HOT-265: Chief Scientist Report

Chief Scientist: Fernando Santiago-Mandujano

R/V Kilo Moana

13-17 September, 2014

Cruise ID: KM 14-19
Departed: 13 September at 0830 (HST)
Returned: 17 September at 0800
Vessel: R/V Kilo Moana
Master of the Vessel: Captain Gray Drewry
OTG Marine Technicians: Trevor Young, Jeff Koch

1. SCIENTIFIC OBJECTIVES

The objective of the cruise was to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Four stations were to be occupied during the cruise, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21° 20.6’N, 158° 16.4’W and was to be occupied on September 13th for about 2 hours.
2) Station 2, referred to as Station ALOHA, is defined as a circle with a 6 nautical mile radius centered at 22° 45’N, 158°W. This is the main HOT station and was to be occupied during September 14th to 16th.
3) Station 5, the site of WHOTS-11 Mooring (anchor position 22° 45.981’N 157° 53.964’W) was to be occupied on September 16th for about one hour.
4) Station 6, referred to as Station Kaena, is located off Kaena Point at 21° 50.8’N, 158° 21.8’W and was to be occupied on September 16th for approximately 2 hours.

Upon arrival to Station Kahe a 1300 lb. weight-test cast to 1000 m, one CTD cast to 1000 m, and a hand-held net sampling were to be conducted on the afternoon of September 13th. The single CTD cast was to be conducted to collect a continuous profile of various physical and chemical parameters. Water samples were to be collected at discrete depths for biogeochemical measurements. After these operations were satisfactorily completed, the ship was to proceed to Station ALOHA.

Upon arrival to Station ALOHA, the free-drifting sediment trap array was to be deployed. The sediment trap array was to stay in the water for about 52 hours. This was to be followed by a 1000 m CTD cast for preparation of the Primary Productivity Array. This cast was to be followed by the deployment of the free-drifting Primary Productivity Array to incubate in situ for 12 hours. A full-depth (~4740 m) CTD cast was to be conducted after the deployment of the Primary Production Array, followed by 1000 m CTD casts at strict 3 hour intervals for at least 36 hours for continuous and discrete data collection, ending with another full-depth CTD cast at 2300 on September 15th.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on September 15th. The Gas Array was to be recovered on September 16th.

A plankton net was to be towed between 1000-1400, and 2200-0200 for 30 minute intervals on September 14th and 15th at Station ALOHA.

A hand-held plankton net was to be deployed for 30 minute intervals two times each on September 14th and 15th, and once on September 16th.
The Hyperpro (a profiling unit with one up-looking and one down-looking hyperspectral radiometer, a WET Labs ECO-BB2F triplet, temperature and conductivity sensors), usually deployed during HOT cruises, was being serviced and was not available during this cruise.

A package including a Wet Labs AC-S, a SeaBird Seacat, and a LISST particle size and distribution analyzer was to be used to profile the upper 200 m at Station ALOHA in the early morning on September 16th.

A trace metal free sample was to be collected by the ATE sampler on September 15th at Station ALOHA.

After the 36 hour burst period of CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating Gas Array and the Sediment Trap Array on the morning of September 16th.

After recovering the arrays, the ship was to transit to Station 50 to conduct a one-hour 200 m CTD yo-yo cast.

If time allowed, one profiler float from the University of Washington/MBARI (K. Johnson, D. Swift, S. Riser) was to be recovered from the vicinity of Station ALOHA.

Once operations at Station ALOHA were complete, the ship was to transit to Station 6, referred to as Station Kaena where a near-bottom CTD cast (~2500 m) was to be conducted to collect salinity and chlorophyll samples for calibration.

After Station Kaena operations were complete, the ship was to transit back to Snug Harbor.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, underway fluorometer and the meteorological package.

2. SCIENCE PERSONNEL

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<tr>
<th>Participant</th>
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<th>Affiliation/HOT Group</th>
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<tr>
<td>Susan Curless</td>
<td>Research Associate</td>
<td>UH</td>
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<td>Dan Sadler</td>
<td>Research Associate</td>
<td>UH</td>
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<td>Donn Viviani</td>
<td>Graduate Student</td>
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<td>Brie Maillot</td>
<td>Technician</td>
<td>UH</td>
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<tr>
<td>Lance Fujieki</td>
<td>Research Associate</td>
<td>UH</td>
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<td>Blake Watkins</td>
<td>Marine Engineer</td>
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<tr>
<td>Christopher Schvarcz</td>
<td>Graduate Student</td>
<td>UH</td>
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<td>Sam Wilson</td>
<td>Scientist</td>
<td>UH</td>
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<tr>
<td>Oliver Kersten</td>
<td>Graduate Student</td>
<td>HPU</td>
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<td>Jeffrey Snyder</td>
<td>Marine Technician</td>
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<tr>
<td>Fernando Santiago-Manudjano</td>
<td>Research Associate</td>
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<td>Robert Walt Deppe</td>
<td>Research Associate</td>
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<tr>
<td>Daniel McCoy</td>
<td>Research Associate</td>
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<tr>
<td>Patricia Kassis</td>
<td>High School Teacher</td>
<td>Hawaii Preparatory Academy</td>
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<tr>
<td>Kirena Clah</td>
<td>Undergraduate Student</td>
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<td>Meagan Putts</td>
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<td>Roman Battisti</td>
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<tr>
<td>Isabell Klawonn</td>
<td>Graduate Student</td>
<td>Stockholm University</td>
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<tr>
<td>Meri Eichnera</td>
<td>Postdoc</td>
<td>University of Gothenburg</td>
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3. GENERAL SUMMARY

Operations at Station ALOHA were conducted as planned, with some modifications to accommodate for the recovery of a profiler float. The CTD cast to be conducted on September 16th at Station 50 was conducted one day earlier.

One 1000 m CTD cast was completed at Station Kahe. Two near bottom CTD casts and thirteen 1000 m CTD casts were conducted at Station ALOHA. One 200 m yo-yo CTD cast was completed near the WHOTS mooring (Station 50) with two cycles completed. One near bottom cast was completed at Station Kaena.

The Caley winch with the 0.322 wire and the A-frame were used for CTD operations. The Caley winch was operated with heave compensation. The tension-meter was reporting large unrealistic tension spikes sporadically during casts.

The Sediment Traps, Primary Production Array, and Gas Array were all deployed and recovered successfully.

Six net tows for the core HOT zooplankton collection were completed successfully; three during the day, and three during the night. Four additional zooplankton net tows were conducted (O. Kersten), two during the day, and two during the night.

A total of six hand-held net zooplankton samplings were completed successfully.

The optical package ACS/LISST was deployed two times in the morning of September 16th.

The ATE was successfully deployed on September 15th.

A profiler float was recovered successfully on September 16th nearly 60 nm west from Station ALOHA.

The underway thermosalinograph system and fluorometer ran without interruption during the cruise. The broad band/narrow band Ocean Surveyor ADCP and the Workhorse ADCP were working correctly during the cruise.

The ship’s meteorological suite ran without interruption during the cruise. The RM Young temperature sensor was just replaced before the cruise, but it was not working properly due to a connection problem which was corrected after the cruise.

Winds were about 5 kt from the northwest early in the cruise, increasing to less than 12 kt from the northeast during the second part of the cruise, with smooth seas.

4. R/V Kilo Moana OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Kilo Moana continues to maintain very good ship support for our work. Captain Drewry and the ship’s crew showed flexibility, enthusiasm, concern, and dedication to our scientific mission.
Technical support during this cruise was very good. OTG personnel were available to assist in our work during the cruise.

5. DAILY REPORT OF ACTIVITIES (HST)

September 13, 2014

0830 - All aboard. Early departure from Snug harbor to avoid harbor traffic
0945 - Safety briefing by the Captain. Science meeting
1015 - Fire and Abandon ship drills
1100 - Arrived at Kahe Station
1125 - Weight cast to 1000 m. Large unrealistic spikes in the Caley winch tension-meter. The spikes appeared sporadically throughout the cast in all the subsequent CTD casts.
1205 - End of weight cast
1248 - Start S1C1 CTD cast to 1000 m
1406 - End of cast
1421 - Bucket water collection (I. Klawonn, M. Eichnera)
1433 - End of water collection
1440 - Transit to ALOHA Station
2216 - Arrived to ALOHA Station
2230 - Start sediment traps deployment
2255 - Deployed sediment traps: 22 44.985'N, 158 3.281'W

September 14, 2014

0155 - Start S2C1 CTD cast to 1000 m
0305 - End of cast
0310 - Hand held net sampling
0320 - Hand held net sampling
0438 - Deployed PP array: 22 45.090'N, 158 1.043'W
0459 - Start S2C2 CTD deep cast
0639 - 5 m off the bottom (22 44.992'N, 157 59.993'W)
0838 - End of cast
0840 - Transit to pump ship's tanks
1002 - Start net tow
1032 - End net tow
1054 - Start S2C3 CTD cast to 1000 m
1208 - End of cast
1315 - Start net tow
1345 - End net tow
1358 - Start S2C4 CTD cast to 1000 m
1513 - End of cast
1600 - Start hand held net sampling
1629 - End hand held net
1655 - Start S2C5 CTD cast to 1000 m
1812 - End of cast
1853 - Recovered PP array 22 47.26' N, 158 0.89'W
1916 - Transit to pump ship's tanks
2010 - Start S2C6 CTD cast to 1000 m
2121 - End of cast
2200 - Start net tow
2230 - End net tow
2235 - Start net tow
2254 - End net tow
2312 - Start S2C7 CTD cast to 1000 m
September 15, 2014

0011 - End cast
0030 - Start net tow
0100 - End net tow
0158 - Start S2C8 CTD cast to 1000 m
0300 - End of cast
0320 - Hand held net sampling
0430 - Gas array deployment 22 45.023'N, 158 1.160'W
0454 - Start S2C9 CTD cast to 1000 m
0553 - End of cast
0600 - Transit to pup ship's tanks
0751 - Start S2C10 CTD cast to 1000 m
0848 - End of cast
0955 - Start net tow
1026 - End net tow
1032 - ATE sampling
1102 - End ATE sampling
1107 - Start S2C11 CTD cast to 1000 m
1206 - End cast
1226 - Start net tow
1256 - End net tow
1300 - Start net tow
1330 - End net tow
1359 - Start S2C12 CTD cast to 1000 m.
1502 - End of cast
1510 - Transit to pump ship's tanks
1655 - Start S2C13 CTD cast to 1000 m
1810 - End of cast
1812 - Transit to Sta 50
1840 - Start S50C1 CTD yo-yo cast to 200 m, 1/4 nm from WHOTS buoy. Two cycles completed
1936 - End of cast
1940 - Transit to ALOHA Station
2010 - Start S2C14 CTD cast to 1000 m
2115 - End of cast
2118 - Transit to pump ship's tanks
2200 - Start net tow
2230 - End of net tow
2235 - Start net tow
2300 - End net tow
2326 - Start S2C15 CTD cast to near-bottom

September 16, 2014

0103 - CTD at 4 m off the bottom 22 44.94'N, 158 0.043'W
0244 - End of cast
0302 - Start ACS/LISST cast
0353 - ACS/LISST recovered
0355 - ACS/LISST re-deployed
0448 - End of ACS/LISST
0453 - Hand held net sampling
0515 - End of hand held net sampling
0516 - Transit to recover gas array
0621 - Start gas array recovery 22 48.712'N 158 6.629'W
0635 - End of recovery
0640 - Transit to recover sediment traps
0720 - Start sediment traps recovery 22 52.972'N 158 6.495'W
0739 - End of recovery
0740 - Transit recover profiler float
1258 - Profiler float recovered 22 50.133'N, 159 6.427'W
1305 - Hand held net sampling
1310 - End of hand held net sampling
1315 - Transit to Kaena Station
1938 - Arrive at Station Kaena, S6C1 –near bottom CTD
2139 - End of cast
2200 - Transit to Snug Harbor

September 17, 2014

0800 - Arrive Snug Harbor, full offload.

6. HOT program sub-components:

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<td>Core Biogeochemistry</td>
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<td>Dave Karl</td>
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<td>Bob Bidigare</td>
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<td>Christopher Schvarcz</td>
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<td>Erica Goetze</td>
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<td>Sara Ferron-Smith</td>
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<td>Diurnal variability of O2/Argon ratios</td>
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<td>Sara Ferron-Smith,</td>
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<td>Daniela del Valle</td>
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<tr>
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<tr>
<td>Justine Shortell,</td>
<td>Cultivation of single bacterial cells from the deep sea</td>
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<td>Stuart Donachie</td>
<td>(Undergraduate Research Opportunities Program)</td>
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<td>Rhea Foreman</td>
<td>SCOPE; Low Level Nitrogen method development</td>
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<td>Oliver Kersten,</td>
<td>Zooplankton community structure within the surface water column at Station ALOHA</td>
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<td>Meri Eichnera, Helle Ploug</td>
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