doi : 10.17596/0003116

R/V Kairei Cruise Report

KR11-05 Leg1

Seismic study in the Izu-Ogasawara region

Mar. 3, 2011 – Mar. 14, 2011

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

Contents:

1．Cruise Information：

（1） Cruise number, Ship name: KR11-05Leg1, R/V Kairei

（2） Title of the cruise: 2010FY “Seismic study in the Izu-Ogasawara region”

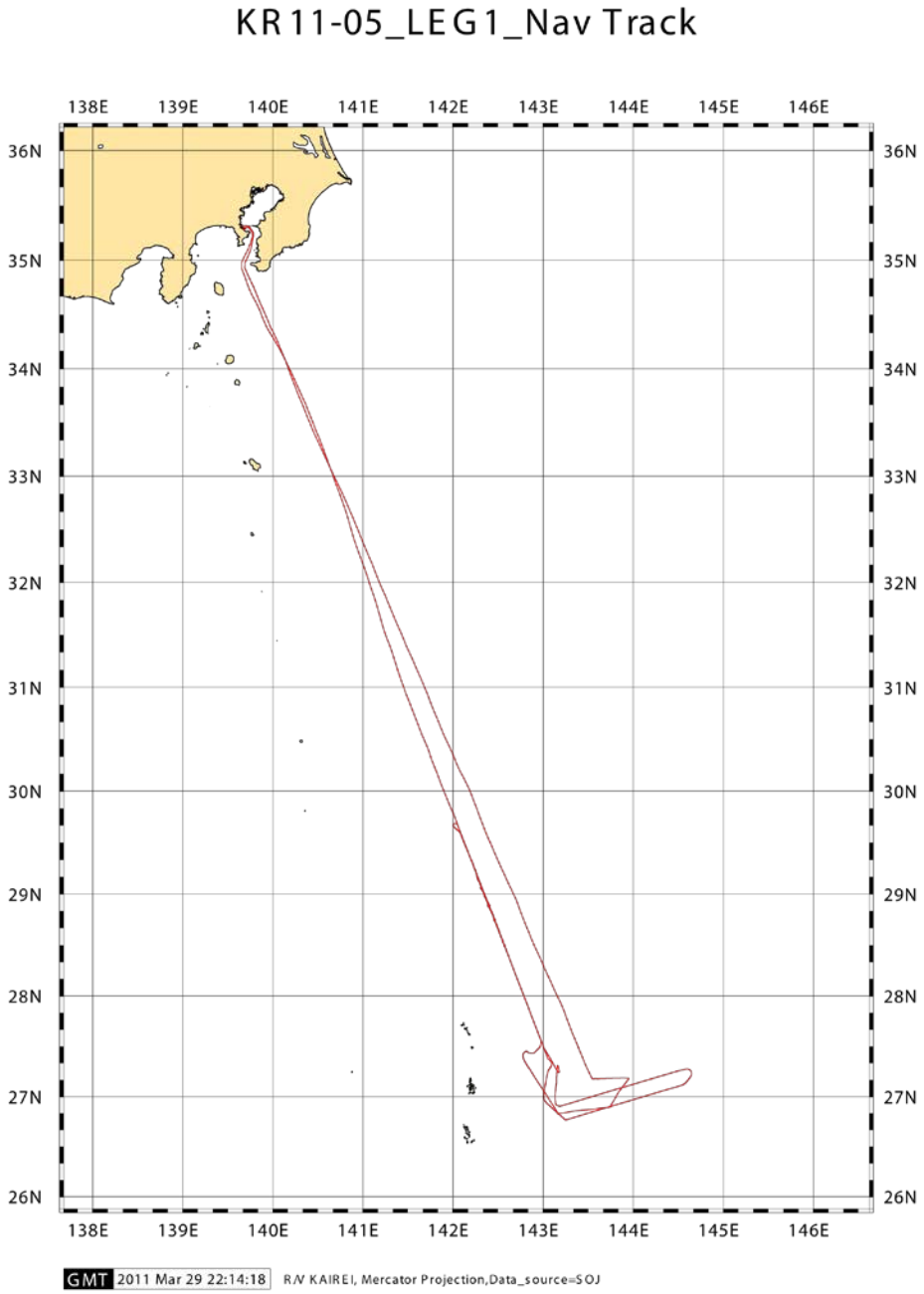
（3） Title of proposal: High-resolution structure study in the Izu-Ogasawara region

（4） Cruise period, Port call:

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

（5） Research Area: Izu-Ogasawara region

（6） Research Map:



２．Researchers

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３．Overview of Observation：

（１）Objectives：

In the Izu-Ogasawara area, IFREE has conducted seismic surveys intensively to understand crustal evolution of oceanic arcs since 2004. The objectives of this cruise in this area are to reveal the distribution of the detail crustal structure in the fore-arc area and in planed drill points of the “Project IBM” being one of an IODP proposal.

The earthquake of M_{JMA} = 7.4 occurred on December 22, 2010 off the east of the Chichi-jima in the Ogasawara area. To understand the mechanism of the earthquake generation and the tsunami generation of this earthquake, and the deformation of the old oceanic plate around the trench, it is important to clarify the location and geometry of the fault plane of the main shock. The objectives are also to reveal the precise aftershock distribution of this earthquake because this distribution is essential to determine the fault geometry.

（２）List of observations：

１）Deployment of OBSs

43 OBSs (KT06_01-KT06_43) were deployed along the east slope of Ogasawara ridge.

２）Multi-channel seismic (MCS) reflection survey

On 4 lines (Off Chichi-jima area: CJ_main and CJ_sub, Izu-Ogasawara area:KT06_obs_0 and KT06_0 lines), 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.

3） Recovery of ocean bottom seismometers (OBSs)

4 OBSs (C01-04) which are deployed by Kairei KR11-01 cruise were recovered in the off chichi-jima.

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), XCP(eXpendable Current Profiler) and XCTD（eXpendable Conductivity, Temperature and Depth） have been conducted to correct the sonic speed for the bathymetry survey and MCS survey.

（3） Cruise log:

Date		Remarks
2011/03/03	Thu	Departure from JAMSTEC (Yokosuka), and transit to survey area
2011/03/04	Fri	Transit to survey area and deployment of OBSs (KT06) Observaion of XCP and XCTD
2011/03/05	Sat	Deployment of OBSs (KT06) and observaion of XCP and XCTD
2011/03/06	Sun	Deployment of OBSs (KT06) and observaion of XCP and XCTD
2011/03/07	Mon	MCS survey on CJ_main line(50m shot)
2011/03/08	Tue	MCS survey on CJ_main line(50m shot)
2011/03/09	Wed	MCS survey on KT06_OBS line(200m shot)
2011/03/10	Thu	MCS survey on KT06_OBS line(200m shot)
2011/03/11	Fri	MCS survey on KT06_OBS line(200m shot)
2011/03/12	Sat	Recovery of OBS(C01-C04) and transit to JAMSTEC (Yokosuka)
2011/03/13	Sun	Transit to JAMSTEC (Yokosuka)
2011/03/14	Mon	Arrival at JAMSTEC (Yokosuka)

（4）Seismic lines

1）Locations of OBS

（1）OBS list

Site	OBS Calibration position					Remarks
	Latitude(N)		Longitude(E)		Depth(m)	
KT06_1	29	19.8748	142	12.1399	4794	deployed
KT06_2	29	17.1755	142	13.0753	4925	deployed
KT06_3	29	14.6407	142	14.1973	4843	deployed
KT06_4	29	12.1329	142	15.4167	4821	deployed
KT06_5	29	9.7931	142	16.5282	4483	deployed
KT06_6	29	7.2414	142	17.6587	4260	deployed
KT06_7	29	4.6922	142	18.8812	4389	deployed
KT06_8	29	2.1444	142	20.0705	4055	deployed
KT06_9	28	59.6578	142	21.1398	4146	deployed
KT06_10	28	57.1451	142	22.2370	4464	deployed
KT06_11	28	54.6794	142	23.3444	4331	deployed
KT06_12	28	52.0382	142	24.4231	3871	deployed
KT06_13	28	49.5465	142	25.4853	3275	deployed
KT06_14	28	47.1623	142	26.6874	4105	deployed
KT06_15	28	44.5706	142	27.8263	4123	deployed
KT06_16	28	42.1677	142	28.8290	4160	deployed
KT06_17	28	39.5477	142	30.1448	3656	deployed
KT06_18	28	37.0703	142	31.0544	3392	deployed
KT06_19	28	34.5004	142	32.1753	3649	deployed
KT06_20	28	31.9679	142	33.2103	3556	deployed
KT06_21	28	29.5182	142	34.2289	3223	deployed
KT06_22	28	27.0334	142	35.4016	3123	deployed
KT06_23	28	24.4899	142	36.4453	3118	deployed
KT06_24	28	22.0438	142	37.5664	3126	deployed
KT06_25	28	19.4822	142	38.6888	3112	deployed
KT06_26	28	17.0094	142	39.8119	3086	deployed
KT06_27	28	14.4673	142	40.9479	3026	deployed
KT06_28	28	11.9589	142	42.0217	3105	deployed
KT06_29	28	9.4132	142	43.0947	3002	deployed
KT06_30	28	6.9025	142	44.1559	3214	deployed
KT06_31	28	4.4417	142	45.2652	3378	deployed
KT06_32	28	1.9044	142	46.3572	3567	deployed

KT06_33	27	59.3750	142	47.4555	3823	deployed
KT06_34	27	56.7475	142	48.3797	3813	deployed
KT06_35	27	54.3117	142	49.6038	3568	deployed
KT06_36	27	51.7808	142	50.7016	3370	deployed
KT06_37	27	49.2179	142	51.7595	4008	deployed
KT06_38	27	46.6450	142	52.8876	4091	deployed
KT06_39	27	44.1384	142	53.9342	4318	deployed
KT06_40	27	41.6636	142	55.1441	5057	deployed
KT06_41	27	39.1173	142	56.2459	5447	deployed
KT06_42	27	36.6899	142	57.3153	5427	deployed
KT06_43	27	34.1083	142	58.3892	5764	deployed
C01	26	54.2	143	45.3	5922.3	retrieved
C02	26	50.0	143	10.1	5644.2	retrieved
C03	27	10.9	142	32.7	5632.1	retrieved
C04	27	11.0	142	57.1	5859.7	retrieved

2） Multi-channel seismic (MCS) reflection survey

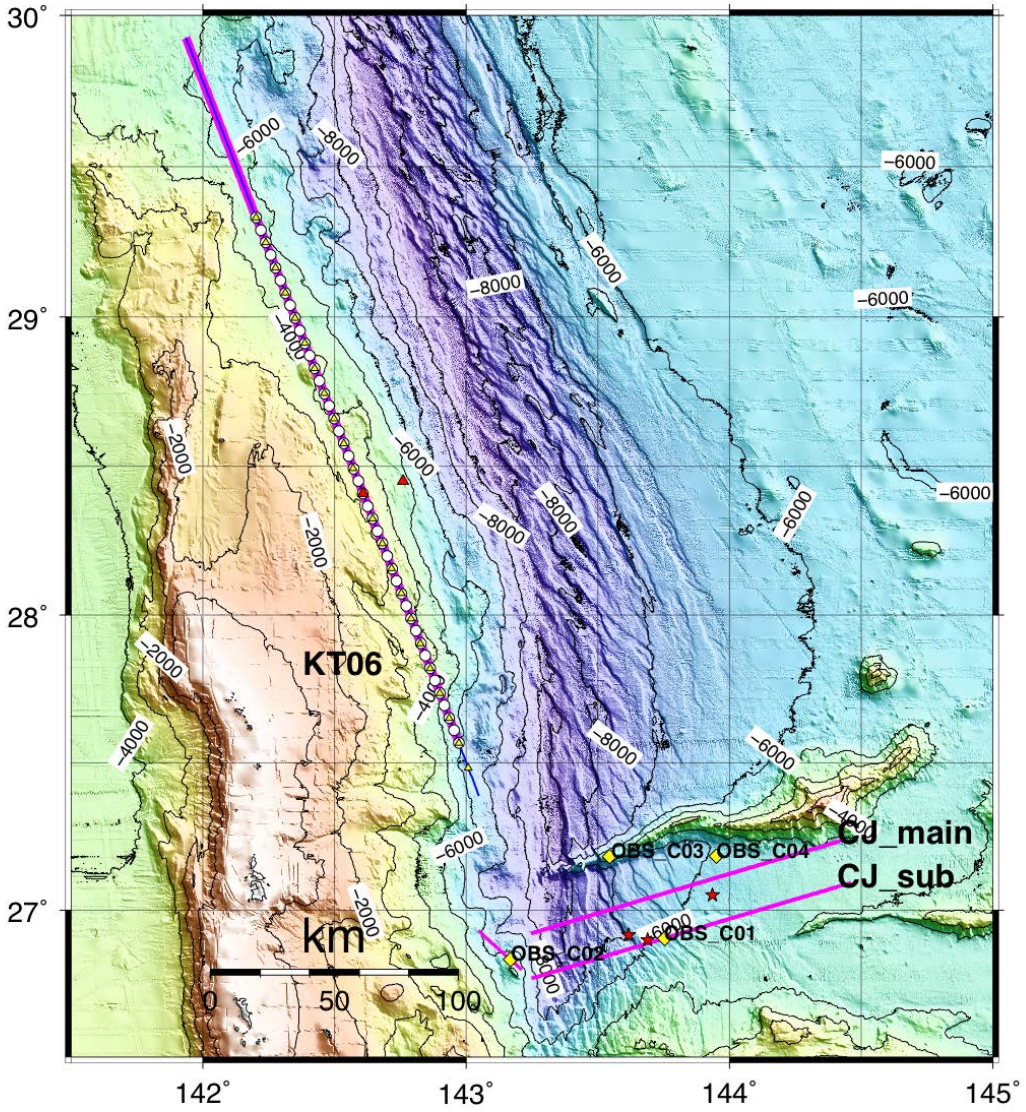
Line name	Position					Remarks
	Latitude(N)		Longitude(E)		Depth(m)	
KT06_1	29	32.8399	142	06.3202	5123	50m
	27	34.1102	142	58.3084	5772	N=>S
KT06obs_0	27	23.3583	143	02.9159	6322	200m
	29	40.5278	142	02.8904	5178	S=>N
CJ_main_0	26	55.2690	143	14.8583	7477	50m
	27	14.2544	144	25.6904	5178	W=>E
CJ_sub_0	27	05.6142	144	27.7479	5114	50m
	26	46.1910	143	15.3596	6843	E=>W

3） XCP and XCTD site

Site	XCP				XCTD				Remarks
	Latitude(N)		Longitude(E)		Latitude(N)		Longitude(E)		
S01	29	19.57	142	12.31	29	19.269	142	12.476	KT06_01
S02	29	14.85	142	14.34	29	14.273	142	14.713	KT06_03
S03	29	09.80	142	16.56	29	09.520	142	16.705	KT06_05
S04	29	04.47	142	18.80	29	04.111	142	18.591	KT06_07
S05	28	59.75	142	21.02	28	59.061	142	21.133	KT06_09

S06	28	54.71	142	23.25	28	54.002	142	23.272	KT06_11
S07	28	49.81	142	25.35	28	50.043	142	25.202	KT06_13
S08	28	44.74	142	27.62	28	44.807	142	27.548	KT06_15
S09	28	39.85	142	29.88	28	40.000	142	29.906	KT06_17
S10	28	32.69	142	32.05	28	34.932	142	32.130	KT06_19
S11	28	29.34	142	34.14	28	28.880	142	34.495	KT06_21
S12	28	24.36	142	36.57	28	23.911	142	36.794	KT06_23
S13	28	19.32	142	38.75	28	18.862	142	38.970	KT06_25
S14	28	14.30	142	40.94	28	13.849	142	41.149	KT06_27
S15	28	09.25	142	43.12	28	08.771	142	43.333	KT06_29
S16	28	04.19	142	45.33	28	03.766	142	45.538	KT06_31
S17	27	59.18	142	47.50	27	58.700	142	47.708	KT06_33
S18	27	54.14	142	49.70	27	53.656	142	49.889	KT06_35
S19	27	49.09	142	51.85	27	48.752	142	52.019	KT06_37
S20	27	44.00	142	54.05E	27	43.628	142	54.194	KT06_39
S21	27	39.97	142	56.24	27	38.681	142	56.380	KT06_41
S22	—				27	33.984	142	58.355	KT06_43
S23	—				27	29.109	143	00.458	—

3) Survey map of OBS, MCS, XCP and XCTD



White circles show the deployed OBS positions. Yellow triangles show XCP and XCTD sites. Yellow diamonds are recovered OBS positions. Magenta lines are MCS(50m shot) lines. Blue line is MCS(200m shot) line for OBS study. Red triangles are proposed points of drilling. Red stars are epicenter positions of Dec. 22 2010 earthquake determined by USGS and JMA.

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.