

TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM
FINAL CRUISE REPORT
TA-19-03-BLFN

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

Itinerary:

TA-19-03-BLFN DEP *September 17, 2019, Agana, Guam*
 ARR *October 29, 2019, Honolulu, HI*

CRUISE DESCRIPTION

The Tropical Atmosphere Ocean (TAO) array consists of 55 buoys utilizing a taut line mooring configuration used to mount data collection sensors for climate research purposes. 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.

TAO Cruise Objective and Plan:

The objective of this cruise was the maintenance of the TAO Array along the 165°E and 180°W meridians.

The scientific complement for the cruise embarked at Honolulu, HI on September 16, 2019 and the ship departed the next day. All operation listed in Section 2.1 were conducted prior to arrival in Honolulu, HI on October 29, 2019.

1.0 PERSONNEL

1.1 CRUISE LEAD AND PARTICIPATING SCIENTISTS:

Cruise Lead: Keith Rubio

Participating Scientists:

Name	Gender	Nationality	Affiliation
Keith Rubio	M	US	NOAA/NDBC
Ryan Savoie	M	US	NOAA/NDBC
Kendall Lumpkin	M	US	NOAA/NDBC
Daniel Rutledge	M	US	NOAA/NDBC
Matthew Winterkorn	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):

TAO Cruise Summary

Buoy Site: 8N 165E	
Mooring Operation: Recovery	Mooring ID#: DM245B
Deployed Location: 08 04.5'N 165 07.9'E	Deployed Date: 08/07/2017
Recovered Location: 08 5.1600'N 165 8.3274'E	Recovered Date: 09/28/2019
Sensors/Equipment Lost at Sea: LW and SW radiation along with stanchion.	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Small amount of long line tangled in nylon between 25m and 50m sensors.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Repair visit under previous deployment, DM245B. Multiple sensors previously recovered.	

Buoy Site: 8N 165E	Mooring Depth: 5211M
Mooring Operation: Deployment	Mooring ID#: DM353A
Deployed Location: 08 03.7'N 165 06.0'E	Deployed Date: 09/29/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: NONE	

Buoy Site: 5N 165E	
Mooring Operation: Recovery	Mooring ID#: DM290A
Deployed Location: 05 02.872'N 164 51.278'E	Deployed Date: 08/12/2018
Recovered Location: 05 2.5500'N 164 52.5360'E	Recovered Date: 09/29/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Yes, top section severed.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Top section severed and net-reeler failed with 5+ spools.	

Buoy Site: 5N 165E	Mooring Depth: 4792M
Mooring Operation: Deployment	Mooring ID#: DM354B
Deployed Location: 05 05.2'N 164 59.2'E	Deployed Date: 10/02/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: Acoustic Release	
Sensors Damaged During Deployment: NONE	
General Comments: Deployed under DM354A and the acoustic release failed and filled with water, which caused the buoy to go adrift. Re-deployed with a new release and nilspin under DM354B.	

Buoy Site: 2N 165E	
Mooring Operation: Recovery	Mooring ID#: DM289A

Deployed Location: 02 15.308'N 164 44.473'E	Deployed Date: 08/11/2018
Recovered Location: 02 14.5260'N 164 44.6940'E	Recovered Date: 10/01/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 2N 165E	Mooring Depth: 4159M
Mooring Operation: Deployment	Mooring ID#: DM355A
Deployed Location: 02 02.5'N 165 00.5'E	Deployed Date: 10/1/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: NONE	

Buoy Site: 0 165E ADCP	
Mooring Operation: Recovery	Mooring ID#: WA016
Deployed Location: 0 02.136'N 165 13.902'E	Deployed Date: 08/10/2017
Recovered Location: 0 02.136'N 165 13.902'E	Recovered Date: 10/04/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to lab for download	
General Comments: No response from ADCP. Returned to SSC for possible recovery.	

Buoy Site: 0 165E ADCP	Mooring Depth: 4405M
Mooring Operation: Deployment	Mooring ID#: WA017
Deployed Location: 00 03.476'N 165 01.582'E	Deployed Date: 10/04/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: Installed CT sensor on ADCP cage.	

Buoy Site: 0 165E C02	
Mooring Operation: Recovery	Mooring ID#: DM247B
Deployed Location: 0 01.900'N 165 04.900'E	Deployed Date: 08/16/2017
Recovered Location: 0 01.9860'N 165 3.9780'E	Recovered Date: 10/04/2019
Sensors/Equipment Lost at Sea: SW and LW radiation with mount, 25m CT sensor and acoustic release.	
Sensors Damaged/Fouled: 75m CT was missing the cover. Sontek 23 head was separated with possible water intrusion. SBE44 23 cable was disconnected and plug damaged.	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Acoustic release was making correct replies to a successful release but still high nilspin tension. Made a second attempt to release at ~600m with no release depth change. Cut nilspin at ~600m.	

Buoy Site: 0 165E C02	Mooring Depth: 4404M
Mooring Operation: Deployment	Mooring ID#: DM356A
Deployed Location: 0 03.99'N 165 09.7'E	Deployed Date: 10/05/2019
Pre-Deployment On Deck Instrument Failures: 12M SBE44	
Sensors/Equipment Lost at Sea: NONE	

Sensors Damaged During Deployment: NONE
General Comments: NONE

Buoy Site: 2S 165E DRIFTER	
Mooring Operation: Recovery	Mooring ID#: DM248A
Deployed Location: 01 59.9'S 165 01.1'E	Deployed Date: 08/12/2017
Recovered Location: 2 44.2980'S 164 59.8380'E	Recovered Date: 10/06/2019
Sensors/Equipment Lost at Sea: Wind bird and stanchion, and acoustic release	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: The shackle at the first spool of nylon along with the remainder of the mooring was missing along with the acoustic release.	

Buoy Site: 2S 165E	
Mooring Operation: Recovery	Mooring ID#: DM287A
Deployed Location: 2 00.47'S 163 50.8134'E	Deployed Date: 08/09/2018
Recovered Location: 01 59.670'S 163 51.186'E	Recovered Date: 10/06/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: 10M CT missing mount.	
Fishing/Vandalism: Yes, small amount of gear at 35m temp sensor.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 2S 165E	Mooring Depth: 4465M
Mooring Operation: Deployment	Mooring ID#: DM358B
Deployed Location: 02 00.5'S 165 00.8'E	Deployed Date: 10/06/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: Acoustic Release	
Sensors Damaged During Deployment: NONE	
General Comments: Deployed under DM358A and the nylon failed during deployment. Re-deployed under 358B with replacement nylon and acoustic release.	

Buoy Site: 5S 165E	
Mooring Operation: Recovery	Mooring ID#: DM286A
Deployed Location: 05 01.293'S 165 11.217'E	Deployed Date: 08/08/2018
Recovered Location: 05 01.0260'S 165 10.8666'E	Recovered Date: 10/07/2019
Sensors/Equipment Lost at Sea: Wind bird and stanchion	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Yes, fishing gear on spool #2 of nylon	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 5S 165E	Mooring Depth: 2488M
Mooring Operation: Deployment	Mooring ID#: DM359A
Deployed Location: 05 00.9'S 165 11.9'E	Deployed Date: 10/07/2019
Pre-Deployment On Deck Instrument Failures: Tube failure. Replaced with spare.	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: NONE	

Buoy Site: 8S 180W	
Mooring Operation: Recovery	Mooring ID#: DM292A

Deployed Location: 07 58.929'S 179 54.721'W	Deployed Date: 08/09/2018
Recovered Location: 07 58.929'S 179 54.721'W	Recovered Date: 10/14/2019
Sensors/Equipment Lost at Sea: 250T, 300T, 500T, Acoustic Release	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Yes, see below.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Large knot in nilspin along with longline just before 250m temp sensor. The nilspin was then cut at this point and the remaining sensors along with mooring and acoustic release were lost at sea.	

Buoy Site: 8S 180W	Mooring Depth: 5489M
Mooring Operation: Deployment	Mooring ID#: DM360A
Deployed Location: 07 59.0'S 179 54.2'E	Deployed Date: 10/14/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: None	

Buoy Site: 5S 180W	
Mooring Operation: Recovery	Mooring ID#: DM293A
Deployed Location: 05 01.424'S 179 42.879'W	Deployed Date: 08/20/2018
Recovered Location: 05 01.5060'S 179 44.1120'W	Recovered Date: 10/15/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Yes. Long line gear was wrapped around nylon spool #2.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 5S 180W	Mooring Depth: 5703M
Mooring Operation: Deployment	Mooring ID#: DM361A
Deployed Location: 05 00.0'S 179 42.6'W	Deployed Date: 10/15/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: Deployed with 6,200lb anchor.	

Buoy Site: 2S 180W	
Mooring Operation: Recovery	Mooring ID#: DM294A
Deployed Location: 01 58.883'S 179 52.329'W	Deployed Date: 08/21/2018
Recovered Location: 01 57.1560'S 179 53.7780'W	Recovered Date: 10/16/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 2S 180W	Mooring Depth: 5341M
Mooring Operation: Deployment	Mooring ID#: DM362A
Deployed Location: 02 00.2'S 179 51.0'W	Deployed Date: 10/17/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: NONE	

Buoy Site: 0 180W	
Mooring Operation: Recovery	Mooring ID#: DM295A
Deployed Location: 0 01.502'N 179 53.786'W	Deployed Date: 08/22/2018
Recovered Location: 0 01.5420'N 179 53.0220'W	Recovered Date: 10/17/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: SSC found unplugged and connector damaged.	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 0 180W	Mooring Depth: 5383M
Mooring Operation: Deployment	Mooring ID#: DM363A
Deployed Location: 0 01.3'N 179 54.0'W	Deployed Date: 10/17/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: NONE	

Buoy Site: 2N 180W	
Mooring Operation: Recovery	Mooring ID#: DM296A
Deployed Location: 02 01.90'N 179 46.9'W	Deployed Date: 08/22/2018
Recovered Location: 02 01.95'N 179 45.9606'W	Recovered Date: 10/18/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: NONE	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Knot in nilspin around 500m TP sensor. Mooring was recovered.	

Buoy Site: 2N 180W	Mooring Depth: 5476M
Mooring Operation: Deployment	Mooring ID#: DM364A
Deployed Location: 02 00.4'N 179 48.8'W	Deployed Date: 10/18/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	
General Comments: NONE	

Buoy Site: 5N 180W	
Mooring Operation: Recovery	Mooring ID#: DM297A
Deployed Location: 04 58.631'N 179 54.639'W	Deployed Date: 08/24/2018
Recovered Location: 04 59.508'N 179 53.1786'W	Recovered Date: 10/19/2019
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Longline wrapped in nylon spool #4.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: NONE	

Buoy Site: 5N 180W	Mooring Depth: 5672M
Mooring Operation: Deployment	Mooring ID#: DM365A
Deployed Location: 04 59.0'N 179 53.0'W	Deployed Date: 10/19/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: NONE	

General Comments: NONE

Buoy Site: 8N 180W	
Mooring Operation: Recovery	Mooring ID#: DM298A
Deployed Location: 08 01.925°N 179 53.92°W	Deployed Date: 08/25/2018
Recovered Location: 08 1.5960°N 179 54.2274°W	Recovered Date: 10/20/2019
Sensors/Equipment Lost at Sea: 500m TP sensor, wind bird, and stanchion missing.	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: YES, missing equipment and top section was severed.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Knot around 500m sensor and only the 2 ends were accounted for.	

Buoy Site: 8N 180W	Mooring Depth: 5949M
Mooring Operation: Deployment	Mooring ID#: DM366A
Deployed Location: 08 01.2°N 179 54.2°W	Deployed Date: 10/20/2019
Pre-Deployment On Deck Instrument Failures: NONE	
Sensors/Equipment Lost at Sea: NONE	
Sensors Damaged During Deployment: SEE BELOW	
General Comments: Equipment tested fine on deck. After deployment, all bottom sensors quit responding after anchor drop. Replaced the top section, all comms returned and the issue was found to be a bad top section cable.	

Buoy Site: 0 125W DRIFTER	
Mooring Operation: Recovery	Mooring ID#: DM227A
Deployed Location: 00 11.1°S 124 30.0°W	Deployed Date: 02/07/2017
Recovered Location: 09 46.41°N 166 42.054°W	Recovered Date: 10/24/2019
Sensors/Equipment Lost at Sea: All sensors at 50m and below to include 2 Chipod's	
Sensors Damaged/Fouled: NONE	
Fishing/Vandalism: Yes. Top section was severed, SSC plug was damaged.	
Sensors/Tubes Downloaded: Sent to Lab for download	
General Comments: Nilspin cut at approx. 45m. All remaining equipment was lost at sea.	

2.2 CTD Casts Completed

No CTD casts were taken on this cruise

2.3 Ancillary Science Projects Supported by the Cruise

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

Atlantic Oceanographic and Meteorological Laboratory (AMOL) Surface Drifting Floats

Sixteen (16) 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 LAT/LONG		Date	SN#	Comments
5.01.747'N	164.58.658'E	09/29/2019	66912840	
5.01.750'N	164.58.560'E	09/29/2019	66911860	
3.00.309'N	165.00.196'E	09/30/2019	66912760	
3.00.230'N	165.00.196'E	09/30/2019	66912830	
0.00.892'N	165.06.785'E	10/5/2019	66912850	
0.00.849'N	165.06.734'E	10/5/2019	66912780	
3.00.045'S	165.00.019'E	10/7/2019	66912810	
3.00.064'S	165.00.019'E	10/7/2019	66912790	
4.57.316'S	179.46.346'W	10/15/2019	66911840	
4.57.387'S	179.46.386'W	10/15/2019	66911850	
2.59.951'S	179.57.978'W	10/16/2019	66910850	
2.59.864'S	179.57.979'W	10/16/2019	66911790	
0.00.057'N	179.59.899'W	10/17/2019	66910820	
0.00.070'N	179.59.810'W	10/17/2019	66910840	
3.00.095'N	179.55.220'W	10/19/2019	66910830	
3.00.099'N	179.55.220'W	10/19/2019	66911830	