

FRANKLIN

National Facility
Oceanographic Research Vessel

Search for submarine hydrothermal activity, Manus
and Woodlark Basins, Papua New Guinea

RV FRANKLIN
CRUISE FR 10/96

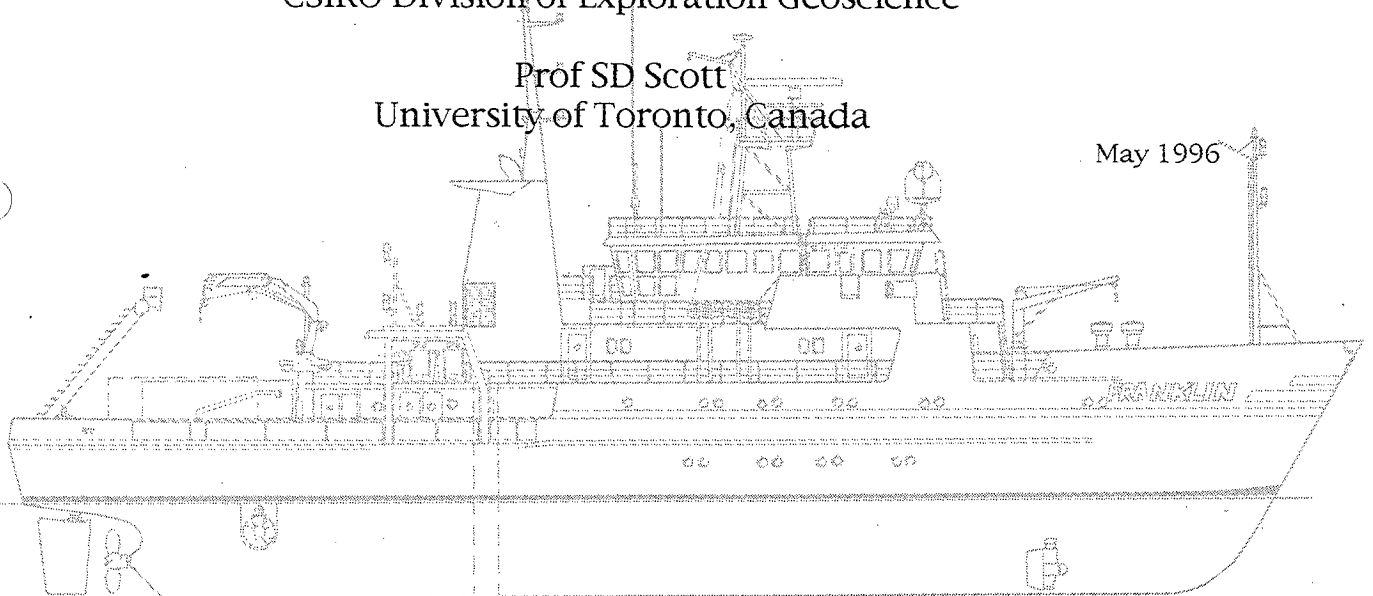
Depart Darwin	1000 hours	Saturday 23 November 1996
Return Cairns	1000 hours	Tuesday 17 December 1996

CHIEF INVESTIGATORS

Dr R.A. Binns
CSIRO Division of Exploration Geoscience

Prof SD Scott
University of Toronto, Canada

May 1996



For further information contact:

ORV Operations Manager
CSIRO Division of Oceanography
GPO Box 1538, Hobart, Tasmania 7001

Phone (002) 32 5222
Fax (002) 32 5000
Telex AA 57182



FRANKLIN is owned and operated by CSIRO

CRUISE PLAN

RV "FRANKLIN" FR 10/96 ("PACMANUS-III")

Itinerary

Depart Darwin	1000 hours	Saturday 23 November 1996
Return Cairns	1000 hours	Tuesday 17 December 1996

Scientific Program

Search for submarine hydrothermal activity, Manus and Woodlark Basins, Papua New Guinea

Principal Investigators (Co-Chief Scientists)

1. Dr R A Binns (Chief Scientist at Sea)
CSIRO Division of Exploration Geoscience
PO Box 136, North Ryde NSW 2113
Tel: (02) 8878741, 8878666; (048) 836069
Fax: (02) 8878921
E-mail: r.binns@syd.dem.csiro.au
2. Prof S D Scott
Department of Geology
University of Toronto
Toronto, M5S 3B1, Canada
Tel: +1-416-9785424, 9783022, 4835431
Fax: +1-416-9783938
E-mail: scottsd@ecf.utoronto.ca

Cruise Objective

To survey recent and current hydrothermal vent sites on the seafloor of the Manus Basin Bismarck Sea, and to collect samples of vent plumes, mineral deposits, and associated rocks and sediments. During the outward passage, briefly test a site in Goodenough Bay for hydrothermal activity, and during the return passage (if time allows) examine two sites in the Woodlark Basin, Solomon Sea.

Cruise Track

- Proceed from Darwin via Torres Strait then China Strait to the first station in Goodenough Bay (west of D'Entrecasteaux Islands) at 9°50'S 150°40'E.
- Following operations in this vicinity, proceed via Ward Hunt

Strait, Star Reefs Passage, and Dampier Strait (or between Umboi and Tolokiwa Islands to the second "Caldera Zone" station at 3°43'S 148°45'E.

- Following operations in this vicinity, proceed to PACMANUS station at 3°43'S 151°40'E, with brief CTD and dredge operations at several sites *en route*. Operations near PACMANUS will extend easterly to 152°08'E.
- Before commencing the return passage to Cairns via St Georges Channel and Jomard Entrance, the Co-Chief Scientists will decide whether time and science priorities allow brief operations at two sites in the Woodlark Basin:
 - Misima Seamounts: 10°30'S 153°40'E
 - Moresby Seamount: 9°50'S 151°35'E.

Operations

Over-the-side and traversing activities will be conducted on a 24-hour basis while on station, and will involve a variable combination (as dictated by progressive results) of:-

- 12 kHz echosounding
- CTD-transmissometer soundings and hydrocasts while drifting or under TAC propulsion (see note below)
- 2-5 km traverses with bottom-following camera under tow at 0.5 kt
- dredging rock samples (1500-2500 m) -see note below
- sediment coring with 2m gravity corer (1500-2500 m)
- deployments of Smith-McIntyre grab
- deployment of ODP site markers (see below)
(deployment of deep-tow gamma-ray spectrometer as per original proposal might not now be undertaken: to be advised if it is)

Dredging: When weather conditions permit, at several sites where very high precision placement of the dredge on bottom is required, we wish to attempt the following modified procedure (common on larger vessels with adequate stern overhang): (1) lower dredge to bottom while holding ship steady exactly over the target (DGPS navigation), (2) move ship approx 500m ahead in a specified direction (ie ship's heading) using bow-thruster if necessary to avoid fouling prop, while paying out cable as required to prevent dredge movement, (3) haul to take up tension and cause dredge to move a small distance, then haul off bottom.

CTD-Transmissometer-Hydrocasts: Mostly single or double dips rather than long tow-yo's. The rosette will be fitted with a new self-contained recording Mn analyser (GAMOS, 30kg) which replaces 3 Niskin bottles (leaving 8 for sampling seawater).

ODP site markers: Approximately 40 will be scattered overboard prior to camera tows at several PACMANUS sites. Made to Ocean Drilling Program specifications, these are simply a 30cm plastic disc (bucket lid) tethered to a weight.

ORV Equipment Required

1. Main winch and towing cable. Tricycle tensiometer and wire-out meter must be operative. Automatic graphic logging of tension and wire-out during dredging, camera tow, and coring operations would be appreciated.

2. Hydro winch (S-M grab, emergency use of corer) and CTD winch and cables.
3. Scientific sounder (12 kHz), with continuous computer logging of digital depth
4. 12 kHz pingers (camera tows)
5. GPS and preferably differential GPS navigation. DGPS will be critical for some planned dredge and corer operations. GPS and DGPS displays (including waypoint distance etc) should be at the bridge winch control station.
6. Mainframe computer and PC's. Continuous logging and printout of GPS and DGPS co-ordinates (every 10-20 seconds?), depth (plus wire-out, tension during operations). Separate logging of Bridge echo-sounder depth (via PC?) during camera tows when SIMRAD is disabled would be helpful. Automated plotting of tracks at 1:20,000 scale if available.
7. CTD profiler, transmissometer, rosette (10 litre Niskin bottles), reversing thermometer. CTD-transmissometer GAMOS profiling will be a critical activity for the cruise, so a spare unit if available would be wise.
8. Milli-Q and Milli-R04 water purification systems, pre-checked.
9. Yeo-Kal 606 SDL (3000m version) or equivalent if available (for attachment to camera cage, monitoring T and salinity)
10. Solvent fumehood (HCl, HNO₃)
11. Oscilloscope and electronics test equipment
12. Shipboard communications (Bridge-Ops-Winch)
13. Photocopier (preferably with A3 and book-copying capability), plenty of toner (ran out last cruise)
14. Weak links for dredging -plenty (1600-2500m, possibly a few at 1000m).
15. Container laboratory (sample preparations, battery charging).
16. 110 volt power supplies (container, chem lab, GP lab)
17. Salinometer (chlorinity measurements on Niskin samples)
18. Chemistry laboratory benches to be cleared of non-required equipment.
19. Smith-McIntyre grab

Equipment Provided by Users

1. 2x Lister chainbag dredges and weights.
2. Towed camera-video system and cage. 110v battery chargers.
3. Sediment mini-corer (gravity).

4. Petrological and stereo microscopes.
5. GAMOS system - Mn analyser for CTD rosette.
6. Consumable supplies.
7. Laptop PCs and Mac

On-board Analysis

Dredge and corer samples will be curated and examined microscopically (container and chemistry laboratory). Seawater from Niskins will be sampled and possibly filtered in the wet lab. GAMOS assembly and maintenance will be in the chem lab.

Time Budget

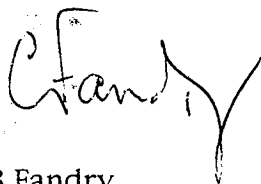
Transit: Darwin-Goodenough-Manus-Cairns	10 days
Operations, Goodenough Bay	1 day
Operations, Caldera Zone	2 days
Operations, PACMANUS-Tumai area	10 days
Contingency (ops in Woodlark Basin)	2 days
<i>Total</i>	<i>24 days</i>

Personnel

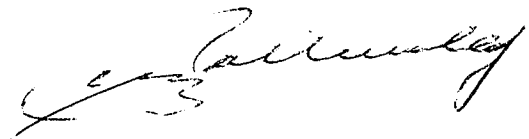
* Ray Binns	CSIRO Expl. Geoscience	(Co-Chf Sci.)
* Joanna Parr	ditto	
John Waters	ditto	
* Dave Edwards	CSIRO ORV	(Cruise Manager)
* Bob Beattie	ditto	
* Bruce Gemmell	Univ. of Tasmania	
* Steve Scott	University of Toronto	(Co-Chf Sci.)
* Roger Moss	ditto	
* Keith Crook	University of Hawaii	
# Kei Okamura	University of Tokyo	
A.N.Other (1)	UPNG	
A.N.Other (2)	CSIRO or Toronto	

- * previous "Franklin" experience
- # other RV experience

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

May 1996