



R/V Kaimei Cruise Report KM19-01



High resolution 3D seismic imaging of active fault zone
in the coastal area

Off Fukushima

Jan. 5, 2019 - Jan. 21, 2019

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

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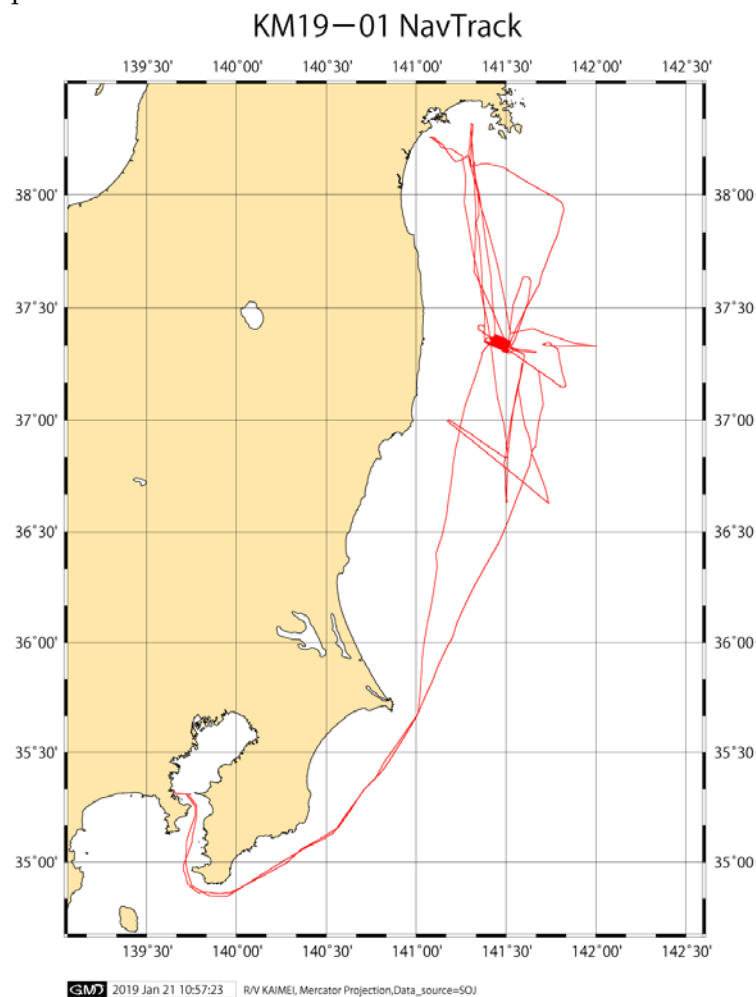
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Acknowledgement

1. Cruise Information

- Cruise ID: KM19-01
- Name of vessel: R/V Kaimei
- Title of project: Observation and monitoring of large scale seafloor deformation for national land resilience
- Title of cruise: High resolution 3D seismic imaging of active fault zone in the coastal area
- Chief Scientist [Affiliation]: Yasuyuki Nakamura [JAMSTEC]
- Cruise period: 5 Jan. 2019 – 21 Jan. 2019
- Ports of departure / arrival: Yokosuka (JAMSTEC) – Yokosuka (JAMSTEC)
- Research area: Off Fukushima
- Research map



2. Research Proposal and Science Party

- Title of proposal: Seismic surveys and earthquake observations for the project “Observation and monitoring of large scale seafloor deformation for national land resilience”
- Representative of Science Party [Affiliation]: Shuichi Kodaira

- Science Party (Proponents) [Affiliation]
 - Shuichi KODAIRA [JAMSTEC]
 - Seiichi MIURA [JAMSTEC]
 - Yasuyuki NAKAMURA [JAMSTEC]
 - Mikiya YAMASHITA [JAMSTEC]
 - Yuka KAIHO [JAMSTEC]
 - Gou FUJIE [JAMSTEC]
 - Ayako NAKANISHI [JAMSTEC]
 - Tetsuo NO [JAMSTEC]
 - Ryuta ARAI [JAMSTEC]
 - Koichiro OBANA [JAMSTEC]
 - Tsutomu TAKAHASHI [JAMSTEC]
 - Yojiro YAMAMOTO [JAMSTEC]
 - Eiichiro ARAKI [JAMSTEC]
 - Toshinori KIMURA [JAMSTEC]
 - Yuya MACHIDA [JAMSTEC]
 - Narumi TAKAHASHI [JAMSTEC]
 - Masaru NAKANO [JAMSTEC]
- Onboard Science Party [Affiliation, assignment etc.]
 - Yasuyuki Nakamura [JAMSTEC]: Chief Scientist
 - Tetsuo No [JAMSTEC]: Associate Chief Scientist
 - Reino Kotate [JAMSTEC]: Scientist
 - Reiko Kakurai [JAMSTEC]: Scientist
 - Kaoru Tsukuda [NME] Chief Marine Technician
 - Yuuki Owatari [NME]: Marine Technician, Chief Observer
 - Keita Suzuki [NME]: Marine Technician, Chief Navigator
 - Naoto Noguchi [NME]: Marine Technician, Chief QC/Processor
 - Akie Suzuki [NME]: Marine Technician, Chief Gunner/deck
 - Makoto Ito [NME]: Marine Technician, Observer
 - Hikaru Iwamaru [NME]: Marine Technician, Observer
 - Waka Komatsu [NME]: Marine Technician, Navigator
 - Shusuke Machida [NME]: Marine Technician, Navigator
 - Ryo Miura [NME]: Marine Technician, QC/Processor
 - Kimiko Serizawa [NME]: Marine Technician, QC/Processor
 - Shintaro Amikura [NME]: Marine Technician, Gunner/deck
 - Tatsuya Sugiyama [NME]: Marine Technician, Gunner/deck
 - Andrew James Graham [ION Concept/Sound Oceanics]: Navigator
 - Hesham Abouhamama [Sound Oceanics]: Navigator

3. Research/Development Activities

●3.1 Background and objectives

This research cruise was planned to conduct the “High resolution 3D seismic imaging of active fault zone in the coastal area”, as a part of the Project “Observation and monitoring of large scale seafloor deformation for national land resilience”. In this cruise

we carried out reflection seismic survey near the epicenter of the M 7.4 earthquake occurred at off Fukushima in November 2016 to obtain three-dimensional image of the active faults. This cruise was finished two days earlier than scheduled due to rough sea condition around the survey area.

3.2 List of observations

(1) 2D reflection seismic survey (Line KM1901A-XXXX)

R/V KAIMEI towed the cluster gun (80 inch³) at 3 and 5 m depth and fired it every 25 m, along the Line KM1901A. Approximately 1500 m streamer cable was also towed at 4 and 6 m depth to record the seismic signal.

(2) HR3D seismic survey (Line HR3AXX-XXXX)

R/V KAIMEI towed 10 streamer cables (187.5 m long, 150 m data available) at 6 m, and the cluster gun (80 inch³) at 5 m depth along the sail lines. Air guns were fired at every 12.5 m.

(3) Dense 2D reflection seismic survey (Line HR2DXXX-XXXX)

When we could not conduct HR3D survey due to the weather and other conditions, we conduct 2D reflection seismic survey along dense survey lines to complement HR3D survey. R/V KAIMEI towed the cluster gun (80 inch³) at 5 m depth and fired it every 12.5 m. A 300 m streamer cable was also towed at 6 m depth to record the seismic signal.

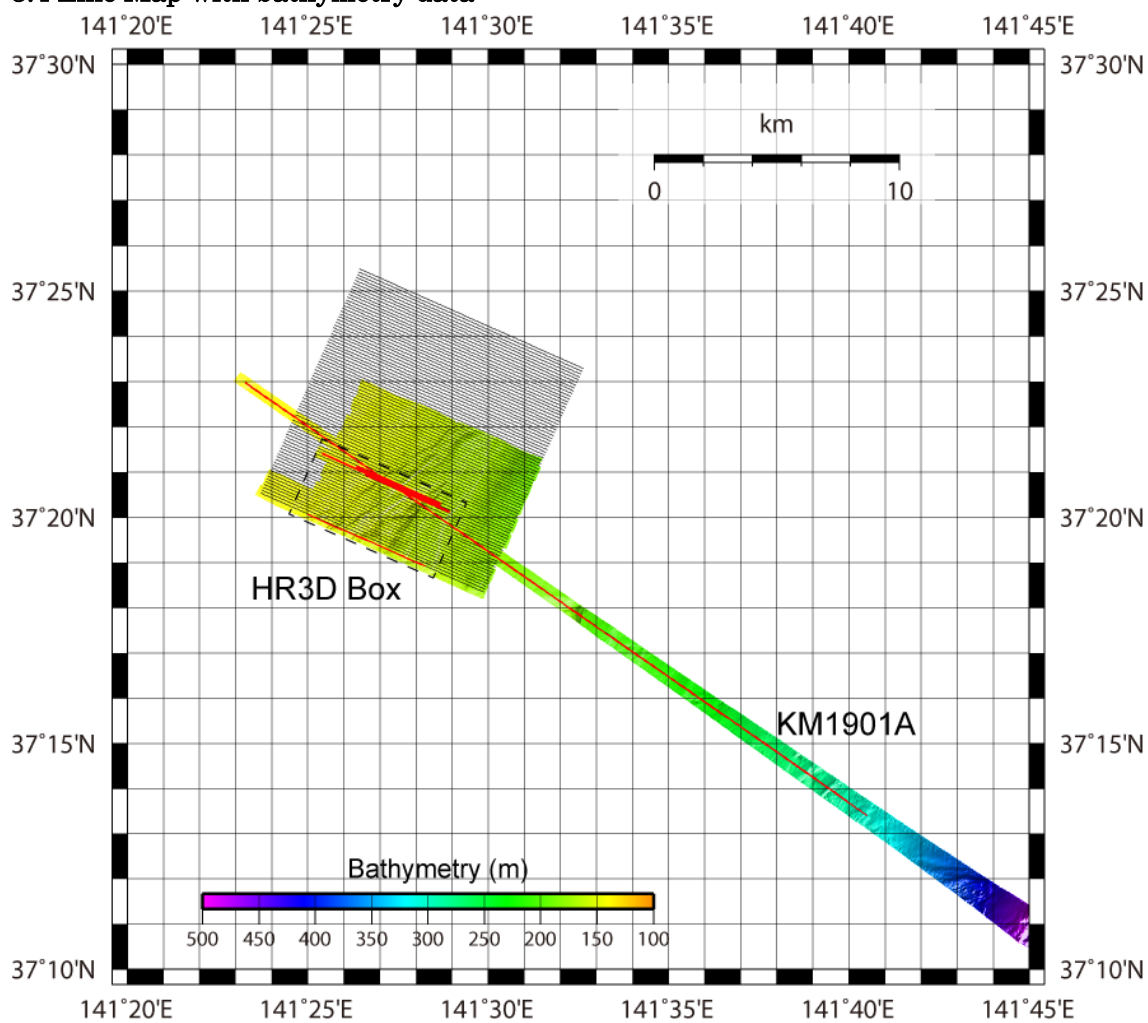
(4) Bathymetry, magnetic, gravity, sub-bottom profiler measurements

Bathymetry, magnetometer, gravity and sub-bottom profiler data were recorded during the cruise.

3.3 List of observation equipments

2D MCS system
HR3D MCS system
Multibeam echo sounder EM712
Sub-bottom profiler TOPAS PS18
Three component magnetometer SFG-2015
Gravimeter MGS-6

3.4 Line Map with bathymetry data



3.5 Line list

NO.	LINE NAME	DATE (UTC)	TIME (UTC)	F.S.P.	VESSEL POSITION		NUMBER OF SHOTS FGSP - LGSP (Increment)	LENGTH FGSP - LGSP (km)	DIRECTION (°)	Mode (m)
				F.G.S.P.						
				L.G.S.P.	Lat.	Lon.				
				L.S.P.						
1	HR2DN06	2019/01/19	2:47:19	1529	37_20.39142'N	141_28.35552'E	269 - 1	3.4	293.7	Distance (12.5m)
		2019/01/19	2:47:19	1529	37_20.39142'N	141_28.35552'E				
		2019/01/19	3:14:17	1261	37_21.13200'N	141_26.28450'E				
		2019/01/19	3:14:17	1261	37_21.13200'N	141_26.28450'E				
2	HR2DN07	2019/01/19	5:32:02	1561	37_20.30478'N	141_28.60380'E	301 - 1	3.8	293.7	Distance (12.5m)
		2019/01/19	5:32:02	1561	37_20.30478'N	141_28.60380'E				
		2019/01/19	5:58:38	1261	37_21.12840'N	141_26.28246'E				
		2019/01/19	5:58:38	1261	37_21.12840'N	141_26.28246'E				
3	HR2DN08	2019/01/19	8:14:09	1561	37_20.30934'N	141_28.60638'E	301 - 1	3.8	293.7	Distance (12.5m)
		2019/01/19	8:14:09	1561	37_20.30934'N	141_28.60638'E				
		2019/01/19	8:41:50	1261	37_21.13044'N	141_26.28360'E				
		2019/01/19	8:41:50	1261	37_21.13044'N	141_26.28360'E				
4	HR2DN09	2019/01/19	10:45:41	1561	37_20.31030'N	141_28.60692'E	301 - 1	3.8	293.7	Distance (12.5m)
		2019/01/19	10:45:41	1561	37_20.31030'N	141_28.60692'E				
		2019/01/19	11:12:38	1261	37_21.13242'N	141_26.28480'E				
		2019/01/19	11:12:38	1261	37_21.13242'N	141_26.28480'E				
5	HR2DN10	2019/01/19	13:14:52	1561	37_20.31378'N	141_28.60872'E	264 - 1	3.3	293.7	Distance (12.5m)
		2019/01/19	13:18:04	1524	37_20.41542'N	141_28.32270'E				
		2019/01/19	13:41:26	1261	37_21.13422'N	141_26.28570'E				
		2019/01/19	13:41:26	1261	37_21.13422'N	141_26.28570'E				
6	HR2DN11	2019/01/19	15:47:09	1561	37_20.31594'N	141_28.60992'E	301 - 1	3.8	293.7	Distance (12.5m)
		2019/01/19	15:47:09	1561	37_20.31594'N	141_28.60992'E				
		2019/01/19	16:13:23	1261	37_21.14040'N	141_26.28912'E				
		2019/01/19	16:13:23	1261	37_21.14040'N	141_26.28912'E				
7	HR2DN12	2019/01/19	18:19:21	1561	37_20.32008'N	141_28.61232'E	301	3.8	293.7	Distance
		2019/01/19	18:19:21	1561	37_20.32008'N	141_28.61232'E				

		2019/01/19	18:45:41	1261	37_21.14328'N	141_26.29080'E				(12.5m)
		2019/01/19	18:45:41	1261	37_21.14328'N	141_26.29080'E	- 1			
8	HR2DN13	2019/01/19	20:51:51	1561	37_20.32224'N	141_28.61352'E	301	3.8	293.7	Distance (12.5m)
		2019/01/19	20:51:51	1561	37_20.32224'N	141_28.61352'E				
		2019/01/19	21:19:28	1261	37_21.14646'N	141_26.29254'E	- 1			
		2019/01/19	21:19:28	1261	37_21.14646'N	141_26.29254'E				
9	HR2DN14	2019/01/19	23:22:55	1561	37_20.32770'N	141_28.61646'E	301	3.8	293.7	Distance (12.5m)
		2019/01/19	23:22:55	1561	37_20.32770'N	141_28.61646'E				
		2019/01/19	23:50:05	1261	37_21.14886'N	141_26.29380'E	- 1			
		2019/01/19	23:50:05	1261	37_21.14886'N	141_26.29380'E				
10	HR2DN15	2019/01/20	1:53:25	1561	37_20.32788'N	141_28.61670'E	301	3.8	293.7	Distance (12.5m)
		2019/01/20	1:53:25	1561	37_20.32788'N	141_28.61670'E				
		2019/01/20	2:20:10	1261	37_21.15168'N	141_26.29548'E	- 1			
		2019/01/20	2:20:10	1261	37_21.15168'N	141_26.29548'E				
11	HR2DN16	2019/01/20	4:24:26	1561	37_20.33226'N	141_28.61910'E	301	3.8	293.7	Distance (12.5m)
		2019/01/20	4:24:26	1561	37_20.33226'N	141_28.61910'E				
		2019/01/20	4:50:45	1261	37_21.15594'N	141_26.29782'E	- 1			
		2019/01/20	4:50:45	1261	37_21.15594'N	141_26.29782'E				
12	HR2DS07	2019/01/19	4:09:11	1281	37_20.94240'N	141_26.67438'E	301	3.8	113.7	Distance (12.5m)
		2019/01/19	4:09:11	1281	37_20.94240'N	141_26.67438'E				
		2019/01/19	4:35:31	1581	37_20.11632'N	141_28.99416'E	+ 1			
		2019/01/19	4:35:31	1581	37_20.11632'N	141_28.99416'E				
13	HR2DS08	2019/01/19	6:53:08	1281	37_20.93622'N	141_26.67090'E	301	3.8	113.7	Distance (12.5m)
		2019/01/19	6:53:08	1281	37_20.93622'N	141_26.67090'E				
		2019/01/19	7:19:15	1581	37_20.11314'N	141_28.99230'E	+ 1			
		2019/01/19	7:19:15	1581	37_20.11314'N	141_28.99230'E				
14	HR2DS09	2019/01/19	9:30:36	1281	37_20.93298'N	141_26.66910'E	301	3.8	113.7	Distance (12.5m)
		2019/01/19	9:30:36	1281	37_20.93298'N	141_26.66910'E				
		2019/01/19	9:56:50	1581	37_20.11014'N	141_28.99062'E	+ 1			
		2019/01/19	9:56:50	1581	37_20.11014'N	141_28.99062'E				
15	HR2DS10	2019/01/19	12:00:42	1281	37_20.93070'N	141_26.66772'E	301	3.8	113.7	Distance
		2019/01/19	12:00:42	1281	37_20.93070'N	141_26.66772'E				

		2019/01/19	12:26:29	1581	37_20.10690'N	141_28.98888'E				(12.5m)			
		2019/01/19	12:26:29	1581	37_20.10690'N	141_28.98888'E	+ 1						
16	HR2DS11	2019/01/19	14:30:01	1281	37_20.92650'N	141_26.66544'E	301	3.8	113.7	Distance (12.5m)			
		2019/01/19	14:30:01	1281	37_20.92650'N	141_26.66544'E							
		2019/01/19	14:56:31	1581	37_20.10492'N	141_28.98786'E	+ 1						
		2019/01/19	14:56:31	1581	37_20.10492'N	141_28.98786'E							
17	HR2DS12	2019/01/19	17:03:26	1281	37_20.92404'N	141_26.66412'E	301	3.8	113.7	Distance (12.5m)			
		2019/01/19	17:03:26	1281	37_20.92404'N	141_26.66412'E							
		2019/01/19	17:29:50	1581	37_20.10048'N	141_28.98540'E	+ 1						
		2019/01/19	17:29:50	1581	37_20.10048'N	141_28.98540'E							
18	HR2DS13	2019/01/19	19:35:51	1281	37_20.92122'N	141_26.66256'E	301	3.8	113.7	Distance (12.5m)			
		2019/01/19	19:35:51	1281	37_20.92122'N	141_26.66256'E							
		2019/01/19	20:02:29	1581	37_20.09826'N	141_28.98408'E	+ 1						
		2019/01/19	20:02:29	1581	37_20.09826'N	141_28.98408'E							
19	HR2DS14	2019/01/19	22:08:32	1281	37_20.91846'N	141_26.66100'E	301	3.8	113.7	Distance (12.5m)			
		2019/01/19	22:08:32	1281	37_20.91846'N	141_26.66100'E							
		2019/01/19	22:35:12	1581	37_20.09526'N	141_28.98252'E	+ 1						
		2019/01/19	22:35:12	1581	37_20.09526'N	141_28.98252'E							
20	HR2DS15	2019/01/20	0:39:26	1281	37_20.91594'N	141_26.65974'E	301	3.8	113.7	Distance (12.5m)			
		2019/01/20	0:39:26	1281	37_20.91594'N	141_26.65974'E							
		2019/01/20	1:05:25	1581	37_20.09154'N	141_28.98042'E	+ 1						
		2019/01/20	1:05:25	1581	37_20.09154'N	141_28.98042'E							
21	HR2DS16	2019/01/20	3:08:55	1281	37_20.91252'N	141_26.65758'E	301	3.8	113.7	Distance (12.5m)			
		2019/01/20	3:08:55	1281	37_20.91252'N	141_26.65758'E							
		2019/01/20	3:35:05	1581	37_20.08848'N	141_28.97862'E	+ 1						
		2019/01/20	3:35:05	1581	37_20.08848'N	141_28.97862'E							
22	HR3A060	2019/01/13	16:48:22	1561	37_20.28702'N	141_28.59312'E	421	5.3	293.7	Distance (12.5m)			
		2019/01/13	16:48:22	1561	37_20.28702'N	141_28.59312'E							
		2019/01/13	17:25:00	1141	37_21.43752'N	141_25.34166'E	- 1						
		2019/01/13	17:25:00	1141	37_21.43752'N	141_25.34166'E							
23	HR3A060-2	2019/01/13	19:53:21	1561	37_20.2704'N	41_28.5837'E	421	5.3	293.7	Distance			
		2019/01/13	19:53:21	1561	37_20.2704'N	41_28.5837'E							

		2019/01/13	20:27:00	1141	37_21.42162'N	141_25.33278'E				(12.5m)
		2019/01/13	20:27:00	1141	37_21.42162'N	141_25.33278'E	- 1			
24	HR3A080-1	2019/01/13	18:20:24	1161	37_20.05188'N	141_25.06848'E	417	5.2	113.7	Distance (12.5m)
		2019/01/13	18:20:45	1165	37_20.04126'N	141_25.0998'E				
		2019/01/13	18:54:33	1581	37_18.90288'N	141_28.31964'E	+ 1			
		2019/01/13	18:54:33	1581	37_18.90288'N	141_28.31964'E				
25	HR3A080-2	2019/01/13	21:20:12	1161	37_20.04648'N	141_25.06524'E	114	1.4	113.7	Distance (12.5m)
		2019/01/13	21:20:12	1161	37_20.04648'N	141_25.06524'E				
		2019/01/13	21:29:26	1274	37_19.74324'N	141_25.94346'E	+ 1			
		2019/01/13	21:57:36	1581	37_18.9057'N	41_28.32096'E				
26	KM1901A-1	2019/01/06	5:36:18	2201	37_13.75734'N	141_39.90456'E	1194	29.8	304.4	Distance (25m)
		2019/01/06	5:37:42	2194	37_13.81164'N	141_39.80766'E				
		2019/01/06	9:42:28	1001	37_23.00718'N	141_23.21754'E	- 1			
		2019/01/06	9:42:28	1001	37_23.00718'N	141_23.21754'E				
27	KM1901A-2	2019/01/06	11:32:43	1001	37_22.94634'N	141_23.32386'E	1241	31.0	124.4	Distance (25m)
		2019/01/06	11:32:43	1001	37_22.94634'N	141_23.32386'E				
		2019/01/06	15:00:54	2241	37_13.38738'N	141_40.56570'E	+ 1			
		2019/01/06	15:00:54	2241	37_13.38738'N	141_40.56570'E				
Total						10060	155.8			

*F.S.P.: First Shot Point, F.G.S.P: First Good Shot Point
L.G.S.P.: Last Good Shot Point, L.S.P.: Last Shot Point

4. Cruise Log

Date	Log
01/05/2019	Departure from Yokosuka, transit to survey area
01/06/2019	Arrival at survey area, XBT, deployment of streamer cable, Lines KM1901A-1, KM1901A-2
01/07/2019	Recovery of streamer cable, cable maintenance, evacuation from rough sea
01/08/2019	Stay in Ishinomaki bay due to rough sea
01/09/2019	Stay in Ishinomaki bay due to rough sea
01/10/2019	Stay in Ishinomaki bay due to rough sea, transit to survey area
01/11/2019	Wait on weather, evacuation from rough sea, stay off Shioyasaki
01/12/2019	Transit to survey area, deployment of HR3D system, trouble shooting
01/13/2019	Trouble shooting, deployment of HR3D system
01/14/2019	Lines HR3A060-1, HR3A080-1, HR3A060-2, HR3A080-2, recovery of HR3D system, evacuation from rough sea
01/15/2019	Stay in Ishinomaki bay due to rough sea
01/16/2019	Stay in Ishinomaki bay due to rough sea, transit to survey area, MBES survey
01/17/2019	MBES survey, evacuation from rough sea, stay in Ishinomaki bay due to rough sea
01/18/2019	Stay in Ishinomaki bay due to rough sea, transit to survey area
01/19/2019	Deployment of streamer cable, Lines HR2DN06, HR2DS07, HR2DN07, HR2DS08, HR2DN08, HR2DS09, HR2DN09, HR2DS10, HR2DN10, HR2DS11
01/20/2019	Lines HR2DN11, HR2DS12, HR2DN12, HR2DS13, HR2DN13, HR2DS14, HR2DN14, HR2DS15, HR2DN15, HR2DS16, HR2DN16, recovery of streamer cable, transit to Yokosuka
01/21/2019	Transit and arrival at Yokosuka

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

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