Submission date 2015/01/14

Cruise Summary

1. Cruise Information

1-1. Cruise ID: MR14-06 Leg1 (MR14-Suetsugu)

1-2. Permit number 008/14

1-3. Name of vessel: R/V MIRAI (ID No. IMO 6919423)

1-4. Title of the cruise: Tropical ocean climate study in the Indian and Pacific Ocean/Study of structure and formation process of the Ontong Java Plateau/Operation of Triton buoy Leg1

1-5. Research area: The Pacific Ocean in and around the Ontong Java Plateau

1-6. Chief scientist: Daisuke Suetsugu (Japan Agency for Marine-Earth Science and Technology)

1-7. Representative of the Science Party:

Daisuke Suetsugu (Japan Agency for Marine-Earth Science and Technology)
Yugo Kanaya (Japan Agency for Marine-Earth Science and Technology)
Kazuma Aoki (Toyama University)
Masaki Katsumata (Japan Agency for Marine-Earth Science and Technology)
Takeshi Matsumoto (Ryukyu University)
Toshio Suga (Japan Agency for Marine-Earth Science and Technology)
Takeshi Hanyu (Japan Agency for Marine-Earth Science and Technology)
Shuji Kawakami (Japan Aerospace Exploration Agency)

1-8. Cruise period: Nov. 4, 2014~Dec. 18, 2014

1-9. Ports of departure / call / arrival: Sekinehama/Yokohama/Chuuk (FSM)

2. Overview of the Observation

The main mission of the project is to deploy ocean bottom seismographs (OBS) and ocean bottom electro-magnetometers (OBEM) on the seafloor in and around the OJP for determination of crust and upper mantle structure beneath the OJP (Fig. 1). The OBS and OBEM can continuously record an electromagnetic field and ground motions due to natural earthquakes. The data are stored in the ocean bottom instruments, which are planned to be recovered in 2016 with R/V MIRAI. The earthquake data from the ocean

bottom seismographs, along with earthquake data recorded at existing island stations will be used to determine three-dimensional seismic structure: Seismic velocity and attenuation structure of the crust and upper mantle beneath the OJP and topography of mantle discontinuities. The electromagnetic data will be used to determine the three-dimensional electrical conductivity structure of the crust and upper mantle beneath the OJP. We will investigate thermal and compositional structure beneath the OJP by comparing the seismic structure, electrical conductivity structure, and existing mineralogical data, which should provide tight constraints on the origin and evolution of the OJP. We also conducted active-source seismic survey, multi-beam echo sounding survey, sea-bottom reflectivity survey, gravity and magnetic surveys to study detailed shallow crustal and seafloor structure, which should provide valuable information on the origin of the OJP and the evolution process after its emplacement.

Along the cruise track, we performed the following researches: Observation of aerosols and trace gases in the atmosphere, which is important for global climate change, to analyze transport from the Asian continent to the ocean environment along the winter monsoon; observation of precipitating clouds in ambient atmospheric and oceanic situations to better estimate precipitation amount by utilizing ship-borne and satellite-borne radars; acquisition of the validation data over sea for Greenhouse gases Observing SATellite (GOSAT) using an automated compact instrument; installation of ARGO profiling floats to obtain vertical profiles of sea temperatures and conductivity.

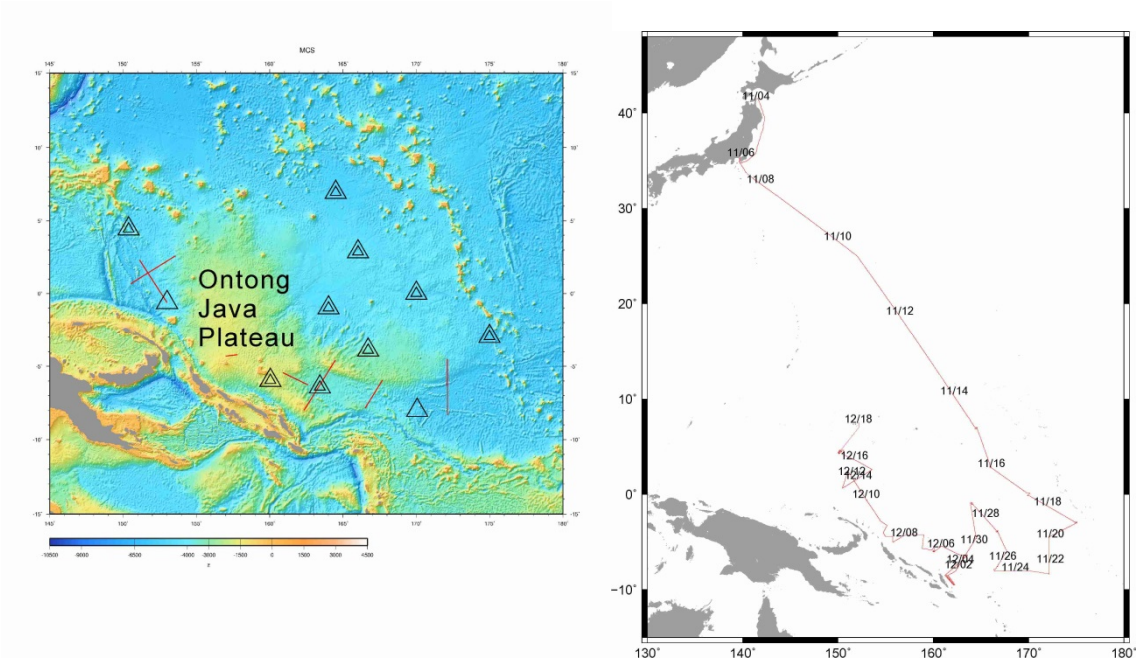

Fig. 1 (Left) Observation area. Triangle: Location of OBS; Double triangle: Location of OBS and OBEM; Red line: MCS survey line; (Right) Cruise track