HOT-189: Chief Scientist Report

Chief Scientist: Eric Grabowski

HOT-189 Chief Scientist's Cruise Report
R/V Ka'Imikai-O-Kanaloa
February 05-09, 2007

Cruise ID: KOK0704
Departed: February 05, 2007 at 0800 (HST)
Returned: February 09, 2007 at 0705
Vessel: R/V Ka'Imikai-O-Kanaloa
Operator: University of Hawaii
Master of the Vessel: Captain Ross Barnes
Chief Scientist: Eric Grabowski
OTG Electronics/Deck Operations Technicians: Steve Poulos and Steve Tottori

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 February 05 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 February 05-08.

3) Station 51, is the site of the MOSEAN Mooring, located at 22 45.622'N, 158 5.246'W and 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 30 minutes.

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.

Plan Overview:
After arrival to Station Kahe a 400 lb. weight-test cast, one CTD cast to 1400 m, and a PRR cast was to be conducted at this location in the afternoon of February 05. 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 three shallow CTD casts (<200 m) to collect water for incubation experiments. After this, an array with incubation experiments (gas array) was to be deployed for 24 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.

One free-drifting array (primary production) was to be deployed for 12 hours for incubation experiments on February 07. Following the deployment of the primary production array the gas array was to be recovered at 0700.

A plankton net was to be towed near noon and midnight for 30-min intervals on February 06 and 07 at Station ALOHA.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on February 05, 07 and 08.

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 around noon on February 07 and 08, and in the early morning on February 08.

An Automated Trace Element Sampler (ATE) was to be deployed once on February 06.

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 Station 51 (MOSEAN) for a 200-m CTD cast, and then to Station 50 (WHOTS) for a 200-m CTD cast. After the CTD casts, the ship was to transit back to Station ALOHA to conduct light casts (PRR, AC9/FRRf).

After operations at station 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 including salinity samples for calibration, after which the ship was to transit back to Snug Harbor.

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
Claire Mahaffey	Research Specialist	UH
Susan Curless	Research Associate	UH
Adriana Harlan	Research Associate	UH
Ken Doggett	Research Associate	UH
Lance Fujieki	Computer Specialist	UH
Eric Grabowski – Chief Scientist	Research Associate	UH
Blake Watkins	Marine Engineer	UH
Dan Sadler – Watch Leader	Research Associate	UH

PO group:

Paul Lethaby	Research Associate	UH
Fernando S.-Mandujano – Watch Leader	Research Associate	UH
Erica Wasner	Technician	UH
Jefrey Snyder	Marine Technician	UH

Others:

Steve Poulos	Marine Technician	UH/OTG
Steve Tottori	Marine Technician	UH/OTG
Darin Hayakawa	Graduate Student	UH/HIMB

3. GENERAL SUMMARY

HOT 189 was originally scheduled to depart on January 29 with a return on February 02. The cruise departed at 0900 on January 29 as scheduled. While in transit to station Kahe we experienced confused seas and high winds which resulted in the ship only steaming at 3-5 knots. The ship measured a sustained wind of 35 knots with wind gusts of up to 50 knots. It was forecasted that the wind would be 25-30 knots with higher gusts for the entire week with a couple different swells rolling in at the 20 foot level. With the current conditions and the forecast looking grim to conduct any science in a same manner it was determined by the captain and I to turn the vessel around and reschedule the cruise. We safely returned to snug harbor at 1230 on January 29. HOT 189 was rescheduled for the following week, February 05-09. All equipment remained on board the ship for our February 05 departure.

Nearly all objectives for HOT 189 were successfully completed.
During the first deployment of the ATE the cap to the sample bottle jammed and didn't take a proper sample. Communication problems with the ATE prevented its rescheduled deployment. The AC9's battery wouldn't hold a charge so one of the casts was canceled. All other activities were completed.

One 1000-m CTD cast was conducted at Kahe station. One 2000-m cast, eleven 1000-m CTD casts, two deep casts, one 100-m cast and two 200-m casts were conducted at Station ALOHA. One 200-m cast was conducted near the MOSEAN mooring (station 51) and another 200-m cast was conducted near the WHOTS mooring (station 50). One 2500-m cast was conducted at Kaena station.

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

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

The AC9/FRRf package was deployed three times, twice at noon and once at night. Although the AC9 was deployed along with the FRRf it did not collect data due to the weak battery pack. One of the AC9/FRRf casts scheduled was canceled because of the battery problem.

The PRR was deployed three times around noon.

The Automated Trace-Element Sampler (ATE) was deployed as scheduled but didn't take a proper sample because the cap on the sample bottle got jammed. The ATE was rescheduled for a later time. The ATE was not deployed for a second time because communication with the instrument was not reestablished.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph and the ship's two anemometers.

Winds started out from the southwest at 20 knots veering to the north between 8 and 13 knots during the course of the cruise.

We arrived back at Snug Harbor on February 09 at 0705.

4. R/V KA'IMIKAI O KANALOA, OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Ka'Imikai O Kanaloa 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)

January 25, 2007; Loading Day

Equipment loaded during this day, The CTD wire was inspected, re-terminated and the CTD system tested.

January 29, 2007

The ship departed from Snug harbor at 0900. Fire and abandon ship drills conducted at 0945. Safety briefing by the First Mate was conducted at 1000, followed by a science meeting which cruise activities were briefly reviewed and safety issues were addressed.
At 1100 it was determined by the captain and I to turn back around and reschedule the cruise because of the current and forecasted conditions.
Arrived at Snug harbor at 1230. All equipment remained on board the ship for our February 05 departure.

February 05, 2007

The ship departed from Snug harbor at 0800. Fire and abandon ship drills conducted at 0900. Safety briefing by the First Mate was conducted at 0915, followed by a science meeting in which cruise activities were briefly reviewed, and safety issues were addressed.

Arrived at Kahe Station at 1100. CTD wire weight cast (400 lb) to 500m, during which J. Snyder inspected the CTD wire. The Profiling Reflectance Radiometer (PRR) was deployed at 1140. A 1400-m CTD cast was conducted at 1220. After the cast ended (1330), the ship got underway to station ALOHA.

Arrived station ALOHA at 2230. The sediment trap array was deployed upon arrival.

February 06, 2007

Two 200-m CTD cast were conducted after the sediment traps deployment.

One 100-m CTD cast was conducted before the gas array deployment.

The gas array was deployed at 0430.

The near-bottom PO/CTD cast was conducted at 0500.

Five 1000-m CTD casts were conducted on this day as part of the 36hr burst period with the first cast beginning at 1100.

The ATE sampler was deployed at 1330 but didn't sample properly because the sample cap got jammed. The ATE was rescheduled for February 08.

Three net tows were conducted at 1015, 1230 and at 2200.

Weather conditions observed at 1400 on February 6th; winds from the SW at 20 knots, seas 8-10ft, cloud cover around 1/8.

February 07, 2007

One 2000-m and six 1000-m CTD casts were conducted on this day, and the 36-hr CTD burst period ended with a second deep cast that started at 2305.

The gas array was recovered at 0800 after drifting about 15 nm NE from the center of station ALOHA.

The primary productivity array was deployed at 0545 and recovered at 1830 after drifting about 5nm NE from the center of ALOHA.

One FRRf cast was conducted at 1300.

One PRR cast was conducted at 1230.

Two net tows were conducted at 0100 and 2200. The net tow scheduled for 1000 was canceled and rescheduled for February 08 because of the transit time taken to recover the gas array.

Weather conditions observed at 1400 on February 7th; winds from the N at 13 knots, seas 9ft and cloud cover 7/8.

February 08, 2007

One 200-m CTD cast occurred near the WHOTS mooring (Station 50) at 1000. A second CTD cast was added to the schedule but was canceled because of a kink in the wire. The CTD wire was reterminated before the MOSEAN cast.

One 200-m CTD cast was conducted near the MOSEAN mooring (Station 51) at 1430.

The sediment traps array was recovered at 0725 after drifting 17nm to the NE from the center of ALOHA.

One net tow was conducted at 1030.

One PRR cast was conducted at 1110.

Two AC-9/FRRf casts were conducted at Station ALOHA at 0315 and 1145. The third cast scheduled for the afternoon was canceled because the battery for the AC-9 wouldn't hold a charge.

The ATE was canceled because communication with the instrument was not reestablished.

One near-bottom cast was conducted at Station Kaena (Station 6).

Weather conditions observed at 1500 on February 8th; winds from the N at 8 knots, seas 12-14ft and cloud cover 3/8.

February 09, 2007

Arrived at Snug Harbor at 0705. 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	Diversity and activities of nitrogen-fixing microorganisms/UH

Additional programs

Investigator:	Project/Institution:
Mike Rappe	Marine bacterioplankton community structure/UH
Edward Boyle	Trace metals