

CRUISE REPORT SS 3/94

May 18–May 31 1994
HOBART TO SYDNEY
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DIVISION OF FISHERIES

ITINERARY

Departed Hobart 0800 h Tuesday, 18 May 1994

Arrived Sydney 1300 h Tuesday, 31 May 1994

AREA OF OPERATION:

Oceanic and shelf waters off eastern Tasmania in the area of the Japanese longline fishery and the Hippolyte Rocks (Fig. 1).

CRUISE OBJECTIVES:

1. Describe the physical oceanography around the Hippolyte Rocks area off eastern Tasmania, using CTD casts to just above the bottom. This work will be timed to coincide with the release of archival tags in the area.
2. Complete a study of the species composition of the midwater and zooplankton fauna around the Hippolyte Rocks.
3. Map the physical oceanography of the area east of Tasmania in which the winter Japanese longline fishery operates.
4. Investigate the biological production in these waters in relation to the main water masses, using CTD casts and a grid of zooplankton trawls.
5. Complete comparisons of the day-night vertical distribution of the micronekton in these waters.
6. Liaise with inshore fishermen and longliners to collect stomachs of tuna. The tuna prey will be compared with net captures.

SECONDARY OBJECTIVES:

1. Continue investigations of the distribution of ichthyoplankton in relation to the main water masses off eastern Tasmania.
2. Conduct a health and safety audit of the scientific facilities on board *Southern Surveyor* during normal scientific operations.
3. Deploy an array of archival tags to examine the effect of depth on light levels at sunrise and sunset at two different latitudes.

RESULTS:

1. Two hydrographic transects were completed off eastern Tasmania; one to the east, and one along the shelf between the Hippolyte Rocks and Maria Island (Fig. 1) (Appendix 1). These transects were made up of CTD casts to 1000 m, replicate drop nets and surface nets. The northward transect was only partly completed.
2. In all, 5 grids of zooplankton tows were completed with the bongo net. Each tow was accompanied by a surface net. Although we initially set a target of three grids of 30 tows, bad weather forced us to reduce this number to about 15. However, the variation in biomass between samples was low. A bonus of this change in plan was that we were also

able to complete a larger number of grids over a wider area. Acoustic data from the EK 500 were collected continuously at frequencies of 38 and 120 KHz.

3. At these same sites, replicate tows with the midwater trawl net were made at night. Although we were unable to complete a day/night comparison of midwater trawl catches, one daytime trawl was made.
4. A health and safety audit was completed during the cruise. A report will be lodged with the OIC, Hobart and the ship's master.
5. Surface plankton samples were completed for the larval fish group on route to Sydney.

CRUISE NARRATIVE

FRV *Southern Surveyor* left Hobart at 0830 h on 18 May 1994 to begin the last in a series of cruises to study the physical and biological oceanography of the waters of the southern bluefin tuna longline fishery off eastern Tasmania.

Work began at 1300 h with a CTD transect between the Hippolyte Rocks and Maria Island along the 100 m depth contour. This work continued through the night in very cold and windy weather, but with little interruption. We completed one tow with the midwater trawl at midnight just off the shelf over "Darcys patch". The Hippolyte transect continued through the night in rising winds.

Diary entry: May 19, Wind strength 20 – 30 knots from NW, low swell, cloudy

Once the Hippolyte work was finished we continued northward to 42°S to begin the main eastward transect (Fig. 1). At 1830 h we arrived at latitude 42°S at the 1000 m depth contour and began this transect. The CTD transect was continued through the night and the next day. A progressive contour plot of temperature versus depth showed we were moving into the East Australian Current (Fig. 2). The transect was completed in very good weather, although this was not to last. We were now ready to steam SW to begin the first of the zooplankton grids in colder water to the south.

We steamed south overnight to 44°S into cold water (surface temperature <13°C) and began the first bongo grid (site 1, Fig. 1) in the morning in overcast NW conditions. The swell had begun to rise but we completed 10 plankton tows without incident. However, by late afternoon the weather had deteriorated so work was halted. This first cold water site was abandoned soon after with the arrival of a SW change with winds gusting to 60 knots and a 3 to 4 m swell. We therefore began steaming into the coast in the hope of continuing work in the lee of the Tasmanian coastline.

May 22, Wind strength 40 – 60 knots from SW, moderate swell, overcast

We steamed through the night in a NW direction to about 30 miles off the coast. The wind had swung back to the NW so we were partly protected by the land and were able to continue the work. At 0600 h we completed a CTD and then began a new cold-water grid (site 2, Fig. 1). The winds remained constant at between 30 and 40 knots, but as the swell was only 2 m, we

were able to work efficiently through the day. We had found previously that by heading into the prevailing conditions we could work in up to 40 knots of wind and a swell of about 3 m. We completed 12 bongos in 2 rows of 6 before dusk. The wind continued at between 35 and 40 knots but we were sufficiently protected from the swell to begin trawling after dinner. Oblique midwater trawls to 400 m were interspersed with bongos to 200 m through the night. We then returned to the shelf to complete a grid of bongos. At 1600 h, we left the Hippolytes to take on water in Hobart. We arrived at 2000 h, 23 May.

We sailed from Hobart the next morning (0800 h) and by mid-afternoon were positioned to begin the northward transect with a CTD to 1000 m. We headed on a course of 035° and planned CTD at 30 n.miles between the zooplankton grids. We had hoped to deploy the array of archival tags, as the weather was calm, but did not do so because gale force winds were forecast. By the next morning we were ready to begin the next series of bongo tows — this time in frontal waters (surface temperature 14–16°C). Sampling continued during the morning in rising winds. By midday the wind had swung to the north-west and risen to 35 knots but the sea remained small enough to continue the bongo grid. Bongo tows were continued through the afternoon, and by the end of the day 16 bongo tows had been completed. The weather eased to 20 knots after dinner and we began trawling. One trawl was completed before the wind returned — 50 knots then average 40 knots — which stopped any further work that night.

May 26, Wind strength 40 – 55 knots from NW, heavy swell, overcast

We hove to all night and the next day in 40 to 60 knot north-westerly winds and a 5 to 8 m swell. We headed slowly toward the shelter of the Tasmanian coastline and made the lee of Eddystone Point on nightfall. The wind was still ferocious on May 27, but by the following afternoon had eased slightly. We left shelter that evening and headed north under the lee of Flinders Island. We continued sheltering behind Babel Island as the wind had not eased. The wind finally abated, so we headed east in the hope of picking up the warm station before heading to Sydney Harbour.

Night weather very calm 3/4 moon, very little wind, good spirits.

We arrived at the warm-water site (surface temperature > 16°C) at 0200 h, 29 May and began trawling. The weather was reasonable but the swell was still quite lumpy. We completed one midwater trawl followed by a CTD. At 0730 h we began a set of bongos in rising winds. Fortunately, we were able to continue working through the day. At dark we deployed the midwater trawl in which, apart from the usual combinations of small fish and crustacea, we caught a very large sunfish. After much manoeuvring, we were able to return it to the sea. We continued fishing until midnight in the calmest conditions of the trip. With most, but not all, objectives met we headed for Green Cape and Sydney Harbour. On route we completed surface tows at 30 n.mile intervals for the Larval Fish Group. We arrived at Garden Island Naval Wharf at 1300 h on 31 May 1994.

SUMMARY

Continuing north-westerly gales (and two storms) meant that not all objectives could be met. The archival tags could not be deployed and the northward CTD transect was not completed. The day/night comparison with the midwater trawl was also not completed. However, we were able to complete 70 tows with the bongo and surface nets, and 11 midwater trawl tows at 5 different locations. We also completed two CTD transects (totalling 27 CTD casts) to add to our work from previous years off eastern Tasmania.

REPORTING

With the completion of this cruise we are now ready to complete laboratory analyses and prepare the data for publication. The results from the past three years will be combined, along with feeding data that was collected concurrently, to provide input into our understanding of what factors affect the distribution of southern bluefin tuna off eastern Tasmania.

PERSONNEL

(Note: unless indicated otherwise, all personnel are staff of the CSIRO Division of Fisheries)

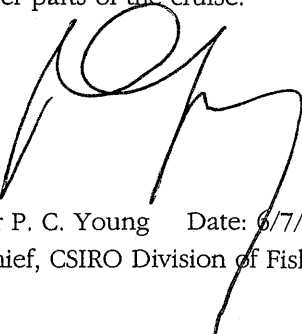
Mr Jock Young (Cruise leader)
Dr Clive Stanley (Assistant cruise leader)
Mr Russell Bradford
Mr Duyet Le
Ms Caroline Langley
Mr Lindsay McDonald
Mr Les Drury

Mr Dave Wright
Mr Tim Lamb
Ms Caroline Sutton
Mr Jeff Stander
Mr Jeff Cordell
Mr Mark Rayner (CSIRO Division
of Oceanography)

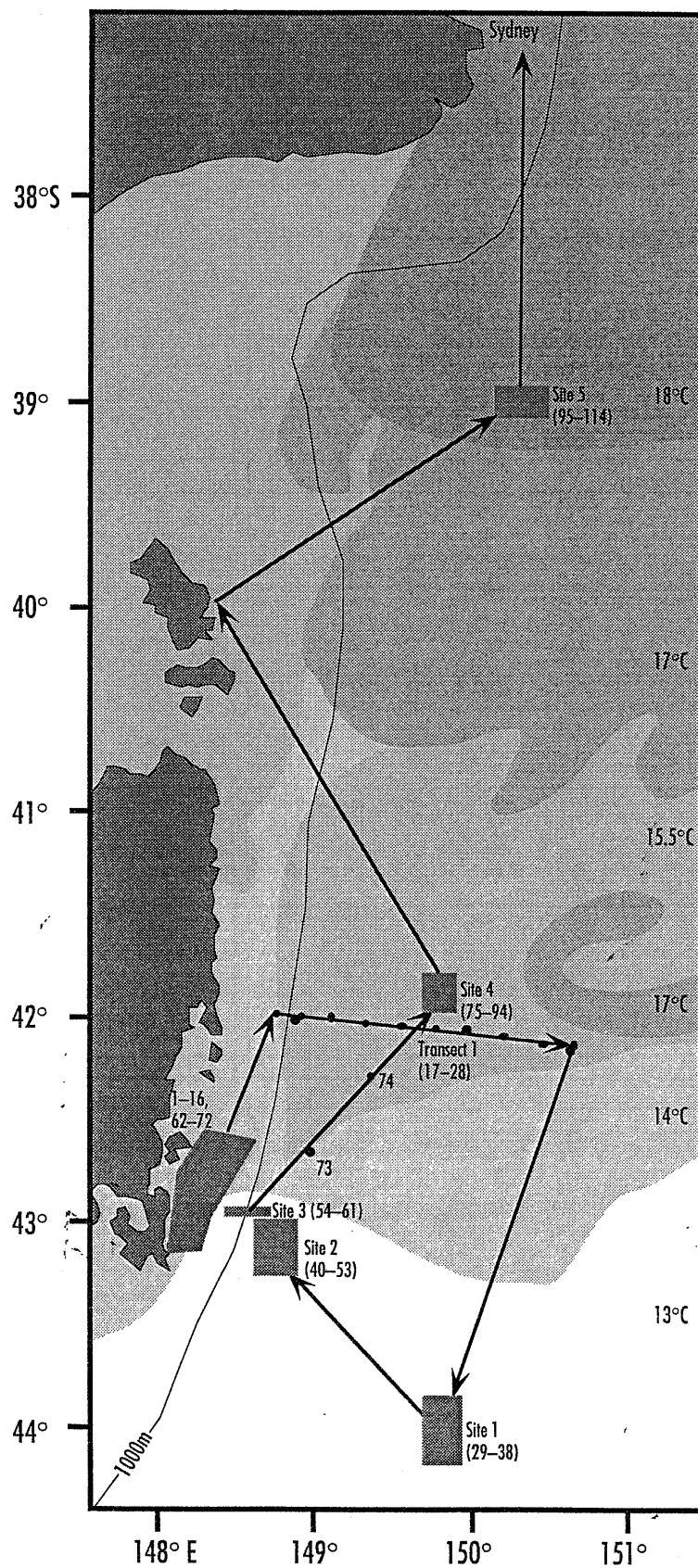
ACKNOWLEDGEMENTS

I would like to thank the skipper Bruce Wallis, fishing master Roger Pepper, second mate Ross Davey and crew of FRV *Southern Surveyor* for their effort and enthusiasm during the cruise. I would also like to thank the CSIRO personnel on this cruise, not only for their efforts but also for maintaining their humour during the wilder parts of the cruise.

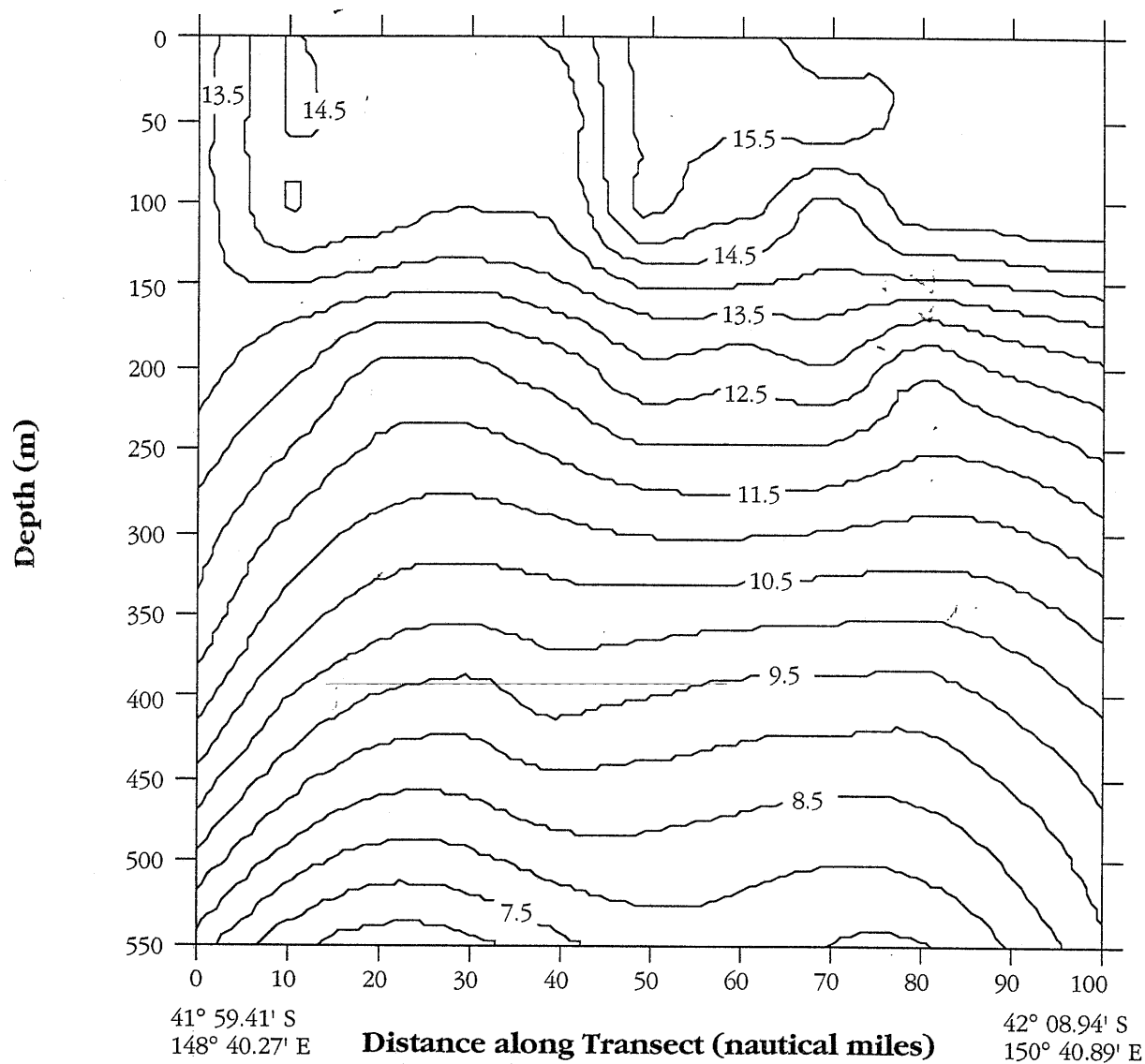
Mr Jock Young
Cruise leader



Dr P. C. Young Date: 6/7/1994
Chief, CSIRO Division of Fisheries

**FIGURE 1.**

Map of the study area and station positions for cruise SS 3/94 (18 May–01 June 1994), with approximate sea surface temperatures from NOAA II satellite imagery.

**FIGURE 2.**

Temperature (°C) contour plot along the main eastward transect of cruise SS 3/94 (18 May–01 June 1994).

APPENDIX 1:

Station positions and activities completed during cruise SS 3/94

(B = Bongo net; DN = Drop net; S = Surface net)

Ship's Station	Date	Local Time (h)	Latitude (S)	Longitude (E)	Activity	*Temperature (°C)
1	18/5/94	13:30	43°06.30'	148°02.80'	CTD, DN	
2	18/5/94	15:30	42°40.30'	148°13.50'	B, S	
3	18/5/94	17:30	42°53.10'	148°08.70'	CTD, DN	
4	18/5/94	18:20	42°52.70'	148°10.70'	B, S	
5	18/5/94	20:30	42°40.60'	148°13.70'	CTD, DN	
6	18/5/94	20:45	42°40.10'	148°15.00'	B, S	
7	18/5/94	21:50	42°36.70'	148°22.40'	CTD, DN	
8	18/5/94	22:30	42°36.20'	148°23.20'	B, S	
9	18/5/94	0:00	42°38.10'	148°31.90'	MIDOC	14.46
10	19/5/94	4:10	42°49.39'	148°17.21'	CTD, DN	14.46
11	19/5/94	5:30	42°48.71'	148°16.72'	S	14.46
12	19/5/94	6:30	42°59.30'	148°13.08'	CTD, DN	14.46
13	19/5/94	7:20	42°58.05'	148°13.62'	S	14.46
14	19/5/94	9:25	43°08.55'	148°10.17'	CTD, DN	14.46
15	19/5/94	10:20	43°06.47'	148°11.61'	S	14.46
16	19/5/94	12:00	43°06.35'	148°03.36'	CTD, DN	14.46
17	19/5/94	12:30	41°59.41'	148°40.27'	CTD	13.39
18	19/5/94	8:20	42°01.39'	148°53.74'	CTD	14.54
19	19/5/94	21:30	42°00.09'	148°54.79'	S	14.79
20	20/5/94	0:30	42°00.86'	149°06.86'	CTD, DN, S	14.64
21	20/5/94	3:25	42°03.22'	149°19.71'	CTD, DN, S	14.38
22	20/5/94	5:55	42°03.89'	149°32.49'	CTD, DN, S	15.42
23	20/5/94	8:50	42°04.50'	149°46.01'	CTD, DN, S	16.05
24	20/5/94	14:30	42°05.69'	149°59.81'	CTD, DN, S	15.94
25	20/5/94	16:30	42°06.81'	150°12.75'	CTD, DN, S	15.87
26	20/5/94	19:00	42°07.96'	150°27.34'	CTD, DN, S	15.91
27	20/5/94	22:15	42°08.94'	150°40.89'	CTD, DN, S	15.84
28	20/5/94	23:55	42°10.65'	150°40.41'	Bottle Test	15.92
29	21/5/94	9:35	43°56.00'	149°53.20'	B, S	
30	21/5/94	10:26	43°58.70'	149°51.90'	B, S	
31	21/5/94	11:35	44°00.00'	149°51.90'	B, S	
32	21/5/94	12:00	44°02.10'	149°51.50'	B, S	
33	21/5/94	12:59	44°05.39'	149°50.63'	B, S	13.40
34	21/5/94	14:15	44°06.27'	149°50.63'	B, S	13.39

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35	21/5/94	14:23	44°07.12'	149°47.00'	B, S	13.42
36	21/5/94	14:50	44°05.31'	149°47.43'	B, S	13.41
37	21/5/94	15:18	44°03.67'	149°47.98'	B, S	13.40
38	21/5/94	15:48	44°02.04'	149°48.46'	B, S	13.41
39	Tow aborted					
40	22/5/94	5:00	43°09.70'	148°52.34'	CTD, DN, S	13.44
41	22/5/94	8:30	43°07.16'	148°49.72'	B, S	13.36
42	22/5/94	9:11	43°06.51'	148°48.60'	B, S	13.37
43	22/5/94	9:40	43°05.86'	148°47.60'	B, S	13.51
44	22/5/94	10:08	43°04.88'	148°46.05'	B, S	14.16
45	22/5/94	10:33	43°03.89'	148°44.82'	B, S	14.53
46	22/5/94	11:02	43°02.91'	148°43.54'	B, S	14.48
47	22/5/94	13:08	43°12.75'	148°52.13'	B, S	12.66
48	22/5/94	13:30	43°10.99'	148°49.29'	B	13.35
49	22/5/94	14:03	43°10.40'	148°48.20'	B	
50	22/5/94	14:34	43°09.40'	148°36.10'	B	
51	22/5/94	15:05	43°08.40'	148°44.10'	B	
52	22/5/94	15:15	43°06.87'	148°41.63'	B	13.81
53	22/5/94	15:45	43°06.10'	148°40.52'	B	13.98
54	22/5/94	18:32	43°00.84'	148°28.19'	MIDOC	13.39
55	22/5/94	20:20	42°59.88'	148°34.20'	B	13.52
56	22/5/94	20:47	42°59.40'	148°31.51'	MIDOC	13.53
57	22/5/94	22:25	42°59.00'	148°36.90'	B	
58	23/5/94	0:01	42°58.36'	148°31.55'	MIDOC	13.56
59	23/5/94	1:50	42°58.85'	148°37.74'	B, S	13.86
60	23/5/94	2:55	42°58.95'	148°35.08'	MIDOC	13.56
61	23/5/94	4:40	42°58.14'	148°42.36'	B, S	14.13
62	23/5/94	7:30	42°36.28'	148°23.11'	CTD, DN, S	13.74
63	23/5/94	8:30	42°37.99'	148°22.01'	B, S	13.70
64	23/5/94	9:02	42°38.35'	148°21.79'	B, S	13.62
65	23/5/94	9:28	42°39.46'	148°21.06'	B, S	13.65
66	23/5/94	9:53	42°40.86'	148°20.26'	B, S	13.65
67	23/5/94	10:23	42°41.40'	148°19.43'	B, S	13.71
68	23/5/94	11:30	42°48.86'	148°17.72'	CTD, DN, S	13.79
69	Tow aborted					
70	23/5/94	14:35	43°06.83'	148°04.04'	CTD, DN	13.71
71	23/5/94	15:05	43°08.39'	148°05.70'	B, S	13.71
72	23/5/94	15:28	43°09.81'	148°05.61'	B, S	13.74
73	24/5/94	16:30	42°40.10'	148°59.89'	CTD, DN, S	14.71
74	24/5/94	20:30	42°18.14'	149°22.82'	CTD, DN, S	15.58
75	25/5/94	0:40	41°49.94'	149°50.19'	CTD, DN, S	15.88

76	25/5/94	2:20	41°51.06'	149°49.99'	B, S	15.83
77	25/5/94	3:00	41°51.08'	149°49.43'	MIDOC, S	15.86
78	25/5/94	7:36	41°50.25'	149°49.78'	B, S	15.99
79	25/5/94	8:05	41°51.63'	149°50.04'	B, S	15.97
80	25/5/94	8:31	41°52.84'	149°50.39'	B, S	16.00
81	25/5/94	8:59	41°54.10'	149°50.71'	B, S	16.01
82	25/5/94	9:26	41°55.17'	149°51.29'	B, S	16.01
83	25/5/94	10:23	41°56.39'	149°48.35'	B, S	16.07
84	25/5/94	10:51	41°55.10'	149°48.67'	B, S	15.89
85	25/5/94	11:16	41°53.85'	149°48.95'	B, S	15.89
86	25/5/94	11:43	41°52.50'	149°49.20'	B, S	15.88
87	25/5/94	12:10	41°50.88'	149°49.52'	B, S	15.84
88	25/5/94	13:13	41°49.67'	149°46.77'	B, S	15.82
89	25/5/94	13:40	41°51.02'	149°47.03'	B, S	15.83
90	25/5/94	14:04	41°52.26'	149°47.24'	B, S	15.77
91	25/5/94	14:34	41°53.61'	149°47.46'	B, S	15.79
92	25/5/94	14:56	41°54.78'	149°47.31'	B, S	15.81
93	25/5/94	16:08	41°51.56'	149°45.60'	B, S	15.71
94	25/5/94	18:30	41°48.66'	149°41.04'	MIDOC, S * 2	15.68
95	29/5/94	2:17	38°54.65'	150°21.75'	MIDOC, S * 2	18.18
96	29/5/94	3:45	38°55.98'	150°27.78'	CTD, DN, S	18.18
97	29/5/94	7:36	38°58.71'	150°29.37'	B, S	18.30
98	29/5/94	8:17	38°58.88'	150°26.87'	B, S	18.18
99	29/5/94	8:44	38°58.91'	150°25.21'	B, S	18.14
100	29/5/94	9:15	38°58.97'	150°23.36'	B, S	18.22
101	29/5/94	9:43	38°59.12'	150°21.84'	B, S	18.23
102	29/5/94	10:46	38°55.86'	150°19.11'	B, S	18.23
103	29/5/94	11:15	38°56.31'	150°17.05'	B, S	18.31
104	29/5/94	11:55	38°56.23'	150°13.67'	B, S	17.29
105	29/5/94	12:19	38°55.63'	150°11.90'	B, S	16.88
106	29/5/94	12:50	38°55.15'	150°10.05'	B, S	16.80
107	29/5/94	13:50	38°56.13'	150°12.25'	MIDOC, S * 4	16.72
108	29/5/94	15:34	38°59.21'	150°18.44'	B, S	17.44
109	29/5/94	16:01	39°00.92'	150°09.15'	B, S	16.74
110	29/5/94	17:48	39°01.27'	150°14.64'	MIDOC, S * 4	17.35
111	29/5/94	19:25	39°01.70'	150°16.78'	B, S	17.19
112	29/5/94	19:58	39°01.70'	150°16.90'	B, S	
113	29/5/94	20:30	39°02.59'	150°19.19'	MIDOC, S * 2	17.99
114	29/5/94	21:56	39°04.05'	150°24.12'	Bongo:	18.18

* Temperature reported is canister temperature (used in salinity calibration) and is approximately 0.5°C higher than sea-surface temperature.