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 April 4th 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 April 5th, 6th, and 7th.
3) Station 50, the site of WHOTS-9 Mooring (anchor position 22° 46.071'N 157° 53.956'W) was to be occupied on April 7th 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 April 7th for approximately 3 hours.

Upon arrival to Station Kahe, a 1300 lb. weight-test cast to 1000 m, one CTD cast to 1000 m, a Hyperpro cast, and a 20 m niskin cast were to be conducted on the afternoon of April 4th. 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 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 insitu 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 April 6th.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on April 6th. The Gas Array was to be recovered on April 7th.

A plankton net was to be towed between 1000-1400, and 2200-0200 for 30 minute intervals on April 5th and 6th at Station ALOHA.
A hand net tow was to be deployed for approximately 15 minutes on the afternoon of April 6th.

The Hyperpro was to be deployed for a half-hour period near noon time on April 4th, 5th and 7th.
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 on April 7th.

A trace metal free sample was to be collected by the ATE sampler in the late morning of April 6th.

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 April 7th.

After recovering both arrays, the ship was to transit back to Station ALOHA to conduct an ACS/AC9/FRRf/LISST cast, and a Hyperpro cast. Once the optics profiles were complete, the ship was to transit to Station 50 to conduct a one-hour 200 m CTD yo-yo cast.

Once operations at Station 50 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

<table>
<thead>
<tr>
<th>Participant</th>
<th>Title</th>
<th>Affiliation/HOT Group</th>
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<tbody>
<tr>
<td>Susan Curless</td>
<td>Research Associate</td>
<td>UH/BEACH</td>
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<tr>
<td>Dan Sadler</td>
<td>Research Associate</td>
<td>UH/BEACH</td>
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<tr>
<td>Brett Updyke</td>
<td>Research Associate</td>
<td>UH/BEACH</td>
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<tr>
<td>Adriana Harlan</td>
<td>Research Associate</td>
<td>UH/BEACH</td>
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<tr>
<td>Lance Fujiiikei</td>
<td>Research Associate</td>
<td>UH/BEACH</td>
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<tr>
<td>Donn Viviani</td>
<td>Graduate Student</td>
<td>UH/BEACH</td>
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<tr>
<td>Shimi Rii</td>
<td>Graduate Student</td>
<td>UH/BEACH</td>
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<tr>
<td>Blake Watkins</td>
<td>Marine Engineer</td>
<td>UH/BEACH</td>
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<tr>
<td>Christopher Schvarcz</td>
<td>Graduate Student</td>
<td>UH/CMORE</td>
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<tr>
<td>Benedetto Barone</td>
<td>Postdoctoral Researcher</td>
<td>UH/CMORE</td>
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<tr>
<td>Jeffrey Snyder</td>
<td>Marine Technician</td>
<td>UH/PO</td>
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<tr>
<td>Fernando Santiago-Mandujano</td>
<td>Research Associate</td>
<td>UH/PO</td>
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<tr>
<td>Cameron Fumar</td>
<td>Research Associate</td>
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<tr>
<td>Daniel McCoy</td>
<td>Research Associate</td>
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<tr>
<td>Jacquelyn Troller</td>
<td>Volunteer</td>
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<tr>
<td>Carly Goodman</td>
<td>Undergraduate Volunteer</td>
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<tr>
<td>Ken Doggett</td>
<td>Research Associate</td>
<td>UH/CMORE</td>
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<tr>
<td>Ger van den Engh</td>
<td>Scientist</td>
<td>BD Biosciences</td>
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<tr>
<td>Jim Foley</td>
<td>Marine Educator</td>
<td>UH/CMORE</td>
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<tr>
<td>Richard Jones</td>
<td>STARS Participant</td>
<td>UH West Oahu</td>
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<tr>
<td>Steven Soltysik</td>
<td>STARS Participant</td>
<td>Kauai Elem./Bishop Museum</td>
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<tr>
<td>Cristina Veresan</td>
<td>STARS Participant</td>
<td>Star of the Sea School</td>
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<tr>
<td>David Grant</td>
<td>STARS Participant</td>
<td>Brookdale Comm. College</td>
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<tr>
<td>Brandi Murphy</td>
<td>Marine Technician</td>
<td>UW</td>
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<tr>
<td>Tina Thomas</td>
<td>Marine Technician</td>
<td>UW</td>
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3. GENERAL SUMMARY

Operations at Station ALOHA were conducted as planned. One 1000 m CTD (S2C4) in the 36-hour burst period was brought back on board with no bottles fired when the conductivity sensor lost signal and the pumps shut off at ~730 dbar on the down cast. The sensor and pumps did regain signal and power on the up cast, and the cable was replaced upon retrieval of the package. Core water needs from Cast 4 (PC/PN) were combined with Cast 5 (PPO4) and ancillary water on cast 4 was rescheduled to later in the cruise.

One 1000 m CTD cast and one 20 m niskin cast were 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 50) with five cycles completed. One near bottom cast was completed at Station Kaena.

The Sediment Traps, Primary Production Array, and Gas Array were all deployed and recovered successfully. All arrays drifted to the southeast of the center of Station ALOHA.

Six net tows for the core HOT zooplankton collection were completed successfully; three during the day, and three during the night. One hand net tow was deployed and recovered successfully.

During cruise preparations the ATE instrument failed to communicate, so the operation was cancelled and a trace metal sample was not collected.

The Hyperpro was deployed and recovered successfully three times near noon.

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

The fluorometer, ADCP, thermosalinograph, and the ship’s meteorological suite ran without interruption during the cruise.

Winds were from the east at ~15-20 kts throughout the cruise. Seas were slight ~1-2 ft with a 6-8 ft northwest swell. The prevailing currents were ~1.0 kt to the south upon arrival to Station ALOHA but within 24 hours of our arrival shifted to due east and then south east for the remainder of the cruise.

4. R/V Thomas G. Thompson OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Thomas G. Thompson provided excellent ship support for our work. Captain DeVaney and the ship’s crew showed not only a positive attitude, but enthusiasm, concern, and dedication to our scientific mission.

Technical support during this cruise was also excellent. The SSSG personnel were available at any time to assist in our work during the cruise.

5. DAILY REPORT OF ACTIVITIES (HST)

April 4, 2013
0858- Depart Snug Harbor
1000- Science Party Briefing with Captain, Chief Mate, Third Mate, and Lead Technician.
1025- Fire and Abandon Ship Drill
1034- Secure from all drills
1145- Arrive Station Kahe, Weight Cast to 1000 m
1215- End of Weight Cast
HOT-251 Chief Scientist Report
1230- Hyperpro
1315- End of Hyperpro
1320- S1C1 1000 m CTD
1430- End of cast
1438- Niskin cast to 20 m
1445- End of cast
1450- Transit Station ALOHA
2139- Arrive Station ALOHA
2159- Deployment of Sediment Traps
2224- Array Released 22° 45.03'N 158° 02.65'W

**April 5, 2013**
0144- S2C1 1000 m CTD
0309- End of cast
0415- Primary Production Array Deployment begins
0500- PP Array Released 22° 41.878'N 157° 59.43'W
0515- Transit to the center of ALOHA; check ST position on way by array to double check argosfix.
0600- S2C2 near bottom CTD cast
0750- At 5 m off the bottom 22° 45.046'N 157° 59.97'W
1015- End of cast
1030- Net Tow
1145- End of cast
1158- S2C3 1000 m CTD
1300- End of cast
1310- Hyperpro
1400- End Hyperpro
1430- S2C4 1000 m CTD - all stop at ~730dbar, spike in primary oxygen and conductivity sensors, primary conductivity sensor signal showing 99, pump status off
1505- Primary conductivity sensor and pumps back on
1510- End of cast
1530- Replaced primary conductivity cable (and oxygen cable again)
1600- Transit to pump ship's tanks
1656- S2C5 1000 m CTD
1805- End of cast
1811- Transit to PP array
1900- Recovery of the PP array 22° 38.72'N 157° 56.15'W
1930- End of recovery, transit ALOHA
2002- S2C6 1000 m CTD
2111- End of cast
2200- Net Tow
2230- Begin second net tow
2304- End of net tows
2314- S2C7 1000 m CTD

**April 6, 2013**
0008- End of cast
0040- Transit of pump tanks
0150- S2C8 1000 m CTD
0101- End of cast
0400- Gas Array Deployment 22° 43.01'N 158° 00.0'W
0445- End of deployment
0450- Re-position within ALOHA for CTD
0459- S2C9 1000 m CTD
0556- End of cast
0600- Transit to Pump Ship's tanks
0800- S2C10 1000 m CTD
0900- End of cast
1000- Net Tow
1035- End of net tow
1055- S2C11 1000 m CTD
1205- End of cast
1215- Net tow
1250- End of net tow
1400- S2C12 1000 m CTD
1501- End of cast
1516- Hand Net Tow
1659- S2C13 1000 m CTD
1811- End of Cast
1815- Transit to pump ship's tanks
1920- Transit Station ALOHA
1957- S2C14 1000 m CTD
2055- End of cast
2130- Net Tow
2215- End of net tow
2259- S2C15 near bottom CTD

April 7, 2013
0046- At 9 m off the bottom 22° 44.99'N 158° 00.03'W
0219- End of cast
0315- AC9/FRRf
0450- End of AC9/FRRf
0500- Transit to Gas Array
0630- Gas Array Recovery begins 22° 41.28'N 157° 46.02'N
0700- Recovery complete, transit to Sediment Traps
0745- Sediment Trap Recovery begins 22° 34.27'N 157° 45.40'W
0815- Recovery complete, transit to Station ALOHA
1000- AC9/FRRf
1200- End of AC9
1215- Hyperpro
1300- End of Hyperpro
1325- S50C1 200 m yo-yo CTD
1526- Transit Station Kaena
2009- Arrive Station Kaena
2015- S6C1 near bottom CTD
2206- End of cast
2212- Transit Snug Harbor

April 8, 2013
0806- Arrive Snug Harbor for full off-load.
**HOT program sub-components:**

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<tr>
<th>Investigator</th>
<th>Project</th>
<th>Institution</th>
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<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>Roger Lukas</td>
<td>Hydrography</td>
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<td>Mike Landry</td>
<td>Zooplankton dynamics</td>
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<td>Ricardo Letelier</td>
<td>Optical measurements</td>
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<td>Charles Keeling</td>
<td>CO₂ dynamics and intercalibration</td>
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<td>Paul Quay</td>
<td>DI¹³C</td>
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<tr>
<td>Matt Church</td>
<td>Diversity and activities of nitrogen-fixing microorganisms</td>
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**Ancillary programs:**

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<td>Adina Paytan</td>
<td>O¹⁸ natural abundance</td>
<td>UCSC</td>
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<tr>
<td>Grieg Steward (via</td>
<td>Viral Dynamics at Station ALOHA and surface water collection for virus</td>
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<tr>
<td>Christopher Schvarcz)</td>
<td>and phytoplankton culturing</td>
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<tr>
<td>Erica Goetze</td>
<td>Temporal stability of copepod populations at Station ALOHA</td>
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<tr>
<td>John Zehr (via Brandon Carter)</td>
<td>UCYN-A2/3 variant search</td>
<td>UCSC</td>
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<tr>
<td>Scott Turn</td>
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<td>Stuart Donachie</td>
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<td>Rebecca Briggs</td>
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<td>Jörg Bollmann</td>
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<tr>
<td>Nicholas Fisher (via Daniel Madigan and Brian Popp)</td>
<td>Tracking transport of Fukushima-derived radionuclides by pelagic species</td>
<td>Stanford/UH</td>
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<tr>
<td>Dave Karl (via Jim Foley)</td>
<td>STARS (Science Teachers Aboard Research Ships)</td>
<td>CMORE/UH</td>
</tr>
<tr>
<td>Dave Karl (via Ken Doggett and Ger van den Engh)</td>
<td>Development of underway sampler for Influx flow cytometer</td>
<td>BD Biosciences/UH</td>
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<tr>
<td>Matt Church (via Shimi Rii and Donn Viviani)</td>
<td>Water collection for nutrient addition experiment</td>
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