HOT-173: Chief Scientist Report

Chief Scientist: F.SANTIAGO-MANDUJANO

HOT-173 Chief Scientist's Cruise Report
R/V Kilo Moana
September 8 - 12, 2005

Cruise ID: KM0515
Departed: September 8, 2005 at 0900 (HST)
Returned: September 12, 2005 at 0730
Vessel: R/V Kilo Moana
Operator: University of Hawaii
Master of the Vessel: Captain Rick Meyer
Chief Scientist: Fernando Santiago-Mandujano
STAG Electronics/Deck Operations Technicians: Daniel Fitzgerald, Steve Poulos

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. Five 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 September 8 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 September 9 to 11.

3) Station 51, is the site of the MOSEAN Mooring, located at 22 46.009'N, 158 5.533'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 22 46.1 N, 157 53.4 W was to be occupied on the 4th day of the cruise for about 30 minutes.

5) 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.

In addition, a bottom-moored sediment trap (ST-12) located at 22 49.72 N, 158 5.08 W was to be retrieved on the 4th day of the cruise

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.

Upon arrival at Station ALOHA, the free-drifting sediment trap array was to be deployed, followed by two 200 m CTD casts to collect water for the gas array. After this, a full-depth CTD cast was to be

conducted, followed by the deployment of the gas array. The sediment trap array was to stay in the water for about 52 hours, and the gas array for about 24 hours. After this, 1000-m CTD casts at strict 3 hour intervals would follow for at least 36 hours for continuous and discrete data collection, ending with another full-depth CTD cast.

One free-drifting array was to be deployed for 12 hours for incubation experiments on September 10.

A hand-held plankton net was to be deployed for 20-min intervals about five times during the cruise by C. Mahaffey.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array. After this the ship was to transit to recover the bottom-moored sediment trap.

After recovering the sediment traps, the ship was to transit to Sta. 51 to conduct a 200-m CTD cast and light cast operations. At the end of these operations, the ship was to transit to Station 50 to conduct a 200-m CTD cast, and then to transit to Station 6.

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 September 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 Sta. ALOHA at noon time on September 10 and 11, and in the early morning on September 11.

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

2. SCIENCE PERSONNEL

BEACH group:

Cruise Participant, Title, Affiliation

Karin Bjorkman Research Specialist UH
Carli Bober Graduate Student UH
Susan Curless Research Associate UH
Allison Fong Graduate Student UH
Lance Fujieki Computer Specialist UH
Eric Grabowski Research Associate UH
Tom Gregory (Watch Leader) Research Associate UH
Cooper Guest Undergraduate Student UH
Adriana Harlan Technician UH
David Leonard Volunteer
Claire Mahaffey Postdoctoral Researcher UH
Dan Sadler Research Associate UH
Blake Watkins Marine Engineer UH

PO group:

Chrystal Jameson Undergraduate Student UH
Paul Lethaby (Watch Leader) Research Associate UH
Alejandro Sanchez Graduate Student UH
Fernando Santiago-Mandujano Chief Scientist (Res. Assoc.) UH
Joseph Shacat Graduate Student UH
Steven Tottori Marine Technician UH

3. GENERAL SUMMARY

Operations during most of the cruise were conducted as planned, with some changes in the schedule during the second day of the cruise. One 1000-m CTD cast within the 36-hr burst period had to be postponed due to time constrains.

One near-bottom CTD cast (~1475 m) was conducted at Kahe station. Eleven 1000-m CTD casts, two deep casts (~4740 m), and four 200-m casts were conducted at Station ALOHA. Two 200-m CTD casts were conducted near the MOSEAN mooring (Station 51), and near the ORS mooring (Station 50) respectively. One near-bottom cast (~2400 m) was conducted at station Kaena (Station 6).

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

The bottom-moored sediment trap was recovered without incidents.

C. Mahaffey conducted six net tows.

The PRR and AC9/FRRf were deployed as planned.

The Automated Trace-Element Sampler was successfully used to collect one trace metal sample.

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

C. Bober collected her samples and conducted her experiments as planned.

Winds were easterlies at 15-20 kt during the cruise. Rain was intermittent during the cruise.

We arrived back at Snug Harbor on September 12 at 0730. Only scientific personnel and some of the samples were unloaded, as the ship had an early appointment for fueling. Full off-load took place September 13.

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. STAG personnel were available at any time to assist in our work and made things much easier for us.

5. DAILY REPORT OF ACTIVITIES (HST)

September 7, 2005; Loading Day

Equipment loaded during this day. CTD wire was re-terminated and CTD system tested. The In-situ Ultraviolet Spectrophotometer (ISUS) was connected to the CTD and tested.

September 8, 2005

The ship departed from Snug harbor at 0900. Science meeting was conducted at 0930, in which cruise activities were briefly reviewed, and safety issues were addressed. This was followed by a safety briefing by the Captain, and by the fire and abandon ship drills.

Arrived to Kahe Station at 1145. A weight cast (400 lb) to 1000 m was conducted.

The Profiling Reflectance Radiometer (PRR) was deployed at 1330

A CTD near-bottom cast (1475 m) was conducted at 1400. The STAG's altimeter was successfully tested during this cast. After the cast ended, the ship headed towards Station ALOHA. The ship lost power momentarily during transit, and continued at a slower speed for about an hour.

September 9, 2005

The ship arrived to Station ALOHA at 0015, and the sediment traps array was deployed at 0054. The array was deployed 2 nm north of the center

Two 200-m CTD cast were conducted at 0126 and 0256 respectively at Station ALOHA.

The gas array was deployed at 0450.

The first deep cast started at 0515, followed by the first 1000-m CTD cast of the 36-hr burst period at 1119. This cast started late because the ship had to transit to pump sewage tanks, and because the CTD crane lost power right before the cast started. The crane was fixed and operations continued. One of the CTD casts (the MIT cast) had to be postponed after the 36-hr period due to time constrains. A total of four 1000-m casts were conducted this day.

The ISUS was connected to the CTD during the first 1000-m cast at ALOHA, and worked fine.

C. Mahaffey conducted two net tows.

Easterlies at 15-20 kts, with some rain during station.

September 10, 2005

Seven 1000-m CTD casts were conducted on this day, ending the 36-hr CTD burst period with a deep cast. An apparent blocking in the secondary sensor's plumbing affected the beginning of casts 8 and 9, during which the CTD had to be brought back on board to purge the sensors. The rosette hit hard on the side of the ship during recovery of cast 9, bending the bottom frame. Sensors worked fine during the following cast 10.

The primary productivity array was deployed at 0600 and recovered at 1900 without any problems.

The gas array was recovered at 0700, about 4 nm NW from the center of ALOHA.

The ATE was deployed at 1030.

One PRR cast and one AC9/FRRf casts were conducted at noon time.

C. Mahaffey conducted two net tows.

Easterly winds at 15-20 kts, with occasional rain.

September 11, 2005

One AC9/FRRf casts was conducted at 0000.

The CTD cable got damaged whithin the traction winch before the cast to be conducted at 0100. The damaged section was cut and the cable was reterminated.

The sediment traps array was recovered at 0330. The array drifted about 7 nm NW.

The sediment trap bottom mooring was recovered at 07:00.

A close visual inspection of the WHOTS buoy revealed that the propeller of one of the anemometers is missing. A 200-m cast was conducted near this mooring at 11:00.

One PRR cast and two AC9/FRRf casts were conducted at noon time at Station ALOHA, followed by a 200-m CTD cast .

One 200-dbar CTD cast was conducted at 1700 near the MOSEAN mooring (Station 51).

One near-bottom cast was conducted at station Kaena at 2253.

C. Mahaffey conducted two net tows.

Easterly winds at 20 kt.

September 12, 2005

Arrived at Snug Harbor at 0730. Off-loading of science personnel and some of the samples. Ship departed for fueling immediately after.

September 13, 2005

Full off-load.

Sub component programs:

Investigator:	Project/Institution:
Bob Bidigare	HPLC pigments/UH
Mike Landry	Zooplankton dynamics/UH
John Dore	CO2 dynamics/UH

Ancillary programs:

Investigator:	Project/Institution:
Charles Keeling	CO2 dynamics and intercalibration/SIO
Mark Abbott/Ricardo Letelier	Optical measurements/OSU
Paul Quay	DI13C and O isotopes/UW
Penny Chisholm	Prochlorococcus population dynamics/MIT

Ancillary research during this cruise:

Investigator:	Project/Institution:
Claire Mahaffey/Allison Fong/ Mattew Church	Assessment of Nitrogen Fixation Rates/UH