

Cruise Summary

1. Cruise Information

Cruise number:

KR09-10

Ship name:

R/V KAIREI

Title of the cruise:

2009 Deep Sea Research
Research cruise with KAIREI

Chief Scientist:

Reiji Kobayashi Kagoshima University

Representative of Science Party:

Reiji Kobayashi Kagoshima University

Title of proposal:

S09-33

Geophysical and Geological site survey (mainly heat flow measurement and piston sampling) for the proposal of the Integrated Ocean Drilling Program (IODP): (IODP proposal # 707: Kanto Asperity project: Geological and Geophysical Characterization of the History and Present Behavior of the Earthquake Cycle)

Cruise period:

August 14, 2009 – August 18, 2009

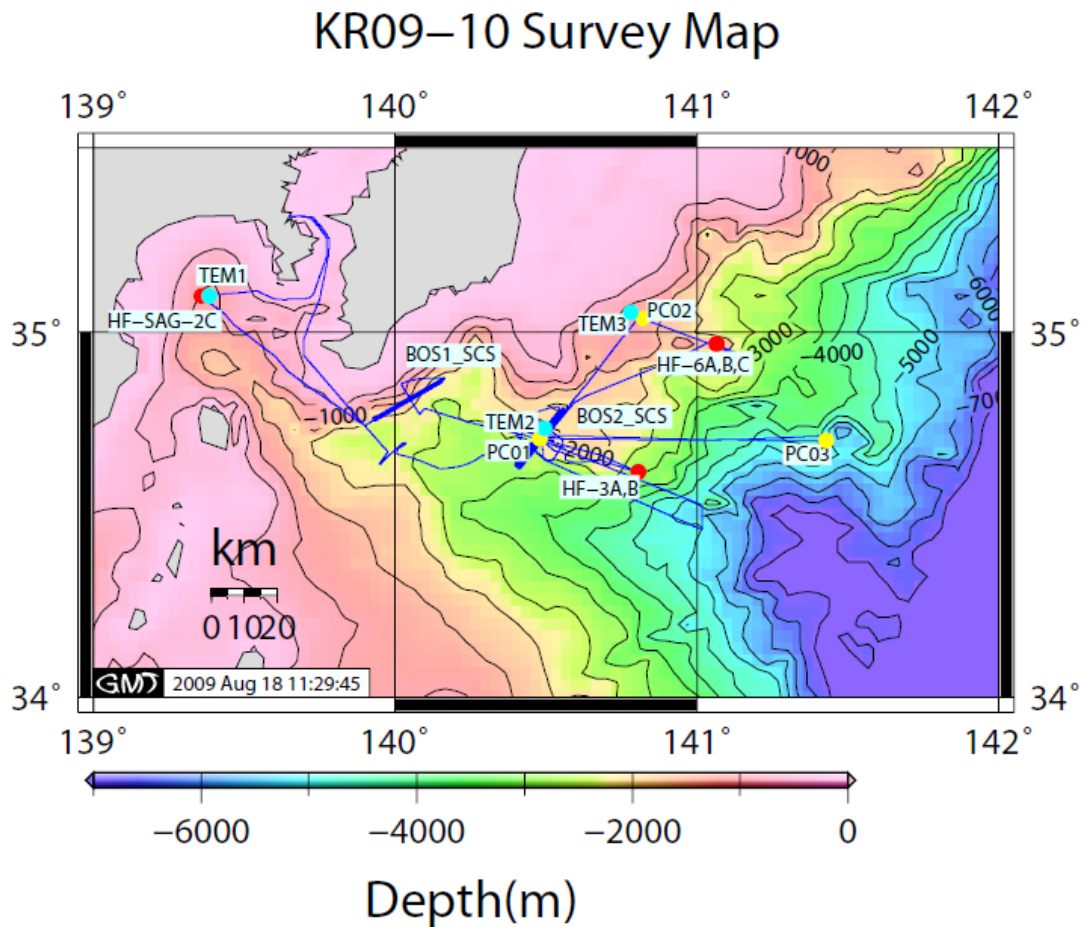
Port call:

2009 Aug. 14 Dept. from Yokosuka (JAMSTEC)
 Aug. 18 Arriv. at Yokosuka (JAMSTEC)

Research area:

Sagami bay and off Boso peninsula

Research map:



Ship track (blue line) and stations of measurement and sampling on KR09-10 cruise. TEM (blue circles): Installing pop-up water temperature measurement system, HF (red circles): heat flow measurement, PC (yellow circles): piston core sampling with heat flow measurement, SCS: single-channel seismic survey.

2. Observations

Overview of observation

[Research objectives]

We have proposed a drilling project "Kanto Asperity Project" to the Integrated Ocean Drilling Program for research of great earthquakes and slow slip events in Sagami bay and off Boso peninsula. We measure heat flow at the candidates of drilling sites as a site survey for the KAP. We also measure those at other points than the candidate sites to know large-scale thermal structure. Based on the obtained results, we will determine the target depth at the drilling sites

and discuss relations between seismogenic zones and estimated large-scale thermal structure.

[Research items]

(1) Heat flow measurement

Heat flow measurement with deep-sea heat flow probes in area with relatively deep water depths.

(2) Long-term temperature monitoring on the seafloor

Long-term monitoring of the bottom water temperature for determination of heat flow in areas with relatively shallow water depths. Temporal changes in water temperature will be used for calibrations of heat flow measurement. In KR09-10, we only install the pop-up water temperature measurement systems.

(3) Piston core sampling with heat flow measurement (HFPC)

Sampling of surface sediments with a piston corer and heat flow measurement at the same site using temperature sensors mounted on the core barrel.

(4) Seismic survey

Detailed images of shallow seismic structures by using single channel seismic survey along dense survey lines.

(5) Bathymetry and geophysical survey

Bathymetry mapping with a multi narrow beam system and sub-bottom profiler.

[Research results]

(1) Heat flow measurement

We carried out heat flow measurements at three sites with the deep-sea heat flow probe, at three sites with the HFPC. At all the sites with the deep-sea heat flow probe, basically multiple penetrations were attempted for examining local variability of heat flow. Temperature profiles measured at sites with water depths shallower than 2000 m were clearly disturbed by temporal variation of the bottom water temperature, and suggested that long-term temperature monitoring is necessary.

(2) Long-term temperature monitoring on the seafloor

We deployed pop-up water temperature measurement systems (PWTs), which monitor variation of the bottom water temperature, at three stations. All of these stations are located in shallow sea areas (shallower than 2000 m) on the landward side of the trench.

(3) Piston core sampling

Sediment core samples were collected at three stations using the heat flow piston coring system (HFPC), along the core barrel of which seven temperature data loggers are mounted. Measurements of thermal conductivity were conducted on board as well as visual description and photographing. 7-cc-cube samples were taken from the working half and will be analyzed on shore.

(4) Seismic survey

Single-channel seismic surveys were performed along dense lines around two sites, BOS-1C and BOS-2C. The data were acquired along four lines around BOS-1C and eight lines around BOS-2C. Detailed reflection images in shallower structures were obtained. Advanced process will be done on shore.