

# HOT-253: Chief Scientist Report

Chief Scientist: Susan Curless

**R/V Kilo Moana**

June 24-28, 2013

Cruise ID: **KM1311**

Departed: June 24, 2013 at 0900 (HST)

Returned: June 28, 2013 at 0730 (HST)

Vessel: **R/V Kilo Moana**, University of Hawaii

Master of the Vessel: Captain Rick Meyer

Chief Scientist: Susan Curless, University of Hawaii

OTG Marine Technicians: Trevor Goodman and Dave Hashisaka

## 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 June 24th 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 June 25th, 26th, and 27th.
- 3) Station 50, the site of WHOTS-9 Mooring (anchor position 22° 46.071'N 157° 53.956'W) was to be occupied on June 27th 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 27th for approximately 3 hours.

Upon arrival to Station Kahe, a 1300 lb. weight-test cast to 500 m, one CTD cast to 1000 m, a Hyperpro cast, and a 20 m niskin cast were to be conducted on the afternoon of June 24th. 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 to prepare incubation experiments and 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 June 26th.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on June 26th. The Gas Array was to be recovered on June 27th.

A plankton net was to be towed between 1000-1400, and 2200-0200 for 30 minute intervals on June 25th and 26th at Station ALOHA.

A hand net tow was to be deployed for approximately 15 minutes on the afternoon of June 26th.

The Hyperpro was to be deployed for a half-hour period near noon time on June 24th, 25th and 27th.

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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 June 27th.

A trace metal free sample was to be collected by the ATE sampler on June 26th.

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 27th.

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,  $p\text{CO}_2$  system, and the meteorological package.

## 2. SCIENCE PERSONNEL

<b>Participant</b>	<b>Title</b>	<b>Affiliation</b>
Susan Curless	Research Associate	UH
Dan Sadler	Research Associate	UH
Stuart Goldberg	Postdoctoral Researcher	UH
Brett Updyke	Research Associate	UH
Adriana Harlan	Research Associate	UH
Lance Fujieki	Research Associate	UH
Donn Viviani	Graduate Student	UH
Sara Thomas	Graduate Student	UH
Blake Watkins	Marine Engineer	UH
Christopher Schvarcz	Graduate Student	UH
Jefrey Snyder	Marine Technician	UH
Fernando Santiago-Mandujano	Research Associate	UH
Cameron Fumar	Research Associate	UH
Daniel McCoy	Research Associate	UH
Carly Goodman	Undergraduate Student	UH
Conor Jerolmon	Undergraduate Student	UH
Mike Grissom	Graduate Student	UH
Irina Shilova	Postdoctoral Researcher	UCSC
Brandon Carter	Research Specialist	UCSC
Zbigniew Kolber	Scientist	UCSC
Matt Mills	Research Specialist	Stanford
Jim Foley	Marine Educator	UH
Matthew Kanemoto	STARS Participant	Kahuku HS and Intermediate
Katherine Loke Roseguo	STARS Participant	Ke Kula 'O Nawahiokalani'opu'u
Deelynn Ka'aha'aina	STARS Participant	UH West Oahu
Trevor Goodman	Marine Technician	OTG
Dave Hashisaka	Marine Technician	OTG

### 3. GENERAL SUMMARY

Operations at Station ALOHA were conducted as planned. One 1000 m CTD cast and one 20 m niskin cast were completed at Station Kahe. Two near bottom CTD casts, one 200 m CTD cast 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 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. The Sediment Traps and Primary Production array drifted southwest from their respective deployment sites and the Gas Array drifted to the northwest of its deployment site.

The trawl winch and 0.681 wire were used with the A-Frame for CTD operations.

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.

The ATE operated successfully and one trace metal free sample was 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,  $p\text{CO}_2$  system, ADCP, thermosalinograph, and the ship's meteorological suite ran without interruption during the cruise.

Winds were from the east at ~14-18 kts throughout the cruise. Seas were slight with a 5-6 ft easterly swell.

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

The R/V *Kilo Moana* provided good ship support for our work. Captain Rick Meyer and the ship's crew showed enthusiasm, concern, and dedication to our scientific mission.

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

### 5. DAILY REPORT OF ACTIVITIES (HST)

#### **June 24, 2013**

0900- Depart Snug Harbor with Pi'ilani Tug escort

0930- Science party briefing with the Captain

1000- Fire and Abandon Ship Drills

1140- Arrive at Station Kahe

1145- Weight Cast to 500 m

1222- End of weight cast

1230- Hyperpro

1321- End of hyperpro

1330- S1C1 1000 m CTD

1451- End of cast

1500- 20 m niskin cast

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1507- Transit Station ALOHA  
2253- Arrive at Station ALOHA, 3 miles due west of center  
2305- Begin sediment trap deployment  
2328- Deployment complete 22° 45.005'N 158° 3.264'W  
2354- S2C1 200 m CTD

**June 25, 2013**

0032- End of cast  
0212- S2C2 1000 m CTD  
0335- End of cast  
0420- Primary Production Array Deployment 22° 44.98'N 158° 02.18'W  
0442- End of deployment  
0503- S2C3 Near bottom CTD  
0900- End of cast  
0905- Transit to pump ship's tanks  
1015- Net tow  
1050- End of net tow  
1100- S2C4 1000 m CTD  
1240- End of cast  
1250- Hyperpro  
1340- End of Hyperpro  
1415- S2C5 1000 m CTD  
1522- End of cast  
1649- S2C6 1000 m CTD  
1811- End of cast  
1816- Transit to pump ship's tanks  
1948- PP array Recovery 22° 43.163'N 158° 2.181'W  
1958- S2C7 1000 m CTD  
2121- End of cast  
2200- Net Tow  
2230- Begin second net tow  
2259- End of net tow  
2309- S2C8 1000 m CTD

**June 26, 2013**

0027- End of cast  
0151- S2C9 1000 m CTD  
0300- End of cast  
0310- Transit Gas Array Deployment Site  
0400- Deploy Gas Array 22° 44.984'N 158° 2.124'W  
0430- Deployment complete  
0450- S2C10 1000 m CTD  
0608- End of cast  
0610- Transit to pump ship's tanks  
0751- S2C11 1000 m CTD  
0908- End of cast  
0950- Net Tow  
1030- End of net tow  
1040- ATE delayed until after 1300 net tow  
1050- S2C12 1000 m CTD  
1215- End of cast  
1220- Net tow  
1255- End of net tow  
1305- ATE  
1332- End of ATE, sample collected  
1343- S2C13 1000 m CTD

1510- End of cast  
1520- Hand net tow  
1531- End of tow  
1650- S2C14 1000 m CTD  
1800- End of cast  
1806- Transit to pump ship's tanks  
1954- S2C15 1000 m CTD  
2112- End of cast  
2204- Net Tow  
2229- End of net tow  
2255- S2C16 Near bottom CTD

**June 27, 2013**

0050- 6m off the bottom, 22° 45.024'N 158° 0.008'W  
0226- End of cast  
0252- AC9/FRRf  
0455- End of AC9/FRRf  
0540- Gas Array Recovery 22° 46.95'N 158° 02.62'W  
0600- Transit to Sediment Traps  
0650- Recover Traps 22° 38.809'N 158° 5.132'W  
0715- Transit to WHOTS  
1000- AC9/FRRf  
1050- End of AC9/FRRf  
1200- Hyperpro  
1315- S50C1 200 m yo-yo  
1500- Transit Station Kaena  
2047- Arrive Kaena  
2054- S6C1 near bottom CTD  
2300- End of cast  
2306- Transit Snug Harbor

**June 28, 2013**

0658- H Buoy with Tug escort  
0730- Arrive Snug Harbor

**HOT program sub-components:**

<b>Investigator</b>	<b>Project</b>	<b>Institution</b>
Matt Church Dave Karl Bob Bidigare	Core Biogeochemistry	UH
John Dore	Biogeochemistry QA/QC	MSU
Roger Lukas	Hydrography	UH
Mike Landry	Zooplankton dynamics	SIO
Ricardo Letelier	Optical measurements	OSU
<b>Ancillary programs:</b>		
Andrew Dickson	CO <sub>2</sub> dynamics and intercalibration	SIO
Paul Quay	DI <sup>13</sup> C	UW
Matt Church & Ricardo Letelier	Diversity and activities of nitrogen-fixing microorganisms	UH
Sam Wilson	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide	UH
Donn Viviani	Bacterial production and EOC at Station ALOHA	UH
Sara Thomas	Chemolithoautotroph experiment	UH
Adina Paytan	O <sup>18</sup> natural abundance	UCSC
Christopher Schvarcz	Viral Dynamics at Station ALOHA and surface water collection for virus and phytoplankton culturing	UH
Erica Goetze	Temporal stability of copepod populations at Station ALOHA	UH
Irina Shilova, Brandon Carter, Matt Mills, and Zbigniew Kolber	Phytoplankton responses to different nitrogen sources in the North Pacific Subtropical Gyre	UCSC Stanford
Scott Turn	Storage Stability of Next Generation Biofuels	HNEI/UH
Barbara Balestra and Adina Paytan	Quantifying trace elements concentrations in extant coccolithophore cells	UCSC
Stu Goldberg	Nutrient and DOC cycling experiment	UH
Jim Foley	STARS Program	UH