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R/V Kairei Cruise Report

KR14-06

FY26 IODP related pre- and post-drilling site surveys

1: Mohole project

Southeast of Shatsky Rise

May 27, 2014-Jun. 24, 2014

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

Contents

1. Cruise Information

● Cruise ID: KR14-06

● Name of vessel: R/V Kairei

● Title of the cruise: FY26 IODP related pre- and post-drilling site surveys 1: Mohole project

● Cruise period: 2014/05/27 – 2014/06/24

● Ports of call: Yokosuka – Tokyo

● Research area: Southeast of Shatsky Rise

● Research Map

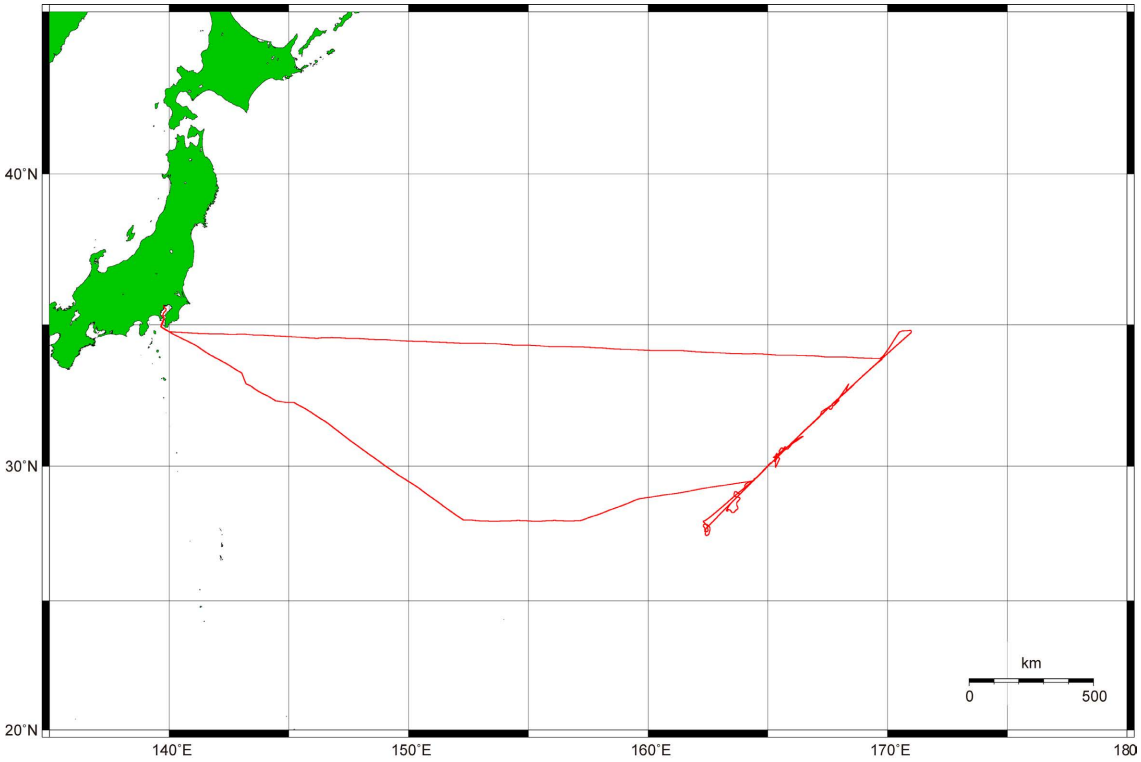

Fig.1. Ship track of KR14-06

2. Researchers

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● Representative of the science party: Shuichi Kodaira [JAMSTEC]

● Science party (List)

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3. Observation

3.1 Background and objectives

This cruise had been originally planned to be carried out off Hawaii as a site survey for the "Mohole project" by International Ocean Discovery Program, however it was postponed due to circumstances on US EEZ clearance. The location was changed to southeast of the Shatsky Rise in the central Pacific Ocean to achieve the original purpose of this cruise, i.e., to understand the "normal" old oceanic plate and evaluate the effects from hotspot activity to the normal oceanic plate structure. We conducted a seismic survey using 5 Ocean Bottom Seismographs (OBS) and multi-channel seismic (MCS) system by R/V Kairei. We set a very long survey line approximately perpendicular to the magnetic lineation to obtain MCS and OBS data using Kairei's MCS system.

3.2 List of observation

(1) Deployment and recovery of OBSs

Five OBSs were deployed along the survey line PP01 to record the seismic waves generated by air guns. Each OBS location was determined by SSBL system at the deployment. After shooting air guns, all OBSs were recovered by acoustic release and self-popup system.

(2) MCS/OBS survey (reflection and refraction seismic survey)

We fired the Kairei's air gun array along the survey line PP01. The air guns were towed at 10 m depth and fired every 200 m. The ship speed was kept ~3.5-4.5 knots during the shooting. A 6000 m, 444 channel streamer cable was towed at 12 m depth to record the seismic signals from air guns.

(3) XCTD measurements

We conducted two XCTD casts at the north and south of the survey area to obtain the acoustic velocity profile in the water column.

(4) Bathymetry, gravity, magnetic surveys

Bathymetry data were collected by multi-narrow beam echo sounder (seabeam) during the survey. Gravity and magnetic data were also collected.

3.3 List of observation equipments

Kairei MCS system (444 channel streamer cable, maximum offset ~6 km)

Ocean Bottom Seismographs

Air gun array (7800 $inch^3$)

Seabeam 2112

XCTD

Three component magnetometer

Gravity meter

3.4 Cruise log

Date	Log
05/27/2014	Departed from JAMSTEC, Transit to survey area
05/28/2014	Transit to survey area
05/29/2014	Transit to survey area
05/30/2014	Transit to survey area
05/31/2014	Transit to survey area
06/01/2014	Arrived at survey area, XCTD, Deployed OBS1, OBS2
06/02/2014	Deployed OBS3, OBS4, OBS5
06/03/2014	Air gun trouble shooting
06/04/2014	Started Line PP01 (PP01obs_0)
06/05/2014	Line PP01 (PP01obs_0), wait on weather
06/06/2014	Streamer cable trouble shooting, Line PP01 (PP01obs_01, PP01_obs02)
06/07/2014	Air gun trouble shooting, Line PP01 (PP01obs_03)
06/08/2014	Line PP01 (PP01obs_03), wait on weather
06/09/2014	Wait on weather
06/10/2014	Wait on weather
06/11/2014	Air gun trouble shooting, Line PP01 (PP01obs_04)
06/12/2014	Line PP01 (PP01obs_04)

06/13/2014	Air gun trouble shooting, Line PP01 (PP01obs_05)
06/14/2014	Wait on weather, Line PP01 (PP01obs_06)
06/15/2014	Line PP01 (PP01obs_06)
06/16/2014	Finished Line PP01 (PP01obs_06), MCS system maintenance
06/17/2014	Retrieved OBS1, OBS2
06/18/2014	Retrieved OBS3, OBS4, OBS5, departed from survey area
06/19/2014	Transit to Tokyo
06/20/2014	Transit to Tokyo
06/21/2014	Transit to Tokyo, onboard seminar
06/22/2014	Transit to Tokyo, ship tour
06/23/2014	Transit to Tokyo
06/24/2014	Arrived at Tokyo-Harumi

3.5 Research Information

Map of survey area and MCS/OBS survey line PP01

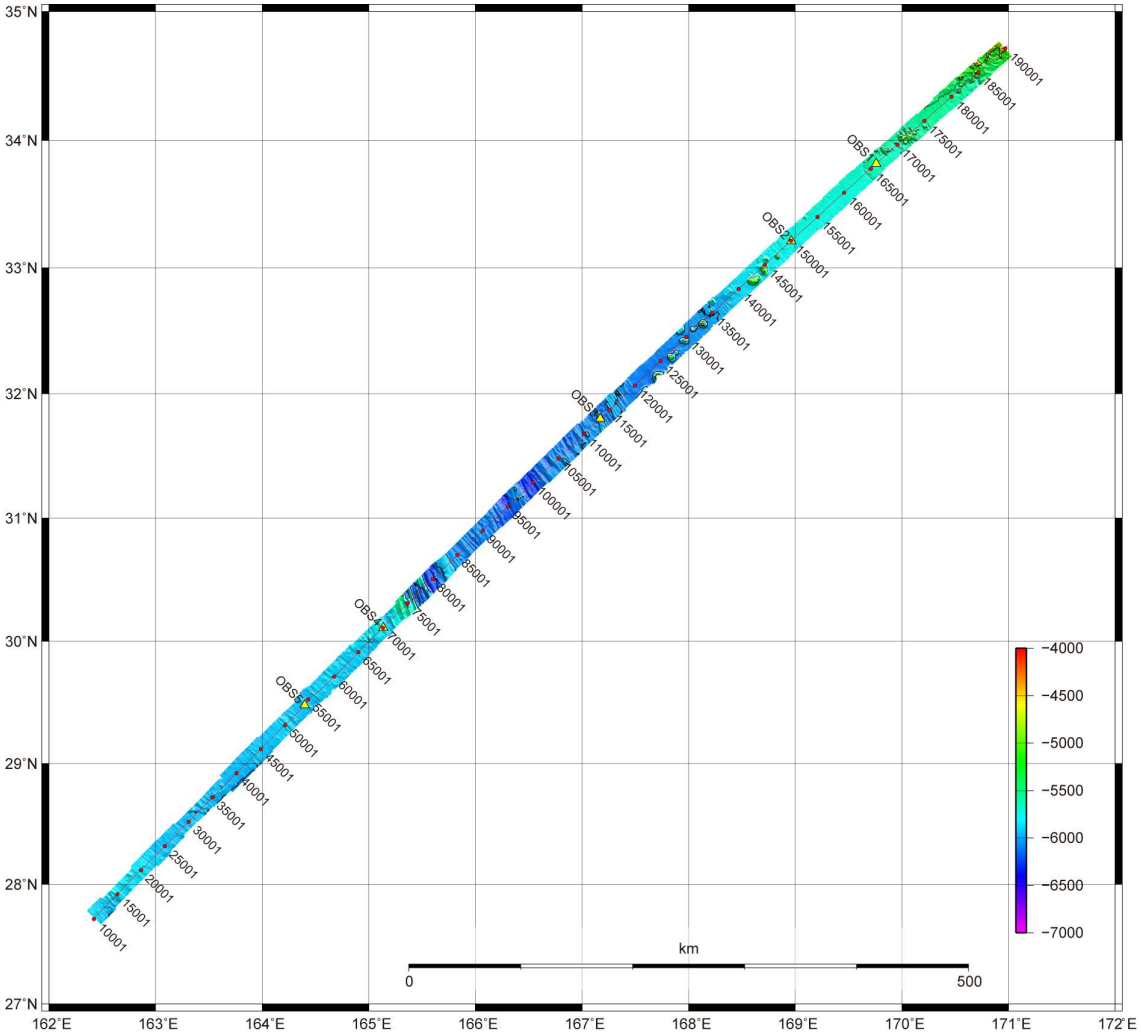

Fig.2. Map of survey line. Red line denote the survey line PP01. Red circles and yellow triangles indicate the CDP number of MCS survey and OBS locations, respectively. Background image is the bathymetry data obtained by the SeaBeam system during KR14-06.

OBS location

OBS No	Calibrated OBS position		
	Latitude (N)	Longitude (E)	Depth (m)
1	33_49.0454	169_45.5555	5621.8
2	33_12.6577	168_57.6787	5750.2
3	31_47.9872	167_10.2060	5942.4
4	30_06.7115	165_08.1075	5770.4
5	29_28.6721	164_24.0184	5922.0

MCS/OBS Line list

LINE NAME	DATE (UTC)	TIME (UTC)	F.S.P. / F.G.S.P. / L.G.S.P. / L.S.P.	VESSEL POSITION	
			L.S.P.	Lat.	Lon.
PP01obs_0	04/06/2014	02:08:03	4913	27_43.40046'N	162_25.56730'E
	04/06/2014	02:19:32	4945	27_44.04805'N	162_26.21533'E
	04/06/2014	21:57:52	8413	28_50.84046'N	163_40.73675'E
	04/06/2014	21:57:52	8413	28_50.84046'N	163_40.73675'E
PP01obs_1	05/06/2014	22:44:22	8001	28_42.92535'N	163_31.81639'E
	05/06/2014	22:47:08	8009	28_43.07926'N	163_31.98927'E
	06/06/2014	03:26:33	8801	28_58.29821'N	163_49.14429'E
	06/06/2014	03:42:11	8817	28_59.41545'N	163_48.56732'E
PP01obs_2	06/06/2014	11:15:14	8701	28_56.36777'N	163_46.98575'E
	06/06/2014	11:19:26	8713	28_56.59704'N	163_47.24737'E
	06/06/2014	18:03:10	9801	29_17.42996'N	164_10.96292'E
	06/06/2014	18:38:58	9897	29_19.26341'N	164_13.06491'E
PP01obs_3	07/06/2014	02:29:25	9733	29_16.12294'N	164_09.48421'E
	07/06/2014	02:32:16	9741	29_16.27697'N	164_09.65761'E
	08/06/2014	04:00:01	13901	30_35.28527'N	165_41.81077'E
	08/06/2014	04:00:01	13901	30_35.28527'N	165_41.81077'E
PP01obs_4	11/06/2014	06:44:44	13637	30_30.30170'N	165_35.89241'E
	11/06/2014	06:47:41	13645	30_30.45196'N	165_36.07269'E
	12/06/2014	13:46:03	18953	32_09.66698'N	167_37.08115'E
	12/06/2014	13:46:03	18953	32_09.66698'N	167_37.08115'E
PP01obs_5	12/06/2014	19:46:20	18893	32_08.55520'N	167_35.69187'E
	12/06/2014	19:49:00	18901	32_08.70434'N	167_35.87611'E
	13/06/2014	06:29:42	20605	32_40.12564'N	168_15.59796'E
	13/06/2014	06:29:42	20605	32_40.12564'N	168_15.59796'E
PP01obs_6	14/06/2014	07:08:33	20433	32_36.96462'N	168_11.56770'E
	14/06/2014	07:11:28	20441	32_37.11425'N	168_11.75224'E
	16/06/2014	01:27:37	27461	34_44.68101'N	170_59.42398'E
	16/06/2014	01:27:37	27461	34_44.68101'N	170_59.42398'E

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.

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