

1-D shear-velocity structure of the mantle transition zone beneath the Western Pacific studied using waveform inversion

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The 1-D shear-velocity structure of the mantle transition zone is studied by performing waveform inversion of seismograms obtained from the F-net for events located around the Western Pacific.

We first collect a dataset of waveforms suitable for DSM forward modeling. We then pick the trial source time function for each earthquake from an isolated S phase. Applying a 1.0 Hz lowpass filter, we find the best time shift in order to perform station and source static correction. We fix the centroid location and moment tensor picked to the Harvard CMT solution. To perform the inversion, we calculate partial derivatives of seismograms with respect to the shear-velocity structure following the method of Geller and Hara (1993). In order to weight all seismograms equally, we normalize both the synthetic seismogram and observed seismogram for each station for each event using the maximum amplitudes of the observed seismogram. We then perform linear waveform inversion applying smoothness constraints. We perform the inversion for several bandpass filtered seismograms and for various choices of vertical discretizations. These 1-D models can be used as the starting models for inversion for 3-D structure.