

# HOT-145: Chief Scientist Report

Chief Scientist: F. SANTIAGO-MANDUJANO

## HOT-145 Chief Scientist's Cruise Report

Cruise ID: KOK0304

Departed: February 24, 2003 at 0900 (HST)

Returned: February 28, 2003 at 0730

Vessel: R/V Ka'Imikai-O-Kanaloa

Operator: University of Hawaii

Master of the Vessel: Captain Ross Barnes

Chief Scientist: Fernando Santiago-Mandujano

STAG Electronics Technician: Gabe Foreman

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 February 24 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 February 25 to February 27.

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 February 27 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 net tow was 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.

One free-drifting array was to be deployed for 12 hours for incubation experiments on February 26.

A plankton net was to be deployed near noon and midnight on February 25 and 26 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 Tethered Spectral Radiometer Buoy (TSRB) were to be deployed for half-hour periods near noon time on each day.

A package including a Wet Labs AC9, a Fast Repetition Rate Fluorometer (FRRf), and a SeaBird Seacat was to be used to profile the upper 200 m at Sta. ALOHA for one-hour periods on February 26 and 27.

An Automated Trace Element Sampler (ATE) was to be hand deployed to collect a 10 m sample at Sta. ALOHA on February 27.

An set of instruments were to be used by C. McNaughton (Antony D. Clarke's group) to evaluate the size distribution and vertical structure of marine aerosols above the ship.

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

## 2. SCIENCE PERSONNEL

### JGOFS group:

Karin Björkman	Research Specialist	UH
Tara Clemente (Watch Leader)	Research Associate	UH
Anne Gasc	Research Associate	UH
Lance Fujieki	Computer Specialist	UH
Tom Gregory	Research Associate	UH
Dan Sadler	Research Associate	UH
Valerie Franck	Scientist	UH
Cecelia Sheridan	Graduate Student	UH

### PO group:

Yoshimi Rii	Research Associate	UH
Daniel Fitzgerald (Watch Leader)	Research Associate	UH
Mark Valenciano	Electronics Technician	UH
Yves Veillerobe	Undergraduate Student	UH/GES
Fernando Santiago-Mandujano	Chief Scientist (Res. Assoc.)	UH

### Others:

Cameron McNaughton	Graduate Student	UH/HiGEAR
Laurie Juranek	Graduate Student	UW

## 3. GENERAL SUMMARY

Operations were conducted as planned, without interruptions.

Fourteen 1000-m CTD casts and two deep casts (~4740 m) 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.

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

C. Sheridan completed successfully 6 plankton net tows.

The PRR, TSRB and AC9/FRRf were deployed as planned.

C. McNaughton used his set of instruments to evaluate the size distribution and vertical structure of marine aerosols. One of his three instruments did not operate during the cruise due to a broken electronic connection. Light scattering measured from the nephelometer showed clean marine conditions with scattering values as low as  $9 \text{ Mm}^{-1}$  and only as high as  $30 \text{ Mm}^{-1}$ . These values represent pristine marine conditions. Vertical visibility during cloud free periods extended beyond 7000m, the limit of instrument detection. The height of the marine stratus clouds were also recorded by the visibility instrument (ceilometer).

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

Winds were easterlies at 10-20 kt, and sea state 2-3.

We arrived back at Snug Harbor on February 28 at 0730. Full off-load took place immediately.

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

The R/V Ka'Imikai O Kanaloa 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 very good. 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)

February 22, 2003; Loading Day

Equipment loaded on this day (Van Labs were loaded earlier, on February 14). Terminated CTD wire and tested CTD system.

February 24, 2003

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

C. McNaughton installed his marine aerosol observation instruments on

the port side of the ship just outside the bridge. Unfortunately the miniature-optical particle counter (mini-OPC) had a broken electronic connection and did not operate during the cruise.

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 Radiometer Buoy (TSRB) were deployed.

A 1000-m CTD cast was conducted at 1400, after which the ship headed towards Station ALOHA.

Winds were easterlies at 10-20 kt. Sea state 3.

February 25, 2003

Arrived at Station ALOHA at 2315 (February 24), and proceeded to conduct a net tow, followed by the deployment of the sediment traps.

The deep PO cast started at 0200 and ended at 0530 without any problems. This cast was followed by the shallow PO cast, which started the 36-hr CTD cast period. A total of six 1000-m CTD casts were conducted this day.

Net tows were conducted at 0000, 1000, 1230 and 2200.

Winds were 10-20 kt easterlies, and 2-3 sea state.

February 26, 2003

Seven 1000-m CTD casts were conducted during this day, ending the 36-hr CTD cast period at 2100. A second deep cast was started at 2300.

The primary productivity array was deployed at 0600 and was retrieved at 1830, the array drifted 1 nm east from the center of ALOHA Sta.

One net tow was conducted at 0030 and one at 1000.

The PRR, TSRB and AC9/FRRf were deployed at 1200.

Winds were easterlies at 10-20 kt, and 2-3 sea state.

February 27, 2003

The second deep CTD cast that started at 2300 on February 26 was completed by 0215.

The floating sediment trap array was recovered at 0645. The array drifted 15 nm northwest from the center of Station ALOHA. One of the array's buoys was missing upon recovery, and the lines connecting the buoys were all tangled.

One AC9/FRRf cast was conducted at 0300 at ALOHA Sta. PRR/TSRB and AC-9/FRRf measurements were conducted between 1100 and 1300 at ALOHA.

A trace element sample was taken with the ATE at 1030 at ALOHA.

A near-bottom cast (~2500 m) was conducted at 2000 at Station Kaena (Stn. 6), after which the ship headed back to Snug harbor.

Winds were easterlies at 10-20 kt and sea state 3.

February 28, 2003

Arrived at Snug Harbor at 0730. Full off-load took place immediately.

Sub component programs:

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

Ancillary programs:

Investigator:	Project/Institution:
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Charles Keeling	CO2 dynamics and intercalibration/SIO
Mark Abbott/Ricardo Letelier	optical measurements/OSU
Penny Chisholm/Erik Zinser	Prochlorococcus ecotype dynamics/MIT

Others:	
Karin Björkman	phosphorus cycling/UH
Antony D. Clarke	Hawai'i Group for Environmental Aerosol Research (HiGEAR)