

# HOT-218: Chief Scientist Report

Chief Scientist: Susan Curless

*R/V Ka'Imikai-O-Kanaloa*

February 15-19, 2010

Cruise ID: **KOK10-04**

Departed: February 15, 2010 at 0800 (HST)

Returned: February 16, 2010 at 0738 (HST)

Vessel: *R/V Ka'Imikai-O-Kanaloa*

Operator: University of Hawaii

Master of the Vessel: Captain Ross Barnes

Chief Scientist: Susan Curless

OTG Technicians: Kuhio Vellalos and Elly Speicher

## 1. SCIENTIFIC OBJECTIVES

The objective of the cruise was to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Four stations were to be occupied during the cruise, in the following order:

- 1) Station 1, referred to as Station Kahe, is located at 21° 20.6'N, 158° 16.4'W and was to be occupied on the first day of the cruise for about 2.5 hours.
- 2) Station 2, referred to as Station ALOHA (A Long Term Oligotrophic Habitat Assessment) 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 was to be occupied during the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> days of the cruise.
- 3) Station 52, is the site of the WHOTS-6 Mooring, located at 22° 39.989'N, 157° 56.961'W will be occupied on the 4<sup>th</sup> day of the cruise for about one hour.
- 4) Station 6, referred to as Station Kaena, is located off Kaena Point at 21° 50.8'N, 158° 21.8'W and will be occupied on the 4<sup>th</sup> day of the cruise for approximately 3 hours.

Upon arrival to Station Kahe a 500 lb. weight-test cast to 500 m, one CTD cast to 1000 m, and a Hyperpro cast were to be conducted at this location on the afternoon of February 15th. The single CTD cast was to be conducted to collect continuous profiles of various physical and chemical parameters. Water samples were to be collected at discrete depths for biogeochemical measurements. After these operations were satisfactorily completed, the ship was to proceed to Station ALOHA.

Upon arrival at Station ALOHA, the free-drifting sediment trap array was to be deployed. The sediment trap array was to stay in the water for about 52 hours. This was to be followed by one shallow CTD cast to 200 m, one 1000 m cast (to collect water for the Primary Production Array), and second 200 m CTD cast. These three casts were to be followed by the deployment of the free-drifting Primary Productivity Array to incubate insitu for 12 hours. A full-depth (~4740 m) CTD cast was to be conducted after the deployment of the Primary Production array, followed by

1000 m CTD casts at strict 3 hour intervals for at least 36 hours for continuous and discrete data collection, ending with another full-depth CTD cast on February 8th.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on February 17th. The Gas Array was to be recovered on February 18th.

A plankton net was to be towed between 1000-1400, and 2200-0200 for 30 min intervals on February 16<sup>th</sup> and 17<sup>th</sup> at Station ALOHA.

The Hyperpro was to be deployed for half-hour periods near noon time on February 15<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</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 around noon time on February 17<sup>th</sup>, and in the early morning and around noon on February 18<sup>th</sup>.

After the 36 hour burst period of CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating Sediment Trap array and the Gas Array on February 18<sup>th</sup>.

After recovering the arrays, the ship was to transit to Station 52 to conduct a one-hour 200 m CTD yo-yo cast. Once operations at Station 52 were complete, the ship was to re-position within Station ALOHA to conduct an ACS/AC9/FRRf/LISST cast, and a Hyperpro cast.

Once those operations were complete, the ship was to transit to Station 6, referred to as Station Kaena where a near-bottom CTD cast (~2500 m) was to be conducted to collect salinity and chlorophyll samples for calibration.

After Station Kaena 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, anemometer, and underway fluorometer.

## 2. SCIENCE PERSONNEL

<b>Participant</b>	<b>Title</b>	<b>Affiliation/HOT Group</b>
Karin Björkman	Marine Specialist	UH/BEACH
Daniela Böttjer	Post-doc	UH/BEACH
Susan Curless	Chief Scientist – Res. Assoc.	UH/BEACH
Ken Doggett	Research Associate	UH/CMORE
Lance Fujieki	Computer Specialist	UH/BEACH
Adriana Harlan	Research Associate	UH/BEACH
Kathryn Stanaway	Research Associate	UH/BEACH
Donn Viviani	Graduate Student	UH/BEACH
Blake Watkins	Marine Engineer	UH/BEACH
Asako Endo	Undergraduate Student	UH/PO
Cammy Fumar	Research Associate	UH/PO
Rachel Mock	Undergraduate Student	UH/PO
Bo Keopaseut	Research Associate	UH/PO
Fernando Santiago-Mandujano	Research Associate	UH/PO
Jefrey Snyder	Marine Technician	UH/PO
Qian (Lydia) Li	Graduate Student	UH
Dave Wisegarver	Technician	NOAA/PMEL
Lucia Upchurch	Technician	Univ. of Texas
Elly Speicher	Marine Technician	OTG
Kuhio Vellalos	Marine Technician	OTG

## 3. GENERAL SUMMARY

Cruise operations were suspended after the Markey Hydrographic Winch failed to operate correctly during operations at Station Kahe. During the 500 m weight cast, the winch payed-out wire when the winch operator was trying to pay-in to lift the weight off the deck, causing slack in the wire and a snarl on the winch drum once the winch did start to pay-in. Two shallower weight casts (less than 30 m) were conducted in attempts to duplicate winch symptoms but winch behaved normally.

During the 1000 m CTD down cast, the winch began to pay-out quickly with the package around 900 m. The rosette experienced a ~20 m free fall before the winch operator was able to bring the controls to neutral and stop the package. The cast terminus was 960 dbar and only one niskin bottle was fired at 960 dbar before being recovered immediately.

Ship propulsion issues were also experienced on the transit out to Station Kahe. Failure of starboard motor control caused delays in arrival at Station Kahe and delays in operations while on station to allow the ship's engineering crew time to attempt repairs and test those repairs.

After experiencing multiple ship equipment failures at Station Kahe, the ship returned to Snug Harbor the morning of February 16<sup>th</sup> to obtain shore support staff assistance to assess the repairs needed on both the Markey winch and the ship's propulsion system. After a full work day of assessment and repair attempts, it became apparent that repairs would not be completed in time

for the ship to depart on February 17<sup>th</sup> to attempt a shortened version of the original cruise plan, and the remainder of the cruise was cancelled.

#### **4. R/V *Ka'Imikai-O-Kanaloa* OFFICERS AND CREW, TECHNICAL SUPPORT**

Despite the problems experienced on this cruise, the R/V *Ka'Imikai-O-Kanaloa* continues to maintain excellent ship support for our work. Captain Ross, the ship's crew, and technicians were most helpful and accommodating throughout the cruise and their shared disappointment in having to go back to Snug Harbor early was definitely noted and appreciated by the science personnel.

Technical support during this cruise was excellent. OTG personnel were available at any time to assist in our work and worked very hard in trying to assess the problems with the Markey winch.

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

##### **February 15, 2010**

0800- Departed Snug Harbor

0840- Fire and Abandon Ship Drills

0857- Science Party Briefing

1035- Propulsion issues- lost starboard motor control, continued motoring on port screw towards Kahe.

1124- Arrived at Station Kahe – no ops while propulsion fuses were tested and repair to A and B starboard motor control attempted.

1225- Propulsion testing with motor control unit from bow thruster in control of starboard screw, tested ok. Can continue cruise with port and starboard screws and no bow thruster.

1250- Weight cast to 500 m.

1325- End of weight cast

-Wire payed out too fast when trying to haul in with the weight back on board, snarl in wire on drum, deployed weight again to test and work out the twisted wire on the drum.

1340- Weight cast to 150 m.

1345- Weight cast delayed due to engine propulsion testing.

1349- Weight cast to 24 m.

-Repeat shallow weight casts did not show previous symptom of winch quick pay-out while hauling in on load.

1355- Hyperpro

1430- Underway for Station Kahe, ship had drifted 1 mile from station, propulsion issues experienced again, again no control of starboard screw, and no bow thruster. Broken wire on bridge found and replaced, starboard engine back on-line.

1535- S1C1 Station Kahe 1000m CTD cast

1604- Winch free fall approximately 20 m on CTD downcast with package at 900m.

1630- Package back on board, maximum depth was 960 dbar, only one niskin bottle fired at 960 dbar, rosette recovered without tag lines in case free-fall was experienced again upon recovery.

1700- Captain and Chief Scientist talk, decision made to go home due to unsafe winch working conditions and propulsion problems.

## **February 16, 2010**

0738- Arrived at Snug Harbor.

Science party put on release by Gray Drewry till 0700 02-17-10 at which time a cruise would depart using a shortened version of the original cruise plan will depart or off-loading of gear will occur.

1500- Captain Ross called the Chief Scientist to say repairs on both the ship's propulsion system and the winch had not been successful. Cruise will not depart tomorrow at 0700.

1519- E-mail was sent to all cruise participants cancelling the remainder of cruise.