

High-resolution seismic constraint on the seafloor sediments using the teleseismic body waves: towards deeper structure analysis using receiver functions

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The seafloor sediment layer acts as a filter to the body waves recorded by the ocean bottom seismometers. The sediment layer has a low velocity that delays and amplifies the P receiver functions (Kim et al., 2021 JGR), and its large impedance contrast with the basement produces multiple reverberating phases hampering the identification of the deeper structure phases. Thus, a sufficient understanding of the sediment structure is a key to performing receiver function analyses using the ocean bottom seismometers. In this study, we suggest a method that constrains the in-situ V_p and V_s structure of the seafloor sediment layer using the teleseismic body waves. Autocorrelation functions of radial and vertical components enable extraction of the PP and SS reflected phases and higher-order multiples within the sediment. We invert the two autocorrelations and the radial component waveform to seismic velocities by depth using the Markov chain Monte Carlo approach. Synthetic tests show that the method can constrain the seismic structure of three-layered sediment. We hope to show seismic structures beneath some ocean bottom seismometer arrays implied from the method suggested in this study.

Keywords: Ocean Bottom Seismometers, seafloor sediment, teleseismic body waves, receiver functions