

## Expedition of the Rodriguez Seegment of the Central Indian Ridge by Hakuho-maru KH-06-04 Research Cruise

# Kensaku Tamaki[1]; Tamaki Ura[2]; Kensaku Tamaki R/V Hakuho-maru KH-06-04 Indian Mid-oceanic Ridge Research Cruise Onboard Scientists[3]

[1] Graduate School of Engineering, Univ. Tokyo; [2] I.I.S., Univ. of Tokyo; [3] -

Leg 3 (Dec 7-23, 2006) and Leg 4 (Dec 26, 2006 - Jan 5, 2007) of R/V Hakuho-maru KH-06-04 Research Cruise were successfully completed. We conducted four operations; geophysical mapping by SeaBeam, magnetics, and gravity, AUV (Autonomous Underwater Vehicle) dives, CTD hydrocasts, and rock samplings. The principal results of the cruise are summarized as follows.

### (1) Success of the dives by AUV at the axis of mid-oceanic ridge

AUV, r2D4, developed by the Institute of Industrial Sciences, University of Tokyo, successfully dived at the axial part of the CIR at its 2800 m water depth and collected high-resolution side scan sonar images, interferometric bathymetry, anomalies of manganese components in the sea water, geomagnetic data, and others. The diving at the Segment 16 of CIR was especially successful with complete sidescan sonar mapping of a large lava plain at the axial rift zone that was named as Great Dodo Lava Plain and the finding of possible hydrothermal site by a realtime manganese analyzer (GAMOS) installed on the AUV.

### (2) Findings of two hydrothermal sites.

Two possible active hydrothermal sites are newly found during the cruise by the CTD operation and AUV operation. One is in the Segment 15 and the other is in the Segment 16. Although further surveys by ROV or submersible are necessary, the intensive signals of manganese anomaly in the deepsea water suggests strong possibility of existence of active hydrothermal sites.

### (3) High resolution mapping of the axial rift of CIR

High resolution bathymetric mapping of the axial rift zones of Segments 15, 16, 17 and 18 was achieved by high frequency multi narrow beam bathymetric mapping system with a sonic frequency of 20kHz and beam width of 1 degree. The resultant mapping of 50 m grid may be one the best quality mapping of the mid-oceanic ridges in the world.

### (4) Pinpoint identification of the contact the Reunion Hotspot plume and CIR spreading axis

Very contact of the eastern extension of the Gastiao Ridge and the axial volcanic chain of the Segment 15 was identified by the high resolution axial mapping. We found a plateau, which was named as the Roger Plateau, between the Gastiao Ridge and the axial rift of the Segment 15. Whole the feature of the Roger Plateau appears to be formed by hotspot-ridge interaction process.

### (5) Bathymetric and magnetic mapping of near axis seamounts

Two seamounts were mapped with high resolution bathymetry and magnetics at the Segment 16. The seamounts have the relative heights of 1300-1800 m and are located at 20km to 40km to the north from the axis of the Segment 16. The seamounts are unusually large at the near axis zone of the mid-oceanic ridge and suggest intensive magmatism at the Segment 16 as well as the occurrence of the Great Dodo Lava Plain.