



R/V Kairei Cruise Report

KR18-06C



**2018FY “Integrated Research Project on Seismic and
Tsunami Hazards Around the Sea of Japan”**

Japan Sea

Apr. 23, 2018 – May. 19, 2018

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

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1. Cruise Information:

- (1) **Cruise ID, Ship name:** KR18-06C, R/V *KAIKEI*
- (2) **Title of the cruise:** 2018FY “Integrated Research Project on Seismic and Tsunami Hazards Around the Sea of Japan”
- (3) **Title of proposal:** Integrated Research Project on Seismic and Tsunami Hazards Around the Sea of Japan
- (4) **Cruise period, Port call:** 2018/4/23 – 2018/5/19, Hakodate to Yokosuka (JAMSTEC)
- (5) **Research Area:** Japan Sea
- (6) **Research Map:** Fig. 1

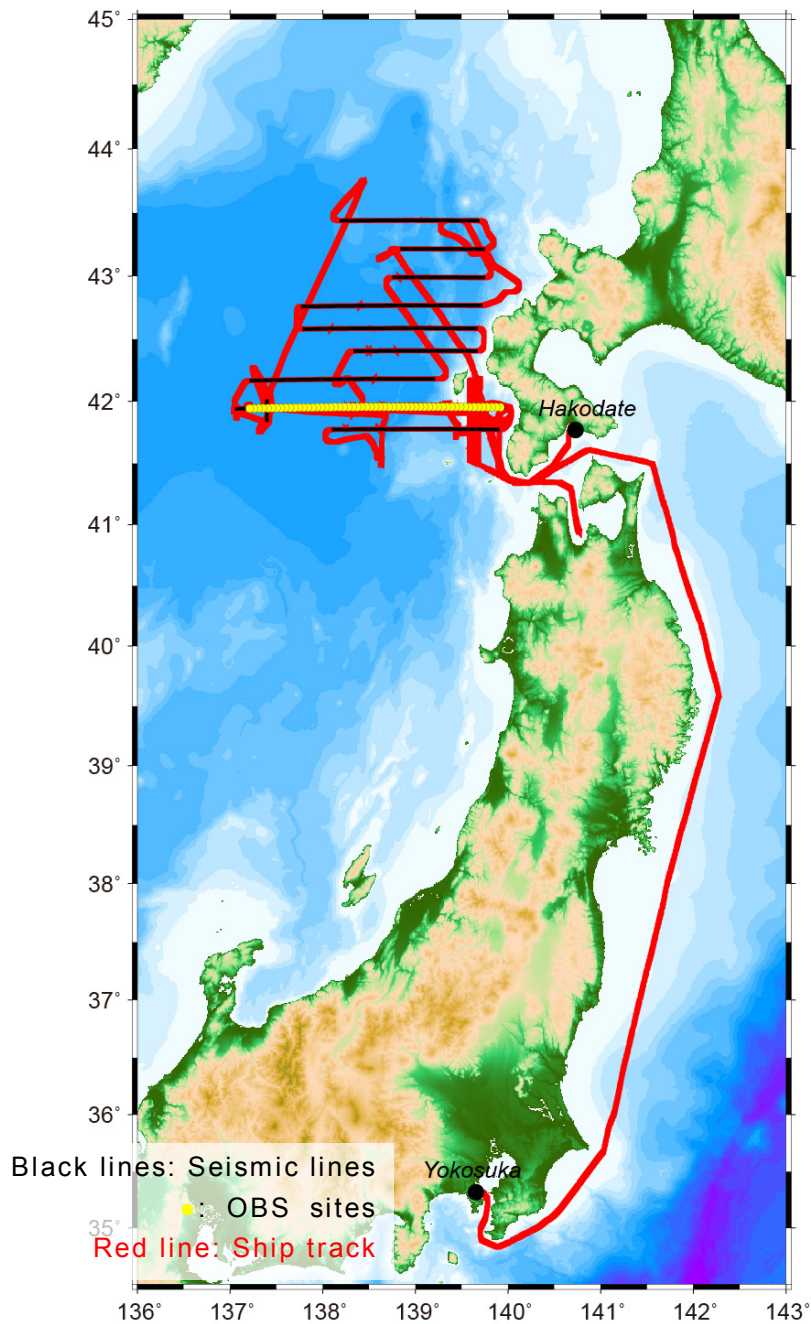


Fig. 1: Ship track during KR18-06C cruise.

2. Researchers and Crews:

(1) **Chief Scientists [Affiliation]:**

Takeshi SATO [JAMSTEC]

(2) **Representative of Science Party [Affiliation]:**

Shuichi KODAIRA [JAMSTEC]

(3) **KR18-06C Shipboard Science Party:**

Takeshi SATO [JAMSTEC]: Chief Scientist

Tetsuo NO [JAMSTEC]: Vice-chief Scientist

Kaoru TSUKUDA [Nippon Marine Enterprises, Ltd. (NME)]: Chief marine technician

Masayuki TOIZUMI [NME]: Marine technician

Yuki OHWATARI [NME]: Marine technician

Shusuke MACHIDA [NME]: Marine technician

Naoto NOGUCHI [NME]: Marine technician

Norio SHIMOMURA [NME]: Marine technician

Takuya MAEKAWA [NME]: Marine technician

Akie SUZUKI [NME]: Marine technician

Keita SUZUKI [NME]: Marine technician

Waka KOMATSU [NME]: Marine technician

Yoshiki HORIUCHI [NME]: Marine technician

Miki TAWATA [NME]: Marine technician

(4) **R/V *KAIREI* Crews:**

Captain: Shinya RYONO

Chief Officer: Takeshi MURAMATSU

1st Officer: Takaaki SHISHIKURA

2nd Officer: Tetsuo SHIRAYAMA

3rd Officer: Syunsuke FUJII

Chief Engineer: Minoru TSUKADA

1st Engineer: Daisuke GIBU

2nd Engineer: Yoshinobu HIRATSUKA

3rd Engineer: Keito SHIMADA

Chief Electronics Operator: Hiroyasu SAITAKE

2nd Electronics Operator: Takayuki MABARA

3rd Electronics Operator: Yohei SUGIMOTO

Boat Swain: Kazuo ABE

Quarter Master: Yasuo KONNO

Quarter Master: Kaname HIROSAKI

Quarter Master: Kenji NAKAE

Sailor: Toshiya SAGA

Sailor: Takumi MIURA

Sailor: Keisuke ISOBE

Sailor: Taisei TANAKA

No.1 Oiler: Masanori UEDA

Oiler: Kota AIZAWA
Oiler: Toshinori MATSUI
Oiler: Ryo SATO
Assistant Oiler: Shotaro SUMITOMO
Assistant Oiler: Masakazu ISHIDA
Chief Steward: Kazuhiro HIRAYAMA
Steward: Masaru SUGIYAMA
Steward: Jun SATO
Steward: Ryu KUBOTA
Steward: Mizuki NAKANO



3. Overview of Observation:

(1) Objective:

The relationship between crustal structures and earthquakes that occurred along the eastern margin of the Japan Sea has been revealed recently by seismic survey as part of the research project “Multidisciplinary research project for construction of fault model in the high strain rate zone” (Sato et al., 2014; No et al., 2014). However, in other areas in the Japan Sea, we do not have information about this relationship because these areas have not yet been conducted to seismic survey for study of the crustal structure. Therefore, we have participated in “Integrated Research Project on Seismic and Tsunami Hazards Around the Sea of Japan” conducted by the MEXT of Japan. In particular, we have performed seismic surveys in the Japan Sea using the R/V *KAIKEI* and R/V *KAIKEI* since 2014.

From April to May 2018, we conducted a marine seismic survey using multi-channel seismic reflection (MCS) system and ocean bottom seismographs (OBSs) to study the crustal structure around the area off the southwestern Hokkaido using the R/V *KAIKEI*. The survey covered the areas from the continental shelf to the Okushiri Ridge, the Japan Basin. And, this survey area includes the rupture zone of the 1993 Hokkaido Nansei-oki Earthquake (M_J 7.8) (e.g., Kasahara et al., 1994; Tanioka et al., 1995), and distribution zone of active faults estimated to be striking a north–south or northeast–southwest trend from the southwestern coast of the Hokkaido to the Okushiri Ridge (e.g., Okamura, 2010). In addition, since our survey line connected to the land seismic survey line of the Earthquake Research Institute, the University of Tokyo which was located on the west extension, we are able to obtain the crustal structure imaging of onshore-offshore seismic profile by further data analysis.

Using an improved seismic acquisition technology for deep seismic imaging, we are able to obtain data so as to clarify the detail crustal structure such as those presented by No et al. (2014) and Sato et al. (2014) for the eastern Japan Sea. Therefore, we will clarify more detail crustal structure in the area off the southwestern Hokkaido.

(2) List of observation instruments:

1) Multichannel seismic reflection (MCS) survey

We used a multichannel seismic reflection (MCS) system of the R/V *KAIREI* (Miura, 2009) (Fig. 2). MCS data were acquired along 9 lines (SJ1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808 and 1809 lines) with a total length of approximately 1,331 km. Some seismic lines were crooked to avoid the fishing operations and equipment in the survey area.

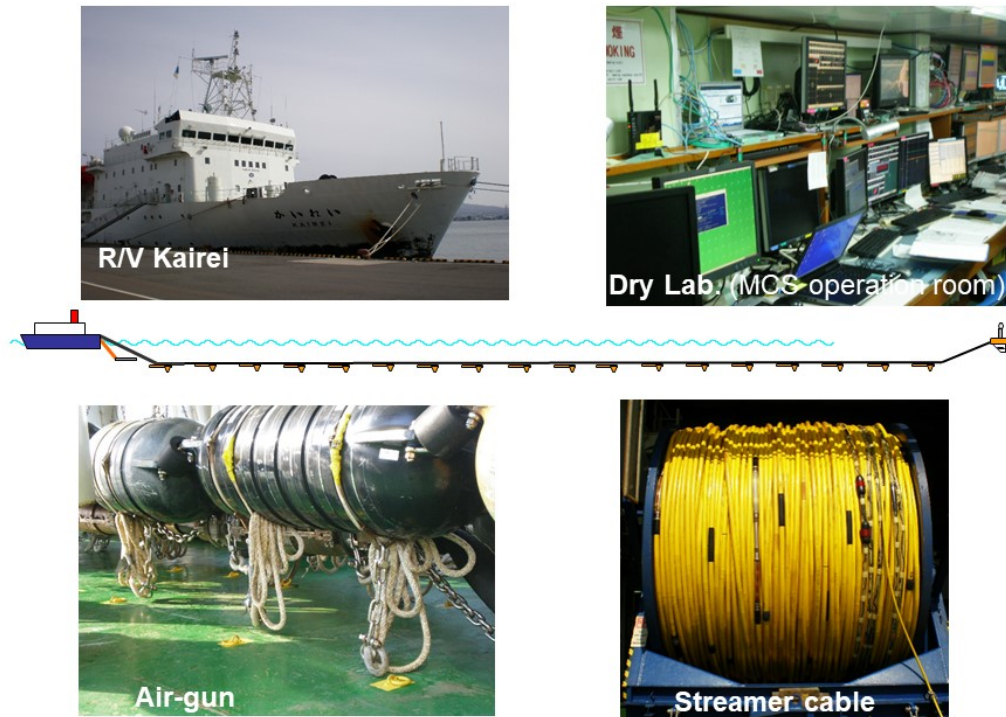


Fig. 2: MCS system on R/V *KAIREI*.

a) Source:

To obtain high-quality MCS data, we shot an air gun array at a spacing of 50 m, which corresponds to a spacing of 20 to 30 s depending on the vessel speed (average of 4.5 knot). The tuned air-gun array has a maximum total capacity of 7,800 cubic inches (about 130 liters) and consists of 32 Bolt Annular Port air-guns. The standard air pressure was 2,000 psi (about 14 MPa). During the MCS survey, the depth of the air-gun array was kept at 10 m below the sea surface. Figs. 3–5 show four strings of sub-arrays deployed at the port and starboard sides of the vessel on each survey lines. Their width was expanded to 45 m by a paravane system, and the central position of the array was set 203 m behind that of the ship's antenna.

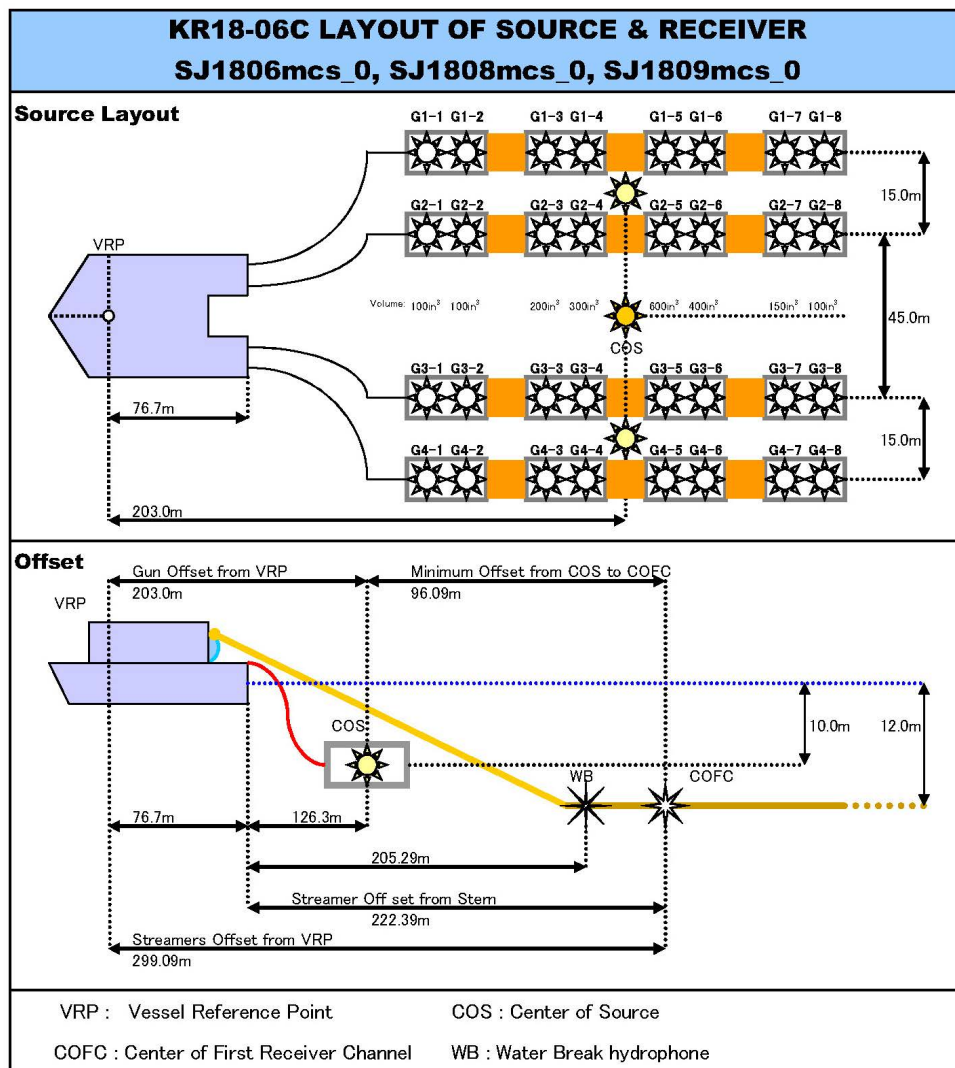


Fig. 3: Vessel towing geometry during the MCS survey on SJ1806, 1808_0, and 1809 lines. Top figure shows the source (air-gun system) layout, bottom figure represents source–receiver depth and position, and navigation offsets.

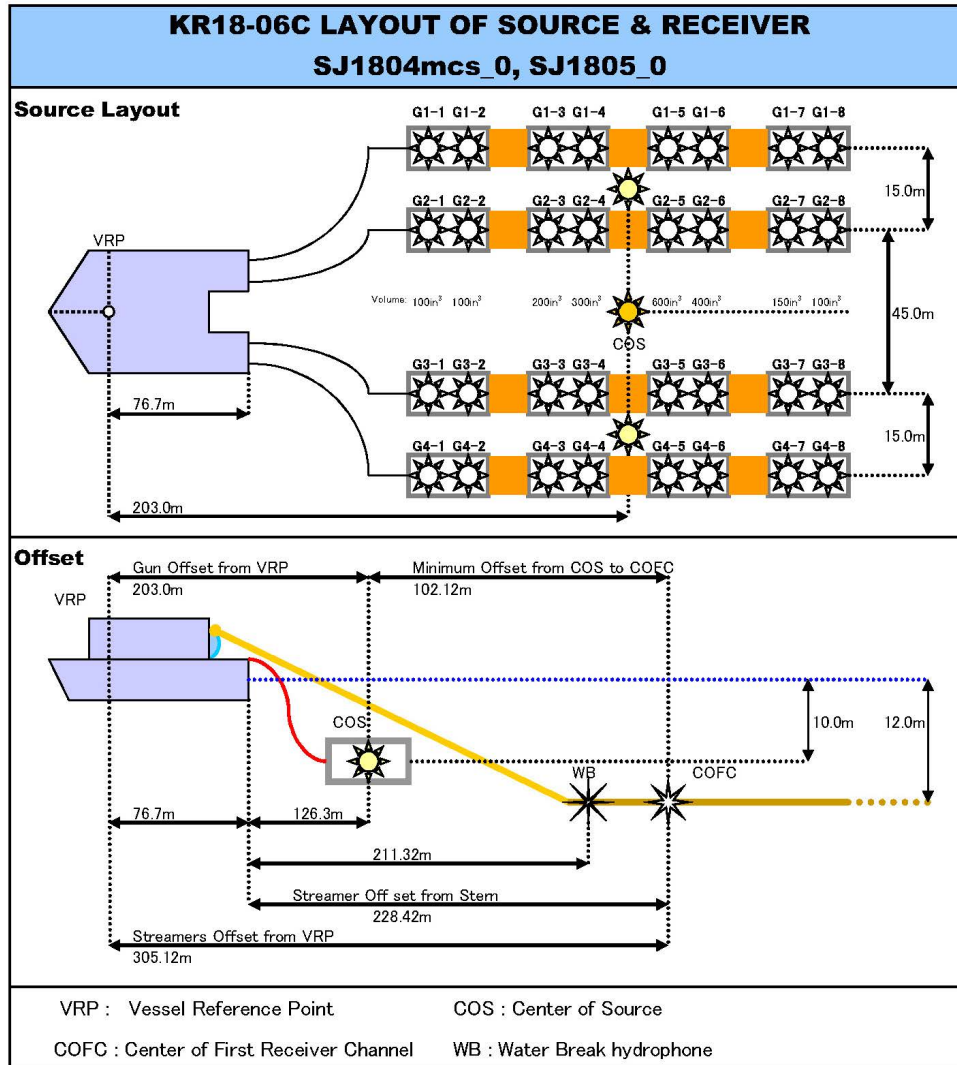


Fig. 4: Vessel towing geometry during the MCS survey on SJ1804, and 1805 lines. Top figure shows the source (air-gun system) layout, bottom figure represents source–receiver depth and position, and navigation offsets.

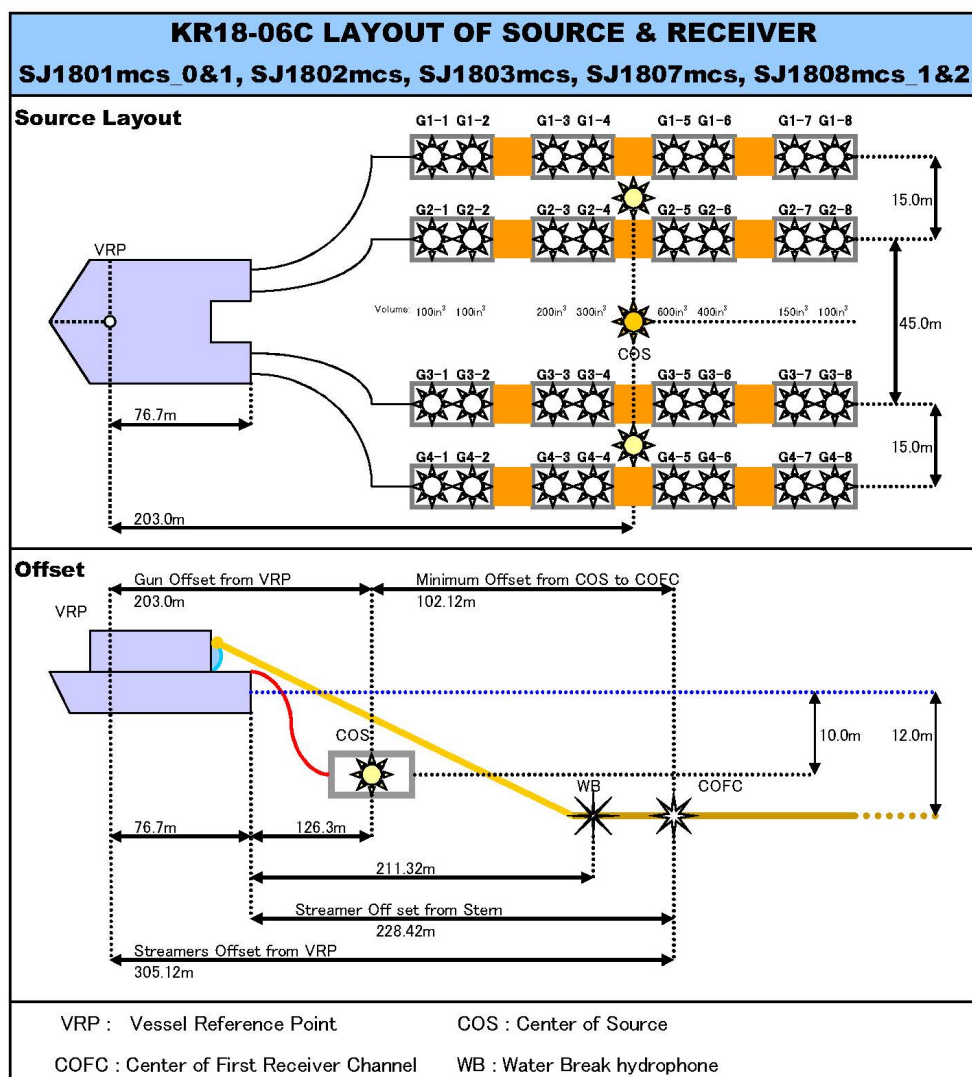


Fig. 5: Vessel towing geometry during the MCS survey on SJ1801, 1802, 1807, and 1808_1&2 lines. Top figure shows the source (air-gun system) layout, bottom figure represents source–receiver depth and position, and navigation offsets.

b) Receiver:

During airgun shooting, we towed a 444-channel hydrophone streamer cable with a group interval of 12.5 m (Sentinel Digital Streamer System, Sercel Inc.) (Figs. 6–8). Hydrophone sensors (Benthos Reduced Diameter Array hydrophone) with a sensitivity of 19.7 V/Bar were used. The signals from eight sensors in the same group (channel) were stacked before A/D conversion. The interval of each group is 12.5 m. The length of the cable was about 6 km. The towing depth of the streamer cable was kept at 12 m below the sea surface by the depth controller called Bird (I/O DigiCOURSE streamer depth controllers).

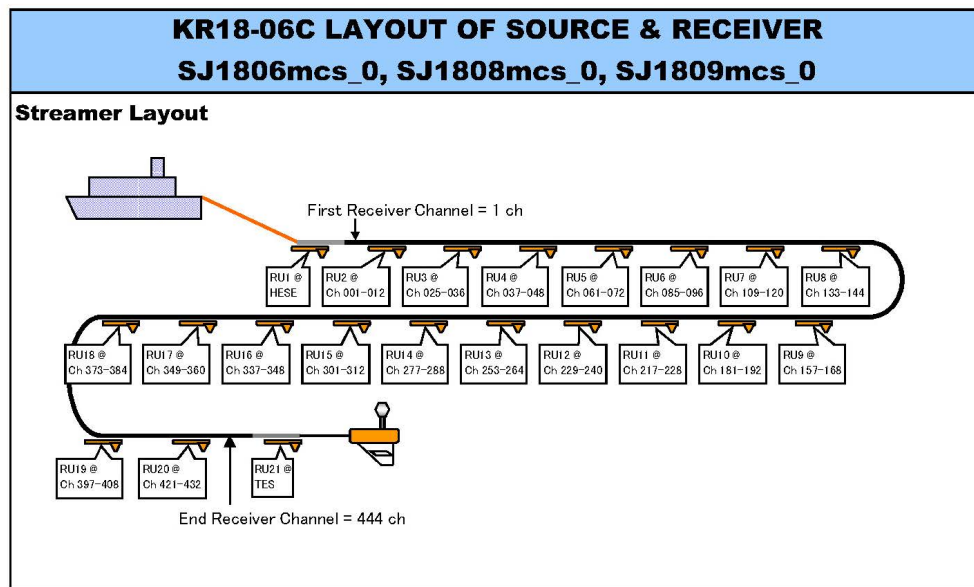


Fig. 6: Streamer cable configuration during the MCS survey on SJ1806, 1808_0, and 1809 lines.

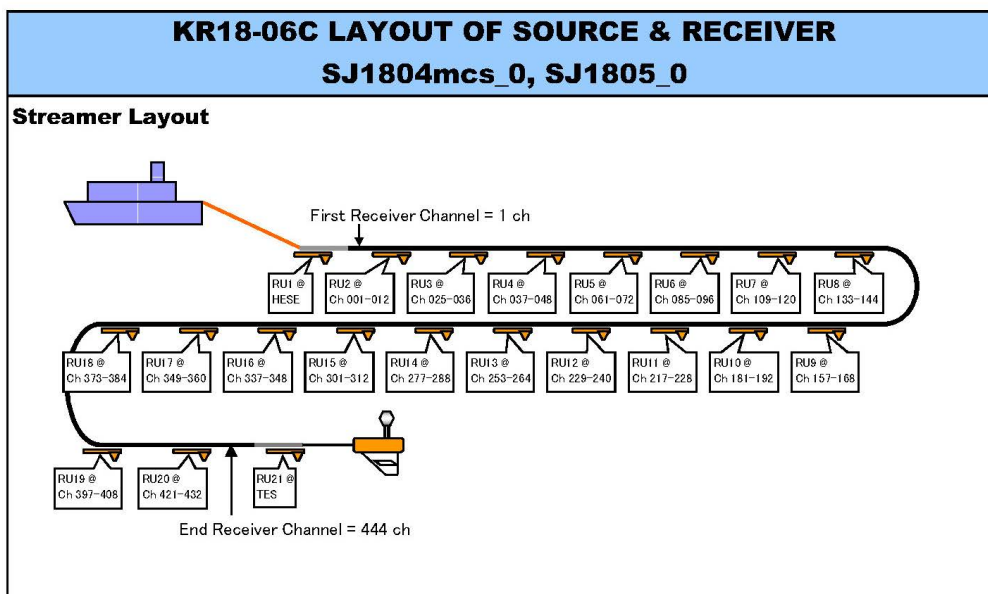


Fig. 7: Streamer cable configuration during the MCS survey on SJ1804 and 1805 lines.

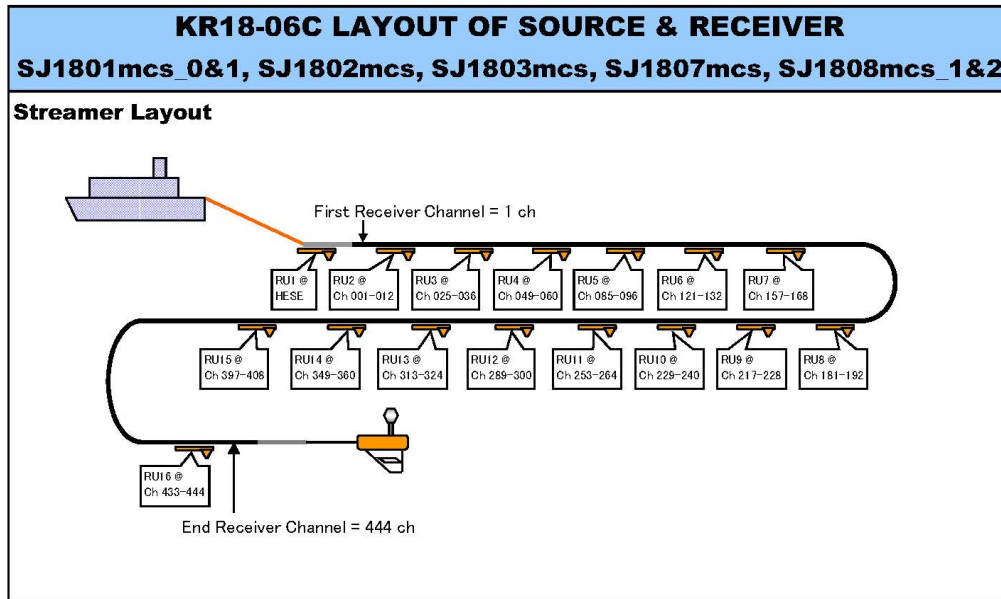


Fig. 8: Streamer cable configuration during the MCS survey on SJ1801, 1802, 1803, 1807 and 1808_1&2 lines.

c) Recording and navigation systems

A Sercel Seal System Ver.5.2 recording system, made by Sercel Inc., was used in the survey; this collected seismic data on LTO tape in the SEG-D 8058 Rev.1 format. The system delay was set to 200 ms, the sampling rate was 2 ms, and the recording length was 16 s.

The Differential Global Positioning System (DGPS) was used for positioning. We adopted NAVCOM's StarFire as the main positioning system, and used Fugro's StarFix as the backup. The accuracy was reported to be about 0.4 m in StarFire and 0.2 m in StarFix. We used SPECTRA 2D (Concept Systems Ltd.) as our navigation software for the seismic data acquisition. Positioning data collected from both StarFire and StarFix were sent to the Power Real Time Navigation Unit (PowerRTNU) (Concept Systems Ltd.) via a terminal server connected to a LAN in the vessel. Shot times and shot points (SPs) were set on SPECTRA, and then a trigger signal was sent to the recording system and the gun controller (ION DigiSHOT Ver.3.1). The main navigation parameters were as follows: survey datum was WGS84; map projection was UTM; UTM zone parameter was 54N.

d) Onboard processing of MCS data:

Raw MCS reflection data were processed on board for the purpose of quality control in the study areas. Onboard data processing was conducted in the conventional processing sequence, which includes trace header edit, trace edit, common midpoint (CMP) binning with an interval of 6.25 m, a bandpass filter, datum correction, amplitude compensation, predictive deconvolution, velocity analysis, normal moveout correction, multiple suppression, mute, CMP stack, time migration, and a bandpass filter (Fig. 9).

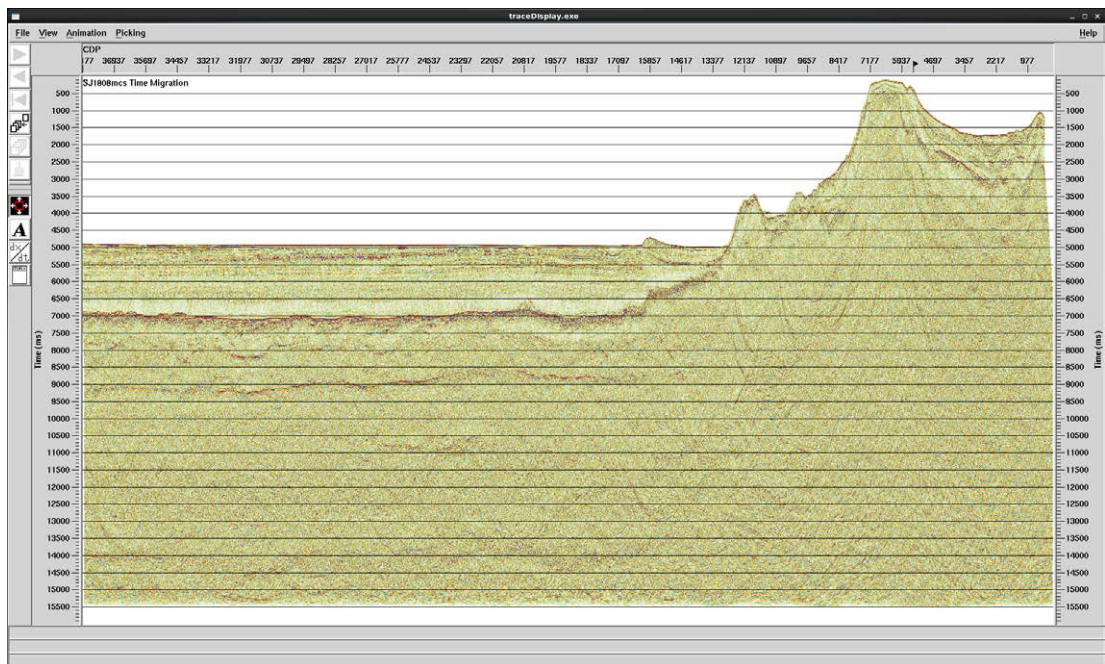
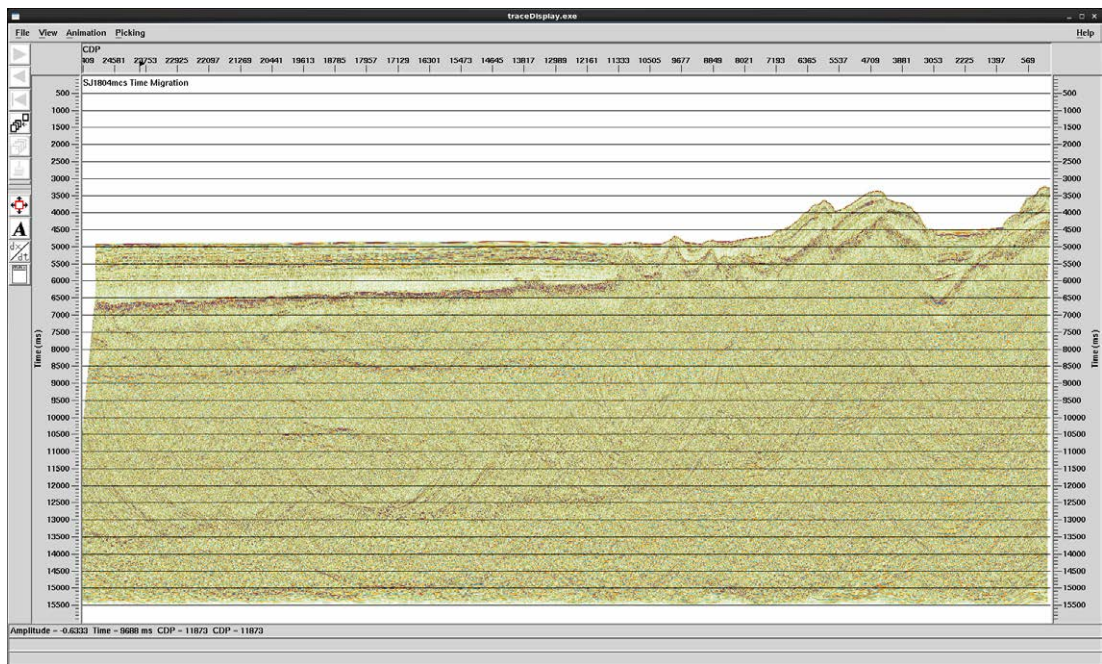


Fig. 9: Example of MCS profile with onboard processing on SJ1804 (upper) and SJ1808 lines (lower).

2) Seismic refraction survey using OBSs

We deployed 57 OBSs along the SJ1808 line. The seismic refraction survey was performed on the SJ1808 (line name: SJ1808obs) and SJ18D (line name: SJ18Dobs) lines using OBSs and an air-gun array with a shot spacing of 200 m. The air-gun array in the seismic refraction survey was placed in almost the same configuration as that in the MCS survey, although the width was expanded to 45.0 m by a paravane system, and the central position of the array was set 203 m behind the ship's antenna (Fig. 10). Each OBS was equipped with three-component geophones with gimbal-leveling mechanisms, a natural frequency of 4.5 Hz, and a hydrophone sensor (Hayashida et al., 2005) (Fig. 11 and Table 1). The air-gun signals were recorded by the OBSs with a sampling rate of 200 Hz.

All OBSs were retrieved by *KAIREI*. The position at the sea bottom of each OBS was determined using the super short baseline acoustic positioning system (SSBL) of the R/V *KAIREI*. Moreover, calibration of the OBS clock to GPS time was performed using the time difference between the OBS clock and GPS time, which was measured just before OBS deployment and just after OBS retrieval. Fig. 12 shows examples of record sections for OBSs (Site04 and Site41).

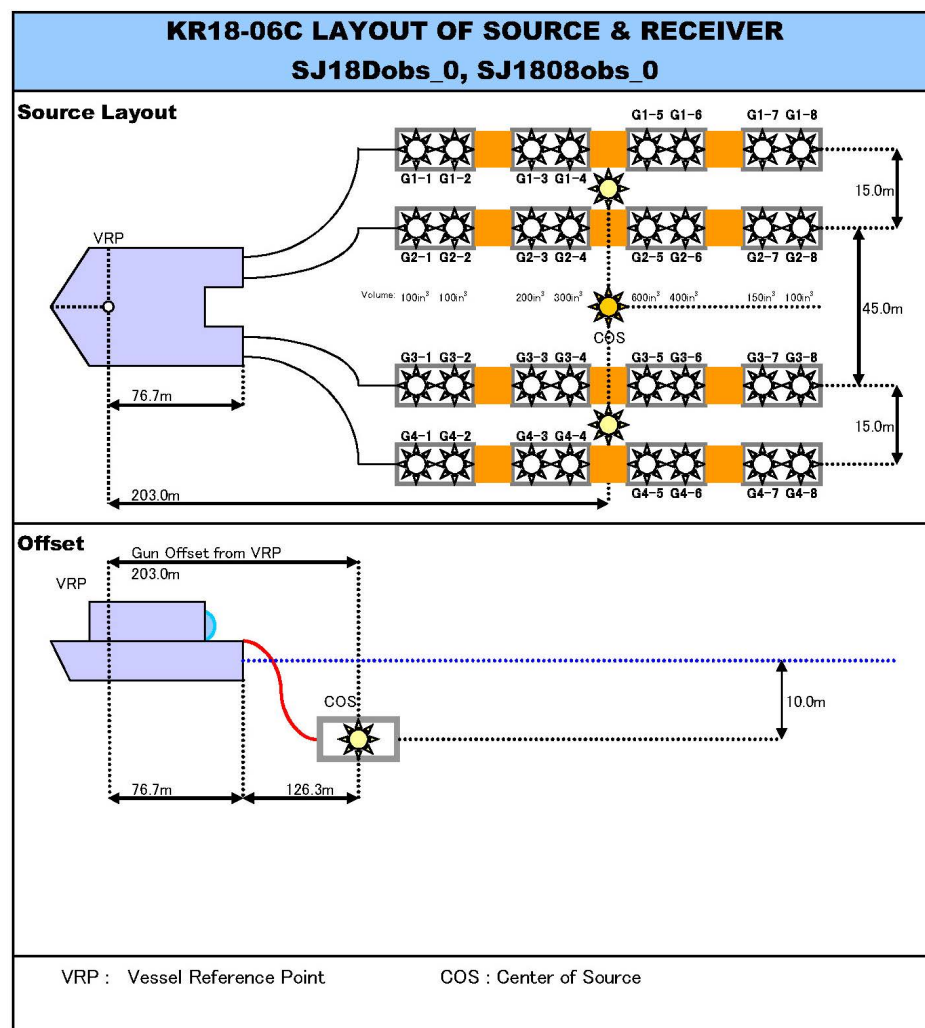


Fig. 10: Vessel towing geometry during the seismic refraction survey on the SJ1808obs line. Top figure shows the source (air-gun system) layout, bottom figure represents source depth and position, and navigation offsets.

Type	TOBS-24N, TOKYO SOKUSHIN CO., LTD.
Maximum Depth	6,700 m
Sensor	Three-component Geophone & Hydrophone [One vertical and two horizontal components, Natural frequency: 4.5Hz, Sensitivity:0.41V/cm/s (OPEN)]
Recording System	Sampling continuously (Timer control is possible for start time). Pre Amplifier Gain (40/40/40/20 dB)
Recording Media	Hard disk
Sampling Rate	24 bit, 200Hz
Power	Lithium battery
Acoustic Communication & Release System	Electric corrosion method
Attached Parts	Weight, Flush light, Radio beacon
Pressure Resistant Container	17 inch glass sphere

Table 1: OBS specifications of seismic refraction survey.

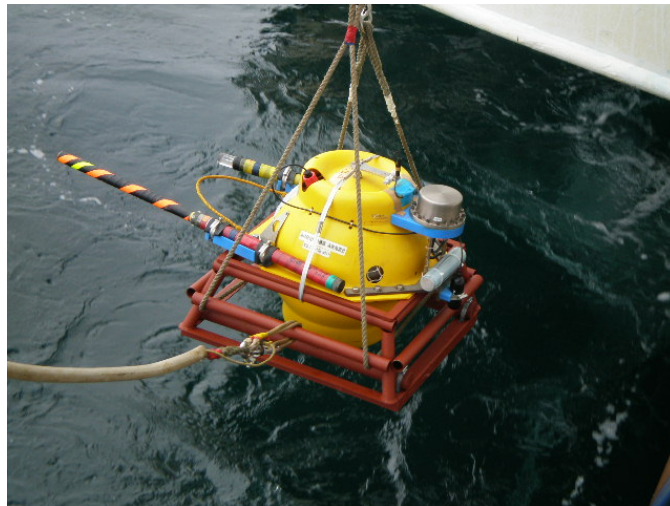


Fig. 11: OBS using this survey.

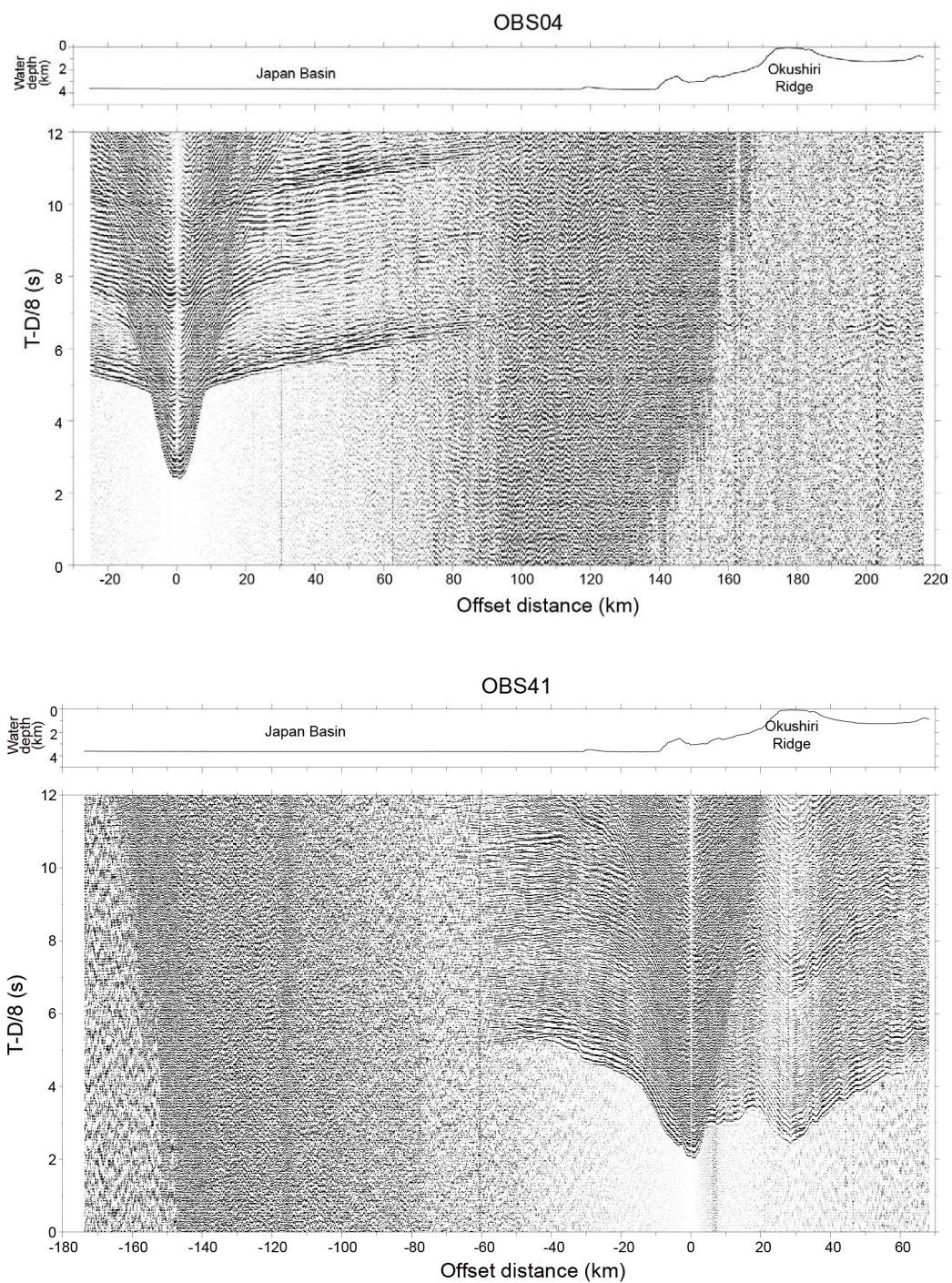


Fig. 12 Examples of record sections for OBSs (Site04 (upper) and Site41 (lower)).

3) Bathymetry, geomagnetic, and gravity observations:

Bathymetry, geomagnetic, and gravity data were recorded continuously during the survey. The bathymetry survey on the R/V *KAIREI* used a multi-narrow beam echo sounder (Sea Beam 3012, SeaBeam Instruments) (Fig. 13). Gravity data was obtained by a shipboard gravimeter (Marine Gravity System 6 (MGS-6), Micro-g LaCoste). The geomagnetic survey used a three-component magnetometer (SFG-1214, Tierra Tecnica Corporation).

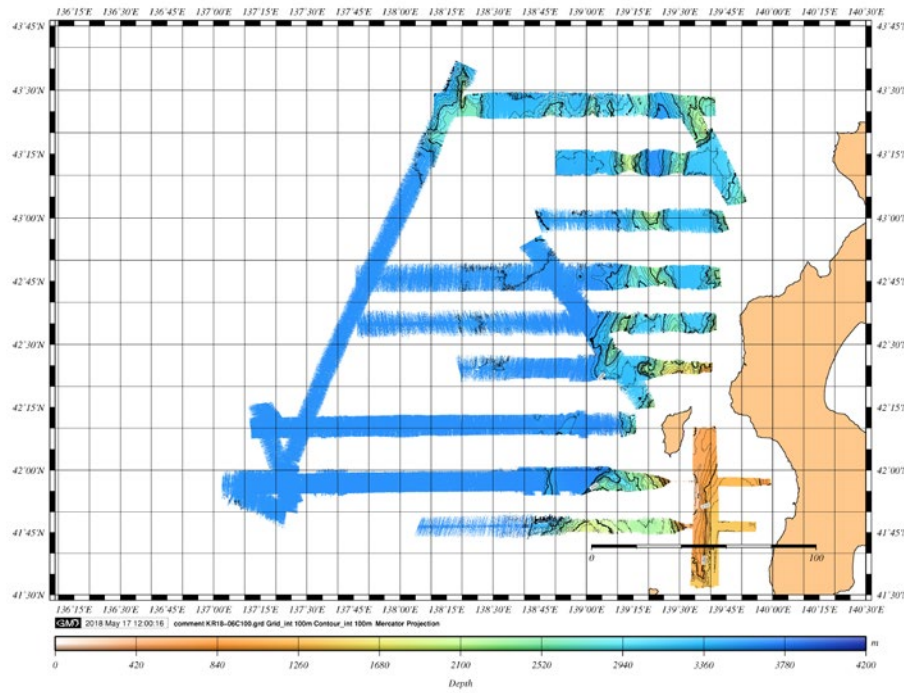


Fig. 13: Result of the bathymetry survey.

(3) Cruise log: Table 2

Date		Remarks
2018/4/23	Mon	Departure from Hakodate port Benten-B pier, transit to the survey area, and check survey about tackle
2018/4/24	Tue	OBS deployment
2018/4/25	Wed	OBS deployment
2018/4/26	Thu	MCS system deployment, and MCS survey (SJ1809)
2018/4/27	Fri	MCS survey (SJ1809, 1808)
2018/4/28	Sat	MCS survey (SJ1808, 1806)
2018/4/29	Sun	MCS survey (SJ1806, 1805)
2018/4/30	Mon	MCS survey (SJ1805, 1804)
2018/5/1	Tue	MCS survey (SJ1804)
2018/5/2	Wed	MCS survey (SJ1801, 1802) and MCS system retrieve
2018/5/3	Thu	Transit to off Aomori port and stay at there to escape the bad sea condition
2018/5/4	Fri	Transit to the survey area, and check survey about tackle
2018/5/5	Sat	MCS system deployment, and MCS survey (SJ1808)
2018/5/6	Sun	MCS survey (SJ1808)
2018/5/7	Mon	MCS survey (SJ1807)
2018/5/8	Tue	MCS survey (SJ1803)
2018/5/9	Wed	MCS survey (SJ1801) and MCS system retrieve
2018/5/10	Thu	Air-gun maintenance and air-gun deployment
2018/5/11	Fri	Seismic refraction survey (SJ18Dobs, 1808obs)
2018/5/12	Sat	Seismic refraction survey (SJ1808obs) and air-gun retrieve
2018/5/13	Sun	OBS recovery, and interrupt of recovery due to fog
2018/5/14	Mon	OBS recovery
2018/5/15	Tue	OBS recovery
2018/5/16	Wed	OBS recovery
2018/5/17	Thu	Bathymetry survey
2018/5/18	Fri	Transit to Yokosuka
2018/5/19	Sat	Transit to Yokosuka and arrive at Yokosuka Headquarter pier

Table 2: Cruise log.

(4) Seismic lines: Fig. 14

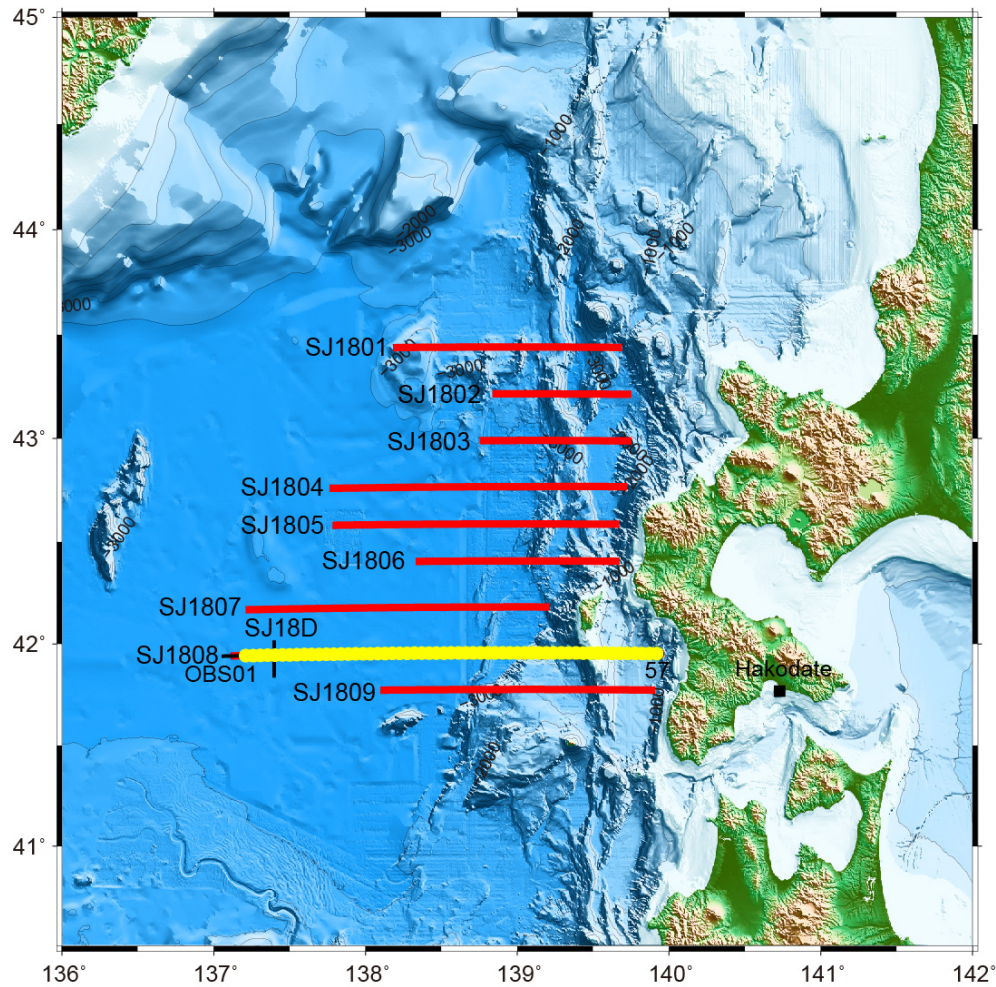


Fig. 14: Map of the bathymetry around the survey area and seismic survey lines in this cruise. Red and thin black lines, and yellow circles show the MCS and seismic refraction lines, and positions of deployed OBSs, respectively.

(5) Seismic line list: Table 3

LINE NAME	DATE (UTC)	TIME (UTC)	F.S.P.	VESSEL POSITION		Depth (m)	LENGTH FGSP - LGSP (km)	DIREC TION (°)	Mode (m)
			F.G.S.P.						
			L.G.S.P.						
			L.S.P.	Lat.	Lon.				
SJ1801 _0	01/05/ 2018	14:48:52	2458	43-26.39286°N	139-20.45858°E	3080	27.5	91.373	Distance (50.0m)
	01/05/ 2018	14:54:45	2442	43-26.39601°N	139-21.05162°E	3102			
	01/05/ 2018	18:11:38	1893	43-26.30671°N	139-41.39972°E	2691			
	01/05/ 2018	18:11:38	1893	43-26.30671°N	139-41.39972°E	2691			
SJ1801 _1	08/05/ 2018	14:39:10	2196	43-26.36655°N	139-29.86831°E	2892	98.4	271.373	Distance (50.0m)
	08/05 /2018	14:53:58	2237	43-26.37284°N	139-28.34867°E	3092			
	09/05 /2018	1:47:44	4205	43-26.28265°N	138-15.42006°E	2981			
	09/05/ 2018	2:27:13	4327	43-26.25094°N	138-10.90052°E	3367			
SJ1802 _0	01/05/ 2018	22:05:41	1681	43-12.79392°N	139-45.06957°E	3106	72.0	271.369	Distance (50.0m)
	01/05/ 2018	22:22:24	1729	43-12.80073°N	139-43.29696°E	3159			
	02/05/ 2018	7:00:17	3168	43-12.93347°N	138-50.16097°E	3400			
	02/05/ 2018	7:00:17	3168	43-12.93347°N	138-50.16097°E	3400			
SJ1803 _0	07/05/ 2018	22:23:58	3314	42-59.43176°N	138-45.13193°E	3492	79.1	91.367	Distance (50.0m)
	07/05/ 2018	22:40:27	3265	42-59.43930°N	138-46.93441°E	3535			
	08/05/ 2018	7:27:46	1683	42-59.30118°N	139-45.13706°E	2244			
	08/05/ 2018	7:27:46	1683	42-59.30118°N	139-45.13706°E	2244			
SJ1804 _0	30/04/ 2018	0:14:48	4207	42-45.53009°N	137-45.81136°E	3655	156.2	91.245	Distance (50.0m)
	30/04/ 2018	0:45:49	4124	42-45.60939°N	137-48.85050°E	3649			
	30/04/ 2018	19:04:50	1001	42-46.01523°N	139-43.30884°E	2378			
	30/04/ 2018	19:04:50	1001	42-46.01523°N	139-43.30884°E	2378			

	2018								
SJ1805 _0	29/04/ 2018	1:30:09	1001	42-35.07167°N	139-40.30467°E	2765	153.4	271.353	Distance (50.0m)
	29/04/ 2018	1:41:31	1030	42-35.05568°N	139-39.10156°E	2961			
	29/04/ 2018	21:13:33	4098	42-34.77766°N	137-46.98748°E	3650			
	29/04/ 2018	21:13:33	4098	42-34.77766°N	137-46.98748°E	3650			
SJ1806 _0	28/04/ 2018	9:22:27	3210	42-24.24762°N	138-19.83408°E	3649	107.6	91.347	Distance (50.0m)
	28/04/ 2018	9:42:43	3153	42-24.27005°N	138-21.91063°E	3642			
	28/04/ 2018	22:18:28	1001	42-24.26775°N	139-40.33802°E	1223			
	28/04/ 2018	22:18:28	1001	42-24.26775°N	139-40.33802°E	1223			
SJ1807 _0	06/05/ 2018	14:48:38	4461	42-10.04734°N	137-12.75307°E	3639	167.9.	91.345	Distance (50.0m)
	06/05/ 2018	15:02:57	4420	42-10.07485°N	137-14.23994°E	3640			
	07/05/ 2018	10:25:01	1062	42-10.86737°N	139-16.13213°E	2718			
	07/05/ 2018	10:25:01	1062	42-10.86737°N	139-16.13213°E	2718			
SJ1808 _0	27/04/ 2018	5:52:03	1001	41-57.15017°N	139-57.90300°E	831	106.7	271.342	Distance (50.0m)
	27/04/ 2018	6:29:30	1096	41-51.17609°N	139-54.46485°E	1128			
	27/04/ 2018	20:40:36	3229	41-57.35857°N	138-37.27389°E	3667			
	27/04/ 2018	20:40:36	3229	41-57.35857°N	138-37.27389°E	3667			
SJ1808 _1	05/05/ 2018	7:18:15	1001	41-57.14914°N	139-57.90304°E	837	31.3	271.342	Distance(50.0m)
	05/05/ 2018	7:22:09	1012	41-57.15178°N	139-57.50487°E	784			
	05/05/ 2018	10:50:04	1638	41-57.31098°N	139-34.84884°E	300			
	05/05/ 2018	10:50:04	1638	41-57.31098°N	139-34.84884°E	300			
SJ1808 _2	05/05 /2018	13:10:03	2020	41-57.36316°N	139-21.02377°E	2049	185.7	271.342	Distance (50.0m)
	05/05 /2018	13:10:40	2022	41-57.36300°N	139-20.95133°E	2052			

	06/05/ 2018	10:48:28	5735	41-56.47783°N	137-06.65231°E	3623			
	06/05/ 2018	10:48:28	5735	41-56.47783°N	137-06.65231°E	3623			
SJ1809 _0	26/04/ 2018	8:22:25	4008	41-46.38554°N	138-05.90247°E	3652	145.7	91.336	Distance (50.0m)
	26/04/ 2018	8:57:18	3914	41-46.41877°N	138-09.29285°E	3657			
	27/04/ 2018	2:24:30	1001	41-46.38640°N	139-54.40650°E	1294			
	27/04/ 2018	2:24:30	1001	41-46.38640°N	139-54.40650°E	1294			
SJ18Do bs_0	10/05/ 2018	14:31:39	1001	42-01.00215°N	137-23.84256°E	3641	20.2	182.409	Distance (200.0m)
	10/05/ 2018	14:31:39	1001	42-01.00215°N	137-23.84256°E	3641			
	10/05/ 2018	16:57:48	1405	41-50.09801°N	137-23.84599°E	3637			
	10/05/ 2018	16:57:48	1405	41-50.09801°N	137-23.84599°E	3637			
SJ1808 obs_0	10/05/ 2018	23:20:27	5841	41-56.40908°N	137-03.11567°E	3612	241.8	91.342	Distance (200.0m)
	10/05/ 2018	23:21:58	5837	41-56.41229°N	137-03.26020°E	3611			
	12/05/ 2018	3:22:30	1001	41-57.14783°N	139-58.19692°E	880			
	12/05/ 2018	3:22:30	1001	41-57.14783°N	139-58.19692°E	880			
Total							1593.2		

Table 3: List of seismic survey (MCS and seismic refraction) lines in this cruise.

(6) OBS position list: Table 4.

Site	Lat. [N]	Lon. [E]	Depth [m]	Site	Lat. [N]	Lon. [E]	Depth [m]
1	41-56.5507N	137-12.6305E	3633m	30	41-57.3620N	138-36.7748E	3664m
2	41-56.6121N	137-15.5276E	3638m	31	41-57.3751N	138-39.6742E	3672m
3	41-56.6509N	137-18.4278E	3645m	32	41-57.3772N	138-42.5779E	3664m
4	41-56.6940N	137-21.3243E	3644m	33	41-57.3890N	138-45.4827E	3660m
5	41-56.7229N	137-24.1632E	3645m	34	41-57.3946N	138-48.3846E	3509m
6	41-56.7670N	137-27.1162E	3647m	35	41-57.4101N	138-51.2851E	3640m
7	41-56.8070N	137-30.0273E	3648m	36	41-57.3990N	138-54.2106E	3680m
8	41-56.8427N	137-32.9282E	3652m	37	41-57.3797N	138-57.0820E	3684m
9	41-56.8991N	137-35.8122E	3647m	38	41-57.3930N	138-59.9994E	3684m
10	41-56.9211N	137-38.7313E	3648m	39	41-57.3870N	139-02.8981E	3334m
11	41-56.9432N	137-41.6408E	3646m	40	41-57.3956N	139-05.7952E	2623m
12	41-56.9850N	137-44.5391E	3647m	41	41-57.3902N	139-08.6897E	3076m
13	41-57.0130N	137-47.4411E	3650m	42	41-57.3695N	139-11.5883E	2987m
14	41-57.0412N	137-50.3448E	3655m	43	41-57.3746N	139-14.4981E	2511m
15	41-57.0730N	137-53.2505E	3653m	44	41-57.3701N	139-17.4005E	2455m
16	41-57.1028N	137-56.1230E	3651m	45	41-57.3668N	139-20.3076E	2113m
17	41-57.1307N	137-59.0477E	3654m	46	41-57.3598N	139-23.2109E	1691m
18	41-57.1479N	138-01.9543E	3650m	47	41-57.3443N	139-26.1121E	575m
19	41-57.1799N	138-04.8646E	3650m	48	41-57.3273N	139-29.0196E	83m
20	41-57.1999N	138-07.7566E	3651m	49	41-57.3191N	139-31.9302E	112m
21	41-57.2241N	138-10.6604E	3653m	50	41-57.3073N	139-34.8266E	297m
22	41-57.2438N	138-13.5451E	3648m	51	41-57.2839N	139-37.7216E	819m
23	41-57.2628N	138-16.4531E	3647m	52	41-57.2770N	139-40.6374E	1045m
24	41-57.2862N	138-19.3478E	3652m	53	41-57.2567N	139-43.5256E	1209m
25	41-57.2935N	138-22.2580E	3654m	54	41-57.2408N	139-46.4340E	1263m
26	41-57.3141N	138-25.1639E	3655m	55	41-57.2056N	139-49.3265E	1253m
27	41-57.3191N	138-28.0613E	3656m	56	41-57.2004N	139-52.2381E	1198m
28	41-57.3373N	138-30.9645E	3661m	57	41-57.1709N	139-55.1244E	1073m
29	41-57.3545N	138-33.8616E	3663m				

Table 4: List of OBS deployed positions on the SJ1808obs line. The position of other OBSs is determined using SSBL.

4. Notice on using:

This cruise report is a preliminary documentation as of the end of the cruise.

This report may not be corrected even if changes on contents (i.e. taxonomic classifications) may be found after its publication. This report may also be changed without notice. Data on this cruise report may be raw or unprocessed. If you are going to use or refer to the data written on this report, please ask the Chief Scientists for latest information.

Users of data or results on this cruise report are requested to submit their results to the Data Management Group of JAMSTEC.

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