HAWAII OCEAN TIME-SERIES

R/V MOANA WAVE

HOT-1: 29 October - 3 November 1988
HOT-2: 30 November - 4 December 1988

Chief Scientists

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Purpose

These research cruises are to establish and maintain the Hawaii Ocean Time-series (HOT) station north of Oahu. The project has been funded under the World Ocean Circulation Experiment (WOCE) and Global Ocean Flux Study (GOFS) programs. Its aim is to collect monthly observations of the hydrography and biology for five years, with the object of identifying and quantifying the processes controlling biogeochemical cycling in the ocean, as well as physical oceanography of a site representative of the central Pacific Ocean.

The HOT site (22°45´N, 158°W), also known as station ALOHA, is about 100 km north of Kahuku Point. Free-drifting sediment traps will be deployed for 72 hours near the site to measure sedimentation rates of particulate matter. CTD casts will be made to obtain temperature, salinity and dissolved oxygen profiles. Water samples will be collected simultaneously with the CTD casts to provide estimates of nutrient levels and biological production. Other research components may be added on future cruises.

A station is also planned near Kahe Point. This will be occupied for about three hours on the way to station ALOHA to test the CTD and other equipment. It will also provide additional time-series data during the program.

Work Plan

Sediment traps

Sediment-trap arrays will be deployed on arrival at the station. These arrays consist of 12 sediment traps suspended at 4 depths between 150 and 500 m from a surface spar-buoy. They will be allowed to drift freely for 72 hours and then recovered just before leaving the site. The surface buoy is equipped with an ARGOS satellite transmitter, strobe light and radio transmitter to help find them for recovery.

Water column measurements

Vertical profiles of temperature, conductivity and dissolved oxygen will be made with a SeaBird CTD attached to a rosette. Chlorophyll *a* will be estimated using a fluorometer also attached to the rosette. Light intensity and light transmission will be measured in the upper water column. Water samples will be taken at selected depths with either 5 l Niskin or 12 l Go-flo bottles. We will use the 12-place General Oceanics rosette for the first few cruises, until a stainless steel rosette is made.

Physical Measurements

Consecutive hydrographic casts will be made over 36 hours to span the local inertial period and three semi-diurnal tidal cycles. This sampling will provide unaliased estimates of variability having longer time scales than inertial or tidal motions. Casts will be made to at least 1500 decibars, with one deep cast made to within 30 m of the bottom. Nutrient, salinity and dissolved oxygen samples will be taken during the deep cast.

Biological and Chemical Measurements

Biological and chemical conditions within the water column will be measured from water samples collected with the CTD/rosette system. As much as possible, all biological and chemical work will be confined to the portable laboratory. All radioisotope work will be done in the portable laboratory.

In general, water samples will be drawn from the 36-hour sampling. Two casts must be made at special times. A light-profile cast will be made near mid-day as soon as possible after arriving on station. The light profile must be measured before some of the other biological measurements can be made. A special cast must be made just before dawn to collect samples for primary production measurements. This cast has to be made after the light profile is determined.

Primary production from the water samples will be measured using an on-deck incubator. This incubator will be located away from any shadows, and will be functioning for at least

24 hours. On HOT-1 and HOT-2, a fairly simple system will be used, consisting of a series of shaded chambers through which seawater will be circulated. On later cruises this will be replaced with a 8 by 4-foot incubator.

ADCP Profiles

The Acoustic Doppler Current Profiler uses scattering of acoustic pulses from particles in the water column and the Doppler principle to measure current profiles. The ADCP will be on continuously during the cruise. During some cruises, but probably not the first two, expendable current profilers (XCPs) may be used in an intercomparison with the ADCP.

XBT Profiles

Expendable Bathythermograph (XBT) measurements may also be made during transit to and from the station.

Schedule

HOT-1

1800 29 Oct	Depart Honolulu	
2100	Arrive Kahe Pt site	
2400	Depart Kahe Pt	
1000 30 Oct	Arrive HOT-site:	deploy sediment traps
1400		Commence 36-hour sampling
..... CTD casts made consecutively, including:		
1200		Light-profile
0300 31 Oct		Primary productivity cast
0200 1 Nov		Cease 36-hour sampling
......CTD casts as required for remaining biological samples		
1000 2 Nov	Recover traps	
0400 3 Nov	Arrive Honolulu	

HOT-1 Personnel (Tentative)

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