Hawaii Ocean Time-series
HOT-148 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 Electronics Technician: Steve Poulos
STAG Deck Technician: Steve Tottori

Loading: May 16, 2003 @ 1000
Departure: May 19, 2003 @ 0900
Arrival: May 23, 2003 @ 0800

1.0 SCIENTIFIC OBJECTIVES

The objective of the cruise is to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Three stations will be occupied during the cruise, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21º 20.6'N, 158º 16.4'W and will be occupied on the first day of the cruise for about 3 hours.
2) Station ALOHA is defined as a circle with a 6 nautical mile radius centered at 22º 45'N, 158ºW. This is the main HOT station and will be occupied during the 2nd, 3rd, and 4th days of the cruise.
3) Station 6, referred to as Station Kaena, is located off Kaena Point at 21º 50.8'N, 158º 21.8'W will be occupied on the 4th day of the cruise.

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 operations, PRR/TSRB casts, primary productivity measurements, AC9, misc. experiments
Kaena Pt. (sta. 6)	CTD operations (2500 m)
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Colleen Allen	UH/JGOFS
Marion Bandet	UH/PO
Jediah Bishop	HPU/PO
Karin Björkman	UH/JGOFS
Tara Clemente	UH/JGOFS
Daniel Fitzgerald	UH/ PO
Valerie Franck	UH/JGOFS
Lance Fujieki	UH/JGOFS
Anne Gasc	UH/JGOFS
Eric Grabowski	UH/JGOFS
Tom Gregory	UH/ JGOFS
Shimi Rii	UH/ PO
Dan Sadler	UH/JGOFS

Fernando Santiago-Mandujano	UH/ PO
Mark Valenciano	UH/ PO
Steve Poulos	UHMC/STAG
Steve Tottori	UHMC/STAG

3.0. SUMMARY SCHEDULE

12 May	Pre-cruise meeting
16 May	Ship loading starting at 1000 hrs
19 May	Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.
19 May	Station 1 Kahe Pt. operations
20-21 May	Station ALOHA operations
22 May	Sediment trap array retrieval, station ALOHA light casts. Station 6 CTD ops.
23 May.	Arrive back to Snug harbor. ETA 0800 hrs, full offload

4.0. OPERATIONAL PLANS

4.1. Station Kahe (21^{o}20.6'N, 158^{o}16.4'W)

A 400 lb. weight-test cast, and a CTD cast to 1000 m will be conducted at this location in the afternoon of May 19. The CTD winch will be required for these operations. PRR/TSRB operations (Sect. 4.2.5) will also be conducted at this station. After the operations are satisfactorily completed, the ship shall proceed to Station ALOHA.

4.2. Station ALOHA (22^{o}45'N, 158^{o}W with 6 nm radius)

4.2.1. Sediment trap deployment

Upon arrival to Station ALOHA, a net tow will be conducted followed by the deployment of the sediment trap. As usual, the array shall be deployed from the starboard side with the ship's starboard crane and the JGOFS DSE winch. Power requirements for the winch are 440 VAC, three-phase at 10 amps. After deployment we request that the Bridge verify that the radio transmitters are functioning and directionally correct. After deployment the ship shall return to the center of Station ALOHA and commence with the work outlined below.

The array will drift for about 54 hours before recovery. The array is equipped with 2 ARGOS satellite transmitters (platform #s 01325 and 03028), 2 strobe lights, and 2 radio transmitters (channel 74, 156.725 MHz). Daily positions of the array shall be transmitted by email from the University of Hawaii to the ship. We request the use of the ship's radio direction finder for locating the array.

4.2.2. 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. We need the ship’s CTD winch 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.

4.2.3. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette (cast 8). Before sunrise on May 21, a free drifting incubation array will be deployed from the starboard side. We request the use of the starboard crane for this operation. The array is equipped with strobe lights and a radio transmitter (channel 72, 156.625 MHz). The ship shall keep within site 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 just at sunset. CTD operations shall continue after recovery. All radioactive waste generated by the experiment shall be returned to the University of Hawaii. Only qualified personnel shall handle radioactive material.

4.2.4. Plankton net tows

Plankton net will be deployed from the stern and shall be towed for two half-hour periods. One-hour periods are scheduled at around noon and midnight on May 20 and 21 (see schedule) with a total of eight available slots to accommodate cancellations due to sea state or other unforeseen problems. We request the use of the ship's 03 rope winch and A-frame for these operations.

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 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/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 Fast Repetition Rate Fluorometer (FRRf), and a Sea-Bird Seacat with temperature, conductivity, and pressure sensors. The package will be deployed to a target depth of 200 m at a constant speed of 10 m/s using the capstan and the A-frame.

4.3 Floating sediment trap recovery

On May 22, after operations at Station ALOHA are completed the ship shall transit to the location of the sediment trap array for its retrieval. The ship shall transit to the array and recover the equipment. The ship's starboard crane will be needed for this operation. After the array is recovered, the ship shall transit back to Station ALOHA to conduct other experiments (ATE, AC-9/FRRf, PRR/TSRB).

4.4 Station Kaena (21º 50.8'N, 158º 21.8'W)

A near-bottom CTD cast (~2500 m) will be conducted at this location on May 22, after which the ship shall return to Snug harbor.

4.5 Acoustic Doppler Current Profiler

The ship’s acoustic Doppler current profiler (ADCP) will be in operation during the duration of the cruise. The ADCP should be set to work in bottom track mode when within range. It is requested to the Bridge officers to maintain the ship in a trajectory where the bottom depth is between 50 to 400 m when in transit between Snug harbor and Kahe Pt. (both directions) when possible. M. Valenciano and the STAG electronics technician will be in charge of the ADCP system.

4.6 Thermosalinograph and Fluorometer

The thermosalinograph and fluorometer sampling the uncontaminated seawater supply system will be in operation during the duration of the cruise while the ship is outside of Snug harbor. Salinity samples to calibrate the thermosalinograph will be taken from the intake hose at 4-hour intervals throughout the duration of the cruise by the science personnel. The STAG electronics technician will be in charge of the thermosalinograph operation.

5.0 EQUIPMENT

5.1 The HOT science party shall be bringing 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 equipment for radioisotope and general use
4. Type I and Type II water and all required chemicals and isotopes
5. Storage van with assorted equipment (03 deck)
6. Large vacuum waste container
7. Liquid nitrogen dewers
8. Drifting sediment trap array with strobe lights, satellite and radio transmitters, floats, weights
9. Kevlar line, polypropylene line
10. Sediment traps and crosses
11. Drifting primary production array with light and radio transmitter, floats, weights
12. PRR/TSRB, AC-9/FRRf and other optical measuring instruments
13. DSE winch (440 VAC, 3 phase at 10 amps) and Kevlar line
14. Oxygen titration system
15. Plankton nets and towing lines
16. Desktop and laptop personal computers
17. Assorted tools
18. All required sampling bottles, chemicals and isotopes
19. Deck incubation system (Note: re-circulating chiller unit requires clean 220 VAC)
20. Vacuum pumps, water pumps
21. Distilled water
22. Pertinent MSDS

5.2. We will need the use of the following ship's equipment:

1. Port and starboard side cranes
2. A-frame block assembly
3. Winch with conducting wire for CTD
4. Electric power for winches and vans
5. Radio direction finder
6. Empty freezer in wet lab
7. Space on the main deck for laboratory van, DSE winch
8. Space on the upper 02 deck for 1 lab van and 1 storage van
9. Hand-held VHF transceivers
10. Precision depth recorder
11. Shackles, sheaves, hooks and lines
12. Shipboard Acoustic Doppler Current Profiler
13. Thermosalinograph and Fluorometer
14. Copy machine
15. Grappling hooks and line
16. Navlink2 PC or equivalent
17. Running fresh water and seawater, hoses
18. Electronic mail system
19. GPS system
20. Uncontaminated seawater supply
21. Capstan

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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,	24
Station ALOHA			
s2c1	4730 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	PPO_4, Salts	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	4
s2c10	1000 m	PSi, Salts	12
s2c11	1000 m	Salts	4
s2c12	1000 m	ATP, Salts	11
s2c13	1000 m	Salts	4
s2c14	1000 m	HPLC, Chl a, Salts, C. Allen (10)	24
s2c15	4730 m (PO -3)	O_2, Temp, Salts	9
Kaena Point			
Sta 6	2500 m	Chl a, Salts	13

SHIP R/V *Ka'imikai-o-Kanaloa* HOT 148 DATE 19-23 May, 2003

TIME	Mon. 5/19	Tue. 5/20	Wed. 5/21	Thu. 5/22	Fri. 5/23
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	Sta. ALOHA	
1100		S2C3 MIT	S2C11 Open	PRR/TSRB	
1200	Arrive Kahe Weight cast	Net tow	PRR/TSRB AC-9/FRRf	AC-9/FRRf	
1300	PRR/TSRB		Net tow	AC-9/FRRf	
1400	S1C1 (Kahe)	S2C4 P.PO4	S2C12 ATP	Transit sta. 6	
1500	Transit ALOHA				
1600					
1700		S2C5 PC/PN	S2C13 Open		
1800					
1900			Recover PP array 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		

May 21: Sunrise 0549, Sunset 1908

6.0 HOT-148 Watch Schedule

0300-1500

Eric Grabowski - Watch Leader
Anne Gasc
Marion Bandet
Lance Fujieki
Tom Gregory
Mark Valenciano
Fernando S-Mandujano

1500-0300

Daniel Fitzgerald - Watch Leader
Shimi Rii
Jediah Bishop
Tara Clemente
Dan Sadler
Karin Björkman

At Large

Colleen Allen
Valerie Franck

STAG

Steve Poulos
Steve Tottori