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Seismic structural and stratigraphic variations of subduction inputs along the Nankai Trough

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The Nankai Trough subduction zone, where the Philippine Sea Plate subducts beneath the Eurasian Plate to the NNW, is known as one of the best-suited convergent plate margins for studying subduction zone earthquakes. Historically, large earthquakes along the subduction zone have occurred with a recurrence interval of 100-200 years. The Nankai subduction zone may be divided into four or five discrete domains marked by the megathrust earthquake rupture, each of which roughly corresponds to a geologically well-defined forearc basin. Previous works indicate variations in upper plate geometry and plate-boundary decollement character along the Nankai Trough. Wedge taper angle of overlying accretionary prism varies significantly along the Nankai subduction zone. Reflection polarity of plate-boundary decollement has also a regional variation: for example, reverse for Muroto transect, and normal for Kumano transect. Those variations of the Nankai subduction-zone processes may be attributed to variations of subduction inputs composed of oceanic crust and overlying sediments of the Philippine Sea plate.

In order to figure out structural and stratigraphic variations of subduction inputs along the Nankai Trough, we interpreted a number of 2D and 3D seismic reflection data which have been acquired by JAMSTEC since 1997. For lithologic and age controls of each seismic reflection unit, we used Ocean Drilling Program and Integrated Ocean Drilling Program NanTroSEIZE drilling results. Based on seismic reflection characteristics, we identify 5 major seismic units from top to bottom: (1) trough turbidite fill, (2) upper Shikoku Basin sediments consisting of hemipelagic mud and volcanic ash, (3) middle Shikoku Basin sediment of volcanoclastics, (4) lower Shikoku Basin sediments consisting of turbidites and hemipelagic mud, and (5) oceanic crust of basalt. In particular, we recognize 3 different turbidite sediments within the lower Shikoku Basin (LSB) unit: LSB-T1, -T2, and ?T3. The shallow LSB-T1 is widely distributed in the east Nankai Trough including offshore Kumano Basin, with pinch-out off Cape Muroto of Shikoku Island. The middle LSB-T2 is confined to a region off Cape Ashizuri of Shikoku Island. The deep LSB-T3 shows a local distribution off Kumano Basin. Variation of oceanic basement highs appears to have influenced the turbidite sedimentation along the Nankai Trough. In this talk, we will present seismic structural and stratigraphic variations of the subduction inputs and then discuss its implications for the Nankai plate-boundary fault behavior.