

HOT-142: Chief Scientist Report

Chief Scientist: F. SANTIAGO-MANDUJANO

HOT-142 Chief Scientist's Cruise Report

Cruise ID: KM0208

Departed: November 23, 2002 at 1000 (HST)

Returned: November 27, 2002 at 1200

Vessel: R/V Kilo Moana

Operator: University of Hawaii

Master of the Vessel: Captain Phil Smith

Chief Scientist: Fernando Santiago-Mandujano

STAG Electronics Technician: Steve Poulos

STAG Deck Operations: David Gravatt

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 November 23 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 November 24 to November 26.

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 November 26 for about 2 hours.

4) Station 10, located in a shallow area near Kaena Point (21 37.5'N, 158 28'W) was to be occupied on November 26 for about 3 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, the deployment of a free-drifting sediment trap array was to be conducted, followed by a full-depth CTD cast. After this, CTD casts at strict 3 hour intervals were to be conducted for at least 36 hours for continuous and discrete data collection, followed by another full-depth CTD cast. The final activity at this station was to be a cast with an optical package containing the AC-9 and the Fast Repetition Rate fluorometer (FRRf).

One more free-drifting array was to be deployed for 12 hours for incubation experiments on November 25.

After work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array. After the sediment traps were recovered, the ship was to transit back to Station ALOHA to conduct two consecutive AC-9/FRRf casts. After these casts were completed, 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 to a shallower area (~800 m) near Kaena point (Station 10) to conduct a 3-hour CTD yo-yo cast.

A Profiling Reflectance Radiometer (PRR) and a Tethered Spectral Radiometer Buoy (TSRB) were to be deployed for half-hour periods near noon time on November 23, 24 and 25.

An automated trace element (ATE) sampler was to be deployed on November 26.

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

2. SCIENCE PERSONNEL

WOCE group:

Carlson, Daryl	Volunteer	UH
Fitzgerald, Daniel	Research Associate	UH
Leroux, Elise	Volunteer	UH
Lukas, Roger	Principal Investigator	UH
Rii, Shimi	Research Associate	UH
Santiago -Mandujano, Fernando (Chief Scientist, Res. Assoc.)		UH
Valenciano, Mark	Electronics Technician	UH

JGOFS group:

Björkman, Karin	Research Specialist	UH
Clemente, Tara	Research Associate	UH
Franck, Valerie	Scientist	UH
Fujieki, Lance	Computer Specialist	UH
Gasc, Anne	Research Associate	UH
Gregory, Tom	Research Associate	UH
Morris, Paul	Technician	UH
Sadler, Dan	Research Associate	UH

Others:

Shinozuka, Yohei	Graduate Student	UH
Bicknell, Steven	Assistant	Super Ships Productions Inc.
Fulmer, Terrance	Director	Super Ships Productions Inc.
MacDonald, Frederick	Camera/DOP	Super Ships Productions Inc.

3. GENERAL SUMMARY

Operations were conducted as planned, with some interruptions due to CTD and CTD wire problems. As a result the first four casts at Stn. ALOHA

were conducted about one hour behind schedule, and one cast of the 36-hr burst sampling was cancelled.

Twelve 1000-m CTD casts and two deep casts were conducted at Station ALOHA. One 1000-m CTD cast was conducted at station Kahe. One near-bottom cast (~2500 m) was conducted at Station 6, and one two-hour CTD yo-yo cast was conducted at station 10.

The array of floating sediment traps and the incubation array were deployed and recovered without incidents. The floating arrays drifted westward.

The PRR and TSRB, as well as the AC-9/FRRf were deployed as planned.

The ATE was not deployed because there were no adequate sampling bottles on board.

The thermosalinograph and fluorometer data from the continuous uncontaminated water system had some interruptions during the cruise due to leaks in the system.

Yohei Shinozuka was measuring marine aerosol with an instrument installed on the bridge deck. The instrument functioned correctly during the cruise.

A fire started in the engine room on November 27 at 0030. The fire was promptly extinguished by the crew. No major damages were reported.

Personnel from Super Ships Productions Inc. were filming the cruise's activities and interviewing some of the ship's and science personnel for a TV documentary for the Discovery Channel Canada.

We arrived back at Snug Harbor on November 27 at 1200. Minor unloading took place because the following ship's cruises were also related to the project.

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

This was the first HOT cruise on the new R/V Kilo Moana. Some of the ship's instruments and equipment related to our work had not been installed (e.g. ADCP), or were not completely functional (e.g. thermosalinograph). The following is a list of items related to our work that were found in the need of attention; some of them had already been addressed when this report was written.

- The CTD winch/crane system has several shortcomings that prevented us from doing safe and efficient CTD casts. Some of the problems have been addressed earlier elsewhere. During this cruise the wire slipped from the crane's top sheave twice, damaging the CTD wire. The wire had to be cut and reterminated, which affected the cruise schedule and which resulted in substantial loss of usable wire on the winch drum. These incidents show the inadequacy of the system to do CTD work.
- The thermosalinograph and fluorometer data collection from the continuous uncontaminated water system had various interruptions during the cruise due to leaks in the system. Also, the external temperature sensor may have a problem since it was giving higher values than the sea surface

temperatures measured with our bucket thermometer.

- Water sampling from the Rosette's bottles is done on the back deck. A tarp has been rigged to prevent sample contamination from rain, however this does not protect from sea spray or water coming from the sides.
- The ship's sonar is unable to detect the signal from our pinger attached to the CTD package. It is possible that the 12 Khz noise from the continuous uncontaminated system's pumps interferes with the pinger's signal, which works at the same frequency.
- A display with information about winch wire out, speed and tension is needed in the CTD control lab.

Other operations such as array deployments and recoveries were conducted without any problem.

The ship's 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. In particular, the officers and crew's response during the engine's fire incident was very fast and professional.

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.

Some of the science personnel reported that during the fire incident they could not hear the fire alarms in their rooms or on the back deck. This problem with the alarm system was apparently addressed and solved after the cruise.

5. DAILY REPORT OF ACTIVITIES (HST)

November 16, 2002; Loading Day

Equipment loaded on this day. Not able to test CTD system because a new CTD wire was not installed on the drum until November 17. The system was tested the first day of the cruise.

November 23, 2002

The ship departed from Snug harbor at 1000. Fire and abandon ship drills conducted at 1100, followed by a science meeting during which the cruise activities were reviewed, and safety issues were addressed.

Arrived to Kahe Station at 1300 and a weight cast (400 lb) to 1000 m was conducted during which M. Valenciano inspected the CTD wire. The PRR and the TSRB were deployed at 1400.

The CTD cast was conducted at 1500, after which the ship headed towards Station ALOHA.

Winds were 8 kt, sea state 2.

November 24, 2002

Arrived at Station ALOHA at 0045. Sediment traps deployed without problems.

The CTD had problems on board before starting the deep cast and was replaced with the backup CTD. The secondary conductivity sensor failed during the upcast and was replaced by a backup sensor after the deep cast.

The first four casts at ALOHA were conducted about one hour behind schedule. A total of six CTD casts were conducted this day.

Light winds (~8 kt), sea state 2

November 25, 2002

The CTD cable came off the crane's end sheave when the CTD was at 1,000 m during cast 7, causing visible damage to the cable. The internal conductor wire was not damaged and the cable was put in place on the sheave by lowering down the crane's top section. The cast was continued and the CTD brought safely on board. About 1,110 m of cable were cut to remove the damaged section, and the ending was reterminated. One CTD cast was skipped from the 36-hr series. The 36-hr CTD burst period ended with cast 13.

The primary productivity array was deployed without problems at 0630, and retrieved safely at 1700. The array drifted 2.5 nm SW from the center of ALOHA Stn.

The PRR and the TSRB were deployed at noon.

The AC-9 was successfully deployed at 12:30 using the CTD wire and crane.

The winds increased to 14 kt, sea state 3-4, 10 ft swell, raining at and around the station.

November 26, 2001

The second deep CTD cast that started at 2300 on November 25 was completed by 0220.

The AC-9/FRRf was deployed at 0300 using the CTD wire. The wire slipped the sheave when the AC-9/FRRf was at 130 m and the wire got damaged. The AC-9/FRRf was retrieved safely, but about 150 m of wire were cut and reterminated to remove the damaged section.

The sediment traps were retrieved without any problem at 0730. The array drifted nearly 20 nm west-north-west from the center of ALOHA. One of the orange plastic floats got detached from the array and was lost at sea.

PRR/TSRB operations were conducted at ALOHA Stn at 1200, followed by two consecutive AC-9/FRRf casts. The AC-9/FRRf was deployed through the A-frame using STAG's capstan.

A near-bottom cast (~2500 m) was conducted at 2200 at Station Kaena (Stn. 6).

Raining during the night and morning. Winds ~10 kt. Small seas but large swells 10+ ft.

November 27, 2002

A fire started in the engine room near 0030. All science crew reported to the staging area. The ship's crew extinguished the fire, which started when a ventilation filter accidentally caught fire. No major damages were reported. Operations resumed at 0130.

A two-hour CTD yo-yo cast was conducted at Station 10 starting at 0300.

Arrived at Snug Harbor at 1000. Minor unloading took place because the following ship's cruises are also related to the project.

Sub component programs:

Investigator: -----	Project/Institution: -----
Bob Bidigare	HPLC pigments/UH

Ancillary programs:

Investigator: -----	Project/Institution: -----
Charles Keeling	CO2 dynamics and intercalibration/SIO
Paul Quay	DIC and 13C/UW
Mark Abbott/Ricardo Letelier	optical measurements/OSU

Others:	
Karin Bjorkman	phosphorus cycling/UH