

Cruise Summary

1. Cruise Information

1) Cruise ID: NT11-15

2) Name of vessel: *Natsushima* with *Hyper Dolphin 3K*

3) Title of the cruise: Research of submarine silicic volcanism, hydrothermal activities and subseafloor chemical environment in the Okinawa Trough

4) Science Party:

Jun-ichiro Ishibashi [Kyushu U., Chief Scientist], Hisayoshi Yokose [Kumamoto U., Vice-Chief Scientist], Hiromi Nagashio [Okayama U.], Yuji Onishi [Okayama U.], Ryoto Yoshizumi [U. Tokyo], Shuntaro Kanamori [U. Tokyo], Shinsuke Kwagucci [JAMSTEC], Mitsuhiro Yoshida [JAMSTEC]

5) Title of the proposal:

S11-88: Diversity of subseafloor chemical environment related with lateral flow of hydrothermal fluids within a sediment-hosted hydrothermal system (proposed by J. Ishibashi and others)

S11-08: Submarine silicic volcanism and hydrothermal activity on the Tokara Islands (proposed by H. Yokose and others)

6) Cruise period: from August 14th (Yokosuka) to August 24th, 2011 (Naha)

7) Research area: Okinawa Trough

Ship tracks are shown in Fig. 1.

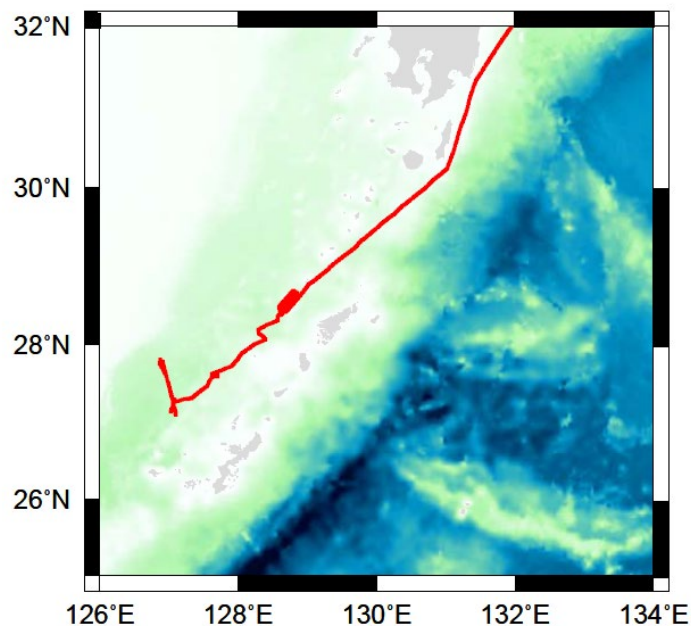


Fig. 1 Ship tracks during NT11-15 cruise conducted in the Okinawa Trough

2. Overview of the research

(1) Bathymetric surveys (proposal S11-08)

During NT11-15 cruise, Aug. 17 to Aug. 18, bathymetric surveys were carried out using the SEABAT8160 hull-mounted narrow multibeam system on the R/V Natsushima (Fig. 2). The first target area was Amami Caldera which is one of silicic huge submarine calderas along the volcanic front of the northern Ryukyu arc (total length of the survey lines was 184 miles). Following the box survey, summit region of volcanic cones along the volcanic front of the middle Ryukyu arc were surveyed (total length of the survey lines was 124 miles).

Our study goal is to understand small scale topographic characteristics such as shape of lava flows and volcanic cone, which could provide important information on spatial distribution of volcanic activities and also relationships with hydrothermal activities in a silicic submarine volcano. To maintain the quality of bathymetric data, ship speed was changed depending on wave direction. Raw data were processed by software package of CARIS on board.

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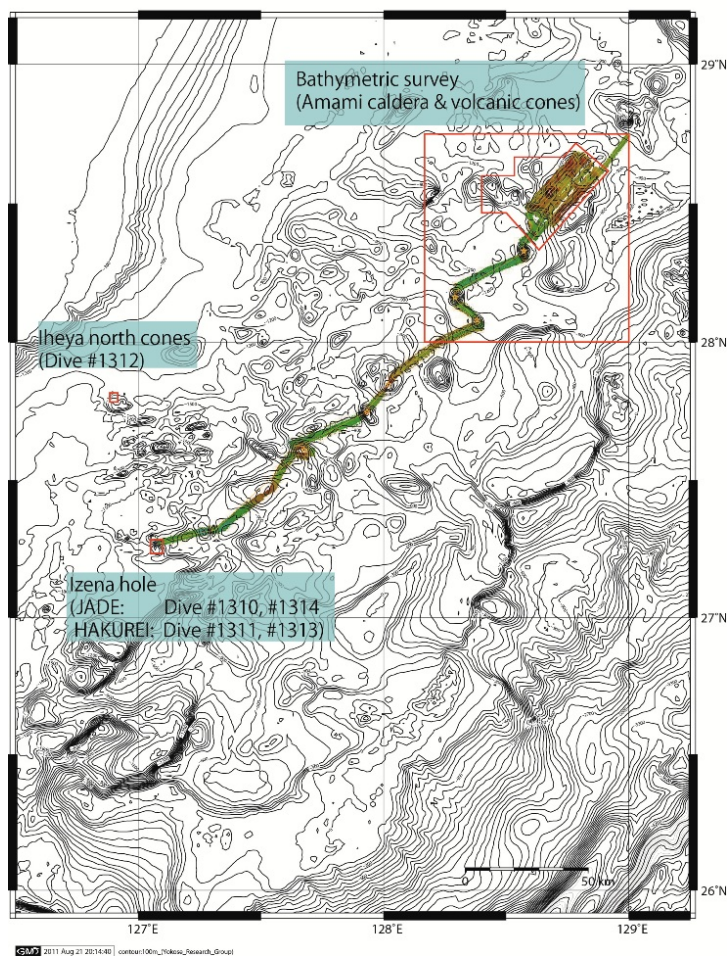


Fig. 2 Topographic map showing target areas of bathymetric surveys and of ROV dive researches

(2) ROV dive researches (proposal S11-88)

During NT11-15 cruise, we conducted five ROV dives in there active hydrothermal fields in the Okinawa Trough (Fig. 2). Dives HD1310 and HD1314 were conducted in Jade field (27°16.0' N, 127°04.5' E) in the Izena Hole. Dives HD1311 and HD1313 were conducted in Hakurei field (27°15.0' N, 127°04.0' E) in the Izena Hole. Dive HD1312 was conducted in Iheya North Knoll field (27°47.4' N, 126°53.8' E). These active fields were targeted because we had been conducted shallow drilling in these fields using BMS (Benthic Multi-coring System) in June, 2011 under a framework of TAIGA project.

Our study goal is to understand subseafloor chemical environment beneath the active hydrothermal field. Subseafloor chemical environment within sediment layer would be affected by subseafloor lateral hydrothermal fluid flow, and in turn should control metabolic responses and biological processes of microbial communities and formation of hydrothermal precipitates. We extensively collected hydrothermal fluids, hydrothermal sediment, and hydrothermal precipitates, to provide them for chemical analysis as well as microbial and mineralogical analysis.