

# HOT-227: Chief Scientist Report

Chief Scientist: Craig Nosse

R/V *Thomas G. Thompson*

November 20-22, 2010

Cruise ID: TN258

Departed: November 20, 2010 at 0800 (HST)

Returned: November 22, 2010 at 1400

Vessel: R/V *Thomas G. Thompson*, University of Washington

Master of the Vessel: Captain Al McClenaghan

Chief Scientist: Craig Nosse, University of Hawaii

SSG Marine Technicians: Tony Burke and Patrick Ahern

## 1. SCIENTIFIC OBJECTIVES

The scientific objectives for this cruise were different than a normal Hawaii Ocean Time-series (HOT) cruise. The cruise was originally scheduled to be conducted November 16 – 20, 2010 aboard R/V *Ka’Imikai-O-Kanaloa*. However, mechanical problems with R/V *Ka’Imikai-O-Kanaloa* put the vessel out of service. R/V *Thomas G. Thompson* was making a port call in Honolulu and was quickly rescheduled to provide three (3) days of service to the HOT program.

HOT cruises are usually four (4) full days and occupy four (4) stations. With the reduced time of the cruise, the objective was to maintain a collection of hydrographic and biogeochemical data at the primary HOT station, Station ALOHA (A Long Term Oligotrophic Habitat Assessment). The 36-hour CTD burst period normally conducted at Station ALOHA could not be scheduled with the allotted time on station and only a 30-hour CTD period could be afforded.

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. Upon arrival to Station ALOHA, a 1000 lb. weight test cast to 1000 m was to be followed by nine (9) 1000 m CTD casts (at approximately 3 hour intervals) ending with a full depth (~4740 m) CTD cast (the 10<sup>th</sup> cast at Station ALOHA).

Other experiments to be conducted in between CTD casts included the deployment of a free-drifting Primary Production Array to incubate *in situ* for 12 hours.

A plankton net was to be towed between 1000-1400 and 2200-0200 for 30 minute intervals on November 20<sup>th</sup> and 21<sup>st</sup>.

The Hyperpro was to be deployed for a half-hour near noon on November 21<sup>st</sup>.

A package including a Wet Labs AC9, a Chelsea Fast Repetition Rate Fluorometer (FRRf), a SeaBird Seacat, and a LISST particle size and distribution analyzer was to be used to profile the upper 200 m at Station ALOHA in the early morning and around noon on November 21<sup>st</sup>.

After Station ALOHA operations were complete, the ship was to transit back to Snug Harbor.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, meteorological package and underway fluorometer and transmissometer.

## 2. SCIENCE PERSONNEL

<b>Participant</b>	<b>Title</b>	<b>Affiliation/HOT Group</b>
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

## 3. GENERAL SUMMARY

Operations during the cruise were conducted mostly as planned. Nine 1000 m CTD casts and one near-bottom CTD cast were conducted at Station ALOHA. One of the 1000 m CTD casts (s2c7) was conducted near the WHOTS buoy, which had drifted inside the Station ALOHA circle. This cast will provide calibration data for the mooring's underwater sensors.

The primary production array was deployed and recovered successfully. The array drifted to the northeast of the center of ALOHA.

Five of the six planned net tows for the core HOT zooplankton collection were completed successfully, two during the day and three during the night. The sixth net tow (a daytime tow) could not be completed as the preceding science activities (including two back-to-back net tows, an AC9 cast, a Hyperpro cast and a CTD cast) pushed the schedule back on November 21<sup>st</sup> such that the net tow could not be completed before the 1000 – 1400 time window expired. In retrospect, the plan to complete all these activities near the noon hour was probably too ambitious.

The Hyperpro was deployed on November 21<sup>st</sup> around 1100.

The optical package AC9/FRRf/LISST was deployed three times during the cruise (one more than originally planned), once around noon and twice in the early morning. The second early morning deployment was an extra cast performed due to a shore-based request. The package did not contain the ACS on any of the casts as it was out for repair/calibration.

The ADCP, thermosalinograph, meteorological system, fluorometer and transmissometer ran without interruption during the cruise.

Ship's equipment that was not operational during the cruise: None.

#### 4. R/V *Thomas G. Thompson* OFFICERS AND CREW, TECHNICAL SUPPORT

The amount of support provided by the officers and crew of R/V *Thomas G. Thompson* was both tremendous and admirable. This cruise was put together very quickly and without much warning. It also shifted the expected schedule for the ship and crew. Despite all these hurdles, the Captain and the ship's crew showed enthusiasm, concern and dedication to our scientific mission. Their "can-do" attitude and commitment towards science were outstanding.

Technical support from the University of Washington Shipboard Support Group (SSG) was excellent. SSG personnel were available at any time to assist in our work. The technicians were knowledgeable, approachable and adapted to our needs.

#### 5. DAILY REPORT OF ACTIVITIES (HST)

##### **20 November 2010**

0800 Depart Snug Harbor  
1230 Safety Meeting  
1730 Arrive Station ALOHA  
1800 Weight Cast to 1000 m  
1927 S2C1 1000-m CTD cast  
2200 Net Tow  
2254 S2C2 1000-m CTD cast

##### **21 November 2010**

0100 Net Tow  
0153 S2C3 1000-m CTD cast  
0348 AC9/FRRf  
0520 Primary Production Array Deployed  
at 22 46.51 N, 158 01.33 W  
0542 S2C4 1000-m CTD cast  
0836 S2C5 1000-m CTD cast  
1004 Net Tow  
1027 Net Tow  
1115 AC9  
1225 Hyperpro  
1249 S2C6 1000-m CTD cast  
1400 Net tow cancelled (time window expired)  
1505 S2C7 1000-m CTD cast  
Conducted 1 nautical mile away from WHOTS mooring  
1830 Recovered PP array. On board at 22 47.88 N, 158 00.63 W  
1840 S2C8 1000-m CTD cast  
2115 S2C9 1000-m CTD cast  
2227 Net Tow

## 22 November 2010

0008 S2C10 4740-m CTD cast  
0153 Bottom of Deep Cast reached (7 m from bottom)  
at 22 45.00, 157 59.99  
0350 Extra AC9 cast  
0440 Transit to Honolulu  
1230 Underway systems shut down  
1400 Arrive Snug Harbor, Full Offload

### HOT program sub-components:

<b>Investigator</b>	<b>Project</b>	<b>Institution</b>
Matt Church	Core Biogeochemistry	UH
Roger Lukas	Hydrography	UH
Mike Landry	Zooplankton dynamics	SIO
Ricardo Letelier	Optical measurements	OSU

### Ancillary programs:

Charles Keeling	CO <sub>2</sub> dynamics and intercalibration	SIO
Paul Quay	DI <sup>13</sup> C	SIO
Penny Chisholm	Prochlorococcus population dynamics	MIT
Matt Church	Diversity and activities of nitrogen-fixing microorganisms	UH
Various CMORE PI's	Microbial RNA/DNA collection	UH/CMORE

### Additional programs:

Dave Karl (via Sam Wilson)	Reduced gases in the upper ocean: The cycling of methane, sulfide and nitrous oxide	UH/Moore
Dave Karl (via Blake Watkins)	700 m and SSW collection for column prototype testing	UH
Angel White and Kate Watkins Brandt	Surface seawater collection	OSU