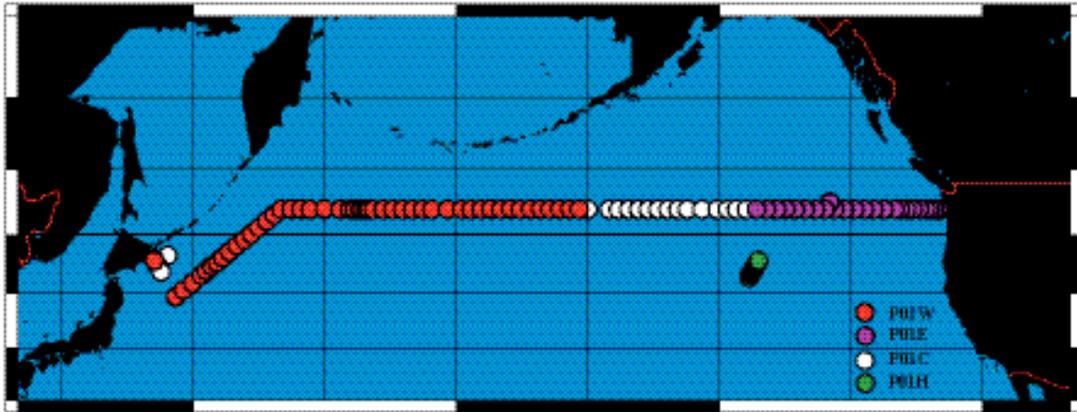


A. CRUISE REPORT: P01E

(Last Update 2008 DEC)

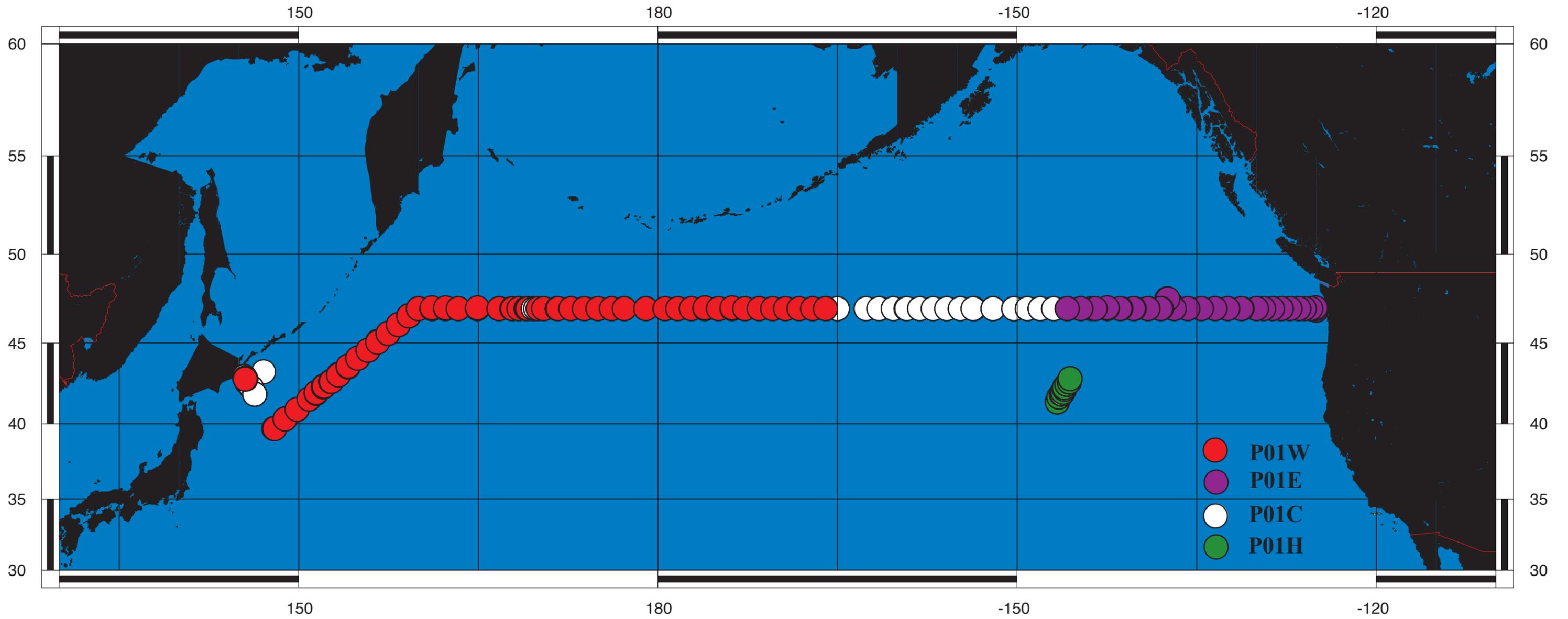


A.1. HIGHLIGHTS

CRUISE SUMMARY INFORMATION

WOCE section designation	P01E		
Expedition designation (EXPOCODE)	18DD199905_1		
Chief Scientist & affiliation	Dr. Ron Perkin/IOS*		
Dates	1999 05 31 - 1999 06 24		
Ship	John P Tully		
Ports of call	Coast of Washington, USA to Victoria, B.C.		
Number of stations	56		
Geographic boundaries of the stations	123° 32.15'W	46° 53.99'N	145° 49.46'W
		48° 31.91'N	
Floats and drifters deployed	0		
Moorings deployed or recovered	1 Deployed, 2 recovered		
Contributing Authors	Elaine Baird (IOS)	Janet Barwell-Clarke (IOS)	
	Michael Lipsen (UBC)	A. Peña (IOS)	
	Ron Perkin (IOS)	Melanie Quenneville (IOS)	
	Cathleen Vestfalls (UBC)		

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(Produced from .sum file by CCHDO)

P1E

I. P1E Project Report

1. **Cruise/Project No.:** 9910
2. **Dates:** May 31 to June 24, 1999
3. **Project Name:** Line P
4. **Area(s) of Operation:** Along 47N from the Washington State coast to 145 W Line P(50N, 145W to 48 34N, 125 30W) Juan de Fuca Strait to Victoria, B.C.
5. **Platform:** John P. Tully
6. **Master:** Bill Noon
7. **Days Allocated:** 25
8. **Days at Sea:** 24
9. **Days lost to weather:** none
10. **Days lost to other causes:** 1 day for loading, 4 days for medical evacuation.
11. **Appropriateness of platform:** very appropriate
12. **Safety issues: (attach narrative if required):**

The ship's drainage system was temporarily blocked resulting in drainage water welling up on the aft deck. The planned dilution of radioactive wastes into the ships drainage system was therefore disallowed due to safety concerns. To avoid problems, all radioactive waste was saved in carboys and disposed over the side in accordance with the permit. If, in future, the sink is to be used for dilution of radioactive wastes, it should have a separate drainage pipe not connected with the ships main drainage system.

13. Cruise/Project Results (see appendix for details):

Nutrient results were mixed between average and low values at the various depths sampled and require detailed analysis. At some stations, low nutrients and iron combined with high chlorophyll or zooplankton levels suggesting that the spring bloom had recently come to an end.

Data Collected:

Rosette/CTD casts for chemical sampling were completed at P4, P12, P16, P20 and P26 and at 24 stations along 47 N latitude(Line P1E). Onboard chemical analyses included salinity, oxygen, nutrients, freons, alkalinity, total CO₂, chlorophyll, dimethyl sulfide, dissolved organic nitrogen. The P1E data will be combined with concurrent Japanese data along 47N spanning the entire Pacific Ocean.

CTD/transmissometry survey was completed at 21 stations along Line P. Primary productivity experiments were carried out at P26, P20, P16, P12 and P4. Iron sampling and analysis were completed at P4, P12, P16, P20 and P26. Primary productivity, Rosette and CTD work was done inside and outside the so-called Haida Eddy, 47 30N, 137 30W.

The P4 and P26 sediment trap moorings were recovered and the P4 mooring was re-deployed.

A mooring to study the re-mineralization of nutrients was recovered at P26.

Free drifting sediment traps were deployed for 2 days at P26.

Underway measurements include PCO₂, temperature, salinity and ADCP profiles.

Net tows for zoo plankton and phytoplankton along Line P were completed.

Sixteen casts of CTD/transmissometry/fluometry/PAR casts were done the Straits of Juan de Fuca to aid another DFO science program.

A freon profile in Saanich Inlet was taken as part of an on-going monitoring program.

Halo-acetic acid was profiled at P20 and at the surface at major line P stations.

A barrel of particulate blank water was obtained at P19.

Net tows were done at the ecological monitoring buoy in Saanich Inlet, off Sombrio Point and off Sooke.

14. **Primary Institute:** Institute of Ocean Sciences, DFO

15. **Associated Institutes:** UBC

16. **Chief Scientist/Affiliation:** Ron Perkin, IOS (Ocean Sciences and Productivity)

17. **Science Staff/Affiliations:**

Ron Perkin	IOS	Janet Barwell-Clarke	IOS
Elaine Baird	IOS	Angelica Pena	IOS
Vince Coronini	IOS	Nes Sutherland	IOS contract
Marty Davelaar	IOS	Melanie Quenneville	IOS contract
Wendy Richardson	IOS		
Tim Soutar	IOS	Hugh Maclean	UBC
Darren Tuele	IOS	Michael Lipsen	UBC
Marie Robert	IOS	Cathleen Vestfalls	UBC
Michael Arychuk	IOS	Michael Bentley	Bird survey

18. **Equipment:**

Sail: no **ADCP:** yes **Other:** sounder

Winches:

type	ID No	Wire type	Wire Condition/Spooling	No Casts/ Depth max
329 CTD	1579	5350 m CTD	good	70/4790
329 CTD	1307	3000 m CTD	Not used	0
310 hydro	1082	5400.m 5/32"	good	70/1000 m
331 work	1231	2500 m 1/2"	not used	0
329 work	1579	Bare drum	good	5/mooring
455 Spooling	1451	mooring	good	5/mooring

Equipment Deployed/recovered

Description	Deployment	Recovery
Free drifting traps, 1000 m	June 11	June 13
Re-mineralization Mooring		June 11
Sediment Trap mooring at P26		June 12
Sediment Trap Mooring at P4	June 22	June 22
AR Mooring (UBC)		not recovered

19. **Comments and recommendations:**

See "Safety Issues" regarding the lab sink drains.

The salinometer should be installed in a room with good temperature control in order to achieve the necessary precision for this instrument. The WOCE manual(Report 68/91) shows that for the Guildline Autosal models, each 1°C change in room temperature results in an error of .001 in salinity determinations. With so much traffic from the lab to the aft deck, cold outside air frequently sends the lab temperature into wild fluctuations and, although the

Portasal may be somewhat less sensitive than the Autosal, it cannot produce WOCE quality data in conditions like that. This was demonstrated with the frequent re-standardizations necessary on this Mission where the outside temperature was often more than 10C colder than normal room temperature.

It should be cleared up as to who is now responsible for the maintenance of the sounder equipment. The control panel for the depth sounder in the lab has developed an intermittent fault in the menu selection joystick and it should be fixed before it becomes a major problem. At present, the depth sounder is needed to detect the proximity of the Rosette to the bottom.

On occasion, the heave compensator was reported to have lost pressure between stations. However, the following cruise(Mission 99-16) reported that there was no pressure loss. This is something that should be monitored on subsequent missions.

The science radios are gradually being replaced as money becomes available. This process should be accelerated as a number of radio failures were reported.

Appendix: Reports from Participants

I. Cruise Narrative

Ron Perkin (IOS)

Departure day, June 1, was taken up largely by work in Saanich Inlet including two anchor installations, a net tow and a freon profile aided by Dave Wisegarver from PMEL in Seattle. After passing through the underway stations in the Straits of Juan de Fuca, the ship sailed directly to the Washington State end of the P1E line along 47N latitude. Intensive sampling to the bottom and on-board analysis proceeded to station P1E100 where the cruise took a brief detour to the center of the large eddy which IOS has been tracking for the last year. Primary productivity and chemical sampling of the eddy was done at the eddy core and, subsequently, outside the eddy at station P1E98. The P1E line was completed to station P1E92(longitude 145 48.5W) and the ship proceeded to Station Papa.

At Station P, some of the mooring deployment and recovery was done on arrival, June 11, but worsening weather limited work to the hydro winch which is mounted amidships. This allowed the primary productivity and iron trace-metal work to be done. A medical emergency limited time at station P to two days, however, a deep rosette cast was completed and the FDSTAR was recovered before returning to Cape Scott. Bad weather made dragging for the UBC mooring impossible and the re-deployment of the sediment trap mooring was put off until September.

The ship returned to the next major Line P station, P20, and, with good weather for the balance of the voyage, finished the remainder of the Line P work in good time.

The last day, June 24th, was spent as planned doing stations in the Strait of Juan de Fuca for the following mission (99-16:Strait of Georgia Survey) and the ship docked in Victoria at about 13:30.

Summary

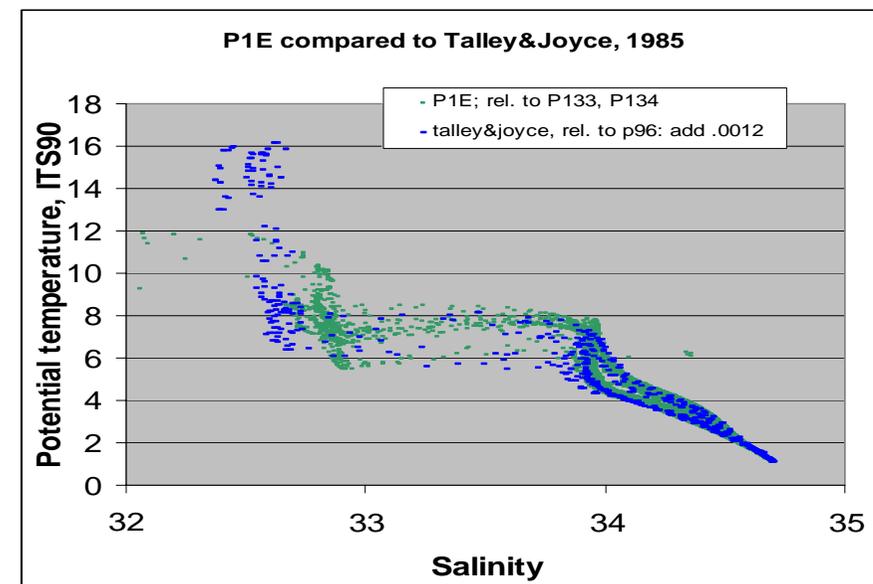
This was a rather busy cruise with a wide assortment of tasks and chores and the challenge of doing WOCE quality chemistry and physics with a minimum of preparation. Thanks are due to the UBC and bird-watching crew for assisting with watch keeping through the period of intensive sampling and analysis. Although some major objectives such as the dragging for the UBC mooring were regrettably not met, the amount of work accomplished was nevertheless quite satisfying.

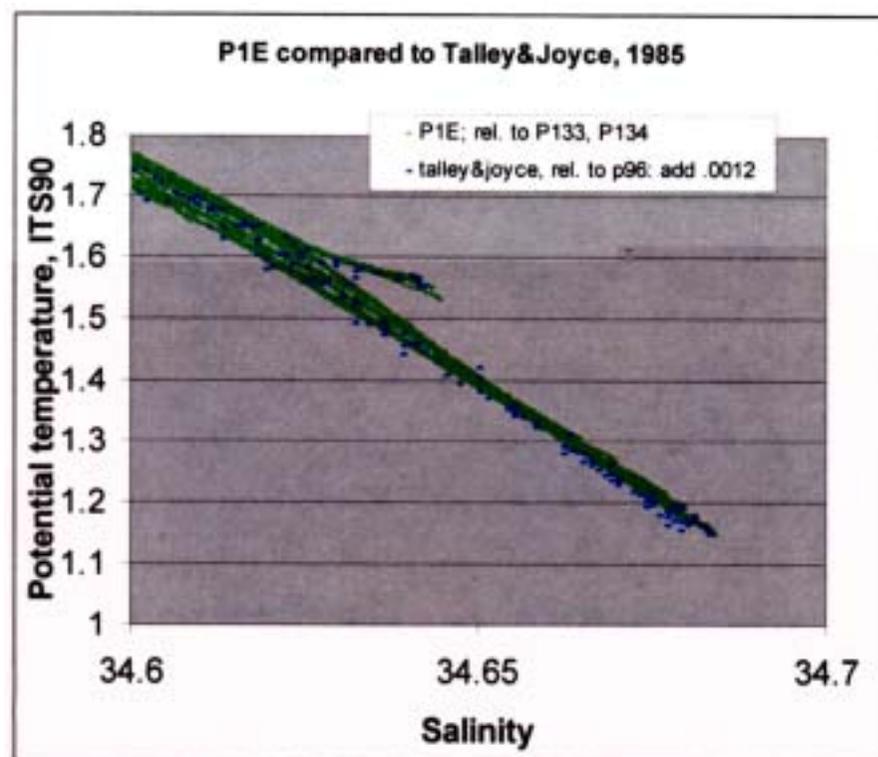
Captain Noon and all the officers and crew have our heartfelt thanks for their competent and efficient seamanship and untiring efforts to make this cruise not only a success but an enjoyable experience. Their medical competence and concern shown for our ailing science crewmember was amply demonstrated and much appreciated.

II. CTD/Transmissivity

Ron Parkin (IOS)

A total of 56 CTD/Transmissivity profiles were taken at the following stations, many combined with chemical sampling. Eleven additional stations were occupied in the Strait of Juan de Fuca with fluorometer and PAR sensors, every third one with chemical sampling. Comparison with the previous P1 cruise, Talley&Joyce(1985)(P96(1.2), showed good agreement(see below). Salinities are relative to P133(-1.4) and after cast 20, P134(-.9).





Station	Cast #	Date	Time (PDT)	Latitude	Longitude	Water Depth
SI03	2	01/06/99	18:54	48.594	-123.5	227
P1E115	4	02/06/99	18:42	46.901	-124.994	777
P1E114	5	02/06/99	21:30	47.003	-125.058	822
PIE113	6	03/06/99	00:31	47.001	-125.509	1762
PIE112	7	03/06/99	04:36	46.999	-126.001	2565
PIE111	8	03/06/99	09:18	47.002	-126.469	2565
P1E110	9	03/06/99	14:28	47	-127.201	2649
P1E109	10	03/06/99	19:38	47.001	-127.923	2712
P1E109	11	03/06/99	23:20	47.001	-127.922	2712
P1E108	12	04/06/99	06:11	47	-128.646	2741
P1E107	13	04/06/99	12:24	46.997	-129.385	2573
P1E106	14	04/06/99	21:42	47.001	-130.018	2650
P1E105	15	05/06/99	08:34	47	-131.231	2750
P1E104	16	05/06/99	21:01	46.998	-132.366	3320
P1E103	17	06/06/99	07:20	47	-133.463	3649
P1E102	18	06/06/99	16:24	46.998	-134.612	3982
P1E101	19	07/06/99	01:16	47.001	-135.735	4137

P1E100	20	07/06/99	09:10	46.997	-136.849	4137
ED1	21	07/06/99	13:53	47.249	-137.164	4121
ED2	22	07/06/99	17:27	47.528	-137.46	4090
ED2	23	07/06/99	18:25	47.532	-137.46	4090
P1E99	24	31/12/79	17:00	46.997	-137.964	4166
P1E98	25	08/06/99	08:52	47.001	-139.067	3527
P1E98	26	08/06/99	09:27	47	-139.069	3917
P1E97	27	08/06/99	17:19	46.999	-140.224	4325
P1E96	28	09/06/99	00:54	47.001	-141.352	4403
P1E95	29	09/06/99	08:21	47.001	-142.439	4494
P1E94	30	09/06/99	15:48	46.997	-143.494	4597
P1E94	31	09/06/99	23:59	46.999	-144.669	4683
P1E92	32	10/06/99	07:55	46.996	-145.809	4783
P26	33	11/06/99	19:47	50	-145	4200
P26	34	13/06/99	08:35	49.999	-145.005	4200
P20	35	17/06/99	12:59	49.566	-138.66	3968
P20	36	17/06/99	14:31	49.568	-138.663	3968
P19	38	18/06/99	13:02	49.498	-137.665	3968
P18	39	18/06/99	18:12	49.431	-136.669	3841
P17	40	18/06/99	23:22	49.349	-135.666	3661
P16	42	19/06/99	07:09	49.271	-134.654	3661
P16	43	19/06/99	09:16	49.273	-134.692	3661
P15	44	19/06/99	23:57	49.199	-133.669	3422
P14	45	20/06/99	05:09	49.123	-132.665	3332
P13	46	20/06/99	10:27	49.042	-131.667	3035
P12	47	20/06/99	16:56	48.971	-130.669	3027
P12	49	21/06/99	06:35	48.972	-130.669	3251
P11	50	21/06/99	11:16	48.931	-130.169	2770
P10	51	21/06/99	14:23	48.892	-129.666	2659
P9	52	21/06/99	17:32	48.857	-129.167	2357
P8	53	21/06/99	20:42	48.816	-128.668	2537
P7	54	21/06/99	23:44	48.776	-128.17	2524
P6	55	22/06/99	02:55	48.743	-127.665	2562
P5	56	22/06/99	05:53	48.691	-127.165	2105
P4	57	22/06/99	12:55	48.65	-126.67	1342
P4	58	22/06/99	14:36	48.65	-126.668	1342
P2	0	23/06/99	09:11	48.599	-125.997	118
P1	62	23/06/99	11:29	48.572	-125.499	135
I03	63	23/06/99	17:29	48.55	-124.717	124

Additional stations occupied for Mission 99-16 are shown in the following map.

III. Cruise Report 9910

Janet Barwell-Clarke and Elaine Baird

Nutrient and chlorophyll samples were analyzed along Line P1E, Line P and the first two stations of Cruise 9916. Silicate, nitrate and phosphate were analyzed for all samples. No ammonia samples were analyzed due to a colourimeter failure. Loop Samples were analyzed for nutrients, chlorophyll, and salinity along Line P1E, underway to Stn.P 26, underway to Port Hardy and back to Stn. P20, and along Line P.

A free drifting sediment trap array was deployed for two days to 1000 m at Stn. Papa. The samples were split, filtered and frozen for future C/N, Opal and Trace Metal analysis.

An in situ productivity experiment was conducted at Stn. Papa to 100 m using GOFLO samplers. The samples were filtered, frozen and will be analyzed at IOS. POC/N samples were collected at the same depths and frozen for analysis at IOS. Poor weather prevented collection of deep POC samples.

Sequential sediment traps were recovered at P26 and P04. Many of the P26- 200 m trap samples were filled with copepods and pteropods and smelled extremely foul. The amount of preservative should be increased for the next deployment. The P26-1000 m trap contained a complete set of samples, however the P26-3800 m trap was plugged after only two samples. It was suspected that this would be the case because the remineralization trap (deployed at the same time) was also plugged by September. The P04 trap was recovered with a full set of samples with the trap and bottles themselves covered with a fine hair-like growth of algae.

A remineralization experiment buoy was recovered at Stn. P26 and will be analyzed for POC/N, CaCO₃, and Opal.

TCO₂ and alkalinity samples were collected and analyzed along Line P1E and Line P. 13C samples were collected for analysis at IOS.

Hydro and Loop data files were generated as well as WOCE –SEA and –SUM files.

IV. Productivity Experiments

Lipsen, Vestfals and Quenneville (IOS and UBC):

Line P Monitoring

As a continuation of our work in 1998, the principal focus along line P was to measure ¹⁴C incorporation into organic and inorganic particulate carbon. Size fractionated chlorophyll *a* concentrations were also measured at the 6 depths of the productivity samples as well as biogenic silica. P v I curves were also generated from each major station at 55% light depth. Samples were collected at all major stations.

Again as a continuation of last years cruise work, we took samples from all major P stations for epifluorescence microscopy, inverted microscopy and scanning electron microscopy in order to enumerate the principal producers of organic and inorganic particulate carbon.

Phytoplankton net (30 µm mesh) samples were taken from line P stations at the 1% light level as well as 150 m. Samples were preserved immediately for qualitative analysis. Initial examination will focus on the larger phytoplankton species with an emphasis on diatoms.

An experiment was conducted to examine the influence of iron and light limitation of phytoplankton at station P26. Water from station P26 was collected using a teflon pump, supplemented with iron and incubated at various light intensities in the deck mounted incubators, together with appropriate non-supplemented controls. These were incubated for over 1 week and

samples taken for chlorophyll, species composition, primary productivity, nutrients and dissolved iron.

Isotope Inventory

5 µCi of ¹⁴C bicarbonate were taken on board. The whole quantity was used in experiments. Low level liquid waste was diluted and disposed over the side following set protocols. No ¹⁴C will be returned to shore with the exception of low level solid waste and filter material.

One µCi of ³²Si was brought on board. 0.91 µCi was used in experiments. Liquid and low level solid waste will be dealt with as above. The remaining 0.09 µCi will be transported back to UBC packed in an appropriate container.

V. Line P

A. Peña (IOS)

Field experiments were initiated as part of a study of processes regulating the variability of primary production and of carbon fluxes along Line P transect. The main focus was at Station P26 and P4; the two-end members of Line P transect, where experiments were conducted to examine the influence of light intensity on changes in phytoplankton carbon to chlorophyll ratios. Water was collected using 10L GOFLO bottles at two depths (55% and 3.5% light depth) and diluted with filtered sea water from same depth. One set of samples was inoculated with ¹⁴C. All samples were incubated at 6 light intensities in on-deck incubators. Also, chlorophyll and phytoplankton samples for microscopic analyses (epifluorescence and inverted microscope) were obtained from 6 depths for determination of species composition and carbon content.

In all major P stations, samples were collected at 2 depths (55 and 3.5% light depth) for photosynthesis vs. irradiance measurements and chlorophyll concentration.

VI. Eddy site

A. Peña (IOS)

With M. Quenneville (IOS), primary production was measured at 6 depths at two stations, one outside and one at the center of an eddy in an attempt to document potential enhancement of primary production by eddies.

VII. Isotope Inventory

A. Peña (IOS)

10 µCi of ¹⁴C bicarbonate was brought on board. 6 µCi were used in the above experiments and 3 mCi in size fractionated primary production work of UBC/ IOS. The remaining 1 µCi was transported back to IOS. Low level liquid waste was diluted and disposed over the side following set protocols. Only ¹⁴C in low level solid waste and filter material was returned to shore.

CCHDO DATA PROCESSING NOTES

Date	Contact	Data Type	Action
2004-04-10	Talley	SUM	Submitted
			<p>Danie - Masao Fukasawa sent me a CDROM with the P1 occupation from 1999. Here is a list of the cruises that make up the section, which they called SAGE. (Part of the Subarctic Gyre Experiment.)</p> <p>p1e - stations 92-115 R/V John Tully 6/2/99-6/10/99 p1c - stations 4-92 R/V Mirai 8/25/99 - 9/8/99 p1w - stations 1-74 R/V Kaiyo-Maru 5/23/99 - 6/11/99 p1h - stations 4-13 R/V Mirai 9/30/99 - 10/2/99</p> <p>The files are called things like p1wsum.txt, p1csum.txt, p1esum.txt, p1hsum.txt</p> <p>I don't have the data sets other than the sum files on my computer, but will look for the CDROM when I get in. I gather then that they weren't sent to the WHPO.</p>
2006-11-02	Johnson, G.	CTD/BTL/SUM	available on JAMESTEC website
			<p>I note that P01 data are now in the public domain (see http://www.jamstec.go.jp/iorgc/ocorp/data/p01rev_1999/index.html), but are listed on the CCHDO site as with the PI Would it be possible for these data to be served publicly on the CCHDO site now?</p>
2006-11-06	Kappa	CTD/BTL/SUM	Website Updated
			<p>Justin was able to get all the p01_1999 data online this morning. Based on our time stamps, it looks like all the ctd files have been worked by our data specialists. 2 of the hyd files have time stamps, 2 don't. We'll be looking at them more closely in the next couple weeks and will let you know if we find any anomalies.</p>