Results of physical property measurements obtained during the CHIKYU cruise CK16-05 of hydrothermal fields at the middle Okinawa Trough.

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The middle Okinawa Trough, located along the Ryukyu-arc on the margin of the East China Sea, has several active hydrothermal fields. Cruise CK16-05 of D/V CHIKYU targeted one of the largest hydrothermal fields, the Izena hydrothermal field, and conducted coring operations. Site C9027 is located on the center part of the Northern sulfide mound. Four other sites where we can observe the subseafloor sulfide layer were drilled along an eastward transect from the Northern mound (Sites C9028, C9026, C9025 and C9032 from west to east). Two additional reference sites (C9029 and C9030) located to the north and northwest of Site C9027, where the subseafloor sulfide layer is not distributed, were also drilled. Here, we present the results of physical property measurements obtained by using CHIKYU’s on-board laboratory.
Drilled core samples from the Northern mound (Site C9027) mainly consisted of sulfide-rich rocks. The total recovered core length was 5.09 m and core recovery rate was only 3.9 %, due to the difficulty of coring operations in this material. These core samples exhibited the highest thermal conductivity (18.37 W/m·K) and the highest P-wave velocity (7,613 m/sec) of all sites, which is consistent with an abundant occurrence of sulfide minerals.
The four sites along the eastward transect from the Northern mound (Sites C9028, C9026, C9025 and C9032) consisted of hemi-pelagic sediment, hydrothermal altered sediment, pumiceous gravel and sulfide layers. Conspicuous peaks in the results of physical property measurements such as a notably high grain density were observed within the cores from all four sites, suggesting that a large sub-seafloor sulfide layer is widely distributed in this area.
Core samples from the two reference sites (Sites C9029 and C9030) mainly consisted of pumiceous gravel and mud, and total recovered core lengths were 84.5 m and 61.4 m with recovery rates of 53.7% and 66.7%, respectively. Physical property data from these two sites did not exhibit the conspicuous peaks that were observed in the sites associated with the sub-seafloor sulfide layer.
Using whole physical property data, we will also present a first-order sub-seafloor physical property model for the Izena hydrothermal field in this presentation.

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