
Press Releases



June 25, 2014
JAMSTEC

Drilling Expedition: Hydrothermal Sediments in Okinawa Trough

The Japan Agency for Marine-Earth Science Technology (JAMSTEC: Asahiko Taira, President) will carry out scientific drilling research in the Okinawa Trough. It forms part of "Scientific Research on Genesis of Marine Resources" (led by Katsuhiko Suzuki, Group Leader, Ore Genesis Research Group, Research and Development Center for Submarine Resources, JAMSTEC) for "Next-generation Marine Resources Survey Technologies" (Program Director: Tetsuro Urabe, Professor, Graduate School of Science, the University of Tokyo; Advisor, Japan Mining Engineering & Training Center) in the Cross-ministerial Strategic Innovation Promotion Program (SIP)^{*1}.

1. Purpose

Okinawa and Izu Ogasawara seas are considered to be promising areas for submarine massive hydrothermal deposits in Japanese coastal waters. It is expected that there are yet-to-be-discovered inactive deposits and concealed mineral deposits (buried underground) in these areas, which is raising high expectations for potential business and industrial development.

However, the genesis of hydrothermal deposits is not fully revealed. Detailed distribution of inactive deposits and concealed mineral deposits is not identified and no exploration scheme is in place. Even if we limit research area to Okinawa and Izu-Ogasawara seas, it is still impossible to thoroughly cover such vast areas in terms of cost and time. It is, therefore, necessary to set targets and narrow down focus areas for effective research using vessels and probe vehicles.

On the other hand, the Integrated Ocean Drilling Program (IODP) ^{*2} Expedition 331 operated by JAMSTEC found the huge and deep expanse of the hydrothermal fluid reservoir in Iheya North Field in the Okinawa Trough in 2010 (as reported on October 5, 2010). In addition, the 2012-2013 IODP expedition also discovered another two new hydrothermal fields in the south of the sea area (Iheya North Natsu site and Iheya North Aki site, as reported on March 4, 2014). Iheya North Knoll is a volcanic body with 8km in diameter at the base, and hydrothermal fields around the area lie across the top of the knoll. If these three hydrothermal vents are derived from the same hydrothermal field, it means that it extends several kilometers as the largest hydrothermal fields in the Okinawa Trough. Verification of existence of the other sub-seafloor hydrothermal fluid reservoirs and understanding of characteristic of sub-seafloor hydrothermal circulation, and distribution and composition of minerals forming deposits will provide us a deep insight about the genesis of mineral deposits (accumulation of minerals).

Furthermore, if such scientific theory is utilized for systematic development of research technology scheme, it will also allow us to contribute to developing sensors necessary for effective research of inactive deposits and concealed deposits of equivalent scales, as well as building a new exploration scheme.

As the first step for building a scientific theory of genesis of inactive deposits and concealed mineral deposits, this expedition aims to understand distribution of the sub sea-floor hydrothermal fields in Iheya Kita Field. Our Deep Sea Drilling Vessel (D/V) *Chikyu* will drill around the sub sea-floor hydrothermal fluid reservoir area found by the expedition in 2010 and newly discovered hydrothermal fields between 2012 and 2013 in Iheya North sites.

2. Expedition Overview

This expedition plans to drill sea areas including the above mentioned hydrothermal fields found in the Iheya North Field, Okinawa Trough ([figure 1](#)) in order to verify topographical continuity of the seafloor hydrothermal fields. Also, minerals and surrounding rocks under the seafloor will be collected for scientific analysis data to understand the genesis of inactive deposits and concealed mineral deposits.

In addition, prior to the expedition, a remotely operated vehicle (ROV) will collect baseline data for environment assessment around the drilling sites as part of research activity, "observation of marine biodiversity and researches for impact of exploitation of submarine resources" (led by Hiroyuki Yamamoto, Group Leader, Environmental Impact Assessment Research Group, Research and Development (R&D) Center for Submarine Resources).

(1) Schedule (a total of 19 days)

July 9, 2014: Set sail from Shimizu Port, Shizuoka Prefecture

July 26, 2014: Disembark at Nakagusuku Port, Okinawa (Completion of expedition)

The schedule is subject to change depending on weather conditions and research progress.

(2) Expedition team

Chief Researcher: Ken Takai

Senior Researcher, Submarine Hydrothermal System Research Group, Research and Development (R&D) Center for Submarine Resources

Other main members include those from Institute of Advanced Industrial Science and Technology, JAMSTEC and Research and Development (R&D) Center for Submarine Resources participating in the "Next-generation Marine Resources Survey Technologies" project.

*1 Cross-ministerial Strategic Innovation Promotion Group (SIP)

It is a newly established program for scientific technology innovation. The Council for Science, Technology and Innovation (CSTI) leads management across government ministries and existing fields. 10 issues including "next-generation ocean resources research technology" have been selected for the program.

*2 Integrated Ocean Drilling Program:IODP

The Integrated Ocean Drilling Program (IODP) is a multinational cooperative project

carried out from 2003 to 2013 at the initiatives of Japan and the U.S. The scientific drilling vessels D/V *Chikyu* operated by Japan and the JOIDES Resolution by the U.S, and the option to charter mission-specific platforms by Europe were utilized for expeditions. The research aimed to shed light on global environmental changes, the earth's mantle and crust dynamics and tectonics, and the biosphere beneath the seafloor. Beginning in October 2013, it was taken over to the International Ocean Discovery Program (IODP).

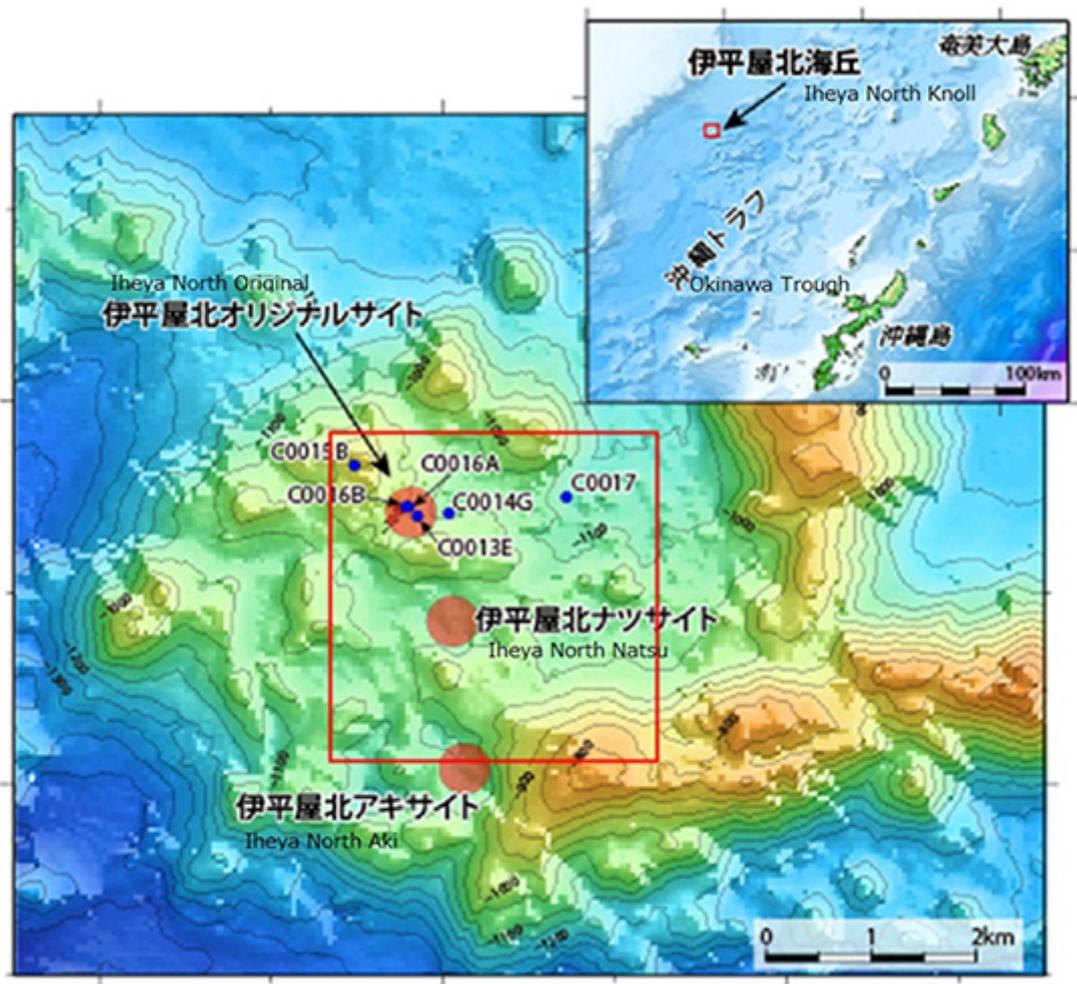


Figure 1 Sea areas

Red square area shows drilling sites for study areas (depth of 960m-1130m):
Sea areas among the three hydrothermal fields (Iheya North Original, Iheya North Natsu, Iheya North Aki)

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