



R/V Kairei Cruise Report  
KR15-07

Seismic survey and observations in Japan Trench region

May 15, 2015 - June 08, 2015

Japan Trench

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

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1. Cruise Information

- (1) Cruise Number, Name of vessel : KR15-07, R/V Kairei
- (2) Title of the Cruise  
FY2015 Seismic survey and observations in Japan Trench region
- (3) Title of proposal  
Seismic structure study at the outer rise of Japan Trench
- (4) Cruise period, Port call  
2015/05/15 – 2015/06/08, Yokosuka-Yokosuka
- (5) Research Area  
Japan Trench region
- (6) Research Map

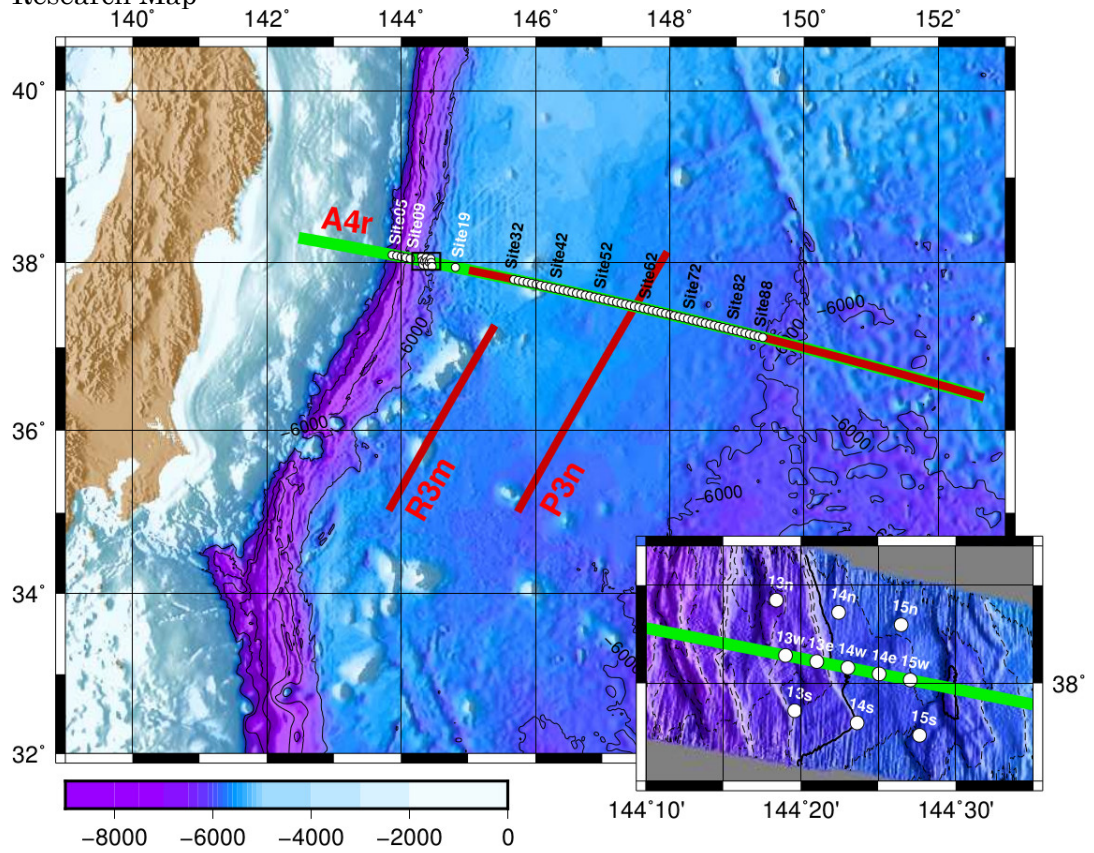


Figure 1. Planned seismic survey. The red lines are seismic survey lines and white circles are OBS sites.

## 2. Researchers

- (1) Representative of Science Party [Affiliation] : Shuichi Kodaira [JAMSTEC]
- (2) Shipboard science party list
  - 1) FUJIE Gou [JAMSTEC], Chief Scientist
  - 2) SHIRAI Taro [JAMSTEC]

## 3. Overview of Observation

### (1) Objectives

On 11 March 2011, the great 2011 Tohoku-oki earthquake (Mw 9.0) was occurred in the Japan Trench region. This was the greatest earthquake that has been observed in Japan, and it caused devastating damages in the eastern Japan. To evaluate the hazard of the large interplate and outer rise earthquakes next to the rupture zones of the 2011 Tohoku-oki earthquake, we conducted seismic structure survey in the Japan Trench region.

### (2) Observations

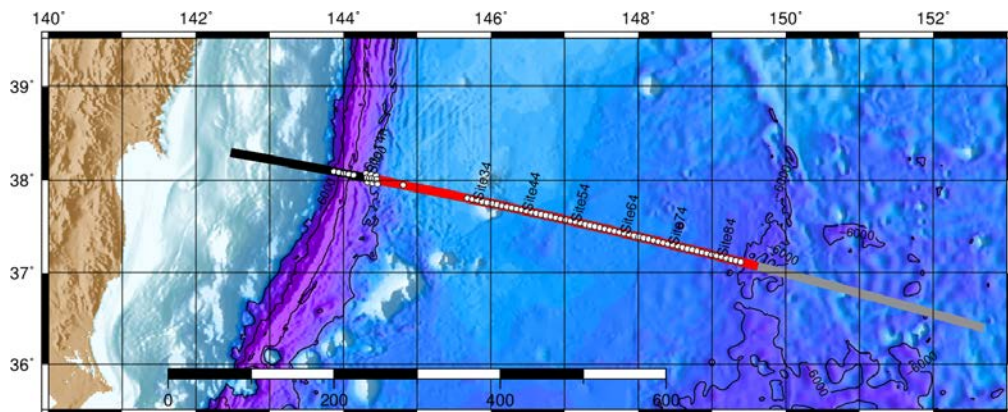


Figure 2. The actual range of air-gun shots (black and red line). A hydrophone streamer cable was towed along the red line during the air-gun shooting.

#### 1) OBS deployment.

We deployed 75 OBSs (8 UD-OBS, 2 OBS2G, and 65 JAMSTEC-Standard OBSs).

#### 2) Air-gun shooting.

An air-gun array of R/V Kairei was shot at an interval of 200m. In the western area of the profile (black line in Figure 2), we shot air-guns without towing a hydrophone streamer cable. On the other hand, on the red line, we towed 6-km-long 444-ch hydrophone streamer cable during air-gun shooting.

#### 3) OBS recovery.

We recovered all OBSs except for one at Site 56.

4) Bathymetry, magnetics and gravity observation.

During the cruise, bathymetry, magnetics and gravity data have been recorded continuously by SEABEAM2112.004, three component magnetometer and gravity meter, respectively. However, the SEABEAM system was broken down and we could not obtain the bathymetry data along the last two lines.

4. List of observation instruments

- (1) Ocean bottom seismometer (OBS)
- (2) 444-ch hydrophone streamer
- (3) SEABEAM2112.004
- (4) three component magnetometer
- (5) gravity meter.

5. Cruise log

| Date             | Remarks  |
|------------------|--|
| 2015/05/15       | Departure from Yokosuka                                      |
| 2015/05/16-18    | OBS deployment (west-end to Site 55)                         |
| 2015/05/19-22    | Air-gun shooting (A4r, without streamer, A4robs_0, A4robs_1) |
| 2015/05/23-24    | OBS deployment (Site 56 to Site 88)                          |
| 2015/05/25       | OBS position calibration                                     |
| 2015/05/26-29    | Air-gun shooting (A4r, with streamer, A4robs_2, A4robs_3)    |
| 2015/05/30-06/03 | OBS recovery   |
| 2015/06/04       | Bad weather  |
| 2015/06/05-06    | OBS recovery   |
| 2015/06/07       | Transit to Yokosuka  |
| 2015/06/08       | Arrival at Yokosuka  |

6. OBS position (deploy position)

| Site | Cast                |                 |             |          |
|------|---------------------|-----------------|-------------|----------|
|      | Time<br>UTC         | Vessel position |             |          |
|      |                     | Lat(N)          | Lon(E)      | Depth(m) |
| 05_U | 2015/05/15 23:57:41 | 38_05.5707      | 143_52.1631 | 6636.0   |
| 06_U | 2015/05/16 01:31:23 | 38_04.9419      | 143_56.1966 | 7094.0   |
| 07_U | 2015/05/16 03:08:54 | 38_04.3165      | 144_00.2778 | 7568.0   |
| 08_U | 2015/05/16 05:00:32 | 38_03.7009      | 144_04.2795 | 7092.0   |
| 09_U | 2015/05/16 06:45:54 | 38_03.0766      | 144_08.3210 | 6742.0   |

|       |                     |            |             |        |
|-------|---------------------|------------|-------------|--------|
| 13n_U | 2015/05/16 08:55:49 | 38_04.2442 | 144_18.4875 | 6346.0 |
| 13w_U | 2015/05/16 10:30:44 | 38_01.4491 | 144_19.0738 | 6182.0 |
| 13s_U | 2015/05/16 12:05:08 | 37_58.5881 | 144_19.6710 | 6119.0 |
| 13e_S | 2015/05/16 13:41:05 | 38_01.1206 | 144_21.1017 | 6127.0 |
| 14n   | 2015/05/16 16:08:24 | 38_03.6836 | 144_22.5226 | 5994.0 |
| 14w   | 2015/05/16 17:33:59 | 38_00.7727 | 144_23.1143 | 5988.0 |
| 14s   | 2015/05/16 19:01:41 | 37_57.9764 | 144_23.7025 | 6003.0 |
| 14e   | 2015/05/16 20:25:06 | 38_00.5050 | 144_25.0998 | 5959.0 |
| 15n   | 2015/05/16 21:47:33 | 38_03.0266 | 144_26.5423 | 5901.0 |
| 15w   | 2015/05/16 23:18:16 | 38_00.1257 | 144_27.1336 | 5897.0 |
| 15s   | 2015/05/17 00:48:32 | 37_57.3842 | 144_27.6808 | 5968.0 |
| 19    | 2015/05/17 03:22:51 | 37_56.7636 | 144_48.6262 | 5480.0 |
| 32    | 2015/05/17 07:21:18 | 37_48.1887 | 145_40.8248 | 5452.0 |
| 33    | 2015/05/17 08:09:52 | 37_47.5096 | 145_44.8348 | 5454.0 |
| 34    | 2015/05/17 09:00:21 | 37_46.8368 | 145_48.8216 | 5374.0 |
| 35    | 2015/05/17 09:50:25 | 37_46.1794 | 145_52.8314 | 5068.0 |
| 36    | 2015/05/17 10:39:02 | 37_45.4900 | 145_56.8359 | 4121.0 |
| 37    | 2015/05/17 11:34:35 | 37_44.8188 | 146_00.8302 | 3952.0 |
| 38    | 2015/05/17 12:30:16 | 37_44.1156 | 146_04.8395 | 5369.0 |
| 39    | 2015/05/17 13:28:24 | 37_43.4165 | 146_08.8448 | 5563.0 |
| 40    | 2015/05/17 14:25:36 | 37_42.7313 | 146_12.8479 | 5545.0 |
| 41    | 2015/05/17 15:21:43 | 37_42.0259 | 146_16.8315 | 5542.0 |
| 42    | 2015/05/17 16:12:37 | 37_41.3393 | 146_20.8286 | 5543.0 |
| 43    | 2015/05/17 17:05:30 | 37_40.6347 | 146_24.8199 | 5522.0 |
| 44    | 2015/05/17 18:00:26 | 37_39.9460 | 146_28.8143 | 5535.0 |
| 45    | 2015/05/17 18:57:16 | 37_39.2444 | 146_32.7972 | 5558.0 |
| 46    | 2015/05/17 19:56:25 | 37_38.5388 | 146_36.7925 | 5573.0 |
| 47    | 2015/05/17 21:00:31 | 37_37.8319 | 146_40.7848 | 5600.0 |
| 48    | 2015/05/17 22:06:37 | 37_37.1212 | 146_44.7824 | 5553.0 |
| 49    | 2015/05/17 23:16:03 | 37_36.4185 | 146_48.7754 | 5695.0 |
| 50    | 2015/05/18 00:21:33 | 37_35.7122 | 146_52.7520 | 5679.0 |
| 51    | 2015/05/18 01:18:31 | 37_34.9782 | 146_56.7363 | 5685.0 |
| 52    | 2015/05/18 02:17:14 | 37_34.2673 | 147_00.7400 | 5690.0 |
| 53    | 2015/05/18 03:16:49 | 37_33.5497 | 147_04.7226 | 5681.0 |
| 54    | 2015/05/18 04:18:36 | 37_32.8339 | 147_08.6939 | 5679.0 |
| 55    | 2015/05/18 05:18:46 | 37_32.1114 | 147_12.6680 | 5678.0 |
| 56_S  | 2015/05/22 15:53:14 | 37_31.3762 | 147_16.6602 | 5685.0 |

|      |                     |            |             |        |
|------|---------------------|------------|-------------|--------|
| 56_1 | 2015/05/22 18:17:13 | 37_31.3956 | 147_16.6376 | 5691.0 |
| 57   | 2015/05/22 19:21:42 | 37_30.6506 | 147_20.6060 | 5672.0 |
| 58   | 2015/05/22 20:27:12 | 37_29.9159 | 147_24.5817 | 5686.0 |
| 59   | 2015/05/22 21:30:53 | 37_29.2010 | 147_28.5624 | 5674.0 |
| 60   | 2015/05/22 22:35:04 | 37_28.4548 | 147_32.5414 | 5635.0 |
| 61   | 2015/05/24 00:37:15 | 37_27.7383 | 147_36.3984 | 5656.0 |
| 62   | 2015/05/23 23:56:19 | 37_26.9961 | 147_40.3743 | 5656.0 |
| 63   | 2015/05/23 23:15:58 | 37_26.2696 | 147_44.3391 | 5643.0 |
| 64   | 2015/05/23 22:38:38 | 37_25.5449 | 147_48.3401 | 5659.0 |
| 65   | 2015/05/23 22:01:41 | 37_24.7924 | 147_52.3390 | 5655.0 |
| 66   | 2015/05/23 21:23:56 | 37_24.0456 | 147_56.2779 | 5662.0 |
| 67   | 2015/05/23 20:46:46 | 37_23.2791 | 148_00.2411 | 5663.0 |
| 68   | 2015/05/23 20:06:59 | 37_22.4995 | 148_04.2126 | 5672.0 |
| 69   | 2015/05/23 19:26:50 | 37_21.7597 | 148_08.1737 | 5688.0 |
| 70   | 2015/05/23 18:47:38 | 37_21.0000 | 148_12.1151 | 5700.0 |
| 71   | 2015/05/23 18:10:09 | 37_20.2510 | 148_16.0811 | 5709.0 |
| 72   | 2015/05/23 17:31:59 | 37_19.4815 | 148_20.0291 | 5712.0 |
| 73   | 2015/05/23 16:51:56 | 37_18.7159 | 148_23.9960 | 5713.0 |
| 74   | 2015/05/23 16:12:06 | 37_17.9582 | 148_27.9128 | 5735.0 |
| 75   | 2015/05/23 15:30:24 | 37_17.1940 | 148_31.8718 | 5741.0 |
| 76   | 2015/05/23 14:48:07 | 37_16.4378 | 148_35.8318 | 5755.0 |
| 77   | 2015/05/23 14:04:58 | 37_15.6564 | 148_39.7693 | 5776.0 |
| 78   | 2015/05/23 13:18:01 | 37_14.8800 | 148_43.7247 | 5799.0 |
| 79   | 2015/05/23 12:28:52 | 37_14.0999 | 148_47.6767 | 5815.0 |
| 80   | 2015/05/23 11:36:29 | 37_13.3166 | 148_51.6359 | 5831.0 |
| 81   | 2015/05/23 10:42:36 | 37_12.5323 | 148_55.5508 | 5840.0 |
| 82   | 2015/05/23 09:52:34 | 37_11.7364 | 148_59.4817 | 5872.0 |
| 83   | 2015/05/23 09:03:39 | 37_10.9378 | 149_03.4454 | 5886.0 |
| 84   | 2015/05/23 08:15:28 | 37_10.1542 | 149_07.3791 | 5896.0 |
| 85   | 2015/05/23 07:29:00 | 37_09.3752 | 149_11.3131 | 5919.0 |
| 86   | 2015/05/23 06:44:07 | 37_08.5861 | 149_15.2501 | 5929.0 |
| 87   | 2015/05/23 05:59:52 | 37_07.8082 | 149_19.2182 | 5930.0 |
| 88   | 2015/05/23 05:12:14 | 37_06.9757 | 149_23.1552 | 5948.0 |

7. Airgun lines (end points)

| NO. | LINE NAME | VESSEL POSITION |                | LENGTH<br><u>FGSP - LGSP</u><br>(km) | DIRECTION<br>(°) |
|-----|-----------|-----------------|----------------|--------------------------------------|------------------|
|     |           | Lat.            | Lon.           |                                      |                  |
| 1   | A4robs_0  | 38_18.14044'N   | 142_25.12635'E | 24.4                                 | 102.767          |
|     |           | 38_18.12028'N   | 142_25.26089'E |                                      |                  |
|     |           | 38_15.82266'N   | 142_41.71289'E |                                      |                  |
|     |           | 38_15.82266'N   | 142_41.71289'E |                                      |                  |
| 2   | A4robs_1  | 38_16.01597'N   | 142_40.36558'E | 178.2                                | 102.767          |
|     |           | 38_15.99703'N   | 142_40.50043'E |                                      |                  |
|     |           | 37_58.08486'N   | 144_40.21874'E |                                      |                  |
|     |           | 37_58.08486'N   | 144_40.21874'E |                                      |                  |
| 3   | A4robs_2  | 37_59.96327'N   | 144_28.29775'E | 73.4                                 | 102.767          |
|     |           | 37_59.94445'N   | 144_28.43231'E |                                      |                  |
|     |           | 37_52.05582'N   | 145_17.52650'E |                                      |                  |
|     |           | 37_52.05582'N   | 145_17.52650'E |                                      |                  |
| 4   | A4robs_3  | 37_52.10845'N   | 145_17.26164'E | 393.8                                | 102.767          |
|     |           | 37_52.08895'N   | 145_17.39576'E |                                      |                  |
|     |           | 37_04.04518'N   | 149_37.69018'E |                                      |                  |
|     |           | 37_04.04518'N   | 149_37.69018'E |                                      |                  |



8. 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 Management Group (DMG), JAMSTEC.