

## Distribution of methane and hydrogen plume around Kuroshima Knoll

# Uta Konno[1]; Urumu Tsunogai[1]; Fumiko Nakagawa[1]; Sohiko Kameyama[1]

[1] Earth & Planetary Sci., Hokkaido Univ.

The Kuroshima Knoll is located on the forearc region of the Ryukyu arc. Large-scale chemosynthetic communities (both living and dead Calyptogena and Bathymodiolus), carbonate crusts including chimney like structures, and some gas bubbling sites have been found on the top of the knoll (depth = 650m). Both the methane/ethane ratio ( $\sim 10^4$ ) and the carbon isotopic ratio of dissolved methane (-40 per mill VPDB) for the bubbles suggest both thermocatalytic decomposition of organic matter for the source of the bubbles and secondary fractionation during the movement for the bubbles from source region to seafloor. However, little has been clarified for the venting flux of methane from the knoll, as well as for the extent of chemoautotrophic activities in seawater.

In this study, during KT05-26 cruise, vertical hydrocasts have been done using Niskin bottles attached to Rosette multi-sampler at 3 stations above and around the knoll to determine vertical distribution of both concentrations and carbon isotope ratios of dissolved methane, as well as concentrations of hydrogen around the knoll. Methane enrichment up to 82nmol/kg was detected on both the station just above the knoll and that 6km south of the knoll at the depth of 630m. The relation between the carbon isotopic ratio and concentration of methane suggest that microbial oxidation of methane is so slow that methane in plume vary just through mixing between seafloor venting methane and surrounding seawater. Both the end-member carbon isotopic ratio of methane (-38 - -39 per mill VPDB) and ethane depletion in the plumes coincide well with that of seafloor vents. The seafloor venting bubbles which had been already found on the top part of the knoll must represent all methane emission to ocean from the knoll. The concentration of hydrogen in the plume exhibit linear orrelation with the concentration of methane. Seeping bubbles must accompany hydrogen at Kuroshima Knoll.