

# MR10-07 Cruise Summary

## 1. Cruise Information

- 1) Cruise Code: MR10-07
- 2) Ship Name: R/V Mirai
- 3) Title of Cruise (project): Tropical Ocean Climate Study
- 4) Chief Scientist: Yuji Kashino (RIGC, JAMSTEC)
- 5) Cruise Period: 24 November 2010 – 30 December 2010 (37 days)
- 6) Ports call: Sekinehama (Japan) - Hachinohe (Japan) – Koror (Republic of Palau)
- 7) Research Area: Western equatorial Pacific and Kuroshio Extension region

## 2. Research Subjects

- 1) Development of CO<sub>2</sub> sensor for long-term mooring and application for study of CO<sub>2</sub> flux  
(PI: Shuichi Watanabe, Mutsu Institute of Oceanography, JAMSTEC)
- 2) Study on long term and vertical measurement by in-situ pH/pCO<sub>2</sub> sensor  
(PI: Kiminori Shitashima, Central Research Institute of Electric Power Industry)
- 3) Observational research on air-sea interaction in the Kuroshio-Oyashio Extension region  
(PI: Yoshimi Kawai, RIGC, JAMSTEC)
- 4) Study of ocean circulation and heat and freshwater transport and their variability, and experimental comprehensive study of physical, chemical, and biochemical processes in the western North Pacific by the deployment of Argo floats and using Argo data  
(PI: Toshio Suga, RIGC, JAMSTEC)
- 5) Maritime aerosol optical properties from measurements of Ship-borne sky radiometer  
(PI: Kazuma Aoki, Toyama Univ.)
- 6) On-board continuous air-sea eddy flux measurement  
(PI: Osamu Tsukamoto, Okayama Univ.)
- 7) Tropospheric aerosol and gas profile observations by MAX-DOAS on a research vessel  
(PI: Hisahiro Takashima, RIGC, JAMSTEC)
- 8) Water sampling for building water isotopologue map over the Ocean  
(PI: Naoyuki Kurita, RIGC, JAMSTEC)
- 9) Lidar observations of optical characteristics and vertical distribution of aerosols and clouds  
(PI: Nobuo Sugimoto, National Institute for Environmental Studies)
- 10) Standardising the marine geophysics data and its application to the ocean floor geodynamics studies  
(PI: Takeshi Matsumoto, Univ. of Ryukyus)

## 3. Overview of Observations

- 1) Maintenance of TRITON moorings  
9 buoys were recovered and re-installed at 5N,147E, 2N,147E, 0N,147E, 2S,156E, 5S,156E, 0N,156E, 2N,156E, 5N,156E and 8N,156E.
- 2) Maintenance of subsurface ADCP moorings  
2 moorings with an ADCP at the depth of 300m were recovered and re-installed at 0N,147E and 0N,156E.
- 3) Deployment of a prototype of the Southern Ocean Buoy  
A prototype of the Southern Ocean Buoy, which has been developing in JAMSTEC, was deployed near the Cape Erimo of Hokkaido.
- 4) CTD and water sampling: 55 casts  
Observations were conducted along 147E and 156E lines, and near the KEO buoys. CTD casts were conducted until 2000m depth when Argo floats were lunched. At the other stations, observations were conducted until 500m or 800m depth with Lowered ADCP.
- 5) XCTD: 45 casts  
Measurement depth is 1000m. Observations were conducted in the tropical and Kuroshio Extension region.
- 6) Ocean turbulence observations: 51 casts  
Ocean turbulence was observed every 30nm along 147E and 156E lines until 500m depth.
- 7) Launch of Argo floats  
Argo floats were launched at 12N, 152E and 7N, 156E.
- 8) Radiosonde observation: 23 casts  
Radiosonde observation was conducted in the Kuroshio Extension region together with XCTD observation.

9) Rain, water vapor, and surface water sampling: 15, 70, and 33 casts, respectively

Rain, water vapor, and sea surface water were collected for analysis of stable isotopes

10) Continuous observations:

Current profile observation by a shipboard ADCP

Sea surface temperature, salinity, and dissolved oxygen, and CO<sub>2</sub> measurements by intake method

Surface meteorological observations (wind, air temperature, pressure, humidity, radiation, rain rate, turbulent flux, and cloud base height)

Aerosol observation using the Sky radiometer

Aerosol and cloud profile measurements using two-wavelength lidar

Aerosol and atmospheric gas observations by MAX-DOAS method

Bathymetry, sea surface gravity and geomagnetic measurements