HOT 330: Chief Scientist Report
Chief Scientist: Tully Rohrer
R/V *Kilo Moana*
May 15 - 19, 2021

Cruise ID: KM 21-05
Vessel: R/V *Kilo Moana*, University of Hawaii
Master of the Vessel: Captain David Martin
Chief Scientist: Tully Rohrer, University of Hawaii
Marine Technicians: Julianna Diehl, Jeff Koch

1.0 COVID-19 PREVENTION

Due to the current COVID-19 pandemic extra precautions were set in place before and during the cruise to prevent the spread of COVID-19 onboard. UNOLS has provided guidelines which were followed on this cruise. A few of the guidelines are found below. The extensive list can be found in the Pandemic Response Plan.

- All HOT participants have been vaccinated for COVID-19, and departure was greater than two weeks from the administration of the final dose for every person.
- Sailed with a minimum science party, one scientist per stateroom, with the exception of two staterooms housing two individuals each.
- Cruise participants self-isolated according to the HOT Risk Mitigation Plan before the cruise (April 27thth – May 14th), and were tested for COVID-19 twice before the cruise (April 27th and May 11th).

During the cruise all participants:

- wore face masks
- maintained a distance of 6 ft. when possible
- properly disinfected of all workspaces often

2.0 SCIENTIFIC OBJECTIVES

The cruise objective was to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations.

A copy of the detailed cruise plan is available at:

https://hahana.soest.hawaii.edu/hot/crsplan/HOT_330_KM_Operational_Cruise_plan.pdf

Science operations were planned for 4 stations, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21° 20.6'N, 158° 16.4'W.
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.
3) Station 52, the site of WHOTS-16 Mooring (anchor position 22° 40.01'N 157° 56.96'W).
4) Deep Moored Sediment Trap Mooring location (target position 22° 51'N, 157° 54'W).

3.0. SCIENCE PERSONNEL

Participant	Title	Affiliation	Citizenship
Eleanor Bates	Graduate Student	UH	USA
Brandon Brenes	Research Assistant	UH	USA
Tim Burrell	Research Associate	UH/SCOPE	NZL
Julianna Diehl	Marine Technician	OTG	USA
Dan Fitzgerald	Research Associate	UH	USA
Eric Grabowski	Research Associate	UH	USA
Jeff Koch	Marine Technician	OTG	USA
Kelsey Maloney	Undergraduate Student	UH	USA
Fernando Pacheco	Research Associate	UH	BRA
Tully Rohrer	Research Associate	UH/SCOPE	USA
Dan Sadler	Research Associate	UH	USA
Fernando Santiago-Mandujano	Research Associate	UH	USA
Eric Shimabukuro	Graduate Student	UH	USA
Ryan Tabata	Research Associate	UH/SCOPE	USA
Blake Watkins	Marine Engineer	UH	USA

4.0. GENERAL SUMMARY

Following the incident on HOT-328 that resulted in the Hawboldt winch system two-blocking the HOT rosette in the docking head and parting the termination, testing of the system's newly installed failsafe mechanisms was completed on loading day and then again at Station Kahe.

Mobilization was completed on May 13th so that the R/V Kilo Moana could use the 14th as a day at sea to patch test the multibeam sonar. The cruise began May 15th at 09:00 (HST). At Station Kahe, in addition to the weight cast, Hyperpro cast, and the 1000 m CTD cast, Eleanor Bates also performed a Trace Metal CTD cast to soak the Niskin bottles. After conducting operations at Station Kahe the ship proceeded to Station ALOHA.

Upon arrival at Station ALOHA, the floating sediment trap and WireWalker arrays were deployed west of center station. A CTD cast was conducted to collect water for the primary productivity array, and subsequently the primary productivity array was deployed. The gas array experiment was deployed on May 17th as scheduled and was recovered on May 18th. All floating arrays were recovered successfully.

In addition to the typical array deployments, Eric Grabowski deployed a Net Trap array from May 16th-17th. Unfortunately, the net was damaged during the deployment, possibly due to the net fatiguing with age. Eric also deployed a large and small Snowcatcher for particle flux analyses.

At Station ALOHA, two near-bottom CTD casts and thirteen 1000 m CTD casts were completed. One 5-cycle yoyo CTD cast to 200 m was completed near the WHOTS mooring (Station 52).

Six net tows for the core HOT zooplankton collection were completed successfully; three during the day and three during the night.

Three total casts were conducted with the Trace Metals CTD using the W2 winch.

Hyperpro operations were conducted once at Station Kahe and twice at Station ALOHA, on May 16th and 18th respectively.

The 300 kHz and the 38 kHz ADCPs, underway fluorometer, transmissometer, thermosalinograph and the ship's meteorological suite ran without interruption during the cruise.

The VPR (Video Plankton Recorder from Tracy Villareal) was deployed twice on May 17th, once at night and once during the day.

The cruise's final operation was the deployment of the Deep Moored Sediment Traps. Deployment of the mooring consisting of two McLane Laboratories Parflux sediment traps went smoothly and was followed by an acoustic anchor survey. The coordinates for the anchor's final resting spot were calculated to be 22° 50.841' N, 157° 54.982' W.

The weather was generally favorable during the cruise, despite sustained winds in the 20-22 kt range. The arrays stayed mostly in the northern part of ALOHA circle before recovery on May 18th.

5.0. R/V *Kilo Moana* OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V *Kilo Moana* continues to maintain very good ship support for our work. The LARS system worked well throughout the cruise, with the implementation of the docking head allowing for "hands-free" deployments and recoveries.

Captain David Martin and the ship's crew showed flexibility, concern, and dedication to our scientific mission.

Technical support during this cruise was also very good. OTG personnel were available to assist in our work during the cruise. They were flexible and accommodating.

6.0. DAILY REPORT OF ACTIVITIES (HST)

May 13th, 2021

0900 – Began equipment loading

May 15th, 2021

0902 – Depart from Pier 35
0950-1000 – Fire and Abandon ship drills
1153 – Arrived at Kahe Station
1210-1252 – Weight cast to 800 m with 1200 lb weight
1301-1335 – Hyperpro cast
1353-1501 – S1C1 CTD cast
1536-1551 – Trace metal cast
1559 – Transit to ALOHA Station

May 16, 2021

0005 – Arrive ALOHA Station
0009-0045 – Sediment Trap Array Deployment, 22 42.99' N, 158 00.57' W
0105-0119 – Wirewalker Deployment, 22 43.94' N, 158 00.32' W
0157-0304 – S2C1, PP Cast
0416-0430 – Primary Production array deployment, 22 45.00' N, 158 01.10
0451 – S2C2, PO Deep Cast 1
0638 – Deepest point of PO Deep cast, 4805 db
0833 – End PO Deep Cast
0845 – Seaglider deployment canceled due to winds/rough seas
0906-0930 – Trace Metal cast #2
1052-1219 – S2C3, PO Shallow Cast
1237-1308 – Net Tow
1310-1352 – Hyperpro casts (1 yo-yo, 2 profiles)
1358-1504 – S2C4, PCPN Cast
1510-1538 – Deployed Net Trap Array, 22 45.42' N, 157 59.65' W
1540 – Transit to Pump Tanks
1712-1817 – S2C5, PPO4 Cast
1820 – Transit to Primary Productivity Array
1900-1916 – Primary Productivity Array Recovery, 22 47.1915' N, 158 02.9590' W
1954-2059 – S2C6, BEACH cast
2130-2146 – Small Snowcatcher Deployment
2205-2305 – Net Tows (2)
2311 – Begin S2C7, Open cast, SCOPE DNA sampling

May 17, 2021

0008 – End S2C7
0032-0140 – T. Villareal VPR Deployment #1
0153-0255 – S2C8, Gas Array Cast

0409- 0432 – Gas array deployment, 22 49.811' N, 157 58.7814' W
0458-0612 – S2C9, Open Cast, SCOPE DNA sampling
0620 – Transit to pump tanks and incinerate
0752-0859 – S2C10, PSi Cast
0910-1035 – T. Villareal VPR Deployment #2
1056-1207 – S2C11, Open Cast, R. Letscher Ancillary sampling, PO Salinity Secondary Standard
1219-1335 – Net Tows (2)
1404-1505 – S2C12, ATP Cast
1515 - Transit to Net Trap Array
1557-1611 – Net Trap Array Recovery, 22 48.26' N, 157 59.94'W
1657-1754 – S2C13, Open Cast, Water Sampling for A. Burger/E. DeLong
1818-1844 – Trace Metal Cast 3
1900 – Transit to Pump Tanks
2006-2105 – S2C14, HPLC Cast
2117-2133 – Large Snowcatcher Deployment
2208-2240 – Net Tow (1)
2310 – Begin S2C15, PO Deep Cast 2

May 18th, 2021

0041 – Reached bottom of cast, 4810 db
0216 – End S2C15
0246-0427 – Optics Cast
0430 – Transit to Gas Array
0603-0626 – Gas Array recovered, 22 53.4659' N, 157 58.6716' W
0710-0743 – Sediment Trap Array recovered, 22 49.1812' N, 158 02.5754' W
0805-0822 – Wirewalker Array recovered, 22 49.4892' N, 158 03.3408' W
0825 – Transit to Station 52, WHOTS Mooring
1058-1213 – S52C1, WHOTS yo-yo cast (5 profiles)
1229-1308 – Hyperpro
1310 – Transit to Deep Mooring Sediment Trap deployment site
1445-1649 – Deploy Deep Mooring Sediment Trap mooring, anchor drop 22 50.855'N, 157 54.744' W
1800-1847 – Acoustic anchor survey, coordinates confirmed as: 22 50.841'N, 157 54.982'W
1847 – Transit to Pier 35

May 19th, 2021

0726 – Arrival at Pier 35

HOT program sub-components:

Investigator	Project	Institution
Angelicque White	Core Biogeochemistry	UH
Dave Karl	SCOPE-biogeochemistry	UH
John Dore	Biogeochemistry QA/QC	MSU
James Potemra	Hydrography	UH
Mike Landry	Zooplankton dynamics	SIO
Ricardo Letelier	Optical measurements	OSU

Ancillary programs:

Matt Church	Diversity and activities of nitrogen-fixing microorganisms	UM/FLBS
Ed DeLong	SCOPE: DNA and Viral DNA collection	UH
Andrew Dickson	CO_2 dynamics and intercalibration	SIO
Paul Quay	$DI^{13}C$	UW
Dan Repeta	SCOPE: DOM collection	WHOI
Angelicque White	SCOPE: C-STAR	UH
John Zehr	Samples for unicellular cyanobacterium	UCSC
Sonya Dyhrman	Physiological ecology of diatom diazotroph associations using metatranscriptome samples.	LDEO
Nicholas Hawco Eleanor Bates	Quantifying Iron Turnover in the Upper Ocean via Time-series Measurements at Station ALOHA	UH
Robert Letscher	Transparent exopolymer and phytoplankton vertical migration as sources for preformed nitrate anomalies in the subtropical N. Pacific Ocean (UNH)	UNH
Debbie Lindell	Seasonal Virus Sampling	Technion
Tracy Villareal	Transparent exopolymer and phytoplankton vertical migration as sources for preformed nitrate anomalies	U of Texas at Austin

	in the subtropical N. Pacific Ocean	
Andrew Burger Ed DeLong	Water collection for viral analysis	UH
Sam Wilson	Water collection for analysis on effect of pH on nitrification (production of N2O)	UH