HAWAII OCEAN TIME-SERIES
HOT- 156 General Cruise Plan

VESSEL: R/V Kaimikai O Kanaloa, University of Hawaii
MASTER OF THE VESSEL: Ross Barnes
CHIEF SCIENTIST: Dan Sadler, University of Hawaii
STAG Deck Technician: Dave Gravatt
STAG Electronics Technician: Steve Poulos
Load: Feb. 20, 2004 0900 HST
Depart: Feb. 23, 2004 0900 HST
Return: Feb. 27, 2004 0800 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT 156 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 ($21^{o}20.6'N$, $158^{o}16.4'W$) 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 $22^{o}45'N$, $158^{o}W$. Kaena Point station ($21^{o}50.8'N$, $158^{o}21.8'W$), will be occupied on the return transit to Honolulu.

1.1 SCIENTIFIC OPERATIONS

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

2.0. SCIENCE PERSONNEL

Clemente, Tara	UH/JGOFS	Research Associate
Watkins, Blake	UH/JGOFS	Marine Engineer
Fujieki, Lance	UH/JGOFS	Computer Specialist
Grabowski, Eric	UH/JGOFS	Research Associate
Gregory, Tom	UH/JGOFS	Research Associate
Sadler, Dan (Chief Scientist)	UH/JGOFS	Research Associate
Sheridan, Cecelia	UH/JGOFS	Graduate Student
Fitzgerald, Daniel	UH/PO	Research Associate
Iriondo, Maya	UH/PO	Graduate Student
Santiago -Mandujano, Fernando	UH/PO	Research Associate
Valenciano, Mark	UH/PO	Electronics Technician
Nurard, Xavier	UH/PO	Research Associate
Gravatt, Dave	UH/STAG	Deck Technician
Poulos, Steve	UH/STAG	Electronics Technician

3.0. SUMMARY SCHEDULE

20 Feb.	Ship loading starting at 0900 hrs
23 Feb.	Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.
23 Feb.	Station 1 Kahe Pt. operations
24-26 Feb.	Station ALOHA operations
26 Feb.	Sediment trap array retrieval, Station 8 CTD ops.
27 Feb.	Return to Snug harbor. ETA 0800 hrs, full offload

4.0. OPERATIONAL PLANS

4.1. Kahe Point Station (21°20.6'N, 158°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°45'N, 158°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 and optics 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 tow winch 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 stern using the knuckle crane and the JGOFS DSE winch. 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. The CTD winch and hydroboom 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, 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 knuckle crane 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. 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 Sea-Bird Seacat with temperature, conductivity, pressure and fluorometer sensors. The package will be deployed to a target depth of 150 m from the starboard side. We request the use of the tow winch for this deployment. The slow sampling rate of these instruments requires a winch speed of 10 m/min.

4.3. Floating Arrays

After operations at Sta. ALOHA have been completed we shall proceed for the recovery of the sediment trap array. We will retrieve the sediment trap array at daybreak. The starboard crane and the JGOFS DSE winch will be needed for this operation.

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 vans 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, AC-9 & other optical measuring instruments
15. Pertinent MSDS
16. DSE winch

5.2 We will need from the ship the following:

1. A-Frame
2. A-frame block assembly
3. Knuckle crane
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 labvan, 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 one labvan and space on the 03 deck for 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. Tow winch for nets and AC9-FRRf deployments

SHIP R/V KOK HOT 156 DATE 23-27 Feb., 2004

TIME	Mon. 1/23	Tue. 1/24	Wed. 1/25	Thu. 1/26	Fri. 1/27
0000		Arrive ALOHA Net tow			
0100		Deploy sed. traps	Net tow		
0200		S2C1 PO-1	S2C8 PP		
0300				AC9-FRRf	
0400				Transit sed traps	
0500			S2C9 Open		
0600			Deploy PP array Log PRR Light		
0700				Recover sed traps	
0800	On Board	S2C2 PO-2 (start 36 hrs)	S2C10 PSi	Transit ALOHA	Arrive Snug Full Offload
0900	Depart Snug Log Licor light				
1000		Net tow	Net tow		
1100		S2C3 MIT	S2C11 Open		
1200	Arrive Kahe Weight cast		PRR AC9-FRRf	PRR	
1300	PRR	Net tow	Net tow	AC9-FRRf	
1400	S1C1 (Kahe)	S2C4 P.PO4	S2C12 ATP	AC9-FRRf	
1500	Transit ALOHA			Transit St. 6	
1600					
1700		S2C5 PC/PN	S2C13 Open		
1800			Recover PP array		
1900			End PRR Light		
2000		S2C6 PE	S2C14 HPLC (end 36 hrs)	S6C1 (Kaena)	
2100				Transit Snug	
2200		Net tow	Net tow		
2300		S2C7 JGOFS-2	S2C15 PO-3		

Sunrise 0657 **Sunset 1833 Feb. 25, 2004**

HOT-156 Watch Schedule

0300-1500
F. Santiago-Mandujano - Watch Leader
M. Valenciano
L. Fujieki
B. Watkins
T. Gregory

1500-0300
E. Grabowski
M. Iriondo
D. Fitzgerald
T. Clemente - Watch Leader
D. Sadler (Chief Scientist)

At-large
C. Sheridan
X. Nurard

23-27 Feb., 2004 **HOT 156**
Ship: R/V KOK **CTD CASTS**

Cast		Samples	#Bottles
Kahe Pt.			
s1c1	*1000 m*	*O_2, Temp, DIC/Alk, Nuts, Chl a, LLN, $LLPO_4$, DOC, FCM, Salts,*	*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*