

HOT-200: Chief Scientist Report

Chief Scientist: Eric Grabowski

HOT-200 Chief Scientist's Cruise Report

R/V Kilo Moana

February 22-February 26, 2008

Cruise ID: KM0802

Departed: February 22, 2008 at 0900 (HST)

Returned: February 26, 2008 at 0800 (HST)

Vessel: *R/V Kilo Moana*

Operator: University of Hawaii

Master of the Vessel: Captain Brian Wehmeyer

Chief Scientist: Eric Grabowski

OTG Electronics/Deck Operations Technicians: Kuhio Vellalos and Elly Speicher

1. SCIENTIFIC OBJECTIVES

The objective of the cruise is to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Four stations will 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 (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 will be occupied during the 2nd, 3rd, and 4th days of the cruise.
- 3) Station 52, is the site of the WHOTS Mooring, located at 22° 40.208'N, 157° 57.001'W and will be occupied on the 4th day of the cruise for about 1 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 3 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 February 22nd. 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 350 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 February 24th.

Another free-drifting array (gas array) was to be deployed for 24 hours for incubation experiments on February 24th. The gas array was to be recovered at 0800 on February 25th.

A plankton net was to be towed near noon and midnight for 30-min intervals on February 23rd and 24th at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on February 24th and 25th.

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 February 24th and 25th and in the early morning on February 25th.

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 February 25th.

After recovering the arrays, the ship was to transit back to Station ALOHA to conduct light casts (PRR, AC9/FRRf).

After operations at Station ALOHA ended, the ship was to transit to Station 52 to conduct a one-hour 200-m CTD yo-yo cast, after which 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.

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

2. SCIENCE PERSONNEL

BEACH group:

Cruise Participant	Title	Affiliation
Eric Grabowski	Chief Scientist – Res. Assoc.	UH/BEACH
Susan Curless	Research Associate	UH/BEACH
Lance Fujieki	Computer Specialist	UH/BEACH
Adriana Harlan	Research Associate	UH/BEACH
Karin Björkman	Research Specialist	UH/BEACH
Binglin Li	Graduate Student	UH/BEACH
Brett Updyke	Technician	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Sam Wilson	Scientist	UH/CMORE
Tara Clemente	Research Associate	UH/BEACH
Jay Wheeler	Research Associate	UH/BEACH
Solange Duhamel	Postdoc	UH/BEACH
Kathryn Stanaway	Volunteer	UH/BEACH

PO group:

Paul Lethaby	Research Associate	UH/PO
Christin Shacat	Research Associate	UH/PO
Jefrey Snyder	Marine Technician	UH/PO
Sarah Yasui	Volunteer	UH/PO
Nicolas Petrochilos	Volunteer	UH/PO
John Fitzpatrick	Volunteer	UH/PO

Others:

Janice Jones	Technician	UCSB
Sara Yeo	Technician	UH/HIMB
Gordon Walker	Teacher	UH/CMORE
Doug Weidman	Teacher	UH/CMORE
Dan Hendricks	Teacher	UH/CMORE
Kate Achilles	CMORE Educator	UH/CMORE
Kuhio Vellalos	Marine Technician	OTG
Elly Speicher	Marine Technician	OTG

3. GENERAL SUMMARY

All of the operations during the cruise were conducted as planned and only minor delays were experienced.

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, thirteen 1000-m CTD casts, one 350-m CTD cast, and one 200-m CTD cast were conducted at Station ALOHA (2). One one hour 200 m yo-yo cast was conducted near the WHOTS mooring (Station 52).

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

All of the arrays drifted to the NNE of ALOHA.

Primary Production Array – 2.7nm; 22 47.934N 157 59.297W.

Gas Array – 4nm; 22 47.489N 157 56.017W

Sediment Trap Array – 12nm; 22 50.170N 157 50.750W

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

The AC9/FRRf was deployed around noon three times, and once at night.

The PRR was deployed three times around noon.

The ADCP, thermosalinograph, pCO₂ system, and the two anemometers ran without interruption throughout the cruise.

Winds ranged from the SE at 10knots to the W at 15knots to NNW at 5knots during the course of the cruise with swells between 4-12ft.

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)

February 21, 2008 – Loading Day

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

CTD wire was reterminated.

February 22, 2008

Departed Snug harbor at 0900hrs

Science and Safety meeting at 0945hrs

Fire and boat drill at 1030hrs, all science personnel attended. After, all of the new personnel attended a meeting about the proper way to deploy life rafts and how to put on the survival suits.

Arrived station Kahe at 1130hrs, conducted a weight cast at 1140hrs, PRR at 1220hrs, a 1400-m CTD cast at 1300hrs and Go-Flow cast at 1430hrs.

Deployed magnetometer at 1440hrs

Underway to station ALOHA at 1450hrs

Recovered magnetometer at 2230hrs

Arrived station ALOHA at 2245hrs

The sediment trap array was deployed at 2327hrs. The array was deployed at the location of 22 45.200N, 157 58.792W.

February 23, 2008

One 200-m CTD cast was conducted at 0030hrs. This was followed by a 1000-m CTD cast at 0210hrs to collect water for the primary productivity experiment.

The primary production array was deployed at 0430hrs at the location of 22 45.968N, 158 2.267W

At 0550hrs a near-bottom PO/CTD cast was conducted.

A net tow was conducted by Blake Watkins at 1015hrs.

The 36hr burst period started at 1115hrs with a 1000-m CTD cast. The second CTD cast of the period started at 1400hrs. The ISUS was installed in the rosette and connected before the first CTD cast of the 36hr period.

A second net tow was conducted at 1300hrs by Blake Watkins.

The primary production array was recovered at 1915hrs on Feb. 23rd. The array drifted about 2.7 nautical miles N from the center of station ALOHA at the location of 22 47.934N 157 59.297W.

As part of the 36hr period, three more 1000-m CTD casts were conducted.

Another net tow was completed by Blake Watkins at 2205hrs

Weather conditions observed at 1500; winds from the SE at 10 knots, seas 5-8ft, cloud cover around 2/8, mixed layer depth ~125m.

February 24, 2008

The gas array was deployed at 0435hrs at the location of 22 45.066N 157 59.914W

One PRR cast was conducted at 1228hrs today.

One AC-9/FRRf cast was conducted after the PRR cast at 1250hrs.

Three net tows were completed by Blake Watkins at 0100hrs, 1015hrs and 2245hrs.

Seven more 1000-m CTD casts were conducted as part of the 36hr burst period before ending the burst period with a second deep cast at station ALOHA at 2345hrs.

After cast 15 the ship transited to pump tanks but on the way back in the circle a longline fishing vessel made the KM take a long route back in the circle. Because of this the net tow and second deep cast were late.

Weather conditions observed at 1430hrs; winds from the W at 15 knots, seas 4-6ft and cloud cover 8/8.

February 25, 2008

The sediment trap array was recovered at 0635hrs after drifting 12nm to the NE from the center of ALOHA. The array was recovered at 22 50.170N 157 50.750W.

The gas array was recovered at 0730hrs after drifting 4nm to the NE from the center of ALOHA. The array was recovered at 22 47.489N 157 56.017W.

One final 200m CTD cast was added at station ALOHA because the WHOTS mooring was tending out of the circle.

One PRR cast was conducted at station ALOHA at 1100hrs.

One AC-9/FRRf cast was conducted at 0345hrs. Two AC-9/FRRf casts were conducted in the afternoon at 1130hrs and 1230hrs.

One 200-m yo-yo CTD cast was conducted near the WHOTS mooring at 1400hrs. Upon recovery, the CTD wire came in contact with the crane cab's ladder which compromised the wire's integrity. The ladder was not properly stowed for CTD recovery operations. Roughly 50m of wire was removed and the wire was reterminated.

A near-bottom CTD cast was conducted at station Kaena at 2100.

Weather conditions at 1600; winds from the NNW at 5 knots, seas 10-12ft and cloud cover 2/8.

February 26, 2008

0800- Arrived snug

0845- Tied up after removing the OTG van, complete offload.

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 and O isotopes/UW
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:

Mike Rappe

Kate Achilles

Project/Institution:

Marine bacterioplankton community
structure/UH
CMORE Education