

HOT 355: Chief Scientist Report

Chief Scientist: Dan Sadler

R/V Kilo Moana

December 18 – 22, 2024

Cruise ID: KM 24-20

Vessel: *R/V Kilo Moana*, University of Hawaii

Master of the Vessel: Captain James Clifford

Chief Scientist: Dan Sadler, University of Hawaii

Marine Technicians: James Harris, Lance Frymire, Scott Nunnery

1.0 COVID-19 PREVENTION

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. All cruise participants were antigen 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-355_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-20 Mooring (anchor position 22° 40.08' N, 157° 57.01' 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
Dan Sadler	Chief Scientist	UH	USA
Paige Dillen	Graduate Student	UH	USA
Mattia Da Fieno	Undergraduate Student	UH	USA
Karin Björkman	Research Specialist	UH	SWE
Brandon Brenes	Graduate Student	UH	USA
Fernando Carvalho Pacheco	Research Associate	UH	BRA
Fernando Santiago-Mandujano	Research Associate	UH	USA
Mike Dowd	Graduate Student	UH	USA
Dan Fitzgerald	Research Associate	UH	USA
Blake Watkins	Marine Engineer	UH	USA
Emily Josefina Velasquez	Undergraduate Student	UH	USA
Briana Prado	Volunteer	UH	USA
Vivian Hui	Undergraduate Student	UH	USA
Emily Bowden	Graduate Student	UTK	USA
Kennedi Hambrick	Graduate Student	UTK	USA
Nerrissa Fisher	Post-Doc	UH	USA
Dana Engel	Volunteer	UH	USA
Eric Grabowski	Research Associate	UH	USA
Rhea Foreman	Scientist	UH	USA
Lance Frymire	OTG	UH	USA
James Harris	OTG	UH	USA
Scott Nunnery	OTG	UH	USA

4.0. GENERAL SUMMARY

Equipment loading was conducted on December 17th, and the cruise departed on December 18th at 0927 (HST). At Station Kahe, the Hawboldt LARS system passed the prescribed operational checks and weight cast. A Hyperpro cast and 1000m CTD cast were completed before proceeding to Station ALOHA.

On arrival at Station ALOHA, the sediment traps were deployed 4 nm NW of station center, as the currents were expected to carry them towards the S. Afterwards, a 200m CTD cast was performed to collect water for an ancillary science experiment followed by a 200m CTD cast to collect water for the Primary Production array. The PP array was deployed 3nm NW of station center.

The floating arrays were recovered in the NW quadrant of Station ALOHA.

At Station ALOHA, two near bottom CTD casts, twelve 1000 m CTD casts, and two 200 m CTD casts were completed. A Yo-Yo CTD cast, comprising five cycles down to 200 dbar 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.

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.

Two Video Plankton Recorder casts were completed.

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

Winds during the cruise were 10 knots from the SW on arrival at St. ALOHA but dropped to 1-3 knots from the N for most of the rest of the cruise. A large, long period NW swell persisted during the cruise but did not hinder operations.

The cruise returned to pier 35 on December 22, 2024 at 0742. All science equipment was offloaded.

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. We applaud the continued efforts by the UH Marine Center to staff and retain experienced crew. All ship departments provided outstanding support to our operations.

Technical support during this cruise by OTG was outstanding. Deck operations were on time and well supervised.

6.0. DAILY REPORT OF ACTIVITIES (HST)

December 18, 2024

0927	Departed Pier 35
1000	Safety meeting followed by Fire and Abandon Ship drills
1224	Arrived St. Kahe
1240-1324	Weight cast to 500m
1341-1422	Hyperpro cast, 5 yoyos to 20m and 2 deep casts to 185m
1437-1541	S1C1 CTD cast to 1000m
1556	Underway to St. ALOHA

December 19, 2004

0038	Arrived Station ALOHA
0112-0131	Sediment traps deployed at 22° 45.96' N, 158° 05.48' W
0156-0222	S1C1 CTD cast to 200m
0325-0403	S2C2 CTD cast to 200m for primary production
0519-0545	Primary production array deployed at 22° 46.09'N, 158° 04.35'W
0644-1017	S2C3 CTD near bottom cast for PO1
1132-1247	S2C4 CTD cast to 1000m for PO2, Begin 36 hours of burst CTD sampling
1301-1342	Hyperpro cast, 5 yoyo to 20m and 2 deep cast to 185m
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1400-1505 S2C5 CTD cast to 1000m for PC/PN
 1523 Transit to pump tanks
 1649-1759 S2C6 CTD cast to 1000m for PPO4
 1900-1922 Recovered primary production array at 22° 45.608'N, 158° 03.101'W
 1951- 2101 S2C7 CTD cast of 1000m for BEACH
 2210-2232 Net tow
 2239-2301 Net tow
 2330-0020 S2C8 CTD cast to 1000m

Friday, December 20, 2024

0035-0139 VPR cast
 0150-0257 S2C9 CTD cast to 1000m for Gas Array
 0419-0445 Gas array deployed at 22° 45.046'N, 158° 03.425'W
 0508-0624 S2C10 CTD cast to 1000m
 0635 Transit to pump tanks and incinerate
 0857-0954 S2C11 CTD cast to 1000m for PSi
 1045-1148 S2C12 CTD csst to 1000m
 1216-1240 Net tow
 1242-1303 Net tow
 1348-1447 S2C13 CTD cast to 1000m for ATP
 1652-1745 S2C14 CTD cast to 1000m
 1750 Transit to pump tanks
 1950-2051 S2C15 CTD cast to 1000m for HPL
 2204-2225 Net tow
 2321-0242 S2C16 near bottom CTD cast

Saturday, December 21, 2024

0250 Transit to gas array
 0505-0539 Gas array recovered at 22° 43.192'N, 157° 59.857'W
 0604-0631 Sediment trap array recovered at 22° 42.501'N, 157° 58.748'W
 0635 Transit to St. 52, WHOTS mooring
 1847-0943 S52C1 CTD cast to 200m, yoyo, 5 cycles
 1004-1051 VPR cast
 1107-1130 Net tow
 1301-1345 Hyperpro cast
 1352 Transit to St Kaena
 1952-2128 S6C1 CTD cast to 2480 m
 2137 Transit to Honolulu Harbor

Sunday, December 22, 2024

0742 Arrive Pier 35

7.0. HOT program sub-components:

Investigator	Project	Institution
Angelique 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
Ralph Keeling	CO ₂ dynamics and intercalibration	SIO
Paul Quay	DI ¹³ C	UW
Angelique White	SCOPE: C-STAR, UVP, IFCB	UH
Debbie Lindell	Seasonal Virus Sampling	Technion
Andrew Hirzel	Video Plankton Recorder	UH
Erik Zinser	Impact of hydrogen peroxide on the microbial community	UTK
Dave Karl	PIT screen experiment and PIC water column profiles	UH
Nerissa Fisher	Mixotrophic phytoplankton grazing dynamics in the North Pacific Subtropical Gyre.	UH