RESEARCH PLAN

FR 10/95

Sail	Darwin	1000	Thursday 7 December 1995
Arrive	Fremantle	1000	Friday 22 December 1995

Modern distributions and chemistries of benthic and planktonic biota to serve as analogues for palaeoceanographic reconstructions.

Principal Investigators
Dr Patrick De Deckker
Dept. Geology, ANU.

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Franklin

Research plan
Cruise Fr 9/95

"Modern distributions and chemistries of benthic and planktonic biota to serve as analogues for palaeoceanographic reconstructions"

Itinerary:

Sail	Darwin	1000h December 7,1995
Arrive	Fremantle	1000h December 22, 1995

Principal investigator:

Patrick De Deckker,
Dept. of Geology, The Australian National University, Canberra ACT 0200
Tel: 06-2492070/2056; fax: 2495544
e-mail: patrick.dedeckker@anu.edu.au

Scientific objectives:

1. collect living planktonic and benthic organisms to build an ecological database on organisms of use for the reconstruction of past oceanic conditions
   - planktonic organisms will be collected at the water surface using plankton nets; we aim at collecting foraminifera, pteropods, diatoms, radiolarians. Calcareous nannoplankton will be collected by filtering 10L samples onboard.
   - benthic organisms will be collected using a multiple corer that gathers up to 8 tubes (10cm wide and 65cm long) at the sediment-water interface.

2. collect 6 m-long gravity cores from selected sites along a several transects ranging from 800m down to 2,500m water depth to study the history of oceanic changes offshore WA and detecting changes in physicochemical parameters of various water masses; emphasis will also be paid to the Holocene history to be obtained from the short, multiple cores.

3. collect water samples from specific depth profiles adjacent to the coring sites down to 2,500m for chemical analyses and for correlating water chemistry data with the chemistry of the calcareous microrganisms collected at the same sites.

Total sampling:

Gravity cores: 1 in Bonaparte Gulf, and a series of 4 cores along 4 principal transects = total 17 gravity cores

Multiple cores: a series of 4 cores along 4 principal transects, plus 5 other MUC cores in shallow depths (~300m) along the cruise track = total 21 MUC.

CTD: a total of 4 CTD profiles down to 2,500m at the beginning of each transect. If at the end of each transect time has been gained on the coring program, I would want to have another CTD profile down to 800m. = Total 4 long CTD and possibly anther 4 shorter (800m) CTD. Physicochemical parameters will be measured on water samples, and additional water samples will be taken for analyses at ANU.

Numerous plankton tows and 10L water samples for filtration of calcareous nannoplankton to be taken along the cruise track.

Cruise track

Day 1. Departure from Darwin 1000h, December 7.
Heading for the deepest part in Bonaparte Gulf [= Station 1](~120m water depth) at 127°50'E 12°00'S; 208 nM, 19 hours travel time, and allowing for 3 plankton tows. Arrival on Day 2 at Station 1 at 0500h, December 8.

Day 2. [Dec.8] 0500h, gravity corer, 1/2h coring deployment, departure for Station 2 located at 121°10'E 14°10'S. Distance 430 nM, 39 hours of travel time, including 3 plankton tows plus 3 MUC [=multiple corer] samples, taking 1/2 hour each, along longitudes 126°, 124° and 122°E. Arrival at Station 2 at 2200h on Day 3, December 9th.

PLANKTON TOWS WILL BE TAKEN EVERY 60 nM WHILE ON ROUTE FOR THE REST OF THE CRUISE. Those tows will simply require the vessel to slow down for a period of 5 minutes at a speed of ~1 knot.

Day 3 [Dec.9] 2200h CTD down to 2,500m at 121°10'E 14°10'S; 5 hours, completion on Day 4 at 0300h

Day 4 [Dec10] at 0300h deployment of gravity corer at same station, 5 hours, completion at 0800h; deployment of MUC, same station, 5 hours, completion at 1300h. Departure for station 3 located at 121°10'E 14°15'S, 1 1/2 hour travel time. Arrival at Station 3 at 1430h. Deployment of gravity corer at that station down to 2,000m, 4 hours, completion at 1830h; deployment of MUC, same station, 4 hours, completion at 2230h. Departure for station 4 located at 121°10'E 14°30'S, 1 1/2 hour travel time. Arrival at Station 4 at midnight.

Day 5 [Dec 11] at Station 4: deployment of gravity corer at that station down to 1,500m, 3 hours, completion at 0300h; deployment of MUC, same station, 3 hours, completion at 0600h. Departure for station 5 located at 121°10'E 14°53'S, 4 hours travel time. Arrival at Station 5 at 1000h. Deployment of gravity corer at that station down to 800 m, 2 hours, completion at 1200h; deployment of MUC, same station, 2 hours, completion at 1400h. *If at the end of this transect time has been gained on the coring program,. I would want to have another CTD profile down to 800m.* Departure for Broome where we are to meet Brad Opdyke. Travel time 19 hours for 208 nM. Arrival time in Broome on Day 6 at 0900h.

Day 6 [Dec 12] Departure at 0900h for Station 6 located at 115° E 17°30'S, Distance to be travelled 420 nM = 39 hours travel time plus three MUC samples to be taken along long 120°E at ~200m water depth [= 1/2 hour], 118°E at ~300m water depth [=1/2 hour], and 116°E at ~1,500m water depth [=3 hours]. Total: 43 hours, arrival at station 6 on Day 8 [Dec 14] at 0400h.

Day 7 [Dec 13] transit to station 6.

Day 8 [Dec 14] arrival at station 6 at 0400h. CTD down to 2,500m: 5 hours; completion at 0900h. Deployment of gravity corer at same station down to 2,500m, 5 hours,

completion at 1400h; deployment of MUC, same station, 5 hours, completion at 1900h. Departure for station 7 located at 114°50'E 17°45'S; travel time 2 1/2 hours [=24 nM]. Arrival at station 7 at 2130h. Deployment of gravity corer at same station down to 2,000m, 4 hours, completion at 0130h on Day 9

Day 9 [Dec 15] at 0130h: deployment of MUC, same station, same water depth, 4 hours, completion at 0530h. Departure for station 8 located at 114°E 19°E. Travel time 71/2 hours [=84 nM]. Arrival at station 8 at 1300h. Deployment of gravity corer down to 1,500m, 3 hours, completion at 1600h; deployment of MUC, same station, 3 hours, completion at 1900h. Departure for station 9 located at 113°E 20°15'S. Travel time 91/2 hours [=100 nM]. Arrival at Station 9 on Day 10 at 0430h.

Day 10 [Dec 16] arrival at station 9 at 0430h. Deployment of gravity corer at that station down to 800m, 2 hours, completion at 0630h; deployment of MUC, same station, same water depth, 2 hours, completion at 0830h. *If at the end of this transect time has been gained on the coring program, I would want to have another CTD profile down to 800m.* Departure for station 10 located at 111°20'E 24°S. Travel time 23 hours [=250 nM]. Arrival at station 10 on Day 11 at 0730h.

Day 11 [Dec 17] arrival at station 10 at 0730h. CTD down to 2,500m; 5 hours, completion at 1230h; deployment of gravity corer at same station, 5 hours, completion at 1730h; deployment of MUC, same station, 5 hours, completion at 2230h. The next 3 stations [stations 11, 12 and 13] are located along a short transect between 111°20'E 24°S and 112°'E 24°15'E. Travel time between station 11 and 13 is estimated to be 4 hours [=42 nM].

Travel to station 11 is 1 hour [11 nM]. Water depth 2,000m. Arrival at station 11 at 2330h. Deployment of gravity corer, 4 hours. Completion on Day 12 at 0330h.

Day 12 [Dec 18]. Completion of gravity corer at 0330h. Deployment of MUC, same station, 4 hours, completion at 0730h. Departure for station 12 and travel time ~1 hour [=11 nM]. Deployment of gravity corer down to 1,500m, 3 hours. Completion 1130h. Deployment of MUC, same station, 3 hours, completion at 1430h. Departure for station 13 located at 112°'E 24°15'E. Travel time 2 hours. Deployment of gravity corer, 2 hours. Completion at 1830h. Deployment of MUC, same station, 2 hours, completion at 2030h. *If at the end of this transect time has been gained on the coring program,.I would want to have another CTD profile down to 800m.* Departure for station 14 located at 112°35'E 28°25'S. Travel time 24 hours [=265 nM]. Arrival time 2030h on Day 13.

Day 13 [Dec 19]. Arrival at station 14 at 2030h. Another transect is to be made between that station [112° 35'E 28°25'S] and 113°E 28°25'S; *estimated travel time is 2 hours in total .*

CTD down to 2,500m; 5 hours, completion at 0130h on Day 14.

Day 14 [Dec 20] completion of CTD at 0130h. Deployment of gravity corer at same station, 5 hours, completion at 0630h; deployment of MUC, same station, 5 hours, completion at 1130h. Travel to station 15, ~ 1 hour. Arrival 1230h. Deployment of gravity corer at 2,000m, 4 hours, completion at 1630h. deployment of MUC, same station, 4 hours, completion at 2030h. Travel to station 16, travel time ~1 hour. Arrival at station 16, 2130h. Deployment of gravity corer at 1,500m, 3 hours, completion at 0030h on Day 15.

Day 15 [Dec 21] At 0030h, deployment of MUC at 1,500m, 3 hours. Completion at 0330h. Departure for station 17, located at 112° 35'E 28°25'S. Travel time ~1 hour. Arrival at station 18 at 0430h. Deployment of gravity corer at 800m, 2 hours, completion at 0630h. Deployment of MUC at 800m, 2 hours. Completion at 0830h. *If at the end of this transect time has been gained on the coring program,.I would want to have*

another CTD profile down to 800m. Departure for Fremantle. Travel time estimated at 24 hours, being for 260 nM., plus deployment of MUC at 2 stations around 400m water depth at 30°S and 32°S latitudes, taking each 1 hour of deployment time.
Arrival in Fremantle on Day 16 [Dec 22] at 1030h.

ORV facilities requested:

1. for CTD profiles: 12 bottle rosettes with 10L bottles and use of reversing thermometer. We would take samples for trace elements (Ba, Sr, Mg, and Cd), and stable isotopes. Alkalinity measurements are also to be made on the samples.
2. containered deck laboratory; access to this laboratory is required for processing plankton samples, filtering waters for nanoplankton, and processing multiple core samples.

Note that the MUC is 900kg and the gravity corer is 1,200kg. The length of the gravity corer with core barrels is approximately 6.5m; this equipment was used previously used by us on the Franklin (FR1/94). A special wooden frame was prepared by Franklin personnel at the time to prevent the corer weight(bomb) from rolling on the deck.

Personnel:

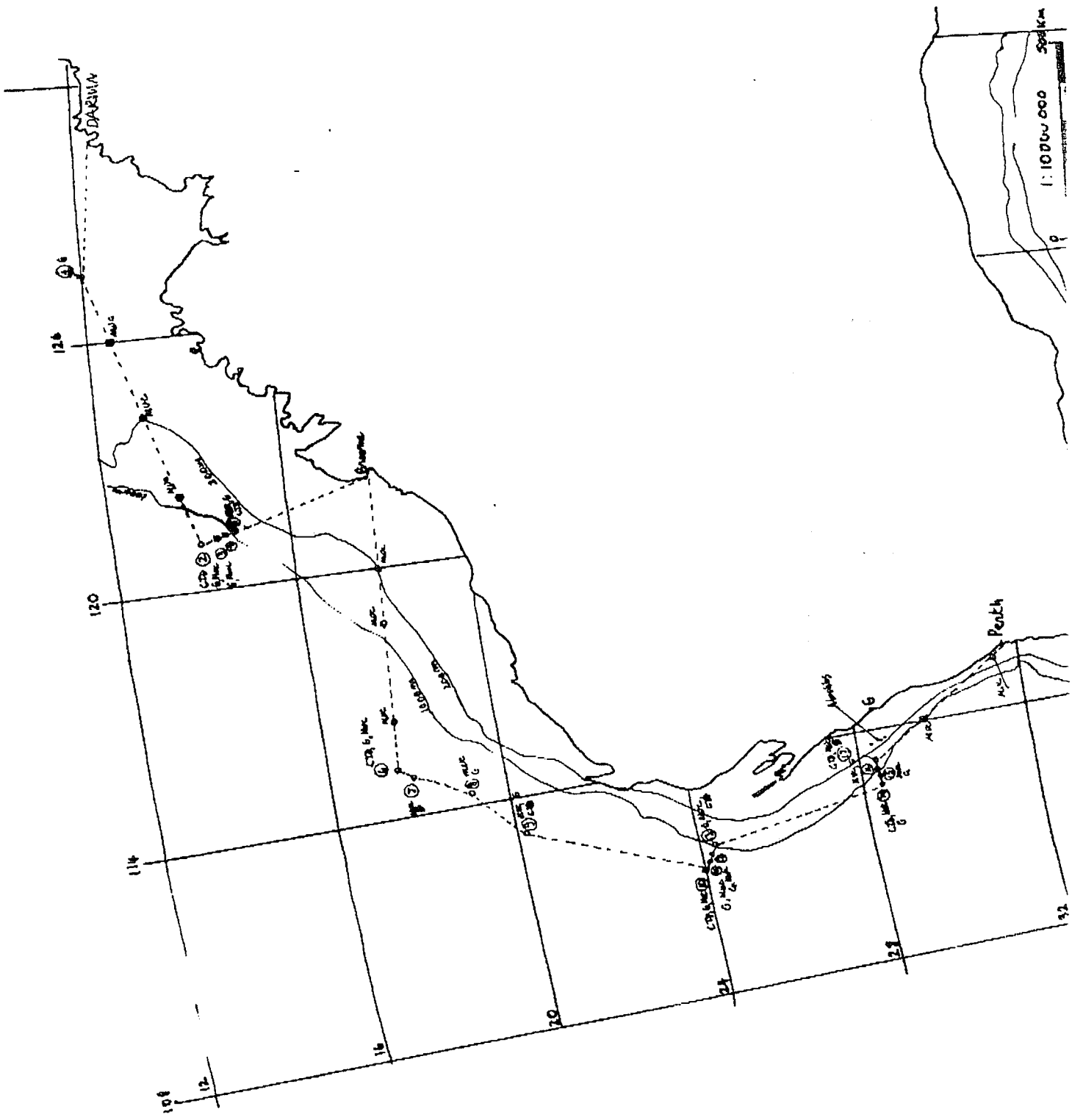
Patrick De Deckker	Geology, ANU	Chief Scientist
Dr Brad Opdyke	Geology, ANU	
Dr Michael Ayress	Geology, ANU	
Mr Paul Burkle	Geology, ANU	
Mr Geoff Deacon,	University of WA (ex ANU)	
Mr Alistair Hack	Geology, ANU	
Dr Paul Hesse,	Earth Sciences, Macquarie University	
Dr Ignacio Martinez	Geology, ANU	
Dr Stefan Nees	GEOMAR, Kiel, Germany	
Mr David Wheeler	University of Wollongong	
David Vaudrey	ORV	Cruise Manager
Erik Madsen	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 Division of Oceanography

G W Paltridge
National Facility Steering Committee

November 1995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