HOT-188: Chief Scientist Report

Chief Scientist: Eric Grabowski

HOT-188 Chief Scientist's Cruise Report
R/V Kilo Moana
December 8-12, 2006

Cruise ID: KM0633
Departed: December 8, 2006 at 0900 (HST)
Returned: December 12, 2006 at 0800
Vessel: R/V Kilo Moana
Operator: University of Hawaii
Master of the Vessel: Phil Smith
Chief Scientist: Eric Grabowski
OTG Electronics/Deck Operations Technicians: Tim McGovern and Steve Poulos

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. Five stations were to be occupied during the cruise, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21º 20.6'N, 158º 16.4'W and was to 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 22º 45'N, 158ºW. This is the main HOT station and was to be occupied during the 2nd, 3rd, and 4th days of the cruise.
3) Station 51, is the site of the MOSEAN Mooring, located at 22º 45'N, 158º 6'W was to be occupied on the 4th day of the cruise for about 30 minutes.
4) Station 50, is the site of the WHOTS Mooring, located at 22o 45.994'N, 157º 53.992'W was to be occupied on the 4th day of the cruise for about 1 hour.
5) Station 6, referred to as Station Kaena, is located off Kaena Point at 21º 50.8'N, 158º 21.8'W was to be occupied on the 4th day of the cruise for about 2 hours.

Upon arrival to Station Kahe a 400 lb. weight-test cast, one CTD cast to 1400 m, and a PRR cast was to be conducted at this location in the afternoon of December 8. 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, an array with incubation experiments (gas array) was to be deployed for 24 hours. A full-depth CTD cast was to be conducted afterwards, 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 10.

One free-drifting array (primary production) was to be deployed for 12 hours for incubation experiments on December 10. Following the depoyment of the primary production array the gas array was to be recovered at 0700 on December 10.

A plankton net was to be towed near noon and midnight for 30-min intervals on December 9 and 10 at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on December 8, 10 and 11.

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 10 and 11, and in the early morning on December 11.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array on December 11.

After recovering the sediment traps, the ship was to transit to Station 51 (MOSEAN) to conduct a 300-m CTD cast, and then to Station 50 (WHOTS) for a 300-m CTD cast. After the CTD cast the ship was to transit back to Station ALOHA to conduct light casts (PRR, AC9/FRRf). Following the light casts the ship was to transit back to Station 50 for another 300-m CTD cast.

After operations at Station 50 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 instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, fluorometer and two anemometers.

2. SCIENCE PERSONNEL

BEACH group:

Cruise Participant	Title	Affiliation
Karin Bjorkman	Research Specialist	UH
Susan Curless(Watch Leader)	Research Associate	UH
Ken Doggett	Research Associate	UH
Eric Grabowski	Chief Scientist (Res. Assoc.)	UH
Adriana Harlan	Technician	UH
Lance Fujieki	Computer Specialist	UH
Blake Watkins	Marine Engineer	UH
Doug White	Technician	UH

PO group:

Paul Lethaby (Watch Leader)	Research Associate	UH
Laurie Menviel	Volunteer	UH
Erica Wasner	Research Associate	UH
Jefrey Snyder	Marine Technician	UH
John Yeh	Graduate Student	UH

Others:

Jamie Becker	Technician	UH
Tim McGovern	Marine Technician	OTG
Steve Poulus	Marine Technician	OTG
Eugene Gorman	Scientist	LDEO
Jennifer Schultz	Volunteer	UH
Dave Wisegarver	Scientist	PMEL

3. GENERAL SUMMARY

Operations during the cruise were conducted without any major delays. Nearly all objectives for HOT 188 were successfully completed except for one AC9/FRRf cast. A problem with the mpak power cable prevented AC9 data from being collected.

One 1000-m CTD cast was conducted at Station Kahe (1). Two deep casts, twelve 1000-m CTD casts and two 200-m casts were conducted at Station ALOHA (2). One 300-m CTD cast was conducted near the MOSEAN moorings (Station 51). Two 300-m and one 200-m CTD casts were conducted near the WHOTS mooring (Station 50). One near-bottom CTD cast was conducted at Station Kaena (6). The CTD wire was reterminated three times during the course of the cruise. During CTD cast 13 the bridge notified the science party that the ship had drifted less than ½ mile out of the circle that defines Station ALOHA. After the CTD was sucssfully recovered the ship transited back into ALOHA.

The array of floating sediment traps, the gas array, and the primary productivity incubation array were deployed and recovered without any major incidents. The arrays drifted NE of ALOHA. While making our recovery approach to the sediment trap a long floating line wrapped around the ship. A grapple hook was used to bring the line onboard. The line was cut and both ends of the line were pulled onboard the ship before re-approaching the sediment trap.

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

The AC9/FRRf was deployed around noon two times, and one time at night. One AC9/FRRf cast was canceled because of a problem with the mpak power cable which prevented AC9 data from being collected.

The PRR was deployed three times around noon time.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph, the fluorometer and the ship's two anemometers.

Winds shifted from E at 20 kt to ESE at 12 kt to ESE at 15 kt during the course of the cruise.

We arrived at Snug Harbor on December 12 at 0800.

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)

December 5, 2006; Vans Loading

The two HOT vans, red storage van, blue winch and capstan were loaded on this day.

December 7, 2006; Loading Day

Equipment loaded during this day, Bullister's van, the CTD wire was inspected, re-terminated and the CTD system tested.

December 8, 2006

Departed Snug harbor at 0906.
Safety briefing by the Captain conducted at 1000, followed by a science meeting in which cruise activities were briefly reviewed and safety issues were addressed.
Fire and boat drill at 1030(meeting with chief mate; Erica, Dave, Eugene, Jamie and Jennifer were in attendance).
Arrived station Kahe at 1145, conducted a 400lb weight cast at 1205, PRR at 1230 and a 1400-m CTD cast at 1300.
Underway to station ALOHA at 1500.
Arrived station ALOHA at 2300.
The sediment trap array was deployed at 2348.

December 9, 2006

Two 200-m CTD casts were conducted during the early morning to collect water for the gas array experiment.
The gas array was deployed at 0419.
Following the gas array deployment at 0450 a near-bottom PO/CTD cast was conducted.
The 36hr burst period started at 1100 with the first 1000-m CTD cast. Five 1000-m CTD casts were completed. The ISUS was installed in the rosette and connected before the first CTD cast of the 36hr period.
Three net tows were conducted at 1000, 1330 and 2200 by Blake Watkins.
Weather conditions observed at 1400; winds were from the E at 20 knots, seas 8-10ft, cloud cover around 7/8.

December 10, 2006

Seven 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 2345. During the recovery of CTD cast 11 the wire jumped the sheave at the end of the crane. The wire was put back in the sheave and the CTD was recovered. The CTD wire was re-terminated because of a kink in the wire. The CTD wire was also re-terminated twice more, once before the deep cast (cast 16) and immediately following the deep cast. The kinks in the wire were caused from deploying the CTD off the stern in rough conditions.
During CTD cast 13 the bridge notified the science party that the ship had drifted less than ½ mile out of the circle that defines Station ALOHA. After the CTD was sucssfully recovered the ship transited back into ALOHA.
Three net tows were completed by Blake Watkins at 0030, 1050 and 2200.
The primary productivity array was deployed at 0555 and was recovered at 1845 after drifting 5nm NE from the center of ALOHA.

The gas array was recovered at 0630. The array drifted about 1.5 nm NNE from the center of station ALOHA.
One PRR cast was conducted at 1315.
One AC-9/FRRf cast was conducted after the PRR cast at 1355.
Weather conditions at 1500; winds were from the ESE at 12 knots, seas 6-8ft and cloud cover 4/8.

December 11, 2006

One AC-9/FRRf cast was conducted at 0345.
The sediment trap array was recovered at 0640 after drifting 9nm to the NE from the center of ALOHA. While making our recovery approach to the sediment trap a long floating line wrapped around the ship. A grapple hook was used to bring the line onboard. The line was cut and both ends of the line were pulled onboard the ship before re-approaching the sediment trap.
One 300-m CTD cast was conducted near the MOSEAN mooring at 0855.
One PRR cast was conducted at station ALOHA at 1300.
One AC-9/FRRf cast was conducted at 1330. The second AC-9/FRRf cast scheduled for the afternoon was canceled because of a problem with the mpak power cable which prevented AC9 data from being collected.
Two 300-m and one 200-m CTD casts were conducted near the WHOTS mooring at 1205, 1511 and 1530. A third cast was added because during the downcast of the second CTD cast the communication cable was disconnected from the laptop. The CTD went to 200-m then back to the surface where the third CTD cast was started without removing the package from the water.
Operations at the WHOTS mooring ended at 1600. Afterwards, the ship transited to station Kaena.
One near-bottom CTD cast was conducted at Station Kaena at 2200 (Sta 6). The CTD wire jumped the sheave at the base of the crane when the CTD was about to be recovered. The crane's ladder was inadvertently left extended, and it pushed the wire out of the sheave when the crane was repositioned for CTD recovery. The wire was put back on the sheave by momentarily releasing tension with a wire grabber tied to the deck. The CTD was safely brought back on board.
Weather conditions at 1500; winds were from the ESE at 15 knots, seas 8-12ft and cloud cover 5/8.

December 12, 2006

Arrived at Snug Harbor at 0800. 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

Additional programs

Investigator:	Project/Institution:
Mike Rappe	Marine bacterioplankton community structure/UH
John Bullister/Eugene Gorman	Dissolved Chlorofluorocarbons