Hawaii Ocean Time-series
HOT-340 Cruise Plan

Cruise ID: KM 23-04
Vessel: R/V *Kilo Moana*, University of Hawaii
Master of the Vessel: Captain David Martin
Chief Scientist: Fernando Santiago-Mandujano, University of Hawaii
Marine Technicians: Trevor Young (lead), James Harris

Marine Center phone number: (808) 956-0688
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Pre-Cruise Meeting: January 13, 2023 at 1330 via Zoom
Start pre-embarkation protocols (masking, social distancing): January 14
COVID Testing: January 21, 2023, before boarding for loading
Loading: January 21, 2023 at 0900, Pier 35.
Departure: January 23, 2023 at 0700 (**Science personnel on board by 0630**).
Arrival: January 26, 2023 at 0800
Post-Cruise Meeting: January 31, 2023 at 1330 via Zoom

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 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 January 23Rd- 25th
2) Deep Moored Sediment Trap Site Deployment - 22° 51'N, 157° 54'W, this operation will be conducted if the weather is favorable

1.1 SCIENTIFIC OPERATIONS

Station	Activities
ALOHA (Sta. 2)	Sediment traps, Primary productivity array, Gas array, Net tows, CTD operations, Trace Metal CTD casts,
Deep Moored Sediment Trap Site	Benthic sediment traps deployment. This operation will be conducted if the weather is favorable
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology.

2.0. SCIENCE PERSONNEL

Participant	**Title**	**Affiliation**	**Citizenship**
Camille Adkison	Graduate Student	UH	USA

Eleanor Bates	Graduate Student	UH	USA
Karin Björkman	Research Specialist	UH	SWE
Clifton Buck	Scientist	UGA	USA
Andy Burger	Scientist	UH	USA
Benjamin Carpenter	Undergrad Student	UH	USA
Mattia Da Fieno	Undergrad Student	UH	USA
Dan Fitzgerald	Research Associate	UH	USA
Carolina Funkey	Research Associate	UH	USA
Eric Grabowski	Research Associate	UH	USA
James Harris	Marine Technician	OTG	USA
Thomas Kasson	Undergrad Student	UH	USA
Charlotte Kollman	Graduate Student	UGA	USA
Chris Marsay	Scientist	UGA	GBR
Fernando Pacheco	Research Associate	UH	BRA
Tully Rohrer	Research Associate	UH/SCOPE	USA
Fernando Santiago-Mandujano	Research Associate	UH	USA
Eric Shimabukuro	Graduate Student	UH	USA
Blake Watkins	Marine Engineer	UH	USA
Trevor Young	Marine Technician	OTG	USA

3.0. SUMMARY SCHEDULE

13 January	Pre-cruise planning meeting 1330 hrs, via Zoom.
14 January	Start pre-embarkation protocols (masking, social distancing)
21 January	COVID Testing followed by Equipment loading at 0900 hrs, Pier 35.
23 January	Depart from Pier 35 at 0700 hrs. **Science personnel to UHMC by 0630.**
23-25 January	Station 2 ALOHA operations.
26 January	Arrive back to Pier 35.
31 January	Post-cruise meeting at 1330 hrs via Zoom

4.0. OPERATIONAL PLANS

4.1. Station Kahe (21°20.6'N, 158°16.4'W) – ***THIS STATION HAS BEEN CANCELLED, WEIGHT CAST AND HAWBOLDT TESTS TO BE CONDUCTED AT ALOHA STATION***

A 1300 lb. weight-test cast to 500 m will be conducted, **including testing of the emergency systems on the docking head of the Hawboldt LARS system.** A Hyperpro cast (Sect. 4.2.8), one CTD cast to 1000 m (4.2.5), and a Trace Metal CTD cast (4.5) will be conducted at this location. The ship's A-frame, CTD winch, and SeaMac winch will be needed for these operations. After the operations are satisfactorily completed, the ship shall proceed to Station ALOHA.

Following the incident on HOT-328, this and all future weight casts are to include the following tests of the Hawboldt system:

A. Manual Anti-2 Block Test

This test will verify that the control system will successfully prevent excessive tension spikes in the event that the operator were to accidentally pull the package into the docking head at full speed.

- Start the hydraulics and enable control from the belly pack.
- Position the test weight and the LARS docking head over the main deck, approximately in the landing area normally used for the rosette.
- Position the docking head approximately 10' from the deck, and manually lower the test weight such that it is barely lifted off the deck

- Ensure the winch is in manual mode
- Ensure all personnel are clear of the area.
- Haul in with the CTD winch at full speed until the test weight compresses the springs completely. The test weight should immediately lower approximately 1.5' and stop as the winch brakes apply.
- The tension can be viewed on the monitor in Lab 1, ensure the spike is below 5,000 lbs.
- Reset all alarms on the Local Console.

B. Auto with LARS Anti-2 Block Test

This test will verify that the control system will successfully prevent excessive tension spikes in the event that the operator were to forget to put the winch into Auto with LARS mode prior to moving the LARS.

- Start the hydraulics and enable control from the belly pack.
- Pick up the test weight with the LARS and position the LARS in the 'Casting' slew position with the knuckle pointing straight down, and the extension boom retracted.
- Ensure all personnel are clear of the area.
- If it isn't already, pull the test weight up into the docking head, just so the springs start to compress.
- Turn the winch to manual mode.
- Knuckle out at full speed. The weight will get pulled into the docking head as the winch will not respond to LARS movement.
- Once the test weight is 2-blocked, the LARS will stop moving and the weight will remain fully 2 blocked.
- The tension can be viewed on the monitor in Lab 1, ensure the spike is below 5,000 lbs.
- Reset all alarms on the Local Console.

C. Auto with LARS Switch Malfunction Test

This test will verify that the control system will successfully prevent excessive tension spikes in the event that the docking head anti-2 block sensor malfunctions during a deployment or recovery.

- Start the hydraulics and enable control from the belly pack.
- Pick up the test weight with the LARS and position the LARS in the 'Casting' slew position with the knuckle pointing straight down, and the extension boom retracted.
- Ensure all personnel are clear of the area.
- If it isn't already, pull the test weight up into the docking head, just so the springs start to compress.
- Turn the winch to Auto with LARS mode
- Knuckle out at a reduced speed.
- As the LARS is moving, temporarily remove fuse F10161 from the Local Console.
- The LARS and winch will immediately stop, the winch will lower the weight about 1.5' and then apply its brake.
- Once this behavior is confirmed, the test is considered successful.
- Reset all alarms on the Local Console

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

4.2.1. Upon arrival to Station ALOHA, the Sediment Trap Array (Sect 4.2.2) (*) will be deployed. After this operation is completed, one 1000-m cast will be conducted to collect water for the Primary Production Array. Following this, the Primary Production array will be deployed (4.2.4). These operations will be followed by a near-bottom CTD cast and the start of the 36-hour water column observations at Station ALOHA.

(*) NOTE: The deployment of all drifting array must be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring.
Array tracking is facilitated through the SOEST Cruise and Drifter Tracks tool found at
http://hahana.soest.hawaii.edu/nowcast/loctable.html

4.2.2. Sediment trap array deployment

The floating sediment traps will be deployed from the back of the deck through the A-frame and using the SeaMac winch. After deployment we request that the bridge verify that the radio transmitters are functioning and directionally correct. The Sediment Trap array will consist of one cross with 12 particle interceptor traps (PIT) at 150m, and one cross above it with 4 traps. There will be two additional crosses at 125 and 200 m (E. Grabowski will oversee).

The array will drift for about 56 hours before recovery. The array is equipped with 1 ARGOS satellite transmitter, 1 Novatech Iridium beacon, strobe lights, and a radio transmitter (see section 6.0 for transmitter IDs). 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. Blake Watkins will direct this deployment.

After this deployment conclude, one 1000 m CTD cast shall be conducted. Following this operation, the ship shall prepare to deploy the Primary Productivity Array.

4.2.3. Optics ***NOT PLANNED FOR THIS CRUISE***

An optical package including a SeaBird Seacat with temperature, conductivity, and pressure sensors, a Wetlabs ECO triplet measuring backscatter, chlorophyll fluorescence, and CDOM fluorescence, and a LISST particle size and distribution analyzer will be deployed during the cruise. Each deployment will consist of three up and two down profiles to a target depth of 200 m at a constant speed of 10 m/min during both the downcast and upcast. An instrument soaking period at just below the surface will be required between the two profiles. The A-frame and capstan will be needed for this operation.

4.2.4. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette. Before dawn (Sunrise 0714 hrs on January 23rd), a free drifting incubation array will be deployed from the back of the deck thru the A-frame and using the SeaMac winch. The primary production incubation array will be deployed at a location within Station ALOHA to be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring. Positions of the array will be emailed to argosfix@km.soest.hawaii.edu, password: argosfix. (See section 6.0 for Trasmitter IDs).

The array will be recovered at sunset (1814 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. Blake Watkins will direct this deployment.

After deployment of the Primary Production Array, the ship shall transit to the center of the station circle to conduct a bottom CTD cast, S2C2 (approximately 4740 m).

4.2.5. 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 crane for these operations. Water samples for biogeochemical measurements will be collected on each cast. The cast after the deployment of the Primary Productivity Array shall be made to the near bottom (approximately 4740 m). Following this cast, a series of 1000-m casts shall be made continuously every three hours for a 36-hour period. 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.

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 **(Dan Fitzgerald and Karin Bjorkman)**.

4.2.6. Lowered Acoustic Doppler Current Profiler (LADCP)

Due to the constraints of the OTG rosette, the LADCP will not be deployed on this cruise.

4.2.7. Gas Array deployment– ***THIS OPERATION HAS BEEN CANCELLED***

A free drifting incubation array will be deployed the third day of the cruise at Station ALOHA. Samples for the gas array will be collected from Station 2 CTD cast 8. The gas array will be deployed from the back of the deck thru the A-frame and using the SeaMac winch. The gas array will be deployed at a location within Station ALOHA to be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring. The array is equipped with GPS transmitters, strobe lights and a radio transmitter (See Section 6.0 for transmitter IDs). Positions of the array will be emailed to argosfix@km.soest.hawaii.edu, password: argosfix. The ship will **not** need to keep within sight of the array until the time of the recovery, approximately 25 hours after its deployment. Assistance from the bridge is requested in plotting the drift track of the array. Blake Watkins will oversee this deployment.

4.2.8. 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 1400 on the first, second and fourth days, the Hyperpro will be deployed from the stern through a small block hung from the A-frame. The instrument is lowered and retrieved by hand. Each deployment will consist of two profiles and one yo-yo (5 x 20m) before the instrument is retrieved.

4.2.9. Zooplankton Net Tows

A plankton net will be deployed from the stern and shall be towed for half-hour periods. Half-hour periods are scheduled around noon and midnight on the second, third, and fourth days (see schedule) for a total of six slots. The A-frame and small capstan will be needed for this operation. Blake Watkins will direct these operations.

4.3. Be-7 Trace Metal Cast, Gas Array and Sediment Trap Array recovery

In the morning of January 25th, after the 36-hr CTD burst period is completed, the Be-7 Trace Metal Cast will be conducted (Sect. 4.11). After this operation is completed, the ship shall transit for the recovery of the Gas Array. The A-frame and the Sea-Mac winch will be needed to retrieve the array. After the Gas Array is recovered, the ship shall transit to recover the floating sediment trap array. Blake Watkins will oversee these recoveries. After these recoveries are competed, the ship shall transit to Station 52 .

4.4. Station 52 - WHOTS-18 Mooring– ***THIS CAST HAS BEEN CANCELLED***

The anchor position of the WHOTS-18 mooring is 22° 40.021'N, 157° 57.018'W. The watch circle of the buoy is about 2 nautical miles. Generally, the buoy stays on the edge of the watch circle. The buoy can be detected via radar in good weather conditions but is harder to detect with larger sea states. Upon arrival at Station 52 on January 25th, a Seaglider will be deployed (Sect. 4.13), one 200 m CTD yo-yo cast, and ADCP intercomparisons will be conducted.

After these operations are completed, the deep sediment traps will be deployed (Sect. 4.10), followed by the McLean Pumps cast (Sect. 4.12.)

4.5. Trace Metal Clean Rosette

Vertical profiles between 0-600m will be conducted for trace metal analysis using a rosette package with autonomous Auto Fire Module. This mini-CTD rosette consists of a SeaBird CTD attached to a 12-place rosette with 8-liter Niskin sampling bottles. The rosette is approximately 5 ft x 5ft x 4 ft and weighs 355/565 lbs in air empty/full. We will deploy the CTD rosette using the W2 winch, delrin block and 1/4" Amsteel line using trace metal clean procedures from the stern of the vessel using the A-Frame. Eleanor Bates will oversee this operation. **We request the ship's personnel to contact us before doing any trash burning or any cooking that would disseminate smoke to the labs or working area**.

4.7. Station Kaena (21° 50.8'N, 158° 21.8'W) *TBD*– ***NOT PLANNED FOR THIS CRUISE***

4.8. Acoustic Doppler Current Profiler

The ship's acoustic Doppler current profilers (ADCP) will be in operation during the duration of the cruise. The OTG technicians will oversee the ADCP system.

4.9. Thermosalinograph, Fluorometer and pCO_2

The ship's thermosalinograph, fluorometer and pCO_2 sampling the uncontaminated seawater supply system will be in operation during the duration of the cruise while the ship is outside of Honolulu 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 ship's meteorological system shall be in operation throughout the cruise. Access to real-time underway data through the ship's network will be required. The OTG technicians will oversee the thermosalinograph, fluorometer, and meteorological suite operations.

4.10 Deep Moored Sediment Trap Deployment (22° 51'N, 157° 54'W) ***– OPERATION TO BE CONDUCTED ON 1/25 IF WEATHER IS FAVORABLE***

The Deep Moored Sediment Trap mooring will be deployed at this location. The mooring will consist of two McLane sediment traps at the following depths, ~3980m and ~4000m. Deployment should take 2 hours and an additional 1 hour is scheduled for acoustically mapping the location of the anchor. Blake Watkins will oversee this operation with 2 or 3 members of the science party. Two ABs will be required to operate the A-frame and winch.

4.11. Be-7 Trace Metal Cast

A hose will be attached to the Trace Metal Clean CTD and will be held at six depths in the upper 175 m while the deck board pump (120V) fills the tanks (6 x 160-gallon plastic tanks). Each depth will take approximately 30 minutes for a total of 3 hours. The hose reel will need to be set up on deck (43"x43") near the CTD. Clifton Buck and the UGA group will be in charge of this operation.

4.12. McLean Pumps **– *OPERATION TO BE CONDUCTED ON 1/25 IF WEATHER IS FAVORABLE***

One in-situ pump cast (which involves deployment, pumping at depth for 2-3hr, and recovery) takes 4-5hr to collect 500-1500L from 4-8 depths in the upper 1000m (with most pumps in the upper 300 m). These pumps have two flow-paths and can collect over multiple filter membranes. Clifton Buck and the UGA group will be in charge of this operation.

4.13. Seaglider Deployment **– *THIS OPERATION HAS BEEN CANCELLED***

One Seaglider (SG511) will be deployed during daylight hours at Station ALOHA. The deployment should take about 30 mins. Procedures primarily directed by B. Watkins in concert with SCOPE team and Steve Poulos (pilot-ashore). Procedures generally are as follows:

1) The Seaglider SG511 will be lowered in the water by using the ship's crane or winch combined with the ship's A-frame. 2) Once the glider is in the water, it should be confirmed that the vehicle is floating prior to complete release. 3) After release, the glider will perform a series of test dives, 25mins – 60mins, to make sure that the vehicle is communicating through Iridium Satellite system and that the sensors are working correctly. 4) The vessel can conduct other operations within the area while waiting for this initial feedback. Should the glider malfunction, the vehicle will need to be recovered. During operations, B. Watkins or SCOPE Team will be communicating via Iridium phone with the Seaglider pilot, Steve Poulos. The plan is for this Seaglider to start a 3 month mission. It can be tracked from the standard HOT navigational web site.

Other info: SG511 – acoustic pinger interrogate Freq: 12.5 kHz; acoustic pinger reply: 11.5 kHz and its associated backup ARGOS PTT Tag # - 90995

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. One 20 ft. laboratory van (#23) with assorted equipment for radioisotope and general use, one 10x8 ft. equipment van (PO) for equipment and spare storage, and one trace metal 20 ft van (#581).
3. Distilled, deionized water and all required chemicals and isotopes
4. Large vacuum waste containers
5. Liquid nitrogen dewars
6. Drifting sediment trap array with strobe lights, satellite and radio transmitters, floats, weights, line, sediment traps and crosses.
7. Drifting primary production array with strobe lights, satellite and radio transmitters, floats, weights, line primary production bottles and spreader bars.
8. Drifting gas array with strobe lights, satellite and radio transmitters, floats, weights, line, 4 L bottles and short mounting bars.
9. Oxygen titration system
10. Plankton nets and towing lines
11. Desktop and laptop personal computers
12. Assorted tools
13. All required sampling bottles
14. Pertinent MSDS
15. SeaFlow
16. Inline C-Star Transmissometer
17. Trace metal clean rosette with 8L Niskin bottles and programmable CTD
18. One incubator, baby blue, stored on 02 Deck
19. Seaglider SG511
20. Bottom moored sediment traps and associated equipment
21. McClean pumps and 6 160-gallon plastic tanks

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

1. A-frame
2. A-frame block assembly
3. CTD winch

4. Electric power
   -440/480 VAC, 3 phase 60Hz, 60amp for winches
   -208 VAC single phase at 60 amps for lab vans
5. Space on upper 01 deck port side for one 10 ft van **(Equipment van)**
6. Space on upper 01 deck port side for one 20 ft van **(#23)**
7. Space on upper 01 deck starboard side for trace metal 20 ft van (**#581**)
8. Space on 02 deck for one incubator
9. Space on deck for ~4 deck baskets of array gear
10. Space on deck to secure 6x160-gallon plastic tanks
11. Small capstan (~ 10 m/min)
12. SeaMac Winch
13. W2 winch
14. Radio direction finder
15. Hand-held VHF transceivers
16. Shackles, sheaves, hooks and lines
17. Precision depth recorder
18. Shipboard Acoustic Doppler Current Profiler
19. Thermosalinograph, pCO_2 system, and Fluorometer
20. Meteorological suite
21. Grappling hooks and line
22. Navlink2 PC or equivalent
23. Running fresh water and seawater, hoses
24. Uncontaminated seawater supply
25. Source of compressed air for Trace Metal pump
26. -80°C Freezer
27. 4°C Refrigerator and -20°C Freezer
28. Distilled, deionized water system
29. Email system
30. GPS system
31. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer, SeaFlow, and inline C-Star transmissometer and access to real-time data through the network.
32. OTG's 24-place rosette, and 24 12-l water sampling bottles (**to be used as primary system**)
33. ~1300 lb weight
34. Remote CTD dbar pressure display in the winch operator area.
35. Monitor in CTD Lab displaying ship coordinates, bottom depth and GMT.
36. OTG's transmissometer
37. OTG's altimeter
38. Trace metal free block
39. Amsteel Line (1/4") for trace metal clean work

6.0 Satellite Position Transmitters Summary

Array Name	RockBlock ID	XEOS ID	Argos ID	Radio Frequency
Sediment Trap (ST)	06	268		CH.68 (156.425 MHz)
Primary Production (PP)	08	266		CH.69 (156.475 MHz)
Gas Array (GA)	08	266		CH.69 (156.475 MHz)

NOTE: Array tracking is facilitated through the SOEST Cruise and Drifter Tracks tool found at http://hahana.soest.hawaii.edu/nowcast/loctable.html

Ship: R/V *Kilo Moana* **HOT 340 CTD CASTS** **Date: Jan 23-26, 2023**

Cast		Samples	#Bottles
Station ALOHA			
s2c1	1000 m	Primary Production (3@ 5, 25, 45, 75, 100, 125, 150, 175) Chl a, FCM, Salts	24
s2c2	4740 m (PO-1)	O_2, Temp, DOC, DIC/Alk, pH, Ref Si, Nuts, Salts, SCOPE DNA (pb or (*) 1000,2000,3000,4000)	24
s2c3	1000 m (PO-2)	O_2, Temp, DOC, DIC/Alk, pH, Nuts, Ref Si, Salts	24
s2c4	1000 m	PC/PN, **SD** (6@20-25(Mixed Layer), Salts **PO** (5@1000 m)	22
s2c5	1000 m	PPO4, SCOPE DNA (1@100,125,150,175m), Salts, **KM** (1@5, MLD, DCM)	21
s2c6	1000 m (BEACH)	O_2, Temp, DIC/Alk, pH, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts	23
s2c7	1000 m	HPLC, SCOPE DNA (1@200,225,250,275), Chl a, **SM** (2@5), Salts	22
s2c8	1000 m	PSi, SCOPE DNA (1@5,25,45,75), **MC** (1@5, 25, 45, 75, 100, 125, 150, 175), Salts	22
s2c9	1000 m	ATP, **DL** (pb@5,25,45,75,100,125,150,175), SCOPE DNA (1@300,400,500,770), Salts	24
s2c10	1000 m (N-cast)	**KB,EG** (high vertical resolution centered on deep Chl max), Salts	24

MC=Matt Church**, SD** = Sonya Dyhrman, **DL** = Debbie Lindell, **PQ**=Paul Quay, **PB** = Petra Byl, **SM** = Scott Miller, **BH** = Britt Henke, **KB**=Karin Bjorkman, **KM** = Kelsey McBeain, **EG**=Eric Grabowski

Underway Filtrations: PB (80 L of um-filtered surface seawater in 20-L carboys), **BH** (20 L of 0.2 micron-filtered surface seawater in 10 L carboys)

(*) If not enough water for DNA, fire the 1200, 1800, 2800 and 3800 m bottles at 1000, 2000, 3000 and 4000 m respectively

Ship: R/V *Kilo Moana* HOT 340 January 23 – 26, 2023

TIME	Monday 1/23	Tuesday 1/24	Wednesday 1/25	Thursday 1/26	Friday 1/27
0000					
0100					
0200		S2C1 PP	S2C8 PSi		
0300					
0400		Deploy PP Array			
0500		S2C2 PO-1 (Deep)	S2C9 ATP		
0600	All Sci. Aboard				
0700	Depart Pier 35 to ALOHA Sta				
0800			S2C10 N-cast		
0900		Trace Metal Cast 2	Transit Sed Traps		
1000					
1100		S2C3 PO-2	Recover Sed Traps		
1200		Net Tow	Transit to Pier 35		
1300		Hyperpro			
1400		S2C4 PC/PN	Incinerator Pump Tanks		
1500		Transit to Pump Tanks			
1600					
1700	Pump ship tanks	S2C5 PPO4			
1800		Transit to PP array Recover PP array			
1900	Arrive ALOHA Trace Metal Cast 1				
2000	Deploy Sed Traps	S2C6 BEACH			
2100	Weight cast and Hawboldt tests				
2200	UGA–Be7 pumping	Net Tow Net Tow			
2300		S2C7 HPLC			

January 23rd Sunrise 0714, Sunset 1814

6.0 HOT-340 Watch Schedule

0300-1500

Dan Fitzgerald - Watch Leader
Carolina Funkey – Water Boss
Fernando Pacheco – Console
Tully Rohrer
Benjamin Carpenter

1500-0300

Camille Adkison
Karin Björkman - Watch Leader
Eric Shimabukuro – Water Boss
Fernando Santiago-Mandujano – Console – Chief Scientist
Thomas Kasson

At Large

Eleanor Bates
Blake Watkins
Andy Burger
Eric Grabowski
Mattia Da Fieno
Clifton Buck
Chris Marsay
Charlotte Kollman

OTG

Trevor Young
James Harris