

## Cruise summary

### 1. Cruise Information:

(1) **Cruise number, Ship name:** KR16-08, R/V *KAIREI*

(2) **Title of the cruise:** 2016FY “Integrated Research Project on Seismic and Tsunami Hazards Around the Sea of Japan”

(3) **Chief Scientist [Affiliation]:** Takeshi SATO [JAMSTEC]

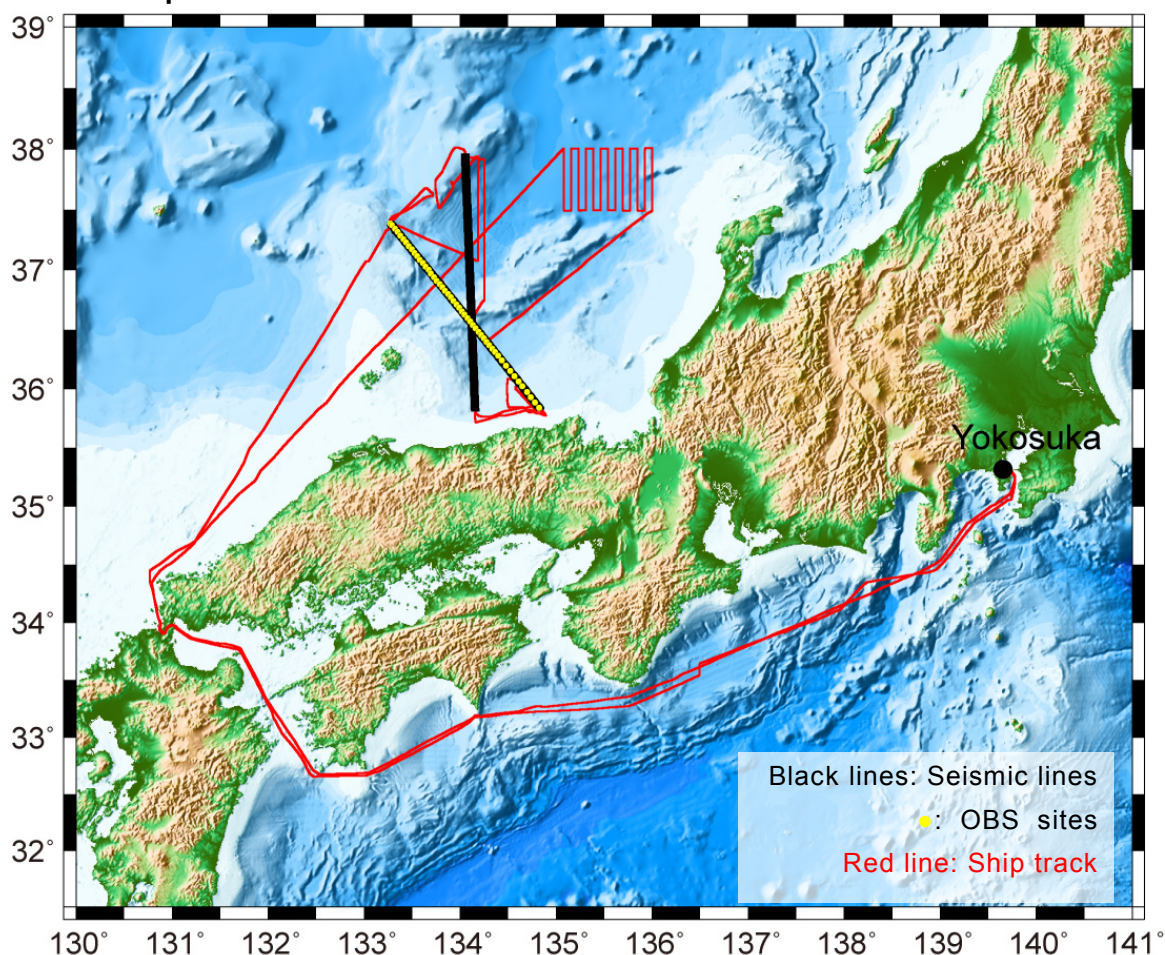
(4) **Representative of Science Party [Affiliation]:** Shuichi KODAIRA [JAMSTEC],

(5) **Title of proposal:** Integrated Research Project on Seismic and Tsunami Hazards Around the Sea of Japan

(6) **Cruise period, Port call:** 2016/7/26 – 2016/8/13, Yokosuka (JAMSTEC) to Yokosuka (Sumitomo Heavy Industry East dock)

(7) **Research Area:** Japan Sea

(8) **Research Map:**



## **2. Overview of Observation:**

### **(1) Objectives:**

The relationship between crustal structures and earthquakes that occurred along the eastern margin of the Japan Sea has been revealed recently by seismic survey as part of the research project “Multidisciplinary research project for construction of fault model in the high strain rate zone” (Sato et al., 2014; No et al., 2014). However, other areas in the Japan Sea have not yet been conducted to seismic survey for study of the crustal structure. Therefore, we have participated in “Integrated Research Project on Seismic and Tsunami Hazards Around the Sea of Japan” conducted by the MEXT of Japan. In particular, we have performed seismic surveys from the R/V *KAIREI* in the Japan Sea since 2014. From July to August 2016, we conducted a marine seismic survey using multi-channel seismic reflection (MCS) system and ocean bottom seismographs (OBSs) to study the crustal structure around the area from off Kyoto to off Tottori. The survey covered the areas from the continental shelf to the Oki Bank, the Yamato Basin.

### **(2) List of observation instruments:**

#### **1) MCS survey:**

We conducted a MCS survey around the areas off Fukui and Kyoto in the Japan Sea using the R/V *KAIREI*. MCS data were acquired along 2 lines (SJ16HY and SJ15TR lines) with a total length of approximately 440 km. Some seismic lines were crooked to avoid the many fishing operations and equipment in the survey area. To obtain high-quality MCS data, we shot an air gun array at a spacing of 50 m, which corresponds to a spacing of 20 to 30 s depending on the vessel speed (average of 4 knot). The tuned air gun array had a maximum capacity of 7,800 cubic inch (approximately 130 l) and consisted of 32 air guns. The standard air pressure was 2,000 psi (approximately 14 MPa). During the experiment, the air gun array depth was maintained at 6 m below the sea surface. During the shooting, we towed a 444-channel hydrophone streamer cable with a group interval of 12.5 m. The towing depth of the streamer cable was maintained at 12 m below the sea surface by depth controllers. The sampling rate and record length were 2 ms and 16 s, respectively.

#### **2) Seismic refraction survey using OBSs:**

We deployed 50 OBSs along the line SJ16HY (Japan Sea). The seismic refraction survey on the line SJ16HY was performed using OBSs and an airgun array with a shot spacing of 200 m. The airgun array in the seismic refraction survey was placed in almost the same configuration as that in the MCS survey. After the seismic refraction and MCS surveys, 42 OBSs were retrieved by *KAIREI*. Other 8 OBSs were retrieved by other vessel (*R/V KAIYO MARU NO.1*) and ROV (*ROV KAIYO 3000*).

#### **3) Bathymetry, geomagnetic, and gravity observations:**

Bathymetry, geomagnetic, and gravity data were recorded continuously during the survey.