TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM FINAL CRUISE REPORT

M/V *Bluefin* TA-14-04

Area: Equatorial Pacific: 8°N 180° to 8°S 180° and 0° 165°E

Itinerary:

TA-14-04-BLFN DEP July 15, 2014, Honolulu, HI

ARR August 7, 2014, Apra, Guam.

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 NDBC Operations Manager

Steve Cucullu Jeff Jenner

National Data Buoy Center National Data Buoy Center

Building 3205 Building 3205

Stennis Space Center, MS 39529 Stennis Space Center, MS 39529

228-688-3804 228-688-2784

Email: stephen.cucullu@noaa.gov
Email: jeff.jenner@noaa.gov

TAO Cruise Objective and Plan:

The objective of this cruise was the maintenance of the TAO Array along the 180° meridian.

The scientific complement for the cruise embarked at Honolulu, HI on July 14, 2014. The ship departed on July 15, 2014 and conducted operations as listed in Section 2.1. The ship arrived in Apra, Guam on August 7, 2014.

1.0 **PERSONNEL**

1.1 <u>CRUISE LEAD AND PARTICIPATING SCIENTISTS</u>:

Cruise Lead: William Thompson.

Participating Scientists:

Name	Gender	Nationality	Affiliation
William Thompson	M	US	NOAA/NDBC
James Rauch	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

Buoy Site: 8N 180 ATLAS				
Mooring Operation: Recovery		Mooring ID#: PM99	Mooring ID#: PM996A	
Deployed Location: 0	7 59.54N/179 52.016W	Deployed Date: 11/3	Deployed Date: 11/30/2011	
Recovered Location: (07 59.4N/179 53.0W	Recovered Date: 7/2	Recovered Date: 7/23/2014	
Sensors/Equipment L	ost at Sea: T150			
Sensors Damaged/Fou	ıled: TP500 flooded			
Fishing/Vandalism: N	Vone			
Sensors/Tubes Downle	oaded: SSC – T125 Dea	ad batteries, TP500 Flood	led, TUBE – No	
Comms.				
General Comments: N	Vone			
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service	
			Observations	
Buoy	09/22/12	Primary xmits ceased	No comms with tube	
Winds	09/04/12	Data stuck	Compass failure	
T25	09/08/12	Data missing	No comms	
T50, T75	12/01/11	Sensors appear to	Dead battery	
		have been deployed at		
		each other's depths		
T100, T125	09/06/12	Data missing	Dead battery	

T150	11/30/11	Data missing	Lost at sea
T200, T250, TP300	09/06/12	Data missing	None
TP500	09/06/12	Data missing	Flooded

Buoy Site: 8N 180 REFRESH	Mooring Depth: 5954m	
Mooring Operation: Deployment	Mooring ID#: DM076A	
Deployed Location: 08 01.128N/179 53.583W	Deployed Date: 7/24/2014	
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 180 ATLAS				
Mooring Operation: Recovery		Mooring ID#: PM9	Mooring ID#: PM995A	
Deployed Location: 04	4 59.272N/179 53.339W	Deployed Date: 11/	Deployed Date: 11/29/2011	
Recovered Location:	Recovered Location: NA		Recovered Date: NA	
Sensors/Equipment L	ost at Sea: All sensors lo	ost at sea		
Sensors Damaged/Fou	iled: N/A			
Fishing/Vandalism: B	uoy Adrift			
Sensors/Tubes Downle	oaded: None			
General Comments: E	Buoy Adrift. Release on	its side on the ocean floo	or.	
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service	
			Observations	
Buoy	01/22/13	Transmits ceased	Lost at sea	
SSC	07/07/12	Data missing	Lost at sea	
T25	10/31/12	Data missing	Lost at sea	
T50-T125, T200,	01/19/13	Data missing	Lost at sea	
TP300				
T150	02/14/12	Data missing	Lost at sea	
TP500	01/18/13	Data missing	Lost at sea	

Buoy Site: 5N 180 REFRESH	Mooring Depth: 5687m	
Mooring Operation: Deployment	Mooring ID#: DM077A	
Deployed Location: 04 59.740N/179 53.657W	Deployed Date: 7/25/2014	
Pre-Deployment On Deck Instrument Failures: None		
Sensors/Equipment Lost at Sea: None		
Sensors Damaged During Deployment: None		
General Comments: No wireless communications.		

Buoy Site: 2N 180 REFRESH	
Mooring Operation: Recovery	Mooring ID#: DM041A
Deployed Location: 02 01.585N/179 48.104W	Deployed Date: 5/22/2012
Recovered Location: 02 01.31N/179 48.60W	Recovered Date: 7/26/2014
Sangarg/Fauinment Last at Sag. Anomemotor	

Sensors/Equipment Lost at Sea: Anemometer

Sensors Damaged/Fouled: T125 slid to 150m, SSC – Pins corroded off. **Fishing/Vandalism:** Cut to wire on nilspin, deep grooves wore into T125.

Sensors/Tubes Downloaded: No comms. with SSC, T25, T50, T75, T125. TP300 Not logging

due to low battery.

General Comments: None

Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service Observations
Wind	06/12/12	WDIR erratic	Stanchion missing, lost at sea
SSC	02/07/14	Data missing	No comms
T25	05/13/14	Data missing	No comms
T50, T100, T150, T200, T250, TP500	06/12/14	Data missing	T50 – No comms
T75	06/02/14	Data missing	No comms
T125, TP300	11/26/13	Excessive spiking	No comms, low battery

Buoy Site: 2N 180 REFRESH	Mooring Depth: 5486m	
Mooring Operation: Deployment	Mooring ID#: DM078A	
Deployed Location: 02 00.96N/179 48.38W	Deployed Date: 7/26/2014	
Pre-Deployment On Deck Instrument Failures: None		
Sensors/Equipment Lost at Sea: None		
Sensors Damaged During Deployment: None		
General Comments: Routine deployment.		

Buoy Site: 0 180 REFRESH		
Mooring Operation: Recovery	Mooring ID#: DM031B	
Deployed Location: 00 01.88N/179 54.977W	Deployed Date: 11/25/2011	
Recovered Location: NA Recovered Date: NA		
Sensors/Equipment Lost at Sea: All sensors lost at sea.		
Sensors Damaged/Fouled: N/A		
Fishing/Vandalism: Buoy adrift.		
Sensors/Tubes Downloaded: None		
General Comments: Buoy Adrift. Release on its side on the ocean floor.		

Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service
			Observations
Buoy	10/10/13	Drifted out data grid	Lost at sea
ATMP	08/10/13	Data too low	Lost at sea
RH	08/01/13	Data too high	Lost at sea
Winds	07/05/12	WDIR erratic	Lost at sea
SSC	06/27/12	Data missing	Lost at sea
T25-T75	05/27/13	Excessive spiking	Lost at sea
T100	05/01/13	Excessive spiking	Lost at sea
T125	02/13/13	Sensor slid to 150m	Lost at sea
T150	07/28/13	Data missing	Lost at sea
T250, TP300	05/19/13	Data missing	Lost at sea

Buoy Site: 0 180 REFRESH	Mooring Depth: 5398m	
Mooring Operation: Deployment	Mooring ID#: DM079A	
Deployed Location: 00 01.785N/179 55.191W	Deployed Date: 7/27/2014	
Pre-Deployment On Deck Instrument Failures: None		
Sensors/Equipment Lost at Sea: None		
Sensors Damaged During Deployment: None		
General Comments: Routine deployment.		

Buoy Site: 2S 180 REFRESH	
Mooring Operation: Recovery	Mooring ID#: DM030A
Deployed Location: 01 59.452S/179 52.283W	Deployed Date: 11/24/2011
Recovered Location: 02 00.00S/179 53.53W	Recovered Date: 7/28/2014
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: SSC T25 sea growth	Top Section severed

Sensors Damaged/Fouled: SSC, T25 sea growth, Top Section severed. **Fishing/Vandalism:** Long line gear around the entire first spool. 20m of long line around the top of the nilspin.

Sensors/Tubes Downloaded: NONE. Errors in all sensors, returned to lab.
General Comments: NONE

General Comments. NONE				
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service	
			Observations	
ATMP	03/16/14	Data erratic	None	
RH	05/29/12	Data saturated	None	
SST	08/09/12	Data missing	Fouled, top section	
			severed, no comms	
SSS	07/19/12	Data too low	Fouled, top section	
			severed, no comms	
T25-TP500	12/04/13	Data missing	Download failed, T25	
			fouled	

Buoy Site: 2S 180 REFRESH	Mooring Depth: 5341m			
Mooring Operation: Deployment	Mooring ID#: DM080A			
Deployed Location: 01 59.475S/179 52.372W Deployed Date: 7/28/2014				
Pre-Deployment On Deck Instrument Failures: None				
Sensors/Equipment Lost at Sea: None				
Sensors Damaged During Deployment: None				
General Comments: None				

Buoy Site: 5S 180 ATLAS					
Mooring Operation: H	Recovery	Mooring ID#: PM9	993B		
Deployed Location: 04	4 57.577S/179 53.755W	Deployed Date: 11	/22/2011		
Recovered Location: (04 57.385S/179 53.984W	Recovered Date: 7	/29/2014		
Sensors/Equipment L	ost at Sea: T100				
Sensors Damaged/Fou	ıled: None				
Fishing/Vandalism: N	None				
Sensors/Tubes Downle	oaded: SSC, T50, T75, T	T125, T150, T200, TP30	00 No comms. All other		
sensors downloaded successfully.					
General Comments: F	General Comments: Release covered in mud.				
Site Sensor Failures	Date Data Flagged	Why Data Flagged	Field Service		
			Observations		
Buoy	Buoy 03/15/13 Transmits ceased None				
SST	02/28/13	Data flatlined	No comms		
SSS	02/05/13	Data too low	No comms		
T100/T125	07/04/12	Data missing	LAS/No comms		

Buoy Site: 5S 180 REFRESH	Mooring Depth: 5672m			
Mooring Operation: Deployment	Mooring ID#: DM081A			
Deployed Location: 04 57.711S/179 53.535W	Deployed Date: 7/29/2014			
Pre-Deployment On Deck Instrument Failures: None				
Sensors/Equipment Lost at Sea: None				
Sensors Damaged During Deployment: None				
General Comments: Routine deployment.				

Buoy Site: 8S 180 REFRESH	
Mooring Operation: Recovery	Mooring ID#: DM042A
Deployed Location: 07 58.627S/179 51.043W	Deployed Date: 5/26/2012
Recovered Location: 07 58.52S/179 51.54W	Recovered Date: 7/30/2014
Sensors/Equipment Lost at Sea: None	

Sensors Damaged/Fouled: None Fishing/Vandalism: Longline gear wrapped around the first 400m of nilspin. Sensors/Tubes Downloaded: None, all sent back to lab for downloading **General Comments:** None. **Date Data Flagged** Why Data Flagged **Site Sensor Failures** Field Service **Observations** WDIR out 180° Winds 07/01/12 Alignment pin worn off lower stanchion SSC 02/27/14 Data missing No comms RH 05/26/13 Data saturated None T100 12/05/13 Data missing No comms TP300 Data missing 07/04/12 No comms

Buoy Site: 8S 180 REFRESH	Mooring Depth: 3893M			
Mooring Operation: Deployment	Mooring ID#: DM082A			
Deployed Location: 07 58.901S/179 50.871W	Deployed Date: 7/31/2014			
Pre-Deployment On Deck Instrument Failures: None				
Sensors/Equipment Lost at Sea: None				
Sensors Damaged During Deployment: None				
General Comments: None.				

Buoy Site: 8S 95W REFRESH					
Mooring Operation: I		Mooring ID	#: DM0	32A	
Deployed Location: 0	8 01.42S/95 14.99W	Deployed D	ate: 2/1	6/2012	
Recovered Location:	11 08.3N/118 39.1W	Recovered I	Date: 6/2	27/2014	
Sensors/Equipment L	ost at Sea: T20-TP500,	Acoustic Release	.		
Sensors Damaged/For	ıled: SSC				
Fishing/Vandalism: A	Adrift				
Sensors/Tubes Downl	oaded: None				
General Comments: A	Adrift				
Site Sensor Failures	Date Data Flagged	Why Data Fla	gged	Field Service	
				Observations	
Buoy	Buoy 10/11/13 Drifted out data grid Top 1" shackle failed				
ATMP	01/30/13 Data too low None				
T20-T500	09/21/12 Excessive spiking Lost at sea				
RH	09/18/12 Data erratic None				
SSC	10/13/12	Data missing		Fouled	

Buoy	Site: () 165I	E ATLA	S
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Mooring Operation: F	Recovery	Mooring ID#: QM0	19A	
Deployed Location: 00	0.164S/164 59.785E	Deployed Date: 8/15	5/2013	
Recovered Location: 1	N/A	Recovered Date: N/	A	
Sensors/Equipment L	ost at Sea: All sensors lo	st at sea		
Sensors Damaged/Fou	iled: N/A			
Fishing/Vandalism: A	drift			
Sensors/Tubes Downle	oaded: None			
General Comments: Acoustic release verified lying horizontal on ocean floor				
Site Sensor Failures	Date Data Flagged Why Data Flagged Field Service			
Observations				
Buoy	08/25/13	Data missing,	Lost at sea	
		transmit failure		
SRAD	08/19/13	Data too low	None	

2.2 <u>CTD Casts Completed</u>

No CTD casts were accomplished 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:

Pacific Marine Environmental Laboratory (PMEL) Argo Profiling CTD Floats

Three (3) 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 or Elizabeth Steffen, NOAA/PMEL

Tel: (206) 526-6806 Tel: (206) 526-6747

E-mail: pmel_floats@noaa.gov E-mail: pmel_floats@noaa.gov

The following outlines the Argo floats deployed during the cruise:

ARGO Floats				
Coordinates	Date	SN#	Comments	
04 59.8 N 179 53.9 W	7/25/2014	FO320		
02 00.0 N 179 48.8 W	7/26/2014	FO330		
00 00.0 179 59.8 E	7/27/2014	FO326		

Atlantic Oceanographic and Meteorological Laboratory (AMOL) Surface Drifting Floats

Twenty (20) 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	
06 00.0 N 179 56.0 W	7/24/2014	114779 (11-050)		
06 00.0 N 1 79 56.0 W	7/24/2014	114780 (11-040)		
04 00.0 N 179 51.8 W	7/25/2014	114792 (11-006)		
04 00.0 N 179 51.8 W	7/25/2014	114783 (11-087)		
02 00.0 N 179 48.8 W	7/26/2014	114795 (11-084)		
02 00.0 N 179 48.8 W	7/26/2014	114797 (11-072)		
00 00.0 179 59.8 E	7/27/2014	114796 (11-005)		
00 00.0 179 59.8 E	7/27/2014	114781 (11-048)		
02 00.0 S 179 59.5 W	7/28/2014	114778 (11-085)		
02 00.0 S 179 59.5 W	7/28/2014	114786 (11-073)		
04 00.0 S 179 51.7 W	7/29/2014	114798 (11-086)		
04 00.0 S 1 79 51.7 W	7/29/2014	114777 (11-093)		