

TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM  
FINAL CRUISE REPORT  
TA-13-04-BLFN

Area: Equatorial Pacific: 8°N 155°W to 8°S 155°W

Itinerary:

TA-13-04-BLFN    DEP    *September 16, 2013, Honolulu, HI*  
                          ARR    *October 21, San Diego, CA*

**CRUISE DESCRIPTION**

The Tropical Atmosphere Ocean (TAO) array consists of 70 buoys utilizing a taut line mooring configuration used to mount data collection sensors for climate research purposes. Fifteen buoys are serviced by JAMSTEC and the remaining 55 buoys from 95°W longitude to 165°E longitude are serviced by National Data Buoy Center (NDBC). Repair and maintenance of the buoys is performed by NDBC contracted personnel on an annual basis utilizing the NOAA Ships and other contract vessels. The buoys' deployment lifecycles are up to 18 months to ensure at least one year of data collection can be completed.

NDBC Points of Contact:

NDBC Operations Branch Chief

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TAO Cruise Objective and Plan:

The objective of this cruise was the maintenance of the TAO Array along the 155°W meridian.

The scientific complement for the cruise embarked at Honolulu, HI on September 15, 2013. The ship departed on September 16, 2013 and conducted operations as listed in Section 2.1. The ship arrived in San Diego, CA on October 21, 2013.

## 1.0 PERSONNEL

### 1.1 CRUISE LEAD AND PARTICIPATING SCIENTISTS:

Cruise Lead: James Haden.

Participating Scientists:

Name	Gender	Nationality	Affiliation
James Haden	M	US	NOAA/NDBC
Alan Lossett	M	US	NOAA/NDBC
Dave Parrett	M	US	NOAA/NDBC

## 2.0 OPERATIONS

### 2.1 TAO Data Recovery Summary

Mooring Operations conducted are shown in the tables below. The following provides details on the data recovery efforts for the buoys serviced. All noted times in this summary report are Coordinated Universal Time (UTC):

### Cruise Summary

<b>Buoy Site:</b> 8N 155W Refresh			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM047A	
<b>Deployed Location:</b> 07 58.839N 155 00.385W		<b>Deployed Date:</b> 6/15/2012	
<b>Recovered Location:</b> 07 58.5N 155 00.8W		<b>Recovered Date:</b> 9/27/2013	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> Payload, anemometer, AT/RH			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> Yes, Tower was missing. Big line tied off on bridle leg.			
<b>Sensors/Tubes Downloaded:</b> T125 could not be downloaded, problems encountered during downloading. All other recovered sensors were downloaded successfully.			
<b>General Comments:</b> Routine recovery. Tower was missing and IM line was cut			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
Tube (all Met)	7/2/12	Data missing, transmits ceased	Tower removed
T125	7/2/12	Data missing	Could not download

<b>Buoy Site:</b> 8N 155W Refresh	<b>Mooring Depth:</b> 5243 m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM056A
<b>Deployed Location:</b> 8 00.5N 154 57.0W	<b>Deployed Date:</b> 9/26/2013
<b>Pre-Deployment On Deck Instrument Failures:</b> None	
<b>Sensors/Equipment Lost at Sea:</b> None	
<b>Sensors Damaged During Deployment:</b> None	
<b>General Comments:</b> None	

<b>Buoy Site:</b> 2N 155W Legacy			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> PM987B	
<b>Deployed Location:</b> 01 59.05N 154 57.45W		<b>Deployed Date:</b> 10/8/2011	
<b>Recovered Location:</b> 01 59.7N 154 58.3W		<b>Recovered Date:</b> 9/28/2013	
<b>Previous Repair Date:</b> 6/12/2012			
<b>Sensors/Equipment Lost at Sea:</b> T150,T250, TP300, and TP500			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> Yes, fishing gear throughout mooring.			
<b>Sensors/Tubes Downloaded:</b> SSC had no communications, T200 encountered problems during downloading. All other recovered sensors were downloaded successfully.			
<b>General Comments:</b> None			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
T150	12/26/12	Data missing	Lost at sea
T250	5/20/12	Data missing	Lost at sea
TP300	5/19/12	Data missing	Lost at sea
TP500	3/1/12	Data missing	Lost at sea

<b>Buoy Site:</b> 2N 155W Refresh	<b>Mooring Depth:</b> 4652 m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM057A
<b>Deployed Location:</b> 01 59.25N 154 57.83W	<b>Deployed Date:</b> 9/29/2013
<b>Pre-Deployment On Deck Instrument Failures:</b> None	
<b>Sensors/Equipment Lost at Sea:</b> None	
<b>Sensors Damaged During Deployment:</b> None	
<b>General Comments:</b> Camera system mounted on platform.	

<b>Buoy Site:</b> 2S 155W Legacy	
<b>Mooring Operation:</b> Recovery	<b>Mooring ID#:</b> PM988A
<b>Deployed Location:</b> 01 58.89S 154 59.6W	<b>Deployed Date:</b> 10/11/2011

<b>Recovered Location:</b> 01 59.2S 155 00.4W		<b>Recovered Date:</b> 9/30/2013	
<b>Sensors/Equipment Lost at Sea:</b> T125,TP500			
<b>Sensors Damaged/Fouled:</b> AT/RH bent			
<b>Fishing Vandalism:</b> Yes, large amount of fishing gear throughout mooring.			
<b>Sensors/Tubes Downloaded:</b> No communications with the tube or SSC. All other recovered sensors were downloaded successfully.			
<b>General Comments:</b> Tower ring was broken.			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
Tube (all Met)	10/17/12	Data missing, transmits ceased	No comms
T125	9/26/12	Data missing	Lost at sea
TP500	10/16/12	Data missing	Lost at sea

<b>Buoy Site:</b> 2S 155W Refresh		<b>Mooring Depth:</b> 4991 m	
<b>Mooring Operation:</b> Deployment		<b>Mooring ID#:</b> DM058A	
<b>Deployed Location:</b> 01 59.15S 154 59.63W		<b>Deployed Date:</b> 10/1/13	
<b>Pre-Deployment On Deck Instrument Failures:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged During Deployment:</b> None			
<b>General Comments:</b> Buoy is a low profile buoy.			

<b>Buoy Site:</b> 8S 155W Refresh			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM025A	
<b>Deployed Location:</b> 08 15.406S 155 00.478W		<b>Deployed Date:</b> 10/13/2011	
<b>Recovered Location:</b> 08 16.4S 155 01.5W		<b>Recovered Date:</b> 10/2/2013	
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing Vandalism:</b> None			
<b>General Comments:</b> Nilspin was tied in a knot above the TP500			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
RH	1/22/13	Data drifted too high	None

<b>Buoy Site:</b> 8S 155W Refresh		<b>Mooring Depth:</b> 5331 m	
<b>Mooring Operation:</b> Deployment		<b>Mooring ID#:</b> DM059A	
<b>Deployed Location:</b> 08 15.3S 155 01.1W		<b>Deployed Date:</b> 10/3/2013	
<b>Pre-Deployment On Deck Instrument Failures:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged During Deployment:</b> None			

<b>General Comments:</b> None
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<b>Buoy Site:</b> 5S 155W Refresh			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM044A	
<b>Deployed Location:</b> 04 58.590S 154 59.219W		<b>Deployed Date:</b> 6/10/2012	
<b>Recovered Location:</b> 04 58.9S 155 00.2W		<b>Recovered Date:</b> 10/4/2013	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> Anemometer tail fin broken off			
<b>Fishing/Vandalism:</b> Fishing line wrapped around middle of mooring			
<b>Sensors/Tubes Downloaded:</b> All sensors downloaded except for tube.			
<b>General Comments:</b> Hydraulic hose was deteriorating and IM line severed.			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
Wind	8/29/12	WDIR 30 degrees off	Top fin broken off
RH	2/28/13	Data too high	None

<b>Buoy Site:</b> 5S 155W Refresh		<b>Mooring Depth:</b> 5027 m	
<b>Mooring Operation:</b> Deployment		<b>Mooring ID#:</b> DM060A	
<b>Deployed Location:</b> 04 58.52S 154 59.55W		<b>Deployed Date:</b> 10/4/2013	
<b>Pre-Deployment On Deck Instrument Failures:</b> AT/RH			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged During Deployment:</b> None			
<b>General Comments:</b> AT/RH was replaced during testing due to failure.			

<b>Buoy Site:</b> 0 155W Refresh CO2			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM045A	
<b>Deployed Location:</b> 00 00.065S 154 56.689W		<b>Deployed Date:</b> 6/12/2012	
<b>Recovered Location:</b> None		<b>Recovered Date:</b> None	
<b>Sensors/Equipment Lost at Sea:</b> Buoy was lost. All equipment lost at sea.			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> Unknown			
<b>Sensors/Tubes Downloaded:</b> None			
<b>General Comments:</b> Buoy was determined Lost at Sea			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
All	6/17/12	Data missing, transmits ceased	Lost at sea

<b>Buoy Site:</b> 0 155W CO2	<b>Mooring Depth:</b> 4639 m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM061A
<b>Deployed Location:</b> 00 00.05N 154 56.9W	<b>Deployed Date:</b> 10/5/2013
<b>Pre-Deployment On Deck Instrument Failures:</b> None	
<b>Sensors/Equipment Lost at Sea:</b> None	
<b>Sensors Damaged During Deployment:</b> AT/RH 35456, replaced with 34524	
<b>General Comments:</b> New style CO2 equilibrator installed on buoy. At/RH was saturated during anchor drop.	

<b>Buoy Site:</b> 5N 155W Refresh			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM046A	
<b>Deployed Location:</b> 05 00.4N 154 56.9W		<b>Deployed Date:</b> 6/14/2012	
<b>Recovered Location:</b> 05 00.9N 154 57.0W		<b>Recovered Date:</b> 10/7/2013	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None			
<b>General Comments:</b> None.			
<b>Site Sensor Failures</b>	<b>Date Sensors Flagged</b>	<b>Why Sensors Flagged</b>	<b>Field Service Observations</b>
RH	4/22/13	Data too high	None
ATMP	5/6/13	Data too high	None
Wind	7/16/13	WDIR erratic	None
T100	9/12/13	Data missing	No comms, dead battery
T200	3/26/13	Data missing	No comms

<b>Buoy Site:</b> 5N 155W Refresh	<b>Mooring Depth:</b> 4583 m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM062A
<b>Deployed Location:</b> 05 00.3N 154 57.0W	<b>Deployed Date:</b> 10/8/2013
<b>Pre-Deployment On Deck Instrument Failures:</b> Tube wireless system not working.	
<b>Sensors/Equipment Lost at Sea:</b> None	
<b>Sensors Damaged During Deployment:</b> None	
<b>General Comments:</b> Camera system was mounted on platform.	

## 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.

No CTD casts were completed during this cruise.

## 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:

### Atlantic Oceanographic and Meteorological Laboratory (AOML) Surface Drifting Floats

Five (5) 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:

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

<b>AOML Floats</b>			
<b>Coordinates</b>	<b>Date</b>	<b>Buoy#</b>	<b>Comments</b>
05 00.616N 154 57.790W	9/28/2013	116418	
03 00.000N 154 58.300W	9/28/2013	118560	
00 00 .002N 154 56.650W	9/30/2013	118558	
03 00.000S 155 03.000W	10/1/2013	116419	
05 00.002S 155 00.200W	10/1/2013	118555	