Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05148, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05148
EGU General Assembly 2008

Mapping of emanating region of hydrothermal plumes in the Iheya-North knoll volcanic complex on the Okinawa-Trough back-arc rifting center

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AUVs, with acoustic sonars/sounders or physical/chemical sensors, are ideal platform to explore submarine volcanoes mainly due to their maneuverability. AUV Urashima of JAMSTEC attached a 100kHz side-scan sonar with other acoustic, physical, and chemical devices explored the active hydrothermal field in the U-shape depression surrounded by the Iheya-North knoll volcanic complex off Okinawa Isl. (YK07-07; May 6 - 18, 2007). She obtained reflection images of hydrothermal plumes with detailed internal structure in high resolution. The plume echoes are not the mushroom-like plume-shape usually anticipated, but a kind of complex of numbers of filament shape or parabolic shape echoes. Those echoes were partly rooting from hydrothermal mounds, recognized in the detailed bathymetry obtained with MNBES. Her CTD-sensor recorded significant anomalies of water temperature up to $\sim$0.2°C, simultaneously. That is why we identified those reflections recorded within water column on the Side-Scan-Sonar images as hydrothermal plumes. The area plume reflections recorded elongated in E-W direction: $>$1km (E-W) and $\sim$500m (N-S).

An extensive heat flow measurement were also conducted for the site survey of an IODP proposal. The area of extremely high heat flow ($>$10 W/m^2) includes most of the hydrothermal mounds located well, however, twice as wide as the area of such hydrothermal mounds were scattered. In the side-scan sonar image, the high heat flow

area is well correspond to the area where hydrothermal plumes were recorded.