

HOT-215: Chief Scientist Report

Chief Scientist: Susan Curless

R/V Ka'Imikai-O-Kanaloa

September 23-27th, 2009

Cruise ID: **KOK0916**

Departed: September 23, 2009 at 0900 (HST)

Returned: September 27, 2009 at 0735 (HST)

Vessel: ***R/V Ka'Imikai-O-Kanaloa***

Operator: University of Hawaii

Master of the Vessel: Captain Ross Barnes

Chief Scientist: Susan Curless

OTG Electronics/Deck Operations Technicians: Vic Polidoro and Justin Smith

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 the first day of the cruise for about 2.5 hours.
- 2) Station 2, referred to as Station ALOHA (A Long Term Oligotrophic Habitat Assessment) 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 the 2nd, 3rd, and 4th days of the cruise.
- 3) Station 52, is the site of the WHOTS-6 Mooring, located at 22° 39.989'N, 157° 56.961'W will be occupied on the 4th day of the cruise 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 will be occupied on the 4th day of the cruise 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 at this location on the afternoon of September 23rd. 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 at 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 shallow CTD cast to 200 m, one 1000 m cast (to collect water for the Primary Production Array), and a 500 m CTD cast. These casts were 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 on September 26th.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on September 25th. The Gas Array was to be recovered on September 26th.

A plankton net was to be towed between 1000-1400, and 2200-0200 for 30 min intervals on September 24th and September 25th at Station ALOHA.

The Hyperpro was deployed for half-hour periods near noon time on September 23rd, 25th, and 26th.

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 around noon time on September 25th and in the early morning and around noon on September 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 September 26th.

After recovering the arrays, the ship was to re-position within Station ALOHA to conduct two ACS/AC9/FRRf/LISST casts, and a Hyperpro cast. Once those deployments were 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 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, anemometer, and underway fluorometer.

2. SCIENCE PERSONNEL

Participant	Title	Affiliation/HOT Group
Donn Viviani	Graduate Student	UH/BEACH
Susan Curless	Chief Scientist – Res. Assoc.	UH/BEACH
Lance Fujieki	Computer Specialist	UH/BEACH
Adriana Harlan	Research Associate	UH/BEACH
Binglin Li	Graduate Student	UH/BEACH
Dan Sadler	Research Associate	UH/BEACH
Brett Updyke	Research Associate	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Sam Wilson	Post-doc Scientist	UH/CMORE
Daniela Bottjer	Post-doc Scientist	UH/BEACH
Fernando Santiago-Mandujano	Research Associate	UH/PO
Paul Lethaby	Research Associate	UH/PO
Jefrey Snyder	Marine Technician	UH/PO
Meg Murphy	Research Associate	UH/PO
Yajuan Lin	Graduate Student	UH
Patrick Drupp	Graduate Student	UH/PO
Sarah Yasui	Undergrad Student Assistant	UH/PO
Amanda Whitmire	Post-doc Scientist	OSU
Angel White	Assistant Professor	OSU
Justin Smith	Marine Technician	OTG
Vic Polidoro	Marine Technician	OTG

3. GENERAL SUMMARY

Operations during the cruise went as scheduled with only minor delays experienced upon arrival to Station ALOHA.

One 500 m weight cast was performed with a 500 lb. weight and one 1000 m CTD cast was conducted at Station Kahe (1). Two near-bottom deep casts, twelve 1000 m, two 200 m, and one 500 m CTD casts were conducted at Station ALOHA (2). One, one hour 200 m yo-yo cast was conducted near the WHOTS mooring (Station 52). One near bottom cast was conducted at Station Kaena (6).

The array of floating sediment traps, the gas array, and the primary production array were deployed and recovered without any major incidents. All arrays drifted west.

Six net tows were successfully completed; three were conducted during the day, and three at night.

The Hyperpro was deployed four times around noon.

The optical package ACS/AC9/FRRf/LISST was deployed five times during the cruise.

The ADCP, thermosalinograph, and the fluorometer ran without interruption throughout the cruise.

Winds were from the east between 18-20 knots throughout the cruise with seas building from 4-6ft to 8-10ft throughout the cruise.

We arrived at Snug Harbor for off-loading on September 27th, at 0735 (HST).

Changed operations due to time constraints:

Station ALOHA: S2C2 was conducted to 200 m instead of the planned 1000 m to make up time in the schedule.

Added operations:

- One ACS/AC9/FRRf/LISST cast was added on the afternoon of September 25th due to the instrument having not recorded data on its first deployment.
- One Hyperpro cast was added on the afternoon of September 26th since time was available in the schedule to allow for an additional cast to be conducted.

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

The R/V *Ka'Imikai-O-Kanaloa* continues to maintain excellent ship support for our work. Captain Ross and the ship's crew were most helpful and accommodating throughout the cruise, especially in regards to providing medical care for an injured member of the science party (see section 6).

Technical support during this cruise was excellent. OTG personnel were available at any time to assist in our work and helped keep operations running smoothly.

5. DAILY REPORT OF ACTIVITIES (HST)

September 23, 2009

0900- Departed Snug Harbor
0930- Abandon ship and fire drills
0945- Safety Meeting
1200- Arrive at Station Kahe
1215- Weight cast
1300- Hyperpro
1332- S1C1 (1000 m)
0310- Transit to Station ALOHA

September 24, 2009

0120- Arrive Station ALOHA
0208- Deployment of the Sediment Traps 22°45.3N 158°1.22W

0222- S2C1 (200 m)
0319- S2C2 (200 m)
0440- S2C3 (500 m)
0600- Deployment of the Primary Production Array
0625- S2C4 PO Deep Cast (~4740 m)
0810- At bottom 22°45'N 158°0.072'W
1042- End of Deep Cast
1100- Net Tow
1217- S2C5 PO Shallow (1000 m)
1335- Net Tow
1433- S2C6 (1000 m)
1700- S2C7 (1000 m)
1732- Recovery of the Primary Production Array 22°44.879'N 158°03.485'W
2000- S2C8 BEACH cast (1000 m)
2215- Net Tow
2300- S2C9 (1000 m)

September 25, 2009

0015- Net Tow
0044- Transit to Pump Ship's Tanks
0213- S2C10 (1000 m)
0503- Gas Array Deployment 22°45.549'N 158°00.161'W
0510- S2C11 (1000 m)
0758- S2C12 (1000 m)
1000- Net Tow
1052- S2C13 (1000 m)
1200- Hyperpro
1230- ACS/AC9/FRRf/LISST cast
1400- S2C14 (1000 m)
1515- ACS/AC9/FRRf/LISST cast - this cast was added since the previous cast did not collect data.
1654- S2C15 (1000 m)
1955- S2C16 (1000 m)
2205- Net Tow
2256- S2C17 PO second Deep Cast (~4740 m)
0037- 5m off the bottom 22°44.88'N 158°0.06'W
0214- End cast 17
0300- ACS/AC9/FRRf/LISST cast
0400- Transit to Sediment Traps
0650- Recovery of Sediment Traps 22°45.676'N 158°13.976'W
0745- Arrive at Gas Array
0814- Recover the Gas Array 22°45.271 158°09.252'W
1015- ACS/AC9/FRRf/LISST cast
1110- ACS/AC9/FRRf/LISST cast
1200- Hyperpro

1230- Hyperpro
1300- S52C1 (200 m yo-yo)
1430- Transit to Station Kaena
2110- Arrive Station Kaena
2120- S6C1 (~2500 m)
2310- End of cast
2320- Transit to Snug Harbor

September 27, 2009

0735- Arrived at Snug Harbor for full offload.

6. MEDICAL SITUATION

Submitted by Fernando Santiago-Mandujano:

Ms. Murphy complained to me about having back pain on the afternoon of September 24, 2009 at 3pm when we started our working shift on the ship. She told me that during loading (September 22, 2009) she was using her legs for moving equipment on board, and because of that the next day her legs were sore and therefore she started putting more strain on her back muscles. She attributed this for the reason of her back pain on September 24. She didn't mention any particular instance when she considered that she was injured. She didn't mention being injured before leaving dock on September 23, 2009.

On September 23, 2009 Ms. Murphy was working with the group doing the regular work of climbing on the rosette cocking the sampling bottles, tagging the rosette, and monitoring the system on the computer during casts.

When Ms. Murphy complained about her back pain on September 24, 2009, she said that she could still do the monitoring work on the computer.

I told her that she would not need to continue working on the deck, and that she should only do the work on the computer. Ms. Murphy continued working her shift doing the work on the computer until 1am on September 25, 2009. She told me that she was going to rest on her bed because we had a break in the working schedule. At 2am, when we asked Ms Murphy to return to work, she said that she was in bad pain, and since then she could not get up to work for the rest of the cruise until the ship came back to port on September 27, 2009 at 8am.

The Captain and the Chief Scientist were informed about the incident, the Captain called a doctor from the ship who indicated to give Ms. Murphy pain killers every 6 hours (Vicodine). The Chief Scientists gave the option to Ms. Murphy to return to shore and take her to emergency care, but she said that it would not be necessary as the pain killers made her feel better.

As soon as we returned, on September 27, 2009, Ms. Murphy walked off the ship under her own power and I took her to the emergency care unit at Queen's Medical Center where she was treated and released around noontime.

HOT program sub-components:

Investigator	Project	Institution
Matt Church	Core Biogeochemistry	UH
Roger Lukas	Hydrography	UH
Mike Landry	Zooplankton dynamics	SIO
Ricardo Letelier	Optical measurements	OSU
Ancillary programs:		
Charles Keeling	CO ₂ dynamics and intercalibration	SIO
Paul Quay	DI ¹³ C	UW
Penny Chisholm	Prochlorococcus population dynamics	MIT
Matt Church	Diversity and activities of nitrogen-fixing microorganisms	UH
Various CMORE PI's	Microbial RNA/DNA collection	UH/CMORE
Mark Brzezinski	Silica production and dissolution rate measurements	UCSB
Additional programs:		
Dave Karl (via Sam Wilson)	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide.	UH
Solange Duhamel	The role of alkaline phosphatase activity in DOP utilization in the NPSG.	UH/CMORE
Yajuan Lin	Bacterioplankton collection for DNA/RNA extraction and diversity/community structure investigation.	UH/Duke
Mike Sieracki	Single cell genomics of bacteria and archaea.	Bigelow Lab
Elisha Wood-Charlson and Alex Culley	Deep Chlorophyll Max water collection for flow cytometry analysis.	UH/CMORE