



August 23, 2010  
Japan Agency for Marine-Earth Science and  
Technology

### **Integrated Ocean Drilling Program (IODP) Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) *CHIKYU* Completes Expedition 326**

#### **Overview**

The Deep-Sea Drilling Vessel *Chikyu*, operated by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), has successfully completed the Integrated Ocean Drilling Program (IODP) ([\\*1](#)) Expedition 326, the first leg for the Nankai Trough Seismogenic Experiment (NanTroSEIZE [\\*2](#)) Stage 3, in the Kumano Basin, off Kii Peninsula. The expedition set sail on July 19th from Shingu Port, Wakayama Prefecture, following the loading of equipment and materials from 15th to 18th July. Upon completion of all scheduled operations on 20th August, the vessel returned to Shimizu Port, Shizuoka Prefecture.

#### **Science results and implemented operations**

IODP Expedition 326 was led by Co-Chief Scientists, Dr. Masataka Kinoshita, NanTroSEIZE Team Leader, JAMSTEC, and Dr. Harold J. Tobin, Associate Professor, University of Wisconsin-Madison. In order to gain insights into the causes of large earthquakes, the NanTroSEIZE Stage 3 attempts to drill a hole into the plate boundary, a place where one oceanic plate slides beneath another plate, core and sample the plate boundary seismogenic zone, and monitor geophysical properties including strain. As the first step in ultra-deep riser-drilling, the drill bit was run to a depth of 872.5 mbsf at Site C0002 (33°18.1' N, 136°38.2' E, water depth of 1,939 meters) ([Fig. 1](#)). The plate boundary in the Nankai Trough is estimated to be about 6,000 to 7,000 m below seafloor.

The drilled borehole was fitted with casing pipes and a well head system at a seafloor level. A corrosion cap was then installed on the well for future revisits in subsequent expeditions, completing all the scheduled tasks for this expedition. In the future ultra-deep riser-drilling, the blow-out protection (BOP) is planned to be fitted at the wellhead to conduct riser drilling.

#### **Expedition schedule**

1 September - 3  
October 2010

IODP Expedition 331 - Deep HOT  
BIOSPHERE

25 October - 12 December 2010	IODP Expedition 332 - NanTroSEIZE Stage 2: Riserless Observatory-2
13 December 2010 - 10 January 2011	IODP Expedition 333 - NanTroSEIZE Stage 2: Inputs Coring -2 & Heat Flow

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

**\*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 subsurface 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.

**\*2. Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE)**

**(1) Background**

The Nankai Trough is a subduction zone located southwest of Japan, stretching from off the coast of the Tokai region to Shikoku. It is a place where the Philippine Sea Plate slides beneath the Eurasian plate and is one of the most active earthquake zones on the planet. The Kumano Basin, off the Kii Peninsula, is a forearc basin of the Nankai Trough subduction zone. The area inferred to be responsible for great earthquakes (characterized by seismic slip on the plate boundary thrust), is located at a depth of about 6,000 meters below the seafloor, which is much shallower than other plate boundaries in the world and within the operational limits of riser drilling by the *CHIKYU*.

The IODP Nankai Trough Seismogenic Zone Experiment is an ocean drilling project that drills in the plate boundary fault and the megasplay fault believed to have generated tsunami. It aims to gain insight into the transition from aseismic to seismic slip within the plate boundary fault zone, as well as the processes of earthquake or tsunami occurrences, by collecting geological samples (core samples) and measuring downhole conditions.

**(2) Project outline**

The NanTroSEIZE drilling project consists of four stages in all, planned to conduct drilling operations at several sites located along a line orthogonally crossing the Nankai Trough region from Shikoku Basin (seaward) to Kumano Basin ([Fig. 2](#)).

Stage 1

Expeditions involved drillings in the shallow portions of the megasplay fault and plate boundary thrust. Data was gathered on characteristics of coseismic faults, including geologic distribution, deformation structure and state of stress.

### Stage 2

Expeditions will drill deep into the upper portion of the seismogenic zone of great earthquakes to unravel its geological structure and state. The borehole will be utilized for the future installation of observatory systems that will be used to monitor the processes of earthquake generation. The expedition will also characterize the composition, architecture and geophysical properties of pre-subduction sediments before they are transported to the seismogenic zone.

### Stage 3

Expeditions will focus on "ultra-deep" drilling that can reach the seismogenic zone, on which great earthquakes have repeatedly occurred. Operations include direct core sampling from the seismogenic zone to understand the seismogenic mechanism from a material science point of view.

### Stage 4

In this Stage, long-term observatory systems will be deployed in the ultra-deep boreholes. Ultimate future goals include connecting the NanTroSEIZE boreholes to an underwater seismic monitoring network, called Dense Ocean-floor Network for Earthquakes and Tsunamis (DONET), so that real-time data from earthquake occurring sites could be made available.

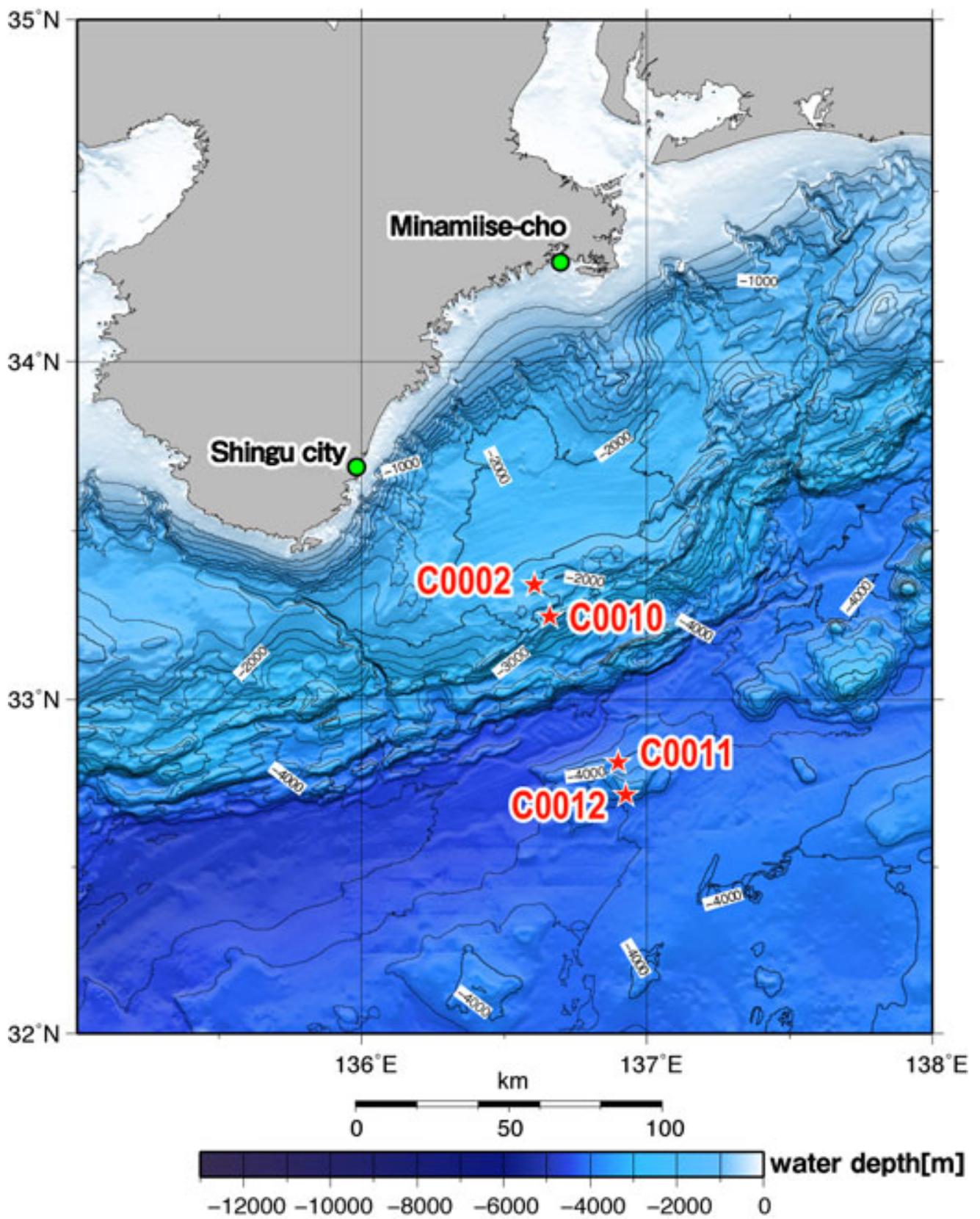
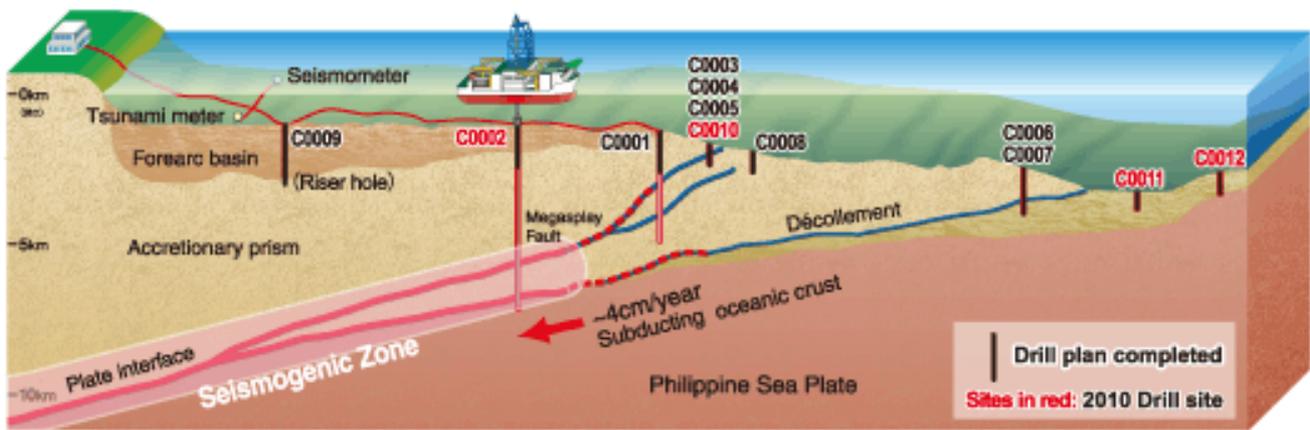


Figure 1: NanTroSEIZE study area and drilling Sites



**Figure 2: NanTroSEIZE Drilling Plan**

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