

A shallow scientific drilling at Higashi Ensei Hydrothermal Field, Okinawa Trough

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A shallow seabed drilling was performed in February 2019 at Higashi Ensei Hydrothermal Field, Northern Okinawa Trough (Cruise ID: KM19-E01). Two localities were selected to investigate natures of sub-seafloor lithology with and without self-potential anomaly (SP anomaly) measured by near-bottom AUV survey. Here such a SP anomaly is to be resulted from a sub-seafloor orebody consisted of mainly sulfides. A seabed drilling apparatus, BMS (Boring machine system, Cellula Robotics Ltd.), was deployed twice from R/V Kaimei. At the first drilling in the cruise, the drilled hole reached to a formation 44m beneath the seafloor but stopped there due to significant venting through the drilled hole. Volcaniclastics with and without sulfide blocks or veins were sampled even poor recovery in the shallow part of the hole. Contrasting to it, the second drilled hole reached to 10 m beneath the seafloor where intact mafic-intermediate lava flow, i.e. volcanic basement, was sampled. In the second hole, little sulfide were retrieved except orange-colored one, probably realgar associating with orpiment and stibnite, in the first core, shallower than 1.5mbsf. On board IP measurement both as well as standard MSCL and visual core description were performed for the cores from the first hole. Further, an ROV dive observation was conducted within 16.5 hours after the drilling of the first hole. An exotic white sediment was recognized in the vicinity of the hole, similarly to the IODP exp.331 at Iheya-North Knoll, and successfully sampled. In this presentation, retrieved drilled samples as well as those sampled by ROV will be reported.

Keywords: A seabed drilling system, Self-potential anomaly, An exotic white sediment around the drilled hole