



September 1, 2010  
Japan Agency for Marine-Earth Science and  
Technology

### **CHIKYU Embarks on IODP Expedition 331 DEEP HOT BIOSPHERE**

The Deep -Sea Drilling Vessel Chikyu, operated by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), has commenced a drilling mission for the Integrated Ocean Drilling Program ([IODP\\*](#)) Expedition 331, "DEEP HOT BIOSPHERE (see [Appendix](#))" on September 1st, 2010.

The goal of Expedition 331 is to directly drill and sample hydrothermally active mounds in the Okinawa Trough to obtain evidence for microbial communities. This includes variations in biomass and species diversity, as well as the function and the role of such active microbial ecosystems untouched beneath the seafloor. Drilled boreholes will be fitted with casing pipes to prepare for future installation of observatories and incubators to gain insights into the hydrothermal vents and subseafloor microbial activities.

Twenty-five scientists from Japan, the United States, Europe, China, and Australia will set off on Expedition 331. From Japan, Co-Chief Scientist Dr. Ken Takai and seven scientists join the expedition.

**\*1. The Integrated Ocean Drilling Program (IODP)** is an international marine research drilling program dedicated to advancing scientific understanding of Earth by monitoring, sampling, and instrumenting subseafloor environments. Through multiple platforms, preeminent scientists explore IODP principal themes: the deep biosphere, environmental change, and solid Earth cycles. IODP has operated since October 2003, funded jointly by the Japan Ministry of Education, Culture, Sports, Science and Technology and the U.S. National Science Foundation. Additional support is provided by the 17-member European Consortium of Ocean Research Drilling, the People's Republic of China, the Republic of Korea, Australia, India, and New Zealand.

#### **Appendix**

#### **- DEEP HOT BIOSPHERE -1**

##### **1. Schedule**

- |                  |  |
|------------------|--|
| 5 September 2010 | Set sail from Port of Shimizu<br>Drilling operations off the southwest coast of Okinawa<br>Main Island |
| 4 October 2010   | Return to Port of Nakagusuku, Okinawa  |

\* The above schedule is subject to change depending on operational requirements or weather.

## 2. Participating scientists

Name	Organization	Role/ expertise
Ken Takai	Principal Scientist, JAMSTEC	Co-Chief Scientist
Jun-ichiro Ishibashi	Associate Prof. , Kyushu University	Sedimentology
Akira Ijiri	The University of Tokyo	Organic Geochemistry
Yuka Masaki	Kochi University/JAMSTEC	Physical properties
Manabu Nishizawa	JAMSTEC	Inorganic Geochemistry
Takuroh Noguchi	Kochi Univwersity	Inorganic Geochemistry
Takuro Nunoura	JAMSTEC	Microbiology
Katsunori Yanagawa	The University of Tokyo	Microbiology

## 3. Expedition Overview

### 1) Science objectives:

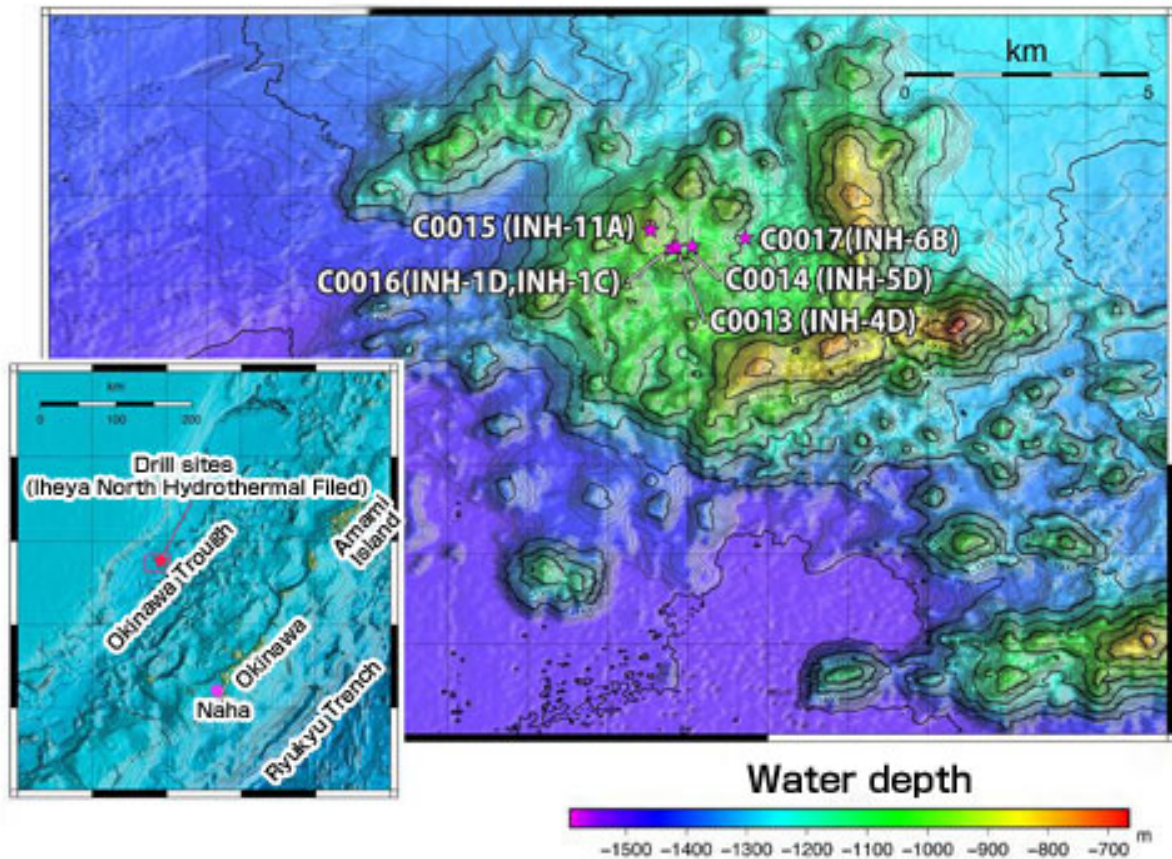
The goal of Expedition 331 is to directly sample hydrothermally active mounds in the Okinawa Trough to obtain evidence for microbial communities. This includes variations in biomass and species diversity, as well as the function and impact of such active seafloor microbial ecosystems underneath the hydrothermal vents. The results are expected, not only to provide clues to the role of a subsurface biosphere left untouched deep under the sea, but also to help understand the mechanism of microbial methane generation and gas transport in seafloor sediments. The expedition also expects to reveal the relationship between the extent of seafloor microbial communities and methane commonly found at high concentration in the hydrothermal fluids, and the formation of hydrothermal mineral deposits.

### 2) Primary operation plan:

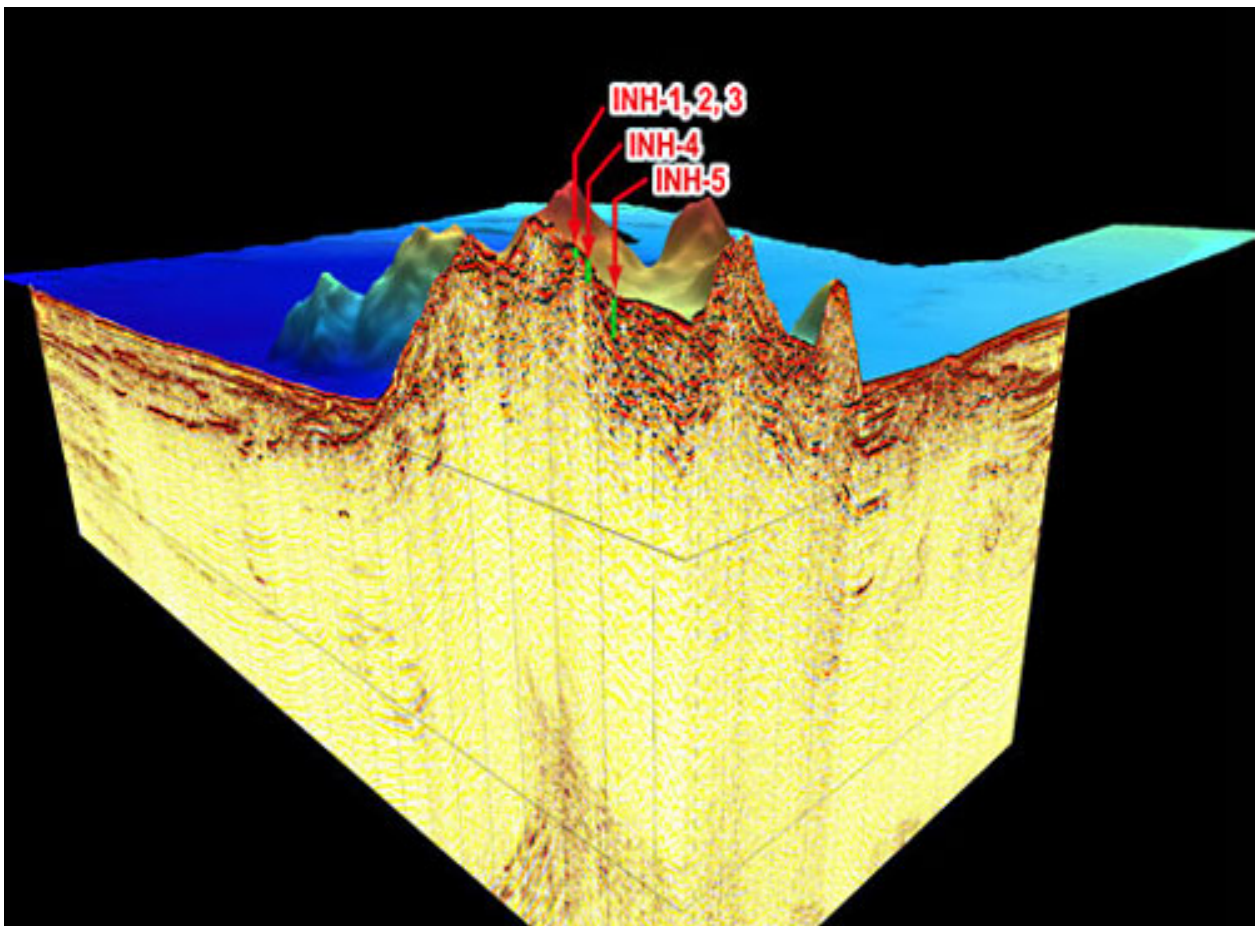
The expedition will run for 33 days, from September 1 to October 3, 2010, at the sites shown in [Figure 1](#) and [Figure 2](#). Coring up to 50 mbsf is planned for Sites INH-1, 2, and 3, which are located on the hydrothermal mounds or in adjacent areas. Following the coring, steel casing pipes (\*) will be installed within the boreholes for future installation of an in-situ incubator.

Site INH-4 and -5 are to be set up on the margin of the hydrothermal vent field, where hydrothermal fluids mix into sea water in subseafloor sediment, creating a unique and extremely active microbial environment (a subsurface analogue to surface estuary). Target drilling depths are 100 mbsf and 200 mbsf, respectively. Coring and casing pipe installation are also planned.

\*An encasement pipe to protect a borehole wall against collapse. Casing pipes made of stainless steel and resistant to hydrothermal corrosion will be used in this expedition.



**Figure 1. DEEP HOT BIOSPHERE study area and drill sites**



**Figure 2. 3D Image of sea floor topography and subseafloor structure at Deep HOT BIOSPHERE sites**

◆ JAMSTEC has launched a special website for Expedition 331 (<http://www.jamstec.go.jp/okinawa2010/>).

The website features a detailed outline of the expedition, profiles of scientists, and reports and updates from Chikyu.

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