

# HOT-179: Chief Scientist Report

Chief Scientist: F. SANTIAGO-MANDUJANO  
HOT-179 Chief Scientist's Cruise Report  
R/V Kilo Moana  
March 8-12, 2006

Cruise ID: KM0608  
Departed: March 8, 2006 at 0900 (HST)  
Returned: March 12, 2006 at 0730  
Vessel: R/V Kilo Moana  
Operator: University of Hawaii  
Master of the Vessel: Captain Richard L Meyer  
Chief Scientist: Fernando Santiago-Mandujano  
OTG Electronics/Deck Operations Technicians: Tim McGovern, Daniel Fitzgerald

## 1. SCIENTIFIC OBJECTIVES

The objective of this cruise was to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Five stations were to be occupied during the cruise, in the following order:

- 1) Station 1, referred to as Station Kahe, is located at 21 20.6'N, 158 16.4'W and was to be occupied on March 8 for about 2 hours.
- 2) Station 2: ALOHA (A Long Term Oligotrophic Habitat Assessment) is defined as a circle with a 6 nautical mile radius centered at 22 45'N, 158W. This is the main HOT Station and was to be occupied for 3 days from March 9 to 11.
- 3) Station 51, is the site of the MOSEAN Mooring, located at 22 46.009'N, 158 5.533'W was to be occupied on the 4th day of the cruise for about 30 minutes.
- 4) Station 50, is the site of the WHOTS Mooring, located at 22 46.1 N, 157 53.4 W was to be occupied on the 4th day of the cruise for about 30 minutes.
- 5) Station 6, referred to as Station Kaena, is located off Kaena Point at 21 50.8'N, 158 21.8'W was to be occupied on the 4th day of the cruise for about 2 hours.

A single CTD cast was to be conducted at Station 1 to collect continuous profiles of various physical and chemical parameters. Water samples were to be collected at discrete depths for biogeochemical measurements.

Upon arrival at Station ALOHA, the free-drifting sediment trap array was to be deployed, followed by four shallow CTD casts (<200 m) to collect water for incubation experiments. The sediment trap array was to stay in the water for about 52 hours. After this, an array with incubation experiments (gas array) was to be deployed for 24 hours. A full-depth CTD cast was to be conducted afterwards, followed by 1000-m CTD casts at strict 3 hour intervals for at least 36 hours for continuous and discrete data collection, ending with another full-depth

CTD cast.

One free-drifting array was to be deployed for 12 hours for incubation experiments on March 10.

A plankton net was to be towed near noon and midnight for 30-min intervals on March 9 and 10 at Station ALOHA.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array.

After recovering the sediment traps, the ship was to transit to Sta. 51 to conduct a 200-m CTD cast, and then back to Station ALOHA to conduct two more 1000-m CTD casts, and light casts (PRR, AC9/FRRf). At the end of these operations, the ship was to transit to Station 50 to conduct a 200-m CTD cast. After conducting these operations, the ship was to transit to Station 6.

A near-bottom CTD cast (~2500 m) was to be conducted at Station 6 including salinity samples for calibration, after which the ship was to transit back to Snug Harbor.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on March 8, 10 and 11.

A package including a Wet Labs AC9, a Chelsea Fast Repetition Rate Fluorometer (FRRf), and a SeaBird Seacat was to be used to profile the upper 200 m at Sta. ALOHA at noon time on March 10 and 11, and in the early morning on March 11.

An Automated Trace Element Sampler (ATE) was to be deployed once on March 11.

One ARGO float was to be deployed at Station ALOHA on the last day of the cruise by K. Heinze.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, and two anemometers.

## 2. SCIENCE PERSONNEL

BEACH group:

Cruise Participant	Title	Affiliation
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Karin Bjorkman	Research Specialist	UH
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Matt Church	Scientist	UH
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Ken Doggett	Research Associate	UH
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Allison Fong	Graduate Student	UH
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Lance Fujieki (Watch Leader)	Computer Specialist	UH
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Adriana Harlan	Technician	UH
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Claire Mahaffey	Research Specialist	UH
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Cecile Mioni	Volunteer	
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Blake Watkins	Marine Engineer	UH
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PO group:

Suzanne Defelice Research AssociateUH  
Pollyanna Fisher Undergrad StudentUH  
Lauren Goodmiller Undergrad StudentUH  
Paul Lethaby (Watch Leader) Research AssociateUH  
Fernando Santiago-Mandujano Chief Scientist (Res. Assoc.)UH  
Steven Tottori Marine TechnicianUH

Others:

Maureen Coleman ScientistMIT  
Edward DeLong ScientistMIT  
Kurt Heinze TechnicianUW  
Zackary Johnson ScientistUH  
Tracy Mincer ScientistMIT  
Matthew Sullivan ScientistMIT  
Anne Thompson ScientistMIT  
Jacob Waldbauer ScientistMIT

### 3. GENERAL SUMMARY

Operations during the cruise were conducted with some changes in the schedule due to the failure of the CTD winch during the first deep cast, and also because of delays caused by transiting to recover the gas array and sediment traps, which drifted farther than expected.

One 1000-m CTD cast was conducted at Kahe station. Twelve 1000-m CTD casts, two deep casts, (~3000 m, and 4700 m), five casts shallower than 200-m were conducted at Station ALOHA. One 1000-m CTD cast and one 200-m cast were conducted near the MOSEAN mooring (Station 51).

The array of floating sediment traps, the gas array, and the primary productivity incubation array were deployed and recovered without incidents. The arrays drifted rapidly northwestward.

K. Heinze deployed an ARGO float at ALOHA Station.

Three net tows were conducted at night and three during the day.

The PRR and AC9/FRRf were deployed as scheduled, with the exception of the AC9/FRRf March 10 deployment, which was cancelled due to time constraints.

The Automated Trace-Element Sampler was successfully used to collect one trace metal sample.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph, and the ship's two anemometers.

Winds were from the southeast at about 20-25 kt during the cruise, with a large swell.

We arrived back at Snug Harbor on March 12 at 0730. Full off-load took place immediately.

### 4. R/V KILO MOANA, OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Kilo Moana continues to maintain the excellent ship

support for our work. The officers and crew were most helpful and accommodating. They showed enthusiasm and concern for our work and were very flexible in receiving changes in our operational schedule.

Technical support during this cruise was excellent. OTG personnel were available at any time to assist in our work and made things much easier for us.

## 5. DAILY REPORT OF ACTIVITIES (HST)

March 7, 2006; Loading Day

Equipment loaded during this day. CTD wire was re-terminated and CTD system tested.

March 8, 2006

The ship departed from Snug harbor at 0900. Safety briefing by the Captain conducted at 0930, followed by a science meeting in which cruise activities were briefly reviewed, and safety issues were addressed. This was followed by a meeting with the Captain, Chief Mate, OTG and PO personnel to discuss methods to improve the safety of the CTD recovery during casts.

Fire and abandon ship drills conducted at 1030.

Arrived at Kahe Station at 1150. A weight cast (400 lb) to 500 m was conducted.

The Profiling Reflectance Radiometer (PRR) was deployed at 1230

A CTD 1000-m CTD cast was conducted at 1300. After the cast ended, the ship headed towards Station ALOHA.

The ship arrived to Station ALOHA at 2130. A 100-m CTD cast was conducted, followed by the sediment traps array deployment at 2350.

March 9, 2006

One 200-m and two 100-m CTD casts were conducted after the sediment traps deployment at Station ALOHA.

The gas array was deployed at 0400.

One deep CTD cast was conducted at 0435. The cast had to be aborted at 3000 dbar due to problems with the CTD winch. The CTD was brought on board and the winch was repaired and tested with the dead weight at the end of the wire.

Six 1000-m CTD casts were conducted this day. The rosette hit the back of the ship during the recovery of cast 8. One of the rosette weight mounts broke and some of the welded joints cracked. The CTD frame also was warped by the impact. The rosette was deemed safe to continue using it. The CTD sensors were tested and seemed to be working correctly.

Two net tows were conducted near noon.

Southeasterlies at over 25 kts, with large swell.

March 10, 2006

Six 1000-m CTD casts were conducted on this day.

The gas array was recovered 23 nm NW from ALOHA Station. One CTD cast from the 36-hr burst period had to be cancelled due to the transit time to recover the array.

The primary productivity array was deployed at 0545 and recovered at 2000 without any problems.

Two consecutive PRR casts were conducted at 1350, and at 1410. The AC9/FRRf cast was canceled due to scheduling conflicts.

Three net tows were conducted at night and one near noon.

Southeasterly winds at 20-25 kts, with large swell.

March 11, 2006

One 4700-dbar and one 500-dbar CTD casts were conducted at ALOHA.

One 1000-m and one 500-m CTD casts were conducted near the MOSEAN mooring.

The sediment traps array was recovered at 1000. The array drifted NW about 38 nm from ALOHA Station.

One AC9/FRRf cast was conducted at 0415, and two consecutive casts were conducted at 1430 near the MOSEAN mooring.

One PRR cast was conducted at 1330 near the MOSEAN mooring.

K. Heinze deployed an ARGO float after all operations ended at Station ALOHA.

Winds of about 20 kt from the southeast

March 12, 2006

Arrived at Snug Harbor at 0730. Full off-load.

Sub component programs:

Investigator: Project/Institution:

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Bob Bidigare HPLC pigments/UH

Mike LandryZooplankton dynamics/UH

John DoreCO2 dynamics/UH

Claire MahaffeyAssessment of Nitrogen Fixation Rates/UH

Ancillary programs:

Investigator: Project/Institution:

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Charles Keeling CO2 dynamics and intercalibration/SIO  
Mark Abbott/Ricardo Letelier Optical measurements/OSU  
Paul QuayDI13C and O isotopes/UW  
Penny ChisholmProchlorococcus population dynamics/MIT  
Matthew Church/Allison FongDiversity and activities of nitrogen-fixing  
microorganisms/UH

Ancillary research during this cruise:

Investigator: Project/Institution:  
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Edward DeLongCommunity genomics of stratified  
(MIT Group)Prochlorococcus, picoplankton, and virus  
communities at station ALOHA/MIT  
Zackary JohnsonBacterial Chlorophyll containing organisms  
genetic diversity estimation/UH  
Kurt Heinze/Steve RiserARGO float deployment/UW