

Discovery of new hydrothermal vent fields in the mid- and southern-Okinawa Trough

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Since the first discovery of seafloor hydrothermal activity at Garapagos Rift in 1977, global plate boundaries and hot spot volcanoes have been surveyed to know how many hydrothermal vents are active on modern Earth. Recent compilation points out that more than five hundreds hydrothermal vent fields has been discovered by camera or suggested by physical and chemical anomalies of seawater column and seafloor sulfide deposition until now [1]. However, this is less than half of the expected numbers. Because any known hydrothermal fields do not show the same composition in fluid chemistry and (micro)biological community each other, further survey of hydrothermal vent fields and geochemical and biological investigation of them after the discovery help to accurately estimate geochemical flux through seafloor hydrothermal activity and biological diversity among the fields. For this purpose, we conducted a cruise KR15-16 of R/V Kairei and ROV Kaiko Mk-IV at mid- to southern Okinawa Trough. The ROV dives were carried out at seven regions where acoustic water-column anomalies [2] were detected during prior cruises of YK14-16, YK15-14, and NT15-18. We successfully discovered four hydrothermal vent sites during KR15-16 and collected venting fluids and macrofauna. A site tentatively named “ANA” is located close to Daisan-Kume Knoll (26°17.4’N 126°28.3’E 1070 m) and characterized by max. 228.5 °C fluid venting. Higa site (26°33.3’N 126°13.4’E 1485 m) is located at a small hill close to Gima Hill and characterized by max. 56.5 °C fluid venting. Swan site is the second hydrothermal site on Tarama knoll and distinguished from the Fox site [3], and Crane site is located on Tarama Hill. We will present fluid chemistry, mode of occurrence of ore minerals, and biological composition of the newly discovered sites.

[1] Beaulieu, S. *et al.* (2013) *Geochem. Geophys. Geosys.*, **14**, doi:10.1002/2013GC004998. [2] Nakamura, K. *et al.* (2015) *Geochem. J.*, **49**, 579-596. [3] Yamanaka, T. *et al.* (2015) in *Subseafloor biosphere linked to global hydrothermal systems; TAIGA Concept*, 497-504.