HOT-209 Chief Scientist's Cruise Report

R/V Kilo Moana

February 16 - 20, 2009

Cruise ID: KM0907
Departed: February 16, 2009 at 0900 (HST)
Returned: February 20, 2009 at 0800
Vessel: R/V Kilo Moana
Operator: University of Hawaii
Master of the Vessel: Captain Brian Wehmeyer
Chief Scientist: Paul Lethaby
OTG Electronics/Deck Operations Technicians: Elly Speicher, Daniel Fitzgerald

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 the first cruise day 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 February 17 to 19.

3) Station 50, is the site of the WHOTS Mooring, located at 22 46'N, 157 53.83'W was to 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 was to 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, one Go-Flo cast to approx. 40-m and a PRR cast was to be conducted at this location in the afternoon of February 16th. The 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.

Sea Glider #139 was to be recovered after operations at Station Kahe were completed.

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 to be followed by one 200 m CTD cast to collect water for CMORE DNA/RNA collection filtration, and one 1000-m CTD cast to collect water for the primary production array. This was to be 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 February 18

A plankton net was to be towed near noon and midnight for 30-min intervals on February 17 and 18 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 Station 50 to conduct a one-hour 200-m CTD yo-yo cast

After Station 50 was occupied, the ship was to transit to Station ALOHA to conduct a PRR cast. Following this a CTD/sipper pump winch was to be deployed and tested. After these operations were completed the ship was to transit to Station Kaena.

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

A trace metal sampler was to be deployed on February 18 to collect a trace metal clean surface seawater sample.

A PRR was to be deployed for half-hour periods near noon time on February 16, 18 and 19.

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

2. SCIENCE PERSONNEL

Cruise Participant	Title	Affiliation
Kate Achilles	CMORE Educator	UH/CMORE
Dotty Bates	Undergrad Student	UH/PO
Matt Baumann	Graduate Student	URI
Michael Beman	Scientist	UH
Stephanie Betancourt	Teacher	CMORE
Karin Bjorkman	Research Specialist	UH/BEACH
Shandy Buckley	Undergrad Student	UH/PO
Tara Clemente	Research Associate	UH/BEACH
Susan Curless	Research Associate	UH/BEACH
Ken Doggett	Research Associate	UH/BEACH
Dan Fitzgerald	Marine Technician	OTG
Adriana Harlan	Research Associate	UH/BEACH
Paul Lethaby	Chief Scientist - Res. Associate	UH/PO
Binglin Li	Graduate Student	UH/BEACH
Chris Olivas	Teacher	CMORE
Fernando Santiago-Mandujano	Research Associate	UH/PO
Christin Shacat	Research Associate	UH/PO
Justin Smith	Undergrad Student	UH/PO
Elly Speicher	Marine Technician	OTG
Brett Updyke	Research Associate	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Kate Werner	Teacher	CMORE
Jay Wheeler	Research Associate	UH/BEACH
Sam Wilson	Scientist	UH/CMORE
Michael Workman	Volunteer	UH/BEACH

3. GENERAL SUMMARY

Most operations during the cruise were conducted as planned. We arrived at Station ALOHA slightly late after the successful recovery of the sea glider. The second cast scheduled to be conducted to 1000-m was only conducted to 200-m so as not to delay the deployment of the primary production array. Another delay in the

schedule occurred after the CTD cable was kinked during cast 3 at ALOHA and had to be re-terminated. One daytime net tow had to be cancelled as a result of the delay but was accomplished the next day.

One 1000-m CTD cast was conducted at Kahe station. Twelve 1000-m CTD casts, two 200-m, and two deep casts were conducted at Station ALOHA. One 200-m CTD yo-yo cast and one 200-m CTD cast were conducted near the WHOTS mooring (Station 50), and one 2400-m CTD cast was conducted at Station Kaena.

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

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

The PRR was deployed three times near noon time.

A trace metal sample was taken (ATE).

Sea Glider #139 was successfully recovered close to Station Kahe with the small boat.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph and pCO2 system.

Winds during the cruise were between 15 and 25 kt occasionally gusting to 30 kt, from the ENE for the duration of the cruise. There were some rain squalls as a weather system passed by during February 18th into February 19th. Sea conditions were moderate to rough between 4 – 8 ft from the east, with a northerly swell of 6 – 8ft also present.

We arrived back at Snug Harbor on February 20 at 0800.

NOTE: Prior to the cruise new 0.322” CTD cable was spooled onto the winch drum. The cable was lubricated with StranCore™ using a high pressure spray applicator during the spool process.

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)

February 15, 2009; Loading Day

Cruise equipment and vans were loaded this day.

February 16, 2009

The ship departed from Snug harbor at 0900. Safety briefing by the Captain conducted at 0940, followed by a brief science meeting. Fire and abandon ship drills were conducted at 1020 for all personnel.

Arrived at Kahe Station at 1140.

A CTD wire weight cast (1,300 lb) to 500-m was conducted at 1150, during which P. Lethaby inspected the CTD wire and winch.

The Profiling Reflectance Radiometer (PRR) was deployed at 1240

Go-Flo cast to 40-m conducted at 1320

A 1000-m CTD cast was conducted at 1355 (s1c1).

Sea Glider #139 was recovered at 1600 at 21 20.68'N, 158 15.28'W.

After the glider was recovered the ship headed to station ALOHA.

February 17, 2009

The ship arrived at Station ALOHA at 0020.

Deployed sediment traps array at 0100.

200-m CTD cast at 0119 (s2c1).

200-m CTD cast at 0231 (s2c2).

The primary production array was deployed at 0457 at 22 44.05'N 157 59.99'W.

One deep CTD cast was conducted at 0526 (s2c3).

Transit to pump ship's tanks at 0930.

CTD cable was re-terminated due to a large kink close to the rosette.

Net tow conducted at 1053

1000-m CTD cast at 1231 (s2c4), start 36-hr CTD burst period.

Conducted one hand held surface net tow at 1412

1000-m CTD cast at 1501 (s2c5)

1000-m CTD cast at 1712 (s2c6).

Primary production array recovered at 1915 at 22 44.74'N, 158 3.05'W.

Transit to pump ship's tanks at 1930.

1000-m CTD cast at 2005 (s2c7).

Net tow conducted at 2204

1000-m CTD cast at 2303 (s2c8)

Winds have been between 15 and 20 kt, from the ENE. Sea are 6-8 ft.

February 18, 2009

Net tow at 0100.

1000-m CTD cast at 0141 (s2c9).

Deployment of gas array at 0417 (22 45.02'N, 158 0.02'W)

1000-m CTD cast at 0503 (s2c10).

Transit to pump ship's tanks at 0623.

1000-m CTD cast at 0817 (s2c11).

Trace metal sample (ATE) at 0950.

Net tow at 1025.

1000-m CTD cast at 1109 (s2c12)

PRR cast at 1229.

Net tow at 1305.

1000-m CTD cast at 1358 (s2c13)

Transit to pump ship's tanks at 1520.

1000-m CTD cast at 1653 (s2c14)

Transit to pump ship's tanks at 1855.

1000-m CTD cast at 2002 (s2c15)

Net tow at 2200

Near-bottom CTD cast at 2308 (s2c16).

Winds have been 15-20 kt from the ENE, occasionally reaching 25 kt with some scattered squalls. Sea conditions have been favourable at 4 - 6 ft.

February 19, 2009

The sediment traps array was recovered at 0506 at 22 45.58'N, 158 10.16'W.

The gas array was recovered at 0619 at 22 50.40'N, 158 7.56'W.

1.5-hr, 200-m CTD yo-yo cast near the WHOTS buoy conducted at 0843 (s50c1).

PRR cast conducted at 1055.

200-m CTD cast near the WHOTS buoy conducted at 1312 (s50c2).

Tested CTD/sipper pump winch at 1400.

Near-bottom CTD cast at station Kaena at 2058 (s6c1).

Winds have been North-easterlies at about 20-25 kt with some period up to 30 kt. Seas have been 6-8 ft.

February 20, 2009

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/Carter	Diversity and activities of nitrogen-fixing microorganisms/UH
Various CMORE PI's	CMORE RNA/DNA sampling/UH
Mark Brzeznski	Silica production and dissolution rate measurements/UCSB

Additional programs:

Investigator:	Project/Institution:
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Edward Boyle	Trace metals/MIT
Sam Wilson	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide/CMORE/UH
Brad Moran/Roger Kelly	Uranium Isotopes/URI
CMORE Education	Teacher at sea program (STARS) Stephanie Betancourt, St.Anthony's Jr/Sr. High School, Maui Kate Werner, Castle High School, Oahu Chris Olivas, High Tech High, San Diego, CA