

Cruise Summary

1. Cruise Information

- Cruise ID YK11-06
- Name of vessel Yokosuka
- Title of the cruise Suiyo Seamount and western part of North Pacific Ocean
- Chief scientist [Affiliation] Takeshi Kakegawa (Tohoku University)
- Representative of the Science Party [Affiliation]

Takeshi Kakegawa (Tohoku University)

Hidetaka Nomaki (JAMSTEC)

- Cruise period 2011/8/29~2011/9/12
- Ports of call Natsushima to Harumi
- Research area

Suiyo Seamount and Western Part of North Pacific Ocean

2. Overview of the Observation

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Scientific interests of this cruise are composed of two different topics, based on approved two individual proposals. In order to perform two proposed research, 8 dives were originally planned, but only 4 dives were done because of Typhoon 12. First scientific interest or objective is (1) to find lipid biomarker for methane-oxidizing bacteria, (2) to find ^{14}N -enriched organic molecules and (3) to find novel microbes which may be useful as resources. Very active submarine hydrothermal activities are recognized at the crater of Suiyo Seamount (approximately 1350 m depth). This submarine field was drilled by the past scientific project (AP project), and drilled holes were cased. Such cased drilled holes were the main subjects for the research. 2 dives were performed at Suiyo Seamount. We were successful to collect precipitates inside cased pipes and sulfide mounds which were studied in past. Hydrothermal water ($4\sim 70^\circ\text{C}$) sampling was also successful by a bag sampling method. These samples were subjects of lipid-biomarker and PCR analyses. In addition, we will perform nitrogen isotope analyses on organic matter extracted from collected samples. Because of reduction of dive numbers, we could not collect volcanic rocks on the slope of Suiyo Seamount.

The second objective is to constrain faunal compositions, metabolic activities, and biogeochemical cycles at the abyssal plain and their importance on global carbon cycle. Deep-sea is the largest single marine-ecosystem on earth. Abyssal plain dominates most of the deep-sea area

while continental slope and trench dominate relatively smaller area. We have investigated on biogeochemical cycles and biological activities mainly on continental slope (Sagami Bay, Arabian Sea, etc) because major part of the C and N burial occurs at this area. However, little is known about biogeochemical cycles at the abyssal plain even though its potential importance. Here, we investigated 1) mega- and macro-benthos community, meiofaunal community, protist community, and microbial community, 2) porewater chemistry, and 3) protists and microbial activity *in situ*. For the purpose 4), we observed mega- and macrobenthos by the camera of SHINKAI 6500 and collect some of them by using a suction sampler and push cores. Meiofauna, protist, and microbe communities were investigated with the push cores. Those are done by 2 dives. Porewater samples were extracted from the sediments collected by a long push core (core tube length = 50 cm). *In situ* benthic activities were investigated by *in situ* incubation cores and chambers using different kinds of ^{13}C - or ^{15}N - labeled substrates.