# Study on microbial diversity and habitat in Suiyo Seamount, using in situ growth chambers

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After excavation using a portable submarine driller near deep-sea hydrothermal vents in the Suiyo Seamount, Izu-Bonin Arc, microbial diversity was examined in samples collected from inside the boreholes using an in situ growth chamber called a vent catheter. This instrument, which we devised for this study, consists of a heat-tolerant pipe tipped with a titanium-mesh entrapment capsule that is packed with sterilized inorganic porous grains, which serve as an adhesion substrate. After this instrument was deployed inside each of the boreholes, as well as a natural vent, for 3-10 days in the vicinity of hot vent fluids (maxima: 156-305 C), DNA was extracted from the adhesion grains, 16S rDNA was amplified, and randomly selected clones were sequenced. Through phylogenetic analysis of more than 120 clones, several novel phylotypes were detected within the epsilon-Proteobacteria, photosynthetic bacteria-related alpha-Proteobacteria, and Euryarchaeota clusters. Members of epsilon-Proteobacteria were encountered frequently. Half of these were classified between two known groups, Corre's B and D. The other half of the clones were assigned to new groups, SSSV-BE1 and SSSV-BE2. From this hydrothermal vent field, we detected a novel lineage within the photosynthetic bacterial cluster, SSNV-BA1, that is closely related to Rhodopila globiformis isolated from a hot spring. A number of archaeal clones were also detected from the borehole samples. These clones formed a novel monophyletic clade, SSSV-AE1, approximately between methanogenic hyperthermophilic members of Methanococcales and environmental clone members of DHVE Group II. Thus, this hydrothermal vent environment appears to be a noteworthy microbial and genetic resource. It is also noteworthy that some of the findings presented here were made possible by the application of the in situ growth chamber into hot fluids deep inside the boreholes.