Hawaii Ocean Time-series
HOT-171 General Cruise Plan

Vessel: R/V Melville, *Scripps Institution of Oceanography*
Master of the Vessel:
Chief Scientist: Thomas K. Gregory, University of Hawaii
Resident Marine Technicians:

Loading: July 14, 2005 @0900
Departure: July 15, 2005 @ 0900
Arrival: July 19, 2005 @ 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. Four 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 2 hours.
2) Station 2, referred to as 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 ST-12 is the site of the sediment trap mooring, is located at 22º 50.5'N, 157º 52.2'W and will be occupied on the 4th day of the cruise for about 4 hours.
4) Station 51, is the site of the MOSEAN Mooring, is located at 22º 45'N, 158º 6'W and will be occupied on the 4th day of the cruise for about 30 minutes.
5) Station 6, referred to as Station Kaena, is located off Kaena Point at 21º 50.8'N, 158º 21.8'W and will be occupied on the 4th day of the cruise for about 2 hours.

1.1 SCIENTIFIC OPERATIONS

Station	Activities
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
ST-12	deployment of moored sediment trap
MOSEAN mooring station (sta. 51)	CTD cast (200 m)
Kaena (sta. 6)	CTD cast (2400 m)
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology

2.0. SCIENCE PERSONNEL

Alvarez, Vicoria	UH/PO	Volunteer
Beversdorf, Lucas	UH/BEACH	Graduate Student
Bjorkman, Karin	UH/BEACH	Research Specialist
Church, Matthew	UH/BEACH	Research Oceanographer
Clemente, Tara	UH/BEACH	Research Associate
Curless, Susan	UH/BEACH	Research Associate
Fong, Allison	UH/BEACH	Graduate Student
Fujieki, Lance	UH/BEACH	Computer Specialist
Grabowski, Eric	UH/BEACH	Research Associate
Gregory, Thomas	UH/BEACH	Chief Scientist
Hannides, Cecelia	UH/BEACH	Graduate Student
Hannides, Angelos	UH/BEACH	Graduate Student
Harlan, Adriana	UH/BEACH	Technician
Hilmer, Tyson	UH/PO	Volunteer
Jachowski, Nicholas	UH/BEACH	Volunteer
Kilpatrick, Thomas	UH/PO	Volunteer
Lethaby, Paul	UH/PO	Research Associate
Mahaffey, Claire	UH/BEACH	Postdoctoral Researcher
Mahdi, Leena	UH/BEACH	Scientist
Mitchell, James	UH/BEACH	Scientist
Sadler, Dan	UH/BEACH	Chief Scientist
Santiago - Mandujano, Fernando	UH/PO	Research Associate
Shacat, Joseph	UH/PO	Research Associate
Valenciano, Mark	UH/PO	Electronics Technician
Watkins, Blake	UH/BEACH	Marine Engineer
Watkins, Jonathan	JSU/BEACH	Graduate Student

3.0. SUMMARY SCHEDULE

15 July Depart from Snug harbor at 0900 hrs. Science personnel on-board by 0830.

15 July Station 1 Kahe Pt. operations

16-18 July Station ALOHA operations. Moored sediment trap deployment. Station 51 CTD cast. Station Kaena CTD cast

19 July 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)

A 400 lb. weight-test cast, one CTD cast to 1000 m, and a PRR cast (Sect. 4.2.7) will be conducted at this location in the afternoon of July 15. The CTD winch and crane will be required for these operations. After the operations are satisfactorily completed, the ship shall proceed to Station ALOHA.

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

4.2.1. Upon arrival to Station ALOHA, operations will begin with the floating sediment trap deployment and then proceed according to the day-hour schedule.

4.2.2. Sediment trap deployment

The floating sediment traps will be deployed at a location within Station ALOHA which depends on local current conditions to be determined enroute to ALOHA. The array will be deployed from the stern using the A-frame and Seamac mooring winch. 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.

4.2.3 Gas Array

Samples for the gas array will be collected from cast 1 and 2. The array is equipped with a strobe light, ARGOS satellite transmitters and a radio transmitter (frequency to be provided). The ship shall keep within sight of the array while performing CTD operations for the approximately 24 hour duration the array will be in the water. CTD operations shall continue after the recovery.

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 boom for this operation. Water samples for biogeochemical measurements will also be collected on each cast. The first cast after the deployment of the gas array (cast 3) shall be made to the near bottom (approximately 4740 m). Following this cast, 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 0557 hrs on July 17), a second 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 DSE 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 (1919 hrs). 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 on the second and third days (see schedule) with a total of eight available slots to accommodate cancellations due to sea state or other unforeseen problems.

4.2.7 CM tows

These are tows with a small net which are deployed and recovered by hand.

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 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.

4.3 Floating sediment trap recovery

On July 18, after the moored sediment trap deployment has been completed, we shall transit for the recovery of the sediment trap array. After the array is recovered, the ship shall transit to Station 51 to conduct one 200 m CTD cast.

4.4 ST-12 Moored Sediment Trap Deployment

Deployment of a Parflux Mark 7 sediment trap mooring will be conducted early on July 18. The target location for the mooring is 22º 50.5’N, 157º 52.2’W. Triangulation to determine actual deployed position will be conducted after mooring deployment.

4.5 MOSEAN Mooring (Station 51)

One 200-m CTD cast will be conducted near the MOSEAN Mooring (Station 50). The cast should be conducted downwind, downcurrent, and at about 200 m from the mooring. The nominal position of the mooring is 22º 45'N, 158º 6’W. After this cast is completed, the ship

shall transit to Station ALOHA to continue operations. After operations at ALOHA are completed, the ship shall transit to Station Kaena to conduct one CTD cast.

4.6 Station Kaena (21^{o} 50.8'N, 158^{o} 21.8'W)

A near-bottom CTD cast (~2500 m) will be conducted at this location in the evening of July 18, after which the ship shall return to Snug harbor.

4.7 Acoustic Doppler Current Profiler

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

4.8 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.

15-19 July, 2005 **HOT 171**
Ship: R/V Melville **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	150 m	Gas Array (7@5, 25, 45), Salts	21
s2c2	150 m	Gas Array (7@75, 100, 125), Salts	21
s2c3	4740 m (PO-1)	O_2, Temp, DOC, DIC/Alk, Nuts, Salts	24
s2c4	1000 m (PO-2)	O_2, Temp, Nuts, DIC/Alk, Quay, DOC, Salts	24
s2c5	1000 m	MIT, Salts, AF 5, 45, 75, 120	18
s2c6	1000 m	ATP, Salts, CM 5 depths tbd	20
s2c7	1000 m	PE, Salts, AF 6@25	20
s2c8	1000 m	HPLC, Chl a, Slides, Salts	22
s2c9	1000 m (BEACH)	O_2, Temp, DIC/Alk, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	20
s2c10	1000 m	Primary Production, Salts	22
s2c11	1000 m	Salts	4
s2c12	1000 m	Salts	4
s2c13	1000 m	PSi, Salts, AF 1@5, 25, 45, 75, 100, 125, 150, 175	18
s2c14	1000 m	PC/PN, Salts	14
s2c15	1000 m	PPO4, Salts	14
s2c16	4740 m (PO-3)	Oxygen, Salts, CM 12 @ 10m	20
MOSEAN Mooring			
s51c1	200 m	Salts	3
Kaena Point			
s6c1	2500 m	Open, Chl a Salts	13

SHIP R/V *Melville* HOT 171 DATE 15 – 19 July, 2005

TIME	Fri. 7/15	Sat 7/16	Sun 7/17	Mon 7/18	Tues 7/19
0000		Deploy floating sed traps		Transit ST-12	Transit Snug
0100		S2C1 Gas 1 Net tow	CM tow Net tow	Deploy ST-12	
0200		S2C2 Gas 2 CM tow	S2C10 PP		
0300		S2C3 PO-1		Triangulate ST-12	
0400			S2C11 open		
0500			Deploy PP array	Transit floating traps	
0600		Deploy gas array	Transit gas array	CM tow Recover sed traps	
0700			Recover gas array		
0800		S2C4 PO-2 (Begin 36 hour)	S2C12 Open	Transit St 51	Arrive Snug offload
0900	Depart Snug				
1000		Net tow	Net tow ATE	S51C1	
1100		S2C5 MIT	S2C13 PSi	Transit ALOHA	
1200	Arrive Kahe Weight cast		PRR AC9/FRRF	PRR	
1300	PRR S1C1	Net tow	Net tow	AC9/FRRF	
1400	Transit ALOHA	S2C6 ATP	S2C14 PC/PN	AC9/FRRF	
1500				Transit Kaena	
1600					
1700		S2C7 PE	S2C15 PPO4		
1800			Transit PP array		
1900			Recover PP array		
2000		S2C8 HPLC	S2C16 PO-3 (end 36 hours)		
2100		AC9/FRRF			
2200		Net tow		S6C1 Kaena	
2300	Arrive ALOHA	S2C9 BEACH			

July 17: Sunrise 0557 Sunset 1919

6.0 HOT-171 Bunk assignment/Watch Schedule

0300-1500
T. Gregory – Watch Leader
L. Fujieki
D. Sadler
A. Harlan
L. Beversdorf
P. Lethaby
M. Valenciano
V. Alvarez

1500-0300
K. Bjorkman – Watch Leader
T. Clemente
S. Curless
N. Jachowski
J. Watkins
J. Shacat
T. Hilmer
F. S-Mandujano

0900 – 2100
T. Kilpatrick

2200 – 1000
B. Watkins
E. Grabowski

At Large
M. Church
C. Mahaffey
L. Mahdi
A. Fong
J. Mitchell
A. Hannides
C. Hannides