How does the unique nature of the hydrothermal system within arc volcano affect the resultant sub-vent biosphere?

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The Phase I of the Archaean Park Project was conducted at the Suiyo Seamount, Izu-bonin Arc, Western Pacific during 2001 and 2003 to investigate geophysical mapping and direct drilling. The investigation made the unique structure and the nature of the hydrothermal system which developed in submarine arc volcano.

The high temperature hydrothermal field of the Suiyo Seamount extends 250 meter by 200 meter on sandy caldera floor at the depth of 1,390 meter. It consists of Central Mound Complex, low-temperature seepage called Shell Carpet, and sourrounding scattered high temperature black smoker mounds.

We conducted ten shallow drilling up to 12 meters using tethered marine rock drill (BMS) in 2001 and 2002. These drill holes intersected high temperature (300 deg C) reservoir a few meters below sea floor. The reservoir is bounded on its upper surface by so-called cap-rock which consists of anhydrite, sericite, pyrite and quartz. The shallow reservoir limits the vertical extent of the sub-vent biosphere as the temperature is too high for microbes.