



R/V Kairei Cruise Report

KR11-01

Seismic study in the northwestern Pacific region

Jan. 4, 2011 – Jan. 20, 2011

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

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1. Cruise Information :

(1) Cruise number, Ship name: KR11-01, R/V Kairei

(2) Title of the cruise:

2010FY “Seismic study in the northwestern Pacific region”

(3) Title of proposal:

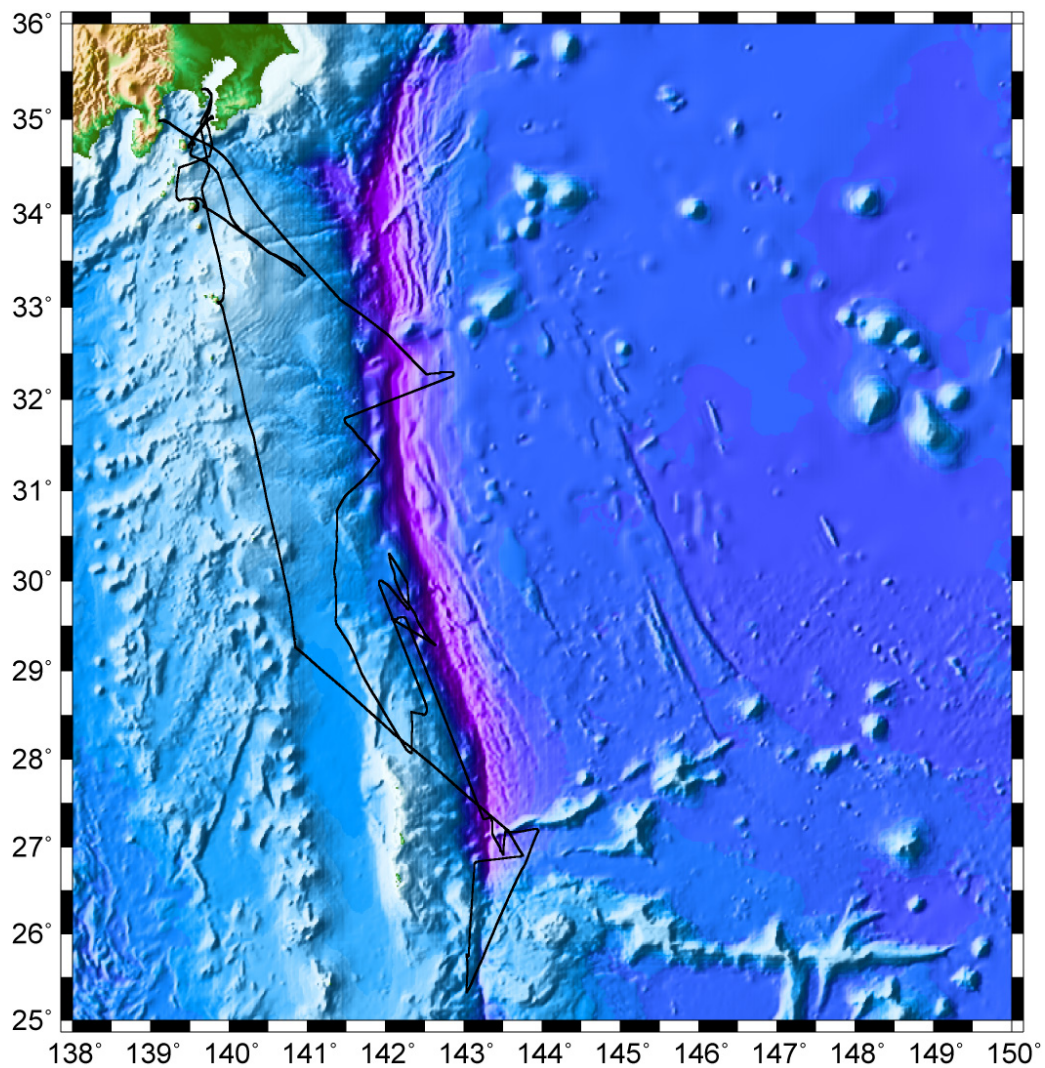
High-resolution structure study in the northwestern Pacific region

(4) Cruise period, Port call:

2011/01/04-01/20, JAMSTEC (Yokosuka) to JAMSTEC (Yokosuka)

(5) Research Area: Northwestern Pacific and Izu-Ogasawara

(6) Research Map:



2. Researchers

(1) Chief Scientist [Affiliation]: Takeshi SATO [JAMSTEC]

(2) Representative of Science Party [Affiliation]:

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(3) Science party list:

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Masao NAKANISHI [Chiba Univ.]

3. Overview of Observation :

(1) Objectives :

In the northwestern Pacific region, the old oceanic plate (Pacific plate) formed in the eastern Pacific ridge has been subducting in the Japan, Kuril and Ogasawara trenches. To advance the “Mohole project” being one of an IODP proposal and to understand the structural character of the old oceanic plate, it is important to clarify the crust and mantle structure in the old oceanic plate and the transitional process of the structure in the plate. The objectives of this cruise are to reveal the detailed crust and mantle structure of the old oceanic plate (Pacific plate) and transition of this structure around the trench.

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 observation instruments :

1) Multi-channel seismic (MCS) reflection survey

On 3 lines (A6mcs_0, KT06_0, and KT07 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 A6mcs_0 line of the MCS survey, a volume of a tuned air-gun array is 6,550 cubic inch because of an air-gun system trouble.

2) Recovery of ocean bottom seismometers (OBSs)

13 OBSs (Site 65-77) deployed off south-southeast of Tori-shima and one OBS (C01) deployed off the east of Chichi-jima by KR10-13 cruise were recovered.

3) Deployment of OBSs

4 OBSs (C01-04) were deployed off the east of 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

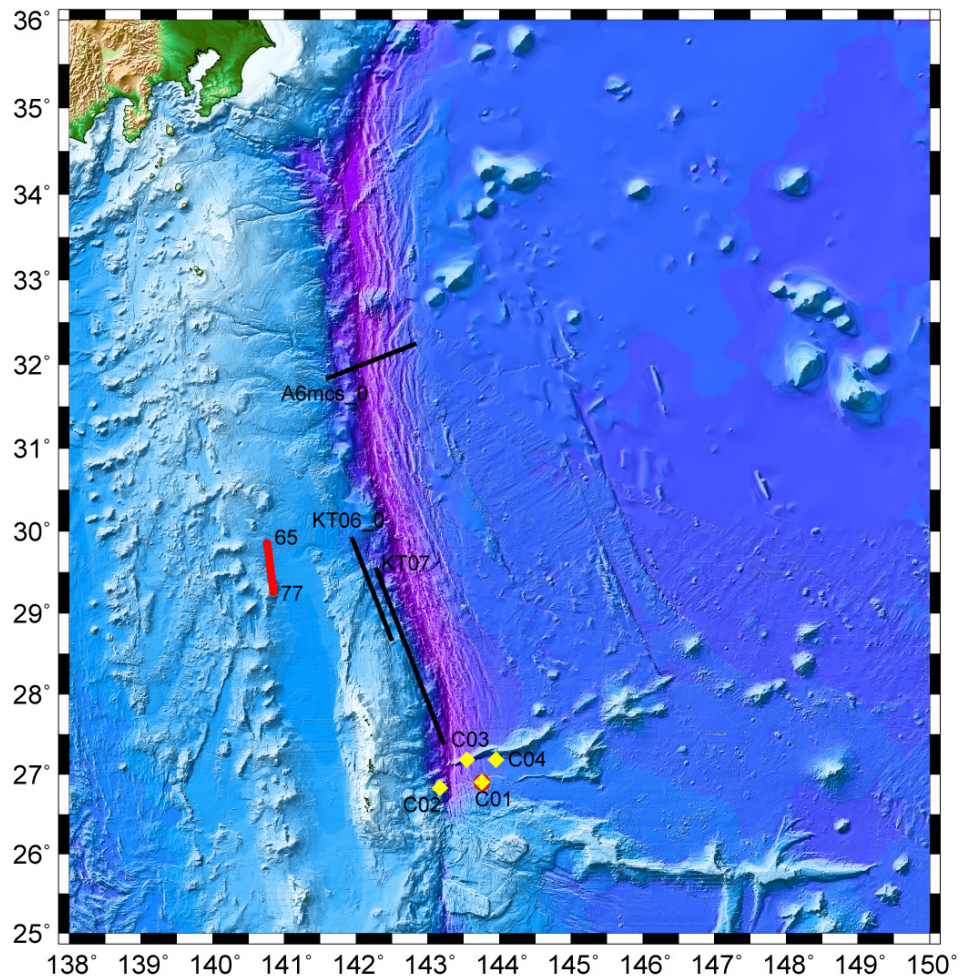
Expendable-Bathy Thermograph (XBT) has been conducted to correct the sonic speed for the bathymetry survey.

(3) Cruise log:

Date		Remarks
2011/01/04	Tue	Departure from JAMSTEC (Yokosuka), and transit to survey area
2011/01/05	Wed	Transit to survey area and recovery of OBSs (Site65-71)
2011/01/06	Thu	Recovery of OBSs (Site72-77, and C01), transit to survey area and deployment OBS (C01)
2011/01/07	Fri	Deployment OBSs (C02 and C04) and interruption of the observation due to the bad sea condition
2011/01/08	Sat	Deployment of OBS (C03) and MCS survey on KT07 line
2011/01/09	Sun	MCS survey on KT07 line
2011/01/10	Mon	Holding of the observation due to the bad sea condition
2011/01/11	Tue	MCS survey on KT06_0 line
2011/01/12	Wed	MCS survey on KT06_0 line and holding of the observation due to the bad sea condition
2011/01/13	Thu	Holding of the observation due to the bad sea condition
2011/01/14	Fri	MCS survey on A6_0 line
2011/01/15	Sat	MCS survey on A6_0 line and transit to off Ito to escape the bad sea condition
2011/01/16	Sun	Stay at off Ito to escape the bad sea condition
2011/01/17	Mon	Stay at Tateyama Bay to escape the bad sea condition
2011/01/18	Tue	Transit to survey area and holding of the observation due to the bad sea condition
2011/01/19	Wed	Transit to JAMSTEC (Yokosuka)
2011/01/20	Thu	Arrive at JAMSTEC (Yokosuka)

(4) Seismic lines

1) Multi-channel seismic (MCS) reflection survey



Red and yellow circles show locations of recovered and deployed OBSs, respectively. Black lines are MCS reflection survey lines conducted in this cruise using a tuned air-gun array and a 444 channel hydrophone streamer.

KT07	Time (UTC)	Latitude (N)	Longitude (E)	Depth (m)	SP
First shot	2011/01/08 06:29	27° 21.75390'	143° 13.77659'	8199	921
First good shot	2011/01/08 06:36	27° 22.23619'	143° 13.57613'	8182	940
Last good shot	2011/01/09 11:59	29° 33.22733'	142° 16.35111'	5648	6127
Last shot	2011/01/09 11:59	29° 33.22733'	142° 16.35111'	5648	6127

KT06_0	Time (UTC)	Latitude (N)	Longitude (E)	Depth (m)	SP
First shot	2011/01/11 07:26	29° 55.50275'	141° 56.15465'	4890	881
First good shot	2011/01/11 07:27	29° 55.45191'	141° 56.17616'	4893	883
Last good shot	2011/01/11 23:44	28° 39.27223'	142° 30.03456'	3614	3903
Last shot	2011/01/11 23:44	28° 39.27223'	142° 30.03456'	3614	3903

A6_mcs_0	Time (UTC)	Latitude (N)	Longitude (E)	Depth (m)	SP
First shot	2011/01/14 04:35	31° 49.30961'	141° 33.55174'	-	881
First good shot	2011/01/14 04:57	31° 49.77405'	141° 34.93342'	4760	928
Last good shot	2011/01/14 21:00	32° 14.88934'	142° 50.42190'	5889	3485
Last shot	2011/01/14 21:00	32° 14.88934'	142° 50.42190'	5889	3485

2) OBSs locations

(1) OBS list

Site	OBS Calibration position					Remarks
	Latitude(N)	Longitude(E)	Depth(m)	x	y	
65	29_50.8687	140_45.4724	3424.8	-22.7	-10.7	1
66	29_47.9372	140_45.8882	3554.1	4.0	-17.3	1
67	29_44.9849	140_46.3250	3459.8	-9.3	8.0	1
68	29_42.1035	140_46.8012	3424.7	108.0	98.7	1
69	29_39.1087	140_47.1995	3425.1	16.0	65.3	1
70	29_36.1966	140_47.6689	3602.4	78.7	146.7	1
71	29_33.2177	140_48.1002	3454.6	16.0	166.7	1
72	29_30.0958	140_48.5396	3222.5	-310.7	201.3	1
73	29_27.3310	140_48.9476	3390.7	24.0	185.3	1
74	29_24.3535	140_49.3499	2904.3	-36.0	160.0	1
75	29_21.3808	140_49.8040	2606.4	-85.3	220.0	1
76	29_18.4784	140_50.1433	2155.3	-6.7	96.0	1
77	29_15.6749	140_50.5348	2045.4	254.7	54.7	1

Site	OBS Calibration position					Remarks
	Latitude(N)	Longitude(E)	Depth(m)	x	y	
C01	26_54.0195	143_45.1144	5775.4	36.0	189.3	1
C01	26_54.1957	143_45.2698	5922.3	361.3	446.7	2
C02	26_49.9516	143_10.0837	5644.2	-89.3	138.7	2
C03	27_10.9306	143_32.7388	5632.1	190.7	18.7	2
C04	27_11.0209	143_57.0727	5859.7	38.7	120.0	2

Remarks:

1: Recovery of OBS.

2: Deployment of OBS.

4 . 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 (DIAG), JAMSTEC.