# 3-D prestack depth imaging in the Nankai accretionary wedge off Shikoku Island, southwest Japan

# Jin-Oh Park[1]; Tetsuro Tsuru[2]; MOE Kyaw Thu[1]; Yoshiyuki Kaneda[3]

[1] JAMSTEC, IFREE; [2] IFREE, JAMSTEC; [3] JAMSTEC,Frontier,IFREE

The Nankai Trough subduction zone off southwest Japan is one of the best-suited convergent plate margins for studying large interplate subduction-zone earthquakes as well as the formation of accretionary prisms. At this margin, the Philippine Sea Plate (PSP) is subducting beneath the Eurasian Plate (EP) to the NNW. The plate convergence rate is estimated to be 4 - 5 cm/yr. The Nankai accretionary wedge off cape Muroto, Shikoku Island, which has developed landward of the trough since the Miocene, mainly consists of offscraped and underplated materials from the trough fill turbidites and the Shikoku Basin hemipelagic sediments. The Nankai forearc accretionary wedge grades landward to the ancient accretionary prism known as the Shimanto Belt, of Cretaceous to Tertiary age, which is widely exposed in southwest Japan. Large thrust earthquakes have repeatedly occurred along the Nankai subduction zone with a recurrence interval of 100-200 years. The most recent interplate earthquake was the Nankai earthquake (Mw=8.2), which occurred in 1946 off the Kii Peninsula.

In order to figure out seismic structure and stratigraphy of the Nankai accretionary wedge off cape Muroto, southwest Japan, we have conducted three-dimensional (3-D) multichannel seismic (MCS) reflection survey using R/V Ewing in 1999, as a Japan-US collaboration program. We acquired the MCS data on 81 separate lines with 100 m line spacing, each 80 km long, producing 8 X 80 km 3-D seismic volume. The 3-D data acquisition was done with 14 tuned air guns with a total volume of ~70 L and a single 6 km, 240-channel streamer with 25 m group spacing. Shot interval is 50 m, and the data recording length is 12 sec. Sorting and binning of the 3-D shot data into 25 X 50 m CDP bins resulted in a 9 X 92.75 km 3-D volume of ~500 GB data capacity, due to streamer feathering. To obtain the 3-D prestack depth migration images, we constructed and updated a 3-D interval velocity model using the CDP bin gathers for which preconditioning processings including amplitude recovery, deconvolution, and multiple suppression were applied. The results of three Ocean Drilling Program (ODP) legs inside the 3-D area provide some information on lithology, stratigraphy, geochemistry, geological age, and physical properties such as P-wave velocity and density for the Nankai accretionary prism.

Miocene to Pliocene Shikoku Basin sediments underthrusts the overlying accretionary prism along a decollement as the PSP subducts beneath the EP. The oceanic crust of the subducting PSP is traceable over the entire inlines. Several imbricate thrust faults are observed in the overlying accretionary wedge. The decollement steps down on the top of subducting oceanic crust around ~30 km landward from the deformation front. We recognize several sigmoid, landward dipping out-of-sequence thrust (OOST) faults in the landward thick wedge package. Most of the OOSTs are apparently developed from the subducting oceanic basement to the seafloor in the forearc region, cutting both underthrust sediments and the overriding accretionary prism. In this paper, we will show and discuss recent results of the 3-D prestack depth imaging, visualization, and seismic structural/stratigraphic interpretation.