

BPT023-03

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## Cold-seep ecosystem including deep-sea subsurface infaunal world

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Infaunal animals in the cold-seep environment have not received enough attention so far. The fossil record strongly suggests that the infaunal animals are much more abundant than the epifaunal ones in the cold-seep environments. To reveal more information on the Recent chemosynthesis-based ecosystem concealed beneath the water/sediment interface, a joint cruise of paleontologists, biologists and geochemists using R/V Natsushima and ROV Hyperdolphin has been performed. The cruise, NT10-19 Leg 2, was operated during 24th to 29th, October, 2010, around off Hatsushima Island in the Sagami Bay. We carefully observed surface of the seafloor, took sediment cores (ca. 30 cm for maximum length) by MBARI-corer and sediments by scoop. Furthermore, we obtained biological samples from those sediments by sieving on board, and measured the concentration of total sulfides in pore water squeezed from the sediments. In addition, we produced resin cast of burrows in situ.

The direct observations have shown that the white bacteria mat areas are densely populated by mobile epifaunal provannid gastropods while there are no living mollusc animals in the sediment underlying the mat. The measured concentrations of the sulfides at this location show 6.6 mg-S/l. On the other hand, we found the living infaunal solemyid and thyasirid bivalves in the sediment samples obtained from areas directly adjoining the Calyptogena colony where no living animals on the seafloor were observed. The solemyid and the thyasirid bivalves are known to host symbiotic sulfur-oxidizing bacteria. Total sulfide concentrations at this sampling site is 0.8 mg-S/l so basically the same value as observed at the reference site. Detailed observations of the seafloor revealed many burrow holes produced by organisms surrounding the Calyptogena colony. We succeeded to get two resin casts of these burrows. One cast displayed Y-shaped burrow with a living solemyid bivalve, *Acharax johnsoni*, at its end. No significant change of sulfide concentrations between the site inhabited by solemyids and the reference site strongly suggests that the solemyids obtain the sulfides necessary for their symbiotic bacteria through the burrows which may connect the much deeper, anoxic zone. These preliminary observations have shown a necessity of further investigations of the cold seep subsurface.

Keywords: methane seep ecosystems, infauna, fossil cold-seep assemblages