Seismic interferometry analyses of teleseismic coda waves on a dense network of permanent ocean bottom seismometers (S-net) offshore Honshu, Japan

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Seismic imaging around the subducting slab where earthquakes nucleate is crucial. The S-net seismic network composed of 150 permanent ocean bottom seismometers offshore Honshu, Japan provides a unique opportunity to study the oceanic trench in one of the most active subductions. Ambient noise correlation analyses have been used to image the Earth’ s structure. However, since surface waves propagating in the thick sedimentary layer is dominant in ambient noise recorded at S-net, it is difficult to extract the waves propagating in a crustal scale structure. Here, we study the properties of cross-correlations of coda part of teleseismic earthquakes in the quest for reconstructing surface- and body-waves traveling across the network. We analyze 361 teleseismic earthquakes recorded at S-net from August 2016 to May 2019. The epicentral distances for the events range from 30 to 85 degrees. We compute cross correlations from 50 s to 300 s after the direct P arrival time. Peak arrival times of cross correlations for different station pairs depend on the source location. We therefore stack the correlations for station-pairs along a great circle path from the events to avoid the spurious phases. Stacked cross correlations show the wave packets traveling with about 8 km/s and 13 km/s, which seems to be corresponding to Pn velocity and apparent velocity of teleseismic phase, respectively. These observations might show the body waves propagating through ocean bottom stations are recovered from cross-correlation of the coda part of teleseismic events.

