

HOT-95: Chief Scientist Report

Chief Scientist: C. NOSSE

Chief Scientist's Cruise Report

HOT-95 Chief Scientist's Cruise Report

R/V Moana Wave

13-17 July 1998

Departed: July 13, 1998 at 0915 (HST)

Returned: July 17, 1998 at 0730 (HST)

Vessel: R/V Moana Wave

Operator: University of Hawai'i

Master of the Vessel: Captain John Stahl

Chief Scientist: Craig Nosse

STAG Electronics Technician: Sharon Stahl

STAG Deck Technician: Dave Gravett

1.0 SCIENTIFIC OBJECTIVES

The objective of the 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 July 13 for about 4 hours.

2) Station 2 (ALOHA) is defined as a circle with a 6 nautical mile radius centered at 22° 45' N, 158° W. This is the main HOT station and was to be occupied for 3 days from July 14 to July 16.

3) Station 8, is the location of the Hale-ALOHA buoy (22° 28' N, 158° 8' W). It was to be occupied on July 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 free-drifting sediment trap array was to be deployed for about 60 hours to measure sedimentation rates of particulate matter. Release and recovery of one inverted echo sounder (IES) was to take place after the deployment of the sediment trap array. 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 July 15. Plankton net tows were to be made near noon and midnight while at Station ALOHA. A profiling reflectance radiometer (PRR) and a tethered spectral radiometric buoy (TSRB) were to be deployed around noon of each day at Station ALOHA.

After operations at Station ALOHA were accomplished, the ship was to transit to recover the sediment trap array. Once the sediment traps were recovered, the ship was to proceed to Station 8, where one CTD cast was to be conducted on July 16 as well as a PRR cast and TSRB deployment. Trace metal samples were also to be collected. After work at Station 8 has finished, 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

pCO₂ system, and an array of meteorological instruments.

2.0. SCIENCE PERSONNEL

Karin Bjorkman - UH Research Associate (JGOFS)
Lance Fujieki - UH Computer Specialist (JGOFS)
Michael Guidry - UH Graduate Student (Apatite and Calcite samples)
Dale Hebel** - UH Scientist (JGOFS)
Terry Houlihan - UH Research Associate (JGOFS)
Markus Karner - UH Postdoctoral Researcher (JGOFS)
Mike Landry - UH Scientist (JGOFS - Zooplankton)
Craig Nosse* - UH Research Associate (WOCE)
Scott Nunnery - UH Research Associate (JGOFS - Zooplankton)
Donna Robinson - HPU Undergraduate Student (WOCE)
Greg Rukowsky - UH Undergraduate Student (Sun Photometry and Aerosols)
Dan Sadler** - UH Research Associate (JGOFS)
Treda Smith - REU Student (JGOFS - Zooplankton)
Luis Tupas - UH Scientist (JGOFS)
Mark Valenciano - UH Electronics Technician (WOCE)
Don Wright - UH Research Associate (WOCE)

* = Chief Scientist

** = Watch Leader

3.0. GENERAL SUMMARY

All the primary JGOFS and WOCE objectives were accomplished and all samples for ancillary projects were taken. The IES was also successfully recovered.

A 36-hour CTD burst sampling period was completed at Station ALOHA which involved twelve 1000 m casts and one deep cast to the near-bottom conducted at the end of the 36-hour period. A near-bottom deep cast was also obtained prior to the commencement of the 36-hour period. 1000 m casts were also obtained at stations Kahe and Hale-ALOHA.

One 8-bottle Go-Flo cast was made to obtain seawater for the primary productivity array which was deployed and recovered without incident. The array of floating sediment traps was also deployed and recovered without incident. The sediment traps had drifted about 15 nm west-southwest from the center of Station ALOHA. Two 4-bottle Go-Flo casts were conducted at Station ALOHA to obtain zooplankton grazing samples for M. Landry and T. Smith. S. Nunnery successfully completed 6 plankton net tows (3 during the day, 3 at night).

The bottom moored IES located four nautical miles north of Station ALOHA was recovered without incident after its year-long deployment. Initial indications show that the IES appears to be in good working order.

Weather conditions were somewhat rough during the transit out to Station ALOHA with 20+ knot winds and about 5-6 foot seas. However, conditions improved dramatically throughout the cruise and on the last day of the cruise, winds had diminished to below 15 knots and the sea condition diminished to 2-3 foot seas.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph, the Licor light logger and the fluorometer. It was decided by the JGOFS group not to run the pCO₂ system during the cruise. The primary meteorological sensors failed to record about 12 hours of data during the second to last day of the cruise but all other meteorological data were continuously recorded throughout the cruise.

We arrived a Snug Harbor on July 17 approximately 0730 (HST) and immediately off-loaded all deck and lab equipment as there was another cruise

scheduled to set sail after this cruise.

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

The R/V Moana Wave continues to provide an excellent platform for our work and the ship support is excellent as well. 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. In particular, First Mate Ross Barnes should be noted for his fine seamanship which greatly assisted in our recovery of the IES through his highly skilled abilities to maneuver the ship.

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. Sharon Stahl was particularly helpful in working on the electronic instruments required to recover the IES and Dave Gravett made sure that all recovery equipment were on-hand at the time of the recovery.

5.0 DAILY REPORT OF ACTIVITIES (HST)

July 10, 1998; Loading Day

The R/V Moana Wave had no cruises scheduled between the previous HOT cruise (HOT-94) and the present cruise (HOT-95). Thus, many items were left on-board from the previous cruise so loading was close to minimal. The JGOFS group had almost all equipment and supplies already on-board but the WOCE group had to load their full complement of gear and also had to make a new CTD cable termination on loading day.

July 13, 1998

The ship departed Snug Harbor at 0915. Fire and abandon ship drills were conducted at about 1000. Arrived at Kahe Station at 1200 and commenced a weight cast to test the CTD winch. At 1315, a PRR (Profiling Reflectance Radiometer) cast was made and simultaneously a TSRB (Tethered SpectroRadiometer Buoy) was deployed off the stern. A 1000 m CTD cast was conducted at 1400.

At 1600, the transit to Station ALOHA was begun and rough seas were encountered after rounding Kaena Point. Winds were from the east at over 20 knots and seas were about 5-6 feet.

July 14, 1998

The ship arrived at Station ALOHA at 0045. Upon arrival, a plankton net was towed off the stern for S. Nunnery and the sediment trap deployment followed. The radio direction finder on the bridge confirmed that the array's buoy was transmitting correctly. M. Guidry placed apatite samples on the array. IES (Inverted Echo Sounder) recovery operations began at 0400. The IES was recovered on-board at 0652. At 0800, a 4-bottle Go-Flo cast was conducted for M. Landry and T. Smith for zooplankton grazing experiments. Attempts were made to begin the WOCE deep cast at 1000. However, problems with one of the conductivity sensors on the CTD delayed this endeavor as it was recording inaccurate readings. As it took time to diagnose and solve this problem, it was decided to postpone CTD operations. In the meantime, a PRR cast and TSRB deployment was made at 1200 and S. Nunnery followed with a plankton net tow at 1215. The deep cast was conducted at 1300 near the center of Station ALOHA. The ship could not proceed to the center of the station as the sediment trap was floating near that area. After the deep cast, the 36-hour CTD burst sampling

period began at 1800. Another plankton net tow was conducted at 2200.

Winds were easterly at about 20 knots and seas were diminishing to 3-4 foot seas.

July 15, 1998

The 36-hour CTD sampling continued as scheduled. One net tow was conducted at 0115. The 8-bottle Go-Flo cast to collect seawater for the primary productivity array began at 0200. The primary productivity array was deployed at 0545. Net tows were conducted at 1030 and 1345. A PRR cast was made and the TSRB was deployed at 1300. The primary productivity array was recovered at 1930. A 4-bottle Go-Flo cast was performed to collect zooplankton grazing samples for M. Landry and T. Smith at 2000. The ship pumped the holding tanks outside of Station ALOHA at 2315. This did not interfere with the 36-hour CTD sampling.

Winds were easterly at about 17 knots and seas were about 2-3 feet.

July 16, 1998

The 36-hour CTD sampling period ended with the second deep cast conducted for this cruise. The second deep cast began at 0600. At 0800, S. Stahl reported that the primary meteorological sensors were not logging data for the previous 12 hours. This problem was fixed. Sediment trap recovery operations began at 1200. After the recovery of the sediment traps, a PRR cast was conducted and the TSRB was deployed at 1300. At 1645, a 1000 m cast began at the Hale-ALOHA station. During the cast, a trace metal sampler was deployed off the stern up the ship. After operations were finished at Hale-ALOHA, the ship began the transit back to Snug Harbor at 1900.

Winds were easterly and reduced below 15 knots. Seas were still about 2-3 feet.

July 17, 1998

We arrived at Snug Harbor at 0730 and proceeded to off-load all the deck and lab equipment. Lab space and staterooms were cleaned. Off-loading was finished by noon.

6.0 SUB COMPONENT PROGRAMS AND SPECIAL PROJECTS

B. Bidigare (UH)	HPLC Pigments
M. Landry (UH)	Zooplankton dynamics/grazing
D. Hebel (UH)	EOC
M. Karner (UH)	Archaeae

7.0 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 samples
J. Zehr (RPI)	Prochlorons

E. Laws (UH)	Surface seawater
C. Measures (UH)	Surface seawater
T. Walsh (UH)	Surface seawater

8.0 SAMPLES TAKEN FOR STUDENTS

A. Adams (UH)	Calcite
K. Bjorkman (UH)	Phosphorous experiments
M. Guidry (UH)	Apatite measurements
T. Smith (REU)	Zooplankton grazing