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 May 30th for about 3 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 May 31st, June 1st, and 2nd.

3) Station 52, the site of WHOTS-10 Mooring (anchor position 22° 40.12'N 157° 57.01'W) was to be occupied on June 2nd 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 June 2nd for approximately 3 hours.

Upon arrival to Station Kahe a 500 lb. weight-test cast to 500 m, one CTD cast to 1000 m, and a Hyperpro cast were to be conducted on the afternoon of May 30th. The single CTD cast was to be conducted to collect continuous profiles 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 one 200 m CTD cast and one 1000 m cast (to collect water for the Primary Productivity Array). These two casts were 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, and 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 June 1st.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on June 1st. The Gas Array was to be recovered on June 2nd.

An Automated Trace Element (ATE) sampler was to be deployed to a depth of 10 m on June 1st.

A plankton net was to be towed between 1000-1400, and 2200-0200 for 30 minute intervals on May 31st and June 1st at Station ALOHA.

The Hyperpro was to be deployed for a half-hour period near noon time on May 30th, 31st, and June 2nd.
A package including a Wet Labs AC9, a Chelsea Fast Repetition Rate Fluorometer (FRRf), 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 and around noon time of June 2nd.

After the 36 hour burst period of CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating Sediment Trap Array and the Gas Array on the morning of June 2nd.

After recovering the arrays, the ship was to transit to Station ALOHA to conduct an AC9/FRRf cast. Once that operation was complete, the ship was to transit to Station 52 to conduct a one-hour 200 m CTD yo-yo cast. Once operations at Station 52 were complete, the ship was to re-position within Station ALOHA to conduct a Hyperpro cast.

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, ship’s two anemometers, and the underway fluorometer.

2. SCIENCE PERSONNEL

<table>
<thead>
<tr>
<th>Participant</th>
<th>Title</th>
<th>Affiliation</th>
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<tr>
<td>Susan Curless</td>
<td>Research Associate</td>
<td>UH</td>
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<tr>
<td>Adriana Harlan</td>
<td>Research Associate</td>
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<td>Dan Sadler</td>
<td>Research Associate</td>
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<tr>
<td>Lance Fujieki</td>
<td>Research Associate</td>
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<tr>
<td>Christopher Schvarcz</td>
<td>Graduate Student</td>
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<tr>
<td>Stuart Goldberg</td>
<td>Postdoctoral Researcher</td>
<td>UH</td>
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<tr>
<td>Jamie Becker</td>
<td>Postdoctoral Researcher</td>
<td>MIT</td>
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<tr>
<td>Charles Roman Battisti</td>
<td>Graduate Student</td>
<td>HPU</td>
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<tr>
<td>Brenner Wai</td>
<td>Technician</td>
<td>UH</td>
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<tr>
<td>Blake Watkins</td>
<td>Marine Engineer</td>
<td>UH</td>
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<tr>
<td>Jefrey Snyder</td>
<td>Marine Technician</td>
<td>UH</td>
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<tr>
<td>Fernando Santiago-Mandujano</td>
<td>Research Associate</td>
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<tr>
<td>Daniel McCoy</td>
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<td>Robert (Walt) Deppe</td>
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<td>Kristine Tofte</td>
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<tr>
<td>Seth Travis</td>
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<tr>
<td>Kayla Svelling</td>
<td>Undergraduate Student</td>
<td>UH</td>
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<tr>
<td>Justin Smith</td>
<td>Marine Technician</td>
<td>OTG</td>
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<tr>
<td>Dave Hashisaka</td>
<td>Marine Technician</td>
<td>OTG</td>
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3. GENERAL SUMMARY

During the Hyperpro deployment at Station Kahe, the Hyperpro communications cable became caught under the aft shaft of the ship. Extra time was taken to free it and then successfully conduct a full Hyperpro cast. This delayed our departure from Kahe and further time was lost heading into the weather during the transit to Station ALOHA. Arrival to the chosen sediment trap deployment site at ALOHA was not until 0200 on May 31st. The planned 200 m CTD cast for ancillary science experiments was cancelled to make up for time lost at Kahe and during the transit.

As CTD operations at Station ALOHA were commencing, CTD winch operator error caused damage to
the rosette when it was accidentally lifted into the ceiling of the air castle. Damage to the niskin bottles and the wire termination required ~3 hours for repairs. To compensate for the time needed for repairs, deployment of the Gas Array was cancelled and the Primary Production Array was deployed in the originally scheduled Gas Array time slot.

One 1000 m CTD cast was completed at Station Kahe. Two near bottom CTD casts and twelve 1000 m CTD casts were conducted at Station ALOHA. One 200 m yo-yo CTD cast was completed near the WHOTS mooring (Station 52) with four cycles completed. One near bottom cast was completed at Station Kaena.

The Sediment Traps and Primary Production Array were deployed and recovered successfully. Both arrays drifted to the south of their deployment sites.

Six net tows for the core HOT zooplankton collection were completed successfully; three during the day, and three during the night.

The Hyperpro casts (three cycles each) were successfully conducted three times around the scheduled 1400-1430 time slot on May 30th, June 1st and 2nd.

The optical package ACS/AC9/FRRf/LISST was deployed two times during the cruise, once around noon and once in the early morning on June 2nd.

The ATE was successfully deployed on May 31st.

The ship’s fluorometer and anemometers ran without interruption during the cruise. The ADCP data collection was interrupted for a couple of hours on June 2nd when the MAHRS Gyro stopped communicating with the ADCP. The thermosalinograph had multiple interruptions of operation during the cruise.

Winds during the cruise were from the east at 10-20kts. Seas were 4-6ft for the first two days of the cruise, diminishing to 2-3 feet on the third day. The swell was ~4-6 ft throughout the cruise.

We arrived at Snug Harbor for off-loading on June 3rd, at 0745 (HST).

4. R/V Ka‘Imikai-O-Kanaloa OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Ka‘Imikai-O-Kanaloa continues to maintain good ship support for our work. Captain Jack and the ship’s crew showed enthusiasm, concern, and dedication to our scientific mission.

Technical support during this cruise was good. OTG personnel were available at any time to assist in our work. OTG’s efforts to help troubleshoot the thermosalinograph problems were very much appreciated.

5. DAILY REPORT OF ACTIVITIES (HST)

May 30, 2014
0758- Depart Snug with two tug boat escorts.
0847- Safety Drills
0920- Safety/ship briefing with the Captain
1115- Arrive Station Kahe
1125- Weight Cast to 500m
1135- Problem with locked and rusty sheaves on drum, engineers inspecting
1206- End of weight cast
1225- Start of Hyperpro cast (over starboard rail)

HOT-263 Chief Scientist Report
-Hyperpro got pushed under the ship by currents, and was then stuck under the aft shaft.
1256- Hyperpro recovered
1300- Ship Reposition
1327- Hyperpro re-deployed through A-frame
1422- Hyperpro recovered
1428- S1C1 1000 m CTD
1557- End of cast
1600- Transit Station ALOHA

May 31, 2014
0207- Arrive Station ALOHA, 3nm southwest of the center
0227- Begin Sediment trap deployment
0249- Sediment trap array deployed 22° 43.095’N 158° 2.134’W
0250- Transit 0.5 nm toward center to begin CTD operations
1315- While deploying the CTD it was accidentally brought up into the ceiling causing damage to the bottles and wire termination. Bottle #24 was replaced, both bottom and top caps were replaced on #22, and various bottles were repositioned.
0618- S2C1 PO deep cast
0815- 5m off the bottom 22° 45.06’N 157° 59.832’W
1002- End S2C1
1010- Net Tow
1124- S2C2 1000 m CTD cast, start of the 36 hour burst period
1242- End of cast
1330- ATE
1401- ATE recovered
1405- S2C3 1000 m CTD
1520- End of cast
1512- End of cast S2C3
1659- S2C4 1000 m CTD
1814- End of cast
1825- Transit to pump tanks
2001- S2C5 1000 m CTD
2103- End of cast
2200- Net Tow
2230- End of net tow
2233- Start of second net tow
2307- End of net tow
2315- S2C6 1000 m CTD

June 1, 2014
0015- End of cast
0158- S2C7 1000 m CTD
0303- End of cast
0401- Deploy PP Array 22° 44.864’N 158° 0.934’W
0456- S2C8 1000 m CTD
0559- End of cast
0602- Bilge pump run
0756- S2C9 1000 m CTD
0855- End of cast
1000- Net tow
1056- S2C10 1000 m CTD
1156- End of cast
1200- Net tow
1321- Hyperpro
1411- End of Hyperpro
1414- S2C11 1000 m CTD
1519- End of cast  
1657- S2C12 1000 m CTD  
1801- End of cast  
1810- Transit to PP Array  
1920- Recovery of PP Array 22° 41.396’N 158° 1.334’W  
1959- S2C13 1000 m CTD  
2101- End of cast  
2201- Net tow  
2240- End of net tow  
2258- S2C14 Near bottom CTD cast  

**June 2, 2014**  
0036- At 8 m off the bottom 22° 44.821’N 157° 59.586’W  
0210- End of cast  
0305- AC9/FRRf  
0415- End of AC9  
0418- AC9/FRRf re-deployed  
0520- End of AC9  
0530- Transit to Sediment traps  
0645- Start Recovery 22° 34.65’N 157° 59.86’W  
0730- End of recovery, transit to ALOHA  
1000- AC9/FRRf  
1103- End of AC9  
1104- AC9/FRRf  
1154- End of AC9, transit to WHOTS  
1210- S52C1 200 m yo-yo  
1221- Ship drifting towards buoy, need to re-position. Cast recovered.  
1227- S52C1 Re-deployed  
1335- End of cast, 4 cycles complete  
1340- Transit to ALOHA  
1400- Hyperpro  
1500- End Hyperpro, transit Kaena  
2130- Arrive Station Kaena  
2132- S6C1 near bottom CTD  
2238- Near bottom, 10 m off 21° 51.351’N 158° 21.64’W  
2321- End of cast  
2325- Transit to Snug Harbor  

**June 3, 2014**  
0715- Entering Honolulu Harbor with two tug escorts.  
0745- Arrive Snug Harbor
### HOT program sub-components:

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<tr>
<th>Investigator</th>
<th>Project</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Matt Church</td>
<td>Core Biogeochemistry</td>
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<tr>
<td>Dave Karl</td>
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<td>Bob Bidigare</td>
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<td>John Dore</td>
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<td>Roger Lukas</td>
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<tr>
<td>Mike Landry</td>
<td>Zooplankton dynamics</td>
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<td>Ricardo Letelier</td>
<td>Optical measurements</td>
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### Ancillary programs:

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<tr>
<td>Andrew Dickson</td>
<td>CO$_2$ dynamics and intercalibration</td>
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<td>Paul Quay</td>
<td>DI$^{13}$C</td>
<td>UW</td>
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<tr>
<td>Matt Church &amp;</td>
<td>Diversity and activities of nitrogen-fixing microorganisms</td>
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<td>Ricardo Letelier</td>
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<tr>
<td>Sam Wilson</td>
<td>Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide</td>
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<td>Christopher Schvarcz</td>
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<td>Erica Goetze</td>
<td>Temporal stability of copepod populations at Station ALOHA</td>
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<tr>
<td>Stu Goldberg</td>
<td>Nutrient and DOC cycling experiment</td>
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<td>Sara Ferrón-Smith</td>
<td>Determination of net community production from the diurnal variability of O2/Argon ratios and water collection for CH4 production experiments</td>
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<tr>
<td>Jamie Becker</td>
<td>Prochlorococcus and bacterial vesicle isolations</td>
<td>MIT</td>
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<tr>
<td>Kendra Turk-Kubo</td>
<td>Genomics of prymnesiophyte/cyanobacterial symbiosis</td>
<td>UCSC</td>
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