

# KAIREI Cruise Report

KR09-11

***NOT COMPLETED YET !***

Research Dives by KAIKO-7000II

Philippine Sea



Aug., 21 – 26, 2009

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

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## 1. Cruise Information

### 1.1. Cruise Number

KR09-11

### 1.2. Ship Name

KAIREI

### 1.3. Title of the Cruise

Research dives by KAIKO7000II

### 1.4. Title of Proposals

Study for mobile ocean bottom broadband seismic observation of the next generation

### 1.5. Cruise Period

Aug., 21 – 26, 2009

### 1.6. Port Call

Jamstec, Yokosuka – Wakayama port

### 1.7. Research Area

Philippine Sea

### 1.8. Research Map

Refer to Figure 1.

## 2. Researchers

### 2.1. Chief Scientist

Hajime Shiobara [ERI, Univ. Tokyo]

### 2.2. Representative of Science Parties

Hajime Shiobara [ERI, Univ. Tokyo]

### 2.3. Science Parties

Hajime Shiobara [ERI, Univ. Tokyo, chief]

Kiyoshi Baba [ERI, Univ. Tokyo, co-chief]

Toshihiko Kanazawa [ERI, Univ. Tokyo, support]

Masanao Shinohara [ERI, Univ. Tokyo, land support]

Hiroko Sugioka [IFREE, JAMSTEC, land support]

Aki Itoh [IFREE, JAMSTEC, support]

Takehi Isse [ERI, Univ. Tokyo, support]

## 2.4. Captain, crew and KAIKO operation team

### 2.4.1. Captain and crew of the R.V. KAIREI

Captain	SUSAMI SATOSHI
Chief Officer	NAKAMURA YOSHIYUKI
2nd Officer	ADACHI TATSUO
3rd Officer	YAMAGUCHI RYO
Chief Engineer	TSUKADA MINORU
1st Engineer	FUNAE KOJI
2nd Engineer	SAKAEMURA SABURO
3rd Engineer	MATSUSHITA DAISUKE
Chief Electronics Operator	AKAMA HIDEYUKI
2nd Electronics Operator	KOMAKI YOSUKE
3rd Electronics Operator	KATAGIRI MICHIIYASU
Boat Swain	ABE SHOICHI
Able Seaman	KAWAMURA YOSHIAKI
Able Seaman	YAMAMOTO SHUICHI
Able Seaman	ISOBE HIDEO
Able Seaman	CHIMOTO TSUYOSHI
Sailor	ONO SHOHEI
Sailor	ITO HIDEO
Sailor	NAKATA HIDEAKI
No.1 Oiler	MIURA KOZO
Oiler	KAWAI YOSHINORI
Oiler	UEDA MASAMI
Oiler	FUJIWARA MASAYUKI
Oiler	UEKI FUMIHIRO
Chef	Steward SASAKI SUETO
Steward	ARIYAMA SHIGETO
Steward	FUKUMURA HIDEO
Steward	ABE TAKAHIRO
Steward	YUASA KANA

#### 2.4.2. KAIKO operation team

Operation Manager

HIRATA KAZUYOSHI

1st ROV Operator

NAMBU YOSHINOBU

1st ROV Operator

MIURA ATSUMORI

2nd ROV Operator

TAKISHITA KIYOSHI

2nd ROV Operator

KONDO TOMOE

2nd ROV Operator

WAKAMATSU HOMARE

2nd ROV Operator

SHIGETAKE SEIJI

3rd ROV Operator

ASAI RYU

### 3. Observation

#### 3.1. Purpose and background

We have already developed the mobile broadband ocean bottom seismometer (BBOBS), and many practical observations and the result have been achieved since 1999. But, through the evaluation of the broadband seismic data, the noise level of horizontal components those are important in data analyses, is rather high in average and its variation in time is also large. The reason of this is assumed as the small tilt variation of the large housing sphere due to a tidal bottom current. To clear this problem, one idea of observation without tilt variation due to the bottom current is the use of small and low profile broadband sensor that enables to intrude into the sediment. Now, we are on the way to develop this new generation BBOBS (BBOBS-NX) under support of Grant-in-Aid for Scientific Research (B) during 2007–2010. Its final goal is the free fall deployment and self pop-up recovery system as same as the BBOBS in present.

#### 3.2. Observations

We recover the BBOBS-NX2 deployed in the KR09-05 cruise, and we deploy the BBOBS-NX3 (modified for free-fall deployment) under support of the ROV, KAIKO7000II. The BBOBS-NA (BBOBS using a new style anchor) and the ocean bottom doppler current meter (OBDC) deployed in the same cruise and a BBOBS and a ocean bottom electro-magneto meter (OBEM) are also planned to be recovered in this cruise by the self pop-up system. It is impossible to do this kind of test observation on the land, because there is almost no low noise station similar to the deep sea floor and the condition of solid-liquid interface and the existence of the bottom current.

#### 3.3. Method and Instruments

The BBOBS-NX3 is deployed by free-falling nearby the BBOBS-NX2. The recording unit of the BBOBS-NX3 is moved from the top of the sensor unit and is put on the sea floor. Finally, the BBOBS-NX2 is recovered by the ROV.

#### 3.4. Research Result

The BBOBS-NX3 was closely landed about 70 m of distance from the BBOBS-NX2 (Figure 2). The BBOBS-NX3 intruded to the sediment with tilt of about 5 degrees by the acoustic communication from the ship. The BBOBS, the BBOBS-NA, the OBDC and the OBEM were released and recovered one by one without troubles, and the data was retrieved well. But, the ROV caused a serious trouble in the downlink of the fiber cable from the launcher to the vehicle when it almost reached the sea floor. As the part in trouble was impossible to be replaced with a spare part or to be repaired on board, so that the dive in this cruise was completely canceled. We could not obtain the data from

the BBOBS-NX2, and the BBOBS-NX3 is not in the correct state of the observation but we forced it to start the data recording.

### 3.5. Cruise Log

2009/08/21

12:30 Onboard

13:30 Departure from Yokosuka (JAMSTEC)

14:30-15:00 Briefing about ship's life and safety

2009/08/22

Transit to survey area "T08"

13:00-13:40 Cruise Meeting

Weather: fine but cloudy/ Wind direction: SSW/ Wind force: 3/ Wave: 2 m/ Swell: 1 m/

Visibility: 10 nautical miles (12:00 JST)

2009/08/23

06:00 Arrive at survey area "T08"

06:22 XBT

08:21 Release the BBOBS-NX3

08:49 BBOBS leaved the sea bottom

09:16 BBOBS-NX3 arrived at the sea bottom

09:59 BBOBS-NA leaved the sea bottom

10:31 Recovered the BBOBS

11:19 Recovered the BBOBS-NA

12:11 OBDC leaved the sea bottom

12:21 OBEM leaved the sea bottom

13:42 Recovered the OBDC

15:16 Recovered the OBEM

17:48 Start MBES survey

22:02 End MBES survey

Weather: fine but cloudy/ Wind direction: ESE/ Wind force: 3/ Wave: 3 m/ Swell: 2 m/

Visibility: 12 nautical miles (12:00 JST)

2009/08/24

08:38 Launch KAIKO (7K#458dive)

10:46 KAIKO communication error before lands (4,908m)

12:43 KAIKO on deck

15:33 Start MBES survey

18:30 End MBES survey

18:30 Transit to Wakayama

Weather: fine but cloudy / Wind direction: ENE Wind force: 2/ Wave: 1 m/ Swell: 1 m/

Visibility: 12 nautical miles (12:00 JST)

2009/08/25

02:07 Start MBES survey

04:37 End MBES survey

11:22 Start MBES survey

13:57 End MBES survey

Weather: fine but cloudy / Wind direction: North Wind force: 4/ Wave: 3 m/ Swell: 3 m/ Visibility: 12 nautical miles (12:00 JST)

2009/08/26

09:20 Arrival at Wakayama, KR09-11 finish and disembarkation

### 3.6. Dive Information

#### 3.6.1. Dive Number

458 (not completed)

#### 3.6.2. Payloads

The remote commander for the acoustic transponder

Hooks for recovery the BBOBS-NX2

Sands to cover the sensor unit of the BBOBS-NX3

## 4. Acknowledgements

We thank for the captain and crew of R.V. KAIREI, the KAIKO operation team and a scientific support staff of NME. This study is supported by KAKENHI (19340121).

## 5. Notice on using

This cruise report is a preliminary documentation as of the end of the cruise. It may not be corrected even if changes on content (i.e. taxonomic classifications) are found after publication. It may also be changed without notice. Data on the cruise report may be raw or not processed. Please ask the Chief Scientist for the latest information before using.

Users of data or results of this cruise are requested to submit their results to Data Integration and Analysis Group (DIAG), JAMSTEC.

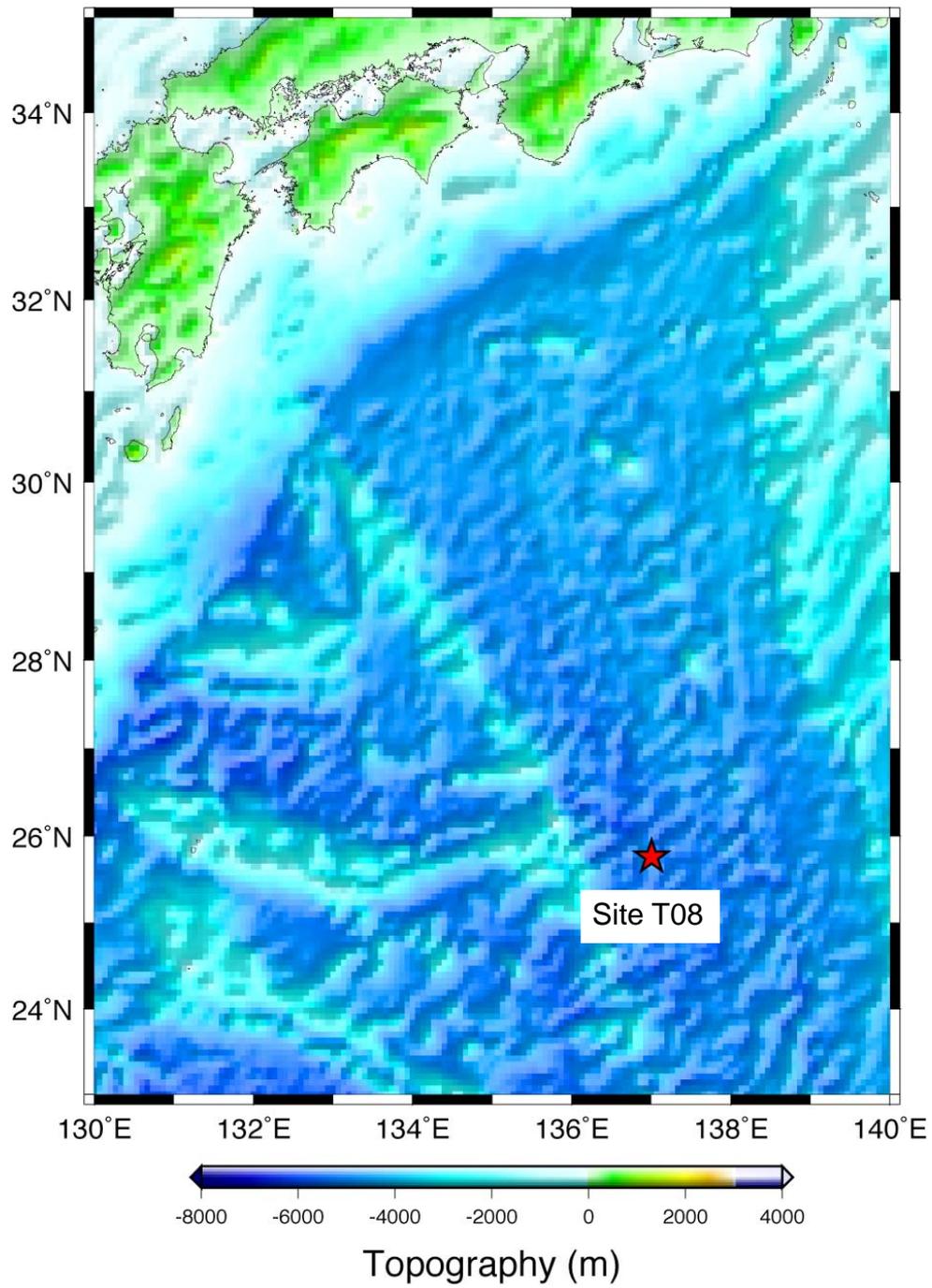


Figure 1. Research map.

Site T08: Broadband seismic observation station (depth: 4920 m)

## Dive #458

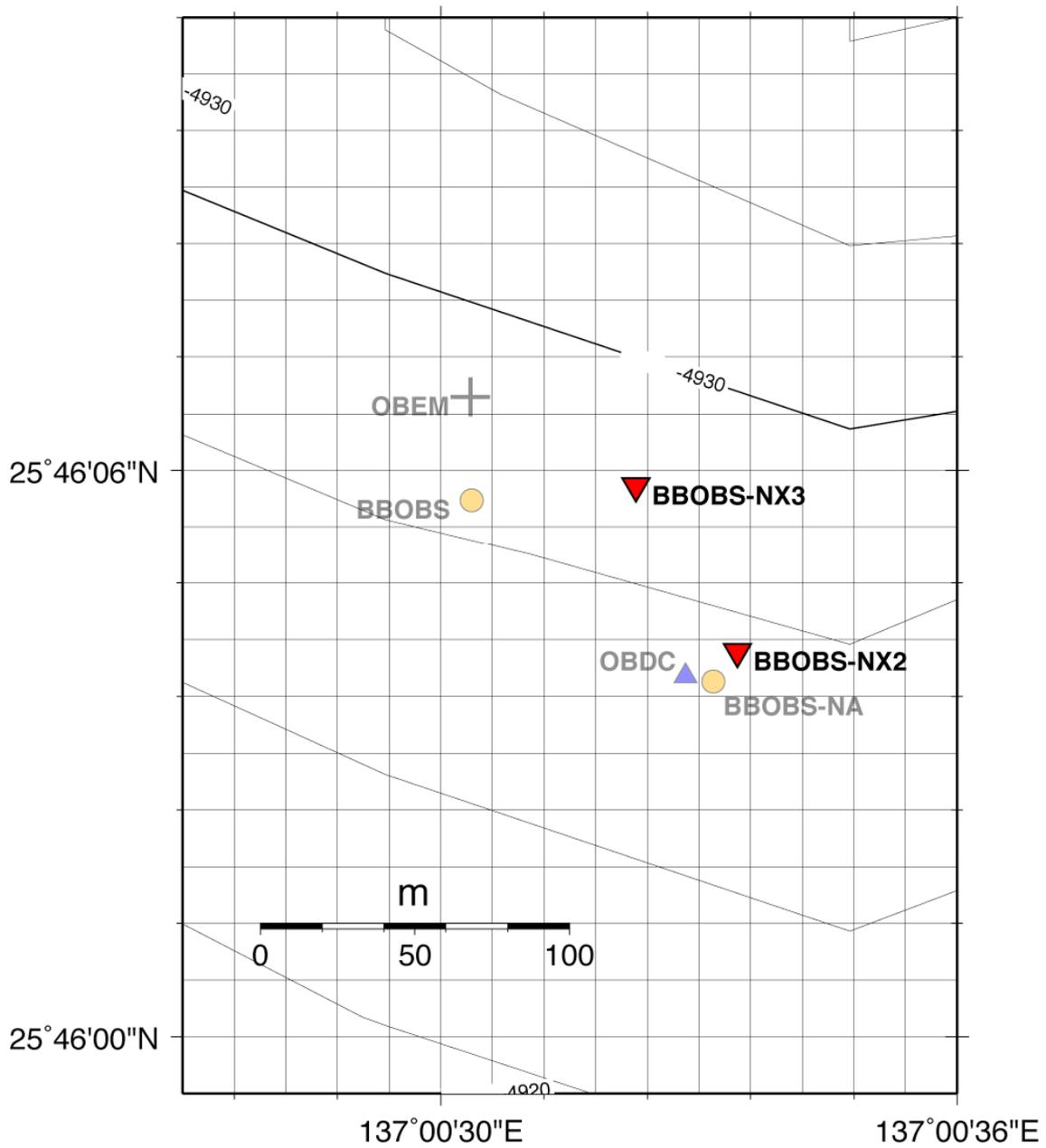


Figure 2. Location map of equipments.

The BBOBS-NX3 was landed near the BBOBS-NX2 about 70 m of distance. The BBOBS and the OBEM were deployed in the KR08-15 cruise. The BBOBS-NX2, the BBOBS-NA and the OBDC were deployed in the KR09-05 cruise. Thin colored four equipments were recovered in this cruise.