Geophysical Research Abstracts
Vol. 20, EGU2018-6085, 2018
EGU General Assembly 2018


# Hydrothermal chimneys in the subsea TA25 caldera, Tonga Arc

Sang-Joon Pak, Hyun-Sub Kim, Sun-Ki Choi, Kyeong-Yong Lee, and Jai-Woon Moon

Korea Institute of Ocean Science & Technology, Deep-sea and Seabed Mineral Resources Research Center, Korea, Republic Of (electrum@kiost.ac.kr)

Seafloor hydrothermal vent field were discovered in the eastern part of TA25 volcanic caldera, Tonga Arc. TA25 caldera is a large funnel-shaped caldera 6-km-long and 1.1-km-deep. Basalt and basaltic andesitie are major host rocks in the caldera. The hydrothermal vents are clustered in either sides of the eastern and western flank of caldera. The chimneys line up along the NE fracture zone that might be a part of the radial fault sets. Chimneys in the eastern part of the caldera are mostly on the wane but some of them are still active. Chimneys are up to 10-m-tall and swarm in places. The two exceptional black smokers were also discovered in the area, which they are much shorter (<1 m) than others. The waney vents is featured by the latest massive chalcopyrite plugging-up in main orifice whereas outer part of orifice is composed of chalcopyrite and sphalerite assemblages, showing its sponge-like textures. Parasite vents on the chimneys were venting $CO_2$-rich fluids. High $CO_2$ concentration (up to $\sim$1200 ppm) causes lowest visibilities. Small black smokers show barite $\pm$ sphalerite assemblages and high temperatures ($\sim$260[U+2103]). Inactive chimneys which are also clogged by chalcopyrite start to oxidize, turning to be reddish brown from outmost layers to inner layers. Abovementioned features of the chimney are indicative of the chimneys were formed on a mature stage of chimney growth.