HOT-46: Chief Scientist Report

Chief Scientist: D. HEBEL

HOT 46 Cruise Report
R/V Wecoma
12-17 April 1993

Personnel List:
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Dale Hebel Chief Scientist UH

WOCE group:
Jeff Snyder Technician UH
Rich Muller Technician UH
Sophia Asghar Graduate Student UH
Hongbin Liu Graduate Student UH
John Bower Graduate Student UH

JGOFS group:
Louie Tupas Scientist UH
Ursula Magaard Technician UH
Ricardo Letelier Graduate Student UH
Dan Sadler Graduate Student UH

Ancillary projects:
Hongbin Liu Graduate Student UH - L. Campbell
Maureen Keller Scientist Bigelow Labs - B. Bidigare
Mikel Latasa Graduate Student UH - B. Bidigare
Charles Holloway Graduate Student UH - J. Cowen
John Bower Graduate Student UH - D. Young
Naeem Ahmed Scientist NIO

Itinerary (approximate local time):
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Monday, 12 April
1015 Departed Snug Harbor
1330 Arrived Kahe Pt. (Sta. 1)
1630 Departed Kahe

Tuesday, 13 April
0200 Arrived Aloha (Sta. 2) trap deployment site
0400 Completed sediment trap array deployment
0500 Arrived Aloha (center of circle), began CTD time series
0600 First winch problem
1130 First cable problem
1530 Winch problem resolved
1900 Wire problems persist
Wednesday, 14 April
0200  Commenced Go-Flo cast
0300  Aborted Go-Flo cast
1800  Wire problem resolved

Thursday, 15 April
0200  Commenced second Go Flo primary productivity cast
0400  Continued with 3 hr interval CTD casts
0630  Deployed primary productivity array
1900  Retrieved primary productivity array

Friday, 16 April
0700  Completed Sta. 2 CTD operations
0900  Commenced dive operations
1130  Completed dive operations
1200  Conducted PNF cast and net tows
1300  Departed station ALOHA
1530  Recovered sediment traps

Saturday, 17 April
0700  Arrived Snug Harbor

Narrative:
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HOT 46 was conducted 12-17 April 1993 aboard the R/V Wecoma (full 5 days at sea) with Capt. Doyle as Master. HOT 46 was not the typical Hawaii Ocean Time-series cruise due to persistent equipment problems on 13-14 April 1993. These were primarily associated with the winch and conducting cable although we also experienced problems during the primary productivity cast with HOT-JGOFs equipment. Additional, short term problems were also experienced with the CTD pylon, fluorometer transmissometer signal, leaking Niskin bottles, hung up Niskin lanyards, broken CTD frame weld, and minor CTD software problems. In spite of the recurring problems all "core" samples were collected due to the combined efforts of the scientific personnel and cooperative support of the ships crew. However, we did lose valuable time which resulted in aborting 2 blue water dives and the second WOCE deep cast. Oddly, we did not experience any equipment problems at our shake-down station (Kahe Pt.). Here we conducted a weight cast to 500 m followed by a PNF cast and 1000 m CTD cast. All equipment functioned properly and all Kahe Pt. samples were collected. In addition, we hosted a visiting Pakistani scientist Mr. Naeem Ahmed from the National Institute of Oceanography. His objective was to observe overall operations in preparation for upcoming Arabian Sea work.

We departed Kahe Pt. on schedule and steamed to the trap drop-off point. Upon arrival the ADCP indicated a 10-20 cm/sec northeast current between 100-300 m. The current was opposite in direction but similar in magnitude from 0-100m. We decided to move to 158 04' W along the same latitude line assuming the traps would track northeast as in HOT 45 (this assumption proved false, the traps drifted almost due west). Following deployment we steamed to the center of station ALOHA and began the WOCE deep cast. The first equipment problems developed during this cast. According to the cruise log the winch stopped 3 times on the downcast and 4 times on the upcast and took a
total of 6 hrs to complete. At the beginning of my shift I spoke with Jeff and he felt the problem was possibly a mismatch between the motor and gears causing the motor to overspeed on the decent and overheat on the ascent. Each time the motor overheated it would take ~15 min. to cool thereby resetting the thermocouple. I spoke with the el.

The twist in the cable persisted causing the cable to kink when the load was applied. This resulted in 3 terminations and removal of approx. ~70 m (?) of cable over the following 24 hr period. At this time we switched to a one conductor cable configuration so we could use the Wecoma's CTD swivel. This solved the problem. Due to the inability to maintain the 3 hr CTD cast interval we extended CTD operations until 0700 hrs on 16 April 1993 (an additional 36 hrs from the point of swivel installation).

Another problem which did not involve ship equipment materialized during the primary productivity cast. We recently repainted the DSE winch and installed new Kevlar line. Although the Go Flo bottles were tested on the new line the Teflon messengers were not. During the cast it was found that the messenger groove was too narrow for the new line. Therefore, the cast was aborted and rescheduled for the following night allowing us an opportunity to enlarge the grooves. This was done in the ship's machine shop and the cast and subsequent in situ incubation completed without incident on 15 April 1993.

Following CTD operations 2 blue water dives were conducted in addition to the daily midday PNF cast followed by a short surface net tow. We departed station ALOHA at approx. 1300 hrs on 16 April 1993 located and retrieved the sediment traps returning to Snug Harbor by 0700 hrs 17 April 1993. Off loading was conducted immediately and completed by 1100 hrs.

Weather:
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The weather was good throughout the cruise with light-moderate trades (10-20 kts), mostly sunny skies and 2-3 m seas.

Equipment and methods:
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All equipment used on HOT 46 was standard for past HOT cruises. However, persistent winch and cable problems plagued a significant portion of the cruise. The only equipment lost was one Niskin spring and one (?) broken end cap handle.

Ancillary programs:
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Investigator: Project:
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Charles Keeling (SIO) CO2 dynamics and inter calibration
Lisa Campbell (UH) Picoplankton studies
Maureen Keller (Bigelow Labs) Phytoplankton pigment studies

Students:
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Ricardo Letelier Tricodesmium studies
Dan Sadler Time series pH measurements
John Bower Squid population studies
Chuck Holloway Th-U disequilibria and marine snow dynamics
Mikel Latasa Phytoplankton pigment distributions
Jinchun Yuan Trace metal studies

Others:
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Ted Walsh (Prj Mgr Anly Svc) Seawater diluent collection
Taro Takahashi pCO2 inter calibration (C. Winn P.I.)