



***R/V Natsushima* Cruise Report**

**NT12-26**

**Chemosynthetic faunal succession in deep-sea floor in  
Nansei-shoto region**

**Oct. 11, 2012 - Oct. 16, 2012**

Japan Agency for Marine-Earth Science and Technology  
(JAMSTEC)

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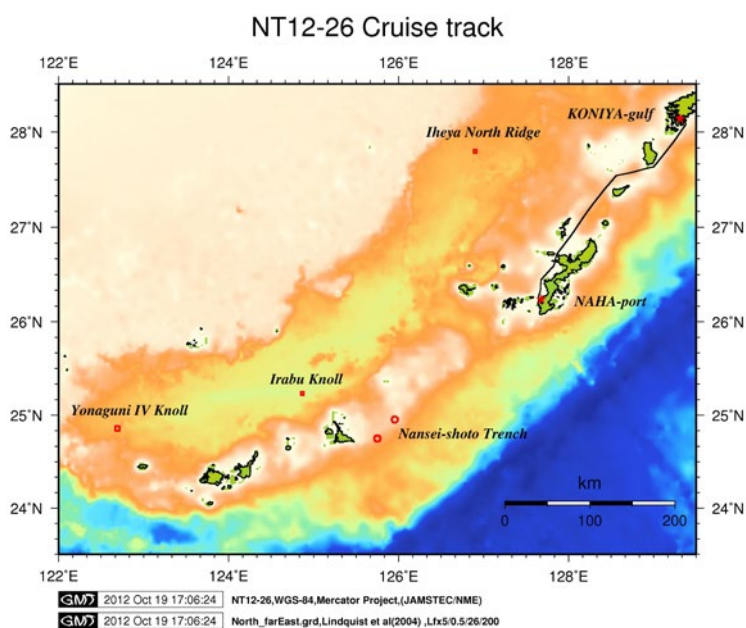
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# 1. Cruise Summary

- Cruise ID: NT12-26
- Name of vessel: Natsushima
- Title of the cruise: Faunal succession in deep-sea floor in Nansei-shoto region
- Chief scientist [Affiliation]: Hiromi WATANABE [JAMSTEC]
- Representative of the Science Party [Affiliation]: Satoshi MITARAI [OIST], Tomoyuki NAKANO [Kyoto University]
- Title of proposal: “Laval dispersal and metapopulation dynamics of hydrothermal vent species in Okinawa Trough”, “Investigation of food web structure of deep-sea benthic community associated with sunken wood”
- Cruise period: 2012.10.11 – 2012.10.16
- Ports of call: Naha, Koniya
- Research area: Yonaguni IV Knoll, Irabu Knoll, Iheya North Ridge, Nansei-shoto Trench



## 2. Researchers associating the cruise

- Chief scientist

Hiromi WATANABE [Japan Agency for Marine-Earth Science and Technology]

- Representative of the science party

Satoshi MITARAI [Okinawa Institute of Science and Technology]

Tomoyuki NAKANO [Not Onboard; Seto Marine Biological Station, Kyoto University]

Atsushi NISHIMOTO [On behalf of Dr. Nakano; Seto Marine Biological Station, Kyoto University]

- Science party (List)

Yoshihito FUJIWARA (Japan Agency for Marine-Earth Science and Technology)

Yasuo FURUSHIMA (Japan Agency for Marine-Earth Science and Technology)

Masako NAKAMURA (Okinawa Institute of Science and Technology)

Larisa KISELEVA (Okinawa Institute of Science and Technology)

Takeshi KAWASHIMA (Okinawa Institute of Science and Technology)

Hiroshi MIYAKE (Kitasato University)

MiHye SEO (Atmosphere and Ocean Research Institute, the University of Tokyo)

Kei SATO (The University Museum, the University of Tokyo)

Natsumi YASUDA (Nara Women's University)

Masayuki TOIZUMI (Nippon Marine Enterprises, Ltd.)

### **3. Observation**

**Due to Typhoon #21, all the planned investigation in this cruise was cancelled.**

#### **3-1. Proposed researches**

##### **3-1-1. Laval dispersal and metapopulation dynamics of hydrothermal vent species in Okinawa Trough (Satoshi MITARAI)**

###### **Background**

When hydrothermal vent communities were first discovered nearly 30 years ago, biologists immediately recognized the key role of dispersal in the dynamics and persistence of the populations. Despite substantial progress on this topic over the past 10 years, some very important questions remain unanswered about the mechanisms of dispersal and their effects on population dynamics, population genetics and community structure. The primary objectives of this project were i) to study the mechanisms of dispersal in order to find out how far larvae can disperse, how quickly they colonize new sites, and what oceanographic and topographic features act as dispersal barriers, and ii) to test these predictions of dispersal with population genetic data that define the geographic characteristics of various species.

###### **Objectives**

Our dispersal questions cannot be answered without an integrated set of physical and biological approaches. We assemble a diverse team of observationalists, modelers and theoreticians to investigate relevant aspects of ridge-associated oceanography and systems biology, and to combine them into a quantitative model of metapopulation dynamics of vent species. We employed a hydrodynamic transport model to aid in experimental design, to help interpret field observations and to provide a framework for evaluating what aspects of the circulation most influence the transport of larvae along the ridge.

###### **Major instruments and methods**

Large volume samplers (“plankton pump”): collect larvae drifting near vents (~20 hours),  
Larval recruitment plates: estimate the number of larvae recruiting to each site (~1 year),  
Acoustic Doppler Current Profilers (ADCPs): monitors ocean currents every 30 minutes over one year.  
Our plan was to estimate larval life history (e.g., spawning season if any, planktonic larval durations, etc.) from live larval samples collected with the plankton pumps. Combined with oceanographic model, this info would have enabled us to predict larval dispersal patterns in Okinawa Trough. The other two instruments were employed to examine those biophysical predictions. ADCP data were supposed to be utilized to examine ocean model, and expected to reveal the level of turbulence that larvae of vent species experience during their transport. Larval recruitment plates would have given us data to compare with the simulated larval dispersal patterns.

###### **Research results and future plans**

While the ocean models were successfully developed, we could not conduct any observations due to severe weather (Typhoon #21). We are hoping to resubmit the application for 2014 JAMSTEC cruise.

### **3-1-2. Investigation of food web structure of deep-sea benthic community associated with sunken wood (Atsushi NISHIMOTO)**

#### **Background**

After flood, lots of coarse woody debris flow into ocean, and some reach to deep-sea floor. Biological assemblage around sunken wood is characterized with wood borers, and has high biodiversity. From these two points, they might be one of the important organic sources in ocean. Moreover, in 2000, Distel proposed that mussels associated with wood and whale bone worked as an evolutionary step for shallow water mussels to colonize chemosynthetic conditions in deep water. So, sunken wood and whale bone attract attentions recently and it is urgently necessary for us to collect their information.

#### **Objectives**

From natural samples, it's difficult to investigate its history, such as wood species and duration time after reaching to sea floor. So, we artificially deploy wood logs in deep sea and collect them after a while. By comparing samples, we will try to understand the community systematically.

#### **Research results and future plans**

Due to the bad sea condition, we couldn't carry out any dive. So, we will complete some articles from the data already collected. After that, we will try to recover deployed samples again.

### **3-1-3. Dive information**

Not applicable.

### **3-1-4. Research Information**

Not applicable.

### **3-1-5. Data treatment**

Not applicable.

## **3-2. List of instruments**

No research instruments were used in this cruise.

## **3-3. Dive reports (including dive logs and trucks)**

No available reports in this cruise.

### **3-4. Sample lists**

No samples were collected in this cruise.

### **3-5. Deployment-recovery lists**

#### **4. Notice on Using**

Notice on using: Insert the following notice to users regarding the data and samples obtained.

This cruise report is a preliminary documentation as of the end of the cruise. This report may not be corrected even if changes on contents (i.e. taxonomic classifications) may be found after its publication. This report may also be changed without notice. Data on this cruise report may be raw or unprocessed. If you are going to use or refer to the data written on this report, please ask the Chief Scientist for latest information. Users of data or results on this cruise report are requested to submit their results to the Data Management Group of JAMSTEC.