HOT-104: Chief Scientist Report

Chief Scientist: F. SANTIAGO-MANDUJANO

HOT-104 Chief Scientist's Cruise Report
R/V Moana Wave
12-16 April 1999

Departed: April 12, 1999 at 0900 (HST)
Returned: April 16, 1999 at 0600
Vessel: R/V Moana Wave
Operator: University of Hawaii
Master of the Vessel: Captain Bob Hayes
Chief Scientist: Fernando Santiago-Mandujano
STAG Electronics Technician: Sharon Stahl
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. Three stations were to be occupied during the cruise, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21o 20.6'N, 158o 16.4'W and was to be occupied on April 12 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 22o 45'N, 158oW. This is the main HOT station and was to be occupied for 3 days from April 13 to 15.

3) Station 8, is the location of the HALE-ALOHA buoy (22o 27.5'N, 158o 7.9'W). It was to be occupied on April 16 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 short CTD cast (300 m) was to be conducted, followed by a plankton net tow. After this the ship would transit to deploy the Free Vehicle Grab Respirometer (FVGR) in the northern edge of the circle. Afterwards a free-drifting sediment trap array was to be deployed for about 54 hours to measure sedimentation rates of particulate matter. After deployment, CTD casts at strict 3 hour intervals were to be conducted continuously for at least 36 hours for continuous and discrete data collection. The ship was to be requested to remain on station during this sampling period. Another free-drifting array was to be deployed for 12 hours for a primary production experiment on April 14. A plankton net was to be deployed near noon and midnight on April 13 and 14 at Station ALOHA.

After work at Station ALOHA was accomplished, the ship was to transit

to recover the FVGR and the sediment trap array on April 15. After the sediment traps were recovered, the ship was to transit to Station 8, to conduct one CTD cast, after which the ship was to transit back to Snug Harbor.

The following instruments were to collect data throughout the cruise: a shipboard ADCP, a thermosalinograph, a fluorometer, and an array of meteorological instruments.

2. SCIENCE PERSONNEL

WOCE group:

Fernando Santiago-Mandujano	Chief Scientist (Res. Assoc.)	UH
Craig Nosse (Watch Leader)	Research Associate	UH
Mark Valenciano	Electronics Technician	UH
Don Wright	Research Associate	UH

JGOFS group:

Karin Bjorkman	Research Associate	UH
Terrence Houlihan	Research Associate	UH
Claudia Benitez-Nelson	Post-Doc	UH
Louie Tupas (Watch Leader)	Scientist (co-PI JGOFS)	UH
Lance Fujieki	Computer Specialist	UH
Daniel Sadler	Research Associate	UH

Ancillary projects:

Scott Nunnery	Research Associate	UH - M. Landry
Albert Calbet	Post-Doc	UH/Zooplankton
Terri Rust	Technician	UH
Ken Smith	Scientist	SIO-Benthic respirometer
Roberta Baldwin	Technician	SIO-Benthic respirometer
Robert Glatts	Technician	SIO-Benthic respirometer

3. GENERAL SUMMARY

Due to problems with the CTD system, the CTD cast at station Kahe could not be completed. The problems were solved upon arrival to station ALOHA. All the primary JGOFS and WOCE objectives were accomplished with the exception of the 36-hour period of continuous CTD casts. The cruise activities were interrupted for 14 hours on April 14 to return to Oahu and disembark one of the cruise members (L. Tupas) that had to take care of a family emergency. The benthic respirometer (FVGR) from K. Smith's group was deployed but could not be found for recovery.

Twelve 1000-m casts were obtained at station ALOHA in addition to one deep cast, and one 1000-m CTD cast was obtained at station HALE-ALOHA.

One 8-bottle go-flo cast was successfully obtained at station ALOHA, and the primary productivity array was deployed and recovered without problems. The array of floating sediment traps was also deployed and recovered without incidents. S. Nunnery and A. Calbet completed successfully 6 plankton net tows.

Weather conditions during the cruise were rough at the beginning, but improved after the second day of the cruise.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph, the fluorometer, and the meteorological sensors.

The signal from the Inverted Echo Sounder (IES) located at the center of the ALOHA station was detected on the 12 kHz PDR.

We arrived back at Snug Harbor on April 16 at 0600. Off-loading of some of the equipment and disembarking of the science personnel took place between 0600 and 0700, after which the ship had to leave for fueling. The rest of the equipment was off-loaded during the evening that day, and on April 19.

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

The R/V Moana Wave 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)

April 9, 1999; Loading Day

Most of the deck equipment such as vans and winches had not been off-loaded from the previous HOT-103 cruise because there were no other cruises before this one. Only minor equipment and materials needed to be loaded by the JGOFS group and ancillary investigators. The WOCE group conducted a full equipment load. M. Valenciano inspected the CTD cable termination and decided that it was not necessary to do a retermination.

April 12, 1999

The ship departed from Snug harbor at 0900. Fire and abandon ship drills conducted at 0930, followed by a short science meeting during which the cruise schedule was reviewed, and safety issues were addressed.

Arrived to Kahe station at 1200 and a weight cast (400 lb) to 1000 m was conducted during which M. Valenciano inspected the CTD wire. At 1300 the Profiling Reflectance Radiometer (PRR) and Tethered Spectral Radiometric Buoy (TSRB) were deployed.

A CTD cast was started at 1330 and starting showing glitches near 200 dbar. The CTD was brought back on board and inspected. The hot wires from the CTD cable were interchanged and the CTD sent back into the water. Glitches reappeared at 200 dbar and the CTD was recovered. We decided to head towards Station ALOHA and reterminate the cable during

transit. The transit to ALOHA was rough because of the prevailing seas. The winds were up to 20 kts.

April 13, 1999.

We arrived at station ALOHA at 0000 and proceeded to conduct a net tow because the CTD cable termination was not completed. A CTD cast started at 0130 but the CTD gave glitches again, however we were able to sample water for T. Rust's experiment to be deployed with the sediment traps array. We proceeded to deploy the FVGR at 0330 and the sediment traps afterwards. Following these opereations we started a 1000-m test cast at 0445 with the second oxygen sensor removed from the package. This cast did not have any glitches.

The deep cast started at 0700 after replacing the second oxygen sensor for the backup and using a brand new conducting cable. The cast was conducted without any problems.

The IES signal was detected on the 12 KHz receiver at 0700

The shallow WOCE cast was conducted after the deep cast, starting the 36-hr CTD cast period. CTD casts continued back on schedule after this cast, a total of 6 1000-m casts were conducted this day.

During the deep cast, the CTD was brought back on board from 10 m because the CTD connector to the fluorometer was left inadvertently uncapped when it was removed from the package. This apparently caused some corrosion in the connector terminals because the fluorometer did not work properly when the instrument was installed during a following cast. After cleaning the connector's contacts the fluorometer worked properly. About three casts have a bad fluorometer trace or glitches.

During cast 7 an interference between the ship's radio communications system and the CTD was detected which prevented from firing the Rosette bottles in the right order. The problem was caused by the CTD control room's radio that was inadvertently set to high power and was resetting the Rosette firing order every time that the radio was operated to communicate with the winch operator. The radio wire was relocated far away from the CTD system to prevent this from happening again. The missing samples were taken in subsequent casts.

Two net tows were conducted at noon and two at night this day.

Winds decreased to about 15 kts, but moderate 4-6 ft seas were still prevailing.

The PRR and TSRB were deployed at 1230.

April 14, 1999.

Operations continued as scheduled. Two more 1000-m CTD casts and one Go-flo cast were conducted during the morning, followed by the Primary Productivity array deployment at 0630.

Operations were stopped at 0730 April 14 to return to Oahu and disembark L. Tupas who had to take care of a family emergency. D. Karl, R. Lukas, D. Hebel, Captain Hayes, and other cruise members were consulted and informed about this decision.

We were back at ALOHA station at 2130 after disembarking L. Tupas off a Zodiac boat at Haleiwa harbor at 1400. The primary productivity array was retrieved without problems near the center of the circle, and CTD casts continued at 2230. Three more 1000-m CTD casts were conducted at ALOHA to complete the HOT core work.

The CTD remote pressure readout started giving problems during cast 9, and stopped working properly a couple of casts after despite the efforts from M. Valenciano to fix it. The CTD wire angle remained relatively small during casts which facilitated the match between pressure and wire readout to fire bottles at the desired levels.

Winds decreased to 10-15 kts with small seas.

April 15, 1999

CTD casts were completed by 0600 after which we headed to recover the FVGR scheduled to resurface at 0800. We arrived to the FVGR recovery site at 0745 and waited until 0900 but the instrument was not found. The ship followed the current drift (as indicated by the sediment traps satellite positions) for one more hour in case the instrument had resurfaced earlier and drifted with the current, but it still could not be found. K. Smith's group suspected that one of the FVGR's floating buoys imploded, making all the other buoys in the array to implode.

The sediment traps were retrieved at 1100, they had drifted northwest. One more net tow was conducted in the ALOHA circle at 1200.

A 1000-m CTD cast was conducted at the HALE-ALOHA station at 1700. Before the cast started, the second oxygen sensor was replaced for the one originally used at Kahe station on April 12. The CTD did not show any problems during this cast, which confirmed that the glitches observed during the casts at Kahe were caused by the second oxygen cable.

10-15 kt winds from the east, 3 feet waves.

April 16, 1999

We arrived at Snug Harbor at 0600. Off-loading of some of the equipment and disembarking of science personnel took place between 0600 and 0700, after which the ship had to leave for fueling. The rest of the equipment was off-loaded during the evening of this day, and on April 19.

SUB COMPONENT PROGRAMS AND SPECIAL PROJECTS

B. Bidigare (UH)	HPLC pigments
M. Landry (UH)	Zooplankton community structure
A. Calbet (UH)	Zooplankton dynamics

T. Rust (UH)	Nitrous oxide production
K. Bjorkman (UH)	Phosphorus dynamics
D. Hebel (UH)	Organic matter exudates
L. Tupas (UH)	Primary production intercomparison

SAMPLES TAKEN FOR OTHER INVESTIGATORS

C. Keeling (SIO)	CO2 dynamics and intercalibration
P. Quay (UW)	DIC and 13C
E. Boyle (MIT)	Trace metals
J. Porter (UH)	Aerosol and Ozone measurements
B. Popp (UH)	Nitrous oxide
M. Abbot (OSU)	Spectral measurements