

Organic Geochemical studies of the drilled core samples from Suiyo Seamount hydrothermal field

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Drilled core samples were recovered from Suiyo Seamount hydrothermal field using the BMS. 7 holes were drilled and core samples had been recovered from 6 holes. The drilled holes reached 2.2~6.7m length, and the recovery of the drilled cores were 22~90% of total length. The core samples have been used looking for evidence to prove a life activity at an extreme subvent environment over 300 degree C. Organic carbon contents and carbon isotopic compositions in the core samples have been measured.

Concentrations of the total organic carbon (TOC) and total nitrogen (TN) in the drilled core samples were less than 0.02 and 0.004 weight %, respectively. Although the TOC and TN values of the cores tend to decrease with depth from seafloor, these values of many core samples are almost background level. The carbon isotope compositions of some core samples, which include more than 0.01% of TOC, varies ranging from -30 to -12 per mil (relative to PDB). During drilling, the core samples could not avoid contamination of the grease, which had a uniform carbon isotope compositions approx. -26 per mil. However, the wide range of carbon isotope compositions suggests that a life activity should occur at the subvent extreme environment.

The low carbon isotopic values less than -30 per mil should be provided from the organisms using RubisCO. On the other hand, the high carbon isotopic values may due to life activity of methanotrophic organisms, because methane carbon isotopic values in the hydrothermal fluid were reported -8 ~ -6 per mil, then methanotrophic organisms show similar isotopic composition. The organisms using RubisCO may be eubacteria. The core samples contained isotopic heavy organic carbon were obtained the hole that warm temperature shimmering (40 degree C) was observed after the drilling. This warm shimmering may be a result of seawater mixing. Therefore, the methanotrophic organisms may not be archaea.

From the above results a life activity may be expected at the subvent environment of the Suiyo Seamount hydrothermal field, the biomass would be very low. No evidence of existence of archaea adapted to the high temperature extreme environment could be found from the core samples. This study, however, confirms that the BMS sampling of the subvent cores can use for organic geochemical study.