MR09-04 Cruise Summary

1. Cruise Information

1) Cruise Code: MR09-04
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: 4 November 2009 – 12 December 2009 (39 days)
6) Ports call: Sekinehama - Hachinohe – Sekinehama
7) Research Area: Western equatorial Pacific and Kuroshio Extension region

2. Research Subjects

1) Development of drifting buoy system with in situ sea surface pCO_2 sensor
(PI: Shuichi Watanabe, Mutsu Institute of Oceanography, JAMSTEC)
2) Study on long term and vertical measurement by in-situ pH/pCO_2 sensor
(PI: Kiminori Shitashima, Central Research Institute of Electric Power Industry)
3) Influence of abnormal bases from bacteria in marine eco-system
(PI: Yasuro Kurusu, Ibakari Univ.)
4) Distribution and ecology of oceanic Halobates inhabiting tropical area around equator and their responding system to several environmental factors
(PI: Tetsuo Harada, Kochi Univ.)
5) Observational Research on the Kuroshio Transport and Sea Surface Flux
(PI: Hiroshi Ichikawa, RIGC, JAMSTEC)
6) Archive of surface meteorological data
(PI: Kunio Yoneyama, RIGC, JAMSTEC)
7) Water sampling for making isotope distribution map over the Ocean
(PI: Naoyuki Kurita, RIGC, JAMSTEC)
8) On-board continuous air-sea eddy flux measurement
(PI: Osamu Tsukamoto, Okayama Univ.)
9) Lidar observations of optical characteristics and vertical distribution of aerosols and clouds
(PI: Nobuo Sugimoto, National Institute for Environmental Studies)
10) Variability of Salinity and Temperature in the North Western Pacific (Argo program)
(PI: Toshio Suga, RIGC, JAMSTEC)
11) Tectonic evolution of the Pacific Plate
(PI: Masao Nakanishi, Chiba Univ.)
12) Anatomy of the ocean-atmosphere interface in mid-latitudes
(PI: Masahisa Kubota, Tokai Univ.)
13) 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 5N147E, 2N147E, 0N147E, 2S156E, 5S156E, 0N156E, 2N156E, 5N156E and 8N156E.
2) Maintenance of subsurface ADCP moorings
2 moorings with an ADCP at the depth of 300m were recovered and re-installed at 0N147E and 0N156E.
3) CTD and water sampling: 43 casts
Observations were conducted along 147E and 156E lines, near the J-KEO and KEO buoys, and before launch of Argo floats. Seven deep casts were conducted until ocean bottom with pH/pCO2 sensors. During these deep casts, water was sampled for analysis of salinity, dissolved oxygen, nutrients, CO2, alkalinity, pH, and microflora.
Except the deep casts, CTD observations were conducted with a Lowered ADCP until 500m or 800m depth.
4) XCTD: 35 casts
Measurement depth is 1000m. Observations were conducted near the TRITON buoys, 156E line, and Kuroshio Extension region.
5) Ocean turbulence observations: 35 casts
Ocean turbulence was observed every 30nm along 147E and 156E lines until 500m depth.

6) Launch of Argo floats
Three Argo floats were launched at 10N, 154-50E, 8N, 156E, and 5N, 156E.
7) Halobates sampling: 8 casts
Harobates (sea skaters) were sampled using net in the late evening or early mooring.
8) Rain, water vapor, and surface water sampling: 31, 76, and 37 casts, respectively
Rain, water vapor, and sea surface water were collected for analysis of stable isotopes
9) Continuous observations:
Current profile observation by a shipboard ADCP
Sea surface temperature, salinity, and dissolved oxygen, and CO2 measurements by intake method
Surface meteorological observations (wind, air temperature, pressure, humidity, radiation, rain rate, turbulent flux, and cloud base height)
Aerosol and cloud profile measurements using two-wavelength lidar
Bathymetry, sea surface gravity and geomagnetic measurements
Note: A cesium magnetometer was towed east of Mariana Islands on the way to and from the equatorial region.