HOT-197 Chief Scientist's Cruise Report
R/V Kilo Moana
November 30 - December 4, 2007

Cruise ID: KM0722
Departed: November 30, 2007 at 0900 (HST)
Returned: December 4, 2007 at 0900
Vessel: R/V Kilo Moana
Operator: University of Hawaii
Master of the Vessel: Captain Richard L Meyer
Chief Scientist: Fernando Santiago-Mandujano
OTG Electronics/Deck Operations Technicians: Kuhio Vellalos, Tobin Chen

1. SCIENTIFIC OBJECTIVES

The objective of this 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 November 30 for about 2 hours.

2) Station 2: ALOHA (A Long Term Oligotrophic Habitat Assessment) is defined as a circle with a 6 nautical mile radius centered at 22 45'N, 158W. This is the main HOT Station and was to be occupied for 3 days from December 1 to 3.

3) Station 52, is the site of the WHOTS Mooring, located at 22 40.208'N, 157 57.001'W was to be occupied on December 3 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 was to be occupied on the 4th day of the cruise for about 2 hours.

A single CTD cast was to be conducted at Station 1 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, the ship was to transit 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 followed by one 200 m CTD cast to collect water for incubation experiments, and one 1000-m CTD cast to collect water for the primary production array. After this, a light cast (AC9/FRRf) cast was to be conducted, followed by the deployment of the array with incubation experiments (primary production array) that was to be in the water for 12 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.

Another free-drifting array (gas array) was to be deployed for 24 hours for incubation experiments on December 2.

A plankton net was to be towed near noon and midnight for 30-min intervals on December 1 and 2 at Station ALOHA.

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

After recovering the arrays, the ship was to transit to Sta. ALOHA to conduct another CTD cast and two consecutive 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 free drifting ARGO float was to be deployed upon departure from station ALOHA on December 3.

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.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on November 30, December 1 and 3.

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 Sta. ALOHA at noon time on December 2 and 3, and in the early morning on December 1.

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

2. SCIENCE PERSONNEL

Cruise Participant	Title	Affiliation
BEACH group:		
Karin Björkman	Research Specialist	UH
Tara Clemente	Research Associate	UH
Susan Curless (Watch leader)	Research Associate	UH
Lance Fujieki	Computer Specialist	UH
Adriana Harlan	Technician	UH
Binglin Li	Graduate Student	UH
Donn Viviani	Graduate Student	UH
Brett Updyke	Technician	UH
Blake Watkins	Marine Engineer	UH
Sam Wilson	Scientist	UH
PO group:		
Paul Lethaby	Research Associate	UH
Fernando Santiago-Mandujano	Chief Scientist (Res. Assoc.)	UH

Christin Shacat	Research Associate	UH
Justin Smith	Undergraduate Student	UH
Jefrey Snyder (Watch leader)	Marine Technician	UH

Others:

Rachel Foster	Scientist	UC Santa Cruz/Zehr
Misty Miller	Technician	UH/Rappe
Naomi Wagoner	Technician	UH/Rappe
Dana Swift	Technician	UW/Riser

3. GENERAL SUMMARY

Most of the operations during the cruise were conducted as planned, with some delays in the schedule due to bad weather and a strong northwestward current.

One 1000-m CTD cast was conducted at Kahe station. Eleven 1000-m CTD casts, two 200-m, and two deep casts were conducted at Station ALOHA. One 1000-m CTD, and one 200-m cast were conducted near the WHOTS mooring (station 52), which was located inside the ALOHA circle.

The array of floating sediment traps, the primary productivity and gas incubation arrays were deployed and recovered without problems. All arrays drifted NW.

Two net tows were conducted at night and two during the day.

The AC9/FRRf was deployed near noon two times, and one time at night.

The PRR was deployed three times near noon time.

A trace metal sample was taken (ATE).

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

Winds were changing from SW to NW at up to 25 kt during the cruise due to the passage of a weather front, accompanied by intermittent rain. A large swell of up to 18 ft from the NW was present. A northwestward surface current of about 0.5 kt was persistent during the cruise.

We arrived back at Snug Harbor on December 4 at 0900.

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.

Despite the adverse weather conditions, the captain and officers were able to maintain good control on the vessel, which allowed us to conduct all our deck operations, deployments and recoveries

in a smooth manner. Without their expertise and enthusiasm we would not have been able to accomplish these operations.

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)

November 29, 2007; Loading Day

The equipment was loaded during this day.

November 30, 2007

The ship departed from Snug harbor at 0900. Safety briefing conducted at 0930, followed by a science meeting in which cruise activities were briefly reviewed, and safety issues were addressed. Fire and abandon ship drills were conducted at 1010 for all personnel.

Arrived at Kahe Station at 1140. CTD wire weight cast (1,300 lb) to 500 m, during which J. Snyder inspected the CTD wire.

The Profiling Reflectance Radiometer (PRR) was deployed at 1245

A 1000-m CTD cast was conducted at 1313. After the cast ended, the ship headed to station ALOHA.

The ship arrived to Station ALOHA at 2210.

December 1, 2007

Deployed sediment traps array at 0003.

Conducted one 200-m CTD cast at 0010 (s2c1).

Conducted one 1000-m CTD cast at 0150 (s2c2). Slow descent due to large swell

An AC9/FRRf cast was conducted at 0345.

The primary production array was deployed at 0505.

One deep CTD cast was conducted at 0640 (s2c3).

1000-m CTD cast at 1235 (s2c4).

1000-m CTD cast at 1520 (s2c5)

Primary production array recovered at 1812. The array drifted 3 nm north

1000-m CTD cast at 1833 (s2c6).

1000-m CTD cast at 2106 (s2c7).

Net tow conducted at 2210

1000-m CTD cast at 2250 (s2c8).

A large swell of about 15 ft from NW was present during the day. Winds were 20-25 kt from SW, but switched direction from NW at 23 kt with the entrance of a weather front at 1230, with rainfall.

December 2, 2007

200-m CTD cast at 0249 (s2c9)

Deployment of gas array at 0500

1000-m CTD cast at 0530 (s2c10).

Trace metal sample (ATE) at 0710.

1000-m CTD cast at 0813 (s2c11).

1000-m CTD cast at 1047 (s2c12).

Net tow at 1230.

PRR cast at 1305

AC9/FRRf cast at 1330

1000-m CTD cast at 1440 (s2c13)

1000-m CTD cast at 1730 (s2c14)

1000-m CTD cast at 2037 (s2c15)

Net tow at 2227

Near-bottom CTD cast at 2350 (s2c16).

Winds from NW at 20 kt. Intermittent rain.

December 3, 2007

The sediment traps array was recovered at 0600 at 22 28.55'N, 158 10.06'W. The array drifted about 10.5 nm NW from ALOHA Station.

The gas array was recovered at 0700 at 22 48.63'N 158 5.37'W. The array drifted about 6 nm NW from ALOHA.

1000-m CTD cast near the WHOTS buoy (located inside the ALOHA circle) (s52c1).

The PRR was put in the water at 1100 and lowered to 75 m, but the operation had to be canceled because the current was bringing the instrument near the

propellers. The officers were unable to effectively maneuver the ship due to the large swell and lack of wind.

AC9/FRRf cast conducted at 1220. The second planned cast had to be cancelled because the ship had to go out of the circle to pump sewage tanks, and these two casts need to be conducted back to back.

A 200-m CTD cast was conducted near the WHOTS mooring. Could not conduct yo-yo cast due to the increasing swell (s52c2).

The free drifting ARGO float was not deployed because it failed to communicate while testing it on board.

Near-bottom CTD cast at station Kaena at 2113 (s6c1).

Winds decreased to less than 5 kt, but the swell increased up to 18 ft from NW, and persisted throughout the day.

December 4, 2007

Arrived at Snug Harbor at 0900. 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/Carter	Diversity and activities of nitrogen-fixing microorganisms/UH
Various CMORE PI's	CMORE RNA/DNA sampling/UH

Additional programs

Investigator:	Project/Institution:
Mike Rappe	Marine bacterioplankton community structure/UH
Dana Swift/Steve Riser	ARGO float/UW
Sam Wilson	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide/CMORE/UH

Rachel Foster/Zehr

Diversity and activities of nitrogen-fixing microorganisms/UCSC