

# **Cruise Report**

**YK10-E02**

*(R/V Yokosuka)*

Site Surveys for IODP expeditions in the Kumano-nada area

October 17 – 19, 2010

Center for Deep Earth Exploration (CDEX)  
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

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## **Preface**

The YK10-E02 cruise of the *R/V Yokosuka* was carried out as an operational site survey for hazard assessment of the NanTroSEIZE project with the *D/V Chikyu*, the Integrated Ocean Drilling Program (IODP). The mission of this cruise was to retrieve two mooring systems, which had been installed near the IODP site, C0002, during the YK10-06 cruise in mid-June 2010 for recording sea current profiles on an ordinary pass of the Kuroshio current. The retrieval operations were conducted on 18 October 2010 and both the two mooring systems were retrieved successfully without serious damages on the systems. The data obtained by the mooring systems shall be used for a riser analysis at Site C0002, at which an ultra deep riser hole is supposed to be drilled in near future.

## **1. Participants aboard the *R/V Yokosuka* cruise YK10-02E**

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## **2. Objectives**

The YK10-E02 cruise of the *R/V Yokosuka* was scheduled as an operational site survey for hazard assessment of the NanTroSEIZE project with the *D/V Chikyu*, the Integrated Ocean Drilling Program (IODP). The mission of this cruise was to retrieve two mooring systems, which had been installed near the IODP site, C0002, during the YK10-06 cruise in mid-June 2010.

The site C0002 at which an ultra-deep riser hole toward a seismogenic zone of the eastern Nankai Trough is planned is unfortunately situated on a major pass of the Kuroshio current. This strong current, exceeding 5 knots sometimes, is expected to exert severe influences on the riser pipe of the *D/V Chikyu* while operations. In order to simulate behaviors of the riser pipe and mitigate operational risks under such strong current conditions, a riser analysis using actual data of current direction and speed with temporal variation of a reasonably long period is required. We, thus, installed mooring systems equipped with acoustic Doppler current profilers to target sites for recording sea current profiles of direction and speed for an extended period of time.

## **3. Survey Areas**

The area for the operations is located near an IODP site, C0002, at the southern margin of the Kumano Basin, a forearc basin of the eastern Nankai Trough, about 70 km southeast of Shingu City, Wakayama Prefecture, Kii Peninsula (Fig. 1). There are two sites, CM03 and CM04, to which the mooring systems are placed, situated at an upstream area of Site C0002 along the Kuroshio current ordinary pass. Site CM03 (33°17.8651'N, 136°31.4941'E) is located on the northern foot of a knoll, 12 km east from Site C0002, 1912.0 m in expected water depth. Site CM04 (33°16.0531'N, 136°33.9294'E) is located near the top of the knoll, 8 km southeast, 1749.0 m in expected water depth. Each mooring systems is equipped with one Acoustic Doppler Current Profiler (ADCP) at the top, four Doppler current meters (RCM 11), three conductivity-temperature-depth recorders (CTD) and two acoustic releasers (Fig. 2, Fig. 3). The top buoys of the sites CM03 and CM04 are arranged to set at about 600 mbsl and 350 mbsl, respectively.

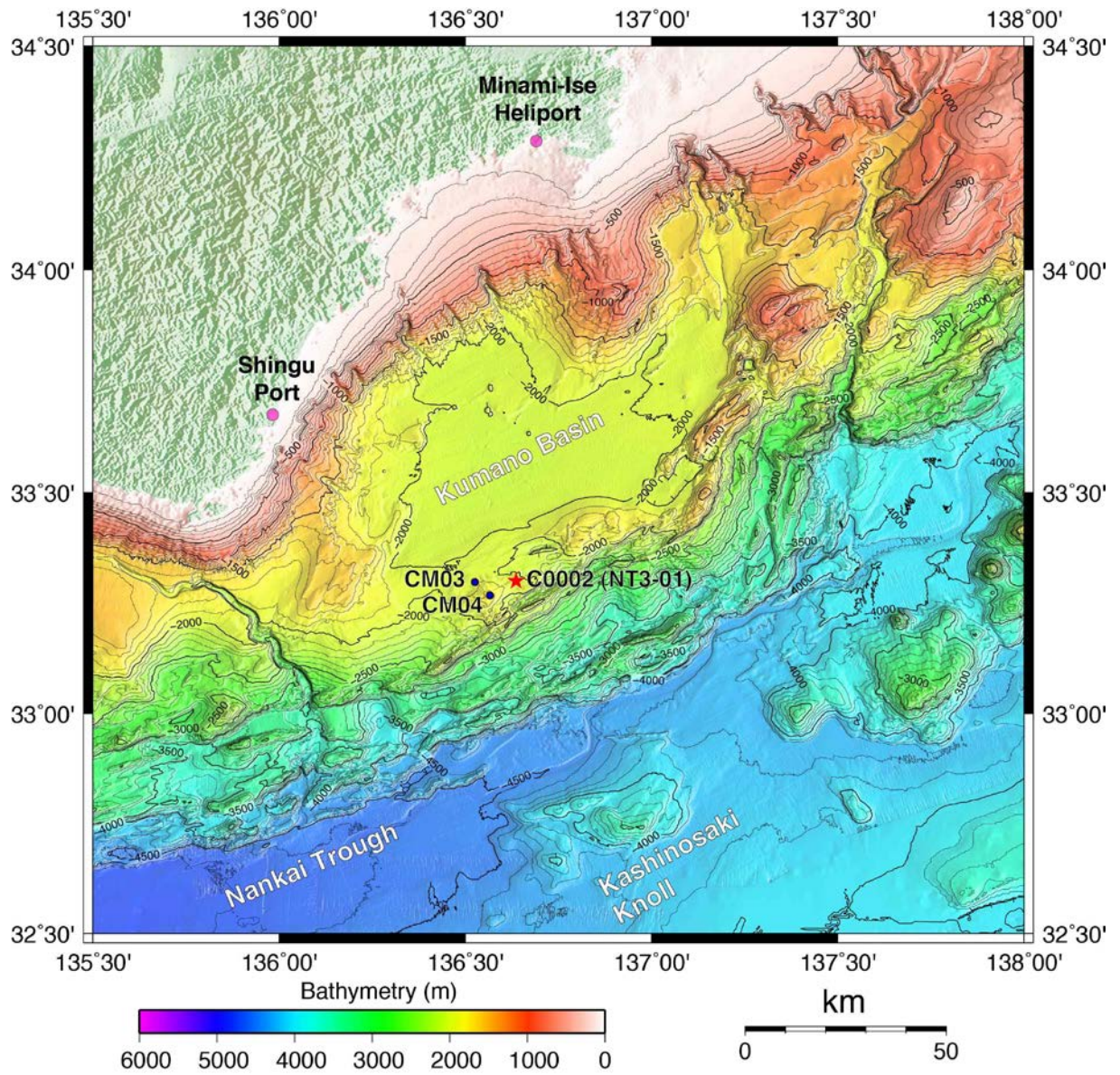
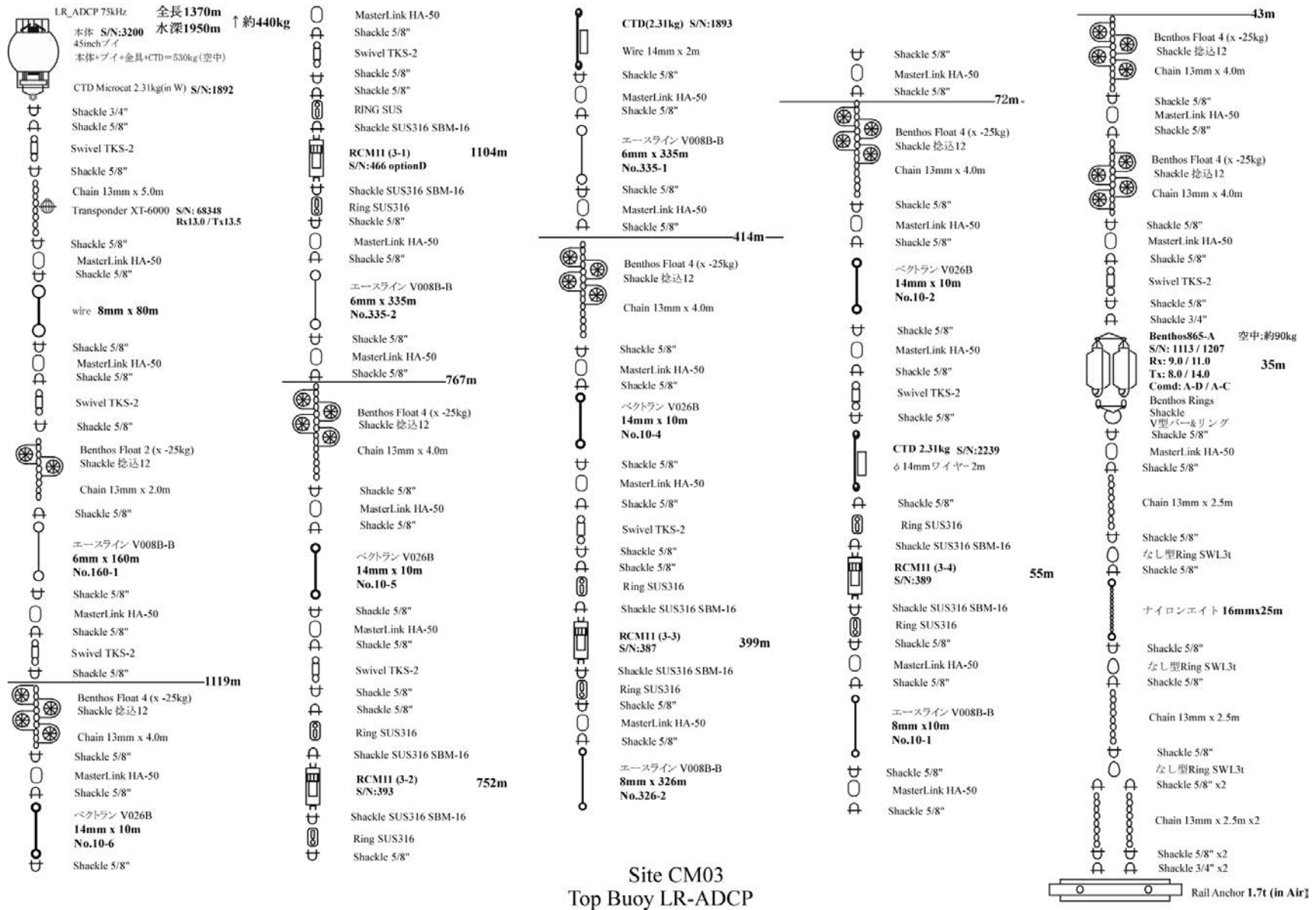


Fig. 1. A bathymetry map the eastern Nankai Trough with showing the installation points of the mooring systems and the location of Site C0002.

Fig. 2. A schematic diagram of the mooring system installed to the site CM03.







#### 4. Chronicle of the Cruise

The *R/V Yokosuka* left from a quay of the Kobe Port Island at 15:00 on 17<sup>th</sup> October and arrived at the objective area at 04:00 on 18<sup>th</sup> and resumed to move to the first site, CM03, at 06:00. The retrieval operations started at 7:00 and finished at 14:30. Then the vessel left for Yokosuka. The vessel came alongside the quay of JAMSTEC, Yokosuka, at 09:00 on 19<sup>th</sup> October. The cruise log is shown as follows and the ship track is shown in Fig. 4.:

2010/10/16

Position: 34°40.2'N, 135°12.1'E / Weather: cloudy / Wind direction: SSW/ Wind force: 2/ Wave: 1 m/ Swell: 0 m/ Visibility: 6 nautical miles (12:00 JST)

17:00 Onboard

2010/10/17

Position: 34°40.2'N, 135°12.1'E / Weather: cloudy / Calm/ Wave: 1 m/ Swell: 0 m/ Visibility: 6 nautical miles (12:00 JST)

08:00 Rig a ship for the mooring buoy system

13:30 Briefing about ship's life and safety

14:30 Safety education and training for operation

15:00 Departure from Kobe

15:30 Proceeding to the site CM03

2010/10/18

Position: 33°16.2'N, 136°36.0'E / Weather: cloudy / Wind direction: NNE/ Wind force: 5/ Wave: 4m/ Swell: 2 m/ Visibility: 7 nautical miles (12:00 JST)

04:00 Arrival at the site CM03

07:20 Transmission of enable command and receive the command

08:58 Transmission of release command and receive the command

09:05 Surfacing of the top buoy

11:06 Recovered the CM03 mooring system

11:10 Proceeding to the next site CM04

12:10 Arrived at the site CM04

12:15 Transmission of enable command and receive the command

12:20 Transmission of release command and receive the command

12:24 Surfacing of the top Buoy

14:17 Recovered the CM04 mooring system

14:30 Left the site CM04

15:00 Proceeding to Yokosuka

2010/10/19

09:00 Alongside the quay and disembarkation



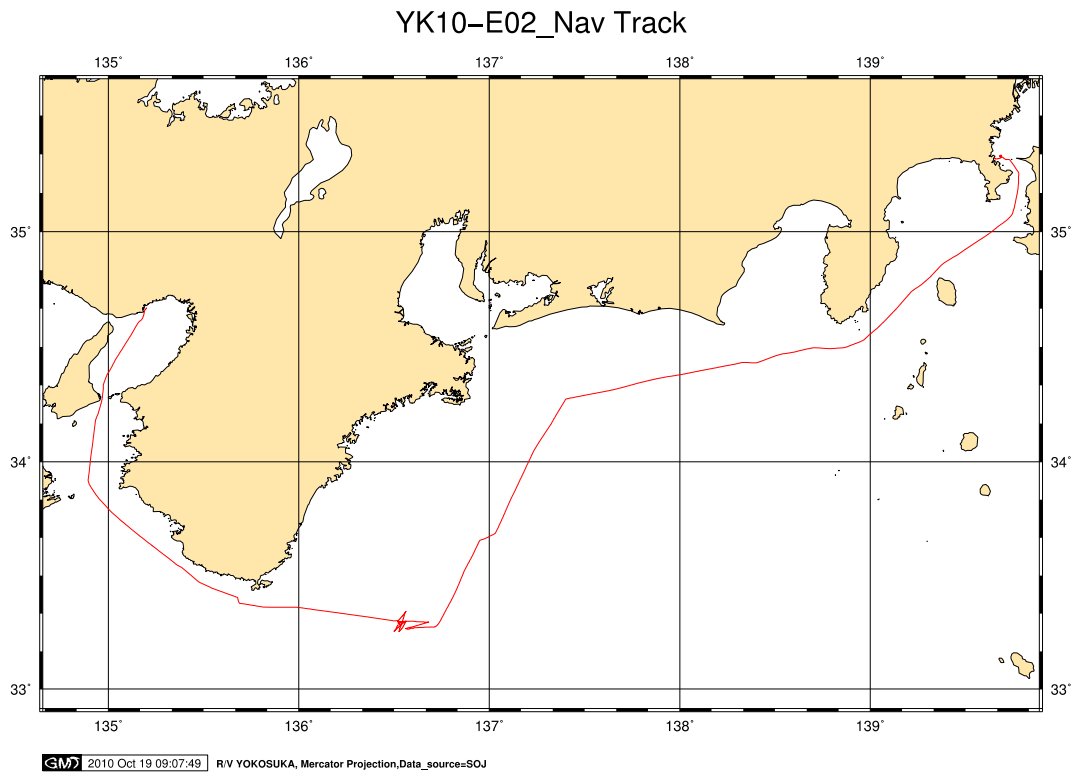


Fig. 4. A map showing the cruise track of YK10-E02.

## 5. Operations Result

In the mooring retrieval operation at CM03 the first releaser did not respond properly to signals from the onboard communication station and caused a misunderstanding that the mooring might be coming up to the surface; however, the second releaser did respond and the mooring was retrieved successfully. In the second operations at the site CM04 the retrieval proceeded smoothly. No serious damage was observed on both the systems. Data retrieval works were performed while sailing to Yokosuka and continued after being alongside the quay. The data obtained shall be used for a riser analysis, by which behaviors of the Chikyu's riser pipe under high current conditions is examined.

## 6. Acknowledgement

We thank Captain Satoshi Susami, crew and technical staffs of our operations conducted during the YK10-E02 cruise, for their kind and thoughtful supports during the cruise.

※Notice on using

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