

TROPICAL ATMOSPHERE-OCEAN (TAO)  
PROGRAM FINAL CRUISE REPORT  
TA-17-03-BLFN

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

Itinerary:

RB-15-02            DEP    *July 12, 2017, Yokohama, Japan*  
                          ARR    *September 4, 2017, Apia, Samoa*

## 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, this cruise utilized the commercial vessel *M/V Bluefin*. 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 Yokohama, Japan on July 11, 2017. The ship departed on July 12, 2017 and conducted operations as listed in Section 2.1. The ship arrived at Apia, Samoa on September 4, 2017.

## 1.0 PERSONNEL

### 1.1 CRUISE LEAD AND PARTICIPATING SCIENTISTS:

Cruise Lead: James Coleman.

Participating Scientists:

Name	Gender	Nationality	Affiliation
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James Coleman	M	US	NOAA/NDBC
Adam Herrin	M	US	NOAA/NDBC
Lee Tretbar	M	US	NOAA/NDBC
Devin Bilbo	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

<b>Buoy Site:</b> 8N 165E REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM190A	
<b>Deployed Location:</b> 08 02.735N 165 08.541E		<b>Deployed Date:</b> 7/8/2016	
<b>Recovered Location:</b> 08 03.933N 165 07.500E		<b>Recovered Date:</b> 8/6/17	
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> Monofilament line entangled in bridle; top section hose severed			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> Serial CT sensor connector slightly bent, but didn't affect data return.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 8N 165E Refresh/TPOS		<b>Mooring Depth:</b> 5,211m	
<b>Mooring Operation:</b> Deployment		<b>Mooring ID#:</b> DM245A	
<b>Deployed Location:</b> 08 04.5N 165 07.9E		<b>Deployed Date:</b> 8/7/17	
<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 165E REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM192A	
<b>Deployed Location:</b> 02 00.150N 165 07.580E		<b>Deployed Date:</b> 7/10/2016	
<b>Recovered Location:</b> 02 00.133N 165 08.283E		<b>Recovered Date:</b> 8/8/17	
<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; tagged for download in lab.			
<b>General Comments:</b> T75 sensor out of mount. T200 sensor slid down to 250m.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 2N 165E REFRESH	<b>Mooring Depth:</b> 4,163m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM246A
<b>Deployed Location:</b> 2 00.30N 165 08.90E	<b>Deployed Date:</b> 8/9/17
<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> 0 165E REFRESH Flux/CO2			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM193A	
<b>Deployed Location:</b> 00 01.183N 165 02.0958E		<b>Deployed Date:</b> 7/11/2016	
<b>Recovered Location:</b> 00 01.167N 165 01.017E		<b>Recovered Date:</b> 8/10/17	
<b>Sensors/Equipment Lost at Sea:</b> 12m Sontek (P/N: 37306) stripped from nilspin;cable severed			
<b>Sensors Damaged/Fouled:</b> TC25 missing cage			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> No comms to 52m Sontek			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 0 165E REFRESH Flux/CO2	<b>Mooring Depth:</b> 4,410m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM247A
<b>Deployed Location:</b> 00 01.621N 165 03.239E	<b>Deployed Date:</b> 8/11/17
<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> 0 165E ADCP			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> WA015	
<b>Deployed Location:</b> 00 00.536N 165 13.462E		<b>Deployed Date:</b>	
<b>Recovered Location:</b> 00 00.536N 165 13.462E		<b>Recovered Date:</b> 8/9/17	
<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; tagged for download in lab.			
<b>General Comments:</b> None			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service</b>

			<b>Observations</b>
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<b>Buoy Site:</b> 0 165E ADCP	<b>Mooring Depth:</b> 4,082m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> WA016
<b>Deployed Location:</b> 0 02.136N 165 13.902E	<b>Deployed Date:</b> 8/10/17
<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> 2S 165E REFRESH/TPOS			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM194A	
<b>Deployed Location:</b> 02 00.291S 164 59.586E		<b>Deployed Date:</b> 7/13/2016	
<b>Recovered Location:</b> 02 00.317S 165 58.617E		<b>Recovered Date:</b> 8/11/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> CTD15 missing cage, T35 out of mount, T60 out of mount			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b>			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 2S 165E REFRESH	<b>Mooring Depth:</b> 4,466m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM248A
<b>Deployed Location:</b> 02 00.199S 165 00.160E	<b>Deployed Date:</b> 8/12/17
<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> 5S 165E REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM195A	
<b>Deployed Location:</b> 05 00.757S 165 10.756E		<b>Deployed Date:</b> 7/14/2016	
<b>Recovered Location:</b> 05 00.883S 165 10.733E		<b>Recovered Date:</b> 8/13/17	
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> T125, T150, and T200 fouled by fishing gear.			
<b>Fishing/Vandalism:</b> Massive amount of purse seiner and long line gear with locator beacon.			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> T16010 spool retired due to fraying with fishing gear.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 5S 165E REFRESH	<b>Mooring Depth:</b> 2,488m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM249A
<b>Deployed Location:</b> 05 01.000S 165 11.400E	<b>Deployed Date:</b> 8/13/17
<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> 0 165E REFRESH Flux/CO2			
<b>Mooring Operation:</b> Recovery/Adrift		<b>Mooring ID#:</b> DM247A	
<b>Deployed Location:</b> 00 01.621N 165 03.239E		<b>Deployed Date:</b> 8/11/17	
<b>Recovered Location:</b> 00 00.354S 164 38.306E		<b>Recovered Date:</b> 8/15/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> Acoustic release P/N: 34472			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> Mooring parted 10m down last spool T12011; Tube failed and battery box fuses blown.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 0 165E REFRESH Flux/CO2	<b>Mooring Depth:</b> 4,409m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM247B
<b>Deployed Location:</b> 00 02.100N 165 03.900E	<b>Deployed Date:</b> 8/16/17
<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> 8N 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM203A	
<b>Deployed Location:</b> 08 01.024N 179 52.535W		<b>Deployed Date:</b> 7/27/2016	
<b>Recovered Location:</b> 08 01.500N 179 52.567W		<b>Recovered Date:</b> 8/21/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> Barnacles blocked conductivity port on SSC			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> All but 1 spool retired due to wear.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 8N 180 REFRESH	<b>Mooring Depth:</b> 5,947m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM250A
<b>Deployed Location:</b> 08 01.363N 179 52.983W	<b>Deployed Date:</b> 8/21/17
<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> 5N 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM202A	
<b>Deployed Location:</b> 04 59.481N 179 52.637W		<b>Deployed Date:</b> 7/26/2016	
<b>Recovered Location:</b> 05 00.317N 179 51.900W		<b>Recovered Date:</b> 8/22/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> Fishing vessel spotted approximately 3.5nm away, but no vandalism.			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> None			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 5N 180 REFRESH	<b>Mooring Depth:</b> 5,670m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM251A
<b>Deployed Location:</b> 05 00.000N 179 53.700W	<b>Deployed Date:</b> 8/23/17
<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 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM201A	
<b>Deployed Location:</b> 02 00.384N 179 47.399W		<b>Deployed Date:</b> 7/25/2016	
<b>Recovered Location:</b> 02 00.888N 179 48.750W		<b>Recovered Date:</b> 8/24/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> SSC cable disconnected/pins corroded, T250 housing broken			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> T75 slid down to 100m			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 2N 180 REFRESH	<b>Mooring Depth:</b> 5,477m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM252A
<b>Deployed Location:</b> 02 01.064N 179 49.617W	<b>Deployed Date:</b> 8/24/17
<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> 0 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM200A	
<b>Deployed Location:</b> 00 01.761N 179 54.422W		<b>Deployed Date:</b> 7/24/2016	
<b>Recovered Location:</b> 00 01.914N 179 53.580W		<b>Recovered Date:</b> 8/25/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b>			
<b>Sensors Damaged/Fouled:</b> None			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> Tube was found to be locked in a constant loop of the boot up process.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 0 180 REFRESH TPOS	<b>Mooring Depth:</b> 5,385m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM253A
<b>Deployed Location:</b> 00 01.906N 179 55.200W	<b>Deployed Date:</b> 8/25/17
<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> 2S 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM199A	
<b>Deployed Location:</b> 01 58.869S 179 50.985W		<b>Deployed Date:</b> 7/23/2016	
<b>Recovered Location:</b> 01 59.562S 179 52.248W		<b>Recovered Date:</b> 8/26/17	
<b>Previous Repair Date:</b> None			
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> SSC cable disconnected/pins corroded			
<b>Fishing/Vandalism:</b> None			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> Top hat upper shackle's cotter pin and nut missing.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 2S 180 REFRESH	<b>Mooring Depth:</b> 5,339m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM254A
<b>Deployed Location:</b> 01 59.507S 179 51.808W	<b>Deployed Date:</b> 8/26/17
<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> 5S 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM198A	
<b>Deployed Location:</b> 04 57.765S 179 52.979W		<b>Deployed Date:</b> 7/21/2016	
<b>Recovered Location:</b> 04 57.850S 179 56.350W		<b>Recovered Date:</b> 8/27/17	
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> T100 and T125 fouled by fishing line			
<b>Fishing/Vandalism:</b> Long line gear at 100m and 125m.			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> Top hat lower shackle missing cotter pin and nut.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 5S 180 Refresh	<b>Mooring Depth:</b> 5,663m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM255A
<b>Deployed Location:</b> 04 57.900S 179 52.600W	<b>Deployed Date:</b> 8/27/17
<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> 8S 180 REFRESH			
<b>Mooring Operation:</b> Recovery		<b>Mooring ID#:</b> DM197A	
<b>Deployed Location:</b> 07 59.055S 179 54.763E		<b>Deployed Date:</b> 7/20/2016	
<b>Recovered Location:</b> 07 58.890S 179 55.770E		<b>Recovered Date:</b> 8/28/17	
<b>Sensors/Equipment Lost at Sea:</b> None			
<b>Sensors Damaged/Fouled:</b> T250-fishing gear			
<b>Fishing/Vandalism:</b> Long line fishing gear at T250 and at 400m.			
<b>Sensors/Tubes Downloaded:</b> None; tagged for download in lab.			
<b>General Comments:</b> T200-no comms.			
<b>Site Sensor Failures</b>	<b>Date Data Flagged</b>	<b>Why Data Flagged</b>	<b>Field Service Observations</b>

<b>Buoy Site:</b> 8S 180 REFRESH TPOS	<b>Mooring Depth:</b> 5,515m
<b>Mooring Operation:</b> Deployment	<b>Mooring ID#:</b> DM256A
<b>Deployed Location:</b> 07 58.746S 179 56.022E	<b>Deployed Date:</b> 8/29/17

<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

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:

Pacific Marine Environmental Laboratory (PMEL) Argo Profiling CTD Floats

Two (2) Argo floats were scheduled for deployment on this 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](mailto:pmel_floats@noaa.gov)

or

Elizabeth Steffen, NOAA/PMEL  
 Tel: (206) 526-6747  
 E-mail: [pmel\\_floats@noaa.gov](mailto:pmel_floats@noaa.gov)

The following outlines the Argo floats deployed during the cruise:

<b>ARGO Floats</b>			
<b>Coordinates</b>	<b>Date</b>	<b>SN#</b>	<b>Comments</b>
06 21.10N 125 02.73W	9/2/14	F0213	
05 04.20N 124 54.90W	9/3/14	F0199	