HOT-210: Chief Scientist Report

Chief Scientist: Eric Grabowski

HOT-210 Chief Scientist's Cruise Report
R/V Knorr, Woods Hole Oceanographic Institution
April 27- May 1, 2009

Cruise ID: KN 195-07
Departed: April 27, 2009 at 0800 (HST)
Returned: May 1, 2009 at 0800
Vessel: R/V Knorr
Operator: Woods Hole Oceanographic Institution
Master of the Vessel: Captain Adam Seamans
Chief Scientist: Eric Grabowski
SSSG Technicians: Robbie Laird and Catie Graver

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, is located at 21° 20.6'N, 158° 16.4'W and was to be occupied on the first day of the cruise for about 3 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 was to 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 was to 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 was to be occupied on the 4th day of the cruise for about 2 hours.

Upon arrival to Station Kahe a 1000 lb. weight-test cast, one CTD cast to 1400 m, a PRR and Hyperpro cast was to be conducted at this location in the afternoon of April 27. 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 (<200 m) and one 1000m cast to collect water for the

PP array incubation experiment. After this, the PP array was to be deployed for roughly 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 on April 29.

One free-drifting array (gas array) was to be deployed for 24 hours for incubation experiments on April 29.

A plankton net was to be towed near noon and midnight for 30-min intervals on April 28 and 29 at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) and a Hyperpro was to be deployed for half-hour periods near noon time on April 27, 29 and 30.

A package including a Wet Labs AC9 and a SeaBird Seacat was to be used to profile the upper 200 m at Station ALOHA around noon time on April 29 and 30.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array on April 30 followed by the recovery of the gas array.

After recovering both arrays, the ship was to transit to Station 50 (WHOTS) for a 200-m yo-yo CTD cast. After the CTD cast the ship was to transit back to Station ALOHA to conduct light casts (PRR, AC9, Hyperpro).

After operations at ALOHA ended, the ship was to transit to Station 6 (Kaena).

A near-bottom CTD cast (~2500 m) was to be conducted at Station 6, after which the ship was to transit back to Snug Harbor.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, fluorometer and I-met sensors.

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2. SCIENCE PERSONNEL

BEACH group:

Cruise Participant	Title	Affiliation
-Eric Grabowski	Chief Scientist	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/BEACH
-Ken Doggett	Research Associate	UH/BEACH
-Tara Clemente	Research Associate	UH/BEACH
-Blake Watkins	Marine Engineer	UH/BEACH
-Jay Wheeler	Research Associate	UH/BEACH
-Richard Allen Shema	Volunteer	BEACH
-Amanda Whitmire	Scientist	OSU/BEACH

PO group:

-Jefrey Snyder	Marine Technician	UH/PO
-Paul Lethaby	Research Associate	UH/PO
-Fernando Santiago-Mandujano	Research Associate	UH/PO
-Justin Smith	Undergrad Student	UH/PO

Others:

-Michael Beman	Scientist	UH
-Kate Achilles	CMORE Educator	UH/CMORE
-Christine Glazer	Teacher	CMORE
-Robert Bevacqua	Teacher	CMORE
-Lily Edmon	Teacher	CMORE
-Alon Amrani	Researcher	CalTech

3. GENERAL SUMMARY

Operations during the cruise were conducted without any major delays. Most objectives for HOT-210 were successfully completed. pH samples were not successfully taken on the PO deep cast and the BEACH cast because the cells were accidently broken.

One 1000-m CTD cast was conducted at Station Kahe (1). Two deep casts, thirteen 1000-m CTD casts and one 200-m casts were conducted at Station ALOHA (2). Two

200-m yo-yo CTD casts were conducted at the WHOTS mooring (50). One near-bottom CTD cast was conducted at Station Kaena (6).

The array of floating sediment traps, the gas array, and the primary productivity incubation array were deployed and recovered without any major incidents.

Six net tows were completed, three net tows at night and three during the day.

The AC9 was deployed around noon three times.

The PRR and Hyperpro were deployed three times around noon time.

The ADCP ran without interruption throughout the cruise, as well as the Thermosalinograph and the fluorometer. The ship's meterological (I-met) data was successfully collected throughout the cruise except for 5hrs on Tuesday, April 28.

Winds were from the NW to NE at 10 kt-20 kt during the course of the cruise.

We arrived at Snug Harbor on May 1 at 0900.

4. R/V Knorr, OFFICERS AND CREW

The R/V Knorr has excellent ship support. 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.

5. DAILY REPORT OF ACTIVITIES (HST)

April 26, 2009: Loading day

April 27, 2009:

Departed Snug Harbor at 0800hrs
Science and safety meeting and safety video at 0900hrs
Fire and boat drill at 1030hrs, all science personnel attended.
Arrived Station Kahe at 1100hrs, conducted a weight cast at 1115hrs and a PRR cast at 1230hrs.
A Hyperpro cast was conducted at 1300hrs. During the deployment, one of the A-frame hydraulic lines busted. The A-frame was stuck in the out position. The cast went as planned and was safely recovered. The A-frame was fixed while transiting to ALOHA.
A 1400-m CTD cast was conducted at 1330hrs.
Underway to Station ALOHA at 1515hrs
Arrived Station ALOHA at 2335hrs

The sediment trap array was deployed at 2354hrs. The array was deployed at the location of 22 45.76N, 158 01.48W.

April 28, 2009:

One 200-m CTD cast (s2c1) was conducted at 0015hrs. This was followed by a 1000-m CTD cast (s2c2) at 0125hrs to collect water for the primary productivity experiment. The first PO deep cast (s2c3) was conducted at 0455hrs.
The primary production array was deployed at 0424hrs at the location of 22 45.0218N, 157 59.9788W.
Kate Achilles deployed a hand lowered net at 1300hrs.
Three net tows were conducted by Blake Watkins at 1012hrs, 1310hrs, and 2210hrs.
The 36hr burst period started at 1100hrs with a 1000-m CTD cast (s2c4). After the pH samples were properly taken on s2c4 the box containing the samples was accidentally dropped. This resulted in all of the pH cells breaking. No pH samples were analyzed on s2C4. The second CTD cast of the period started at 1500hrs. The ISUS was installed in the rosette and connected before the first CTD cast of the 36hr period.
Five 1000-m CTD casts were completed as part of the 36hr period.
The primary production array was recovered at 1928hrs. At the time of recovery the array was located at 22 44.176N 158 01.690W.
Weather conditions observed at 1400 on April 28th; winds from the NW at 10 knots, seas 3ft, cloud cover around 7/8.

April 29, 2009:

Three net tows were completed by Blake Watkins; 0022hrs, 1015hrs, and at 2210hrs.
Seven 1000-m CTD casts were completed as part of the 36hr period before ending the burst period with a second deep cast (s2c16) at 2307hrs.
The gas array was deployed at 0410hrs at the location of 22 45.651N 158 01.003W
The ATE was successfully deployed at 0700hrs.
One PRR cast was conducted at 1200hrs followed by a Hyperpro cast.
One AC-9 cast was conducted at 1300hrs.
Weather conditions observed at 1500hrs on April 29th; winds from the NE at 15 knots, seas 4-6ft and cloud cover 6/8.

April 30, 2009:

The sediment trap array was recovered at 0410hrs. The array was recovered at 22 43N 158 3.1W.
The gas array was recovered at 0510hrs. The array was recovered at 22 43.3N 158 1.3W.
One PRR cast was conducted at Station ALOHA at 1120hrs. This was followed by a Hyperpro cast.
Two AC-9 casts were conducted at 1200hrs and 1300hrs.
One, one hour, 200-m yo-yo CTD cast was conducted near the WHOTS mooring at 0834hrs. A second CTD cast was conducted at 1421hrs.

At 1030 the PO thermistor chain release was interrogated near the center of ALOHA. A very strong signal was received and a good range was made.
A near-bottom CTD cast at Kaena Point was conducted and successfully completed.
Weather conditions at ALOHA at 1500 on April 30th; winds from the NE at 15 knots, seas 4-6ft cloud cover 5/8.

May 1, 2009:

Arrived at Snug Harbor at 0900. 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
Penny Chisholm	Prochlorococcus population dynamics/MIT
Zehr/Church/Montoya	Diversity and activities of nitrogen-fixing microorganisms/UH
CMORE PI's	Microbial RNA/DNA collection/CMORE
Mark Brzezinski	Silica production and dissolution rate measurements/UCSB

Additional programs:

Investigator:	Project/Institution:
Barb Bruno	C-MORE Education STARS Program/UH
Alon Amrani	Gases/CalTech
Sam Wilson	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide/CMORE/UH
Edward Boyle	Trace metals/MIT