

National Facility Research Vessel

	Voyage Plans and Summaries	
RV FRANKLIN	[back to voyage document index]	
VOYAGE DOCUMENTS	Franklin Voyage Plan No. FR02/00	
RV SOUTHERN SURVEYOR	Title Tropical River Ocean Processes in Coastal Settings (TROPICS) Project - Biogeochemistry, Benthos, & Sedimentation in the Gulf of Papua	
CSIRO AUSTRALIA	Itinerary	
CSIRO MARINE AND ATMOSPHERIC RESEARCH	Depart Rabaul, New Britain, 0030 hrs, 4 February 2000 Steam to Gulf of Papua for work stations Scientific crew change in Port Moresby on 13 February Arrive Cairns 22 February 2000 Principal Investigator(s)	
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	Scientific Objectives	
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Project TROPICS research began in 1996 to describe and model the mechanisms of globally significant wet tropical river delivery of dissolved and suspended materials to the coastal ocean. We are contrasting the delivery of

the north coast PNG Sepik River inputs to the Bismarck Sea, where there is little or no continental shelf, to the south coast PNG Gulf of Papua rivers, where nearly all large river inputs are trapped in the mangroves and inner shelf. Collaborators are trying to measure all the components of a mass balance for river inputs, losses to the atmosphere and sedimentation, and export to oceanic circulation.

Dr. Milliman and technicians will be mapping Holocene sediment thickness with high resolution seismic equipment, to determine the volume and mass of sediments trapped on the inner shelf over the last 6000 years. Dr. Nittrouer and Ph.D. student J. P. Walsh will be Kasten Coring and box coring sediments to estimate accumulation rate and sediment mixing depth. Dr. Robert Aller will be Kasten and box coring to obtain benthic biological samples, and for measurements of organic matter decomposition reactions.

Dr. Brunskill will be measuring the natural isotopes of radium in large volume samples of surface water to estimate the residence time of shelf water. He will also obtain grab samples and Kasten Cores for geochemical mass balance research on trace elements and the biological elements in the Gulf of Papua.

Cruise Objectives

During our transit from Rabaul to the Gulf of Papua, we will run the ADCP for Drs. George Cresswell and Ray Binns, and if time, shiptrack, and weather permits, we will stop for one CTD cast to the bottom in the Goodenough Basin.

Upon entry to the Gulf of Papua, we will select transects of coring sites across the shelf (from 15-200 meter depth) to obtain Kasten cores, box cores, and grab samples of sediment, in relation to our previous core sites from the R/V Lady Basten and R/V Franklin (1993-1997). This will be done on transects to the SE of the Fly River mouth, south of the Kikori, and south of the Purari River mouth. Inshore and offshore sites will also be used for large water volume radium isotope sampling. Sediment cores will be processed and subsampled on the aft deck and in the Franklin laboratory, and some shipboard chemical measurements will be made. Grab samples will be sieved and sorted to obtain benthic plants and animals.

At some special coring sites, we will request CTD, fluorometer, gafanhoto turbidity probe, and Niskin bottle casts to the bottom. Water samples will be processed and analyzed by the scientific crew on the ship or in their home laboratories.

On 13 February we will steam to Port Moresby to allow 3 scientific crew members (Dr. Nittrouer, Dr. Sternberg, and Vanessa Madrid) to depart, and take on 3 different scientists (Dr. Milliman, Ms. Farnsworth, and David Cacciohone). The remaining day and night watches will be occupied by largely Dr. Milliman's seismic transects, running at constant speed (~6 kts) from the edge of the continental shelf to as shallow as possible (15 m?) inshore. The

objective for the seismic transects is to map the thickness of the Holocene soft river mud sediments, which occur mostly on the inner shelf. During these constant speed seismic transects, we hope to have the ADCP running for cross sections of the shelf current mapping for Dr. George Cresswell. During the day, there will be a slower continuation of workstations for CTD, gafenhoto probe, grab samples, box cores, and Kasten cores. This second shift will focus more on the western portion of the Gulf of Papua.

Cruise Track

See Figures 1a, 1b, and 1c at end of document. Latitude and Longitude for the transect lines are given in the text below "Time Estimates". A complete sediment sampling station would consist of the following activities in chronological order: 1) CTD profile to bottom, 2) Niskin water samples from near bottom, 3) Gaffenhotto tripod profile, 4) 1-3 Smith-MacIntyre Grab samples, 5) 1-3 box cores, 6) 1-3 Kasten Cores. A complete sampling station would probably be done only once per day. Other stations would consist of only grab sample, box core, and a single Kasten core. In a few locations, we will pump 1000-2000 liters of surface water into barrels on deck for radium isotope samples.

Seismic transect lines during Dr. Milliman's 13-20 February time consist of constant ship speed (5-6 knots) towing of a "fish" on the main aft wire from the continental slope to nearshore shallow water (to the limit of the Ship Master's judgement). The electronic fish is sending and receiving sonic signals that estimate the thickness of the sediments.

The schedule below is very approximate, and will be changed due to equipment troubles, weather, sample processing speed, and exciting discoveries that we did not anticipate. Proposed changes to the cruise plan for 1-3 days in advance will be discussed with the Ship Master and the CSIRO Cruise Manager.

Time Estimates

11-12 January 2000, Tuesday-Wednesday

Load container on truck at AIMS Drive to Cairns, transfer gear to Franklin hold Mackey crew: Biolab and Clean lab on aft deck 13 January

14 January

R/V Franklin departs Cairns on FR01/00, TROPICS Leg 9, Denis Mackey, Kathy Burns, Ron Szymczak, loose on the Bismarck Sea.

3 February, Thursday

R/V Franklin arrives in Rabaul, PNG. Mackey's crew departs.Two containers removed from aft deck.Locate and unload Nittrouer Container to shipBrunskill scientific crew arrives, board ship, bring gear up from hold

4 February, Friday

R/V Franklin departs Rabaul 0030, steam to Gulf of Papua, 66 hours Assemble lab gear and coring equipment.

Run ADCP across the Solomon Sea & Goodenough Basin for George Cresswell & Ray Binns, one CTD station in Goodenough Basin for Cresswell?

7 February

0000 hours, arrive 8° 58' S., 146° 22' E., Line A, sediment sampling at 300 m, 1 hour 100 m, 1 hour 50 m, 30 min 30 m, 30 min 25 m, 30 min, inside Hall Sound at 8° 26.5' S., 146° 15.5' E. Steaming time 4 hr, total time 8 hr

0800 hours, steam to Line B, 3 hrs, to 8° 32' S., 146° 8' E., 1100 hrs, sampling at 100 m, 1 hour 50 m, 30 min 20 m, 30 min. at 8° 26.5' S., 146° 15.5' E. off Northwest Hill 2 hours steaming., total time 4 hours

1500 hours, steam to Line C, 1.5 hours, 8° 23.5' S., 145° 54.5' E.
1700 hours, sampling on Line C at
100 m, 1 hour
50 m, 1 hour
25 m, 30 min
15 m, 30 min in Freshwater Bay at 8° 10' S., 146° 1' E.
3 hours steaming, total time 6 hours

2100 hours, steam to Line D, 1 hour, at 8° 27' S., 145° 41' E.
2200 hours, Line D, sampling at
200 m, 1 hour
100 m, 1 hour

8 February, 0000 hours

55 m, 30 min. 30 m, 30 min. 15 m, 30 min., off Kerema Bay at 8° 2.5' S., 145° 41' E. 4 hours steaming, total time 8 hours 0400 hours, steam 2 hours to Line E at 8° 16' S., 145° 23.5' E. 0600 hours, sediment sampling at 100 m, 1 hour 75 m, 1 hour 50 m, 1 hour 30 m, 30 min. 15 m, 30 min., off Maclatchie Point at 7° 59' S., 145° 23.5' E. 3.5 hours steaming, total time 8 hours 1400 hours, steam 1 hour to Line F at 7° 55' S., 145° 9' E., off E. Purari River Delta 1500 hours, sediment sampling at 15 m, 1 hour 30 m, 1 hour 50 m, 1 hour Deploy Sternberg tripod at 7° 57' S., 145° 10' E. 75 m, 1 hour 100 m, 30 min. (hard bottom, grab only?) 100 m, 20 min. (hard bottom, grab only?) 120 m, 20 min. (hard bottom, grab only?), at 8° 43.5' S., 145° 9' E. 4.5 hours steaming, total time 9 hours 9 February, 0100, steam 1 hour to Line G at 8° 37' S., 145° 4.5' E. Sediment sampling at 100 m, 30 min (hard bottom, grab only?) 80 m, 30 min (hard bottom, grab only?) 75 m, 1 hour 50 m, 1 hour 35 m, 1 hour 25 m, 1 hour 15 m, 30 min. at 7° 58.5' S., 144° 37.5' E. at SE of Cape Blackwood 4 hours steaming, total time 9 hours 1000 hours, steam 4 hours to Line H at 8° 14' S., 144° 19' E., SE of Turama River mouth 1400 hours, sediment sampling at 15 m, 30 min. 20 m, 30 min. 30 m, 30 min. 50 m, 1 hour 55 m, 1 hour 60 m, 1 hour 100 m, 30 min (hard bottom, grab only?) at 8° 44' S., 144° 54.5' E.

4 hours steaming, total time 10 hours

10 February 0000 hours

Steam 1.5 hours to Line I at 8° 56' S., 144° 46' E. 0200, sediment sampling at 100 m, 30 min. (hard bottom, grab only?) 80 m, 30 min. (hard bottom, grab only?) 60 m, 1 hour 50 m, 1 hour 30 m, 1 hour 20 m, 1 hour 15 m, 1 hour at 1200 hours, 8° 30' S., 144° 11' E. 4 hours steaming, total time 10 hours

Steam 3 hours to Line J at 8° 53' S., 143° 54.5' E., SE of Kiwai Island
1500 hours, sediment sampling at
15 m, 30 min
25 m, 1 hour
35 m, 1 hour
40 m, 1 hour
55 m, 1 hour
65 m, 1 hour (hard bottom?)
75 m, 1 hour (hard bottom?) at 2400 hours, 9° 13' S., 144° 43' E.
Steaming 5 hours, total time 12 hours

11 February 0000 hours, steam 5 hours to Line K at 9° 20' S., 143° 57' E.

Eastern margin of north Torres Strait reefs 0600, sediment sampling at 50 m, 1 hour 40 m, 1 hour 30 m, 1 hour 25 m, 1 hour 15 m, 30 min. at 9° 4' S., 143° 38' E., SE of Parama Island and Ellen Gowan Rock 2 hours steaming, total time 7 hours

1300 Spare afternoon, radium sample pumping, volcanic rock sampling, Bramble Cay

12 February 0000, steam for Port Moresby

Recover Sternberg tripod at 7° 57' S., 145° 10' E. 1900 Arrive Port Moresby Nittrouer, Sternberg, Madrid step off the ship Milliman, Farnsworth, Mucciarone get on the ship Set up seismic gear [If Milliman team arrives Moresby later, we may delay arrival till 13 Feb]

13 February 0000, steam for Line E, 8° 46' S., 145° 24' E. at 700 m depth

Seismic transect from Moresby to Line E, with ADCP in operation, seismic fish on aft wire Ship at half speed, approximately 6 knots, as per Dr. Milliman's request. 1200 hours, Seismic transect Line E due north to 15 m water depth, ADCP, to Maclatchie Point 1700 hours, end seismic Line E, 2 hours of coring operations, 30-55 m water depth 2100 hours, Seismic Line between E & F, by Dr. Milliman's specifications, south to 700 m

14 February 0200, end transect

0300, Seismic Line F at 120 m water depth at 8° 53.5′ S., 145° 10′ E.
due north to 15 m
0900, end transect
1000, 2 hours coring at 20-60 m water depth
1300, Seismic Line between F and G, by Dr. Milliman's specifications, south to 100 m
1900, Seismic Line G, from 700 m to 15 m water depth, 7 hours

15 February 0200, end transect Line G, transit to Line between G and H (Milliman)

0400, Seismic Line G-H, from 15 m to 700 m, 7 hours 1100, Grab sampling at top of slope and outer shelf (200-100 m water depth, ooids) 1400, Seismic Line H, 7 hours from 700 m to 15 m water depth 2100, Seismic Line between H and I, 7 hours, 15 m to 700 m water

16 February

depth

0400 hours, Grab sampling at top of slope & outer shelf (200-100 m, ooids) 0600 hours, Seismic Line I, 7 hours, 700m to 15 m water depth 1300 hours, 3 hours for coring, 25-50 m water depth. 1700 hours, Seismic Line between I and J, from 15 m in Delta Channel to 500 m on slope

17 February

0100 hours, Seismic Line J, from 500 m on slope to 15 m near Fly Delta, 7 hours 0800 hours, 3 hours for coring 1100 hours, Seismic Line between J and K, Dr. Milliman's specifications, 7 hours
1800 hours, Grab sampling for ooids, 2 hours, 200-100 m
2100 hours, Seismic Line K, 15 to 200 m, Dr. Milliman's specifications, 7 hours

18 February

Spare day: Northern Torres Strait seismic lines, discolored water patch for radium Carbonate debris grab sampling, eastern Torres Strait

19 February

Portloch and Ashmore Reef grab sediment sampling, zodiac sampling Large volume radium samples Deep cores from margin of reef platforms

20 February

0000 Steam for Cairns, 52 hours

22 February

Arrive Cairns, unload samples and gear to containers for shipment

Piggy-back Projects (if any)

Samples will be taken for many TROPICS collaborators who failed to obtain Franklin ship time. Approximately 20 collaborators not on the ship will receive samples from our work. This will not greatly alter our cruise plan or time estimates. ADCP data across the Solomon Sea, and one CTD station in the Goodenough Basin, will be obtained for Drs. Cresswell and Binns of CSIRO.

Franklin Equipment

CTD with fluorometer and turbidity sensor Niskin Bottles (large) on Rosette ADCP and experienced operator (data for George Cresswell) Hydrowinch Main winch Hydrolab benches for core cutting Below deck Lab benches, fume hood, fridge, freezer Gimbaled platform in chemistry lab (for small centrifuge) Smith-MacIntyre Grab sampler (for spare) Hydrolab bench tables for chemical measurements. General Purpose lab for chemical measurements on sediment samples Zodiac for shallow reef lagoon sampling Aft A Frame main block moveable off centreline: Kasten corer to port, Box corer to starboard at the transom.

User Equipment

AIMS Kasten Corer, rails and dolly, spare corer head and weights Core slicing table, 8 square core tubes on rack University of Washington Kasten Corer, 3 square core tubes University of Washington Box corer, 3 boxes University of Washington Gafenhoto (tripod profiler for turbidity, Currents, nepheloid benthic layer, fluid mud flow) University of Washington Benthic Lander (released on bottom for 5-7 days) Smith-MacIntyre Grab sampler (weighted), sieve table for benthos sorting Water pumps, plastic barrels, and hoses (for cubic meter volume samples of water) Natural seawater radionuclide extraction system, radium counting system Seismic equipment and computers X-ray machine for sediment slabs, lead shielding cage Centrifuges, sediment pore water squeezers

Laboratory equipment, sample containers, laptops

Personnel List (Alternate names are spare personnel, in case of sickness)

Gregg Brunskill, AIMS, Chief Scientist Irena Zagorskis, AIMS, Sediment core processing, porewater John Pfitzner, AIMS, radiochemist, coring, porewater Charles Nittrouer, University of Washington, coring Richard Sternberg, UW, gaffenhotto, fluid mud layers John P. Walsh, University of Washington, coring Beth Mullenbach, UW Andrea Ogston, UW Robert Aller, State University of New York, benthic chemistry, box coring, grabs Angelos K. Hannides, SUNY, Aller assistant Vanessa Madrid, SUNY, Aller assistant John Milliman, Virginia Institute of Marine Science, seismic profiling Katie Farnsworth, VIMS, Ph.D. student, seismic profiling Dave Mucciarone, VIMS, electronics and computers for seismic work Bob Beattie, CSIRO Cruise Manager Daniel Conwell, CSIRO Electronics and ADCP operator

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

Ships Manager

Figures







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