

南部マリアナトラフの熱水系の地形・地質学的特徴 Geomorphological and geological characteristics of hydrothermal system in the southern Mariana Trough

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To examine the relationship between geomorphological characteristics and hydrothermal activity, and relation of tectonic and volcanic control to hydrothermal system in the southern Mariana Trough, we investigated the five hydrothermal sites using near-bottom swath mapping data collected by SEABAT7125AUV on the AUV Urashima during the cruise YK09-08, and dive observation data acquired by the submersible Shinkai6500 during the cruise YK10-11. The principal findings are as follows. 1) The two on-axis hydrothermal sites (Snail and Yamanaka sites) are possibly locally developed on a 4th order spreading segment, in association with diking events. The three off-axis sites (Archean, Urashima, and Pika sites) appear to represent locations of sustained hydrothermal activity, which has created relatively large-scale hydrothermal features as compared with those observed in the on-axis area. The formation of off-axis hydrothermal sites likely closely related to an off-axis magma upwelling system, as evidenced by the absence of fault systems and the undeformed morphology of the mound and the knoll. 2) The three off-axis hydrothermal sites are mainly composed of breccias assemblages probably originated in hydrothermal activity with black smoker venting. In those areas, numerous ridge lines (height, mainly 1-6 m), conically-shaped mound (height, 50-100; diameter, 250-300m), and bumpy seabed texture are found, in contrast, the on-axis sites are characterized by no ridge lines, and white smoker and shimmering observed on dome-shaped pillow mound (height, 5-30 m; diameter, 250-320 m). Hence, distribution of the ridge lines, mound morphology, and bumpy seabed textures likely to correlate with hydrothermal activity.