorded at the Japanese short-period seismic networks of Hi-net and J-array are analyzed. Large-aperture array analyses and the waveform migration method are used to extract subtle signals induced at the lowermost mantle heterogeneities. By the waveform migrations for both ScP pre- and post-cursor, a strong seismic reflector is indicated at a 10 - 20 km above the CMB with respect to IASP91 model. Its scale length is roughly 200 - 300 kilometers (Figure 2). I also noted that the energy amplitude of ScP post-cursor is clearly diminished in the westward with respect to the ScP precursor. It is likely that the variability of the pre- and post-cursor amplitudes is mainly due to the change in elastic properties at the reflector, implying the chemical heterogeneity.