

Determining the Location of the Fault Plane for the Nankai Subduction Zone

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We estimate the location of the thrust plane for large earthquakes in the Nankai subduction zone by using high quality locations of small earthquakes. We assume that the small events in the depth range of 10 to 80 km are occurring close to the plate interface or within the subducted oceanic crust a few kilometers below. We are studying the region near the Kii Peninsula, where seismic experiments have already produced a good starting velocity model (Ito et al., 2006). We have collected waveform data at 70 seismic stations, from 450 earthquakes (M larger than 1.7) with hypocenter locations determined by both JMA and NIED.

In order to recalculate the hypocenters, we are using P- and S-waves arrival times determined by JMA, as well as high-precision differential travel times from waveform correlations of P-waves. For all possible earthquake pairs with catalog-derived distances of less than 15 km apart, waveforms on vertical component, recorded at common seismic stations, were cross-correlated to obtain differential travel times. The waveforms were filtered to 2-10 Hz and sliced in 2.00 sec. (200 time sample) windows around the P-arrival time determined by NIED. Two waveforms were considered similar if their correlation coefficient equalled or exceeded a threshold of 0.6.

We are using the absolute and relative travel time data together with a double-difference tomography approach (Zhang and Thurber, 2003) to obtain an improved 3D velocity structure and better locations for the earthquakes.