

HOT 334: Chief Scientist Report

Chief Scientist: Karin Björkman

R/V *Kilo Moana*

December 2-7, 2021

Cruise ID: KM 21-18

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

Master of the Vessel: Captain Peter Aguinaldo

Chief Scientist: Karin Björkman, University of Hawaii

Marine Technicians: Jeff Koch, Nick Mathews

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.
- All cruise participants were tested for COVID.

During the cruise participants:

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

SCIENTIFIC OBJECTIVES

The cruise objective was to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. In addition, we had planned on large volume water collections as this cruise was extended by one day compared to regular HOT cruises.

A copy of the detailed cruise plan is available at:

https://hahana.soest.hawaii.edu/hot/crsplan/HOT_334_Operatonal_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
Andy Burger	Scientist	UH	USA
Karin Björkman	Scientist/Chief Scientist	UH	SWE
Dan Fitzgerald	Research Associate	UH	USA
Lance Fujieki	Research Associate	UH	USA
Caroline Jackson	Graduate student	UH	USA
Reece James	Graduate student	UH	USA
Lucie Knor	Graduate student	UH	DEU
Jeff Koch	Marine Technician	OTG	USA
Fuyan Li	Post-doc	UH	CHI
Nick Mathews	Marine Technician	OTG/UNOLS	USA
Nicole Mathews	Undergraduate student	UH	USA
James Harris III	Undergraduate student	UH	USA
Dan Sadler	Research Associate	UH	USA
Fernando Santiago-Mandujano	Research Associate	UH	USA
Eric Shimabukuro	Graduate student	UH	USA
Blake Watkins	Marine Engineer	UH	USA

(Jia Cashon Undergraduate student UH USA)

Jia Cashon was unable to join the cruise as she had yet to receive her COVID test results in time for departure).

4.0. GENERAL SUMMARY

Equipment loading was conducted on December 1st, followed by a next day departure at 0900 (HST). At Station Kahe, the Hawboldt LARS passed the prescribed operational checks and weight cast. A Hyperpro cast was completed as well as a TM Go-Flo cast. The CTD cast was aborted as the sensors were giving erratic outputs. A second attempt was made but the sensor again failed. The cast was cancelled and the ship proceeded to Station ALOHA around 1645. As we neared Station ALOHA around 0030 the Captain decided to return to the lee of Oahu to wait for more favorable weather conditions.

During this standby time we successfully completed the cast previously cancelled at Station Kahe using OTG's CTD. We also spent time troubleshooting of the faulty PO CTD sensors and cables with a second fish (P. Flament's). These operations were conducted in rough seas (20-30 knot winds, 10-12 ft swells).

Late December 3rd the ship started its transit to Station ALOHA but turned around at Kaena Point due to rough seas. We subsequently spent Saturday 4th south of Oahu. Another PO CTD test was conducted there.

On Sunday 5th we proceeded towards Station ALOHA and arrived at the center at 1430 when we commenced operations in moderate to rough conditions. These conditions held for the majority of the remaining cruise. From Monday morning, throughout the day and into Tuesday we saw more or less continuous rainfall on station.

HOT-334 Chief Scientist report

Due to the loss of time at Station ALOHA we were granted a late arrival in Honolulu Tuesday 7th. This made it possible for us to have a meaningful cruise and the majority of our core, water column sampling was accomplished.

At Station ALOHA, one near bottom CTD cast and ten 1000 m casts were completed out of the 21 originally scheduled.

Four net tows for the core HOT zooplankton collection were completed out of six scheduled: two during the day and two at night.

4 trace-metal Go-Flo casts were completed.

Planned operations missed due to weather or time constraints:

Primary production array, sediment trap array, gas array, hyperpro at Station ALOHA, optics cage cast, Station 50 (WHOTS) Yo-Yo cast, incomplete 36 hour burst sampling cycle, second PO deep cast, Station Kaena, and ancillary investigator's large volume water collection.

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 Peter Aguinaldo 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 December 2nd, 2021

- 0910 Depart Pier 35
- 0940 Safety briefing by the Captain
- 1015 Fire and boat drills
- 1217 Arrival at Station Kahe
- 1253 Weight cast to 500 m
- 1329 Hyperpro cast (21°20.6211'N, 158°16.3147'W)
- 1442 CTD Kahe S1C1– recovered after 300 m. Large errors in both conductivity sensors, and at least one T, and O2 sensor. Plumbing or sensor issues suspected.
- 1515 TM Go-Flo cast. (end 1544).
- 1600 S1C2 – multiple errors in sensor. Cast aborted at 500 m. All bottles fired to test closing, mistrips. All bottles closed. Temperatures indicated bottle #15 likely mistripped.
- 1645 Departed for Station ALOHA.

December 3rd, 2021

- 0039 Near Station ALOHA circle (22°37.34'N, 158°1.61'W). By Captain's decision the ship was turned around to seek lee of Oahu due to weather. Winds ~ 25 knots, gusts up to ~30 knots.
- 1020 Arrive Station Kahe
- 1038 S1C3 – using OTG CTD and computer.
- 1437 S1C4 – test using PO (P. Flament's) fish, PO sensors and computer. Multiple errors again above 500 db.

Saturday December 4th, 2021

- 0000 Transit to Station ALOHA at 6 knots
- 0320 Ship turned around by Kaena Point to seek calmer seas in lee of Oahu
- 1526 Test cast of PO CTD
- 1625 End of cast

Sunday December 5th, 2021

- 0630 En route to Station ALOHA in rain
- 1430 Arrive Station ALOHA center
- 1437 Start S2C1 PO-Deep
- 1757 End S2C1. Bottle # 18 did not close properly and leaked.
- 1900 TM Go-Flo cast 1
- 1950 Start S1C2 PO-shallow
- 2130 Pump tanks
- 2317 S2C3 PC/PN

Monday December 6th, 2021

- 0102 TM Go-Flo cast 2. Cast repeated due to messenger hang-up.
 - 0210 Start S2C4 PPO4
 - 0254 Rain on station
 - 0506 Start S2C5 PSi
- HOT-334 Chief Scientist report

0705 TM Go-Flo cast 3
0807 S2C6
1020 Net tows in heavy rain
1135 Transit to Station 50 – WHOTS
1404 TM Go-Flo cast 4
1440 S2C7 ATP (by WHOTS mooring)
1700 S2C8 BEACH cast – bottle 18 did not close. Latch stuck.
2000 S2C9 HPLC
2204 Net tows (still raining). Recovery delayed due problems with A-frame hydraulics.
2348 S2C10

Tuesday December 7th, 2021

0200 Start S2C11
0309 S2C11 completed
0318 En route to Honolulu Harbor
1530 Arrival Sea buoy
1621 First line
1645 Start off load

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
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
Angelique White	SCOPE: C-STAR, UVP, IFCB (not on HOT 334)	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

