Shallow drilling at hydrothermal sites in southern Mariana Trough, western Pacific: Preliminary report of Hakurei-Maru #2 cruise

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Two seafloor hydrothermal sites on southern Mariana back-arc spreading center and off-ridge seamount were drilled using marine rock drill named BMS on-board the R/V Hakurei-Maru #2 during January-February 2004. Average depth and core length of the four holes, APM01-04 are 5.37 meters and 2.22 meters, respectively. Two of them were bored on the spreading axis where 247 deg-C fluid venting was discovered during R/V T.G. Thompson cruise (P.I. Patty Fryer, Univ. of Hawaii) in 2003 beneath hydrothermal plume detected by Submarine Ring of Fire Cruise of NOAA/PMEL (P.I. Bob Embley).

The APM04 hole is located a few meters off the original discovery point (12_57N, 143_37E, depth=2840m). Blue-green nontronite(?) occurs on cracks and fissures of well-vesiculated basalt lava which indicates reduced fluid circulates through dense fractures within a few meters below seafloor. Pyrite crystals coat these fractures in other hole, APM01 where venting of 75 deg-C fluid was observed from cased pipe after the drilling.

One of the two holes on the ridge of off-ridge volcano (12_55N, 143_39E, depth=2780m) is characterized by thick (5.6 meters) accumulation of massive sulfide ore which indicates in-situ

accumulation of sulfide minerals occur not only as sulfide chimney but also as sulfide mound at seawater-basalt interface. The other hole, APM03 represents oxygenated low temperature hydrothermal circulation within cracks of vesicular basalt around a hydrothermal mound.