

## Cruise Summary

### 1. Cruise Information

- Cruise ID: KY11-E05
- Name of vessel: Kaiyo
- Title of the cruise: Rapid response survey after the 2011 Tohoku earthquake in the Japan Trench
- Chief scientist [Affiliation]:  
Yasuyuki Nakamura [Japan Agency for Marine-Earth Science and Technology]
- Cruise period: Oct. 21, 2011 – Nov. 11, 2011
- Ports of call: Yokosuka-Yokosuka
- Research area: Japan trench off Miyagi

### 2. Overview of the Observation

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The 2011 off the Pacific coast of Tohoku Earthquake, which occurred on 11<sup>th</sup> March, 2011, was one of the largest earthquakes ( $M_w = 9.0$ ) observed in Japan. This earthquake brought serious damage not only by its strong ground motion but also by devastating tsunamis. To understand the mechanisms of this earthquake and tsunami generation, it is indispensable to investigate the structure beneath the seafloor in detail. After the earthquake, JAMSTEC has conducted the rapid response seismic surveys off Miyagi area, which is recognized as the source area of the large tsunami pulse. These surveys have been carried out using R/V Kairei, with larger volume of sounding source array and a long streamer cable, to mainly focus on the deeper structure, e.g. the plate boundary underlying beneath the landward slope of the Japan trench. To elucidate the shallower structure, high-resolution survey is necessary. The purpose of the KY11-E05 cruise is to obtain high-resolution seismic images of shallower part beneath the inner (landward) slope to trench axis of the Japan trench off Miyagi. We used “portable” multichannel seismic reflection system which consist of a 192-channel, 1200 m streamer cable and cluster gun system with total volume of 320 inch<sup>3</sup> in this survey. A gridded survey lines with ~500 m spacing were planned and 21 E-W lines and 17 N-S lines were completed. Preliminary processed seismic images demonstrate the finer structure especially beneath the trench axis area compare with the image obtained by Kairei surveys. These data will contribute to the site selection of the IODP drilling expedition to the fault ruptured during the Tohoku earthquake.

We also conducted the bathymetric survey on the seismic lines using SeaBeam 2100, XCTD casts, and ADCP observation. Ten Ocean bottom seismographs deployed in August were also recovered during this cruise.