

HOT-207: Chief Scientist Report

Chief Scientist: Eric Grabowski

HOT-207 Chief Scientist's Cruise Report

R/V Kilo Moana

December 15-December 19, 2008

Cruise ID: KM0824

Departed: December 15, 2008 at 0920 (HST)

Returned: December 16, 2008 at 0800 (HST)

Vessel: ***R/V Kilo Moana***

Operator: University of Hawaii

Master of the Vessel: Captain Ross Barnes

Chief Scientist: Eric Grabowski

OTG Electronics/Deck Operations Technicians: Elly Speicher and Tobin Chen

1. SCIENTIFIC OBJECTIVES

The objective of the 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, located at 21° 20.6'N, 158° 16.4'W and will be occupied on the first day of the cruise for about 2 hours.
- 2) Station 2, referred to as Station ALOHA is defined as a circle with a 6 nautical mile radius centered at 22° 45'N, 158°W. This is the main HOT station and will be occupied during the 2nd, 3rd, and 4th days of the cruise.
- 3) Station 50, is the site of the WHOTS Mooring, located at 22° 46'N, 157° 53.83'W will be occupied on the 4th day of the cruise for about one hour.
- 4) Station 6, referred to as Station Kaena, is located off Kaena Point at 21° 50.8'N, 158° 21.8'W will 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. 20-m and a PRR cast was to be conducted at this location in the afternoon of December 15th. The single CTD cast was to be conducted 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 were satisfactorily completed, the ship was to proceed 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 shallow CTD cast to 200-m and one 1000-m CTD cast to collect water for the primary productivity array. After this, the free-drifting primary productivity array was to be deployed for 12 hours. A full-depth CTD cast was to be conducted after the deployment of the primary production array, 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 on December 18th.

Another free-drifting array (gas array) was to be deployed for 24 hours for incubation experiments on December 17th. The gas array was to be recovered at 0700 on December 18th.

A plankton net was to be towed near noon and midnight for 30-min intervals on December 16th and December 17th at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on December 17th and 18th.

A package including a Chelsea Fast Repetition Rate Fluorometer (FRRf), and a SeaBird Seacat was to be used to profile the upper 200-m at Station ALOHA around noon time on December 17th and 18th and in the early morning on December 8th.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array and the gas array on December 18th.

After recovering the arrays, the ship was to transit to Station 50 to conduct a one-hour 200-m CTD yo-yo cast.

Following the yo-yo CTD cast, light casts (PRR and FRRf) were to be completed at Station ALOHA.

After operations at Station ALOHA ended, the ship was to transit to Station Kaena.

A near-bottom CTD cast (~2500 m) was to be conducted at Station 6 including salinity and chlorophyll samples for calibration, after which the ship was to transit to Snug Harbor.

A Seaglider was to be deployed at some point during the cruise.

The ATE sampler was to be deployed during the cruise.

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

2. SCIENCE PERSONNEL

Cruise Participant	Title	Affiliation
BEACH group:		
Eric Grabowski	Chief Scientist – Res. Assoc.	UH/BEACH
Karin Björkman	Research Specialist	UH/BEACH
Susan Curless	Research Associate	UH/BEACH
Lance Fujieki	Computer Specialist	UH/BEACH
Adriana Harlan	Research Associate	UH/BEACH
Binglin Li	Graduate Student	UH/BEACH
Dan Sadler	Research Associate	UH/BEACH
Brett Updyke	Technician	UH/BEACH
Sam Wilson	Scientist	UH/CMORE
Ken Doggett	Research Associate	UH/CMORE
Tara Clemente	Research Associate	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Scott Bacon	Volunteer	UH/BEACH
Kate Achilles	CMORE Educator	UH/CMORE
Alison Ashford	Teacher	CMORE
Stephanie Betancourt	Teacher	CMORE
Kate Werner	Teacher	CMORE
PO group:		
Jefrey Snyder	Marine Technician	UH/PO
Paul Lethaby	Research Associate	UH/PO
Christin Shacat	Research Associate	UH/PO
Justin Smith	Volunteer	UH/PO
Others:		
Roger Kelly	Researcher	URI
Elly Speicher	Marine Technician	OTG
Tobin Chen	Marine Technician	OTG

3. GENERAL SUMMARY

Before the cruise departed it was arranged that Station Kaena would be canceled to allow more time at the end of the cruise for tests to be done aboard the Kilo Moana. The Kilo Moana had been experiencing power outages so the marine center arranged for a tech to come aboard the ship. The tech requested for the ship to be underway in order to conduct the necessary tests to diagnose the problem so it was planned to do a small boat transfer on the westside of Oahu, early morning of Dec. 19th. The tests would be completed while underway to the harbor.

The CTD winch aboard the Kilo Moana was found to be leaking oil. The engineers inspected the problem while in port and found a faulty seal. On December 12th the drive box was taken apart and taken to a local machine shop to fix the problem. It was found that the part needed had to be shipped from Germany. It was decided to put the winch back together on December 13th and to proceed with the scheduled operations. A plan was in place to check and replace the oil after each CTD cast. The cruise departed as planned.

The weight cast scheduled at Station Kahe was lengthened to 1000-m to mimic our regular CTD casts. This was intended to make sure that the winch was operational and could be used with our CTD package. The weight cast went ahead as planned and was deployed to 1000-m at 1230. On the way back to the surface, at 1255 at a depth of 764-m, the weight cast was stopped. Winch controls were lost. All of the ship's engineers were notified and looked into the problem. The problem was isolated and it was thought that salt water got into the valve that operates the speed and direction of the traction winch. It was decided at 1458 to override the controls so the weight could be recovered. The weight was recovered and on deck at 1511. All operations at Station Kahe were canceled and at 1522 the KM got underway for Station ALOHA. It was decided that the engineers would try and fix the winch while enroute to Station ALOHA. They encountered problems getting into the valve because it was rusted closed. They removed the valve and replaced it with another valve from the trawl winch. They thought they had the problem fixed so at 1800 the KM stopped and another test weight cast was performed. Initially the cast was to be deployed to 50-m and then brought back to surface since the upcast was the initial culprit. The weight was deployed to 50-m and then brought back to the surface. On the way back to the surface, just below the surface, controls were lost with the winch. The weight was left in this position while the engineers looked into the problem. Without controls of the winch it was decided to recover the weight using only the crane. Luckily the weight was just at the surface which made the recovery possible. At 1930, the engineers estimated a probability of 30% of figuring and fixing the problem. Instead of continuing on to Station ALOHA it was decided to hold station for an hour so the engineers could have a chance to understand the complexity of the problem and provide the Captain and the Chief Scientist with a report of the findings. During this time a Go-Flo cast was conducted to collect water for Karin Björkman. At 2100 the Captain, the Chief Engineer and the Chief Scientist met and discussed the situation. It was decided that the winch could not be fixed at sea so the KM turned around and got underway for the harbor at 2130.

Because of the length of time needed to properly fix the winch and the need for the KM to be in port on December 19th the cruise was canceled.

4. R/V KILO MOANA, OFFICERS AND CREW, TECHNICAL SUPPORT

The Captain and crew were helpful and accommodating during this short cruise. The Captain and the Chief Engineer kept me well informed during the winch problems. The Engineers did everything they could to try and fix the problem. They exhausted all options before it was decided to cancel the cruise.

OTG personnel kept good communications between the Engineers, Captain and the Chief Scientist. They proved to be very helpful in this situation.

5. DAILY REPORT OF ACTIVITIES (HST)

December 12, 2008 – Loading Day

0900 - Heavy equipment, the blue storage van and all hand carried gear was loaded during this day.

December 15, 2008

Departed Snug Harbor at 0920hrs

Fire and boat drill at 1015hrs, all science personnel attended. After, all of the new personnel attended a meeting about the life rafts and survival suits.

Science and Safety meeting at 1045hrs

Arrived Station Kahe at 1215hrs, conducted a weight cast at 1230hrs

Underway to Station ALOHA at 1522hrs

Stopped at 1800 to conduct a weight cast

Recovered the weight using only the crane at 1915

Turned around for the Harbor at 2130

December 16, 2008

0800- Arrived Snug Harbor

0830- Offloaded. All gear and vans were removed.

HOT program sub-components:

Investigator:

Dave Karl
Roger Lukas
Bob Bidigare
Mike Landry
Mark Abbott/Ricardo Letelier

Project/Institution:

Core Biogeochemistry/UH
Hydrography/UH
HPLC pigments/UH
Zooplankton dynamics/UH
Optical measurements/OSU

Ancillary programs:

Investigator:

Charles Keeling
Paul Quay
Penny Chisholm
Zehr/Church/Montoya

CMORE PI's
Mark Brzezinski

Project/Institution:

CO2 dynamics and intercalibration/SIO
DI13C
Prochlorococcus population dynamics/MIT
Diversity and activities of nitrogen-fixing
microorganisms/UH
Microbial RNA/DNA collection/CMORE
Silica production and dissolution rate
measurements/UCSB

Additional programs

Investigator:

Sam Wilson

Edward Boyle
CMORE Education
Roger Kelly

Project/Institution:

Reduced gases in the upper ocean: The cycling of
methane, sulfide and nitrous oxide/CMORE/UH
Trace metals/MIT
Teacher at sea program
Uranium Isotopes/URI