

CRUISE PLAN

R. V. FRANKLIN

FR14/98

Itinerary

Depart Sydney: 12:00 h 14 November 1998

Arrive Sydney: 15:00 h 27 November 1998

Scientific Programme

The overall programme is to determine and model upwelling processes at the of the East Australian Current off northern NSW, and to determine the effect of this nutrient addition on the growth, condition and size structure of zooplankton and red-tide forming biota. We are targeting the area off Smokey Cape and Laurieton ($30^{\circ} 30$ to $32^{\circ} 30$, from the coast to 500 m isobath) as regions of probable EAC induced upwelling. The actual location of sampling will depend on the activity of the EAC during the week prior to and during the cruise, because we will be examining ephemeral upwelling events that are not yet easily predictable.

Specifically, we wish to

- observe the baroclinic structure of the coastal ocean at sections in the vicinity of Smokey Cape to identify upwelling zones and nutrient uplifting, through a construction of ADCP, CTD and moored instrument data, and
- to examine the changing phytoplankton and zooplankton communities at four regions off northern NSW, and off Sydney which exhibit varying nutrient sources and levels, and to determine the effect on larval fish condition

This is the first of two cruises, the second being FR1/99

Investigators

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Cruise objectives

1. To undertake CTD casts and ADCP profiles along two transects off Smokey Cape and Laurieton (Fig. 1)
2. To deploy three current meter moorings and two thermistor strings along each transect,
3. Night-time biological sampling at two stations (50 m and 70 m isobaths) within four differing oceanographic regimes; north of Smokey Cape (non-upwelled, Region A, 30° 40'), south of Smokey Cape (upwelling, Region B, 31° 00'); Laurieton (2-7 d old upwelled water, Region C, 31° 40'); south of Sydney (Region D, 34° 05', Fig. 2)
4. To sample for red-tide forming phytoplankton in the vicinity of a drifting drogue (at 30 m) over 24 hours (depending on wind and oceanographic conditions), using the CTD, miniBAT, and EZ net.

Biological sampling will generally commence at dusk (20:00 h) at the region nearest to the days physical sampling. Small, light traps will be deployed at the two stations, anchored with a simple sand anchor, marked by a radar reflector /flasher, and will be retrieved at dawn (05:00 h - timing is not crucial). Initially, a CTD profile and miniBAT tow will be conducted at each station, followed by EZ net tows (3 nets, 333 m m mesh) and surface neuston tow at each station. Another CTD profile and miniBAT tow will be conducted, before retrieval of the light traps.

Cruise area

The cruise area is shown in Figures 1 (Smokey Cape) and Fig. 2 (Pt. Hacking).

ORV Equipment required

- All standard systems; especially the profiling CTD system with altimeter and 12 bottle rosette (5 litre and 10 litre bottles) plus profiling fluorometer,
- The XBT system, the ADCP system with operational bottom tracking, scientific sounder, Inmarsat, thermosalinograph, GPS,
- Onboard computing to display preliminary analyses of CTD data and ADCP data,
- Underway fluorometer and autoanalyser,
- Oxygen analysis equipment: Automated Winkler titration
- Boom for surface net deployment,
- The EZ net plus associated CTD system and winch,
- Container lab. for formalin work.
- Inductive salinometer: Yeokal model 602II
- MET station

Autoanalyser to analyse for low level nutrients (NO_x, P, Si, DO₂, Temperature /Salinity).

We will also require a large storage space and clear deck area for mooring work and EZ net

Deck area to mount the 12 volt miniBAT winch (size of a small arm-chair), and an area to deploy the miniBAT (weight 20 kg), out of the mooring deployment. Possibly on the rear starboard side.

Deck hose on foredeck for larval fish maintenance, and deck hose on aft deck (when not required for other purposes) for continuous filtration of fine zooplankton (100-300 m m mesh).

Time estimates

Nov. 1412:00 Depart Sydney, begin CTD transect off Pt. Hacking, and then commence biological sampling at Region D

Nov. 15 06:00 Depart for Laurieton,

Nov. 16 06:00 arrive off Laurieton, deploy moorings (day), conduct CTD transects as appropriate, and where possible, at night, conduct light trap sampling and miniBAT profiles in any of the Regions (no EZ net).

Nov. 17 Deploy moorings, conduct CTDs etc as above

Nov. 18 Deploy moorings, conduct CTDs etc as above

Nov. 19 Detailed CTD and ADCP profiles, prepare/practice EZ net.

Nov. 20 Detailed CTD and ADCP profiles

Nov. 21 Day, CTD

Night, Biological sampling

Nov. 22 Day, CTD

Night, Biological sampling

Nov. 23 Day, CTD

Night, Biological sampling

Nov. 24 24 h drift station in the vicinity of *Noctiluca* concentrations (red-tide forming phytoplankton)

Nov. 25

18:00 depart for Sydney

Nov. 26 steaming for Sydney

18:00, arrive off Pt. Hacking, night biological sampling at Region D,

Nov. 27 06:00 CTD transect off Pt. Hacking,

Arrive Sydney 15:00

Personnel

Jason Middleton (Cruise Leader)

Greg Nippard (moorings, ADCP, EZ net)

Moninya Roughan (CTD, ADCP, EZ net)

TBA

TBA

Iain Suthers (EZ net, miniBAT, CTD)

Richard Piola (moorings, miniBAT, EZ net, CTD)

Jocelyn Dela Cruz (moorings, miniBAT, EZ net, CTD)

Augy Syahailatua (moorings, miniBAT, EZ net, CTD)

David Terhell CSIRO ORV Cruise Manager (data analysis/Autoanalyser chemist)

Erik Madsen CSIRO ORV (Electronics technician)

Bernadette Heaney CSIRO ORV (Computing specialist)

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

Dr Nan Bray,

Chief,

CSIRO Division of Marine Research

