Cruise Summary

1. Cruise Information

- Cruise ID: : YK13-03
- Name of vessel: R/V Yokosuka
- Title of the cruise: Kairei-Yokoniwa geophysics, petrology, and biogeochemistry
- Chief scientist: Kentaro Nakamura [JAMSTEC]
- Representative of the Science Party

  Kentaro Nakamura [JAMSTEC]

  Nobukazu Seama [Kobe Univ.]
- Cruise period: February 28, 2013 - March 28, 2013
- Ports of call: Port Louis (Mauritius)
- Research area: near the Indian Ocean Ridge triple junction

2. Overview of the Observation

- Overview of the observation:

In this cruise, we successfully recovered fifteen OBEMs, seventeen OBSs, one OBSP, and one OBSM across the central and southeast Indian Ridges near the Rodriguez Triple Junction and near the "Kairei" hydrothermal vent site in the first segment of the central Indian Ridge. Observation started after the deployment of these ocean bottom instruments during another Yokosuka cruise (YK13-01) in this January; the measurement of magnetic and electric field variations by the OBEMs and OBSMs and seismic observation by the OBSs including the OBSP and OBSMs. The observation continued up to the recovery of these instruments during this cruise. We also conducted active seismic surveys to investigate seismic velocity structure using the OBSs, an air-gun, and a single channel hydrophone streamer. Further, we conducted surface geophysical survey to collect multi-narrow beam bathymetry, magnetic field, and gravity field data, which cover total 1230 miles in the research area.

We also performed three Shinkai 6500 dives (1 dive at the Kairei hydrothermal field and 2 dives at the Yokoniwa Rise) and three YKDT dives (at the Yokoniwa Rise). In the Shinkai dive #1330, we collected hydrothermal fluid samples and various hydrothermal vent animals including scary-foot gastropod from the Kairei hydrothermal field. Camera observation in YKDT dive #153 suggested that unseen active hydrothermal vent exists at the western part of the summit of the Yokoniwa Rise. In Shinaki dive #1331, we discovered low-temperature hydrothermal venting at the western part of the summit of the Yokoniwa Rise and sampled hydrothermal fluids and animals. Shinkai dive #1332 confirmed that

pillowed basalt is extensively exposed at the southwestern part of the Yokoniwa Rise, boundary between the Hakuho-knoll and Yokoniwa Rise. In addition, camera observations at the Yokoniwa Rise in YKDT dive #154 and #155 suggested that pillowed basalt is also exposed at the southeastern slope, whereas massive rocks (probably gabbro or peridotite) are exposed on the northern slope.

The observed data will be analyzed to derive upper mantle structure, crustal structure, hypocenter distribution, and tectonic history, which will provide important constraint on geodynamics of this seafloor-spreading system together with hydrothermal activities.