HAWAII OCEAN TIME-SERIES
HOT- 139 General Cruise Plan

VESSEL: R/V *Ka'Imikai-O-Kanaloa*, University of Hawaii
MASTER OF THE VESSEL: Captain Ross Barnes
CHIEF SCIENTIST: Fernando Santiago-Mandujano, University of Hawaii
STAG Deck Technician: Dave Gravatt
STAG Electronics Technician: Gabe Foreman
Load: July 23, 2002, 0900 HST
Departure: July 24, 2002; 0900 HST
Return: July 28, 2002; 0800 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT 139 is to maintain collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) Station ALOHA, our near shore station Kahe Point, surface mooring site HALE ALOHA 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. HALE ALOHA (22° 20'N, 158° 10.6'W), and Kaena Point stations (21^{o}50.8'N, 158^{o}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, net tows, CTD op's, PRR/TSRB casts, primary productivity measurements, AC9, misc. experiments
HALE ALOHA (sta. 8)	CTD op's (1000 m)
Kaena Pt. (sta. 6)	CTD op's (2500 m)
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Björkman, Karin*	UH/JGOFS
Brum, Jennifer*	UH/JGOFS
Clemente, Tara*	UH/JGOFS
Fujieki, Lance	UH/JGOFS
Gasc, Anne*	UH/JGOFS
Gregory, Tom	UH/JGOFS
Juranek, Laurie*	UW/JGOFS
Preston, Chris*	MBARI/JGOFS
Sadler, Dan	UH/JGOFS
Sheridan, Cecelia*	UH/JGOFS
Simmons, Melinda*	UH/JGOFS
Fitzgerald, Daniel	UH/PO
Riser, Stephen	UW/PO
Santiago -Mandujano, Fernando (Chief Scientist)	UH/PO
Valenciano, Mark	UH/PO
Veillerobe, Yves	UH/PO

Foreman, Gabe	UHMC/STAG
Gravatt, Dave	UHMC/STAG

*female

3.0. SUMMARY SCHEDULE

17 July	Pre-cruise meeting
23 July	Ship loading starting at 0900 hrs
24 July	Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.
24 July	Station 1 Kahe Pt. operations
25-27 July	Station ALOHA operations
27 July	Sediment trap array retrieval, station 8 & 6 CTD ops.
28 July.	Arrive back 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 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 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/TSRB casts, primary production cast/array deployment/retrieval, additional plankton net tows, and misc. experiments. Our final activity at this station will be a second near-bottom CTD cast.

At the completion of Station ALOHA operations, we will transit to the sediment trap array for a daybreak recovery.

4.2.1. Plankton net tows

A series of plankton net tows will be conducted from the stern. We request the use of the ship's 03 rope 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 starboard side using the ship's starboard crane 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 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 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.

4.2.4. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette (cast 8). Just before dawn (sunrise 0550 hrs), a second free drifting array with incubation samples will be deployed from the starboard side. We request the use of the starboard 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 (1918 hrs). CTD operations shall continue after the recovery.

4.2.5. 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.

4.2.6. 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 from the starboard side. We request the use of the starboard crane for this operation.

4.2.7. Argo-style profiling float deployment

An Argo-style profiling float will be deployed after one of the CTD casts by S. Riser. Deployment will take 5-10 minutes, and will be conducted by hand with a rope from the starboard side.

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 ship's starboard crane will be needed for this operation.

4.4. HALE ALOHA (station 8)

Following retrieval of the sediment trap array the ship shall transit to the HALE ALOHA mooring site (22° 20'N, 158° 10.6'W), where one 1000 m CTD cast will be conducted before transitting to Station 6 (Kaena Pt.)

4.5 Kaena Point (station 6)

The final station will be station 6, Kaena Point (21°50.8'N, 158°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. Two laboratory vans (main and 03 deck) 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 (03 deck)
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. Plankton nets and towing lines
12. Dissolved oxygen measurement system
13. Desktop and laptop personal computers
14. PRR/TSRB, AC-9 & other optical measuring instruments
15. Deck incubation system (Note: re-circulating chiller unit requires clean 220 VAC)
16. Pertinent MSDS
17. DSE winch
18. Argo-style profiler float (S. Riser, UW)

5.2 We will need from the ship the following:

1. Starboard crane
2. A-frame block assembly
3. Winch with conducting wire for CTD and boom extension
4. Electric power for winches, vans, and incubators
5. Radio direction finder
6. Empty freezer and refrigerator in wet lab
7. Space on the main deck for 1 van
8. Space on 03 deck for 2 vans
9. Hand-held VHF transceivers
10. Precision depth recorder
11. Shackles, hooks and lines
12. Shipboard Acoustic Doppler Current Profiler
13. Space on the 03 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 *Ka'imikai-o-Kanaloa* HOT 139 DATE 24-28 July, 2002

TIME	Wed. 7/24	Thu. 7/25	Fri. 7/26	Sat. 7/27	Sun. 7/28
0000		Arrive ALOHA Net tow			
0100		Deploy sed. traps	Net tow		
0200		S2C1 WOCE-1	S2C8 PP		
0300				Transit sed traps	
0400			Deploy PP array Log PRR Light		
0500			S2C9 Open		
0600				Recover sed traps	
0700					
0800	On Board	S2C2 WOCE-2 (start 36 hrs)	S2C10 PE	Transit HALE ALOHA	Arrive Snug
0900	Depart Snug Log Licor light				
1000		Net tow	Net tow		
1100		S2C3 PSi	S2C11 Open		
1200	Arrive Kahe Weight cast	PRR/TSRB	PRR/TSRB AC-9	S8C1	
1300	PRR/TSRB	Net tow	Net tow	Transit sta. 6	
1400	S1C1 (Kahe)	S2C4 PC/PN	S2C12 ATP		
1500	Transit ALOHA				
1600					
1700		S2C5 P.PO4	S2C13 Thorium	S6C1 (Kaena)	
1800				Transit Snug	
1900			Recover PP array End PRR Light		
2000		S2C6 JGOFS-2	S2C14 HPLC (end 36 hrs)		
2100					
2200		Net tow	Net tow		
2300		S2C7 Open	S2C15 WOCE-3		

Sunrise 0601 Sunset 1916 July 26, 2002

HOT-139 Watch Schedule

0300-1500

T. Gregory - Watch Leader
D. Fitzgerald
M. Valenciano
L. Fujieki
A. Gasc*

1500-0300

D. Sadler – Watch Leader
T. Clemente*
F. Santiago-Mandujano (Chief Scientist)
Y. Veillerobe
J. Brum*
S. Riser

At-large

C. Sheridan*
M. Simmons*
C. Preston*
L. Juranek*
K. Björkman*

STAG

D. Gravatt
G. Foreman

*Female

24 – 28 July, 2002 **HOT 139**
Ship: R/V *Ka'Imikai-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,	16
Station ALOHA			
s2c1	4800 m (WOCE-1)	O_2, Temp, DOC, DIC/Alk, Nuts, Salts	24
s2c2	1000 m (WOCE-2)	O_2, Temp, Nuts, DIC/Alk, Quay, DOC, Salts	24
s2c3	1000 m	PSi, Salts	10
s2c4	1000 m	PC/PN, Salts	14
s2c5	1000 m	PPO_4, Salts	14
s2c6	1000 m (JGOFS-2)	O_2, Temp, DIC/Alk, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	19
s2c7	1000 m	Salts	8
s2c8	1000 m	Primary Productivity, Chl a, FCM, Salts	22
s2c9	1000 m	Salts	8
s2c10	1000 m	PE, Salts	14
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 (WOCE-3)	O_2, Temp, Salts, Thorium, WOCE	14
HALE ALOHA			
Sta 8	1000 m	O_2, Temp, DIC/Alk, Nuts, Chl a, LLN, LLP, DOC, FCM, Salts	13
Kaena Point			
Sta 6	2500 m	Open, Chl a Salts	13