

Hawaii Ocean Time-series HOT-178 General Cruise Plan

Vessel: R/V *Kilo Moana*, University of Hawaii
Master of the Vessel: Captain Gray Drewry
Chief Scientist: Thomas K. Gregory
OTG Marine Technicians: Tim McGovern and Gabe Foreman

Loading: Feb. 13, 2006 @ 0700 HST
Departure: Feb. 13, 2006 @ 1100
Arrival: Feb. 17, 2006 @ 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. Two stations will be occupied during the cruise, in the following order:

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

1.1 SCIENTIFIC OPERATIONS

<u>Station</u>	<u>Activities</u>
Kahe (sta. 1)	Weight Cast, PRR cast, CTD cast (1000 m)
ALOHA (sta. 2)	Sediment traps, net tows, CTD operations, primary productivity measurements, AC9/FRRf, misc. experiments
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Participant	Affiliation/HOT Group	Title
Curlless, Susan	UH/BEACH	Research Associate
Defelice, Suzanne	UH/PO	Research Associate
Doggett, Ken	UH/BEACH	Research Associate
Foreman, Gabe	UH/OTG	Marine Technician
Grabowski, Eric	UH/BEACH	Research Associate
Gregory, Thomas	UH/BEACH	Chief Scientist
Harlan, Adriana	UH/BEACH	Research Associate
Lethaby, Paul	UH/PO	Research Associate
Mahaffey, Claire	UH/BEACH	Research Specialist
McGovern, Tim	UH/OTG	Marine Technician
Reschke, Brent	WVU/BEACH	Graduate Student
Santiago - Mandujano, Fernando	UH/PO	Research Associate
Timperman, Aaron	WVU/BEACH	Professor
Tottori, Steve	UH/OTG	Marine Technician
Watkins, Blake	UH/BEACH	Marine Engineer

3.0. SUMMARY SCHEDULE

.7 Feb	Pre-cruise meeting
13 Feb.	Ship loading starting at 0700 hrs
13 Feb.	Depart from Snug harbor at 1100 hrs.
14-16 Feb.	Station ALOHA operations.
16 Feb.	Station 1 Kahe Pt. operations
17 Feb.	Arrive back to Snug harbor. ETA 0800 hrs, full offload

4.0. OPERATIONAL PLANS

4.1. Station Kahe (21°20.6'N, 158°16.4'W)

One CTD cast to 1000 m will be conducted at this location in the evening of Feb. 16. The CTD winch and crane will be required for these operations. After the operations are satisfactorily completed, the ship shall proceed to Snug Harbor.

4.2. Station ALOHA (22°45'N, 158°W with 6 nm radius)

4.2.1. Upon arrival to Station ALOHA, A series of CTD casts will commence.

4.2.2. Sediment trap deployment

At midnight on Feb. 14, the floating sediment traps will be deployed at a location within Station ALOHA which will be determined by local current conditions to be determined enroute to ALOHA. The array will be deployed from the stern using the A-frame and our Seamac winch. Power requirement for the winch is 440 VAC, three phase at 10 amps. After deployment we request that the Bridge verify that the radio transmitters are functioning and directionally correct.

The array will drift for about 52 hours before recovery. The array is equipped with 2 ARGOS satellite transmitters (platform #s 01325 and 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; therefore the ship will not need to keep within site of the array until the time of the recovery. 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 before recovery.

After deployment of the sediment trap array, the ship shall return to the center of Station ALOHA to deploy the gas array.

4.2.3 Gas Array

Samples for the gas array will be collected from casts 2 and 3. We request the use of the A-frame for this operation and will also use the Seamac winch. The array is equipped with a strobe light and a radio transmitter (frequency to be provided).

4.2.4. Water column measurements

Vertical profiles of temperature, conductivity and dissolved oxygen will be made with an instrument package consisting of a Sea-Bird CTD attached to a 24-place rosette with 12 liter sampling bottles. We need the ship's CTD winch and crane for this operation. Water samples for biogeochemical measurements will also be collected on each cast. Beginning with **cast 9**, a series of 1000-m casts shall be made continuously every 3 hours for a 36-hour period, ending with a second near-bottom cast. 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.

4.2.5. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette. Just before dawn (sunrise 0704 on Feb. 15), a third free drifting incubation array will be deployed from the stern. We request the use of the A-frame for this operation and will also use the Seamac winch. 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 (1829). 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.

4.2.6. Plankton net tows

Plankton nets will be deployed from the stern and shall be towed for half-hour periods. Half-hour periods are scheduled at around noon and midnight throughout the cruise. The A-frame and trawl winch will be needed for this operation.

4.2.7. Profiling Reflectance Radiometer (PRR).

Around noon on each day a profiling reflectance radiometer will be deployed from the main deck using the main crane. The instrument is hand-lowered and retrieved with assistance from the Seamac winch.

4.2.8. 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, fluorometer, and pressure sensors. The package will be deployed to a target depth of 250 m at a constant speed of 10 m/min during the downcast and upcast. We request the use of the small capstan and A-frame for this operation.

4.3 Floating sediment trap recovery

On Feb. 16, after the morning AC9/FRRf cast has been completed, we shall transit for the recovery of the sediment trap array. The main crane and the Seamac winch will be needed to retrieve the sediment trap array. After the array is recovered, the ship shall transit to Station 51 to conduct one 200 m CTD cast.

4.6 Acoustic Doppler Current Profiler

The ship's acoustic Doppler current profiler (ADCP) will be in operation during the duration of the cruise. The OTG electronics technician will be in charge of the ADCP system.

4.7 Thermosalinograph and Fluorometer

The ship's 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 OTG 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 except pinger and altimeter, deck boxes and computer CTD acquisition systems.
3. One laboratory vans with assorted equipment for radioisotope and general use
4. Distilled, deionized water and all required chemicals and isotopes
5. Storage van with assorted equipment
6. Large vacuum waste container

7. Liquid nitrogen dewars
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, polypro. Line, spare buoy, etc.
12. PRR, AC-9 and other optical measuring instruments.
13. SEA-MAC 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.
19. Deck incubation system
20. 400 lb weight.
21. Acoustic transponders for mooring release
22. Pertinent MSDS
23. Small capstan for optics and net tows

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

1. A-frame and trawl winch
2. A-frame block assembly
3. Appleton crane and winch with conducting wire for CTD
4. Electric power for winches (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)
5. Radio direction finder
6. Empty freezer and refrigerator in wet lab
7. Space on the main deck for one storage van, SEA-MAC winch
8. Space on the 02 deck for one lab vans
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
22. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer

23. 24-place rosette with 10-l sampling bottles. SeaPoint Fluorometer, Pinger and Altimeter, spare carousel, spare oxygen sensor.

Ship: R/V KILO MOANA

HOT 178 CTD CASTS

13-17 Feb., 2006

Cast	Samples	#Bottles
<u>Station ALOHA</u>		
S2c1	200 m AT	24
s2c2	200 m Gas Array (7@5, 25, 45), Salts,	21
s2c3	200 m Gas Array (7@75, 100, 125), Salts,	21
s2c4	4740 m (PO-1) O ₂ , Temp, DOC, DIC/Alk, Nuts, Salts, SD(PB), Sharp	24
s2c5	1000 m (PO-2) O ₂ , Temp, Nuts, DIC/Alk, Quay, DOC, Salts, SD(PB), Sharp	24
s2c6	1000 m ATP, Salts, CM (11@30, 2@700)	24
s2c7	1000 m PE, Salts, MC(5,25,45,75,100,125,150,175)	17
s2c8	1000 m HPLC, Chl a, Slides, Salts, CM(PB), CM(200, 250)	24
s2c9	1000 m(BEACH) O ₂ , Temp, DIC/Alk, Nuts, LLN, LLP, LLSi DOC, Keeling, Quay, Salts	20
s2c10	1000 m Primary Production, Salts	22
s2c11	1000 m AT	24
s2c12	1000 m PSi	10
s2c13	1000 m MIT, MC(PB:5,45,75,100,150,175) MC(25 125)	14
s2c14	1000 m PC/PN, Salts	14
s2c15	1000 m PPO ₄ , Salts,	19
s2c16	1000 m AT	24
s2c17	4740 m (PO-3) Oxygen, Salts, MC(1@1000,2000,3000,4000), PUR, SD(PB)	24
s2c18	1000 m ZJ, MC(2@200,300,500,770)	20
s2c19	4600 m AT	24
<u>Kahe Pt.</u>		
s1c1	1000 m O ₂ , Temp, DIC/Alk, Nuts, Chl a, LLN, LLPO ₄ , DOC, FCM, Salts, SD(PB)	24

SHIP R/V KILO MOANA HOT 178 DATE 13 – 17 Feb. 2006

TIME	Mon. 2/13	Tues. 2/14	Wed. 2/15	Thurs. 2/16	Fri. 2/17
0000		Deploy sed traps			Transit Snug
0100		S2C2 Gas 1	Net Tow		
0200		S2C3 Gas 2	S2C10 PP	Net Tow	
0300				AC9/FRRF	
0400			S2C11 AT	Transit sed traps	
0500		Deploy gas array	Deploy PP	Recover traps	
0600		S2C4 PO-1	Transit gas array	Transit ALOHA	
0700			Recover gas array		
0800			S2C12 PSi	S2C18 ZJ	Arrive Snug offload
0900					
1000		Net Tow	Net Tow	AC9/FRRF	
1100	Depart Snug	S2C5 PO-2 (Begin 36 hr)	S2C13 MIT	AC9/FRRF	
1200			PRR AC9/FRRF	PRR S2C19 AT	
1300		Net Tow	Net Tow		
1400		S2C6 ATP	S2C14 PC/PN		
1500					
1600				Transit St. Kahe	
1700		S2C7 PE	S2C15 PPO4		
1800			Recover PP		
1900					
2000		S2C8 HPLC	S2C16 AT		
2100					
2200		Net Tow	Net Tow		
2300	Arrive ALOHA S2C1 AT	S2C9 BEACH	S2C17 PO-3 (end 36 hours)	S1C1	

Feb 15: Sunrise 0704 Sunset 1829

6.0 HOT-178 Watch Schedule/ Bunk assignment

0300-1500

Eric Grabowski - Watch Leader (01-15L)

Ken Doggett (01-12L)

Adriana Harlan (01-18L)

Fernando S-Mandujano (01-08L)

Steve Tottori (01-11L)

1500-0300

Paul Lethaby - Watch Leader (01-08U)

Tom Gregory – Chief Scientist (02-02)

Susan Curless (01-14L)

Suzanne Defelice (01-09L)

At Large

Claire Mahaffey (01-16L)

Blake Watkins (01-10L)

Aaron Timperman (01-13L)

Brent Reschke (01-13U)

OTG

Tim McGovern

Gabe Foreman