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## Retrieval of body waves propagating between two sources using direct P and S waves -Toward SI tomography-

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Seismic interferometry combined with a spatial reciprocity theorem has been recently employed to extract the inter-source wave propagations. We applied the technique to seismograms of the earthquakes occurring at depths of 300-500 km underneath the Bonin Islands. In this study, the portion of direct wave (P and S waves), whose time length is -3-17 sec from the theoretical arrival time of the direct wave, was cross-correlated to retrieve waves traveling between two sources. To depress the both edges of the wavelet, we applied cosine taper of 3 sec. The frequency band is 0.5-2.0 Hz. Our results show the retrieval of direct P and S waves propagating between two deep earthquakes, especially direct P wave could be clearly reconstructed in most of event pairs. In order to retrieve the propagation of body wave well, (1) it would be important to design the geometry in which the stationary phase derived from two earthquakes can be observed at the used stations, (2) travel time difference of the stationary phases emerged in the used cross-correlation functions is required to be as small as possible, and (3) the large amplitude of direct wave associated with the deep earthquake is observed in the used stations for cross-correlation operation. The large number of the extracted P wave would be applicable to SI (Seismic Interferometry) tomography in the future studies.

Keywords: seismic interferometry, retrieval of body waves, reciprocity theorem, deep sources