CRUISE PLAN

R.V. FRANKLIN

FR 01/99

Itinerary

Depart Brisbane 1200 hrs 20 January, 1999

Arrive Brisbane 0900 hrs 04 February, 1999

Title

Continental Shelf Processes and their Effects on Plankton Condition and Size Structure

Principal Investigators

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Scientific Program

This cruise is the second of two, the first being FR 14/98, undertaken from 14 to 27 November, 1998.

The overall program is to determine and model upwelling processes of the East Australia Current (EAC) off Northern NSW, and to determine the effect of the nutrient supply on the growth, condition and size structure of zooplankton and red-tide forming biota. The area from Smoky Cape to Laurieton (30 30S to 32 30S), and from the coast to the 500m isobath, is the prime area of interest. With the cruise originating in Brisbane, we will take the opportunity to observe the shelf-sea response to the EAC north of our main area.

Specifically, we plan to:

- Measure the baroclinic structure of the coastal currents at a range of locations off the Northern NSW shelf, and, together with data acquired by current meters to be retrieved from this cruise, identify the key processes responsible for upwelling.

- Sample the phytoplankton and zooplankton communities at each of these locations, as well as the larval fish condition.
- Determine the overall effects of the physical environment on the production of nutrients, and the subsequent development of the food chain to the stage of larval fish.

Cruise Objectives

- To pick up current meter moorings deployed in November at the Smoky Cape and Diamond Head sections.
- To repeat CTD sections at Urunga, Smoky Cape, Point Plomer and Diamond Head from the coast to 1000m.

- To undertake CTD sections at North Solitary Island (as well as a short survey of the wake behind the island), Cape Byron, Cape Moreton and Double Island Point.
- To undertake nightime sampling at each of the CTD sections at the 50m and 100m isobaths with the EZ net, with a neuston net, and for plankton with filtered samples from Niskin bottles.
- To undertake Minibat tows at the above locations to relate particle size to samples collected.

Biological sampling will generally be undertaken during the night and CTD sections generally during the day. Some CTD sections will be taken at night while some biological sampling will be undertaken during the day.

ORV Equipment required

- All standard systems, especially the CTD system with fluorometer, altimeter and 12 bottle rosette (5 litre and 10 litre bottles)

- The ADCP system with operational bottom tracking, scientific sounder and GPS

- Onboard computing to log and display results

- Underway temperature, salinity and fluorometer system

- Inductive salinometer and oxygen titration system for calibration

- Autoanalyser for nutrient determination
- Towing winch for mooring retrieval
- Pyrogeometer and pyranometer

- Boom for surface net deployment

- EZ net, associated CTD system and winch
- Meteorological station and radiation sensors
- Deck lab for formalin work
- Hydro-wire and three 40 litre Niskin bottles.

We will be looking to recover current meter moorings, and although all have acoustic releases, there may be some need to use the towing winch and a grapnel.

As we will be using the EZ net, we will a need a relatively clear afterdeck area. In addition we will be requiring to mount the Minibat winch on the starboard side of the afterdeck.

A deck hose for EZ net and surface neuston net maintenance is required for the afterdeck.

Time Estimates

20 JanuaryDepart Brisbane, transit enroute to Urunga (30 30S), conducting a practice CTD when possible.

21 January Arrive at Urunga section about 1000, and begin a CTD section from 25m depth to 500m depth. Conduct an ADCP transect back toward shore arriving at dusk. Undertake night biosampling to 0400.

22 JanuaryAt 0400 transit to the Smoky Cape section, and begin a CTD section working out from the 25m contour. Conduct an ADCP transect back toward shore. Undertake night biosampling to 0400.

23 January At 0400 transit to the Point Plomer section, and begin a CTD section working out from the 25m contour. Conduct an ADCP transect back toward shore. Undertake night biosampling with surface net, Minibat and CTD to 0400.

24 January At 0400 transit to the Diamond Head section, and begin a CTD section working out from the 25m contour. Conduct an ADCP transect back toward shore. Undertake night biosampling with surface net, Minibat and CTD to 0400.

25 January Retrieve moorings from the Diamond Head section at 150m, and 95m depths. Undertake night biosampling with surface net, Minibat and CTD to 0400.

26 & 27 January Retrieve remaining Diamond Head moorings from 50m and 30m depths. Conduct an ADCP section from the coast to 500m depth.

28 January Transit to Smoky Cape, and retrieve moorings in 50m, 100m and 150m depth. Conduct night biosampling with surface net, Minibat and CTD.

29 January Transit back to Diamond Head or to EAC separation point, and conduct CTD sections during the day at the temperature front, or to the coast, depending on the satellite image. Conduct night biosampling with surface net, Minibat and CTD.

30 January Transit to Point Plomer or to EAC separation point, and conduct CTD sections during the day at the temperature front, or to the coast, depending on the satellite image. Conduct night biosampling with surface net, Minibat and CTD.

31 January Transit to Smoky Cape or to EAC separation point, and conduct CTD sections during the day at the temperature front, or to the coast, depending on the satellite image. Conduct night biosampling with surface net, Minibat and CTD.

1 February Transit to North Solitary Island, and conduct CTD and ADCP survey around the island, and especially in the wake (if it exists). Conduct night biosampling with surface net, Minibat and CTD as possible given the shallow depth.

2 February Complete CTD and ADCP work at North Solitary Island. Conduct night biosampling with surface net, Minibat and CTD as possible.

3 FebruaryConduct CTD section at Byron Bay. Conduct night biosampling with surface net, Minibat and CTD as possible. Depart Byron Bay area around dusk, for Brisbane.

4 FebruaryArrive Brisbane 0900

Personnel

Jason Middleton (Chief Scientist)

Greg Nippard

Moninya Roughan

Ann Marie Wong

TBA

Iain Suthers

Jocelyn Delacruz

Richard Piola

Augy Syahailatua

Mark Underwood(Electronics)

Bob Beattie(Cruise Manager and Computing)

Mark Rayner(Hydrochemistry)

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

Dr Nan Bray

Chief, CSIRO Division of Marine Research

Figure 1, Study areas for FR 2/99, including the area off Byron Bay, North Solitary Island, and the main study area including Urunga, Smoky Cape, Point Plomer and Diamond Head.