

MR05-03 Cruise Summary

1. Introduction

The warm water pool located at the western equatorial Pacific and eastern Indian Oceans has the highest sea surface temperature in the ocean all over the world. Therefore interaction between the ocean and atmosphere in that region becomes important for climate change such as ENSO (El Nino/Southern Oscillation) in the Pacific Ocean and Dipole mode in the Indian Ocean. This cruise is conducted for understanding the process of warm water convergence and divergence, and interaction processes in that region. For that purpose, we carried out deployment and recovery of the TRITON (TRIangle Trans Ocean buoy Network) buoys as the main mission. The TRITON buoys have advantage of analysis for long-term variability in the warm water pool. We also carried out other observations, such as ADCP moorings, CTD measurements and meteorological observation, for understanding the Ocean and atmospheric conditions.

2. Overview

2.1. Ship

R/V MIRAI
Captain Yujiro Kita
(Captain Masaharu Akamine: for September 04-05)

2.2. Cruise code

MR05-03

2.3. Project name

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
2-15, Natsushima-cho, Yokosuka 237-0061, Japan

2.5. Chief Scientist

Leg 1: Kentaro Ando (JAMSTEC)
Leg 2: Hideaki Hase (JAMSTEC)
Leg 3: Shuichi Mori (JAMSTEC)

2.6. Period

Leg 1: July 4th, 2005 (Guam) – July 26th, 2005 (Darwin)
Leg 2: July 26th, 2005 (Darwin) – August 25th, 2005 (Palau)
Leg 3: August 26th, 2005 (Palau) – September 5th, 2005 (Sekinehama)

2.7. Research Participants

Total 51 scientists and technical staffs participated from 8 different institutions and companies, including 3 Indonesian scientists and officer during each of Leg 1 and 2.

3. Observation summary

TRITON buoy deployment:	8 sites
TRITON buoy recovery:	8 sites
ADCP buoy deployment:	1 site
ADCP buoy recovery:	2 sites
CTD including water sampling:	66 casts
XCTD:	92 launches
Radio sonde:	127 launches
Surface meteorology:	continuous
Shipboard ADCP measurement:	continuous
Surface temperature and salinity measurements by intake method:	continuous

*** Other specially designed observations have been carried out.

Observed oceanic and atmospheric conditions

Leg 1: Observation in the western tropical Pacific

Oceanic and atmospheric conditions in the tropical Pacific region showed neutral condition and suggested the possible development of La Nina during the next several months. The TAO (Tropical Atmospheric and Ocean)/TRITON array data showed slightly warmer sea surface temperature (SST) in the western end of the warm pool region. Not like the atmospheric and oceanic condition in the last year, according to this high SST distribution westerly winds cannot dominate western end of the warm pool in the Pacific Ocean. Due to this climatological westward shift of convection region, the western region of Pacific warm pool was calm.

Leg 2: Observation in the eastern Indian Ocean

August is in a southwesterly monsoon season in the Indian Ocean. During this cruise period, the SST along 90E observational line exceeded 29 deg-C around the region between 1N and 4S, the highest temperature core in the surface layer shifted to the south of the equator. The low salinity cores in the surface layer appeared in the region of 5N-2N, the equator-1S and 4S-5S, where the values were less than 34.0, 34.5 and 34.5, respectively. The surface current in the equatorial band indicated the eastward. We recovered and deployed two TRITON buoys in the eastern Indian Ocean. The other recovery/deployment operations (ADCP mooring, rawinsonde and ARGO floats etc.) and observation equipments (CTD, shipboard ADCP etc.) were mostly worked without significant problem.

Leg 3: Observation in the western tropical and subtropical Pacific

Oceanic and atmospheric environments with high SST and moist boundary layer are suitable to generate typhoons over the western tropical and subtropical Pacific Ocean in

the boreal summer monsoon season. Typhoon Talim (TS0513) was formed at (14.1N, 142.3E) upgraded from Tropical Depression (TD) on August 27 00UTC and passed across our track from August 28 through 29. We encountered strong wind, heavy shower rain, and great waves during the period. Dynamical and thermo dynamical structures of the typhoon were observed successfully with continuous Doppler radar observation, sequential rawinsonde soundings, and other shipboard equipments.