Hawaii Ocean Time-series
HOT-227 Operational Cruise Plan

Cruise ID: TN258
Vessel: R/V *Thomas G. Thompson*, University of Washington
Master of the Vessel: Captain Al McClenaghan
Chief Scientist: Craig Nosse, University of Hawaii
TGT Marine Technician: Tony Burke
OTG Marine Technician: Ben Colello

UH Marine Center phone number: 842-9813
TGT Satellite Phone Number: 870-77-315-3093

Loading: November 18, 2010 @ 0800
Departure: November 20, 2010 @ 0800
Arrival: November 22, 2010 @ 1600

**Warning - Navigational and array deployment hazard. **

HOT Profiler Mooring (HPM)- Deployed at Station ALOHA October 2010

This mooring's nominal location is **22° 44.800'N 158° 01.455'W**, approximately 1.5 miles WSW of the center of Station ALOHA. It has a small surface tether telemetry marker buoy and an instrument platform 80 m below the surface. This area of the circle should be avoided.

1.0 SCIENTIFIC OBJECTIVES

The objective of the cruise is to maintain a collection of hydrographic and biogeochemical data at the primary Hawaii Ocean Time-series (HOT) station (Station ALOHA).

Station ALOHA, also referred to as Station 2, is defined as a circle with a 6 nautical mile radius centered at 22° 45'N, 158°W.

1.1 SCIENTIFIC OPERATIONS

Planned operations at Station ALOHA include: CTD operations, primary productivity array, Hyperpro and optics casts, net tows and miscellaneous experiments.

Planned underway operations include: ADCP, thermosalinograph, fluormetry and meteorology.

2.0. SCIENCE PERSONNEL

Participant	Title	Affiliation/HOT Group
Susan Curless	Research Associate	UH/BEACH
Lance Fujieki	Computer Specialist	UH/BEACH
Adriana Harlan	Research Associate	UH/BEACH
Dan Sadler	Research Associate	UH/BEACH
Brett Updyke	Research Associate	UH/BEACH
Brenner Wai	Technician	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Cameron Fumar	Research Associate	UH/PO
Bo Keopaseut	Research Associate	UH/PO
Fernando Santiago-Mandujano	Research Associate	UH/PO
Steve Tottori	Technician	UH/PO
Craig Nosse	Research Associate	UH/PO
Scott Grant	Graduate Student	UH/CMORE
Ben Colello	Marine Technician	OTG

3.0. SUMMARY SCHEDULE

10 November	Pre-cruise meeting 1330 hrs.
18 November	Ship loading starting at 0800 hrs.
20 November	Depart from Snug harbor at 0800 hrs.
20-22 November	Station ALOHA operations.
22 November	Arrive Snug harbor. ETA 1600 hrs, full offload

4.0. OPERATIONAL PLANS

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

4.1.1. Upon arrival to Station ALOHA, a 500 lb. weight-test cast will be conducted. After the weight-test is complete, a series of 1000-m casts shall be made continuously every 3 hours, ending with a near-bottom cast (approximately 4740 m) in the early morning of November 22nd. 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.

4.1.2. 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 will need the ship's CTD winch and boom for these operations. Water samples for biogeochemical measurements will also be collected on each cast..

Whenever pumping of the ship's tanks is needed, it must be conducted outside the circle that defines station ALOHA (Sect. 1.0). To avoid disruptions in the schedule, this operation should be coordinated with the chief scientist or the watch leaders **(Susan Curless, Fernando Santiago-Mandujano)**.

4.1.3 Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette. Before dawn (Sunrise 0646 hrs on November 21st), a free drifting incubation array will be deployed. The array is equipped with two ARGOS satellite transmitters (platform #'s 60484, 84857, emailing positions to a TGT email account designated by the marine technician), strobe lights and a radio transmitter (channel 74, 156.725 MHz). The **ship shall keep within site of the array** while performing CTD operations for the last 6 hours of the approximately 12-hour time the array will be in the water unless the array drifts outside of the ALOHA circle. If the array drifts out of the circle, the ship should return inside the circle to conduct CTD casts, and the monitoring of the array will be coordinated with the watch leader. The array will be recovered just at sunset (1748 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.

4.1.4. Zoo net tows

A plankton net will be deployed from the starboard boom and shall be towed for half-hour periods. Half-hour periods are scheduled around noon and midnight on the first and second days of the cruise (see schedule) for a total of six slots. The starboard boom and small starboard winch will be used for the deployments. B. Watkins will be in charge of these operations.

4.1.5. Hyperpro

The Hyperpro is a profiling unit with one up-looking and one down-looking hyperspectral radiometer, a WET Labs ECO-BB2F triplet (measuring Chlorophyll-a fluorescence and backscattering in the blue and red wavelengths), temperature and conductivity sensors. This instrument also incorporates a ship mounted surface radiometer. Around noon on the second day, the Hyperpro will be deployed. The instrument is hand-lowered and retrieved with assistance from a winch.

4.1.6. ACS/AC9/FRRf/LISST

An optical package including a Wet Labs AC9 that measures water column spectral absorption and attenuation at nine wavelengths, a Chelsea Fast Repetition Rate Fluorometer (FRRf), a SeaBird Seacat with temperature, conductivity, fluorometer, and pressure sensors, and a LISST particle size and distribution analyzer will be deployed to a target depth of 200 m at a constant speed of 10 m/min during the downcast and upcast. The starboard boom and small winch will be needed for this operation.

4.2 Acoustic Doppler Current Profiler

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

4.3 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 TGT technicians will be in charge of the thermosalinograph and fluorometer operations.

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. Rosette and 24 12L Bullister sampling bottles, all spare parts
3. One 20 ft. laboratory van with assorted equipment for radioisotope and general use
4. Distilled, deionized water and all required chemicals and isotopes
5. Large vacuum waste container
6. Liquid nitrogen dewar
7. Kevlar line, polypropylene line
8. Sediment traps and crosses
9. Drifting primary production array and gas array with light and radio transmitter, floats, weights, polypro. Line, spare buoy, etc.
10. Hyperpro and other optical measuring instruments
11. Oxygen titration system
12. Plankton nets and towing lines
13. Desktop and laptop personal computers
14. Assorted tools
15. All required sampling bottles
16. Deck incubation system
17. Pertinent MSDS

5.2. We will need the use of the following OTG and ship equipment:

1. A-frame
2. A-frame block assembly
3. Winch with conducting wire for CTD
4. Electric power for van (208 VAC single phase at 60 amps for lab van)
5. Radio direction finder
6. Space for one 20 ft. lab van
7. Hand-held VHF transceivers
8. Precision depth recorder
9. Shackles, sheaves, hooks and lines
10. Shipboard Acoustic Doppler Current Profiler
11. Thermosalinograph and Fluorometer
12. Copy machine
13. Grappling hooks and line
14. Navlink2 PC or equivalent
15. Running fresh water and seawater, hoses
16. Electronic mail system
17. GPS system
18. Uncontaminated seawater supply
19. Small capstan (~ 10 m/min)
20. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer
21. OTG's rosette and sampling bottles (to be used as spare)
22. 500 lb weight.
23. Remote CTD decibar pressure display in the winch operator cabin.
24. Back deck winch.

Ship: R/V *Thomas G. Thompson* **HOT 227 CTD CASTS** **November 20-22, 2010**

Cast		Samples	#Bottles
Station ALOHA			
s2c1	1000 m (BEACH)	O_2, Temp, DIC/Alk, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	23
s2c2	1000 m	PUR, CMORE(5@1000,5@770,5@500), Salts	24
s2c3	1000 m	Primary Production, MC(pb 5,25,45,75,100,125,150,175), Salts	22
s2c4	1000 m	CMORE(5@125,5@200, 5@75), PO(6@1000), Salts	22
s2c5	1000 m	PSi, MC(5,25,45,75,100,125,150,175), Salts SW(1@1000,700,600,500,400,300,200, and pbMC depths)	24
s2c6	1000 m	MIT, ATP, CMORE(5@25,5@45)	24
s2c7	1000m	PPO4, PC/PN, MC(1@200,300)Salts	24
s2c8	1000m	HPLC, Chl a, Slides, MC(1@500,700), Salts	24
s2c9	1000 m (PO-2)	O_2, Temp, Nuts, DIC/Alk, DOC, Salts	24
s2c10	4740 m (PO-1)	O_2, Temp, DOC, DIC/Alk, Nuts, Salts	24

MC=Matt Church, **SW**=Sam Wilson

SHIP: R/V *Thomas G. Thompson* HOT 227 Date: November 20-22, 2010

TIME	Sat. 11/20	Sun. 11/21	Mon. 11/22
0000		S2C2 PUR	S2C10 PO-1
0100		Net Tow	
0200			
0300		S2C3 PP	
0400		AC9/FRRF	
0500		Deploy PP Array	Transit Snug
0600		S2C4 Open	
0700			
0800	Depart Snug		
0900		S2C5 PSi	
1000		Net Tow Net Tow	
1100		Hyperpro AC9/FRRF	
1200		S2C6 MIT	
1300		Net Tow	
1400			
1500		S2C7 PPO4 & PC/PN	
1600			Arrive Snug Full Offload
1700		Recover PP array	
1800		S2C8 HPLC	
1900	Arrive ALOHA Weight Cast		
2000			
2100	S2C1 BEACH	S2C9 PO-2	
2200	Net Tow	Net Tow	
2300			

November 21: Sunrise 0646, Sunset 1748

6.0 HOT-227 Watch Schedule

0300-1500

Adriana Harlan – *Water Boss*
Lance Fujieki – *Alt Tag*
Dan Sadler – *Tag*
Fernando Santiago-Mandujano – *Tag*
Bo Keopaseut – *Console*

1500-0300

Susan Curless – Watch Leader – *Water Boss*
Craig Nosse – Chief Scientist – *Tag*
Cameron Fumar – *Console*
Brett Updyke – *Tag*

At Large

Blake Watkins
Scott Grant
Brenner Wai
Steve Tottori

OTG

Ben Colello