HAWAII OCEAN TIME-SERIES
HOT- 153 General Cruise Plan

VESSEL: R/V *Kilo Moana*, University of Hawaii
MASTER OF THE VESSEL: Captain Drewry
CHIEF SCIENTIST: Dan Sadler
STAG Deck Technician: Gabe Foreman
STAG Electronics Technician: Kuhio Vellalos
Load: November 7, 2003, 0900 HST
Depart: November 8; 2003 0900 HST
Return: November 13; 2003 0800 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT 153 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 Point 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 occupied on the return transit to Honolulu. A bottom moored sediment trap will be deployed just NE of Station ALOHA at 22°50'N, 157°53.8'W.

1.1 SCIENTIFIC OPERATIONS

Station	Activities
Kahe (sta. 1)	Weight Cast, PRR/TSRB cast, CTD cast (1000 m)
ALOHA (sta. 2)	Sediment traps, net tows, CTD op's, PRR/TSRB casts, primary productivity measurements, AC9, misc. experiments
NE of ALOHA	Bottom moored sediment trap deployment
Kaena Pt. (sta. 6)	CTD op's (2500 m)
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Björkman, Karin	*UH/JGOFS*	Research Specialist
Clemente, Tara	UH/JGOFS	Research Associate
Fitzgerald, Daniel	UH/PO	Research Associate
Foreman, Gabe	UHMC/STAG	Marine Technician
Fujieki, Lance	UH/JGOFS	Computer Specialist
Grabowski, Eric	UH/JGOFS	Research Associate
Gregory, Tom	UH/JGOFS	Research Associate
Hicks, Travis	HPU/PO	Undergraduate Student
Iriondo, Maya	UH/PO	Graduate Student
McGee, Colleen	HPU/PO	Undergraduate Student
Morris, Paul	UH/JGOFS	Research Associate
Sadler, Dan (Chief Scientist)	UH/JGOFS	Research Associate
Santiago-Mandujano, Fernando	UH/PO	Research Associate
Simmons, Melinda	SIOJGOFS	Graduate Student
Valenciano, Mark	UH/PO	Electronics Technician
Vellalos Kuhio	UHMC/STAG	Marine Technician
Watkins, Blake	UH/JGOFS	Research Associate

3.0. SUMMARY SCHEDULE

7 NOV	Ship loading starting at 1000 hrs
8 NOV	Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.
8 NOV	Station 1 Kahe Pt. operations
8-11 NOV	Station ALOHA operations
11 NOV	Moored trap deployment, floating sediment trap array retrieval, Station 6 CTD ops.
12 NOV	Return to Snug harbor. ETA 0800 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 a hand-lowered light cast (PRR-600) and CTD cast to 1000 m. After all operations have been completed the ship shall proceed to Sta. ALOHA.

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

Upon arrival at Station ALOHA a net tow will be conducted, followed by deployment of the floating sediment traps. 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 casts, primary production cast/array deployment/retrieval, additional plankton net tows, and misc. experiments.

4.2.1. Plankton net tows

A series of plankton net tows will be conducted off the stern. We request the use of the ship's capstan and A-frame for these operations. Hour periods are scheduled at around noon and midnight (see day-hour schedule) in excess of the six required in the event of equipment problems and/or rough sea conditions.

4.2.2. Floating Sediment Trap deployment

The floating sediment traps will be deployed from the center of Station ALOHA. The array will be deployed from the starboard side using the ship's starboard crane and the JGOFS DSE winch. The power requirement 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 55 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.

4.2.3. 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. We request the use of the ship's CTD winch 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, repositioning to the center of the Station before each cast whenever possible.

4.2.4. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette (cast 8). Just before dawn, a second free drifting array with incubation samples will be deployed from the stern. We request the use of the A-Frame for this operation and will also use the JGOFS DSE winch. 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. CTD operations shall continue after the recovery.

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 starboard crane. This instrument is hand-lowered and retrieved with assistance from the capstan or our DSE winch.

4.2.6. FRRf

The Chelsea Fast Repetition Rate fluorometer (FRRf) is an optical instrument used to measure photosynthetic properties in the water column. The package will be deployed to a target depth of 250 m from the stern. We request the use of the ship's A-frame and capstan for this operation. The slow sampling rate of these instruments requires a line speed of 10 m/min (20 m/min is acceptable when using the large capstan).

4.2.7 Floating Sediment Trap Recovery

After deployment and triangulation of the bottome moored sediment traps are completed we shall proceed for the recovery of the sediment trap array. The starboard crane and the JGOFS DSE winch will be needed for this operation.

4.3 Bottom Moored Sediment Trap Deployment

The deployment of the bottom moored sediment traps will be begin at sunrise on Tuesday, November 11th. The deployment will require use of the ship's A-frame, large capstan and blue mooring winch. After deployment, the exact location the traps will be determined by triangulation.

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 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. Type I and Type II 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
10. Drifting primary productivity array with strobe light, radio transmitter, floats, weights, polypro. line, spar buoy etc.
11. Plankton nets
12. Dissolved oxygen measurement system
13. Desktop and laptop personal computers
14. PRR, FRRf & other optical measuring instruments
15. Pertinent MSDS

16. DSE winch
17. Deck incubation system (Note: re-circulating chiller unit requires clean 220 VAC)
18. Bottom moored sediment trap array.
19. Mooring deck box, head phones and transducer.

5.2 We will need from the ship the following:

1. A-Frame
2. A-frame block assembly
3. Hydro winch
4. CTD winch
5. Electric power for winch (440 VAC three phase at 10 amps) and vans (208 VAC single phase at 30 amps for labvans, 110 VAC 10 amps for equipment van)
6. Radio direction finder
7. Empty freezer and refrigerator in wet lab
8. Space on the main deck for 2 labvans and one equipment van
9. Hand-held VHF transceivers
10. Precision depth recorder
11. Shackles, hooks and lines
12. Shipboard Acoustic Doppler Current Profiler
13. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer
14. Grappling hooks and line
15. Running fresh water and seawater hoses
16. Electronic mail system
17. GPS system
18. Navlink2 PC or equivalent
19. Uncontaminated seawater supply
20. Tracks and cart to bring CTD rosette into staging bay
21. Blue mooring winch
22. Large capstan

R/V *Kilo Moana* HOT 153 8-13 November, 2003

TIME	SAT 11/8	SUN 11/9	MON 11/10	TUES 11/11	WED 11/12
0000		Arrive ALOHA Net tow			
0100		Deploy sed. traps	Net tow		S6C1 (Kaena)
0200		S2C1 PO-1	S2C8 PP		
0300				FRRf	
0400					Transit Snug
0500			S2C9 Open		
0600			Deploy PP array Log PRR Light	Deploy Deep Sediment Traps	
0700					
0800	On Board	S2C2 PO-2 (start 36 hrs)	S2C10 PSi		
0900	Depart Snug Log Licor light				
1000		Net tow	Net tow		
1100		S2C3 MIT	S2C11 Open	Triangulate Traps	
1200	Arrive Kahe Weight cast	PRR FRRf	PRR FRRf		Arrive Snug Full Offload
1300	PRR	Net tow	Net tow		
1400	S1C1 (Kahe)	S2C4 P.PO4	S2C12 ATP		
1500	Transit ALOHA			Transit sed traps	
1600					
1700		S2C5 PC/PN	S2C13 Open	Recover sed traps	
1800					
1900			Recover PP array End PRR Light		
2000		S2C6 PE	S2C14 HPLC (end 36 hrs)	Transit St. 6	
2100					
2200		Net tow	Net tow		
2300		S2C7 JGOFS-2	S2C15 PO-3		

Sunrise 0642 **Sunset 1750** **November 10, 2003**

HOT-153 Watch Schedule

0300-1500

D. Fitzgerald
M. Valenciano
C. McGee
L. Fujieki
E. Grabowski
B. Watkins
T. Gregory - Watch Leader

1500-0300

F. Santiago-Mandujano - Watch Leader
M. Iriondo
T. Hicks
D. Sadler (Chief Scientist)
T. Clemente
K. Bjorkman
P. Morris
T. Hicks

At-large

M. Simmons

STAG

G. Foreman
K. Vellalos

8-12 July, 2003 **HOT 153**
Ship: R/V *Kaimikai O Kanaloa* **CTD CASTS**

Cast		Samples	#Bottles
Kahe Pt.			
s1c1	1000 m	O_2, Temp, DIC/Alk, Nuts, Chl a, LLN, $LLPO_4$, DOC, FCM, Salts, Si	24
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	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	8
s2c10	1000 m	PSi, Salts	10
s2c11	1000 m	Salts	4
s2c12	1000 m	ATP, Salts	11
s2c13	1000 m	Salts	4
s2c14	1000 m	HPLC, Chl a, Salts	14
s2c15	4800 m (PO-3)	O_2, Temp, Salts, WOCE	9
Kaena Point			
s6c1	2500 m	Open, Chl a Salts	13