

# FRANKLIN

National Facility  
Oceanographic Research Vessel

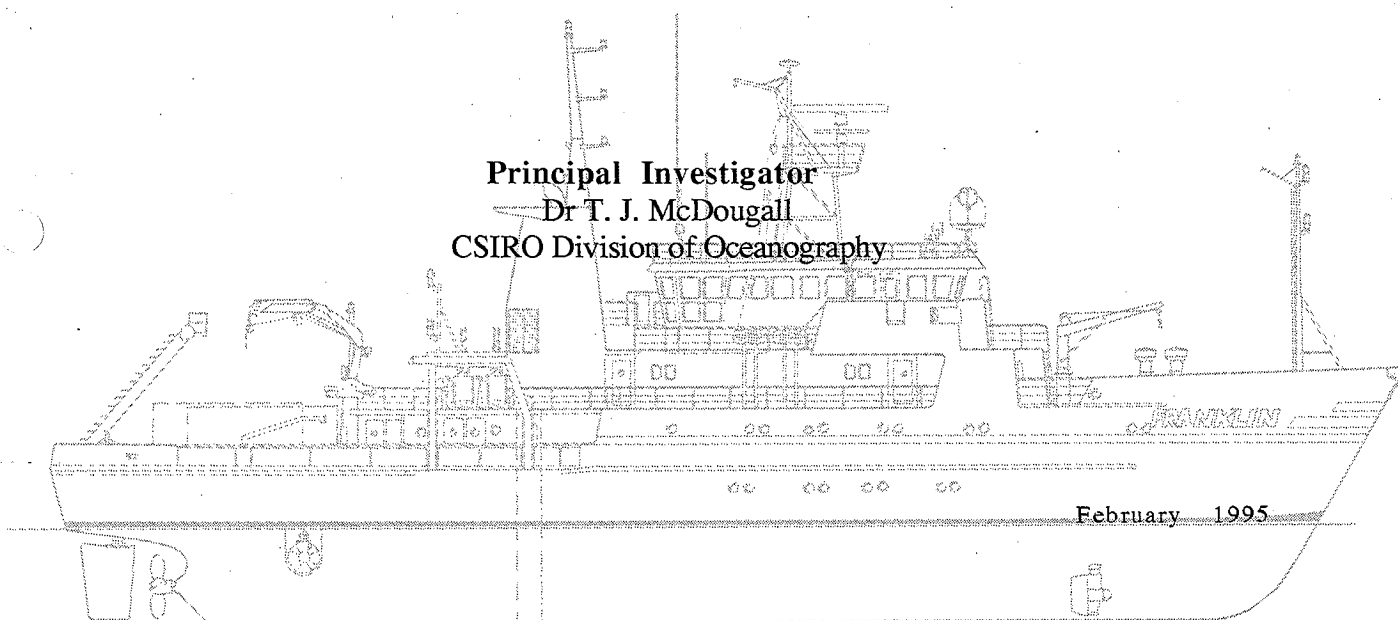
## RESEARCH PLAN

FR 6/95

|        |           |      |          |              |
|--------|-----------|------|----------|--------------|
| Sail   | Fremantle | 0800 | Saturday | 17 June 1995 |
| Arrive | Fremantle | 1500 | Friday   | 7 July 1995  |

Moored Measurements and CTD sections of the flow of  
Deep and Bottom Water into the West Australian Basin  
of the Indian Ocean

Principal Investigator  
Dr T. J. McDougall  
CSIRO Division of Oceanography



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# RESEARCH PLAN

FR 05/95

## Itinerary

|        |           |      |          |              |
|--------|-----------|------|----------|--------------|
| Sail   | Fremantle | 0800 | Saturday | 17 June 1995 |
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## Moored Measurements and CTD sections of the flow of Deep and Bottom Water into the West Australian Basin of the Indian Ocean

### Cruise Objectives

(i) To deploy moored current meters in the passage between Cape Mentelle and Broken Plateau to measure the flow of Deep and Bottom water into the West Australian Basin.

(ii) To use the moored current-meter data together with several realisations of the hydrography across the section between Cape Mentelle and Broken Ridge to deduce the flow of Bottom, Deep and Intermediate Waters in this region.

(iii) To estimate the vertical diffusivity across the potential temperature surfaces less than 1.1°C in the West Australian Basin using the deduced volume flow rates of Deep and Bottom water across the section from Naturaliste Plateau to Broken ridge.

(iv) By obtaining more reliable estimates of the equatorward flux of deep and bottom water into the West Australian Basin, contribute to the estimate of the poleward heat flux borne by the Indian Ocean.

### Principal Investigator

Dr T. J. McDougall, CSIRO Division of Oceanography

### Cruise Track

The proposed cruise track is shown in Figure 1. We will retrace the path of the *Darwin* 1987 section in this region, doing CTD stations at each of stations #109 - #79 of the Darwin cruise, together with an additional 9 stations at the locations of the steepest deep topography between #85 and #99. After deploying the moorings and completing this line of CTD casts, time permitting we will proceed to the northern region of Tryal Ridge and do up to 10 more CTD stations in an attempt to quantify the suggestion of Toole and Warren that most of the deep northward flow between Broken Ridge and the Naturaliste Fracture Zone is focused between Tryal Ridge and Dirck Hartog Ridge. If this is indeed the case then most of the flow of the very coldest water will be estimated again on this shorter CTD section. We do not propose this section as our primary section because of the many narrow passages that exist in the Dirck Hartog Ridge and in the Naturaliste Fracture Zone that allow the leakage of flow and so would lead to inconclusive results for all but the very coldest fluid.

## ORV Equipment required

All standard equipment, including thermosalinograph; ADCP; CTD, with 12-bottle rosette.

## Equipment Supplied by Users

Mooring gear for 10 moorings as shown in Figure 2, including 10 releases, 29 Aanderaa current meters, flotation, rope and mooring winch.

## Time estimates

The distance around our cruise track is 2030 nautical miles, and using an average ship speed of 10 knots gives a total transit time of 8.5 days. I have taken a ship speed of 10 knots rather than 12 knots because of the frequent inclement weather in this region. Allowing 12 hours for the deployment of each of the ten moorings means that 5 days will be devoted to the mooring work. Assuming a CTD wire speed of 1 m/s, the CTD station time is estimated to be a total of 6.5 days. The total cruise time is then 20 days allowing one extra day for bad weather gives 21 days. I am conscious that we should expect more down-time due to the sea state in this part of the ocean. If we are afflicted with a significant amount of such bad weather we will omit some of the CTD stations and perhaps omit the whole small section at Tryal Ridge if need be.

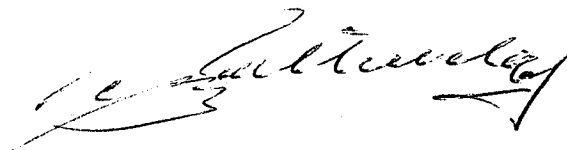
## Personnel

|                  |       |              |                 |
|------------------|-------|--------------|-----------------|
| Trevor McDougall | CSIRO | Oceanography | Chief Scientist |
| Fred Boland      | CSIRO | Oceanography |                 |
| Danny McLaughlan | CSIRO | Oceanography |                 |
| Lindsay Pender   | CSIRO | Oceanography |                 |
| Phil Adams       | CSIRO | ORV          |                 |
| Jeff Dunn        | CSIRO | ORV          |                 |
| Mark Rayner      | CSIRO | ORV          |                 |
| Dave Terhell     | CSIRO | ORV          |                 |

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



A D McEwan  
CSIRO Division of Oceanography



G Paltridge  
National Facility Steering Committee

February 1995



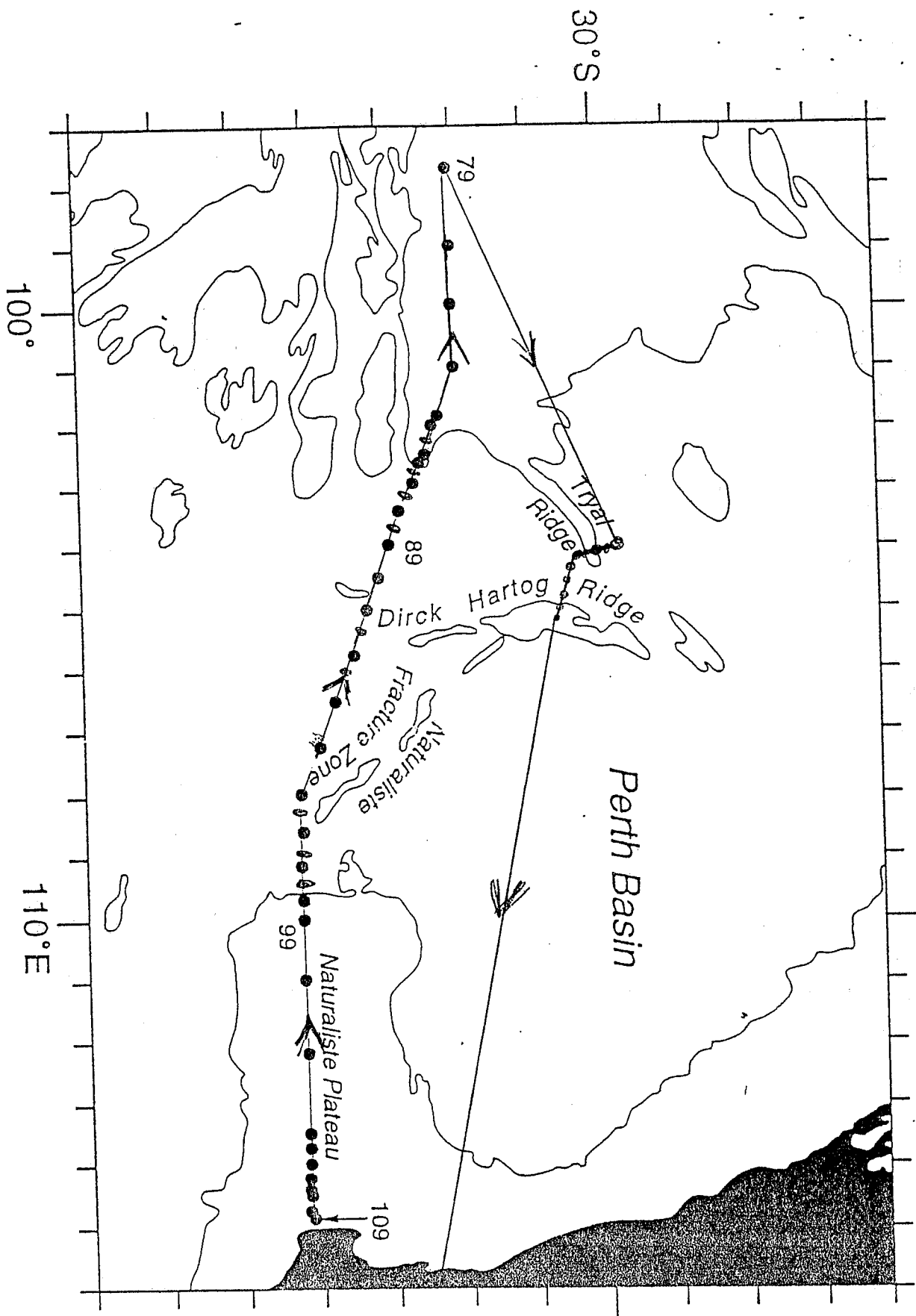


Figure 1

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