

Subseafloor mineralization at the Izena Hole, Okinawa Trough from the aspect of drill cores obtain by the CK16-05 Cruise (Exp. 909)

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From 16h Nov. to 15th Dec. in 2016, a drilling research cruise was conducted at the Izena Hole, middle Okinawa Trough under the framework of the Next-generation Technology for Ocean Resources Exploration Project, Cross-ministerial Strategic Innovation Promotion Program (SIP). 9 Holes of 8 Sites were drilled with the total drilling length was 834.0 m and the deepest drilling depth of 200.5 mbsf. Here, we report the subseafloor mineralization style beneath hemipelagic sediment of ca. 30 m thickness based on the results of VCD, XRD, PP-ED-XRF and ICP-MS analyses.

We successfully penetrated the subseafloor orebody and obtained continuous drill core samples including the boundary between hemipelagic sediment and subseafloor sulfide orebody. Across this boundary, subseafloor sulfide ore, barite-rich layer, acidic altered clay layer rich in kaolinite and neutrally altered clay layer rich in anhydrite were observed in ascending order. Drill cores of the unmineralized reference holes consist mainly of permissible pumice and volcanoclastics. Thus, subseafloor orebody of the Izena Hole was considered to be produced by “replacement” of pumice layer whose contact with seawater was isolated by anhydrite cap layer which is now observed as barite-rich layer. Moreover, acidic altered clay layer rich in kaolinite was produced by low-pH hydrothermal fluid which often leaked from the anhydrite-rich cap layer.