HAWAII OCEAN TIME-SERIES
HOT- 143 General Cruise Plan

VESSEL: R/V *Kilo Moana*, University of Hawaii
MASTER OF THE VESSEL: Captain Phil Smith
CHIEF SCIENTIST: Thomas Gregory, University of Hawaii
STAG Deck Technician: Dave Gravatt
STAG Electronics Technician: Steve Poulos
Load: December 16, 2002, 1300 HST
Departure: December 17, 2002; 0800 HST
Return: December 21, 2002; 0730 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT-143 is to maintain collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) Station ALOHA, our near shore station Kahe Point, and Kaena Pt. station. Kahe Point (21°20.6'N, 158°16.4'W) is occuppied enroute to Station ALOHA to test equipment and collect nearshore data. Station ALOHA is defined as a circle with a 6 nautical mile radius centered at 22°45'N, 158°W. Kaena Point station (21°50.8'N, 158°21.8'W), will be occuppied on the return transit to Honolulu.

1.1 SCIENTIFIC OPERATIONS

Station	Activities
Kahe (sta. 1)	Weight Cast, PRR/TSRB cast, CTD cast (1000 m)
ALOHA (sta. 2)	Sediment traps, CTD operations, PRR/TSRB casts, primary productivity measurements, AC9, misc. experiments
Kaena Pt. (sta. 6)	CTD operations (2500 m)
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Clemente, Tara	Research Associate	UH/JGOFS
Fitzgerald, Daniel	Research Associate	UH/PO
Franck, Valerie	Investigator	UH/JGOFS
Fujieki, Lance	Computer Specialist	UH/JGOFS
Gasc, Anne	Research Associate	UH/JGOFS
Gregory, Tom	Research Associate	UH/JGOFS
Johnson, Steve	Volunteer	UH/PO
Morris, Paul	Technician	UH/JGOFS
Rii, Shimi	Research Associate	UH/PO
Sadler, Dan	Research Associate	UH/JGOFS
Santiago -Mandujano, Fernando	Research Associate	UH/PO
Unterwiser, Ivaleen	Volunteer	UH/PO
Valenciano, Mark	Electronics Technician	UH/PO
Gravatt, Dave	Deck Technician	UHMC/STAG
Poulos, Steve	Electronics Technician	UHMC/STAG

JGOFS: Joint Global Ocean Flux Study group

PO: Physical Oceanography group
STAG: Shipboard Technical Assistance Group

3.0. SUMMARY SCHEDULE

13 December	Pre-cruise meeting at 1100 HST in MSB 305
16 December	Ship loading starting at 1300 hrs
17 December	Depart from Snug harbor at 1000 hrs. Science personnel on-board by 0930.
17 December	Station 1 Kahe Pt. operations
18-20 December	Station ALOHA operations
20 December	Sediment trap array retrieval, station 6 CTD operations.
21 December	Arrive back to Snug harbor. ETA 0900 hrs, full offload

4.0. OPERATIONAL PLANS

4.1. Kahe Point Station (21^{o}20.6'N, 158^{o}16.4'W)

Operations at Kahe station include an initial weight cast to 1000 m, followed by simultaneous floating TSRB and hand-lowered light cast (PRR-600); and CTD cast to 1000 m. After all operations have been completed the ship shall proceed to Station ALOHA.

4.2. Station ALOHA (22^{o}45'N, 158^{o}W with 6 nmile radius)

Upon arrival at Station ALOHA the floating sediment traps will be deployed. After the trap deployment CTD operations will begin. As usual the first cast will be to near-bottom, followed by the 36 hr, 3 hr interval "burst" sampling. Interspersed in this time frame are PRR/TSRB casts, primary production cast/array deployment/retrieval, and misc. experiments. Our final activity at this station will be an AC-9/FRRf cast.

4.2.1. Floating Sediment Trap deployment

The floating sediment traps will be deployed from the center of Station ALOHA. The array will be deployed from the A-frame and the JGOFS DSE winch. Power requirements for the winch is 440 VAC, three phase at 10 amps. After deployment we would like to return to the center of Station ALOHA and commence with CTD operations.

The array will drift for approximately 52 hours before recovery. The array is equipped with 2 ARGOS satellite transmitters (platform # 01325 & 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. 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.

4.2.2. Water column measurements

Vertical profiles of temperature, conductivity and dissolved oxygen will be made with an instrument package consisting of a Seabird CTD attached to a 24-place rosette with 12 liter sampling bottles. The ship's CTD winch will be used 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 casts shall be made continuously every 3 hours for a 36-hour period, after which a second full-depth cast will be conducted. 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.

4.2.3. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette (cast 8). Just before dawn (sunrise 0707 hrs), a second free drifting array with incubation samples will be deployed from the port side. We request the use of the port crane for this operation. The array is equipped with a strobe light and a radio transmitter (channel 72, 156.625 MHz). The ship shall keep within sight 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 around sunset (1751 hrs). CTD operations shall continue after the recovery.

4.2.4. Profiling Reflectance Radiometer (PRR) and Tethered Spectral Radiometric Buoy (TSRB)

Around noon on each day a profiling reflectance radiometer will be deployed from the main deck using the starboard crane. The floating tethered spectral radiometric buoy will be deployed from the stern at the same time as the PRR cast to obtain simultaneous data streams.

4.2.5. AC-9/FRRf

An optical package containing the AC-9 and the Fast Repetition Rate fluorometer (FRRf) will be deployed 4 times during the cruise. The package will be deployed to a depth of up to 300 m at a steady wire speed of 10 m/s during the downcast and upcast.

4.2.6 ATE

An automated trace element sampler will be deployed on the fourth day of the cruise. This instrument is hand-lowered over the side. It is important that this deployment take place at Station ALOHA as soon as we return from recovering the sediment traps.

4.3. Floating Arrays

After the AC-9/FRRf cast on the fourth morning of the cruise has been completed we shall transit for the recovery of the sediment trap array. We will retrieve the sediment trap array at daybreak. The ship's A-frame will be needed for this operation. Once recovery is completed we will transit back to Station ALOHA to continue AC-9/FRRf operations, after which the ship shall transit to Station 6.

4.4 Kaena Point (station 6)

The final station will be station 6, Kaena Point ($21^{o}50.8$'N, $158^{o}21.8$'W), on the return transit. Here a near-bottom (~2500 m) CTD cast will be conducted. After this cast is completed, a CTD Yo-yo cast will be conducted before returning to Snug Harbor.

5.0 EQUIPMENT

5.1 The HOT science party shall bring the following:

1. Sea-Bird 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 with assorted laboratory equipment for radioisotope and sample processing work.
4. All required sampling bottles
5. Distilled, deionized water and all required chemicals and isotopes
6. Storage van with assorted equipment

7. Large vacuum waste container
8. Liquid nitrogen dewars
9. Drifting sediment trap array with strobe lights, satellite and radio transmitters, floats, weights, spar buoy etc.
10. Drifting primary productivity array with strobe light, radio transmitter, floats, weights, polypro. line, spar buoy etc.
11. Dissolved oxygen measurement system
12. Desktop and laptop personal computers
13. PRR/TSRB, AC-9/FRRf, and other optical measuring instruments
14. Deck incubation system
15. Pertinent MSDS
16. DSE winch

5.2 We will need from the ship the following:

1. Port crane
2. A-frame block assembly
3. Crane and winch with conducting wire for CTD
4. Electric power for winches, vans, and incubators
5. Radio direction finder
6. Empty freezer and refrigerator in science storage room
7. Space on the main deck for 1 labvan
8. Space on 01 deck for 1 van
9. Hand-held VHF transceivers
10. Precision depth recorder
11. Shackles, hooks and lines
12. Shipboard Acoustic Doppler Current Profiler
13. Space on the 02 deck for incubator
14. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer
15. Grappling hooks and line
16. Running fresh water and seawater hoses
17. Electronic mail system
18. GPS system
19. Navlink2 PC or equivalent
20. Uncontaminated seawater supply

SHIP R/V *Kilo Moana* HOT 143 DATE 17-21 December, 2002

TIME	Tues. 12/17	Wed. 12/18	Thurs. 12/19	Fri. 12/20	Sat. 12/21
0000		Arrive ALOHA			
0100		Deploy sed. traps			
0200		S2C1 PO-1	S2C8 PP		
0300				AC-9/FRRf	
0400				Transit sed traps	
0500			S2C9 Open		
0600			Deploy PP array Log PRR Light		
0700	On Board			Recover sed traps	Arrive Snug
0800	Depart Snug Log Licor light	S2C2 PO-2 (start 36 hrs)	S2C10 PSi		
0900				Transit ALOHA	
1000					
1100		S2C3 MIT	S2C11 Open	ATE	
1200	Arrive Kahe Weight cast		PRR/TSRB AC-9/FRRf	PRR/TSRB AC-9/FRRf	
1300	PRR/TSRB			AC-9/FRRf	
1400	S1C1 (Kahe)	S2C4 P.PO4	S2C12 ATP	Transit sta. 6	
1500	Transit ALOHA				
1600					
1700		S2C5 PC/PN	Recover PP array S2C13 Thorium		
1800			End PRR Light		
1900					
2000		S2C6 PE	S2C14 HPLC (end 36 hrs)	S6C1 (Kaena)	
2100				Transit Snug	
2200					
2300		S2C7 JGOFS-2	S2C15 PO-3		

Sunrise 0707 Sunset 1751 December 18, 2002

HOT-143 Watch Schedule (Berth assignments)

0300-1500

A. Gasc (01-13) - Watch Leader
L. Fujieki (01-8 U)
F. Santiago-Mandujano (01-10)
T. Gregory (02-02) (Chief Scientist)
I. Unterwiser (01-14 L)
S. Rii (01-9)

1500-0300

P. Morris (01-8 L) - Watch Leader
T. Clemente (01-14 U)
D. Fitzgerald (01-11)
D. Sadler (01-12)
S. Johnson (01-16 U)

At-large

V. Franck (01-15)
M. Valenciano (01-16 L)

STAG

D. Gravatt (01-02 L)
S. Poulos (01-04 L)

17 - 21 December, 2002 **HOT 143**
Ship: R/V *Kilo Moana* **CTD CASTS**

Cast		Samples	#Bottles
Kahe Pt.			
s1c1	1000 m	O_2, Temp, DIC/Alk, Nuts, Chl a, LLN, $LLPO_4$, DOC, FCM, Salts,	16
Station ALOHA			
s2c1	4800 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	PPO4, Salt	14
s2c5	1000 m	PC/PN, Salts	14
s2c6	1000 m	PE, Salts, VF (2)	16
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	8
s2c10	1000 m	PSi, Salts, VF (2)	12
s2c11	1000 m	Salts	4
s2c12	1000 m	ATP, Salts	11
s2c13	1000 m	Thorium, Salts	17
s2c14	1000 m	HPLC, Chl a, Salts	14
s2c15	4800 m (PO-3)	O_2, Temp, Salts, Thorium, WOCE	14
Kaena Point			
s6c1	2500 m	Open, Chl a Salts	13