HOT-276: Chief Scientist Report

Chief Scientist: Susan Curless
R/V *Ka'Imikai-O-Kanaloa*
September 24-28, 2015

Cruise ID: **KOK15-11 and KOK15-12**
15-11 Departed: September 24, 2015 at 0906 (HST)
15-11 Returned: September 24, 2015 at 2000 (HST)
15-12 Departed: September 26, 2015 at 0757 (HST)
15-12 Returned: September 28, 2015 at 0805 (HST)
Vessel: **R/V *Ka'Imikai-O-Kanaloa***
Master of the Vessel: Captain Don Jack
OTG Marine Technicians: Trevor Young and John Ahearn

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 September 24th for about 3 hours.
2) 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 was to be occupied September 25th, 26th, and 27th.
3) Station 52, the site of WHOTS-12 Mooring (anchor position 22° 40.061' N, 157° 56.9654' W) was to be occupied on September 27th 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 was to be occupied on September 27th for approximately 3 hours.

Upon arrival to Station Kahe a 400 lb. weight-test cast to 1000 m, one CTD cast to 1000 m, and a Hyperpro cast were to be conducted on the afternoon of September 24th. 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. As the ship departed Station Kahe, three SLDMB floats were to be deployed to map an eddy feature located off the west side of Oahu.

Upon arrival to 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 1000 m cast to collect water for the Primary Productivity Array. This cast was 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, and 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 at 2300 on September 27th.

Another free-drifting array (Gas Array) was to be deployed for 24 hours for incubation experiments on September 26th. The Gas Array was to be recovered on September 27th.

An Automated Trace Element (ATE) sampler was to be deployed to a depth of 10 m on September 26th.

A plankton net was to be towed three times between 1000-1400, and three times between 2200-0200 for 30 minute intervals on September 26th and 27th at Station ALOHA.

The Hyperpro was to be deployed for a half-hour period near noon time on September 24th, 25th, and 27th.

An optics package including a Wet Labs AC9, 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 September 27th.

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 the morning of September 27th.

After recovering the arrays, the ship was to transit to Station ALOHA to conduct an optics cast. Once that operation was complete, 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 a Hyperpro cast. Once the Hyperpro cast was complete, an APEX float was to be deployed.

Once operations at Station ALOHA 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, the underway fluorometer, and the ship's anemometers.

2. SCIENCE PERSONNEL

Participant	**Title**	**Affiliation**
Susan Curless	Research Associate	UH
Lance Fujieki	Research Associate	UH
Dan Sadler	Research Associate	UH
Brenner Wai	Research Associate	UH
Blake Watkins	Marine Engineer	UH
Brie Maillot	Technician	UH
Karin Björkman	Research Specialist	UH
Eric Shimabukuro	Research Associate	UH/SCOPE
Jim Burkitt	Research Associate	UH/SCOPE
Greyson Adams	Research Associate	UH/SCOPE
Ken Doggett	Research Associate	UH/CMORE
Jefrey Snyder	Marine Technician	UH
Fernando Santiago-Mandujano	Research Associate	UH
Daniel McCoy	Research Associate	UH
Robert (Walt) Deppe	Research Associate	UH
Justine Flotron	Undergraduate Student	HPU
**Victoria Futch	Graduate Student	UH
*Lisa Hall	Undergraduate Student	UH
*Kelsey Maloney	Undergraduate Student	UH
John Ahern	Marine Technician	OTG
Trevor Young	Marine Technician	OTG

*Denotes cruise participants unable to participate in the cruise for the second departure.
**Denotes cruise participants added to the cruise for the second departure.

3. GENERAL SUMMARY

HOT 276 originally departed on September 24th. During operations at Station Kahe it was noticed there was no tension readout on the Markey winch. Further investigations by OTG confirmed that the load cell pin had broken. Without proper equipment on board to fix the problem, we returned to Snug Harbor for repairs.

Once repairs to the load pin were complete (September 25th), the cruise was rescheduled to depart on September 26th. Operations ran as scheduled until the ship began transiting to Station ALOHA. Heavy winds and seas delayed arrival on Station until 0600 September 27th. Weather on station was 10-12 ft swells with 7 ft seas, and 30 kt winds. Science operations were suspended due to heavy weather.

After reviewing weather forecasts, it was decided by the Captain and the Chief Scientist that the gradient between the high pressure system and tropical storm was not going to allow the weather to get better before our scheduled arrival time into the harbor. To save sea days, the cruise returned to Snug Harbor at 0800 on September 28th.

Operations completed: Station Kahe weight cast to 500 m, 1000 m CTD and a Hyperpro deployment. Three SLDMB floats were successfully deployed while departing Station Kahe. One SLDMB float was deployed upon our return to Snug Harbor at the same latitude as the other float deployments. The ship's anemometers, ADCP, thermosalinograph and underway fluorometer ran successfully throughout the cruise.

Operations not completed: All scheduled Station ALOHA, Station WHOTS, and Station Kaena activities. The APEX float was not deployed.

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

The R/V *Ka'Imikai-O-Kanaloa* continues to maintain very good ship support for our work. Captain Don Jack and the ship's crew showed flexibility, enthusiasm, concern, and dedication to our scientific mission.

Technical support during this cruise was very good. OTG personnel were available to assist in our work during the cruise. A special thank you to Trevor Young, Steve Tottori, and the OTG team for all their hard work troubleshooting and fixing the load pin.

5. DAILY REPORT OF ACTIVITIES (HST)

September 24th, 2015
0756- Departure delayed due to bow thruster problems and traffic in the harbor channel
0906- Depart Snug Harbor
0948- Fire and Abandon Ship Drills
1010- Safety briefing with the Captain
1024- End of Safety Briefing
1228- Arrive Station Kahe
1245- Weight Cast -aborted due to no tension readout - troubleshooting reveals flooded junction box
1316- Deploy Hyperpro
1345- Hyperpro recovered - troubleshooting connection issues
1413- Hyperpro re-deployed
1440- Hyperpro recovered
1500- Load cell pin in winch not working, troubleshooting continues with attempts to bypass amplifier board
1630- No parts on board to fix load cell, depart to Snug Harbor
2000- Arrive Snug Harbor

September 25th, 2015
OTG fixed load pin

September 26th, 2015
0757- Depart Snug Harbor (Science party muster in galley prior to departure for safety briefing.)
0827- Fire and abandon ship drills
0844- Secure from drills
1100- Arrive at Station Kahe
1110- Weight cast to 500m
1130- Weight recovered
1145- Hyperpro
1230- Hyperpro Recovered
1248- S1C1 1000 m CTD
1400- End of cast
1412- Deployment of SLDMB floats (#1,#2,#3)
1424- Transit Station ALOHA

September 27th, 2015
0600- Arrive Station ALOHA – operations suspended due to heavy seas and high winds
1730- Captain and Chief Sci meet to go over forecasts again. Decision to head into the harbor due to non-workable conditions was made.
1745- Transit Snug Harbor

September 28th, 2015
0336- Deployment of SLDMB float (#4)
0800- Arrive Snug Harbor

HOT program sub-components:

Investigator	**Project**	**Institution**
Matt Church Dave Karl Bob Bidigare	Core Biogeochemistry	UH
John Dore	Biogeochemistry QA/QC	MSU
Roger Lukas	Hydrography	UH
Mike Landry	Zooplankton dynamics	SIO
Ricardo Letelier	Optical measurements	OSU

Ancillary programs:

Ken Doggett and Karin Björkman	3H and 14C labeled cell sorting	UH
Victoria Futch	SLDMB float deployement	UH