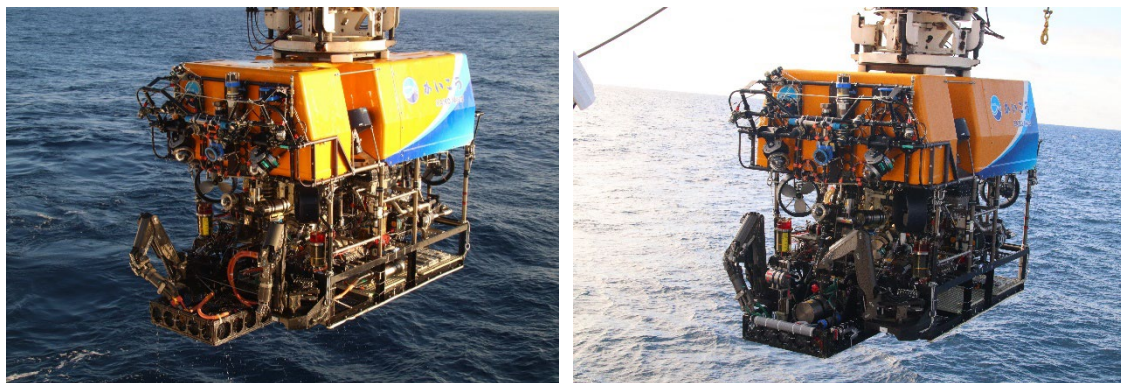




KM24-11 Cruise Report R/V Kaimei & ROV Kaiko Mk-IV

Real-time ocean bottom crustal movement observation



Kumanonada Sea, Off Kiisuido Strait

Sep. 25th, 2024 – Oct. 11th, 2024

R&D Group for Seafloor Observatory
R&D Center for Earthquake and Tsunami Forecasting
Research Institute for Marine Geodynamics
Japan Agency for Marine-Earth Science and Technology

Contents

1. Cruise Information.....	3
2. Research Proposal and Science Party.....	3
3. Activity and Results.....	4
4. Operation & Dive Log	5
5. Notice on Using	14

1. Cruise Information

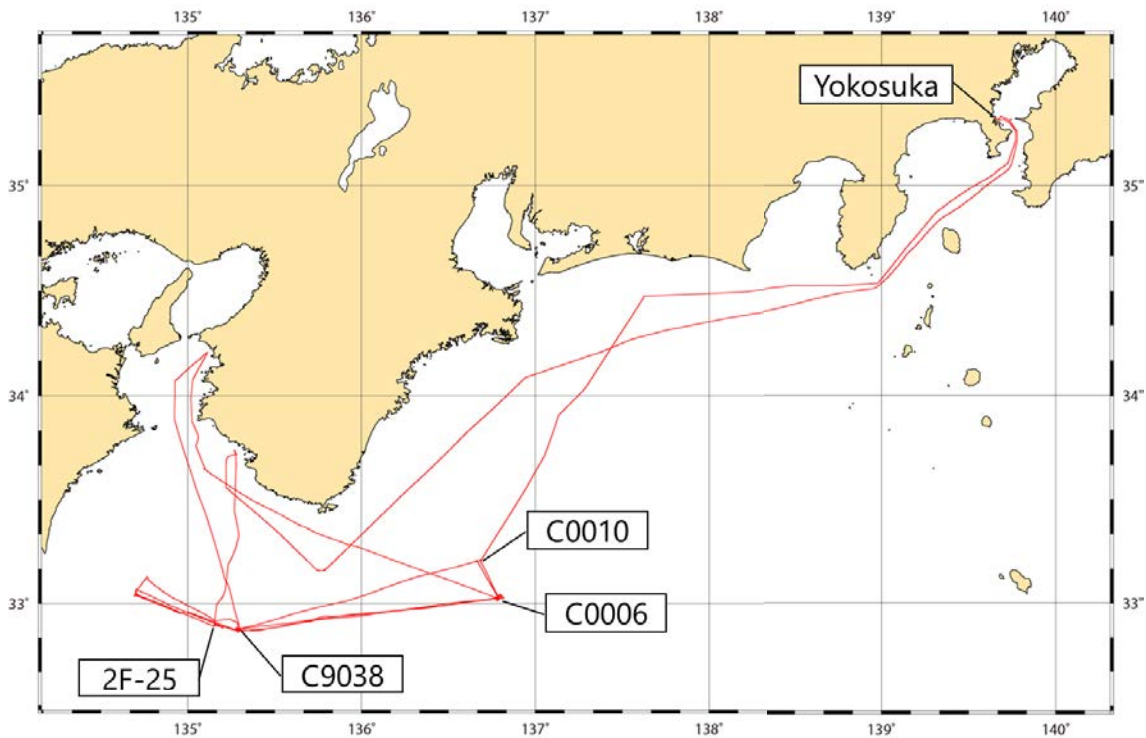
Cruise ID:	KM24-11		
Name of vessel:	Kaimei		
Title of cruise:	Real time ocean bottom crustal movement observation		
Chief Scientist:	Affiliation	Duration	
Shuhei Nishida	JAMSTEC	Sep. 25 th – Oct. 11 th	
Boarding Scientist:	Affiliation	Duration	
Yuya MACHIDA	JAMSTEC	Sep. 25 th – Oct. 11 th	
Takashi YOKOBIKI	JAMSTEC	Sep. 25 th – Oct. 11 th	
Eiichiro ARAKI	JAMSTEC	Sep. 25 th – Oct. 3 rd	
Aki ITO	JAMSTEC	Sep. 25 th – Oct. 3 rd	
Hajime SHIOBARA	The University of Tokyo	Sep. 25 th – Oct. 3 rd	
Masayuki TOIZUMI	NME	Sep. 25 th – Oct. 11 th	
Fumito SAKURAGI	NME	Sep. 25 th – Oct. 11 th	
Seiya YOKOI	NME	Sep. 25 th – Oct. 11 th	
Cruise period:	Sep. 25 th – Oct. 11 th		
Ports of departure / arrival:	JAMSTEC Yokosuka HQ / JAMSTEC Yokosuka HQ		
Research area:	Kumanonada Sea, Off Kiisuido Strait		

2. Research Proposal and Science Party

Science Party List:		
	Eiichiro Araki	JAMSTEC
	Takashi Yokobiki	JAMSTEC
	Hiroyuki Matsumoto	JAMSTEC
	Yuya Machida	JAMSTEC
	Shuhei Nishida	JAMSTEC
	Shuhei Tsuji	JAMSTEC
	Satoru Baba	JAMSTEC
	Takane Hori	JAMSTEC
	Shuichi Kodaira	JAMSTEC
	Takashi Tonegawa	JAMSTEC
	Koichiro Obana	JAMSTEC
	Aki Ito	JAMSTEC
	Hajime Shiobara	The University of Tokyo

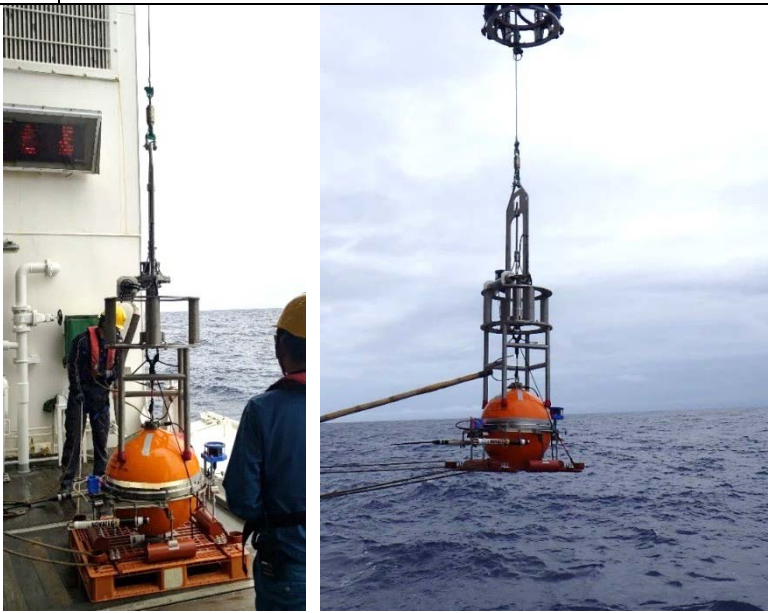
3. Activity and Results

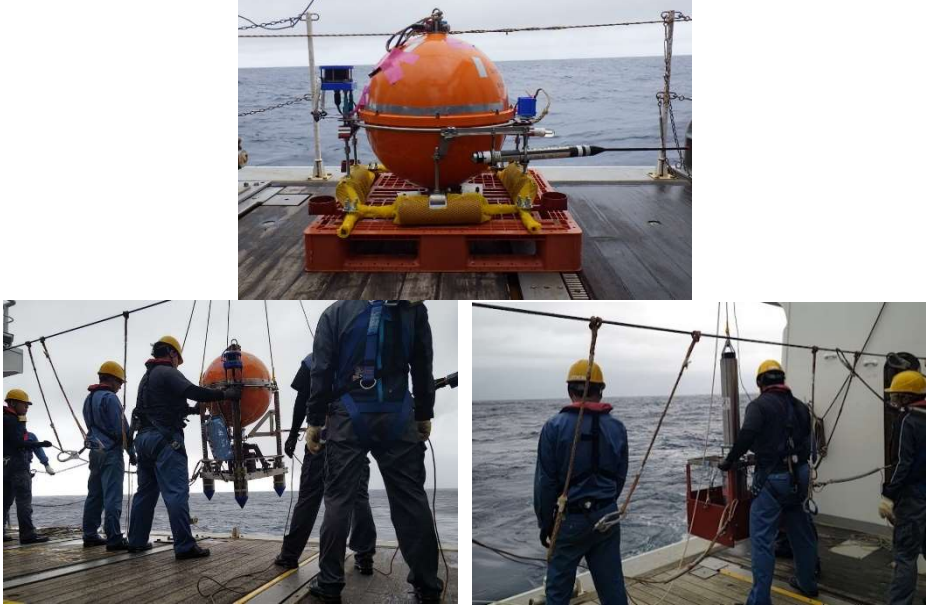
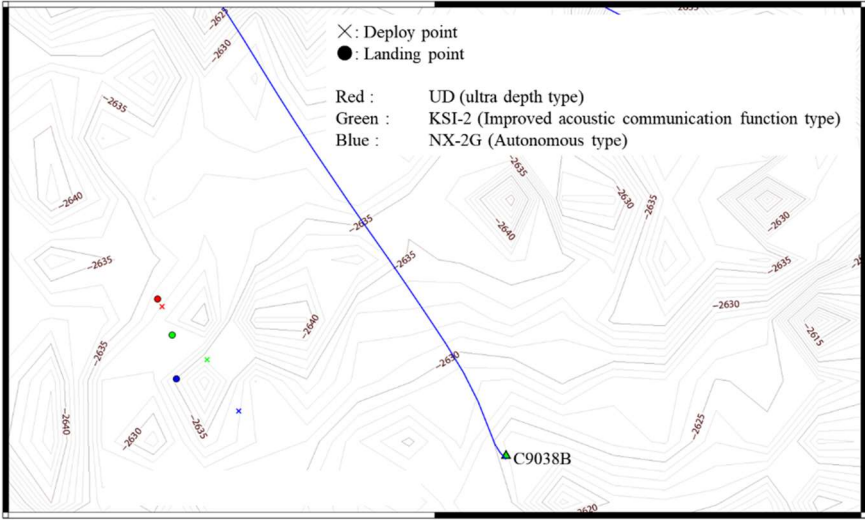
- A) Broadband ocean bottom seismometers (BBOBS) were installed at about 50 m near long-term borehole measurement systems (LTBMS) C0010 and C0006. BBOBS were detached near the seafloor using an acoustic releaser and placed on the seafloor, then relocated using ROV Kaiko Mk-IV.
- B) Four BBOBSs were installed at approximately 1.4 km west northwest from C0006 in the long-term borehole observation system. The BBOBSs were deployed from the sea surface and free-fall to the seafloor.
- C) Three types of improved BBOBS were installed approximately 1.4 km west of LTBMS C9038B. The improved BBOBSs were deployed from the sea surface and free-fall to the seafloor.
- D) Optical fiber sensing using the sensing fiber installed at LTBMS C9038B was conducted from the vessel via ROV.
- E) The ROV Kaiko Mk-IV landed on the bottom a few meters from DONET station 2F-25 and used a mobile pressure calibrator to acquire calibration data for the bottom pressure gauge at DONET observatory 2F-25.

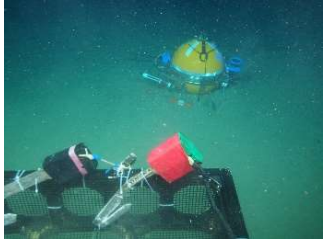
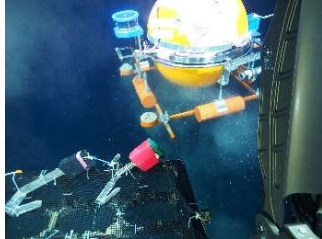

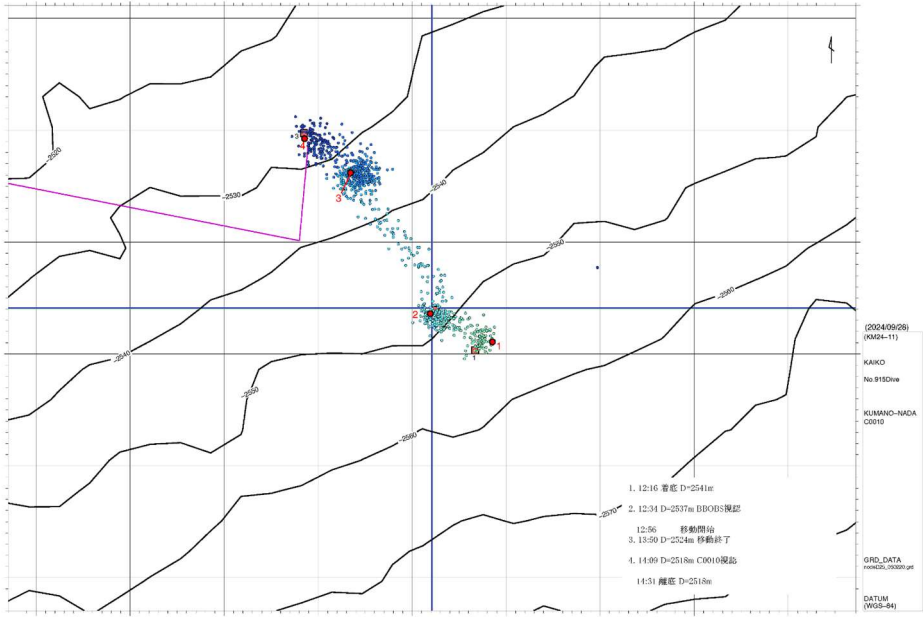


vessel tracks during KM24-11

4. Operation & Dive Log

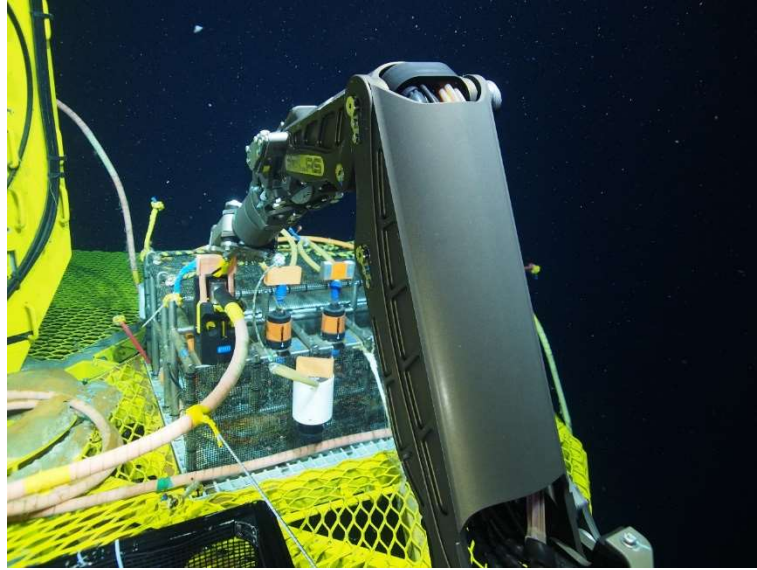
No.	Date	Site	Launch Landing	Latitude	Longitude	Depth
1	2024/09/26	C0010	09:04	33-12.5448N	136-41.2806E	10 m
			10:22	33-12.5206N	136-41.2663E	2533 m
		C0006	13:19	33-01.7824N	136-47.5532E	11 m
			14:57	33-01.7269N	136-47.5836E	3863 m
	Work Summary	The broadband ocean bottom seismometers (BBOBSs) were hung using the acoustic releaser, moved to a position approximately 200 m from the Long-Term Borehole Measurement Systems (LTBMS) C0010 and C0006, and then released 15 m above the seafloor, allowing them to free-fall and be installed.				
						

No.	Date	Site	Launch Landing	Latitude	Longitude	Depth
2	2024/09/27	C9038B	08:36	32-52.3023N	135-17.4663E	2634 m
		KSI-2	09:12	32-52.3508N	135-17.3842E	2668 m
		C9038B	11:03	32-52.4072N	135-17.3606E	2637 m
		NX-2G	11:36	32-52.4221N	135-17.2455E	2672 m
		C9038B	10:38	32-52.2006N	135-17.5403E	2635 m
	UD	-	32-52.2635N	135-17.3940E	2673 m	
Work Summary	The improved BBOBSs were deployed from the sea surface and free-fall to the seafloor and were installed approximately 1.4 km west of LTBMS C9038B. Their landing points were within 230 m of the deploy points.					
						
						

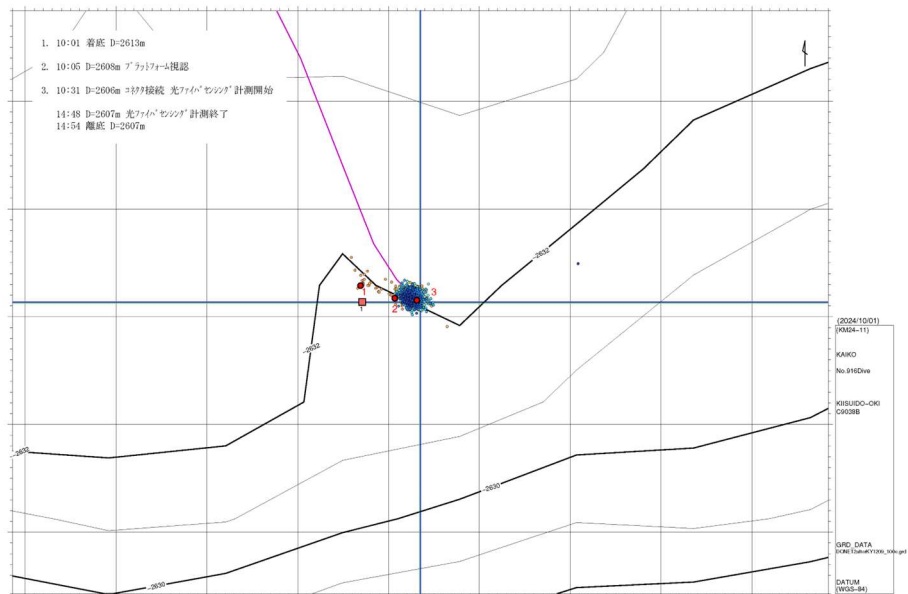
No.	Date	Site	Staying Time	Latitude	Longitude	Depth
	KK915 2024/09/28	C0010	12:16	33-12.5054N	136-41.2927E	2,541m
			14:31	33-12.5962N	136-41.1928E	2,518m
	Work Summary	The ROV dived toward the BBOBS deployed on September 26th and found it near the location it deployed. And then, the BBOBS was transported by the ROV and was finally relocated to a position 50 m southeast of C0010.				
						
	2: Finding		2-3: Moving		3: Relocating	
3	 <p> 1. 12:16 着底 D=2541m 2. 12:34 D=2537m BBOBS確認 12:56 移動開始 3. 13:50 D=2524m 移動終了 4. 14:09 D=2518m C0010確認 14:51 離底 D=2518m </p> <p> (2024/09/28) (KM24-11) KAIKO No.915Dive RUMANO-NADA C0010 GRD_DATA name02_00000.grd DATUM (WGS-84) </p>					

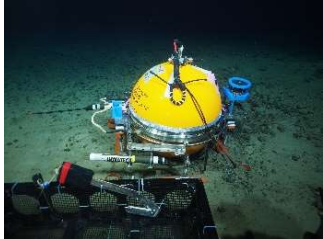

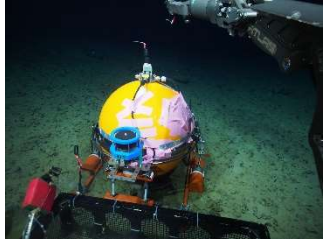
No.	Date	Site	Target Launch Landing	Latitude	Longitude	Depth	from target			
							Bearing	Distance		
4	2024/09/29	BBOBS C0006A	-	136-46.8510	33-01.9780	-3935	-	-		
			08:23	136-46.8850	33-01.9770	-3935	92.0	52.9		
			09:09	136-46.8709	33-01.9617	-3935	134.3	43.2		
		BBOBS C0006B	-	136-47.9760	33-02.3460	-3682	-	-		
			10:24	136-48.0220	33-02.3680	-3676	60.3	82.3		
			11:06	136-47.9640	33-02.3437	-3716	257.1	19.1		
		BBOBS C0006C	-	136-48.5580	33-01.6320	-3977	-	-		
			15:22	136-48.6343	33-01.6626	-3980	64.4	131.5		
			16:05	136-48.5333	33-01.6140	-4014	229.0	50.8		
		BBOBS C0006D	-	136-46.9340	33-01.1860	-4164	-	-		
			13:09	136-46.9800	33-01.2080	-4157	60.3	82.3		
			13:55	136-46.8294	33-01.1721	-4169	261.0	164.8		
		Work Summary		<p>BBOBS were placed at four points on the circumference of a circle with a radius of 1.4 km centered on LTBMBS C0006.</p> <p>After the BBOBSs were deployed, bottom-entry confirmation and position estimation were performed via acoustic communication, and the drifted distance and heading were obtained.</p> <p>In order to place the next BBOBS at the target point, the launch point of the next BBOBS was adjusted by referring to the estimated drift and the current measured at the launch point. As a result, during this deployment operation, the maximum estimated distance between the target point and the landing point was 164 m, 4% of bottom depth.</p>						
		<p>☆ : Target ○ : Launch □ : Landing</p> <p>circle represents 10% of the water depth, about 400 m.</p> <p>1000 m</p> <p>Data SIO, NOAA, U.S. Navy, NGA, GEBCO</p> <p>Google Earth</p>								

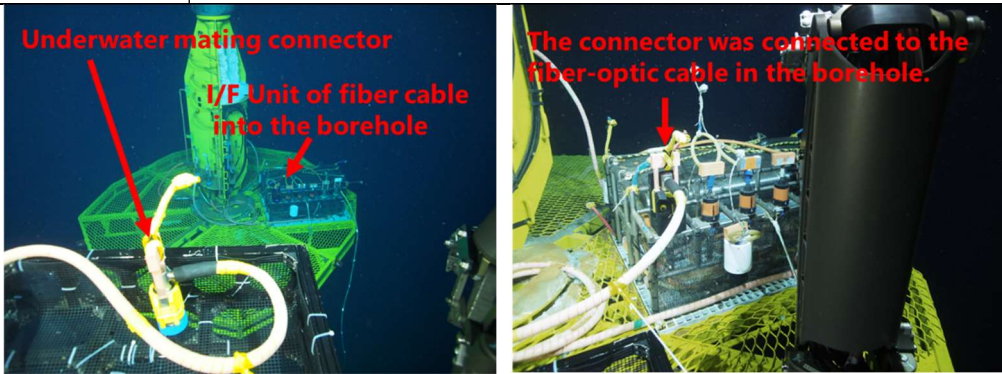
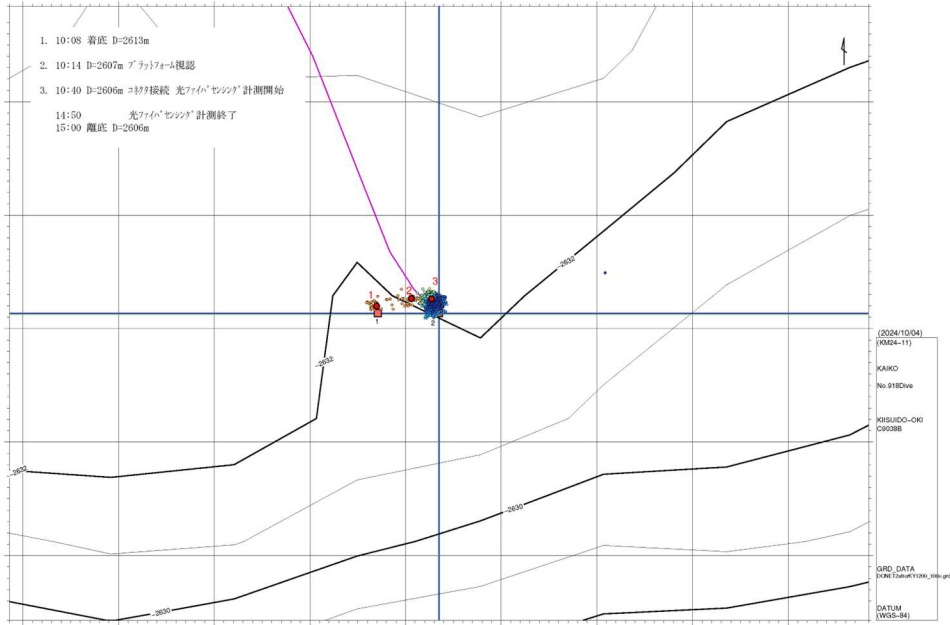
No.	Date	Site	Staying Time	Latitude	Longitude	Depth
	KK916 2024/10/01	C9038B	10:01	32-52.1144N	135-18.1346E	2,613m
			14:54	32-52.1076N	135-18.1655E	2,607m
	Work Summary	The ROV dived toward LTBMS C9038B, and connected to LTBMS the connector for optical fiber sensing. Optical fiber sensing using the sensing fiber cable installed into LTMBS C9038B was conducted from the vessel via ROV.				

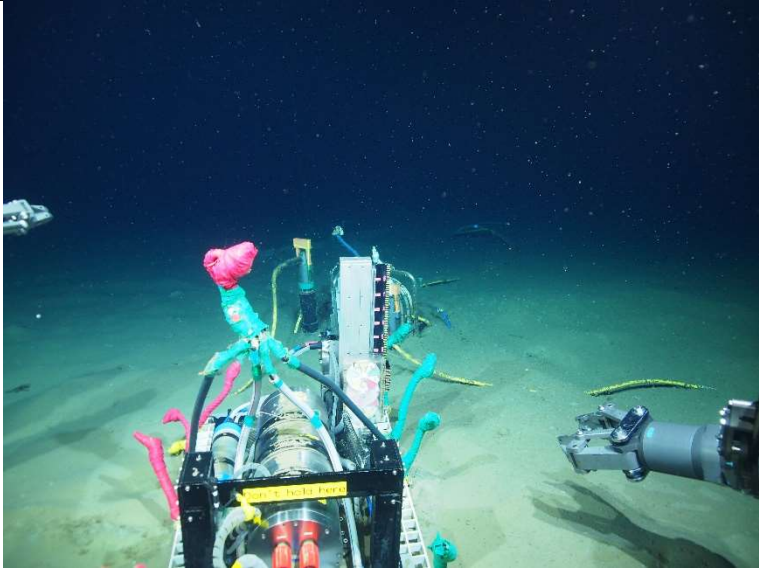
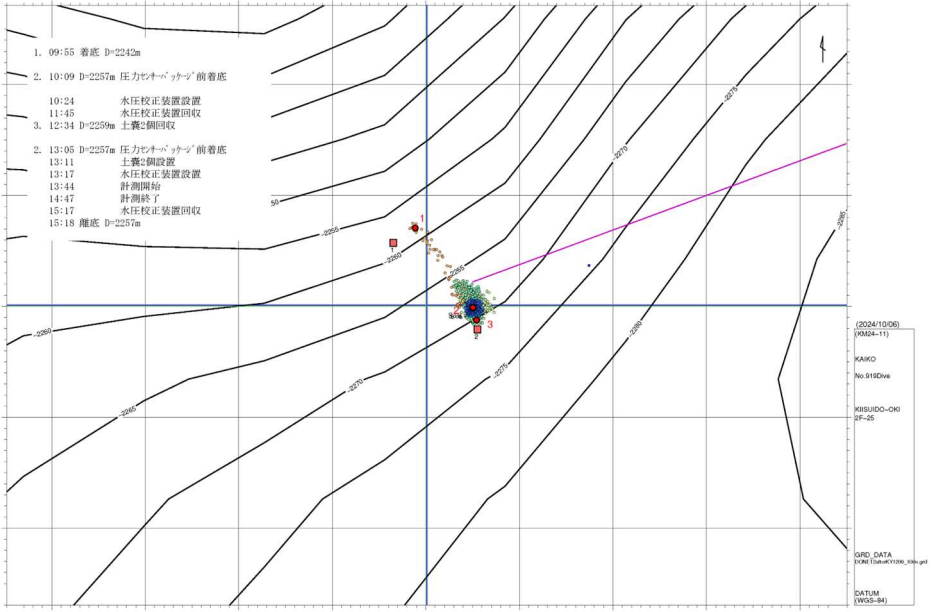


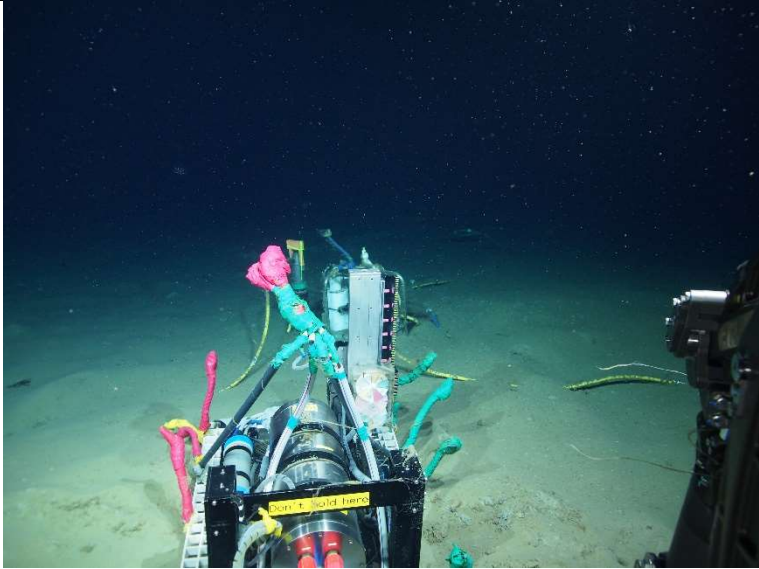
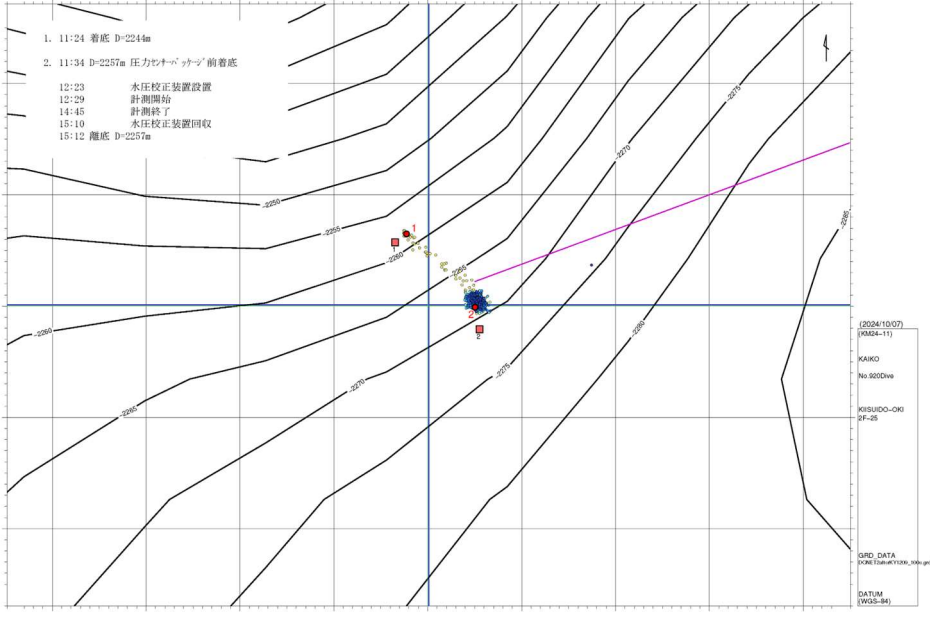
5 An underwater mating connector linked to the onboard equipment was connected to the borehole system for fiber-optic sensing via the ROV.



No.	Date	Site	Staying Time	Latitude	Longitude	Depth
	KK917 2024/10/02	C0006	10:37	33-01.6981N	136-47.5956E	3,853m
			12:31	33-01.6474N	136-47.6471E	3,859m
	Work Summary	The ROV dived toward the BBOBS deployed on September 26th and found it near the location it deployed. And then, the BBOBS was transported by the ROV and was finally relocated to a position 50 m northwest of C0006.				
						
	2: Finding		2-3: Moving		3: Relocating	
6						

No.	Date	Site	Staying Time	Latitude	Longitude	Depth
	KK918 2024/10/04	C9038B	10:08	32-52.1099N	135-18.1348E	2,613m
			15:00	32-52.1131N	135-18.1636E	2,606m
	Work Summary	The ROV dived toward LTBMS C9038B, and connected to LTBMS the connector for optical fiber sensing. Optical fiber sensing using the sensing fiber cable installed into LTMBS C9038B was conducted from the vessel via ROV.				
			<p>An underwater mating connector connected to the onboard equipment for optical fiber sensing via ROV.</p>			
7						

No.	Date	Site	Staying Time	Latitude	Longitude	Depth
	KK919 2024/10/06	2F-25	09:55	32-53.5353N	135-09.1943E	2,242m
			15:18	32-53.4938N	135-09.2271E	2,257m
	Work Summary	The ROV dived to the pressure gauge at the DONET 2F-25 observatory and carried out an in-situ calibration using a mobile pressure calibrator.				
						
8	 <p> 1. 09:55 着底 D=2242m 2. 10:09 D=2257m 圧力センサー「リターン」前着底 10:24 水圧校正装置設置 11:45 水圧校正装置回収 3. 12:34 D=2259m 土壌2個回収 2. 13:05 D=2257m 圧力センサー「リターン」前着底 13:11 土壌2個設置 13:17 水圧校正装置設置 13:44 計測開始 14:47 計測終了 15:17 水圧校正装置回収 15:18 離底 D=2257m </p> <p> (2024/10/06) KAIKO-111 KAIKO No.918Eve KISSJEDD-OKI 2F-25 GRID_DATA KONE Data\K106_10606.gpr DATUM (WGS84) </p>					

No.	Date	Site	Staying Time	Latitude	Longitude	Depth
9	KK920 2024/10/07	2F-25	11:24	32-53.5324N	135-09.1887E	2,244m
			15:12	32-53.4995N	135-09.2252E	2,257m
	Work Summary	The ROV dived to the pressure gauge at the DONET 2F-25 observatory and carried out an in-situ calibration using a mobile pressure calibrator.				
						
 <p>1. 11:24 着底 D=2244m 2. 11:34 D=2257m 圧力センサー「カナー」に着底 12:23 水圧校正装置設置 12:29 計測開始 14:45 計測終了 15:10 水圧校正装置回収 15:12 離底 D=2257m</p> <p>(2024/10/07) KAKO No.920Dive KESUDD-OKI 2F-25 GRID DATA OKI/Station/1000_1000.gpt DATUM (WGS-84)</p>						

5. 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