HOT-217 Chief Scientist's Cruise Report
R/V Ka'Imikai-O-Kanaloa
December 8-12, 2009
Cruise ID: KOK0920
Departed: December 8, 2009 at 0830 (HST)
Returned: December 12, 2009 at 0800
Vessel: R/V Ka'Imikai-O-Kanaloa
Operator: University of Hawaii
Master of the Vessel: Captain Ross Barnes
Chief Scientist: Fernando Santiago-Mandujano
OTG Electronics/Deck Operations Technicians: Victor Polidoro/Justin Smith

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 December 9 to 11.

3) Station 52, is the site of the WHOTS Mooring, located at 22° 39.989'N, 157° 56.961'W was to be occupied on the 4th day of the cruise for about 1 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.

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, and one more one 200 m CTD cast. 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 December 10

A plankton net was to be towed near noon and midnight for 30-min intervals on December 9 and 10 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 52 to conduct a one-hour 200-m CTD yo-yo cast.

After station 52 was occupied, the ship was to transit to Sta. ALOHA to conduct a Hyperpro cast, and one AC9 cast, and to conduct a 200-m CTD cast for water collection, after which the ship was to transit to Kaena station

A Hyperpro was to be deployed for half-hour periods near noon time on December 8, 10 and 11.

A package including a Wet Labs AC9, a Chelsea Fast Repetition Rate Fluorometer (FRRf), a LISST particle size and distribution analyzer, and a SeaBird Seacat was to be used to profile the upper 200 m at Sta. ALOHA in the morning of December 11, and at noon time on December 10 and 11.

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

2. SCIENCE PERSONNEL

Cruise Participant	Title	Affiliation
Karin Bjorkman	Marine Specialist	UH/BEACH
Daniela Bottjer	Post-Doc Scientist	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	Research Associate	UH/BEACH
Donn Viviani	Graduate Student	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
John Fitzpatrick	Research Associate	UH/PO
Paul Lethaby	Research Associate	UH/PO
Fernando Santiago-Mandujano	Chief Scientist - Res. Assoc.	UH/PO
Jefrey Snyder	Marine Technician	UH/PO
Sarah Yasui	Undergrad Student Assistant	UH/PO
Ken Doggett	Research Associate	UH/CMORE
Janice Jones	Technician	UCSB
Vic Polidoro	Marine Technician	OTG
Justin Smith	Marine Technician	OTG

3. GENERAL SUMMARY

Operations during the cruise were conducted as planned.

One 1000-m CTD cast was conducted at Kahe station. Thirteen 1000-m CTD casts, two 200-m, and two deep casts were conducted at Station ALOHA. One 200-m CTD yo-yo cast, and one 200-m cast were conducted near the WHOTS mooring (station 52). One near-bottom cast was conducted at station Kaena.

The array of floating sediment traps, the primary productivity,

and the gas incubation arrays were deployed and recovered without problems. It seems like a boat ran over the sediment traps array because the line was twisted, the buoy's frame was bent, one flotation sphere was cracked and filled with water, and the lights were not working. The sediment traps were in good condition.

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

The ACS/AC9/FRRf/LISST optical package was deployed near noon on December 10 and 11, and the morning of December 11.

The Hyperpro was deployed three times near noon time.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph system.

The capstan stopped working during one of the net tows, but the blue SeaMac winch was used to complete the remaining net tows, Hyperpro and ACS/AC9/FRRf/LISST operations.

Winds during the cruise were variable at less than 10 kt for the first three days, increasing to 15-20 kt the fourth day. There was a large swell as we departed from station Kahe, but decreased after arriving to station ALOHA.

We arrived back at Snug Harbor on December 12 at 0800.

4. R/V Ka'Imikai-O-Kanaloa, OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Ka'Imikai-O-Kanaloa continues to maintain 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. They were very helpful in assisting the science party during the equipment loading.

Technical support during this cruise was excellent. OTG personnel were available at any time during the cruise to assist in our work and made things much easier for us. OTG personnel were not available during loading due to schedule conflicts, but the ship's crew were able to assist us with the loading operations.

5. DAILY REPORT OF ACTIVITIES (HST)

December 22, 2009; Loading Day

The equipment was loaded on this day.

December 8, 2009

Hour (HST) Activity

08:30 Departed from Snug harbor
09:00 Fire and abandon ship drills, followed by safety briefing and science meeting
11:30 Arrived at Kahe station, 300 lb weight cast to 500 m
12:15 Hyperpro cast

13:00 CTD cast to 1000-m (S1C1)
14:11 Depart to station ALOHA

Light winds at less than 10 kt

December 9, 2009

Hour (HST) Activity
00:50 Deployed sediment traps at arrival to station ALOHA (22 43.82'N, 158 0.26'W)
01:06 CTD cast to 200-m (S2C1)
02:15 CTD cast to 1000-m (S2C2)
04:11 CTD cast to 200-m (S2C3)
05:00 Deployed primary production array (22 44.1'N, 158 0.6'W)
05:38 Near-bottom CTD cast (S2C4)
10:15 Net tow
11:02 CTD cast to 1000-m (S2C5)
12:40 Net tow
14:00 CTD cast to 1000-m (S2C6)
16:27 CTD cast to 1000-m (S2C7)
18:00 Recovered primary production array (22 39.99'N, 158 4.18'W)
20:00 CTD cast to 1000-m (S2C8)
22:00 Net tow
23:00 CTD cast to 1000-m (S2C9)

Light and variable winds at less than 10 kt, with smooth seas

December 10, 2009

01:54 CTD cast to 1000-m (S2C10)
04:10 Gas array deployment (22 45.17'N, 158 1.06'W)
05:00 CTD cast to 1000-m (S2C11)
06:00 Transit outside the ALOHA circle to pump ship's sewage tanks
08:00 CTD cast to 1000-m (S2C12)
10:00 Net tow
10:55 CTD cast to 1000-m (S2C13)
11:55 Hyperpro cast
12:30 ACS/AC9/FRRf/LISST optics cast
13:57 CTD cast to 1000-m (S2C14)
16:57 CTD cast to 1000-m (S2C15)
19:55 CTD cast to 1000-m (S2C16)
20:00 Net tow
22:55 CTD cast to near-bottom (S2C17)

Light and variable winds at less than 10 kt, with smooth seas

December 11, 2009

03:02 ACS/AC9/FRRf/LISST optics cast
07:12 Recovered sediment traps (22 34.02'N, 158 18.8'W)
08:30 Recovered gas array (22 37.31'N, 158 10.64'W)
11:01 Hyperpro cast
11:45 AACS/AC9/FRRf/LISST optics cast
12:37 1-hour CTD yo-yo cast to 200-m (S52C1)
14:44 CTD cast to 200-m (S52C2)
21:30 Arrived to Kaena station
21:39 Near-bottom ctd cast (S6C1)

Winds increasing to 15 to 20 kt.

December 12, 2009

Arrived at Snug Harbor at 0800. 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 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 Brzeznski	Silica production and dissolution rate measurments/UCSB

Additional programs

Investigator:	Project/Institution:
Sam Wilson	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide/CMORE/UH

Additional sampling during this cruise

Investigator:	Project/Institution:
Karin Bjorkman	Radioisotope labelling experiments coupled with cell sorting
Daniela Bottjer	CO2 perturbation experiment
Ken Doggett	Flow Cytometric sorting of radiolabled seawater