HAWAII OCEAN TIME-SERIES
HOT- 160 General Cruise Plan

VESSEL: R/V Kaimikai O Kanaloa, University of Hawaii
MASTER OF THE VESSEL: Ross Barnes
CHIEF SCIENTIST: Thomas K. Gregory, University of Hawaii
STAG Deck Technician: Tim McGovern
STAG Electronics Technician: Steve Poulos
Load: June 10, 2004 0900 HST
Depart: June 14, 2004 0900 HST
Return: June 18, 2004 0800 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT 160 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

Bjorkman, Karin	UH/BEACH	Research Specialist
Clemente, Tara	UH/BEACH	Research Associate
Dafner, Evgeny	UH/BEACH	Research Associate
Donachie, Stuart	UH/BEACH	UH Faculty
Fujieki, Lance	UH/BEACH	Computer Specialist
Grabowski, Eric	UH/BEACH	Research Associate
Gregory, Tom (Chief Scientist)	UH/BEACH	Research Associate
Hayakawa, Darin	UH/BEACH	Undergraduate Student
Iriondo, Maya	UH/PO	Graduate Student
Jachowski, Nick	UH/BEACH	Volunteer
McGovern, Tim	UH/STAG	Deck Technician
Murard, Xavier	UH/PO	Research Associate
Park, Bora	UH/BEACH	Undergraduate Student
Poulos, Steve	UH/STAG	Electronics Technician
Rii, Shimi	UH/BEACH	Graduate Student
Santiago - Mandujano, Fernando	UH/PO	Research Associate
Simmons, Melinda	SIO/BEACH	Graduate Student
Snyder, Jeffrey	UH/PO	Electronics Technician
Watkins, Blake	UH/BEACH	Marine Engineer

3.0. SUMMARY SCHEDULE

10 June	Ship loading starting at 0900 hrs
14 June	Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.
14 June	Station 1 Kahe Pt. operations
15-17 June	Station ALOHA operations
17 June	Sediment trap array retrieval, Station 8 CTD ops.
18 June	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 at the center of Station ALOHA. The array will be deployed from the stern using the knuckle crane and the 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 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 the DSE winch.

4.2.6. AC9

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. We request the use of the tow winch and A-frame for this operation.

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 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

SHIP R/V KOK HOT 160 DATE 14-18 June, 2004

TIME	Mon. 6/14	Tues. 6/15	Wed. 6/16	Thurs. 6/17	Fri. 6/18
0000		Net tow			
0100		Deploy sed. traps	Net tow		
0200		S2C2 PO-1	S2C9 PP		
0300				Transit sed traps	
0400			Deploy PP array Log PRR Light		
0500			S2C10 Open		
0600				Recover sed traps	
0700				Transit ALOHA	
0800	On Board	S2C3 PO-2 (start 36 hrs)	S2C11 PSi		Arrive Snug Full Offload
0900	Depart Snug Log Licor light				
1000		Net tow	Net tow		
1100		S2C4 MIT	S2C12 Open	PRR AC9	
1200	Arrive Kahe Weight cast		PRR AC9	AC9 Transit St. 6	
1300	PRR	Net tow	Net tow		
1400	S1C1 (Kahe)	S2C5 P.PO4	S2C13 ATP		
1500	Transit ALOHA				
1600					
1700		S2C6 PC/PN	S2C14 Open		
1800					
1900			Recover PP array End PRR Light	S6C1 (Kaena)	
2000		S2C7 PE	S2C15 HPLC (end 36 hrs)	Transit Snug	
2100					
2200		Net tow	Net tow		
2300	Arrive ALOHA. S2C1 Mix	S2C8 BEACH	S2C16 PO-3		

Sunrise 0547 **Sunset 1919 June 16, 2004**

HOT-160 Watch Schedule

0300-1500
F. Santiago-Mandujano - Watch Leader
L. Fujieki
E. Grabowski
E. Dafner
J. Snyder
B. Park

1500-0300
T. Clemente - Watch Leader
M. Iriondo
X. Murard
B. Watkins
T. Gregory (Chief Scientist)
S. Rii
D. Hayakawa

At-large
M. Simmons
N. Jachowski
K. Bjorkman
S. Donachie

14-18 June, 2004 **HOT 160**
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	1000 m	Mixing experiment, Salts (2@700, 5@30)	7
s2c2	4800 m (PO-1)	O_2, Temp, DOC, DIC/Alk, Nuts, Salts	24
s2c3	1000 m (PO-2)	O_2, Temp, Nuts, DIC/Alk, Quay, DOC, Salts	24
s2c4	1000 m	MIT, Salts	14
s2c5	1000 m	PPO4, Salt	14
s2c6	1000 m	PC/PN, Salts	14
s2c7	1000 m	PE, Salts	14
s2c8	1000 m (BEACH)	O_2, Temp, DIC/Alk, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	19
s2c9	1000 m	Primary Productivity, Chl a, FCM, Salts	22
s2c10	1000 m	Salts	4
s2c11	1000 m	PSi, Salts	10
s2c12	1000 m	Salts	4
s2c13	1000 m	ATP, Salts	11
s2c14	1000 m	Salts	4
s2c15	1000 m	HPLC, Chl a, Salts	14
s2c16	4800 m (PO-3)	O_2, Temp, Salts	9
Kaena Point			
s6c1	2500 m	Open, Chl a Salts	13