HOT-154: Chief Scientist Report

Chief Scientist: F.SANTIAGO-MANDUJANO

HOT-154 Chief Scientist's Cruise Report
R/V Kilo Moana
December 18-22, 2003

Cruise ID: KM0325
Departed: December 18, 2003 at 1300 (HST)
Returned: December 22, 2003 at 1000
Vessel: R/V Kilo Moana
Operator: University of Hawaii
Master of the Vessel: Captain Grey Drewry
Chief Scientist: Fernando Santiago-Mandujano
STAG Electronics Technician: Steve Poulos
STAG Deck Operations: Kuhio Vellalos

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. Three 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 December 18 for about 3 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 19 to December 21.

3) 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 December 21 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.

Upon arrival at Station ALOHA, a free-drifting sediment trap array was to be deployed. After deployment, a full-depth CTD cast was to be conducted, followed by CTD casts at strict 3 hour intervals for at least 36 hours for continuous and discrete data collection, followed by another full-depth CTD cast.

One free-drifting array was to be deployed for 12 hours for incubation experiments on December 20.

A plankton net was to be deployed near noon and midnight on December 19 and 20 at Station ALOHA.

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 return to Sta. ALOHA to continue light cast operations, after which the ship was to transit to Station 6.

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.

A Profiling Reflectance Radiometer (PRR) and a Hyperspectral Tethered Spectral Radiometric Buoy (HTSRB) were to be deployed for half-hour periods near noon time on December 19, 20 and 21.

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 300 m at Sta. ALOHA for one-hour periods on December 20 and 21. A Satlantic ISUS sensor was added to this package to measure the vertical distribution of nitrate.

A Remote Automatic Sampler (RAS) was to be deployed after the second deep cast at Station ALOHA with the CTD cable to a target depth of 4500 m, and to be raised to selected levels at pre-determined time intervals, for a total of 8 hours.

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

2. SCIENCE PERSONNEL

JGOFS group:

Amanda Ashe	Research Assistant	OSU
Karin Bjorkman	Research Specialist	UH
Tara Clemente	Research Associate	UH
Lance Fujieki	Computer Specialist	UH
Eric Grabowski	Research Associate	UH
Sam Laney	Graduate Student	OSU
Dan Sadler (Watch Leader)	Research Associate	UH
Cecelia Sheridan	Graduate Student	UH
Kuulei Vickery	Undergraduate Student	UH
Blake Watkins	Marine Engineer	UH

PO group:

Santiago Andrioni	Undergraduate Student	HPU
Daniel Fitzgerald (Watch Leader)	Research Associate	UH
Nina Hamacher	Undergraduate Student	HPU
Maya Iriondo	Graduate Student	UH
Fernando Santiago-Mandujano	Chief Scientist (Res. Assoc.)	UH
Mark Valenciano	Electronics Technician	UH

3. GENERAL SUMMARY

Operations were conducted as planned, with a minor delay in the departure from Snug harbor.

Twelve 1000-m CTD casts, two deep casts (~4740 m) and one deep yo-yo cast were conducted at Station ALOHA. One 1000-m CTD cast was conducted at station Kahe.

The array of floating sediment traps and the primary productivity incubation array were deployed without incidents. The incubation and sediment trap arrays were recovered without any problems. Both arrays drifted southeastward at a significant rate.

C. Sheridan completed successfully 6 plankton net tows.

The PRR, HTSRB, AC9/FRRf/ISUS, as well as the RAS were deployed as planned.

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

Winds were easterlies at 10-15 kt, decreasing to less than 10 kt during the second part of the cruise.

We arrived back at Snug Harbor on December 22 at 1000. Full off-load took place immediately.

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. STAG personnel were available at any time to assist in our work and made things much easier for us.

5. DAILY REPORT OF ACTIVITIES (HST)

December 18, 2003; Loading Day

Equipment loaded on this day starting at 0900. CTD wire was re-terminated and CTD system tested.

December 18, 2003

The ship departed from Snug harbor at 1340. Safety and science meetings conducted at 1445. The cruise activities were briefly reviewed, and safety issues were addressed.

Arrived to Kahe Station at 1600 and a weight cast (400 lb) to 1000 m was conducted, during which M. Valenciano inspected the CTD wire. This was followed by a AC9/FRRf/ISUS test cast.

A 1000-m CTD cast was started at 1800 and ended at 1925, after which the ship headed towards Station ALOHA.

Winds were easterlies at 17 kt.

December 19, 2003

Arrived at Station ALOHA at 0240, and proceeded to deploy the sediment traps, inmediately followed by the deep PO cast, which started at 0430 and ended at 0820 without any problems. This cast was followed by the shallow PO cast at 1100, which marked the beginning of the 36-hr CTD cast period. A total of five 1000-m CTD casts were conducted this day.

Fire and abandon ship drills were conducted at 1300.

HTSRB and PRR operations conducted near noon time. The AC-9/FRRf/ISUS was also deployed for a short test.

The clean water system that feeds the thermosalinograph and fluorometer stopped working in the morning for a short period due to a pump failure. The problem was fixed immediately.

Two net tows were conducted between 1000 and 1400 on December 19. Two net tows were conducted between 2200, December 19, and 0200, December 20.

Winds were 5-15 kt easterlies.

December 20, 2003

Seven 1000-m CTD casts were conducted during this day, ending the 36-hr CTD cast burst period with the second deep cast, which started at 2300 and ended at 0230 (December 21).

The primary productivity array was deployed at 0630, and was retrieved at 1840. The array drifted 12 km SE of the center of ALOHA Sta.

Two net tows were conducted near noon and one at night.

The HTSRB was deployed three times during the day. The PRR was deployed once near noon, as well as the AC-9/FRRf/ISUS.

Winds were from the north at 6 kt.

December 21, 2003

The second deep CTD cast that started at 2300 on December 20 was completed by 0230. A cold event was captured in progress as indicated by the second deep cast data. Potential temperature in the bottom 40 dbar decreased from 1.113 degC in the first deep cast to 1.090 degC in the second, in less than 48 hr. In the same depth range the salinity increased from 34.688 to 34.690.

The AC-9/FRRf/ISUS was deployed at 0300, and near noon time. The HTSRB and PRR were also deployed near noon time.

The Remote Access Sampler (RAS) was deployed at 0430, and was back on board at 1110.

The floating sediment trap array was recovered at 1730. The array drifted 20 km SE from the center of Station ALOHA.

Given the development of the cold event indicated by the second deep cast data, it was decided to do a near-bottom CTD yo-yo cast at Station ALOHA and to cancel the Station Kaena cast. A yo-yo cast between 4700 dbar and near the bottom was conducted from 1940 through 0140 (December 22). After this the ship headed back to Snug harbor.

One net tow was conducted near noon time.

Winds were northerlies at 6 kt, with smooth seas.

December 22, 2003

Arrived at Snug Harbor at 1000. Full off-load took place immediately.

Sub component programs:

Investigator:	Project/Institution:
Bob Bidigare	HPLC pigments/UH
Mike Landry	Zooplankton dynamics/UH
John Dore	CO2 dynamics/UH

Ancillary programs:

Investigator:	Project/Institution:
Charles Keeling	CO2 dynamics and intercalibration/SIO
Mark Abbott/Ricardo Letelier	Optical measurements/OSU
Paul Quay	DI13C and O isotopes/UW
Sally Chisholm	Prochlorococcus population dynamics/MIT