

Relation between topography and sediments on the Reference site for the Nankai Trough Seismogenic zone Drilling Project

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The forthcoming Nankai Trough Drilling project will focus on the analysis of the early phase of the deformation of the Nankai prism. The Reference site is chosen at the floor of the Nankai Trough off the Kii Peninsula, where the pre-deformation turbidite is being deposited. The cruise KY07-01 by R/V Kaiyo of JAMSTEC was aimed at clarifying the thermal structure and the sedimentary succession of this site, in the period from Jan. 4- 19, 2007.

Topographic survey was performed during the cruise, while 12 piston cores were obtained. Sedimentary facies of the collected cores together with the topography obtained are reported in detail, and the sedimentary system deduced from the observation will be discussed in this paper.

The surveyed area occupies the area from the point 32N, 137N to the point 33N, 13630'E, ranging from the Shikoku Basin to the Nankai Trough. The sea-beam topographical survey was carried out and 12 piston cores were recovered systematically along the transect from NW to SE.

The area can be topographically classifiable into Shikoku Basin, Kashinozaki Knoll and Nankai Trough areas. The Kashinozaki Knoll is situated around 3240' and 137E and is as high as 500m from the ocean bottom.

The Shikoku Basin is a flat abyssal plane. It is covered by hemipelagic clay about 1 m thick, underlain by an ash layer about 10 cm thick. Below this layer, greenish altered tuff are interbedded with hemipelagic clay sediments.

On the abyssal plane surrounding the Kashinozaki Knoll, hemipelagic clay contain characteristically yellowish pumiceous clay. At least six scars of submarine slides are observable on the Knoll. As this indicates, the Knoll could have been dissected by these submarine slidings and the present topography could be the result of this process. Just below the scars, the pumice grains become coarser, indicating the sediments were transported as slide masses. On the top of the Knoll, there is a depression of about 4 km squares, several layers of volcanic ashes analogous to those collected from the Shikoku Basin are observed in this depression. Two thrust planes are visible in this core, suggesting some kind of deformation occurred here. The cause of the thrusts is unknown, but it is possible that the thrust was formed by local compression accompanying gravitational gliding.

In the bottom of the Nankai Trough, more than six trench turbidite beds are confirmed. This sandy turbidite spreads over the mid-flank of the Kashinozaki Knoll. In the Trough bottom, volcanic ash layers similar to those seen in the Shikoku Basin is seen at the 1.5m depth of the core.

In short, the sediments around the Reference site are summarized as follows: hemipelagic clay in the Shikoku Basin, pumiceous clay around the Kashinozaki Knoll, and trench turbidite in the Nankai Trough. Volcanic ashes are not analyzed yet, but if the thick volcanic ash layers seen in all the three areas is the K-Ah (7325 yr. B.P.), the sedimentation rates can be calculated as about 10 cm / ky in the Shikoku Basin, 10-20cm / ky in the Kashinozaki Knoll, and about 20 cm / ky in the Nankai Trough.