



R/V Kairei Cruise Report

KR17-04

Seismic survey and observations in Japan Trench region

Japan Trench

Feb. 26,2017-Mar. 30, 2017

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

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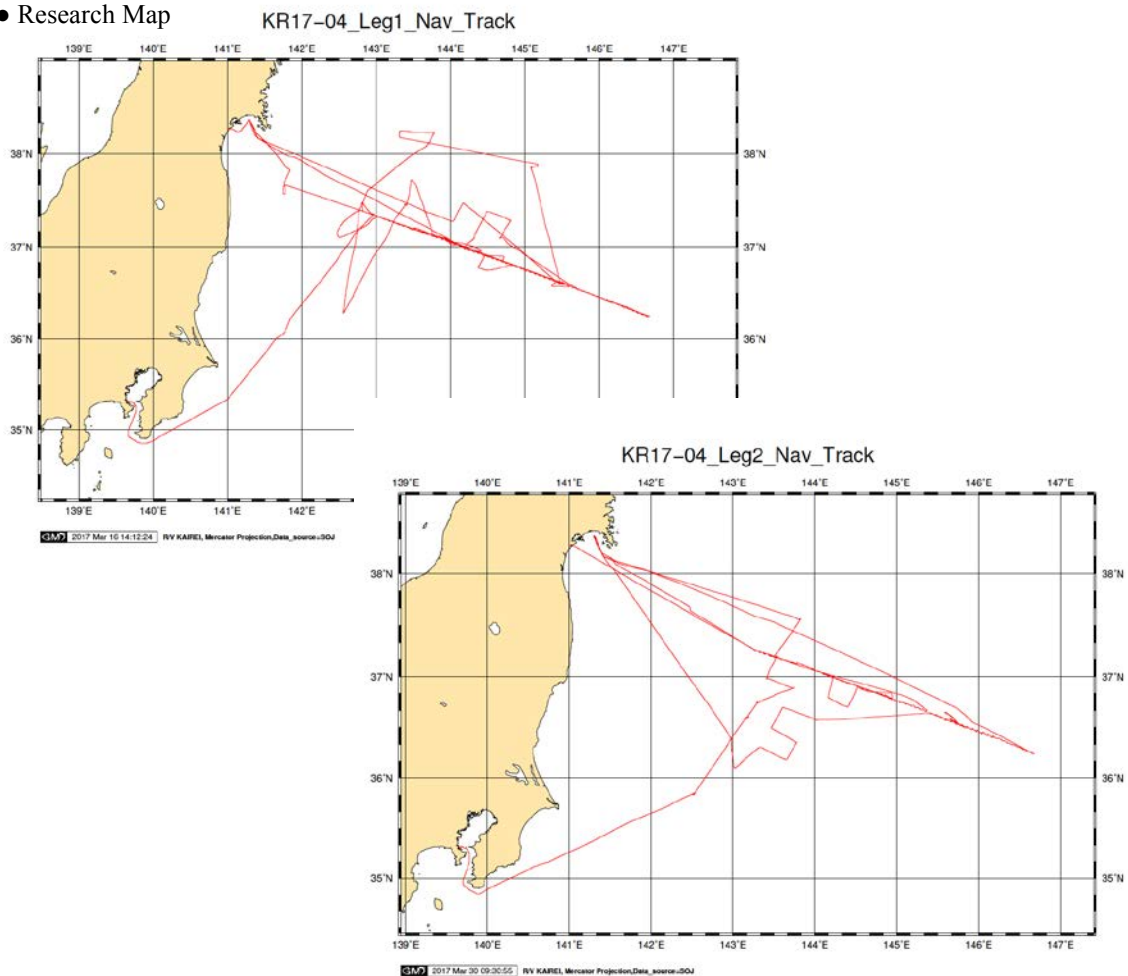
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1. Cruise Information

- Cruise ID: KR17-04
- Name of vessel: R/V Kairei
- Title of the cruise: Seismic survey and observations in Japan Trench region
- Title of proposal:
 - Marine Geological and Geophysical surveys to investigate the nature of subduction zone mega earthquakes and tsunamis
 - 1. Seismic survey in the outer rise region
 - 3. Seismicity observation in the outer rise and trench axis region
- Cruise period:
 - Leg 1: February 26, 2017 – March 16, 2017
 - Leg 2: March 17, 2017 – March 30, 2017
- Ports of departure / call / arrival:
 - Leg 1: Yokosuka (JAMSTEC) – Sendai
 - Leg 2: Sendai – Yokosuka (JAMSTEC)
- Research area: Japan Trench
- Research Map



2. Researchers

- Chief scientist [Affiliation]:

Leg 1: Gou Fujie [JAMSTEC]

Leg 2: Koichiro Obana [JAMSTEC]

- Representative of the science party: Shuichi Kodaira [JAMSTEC]

- Science party:

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3. Observation

- (1) Objectives:

On 11 March 2011, the great 2011 Tohoku-oki earthquake (Mw 9.0) was occurred in the Japan Trench region. This was the greatest earthquake that has been observed in Japan, and it caused devastating damages in the eastern Japan. To evaluate the hazard of the large interplate and outer rise earthquakes next to the rupture zones of the 2011 Tohoku-oki earthquake, we conducted seismic structure survey and seismicity observations in the Japan Trench region as described below.

(2) List of observations:

1) Deployment and retrieval of ocean bottom seismometers (OBSs)

We deployed 66 OBSs (10 2G-UD OBS, 3 OBS2G, 1 UD OBS, 47 JAMSTEC-standard OBS, 2 ERI-UD OBS, 1 ERI-BBOBS, 1 ERI-4.5Hz OBS, and 1 ERI-1Hz OBS) for wide-angle seismic refraction and reflection survey along the survey line of A6e and 65 OBSs were recovered.

Table: OBS positions for crustal structure survey along A6e (Vessel position at the deployment)

Site	Lat. (N)	Lon. (E)	Depth(m)	Type
Site27	37° 21.25'	142° 56.22'	4022	JAMSTEC standard
Site28	37° 20.19'	143° 0.13'	4375	JAMSTEC standard
Site29	37° 19.12'	143° 3.88'	4374	JAMSTEC standard
Site30	37° 18.04'	143° 7.73'	4504	JAMSTEC standard
Site31	37° 16.99'	143° 11.60'	4677	JAMSTEC standard
Site32	37° 15.91'	143° 15.41'	5393	JAMSTEC standard
Site33	37° 14.85'	143° 19.26'	6171	2G-UD
Site34	37° 13.77'	143° 23.07'	6765	2G-UD
Site35	37° 12.71'	143° 26.90'	6746	2G-UD
Site36	37° 11.64'	143° 30.76'	7204	2G-UD
Site37	37° 10.54'	143° 34.58'	7403	2G-UD
Site38	37° 9.41'	143° 38.44'	7370	UD
Site39	37° 8.32'	143° 42.26'	7086	2G-UD
Site40*1	37° 7.29'	143° 46.09'	6749	ERI-UD
Site41_1	37° 6.35'	143° 50.04'	6875	2G-UD
Site41_2	37° 6.09'	143° 49.85'	6852	2G
Site42	37° 5.07'	143° 53.75'	6440	2G-UD
Site43_1	37° 3.78'	143° 57.29'	6355	ERI-UD
Site43_2	37° 4.00'	143° 57.56'	6342	2G
Site44	37° 1.44'	144° 4.84'	-	2G-UD
Site45_1	37° 2.69'	144° 1.22'	6142	2G-UD
Site45_2*2	37° 1.69'	144° 5.09'	6011	2G
Site46	37° 0.66'	144° 8.97'	5867	JAMSTEC standard
Site47	36° 59.39'	144° 12.55'	5826	JAMSTEC standard

Site48	36° 58.31'	144° 16.34'	5700	JAMSTEC standard
Site49	36° 57.20'	144° 20.15'	5650	JAMSTEC standard
Site50	36° 56.11'	144° 23.99'	5520	JAMSTEC standard
Site51	36° 55.07'	144° 27.87'	5441	JAMSTEC standard
Site52	36° 53.93'	144° 31.69'	5246	JAMSTEC standard
Site53	36° 52.88'	144° 35.45'	4411	JAMSTEC standard
Site54	36° 51.71'	144° 39.29'	2906	JAMSTEC standard
Site55	36° 50.64'	144° 43.14'	1979	JAMSTEC standard
Site56	36° 49.44'	144° 47.41'	2254	JAMSTEC standard
Site57	36° 48.42'	144° 50.73'	2707	JAMSTEC standard
Site58	36° 47.31'	144° 54.54'	4008	JAMSTEC standard
Site59	36° 46.19'	144° 58.38'	4921	JAMSTEC standard
Site60	36° 45.10'	145° 2.16'	5550	JAMSTEC standard
Site61	36° 43.93'	145° 5.98'	5782	JAMSTEC standard
Site62	36° 42.80'	145° 9.73'	5781	JAMSTEC standard
Site63	36° 41.67'	145° 13.51'	5730	JAMSTEC standard
Site64	36° 40.54'	145° 17.27'	5708	JAMSTEC standard
Site65	36° 39.40'	145° 21.05'	5732	JAMSTEC standard
Site66	36° 38.26'	145° 24.83'	5712	JAMSTEC standard
Site67_1	36° 37.13'	145° 28.61'	5607	JAMSTEC standard
Site67_2	36° 37.20'	145° 28.70'	5604	ERI-BBOBS
Site67_3	36° 37.22'	145° 28.67'	5604	ERI-4.5Hz
Site67_4	36° 37.27'	145° 28.64'	5602	ERI-1Hz
Site68	36° 35.97'	145° 32.38'	5587	JAMSTEC standard
Site69	36° 34.90'	145° 36.14'	5606	JAMSTEC standard
Site70	36° 33.81'	145° 39.91'	5592	JAMSTEC standard
Site71	36° 32.66'	145° 43.71'	5534	JAMSTEC standard
Site72	36° 31.53'	145° 47.44'	5497	JAMSTEC standard
Site73	36° 30.37'	145° 51.27'	5480	JAMSTEC standard
Site74	36° 29.22'	145° 55.08'	5480	JAMSTEC standard
Site75	36° 28.10'	145° 58.80'	5481	JAMSTEC standard
Site76	36° 26.91'	146° 2.59'	5504	JAMSTEC standard

Site77	36° 25.89'	146° 6.38'	5536	JAMSTEC standard
Site78	36° 24.75'	146° 10.18'	5548	JAMSTEC standard
Site79	36° 23.53'	146° 13.83'	5614	JAMSTEC standard
Site80	36° 22.08'	146° 17.53'	5656	JAMSTEC standard
Site81	36° 20.88'	146° 21.32'	5667	JAMSTEC standard
Site82	36° 19.68'	146° 25.05'	5689	JAMSTEC standard
Site83	36° 18.45'	146° 28.82'	5692	JAMSTEC standard
Site84	36° 17.29'	146° 32.50'	5693	JAMSTEC standard
Site85	36° 16.12'	146° 36.27'	5690	JAMSTEC standard
Site86	36° 14.94'	146° 40.01'	5654	JAMSTEC standard

*1 : No data due to recording trouble

*2 : Not retrieved yet.

2) Airgun shooting

We shot the airgun array of R/V Kairei along A6e and A4. The shot spacing was 200-m along A6e and 50-m along A4. We towed a 6-km long, 444-ch hydrophone streamer cable during air-gun shooting except the western and eastern part of the line A6e.

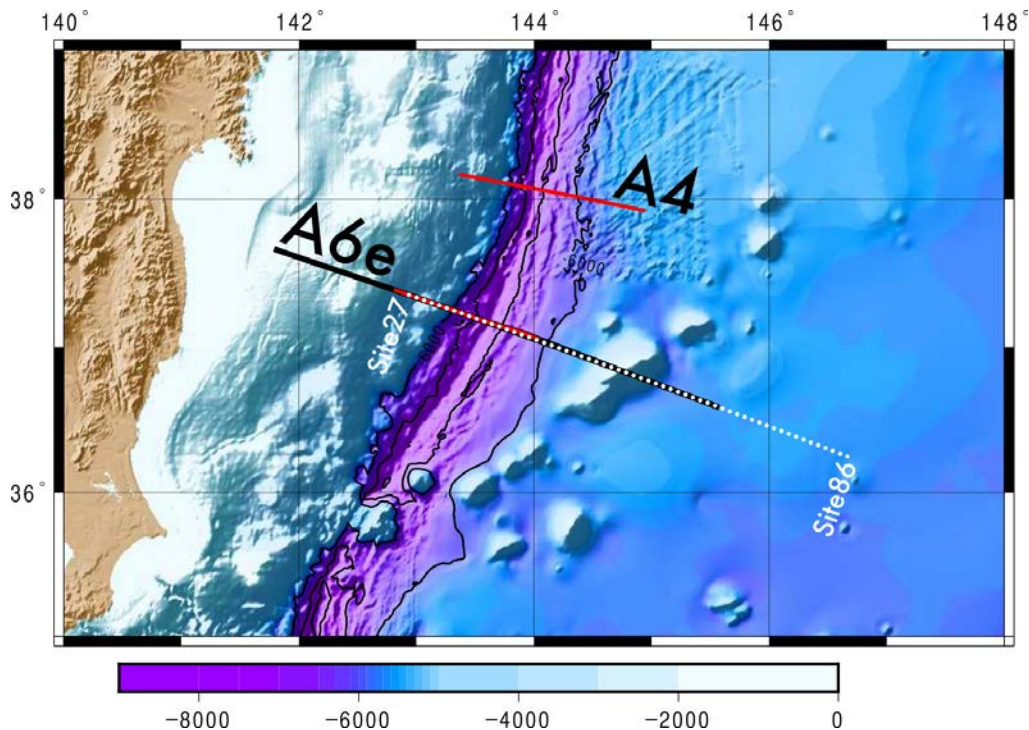


Figure 1. The actual air-gun shot lines; black line: without towing a hydrophone streamer cable, red line: with towing a hydrophone streamer cable. White circles are OBS position for active source seismic surveys.

Table 1. Active source seismic survey lines (start and end points).

Line	Start				End			
	Lat(N)		Lon(E)		Lat(N)		Lon(E)	
A6e (without streamer)	37°	39.9282'	141°	47.3664'	36°	35.2086'	145°	34.5162'
A6e (with streamer)	37°	23.3424'	142°	48.5634'	37°	3.0888'	144°	2.6892'
A4	37°	55.4316'	144°	56.8626'	38°	10.2439'	143°	21.3445'

3) OBS deployment for seismicity observations

We deployed 35 OBSs for seismicity observations in trench-outer rise region. The OBSs will be recovered in summer 2017.

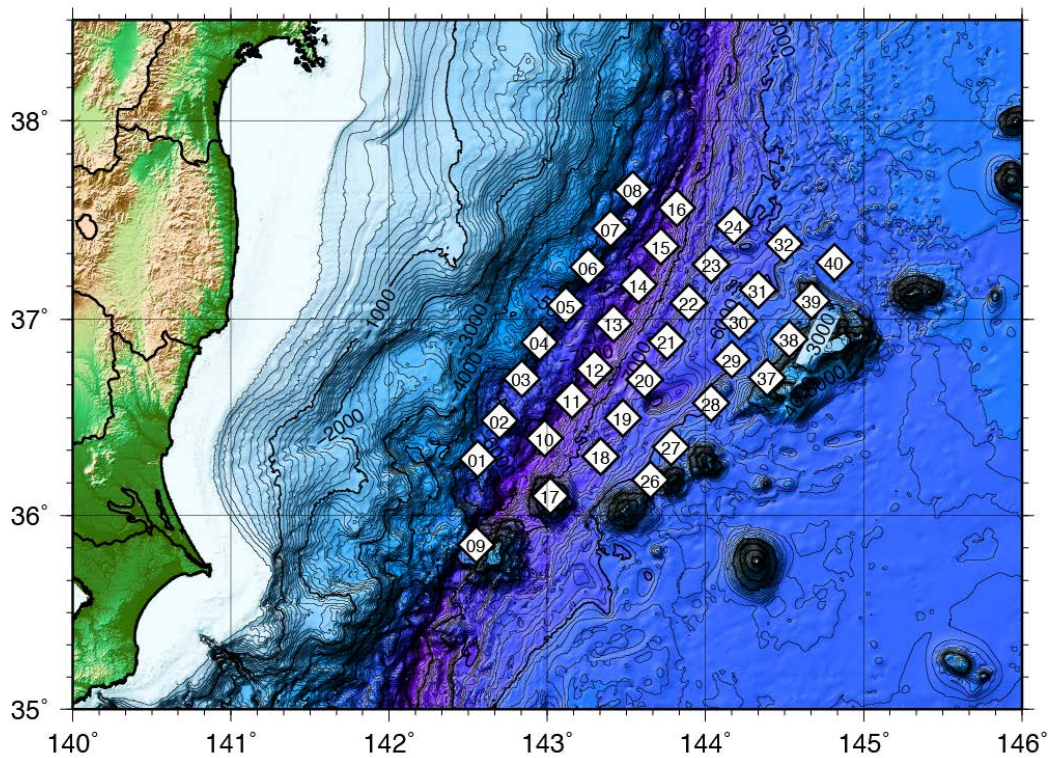


Figure 2. OBS locations for the seismicity observations

Table 2: OBS positions for seismicity observations (Vessel position at the deployment)

Site	Lat. (N)		Lon. (E)		Depth(m)
JJB01A	36°	17.39'	142°	33.37'	5595
JJB02A	36°	28.88'	142°	41.93'	5692
JJB03A	36°	41.78'	142°	50.04'	5655

JJB04A	36°	52.83'	142°	56.80'	5559
JJB05A	37°	4.04'	143°	6.84'	5626
JJB06A	37°	15.90'	143°	15.30'	5408
JJB07A	37°	27.48'	143°	23.79'	5555
JJB08A	37°	39.23'	143°	32.39'	5279
JJB09A	35°	50.90'	142°	32.00'	5177
JJB10A	36°	23.60'	142°	58.70'	7954
JJB11A	36°	35.40'	143°	9.30'	7576
JJB12A	36°	45.00'	143°	17.48'	7656
JJB13A	36°	58.90'	143°	24.65'	7553
JJB14A	37°	10.50'	143°	34.50'	7424
JJB15A	37°	22.17'	143°	42.95'	7814
JJB16A	37°	33.80'	143°	49.18'	7593
JJB17A	36°	5.90'	143°	0.92'	4215
JJB18A	36°	18.20'	143°	20.05'	6611
JJB19A	36°	30.00'	143°	28.10'	6605
JJB20A	36°	41.70'	143°	36.40'	6713
JJB21A	36°	53.50'	143°	44.90'	6665
JJB22A	37°	5.10'	143°	53.60'	6436
JJB23A	37°	16.60'	144°	2.15'	6364
JJB24A	37°	28.34'	144°	10.64'	6204
JJB26A	36°	11.00'	143°	38.80'	5903
JJB27A	36°	21.00'	143°	46.80'	5610
JJB28A	36°	34.60'	144°	1.60'	5467
JJB29A	36°	47.90'	144°	10.00'	5755
JJB30A	36°	59.60'	144°	12.80'	5852
JJB31A	37°	8.87'	144°	19.65'	5796
JJB32A	37°	22.84'	144°	29.22'	5936
JJB37A	36°	42.30'	144°	23.20'	5124
JJB38A	36°	54.00'	144°	31.70'	5291
JJB39A	37°	5.62'	144°	39.73'	5297
JJB40A	37°	17.26'	144°	48.32'	5652

4) Bathymetry, magnetics and gravity observation

During the cruise, bathymetry, magnetics and gravity data have been recorded continuously by multi-beam echo sounder (MBES), three-component magnetometer and gravity meter, respectively.

(3) Cruise Log

Date	Remarks
2017/2/26	Departure from Yokosuka
2017/2/27	OBS deployment (site27-43_2)
2017/2/28	OBS deployment (site44-76)
2017/3/1	OBS deployment (site75-86), OBS deployment (JJB31A,32A,39A,40A)
2017/3/2	Wait on weather in Ishino-maki
2017/3/3	Wait on weather in Ishino-maki
2017/3/4	Airgun shooting from western end of A6e (without streamer)
2017/3/5	Airgun shooting along A6e (with streamer)
2017/3/6	Airgun shooting along A6e (with streamer)
2017/3/7	OBS deployment (JJB01A,02A,03A,04A,05A,07A)
2017/3/8	OBS deployment (JJB08A), Airgun shooting from eastern end of A4
2017/3/9	Airgun shooting along A4
2017/3/10	Airgun shooting along A6e (without streamer)
2017/3/11	Airgun shooting along A6e (without streamer), OBS recovery (site27-31)
2017/3/12	Airgun shooting along A6e (without streamer)
2017/3/13	Airgun shooting along A6e (without streamer), OBS recovery (site67_2), OBS deployment (JJB15A,23A,24A)
2017/3/14	Wait on weather in Ishino-maki
2017/3/15	Wait on weather in Ishino-maki
2017/3/16	Arrival at Sendai. End of Leg 1
2017/3/17	Departure from Sendai. Beginning of Leg 2
2017/3/18	OBS recovery (site 32-41_2)
2017/3/19	OBS recovery (site 42-55)
2017/3/20	OBS recovery (site 56-61), OBS deployment (JJB29A,30A,37A,38A)
2017/3/21	OBS recovery (site 62-65), OBS deployment (JJB06A,14A,22A)
2017/3/22	Wait on weather in Ishino-maki
2017/3/23	OBS deployment (JJB10A,17A,18A,19A,26A,27A)
2017/3/24	OBS deployment (JJB20A,28A), OBS recovery (site 66-70)

2017/3/25	OBS recovery (site 71-76)
2017/3/26	OBS recovery (site 77-86)
2017/3/27	Wait on weather in Ishino-maki
2017/3/28	OBS deployment (JJB16A)
2017/3/29	OBS deployment(JJB09A,11A,12A,13A,21A), OBS recovery (site 36)
2017/3/30	Arrival at Yokosuka

● **4. Notice on Using**

Notice on using: Insert the following notice to users regarding the data and samples obtained.

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 Scientist 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.