doi : 10.17596/0002662

Kaimei Cruise Report
KM18-09

Development of continuous real-time observation system for crustal deformation

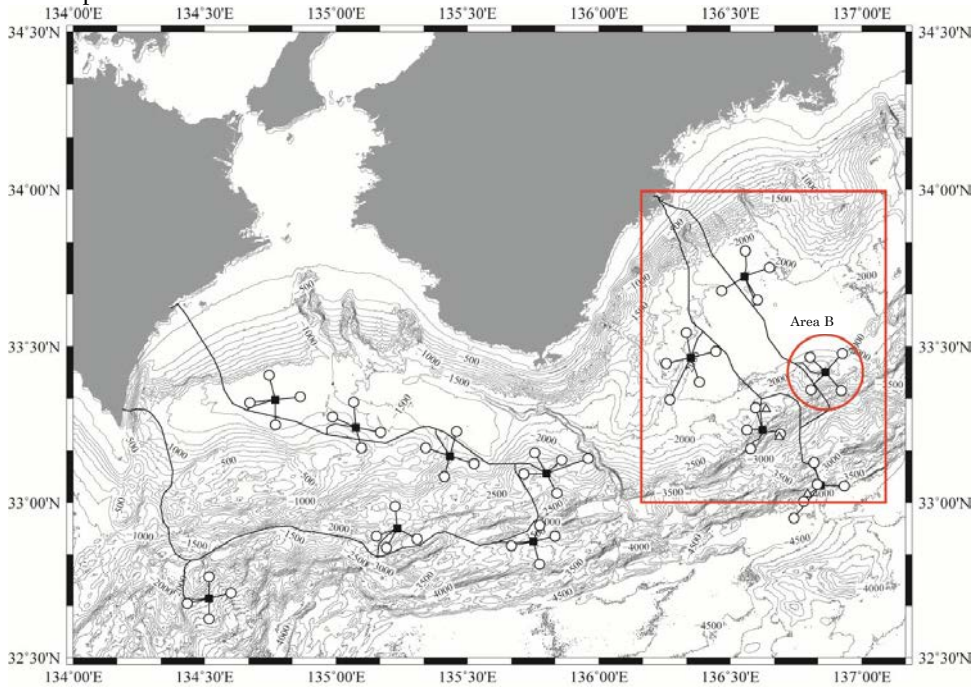
Kumano-nada

13 October 2018 - 20 October 2018

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

1. Cruise Information

- Cruise ID: KM18-09
- Name of vessel: R/V Kaimei
- Title of cruise: Development of continuous real-time observation system for crustal deformation
- Chief Scientist [Affiliation]: Takashi YOKOBIKI [JAMSTEC]
- Cruise period: 13 October 2018 – 20 October 2018
- 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 [Affiliation]: Shuichi KODAIRA [JAMSTEC]
- Science Party [Affiliation, assignment etc.]:
  - Takashi YOKOBIKI [JAMSTEC]
  - Paul Prunianu [Cellula Robotics Ltd.]
  - Toshikatsu NASU [NME]
  - Kouki KUNO [NME]
  - Hiroyoshi SHIMIZU [NME]

3. Research/Development Activities

3.1 KM-ROV#89 on 14 October 2018: Site survey

In this dive, site survey was carried out. At first, KM-ROV moved to point-2 in figure 1 where the miniature transponder #91 was put by HPD in DIVE#2069 KS-18-J06 and we started search the extension cable of observatory site 1B-6 of DONET1. The extension cable was confirmed from point-3 to point-4 where is almost 200m away from planed line that is showed by purple line in fig.1. And KM-ROV back to the point-2 to observe the condition of the seafloor. The condition of the seafloor from point-2, point-5 to point-6 was tight sand and almost flat. We decided the drilling point where is also observation site of tilt meter. KM-ROV was leaved from point-6 of seafloor at 16:29.

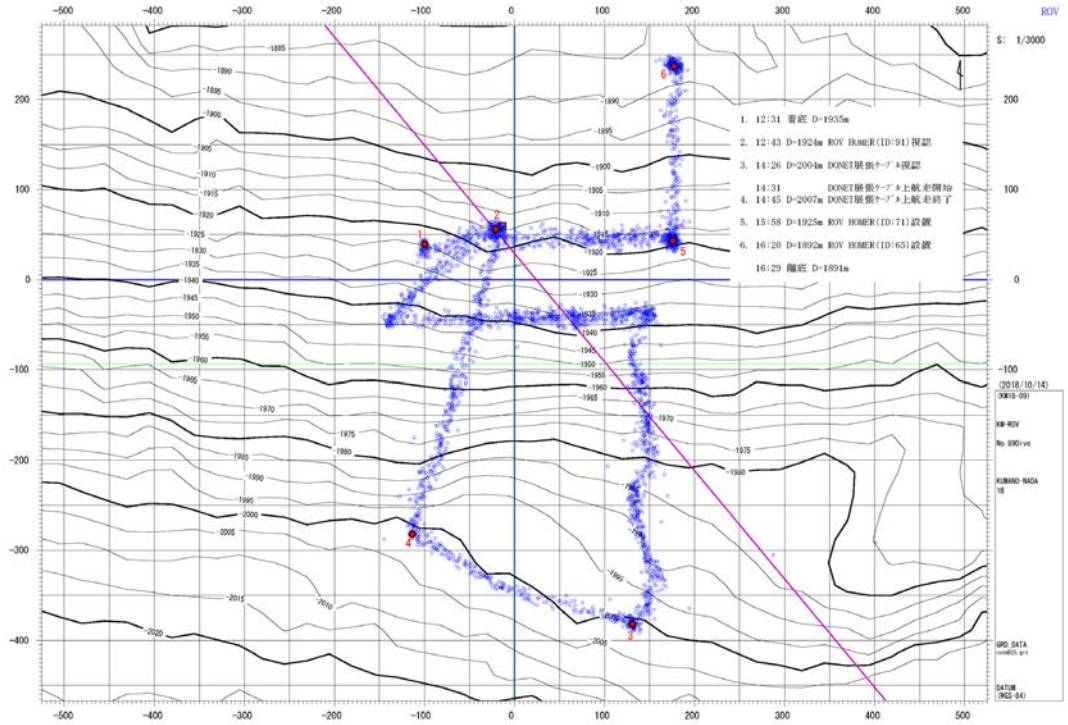


Fig.3-1 Trace line of KM-ROV Dive#89

3.2 BMS#7 on 15 October 2018: Drilling operation for observatory point

Drilling operation was conducted to construct the borehole for the tiltmeter. The BMS landed at 33-23.295N 136-53.803E where the depth is 1,888m. The BMS started drilling operation at 10:33 using H-size drilling tools. After drilling 9.352mbsf, the BMS left the seafloor at 14:43.

3.3 KM-ROV#90 on 16 October 2018: Installation of a tiltmeter and site survey

In this dive, the tiltmeter was installed in the borehole that was bored in BMS#7. At first, KM-ROV landed at point-1 in Fig.3-2 and started to find the borehole at 9:07. The borehole was found in point-2 at 9:36 (Fig.3-3) The tiltmeter was lowered in the borehole to payout the rope to the bottom and the connector on the grid panel was put near the borehole. The miniature transponder #65 was placed near the borehole. (Fig.3-4) KM-ROV moved to the point-4 to check the seafloor where sea trial will be carried out in next BMS dive (Fig.3-5) and leaved from seafloor at 12:12.

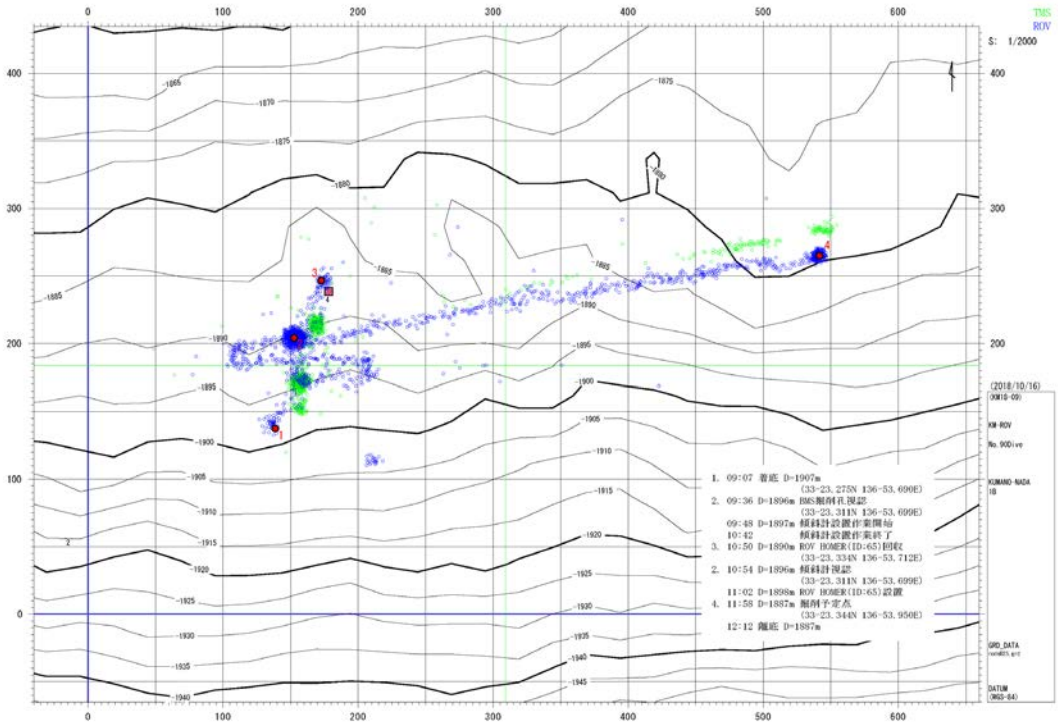


Fig.3-2 Trace line of KM-ROV Dive#90

Fig. 3-3 Borehole BMS#7

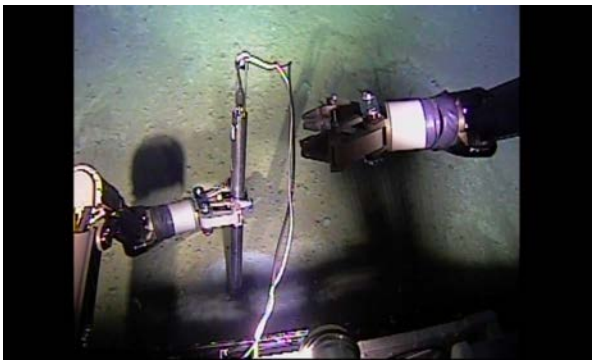


Fig. 3-4 Tilt meter

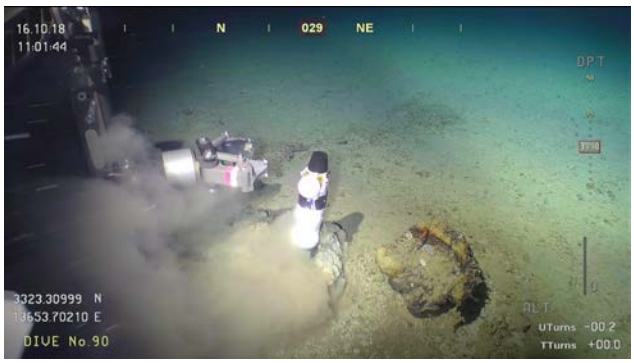


Fig.3-5 Miniature transponder

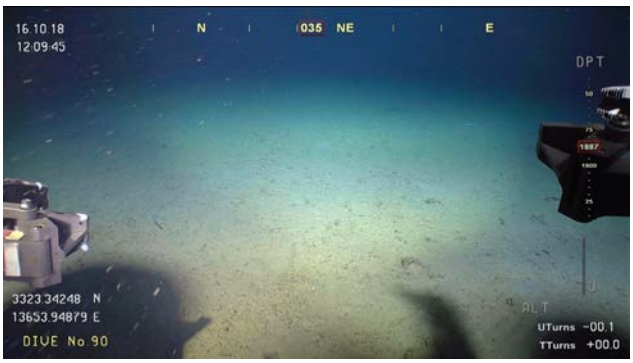


Fig. 3-6 Planned site of sea trial for next BMS dive

3.4 KM-ROV#91 on 17 October 2018: Recover the tiltmeter

Before dive, we planned to check the tiltmeter and bury the tiltmeter. But the fault was occurred in the tilt meter, the tiltmeter was recovered.

KM-ROV arrived at the borehole BMS#7 at 9:13 and started to check the tiltmeter that was installed in Dive#90. (Fig. 3-7) When the tiltmeter turned on, the alarm of insulation failure was issued. Though the underwater mateable connector was unplugged/mated three times (Fig. 3-8) , the fault did not improve. So, we decided to recover the tiltmeter. The underwater mateable connector, cable and tiltmeter were recovered to the sample basket. KM-ROV leaved the sea floor at 11:11.

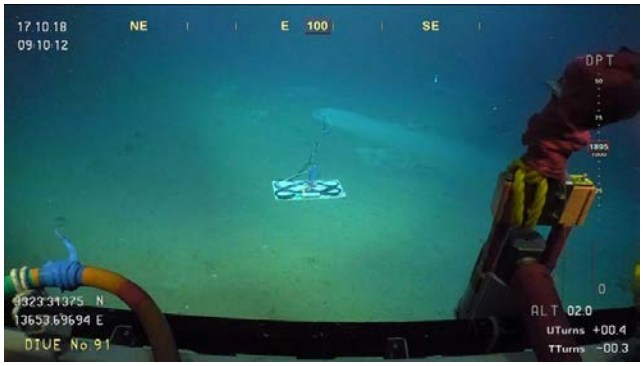


Fig. 3-7 the borehole and underwater mateable connector

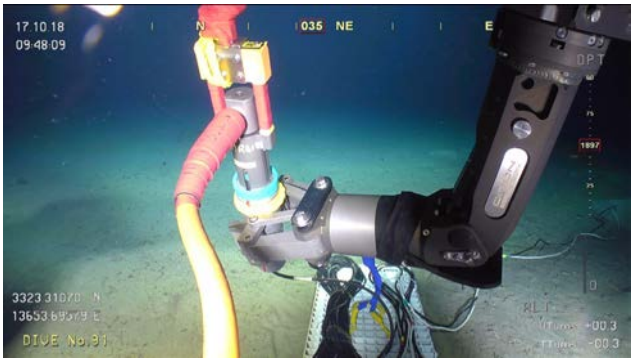


Fig. 3-8 Connect to check the tiltmeter

3.5 BMS#8 on 18 October 2018: Sea trial of sensor deployment module

The function of the deployment module was checked in this dive. The deployment module was developed to install a sensor into the borehole after the drilling operation at single dive.

Inside the deployment module contains three section. From bottom to top, there are a sensor unit, cable storage, and the underwater mateable connector with float. The deployment module is lowered to the bottom of the borehole using wireline system after usual drilling operation. The module releases a sensor at the bottom and payout the cable inside the borehole when the module is recovered. At last, the connector is unfastened when the recover work is finished, and the connector with float appears over the borehole.

Figure 3-11 shows the deployment module set in the carousel of the BMS. (fig. 3-11)

BMS was landed at 10:00, and started drilling operation at 10:11 after the status of the attitude was confirmed. The borehole of 2.589mbsf was drilled using 146T drilling tools and the sea trial of the deployment module was conducted. The dummy sensor (Fig. 3-12) and connector were successfully installed as planned. (Fig. 3-13) The operation time was 2 hours and 25 minutes and BMS leaved the sea floor at 12:44. The position of the borehole is 33-23.340N 136-53.938E at 1879m depth.

Fig. 3-11 The deployment module was set in the carousel (Silver cylinder)

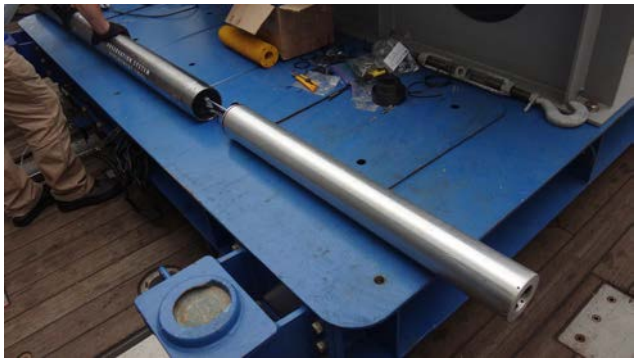


Fig. 3-12 Dummy sensor

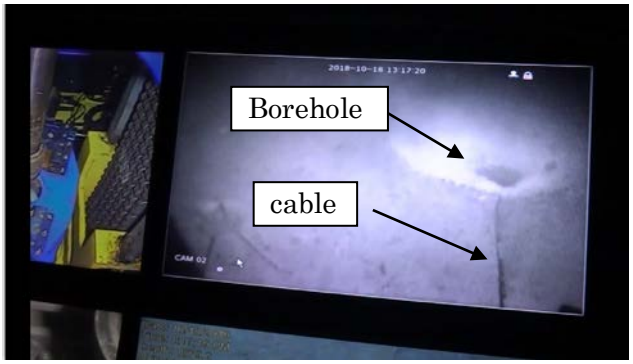


Fig. 3-13 Deployed sensor unit

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