

TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM
FINAL CRUISE REPORT
KA-11-01

Area: Equatorial Pacific between 8°N and 8°S latitude along 155°W Longitude and 8°S to 8°N Latitude along 170°W Longitude.

Itinerary:

KA-11-01 DEP *January 18, 2011, Honolulu, HI*
ARR *February 18, Pohnpei, FSM*

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.

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 155°W and 170°W meridians.

The scientific complement for the cruise embarked at **Honolulu, HI** on **February 17, 2011**. The ship departed on **February 18, 2011** and conducted operations as listed in Section 2.1. The ship arrived in **Pohnpei, FSM** on **February 18, 2011**.

1.0 PERSONNEL

1.1 CRUISE LEAD AND PARTICIPATING SCIENTISTS:

Cruise Lead: Leonard Quigley

Participating Scientists:

Name	Gender	Nationality	Affiliation
Leonard Quigley	M	US	NOAA/NDBC
James Haden	M	US	NOAA/NDBC
Casey Burge	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 155W			
Mooring Operation: Visit		Mooring ID#: PM928A	
Deployed Location: 7 58.045N 154 59.578W		Deployed Date: 9/6/2010	
Visit Location: 8 00.8N 154 56.6W		Visit Date: 1/22/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Buoy riding well in the water.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 8N 155W Refresh			
Mooring Operation: Recovery		Mooring ID#: DM006B	
Deployed Location: 7 54.9N 154 57.9W		Deployed Date: 1/9/2010	
Recovered Location: N/A		Recovered Date: 1/22/2011	
Previous Repair Date: 9/5/2010			
Sensors/Equipment Lost at Sea: All			
Sensors Damaged/Fouled: N/A			
Fishing/Vandalism: Vandalism Possible			
Sensors/Tubes Downloaded: None			
General Comments: Transmissions ceased suddenly on 10/29/2010. The acoustic release was found on station on the ocean floor. Everything was lost at sea.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
T25	9/25/10	Data erratic	Lost at Sea
T100	9/27/11	Slipped down nilspin	Lost at Sea

Buoy Site: 8N 155W Refresh		Mooring Depth: 5234m	
Mooring Operation: Deployment		Mooring ID#: DM017A	
Deployed Location: 7 56.4N 154 58.7W		Deployed Date: 1/22/2011	
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 155W			
Mooring Operation: Recovery		Mooring ID#: PM866B	
Deployed Location: 5 00.3N 154 54.5W		Deployed Date: 1/11/2010	
Recovered Location: 5 04.7N 154 57.5W		Recovered Date: 1/23/2011	
Previous Repair Date: 9/7/2010			
Sensors/Equipment Lost at Sea: T150 SN# 14448			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: Long line cuts in nilspin at 150m and 200m			
Sensors/Tubes Downloaded: All sensors downloaded except T150 SN# 14448 - lost at sea and T125 SN#14447 - dead batteries			
General Comments: None			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
T125	9/27/10	Data missing	Dead batteries
T150	8/15/10	Data missing	Lost at Sea

Buoy Site: 5N 155W	Mooring Depth: 4591m
Mooring Operation: Deployment	Mooring ID#: PM950A
Deployed Location: 4 59.9N 154 57.3W	Deployed Date: 1/24/11
Pre-Deployment On Deck Instrument Failures: TP10 SN#13810 would not transmit data, it was replaced with TP10 SN# 14849.	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: None	

Buoy Site: 2N 155W			
Mooring Operation: Visit		Mooring ID#: PM929A	
Deployed Location: 1 59.10N 154 56.56W		Deployed Date: 9/8/2010	
Visit Location: 1 59.1N 154 56.4W		Visit Date: 1/25/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Buoy riding well in the water.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 0 155W			
Mooring Operation: Recovery		Mooring ID#: PM867B	
Deployed Location: 0 00.2N 154 57.3W		Deployed Date: 1/13/2010	
Recovered Location: 0 00.2S 154 57.6W		Recovered Date: 1/25/2011	
Previous Repair Date: 9/9/2010			
Sensors/Equipment Lost at Sea: Acoustic release.			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: Antenna mast bent over.			
Sensors/Tubes Downloaded: All sensors downloaded successfully.			
General Comments: Communication could not be established with acoustic release. Had to cut mooring with a line cutter.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site 0 155W	Mooring Depth: 4652m
Mooring Operation: Deployment	Mooring ID#: PM951A
Deployed Location: 0 00.22S 154 56.91W	Deployed Date: 1/26/2011
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None.	
Sensors Damaged During Deployment: None	
General Comments: Deployment went well.	

Buoy Site: 2S 155W			
Mooring Operation: Visit		Mooring ID#: PM930A	
Deployed Location: 1 58.505S 154 59.671W		Deployed Date: 9/11/2010	
Visit Location: 1 58.3S 154 59.4W		Visit Date: 1/26/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Buoy riding well in the water.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 5S 155W			
Mooring Operation: Recovery		Mooring ID#: PM868B	
Deployed Location: 4 58.8S 154 58.0W		Deployed Date: 1/16/2010	
Recovered Location: 4 58.1S 154 59.9W		Recovered Date: 1/27/2011	
Previous Repair Date: 9/11/2010			
Sensors/Equipment Lost at Sea: T250 SN#13071.			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: Long Line gear at 250m down to approximately 450m.			
Sensors/Tubes Downloaded: All sensors were downloaded successfully except T250 SN#13071 which was lost at sea.			
General Comments: 250m T sensor was reporting just prior to recovery but the long line gear must have pulled sensor off during recovery operations.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 5S 155W	Mooring Depth: 5032m
Mooring Operation: Deployment	Mooring ID#: PM952A
Deployed Location: 4 59.0S 154 59.0W	Deployed Date: 1/28/2011
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: None	

Buoy Site: 8S 155W			
Mooring Operation: Visit		Mooring ID#: PM931A	
Deployed Location: 8 15.762S 155 00.262W		Deployed Date: 9/13/2011	
Visit Location: 08 15.7S 154 59.6W		Visit Date: 1/29/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Buoy riding well in the water.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 8S 170W			
Mooring Operation: Recovery		Mooring ID#: PM 869A	
Deployed Location: 7 59.24S 170 01.118W		Deployed Date: 1/28/2010	
Recovered Location: 7 59.8S 170 02.3W		Recovered Date: 2/1/2011	
Previous Repair Date: None			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: None			
Sensors/Tubes Downloaded: All sensors downloaded successfully.			
General Comments:			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 8S 170W	Mooring Depth: 5384m
Mooring Operation: Deployment	Mooring ID#: PM953A
Deployed Location: 8 00.3S 170 02.5W	Deployed Date: 2/2/2011
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: None	

Buoy Site: 5S 170W			
Mooring Operation: Repair		Mooring ID#: PM932B	
Deployed Location: 4 59.6S 170 00.5W		Deployed Date: 9/18/2010	
Repair Location: 5 00.5S 170 01.5W		Repair Date: 2/3/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Replaced T25. Old SN# 14771 with new T25 SN# 14699. During repair team noticed that T3 sensor and T4 sensor was not transmitting.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
T25	10/15/10	Data missing	None

Buoy Site: 2S 170W			
Mooring Operation: Visit		Mooring ID#: PM933A	
Deployed Location: 02 10.1S 170 00.3W		Deployed Date: 9/20/2010	
Visit Location: 2 10.5S 170 02.2W		Visit Date: 2/4/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Buoy riding well in the water.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
T200	9/19/10	Data too low	None

Buoy Site: 2S 170W Refresh			
Mooring Operation: Recovery		Mooring ID#: DM007A	
Deployed Location: 2 09.6S 170 02.7W		Deployed Date: 2/2/2010	
Recovered Location: 2 10.4S 170 02.1W		Recovered Date: 2/3/2011	
Previous Repair Date: None			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: None			
Sensors/Tubes Downloaded: All sensors downloaded successfully.			
General Comments: Top section severed at bridle where lead weights are			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 2S 170W Refresh		Mooring Depth: 4951m	
Mooring Operation: Deployment		Mooring ID#: DM018A	
Deployed Location: 2 09.1S 170 00.59W		Deployed Date: 2/4/2011	
Pre-Deployment On Deck Instrument Failures: None			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged During Deployment: None			
General Comments: None			

Buoy Site: 0 170W			
Mooring Operation: Recovery		Mooring ID#: PM871B	
Deployed Location: 0 01.2S 170 02.7W		Deployed Date: 2/3/2010	
Recovered Location: 0 01.3S 170 03.0W		Recovered Date: 2/4/2011	
Previous Repair Date: 9/20/2010			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: TP10 SN# 13390 sensor housing tip by coil broken off			
Fishing/Vandalism: Fishing gear at 75m			
Sensors/Tubes Downloaded: All downloaded successfully except T200 SN#12657 which had dead batteries.			
General Comments: 500m TP SN#13390 had the tip of the housing by the coil broken off and not on nilspin.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
T200	12/22/10	Data missing	Dead batteries

Buoy Site: 0 170W	Mooring Depth: 5605m
Mooring Operation: Deployment	Mooring ID#: PM954A
Deployed Location: 0 0.7S 170 02.8W	Deployed Date: 2/5/2011
Pre-Deployment On Deck Instrument Failures: None	
Sensors/Equipment Lost at Sea: None	
Sensors Damaged During Deployment: None	
General Comments: None	

Buoy Site: 2N 170W			
Mooring Operation: Recovery		Mooring ID#: PM872B	
Deployed Location: 2 00.9N 170 00.1W		Deployed Date: 2/4/2010	
Recovered Location: 2 01.6N 170 00.8W		Recovered Date: 2/5/2011	
Previous Repair Date: 9/22/2010			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: Long line gear throughout the mooring			
Sensors/Tubes Downloaded: All sensors downloaded successfully except T50 SN#14201-would not download			
General Comments:			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			None

Buoy Site: 2N 170W		Mooring Depth: 5393m	
Mooring Operation: Deployment		Mooring ID#: PM955A	
Deployed Location: 2 02.1N 170 02.2W		Deployed Date: 2/6/2011	
Pre-Deployment On Deck Instrument Failures: None			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged During Deployment: None			
General Comments: None			

Buoy Site: 2N 170W Refresh			
Mooring Operation: Repair		Mooring ID#: DM012B	
Deployed Location: 1 58.2N 170 01.5W		Deployed Date: 9/22/2010	
Repair Location: 1 59.7N 170 02.6W		Repaired Date: 2/5/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
Sensors/Tubes Not Downloaded: No sensors were downloaded.			
General Comments: Replaced AT/RH			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
RH	10/1/10	Data too high	None

Buoy Site: 5N 170W			
Mooring Operation: Repair		Mooring ID#: PM934B	
Deployed Location: 4 59.9N 170 00.3W		Deployed Date: 9/24/2010	
Repair Location: 5 01.3N 169 59.0W		Repaired Date: 2/7/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
Sensors/Tubes Not Downloaded: None			
General Comments: Installed new SSC SN#13259. Original SSC SN#15223 is still installed on the bridle.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
SSC	11/3/10	Data too high	None

Buoy Site: 8N 170W			
Mooring Operation: Recovery		Mooring ID#: PM883A	
Deployed Location: 8 00.3N 170 02.3W		Deployed Date: 3/14/2010	
Recovered Location: 8 00.7N 170 01.7W		Recovered Date: 2/8/2011	
Previous Repair Date: None			
Sensors/Equipment Lost at Sea: 50m T SN#13445			
Sensors Damaged/Fouled: None			
Fishing/Vandalism: None			
Sensors/Tubes Downloaded: All sensors downloaded successfully except T50 SN#13445 lost at sea, T250 SN# 13460 had dead batteries, and the payload had 1047 records but 0 bytes to transfer.			
General Comments:			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
T50	8/19/10	Data missing	Lost at Sea
T250	8/29/10	Data missing	Dead batteries

Buoy Site: 8N 170W		Mooring Depth: 5544m	
Mooring Operation: Deployment		Mooring ID#: PM956A	
Deployed Location: 8 00.0N 170 02.2W		Deployed Date: 2/9/2011	
Pre-Deployment On Deck Instrument Failures: None			
Sensors/Equipment Lost at Sea: None			
Sensors Damaged During Deployment: None			
General Comments: None			

Buoy Site: 8N 180			
Mooring Operation: Visit		Mooring ID#: PM941A	
Deployed Location: 8 00.61N 179 47.07W		Deployed Date: 10/28/2010	
Visit Location: 7 58.18N 179 51.8W		Visit Date: 2/11/2011	
Sensors/Equipment Lost at Sea: None			
Sensors Damaged/Fouled: None			
Fishing Vandalism: None			
General Comments: Visit only, buoy was not in transmit window for data comparison.			
Site Sensor Failures	Date Sensors Failed	Why Sensors Failed	Field Service Observations
			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
0700.176N 15457.330W	1/22/2011	KA10011	3000m
0700.176N 15457.330W	1/23/2011	KA10021	1000m
0559.971N 15457.052W	1/23/2011	KA10031	1000m
0501.779N 15458.525W	1/24/2011	KA10041	1000m
0400.695N 15457.196W	1/24/2011	KA10051	1000m
0300.290N 15457.046W	1/24/2011	KA10061	1000m
0200.341N 15457.559W	1/25/2011	KA10071	1000m
0100.350N 15457.606W	1/25/2011	KA10081	1000m
0002.019N 15457.500W	1/25/2011	KA10091	3000m
0059.954S 15458.745W	1/26/2011	KA10101	1000m
0156.591S 15459.624W	1/26/2011	KA10111	1000m
0259.762S 15500.599W	1/26/2011	KA10121	1000m
0401.106S 15501.861W	1/27/2011	KA10131	1000m
0456.162S 15501.515W	1/27/2011	KA10141	1000m
0559.812S 15459.970W	1/28/2011	KA10151	1000m
0659.621S 15500.059W	1/28/2011	KA10161	1000m
0815.433S 15502.012W	1/29/2011	KA10171	3000m
0756.901S 17001.723W	2/1/2011	KA10181	3000m
0700.194S 17002.515W	2/2/2011	KA10191	1000m
0559.794S 17001.814W	2/2/2011	KA10201	1000m
0501.333S 17002.867W	2/2/2011	KA10211	1000m
0400.208S 17001.916W	2/3/2011	KA10221	1000m

0259.966S 17001.256W	2/3/2011	KA10231	1000m
0206.702S 17002.671W	2/4/2011	KA10241	1000m
0059.778S 17000.515W	2/4/2011	KA10251	1000m
0002.382N 17006.177W	2/5/2011	KA10261	3000m
0100.312N 16959.818W	2/5/2011	KA10271	1000m
0203.258N 17004.723W	2/6/2011	KA10281	1000m
0300.418N 17001.241W	2/7/2011	KA10291	1000m
0400.321N 17000.411W	2/7/2011	KA10301	1000m
0500.157N 16959.787W	2/7/2011	KA10311	1000m
0600.216N 17000.119W	2/8/2011	KA10321	1000m
0700.330N 17001.641W	2/8/2011	KA10331	1000m
0800.117N 17000.294W	2/8/2011	KA10341	3000m
0756.542N 17952.736W	2/11/2011	KA10351	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

One (2) Argo float was 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
00 00.873S 000 00.873S	1/26/2011	4666	
00 03.371N 170 06.251W	2/5/2011	4660	