



National Facility Research Vessel

RV FRANKLIN

VOYAGE DOCUMENTS

RV SOUTHERN SURVEYOR

CSIRO AUSTRALIA

CSIRO MARINE AND
ATMOSPHERIC RESEARCH

Voyage Plans and Summaries

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Franklin Voyage Plan No. FR09/00

Title

Monitoring Ocean Climate Change Around Australia: the Deep Ocean Time Series Sections (DOTSS)

Itinerary

Leg 1:

Depart Dampier 1000hrs, Tuesday 26 September, 2000
Arrive Cocos Islands, 0800hrs, Saturday 14 October, 2000

Leg 2:

Depart Cocos Islands, 1700hrs, Saturday 14 October, 2000
Arrive Fremantle, 1000hrs, Monday 6 November, 2000

Principal Investigators

Susan E. Wijffels*, John A. Church, Steve R. Rintoul and Bronte Tilbrook
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Antarctic Co-operative Research Center, University of Tasmania, Hobart, TAS

(* denotes PI's not going to sea)

Scientific Objectives

- to establish a time series of full-depth repeat ocean measurements capable of resolving decadal and longer time scale changes in the structure of the oceans around Australia, and their storage of important climate quantities such as heat, freshwater, oxygen and carbon. The proposed surveys will build upon the high-quality sections made in the mid-90's as part of the World Ocean Circulation Experiment (WOCE).
- to use these data through comparisons with climate model runs to: validate

climate model predictions; and to determine whether and how fast climate is changing due to the Greenhouse Effect and/or natural decadal variability.

- improve our understanding of basic ocean processes and fluxes through collection of full depth direct velocity measurements while conducting the repeat surveys

Cruise Objectives

To re-occupy portions of several World Ocean Circulation Experiment (WOCE) hydrographic lines between Australia and 90° E in the Southeast Indian Ocean as part of establishing a Deep Ocean Time Series Section grid around Australia. Full-depth 24 bottle 10L Niskin/CTD casts will be taken at WOCE spatial resolution. Sampling and chemical analysis will be completed for oxygen, nutrients, dissolved carbon and alkalinity. Rigorous at-sea quality control will occur with all CTD and sample data collected to be scrutinized as soon as it is available and compared with the WOCE data.

Cruise Track and Time Estimates

The proposed work requires 42 ship days. Two legs are planned (see Figure 1):

- Leg 1: Departs Dampier 1000hrs, Tuesday September 26 to Cocos Islands, 0800hrs Saturday October 14, 2000. 61 hydrographic casts.
- Cocos Islands: 0800-1700 hrs, Saturday October 14, 2000. Scientific crew swap and bunkers to be taken if necessary. Flights are usually once a week on Saturdays.
- Leg 2: Departs Cocos Islands 1700hrs, Saturday October 14 to Fremantle, 1000hrs Monday November 6, 2000. 85 hydrographic casts.

We aim to complete a total of around 146 hydrographic casts. The estimated total station time is 21.2 days, we will steam 5292.5 Nm at 11 knots taking 20.0473 days.

Piggy-back Projects

None known at present.

Franklin Equipment

- Navigational: GPS, DGPS (where possible), 3-D GPS [for ADCP calibration]
- Sounder
- ADCP
- Meteorological sensors
- Thermosalinograph

- XBT's quotient (in case of very bad weather)
- Full depth CTD (and spares)
- Rosette: 24 x 10L Niskins (with spares). Due to unknown tension levels for such a package we request that a full 24x5L set also be available, as well as some 2.5L Niskins in case the payload has to be reduced to keep wire tensions safe.
- Hydrographic sample analyses: salinity, oxygen, nitrate, silicate and phosphate
- Milli-Q water supply
- Pinger for monitoring CTD package altitude
- Colour printer, laser printer, unix computers
- Clean container for pCO₂, DIC and alkalinity measurements
- Underway surface water intake, connected through to the Clean container
- Clean power supply to clean container
- Good airconditioning in clean container

User Equipment

Pending insurance costs we will bring a Lowered Acoustic Doppler Profiler to be installed on the Rosette frame. We aim to have this instrument shipped to Hobart before the frames are sent to meet Franklin.

Personnel List

| Role | Leg 1 | Leg 2 |
|-----------------|----------------------------|----------------------|
| Chief Scientist | John Church, CMR | Steve Rintoul, CMR |
| CTD watch | Ming Feng, CMR | Mark Rosenburg, CMR |
| CTD watch | Ann Gronell, CMR | Neil White, CMR |
| CTD watch/LADCP | TBA | Serguei Sokolov |
| CO ₂ | TBA | TBA |
| CO ₂ | Bronte Tilbrook, CMR | Mark Pretty |
| CO ₂ | Alain Poisson, LPCM, Paris | TBA - French Student |
| Electronics ORV | Erik Madsen | Daniel Conwell |
| Computer ORV | Lindsay Pender | Pamela Brodie |

Hydrochemistry ORV

Gary Critchley

Val Latham

Rebecca Cowley

David Terhell

Neale Johnston

Neale Johnston

This cruise plan is in accordance with the directions of the National Facility Steering Committee for the Research Vessel Franklin.

John Wallace
Ships Manager

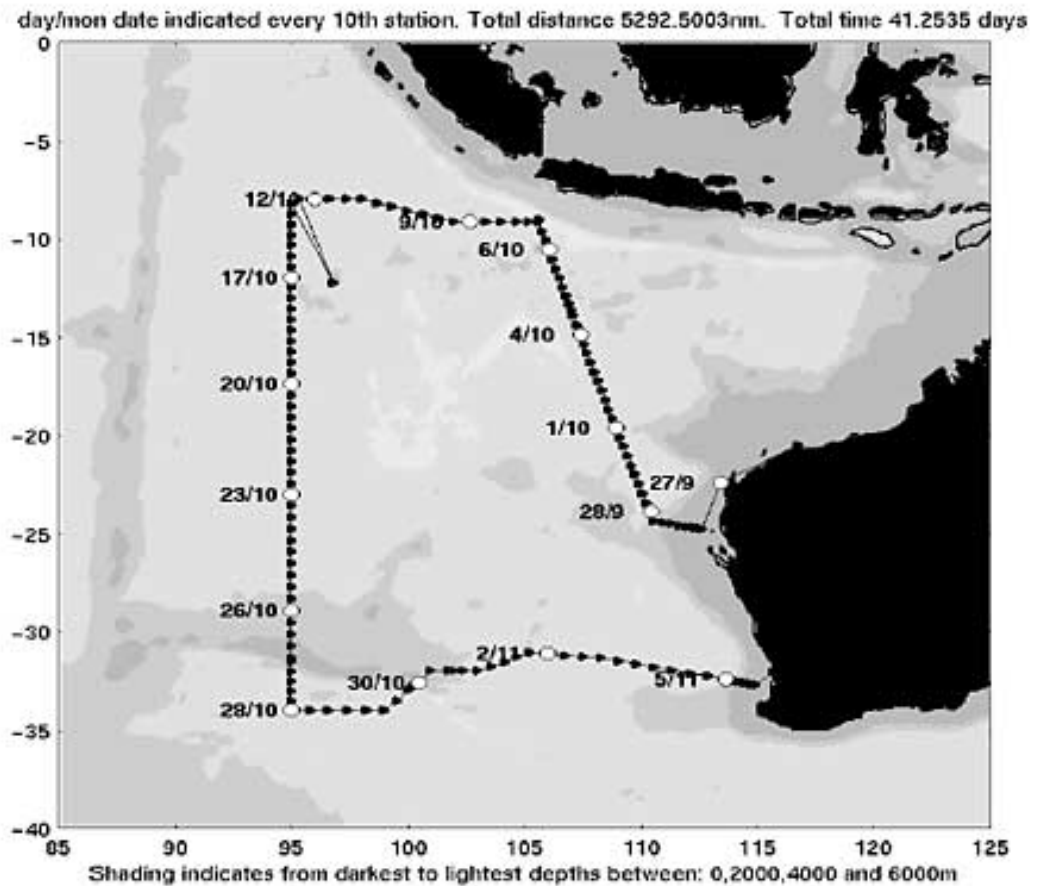


Figure 1. Cruise track for FR09/00 with ports of call indicated. Planned hydrographic casts locations are shown as black diamonds, with every tenth marked with a white circle. The projected date of arrival at these latter stations is marked on the plot as day/month. Ocean bottom topography is shown in the grey shading.

Updated: 31/01/03



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