



R/V Kairei Cruise Report

KR13-06 Leg 1 & Leg 2



2012FY “Tsunami prediction system
and comprehensive research in the Japan Trench”

Japan Trench off Miyagi

Mar. 02, 2013-Mar. 30, 2013

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

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Acknowledgement

1. Cruise Information

- Cruise ID: KR13-06
- Name of vessel: KAIREI
- Title of the cruise: 2012FY “Tsunami prediction system and comprehensive research in the Japan Trench”
- Cruise period: 2013/03/02 – 2013/03/30

[Leg 1] 2013/03/02 – 2013/03/14, [Leg 2] 2013/03/14 – 2013/03/30

- Ports of call: JAMSTEC (Yokosuka) – Sendai-Shiogama – JAMSTEC (Yokosuka)
- Research area: Japan Trench off Miyagi
- Research Map

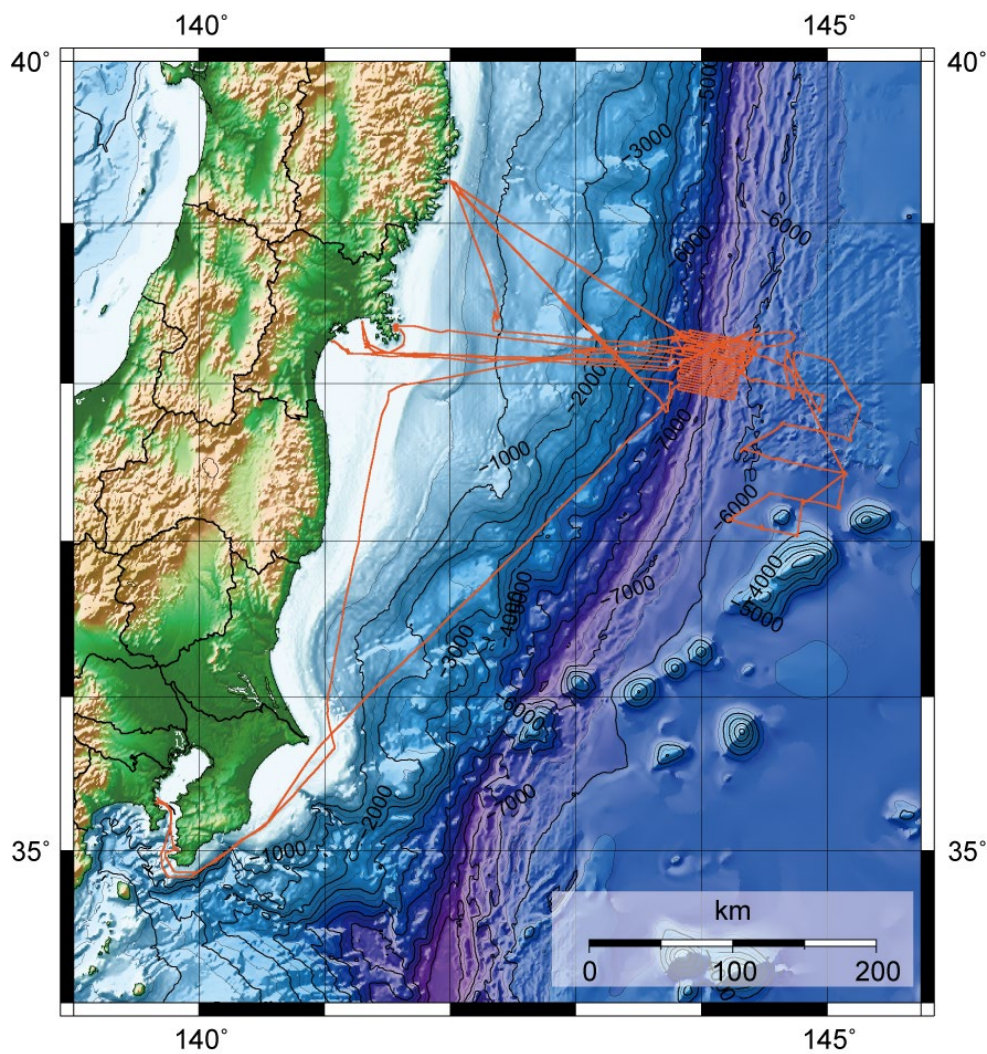


Fig.1 Ship track of KR13-06.

2. Researchers

- Chief scientist [Affiliation]:

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

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3. Observation

3.1 Background and objectives

On 11 March 2011, the great earthquake (the 2011 Off the Pacific Coast of Tohoku Earthquake: Mw 9.0) occurred in the forearc area of the Japan Trench region. This earthquake caused devastating damages in the Tohoku and the Kanto regions. Especially, the huge tsunami struck to the Pacific coast in these regions and caused considerable damage. This research cruise was conducted as a part of “Research program on tsunamis and earthquakes occurred off the Pacific coast of Tohoku” funded by the Ministry of Education, Culture, Sports, Science, and Technology of Japan. To understand the mechanism of this great earthquake and tsunami and tectonics around the source area of this earthquake, and to collect the information about the mitigating of the disaster such as this earthquake, it is very important to clarify the detailed crustal structure in the Japan Trench region. The main objective of this cruise is the revealing the detailed structure at the vicinity of trench axis area off Miyagi prefecture, using high resolution (portable) multichannel reflection seismic system.

3.2 List of Observations

(1) High resolution seismic reflection survey

A cluster gun array with 380 inch³ of total volume was towed at 5 m depth. The guns were fired every 37.5 m. Seismic data was recorded with a 192 channel, 1300-m-long streamer cable, which was towed at 6 m depth. Twenty two seismic lines were completed during the cruise. Source signature observation was also conducted.

(2) XCTD casts

The XCTD casts were conducted three times during the cruise to obtain accurate velocity profile in the water column.

(3) Bathymetry, Geomagnetic, Gravity measurements

Bathymetry, geomagnetic and gravity data were recorded during the cruise.

(4) Recovery of Ocean Bottom Seismographs

Twenty two Ocean Bottom Seismographs deployed during previous cruises were retrieved.

3.3 List of observation equipments

PMCS system (192 channel streamer cable, maximum offset ~1.3 km)

Cluster gun (40 inch³ x2, 150 inch³ x2)

Seabeam 2112

XCTD

Three component magnetometer

Gravity meter

Ocean Bottom Seismographs

3.4 Cruise log

Date	Log	Remarks
03/02/2013	Leave JAMSTEC, Stay off Tateyama due to bad weather	Leg 1
03/03/2013	Transit to survey area	↑
03/04/2013	Transit to survey area, MCS HDMY003, HDMY001	
03/05/2013	MCS HDMY005, HDMY007, HDMY011, HDMY009	
03/06/2013	MCS HDMY015, HDMY013, Suspend survey due to bad weather	
03/07/2013	Wait on weather, MCS HDMY021, Suspend survey due to bad weather	
03/08/2013	Wait on weather, MCS HDMY017, maintenance, Suspend survey, Transit to Ishinomaki	
03/09/2013	Stay off Ishinomaki due to bad weather	
03/10/2013	Stay off Ishinomaki due to bad weather	
03/11/2013	Stay off Ishinomaki due to bad weather, Transit to survey area	
03/12/2013	Transit to survey area, MCS HDMY019, HDMY023, Suspend survey	
03/13/2013	Transit to Kinkasan, Stay off Kinkasan due to bad weather	↓
03/14/2013	Transit to Sendai-Shiogama, Scientists disembark/embark, Transit to survey area	Leg 1/ Leg2
03/15/2013	Transit to survey area, MCS HDMY025, HDMY031, HDMY027	↑
03/16/2013	MCS HDMY033, HDMY029, recover OBS JOR01, Suspend survey	
03/17/2013	Wait on weather, MCS HDMY035, Suspend survey, transit to Kamaishi	
03/18/2013	Recover mooring system, Transit to Kamaishi, Stay off Kamaishi due to bad weather	
03/19/2013	Stay off Kamaishi, Transit to survey area	
03/20/2013	Recover OBS A6n-37, JMT07, JMT03, Transit to Kamaishi	
03/21/2013	Staf off Kamaishi due to bad weather, Transit to survey area	
03/22/2013	Recover OBS JOR02, JOR06, JOR12, Wait on weather	
03/23/2013	Recover OBS JOR05, JOR11, JOR17, JOR18, JOR13	
03/24/2013	Recover OBS JOR07, JOR03, JOR08, JOR14, JOR20, Wait on weather	
03/25/2013	Recover OBS JOR09, JOR04, JOR10, JOR16, JOR15	
03/26/2013	Wait on weather, MCS HDMY037	
03/27/2013	MCS HDMY041, HDMY039, HDMY043	
03/28/2013	Transit to Yokosuka, escaping from rough sea area	

03/29/2013	Transit to Yokosuka, escaping from rough sea area	↓
03/30/2013	Arrival at Yokosuka	Leg2

3.5 Research Information

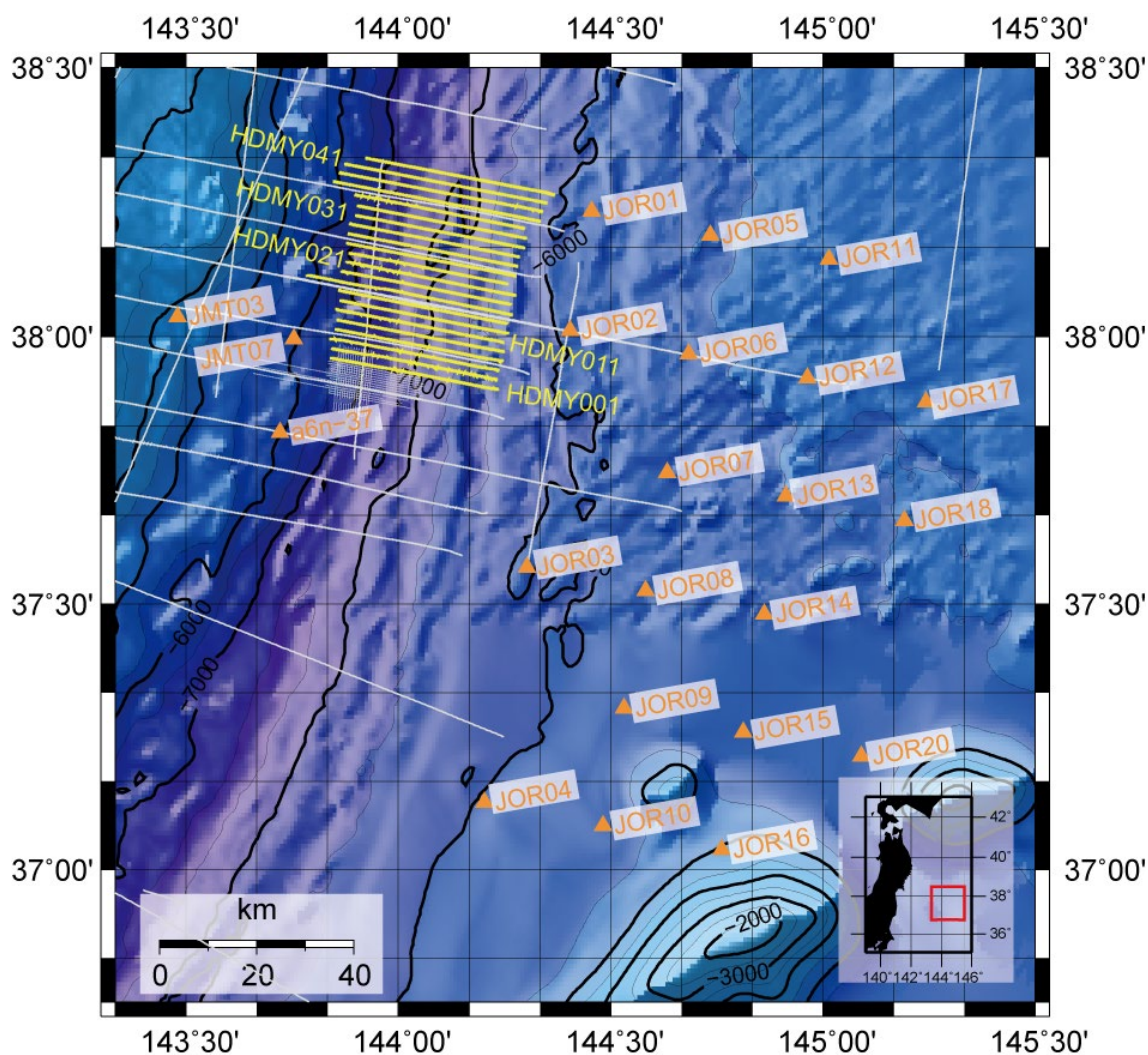


Fig. 2. Map of MCS survey lines and OBSs. Yellow lines denote MCS Lines. The line name was shown only every 5 lines. Orange triangles indicate OBS location. Detailed information is described below.

(1) MCS Line List

LINE NAME	DATE (UTC)	TIME (UTC)	F.S.P.	VESSEL POSITION	
			L.S.P.	Lat.	Lon.
HDMY001_0	04/03/2013	07:14:38	1937	37_54.00167°N	144_13.68400°E
	04/03/2013	14:32:13	1001	37_57.59750°N	143_50.16950°E
HDMY003_0	04/03/2013	01:43:04	1020	37_58.56050°N	143_51.02350°E

	04/03/2013	05:54:42	1937	37_55.04500'N	144_14.05917'E
HDMY005_0	04/03/2013	15:34:21	999	37_59.64367'N	143_50.71883'E
	04/03/2013	19:48:55	1937	37_56.10800'N	144_14.30317'E
HDMY007_0	04/03/2013	21:00:48	1939	37_57.17500'N	144_14.46383'E
	05/03/2013	02:18:31	1001	38_00.78933'N	143_50.88550'E
HDMY009_0	05/03/2013	08:38:03	1936	37_58.34233'N	144_14.64867'E
	05/02/2012	13:09:20	1001	38_01.85533'N	143_51.12300'E
HDMY011_0	05/03/2013	03:27:19	1001	38_02.89267'N	143_51.49533'E
	05/03/2013	07:40:07	1937	37_59.29150'N	144_15.03667'E
HDMY013_0	05/03/2013	19:32:00	1939	38_00.36133'N	144_15.18817'E
	05/03/2013	23:57:51	1001	38_03.97333'N	143_51.60133'E
HDMY015_0	05/03/2013	14:23:26	1001	38_05.02767'N	143_51.97717'E
	05/03/2013	18:32:32	1937	38_01.40583'N	144_15.52183'E
HDMY017_0	07/03/2013	23:43:10	1939	38_02.49217'N	144_15.67800'E
	08/03/2013	05:00:13	797	38_06.87567'N	143_46.93650'E
HDMY019_0	11/03/2013	23:36:36	999	38_07.15283'N	143_52.39900'E
	12/03/2013	05:24:44	1937	38_03.54267'N	144_16.00950'E
HDMY021_0	06/03/2013	23:26:02	1939	38_04.61433'N	144_16.16717'E
	07/03/2013	05:21:20	1001	38_08.22133'N	143_52.56667'E
HDMY023_0	12/03/2013	06:26:41	1915	38_05.76267'N	144_15.81000'E
	12/03/2013	10:29:09	1001	38_09.29800'N	143_52.79817'E
HDMY025_0	14/03/2013	23:37:29	999	38_10.34483'N	143_53.11467'E
	15/03/2013	03:49:06	1937	38_06.72550'N	144_16.73833'E
HDMY027_0	15/03/2013	10:14:37	999	38_11.41250'N	143_53.35683'E
	15/03/2013	14:51:04	1937	38_07.79283'N	144_16.98400'E
HDMY029_0	15/03/2013	21:55:05	999	38_12.47517'N	143_53.59583'E
	16/03/2013	02:33:26	1947	38_08.81833'N	144_17.48150'E
HDMY031_0	15/03/2013	05:01:34	1939	38_09.92567'N	144_17.39683'E
	15/03/2013	09:15:54	1001	38_13.54483'N	143_53.75700'E
HDMY033_0	15/03/2013	16:05:07	1939	38_10.98833'N	144_17.64233'E
	15/03/2013	20:55:40	1001	38_14.61283'N	143_53.99750'E
HDMY035_0	17/03/2013	04:57:51	999	38_15.65883'N	143_54.31000'E
	17/03/2013	09:02:01	1937	38_12.03083'N	144_17.96183'E
HDMY037_0	26/03/2013	08:01:56	867	38_17.22800'N	143_51.22150'E
	26/03/2013	13:09:23	2017	38_12.79067'N	144_20.22450'E

HDMY039_0	26/03/2013	20:19:39	894	38_18.18733'N	143_52.14150'E
	27/03/2013	01:14:32	2017	38_13.84483'N	144_20.46133'E
HDMY041_0	26/03/2013	14:08:21	2017	38_14.93200'N	144_20.58933'E
	26/03/2013	19:24:59	894	38_19.27050'N	143_52.25317'E
HDMY043_0	27/03/2013	01:57:21	2047	38_15.84383'N	144_21.58483'E
	27/03/2013	07:41:05	1001	38_19.92350'N	143_55.19600'E

(2) List of OBS retrieved during this cruise (Ship position at deployment)

OBS No.	Latitude		Longitude		Water depth (m)
	degrees	minutes	degrees	minutes	
JOR01	38	13.98	144	27.26	5,883
JOR02	38	0.72	144	24.18	5,981
JOR03	37	34.17	144	18.13	5,915
JOR04	37	7.64	144	12.10	5,928
JOR05	38	11.34	144	44.06	5,573
JOR06	37	58.10	144	41.02	5,631
JOR07	37	44.81	144	37.91	5,890
JOR08	37	31.55	144	34.95	5,936
JOR09	37	18.27	144	31.89	5,773
JOR10	37	5.01	144	28.91	5,692
JOR11	38	8.69	145	0.82	5,315
JOR12	37	55.42	144	57.82	5,505
JOR13	37	42.15	144	54.72	5,607
JOR14	37	28.86	144	51.68	5,656
JOR15	37	15.60	144	48.67	5,640
JOR16	37	2.34	144	45.69	5,056
JOR17	37	52.71	145	14.50	5,493
JOR18	37	39.46	145	11.46	5,463
JOR20	37	12.87	145	5.44	5,778
JMT03	38	2.22	143	28.73	4,131

JMT07	37	59.80	143	44.93	5,947
a6n-37	37	49.22	143	42.96	5,962

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 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.

Acknowledgement

We would like to thank the captain Hitoshi Tanaka and his crew of the R/V KAIREI, and Makoto Ito and the marine technician team (Nippon Marine Enterprises, Ltd.) for their safe operation and great support during the cruise. We are grateful to member of IFREE (Institute for Research on Earth Evolution), and MARITEC (Marine Technology Center) in JAMSTEC for their help on this cruise. This project is funded by “Research program on tsunamis and earthquakes occurred off the Pacific coast of Tohoku” by the Ministry of Education, Culture, Sports, Science, and Technology. Figures are produced with “The Generic Mapping Tools” (Wessel and Smith, 1991).