HOT-195: Chief Scientist Report

Chief Scientist: Paul Lethaby

HOT-195 Chief Scientist's Cruise Report
R/V Kilo Moana
September 1 – 5, 2007

Cruise ID: KM0717
Departed: September 1, 2007 at 0910 (HST)
Returned: September 5, 2007 at 0725 (HST)
Vessel: *R/V Kilo Moana*
Operator: University of Hawaii
Master of the Vessel: Captain Richard L. Meyer
Chief Scientist: Paul Lethaby
OTG Electronics/Deck Operations Technicians: Tobin Chen and Tim McGovern

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. Five 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 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 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 2 hours.

Upon arrival to Station Kahe a 1000 lb. weight-test cast, one CTD cast to 1000 m, one Go-Flo type cast to 40m, and a PRR cast was to be conducted at this location in the afternoon of September 1st. 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 two shallow CTD casts (<200 m) to collect water for incubation experiments. After this, a free-drifting array with incubation experiments (gas array) was to be deployed for 24 hours. A full-depth CTD cast was to be conducted after the

deployment of the gas 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 3rd.

One free-drifting array (primary production) was to be deployed for 12 hours for incubation experiments on September 3rd. Following the deployment of the primary production array, the gas array was to be recovered at 0700 on September 3rd.

A plankton net was to be towed near noon and midnight for 30-min intervals on September 2nd and 3rd at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on September 1st, 3rd, and 4th.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array on the morning of September 4th.

After recovering the sediment traps, the ship was to transit to ALOHA for a 200m CTD cast followed by a PRR cast. The ship was to transit to Station 52 (WHOTS) for a one hour 200-m Yo-Yo CTD cast.

After operations at Station ALOHA ended, the ship was to transit to Station 6 (Kaena).

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

The following instrumentation were to collect data throughout the cruise: shipboard ADCP, underway thermosalinograph, fluorometer and *p*CO2, and meteorological suite.

2. SCIENCE PERSONNEL

Cruise Participant	Title	Affiliation
BEACH group:		
Karin Björkman	Research Specialist	UH/BEACH
Susan Curless (Watch Leader)	Research Associate	UH/BEACH
Lance Fujieki	Computer Specialist	UH/BEACH
Adriana Harlan	Technician	UH/BEACH
Dan Sadler	Research Associate	UH/BEACH
Brett Updyke	Technician	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
PO group:		
Paul Lethaby	Chief Scientist – Research Assoc.	UH/PO
Nancy Niklis	Volunteer	UH
Svetlana Port	Volunteer	UH
Fernando Santiago-Mandujano	Research Associate	UH /PO
Justin Smith	Undergraduate Student	UH/PO
Jefrey Snyder (Watch Leader)	Marine Technician	UH/PO
Lisa Tatsumi	Volunteer	UH
Others:		
Kate Achilles	CMORE Educator	UH/CMORE
Tobin Chen	Marine Technician	OTG
Raeanne Cobb-Adams	Undergraduate Student	UH
Jennifer Hoof	Teacher (Farrington High)	CMORE
Misty Miller	Technician	UH/Rappé
Tim McGovern	Marine Technician	OTG
Mari Taira	Teacher (Farrington High)	CMORE
Sam Wilson	Scientist	UH/CMORE

3. GENERAL SUMMARY

Operations during the cruise were accomplished as planned with some slight delays due to the transit time taken to recover the drifting arrays and return to Station ALOHA. There was a strong flow to the south during the cruise indicated by the ADCP and as seen in the drift pattern of the arrays.

One 1000-m CTD cast and one 40m Go-flo type cast was conducted at Kahe station.

Thirteen 1000-m CTD casts, two deep casts, and two 200-m CTD casts were conducted at Station ALOHA. One 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 productivity incubation array were successfully deployed and recovered. All arrays drifted SSW.

Three net tows were conducted at night and three during the day.

The PRR was deployed three times at noon time.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph, fluorometer, *p*CO2, and the ship's meteorological instruments.

Winds were easterlies between 10 and 20 kt, with occasional rain showers.

We arrived back at Snug Harbor on September 05 at 0725.

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

The R/V Kilo Moana continues to maintain the excellent ship support for our work. The officers and crew were most helpful and accommodating. They showed enthusiasm and concern for our work and were very flexible in receiving changes in our operational schedule.

Technical support during this cruise was excellent. OTG personnel were available at any time to assist in our work and made things much easier for us.

5. DAILY REPORT OF ACTIVITIES (HST)

August 31, 2007 – Loading Day

Heavy equipment and the blue storage van were loaded during this day.
The CTD wire was inspected and re-terminated by J. Synder.

September 1, 2007

The R/V Kilo Moana departed Snug Harbor at 0910. A safety briefing was held at 0945 followed by a science meeting in which cruise activities were briefly reviewed and safety issues were re-emphasized. Emergency and abandon ship drills were conducted at 1015. New personnel were made familiar with life-raft operation and donning of emergency immersion suits.

Arrived at Kahe Station at 1145. CTD wire weight cast (1000 lbs) to 500 m, during which J. Snyder inspected the CTD wire.

The Profiling Reflectance Radiometer (PRR) was deployed at 1240.

A 1000 m CTD cast was conducted at 1320 followed by a Go-flo type cast to 40 m. The ship the headed for station ALOHA at 1520.

During the transit the magnetometer was deployed at 1555 and recovered at 2245 prior to arrival at ALOHA at 2250.

Sediment traps were deployed at 22 45.09'N 157 56.50'W, 3 miles to the east of the center at 2350.

September 2, 2007

Two 200 m CTD casts were conducted at 0020 and 0140 to collect water for the gas array which was deployed at 22 45.0'N 157 58.5'W, 1.5 miles to the east of the center at 0415.

One deep cast to approximately 10 m off the bottom was conducted at 1524.

Five 1000 m CTD casts were conducted on this day as part of the 36hr burst period with the first cast beginning at 1102. The ATE sampler was deployed at 1315. Two net tows were conducted at 1015, and 2200.

September 3, 2007

Seven 1000 m CTD casts were conducted on this day, and a second deep cast was conducted at 2306.

The primary productivity array was deployed 2 nautical miles to the north of the center at 0550, and recovered at 1900. The array drifted approximately 7.7 nm SSW from the center of ALOHA to 22 37.97'N 158 3.45'W.

The gas array was recovered at 22 29.8'N 158 4.87'W, 16 nm SSW of the center at 0800.

One PRR cast was conducted at 1220.

Two nighttime net tows were conducted at 0107 and 2208, and one daytime at 1020.

A surface hand held net tow was conducted at 1300.

September 4, 2007

The sediment trap array was recovered at 0605 at 22 21.96'N 158 4.98'W. The array drifted about 24 nm SSW from ALOHA Station.

On return to ALOHA an unscheduled ADCP survey was conducted with spare time usually allotted to the optical package. The optical package had been sent in for its annual calibration. The survey track was the circumference of the 6 mile radius circle centered on Station ALOHA beginning near the WHOTS mooring in an anti-clockwise direction. At the start of the survey the magnetometer was deployed at 0830 and recovered at 1200.

One 1000 m CTD cast was conducted at 1253. This cast was originally scheduled to 200 m but was increased to 1000 m in order to calibrate two OTG conductivity sensors.

One one-hour 200 m CTD yo-yo cast was conducted near the WHOTS mooring (Station 52) at 1529.

One PRR cast was conducted at 1220.

One near bottom CTD cast was conducted at Kaena station at 2104

September 5, 2007

Arrived at Snug Harbor at 0725 for a full off-load.

HOT program sub-components:

Investigator:	Project/Institution:
Dave Karl	Core Biogeochemistry/UH
Roger Lukas	Hydrography/UH
Bob Bidigare	HPLC pigments/UH
Mike Landry	Zooplankton dynamics/UH
Mark Abbott/Ricardo Letelier	Optical measurements/OSU

Ancillary programs:

Investigator:	Project/Institution:
Charles Keeling	CO2 dynamics and intercalibration/SIO
Paul Quay	DI13C and O isotopes/UW
Penny Chisholm	Prochlorococcus population dynamics/MIT
Zehr/Church/Montoya	Diversity and activities of nitrogen-fixing microorganisms/UH
Various CMORE PI's	Microbial RNA/DNA collection/CMORE

Additional programs

Investigator:	Project/Institution:
Mike Rappe	Marine bacterioplankton community structure/UH
Edward Boyle	Trace metals
Kate Achilles	CMORE Educational project