



R/V Kairei Cruise Report
KR14-E02

Seismic survey and observations in Japan Trench region

Nov. 19, 2014 - Dec. 09, 2014

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

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1. Cruise Information

(1) Cruise Number, Ship name : KR14-E02, R/V Kairei

(2) Title of the Cruise

FY2014 Seismic survey and observations in Japan Trench region

(3) Title of the proposal

Marine geological and geophysical research and surveys to unravel the subduction zone great earthquakes and tsunamis: seismic refraction and reflection survey in the outer rise region

(4) Cruise period, Port call

2014/11/19 – 2014/12/09, Yokosuka-Yokosuka

(5) Research Area

Japan Trench region

(6) Research Map

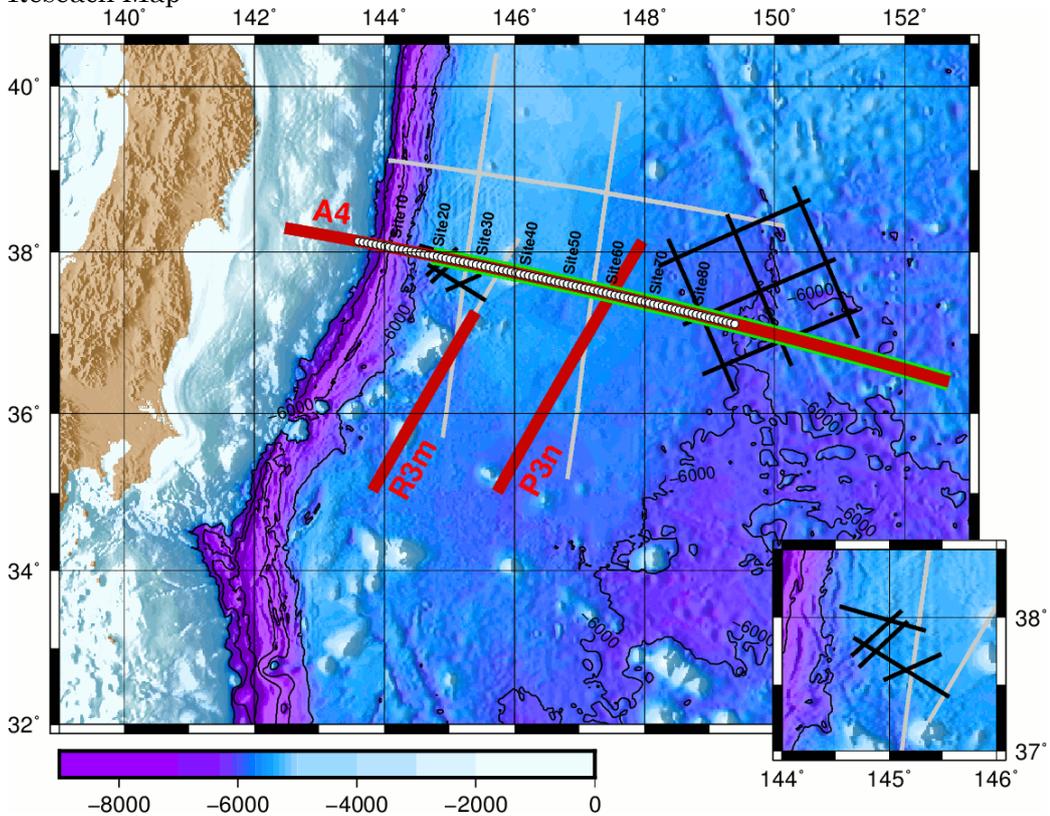


Figure 1. Planned seismic survey. The red lines are seismic survey lines and white circles are OBS sites.

2. Researchers

(1) Representative of Science Party [Affiliation] : Shuichi Kodaira [JAMSTEC]

(2) Shipboard science party list

- 1) FUJIE Gou [JAMSTEC], Chief Scientist
- 2) IWAMARU Hikaru [JAMSTEC]
- 3) Jason. P. Morgan [Royal Holloway University of London]
- 4) Anke Dannowski [GEOMAR]
- 5) Martin Thorwart [GEOMAR]

3. Overview of 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 interpolate and outer rise earthquakes next to the rupture zones of the 2011 Tohoku-oki earthquake, we conducted seismic structure survey in the Japan Trench region.

(2) Observations

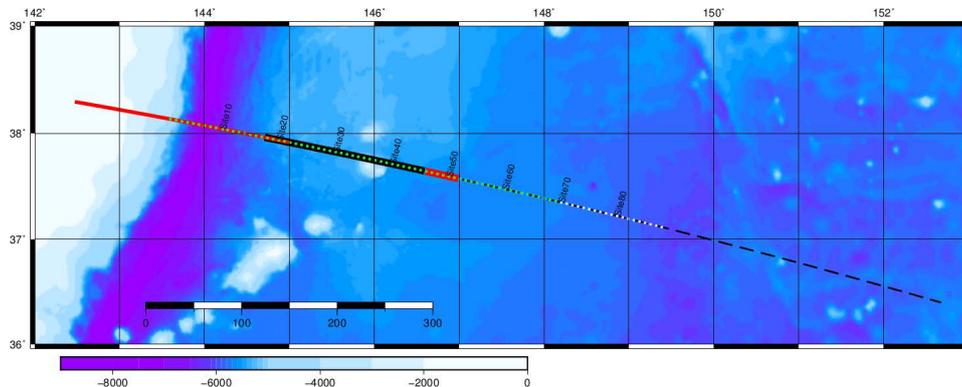


Figure 2. Deployed OBSs (green) and the actual range of air-gun shots (red line). A hydrophone streamer cable was towed along the black line during the air-gun shooting.

1) OBS deployment.

We deployed 73 OBSs (10 GEOMAR OBSs, 3 JAMSTEC UD-OBS, 2 JAMSTEC OBS2G, and 58 JAMSTEC-Standard OBSs) at 69 Sites; site 10, 12, 15 were comparison sites and plural OBSs were deployed.

2) Air-gun shooting.

An air-gun array of R/V Kairei was shot at an interval of 200m. In the western and eastern sides of profile (red lines in Figure 2), we shot air-guns without towing a hydrophone streamer cable. Contrastly, we towed 6-km-long 444-ch hydrophone streamer cable around the center of our seismic

survey line (black line in Figure 2).

3) OBS recovery.

We recovered 15 OBSs during this cruise (10 GEOMAR OBSs and 5 JAMSTEC-Standard OBSs). The rest of deployed OBSs were recovered by Yokosuka (YK14-E02) except Site 10, Site 19, and Site 33.

4) Bathymetry, magnetics and gravity observation.

During the cruise, bathymetry, magnetics and gravity data have been recorded continuously by SEABEAM2112.004, three component magnetometer and gravity meter, respectively. However, the SEABEAM system was broken down and we could not obtain the bathymetry data along the last two lines.

4. List of observation instruments

- (1) Ocean bottom seismometer (OBS)
- (2) 444-ch hydrophone streamer
- (3) SEABEAM2112.004
- (4) three component magnetometer
- (5) gravity meter.

5. Cruise log

Date	Remarks
2014/11/19	Departure from Yokosuka
2014/11/20-23	OBS deployment
2014/11/24	OBS deployment, air-gun shooting
2014/11/25	Air-gun shooting (A4obs_0, without streamer)
2014/11/26	Bad weather (stay in Ishinomaki bay)
2014/11/27	Leave Ishinomaki bay to survey area
2014/11/28	Air-gun shooting (A4obs_1, with streamer)
2014/11/29	Air-gun shooting (A4obs_1, with streamer)
2014/11/30	OBS recovery
2014/12/01	OBS recovery and transit to Ishinomaki bay
2014/12/03	Bad weather (Ishinomaki bay)
2014/12/04	Transit to survey area
2014/12/05	Air-gun shooting (A4obs_2, without streamer)
2014/12/06	OBS position calibration by SSBL, OBS recovery
2014/12/07	Bad weather
2014/12/08	OBS recovery and transit to Yokosuka
2014/12/09	Arrival at Yokosuka

6. OBS position (deploy position)

Site	Cast			
	Time UTC	Vessel position		
		Lat(N)	Lon(E)	Depth(m)
01_1	2014/11/20 00:29:27	38_07.9851	143_35.8938	4368.0
01_2	2014/11/30 12:10:37	38_07.9619	143_35.9989	4407.0
02	2014/11/20 01:36:09	38_07.3339	143_40.0488	4865.0
03	2014/11/20 02:47:09	38_06.7809	143_44.0073	5554.0
04_G	2014/11/20 04:04:10	38_06.1829	143_48.0671	5943.0
05_G	2014/11/20 04:32:22	38_05.5206	143_52.1429	6624.0
06_G	2014/11/20 04:57:55	38_04.9199	143_56.1691	7084.0
07_G	2014/11/20 05:24:59	38_04.3061	144_00.3041	7570.0
08_G	2014/11/20 05:53:55	38_03.6890	144_04.2483	7124.0
09_G	2014/11/20 06:30:07	38_03.0747	144_08.3252	6745.0
10_G	2014/11/20 09:28:12	38_02.3673	144_12.8053	6488.0
10_U	2014/11/20 07:03:18	38_02.3509	144_12.9860	6490.0
10_S	2014/11/20 07:06:06	38_02.3285	144_13.1202	6473.0
11_G	2014/11/20 10:09:13	38_01.8179	144_16.3758	6245.0
12_U	2014/11/20 10:37:40	38_01.2104	144_20.3927	6153.0
12_S	2014/11/20 10:40:21	38_01.1935	144_20.5170	6139.0
13_G	2014/11/20 13:12:12	38_00.5817	144_24.4705	5969.0
14	2014/11/20 13:39:12	37_59.9578	144_28.4534	5869.0
15_G	2014/11/20 15:01:04	37_59.3429	144_32.3280	5861.0
15	2014/11/20 15:03:56	37_59.3189	144_32.4519	5854.0
15_U	2014/11/20 15:07:29	37_59.3018	144_32.5951	5854.0
16	2014/11/20 16:32:27	37_58.6851	144_36.5002	5708.0
17	2014/11/20 17:47:53	37_58.0174	144_40.5174	5643.0
18	2014/11/20 20:55:08	37_57.3814	144_44.5264	5530.0
19	2014/11/20 22:23:10	37_56.7540	144_48.5919	5469.0
20	2014/11/21 00:22:59	37_56.1053	144_52.5960	5443.0
21	2014/11/21 01:56:52	37_55.4497	144_56.6235	5489.0
22	2014/11/21 03:14:38	37_54.8198	145_00.6123	5421.0
23	2014/11/21 04:32:14	37_54.1665	145_04.6560	5440.0
24	2014/11/21 05:53:26	37_53.5050	145_08.6835	5468.0
25	2014/11/21 07:09:47	37_52.8470	145_12.7058	5466.0

26	2014/11/21 08:26:59	37_52.2060	145_16.7285	5478.0
27	2014/11/21 09:41:18	37_51.5266	145_20.7414	5426.0
28	2014/11/21 10:54:57	37_50.8646	145_24.7478	5415.0
29	2014/11/21 12:11:27	37_50.2136	145_28.7574	5424.0
30	2014/11/21 13:29:02	37_49.5308	145_32.7795	5448.0
31	2014/11/21 14:44:35	37_48.8746	145_36.7777	5469.0
32	2014/11/21 16:00:56	37_48.1905	145_40.7720	5455.0
33_1	2014/11/21 17:14:44	37_47.5074	145_44.7746	5454.0
33_2	2014/11/21 18:38:54	37_47.5222	145_44.7961	5448.0
34	2014/11/21 19:54:53	37_46.8490	145_48.7870	5377.0
35	2014/11/21 21:08:58	37_46.1589	145_52.8014	5068.0
36	2014/11/21 22:21:12	37_45.4825	145_56.8147	4109.0
37	2014/11/21 23:20:51	37_44.7935	146_00.8086	3942.0
38	2014/11/22 00:20:09	37_44.0948	146_04.7961	5359.0
39	2014/11/22 01:32:30	37_43.4012	146_08.8138	5564.0
40	2014/11/22 02:46:41	37_42.7213	146_12.8069	5546.0
41	2014/11/22 04:01:27	37_42.0410	146_16.8076	5540.0
42	2014/11/22 05:15:25	37_41.3520	146_20.8058	5540.0
43	2014/11/22 06:31:23	37_40.6423	146_24.7979	5526.0
44	2014/11/22 07:47:56	37_39.9687	146_28.7923	5536.0
45	2014/11/22 09:03:36	37_39.2525	146_32.8021	5560.0
46	2014/11/22 10:20:33	37_38.5402	146_36.7885	5575.0
47	2014/11/22 11:39:22	37_37.8341	146_40.7687	5601.0
48	2014/11/22 12:57:02	37_37.1301	146_44.7568	5556.0
49	2014/11/22 14:13:41	37_36.4252	146_48.7470	5706.0
50	2014/11/22 15:30:39	37_35.7069	146_52.7253	5687.0
51	2014/11/22 16:46:59	37_34.9971	146_56.7089	5689.0
52	2014/11/22 18:04:29	37_34.2908	147_00.6846	5697.0
53	2014/11/22 19:22:18	37_33.6016	147_04.6214	5688.0
54	2014/11/22 20:42:09	37_32.8697	147_08.6076	5686.0
55	2014/11/22 22:01:32	37_32.0981	147_12.6503	5680.0
56	2014/11/22 23:22:16	37_31.3894	147_16.6279	5686.0
57	2014/11/23 00:43:12	37_30.6615	147_20.6052	5672.0
58	2014/11/23 02:01:45	37_29.9415	147_24.5818	5687.0
59	2014/11/23 03:17:58	37_29.2226	147_28.5361	5673.0
60	2014/11/23 04:34:05	37_28.4890	147_32.4913	5633.0
61	2014/11/23 05:50:09	37_27.7478	147_36.4815	5658.0
62	2014/11/23 07:08:27	37_27.0028	147_40.4277	5661.0

63	2014/11/23 08:28:00	37_26.2778	147_44.4001	5645.0
64	2014/11/23 09:47:04	37_25.5326	147_48.4010	5668.0
65	2014/11/23 11:04:34	37_24.7895	147_52.3558	5660.0
66	2014/11/23 12:24:39	37_24.0401	147_56.3215	5657.0
67	2014/11/23 13:43:13	37_23.2840	148_00.2896	5673.0
68	2014/11/23 15:15:10	37_22.6188	148_03.8166	5676.0
69	2014/11/23 16:48:02	37_21.7695	148_08.2062	5689.0

7. Airgun lines (end points)

NO.	LINE NAME	S.P. POSITION	
		Lat.	Lon.
1	A4obs_0	37_54.80753'N	145_00.59294'E
		38_17.70358'N	142_28.26914'E
2	A4obs_1	37_58.25085'N	144_39.14660'E
		37_38.52638'N	146_36.89981'E
3	A4obs_2	37_38.62215'N	146_36.50851'E
		37_34.08087'N	147_01.84066'E

8. Notice on using

This cruise report is a preliminary documentation as of the end of the cruise. It may not be corrected even if changes on content (i.e. taxonomic classifications) are found after publication. It may also be changed without notice. Data on the cruise report may be raw or not processed. Please ask the PI(s) for the latest information before using. Users of data or results of this cruise are requested to submit their results to Data Integration and Analysis Group (DMG), JAMSTEC.