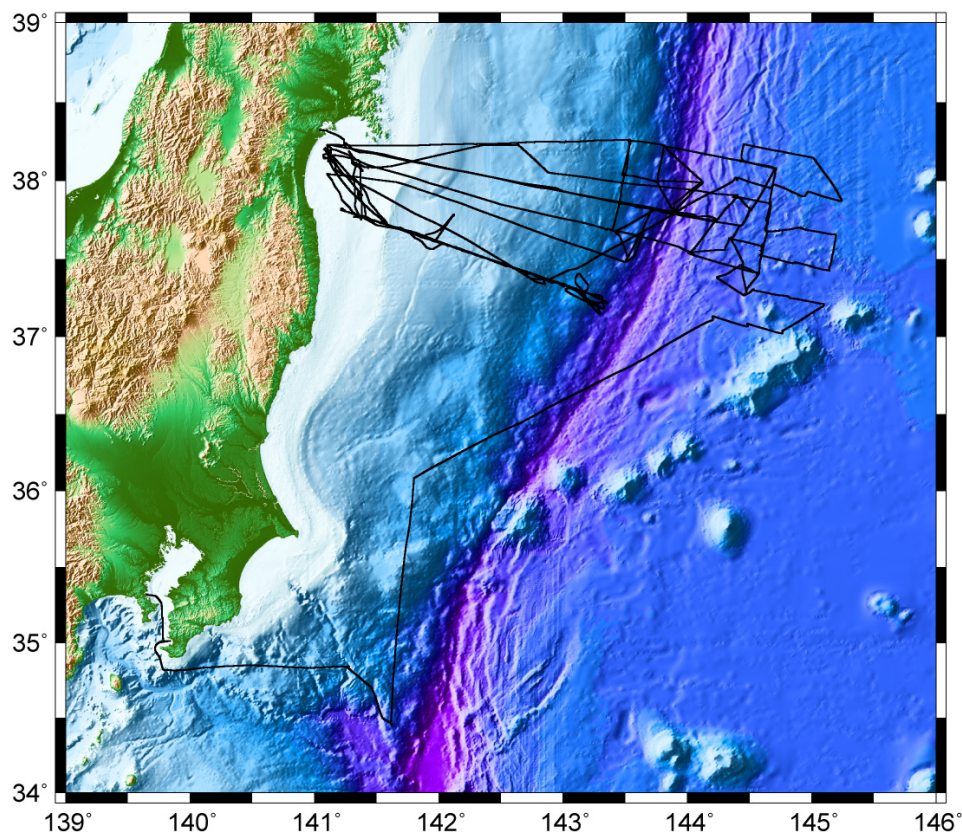


Cruise summary

1. Cruise Information :

- (1) Cruise number, Ship name: KR12-20, R/V Kairei
- (2) Title of the cruise:
2012FY “Tsunami prediction system and comprehensive research in the Japan Trench”
- (3) Chief Scientist [Affiliation]: Takeshi SATO [JAMSTEC]
- (4) Representative of Science Party [Affiliation]: Shuichi KODAIRA [JAMSTEC]
- (5) Title of proposal:
Tsunami prediction system and comprehensive research in the Japan Trench
(Part 1. Seismic survey and earthquake observation)
- (6) Cruise period, Port call:
2012/12/10-2013/1/8, JAMSTEC (Yokosuka) to Sendai-Shiogama-ko Port
- (7) Research Area: off Sanriku, Japan Trench
- (8) Research Map:



2. Overview of Observation :

(1) Objectives :

On 11 March 2011, the great earthquake (the 2011 Off the Pacific Coast of Tohoku Earthquake: Mw 9.0) occurred in the forearc area of the Japan Trench region. This earthquake caused devastating damages in the Tohoku and the Kanto regions. Especially, the huge tsunami struck to the Pacific coast in these regions and caused considerable damage. This research cruise was conducted as a part of the study of “Research program concerning tsunamigenic and seismogenic study off the Pacific coast of Tohoku” funded by the Ministry of Education, Culture, Sports, Science, and Technology of Japan. To understand the mechanism of this great earthquake and tsunami and tectonics around the source area of this earthquake, and to collect the information about the mitigating of the disaster such as this earthquake, it is very important to clarify the detailed crustal structure in the Japan Trench region. The objectives of this cruise are the revealing the detailed structure around the rupture zone of this great earthquake and transition of the structure in the oceanic plate from the outer rise region, the trench to landward and continental plate from the inner slope to landward

And, the earthquake of $M_{JMA} = 7.4$ occurred on December 7, 2012 off the east of Ojika Peninsula in the Japan Trench area. To understand the mechanism of the earthquake generation and the tsunami generation of this earthquake, and the deformation of the crustal structure around this hypocenter, 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) Deployment of ocean bottom seismometers (OBSs)

31 OBSs were deployed on A6 line, and 46 OBSs were deployed in the outer rise region and in aftershocks area of the earthquake occurred off the east of Ojika Peninsula in the Japan Trench region, respectively. Moreover, 3 OBSs were deployed off Boso Peninsula.

2) Seismic refraction/wide-angle reflection survey

A seismic refraction/reflection survey and OBSs was conducted on 2 survey lines (A6_obs and A6_50m lines) off Soma, Fukushima in the Japan Trench, although this survey was planned to conduct on 3 lines (A6_obs, A6n, and A6_50m lines) using a tuned air-gun array of 7,800 cubic inch. A volume of a tuned air-gun array is 5,850 cubic inch on a part of A6_obs line because of an air-gun system trouble. And the volume of this array is 3,900 cubic inch on the other part of A6 and A6_50m lines in the area less than 200m of water depth.

3) Multi-channel seismic (MCS) reflection survey

The MCS survey using a tuned air-gun array of 5,950 cubic inch and a 444 channel hydrophone streamer with a 12.5 m group interval were conducted on A6_mcs line, although the array of 7,800 cubic inch would be used. A6n line on this survey could

not be conducted during this cruise because of the bad sea condition.

4) Recovery of OBSs

31 and 24 OBSs deployed on A6 line and in aftershocks area of the earthquake occurred off the east of Ojica Peninsula in the Japan Trench region were recovered.

5) 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.

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

Expendable Conductivity-Temperature-Depth (XCTD) and expendable-Bathy Thermograph (XBT) have been conducted to correct the sonic speed for the bathymetry data.