

Geochemical and biological features of hydrothermal vent fields newly discovered in the Okinawa Trough

A. MAKABE^{1*}, E. TASUMI¹, Y. MATSUI¹, S. HORAI², S. SATO², C. CHEN¹, T. SHIBUYA¹, K. KITADA¹, A. TAKAHASHI¹, J. MIYAZAKI¹, K. NAKAMURA³, S. KAWAGUCCI¹, AND H. KUMAGAI¹

¹ JAMSTEC, 2-15 Natsushima-cho, Yokosuka, Kanagawa 237-0061, Japan (*makabea@jamstec.go.jp)

² Kyushu University, 744 motooka, Nishi-ku, Fukuoka-city 819-0395, Japan

³ The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan

Seafloor hydrothermal deposits are expected as useful mineral resources for base, rare, and precious metals. Recently, an efficient method to detect such deposits, based on the geophysical technique using multibeam echo sounder systems on vessels or AUV, has been developed [1]. Known hydrothermal fields show a wide variety of geochemical and biological features, and further survey of new hydrothermal vent fields help to understand factors controlling quality and quantity of the ore deposits. We conducted dives with ROV Kaiko Mk-IV in Okinawa Trough, during a cruise KR16-16 of R/V Kairei. The ROV dives were carried out at four locations where acoustic anomalies in water column were detected during previous cruises YK14-16 and YK16-07. We successfully discovered three hydrothermal vent fields and collected venting fluids and macrofauna. One was a field christened “Yokosuka” field located on the Yaeyama Knoll in the southern-Okinawa Trough. It is not only the deepest (2160–2205 m) of all known hydrothermal vent fields in the Okinawa Trough but also exhibited the highest maximum temperature of venting fluids (364 °C) ever recorded from the Okinawa Trough. Notably high gas concentration coupled with low Cl concentration of the fluids from Yokosuka field suggested vapor-rich phase segregation under the seafloor. The second was named “Futagoyama” field, also located in the southern-Okinawa Trough, in which two sites were detected, named Waka and Taka. Max. 291 °C fluid venting was recorded in Waka site, whereas only gas bubbles emitted from the seafloor were observed visually in Taka site. Lastly, “Higashi-Ensei” field was discovered near the Tokara Islands, in which two hydrothermal sites were found. Ghibli site was characterized by max. 319 °C fluid venting, but only diffuse venting was seen in Fukai site. We will present fluid chemistry and biological composition of these newly discovered sites.

[1] Nakamura, K. *et al.* (2015) *Geochem. J.*, **49**, 579-596.