

HOT-133: Chief Scientist Report

Chief Scientist: T. GREGORY

Departed: December 12, 2001 at 1000 (HST)

Returned: December 16, 2001 at 1930 (HST)

Vessel: R/V Ka'imikai-o-Kanaloa

Operator: University of Hawaii

Master of the Vessel: Captain Robert Hayes

Chief Scientist: Thomas Gregory

STAG Electronics Technician: Steve Poulos

STAG Deck Operations: Dave Gravatt

1. SCIENTIFIC OBJECTIVES

The objective of this cruise was to continue building 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 December 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 22° 45'N, 158°W. This is the main HOT station and was to be occupied for 4 days from December 13 to December 16.

3) Station 8, referred to as HALE-ALOHA is the location of our deep ocean mooring (20° 20'N, 158° 10.6'W). The mooring is no longer deployed. It was to be occupied on December 16 for about 2 hours.

4) 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 16 for about 4 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. PRR and TSRB measurements were also to be made.

Upon arrival at Station ALOHA, net tows were to be conducted followed by the deployment of a free-drifting sediment trap array. 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. Two other free-drifting arrays were to be deployed on December 14: an oxygen balance experiment for 24 hours and a primary production experiment for 12 hours. Plankton net tows were to be conducted near noon and midnight on December 13 and 14 at Station ALOHA. PRR and TSRB deployments and recoveries were to be done around noon December 13 and 14. After work at Station ALOHA was accomplished, the ship was to transit to recover bottom moored sediment traps, which had been

deployed near Station ALOHA on December 15, 2000. Following this operation we were to recover the drifting sediment trap array.

Following Station ALOHA operations, the ship was to transit to Station 8 to conduct one CTD cast and then 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.

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

2. SCIENCE PERSONNEL

WOCE group:

Noel Larson (Watch Leader)	Research Associate	UH
Jeremiah Johnson	Research Associate	UH
Mark Valenciano	Electronics Technician	UH
Fernando Santiago-Mandujano	Research Associate	UH

JGOFS group:

Tom Gregory (Chief Scientist)	Research Associate	UH
Karin Björkman	Research Specialist	UH
Anne Gasc	Research Associate	UH
Lance Fujieki (Watch Leader)	Computer Specialist	UH
Paul Morris	Technician	UH
John Dore	Scientist	UH
Tara Clemente	Research Associate	UH
Colleen Allen	Research Associate	UH

3. GENERAL SUMMARY

One 1000-m CTD cast was obtained at both Station Kahe and Station HALE-ALOHA however we did not complete a cast at Station Kaena. PRR/TSRB deployments were successful at Station HALE-ALOHA. Heavy seas and high winds hampered operations at Station ALOHA. After waiting for the heavy weather to subside to operational levels, all CTD-related sampling goals were accomplished including the 36-hour sampling interval.

Neither free-floating array deployments nor PRR/TSRB work were attempted at Station ALOHA due to extreme weather. Also, we decided to postpone recovery of the bottom moored sediment trap to a future cruise.

C. Allen attempted one plankton net tow however most of the 202 ?m net including the cod end was lost.

The ADCP ran without interruption throughout the cruise, as well as the fluorometer, thermosalinograph and the ship's anemometer. However, thermosalinograph conductivity data was quite noisy, probably due to bubbles in the system.

We arrived back at Snug Harbor on December 16 at about 1930. A partial off-load took place the next morning.

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

The R/V Ka'imikai-o-Kanaloa and her crew continue to deliver excellent ship support for our work. The officers and crew were most helpful and accommodating and are to be commended for maintaining their high standards during a grueling cruise. They showed enthusiasm and concern for our work and were very flexible in receiving changes in our operational schedule that were mandated by the extreme weather we experienced.

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 11, 2001; Loading Day

Equipment loaded on this day. Tested CTD system.

December 12, 2001

The ship departed from Snug harbor at 1015. Fire and abandon ship drills were conducted at 1049, followed by a short science meeting during which the cruise schedule was reviewed and safety issues were discussed.

We arrived at Kahe station at 1314 and the PRR and TSRB were deployed immediately. Both worked without problems. A weight cast (400 lb) to 1000 m was conducted at 1350 followed by the CTD cast at 1506. A bottle was leaking on retrieval and another didn't close. The STAG Seapoint fluorometer (SN 2440) was used as the JGOFS fluorometer was not on board. The CTD cast was back on board at 1610 and we began transit to Station ALOHA. Due to high seas our speed was reduced to 7-8 knots.

Close to midnight the starboard forward vent box developed a leak. Seawater was observed flooding into the starboard lounge at about 1 gal/min. Ship engineers placed a soft patch on the holed vent box and we resumed transit to Station ALOHA at 2345. Sea conditions demanded a reduced speed of 6 knots.

December 13, 2001

We arrived at station ALOHA at 0650. Sustained 35 knot winds and steep, short period seas averaging 14 feet forced postponement of science operations. Conditions worsened throughout the day precluding any work.

Thermosalinograph conductivity data was quite noisy. We believe there were bubbles in the system due to high seas and extreme ship motion.

The ADCP showed a strong north current of about 1 knot turning northwestward below 100 m.

December 14, 2001

News of forecasted weather abatement was received during a satellite telephone with Roger Lukas, prompting us to remain on station. Heavy weather continued throughout the day however conditions improved such that we were able to begin our first CTD cast at 1950. A large northwest swell was expected to arrive by around noon on December 15 and we were concerned that we had only a short window in which to do some casts. Therefore we decided to begin with a tentative schedule of six casts, including one deep cast, that addressed our core sampling requirements. The first CTD cast was back on deck at 2055. The second cast went in at 2225 and was recovered at 2328.

Marginal working conditions combined with strong surface currents prompted the decision to cancel free-floating array and PRR/TSRB work for this cruise.

A zooplankton net tow was begun at 2336. The net tow was recovered at 2358. The 202 m net had ripped away from the rig and was lost. No more net tows were attempted this cruise.

December 15, 2001

The remaining four casts in our abbreviated schedule, including a deep cast to approximately 4800 m, were successfully completed. At this point all JGOFS goals involving CTD work had been met. We decided to remain on station to complete the 36-hour sampling period required by WOCE. We also decided to postpone recovery of our moored sediment trap until another cruise.

A total of 8 CTD casts were successfully completed this day.

December 16, 2001

We successfully completed two CTD casts this morning, meeting the 36-hour sampling period goal. We began transit to Station 8 at 0550.

The ship arrived at Station 8 and we began the CTD cast at 0900. CTD was recovered at 0953 and we departed for Snug Harbor.

The WOCE group decided to forego Station 6 this cruise.

Arrived at Snug Harbor at 1930.

December 17, 2001

A partial offload was completed this morning.

WEATHER:

Below is the cruise bridge log description for HOT 133. Wind and sea directions are in degrees, wind speed in knots, seas in Beaufort scale, swells in feet, barometer in inches Hg, temp in °F (dry bulb), clouds

in tenths.

Date	Wind	Sea	Swell	Barometer	Temp	Clouds
Wed 12, Dec.	080, 25-30	080, 5	120, 8-10	29.98-30.05	75-82	1-8
Thurs 13, Dec.	085-095, 32-38	085-095, 5-6	080-100, 15-20	30.04-30.10	72-78	4-9
Fri 14, Dec.	090-110, 26-40	090-110, 5-6	090, 16	29.99-30.09	73-76	6-10
Sat 15, Dec.	075-110, 17-26	075-110, 4-6	100, 10-15	29.96-30.05	74-76	4-10
Sun 16, Dec.	070-080, 20-24	070-080, 3-5	090-310, 5-10	30.00-30.05	71-73	2-7

Sub component programs:

Investigator:

Bob Bidigare

Mike Landry

John Dore

Project:

HPLC pigments/UH

zooplankton dynamics/UH

CO2 dynamics/UH

Ancillary programs:

Investigator:

Charles Keeling

Paul Quay

Mark Abbott/Ricardo Letelier

Peter J. LeB. Williams

Project:

CO2 dynamics and intercalibration/SIO

DI13C and O isotopes/UW

optical measurements/OSU

oxygen balance/U Wales Bangor, UK

Others:

Investigator:

Dale Hebel

Karin Björkman

Paul Morris

Project:

EOC production /UH

phosphorus cycling/UH

oxygen balance/UH