HAWAII OCEAN TIME-SERIES
HOT- 144 General Cruise Plan

VESSEL: R/V Kaimikai O Kanaloa, University of Hawaii
MASTER OF THE VESSEL: Captain Ross Barnes
CHIEF SCIENTIST: Dan Sadler, University of Hawaii
STAG Deck Technician: Dave Gravatt
STAG Electronics Technician: Steve Poulos
Load: January 14, 2003 0900 HST
Departure: January 15, 2003; 0900 HST
Return: January 19, 2003; 0800 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT 144is 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 occupied enroute to Station ALOHA to test equipment and collect near shore 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.

1.1 SCIENTIFIC OPERATIONS

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

2.0. SCIENCE PERSONNEL

Björkman, Karin	UH/JGOFS
Clemente, Tara	UH/JGOFS
Fitzgerald, Daniel	UH/PO
Fujieki, Lance	UH/JGOFS
Gasc, Anne	UH/JGOFS
Grabowski, Eric	UH/JGOFS
Gravatt, Dave	UHMC/STAG
Gregory, Tom	UH/JGOFS
Naish, Randy	UH/JGOFS
Poulos, Steve	UHMC/STAG
Rii, Shimi	UH/PO
Sadler, Dan (Chief Scientist)	UH/JGOFS
Santiago-Mandujano, Fernando	UH/PO
Sheridan, Cecelia	UH/JGOFS
Valenciano, Mark	UH/PO

3.0. SUMMARY SCHEDULE

9 January	Pre-cruise meeting
14 January	Load HOT-144 starting at 0900 hrs
15 January	Depart HOT-144
15 January	Station 1 Kahe Pt. operations
16-18 January	Station ALOHA operations
18 January	Sediment trap, station 6 CTD ops.
19 January.	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 1000m, a simultaneous floating TSRB and hand-lowered light cast (PRR-600), and CTD cast to 1020 db. After all operations have been completed the ship shall proceed to Sta. ALOHA.

4.2. Station ALOHA (within a 6 nautical mile radius of 22°45'N, 158°W)

Upon arrival at Station ALOHA we will conduct a net tow followed by deployment of our floating sediment traps. After the trap deployment we will begin CTD operations. As usual we will start with a deep cast to near bottom followed by our 36 hr, 3 hr interval "burst" sampling. Interspersed in this time frame are PRR/TSRB casts, AC9/FRRf casts, primary production cast/array deployment/retrieval, additional plankton net tows, and misc. experiments. Our final activity will be a second near bottom deep CTD cast.

At the completion of Station ALOHA operations we will transit to the floating 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, dissolved oxygen, and flash fluorescence will be made with a Seabird CTD with associated sensors 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 at Station ALOHA will be a deep cast (approximately 4800 m). We will conduct two near bottom casts: one at the beginning of the 36 hr "burst" sampling period and one at the end.

Following the first deep cast, a series of 1000 m CTD casts shall be made continuously every 3 hours for a 36 hour period. We request that this 'burst' sampling be done without interruption **within the circle perimeter which describes Station ALOHA**.

4.2.4. AC9/FRRf

An optical package containing the AC9 and the Fast Repetition Rate Fluorometer (FRRf) will be deployed between 2 and 4 times during the cruise. The deployment requires the use of the capstan. The package will be deployed to a depth of 200m at a steady wire speed of 10m/s during the downcast and up cast .

4.2.5. Primary production experiment

We will collect our primary productivity samples from the rosette (s2c8). Just before dawn, a second free drifting array 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. CTD operations shall continue after the recovery.

4.2.6. 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.

4.2.7 Automated Trace Element Sampler (ATE)

After recovering the sediment traps, we return to the Station ALOHA. Immediately upon arrival, the ATE will be hand deployed off the back deck to a depth of 10m. The ATE is recovered after 30 minutes in the water. The ATE is approximately 1’ tall and 4” in diameter, weighing 5 lbs.

4.3. Floating Arrays

After operations at Sta. ALOHA have been completed we will recover the floating sediment trap array. The ship's starboard crane will be needed for this operation.

4.4 Kaena Point (station 6)

Our final station will be station 6, Kaena Point (21°50.8'N, 158°21.8'W), on our return transit. Here we will conduct ~2500 db CTD cast before we return to Snug Harbor.

5.0 EQUIPMENT

5.1 The HOT science party shall bring the following:

1. Seabird 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 (main deck) with assorted laboratory equipment for radioisotope and sample processing work
4. All required sampling bottles
5. Distilled and deionized 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 & other optical measuring instruments
15. Deck incubation system (Note: re-circulating chiller unit requires clean 220 VAC)
16. Pertinent MSDS
17. DSE Winch

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, capstan, 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 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 03 deck for incubator
14. Underway/on-station data acquisition system for met. instrument, 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
21. Capstan

R/V Ka‘imikai-o-Kanaloa HOT-144 15-19 January, 2003

TIME	Wed. 1/15	Thu. 1/16	Fri. 1/17	Sat. 1/18	Sun. 1/19
0000		Arrive ALOHA Net tow			
0100		Deploy sed. traps	Net tow		
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				Recover sed traps	
0800	On Board	S2C2 PO-2 (start 36 hrs)	S2C10 PSi		Arrive Snug
0900	Depart Snug Log Licor light			Transit ALOHA	
1000		Net tow	Net tow	ATE	
1100	Arrive Kahe Weight cast	S2C3 MIT	S2C11 Open	PRR/TSRB AC-9/FRRf	
1200	PRR/TSRB		PRR/TSRB AC-9/FRRf	AC-9/FRRf	
1300		Net tow	Net tow		
1400	S1C1 (Kahe)	S2C4 P.PO4	S2C12 ATP	Transit Station 6	
1500	Transit ALOHA				
1600			S2C13 Thorium		
1700		S2C5 PC/PN	Recover PP array		
1800			End PRR Light		
1900					
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 0715 Sunset 1810, January 17, 2003

Shifts:

0300-1500

F. Santiago-Mandujano– Watch Leader
M. Valenciano
D. Sadler (Chief Scientist)
L. Fujieki
A. Gasc
R. Naish

1500-0300

T. Clemente – Watch Leader
D. Fitzgerald
S. Rii
T. Gregory
E. Grabowski
K. Björkman

At-large

C. Sheridan
D. Gravatt
S. Poulos

HOT 144 15-19 January, 2003
CTD CASTS R/V *Kaimikai O Kanaloa*

Cast		Samples	#Bottles
Kahe Point			
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, DOC, Salts	24
s2c3	1000 m	MIT, Salts	14
s2c4	1000 m	PPO_4 , Salts	14
s2c5	1000 m	PC/PN, Salts	14
s2c6	1000 m (JGOFS-2)	PE, Salts	14
s2c7	1000 m	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	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, C. Sheridan (10)	24
s2c15	1000 m (PO-3)	O_2, Temp, Salts, Thorium	14
Kaena Point			
Sta 6	2500 m	Open, Chl a Salts	13