

TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM
FINAL CRUISE REPORT
TA-13-01-KOK

Area: Equatorial Pacific: 8°N 125°W, 8°N 110°W to 0° 110°W, 2°S 95°W to 8°N 95°W

Itinerary:

TA-13-01-KOK DEP *March 5, 2013, Honolulu, HI*
 ARR *April 11, 2013, Golfito, Costa Rica*

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 Ship *Ka'imimoana* and other ships. 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 110°W and 95°W meridians. Due to mechanical problems, the ship was diverted and completed portions of the 125°W, 110°W and 95°W meridians.

The scientific complement for the cruise embarked at Honolulu, HI on March 4, 2013. The ship departed on March 5, 2013 and conducted operations as listed in Section 2.1. The ship arrived in Golfito, CR on April 11, 2013.

1.0 PERSONNEL

1.1 CRUISE LEAD AND PARTICIPATING SCIENTISTS:

Cruise Lead: William Thompson.

Participating Scientists:

Name	Gender	Nationality	Affiliation
William Thompson	M	US	NOAA/NDBC
Alan Lossett	M	US	NOAA/NDBC
James Houston	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

Buoy Site: 8N 125W ATLAS	
Mooring Operation: Recovery	Mooring ID#: QM006A
Deployed Location: 08 01.69N 125 00.53W	Deployed Date: 3/28/2012
Recovered Location: 08 04.10N 124 59.02W	Recovered Date: 3/18/2013
Sensors/Equipment Lost at Sea: N/A	
Sensors Damaged/Fouled: T140 & T180 Broken Mount	
Fishing/Vandalism: None	
Sensors/Tubes Downloaded: All sensors downloaded successfully.	
General Comments: None	

Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
None			

Buoy Site: 8N 125W ATLAS	Mooring Depth: 4644 m
Mooring Operation: Deployment	Mooring ID#: QM013A
Deployed Location: 08 00.521N 125 0.32W	Deployed Date: 3/19/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment.	

Buoy Site: 8N 110W ATLAS			
Mooring Operation: Recovery	Mooring ID#: PM976A		
Deployed Location: 08 00.70N 110 11.60W	Deployed Date: 7/28/2011		
Recovered Location: 08 02.43N 110 09.072W	Recovered Date: 3/24/2013		
Sensors/Equipment Lost at Sea: T180			
Sensors Damaged/Fouled: TP300 Broken Mount			
Fishing/Vandalism: Minor fishing line			
Sensors/Tubes Downloaded: All recovered sensors downloaded successfully.			
General Comments: Swapped in a new battery in order to communicate and download SSC.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
T180	10/20/12	Data missing	Lost at sea

Buoy Site: 8N 110W ATLAS	Mooring Depth: 4229 m
Mooring Operation: Deployment	Mooring ID#: QM014A
Deployed Location: 08 02.139N 110 09.825W	Deployed Date: 3/25/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment.	

Buoy Site: 5N 110W ATLAS	
Mooring Operation: Recovery	Mooring ID#: PM997A
Deployed Location: 04 59.62N 110 04.56W	Deployed Date: 2/8/2012
Recovered Location: 05 11.2N 110 01.0W	Recovered Date: 3/25/2013
Sensors/Equipment Lost at Sea: TP300	

Sensors Damaged/Fouled: SSC, T20, T40 fouled.			
Fishing/Vandalism: Long line throughout the mooring.			
Sensors/Tubes Downloaded: All recovered sensors downloaded successfully.			
General Comments: The release was lying on its side upon arrival at the buoy. Had good communications with release, but it wouldn't respond to release command. The recovery was treated as a no release. After the mooring was pulled tight, the release responded properly and let go of the anchor. The depth was 300m shallower than deployment location.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
TP300	1/6/13	Data missing	Lost at sea

Buoy Site: 5N 110W REFRESH	Mooring Depth: 4247 m
Mooring Operation: Deployment	Mooring ID#: DM048A
Deployed Location: 04 59.66N 110 04.64W	Deployed Date: 3/26/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment.	

Buoy Site: 2N 110W ATLAS			
Mooring Operation: Recovery	Mooring ID#: PM978B		
Deployed Location: 02 02.06N 110 02.15W	Deployed Date: 8/1/2011		
Recovered Location: 02 02.3N 110 02.9W	Recovered Date: 3/27/2013		
Previous Repair Date: 2/9/2012			
Sensors/Equipment Lost at Sea: T20 & TP300			
Sensors Damaged/Fouled: T40 & T140 broken mount.			
Fishing/Vandalism: None			
Sensors/Tubes Downloaded: All sensors successfully downloaded except SSC, T40, and T60 due to dead batteries.			
General Comments: None			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
SSC	2/23/13	Data missing	Dead battery
T20	7/25/12	Data missing	Lost at sea
T40	11/26/11	Data missing	Dead battery
T60	2/8/12	Data missing	Dead battery
TP300	2/8/12	Data missing	Lost at sea
RH	4/28/12	Data too high	None

Buoy Site: 2N 110W REFRESH	Mooring Depth: 3763 m
Mooring Operation: Deployment	Mooring ID#: DM049A

Deployed Location: 02 02.205N 110 03.187W	Deployed Date: 3/28/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment.	

Buoy Site: 0 110W ADCP	
Mooring Operation: Recovery	Mooring ID#: EA019
Deployed Location: 00 00.506N 109 56.448W	Deployed Date: 8/2/2011
Recovered Location: 00 00.507N 109 56.44W	Recovered Date: 3/28/2013
Previous Repair Date: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged/Fouled: None	
Fishing/Vandalism: None	
Sensors/Tubes Downloaded: Sent to lab for download	
General Comments: Mooring deployed without a 1 m chain or swivel under float, counter to mooring diagram.	

Buoy Site: 0 110W ADCP	Mooring Depth: 3820 m
Mooring Operation: Deployment	Mooring ID#: EA020
Deployed Location: 00 01.156N 109 56.203W	Deployed Date: 3/29/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine Deployment.	

Buoy Site: 0 110W ATLAS			
Mooring Operation: Recovery		Mooring ID#: PM979B	
Deployed Location: 00 01.81N 109 55.61W		Deployed Date: 8/2/2011	
Recovered Location: NA		Recovered Date: 3/29/2013	
Previous Repair Date: 2/10/2012			
Sensors/Equipment Lost at Sea: All sensors lost at sea			
Sensors Damaged/Fouled: All sensors lost at sea.			
Fishing/Vandalism: Buoy adrift			
Sensors/Tubes Downloaded: All sensors lost at sea.			
General Comments: Lost at sea.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
All (Tube)	5/2/12	No transmissions	No xmits, Lost at sea

Buoy Site: 0 110W ATLAS	Mooring Depth: 3799 m
Mooring Operation: Deployment	Mooring ID#: QM015A
Deployed Location: 00 02.1139N 109 54.52W	Deployed Date: 3/29/2013
Pre-Deployment On Deck Instrument Failures: AT/RH	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment.	

Buoy Site: 2S 95W ATLAS			
Mooring Operation: Recovery		Mooring ID#: QM001A	
Deployed Location: 01 59.07S 95.10.98W		Deployed Date: 2/20/2012	
Recovered Location: NA		Recovered Date: 4/2/2013	
Sensors/Equipment Lost at Sea: All equipment lost at sea			
Sensors Damaged/Fouled: All sensors lost at sea			
Fishing/Vandalism: All equipment lost at sea			
Sensors/Tubes Downloaded: None			
General Comments: All equipment lost at sea.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
All (Tube)	8/13/12	No transmissions	No xmits, Lost at sea
Rain	7/6/12	High percent time raining with no rain-rate	Lost at sea

Buoy Site: 2S 95W ATLAS	Mooring Depth: 3450 m
Mooring Operation: Deployment	Mooring ID#: QM016A
Deployed Location: 01 59.001S 95 11.067W	Deployed Date: 4/2/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment.	

Buoy Site: 0 95W ATLAS	
Mooring Operation: Recovery	Mooring ID#: QM002A
Deployed Location: 00 00.611S 94 58.378W	Deployed Date: 2/21/2012
Recovered Location: NA	Recovered Date: 4/3/2013
Sensors/Equipment Lost at Sea: All sensors lost at sea	
Sensors Damaged/Fouled: All sensors lost at sea	

Fishing/Vandalism: Buoy lost at sea.			
Sensors/Tubes Downloaded: NONE			
General Comments: Buoy adrift, Acoustic release verified lying horizontal on ocean floor.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
All (Tube)	7/4/12	No transmissions	Lost at sea
Wind	6/15/12	WSPD zeroed out	Lost at sea
Rain	6/15/12	High percent time raining with no rain-rate	Lost at sea
Salinity	4/23/12	Data drifted high	Lost at sea

Buoy Site: 0 95W REFRESH	Mooring Depth: 3266 m
Mooring Operation: Deployment	Mooring ID#: DM050A
Deployed Location: 00 05.725S 95 27.748W	Deployed Date: 4/3/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: Routine deployment. Pentagon anti-tamper bolts installed.	

Buoy Site: 2N 95W ATLAS			
Mooring Operation: Recovery	Mooring ID#: QM003A		
Deployed Location: 01 58.50N 95 18.46W	Deployed Date: 2/22/2012		
Recovered Location: NA	Recovered Date: 4/4/2013		
Sensors/Equipment Lost at Sea: All sensors lost at sea			
Sensors Damaged/Fouled: All sensors lost at sea.			
Fishing/Vandalism: Buoy is adrift.			
Sensors/Tubes Downloaded: None			
General Comments: Buoy is adrift, no communication with acoustic release.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
All (Tube)	3/9/12	No transmissions	Lost at sea
Rain	3/3/12	High percent time raining with no rain-rate	Lost at sea

Buoy Site: 2N 95W REFRESH	Mooring Depth: 2817 m
Mooring Operation: Deployment	Mooring ID#: DM051A
Deployed Location: 01 54.983N 95 20.205W	Deployed Date: 4/4/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	

General Comments: Routine deployment. Pentagon anti-tamper bolts installed. End of fairings at 180m.

Buoy Site: 5N 95W ATLAS			
Mooring Operation: Recovery		Mooring ID#: QM004A	
Deployed Location: 04 57.2N 95 00.5W		Deployed Date: 2/24/2012	
Recovered Location: 04 57.4N 95 01.1W		Recovered Date: 4/5/2013	
Sensors/Equipment Lost at Sea: Tower, Tube, AT/RH, Wind, Rain Gauge			
Sensors Damaged/Fouled: T100, T140, TP300, TP500 broken module mount.			
Fishing/Vandalism: Tower missing and long line on nylon.			
Sensors/Tubes Downloaded: All recovered sensors successfully downloaded except T40 due to dead batteries.			
General Comments: None			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
All (Tube)	8/18/12	No transmissions	Tower missing
ATMP/RH	8/17/12	Data low & erratic	Tower missing

Buoy Site: 5N 95W ATLAS		Mooring Depth: 3509 m	
Mooring Operation: Deployment		Mooring ID#: QM017A	
Deployed Location: 04 57.56N 95 00.002W		Deployed Date: 4/5/2013	
Pre-Deployment On Deck Instrument Failures: None			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged During Deployment: T100			
General Comments: Routine deployment. T100 out on deployment			

Buoy Site: 8N 95W ATLAS			
Mooring Operation: Recovery		Mooring ID#: QM005A	
Deployed Location: 08 01.03N 94 57.32W		Deployed Date: 2/25/2012	
Recovered Location: 08 00.7N 94 58.4W		Recovered Date: 4/6/2013	
Sensors/Equipment Lost at Sea: Tower, Tube, AT/RH, Wind, Rain Gauge			
Sensors Damaged/Fouled: T120, T180 BROKEN MOUNT			
Fishing/Vandalism: Tower unbolted and missing. Several tow lines wrapped in the bridle and buoy pad eyes.			
Sensors/Tubes Downloaded: All recovered sensors downloaded successfully except SSC & T20 due to dead batteries.			
General Comments: None.			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
All (Tube)	3/4/12	No transmissions	Tower missing

Rain	2/26/12	High percent time raining with no rain-rate	Tower missing
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Buoy Site: 8N 95W ATLAS	Mooring Depth: 3687 m
Mooring Operation: Deployment	Mooring ID#: QM018A
Deployed Location: 08 0.942N 94 57.416W	Deployed Date: 4/7/2013
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: None	

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 Operations					
Coordinates		Date	Cast #	Comments	
0800.247N	12501.591W	3/19/13	KOK10011	1000m	
0801.447N	11010.44W	3/25/13	KOK10021	1000m	
0458.58N	11005.746W	3/26/13	KOK10031	1000m	
0201.1N	11003.2W	3/28/2013	KOK10041	1000m	
0002.566N	10954.566W	3/29/13	KOK10051	1000m	
0200.112S	09509.924W	4/2/13	KOK10061	1000m	
0006.233S	09527.377W	4/3/13	KOK10071	1000m	
0154.897N	09518.740W	4/4/13	KOK10081	1000m	
0457.90N	09458.89W	4/5/13	KOK10091	1000m	
0800.067N	09457.846W	4/7/13	KOK10101	1000m	

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

Thirteen (13) 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 Floats			
Coordinates	Date	SN#	Comments
2 2.30N 110 3.585W	3/28/13	F0190	
0 59.9N 109 59.99W	3/28/13	F0210	
0 02.95N 109 54.32W	3/28/13	F0191	
1 28.04S 98 59.9W	4/1/13	F0192	
1 58.5S 95 11.0W	4/3/13	F0193	
1 0.04S 95 4.79W	4/3/13	F0194	
0 5.25S 95 27.4W	4/4/13	F0195	
1 1.1N 95 23.8W	4/4/13	F0196	
1 55.22N 95 20.34W	4/4/13	F0197	

Atlantic Oceanographic and Meteorological Laboratory (AMOL) Surface Drifting Floats

Thirty-nine (39) 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 Floats			
Coordinates	Date	SN#	Comments
4 59.72N 110 4.25W	3/26/13	118579	
2 2.30N 110 3.585W	3/28/13	118580	
0 2.95N 109 54.32W	3/29/13	118581	
1 58.5S 95 11.0W	4/3/13	118577	
0 05.2S 95 27.4W	4/4/13	118570	
1 55.22N 95 20.34W	4/4/13	118572	
4 57.97N 94 39.89W	4/6/13	118578	