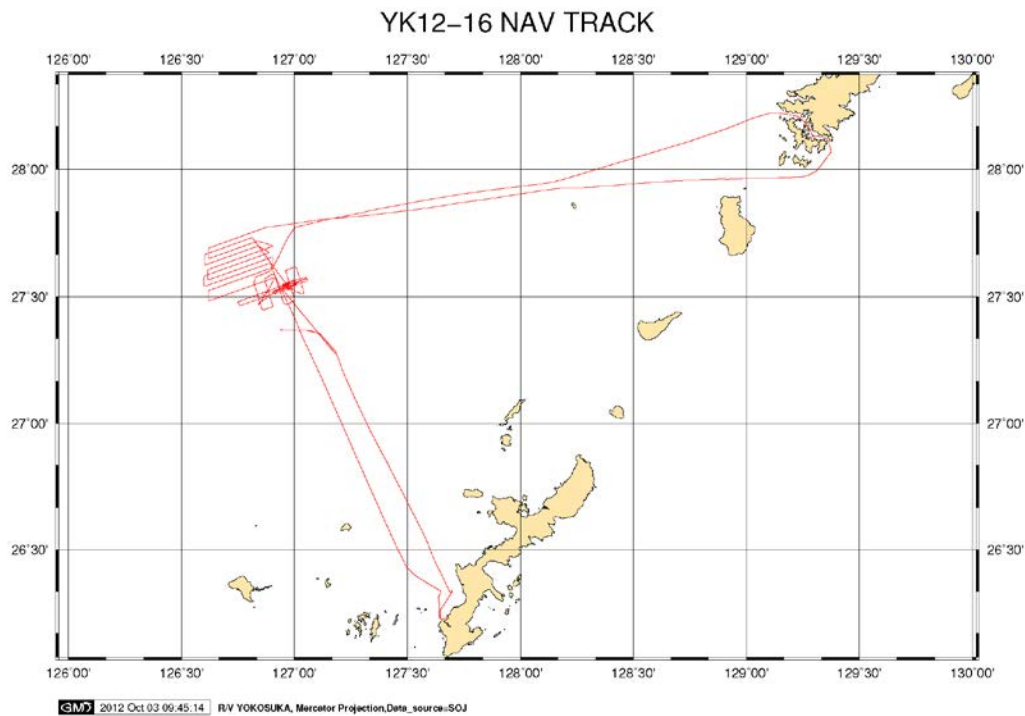


## Cruise Summary

### 1. Cruise Information

- Cruise ID : YK12-16
- Name of vessel Yokosuka / Urashima
- Title of the cruise: The first trial of wholesale arrests of hydrothermalism in Mid-Okinawa Trough
- Chief scientist: Hidenori Kumagai [SRRP/IFREE, JAMSTEC]
- Representative of the Science Party: Hidenori Kumagai [SRRP/IFREE, JAMSTEC]
- Title of proposal: Distribution estimate of Hydrothermalism in Mid-Okinawa Trough
- Cruise period: Sept. 24, 2012 – Oct. 3, 2012
- Ports of call: Naha – Naha (Note: Evacuation from T1217 at Satsukawa-Bay, Amami-O shima)
- Research area: Iheya-Small Ridge (or Iheya-Depression Median Ridge), Mid Okinawa Trough
- Research map



**Fig.1: Cruise Track of YK12-16**

### 2. Overview of the Observation

#### 2.1. Purpose, background

In this cruise, a total capture of hydrothermal activity in the study area was planned because some large-size hydrothermal sulfide deposits have been anticipated in Mid-Okinawa Trough. As the first step, mapping of acoustic scattering in water column coupled with chemical and physical sensing was carried out at Iheya-small ridge (or Iheya-Depression Median Ridge) by using AUV Urashima. Further, Single channel seismic survey (SCS survey) was also conducted in order to investigate shallow fluid/water path for hydrothermal activities.

#### 2.2. Operations and results

Due to an evacuation from severe typhoon, T1217, operations were limited four days: two Urashima-dives, a

1-day SCS survey, and a 1-day regional scale bathymetric survey (Fig.1).

Two dive survey of Urashima-AUV were concentrated to the center of the western segment of the Iheya-Small Ridge, Natsushima 86-2 Knoll and its eastern knoll (hereafter, 126°59.3'E Knoll). At the western flank of the 126°59.3'E Knoll, there is a well-known hydrothermal site since late 80s, CLAM ( ) site. A set of chemical and physical sensors were also equipped on Urashima-AUV coupled with standard acoustic survey; turbidity meter, Oxidation-Reduction Potential (ORP) sensor and deep underwater three-component magnetometers (operation of ORP sensor was limited at dive #149). The 149th dive of Urashima was planned as a swath survey mainly on Natsushima 86-2 Knoll, where the 233rd dive of Shinkai2000 was carried out in 198x, followed on a survey line At center of the 126°59.3'E Knoll (Fig.2a). At the 150th dive, the survey track was set to confirm acoustic and/or physico-chemical anomalies found at 149th dive and investigate a small topographic high 2 nautical miles southward from the 126°59.3'E Knoll nearby a high heatflow anomaly reported by Kinoshita and Yamano (199x) (Fig. 2b). During the both dives, a numbers of acoustic diffraction within water column and anomalies of turbidity/ORP/temperature were recorded.

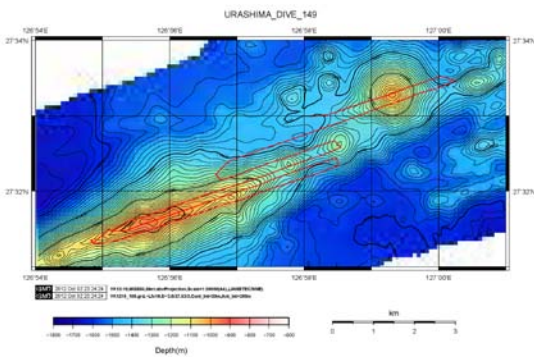


Fig. 2a: Dive track at 149th dive of Urashima.

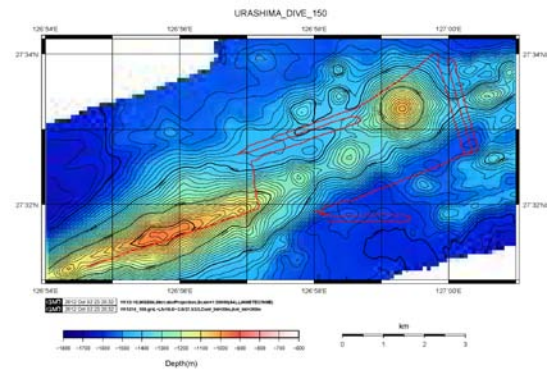


Fig. 2b: Dive track at 150th dive of Urashima.

Single channel seismic survey covered whole of Iheya-Small Ridge by five of six-nm survey lines with 3 nm in interval (Fig. 3). Even by the on-board processing, some up-and-downs of the volcanic basement were found.

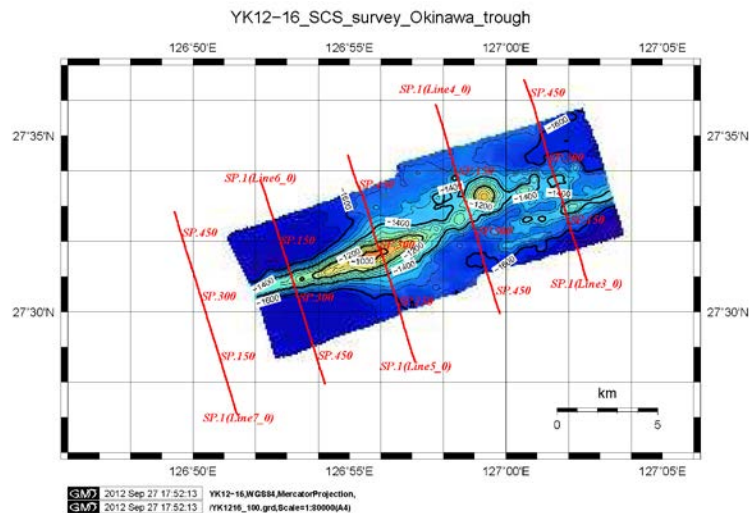


Fig. 3: SCS Survey lines and general topography of Iheya-Small Ridge.

A regional bathymetric survey was carried out in a topographic depression on northwestward from Iheya-Small Ridge. Some gentle ridge-like topographies and small topographic highs were mapped.

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