

## Hydrologic system of Iheya-North hydrothermal field in Mid-Okinawa trough inferred from heat flow observations

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The Okinawa Trough is a back-arc basin in the southwestern part of Japan. It is considered to be in the initial stage of rifting of continental crust, and volcanic outcrops interpreted as intrusion after rifting in the trough of mid-axis. The Iheya-North hydrothermal field is one of the most active hydrothermal fields.

A lot of heat flow data gives cogent information to discuss the various scales of hydrothermal circulation. It is available to presume the patterns of temperature distribution and stream of fluids. We obtained 78 heat flow data from 2002 to 2008 in and around the Iheya-North hydrothermal field. This shows that the heat flow is higher than  $10 \text{ W/m}^2$  within 0.5 km of the hydrothermal vent complex, that it gradually decrease eastward to  $<1 \text{ W/m}^2$ , and the very low heat flow around  $0.01 \text{ W/m}^2$  is observed at  $\sim 2 \text{ km}$  east from the hydrothermal field. The average heat flow outside of Iheya-North is  $\sim 0.1 \text{ W/m}^2$ . The low heat flow to the east is most likely caused by an inward of seawater as recharge of the circulation. Side-scan sonar images show that the sea floor seems very rough inferred from the reflection distributions (M. Asada personal communication) in this area. Also the clay sediments exist between the hydrothermal vent and the low heat flow zone according to the piston coring and video images. The sediment layer should work as a hydrological barrier to suppress flow through the seafloor.

The hydroregime of the circulation is provided by the difference of permeability, geological setting, heat source distribution and so on. We performed numerical calculations to consider that the different permeability contribute to the heat flow. The upper and lower 2 layers were assumed under the structure of the Iheya-North hydrothermal field. Two-order higher value of permeability affects no more heat flow value. We will show the hydrologic system of the Iheya-North hydrothermal field inspected by numerical analysis considered permeability sampled and assume Darcy velocity, the scale of heat source.

Keywords: hydrothermal, Okinawa Trough, Iheya-North, Heat Flow, numerical calculation