Submarine active structure and cold seepage in the Nankai Trough: Results from Deep-tow camera survey

Saneatsu Saito[1], Juichiro Ashi[2], Yu'suke Kubo[1], Naoto Misawa[3]

[1] JAMSTEC, [2] ORI, Univ. Tokyo, [3] Sch. Mar. Sci. Tech., Tokai Univ.

Distribution and activity of submarine structures and cold seepage in accretionary prism are key phenomena to understand dynamics and fluid flow in subduction zones. JAMSTEC's deep-tow camera system was deployed during NT02-02 cruise from February 15 to March 2, 2002. This camera system can observe seafloor at the depth shallower than 4000 m. In this survey we focused on four targets; 1) spray faults off Kumano and Shionomisaki area, 2) Enshu active fault system in Kumano-nada, 3) mud diapir in the Kumano Basin, and 4) Tokai and Kodaiba Faults in Enshu-nada. A total of 150 km deep-tow survey was conducted for 80 hours and obtained seawater and rock samples.

Calyptogena colonies in the Kumano area were discovered by Shinkai 6500 dives (Ashi et al., 2001). We discovered additional Calyptogena colonies at the depth from 3500 m to 2100 m on three survey lines across spray faults, which were identified by seismic survey (Park et al., 2001), off Kumano and Shionomisaki area. The colonies indicate that seep activity is not strong compare to the Tokai region. However, these results provide useful information for future seismogenic zone drilling in the IODP. On

Enshu fault system in Kumano-nada, we observed deformation structures such as cracks, minor faults and grabens in mudstone outcrops. Small amount of Calyptogena colonies associated with Enshu fault system were also discovered. Living Calyptogena colonies and crater-like structure were discovered on the summit area of the smallest mud volcano (700 m in diameter, 80 m in altitude) in the Kumano Mud Volcano Chain. We also discovered living Calyptogena bodies on the summit area of the largest mud volcane (2 km in diameter, 100 m in altitude) in the volcano chain. Active Calyptogena colonies are widely distributed in a knoll at the south of Daini Atsumi Knoll, which is interpreted as a BSR dome structure, in Enshu-nada. Bacterial mats and chimneys were also observed on this knoll.