

HOT-206: Chief Scientist Report

Chief Scientist: Eric Grabowski

HOT-206 Chief Scientist's Cruise Report

R/V Kilo Moana

November 29-December 3, 2008

Cruise ID: KM0822

Departed: November 29, 2008 at 0900 (HST)

Returned: December 3, 2008 at 0715 (HST)

Vessel: *R/V Kilo Moana*

Operator: University of Hawaii

Master of the Vessel: Captain Ross Barnes

Chief Scientist: Eric Grabowski

OTG Electronics/Deck Operations Technicians: Kuhio Vellalos and Tobin Chen

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 are 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 will be occupied on the first day of the cruise 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 will be occupied during the 2nd, 3rd, and 4th days of the cruise.
- 3) Station 50, is the site of the WHOTS Mooring, located at 22° 46'N, 157° 53.83'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 will be occupied on the 4th day of the cruise for about 2 hours.

Upon arrival to Station Kahe a 1,300 lb. weight-test cast to 500 m, one CTD cast to 1000 m, and a PRR cast was to be conducted at this location in the afternoon of November 29th. 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 and one 1000 m CTD cast to collect water for the primary productivity array. After this, the free-drifting primary productivity array was to be deployed for 12 hours. A full-depth 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 December 2nd.

Another free-drifting array (gas array) was to be deployed for 24 hours for incubation experiments on December 1st. The gas array was to be recovered at 0700 on December 2nd.

A plankton net was to be towed near noon and midnight for 30-min intervals on November 30th and December 1st at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on December 1st and 2nd.

A package including a Wet Labs AC9, a Chelsea Fast Repetition Rate Fluorometer (FRRf), and a SeaBird Seacat was to be used to profile the upper 200 m at Station ALOHA around noon time on December 1st and 2nd and in the early morning on December 2nd.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array and the gas array on December 2nd.

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

Following the yo-yo CTD cast, light casts (PRR and AC9/FRRf) were to be completed at Station ALOHA.

After operations at Station ALOHA ended, the ship was to transit to Station Kaena.

A near-bottom CTD cast (~2500 m) was to be conducted at Station 6 including salinity and chlorophyll samples for calibration, after which the ship was to transit to Snug Harbor.

A Seaglider was to be deployed at some point during the cruise.

The ATE sampler was to be deployed during the cruise.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, underway fluorometer, two anemometers, and the pCO₂ system.

2. SCIENCE PERSONNEL

Cruise Participant	Title	Affiliation
BEACH group:		
Eric Grabowski	Chief Scientist – Res. Assoc.	UH/BEACH
Karin Björkman	Research Specialist	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	Technician	UH/BEACH
Jay Wheeler	Research Associate	UH/BEACH
Sam Wilson	Scientist	UH/CMORE
Ken Doggett	Research Associate	UH/CMORE
Tara Clemente	Research Associate	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Solange Duhamel	Postdoc	UH/BEACH
Kathryn MacDonald	Grad. Student/Volunteer	UH/BEACH
PO group:		
Fernando Santiago-Mandujano	Research Associate	UH/PO
Jefrey Snyder	Marine Technician	UH/PO
Paul Lethaby	Research Associate	UH/PO
Christin Shacat	Research Associate	UH/PO
Graham Dean	Undergrad/Volunteer	UH/PO
Amanda Ricardo	Undergrad/Volunteer	UH/PO
Others:		
Kuhio Vellalos	Marine Technician	OTG
Tobin Chen	Marine Technician	OTG

3. GENERAL SUMMARY

Most operations during the cruise were conducted as planned. The swell was quite large (10-12ft with 15ft sets) at the beginning and at the end of the cruise which contributed to the delays in the schedule. One CTD cast (s2c8) was canceled and made up at the end of the cruise. An extra array was deployed because Karin Björkman's samples were inadvertently left off of the primary production array. The Seaglider was not deployed on this cruise because of the rough conditions. All AC-9/FRRf casts were canceled. One of the pins broke off in the MPAK so the battery could not be charged. The dummy plug for the FRRf was also left behind. Without the plug it was too risky to deploy the package. An extra 200-m CTD cast was added at Station 50. On December 1st at approximately 1400hrs the ships power went down. This caused the computer that logs the surface PRR to shut down. This was not noticed until December 2nd at approximately 1215, at the time of the PRR cast. The computer was then brought back on-line. The CTD cast at Station Kaena was canceled because of the large swell. The rosette hit the side of the ship during the s2c1 recovery and its tag ring got damaged. The ring was welded later in the cruise.

One 500 m weight cast was performed with a 1,300 lb. weight and one 1000-m CTD cast was conducted at Station Kahe (1). Two near-bottom deep casts, twelve 1000-m CTD casts and two 200-m CTD casts were conducted at Station ALOHA (2). One, one hour 200 m yo-yo CTD cast and one 200-m CTD cast was conducted near the WHOTS mooring (Station 52).

The array of floating sediment traps, the gas array, the primary production array and Karin Björkman's array were deployed and recovered without any incidents. All of the arrays drifted to the NNW of ALOHA.

Primary Production Array – recovered at 22 47.051N 158 1.493W.

Karin Björkman's array – recovered at 22 47.051N 158 1.493W.

Gas Array – recovered at 22 52.582N 157 59.871W

Sediment Trap Array – recovered at 22 57.287N 158 7.669W

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

The AC9/FRRf was not deployed on this cruise.

The PRR was deployed three times around noon.

The ATE sampler was successfully deployed and recovered.

The uncontaminated water system turned off during the power outage. As a result, there was a 20 minute gap in the thermosalinograph and pCO₂ data.

The ADCP and the two anemometers ran without interruption throughout the cruise.

Winds ranged from the SW at 5 knots, N at 15 knots to the NE at 15 knots gusting to 20 during the course of the cruise. The swell ranged from 4-12ft with 15ft sets.

4. R/V KILO MOANA, OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Kilo Moana continues to maintain excellent ship support for our work.

The Captain and crew were most helpful and accommodating throughout the cruise. They were very flexible in receiving changes to our operational schedule. Throughout our cruise, the entire crew showed enthusiasm, concern, and dedication to our scientific mission.

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)

November 26, 2008 – Loading Day

0900 - Heavy equipment, the blue storage van and all hand carried gear was loaded during this day.

CTD wire was not reterminated for this cruise.

November 29, 2008

Departed Snug Harbor at 0900hrs

Fire and boat drill at 0945hrs, all science personnel attended. After, all of the new personnel attended a meeting about the life rafts and survival suits.

Science and Safety meeting at 1015hrs

Arrived Station Kahe at 1145hrs, conducted a weight cast at 1200hrs, PRR at 1245hrs, and a 1400-m CTD cast at 1330hrs.

Underway to Station ALOHA at 1515hrs

Arrived Station ALOHA at 2345hrs

November 30, 2008

The sediment trap array was deployed at 0056hrs. The array was deployed at the location of 22 45.968N, 158 0.181W. Communication problems with the TSRB delayed the deployment. The problem was resolved.

One 200-m CTD cast (s2c1) was conducted at 0134hrs. This was followed by another 200-m CTD cast (s2c2) at 0304hrs to collect water for the primary productivity experiment. Cast 2 was scheduled to be deployed to 1000-m but this was changed to 200-m because the first 200-m cast took 45 minutes to complete. We were already behind schedule at the time of the first cast.

The primary production array was deployed at 0445hrs at the location of 22 45.591N, 157 59.905W. Karin Björkman intended to add samples onto this array but this was not effectively communicated so the samples were inadvertently left off of the array.

Another array was deployed at 0535 at the location of 22 46.084N, 157 58.771W with all of Karin Björkman's samples.

At 0610hrs a near-bottom PO/CTD (s2c3) cast was conducted. This cast took 4 hours to complete.

Two net tows were conducted by Blake Watkins at 1115hrs and 2205hrs.

One net tow was canceled because of the delays.

The 36hr burst period started at 1237hrs with a 1000-m CTD cast (s2c4). This cast took 1hour 30minutes to complete. The second CTD cast (s2c5) of the period started at 1535hrs. The ISUS was installed in the rosette and connected before the first CTD cast of the 36hr period.

As part of the 36hr period, two more 1000-m CTD casts were conducted on this day.

s2c6-at 1938hrs

s2c7-at 2307hrs

Because of the delays the PUR cast (scheduled as s2c8) was canceled. This cast was to be made up in place of the deep cast (2300hrs on Dec.1). The second deep cast was re-scheduled for 0200hrs on Dec.2.

The Seaglider operations were canceled because of the rough conditions.

The primary production array was recovered at 1811hrs. At the time of recovery the array was located at 22 47.051N 158 1.493W.

Karin Björkman's array was recovered at 1855hrs. At the time of recovery the array was located at 22 47.051N 158 1.493W.

Weather conditions observed at 1500hrs; winds from the SW at 5 knots, seas 10-12ft with 15ft sets, cloud cover around 6/8.

December 1, 2008

As part of the 36hr period, eight 1000-m CTD casts were conducted on this day.

s2c8 at 0223hrs

s2c9 at 0600hrs

s2c10 at 0830hrs

s2c11 at 1100hrs

s2c12 at 1500

s2c13 at 1700

s2c14 at 2000

s2c15 at 2304

Four net tows were completed by Blake Watkins; 0059hrs, 1015hrs, 1335hrs and 2203hrs.

The gas array was deployed at 0443hrs at the location of 22 44.99N 157 59.99W.
The ATE was successfully deployed at 0745hrs.
One PRR cast was conducted at 1200hrs.
All AC-9/FRRf casts were canceled. One of the pins broke off in the MPAK so the battery could not be charged. The dummy plug for the FRRf was also left behind.
Without the plug it was risky too deploy the package.
At approximately 1400hrs the ships power went down. This caused the computer that logs the surface PRR to shut down. The computer was not brought back on-line until Dec.2 at 1215hrs.
The Seaglider operations were canceled because of the rough conditions.
Weather conditions observed at 1500hrs; winds from the N at 15 knots, seas 4-6ft and cloud cover 1/8.

December 2, 2008

The 36hr burst period ended with a second deep cast (s2c16) at 0203hrs.
The sediment trap array was recovered at 0730hrs after drifting 12nm to the NW from the center of ALOHA. The array was recovered at 22 57.287N 158 7.669W.
The gas array was recovered at 0900hrs after drifting 6nm to the N from the center of ALOHA. The array was recovered at 22 52.582N 157 59.871W.
One PRR cast was conducted at Station ALOHA at 1245hrs.
Yesterday at approximately 1400hrs the ships power went down. This caused the computer that logs the surface PRR to shut down. This was not noticed until the time of the PRR cast (1215hrs). The computer was brought back on-line.
All AC-9/FRRf casts were canceled.
The Seaglider operations were canceled because of the rough conditions.
One, one hour, 200-m yo-yo CTD cast was conducted near the WHOTS mooring at 1100hrs. A second 200-m CTD cast was conducted at 1330hrs to collect water.
The last CTD cast conducted at the WHOTS mooring showed significant spikes in the tension read-out.
At 1515hrs we departed Station ALOHA and transited to Station Kaena where a near-bottom CTD cast was scheduled to be completed. Because of the rough conditions the CTD cast was canceled.
Weather conditions at 1500; winds from the NE at 15 knots gusting to 20 knots, seas 10-12ft with 15ft sets and cloud cover 4/8.

December 3, 2008

0720- Arrived Snug Harbor.
0745- Offloaded. Most gear was left aboard the ship in the science hold for the next cruise.

HOT program sub-components:

Investigator:

Dave Karl
Roger Lukas
Bob Bidigare
Mike Landry
Mark Abbott/Ricardo Letelier

Project/Institution:

Core Biogeochemistry/UH
Hydrography/UH
HPLC pigments/UH
Zooplankton dynamics/UH
Optical measurements/OSU

Ancillary programs:

Investigator:

Charles Keeling
Paul Quay
Penny Chisholm
Zehr/Church/Montoya

CMORE PI's
Mark Brzezinski

Project/Institution:

CO2 dynamics and intercalibration/SIO
DI13C
Prochlorococcus population dynamics/MIT
Diversity and activities of nitrogen-fixing
microorganisms/UH
Microbial RNA/DNA collection/CMORE
Silica production and dissolution rate
measurements/UCSB

Additional programs

Investigator:

Sam Wilson

Project/Institution:

Reduced gases in the upper ocean: The cycling of
methane, sulfide and nitrous oxide/CMORE/UH

