

# FRANKLIN

National Facility  
Oceanographic Research Vessel

RESEARCH PLAN  
FR 05/96

Sail : Fremantle 1000 Tuesday 7 May 1996  
Arrive Dampier 1500 Friday 31 May 1996

Mixing and Circulation in the Perth Basin

Principal Investigators

Dr Peter C. McIntosh CSIRO Division of Oceanography (Chief Scientist)  
Dr Trevor J. McDougall CSIRO Division of Oceanography

and

Horizontal and Spatial Dynamics of Surface  
Phytoplankton

Principal Investigator

Ms Esmee Van Wijk

Flinders University (piggyback project)

February 1996

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## Mixing and Circulation in the Perth Basin

### Itinerary

Sail	Fremantle	1000	Tuesday	7 May 1996
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### Cruise Objectives

- To conduct a closely-spaced CTD survey around the perimeter of the Perth Basin so that the flows into and out of the basin at all depths can be estimated by inverse methods.
- To deduce the importance of mixing processes in the Perth Basin by examining the changes in water-mass properties as fluid flows through the basin and by using inverse methods on the hydrographic data from the perimeter of the Perth Basin.
- To investigate horizontal changes in chlorophyll a and phytoplankton species composition across hydrographic fronts.
- To correlate continuous chlorophyll a measurements with discrete samples of phytoplankton species composition.

### Principal Investigators

Dr Peter C. McIntosh, CSIRO Division of Oceanography (Chief Scientist)  
Dr Trevor J. McDougall, CSIRO Division of Oceanography  
Ms Esmee Van Wijk, Flinders University

### Cruise Track and Time Estimate

The cruise track, shown in Figure 1, will retrace the path of the 1987 Darwin section along the southern leg of the box, passing over the deep current meter moorings of McDougall and Toole. The track then turns north, passing over Gulden Draak Knoll and Batavia Knoll, then turning northeastwards over Wallaby Plateau, into the Cuvier Basin and closing the box over the ICM6 Tomczak and Church current meter moorings off Northwest Cape. Hydrographic stations are spaced every 50km, or every 500m change in depth, whichever occurs first. This leads to a total of 111 CTD stations with an average depth of 3500m. The distance around our cruise track is 4676km, including transits to or from Fremantle and Dampier. Based on previous Franklin cruises (Neil White, pers.~comm.), the transit plus station time is estimated to be 22 days. Allowing 3 days when CTD casts cannot be done due to bad weather, the total cruise time is then 25 days.

In the event of losing several days due to the frequent bad weather in this region of the Indian Ocean, an alternative cruise track has been prepared (see Figure 2). This track encloses a smaller region of ocean, but still passes over both sets of current meter moorings. A decision to use this track could be delayed until the cruise has passed over the McDougall and Toole moorings (if the track is traversed clockwise). This track involves 97 CTD stations, and has a length of 3844km. The estimated time for this track is 19 days, excluding allowance for bad weather. Hence this track saves 3 days over the original track.

## ORV Equipment Required

ADCP, CTD with 24-bottle rosette, XBT, Thermosalinograph, Scientific sounder, meteorological station, underway fluorometer.

Many of the CTD casts are in water deeper than 5000m. This, together with the frequent rough weather in this region, means that it is highly desirable to use the small CTD frame with 24 3 litre bottles. However, we understand that the 3 litre bottles leak badly, and we do not intend to use them in this state.

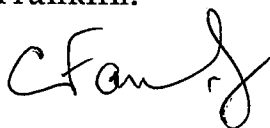
## Equipment Provided by Users

Microscope.

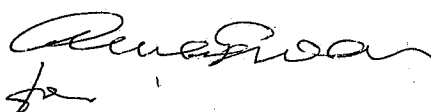
## Personnel

Peter McIntosh	CSIRO Oceanography	Chief Scientist
Andreas Schiller	CSIRO Oceanography	
Yukio Masumoto	University of Tokyo	
Esmee Van Wijk	Flinders University	(piggyback project)
Sarah Searson	University of Cape Town	(to be confirmed)
Neil White	CSIRO-ORV	Cruise Manager
Erik Madsen	CSIRO-ORV	
Helen Beggs	CSIRO-ORV	
Dave Terhell	CSIRO-ORV	
Val Latham	CSIRO-ORV	
Kate Berry	CSIRO-ORV	

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



C B Fandry  
CSIRO Oceanography



G Paltridge  
National Facility Steering Committee

March 1996

Proposed cruise track and CTD locations

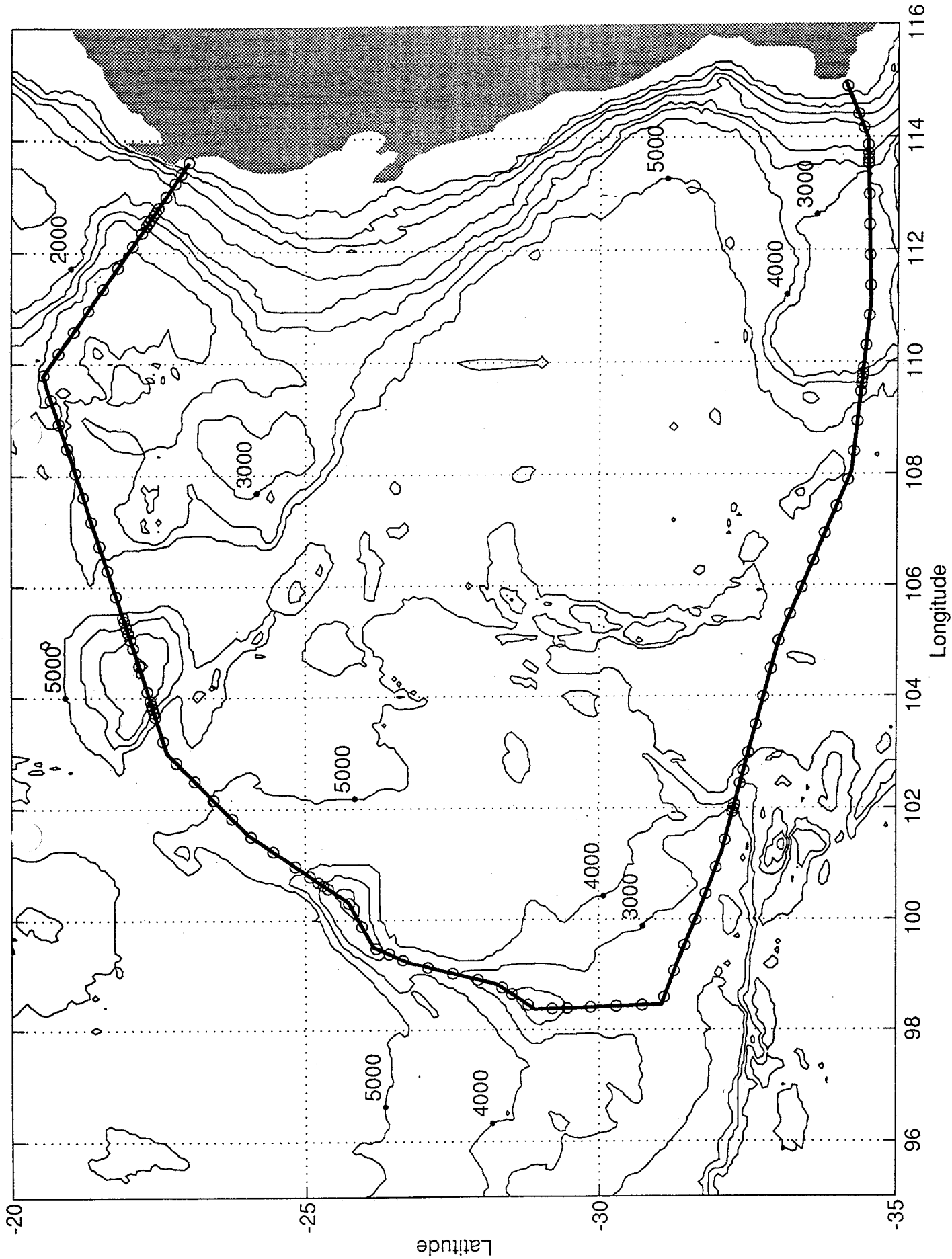


Fig 1.

Heavy weather alternative cruise track

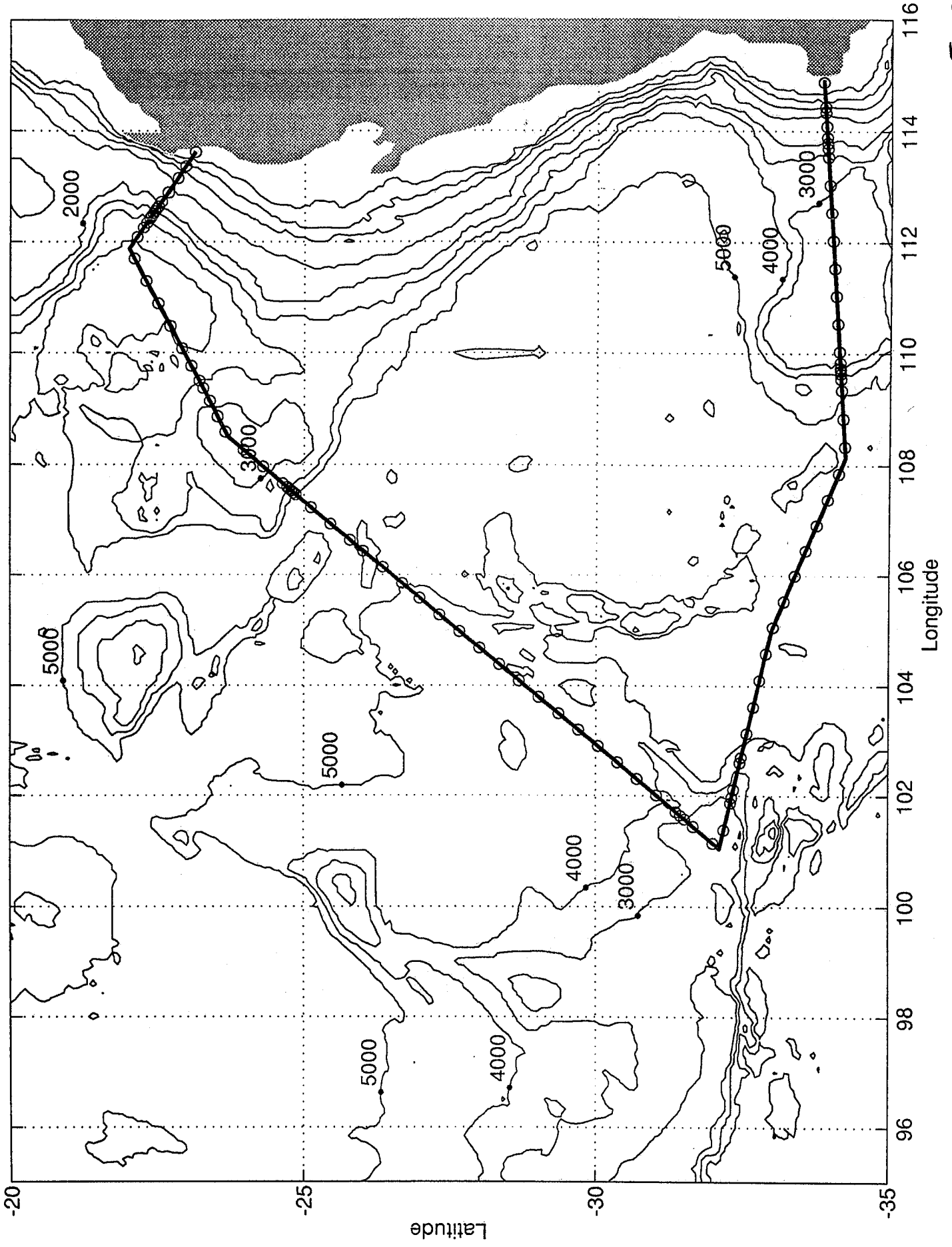


Fig 2.