Tectonics and geomorphology of Tenryu Canyon, off Tokai

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Eastern Nankai Trough is one of the best investigated area. The Tenryu Canyon, occupies on the central part in the area. It is an entrenched meander submarine canyon across the entire Tokai accretionary prism. From the quantitative morphologic analysis, the relation between the canyon morphology and the activity of the active faults is shown together with the uplift rate examined from the abandoned canyon floor analysis. Then tectonic development of the Tokai accretionary prism is discussed.

Geomorphology of a continental slope is controlled by not only sedimentary process, such as sedimentation and erosion, but also tectonic process. In a convergent margin, the tectonic process is anticipated to play an important role for development of a continental slope. However, it is poorly understood what and how it influences, then it is notoriously difficult to quantify. One of key features to better understand the problem is an entrenchment of transeverse deep water canyon because canyon incision is made by erosion due to turbidity current to balance between stable channel gradient and relative uplift of a continental slope. However, incision as well as its relating morphic features has been poorly known in a deep water canyon. The 130 km long Tenryu Canyon is an active deep water meandering canyon transversely developed on the tectonically active Tokai accretionary prism, where the multiple intraplate deformation caused by the arc-arc Izu Collision. Over 2,000 km of EM12 data, 3.5 kHz profiles and PASISAR profiles obtained during the KAIKO-TOKAI Project, 1996; and IZANAGI data; the bathymetric chart; and the preexisting seismic profile data, enables us to better understand the geomorphology of the Tenryu Canyon. The uplift rate is estimated based on the difference in topographic level between the present active channel and abondoned channel floor at the mid reach. The piston core sample suggest that age when the avulsion takes place, and it is revealed that the dynamic equibrium is balanced in the Tenryu Canyon. Noteworthy is that the relief between the channel bottom and the levee surface tends to increase with water depth. This is actualized from a water depth of 2, 400 m where the Tokai Thrust displaces the Tenryu Canyon. An appropriate interpretation is that the Nankai Trough floor off Tokai Region abruptly subsided, and the present Tenryu Canyon is a rejuvenation canyon, catching up the gap between the subsided Nankai Trough floor and the upper continental slope. The total amount of the subsidence of > 800 m was estimated deeper than 2,400 m in water depth. Probably, the subsidence was caused by the indentation of the paleo-Zenisu Ridge that subducted beneath the Kodaiba Knoll.