

3-D MULTI-CHANNEL SEISMIC REFLECTION ANALYSIS IN THE EASTERN NANKAI TROUGH ACCRETIONARY PRISM, OFF TOKAI DISTRICT

Toshihiro Ike[1], Hidekazu Tokuyama[2], Shin'ichi Kuramoto[3], Jun Matsushima[4], Toshiyuki Yokota[5]

[1] Earth & Planetary Sci, Univ Tokyo, [2] ORI, Univ. Tokyo, [3] AIST, [4] GSJ, [5] Geophysics Dept., GSJ

To investigate geological and geophysical structure of the accretionary prism off Tokai district, a three-dimensional multi-channel seismic (3D-MCS) reflection data was processed and interpreted. A 3D-MCS survey was conducted using IFREMER's research vessel Nadir with a tuned air gun array system during June and July 2000. The survey area is located 50km southwest off Omaezaki and it covers a 45km-long and 5km-wide rectangle (3D-Box) trending NNW-SSE direction. Fifty-one seismic lines were shot to fill this box. We applied a non-iterative Kirchhoff pre-stack time migration method with stacking velocity analysis to our 3-D data. During the 3-D analysis, the synthetic waveform at an arbitrary point was calculated with all seismic data collected in the 3-D Box as a summation of scattering waves. We analyzed 7 seismic lines with this method. The processed 3-D data gives us a significantly clear image of the thrust faults, the relationship between sediment deformation and thrust activity. A 3-D interpretation was conducted and led to the following results. The Tokai and Kodaiba thrusts are clearly imaged down to 7-7.5 s in two-way time (TWT). A strong low frequency reflector imaged around 7s in TWT can be traced in the entire profile, and this reflector was interpreted as the top of the oceanic crust. Both of the Tokai and the Kodaiba fault systems merged to the oceanic crust at 60 km northwest from the Nankai trough axis. The contact area of the thrust faults and the oceanic crust may correspond to the up-dip limit of seismogenic zone in the eastern Nankai accretionary prism. Deep structures imaged in our 3D-MCS data are chaotic and difficult to interpret in comparison to data from the off Muroto transect. The eastern accretionary prism off Tokai is the region where the fundamental trend in ENE-WSW has been overprinted by the NE-SW/NNE-SSW trend. This overprint was brought by the collision of the Izu-Bonin arc into the Japan island arc accompanied with the counterclockwise rotation since 15 Ma. This complicated tectonics off Tokai could be a reason of the difficulty in imaging deep structures.