

Offshore receiver function imaging of the Philippine Sea Plate in the Nankai subduction zone

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We show receiver function (RF) images around the Nankai subduction zone, using a cabled seafloor network (DONET: Dense Oceanfloor Network System for Earthquake and Tsunamis) and seismometers deployed at two boreholes. DONET contains 22 stations in DONET1 (eastern network) and 29 stations in DONET2 (western network), and their observation periods exceed more than 6 years and 1.8 years, respectively. In this study, we collected teleseismic P waves from records observed at the 53 (22 + 29 + 2 borehole stations), and applied a RF analysis to retrieve P-to-s converted waves. To convert time- to depth-domain RFs, we used shear velocity models obtained from a Rayleigh admittance analysis (Tonegawa et al. 2017), which describe shallow velocity structure at the accretionary prism. As a result, we obtained RF images that show the top of oceanic crust at depths shallower than 10 km beneath the southern part of DONET1. These are consistent with reflectors obtained from previous studies (e.g., Kamei et al. 2012). At the northern part of DONET1, RF images show strong Ps amplitudes at depths of 10–25 km. These may also correspond to the top of the oceanic crust. For DONET2, since the number of available teleseismic P waves was small due to the short observation period, we could detect clear Ps amplitudes only at shallow depths.

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