

HAWAII OCEAN TIME-SERIES
HOT- 130 General Cruise Plan

VESSEL: R/V Kaimikai O Kanaloa, University of Hawaii
MASTER OF THE VESSEL: Captain Bob Hayes
CHIEF SCIENTIST: Dale Hebel, University of Hawaii
STAG Deck Technician: Dave Gravatt
STAG Electronics Technician: Steve Poulos
Load: Sept. 28, 2001 @ 1200 hrs
Departure: Sept. 30, 2001; 0900 HST
Return: Oct. 4, 2001; 0800 HST

1.0. SCIENTIFIC OBJECTIVES

The objective of HOT 130 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°20.6'N, 158°16.4'W) is occupied 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, and HALE ALOHA (22° 20'N, 158° 10.6'W), is the site of our deep ocean mooring. Kanea Point station (21°50.8'N, 158°21.8'W), on this cruise, will be occupied on the return transit to Honolulu.

1.1 SCIENTIFIC OPERATIONS

<u>Station</u>	<u>Activities</u>
Underway/continuous Kahe (sta. 1) ALOHA (sta. 2)	ADCP, thermosalinograph, fluorometry, meteorology Wt. Cast, PRR/TSRB cast, CTD cast Sediment traps, net tows, CTD op's, PRR/TSRB casts, primary productivity measurements, misc experiments, aerosol measurements
HALE ALOHA (sta. 8) Kaena Pt. (sta. 6)	CTD op's (1000 m) CTD op's (2500 m)

2.0. SCIENCE PERSONNEL

Allen, Colleen*	UH/JGOFS
Bjorkman, Karen*	UH/JGOFS
Fujieki, Lance	UH/JGOFS
Gasc, Anne*	UH/JGOFS
Gravatt, Dave	UHMC/STAG
Gregory, Tom	UH/JGOFS
Hebel, Dale	UH/JGOFS
Johnson, Jerimiah	UH/WOCE
Larson, Noel*	UH/WOCE
Mandujano, Fernando-Santiago	UH/WOCE
Morris, Paul	UH/JGOFS
Poulos, Steve	UHMC/STAG
Sheridan, Cecelia*	UH/JGOFS
Valenciano, Mark	UH/WOCE

*female

3.0. SUMMARY SCHEDULE

11 Sept. Pre-cruise meeting
28 Sept. Load HOT 130 starting at 1200 hrs
30 Sept. Depart HOT 130
30 Sept. Station 1 Kahe Pt. operations
1-3 Sept. Station ALOHA operations
3 Sept. Sediment trap & oxygen flux array retrieval, station 8 & 6 CTD ops.
4 Sept. ETA 0800 hrs, complete 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 (22°45'N, 158°W with 6 nmile radius)

Upon arrival at Station ALOHA we will do 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, primary production cast/array deployment/retrieval, additional plankton net tows, midday aerosol measurements 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 O₂ 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 do 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 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. Oxygen flux experiment

Samples for the oxygen flux experiment will be collected from the rosette (s2c7) and be deployed on a separate free-floating array prior to the deployment of the primary productivity array. We request the use of the starboard crane for this operation. The O₂ flux array is equipped with an Argos transmitter (platform # 8500), strobe light and radio transmitter (channel 69, ? MHz). This array will drift free for approximately 24 hrs with recovery planned for daybreak on Wednesday Oct. 3.

4.2.5. Primary production experiment

We will collect our primary productivity samples from the rosette (s2c8). Just before dawn (sunrise 0624 hrs), 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 after sunset (1818 hrs). 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. Sun Photometer and Aerosol Measurements

We will be doing aerosol measurements at about noon on those days with good satellite angle and minimal cloud cover. We would like to coordinate our PRR/TSRB light measurements (see 4.2.6.) with the aerosol measurements and, if possible, move the ship to a clear sky area if necessary.

4.3. Floating Arrays

After operations at Sta. ALOHA have been completed we will have two floating arrays still in the water. The O₂ flux and sediment trap arrays. We will retrieve the O₂ flux array first, at daybreak on Wednesday, followed by the retrieval of the sediment trap array. The ship's starboard crane will be needed for this operation.

4.4. HALE ALOHA (station 8)

Following retrieval of the arrays the ship shall transit to the HALE ALOHA mooring site (22° 20'N, 158° 10.6'W). We will conduct one 1000 m CTD cast before our transit to station 6 Kaena Pt.

4.5 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. 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 dewers
9. Drifting sediment trap array with strobe lights, satellite and radio transmitters, floats, weights, spar buoy etc.
10. DSE winch (440VAC, 3 phase at 10 amps) and Kevlar line
12. Drifting primary productivity array with strobe light, radio transmitter, floats, weights, polypro. line, spar buoy etc.
14. Plankton nets and towing lines
15. Dissolved oxygen measurement system
16. Desktop and laptop personal computers
17. PRR/TSRB & other optical measuring instruments
18. Deck incubation system (Note: re-circulating chiller unit requires clean 220 VAC)
19. Drifting O₂ array with strobe light, radio transmitter, Argos transmitter, floats, weights, line, spar buoy etc.
20. Flow thru hydrogen peroxide analytical system
21. Pertinent MSDS

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, DSE winch
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 equipment van and laboratory van
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

WATCH SCHEDULE

0300-1500

Fernando Santiago-Mandujano - Watch leader
Mark Valenciano
Lance Fujieki
Anne Gasc
Tom Gregory

1500-0300

Karin Bjorkman - Watch leader
Noel Larson
Dale Hebel
Paul Morris
Jerimiah Johnson

At-large

Dave Gravatt
Steve Poulos
Cecelia Sheridan
Colleen Allen

SHIP R/V Kaimikai O Kanaloa HOT 130 DATE 30 Sept.- 4 Oct., 2001

TIME	Sunday 9/30	Mon. 10/1	Tues. 10/2	Wed. 10/3	Thurs. 10/4
0000		Arrive ALOHA Net tow	Net tow		
0100					
0200		Deploy sed. traps	S2C8 PP		
0300		S2C1 WOCE-1	Deploy O2 array	Transit O2 array	
0400					
0500			S2C9 H2O2		
0600			Deploy PP array Log PRR Light	Recover O2 array	
0700				Cecelia net tows (1 hr - tentative)	
0800	On Board	S2C2 WOCE-2 (start 36 hrs)	S2C10 PE	Transit sed. traps	Arrive Snug
0900	Depart Snug Log Licor light				
1000		Net tow	Net tow	Recover sed. traps	
1100	Arrive Kahe	S2C3 PSi	S2C11 234Th	Transit HALE ALOHA	
1200	Weight cast PRR/TSRB	PRR/TSRB	PRR/TSRB		
1300	S1C1	Net tow	Net tow		
1400	Transit ALOHA	S2C4 PC/PN	S2C12 ATP	S8C1	
1500		Cecelia net tows (1 1/2 hrs)	Cecelia net tows (1 1/2 hrs)		
1600				Transit sta. 6	
1700		S2C5 P.PO4	S2C13 H2O2		
1800			Recover PP array End PRR Light		
1900				S6C1 (2500 m)	
2000		S2C6 JGOFS-2	S2C14 HPLC (end 36 hrs)		
2100				Transit Snug	
2200		Net tow	Net tow		
2300		S2C7 O2	S2C15 WOCE-3 234Th		

Sunrise Oct. 2, 0624; Sunset 1818 hrs

30 Sept. - 4 Oct., 2001
 Ship: R/V Kaimikai O Kanaloa

HOT 130
 CTD CASTS

Cast	Samples	Approximate #Bottles
<u>Kahe Pt.</u>		
s1c1 1000 m	O2, Temp, DIC/Alk, Nuts, Chl a, LLN, LLPO4, DOC, FCM, Salts	16
<u>Station ALOHA</u>		
s2c1 4800 m (WOCE-1)	O2, Temp, DOC, DIC/Alk, Nuts, Salts	24
s2c2 1000 m (WOCE-2)	O2, Temp, Nuts, DIC/Alk, Quay, DOC, Salts	24
s2c3 1000 m	P.Si, Salts	10
s2c4 1000 m	PC/PN, Salts	14
s2c5 1000 m	PPO4, Salts	14
s2c6 1000 m (JGOFS-2)	O2, Temp, DIC/Alk, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	19
s2c7 1000 m	O2 flux, Salts	20
s2c8 1000 m	Primary Productivity,, Chl a, FCM, Salts	20
s2c9 1000 m	H2O2, Salts	7
s2c10 1000 m	PE, Salts	13
s2c11 1000 m	234Th, Salts	16
s2c12 1000 m	ATP, Salts	14
s2c13 1000 m	H2O2, Salts	3
s2c14 1000 m	HPLC, Chl a, Salts	14
s2c16 1000 m (WOCE-3)	O2, Temp, 234Th, Salts	6
<u>HALE ALOHA</u>		
Sta 8 1000 m	O2, Temp, DIC/Alk, Nuts, Chl a, LLN, LLP, DOC, FCM, Salts	13
<u>Kaena Point</u>		
Sta 6 2500 m	Open, Salts	7