Sub-seafloor Archaeal Community at Suiyo Seamount on the Izu-Ogasawara Arc

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In the Archaean Park Project supported by Special Coordination Fund, several holes were bored and cased in the crater of the Suiyo seamount on the Izu-Ogasawara arc, Japan (about 1,400 m depth) in 2001 and 2002. Hydrothermal fluids were sampled at various sites of cased holes at Suiyo seamount. Black smoker chimney sample was also collected. The fluids were filtered to collect the microbial cells. Filters and black smoker chimney samples were crushed and DNA was extracted and purified. The DNA was used to amplify archaeal 16S rDNA fragments by PCR using an archaea specific primer set. The PCR fragments were cloned and sequenced. Archaeal PCR clone communities of sub-seafloor showed different spectrum from that of black smoker chimney. Archaeal PCR clones obtained from sub-seafloor belonged to the order Archaeoglobales and the clones related to the order Methanococcales. These clones reflect the hydrogen dependent chemolithoautotrophic archaea community. However, fluorescent in situ hybridization analysis showed that an archaeal population in hydrothermal fluid from sub-seafloor at the site on Suiyo seamount was low. Clone-analysis showed significant variation in bacterial sequences found in fluid samples. Difference in the dominant species depending on the location was found, suggesting that the bacterial community at sub-sea floor is not monotonous but has gradual shift from the hydrothermal center to peripheral area.