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-09-01 Bellingham, WA DEP April 26, 2009
Kwajalein, RMI ARR June 11, 2009

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 NOAA Ship Ronald H. Brown. The buoys deployment lifecycle are up to 18 months to ensure at least one year of data collection can be completed.

TAO Project Points of Contact:

TAO Program Manager TAO Operations Manager
Shannon McArthur Lex LeBlanc
National Data Buoy Center National Data Buoy Center
Building 1007 Building 3203
Stennis Space Center, MS 39529 Stennis Space Center, MS 39529
228-688-2830 228-688-7465
Email: shannon.mcarthur@noaa.gov 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. In addition to this work, NDBC Weather Buoy 46006 was serviced during the transit to 155°W and two TAO refreshed buoy systems were deployed at 5S 170W and 8N 180. The ATLAS buoy at 8N 180 was also recovered and re-deployed.

The scientific complement for the cruise embarked at Bellingham, WA on April 25, 2009. The ship departed on April 26, 2009 and conducted operations as listed in Section 2.1. The ship arrived in Kwajalein, RMI on June 11, 2009.

1.0 PERSONNEL

1.1 CHIEF SCIENTIST AND PARTICIPATING SCIENTISTS:

Cruise Lead: Jeffrey Wise

Participating Scientists:

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Nationality</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jeffrey Wise</td>
<td>M</td>
<td>US</td>
<td>NOAA/NDBC</td>
</tr>
<tr>
<td>Alan Lossett</td>
<td>M</td>
<td>US</td>
<td>NOAA/NDBC</td>
</tr>
<tr>
<td>James Rauch</td>
<td>M</td>
<td>US</td>
<td>NOAA/NDBC</td>
</tr>
</tbody>
</table>

2.0 OPERATIONS

2.1 TAO Data Recovery Summary

Mooring Operations conducted are shown in the table below. The following provides details on the data recovery efforts for the buoys serviced. All noted time in the summary reports is Coordinated Universal Time (UTC):

<table>
<thead>
<tr>
<th>Buoy Site: 8N 155W</th>
<th>Mooring Depth: 5387</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mooring Operation:</td>
<td>Recovery</td>
</tr>
<tr>
<td>Deployed Location:</td>
<td>07 58.4N 154 59.2W</td>
</tr>
<tr>
<td>Deployed Date: 8/25/08</td>
<td></td>
</tr>
<tr>
<td>Recovered Location:</td>
<td>07 58.00N 155 00.575W</td>
</tr>
<tr>
<td>Recovered Date: 5/8/09</td>
<td></td>
</tr>
<tr>
<td>Previous Repair:</td>
<td>None</td>
</tr>
<tr>
<td>Sensors/Equipment Lost at Sea: T14445</td>
<td></td>
</tr>
<tr>
<td>Sensors Damaged/Fouled: None</td>
<td></td>
</tr>
<tr>
<td>Fishing/Vandalism: Nilspin was cut at 50 meters. The cut was about 2” long down to the wire</td>
<td></td>
</tr>
<tr>
<td>Sensors/Tubes Downloaded: All sensors downloaded successfully.</td>
<td></td>
</tr>
<tr>
<td>Site Sensor Failures</td>
<td>Date Sensors Failed</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**Buoy Site:** 8N 155W  
**Mooring Depth:** 5243  
**Mooring Operation:** Deployment  
**Mooring ID#:** PM810A  
**Deployed Location:** 07 58.720N 154 59.462W  
**Deployed Date:** 5/9/09  
**Pre-Deployment On Deck Instrument Failures:** None  
**Sensors/Equipment Lost at Sea:** None  
**Sensors Damaged:** None  
**General Comments:** Routine Deployment.

**Buoy Site:** 5N 155W  
**Mooring Depth:** 4587  
**Mooring ID#:** PM721A  
**Deployed Location:** 05 00.503N 154 55.292W  
**Deployed Date:** 2/5/08  
**Recovered Location:** 05 03.545N 154 58.563W  
**Recovered Date:** 5/9/09  
**Previous Repair:** None  
**Sensors/Equipment Lost at Sea:** Anemometer 28506, T13396, T13452, T13453  
**Sensors Damaged/Fouled:** SSC 12121, TUBE 667  
**Fishing/Vandalism:** Lines were fouled inside the bridle and the around the Nilspin. They appeared to be for towing.  
**Sensors/Tubes Downloaded:** All sensors downloaded successfully.

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>12/11/08</td>
<td>Vane went to zero.</td>
<td>Wind sensor missing</td>
</tr>
<tr>
<td>Salinity</td>
<td>1/9/09</td>
<td>Data too high.</td>
<td>Sensor fouled</td>
</tr>
</tbody>
</table>

**Buoy Site:** 5N 155W  
**Mooring Depth:** 4593  
**Mooring ID#:** PM811A  
**Deployed Location:** 05 00.3N 154 55.6W  
**Deployed Date:** 5/10/09  
**Pre-Deployment On Deck Instrument Failures:** None  
**Sensors/Equipment Lost at Sea:** None  
**Sensors Damaged:** None  
**General Comments:** Routine Deployment.
Buoy Site: 2N 155W  Mooring Depth: 4659
Mooring Operation: Recovery  Mooring ID#: PM722A
Deployed Location: 01 58.47N 154 58.922W  Deployed Date: 2/8/08
Recovered Location: 01 59.27N 154 57.36W  Recovered Date: 5/11/09
Previous Repair: None
Sensors/Equipment Lost at Sea: TP13004
Sensors Damaged/Fouled: None
Fishing/Vandalism: A nylon strap from a fishing boat was tied to a tower leg. It was hanging over the side of the buoy and got entangled on the bridal and broke the SSC cable
Sensors/Tubes Downloaded: All sensors downloaded successfully.

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Buoy Site: 2N 155W  Mooring Depth: 4663
Mooring Operation: Deployment  Mooring ID#: PM812A
Deployed Location: 01 59.166N 154 57.785W  Deployed Date: 5/12/09
Pre-Deployment On Deck Instrument Failures: None
Sensors/Equipment Lost at Sea: None
Sensors Damaged: None
General Comments: The anemometer failed after deployment. It was replaced with anemometer serial number 88404.

Buoy Site: 0 155W  Mooring Depth: 4656 m
Mooring Operation: Visit  Mooring ID#: PM758A
Deployed Location: 00 00.63N 154 58.20W  Deployed Date: 8/15/08
Visit Location: 00 00.93N 154 58.50W  Visit Date: 5/12/09
Previous Repair: None
Sensors/Equipment Lost at Sea: None
Sensors Damaged/Fouled: None
Fishing/Vandalism: None
Sensors/Tubes Downloaded: None
General Comments: Visit only. Buoy riding well, no signs of damage or vandalism.

Buoy Site: 2S 155W  Mooring Depth: 4988
Mooring Operation: Recovery  Mooring ID#: PM723A
Deployed Location: 01 58.58S 155 00.01W  Deployed Date: 2/10/2008
### Buoy Site: 2S 155W
- **Mooring Depth:** 4987
- **Mooring ID#:** PM813A
- **Deployed Location:** 01 58.34 S 154 59.57W
- **Deployed Date:** 5/14/09
- **Pre-Deployment On Deck Instrument Failures:** None
- **Sensors/Equipment Lost at Sea:** None
- **Sensors Damaged:** None
- **Fishing/Vandalism:** None
- **Sensors/Tubes Downloaded:** Tube downloaded successfully.
- **General Comments:** Routine Deployment

### Buoy Site: 5S 155W
- **Mooring Depth:** 5028 m
- **Mooring ID#:** PM760A
- **Deployed Location:** 04 59.40S 154 58.29W
- **Deployed Date:** 8/17/08
- **Visit Location:** 05 00.2S 154 58.9W
- **Visit Date:** 5/14/09
- **Previous Repair:** None
- **Sensors/Equipment Lost at Sea:** None
- **Sensors Damaged/Fouled:** None
- **Fishing/Vandalism:** None
- **Sensors/Tubes Downloaded:** Tube downloaded successfully.
- **General Comments:** Visit only. Buoy riding low, no signs of damage or vandalism.

### Buoy Site: 8S 155W
- **Mooring Depth:** 5331
- **Mooring ID#:** PM724B
- **Deployed Location:** 08 15.73S 155 01.03W
- **Deployed Date:** 2/12/08
- **Recovered Location:** 08 16.23S 155 01.02W
- **Recovered Date:** 5/15/09
- **Previous Repair:** 8/18/08 – ATRH sensor replaced.
- **Sensors/Equipment Lost at Sea:** None
- **Sensors Damaged/Fouled:** Thick red growth on Nilspin for first 100 meters.
<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Buoy Site: 8S 155W  
Mooring Depth: 5335  
Mooring Operation: Deployment  
Mooring ID#: PM814A  
Deployed Location: 08 15.730S 154 59.550W  
Deployed Date: 5/16/09  
Pre-Deployment On Deck Instrument Failures: None  
Sensors/Equipment Lost at Sea: None  
Sensors Damaged: None  
General Comments: Routine deployment.

Buoy Site: 8S 170W  
Mooring Depth: 5371  
Mooring Operation: Recovery  
Mooring ID#: PM725A  
Deployed Location: 07 58.52S 170 01.70W  
Deployed Date: 2/23/08  
Recovered Location: 07 58.66S 170 02.340W  
Recovered Date: 5/27/09  
Previous Repair: None  
Sensors/Equipment Lost at Sea: None  
Sensors Damaged/Fouled: None  
Fishing/Vandalism: None  
Sensors/Tubes Downloaded: All sensors downloaded successfully.

Buoy Site: 8S 170W  
Mooring Depth: 5373  
Mooring Operation: Deployment  
Mooring ID#: PM815A  
Deployed Location: 08 00.2S 170 00.4W  
Deployed Date: 5/28/09  
Pre-Deployment On Deck Instrument Failures: T13671  
Sensors/Equipment Lost at Sea: None  
Sensors Damaged: None  
General Comments: Routine deployment.
Buoy Site: 5S 170W | Mooring Depth: 5430
---|---
Mooring Operation: Recovery | Mooring ID#: PM726A
Deployed Location: 04 59.95S 170 01.04W | Deployed Date: 2/24/08
Recovered Location: 05 02.1S 170 07.5W | Recovered Date: 5/29/09
Previous Repair: None
Sensors/Equipment Lost at Sea: SST12747
Sensors Damaged/Fouled: None
Fishing/Vandalism: None
Sensors/Tubes Downloaded: All sensors downloaded successfully.

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salinity</td>
<td>1/24/09</td>
<td>Downward drift.</td>
<td>Lost at sea</td>
</tr>
<tr>
<td>Buoy</td>
<td>3/1/09</td>
<td>Moved off station.</td>
<td>Drifted off station</td>
</tr>
</tbody>
</table>

Buoy Site: 5S 170W (Refresh) | Mooring Depth: 5417
---|---
Mooring Operation: Deployment | Mooring ID#: DM001A
 Deployed Location: 04 58.3S 169 57.1W | Deployed Date: 5/29/09
Pre-Deployment On Deck Instrument Failures: None
Sensors/Equipment Lost at Sea: None
Sensors Damaged: None
General Comments: The T sensor at 25m failed after deployment.

Buoy Site: 5S 170W | Mooring Depth: 5417
---|---
Mooring Operation: Deployment | Mooring ID#: PM816A
Deployed Location: 05 00.0S 169 59.5W | Deployed Date: 5/30/09
Pre-Deployment On Deck Instrument Failures: None
Sensors/Equipment Lost at Sea: None
Sensors Damaged: None
General Comments: Routine deployment.

Buoy Site: 2S 170W | Mooring Depth: 4960
---|---
Mooring Operation: Recovery | Mooring ID#: PM727B
Deployed Location: 02 09.71S 170 00.74W | Deployed Date: 2/25/08
Recovered Location: 02 09.3S 170 00.8W | Recovered Date: 5/30/09
Sensors/Equipment Lost at Sea: T12839, T12366
Sensors Damaged/Fouled: SST12688 fouled with barnacles
**Fishing/Vandalism:** There was a small line on the buoy tower and the shackle on the lifting line was removed from the buoy pad eye. Large amount of fishing line on mooring and Nilspin sensors/tubes.

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salinity</td>
<td>7/13/08</td>
<td>Slow downward drift.</td>
<td>Fouled with barnacles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buoy Site: 2S 170W</th>
<th>Mooring Depth: 4962</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mooring Operation:</td>
<td></td>
</tr>
<tr>
<td>Deployment</td>
<td>Mooring ID#: PM817A</td>
</tr>
<tr>
<td>Deployed Location:</td>
<td>Deployed Date: 5/31/09</td>
</tr>
<tr>
<td>02 09.9S 170 00.5W</td>
<td></td>
</tr>
</tbody>
</table>

**Pre-Deployment On Deck Instrument Failures:**

**Sensors/Equipment Lost at Sea:** None

**Sensors Damaged:** None

**General Comments:** None

---

**Buoy Site:** 00 170W  
**Repair Date:** 6/1/09  
**Mooring Depth:** 5602

<table>
<thead>
<tr>
<th>Mooring Operation:</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployed Location:</td>
<td>00 02.445S 170 03.064W</td>
</tr>
<tr>
<td>Deployed Date:</td>
<td>8/23/08</td>
</tr>
</tbody>
</table>

**Sensors Damaged:**

**Sensors/Tubes Downloaded:** TUBE 617 did not download correctly, although we did get a file that might contain data.

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain</td>
<td>11/8/09</td>
<td>Erratic data.</td>
<td></td>
</tr>
<tr>
<td>50m Salinity</td>
<td>5/20/09</td>
<td>Persistent density inversion.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Buoy Site:** 2N 170W  
**Repair Date:** 6/2/09  
**Mooring Depth:** 5387

<table>
<thead>
<tr>
<th>Mooring Operation:</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployed Location:</td>
<td>02 00.8N 170 01.1W</td>
</tr>
<tr>
<td>Deployed Date:</td>
<td>8/25/08</td>
</tr>
</tbody>
</table>

**Sensors Damaged:** None

**Sensors/Tubes Downloaded:**

**General Comments:** Recovered SSC 13237 and replaced it with SSC 12296 with diver assistance. Data dump. Put tube in dep mode. Recovered buoy light.

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Buoy Site: 5N 170W
- **Mooring Depth:** 5789 m
- **Mooring Operation:** Recovery
- **Deployed Location:** 05 00.1N 169 58.7W
- **Recovered Location:** 04 59.8N 169 59.1W
- **Mooring ID#:** PM728A
- **Deployed Date:** 2/28/08
- **Recovered Date:** 6/3/09
- **Previous Repair:** None
- **Sensors/Equipment Lost at Sea:** T13555
- **Sensors Damaged/Fouled:** TUBE 448- antennae hit ship on recovery, WIND 6877-damaged
- **Fishing/Vandalism:** Marker buoy was floating inside the torroid. Some fishing gear wrapped around the mooring.
- **Sensors/Tubes Downloaded:**

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>8/22/08</td>
<td>Data went to zero.</td>
<td></td>
</tr>
</tbody>
</table>

### Buoy Site: 5N 170W
- **Mooring Depth:** 5790 m
- **Mooring Operation:** Deployment
- **Deployed Location:** 04 59.5N 169 58.4W
- **Pre-Deployment On Deck Instrument Failures:**
- **Mooring ID#:** PM818A
- **Deployed Date:** 6/4/09
- **Sensors/Equipment Lost at Sea:** None
- **Sensors Damaged:** None
- **General Comments:** None

### Buoy Site: 8N 170W
- **Mooring Depth:** 5542 m
- **Mooring Operation:** Visit
- **Deployed Location:** 08 00.2N 170 00.4W
- **Visit Location:** 07 59.9N 170 03.9W
- **Mooring ID#:** PM766A
- **Deployed Date:** 8/27/08
- **Visit Date:** 6/5/09
- **Previous Repair:**
- **Sensors/Equipment Lost at Sea:** None
- **Sensors Damaged/Fouled:** None
- **Fishing/Vandalism:** None
- **Sensors/Tubes Downloaded:** None
- **General Comments:** Visit only. Repair to station (SSC and T1 were out) cancelled due to heavy weather. Buoy riding well. No sign of damage or vandalism. 
Buoy Site: 8N 180  
Mooring Operation: Recovery  
Deployed Location: 07 59.7N 179 52.66W  
Recovered Location: 7 59.3N 179 54.0W  
Previous Repair: 3/2/08  
Mooring Depth: 5950  
Mooring ID#: PM693B  
Deployed Date: 8/6/07  
Recovered Date: 6/7/09  
Sensors/Equipment Lost at Sea: T13427, TP12673  
Sensors Damaged/Fouled:  
Fishing/Vandalism: Long liner gear wrapped around mooring from 50m to 150m.  
Sensors/Tubes Downloaded: SST12196, T13399

<table>
<thead>
<tr>
<th>Site Sensor Failures</th>
<th>Date Sensors Failed</th>
<th>Why sensors were Failed</th>
<th>Field Service Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buoy</td>
<td>1/1/09</td>
<td>Transmission failure, low transmit battery voltage.</td>
<td></td>
</tr>
</tbody>
</table>

Buoy Site: 8N 180W  
Mooring Operation: Deployment  
Deployed Location: 07 59.6N 179 52.0W  
Pre-Deployment On Deck Instrument Failures: None  
Sensors/Equipment Lost at Sea: None  
Sensors Damaged: None  
General Comments: Fathometer was not working well. We used chart depth for final depth.

Buoy Site: 8N 180W (Refresh)  
Mooring Operation: Deployment  
Deployed Location: 07 58.3N 179 53.1W  
Pre-Deployment On Deck Instrument Failures: GPS Antenna 31664  
Sensors/Equipment Lost at Sea: None  
Sensors Damaged: None  
General Comments: The T sensors at 50m and 125m failed after deployment.

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

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>8N 155W</td>
<td>5/8/09</td>
<td>3000 m</td>
</tr>
<tr>
<td>7N 155W</td>
<td>5/9/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>6N 155W</td>
<td>5/9/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>5N 155W</td>
<td>5/10/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>4N 155W</td>
<td>5/11/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>3N 155W</td>
<td>5/11/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>2N 155W</td>
<td>5/11/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>1N 155W</td>
<td>5/12/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>0N 155W</td>
<td>5/12/09</td>
<td>3000 m</td>
</tr>
<tr>
<td>1S 155W</td>
<td>5/13/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>2S 155W</td>
<td>5/13/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>3S 155W</td>
<td>5/14/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>4S 155W</td>
<td>5/14/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>5S 155W</td>
<td>5/14/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>6S 155W</td>
<td>5/15/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>7S 155W</td>
<td>5/15/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>8S 155W</td>
<td>5/16/09</td>
<td>3000 m</td>
</tr>
<tr>
<td>8S 170W</td>
<td>5/27/09</td>
<td>3000 m</td>
</tr>
<tr>
<td>7S 170W</td>
<td>5/28/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>6S 170W</td>
<td>5/28/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>5S 170W</td>
<td>5/29/09</td>
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</tr>
<tr>
<td>4S 170W</td>
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<td>3S 170W</td>
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</tr>
<tr>
<td>2S 170W</td>
<td>5/31/09</td>
<td>1000 m</td>
</tr>
<tr>
<td>1S 170W</td>
<td>6/1/09</td>
<td>1000 m</td>
</tr>
<tr>
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<td>3000 m</td>
</tr>
<tr>
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</tr>
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</tr>
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</tr>
<tr>
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</table>

### 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 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 or Tel: (206) 526-6747
E-mail: pmel_floats@noaa.gov or pmel_floats@noaa.gov

The following outlines the Argo floats deployed during the cruise:

<table>
<thead>
<tr>
<th>Coordinates</th>
<th>Date</th>
<th>SN#</th>
<th>Comments</th>
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<tbody>
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Atlantic Oceanographic and Meteorological Laboratory (AMOL) Surface Drifting Floats

Twelve 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:

<table>
<thead>
<tr>
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<th>SN#</th>
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</table>
PCO2 and Nitrate Mapping System and Nutrient Samples

Thirty-four 30ml water samples were collected on this cruise. The chief scientist verified and briefed the Operations Officer on the specifications of the water samples to be collected during CTD casts prior to the start of the cruise. All water samples were collected as scheduled.

Questions concerning Nutrient Samples should be directed to:

Cathy Cosca
NOAA/PMEL
7600 Sand Point Way NE
Seattle, Washington 98115
Tel: (206) 526-6183
E-mail: cathy.cosca@noaa.gov