

MR07-07 Leg1 Cruise Summary



1. Introduction

The purpose of this cruise is to observe the ocean and atmosphere in the western tropical Pacific Ocean for better understanding of climate variability involving the ENSO (El Nino/Southern Oscillation) phenomena and Asian monsoon variability, which largely influence social and economical activity in the eastern Asian region. Particularly, the warm water pool (WWP) in the western tropical Pacific, which is characterized by the highest sea surface temperature in the world and plays a major role in driving global atmospheric circulation, is focused in this study.

For above purpose, we recover and re-install six TRITON (TRIangle Trans-Ocean buoy Network) buoys along 130E and 137-138E lines in the western equatorial Pacific. We also observe low-latitude western boundary currents (Mindanao Current and New Guinea Coastal Current/Undercurrent), which are important factors for the ocean climate in the western equatorial Pacific, using CTD/XCTD, and lowered/shipboard Acoustic Doppler Current Profilers (ADCP) under the 2007-08 La Nina condition.

During this cruise, atmospheric cumulus convection in the Philippine Sea is also focused because of large latent heat by the convection in this region. Therefore, we conduct meteorological observations launching radiosondes and using Dopplar radar east of Philippines.

Furthermore we conduct continuous oceanic, meteorological and geophysical observations in the western equatorial Pacific for establishing database in the ocean.

2. Summary

1. Cruise Code: MR07-07 Leg 1
2. Project Name: Tropical Ocean Climate Study
3. Ship: R/V Mirai
4. Chief Scientist: Yuji Kashino (IORGC, JAMSTEC)
5. Period: December 28, 2007 – January 25, 2008 (29 days)
6. Ports call: Auckland (Dec. 28, 2007) – Nakagusuku (Jan. 25, 2008)

3. Observations

1. Maintenance work of TRITON mooring:
 - 5 buoys were recovered at 0N138E, 2N138E, 5N137E, 8N137E and 8N130E
 - 6 buoys were re-installed at 0N138E, 2N138E, 5N137E, 8N137E, 2N130E and 8N130E
2. CTD and water sampling: 24 casts
 - Measurement depth was until the 800m or 1000m depth.
 - Observations along 137-138E line were conducted with a lowered ADCP in order to observe ocean mixing.
 - Water was sampled at the deepest layer for analysis of salinity.
3. XCTD: 52 casts
 - Measurement depth is 1000m. Observations were concentrated near the Philippine coast.
4. Radiosonde observations: 57 casts

Observations were carried out every 6 hours from January 6 through 20, 2008, except when R/V Mirai was near the Philippine coast.
Measurement height is mostly until 20–25km.

5. Rain sampling: 20 stations.

Rainfall samples were collected in 6cc glass bottle for analysis of stable isotopes

6. Continuous observations:

Current profile observation by a shipboard ADCP

Sea surface temperature, salinity, and dissolved oxygen measurements by intake method

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

Rain fall observation using Doppler radar

Aerosol and cloud profile measurements using two-wavelength lidar

Bathymetry, sea surface gravity and geomagnetic measurements