

# Chief Scientist's Cruise Report

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HOT-204 Chief Scientist's Cruise Report

R/V Kilo Moana

August 15 - 19, 2008

Cruise ID: KM0815

Departed: August 15, 2008 at 0900 (HST)

Returned: August 19, 2008 at 0800

Vessel: R/V Kilo Moana

Operator: University of Hawaii

Master of the Vessel: Captain Brian Wehmeyer

Chief Scientist: Fernando Santiago-Mandujano

OTG Electronics/Deck Operations Technicians: Tobin Chen, Tim McGovern

## 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 August 16 to 18.

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) The deep moored sediment traps located at 22° 51.464'N, 157° 55.145'W were to be recovered on August 18. Five hours were scheduled for this operation.

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 to be 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. 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 August 17.

A plankton net was to be towed near noon and midnight for 30-min intervals on August 16 and 17 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 Sta. ALOHA to conduct a PRR cast, and two consecutive AC9/FRRf casts, after which the ship was to transit to the location of the moored sediment traps.

A pair of deep moored sediment traps were to be recovered on August 18. After these operations were completed, 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 August 15, 17 and 18.

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 August 17 and 18, and in the early morning on August 18.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, pCO<sub>2</sub> system, and two anemometers.

## 2. SCIENCE PERSONNEL

Cruise Participant Title Affiliation

Tara Clemente Research Associate UH/BEACH  
Lance Fujieki Computer Specialist UH/BEACH  
Eric Grabowski Research Associate UH/BEACH  
Adriana Harlan Research Associate UH/BEACH  
Binglin Li Graduate Student UH/BEACH  
Dan Sadler Research Associate UH/BEACH  
Brett Updyke Research Associate UH/BEACH  
Sam Wilson Scientist UH/CMORE  
Blake Watkins Marine Engineer UH/BEACH  
Jay Wheeler Research Associate UH/BEACH  
Shandy Buckley Undergrad Student UH/PO  
Michael Gray Undergrad Student UH/PO  
Brooke Hoffman Volunteer PO  
Paul Lethaby Research Associate UH/PO  
Eric Liaw High School Student Punahou/PO  
Christin Shacat Research Associate UH/PO  
Fernando Santiago-Mandujano Chief Scientist - Res. Assoc. UH/PO  
Jefrey Snyder Marine Technician UH/PO  
Tobin Chen Marine Technician OTG  
Tim McGovern Marine Technician OTG

## 3. GENERAL SUMMARY

Operations during the cruise were conducted as planned. In addition, a near-bottom CTD cast was conducted at Kaena Sta (21° 50.8'N, 158° 21.8'W).

One 1000-m CTD cast was conducted at Kahe station. Thirteen 1000-m CTD casts, one 200-m, and two deep casts were conducted at Station ALOHA. One 200-m CTD yo-yo cast was 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 NW. Unfortunately after recovery,

the sediment traps material was accidentally spilled on deck while carrying the sampling tubes to the lab. All samples from the sediment traps array were lost.

The moored sediment traps were successfully recovered.

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

The AC9/FRRf was deployed near noon two times, and one time at night. The AC9/Frrf solid state memory could not be reformatted, and consequently the last cast scheduled for the afternoon of August 18 was not conducted due to lack of space for data storage.

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 pCO2 system.

Winds were easterlies between 15 and 20 kt. A westward to northwestward current prevailed during the cruise with maximum speeds of up to 0.5 kt in the upper 120 m.

We arrived back at Snug Harbor on August 19 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)

August 14, 2008; Loading Day

The equipment was loaded on this day. The CTD wire was reterminated.

August 15, 2008

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 1200. CTD wire weight cast (1,300 lb) to 1000 m, during which J. Snyder inspected the CTD wire.

The Profiling Reflectance Radiometer (PRR) was deployed at 1300

A 1000-m CTD cast was conducted at 1330. After the cast ended, the ship headed to station ALOHA.

Passed through patches of a Trichodesmium bloom as departing Kahe station at 1500. Light winds less than 10 kt.

The ship arrived to Station ALOHA at 2230. Deployed sediment traps array at 2310.

Conducted one 200-m CTD cast at 2355 (s2c1).

Winds were 17-20 kt from ESE. A westward current of about 0.5 kt was present in the upper 120 m at station ALOHA. The westward current was also present during most of the transect between Kaena and ALOHA station.

August 16, 2008

Conducted one 1000-m CTD cast at 0122 (s2c2).

Transit to pump ship's tanks at 0300.

The primary production array was deployed at 0410.

One deep CTD cast was conducted at 0450 (s2c3).

Transit to pump ship's tanks at 0855.

Net tow conducted at 1000

1000-m CTD cast at 1108 (s2c4).

Net tow conducted at 1243

1000-m CTD cast at 1400 (s2c5)

Transit to pump ship's tanks at 1530.

1000-m CTD cast at 1656 (s2c6).

Primary production array recovered at 1920 . The array drifted to 22 50.48'N, 158 4.78'W, 7 nm NW from the center of ALOHA station.

1000-m CTD cast at 1959 (s2c7).

Net tow conducted at 2200

1000-m CTD cast at 2304 (s2c8).

Winds were easterlies at 16-21 kt. The current in the upper 100 m was towards the NNW, at about 20 cm/s.

August 17, 2008

Net tow at 0030.

1000-m CTD cast at 0159 (s2c9)

Transit to pump ship's tanks at 0300.

Deployment of gas array at 0420 (22 45.19'N, 158 1.13'W)

1000-m CTD cast at 0604 (s2c10). Cast delayed. The CTD wire jumped the traction sheave during preparations for deployment. The CTD wire was not damaged.

1000-m CTD cast at 0805 (s2c11).

Transit to pump ship's tanks at 0908.

Trace metal sample (ATE) at 0940.

Net tow at 1015.

1000-m CTD cast at 1102 (s2c12).

PRR cast at 1203

AC9/FRRf cast at 1239

1000-m CTD cast at 1402 (s2c13)

Transit to pump ship's tanks at 1550.

1000-m CTD cast at 1959 (s2c14)

1000-m CTD cast at 2004 (s2c15)

Transit to pump ship's tanks at 2145.

Net tow at 2200

Near-bottom CTD cast at 2314 (s2c16).

Winds were easterlies at 16-21 kt, with smooth seas. The northwestward current in the upper 100 m has persisted.

August 18, 2008

AC9/FRRf cast at 0300

The sediment traps array was recovered at 0546 at 23 0.16'N, 158 3.84'W.

The gas array was recovered at 0655 at 22 54.78'N, 158 6.71'W.

200-m CTD yo-yo cast near the WHOTS buoy conducted at 0913 (s50c1).

PRR cast conducted at 1108.

AC9/FRRf cast conducted at 1125.

The sediment trap mooring was recovered between 1400 and 1650.

Near-bottom CTD cast at station Kaena (21° 50.8'N, 158° 21.8'W) at 2253 (s6c1).

Easterlies at about 14-18 kt with smooth seas.

August 19, 2008

Arrived at Snug Harbor at 0800. Full off-load.

HOT program sub-components:

Investigator: Project/Institution:

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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:

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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 Brzezinski Silica production and dissolution rate  
measurments/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