Hawaii Ocean Time-series
HOT-157 General Cruise Plan

Vessel: R/V *Kilo Moana*, University of Hawaii
Master of the Vessel: Captain Grey Drewry
Chief Scientist: Fernando Santiago-Mandujano, University of Hawaii
STAG Electronics Technician: Steve Poulos
STAG Deck Technician: Dave Gravatt

Loading: March 17, 2003 @ 0900
Departure: March 18, 2003 @ 0900
Arrival: March 22, 2003 @ 0800

1.0 SCIENTIFIC OBJECTIVES

The objective of the cruise is to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Two stations will 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 will be occupied on the first day of the cruise for about 5 hours.
2) Station ALOHA is defined as a circle with a 6 nautical mile radius centered at 22º 45'N, 158ºW. This is the main HOT station and will be occupied during the 2nd, 3rd, and 4th days of the cruise.

1.1 SCIENTIFIC OPERATIONS

Station	Activities
Kahe (sta. 1)	Weight Cast, Sea-Bird cast (1000 m), PRR cast, CTD cast (1000 m)
ALOHA (sta. 2)	Sediment traps, net tows, CTD operations, Sea-Bird deep casts, PRR casts, primary productivity measurements, AC9/FRRf, misc. experiments
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Karin Bjorkman	Research Specialist	UH/JGOFS
Tara Clemente	Research Associate	UH/JGOFS
Al Devol	Scientist	UW/JGOFS
Daniel Fitzgerald	Research Associate	UH/ PO
Lance Fujieki	Computer Specialist	UH/JGOFS
Eric Grabowski	Research Associate	UH/JGOFS
Marcie Grabowski	Graduate Student	UH/JGOFS
Tom Gregory	Research Associate	UH/JGOFS

Dave Gravatt	Marine Technician	UHMC/STAG
Bruce Howe	Scientist	UW/PO
Maya Iriondo	Graduate Student	UH/ PO
Marissa Kinnear Daniels	Undergraduate Student	UH/PO
Roger Lukas	Scientist	UH/PO
Darius Miller	Engineer	Sea-Bird/PO
David Murphy	Engineer	Sea-Bird/PO
Xavier Murard	Research Associate	UH/PO
Steve Poulos	Marine Technician	UHMC/STAG
Michael Rappe	Scientist	HIMB/JGOFS
Fernando Santiago-Mandujano	Chief Scientist, Res. Assoc.	UH/ PO
Cecelia Sheridan	Graduate Student	UH/JGOFS
Benjamin Van Mooy	Post-Doc	WHOI/JGOFS
Mark Valenciano	Electronics Technician	UH/ PO
Blake Watkins	Research Associate	UH/JGOFS

3.0. SUMMARY SCHEDULE

11 March	Pre-cruise meeting
17 March	Ship loading starting at 0900 hrs
18 March	Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.
18 March	Station 1 Kahe Pt. operations
19-20 March	Station ALOHA operations
21 March	Sea-Bird operations. Light casts. Sediment trap array retrieval.
22 March.	Arrive back to Snug harbor. ETA 0800 hrs, full offload

4.0. OPERATIONAL PLANS

4.1. Station Kahe (21°20.6'N, 158°16.4'W)

A 400 lb. weight-test cast, two CTD casts to 1000 m, and a PRR cast (Sect. 4.2.5) will be conducted at this location in the afternoon of March 18. The CTD winch and crane will be required for these operations. After the operations are satisfactorily completed, the ship shall proceed to Station ALOHA.

4.2. Station ALOHA (22°45'N, 158°W with 6 nm radius)

4.2.1. Sediment trap deployment

Upon arrival to Station ALOHA, the sediment trap array will be deployed. The array will be deployed from the A-frame and the JGOFS DSE winch. Power requirement for the winch is 440 VAC, three phase at 10 amps. After deployment we request that the Bridge verify that the radio transmitters are functioning

and directionally correct. After deployment the ship shall return to the center of Station ALOHA and commence with the work outlined below.

The array will drift for about 57 hours before recovery. The array is equipped with 2 ARGOS satellite transmitters (platform #s 01325 and 01833), 2 strobe lights, and 2 radio transmitters (channel 74, 156.725 MHz). Daily positions of the array shall be transmitted by email directly to the ship, therefore the ship will not need to keep within site of the array until the time of the recovery. Assistance from the bridge is requested in plotting the drift track of the array. We request the use of the ship's radio direction finder for locating the array before recovery.

4.2.2. Water column measurements

Vertical profiles of temperature, conductivity and dissolved oxygen will be made with an instrument package consisting of a Sea-Bird CTD attached to a 24-place rosette with 12 liter sampling bottles. We need the ship's CTD winch and crane for this operation. Water samples for biogeochemical measurements will also be collected on each cast. The first cast shall be made to the near bottom (approximately 4800 m). Following this cast, a series of 1000-m casts shall be made continuously every 3 hours for a 36-hour period. It is highly desired that this burst sampling be done without interruption and we request the ship to maintain position within the study area for that period of time, and repositioning to the center of the Station before each cast whenever possible. After the burst period, two full-depth casts lasting 7.5 hr each will be conducted by Sea-Bird personnel in the morning and in the evening of March 21 at Station ALOHA (Sect. 4.2.7).

4.2.3. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette. Just before dawn (sunrise 0635 hrs on March 20), a free drifting incubation array will be deployed from the port side. We request the use of the port crane for this operation. The array is equipped with strobe lights and a radio transmitter (channel 72, 156.625 MHz). The ship shall keep within site of the array while performing CTD operations for the approximately 12-hour duration the array will be in the water. The array will be recovered just at sunset (1843 hrs). CTD operations shall continue after recovery. All radioactive waste generated by the experiment shall be returned to the University of Hawaii. Only qualified personnel shall handle radioactive material.

4.2.4. Plankton net tows

Plankton nets will be deployed from the stern and shall be towed for half-hour periods. Half-hour periods are scheduled at around noon and midnight on March 19 and 20 (see schedule) with a total of eight available slots to accommodate cancellations due to sea state or other unforeseen problems. The A-frame and capstan will be needed for this operation.

4.2.5. Profiling Reflectance Radiometer (PRR).

Around noon on each day a profiling reflectance radiometer will be deployed from the main deck using the A-frame.

4.2.6. AC9/FRRf

The Wet Labs AC9 is an optical instrument that measures water column spectral absorption and attenuation at nine wavelengths. The AC9 package also includes a Fast Repetition Rate Fluorometer (FRRf), and a Sea-Bird Seacat with temperature, conductivity, and pressure sensors. The package will be deployed to a target depth of 300 m at a constant speed of 10 m/min using the capstan and the A-frame.

4.2.7 Sea-Bird CTD casts

Personnel from Sea-Bird Electronics Inc. will be conducting oxygen sensor experiments during CTD casts using our Rosette package and CTD wire. Additional instruments (SBE 9plus and 17plus/49) will be installed on the Rosette during one 1000-m cast at Kahe Station, and two 4730-m casts at ALOHA Station. Each deep casts will last 7.5 hr. We need the ship's CTD winch and crane for these casts.

4.3 Floating sediment trap recovery

On March 21, after the morning Sea-Bird CTD cast has been completed, we shall transit for the recovery of the sediment trap array. The ship's A-frame will be needed to retrieve the sediment trap array. After the array is recovered, the ship shall transit back to Station ALOHA to continue operations.

4.5 Acoustic Doppler Current Profiler

The ship's acoustic Doppler current profiler (ADCP) will be in operation during the duration of the cruise. The ADCP should be set to work in bottom track mode when within range. It is requested to the Bridge officers to maintain the ship in a trajectory where the bottom depth is between 50 to 400 m when in transit between Snug harbor and Kahe Pt. (both directions) when possible. The STAG electronics technician will be in charge of the ADCP system.

4.6 Thermosalinograph and Fluorometer

The ship's thermosalinograph and fluorometer sampling the uncontaminated seawater supply system will be in operation during the duration of the cruise while the ship is outside of Snug harbor. Salinity samples to calibrate the thermosalinograph will be taken from the intake hose at 4-hour intervals throughout the duration of the cruise by the science personnel. The STAG electronics technician will be in charge of the thermosalinograph operation.

5.0 EQUIPMENT

5.1 The HOT science party shall be bringing the following

1. Seabird CTD system, all sensors, deck boxes and computer CTD acquisition systems.
2. 24-place rosette with 12-l water sampling bottles, all spare parts
3. One laboratory van (01 deck) with assorted equipment for radioisotope and general use
4. Distilled, deionized water and all required chemicals and isotopes
5. Storage van with assorted equipment (main deck)
6. Large vacuum waste container
7. Liquid nitrogen dewers
8. Drifting sediment trap array with strobe lights, satellite and radio transmitters, floats, weights

9. Kevlar line, polypropylene line
10. Sediment traps and crosses
11. Drifting primary production array with light and radio transmitter, floats, weights
12. PRR, AC-9/FRRf and other optical measuring instruments.
13. DSE winch (440 VAC, 3 phase at 10 amps) and Kevlar line
14. Oxygen titration system
15. Plankton nets and towing lines
16. Desktop and laptop personal computers
17. Assorted tools
18. All required sampling bottles.
19. Deck incubation system
20. Small capstan
21. 400 lb weight.
22. Pertinent MSDS

5.2. We will need the use of the following ship's equipment:

1. Port side crane
2. A-frame block assembly
3. Crane and winch with conducting wire for CTD
4. Electric power for winches and vans
5. Radio direction finder
6. Empty freezer and refrigerator in science storage room
7. Space on the main deck for storage van, DSE winch
8. Space on the upper 01 deck for 1 lab van
9. Hand-held VHF transceivers
10. Precision depth recorder
11. Shackles, sheaves, hooks and lines
12. Shipboard Acoustic Doppler Current Profiler
13. Thermosalinograph and Fluorometer
14. Copy machine
15. Grappling hooks and line
16. Navlink2 PC or equivalent
17. Running fresh water and seawater, hoses
18. Electronic mail system
19. GPS system
20. Uncontaminated seawater supply
21. Capstan
22. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer

18-22 March 2004 **HOT 157**
Ship: R/V *Kilo Moana* **CTD CASTS**

Cast		Samples	#Bottles
Kahe Pt.			
Sea-Bird-1, 1000 m		Sea-Bird test cast, no samples.	
s1c1	1000 m	O_2, Temp, DIC/Alk, Nuts, Chl a, LLN, $LLPO_4$, DOC, FCM, Salts,	24
Station ALOHA			
s2c1	4730 m (PO-1)	O_2, Temp, DOC, DIC/Alk, Nuts, Salts	24
s2c2	1000 m (PO -2)	O_2, Temp, Nuts, DIC/Alk, Quay, DOC, Salts	24
s2c3	1000 m	MIT, Salts	14
s2c4	1000 m	PPO_4, Salts	14
s2c5	1000 m	PC/PN, Salts	14
s2c6	1000 m	PE, Salts	14
s2c7	1000 m (JGOFS-2)	O_2, Temp, DIC/Alk, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	19
s2c8	1000 m	Primary Productivity, Chl a, FCM, Salts	22
s2c9	1000 m	Salts	4
s2c10	1000 m	PSi, Salts	12
s2c11	1000 m	Salts	4
s2c12	1000 m	ATP, Salts	11
s2c13	1000 m	Salts	4
s2c14	1000 m	HPLC, Chl a, Salts, C. Sheridan (10)	24
Sea-Bird-2, 4730 m		O2, Salts	13
Sea-Bird-3, 4730 m		O2, Salts	13

SHIP R/V *Kilo Moana* HOT 157 DATE 18-22 March, 2004

TIME	Thu. 3/18	Fri. 3/19	Sat. 3/20	Sun. 3/21	Mon. 3/22
0000		Arrive ALOHA Net tow			
0100		Deploy sed. traps	Net tow		
0200		S2C1 PO-1	S2C8 PP		
0300					
0400			AC-9/FRRf		
0500			S2C9 Open		
0600			Deploy PP array Log PRR Light		
0700				Transit sed traps	
0800	On Board	S2C2 PO-2 (start 36 hrs)	S2C10 PSi		Arrive Snug Full Offload
0900	Depart Snug Log Licor light			Recover sed traps	
1000		Net tow	Net tow	Transit ALOHA	
1100	Arrive Kahe1130 Weight cast	S2C3 MIT	S2C11 Open		
1200	PRR	Net tow TSRB	PRR AC-9/FRRf	PRR	
1300	Sea-Bird-1	PRR	Net tow	AC-9/FRRf	
1400	shallow cast	S2C4 P.PO4	S2C12 ATP	AC-9/FRRf	
1500	S1C1 (Kahe)			Sea-Bird-3 deep cast	
1600	Transit ALOHA				
1700		S2C5 PC/PN	S2C13 Open		
1800			Recover PP array		
1900			End PRR Light		
2000		S2C6 PE	S2C14 HPLC (end 36 hrs)		
2100					
2200		Net tow	Net tow		
2300		S2C7 JGOFS-2	Sea-Bird-2 deep cast	Transit Snug	

March 20: Sunrise 0635 Sunset 1843

6.0 HOT-157 Watch Schedule

0300-1500

Bunk No.
01-16 (D) Tom Gregory - Watch Leader
01-15 (D) Lance Fujieki
01-12 (U) Tara Clemente
01-18 (U) Mark Valenciano
01-14 (U) Maya Iriondo
01-11 (U) Marissa Kinnear Daniels

1500-0300

01-18 (D) Daniel Fitzgerald - Watch Leader
01-09 (U) Xavier Murard
01-16 (U) Eric Grabowski
01-11 (D) Marcie Grabowski
01-15 (U) Blake Watkins
01-12 (D) Karin Bjorkman

At Large

01-10 (D) Al Devol
01-08 (D) Bruce Howe
01-08 (U) Roger Lukas
01-13 (U) Darius Miller
01-13 (D) David Murphy
01-10 (U) Michael Rappe
02-02 Fernando S-Mandujano
01-14 (D) Cecelia Sheridan
01-09 (D) Benjamin Van Mooy

STAG

01-02 Steve Poulos
01-04 Dave Gravatt