

## Thermal and hydrological regime of Iheya-North hydrothermal site, mid-Okinawa Trough, inferred from submersible heat flow data

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The Okinawa Trough is known in the rifting stage of the backarc continental crust. Along the axis of the trough, present volcanisms are accompanied by vigorous hydrothermal activities. The Iheya-north hydrothermal field, ~100NM NW of the Okinawa Island, is one of the most active sites, venting high-temperature black smokers and biological communities. Bathymetry, seismic, and diving surveys have been made in this area.

Heat flow data provide essential constraints on thermal and hydrological regimes, as well as thermal and hydrological properties. Intensive heat flow surveys have also been carried out using ROV and HOV. By 2006 41 heat flow data are obtained in and around the Iheya-north hydrothermal site. Within the hydrothermal area heat flow is higher than  $10 \text{ Wm}^{-2}$  near the vents and over the low-temperature seep communities. Relative higher heat flow ( $0.2\text{-}1 \text{ Wm}^{-2}$ ) extends eastward from the hydrothermal area over 1 km.

The NT07-11&13 cruise was carried out using R/V NATSUSHIMA and ROV 'Hyper Dolphin' and we obtained 8 new heat flow data. Heat flow is lower than the  $0.1 \text{ Wm}^{-2}$  in a basin 2km to the east of the active hydrothermal site (Iheya-north hydrothermal field). It suggests that the hydrothermal circulation occurs with at least 2km horizontal scales and the area of hydrothermal circulation.

A hypothetical model of thermal and hydrological regime is constructed based on these heat flow data, as well as seafloor video images, high-resolution bathymetry and side-scan image obtained by AUV Urashima. We also made a simple numerical simulation.