

TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM
FINAL CRUISE REPORT
KA-08-03

Area: Equatorial Pacific between 9N and 5S latitude along 140W longitude and 8S to 8N latitude along 125W longitude.

Itinerary:

KA-08-03	<i>Honolulu, HI</i>	DEP	<i>April 29, 2008</i>
	<i>Manzanillo, Mexico</i>	ARR	<i>May 31, 2008</i>

CRUISE DESCRIPTION

The Tropical Atmosphere Ocean (TAO) array (renamed the TAO/TRITON array on January 1, 2000) consists of 70 moorings in the Topical Pacific Ocean, telemetering oceanographic and meteorological data to shore in real time. Fifteen buoys are serviced by JAMSTEC and National Data Buoy Center (NDBC) services the remaining 55 buoys from 95W longitude to 165E longitude. Repair and maintenance of the buoys is performed by NDBC contracted personnel on an annual basis utilizing the NOAA Ship KA'IMIMOANA and NOAA Ship RONALD H. BROWN. The buoy deployment lifecycles are up to 18 months to ensure at least one year of data collection can be completed.

TAO Project Points of Contact:

TAO Program Manager:

Shannon McArthur

National Data Buoy Center

Building 1007

Stennis Space Center, MS 39529

228-688-2830

Email: shannon.mcarthur@noaa.gov

TAO Operations Manager:

Lex LeBlanc

National Data Buoy Center

Building 3203

Stennis Space Center, MS 39529

228-688-7465

Email: lex.leblanc@noaa.gov

TAO Cruise Objective and Plan:

The objective of this cruise was the maintenance of the TAO Array along the 140W and 125W meridians. The scientific complement for the cruise embarked at *Ford Island, HI* on *April 28, 2008*. The ship departed on *April 29, 2008* and conducted operations on the 140W and 125W lines as listed in Section 2.1. The ship arrived in **Manzanillo, Mexico** on *May 31, 2008*.

1.0 PERSONNEL

1.1 CHIEF SCIENTIST AND PARTICIPATING SCIENTISTS:

Chief Scientist: Leonard Quigley

Participating Scientists:

Name	Gender	Nationality	Affiliation
Leonard Quigley	M	US	NOAA/NDBC/TAO
William Thompson	M	US	NOAA/NDBC/TAO
Dawn Petraitis	F	US	NOAA/NDBC/TAO
Russel Spiers	M	US	NOAA/NDBC/DART
James Coleman	M	US	NOAA/NDBC/DART

2.0 OPERATIONS

2.1 TAO Data Recovery Summary

Mooring Operations conducted are shown in the table below. Operations were conducted from *9N 140W* to *5S 140W* and *8S 125W* to *8N 125W*). The following provides details on the data recovery efforts for the buoys serviced. All noted time in the summary reports is Coordinated Universal Time (UTC):

9N 140W

Buoy ID: PM629B	Buoy Configuration: Standard
Buoy Type: ATLAS	Water Depth: 4825 m
Deployed Location: 8 59.9N 140 15.39W	Recovery Location: 8 59.9N 140 15.37W
Buoy Start Date: 9/18/06	Buoy End Date: 5/5/08
Service Description: Recovery/Deployment. T6 and T7 flooded. All data on other sensors were recovered.	

Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
None			

5N 140W

Buoy ID: PM702A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4485 m	
Deployed Location: 4 59.2N 139 58.0W		Repair Location: 5 0.3N 139 57.7W	
Buoy Start Date: 9/28/07		Buoy End Date: Still deployed	
Service Description: Repair. Exchanged rain gauge, downloaded tube.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Rain	10/4/07	Low rain rate for high percent time raining.	

2N 140W

Buoy ID: PM704A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4370 m	
Deployed Location: 1 58.6N 140 01.5W		Visit Location: 1 58.9N 140 7.85W	
Buoy Start Date: 5/8/08		Buoy End Date: Still active	
Service Description: Buoy riding well, no apparent damage.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Buoy	12/23/07	Buoy flagged as moved.	
Relative Humidity	1/20/08	Dropped to ~60%, then dropped lower before going missing.	
Salinity	3/30/08	Salinity data too high (~38 psu).	

0 140W

Buoy ID: PM683B		Buoy Configuration: Flux/CO2	
Buoy Type: ATLAS		Water Depth: 4358 m	
Deployed Location: 0 0.3N 139 51.9W		Recovered Location: 2 4.42S 140 39.78W	

Buoy Start Date: 5/31/07		Buoy End Date: 5/10/08	
Service Description: Recovery/Deployment. Mooring was adrift. Anemometer propeller seized. 12 m Sontek fin broken off. 47 m Sontek cable broken at Sontek end. 5m TC missing poison pucks. Data from TC14259 appear to be corrupted. No communications with Sontek D102. All other subsurface instruments downloaded successfully.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
80m Salinity	10/25/07	Persistently lower density than higher depth.	
Buoy	11/20/07	Buoy flagged as moved.	
Air Temperature/ Relative Humidity	12/3/07	Air temperature erratically low, relative humidity failed as a result.	
Buoy	12/26/07	Buoy outside watch grid.	
Buoy	1/1/08	Buoy returned inside watch grid, data released.	
Wind	1/8/08	All wind data went to zero.	
Buoy	1/28/08	Buoy outside watch grid.	

2S 140W

Buoy ID: PM706A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4330 m	
Deployed Location: 1 58.6S 140 1.25W		Repair Location: 2 0.37S 139 57.422W	
Buoy Start Date: 9/29/07		Buoy End Date: Still deployed	
Service Description: Repair. Exchanged anemometer.			
Site Sensor Failures	Date Sensors Failed	Why sensors were failed	Field Service Observations
Wind	12/2/07	Vane angle went to zero.	

5S 140W

Buoy ID: PM681A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4367 m	
Deployed Location: 4 58.3S 139 55.4W		Recovery Location: 4 58.3S 139 55.4W	
Buoy Start Date: 5/27/07		Buoy End Date: 5/13/08	
Service Description: Recovery/Deployment Temperature sensors at 20 m and 80 m lost			
Site Sensor Failures	Date Sensors Failed	Why sensors were failed	Field Service Observations
None			

8S 125W

Buoy ID: PM678A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4477 m	
Deployed Location: 7 59.13S 124 58.42W		Recovery Location: 7 59.15S 124 59.2W	
Buoy Start Date: 5/21/07		Buoy End Date: 5/19/08	
Service Description: Recovery/Deployment. 20 m temperature sensor missing.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
None			

5S 125W

Buoy ID: PM677B		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4552 m	
Deployed Location: 5 0.4S 125 57.1W		Recovery Location: 5 0.0S 124 57,2W	
Buoy Start Date: 5/20/07		Buoy End Date: 5/20/08	
Service Description: Recovery/Deployment. Upper poison puck on SSC missing. SSC cable cut near connector.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Wind	2/3/08	Direction very erratic.	

2S 125W

Buoy ID: PM675B		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4761 m	

Deployed Location: 2 1.9S 124 53.32W		Recovery Location: 2 0.5S 125 0.7W	
Buoy Start Date: 5/16/08		Buoy End Date: 5/21/08	
Service Description: Recovery/Deployment. Apparent vandalism - mast bent, tail broken off anemometer.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Wind	2/7/08	Direction erratic.	

0 125W

Buoy ID: PM709A		Buoy Configuration: CO2	
Buoy Type: ATLAS		Water Depth: 4792 m	
Deployed Location: 0 9.8S 124 23.9W		Repair Location: 0 0.9S 124 23.3W	
Buoy Start Date: 10/16/07		Buoy End Date: 5/22/08	
Service Description: Repair. Replaced ATRH and SSC sensors.			
Site Sensor Failures	Date Sensors Failed	Why sensors were failed	Field Service Observations
Salinity	12/17/07	Values were too high.	
Relative Humidity	2/21/08	Saturated values for too long of a time period.	

2N 125W

Buoy ID: PM673A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4715 m	
Deployed Location: 1 55.9N 125 36.1W		Recovery Location: None	
Buoy Start Date: 5/14/2007		Buoy End Date: None	
Service Description: Buoy adrift and not recovered.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Buoy	9/29/07	Buoy flagged as moved.	
Air Temperature/ Relative Humidity	9/29/07	Hourly values went erratic.	
Wind	10/6/07	Directions were erroneous.	
Buoy	10/31/07	Buoy outside watch grid.	

5N 125W

Buoy ID: PM710A		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4373 m	
Deployed Location: 5 4.9N 124 52.8W		Repair Location: 5 5.7N 124 52.5W	
Buoy Start Date: 10/18/07		Buoy End Date: Still deployed	
Service Description: Repair. The datalogger tube, SSC sensor, and ATRH sensor were replaced.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Wind	10/19/07	Direction off ~180 degrees.	
Relative Humidity	4/8/08	Values too high (above 100%).	

8N 125W

Buoy ID: PM616B		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4588 m	
Deployed Location: 8 2.79N 124 59.1W		Recovery Location: 8 3.5N 124 59.5W	
Buoy Start Date: 8/26/06		Buoy End Date: 5/25/08	
Service Description: Buoy not transmitting at time of recovery. T10 and T40 missing.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Buoy	1/5/08	Transmit failure due to low battery.	
Buoy	2/19/08	Resumed transmits, data released.	
Buoy	3/19/08	Transmit failure due to low battery.	

2.2 *CTD Casts Completed*

A Sea-Bird 911plus CTD with dual temperature and conductivity sensors was provided by the NMAO. Temperature and conductivity sensors are calibrated yearly at Sea-Bird and sent in for diagnostics as necessary. A Sea-Bird 12-position carousel and twelve 5-liter Niskin bottles were used to collect water samples for the analysis of salinity.

The following outlines the CTD casts completed during the cruise:

CTD Casts		
Site	Date	Comments
9N 140W	5/6/2008	3000 m
8N 140W	5/6/2008	1000 m
7N 140W	5/6/2008	1000 m
6N 140W	5/7/2008	1000 m
5N 140W	5/7/2008	1000 m
0N 140W	5/9/2008	3000 m
1S 140W	5/10/2008	1000 m
2S 140W	5/11/2008	1000 m
5S 140W	5/13/2008	3000 m
8S 125W	5/19/2008	3000 m
5S 125W	5/20/2008	1000 m
2S 125W	5/22/2008	1000 m
1S 125W	5/22/2008	1000 m
0.5S 125W	5/22/2008	1000 m
0 125W	5/22/2008	3000 m
1N 125W	5/23/2008	1000 m
2N 125W	5/23/2008	1000 m
3N 125W	5/24/2008	1000 m
4N 125W	5/24/2008	1000 m
5N 125W	5/24/2008	1000 m
6N 125W	5/24/2008	1000 m
7N 125W	5/25/2008	1000 m
8N 125W	5/25/2008	3000 m

2.3 *Ancillary Science Projects Completed on the Cruise*

The following outlines the ancillary science work performed in conjunction with the TAO operations on the cruise:

Pacific Marine Environmental Laboratory (PMEL) Argo Profiling CTD Floats

Four Argo floats were scheduled for deployment on this cruise. The chief scientist verified and briefed the Operations Officer on the deployment positions prior to the start of the cruise. All Argo Float deployments were completed as scheduled.

Questions concerning ARGO Floats should be directed to:

Gregory Johnson, NOAA/PMEL
 Tel: (206) 526-6806
 E-mail: pmel_floats@noaa.gov

or

Elizabeth Steffen, NOAA/PMEL
 Tel: (206) 526-6747
 E-mail: pmel_floats@noaa.gov

The following outlines the Argo floats deployed during the cruise:

Argo Float Deployments		
Site	Date	Comments
11 59.9N 145 23.6W	5/4/2008	
08 58.574N 140 15.534W	5/6/2008	
00 01.164N 139 50.253W	5/9/2008	
00 05.574S 124 20.020W	5/22/2008	

Atlantic Oceanographic and Meteorological Laboratory (AMOL) Surface Drifting Floats

Ten AOML Surface Drifters were scheduled for deployment on this cruise. The chief scientist verified and briefed the Operations Officer on the deployment positions prior to the start of the cruise. All AOML Surface Drifter deployments were completed as scheduled.

Questions concerning AOML Surface Drifters should be directed to:

Shaun Dolk, NOAA/AOML
 Global Drifter Center,
 Tel: (305) 361-4546
 Fax: (305) 361-4436
 E-mail: shaun.dolk@noaa.gov

The following outlines the AOML Drifting floats deployed during this cruise:

AOML Float Deployments		
Site	Date	Comments
5N 140W	5/7/2008	
2N 140W	5/8/2008	
0 140WW	5/9/2008	
02 S 140W	5/12/2008	
5S 140W	5/14/2008	
5S 125W	5/21/2008	
2S 125WW	5/22/2008	
0 125W	5/22/2008	
2N 125W	5/23/08	
5N 125W	5/24/08	

PCO2 and Nitrate Mapping System and Nutrient Samples

Twenty-three 30ml water samples were collected on this cruise. The chief scientist verified and briefed the Operations Officer on the specifications of the water samples to be collected during CTD casts prior to the start of the cruise. All water samples were collected as scheduled.

Questions concerning Nutrient Samples should be directed to:

Cathy Cosca
NOAA/PMEL
7600 Sand Point Way NE
Seattle, Washington 98115
Tel: (206) 526-6183
E-mail: cathy.cosca@noaa.gov