

# CSIRO

## MARINE LABORATORIES

Division of Fisheries Research  
Division of Oceanography

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1st July, 1985.

### CRUISE PLAN R.V. FRANKLIN FR 4/85

#### Itinerary

Depart Cairns	Friday July 19, 1985
Arrive Truk Islands	Friday August 9, 1985
Depart Truk Islands	Sunday August 11, 1985
Arrive Townsville	Saturday August 24, 1985

#### Scientific Program

Western Equatorial Pacific Ocean Circulation Study (WEPOCS)

#### Principal Investigator

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#### Associate Investigators

Dr. G. Meyers (CSIRO)  
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Dr. D. Mackey (CSIRO)  
Dr. G. Harris (CSIRO)  
Dr. R. Lukas (U. of Hawaii)  
Dr. E. Firing (U. of Hawaii)  
Dr. M. Tsuchiya (Scripps)  
Dr. R. Fine (U. of Miami)

#### Cruise Objectives

- (a) To complete CTD sections along cruise track (Figure 1) for the purpose of geostrophic velocity computation and water mass analysis. (Lindstrom)
- (b) To deploy three current meter moorings for direct measurement of velocities over a six month period in the Vitiaz Strait, St. Georges Channel and the Equatorial Undercurrent ( $0^{\circ}$ ,  $150^{\circ}$  E). (Boland)
- (c) To obtain surface to bottom absolute velocity profiles at five sites within one degree of the equator (along  $150^{\circ}$  E) using the Pegasus profiling system. (Firing)

- (d) To obtain acoustic doppler current profiler sections along cruise track for the purpose of determining relative and absolute flow patterns in the upper 300 m. (Zedel)
- (e) To measure primary production in relation to phytoplankton size distribution in tropical oligotrophic waters. (Griffiths)
- (f) To study naturally occurring metal-organic compounds and measure the complexing capacity in tropical oligotrophic waters. (Mackey)
- (g) To determine the lipid content of particulate and dissolved organic fraction in oligotrophic tropical waters and relate them to biological and physical conditions. (Everitt)

### Cruise Track

The proposed cruise track is shown in Figure 1.

From Cairns (16.55°S, 145.46°E) to Vitiaz Strait mooring site (6°S, 147°45'E) via Jomard Entrance (Louisiade Archipelago) (11°20'S, 152°6'E) and east side of Kiriwina Island (8°30'S, 151°15'E). CTD stations will be occupied at 30nm intervals from Kiriwina Island to the nominal mooring site in Vitiaz Strait. A survey will be undertaken to choose a suitable mooring site followed by deployment. CTD stations will be occupied for a 24 hour period on a section transverse across Vitiaz Strait which includes the mooring site. After proceeding to the northwest entrance of Vitiaz Strait we will begin a CTD section across the Bismark Sea (from Teliata Point to the western tip of New Hanover). Stations will occur at 30nm intervals alternating between 1000m and bottom casts. The Franklin will then make way directly to the northwest entrance of St. Georges Channel (between New Ireland and New Britain) where a mooring site is nominally located northeast of Duke of York Island (4°8'S, 152°34'E). We will undertake a bottom survey to choose a suitable mooring site and after deployment occupy a section across the Channel for a 24 hour period. Proceeding back to the western tip of New Hanover CTD stations will be occupied at 30nm intervals.

A section northward along 150°E will begin from the northern coast of New Hanover and proceed to 5°N (7°N if time permits). Stations will be occupied at 30nm intervals with bottom (5000m) stations taken every 60nm. From 1°S to 1°N five Pegasus profiling sites will be selected, surveyed, and transponders deployed. One or two profiles will be obtained at each station. At the Equator a site for the surface mooring will be surveyed and deployment undertaken. After completion of the 150°E section the Franklin will proceed to the Truk Islands (7.25°N, 151.47°E). After a two day port call in Truk the ship will sail directly to the northern most Pegasus site (near 1°N, 150°E) to begin repeat profiling at the five sites. Several stations may be occupied enroute for chemical and biological sampling. After completion of the Pegasus profiling (1°S, 150°E) we will return to the equator to begin a CTD section westward from 150°E to 143°E. Stations will be occupied every 30nm, alternating between 1000m and bottom (5000 m). From 0°, 143°E the Franklin will make way for Townsville via Vitiaz Strait and the Louisiade Archipelago. CTD stations will be occupied enroute as time permits.

O.R.V Equipment

- Inmarsat
- Scientific sounder
- CTD and tape recorder
- Rosette (5 l and 10 l Niskins)
- Thermometers
- Thermosalinigraph
- XBT system
- Salinometer
- Oxygen analysis equipment
- Autoanalyzer
- Acoustic release system
- Acoustic Doppler current profiler
- Liquid scintillation counter
- Variosens.
- Particle size analyser
- Line hauler for free-fall plankton net
- Turner fluorometer

Equipment provided by users

Current meter moorings (Boland; load in Hobart)

Pegasus velocity profiler and associated transponders, hydrophones and deck gear (Lindstrom; to be loaded in Cairns)

Plankton nets (Griffiths; load in Hobart)

Miscellaneous chemicals and analysis equipment (Mackey, Everitt and Griffiths; load in Hobart)

Back-up CTD underwater unit (Lindstrom; load in Hobart)

On Board Analysis

On each CTD station samples will be taken for salinity, oxygen, nitrates, silicates and phosphates. We wish to use twelve bottles on each cast, usually 5 l Niskins but on the second leg 10 l Niskins on occasion. Expected number of samples for each property is about 1000.

Time Estimates

Steaming time 8080 km at 11 kt	= 16.7 days
CTD stations ( 88 stations)	= 7.8 days
Deployment/surveys	= 2.0 days
Pegasus Profiling	= 6.0 days
Port time in Truk	= 2.0 days
Load/Unloading	= 1.0 days

Total

36.5 days

Personnel

Cairns - Truk - Townsville

CSIRO Division of Oceanography

Eric J. Lindstrom (Cruise Leader)  
Andrew Forbes  
Len Zedel  
Ken Suber  
David Terhell  
Mark Rayner  
Alan Poole

University of Hawaii

Eric Firing

Cairns - Truk

CSIRO Division of Oceanography

Fred Boland  
Daniel McLaughlin  
Kevin Miller  
Robert Beattie

Truk - Townsville

CSIRO Division of Oceanography

Denis Mackey  
David Everitt  
David Edwards

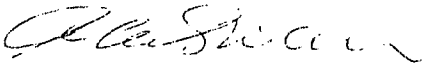
CSIRO Division of Fisheries Research

Brian Griffiths

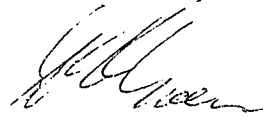
Late Amendment

The U.S. WEPOCS vessel Thompson is presently at sea completing its cruise track. They have amended their cruise track to include the Kiriwina Island to Vitiaz Strait section previously proposed for the Franklin. As there is no necessity to complete the section twice the Franklin cruise plan will drop the Kiriwina Island to Vitiaz Strait section in favor of a Lavongai Island (New Hanover) to Rambutyo Island (just east of Manus Island) section before proceeding to St Georges Channel. The section is a valuable addition to the program in that it completes an "enclosure" of the Bismark Sea. Because of this change the U.S. team will now place very high priority on the Manus Island to Papua New Guinea section which guarantees that sections completely encompass the Bismark Sea.

This cruise plan is in accordance with the directions of the National Facility Steering Committee for the oceanographic research vessel RV Franklin.



A.D. McEwan  
CSIRO Division of Oceanography



D.H. Green  
National Facility Steering  
Committee