HOT 366: Chief Scientist Report
Chief Scientist: Fernando Carvalho Pacheco
R/V *Kilo Moana*
September 16 – 21, 2026

Cruise ID: KM 26-11
Vessel: R/V *Kilo Moana*, University of Hawai‘i
Master of the Vessel: Captain Matt Nugent
Chief Scientist: Fernando Carvalho Pacheco, University of Hawai‘i at Mānoa
Marine Technicians: Scott Nunnery, Joseph Soltis, Pete Felicijan

1.0 SCIENTIFIC OBJECTIVES

The cruise objective was to maintain hydrographic and biogeochemical data collection 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_366_Operational_Cruise_plan.pdf

Science operations were planned for four stations in the following order:

1) Station 1, referred to as Station Kahe, is located at 21° 20.6’ N, 158° 16.4’ W and will be occupied on September 16th for about 3-4 hours.
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. This is the main HOT station and will be occupied September 17th - 19th.
3) Station 50, the site of WHOTS-21 Mooring (anchor position 22° 45.990’ N, 157° 54.053’ W) will be occupied for about 3-4 hours on September 19th.
4) A2K1 Transect. Following the Station ALOHA operations, an additional hydrographic transect (A2K1) will be conducted southward along 158° W from Station ALOHA toward Kahuku Point. The transect will consist of approximately 10–12 CTD stations spaced at 5-minute intervals of latitude, extending from approximately 22° 45’ N to 21° 50’ N. Stations along the transect will be numbered sequentially beginning with Station 100.

2.0. SCIENCE PERSONNEL

Participant	Title	Affiliation	Citizenship
Garrett Licata-Portentoso	Graduate Student	UH	USA
Maggie Bradley	Graduate Student	UH	USA
Hi'ilani Mietlicki	Undergraduate Student	UH	USA
Sophia Demarco	Undergraduate Student	UH	USA
Sage Melton	Undergraduate Student	UH	USA
Leanne De Leon	Undergraduate Student	UH	USA
Amanda Laughlin	Graduate Student	UH	USA
Jessica Leaning	Graduate Student	UH	USA
Blake Watkins	Marine Engineer	UH	USA
Brandon Brenes	Graduate Student	UH	USA
Dan Sadler	Research Associate	UH	USA
Devin Hogate	Research Associate	UH	USA
Fernando Carvalho Pacheco	Research Specialist	UH	BRA
Fernando Santiago-Mandujano	Research Specialist	UH	USA
Mattia Da Fieno	Research Associate	UH	USA
Madi Davis	Research Associate	UH	USA
Mike Dowd	Graduate Student	UH	USA
Tully Rohrer	Research Associate	UH	USA
Scott Nunnery	Marine Technician	OTG	USA
Joseph Soltis	Marine Technician	Oregon State Tech Exchange	USA
Pete Felicijan	Marine Technician	OTG	

3.0. GENERAL SUMMARY

HOT-366 departed the UH Marine Center (Pier 35) on September 16 at 0909 HST and completed the weight test, HyperPro work, and S1C1 CTD cast at Station Kahe before transiting to ALOHA. During the HyperPro operations at Kahe, data acquisition problems occurred during the deep profiles. The cable was replaced after a data glitch during the first deployment, and the display stopped updating during the second deployment, although the instrument appeared to continue logging. The HyperPro system was also briefly interrupted during operations on September 19 when the acquisition computer crashed. Troubleshooting was required before the remaining profiles could be completed. Station ALOHA operations began shortly after midnight on September 17 with deployment of the HOT Sediment Trap Array. The Primary Productivity (PP) Array was deployed before dawn after the S2C1 sampling cast.

At ALOHA (Station 2), we deployed sixteen CTD casts (S2C1–S2C16): thirteen 1000 m casts, two near-bottom casts and a final 200 m OPEN cast. The CTD altimeter was unavailable throughout the cruise after a corroded connector pin broke during loading. Because the altimeter was not available, both deep casts were lowered to approximately 4800 dbar. Based on our experience from previous cruises at Station ALOHA, this pressure corresponds to approximately 12–15 m above the bottom. The maximum wire-out during the deep casts was less than approximately 4780 m, indicating that there was no excessive slack in the wire. Six regular net tows, three VPR tows, and HyperPro work were completed. At WHOTS-21, S50C1, we completed five yo-yo cycles to 200 m. There was no Kaena cast for HOT-366.

The PP Array was recovered on September 17 at 1902 HST, approximately 4.2 nm southwest of ALOHA center. Mechanical damage was found around the 5 m incubation level: a broken plastic spreader/bottle-holder assembly, damaged lines and attachments, and two missing incubation bottles. The rest of the array appeared intact. The cause and timing of the damage are unknown. The estimated missing activity is 80 μCi of ^{14}C (40 μCi per bottle). UH Radiation Safety determined that this quantity was below the 1 mCi NRC reporting threshold and that NRC notification was not required; the incident is being documented internally through the UH Radiation Safety Committee. Damaged equipment and photographs were retained for documentation.

The Gas Array, deployed on September 18, and the HOT Sediment Trap Array were recovered on September 19 without problems, approximately 7 nm and 12 nm southwest of Station ALOHA center, respectively. Following the array recoveries, the team completed the remaining operations near the WHOTS buoy and Station ALOHA. The A2K1 hydrographic transect began on September 19 at Station S100 and continued southward along 158°W, with CTD stations spaced at 5′ intervals of latitude. All 12 planned CTD casts (S100–S111) were completed by the evening of September 20. The first 11 casts reached 1000 m, while the final cast (S111) reached 549 dbar before the winch stopped, with 604 m of wire out. The CTD sensors continued working without any problems during the upcast. All equipment was inspected after the cast, and the CTD sensors, rosette, and associated equipment were apparently not compromised. The sensors will be sent to Sea-Bird for inspection.

The shipboard OS38 ADCP recorded data for the duration of the cruise, while the WH300 remains out of service. The ship's meteorological and thermosalinograph suite all operated without interruption throughout the cruise. The MilliQ Ultrapure water system was out of order for the duration of the cruise, and carboys of DI water were pre-filled by HOT personnel and brought aboard

Conditions at ALOHA included ENE trade winds often around 15-25 kt, with a lighter interval near 9-11 kt on September 18 and seas reported up to 6-8 ft from the east on September 19. Observed upper-ocean current speed and direction varied during the station occupation, including southward and southwestward flow of roughly 0.2-0.9 kt.

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

The R/V Kilo Moana provided excellent support throughout the cruise. OTG marine technicians Scott Nunnery, Joseph Soltis, and Pete Felicijan were extremely helpful, always enthusiastic, and willing to assist whenever needed. Captain Matt Nugent and the bridge crew did an excellent job during array recoveries and maintained good communication with the science team throughout the cruise.

5.0. DAILY REPORT OF ACTIVITIES (HST)

September 16, 2026 - HST

0909 - Departed UH Marine Center at Pier 35
1015 - Safety briefing
1050 - Fire and abandon ship drills
1209 - Arrived at Station Kahe
1215-1248 - Weight cast (21°20.6921′N, 158°16.3806′W); tension was 1,090 lbs in air and 1,180 lbs at 500 m.
1253-1307 - HyperPro deployment (21°20.6264′N, 158°16.3460′W). Five yo-yos completed successfully. Switched HyperPro cable after the first deep cast due to a glitch at approximately 50–60 m during the downcast.
1312-1338 - Second deep HyperPro deployment (21°20.6901′N, 158°16.3229′W). During the second deep cast, the data display stopped updating at approximately 100 m, although the indicator lights remained on and the instrument appeared to continue logging.
1354 - S1C1 CTD cast to 1020 m at Kahe (21°20.7509′N, 158°16.1472′W); PAR glitch observed between approximately 60–147 m.
1456 - End S1C1 CTD cast (21°20.7422′N, 158°16.1248′W).
1505 - Began transit to Station ALOHA.
2357 - Arrived approximately 3 nm west of Station ALOHA center.

September 17, 2026 - HST

0010-0030 - Deployed HOT Sediment Trap Array (22°45.0189′N, 158°03.288′W).
0203-0255 - S2C1 1000 m CTD cast (22°45.009′N, 158°2.193′W). Upon landing the package on deck, approximately 40 m of wire jumped off the winch drum.

0357-0418 - Deployed Primary Productivity Array approximately 2 nm west of Station ALOHA center (22°45.0112′N, 158°02.2101′W). Winds were ~20 kt from the northeast, with upper 60 m currents of ~0.3–0.4 kt southward.
0503 - Began S2C2 near-bottom CTD cast (PO-1 deep) at 22°45.004′N, 157°59.993′W. The altimeter is not operational for HOT-366. During loading day, corrosion was observed on the connector pins, and pin 6 was found bent. While attempting to straighten the pin, it broke.
0632 - At about 12-15m off the bottom (4789 wireout), 22°45.005′N, 157°59.993′W
0824 - End of S2C2 (22°45.004′N, 157°59.993′W). PAR glitch during the upcast at about 87-85m and 80 to the surface.
0834 - Transit to Pump tanks
1052-1201 - S2C3 CTD cast to 1000m (PO shallow), 22°45.048′N, 157°59.927′W
1221-1242 - Net Tow 1
1256-1345 - Hyperpro cast
1349-1443 - S2C4 CTD cast 1000m (PCPN), 22°45.486′N, 157°59.380′W. PAR glitch at the top 100m.
1500 - Transit to PP array location
1654-1755 - S2C5 CTD cast 1000m (PPO4), 22°43.417′N, 158°03.123′W
1844-1902 - Recovered Primary Productivity Array (22°42.369′N, 158°04.230′W), approximately 4.2 nm southwest of center. Winds were 17-20 kt from ENE and currents approximately 0.8 kt toward the south. Damage was observed on the array, concentrated around the 5 m incubation level. The 5 m plastic spreader/bottle-holder assembly was broken, attachment lines and bungees were damaged, and localized flattening, abrasion, and fraying were observed on the line. Two 5 m incubation bottles were missing. A scrape was also observed on the metal structure of the surface float. Components above and below the affected section appeared intact. Deployment and recovery operations appeared normal, and no interaction between the array and R/V Kilo Moana was observed during recovery. The cause and timing of the damage are unknown. Each missing bottle contained approximately 500 mL of seawater with a final ^{14}C activity of 80 μCi L^{-1}, corresponding to approximately 40 μCi per bottle and an estimated total loss of 80 μCi ^{14}C. The incident was reported to the appropriate HOT personnel and the UH Radiation Safety Program. UH Radiation Safety determined that the quantity involved is below the 1 mCi (1,000 μCi) U.S. Nuclear Regulatory Commission (NRC) reporting threshold and does not require notification. The incident will be documented internally through the UH Radiation Safety Committee, and an incident report will be completed for UH RSP records. Damaged equipment and photographs were retained for documentation.
1939-2044 - S2C6 CTD cast 1000m (BEACH), 22°42.390′N, 158°3.866′W
2055 - Transit to Pump tanks
2207-2229 - Net Tow 2
2233-2255 - Net Tow 3
2307-0005 - S2C7 CTD cast 1000m (OPEN), 22°44.769′N, 158°4.492′W

September 18, 2026 - HST
0150-0247 - S2C8 CTD cast 1000m (GA), 22°44.768′N, 158°4.489′W
0403-0429 - Deployed Gas Array (22°44.769′N, 158°4.487′W) at about 4nm west of the center. Wind was 15kt from E, and currents were about 4 kt towards west.

0448-0531 - S2C9 CTD cast 1000m (OPEN), 22°44.839′N, 158°4.154′W
0539 - Transit to Pump tanks
0747-0837 - S2C10 CTD cast 1000m (PSI), 22°45.623′N, 158°0.840′W
1041-1135 - S2C11 CTD cast 1000m (OPEN), 22°45.622′N, 158°0.841′W
1202-1224 - Net Tow 4. Wind:15-16kt from E; Currents: 0.2-0.3kts toward NE.
1227-1244 - Net Tow 5.
1307 - Unwrap Net Tow line for maintenance
1354 - 1447 - S2C12 CTD cast 1000m (ATP), 22°45.578′N, 157°58.802′W
1458 - Transit to Pump Tanks
1656-1742 - S2C13 CTD cast 1000m (OPEN), 22°47.526′N, 157°4.661′W
1954-2103 - S2C14 CTD cast 1000m (HPLC), 22°45.004′N, 158°0.000′W
2205-2227 - Net Tow 6.
2308 - S2C15 near-bottom CTD cast (PO-3 Deep), 22°44.992′N, 158°0.002′W

September 19, 2026 - HST

0040 - at 4801 dbar with 4780m of wire out and no altimeter. 22°44.992′N, 158°0.005′W
0213 - End of PO-3 Deep cast
0231 – Transit to Pump tanks + recover Gas Array (~7nm SW from center)
0410-0457 - Gas-array recovery (22˚40.902’ N, 158˚07.068’ W) about ~7nm SW from the center.
0458 - Transit to Sediment Trap Array
0554-0618 - Sediment trap recovery (22˚35.651’ N, 158˚08.543’ W) about 12nm SW of the center
0725 – Transit to WHOTS
0905-0957 - S50C1 CTD yo-yo to 200 m. 5 yo-yos completed
1010-1226 - VPR Tow 1
1227 – Transit 1nm into circle
1256-1304 - S2C16 CTD cast 200 m (OPEN), 22°45.230′N, 157°54.7119′W
1333-1410 – Hyperpro cast - Program failed to record depth. Computer crashed, and some troubleshooting was necessary before completing 5 yo-yo and 1 deep cast.
1415 – Transit to Pump tanks
1523-1813 - VPR Cast 2
1821-2115 - VPR Cast 3
2152-2251 - S100C1 CTD cast 1000m (A2K1), 22°45′N, 158°′W
2356-0045 - S101C1 CTD cast 1000m (A2K1), 22°40′N, 158°′W

September 20, 2026 - HST
0153-0253 - S102C1 CTD cast 1000m (A2K1), 22°35′N, 158°′W
0353-0435 - S103C1 CTD cast 1000m (A2K1), 22°30′N, 158°′W
0539-0635 - S104C1 CTD cast 1000m (A2K1), 22°25′N, 158°′W
0750-0833 - S105C1 CTD cast 1000m (A2K1), 22°20′N, 158°′W
0938-1022 - S106C1 CTD cast 1000m (A2K1), 22°15′N, 158°′W
1119-1219 - S107C1 CTD cast 1000m (A2K1), 22°10′N, 158°′W

1315-1409 - S108C1 CTD cast 1000m (A2K1), 22°5′N, 158°′W
1502-1620 - S109C1 CTD cast 1000m (A2K1), 22°N, 158°′W
1753-1850 - S110C1 CTD cast 1000m (A2K1), 21°55N, 158°′W
2000-2054 - S111C1 CTD cast 549m (A2K1), 21°50N, 158°′W. Winch stopped at 549 dbar (604m wire out). Echosounder was showing 1100m.
2105 - Transit to Pier 35

September 21, 2026 - HST

0755 - Arrived @ Pier 35

6.0 HOT program sub-components:

Investigator	Project	Institution
Angelicque White	Core Biogeochemistry	UH
Dave Karl	Biogeochemistry	UH
John Dore	Biogeochemistry QA/QC	MSU
James Potemra	Hydrography	UH
Mike Landry	Zooplankton dynamics	SIO
Ricardo Letelier	Optical measurements	OSU
Al Plueddemann/ James Potemra	WHOTS mooring	WHOI

7.0 Ancillary programs:

Matt Church	Diversity and activities of nitrogen-fixing microorganisms	UM/FLBS
Andrew Dickson	CO_2 dynamics and intercalibration	SIO
Paul Quay	$DI^{13}C$	UW
Debbie Lindell	Seasonal Virus Sampling	Technion
Andrew Hirzel	Video Plankton Recorder	UH
Paige Dillen / Fernanda H.Freitas/ Angelicque White	Leveraging the Hawaii Ocean Time-series program for validation of the PACE Mission in oligotrophic waters	UH