



R/V Kairei Cruise Report

KR11-05 Leg2

Seismic study in the Nihon kaiko region

Mar. 14, 2011 – Mar. 31, 2011

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

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1. Cruise Information :

(1) Cruise number, Ship name: KR11-05Leg2, R/V Kairei

(2) Title of the cruise:

Urgent study of the 2011 off the Pacific coast of Tohoku Earthquake

(3) Title of proposal:

Urgent study of the 2011 off the Pacific coast of Tohoku Earthquake

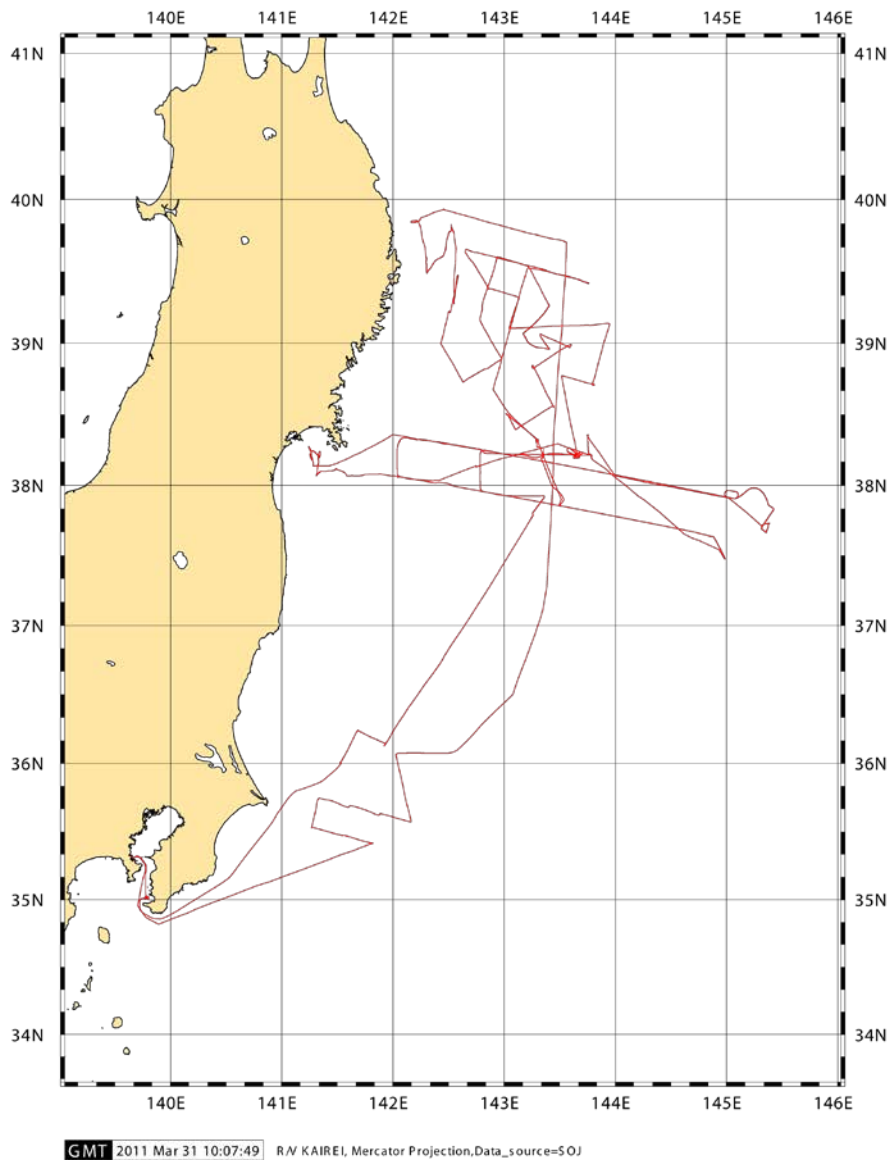
(4) Cruise period, Port call:

2011/03/14-03/31, JAMSTEC (Yokosuka) to JAMSTEC (Yokosuka)

(5) Research Area: Nihon kaiko region

(6) Research Map:

KR11-05_LEG2_Nav Track



2. Researchers

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3. Overview of Observation :

(1) Objectives :

A massive earthquake of magnitude of 9.0 occurred Friday 11 March (The 2011 off the Pacific coast of Tohoku Earthquake), off the Pacific coast of the Tohoku Region, causing devastating damages in the Tohoku and Kanto region. No earthquake in such scale occurred before in Japan. A crustal deformation is estimated to be in the scale of more than several meters at the bottom of the ocean, which caused a huge tsunami. Tsunami occurred in a vast area for hundreds of kilometers from off Iwate Prefecture to Ibaraki Prefecture.

Such huge earthquakes have been repeatedly occurring, with focal area from off Tohoku to Japan Trench. Large numbers of aftershocks will occur around the wide focal areas. Attention to the aftershocks has to be paid in a long-term for this earthquake with magnitude of 9.

To reveal precise aftershock distribution urgently, R/V kairei cruise KR11-05 Leg2 were conducted. 39 OBS(Ocean Bottom Seismometer)s were deployed covering the whole source region. Already deployed 6 OBS and 1 OBP(Ocean bottom presser gauge) were recovered. Furthermore, MCS(Multi-Channel Seismic) survey was carried out.

(2) List of observation instruments :

1) Deployment of OBSs

39 OBSs (23:JAMSTEC, 16: ERI) were deployed focal area from shore of Tohoku to Japan Trench.

2) Recovery of ocean bottom seismometers (OBSs)

4 OBSs (C01-04) deployed off Chichi-jima by kairei KR11-05 cruise were recovered.

3) Multi-channel seismic (MCS) reflection survey

On 2 lines (Off miyagi area: TH03 and TH04, the MCS reflection survey using a tuned air-gun array of 7,800 cubic inch and a 444 channel hydrophone streamer with a 12.5 m group interval was conducted. On KT06_obs line, shot spacing is 200m for OBS survey. On KT06, CJ_main and CJ_sub lines, shot spacing is 50m for the MCS survey.

4) Bathymetry, Gravity and Geomagnetic observation

During this cruise, bathymetry, gravity and geomagnetic data have been recorded continuously by SEABEAM2112, gravity meter (KSS-31) and three-component magnetometer (SFG1214), respectively.

5) Temperature and Conductivity observation for the correction of sonic speed

Expendable-Bathy Thermograph (XBT) has been conducted to correct the sonic speed for the bathymetry survey and MCS survey.

(3) Cruise log:

Date		Remarks
2011/03/14	Mon	Departure from JAMSTEC (Yokosuka), and transit to survey area
2011/03/15	Tue	Deployment of 7 OBSs and transit to off Tohoku
2011/03/16	Wed	Deployment of 4 OBSs
2011/03/17	Thu	Deployment of 8 OBSs
2011/03/18	Fri	Deployment of 5 OBSs and recovery of 2 OBSs
2011/03/19	Sat	Deployment of 5 OBSs
2011/03/20	Sun	Deployment of 6 OBSs
2011/03/21	Mon	Deployment of 3 OBSs and calling of 2 OBSs and 1 OBP
2011/03/22	Tue	MCS survey on TH03 line(50m shot)
2011/03/23	Wed	MCS survey on TH03 line(50m shot)
2011/03/24	Thu	MCS survey on TH04 line(50m shot)
2011/03/25	Fri	Recovery and deployment of 1 OBS, recovery of 1 OBP and calling of 1 OBP. BBOBS were recovered at shore area. Transit to Ishino-maki bay for storm evacuation.

2011/03/26	Sat	Stay at Ishino-maki bay
2011/03/27	Sun	Transit to survey area. Calling the OBP.
2011/03/28	Mon	MCS survey on TH03 line landward side(50m shot)
2011/03/29	Tue	MCS survey on TH04 line landward side(50m shot) Transit to off Ibaraki
2011/03/30	Wed	Recovery of 3 OBS and transit to JAMSTEC
2011/03/31	Thu	Arrival at JAMSTEC (Yokosuka)

(4) Seismic lines

1) Locations of deployed OBS

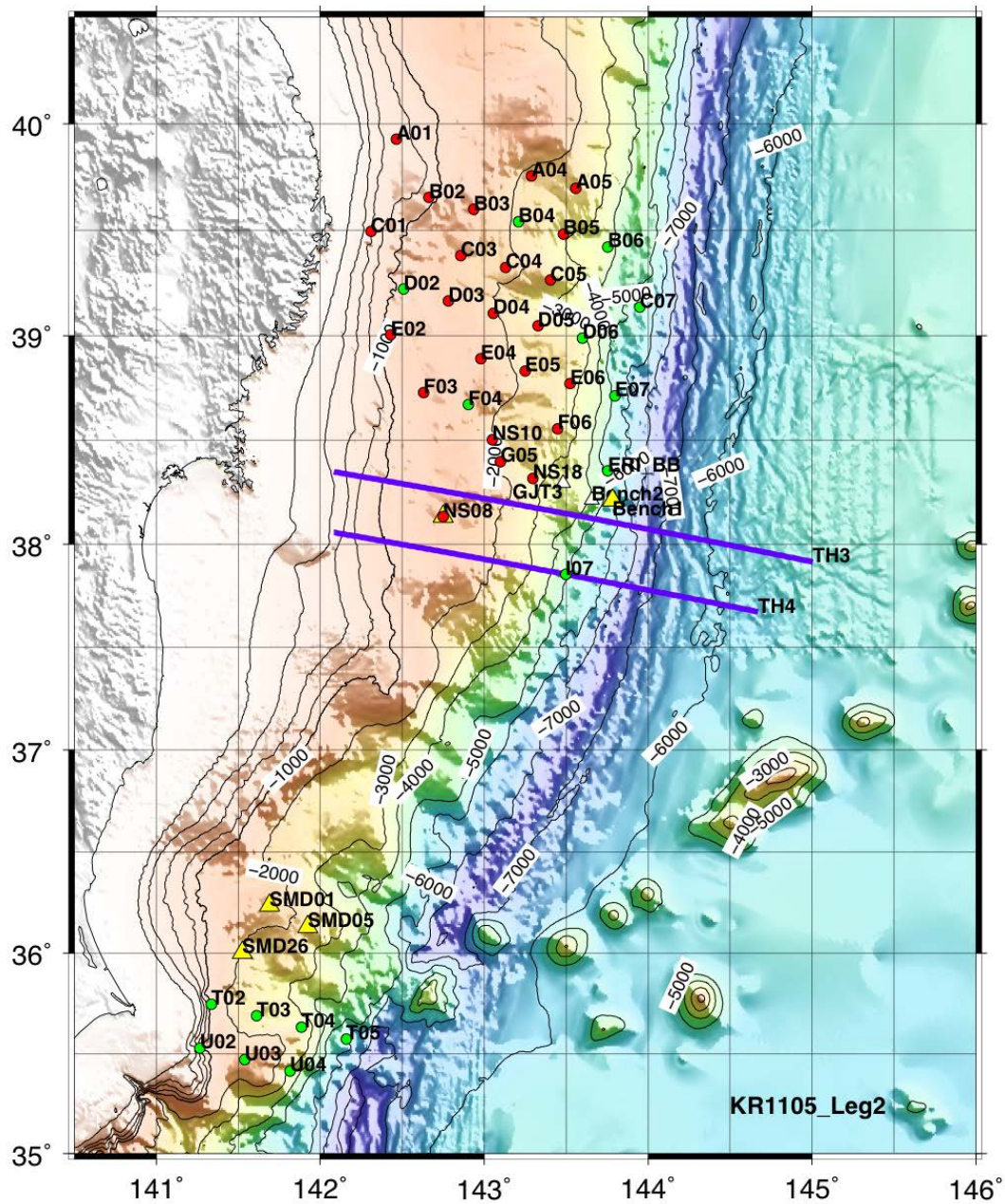
Site	Institute	OBS Calibration position					Remarks
		Latitude(N)		Longitude(E)		Depth(m)	
A01	JAMSTEC	39	55.7	142	27.9	702	Deployment
A04	JAMSTEC	39	45.4	143	17.2	2096	Deployment
A05	JAMSTEC	39	41.9	143	33.6	2378	Deployment
B02	JAMSTEC	39	39.3	142	39.7	907	Deployment
B03	JAMSTEC	39	35.9	142	56.1	1548	Deployment
B05	JAMSTEC	39	28.9	143	29.0	2872	Deployment
C01	JAMSTEC	39	29.7	142	18.6	588	Deployment
C03	JAMSTEC	39	22.8	142	51.5	1677	Deployment
C04	JAMSTEC	39	19.4	143	7.9	1893	Deployment
C05	JAMSTEC	39	15.8	143	24.3	2385	Deployment
D03	JAMSTEC	39	9.8	142	46.9	1548	Deployment
D04	JAMSTEC	39	6.3	143	3.3	1880	Deployment
D05	JAMSTEC	39	2.9	143	19.7	2415	Deployment
E02	JAMSTEC	39	0.2	142	25.8	1100	Deployment
E04	JAMSTEC	38	53.4	142	58.7	1510	Deployment
E05	JAMSTEC	38	49.9	143	15.1	2268	Deployment
E06	JAMSTEC	38	46.3	143	31.4	2667	Deployment
F03	JAMSTEC	38	43.8	142	37.8	1256	Deployment
F06	JAMSTEC	38	33.3	143	26.9	2500	Deployment
G05	JAMSTEC	38	23.8	143	6.0	2167	Deployment
NS08	JAMSTEC	38	8.1	142	45.0	1510	Deployment
NS10	JAMSTEC	38	30.1	143	3.0	2017	Deployment
NS18	JAMSTEC	38	19.1	143	17.9	2746	Deployment
B04	ERI	39	32.4	143	12.6	2051	Deployment
B06	ERI	39	25.3	143	45.2	3545	Deployment

C07	ERI	39	8.2	143	56.9	5385	Deployment
D02	ERI	39	13.3	142	30.4	1072	Deployment
D06	ERI	38	59.3	143	36.1	2899	Deployment
E07	ERI	38	42.7	143	47.8	5351	Deployment
F04	ERI	38	40.3	142	54.2	1560	Deployment
ERI BBOBS	ERI	38	21.2	143	45.1	5225	Deployment, BBOBS
I07	ERI	37	51.2	143	29.9	4699	Deployment, BBOBS
T02	ERI	35	44.8	141	20.1	1215	Deployment
T03	ERI	35	41.4	141	36.6	2460	Deployment
T04	ERI	35	37.9	141	53.1	2373	Deployment
T05	ERI	35	34.3	142	9.5	5737	Deployment
U02	ERI	35	31.7	141	15.9	668	Deployment
U03	ERI	35	28.3	141	32.4	1601	Deployment
U04	ERI	35	24.8	141	48.9	3169	Deployment
SMD01	ERI	36	14.2	141	41.5	1798	Recovery
SMD05	ERI	36	7.7	141	55.4	2167	Recovery
SMD26	ERI	36	0.2	141	31.5	2107	Recovery
NS08	Tohoku Univ.	38	8.0	142	45.0	1532	Recovery
NS10	Tohoku Univ.	38	30.1	143	2.0	1981	Recovery
NS18	Tohoku Univ.	38	19.0	142	17.9	2774	Recovery
Bench1	Tohoku Univ.	38	12.7	143	47.1	5760	Recovery, OBP

2) Multi-channel seismic (MCS) reflection survey

Line name	Position					Remarks
	Latitude(N)		Longitude(E)		Depth(m)	
TH03_2	37	54.7313	145	01.1788	5425	50m shot
	38	14.9078	142	48.9876	1415	E=>W
TH03_3	38	13.5925	142	57.5339	1519	50m shot
	38	20.1831	142	06.4688	490	E=>W
TH04_0	37	56.9446	142	51.1612	1502	50m shot
	37	40.3937	144	40.2450	5872	W=>E
TH04_1	38	03.2619	142	06.0492	482	50m shot
	37	55.6047	143	01.5678	1927	W=>E

2) OBS and MCS survey map



White circles show the deployed OBS positions. Red circles show the JAMSTEC OBSs and green circles show ERI OBSs. Yellow triangles show recovered instruments sites. Purple lines are MCS(50m shot) lines.

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.