

VOYAGE PLAN SS09/2003

Title

Continental shelf processes between Cape Leeuwin and the Arolhos islands during the summer.

Itinerary

Depart Fremantle 1000 hrs, Friday 24 October 2003

Arrive Fremantle 1000 hrs, Sunday 9 November 2003

Principal Investigator

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Scientific Objectives

- To identify the physical and biological processes of the Capes Current, which flows along the south-west Australian continental shelf during the summer and its extension to the region to the north of Rottnest Island terminating at the Arolhos islands.
- To define the effects of topographic features on the Capes Current.
- To investigate the role of the onshore geostrophic flow from the West Australian Current to the Leeuwin Current.
- Subsurface Chlorophyll Maximum (SCM) –determine if there is a consistent SCM on the shelf and under the Leeuwin Current, and the spatial extent of this feature between Arolhos Islands and Cape Leeuwin.
- To assess onshore-offshore and alongshore patterns in the: abundance, diversity and species composition of the zooplankton community.

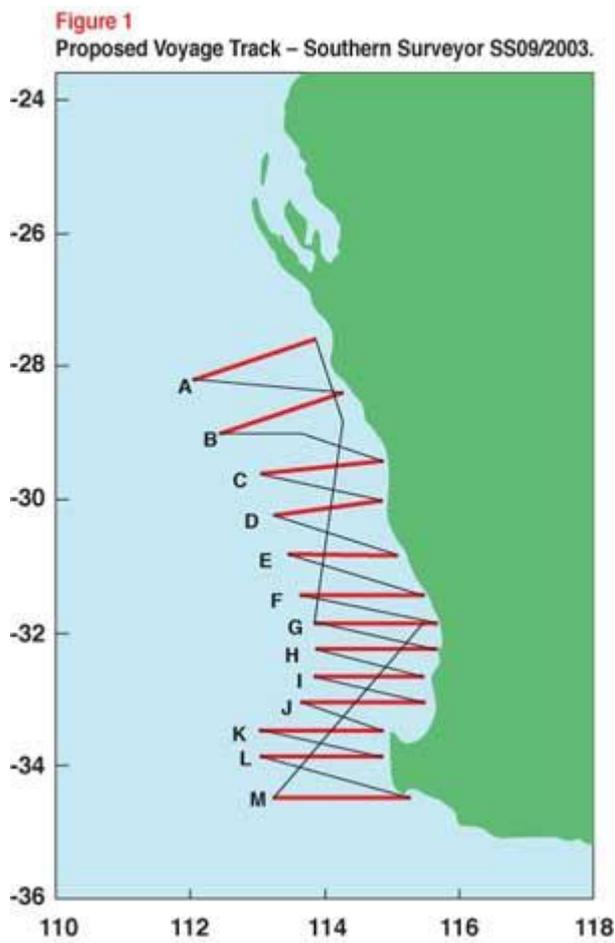
Cruise Objectives

After departing Fremantle, Southern Surveyor will conduct 14 cross-shelf transects (Figure 3) with one transect (G) repeated. For each transect, 10-15 CTD stations will be occupied depending on the shelf width. The transects will extend from the coast (~30 m isobath) to the 1000 m contour. In addition to the standard CTD and fluorescence, nutrient data will also be collected. On alternate transects, oblique zooplankton tows will be taken to a maximum depth of 150 m at the 30, 50, 100, 200 and 1000 m stations. Microzooplankton samples will be obtained from the Niskins at the near-surface and chlorophyll maximum at these stations. The measurement of currents (from the shipborne ADCP) and water properties (temperature, salinity, fluorescence) will enable the mapping of the structure of the continental current systems and the Leeuwin Current.

Process studies (using ADCP measurements and high resolution CTD stations) will be undertaken at two sites: (a) Abrolhos Islands and (b) Rottneest Canyon to examine the fine-scale features of the effect of topography on the currents.

Cruise Track

The cruise will depart Fremantle, undertake a cross-shore transect offshore Hillarys (Transect G). After completing this transect, we will steam north to Abrolhos Islands. The two northern-most cross-shelf transects, Transects A and B, will be completed and then, based on the results of the two initial transects and satellite data, we have allowed for 24 hours to undertake stations and ADCP transects at high resolution to capture flow dynamics around the Abrolhos Island using CTD casts and ADCP. At the conclusion of the intensive studies, Transects C to G will be completed. Based on the data collected from transects G and satellite imagery, we have allowed for 24 hours to undertake stations and ADCP transects at high resolution to capture the circulation and distribution of properties within the Rottneest Canyon. At the conclusion, we shall complete transects H to M and return to Fremantle. The cruise track is given on Figure 1.



Time Estimates

Fremantle to start of transect G (2 hrs @ 11 knots)
transect G – (7 hrs @ 11 knots + 11 hours on station)
transect G to start of transect A – (20 hrs @ 11 knots)
transect A – (7 hrs @ 11 knots + 11 hours on station)
transect A to start of transect B – (5 hrs @ 11 knots)
transect B – (5 hrs @ 11 knots + 11 hours on station)
Intensive studies off Abrolhos Islands – (24 hours)
Abrolhos Islands to start of transect C – (3 hrs @ 11 knots)
transect C – (6 hrs @ 11 knots + 11 hours on station)
transect C to start of transect D – (5 hrs @ 11 knots)
transect D – (6 hrs @ 11 knots + 11 hours on station)
transect D to start of transect E – (5 hrs @ 11 knots)
transect E – (5 hrs @ 11 knots + 11 hours on station)
transect E to start of transect F – (5 hrs @ 11 knots)
transect F – (5 hrs @ 11 knots + 11 hours on station)
transect F to start of transect G – (4 hrs @ 11 knots)
transect G – (5 hrs @ 11 knots + 11 hours on station)
Intensive studies off Rottnest Island/Canyon – (24 hours)
Rottnest Island to start of transect H – (2 hrs @ 11 knots)
transect H – (5 hrs @ 11 knots + 11 hours on station)
transect H to start of transect I – (6 hrs @ 11 knots)
transect I – (5 hrs @ 11 knots + 11 hours on station)
transect I to start of transect J – (7 hrs @ 11 knots)
transect J – (6 hrs @ 11 knots + 11 hours on station)
transect J to start of transect K – (7 hrs @ 11 knots)
transect K – (8 hrs @ 11 knots + 12 hours on station)
transect K to start of transect L – (7 hrs @ 11 knots)
transect L – (6 hrs @ 11 knots + 11 hours on station)
transect L to start of transect M – (6 hrs @ 11 knots)
transect M – (7 hrs @ 11 knots + 12 hours on station)
transect M to Fremantle – (16 hrs @ 11 knots)

Transit time: 183 hours

On station: 156 hours

Process studies: 32 hours

Contingency: 13 hours

TOTAL 384 hours = 16 days

Piggy-back Projects (if any)

None

Southern Surveyor Equipment

- Navigational: GPS, DGPS (where possible)
- Sounder
- Meteorological sensors
- Thermosalinograph with underway fluorometer, oxygen
- ADCP
- XBT
- CTD with Oxygen, Transmissometer, Fluorescence, Light sensors, Altimeter
- Rosette: 24 x 5L Niskins (with spares)

- Hydrographic sample analyses: salinity, oxygen, nitrate, silicate and phosphate
- Milli-Q water supply
- Colour printer, laser printer, unix computers
- Scintillation Counter
- General Purpose Laboratory for 14C work
- Running seawater on the back deck (deck hoses fine)

User Equipment

- Turner Designs Fluorometer
- Incubation racks
- Bongo nets

Personnel List

Charitha Pattiaratchi	CWR/UWA	Chief Scientist/Physical Oceanography
Will Schroeder	University of Alabama	Physical Oceanography
Susan Rennie	CWR/UWA	Physical Oceanography
Florence Verspecht	CWR/UWA	Physical/Biological Oceanography
Joanne O'Callaghan	CWR/UWA	Physical Oceanography
Luke Twomey	CWR/UWA	Biological Oceanography
Vanessa Pez	CWR/UWA	Biological Oceanography
Tony Koslow	CMR	Zooplankton
Bob Beattie	CMR	Computing/Voyage Manager
Lindsay MacDonald	CMR	Electronics
Kate Berry	ORV	Hydrochemistry
Rebecca Cowley	ORV	Hydrochemistry

This voyage plan is in accordance with the directions of the National Facility Steering Committee for the Research Vessel Southern Surveyor.

C Pattiaratchi
Chief Scientist