HOT 339: Chief Scientist Report

Chief Scientist: Dan Sadler
R/V *Kilo Moana*
August 30 – September 4, 2022

Cruise ID: KM 22-10
Vessel: R/V *Kilo Moana*, University of Hawaii
Master of the Vessel: Captain Andrew Chen
Chief Scientist: Dan Sadler, University of Hawaii
Marine Technicians: Trevor Young, Benjamin Duncan

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 science party was vaccinated.
- All cruise participants self-isolated according to the HOT Risk Mitigation Plan.
- All cruise participants were Antigen tested for COVID.
- All ancillary participants were PCR tested for COVID.

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_339_Cruise_Plan_26AUG22.pdf

Science operations were planned for 3 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-18 Mooring (anchor position 22° 40.021'N, 157° 57.078'W).

3.0. SCIENCE PERSONNEL

Participant	Title	Affiliation	Citizenship
Camille Adkison	Graduate Student	UH	USA
Eleanor Bates	Graduate Student	UH	USA
Karin Björkman	Research Specialist	UH	SWE
Brandon Brenes	Research Associate	UH	USA
Tim Burrell	Research Associate	UH	NZL
Dan Fitzgerald	Research Associate	UH	USA
Trevor Young	Marine Technician	OTG	USA
Carolina Funkey	Research Associate	UH	USA
Benjamin Duncan	Marine Technician	OTG	USA
Fernando Pacheco	Research Associate	UH	BRA
Dan Sadler	Research Associate	UH	USA
Fernando Santiago-Mandujano	Research Associate	UH	USA
Ryan Tabata	Research Associate	UH	USA
Blake Watkins	Marine Engineer	UH	USA
Sarah Trubovitz	Scientist	USC	USA
Madeline Davis	Graduate Student	UH	USA
Marine Lebrec	Graduate Student	SJSU	USA
Will Kumler	Graduate Student	UW	USA
Julia Duerschlag	Scientist	UC	DEU
Daniel Ohnemus	Scientist	UGA	USA
Chris Marsay	Scientist	UGA	GBR
Charlotte Kollman	Graduate Student	UGA	USA
Mariah Ricci	Graduate Student	UGA	USA
Kieran Curran	Scientist	UNH	GBR
Jessica Gray	Graduate Student	UNH	USA
Chip Fletcher	Scientist	UH	USA

4.0. GENERAL SUMMARY

Equipment loading was conducted on August 29th, and the cruise departed on August 30th at 16:03 (HST). At Station Kahe, the Hawboldt LARS system passed the prescribed operational checks and weight cast. After completing operations at Station Kahe, the ship proceeded to Station ALOHA.

Upon arrival at Station ALOHA, the sediment traps, and WireWalker were deployed SW of center station, as the currents were expected to carry them towards the NW. Afterwards, the deep moored sediment traps were recovered. A trace metal cast and net tows were conducted along with a CTD cast to collect water for ancillary investigations followed by a large volume water collection by submersible pump to get a Beryllium profile. A CTD cast was conducted to collect water for the primary productivity array, and the array was deployed SW of station center. The primary productivity array drifted towards the W and was recovered after sunset on September 1st. The gas array experiment was deployed on September 2nd and recovered on schedule on September 3rd. The remaining arrays drifted W and were recovered on September 3rd.

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

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

Six closing net tows and 7 hand net tows were completed.

A Seaglider was recovered.

A McLane pump cast was completed, collecting water at 4 depths.

Hyperpro operations were conducted at Station ALOHA during the primary production experiment and next to the WHOTS mooring. Each operation consisted of 2 deep casts to 185 m, and a 5 cycle Yo-Yo cast to 20 m.

Four trace-metal cast were completed.

The 300 kHz ADCP, underway fluorometer, transmissometer, thermosalinograph and the ship's meteorological suite ran without interruption during the cruise. The 38 kHz ADCP is still not working correctly due a failed cable, but data were collected using three transducers and may still be useful.

Winds during the cruise were 10-12 knots from the E.

On the first day of the cruise an OTG technician felt ill and tested positive using a COVID antigen test. The individual was isolated in the ship's hospital for the rest of the cruise. The crew and science party followed Captain Andrew's directions for implementing the ship's health protocols.

Special thanks to Dan Fitzgerald and Blake Watkins for coordinating with the remaining OTG technician to conduct deck operations. Without their expertise and help, we would not have been able to complete our planned work.

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

The R/V *Kilo Moana* continues to be our favorite ship for HOT cruises. Sailing with a crew familiar with our work contributed to the success of the cruise. We applaud everyone responsible for staffing, training, and retaining these professional mariners.

Captain Andrew Chen and the ship's crew showed flexibility, concern, and dedication to our scientific mission. Ship handling was excellent during all operations.

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)

August 30, 2022

1603 Departed UH Marine Center at Pier 35
1730 Safety and Science Briefing followed by fire and abandon ship drills
1845 Arrived Station Kahe
1849-1920 Hawbolt crane/winch testing and weight cast
1942-1954 Trace metal cast
2010-2109 S. Trubovitz net tows
2125-2250 S1C1 1000 m CTD cast. Issues with wire out display and sensor output. Subsequently resolved. CTD broke the surface before firing 5m bottle.
2300 Begin transit to Station ALOHA

August 31, 2022

0550 Arrive Station ALOHA
0710-0725 Wirewalker deployed at 22 44.8913N, 158 02.1661W
0833-0851 Sediment Traps deployed at 22 44.8856N, 158 03.3820W
0900 Transit to Deep Moored Sediment Trap site
0915 Meeting with Captain, Chief Mate, Chief Engineer and Blake W. to review mooring recovery operations
1000 PO Volunteer training
1012-1029 Transducer communications to release deep moored traps
1103 Array on surface at 22 51.1504N, 157 53.9575
1130-1300 Deep Moored Sediment Trap recovered
1444-1510 Trace Metal Cast
1525-1652 S. Trubovitz net tows
1708-1812 S2C1 CTD cast to 1000m
1845-2155 Submersible pumping for Beryllium profile

September 1, 2022

0153-0232 S2C2 200m CTD cast for Primary Production Experiment
0313-0321 S. Trubovitz hand net tow
0418-0445 PP array deployed at 22 45.1176N, 158 01.1462W
0505-0851 S2C3 near bottom CTD cast (PO Deep)
0920-0950 Trace Metal Cast
1003-1045 S. Trubovittz net tow
1107-1232 S2C4 CTD to 1000m (PO Shallow)
1255-1333 Net Tow
1351-1402 Hyperpro Cast
1436-1611 S2C5 CTD cast to 1000m (PC/PN) – delay to fix loose wire wraps on drum
1707-1821 S2C6 CTD cast to 1000m (PPO4)
1832 Transit to primary production array
1934-1948 Primary Production array recovered at 22 45.320 N, 158 05.376 W
2000 Transit to pump tanks
2050-2210 S2C7 CTD cast to 1000m (BEACH)

2130-2140 S. Trubovitz hand net tow
2236-2346 Net tows (2)

September 2, 2022

0003-0057 S2C8 CTD cast to 1000m
0203-0305 S2C9 CTD cast to 1000m (Gas Array)
0409-0436 Gas Array deployed at 22 44.6920 N, 158 03.8022 W.
0457-0600 S2C10 CTD cast to 1000m
0609 Transit to pump tanks
0848-0957 S2C11 CTD cast to 1000m (PSi)
1012-1052 S. Trubovitz net tows
1057-1204 S2C12 CTD cast to 1000m
1245-1327 Net tow
1359-1502 S2C13 CTD cast to 1000m (ATP)
1509-1514 S. Trubovitz hand net tow
1600 Transit to recover Seaglider
1730 Recovered Seaglider at 22 43.92 N, 158 01.77 W
1732 Transit to pump tanks
1919-1941 Trace Metal Cast
1952-2103 S2C14 CTC cast to 1000m (HPLC)
2125-2155 S. Trubovitz net tows
2212-2242 Net tow
2250 Transit to ALOHA center
2327 Start S2C15 near bottom CTD cast (PO3)

September 3, 2022

0249 End of cast
0314-0458 Optics cast. 3 cycles to 200m
0505 Transit to gas array
0644-0708 Gas array recovered at 22 46.3546 N, 158 10.9534 W
0710 Transit to Sediment Trap array
0841-0901 Sediment Traps recovered at 22 46.6679 N, 158 22.0496 W
0905 T ransit to Wirewalker
0945-1000 Transit to Station 52
1250-1313 Hyperpro cast at 22 40.7767 N, 157 59.0460 W
1318-1452 S52C1 CTD yoyo cast to 1000m with 4 cycles to 200m
1512-1529 S. Trubovitz net tows
1556-2005 Submersible McLane pump operations
2010 Transit to Honolulu

September 4, 2022

0815 First line, arrived 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, UVP, IFCB	UH
Nicholas Hawco Eleanor Bates	Quantifying Iron Turnover in the Upper Ocean via Time-series Measurements at Station ALOHA	UH
Sonya Dyhrman	Physiological ecology of diatom diazotroph associations using metatranscriptome samples.	LDEO
Debbie Lindell	Seasonal Virus Sampling	Technion
Dan Ohnemus Chris Marsay Mariah Ricci Charlotte Kollman	Hawaii Aerosol Time-Series: Quantifying marine dust deposition and composition in an oligotrophic gyre	UGA
Madeline Davis Marine Lebrec	Developing Automated Nutrient and Trace Metal Methodology Using Programable Flow Injection	UH

Sarah Trubovitz	Integrating genetic-morphologic concepts of diversity In Radiolaria	USC
Anitra Ingalls Will Kumler Julia Duerschlag	Tracking the fate of nitrogen fixation into isotope labeled Protiens and metabolites	UW
Robert Letscher Kieran Curran Jessica Gray	Transparent exopolymer and phytoplankton vertical migration As sources for preformed nitrate anomalies in the subtropical North Pacific Ocean	UNH