HOT-175 Chief Scientist's Cruise Report
R/V Kilo Moana
November 10-14, 2005

Cruise ID: KM0519
Departed: November 10, 2005 at 0900 (HST)
Returned: November 14, 2005 at 0730
Vessel: R/V Kilo Moana
Operator: University of Hawaii
Master of the Vessel: Captain Rick Meyer
Chief Scientist: Fernando Santiago-Mandujano
OTG Electronics/Deck Operations Technicians: Tim McGovern/Kuhio Vellalos

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 November 10 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 November 11 to 13.

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 two hours.

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.

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 four shallow CTD casts (<200 m) to collect water for incubation experiments. The sediment trap array was to stay in the water for about 52 hours. After this, a full-depth CTD cast was to be conducted, 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.

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

A plankton net was to be towed near noon and midnight for 30-min intervals on November 11 and 12 at Station ALOHA by M. Landry.

A hand-held plankton net was to be deployed for 20-min intervals 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 recovering the sediment traps, the ship was to transit to Sta. 51 to conduct a 200-m CTD cast, and then back to Station ALOHA to conduct two more 1000-m CTD casts, and light casts (PRR, AC9/FRRf). At the end of these operations, the ship was to transit to Station 50 to conduct operations with a small boat, and a 200-m CTD cast. The operations with the small boat consisted in retrieving a Glider and repairing the anemometer on the WHOTS buoy. After conducting these operations, the ship was 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 November 11 and 13.

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 November 11, 12, and 13, and in the early morning on November 13.

An Automated Trace Element Sampler (ATE) was to be deployed once on November 13.

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
Marina Brandon	Graduate Student	UH
Susan Curless	Research Associate	UH
Ken Doggett	Research Associate	UH
Allison Fong	Graduate Student	UH
Lance Fujieki (Watch Leader)	Computer Specialist	UH
Eric Grabowski	Research Associate	UH
Tom Gregory	Research Associate	UH
Cooper Guest	Undergraduate Student	UH
Adriana Harlan	Technician	UH
Mike Landry	Scientist	UCSD
Claire Mahaffey	Research Specialist	UH
Kristina Mojica	Graduate Student	UH
Blake Watkins	Marine Engineer	UH

PO group:

Suzanne Defelice	Research Associate	UH
Paul Lethaby (Watch Leader)	Research Associate	UH
Chris Ostrander	Graduate Student	UH
Fernando Santiago-Mandujano	Chief Scientist (Res. Assoc.)	UH
Justin Smith	Undergraduate Student	UH
Steven Tottori	Marine Technician	UH
Joji Uchikawa	Graduate Student	UH

Others:

Darin Hayakawa	Graduate Student	UH
Ian Hewson	Postdoc	UC Santa Cruz
Sam Laney	Graduate Student	OSU
Rachel Poretsky	Graduate Student	U Georgia
Charles Stump	Technician	U Washington

3. GENERAL SUMMARY

Operations during the cruise were interrupted on the second day due to the loss of the CTD/Rosette package. The CTD cable broke at 100 m during the first cast of the 36-hr burst period, and the CTD/rosette package including the Satlantic ISUS Nitrate sensor sank to the bottom. The incident happened at 12:37, November 11 when the CTD was being brought back to the surface. The cable broke near the crane's sheave, at the passage of a wave. Coordinates 22 44.997'N, 157 59.995'W. Operations continued after cutting about 540 m of wire, and using the OTG (STAG) rosette, bottles, CTD, sensors, and spare sensors from the PO group.

One 1000-m CTD cast was conducted at Kahe station. Twelve 1000-m CTD casts, two deep casts, (~4740 m, and 4000 m), four 200-m casts and one 100-m cast were conducted at Station ALOHA. One 1000-m CTD cast was conducted near the MOSEAN mooring (Station 51), and one 200-m cast near the WHOTS mooring (Station 50). One 2000-m cast was conducted at station Kaena (Station 6).

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

C. Stump retrieved his Glider.

P. Lethaby fixed the anemometer on the WHOTS buoy.

M. Landry and C. Mahaffey conducted successfully their respective net tows. Landry's old style net ripped at the surface upon recovery during the second tow of the cruise and was not used anymore. One of the tows was compromised because a half burnt cigarette, probably discharged from the ship was caught in the net.

The PRR and AC9/FRRf were deployed as needed.

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.

Winds were easterlies at about 15 kt during the cruise, decreasing to 10 kt and becoming southerlies by the end of the cruise.

We arrived back at Snug Harbor on November 14 at 0730. Only scientific personnel and some of the samples were unloaded, as the ship departed at 1000 for a three day cruise to try to recover the CTD, and to conduct other experiments. Full off-load took place November 17.

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)

November 9, 2005; Loading Day

Equipment loaded during this day. CTD wire was re-terminated and CTD system tested.

November 10, 2005

The ship departed from Snug harbor at 0900. Safety briefing by the Captain conducted at 0945, followed by a science meeting in which cruise activities were briefly reviewed, and safety issues were addressed. This was followed by the fire and abandon ship drills at 1030.

Arrived to Kahe Station at 1130. A weight cast (400 lb) to 500 m was conducted.

The Profiling Reflectance Radiometer (PRR) was deployed at 1230

A CTD 1000-m CTD cast was conducted at 1250. After the cast ended, the ship headed towards Station ALOHA.

The ship arrived to Station ALOHA at 2210, and the sediment traps array was deployed at 2340. The array was deployed at the center of ALOHA.

November 11, 2005

Two 200-m CTD cast were conducted at 0000 and 0100 respectively, one 100-m CTD cast at 0215, and one 200-m cast at 0314 at Station ALOHA.

One near-bottom CTD cast was conducted at 0437. The CTD cable had a kink about 3 m from the package after this cast and had to be reterminated.

The first 1000-m cast of the 36-hr CTD burst period started at 1130, and the CTD cable parted at 1237, when the CTD was at 100 dbar during the upcast. Coordinates 22 44.997'N, 157 59.995'W. The following equipment was lost.

One Scripps Rosette
24 Scripps 12-l sampling bottles
One SeaBird CTD 911plus SN 92859
Two SeaBird Temperature sensors SN 2700 and 2242
Two SeaBird Conductivity sensors SN 2725 and 2541
Two SeaBird Oxygen sensors SN 43325 and 43134
Two SeaBird pumps SN 052459 and 053219
One SeaBird Carousel SN 0223
One Satlantic ISUS Nitrate sensor SN 057
One Datasonics Altimeter SN 958
One Benthos Pinger SN 1232
One SeaPoint Fluorometer SN 2440

After the incident, about 540 m of wire were cut from the CTD drum, and the cable was tension tested on board to 5000 lb. The rosette, bottles, CTD, and sensors from the OTG (STAG) group were used, as well as spare sensors from the PO group to continue operations. CTD operations continued at 1811. Two 1000-m CTD casts were conducted this day.

Two consecutive AC9/Frrf casts were conducted near noon.

M. Landry conducted one net tow at 1000, and two consecutive tows at night. The old style net ripped at the surface upon recovery and was not used anymore.

Easterlies at 15-20 kts, with slight rain.
November 12, 2005

Eight 1000-m and one 200-m CTD casts were conducted on this day. Three kinks were found in the CTD wire, near the package after the first of these casts. The cable was reterminated.

The primary productivity array was deployed at 0540 and recovered at 1830 without any problems. The array drifted NW about 7 km.

The ATE was deployed at 0925.

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

M. Landry conducted two consecutive net tows in the early morning, two near noon, and one more at night.

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

November 13, 2005

One 1000-m and one 4000-m CTD casts were conducted at ALOHA. The 36-hr CTD burst period was 3 hr short.

One AC9/FRRf cast was conducted at 0020.

The sediment traps array was recovered at 0450. The array drifted NW about 24 km.

Small boat operations were conducted at 1100, during which a Glider was recovered by C. Stump; and P. Lethaby repaired the anemometer from the WHOTS buoy. The glider was recovered about 4 km from the WHOTS buoy.

One 200-m cast was conducted near the WHOTS mooring, and one 1000-m cast was conducted near the MOSEAN mooring.

One 2000-m cast was conducted at Kaena Sta.

Winds of about 10 kt from the south southeast

November 14, 2005

Arrived at Snug Harbor at 0730. Off-loading of science personnel and some of the samples. Ship departed at 1000 for a three day cruise to try to recover the CTD, and to conduct other experiments.

November 17, 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
Claire Mahaffey	Assessment of Nitrogen Fixation Rates/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
Matthew Church/Allison Fong	Diversity and activities of nitrogen-fixing microorganisms/UH

Ancillary research during this cruise:

Investigator:	Project/Institution:
Sam Laney	Optical characterization of photosynthetic parameters/OSU
Michael Rappe/Darin Hayakawa/ Marina Brandon	Marine bacterioplankton community structure/UH
Ian Hewson/Rachel Poretsky	Open ocean bacterioplankton transcriptome/UCSC/UG
Ian Hewson	Meso and bathypelagic diazotroph dynamics/UCSC
Chuck Stump	Recovery of glider/UW