doi : 10.17596/0002500

# Kairei Cruise Report
# KR21-13

# Development of continuous real-time observation system for crustal deformation

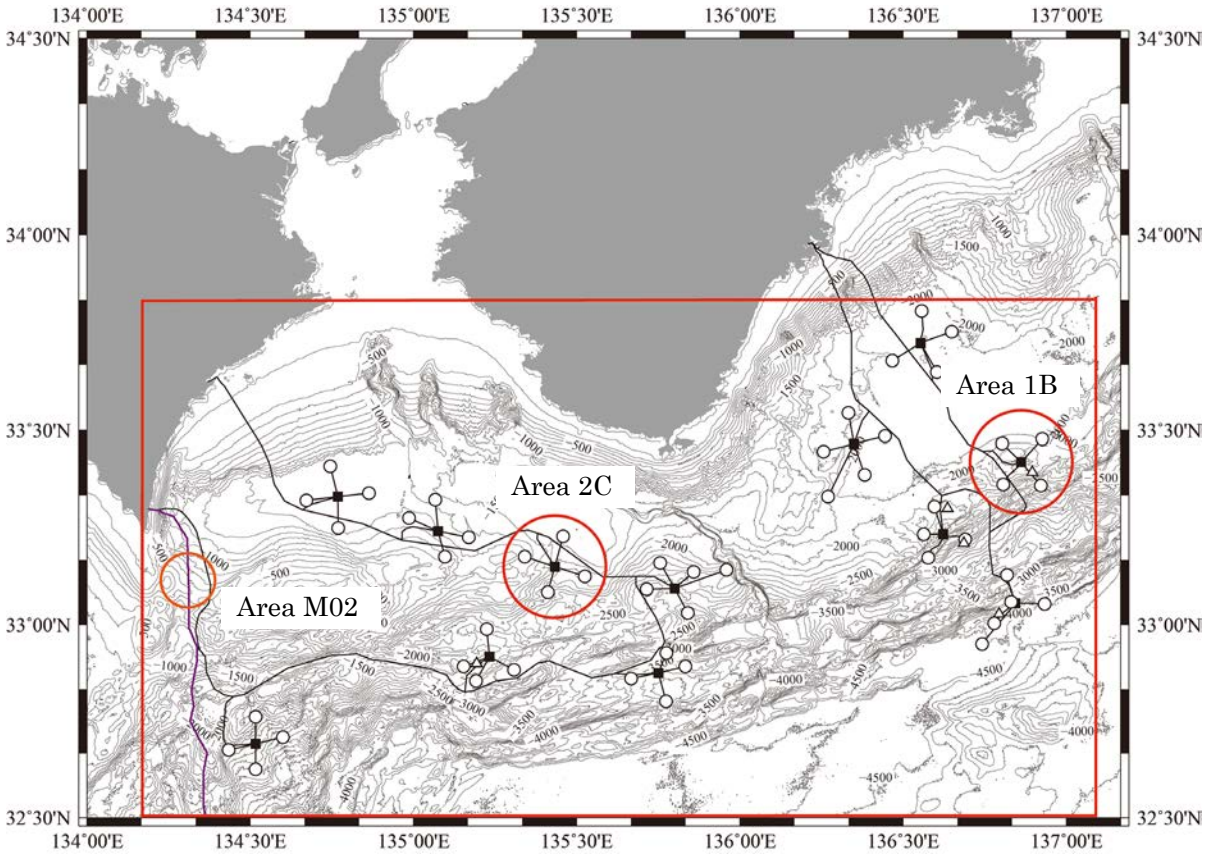
Off Cape Muroto & Kumano-nada

12-23 August 2021

Japan Agency for Marine-Earth Science and Technology
Tohoku University

## 1. Cruise Information

- Cruise ID: KR21-13
- Name of vessel: R/V Kairei
- Title of cruise: Development of continuous real-time observation system for crustal deformation
- Chief Scientist [Affiliation]: Takashi YOKOBIKI [JAMSTEC]
- Cruise period: 12 August 2021 – 23 August 2021
- Ports of departure / call / arrival: JAMSTEC Yokosuka - JAMSTEC Yokosuka
- Research map and area




Research Map

## 2. Research Proposal and Science Party

- Title of proposal: Development of continuous real-time observation system for crustal deformation
- Representative of Science Party: Eiichiro ARAKI [JAMSTEC]
- Science Party:
  - Takashi YOKOBIKI [JAMSTEC]
  - Shuhei NISHIDA [JAMSTEC]
  - Hiroyuki MATSUMOTO [JAMSTEC]
  - Yuya MACHIDA [JAMSTEC]
  - Makiko SATO [Tohoku University]
  - Toshikatsu NASU [NME]
  - Kenya YAMANAKA [NME]

## 3. Research/Development Activities

3.1 Kaiko Dive#867 on 16th August 2021: Installation of the thermometer with the ADCP.

In this dive, Self-logging pop-up type thermometer was installed near the Off-cape Muroto submarine cable. Since the strain of the optical fiber is affected by the temperature, the temperature near the submarine cable is measured, and at the same time, the strain of the submarine cable laid on the seabed is measured. The strain of the submarine cable had been measured using Distributed acoustic sensing (DAS) installed in the Landing station, and the pop-up type thermometer will be recovered in November.

Fig3-1.1 shows the seafloor topography of this dive area, the purple line shows the cable route of off-Muroto cable, and the red line shows the trace line of Kaikou. First, Kaikou landed at point 1 in Fig3-1.1 at 10 o'clock and moved southward in search of the submarine cable, but no submarine cable was found. Due to the limitation of dive time, we quitted the cable searching and installed the thermometer at point 6 at 13:34, and Kaiko left the seabed.

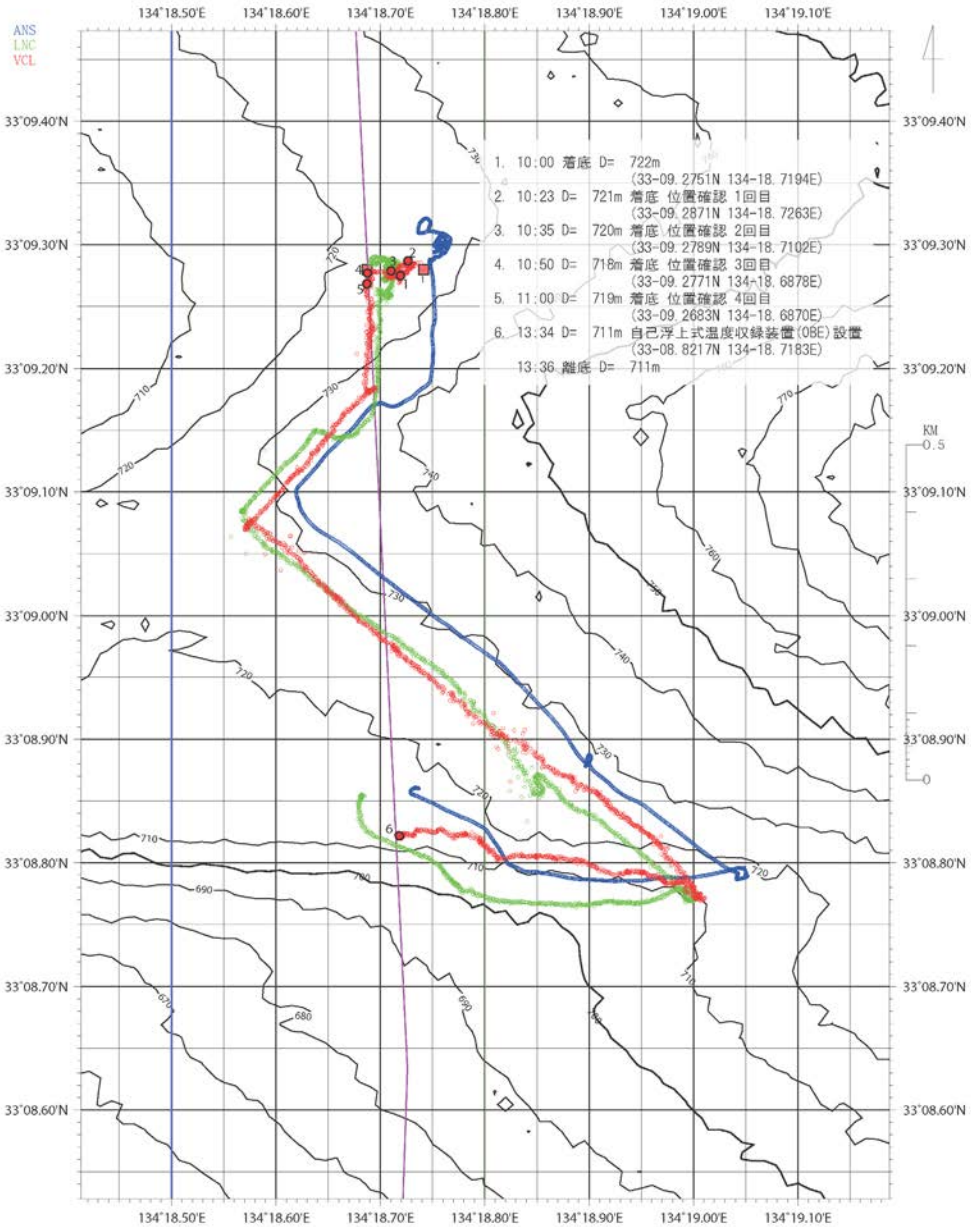



Fig.3-1.1 Trace line of Kaiko Dive#867

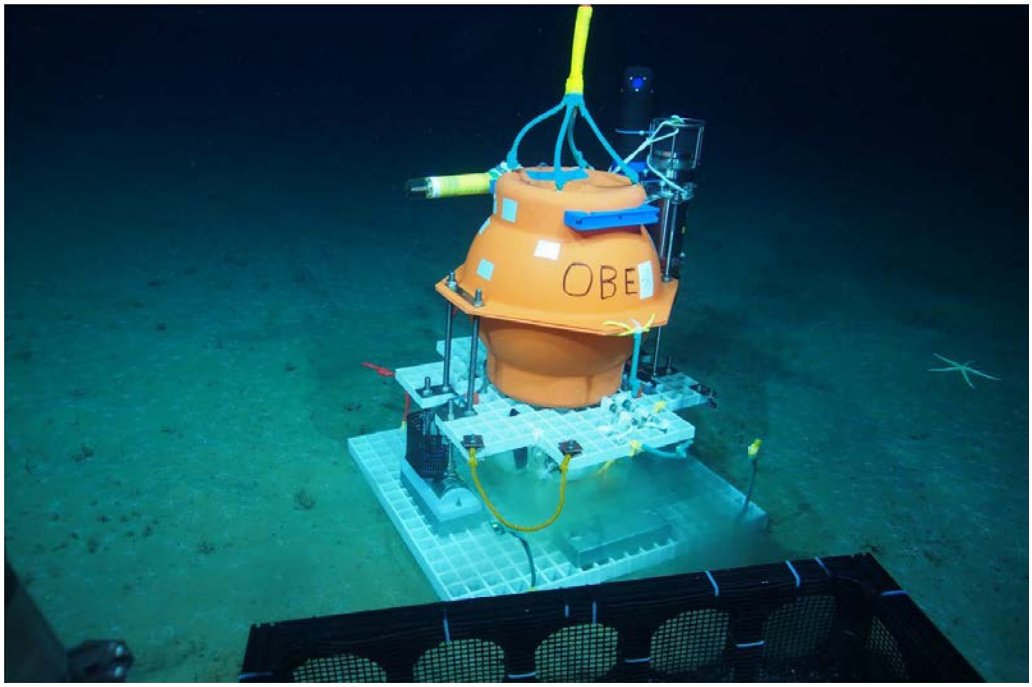


Fig. 3-1.2 Self-logging pop-up type thermometer placed in Point 6.

3.2 R/V Kairei operation on 17 October 2021: Installation and recovering of instruments

The OBP installed in KR20-09 was recovered, and the IES and OBP was installed in this operation.
The A-0-A OBP that is the pop-up type ocean bottom pressure recorder with self-calibration system was installed on 10th February 2020 in KR20-09. Release command was transmitted at 08:00, and A-0-A OBP was recovered at 09:00. The OBP and the IES were released at 12:59, and 13:05 respectively. The position of these instruments was specified by conducting three-point survey from 13:34 to 15:17. The settled positions were as follows.

OBP: 33:06.7185N, 135:32.2383E Depth: 1,788.2m
IES: 33:06.7237N, 135:32.2217E Depth: 1,784.4m

Fig.3-2.1 Recovered A-0-A OBP

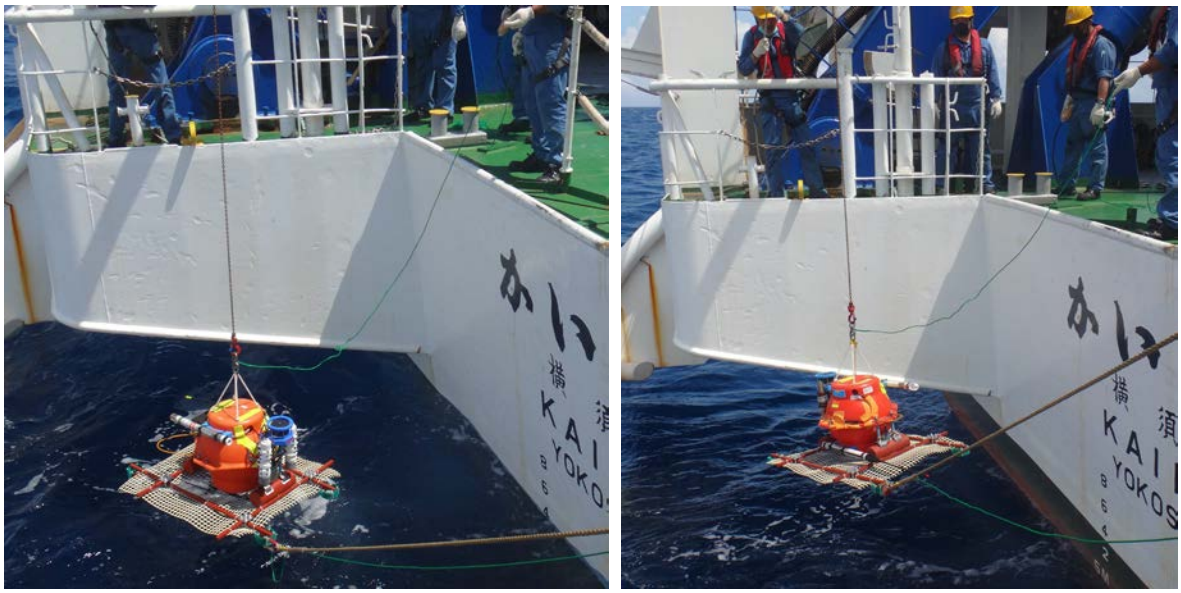


Fig3-2.2 Release operations of OBP(Left) and IES (Right)

3.3 Kaiko Dive#868 on 20th August 2021: Data acquisition for calibration of DONET pressure gage at 2C-10.

In this dive, Data acquisition was conducted to calibrate the DONET pressure gage using mobile pressure sensor at DONET observation site 2C-10.

ROV Kaiko landed near the DONET pressure gage at 10:31 and started data acquisition at 10:56. At 12:55, data acquisition was discontinued due to deterioration of weather. ROV Kaiko leaved seabed at 13:14 and was back on the deck at 14:52.

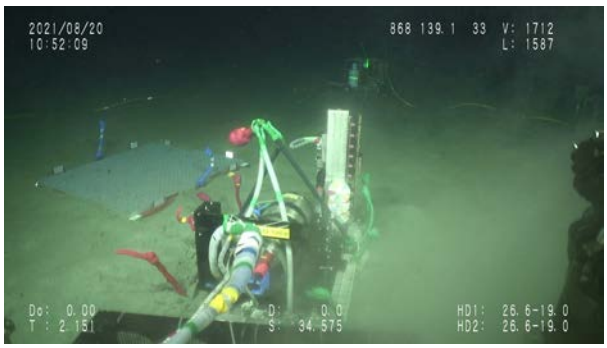



Fig. 3-3.1 Mobile pressure sensor

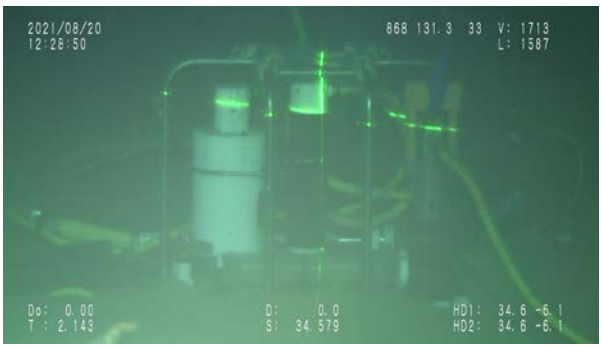



Fig. 3-3.2 DONET pressure gage during calibration

3.4 Kaiko Dive#869 on 21st August 2021: Data acquisition for calibration of DONET pressure gage at 1B-8.

In this dive, Data acquisition was conducted to calibrate the DONET pressure gage using mobile pressure sensor at DONET observation site 1B-8.

ROV Kaiko landed near the DONET pressure gage at 10:39 and started data acquisition at 11:26. At 14:24, data acquisition was finished and ROV Kaiko leaved seabed at 14:39.

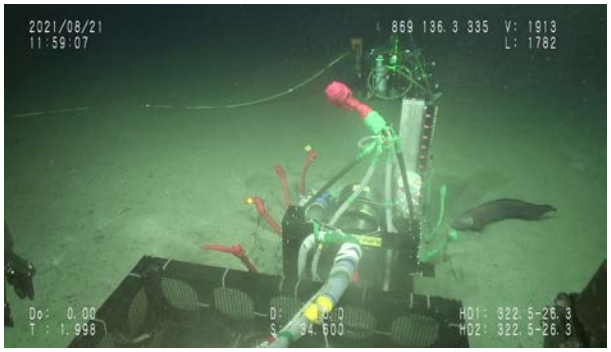



Fig. 3-4.1 Mobile pressure sensor


Fig. 3-4.2 DONET pressure gage during calibration

3.5 Kaiko Dive#870 on 22nd August 2021: Data acquisition for calibration of DONET pressure gage at 1B-8.

In order to confirm the calibration data reproducibility measured in Dive#869, ROV Kaiko was dive to the same site 1B-8 as the day before.

ROV Kaiko landed near the DONET pressure gage at 10:44 and started data acquisition at 11:24. At 13:39, data acquisition was finished and ROV Kaiko leaved seabed at 13:55.

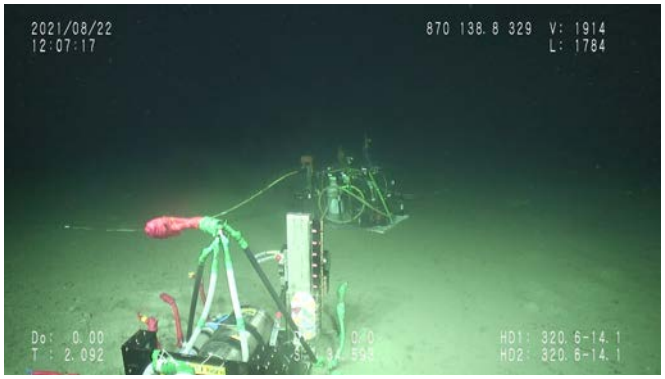



Fig. 3-5.1 Mobile pressure sensor

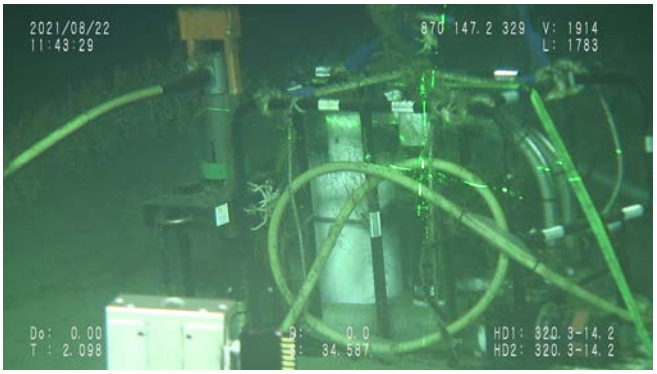



Fig. 3-5.2 DONET pressure gage during calibration

## 4. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.
This report is not necessarily corrected even if there is any inaccurate description (i.e. taxonomic classifications). This report is subject to be revised without notice. Some data on this report may be raw or unprocessed. If you are going to use or refer the data on this report, it is recommended to ask the Chief Scientist for latest status.
Users of information on this report are requested to submit Publication Report to JAMSTEC.

http://www.godac.jamstec.go.jp/darwin/explain/1/e#report
E-mail: submit-rv-cruise@jamstec.go.jp