Seismic velocity structure around the splay fault area in the rupture zones of the Tonankai Earthquake

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In the Kumano-nada area off the Kii peninsula, seismic reflection profiles of JAMSTEC revealed steeply landward-dipping splay faults developed around the updip of the rupture zone of the Tonankai earthquake [Park et al., 2002]. Both science drilling of the seismogenic zone and 3D MCS survey are planned in the splay fault area.

We performed a wide-angle seismic survey in and around the rupture zone of the Tonankai earthquake off the Kii peninsula in autumn of 2004 [Nakanishi et al., 2005 JGU]. Our seismic study looks at the detailed structure beneath the splay fault area as well as the subduction structure along the NT0405 profile. The relation between the seismic image and the 2004 offshore southeast of the Kii Peninsula Earthquake, whose aftershock area is close to southeast part of the NT0405 profile, is also an interesting subject. This research is part of 'Structure research on plate dynamics of the presumed rupture zone of the Tonankai-Nankai Earthquakes' funded by Ministry of Education, Culture, Sports, Science and Technology.

In this presentation, we show results of the NT0405 profile. Data quality is very good on 72 of 74 OBSs. Referring to MCS data obtained by a 12 ch streamer in this study and previous data obtained by JAMSTEC, a seismic velocity image is derived by refraction tomography [Zhang et al., 1998] by using travel time picks of the obvious first arrivals. We used a previously obtained crustal structure around the survey area [Nakanishi et al., 2002]. A new fine-scale velocity image including the rough plate boundary can be obtained beneath the dense OBS profile (1km interval) in the splay fault area. Results of checkerboard tests show that the 1.25kmx1.25km, 5kmx2.5km, and 10kmx5km anomaly patterns can be resolved by the depth down to about 5km, 10km, and 15km, respectively. Comparing the seismic velocity image and MCS data in the time domain, we found difference in velocity gradient of upper and lower parts of the splay fault, which may indicate the splay fault as a material boundary.