HOT 335: Chief Scientist Report

Chief Scientist: Tully Rohrer
R/V *Kilo Moana*
March 26th-30th, 2022

Cruise ID: KM 22-04
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, Lance Frymire

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 before the cruise, including 5-day quarantines for visiting scientists flying from the mainland.
- All cruise participants were tested for COVID.

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_335_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 50, the site of WHOTS-17 Mooring (anchor position 22° 46.002'N 157° 53.958'W).
4) Station 6, referred to as Station Kaena, is located off Kaena Point at 21˚ 50.8'N, 158˚ 21.8'W

3.0. SCIENCE PERSONNEL

Participant	Title	Affiliation	Citizenship
Eleanor Bates	Graduate Student	UH	USA
Karin Björkman	Research Specialist	UH	SWE
Brandon Brenes	Research Assistant	UH	USA
Tim Burrell	Research Associate	UH/SCOPE	NZL
Jia Cashon	Undergraduate Student	UH	USA
Julianna Diehl	Marine Technician	OTG	USA
Bailey Donaldson	Graduate Student	UH	USA

Julia Duerschlag	Scientist	UChicago	DEU
Dan Fitzgerald	Research Associate	UH	USA
Carolina Funkey	Research Associate	UH	USA
Lance Frymire	Marine Technician	OTG	USA
Reece James	Graduate 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
Ryan Tabata	Research Associate	UH/SCOPE	USA
Addison Trainer	Undergraduate Student	UH	USA
Jake Waldbauer	Scientist	UChicago	USA
Blake Watkins	Marine Engineer	UH	USA

4.0. GENERAL SUMMARY

Equipment loading was conducted on March 25th, followed by a next day departure at 0945 (HST). At Station Kahe, the Hawboldt LARS passed the prescribed operational checks and weight cast. A Hyperpro cast, a Trace Metal CTD cast, and a 1000 m CTD cast were completed.

Upon arrival at Station ALOHA, the WireWalker and the sediment trap arrays were deployed southwest 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 March 28th as scheduled and was recovered on March 29th. In addition to the typical arrays, a 24-hour net trap array and a 24-hour sediment trap array were deployed a quarter mile apart from each other for intercomparison (D. Karl, E. Grabowski, and K. Björkman). All floating arrays were recovered successfully.

At Station ALOHA, two near-bottom CTD casts and thirteen 1000 m CTD casts were completed, with the 36-hour burst sampling CTD schedule completed without interruption. One 5-cycle yoyo CTD cast to 200 m was completed near the WHOTS mooring (Station 50). One near-bottom cast was conducted at Kaena station as well (Station 6).

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 Metal CTD using the W2 winch.

Winds were 5-15 kts from the east, and swell was 1-2m. The arrays generally moved in a NE direction and the longer-term arrays were recovered about 4.5 nm from their respective deployment locations.

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. Captain David Martin and the ship's crew showed concern, and dedication to our scientific mission. Ship handling was good during all operations on station.

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)

Friday March 25th, 2022
1200-1830 – Mobilization/loading

Saturday March 26th, 2022
0945 – Depart from Pier 35
1015 – Fire and Abandon ship drills
1230 – Arrived at Kahe Station
1245-1325 – Weight cast to 900 m with 1200 lb weight
1332-1412 – Hyperpro cast
1441-1558 – S1C1 CTD cast
1615-1630 – Trace metal cast
1635 – Transit to ALOHA Station

March 27, 2022
0018 – Arrive WireWalker deployment site
0034-0044 – Begin WireWalker deployment, 22° 42.075'N, 158° 00.786'W
0106-0134 – Sediment Trap array deployment, 22° 43.057'N, 158° 00.479'W
0200-0312 – S2C1, PP Cast
0416-0443 – Primary Production array deployment, 22° 43.991'N, 158° 01.363'W
0518 – Begin S2C2, PO Deep Cast
0704 – Deepest point of PO Deep cast, 4800 db, 22° 45.005'N, 158° 00.000'W
0909 – End PO Deep Cast
0943-1010 – Trace Metal cast #2
1056-1231 – S2C3, PO Shallow Cast
1243-1315 – Net Tow
1329-1407 – Hyperpro casts (2 profiles, 1 yo-yo)
1410-1521 – S2C4, PCPN Cast
1534 – Depart to look for uncommunicative PP Array
1555 – Inspected PP array, did not recover
1605 – Transit to pump tanks
1717-1821 – S2C5, PPO4 Cast
1839 – Deployed 24-hour Net Trap array; 22° 49.641'N, 158° 01.335'W
1908 – Deployed 24-hour Sediment Trap array; 22° 49.369'N, 158° 01.170'W
1948-2010 – Recover Primary Production array
2012-2112 – S2C6, BEACH cast
2202-2303 – Net Tows (2)
2305 – Begin S2C7, Open cast (Jake Waldbauer Sampling)

March 28, 2022
0017 – End S2C7
0205-0307 – S2C8, Gas Array Cast
0430-0451 – Gas array deployment, 22° 46.6420'N, 157° 59.7546'W
0502-0609 – S2C9, Open Cast, SCOPE DNA sampling
0611 – Transit to pump tanks and incinerate
0701 – Rain on station
0755-0901 – S2C10, PSi Cast

1048-1154 – S2C11, Open Cast, SCOPE DNA sampling
1206-1309 – Net Tows (2)
1354-1456 – S2C12, ATP Cast
1639-1743 – S2C13, Open Cast, PO Salinity Secondary Standard collected
1750 – Transit to recover 24-hour Sediment Traps
1815-1825 – Recover 24-hour Sediment Trap Array, 22° 52.2624'N, 158° 01.3824'W
1903-1915 – Recover 24-hour Net Trap Array, 22° 54.474'N, 158° 01.1884'W
2003-2026 – Trace Metal Cast 3
2037-2140 – S2C14, HPLC Cast
2207-2238 – Net Tow
2240 – Raining on Station
2314 – Begin S2C15, PO Deep Cast #2

March 29, 2022
0053 – Reached bottom of cast, 4806 db
0232 – End S2C15
0302-0447 – Optics Cast
0449 – Transit to Gas Array
0610-0649 – Gas Array recovered, 22° 50.215'N, 157° 59.678' W
0705-0728 – Sediment Trap Array recovered, 22° 48.677'N, 157° 58.835'W
0750-0806 – WireWalker Array recovered, 22° 46.147'N, 157° 58.933'W
0810 – Transit to WHOTS mooring, Station 50
1045-1155 – S50C1, WHOTS yo-yo cast
1200-1259 – Hyperpro
1319 – Argo Float Deployed (Dana Swift)
1330 – Depart for Kaena Station
1910-2104 – S6C1, Kaena Cast
2125 – Depart for Pier 35

March 30, 2022
0736 – Arrive Pier 35, begin offload

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
Jacob Waldbauer Julia Durschlag	Tracking marine diazotrophy with isotope-labeling proteomics	UChicago
Robert Letscher	Transparent exopolymer and phytoplankton vertical migration as sources for preformed nitrate anomalies in the subtropical N. Pacific Ocean	UNH