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WOCE SECTION P15N HYDROGRAPHIC SECTION OF THE PACIFIC OCEAN FROM DUTCH HARBOR, ALASKA TO AMERICAN SAMOA

by

F. Whitney and J. Barwell-Clarke

Institute of Ocean Sciences
Department of Fisheries and Oceans
Sidney, B.C.

1997

CANADIAN TECHNICAL REPORT OF HYDROGRAPHY AND OCEAN SCIENCES NO. 184

Fisheries and Oceans Pêches et Océans

Canada

Canadian Technical Report of Hydrography and Ocean Sciences

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Cat. No. 0711-6764 ISSN Fs 97-18/184E

Correct citation for this publication:
Whitney, F. and J. Barwell-Clarke. 1997. WOCE Section P15N: Hydrographic section of the Pacific Ocean from Dutch Harbor, Alaska to American Samoa. Can. Tech. Rep. Hydrogr. Ocean Sci. 184: v + 61 p.

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Whitney, F. and J. Barwell-Clarke. 1997. WOCE Section P15N: Hydrographic section of the Pacific Ocean from Dutch Harbor, Alaska to American Samoa. Can. Tech. Rep. Hydrogr. Ocean Sci. 184: v + 61 p.

From September 6 to November 10, 1994, scientists aboard the research vessel CSS *John P. Tully* completed detailed hydrographic measurements in the central north Pacific as part of the World Ocean Circulation Experiment (WOCE). Section P15N started near Dutch Harbor, Alaska and continued to 15 ° south. A total of 128 CTD/rosette stations were occupied along this line, almost all of them extending from the surface to the bottom. This report includes details of the cruise report submitted to the WOCE Hydrographic Programme Office (WHPO), the station summary files as submitted to WHPO, a description of the water sample data (salinity, temperature, oxygen, nutrients, CFCs), vertical section plots, and detailed plots of features along Section P15N.

Key words: CFCs, hydrography, nitrate, north Pacific, oceanography, phosphate, oxygen, salinity, silicate, temperature, World Ocean Circulation Experiment (WOCE).

RÉSUMÉ

Whitney, F. and J. Barwell-Clarke. 1997. WOCE Section P15N: Hydrographic section of the Pacific Ocean from Dutch Harbor, Alaska to American Samoa. Can. Tech. Rep. Hydrogr. Ocean Sci. 184: v + 61 p.

Du six septembre au dix novembre, 1994, des chercheurs à bord du navire de recherche *John P. Tully* ont complété des mesures hydrographiques détaillées du centranord Pacifique dans le cadre du World Ocean Circulation Experiment (WOCE). La section P15N commença près de Dutch Harbor, Alaska et continua jusqu'à 15 ° sud. Un total de 128 stations de CTD/rosette ont été visitées le long de cette ligne, presque toutes allant de la surface jusqu'au fond. Ce rapport inclut des détails du rapport de l'expédition soumi au WOCE Hydrographic Programme Office (WHPO), les dossiers de sommaires des stations soumis au WHPO, une déscription des données d'échantillon d'eau (salinité, température, oxygène, éléments nutritifs, CFCs, des profils verticaux, et des diagrammes détaillés des caractéristiques le long de la section P15N.

Mots-clés:

CFCs, le nord du Pacifique, nitrate, océanographie, oxygène, phosphate, salinité, silicate, température, World Ocean Circulation Experiment (WOCE).

1.0. INTRODUCTION

1.1. OBJECTIVES

The World Ocean Circulation Experiment (WOCE) is a global project aimed at understanding the role of the ocean in the world's climate system. As we question our impact on global climate, information on the rates of heat transport in the oceans and the capacity of the ocean to absorb greenhouse gases, becomes invaluable. It is also becoming apparent that understanding these large scale ocean processes is crucial in resolving causes of variability in fish stocks that dramatically impact coastal communities of Canada. The scale of WOCE is such that a global effort is needed to complete one of its major aims, an intensive survey of water properties of the world's oceans over a short period (1990 to 1997). Details of WOCE data collection activities can be obtained from their web site:

(http://www.cms.udel.edu/woce/dacs.html)

In 1991, the Institute of Ocean Sciences (IOS) received funding from the Canadian Government's Green Plan - Ocean Climate Program to participate in the WOCE program. IOS agreed to undertake a major section (P15N) in the Pacific along 165 W from the Aleutian Islands (55 °N) to 10 °S. To meet the high standards imposed by WOCE, IOS had to modify its deep ocean sampling and analytical procedures. Between 1991 and 1994 changes were made to both our research vessel, the *CSS John P. Tully*, and our oceanographic protocols, and were subsequently tested on several coastal cruises. On September 6, 1994, the *Tully* left IOS to begin a 3 month round trip to American Samoa which covered over 20,000 km. More than 3300 sea water samples were collected and analyzed for a variety of parameters which were intended to help describe ocean circulation. The goals of P15N included investigating such processes and features as: carbon dioxide penetration into the North Pacific, the Alaska Stream, sub-arctic front, 2200 m silicate maximum (37° to 43°N), shallow oxygen minimum north of the equator, equatorial upwelling, and flow of Antarctic water through the Samoan Gap. This report summarizes our results from water sampling along WOCE Section P15N, and documents our submissions to the WOCE Hydrographic Programme Office.

1.2. CRUISE NARRATIVE

1.2.1. Cruise Track

The cruise track and the CTD/rosette stations are given in Figure 1. Cruise P15N started on September 6, 1994 when the CSS *John P. Tully* sailed west from the mouth of Juan de Fuca Strait. Four stations were sampled on line PR6, including Station PRS1 (Station Papa), then the vessel sailed for Dutch Harbor, where it refueled. Section P15N started at 53°55.28'N, 164°59.43'W, and continued south along 165°W. At 24°N, the cruise track shifted to the west to coincide with a previous National Oceanic and Atmospheric Administration (NOAA) section and the planned route of P15S. At 20°53.94'N, 165°58.65'W (Stn. W070) the ship headed to Honolulu for a crew change. The ship resumed station work at 20°30.27'N, 166°5.18'W (Stn. W071). The cruise track gradually moved westward to 168°45'W at 10°N and remained on this longitude through the equator, then began a second southwestward course at 8°30'S to 170°W at 10°S. The last WOCE station (Stn. W142) on the P15N section was made at 15°0.03'S, 170°0.04'W, and the vessel arrived in American Samoa on November 10, 1994.

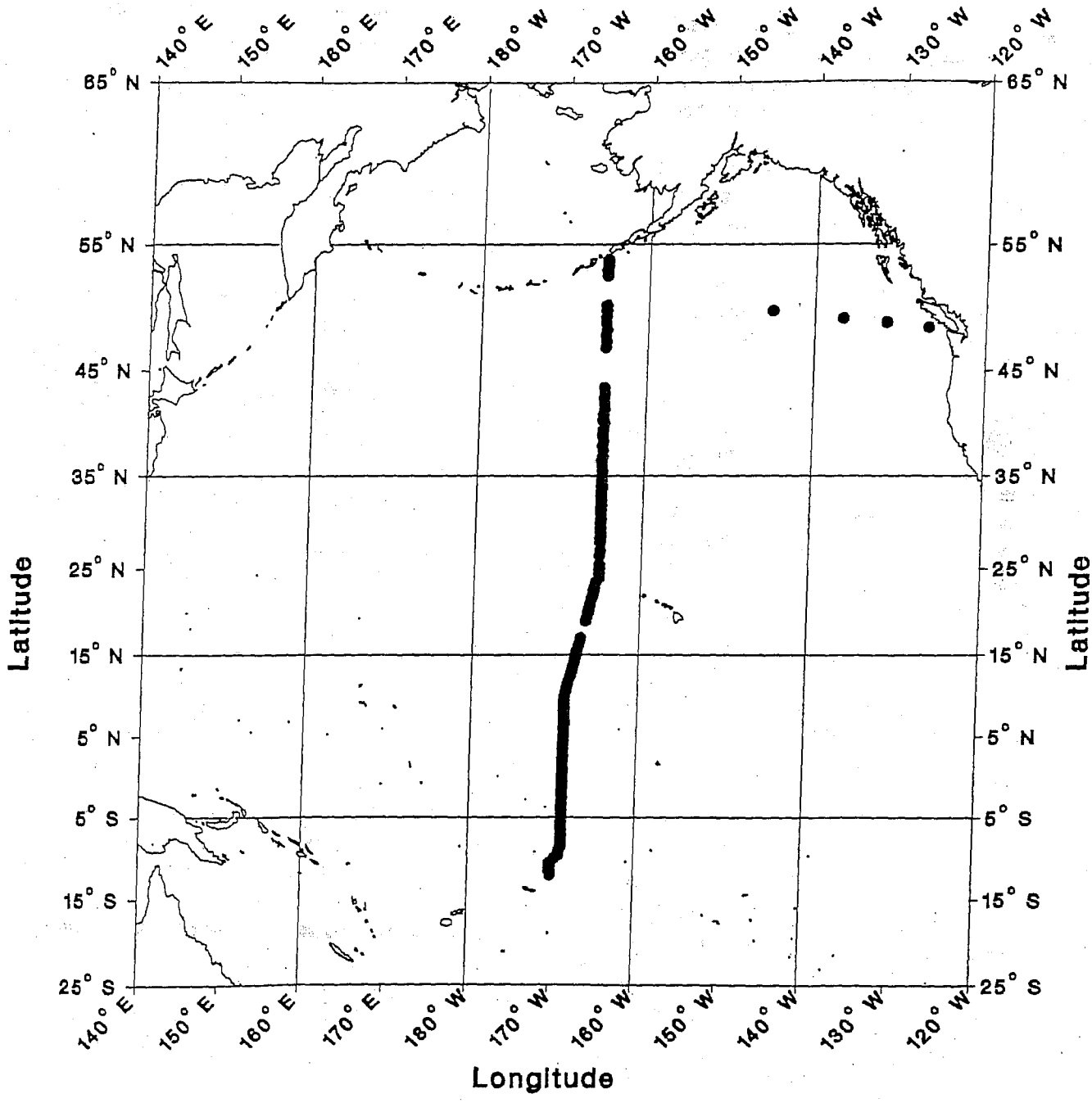

Figure 1. WOCE Section P15N aboard CSS *John P. Tully*

1.2.2. Stations and Sampling

The total stations occupied on both legs of the cruise are listed in Table 1. A total of 128 CTD/rosette stations were occupied on Line P15N. Two rosettes were used to collect samples for onboard analysis of salinity, oxygen, nutrients, CFCs, total CO_2 and alkalinity. Additional samples were stored for ^{13}C, ^{14}C, ^{18}O and CH_4. Continuous measurements of air and seawater CO_2 were taken from the scientific seawater supply (Uncontaminated Sea Water). USW was also sampled for salinity, nutrients, and chlorophyll *a* at most cast stations, and each degree of longitude between PRS1 and Dutch Harbor. Tracers were occasionally collected from the USW supply.

TABLE 1. Table of stations occupied on Section P15N

Sample type:	No. Stations:	Max. depth:
Rosette/CTD casts	128	6040 dbar
CTD casts	17	5070 dbar
Drifters	4	120 m
Loop stations	189	5 m

1.2.3. Floats, Drifters, and Moorings

At four stations, a total of 15 Argos drifters (seven 20 m and eight 120 m drogues) were deployed. A single meteorological drifter was deployed for the Department of the Environment near 47°N. Several dozen wine bottles containing postcards were deployed at locations selected by a local school class. No moorings were deployed or recovered on this cruise.

1.2.4. Meteorological Log

A SAIL (Standard ASCII Interface Loop) system onboard ship polled several sensors at two minute intervals. Data were stored on a micro computer and subsequently processed in a format accessible for general use. Ship's officers measured the ship's course and speed, true wind direction and speed, barometric pressure, and dry and wet bulb temperature every four hours.

1.2.5. Sea Floor Topography along P15N Line

The sea floor topography along the cruise track was digitized from British Admiralty charts and is shown in the Hydrographic Section Plots (Section 6.0.). The main topographic features along P15N from north to south are: Davidson Bank, Aleutian Trench, Hawaiian Ridge, Nova Trough and the Samoan Gap.

1.2.6. Cruise Personnel

The Principal Investigators and Cruise Participants are listed in Appendix 1.

2.0. HYDROGRAPHIC MEASUREMENT TECHNIQUES AND CALIBRATIONS

2.1. WATER SAMPLING

A 23 bottle rosette with a Guildline Model 8737 CTD was the primary sampling system (Niskin bottles numbers 1 to 23). An 11 bottle rosette with a Guildline 8705 CTD was used for shallow casts (Niskin bottles number S1 to S11).

Water samples were collected from rosettes by CFC analysts (Freons only) and sampling teams. Samples were drawn in the order: CFCs, oxygen, carbonate suite (TCO_2, alkalinity, ^{13}C, ^{14}C) and methane; then nutrients, salinity and ^{18}O in any order.

CFC samples were drawn into 100 mL glass syringes that were thoroughly rinsed in a continuous stream of sample. CFC samplers checked each Niskin bottle for leakage by pushing in the sample spigot before opening the air vent. Gas samples were drawn through amber or Tygon tubing and were all allowed to overflow from one to two volumes. Carbonate samples were poisoned with 200 µL of saturated $HgCl_2$ solution per 250 mL. Methane samples were drawn through amber tubing into glass bottles. Rubber septa, with syringe needles piercing their centers, were used to eliminate air from the samples. Septa were crimp sealed in place and samples were refrigerated.

Other sample containers were rinsed 3 times and filled as required. Nutrient samples were refrigerated until analysis. Salinity samples were warmed to lab temperature before being analyzed. ^{18}O samples were tightly stoppered and refrigerated.

2.2. CTD MEASUREMENTS

The three CTD probes used during this cruise were made by Guildline Instruments of Smiths Falls, Ontario, Canada. The primary instrument was the WOCE CTD (model 8737) which was used for most of the deep casts using the 24 bottle rosette. The 12 bottle rosette, used for shallow casts, was equipped with a standard Guildline Digital CTD (model 8705) referred to as Ocean Physics (OP) CTD. An additional Guildline CTD with a high precision pressure sensor was used when weather would not allow rosette casts.

The parameters CTDPRS and CTDTMP, found in Appendix 3, are data sets extracted (as the Niskin samplers were closed) from pre-cruise calibrated data files onboard ship.

WOCE CTD, Guildline Model 8737, SN 59901

This CTD was usually mounted in a bottle slot on a custom made 24 bottle rosette and was used for most of the casts in this cruise. It was interfaced to a General Oceanics (GO) pylon which triggered the 10-liter bottles in the remaining 23 slots. No post-cruise change to pressure was required for the WOCE CTD. It was initially calibrated for temperature with the post-cruise calibration of (offset, slope) = (-0.0015, 0.999938). To account for changes which occurred during the cruise, temperature offsets ranging from -0.00215 to 0.008967 were applied.

OP CTD, Guildline Model 8705, SN 58483

This CTD was used mainly for casts with the 12-bottle rosette to depths not exceeding 1500 dbar. Its main function was to provide temperature and pressure data for the bottles since each station was covered by full depth profile by one of the other CTD's. Comparisons in the upper 1500 m of the water column with the other CTD's showed a great deal of scatter due to water column variability so a lowered accuracy is claimed for this data. The post-cruise pressure correction was -4.6 dbar and the temperature correction was 0.0074 ° C.

2.3. CFC ANALYSIS

CFC-11 and CFC-12 were analyzed by the method of Bullister and Weiss (1988).

Data reduction was carried out using an adapted Scripps program (Weiss). This program requires salinity and temperature for calculations; the former was taken from salinometer data; and the latter was read from the sample bucket when the syringe was removed and attached to the extraction system.

Carrier blanks, stripper blanks, and restripped samples were analyzed throughout the cruise. Syringe air samples (Table 1) were usually taken at noon from above the bridge, the aft deck (where sampling was done), and inside the lab container .

TABLE 2. Freon levels of air (ppt)

Stn	Above bridge		Sampling deck		Lab	
	F-11	F-12	F-11	F-12	F-11	F-12
74	252.4	612.2	280.1	853.0	300.2	615.3
74	281.2	504.4			287.3	595.1
86			271.6	507.9	315.6	366.2
86					277.8	602.3
98	279.7	673.5	271.1	571.6	274.0	493.6
101	272.0	531.5	281.4	1301.1	279.9	820.7
106	249.6	528.6	258.5	673.5	264.2	1194.8
108	263.1	518.8	261.7	516.6	265.4	689.6
113	360.3	580.2	271.2	765.4	321.1	524.5

The values reported were initially calculated with the Freon analysis program. If a particular station had a stripper blank run, the program automatically subtracted this before printing the final results. If a station did not have a stripper blank, a manual blank subtraction was applied to the calculated results based on deep water values.

Working standard tank number 63098 was used for Stns. 71, 72, 73 and 74 and tank number 63100 was used for the remaining stations. (Tank 63100 values: F-11, 583.1 ppt, standard deviation 2.1, and F-12, 279.2 ppt, standard deviation 1.0. Tank 63098 values: F-11, 443.6 ppt, standard deviation 2.6 and F-12, 502.8, standard deviation 1.9).

These standards were made up of outside air. The tanks were calibrated against Centre of Ocean Climate Chemistry (COCC) lab standard tank number 63088 (F-11, 457.6 ppt, standard deviation 0.6; and F-12, 263.1 ppt standard deviation 0.8). This COCC lab standard was calibrated by John Bullister's lab (Pacific Marine Environmental Lab, Seattle, WA) in October 1993.

There were some difficulties encountered throughout the cruise that hampered obtaining optimal results:

- Our use of an aging Hewlett-Packard GC created problems. For the first days on Line PR6, corrosion on a circuit board shut the system down. Then as we sailed from Honolulu, the GC failed completely and we had to return to pick up another that was flown to us from IOS. Stations were occasionally skipped as columns were cleaned after they saturated with CFCs.
- A problem with the consistency of the quality of the carrier gas meant having to subtract higher than normal stripper blanks.
- The results of stations 83 to 97 may show zero at the 300 to 400 m depth because the threshold was initially set as per the 5890 GC program. This was modified for later stations in order to have very small peaks integrated. Thus these zero values may be a factor of threshold setting rather than a complete absence of Freon.

During some of the earlier stations we encountered samples affected by some sort of interference. This resulted in the F-11 peak being split or at other times summed, usually in the fifty meter sample. Neither using the split value nor a summed value seemed to give a reasonable result so these samples were flagged as questionable or bad. This problem was also encountered on the first leg of the cruise. Contamination for F-12 was variable from day to day and detection limits were estimated each day as 3 times the standard deviation of deep sample concentrations. Thus from 2 to 7 samples were used to assess LODs in the range 0.025 to 0.244 pmol/kg. Any value below this limit of detection was reported as zero.

Both carrier gas and bottle blanks (deep ocean samples) were consistently zero for F-11. The lowest discernible value was 0.045 pmol/kg.

The restrips of water samples demonstrated the high stripper efficiency of the Freon analysis system.

2.4. OXYGEN

Oxygen samples were drawn immediately following CFC and carbonate samples through either amber rubber or Tygon tubing into calibrated 125 mL iodine flasks. The flasks were allowed to overflow twice their volume before being stoppered then unstoppered, fixed with manganous and iodide reagents according to Carpenter (1965), restoppered and shaken thoroughly. Sample temperatures were measured before initial stoppering to ±0.5°C. To avoid outgassing during analysis, samples were initially all refrigerated at 4°C for 1 to 24 hours, before being titrated with an auto-burette (Brinkman Dosimat) to an iodine colorimetric endpoint.

By station W042, samples from the mixed layer were pulling in sizable air bubbles when they were cooled. At 2 stations (W050 and W058), the effect of air contamination of pickled samples was tested and shown to add 1 to 3 μmol/kg oxygen to surface samples that are

cooled. This bias remains in surface layer data from stations W042 to W050, and will vary in amount depending on the amount of cooling (volume change) for each sample. Surface layer samples from W051 to W070 were not cooled.

On Leg 2, flasks were sealed with tap water around the lip of the flask. This greatly reduced the amount of oxygen that entered a flask during cooling. Samples were routinely refrigerated before being analyzed. Standards were prepared as outlined in WOCE Report 73/91.

2.5. TOTAL CO_2

The coulometric procedure outlined in DOE (1994) was used to measure carbon dioxide in sea water. Samples were collected in 250 mL glass stoppered bottles, fixed with 200 μL of saturated $HgCl_2$ solution, and cool stored until analyzed.

2.6. ALKALINITY

Following the method of DOE (1994), alkalinity was determined using a temperature stable (25°C) closed titration cell, a Metrohm 665 Dosimat, a Metrohm 649 stir apparatus and an Orion model 720A pH meter.

2.7. NUTRIENTS

Samples were collected in 50 mL polyethylene tubes and refrigerated for a maximum of 12 h (rosette) or 30 h (USW) before being analyzed. A four channel Technicon Autoanalyzer was used to measure NO_3 + NO_2, NO_2, PO_4 and dissolved Si. Analytical procedures are essentially those described by Koroleff and Grasshoff (1983).

Concentrated standards were prepared from oven dried (80°C) reagents shortly before sailing on Leg 1 and again in Honolulu. Working standards were made every 1 to 2 days by diluting 1 to 6 mL of stock solutions to 250 mL with 3.2% NaCl (w/v in double run Milli-Q water). Nitrate, nitrite and silicate standards were compared to Sagami standards. The nitrate standards agreed to within 0.1 μmol/l, but the silicate concentrations differed by 2%, an unusual finding since our prepared standards usually agree very well with the stable Sagami standards. Our silicate standard was checked on a recent cruise and again compared to Sagami and it was found to be low by 2.2%. We compared our results with data from one matching station on the Cruise TT190 of the R/V *Thomas Thompson* in 1985 and found that below 1000 m our silicate results are comparatively low by an average of 2.2%. No corrections have been applied to our data, although in consultation with a WOCE DQE, this might be done.

Nutrient lab temperatures were recorded approximately hourly during analyses.

Phosphate samples were occasionally contaminated during the second half of the first leg. A nitrate reagent containing phosphoric acid was spilt on September 30 when Stations W044, W045, and W046 were analyzed. On October 1 it was noted in the nutrient log that the crew were washing the deck with soap - Stations W047, W048 and W049 were analyzed on this day.

Our water demineralizing system failed during Leg 2, which forced us to use low nutrient sea water to establish a baseline during analyses, and for the preparation of standards. Each day, a sample of 3.2% NaCl in double run Milli-Q water was analyzed to assess zero concentrations. Silicate and phosphate in low nutrient wash water was typically 2 and 0.2 µM higher than the clean salt solution.

Crystals developed in the nitrite line from Station 123 onwards. This data has been labeled quality 3 for nitrite. An error is introduced into nitrate data since nitrite is subtracted from the NO3 & NO2 analysis results. Consequently, nitrates have also been assessed as questionable (quality 3) although the actual offset is only 0.1 to 0.3 umol/kg. Summing nitrite and nitrate will provide correct NO_3 + NO_2 values.

2.8. SALINITY

Samples were collected in glass bottles and analyzed onboard ship using a Guildline Model 8410 Portasal. The Portasal was standardized daily with IAPSO standard sea water Batch P125. Salinity and nutrient measurements were made in an air conditioned lab.

2.9. PRECISION OF MEASUREMENTS

Standard Deviations of Pairs (S*p*) were calculated from replicates drawn from Niskin bottles tripped within 2.3 dbar of each other, using the following formula:

$$Sp = \{\Sigma d^2/2k\}^{0.5}$$

where d = differences between pairs and k = number of pairs.

Using this as a measure of precision includes all discrepancies introduced by leaking water samplers, sample collection, sample storage and analysis.

TABLE 3. Standard deviation of pairs (S_P)

Parameter	Range	S*p*	k
Salinity (PSS-78)	33.576 - 35.923	0.003	46
Oxygen (umol/kg)	20.86 - 203.41	1.02	45
Silicate (umol/kg)	0.02 - 149.8	0.34	46
Nitrate (umol/kg)	0 - 42.9	0.11	44
Nitrite (umol/kg)	0 - 1.406	0.008	46
Phosphate (umol/kg)	0.04 - 3.13	0.02	46
CFC-11 (pmol/kg)	0.415 - 2.587	0.076	11
CFC-12 (pmol/kg)	0.263 - 1.359	0.040	11

3.0. UNDERWAY MEASUREMENTS

3.1. NAVIGATION AND BATHYMETRY

A SAIL (Standard ASCII Interface Loop) system onboard ship polls several sensors at 2 minute intervals. Data is stored on a micro computer and is subsequently processed in a format that is accessible for general use. Ship's speed, heading, and position plus ocean depth are logged.

3.2. ACOUSTIC DOPPLER CURRENT PROFILER (ADCP)

A hull mounted current profiler logged upper layer currents every 5 minutes throughout the cruise.

3.3. THERMOSALINOGRAPH AND UNDERWAY DISSOLVED GASSES

Temperature and conductivity sensors were installed near the intake of a sea water line that is used as a scientific supply in the laboratory. Data is logged on SAIL.

Uncontaminated Sea Water (USW) was continuously pumped to the laboratory and used for half hourly measurements of pCO_2, continuous fluorometry (chlorophyll a) and discrete sampling at stations.

An infrared CO_2/H_20 analyzer (LI-COR Model 6262) was used to measure air, sea water and standard CO_2 concentrations every 30 minutes throughout the cruise. Sea water was equilibrated within a trapped air space to provide samples for measurements of pCO_2 in surface sea water (DOE 1994).

Chlorophyll *a* samples were collected from the USW supply at most stations, and filtered through Whatman GF/F filters. Samples were then frozen for transport back to IOS.

3.4. EXPENDABLE BATHYTHERMOGRAPH AND SALINITY MEASUREMENTS

XBTs (Type T-5, 1830 m) were used at several stations when bad weather prevented use of CTDs.

3.5. METEOROLOGICAL OBSERVATIONS

The meteorological observations include: ship's course and speed, true wind direction and speed, barometric pressure, and dry and wet bulb temperature.

4.0. PRELIMINARY RESULTS

4.1. GOALS ACHIEVED

Features such as the Alaska Stream, sub-arctic front, 2200 m silicate maximum (37 to 43°N), shallow oxygen minimum north of the equator, equatorial upwelling, and flow of Antarctic water through the Samoan Gap, are readily identified in this data set. Surface waters in the subarctic region of the Pacific are evidently a strong sink for CO_2 in September.

Our deep ocean winch, rosette/CTD and heave compensation equipment worked very well to 6000 m, the first test it has had below 4200 m. Sampling from the *Tully* was equally successful. The ship was able to hold station in 40 knot winds, and aft deck sampling proved comfortable and safe in most conditions. Sampling was suspended whenever the rosette unweighted excessively, as recorded on a load sensor mounted between the rosette and cable.

4.2. MAJOR PROBLEMS AND GOALS NOT ACHIEVED

Several stations were omitted due to high winds (reaching 70 knots), and CTD casts only were attempted at another 12 stations in marginal conditions. Sampling intervals were spaced to 250 or 500 m below 3000 m at many stations, allowing us to save time by carrying out only a single rosette cast. This spacing should result in negligible loss of information, since there is little structure in North Pacific deep waters.

Our deep ocean winch was damaged beyond repair following a cast at 10°S. Subsequent sampling was restricted to a maximum depth of 3800 m.

There were difficulties encountered throughout the cruise that hampered obtaining optimal results for CFC-11 and CFC-12. About 75 % of the stations were successfully analyzed. We had to return to Honolulu to pick up a replacement Gas Chromatograph at the beginning of Leg 2, costing us 3 days of ship time. The inconsistent quality of the carrier gas resulted in higher than normal stripper blanks. The zero values of stations 83 to 97 may be a factor of threshold setting rather than a complete absence of CFCs. Some F11 samples were affected by interference so these samples have been flagged as questionable.

Our water demineralizing system failed during Leg 2. Low nutrient sea water (LNSW) from the sea water loop was used as a baseline and in preparation of standards for nutrients. LNSW was also used to rinse samples tubes after acid cleaning.

Some phosphate samples were contaminated during the second half of Leg 1 likely due to a spill of a phosphoric acid containing reagent or washing of the decks with a soap solution. Nitrite values for Stns. W123 to W137 were higher than expected for deep samples due to a crystal build up in the nitrite line. Data quality has been labeled 3 for both nitrite and nitrate for these samples.

5.0. CTD AND ROSETTE STATION DATA

5.1. STATION SUMMARY

A station summary file including station number, cast type, date, time, position, bottom depth and parameters measured at each station is submitted to the WOCE Hydrographic Programme Office (WHPO) with the cruise report. The summary files (Legs 1 and 2) for P15N are listed in Appendix 2 as well as abbreviations and codes used for sample parameters.

5.2. ROSETTE SAMPLE DATA

The data collected from the rosette bottles during the cruise is submitted to WHPO as a -.SEA file. The WOCE parameters included salinity, oxygen, nutrients, CFC-11, CFC-12, total carbon and alkalinity. Investigators evaluated the quality of their measurements for water bottles and water samples and included this as part of the data record. The Quality Flag definitions for water bottles and water samples is listed in Appendix 3. The data are later independently evaluated by data quality evaluators (DQEs), who assign a second quality flag to the record for each measurement.

The parameters CTDPRS and CTDTEMP refer to the CTD values as the Niskin samplers were closed, and were extracted from uncorrected data files onboard ship.

A sample of the -.SEA files for the first twelve WOCE stations is listed in Appendix 3.
The -.SEA files for Legs 1 and 2 were submitted to WHPO and were used to produce the section plots found in Appendix 4.

5.3. CTD DATA

CTD data has been processed and submitted to WHPO. Following a proprietary use period, it can be requested from the Institute of Ocean Sciences.

5.4 STATUS AND AVAILABILITY OF DATA

Data is available from WHPO or through principal investigators.

WOCE information is available from the Data Information Unit which updates its files daily.

WOCE Data Information Unit
College of Marine Studies
University of Delaware
Lewes, DE 19958 USA

World Wide Web Site: http://www.cms.udel.edu/woce/dacs.html

The WHP Office has prepared an electronic atlas of onetime Pacific survey data including data files and plots that are accessed either by a web browser or via ftp. This data is password protected and is only available to PIs who have submitted onetime data to the WHPO. Availability of the atlas outside the group of PIs is strictly limited and will not be given without prior notification or approval.

Data can also be requested from principal investigators at the Institute of Ocean Sciences.

Institute of Ocean Sciences
Department of Fisheries and Oceans
9860 West Saanich Rd.
P.O. Box 6000
Sidney, British Columbia
Canada
V8L 4B2

6.0. HYDROGRAPHIC SECTIONS

6.1. SEA FLOOR TOPOGRAPHY AND SAMPLING LOCATIONS

Sea floor topography and bottle sampling locations are found in Appendix 4. The crosses indicated discrete water samples at each station and the bottom topography is digitized from British Admiralty charts.

6.2. VERTICAL SECTIONS

Vertical sections plots of P15N from 0 to 6300 dbar for potential temperature, salinity, oxygen, silicate, nitrate, phosphate, and from 0 to 1000 dbar for CFC-11 and CFC-12 are in Appendix 4. The potential temperature was computed from pre-cruise calibrated CTD data which are accurate to better than 0.01 C. Depth is correct to within 5 dbar on all section plots.

6.3. FEATURES ALONG P15N

Bathymetric features from north to south include:
a narrow continental shelf off the Aleutian Islands; Aleutian trench which exceeds 6000 m depth; generally deep waters (over 5000 m) which exceed 6000 m through the Mendocino Fracture Zone at 37 N until the Hawaiian Islands are approached at 25 N; shoaling at the western end of the Line Islands at 10 N; and the Samoan Gap at 10 S (a passage which connects the southern and northern abyssal Pacific).

Oceanographic features observable in vertical sections include:
the Alaskan Stream; western edge of the Alaskan Gyre; Subarctic front near 40 N; North Pacific Intermediate Waters (NPIW) which intrude from the north to at least 20 N, to a depth of 1000 m; the North Pacific oxygen minimum and nutrient maximum which is situated below the NPIW; silicate maximum in northern waters centered at 2200 m; upwelling of low oxygen and high nutrient waters at 10 N; and strong northward flow through the Samoan Gap.

7.0. ACKNOWLEDGEMENTS

The officers and crew of the research vessel CSS *John P. Tully*, lead by Captain John Anderson, undertook both Section P15N and the preparatory PR6 Lines with great zeal. Their good humor and competence made this voyage an experience to remember. The group of ocean-going staff and contractors at IOS, with their wisdom and experience, solved the challenges that faced a program of this size. Four chemists from the Pacific Oceanological Institute in Vladivostok provided skilled assistance in handling the heavy analytical workload. Thanks to other Department of Fisheries and Oceans groups, especially the Canadian Hydrographic Service, who permitted their staff to participate. Volunteers were an integral part of this section. In particular, the participation of 6 university students brought some youthful inquisitiveness and energy to the program. The overall enthusiasm of all participants was greatly appreciated.

Support for this work was supplied by the Department of Fisheries and Oceans, Panel for Energy Research Development Project #48105 (C. S. Wong) and Green Plan Ocean Climate Project W1 (Howard Freeland) of the Government of Canada.

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APPENDIX 1. PRINCIPAL INVESTIGATORS AND CRUISE PARTICIPANTS

PRINCIPAL INVESTIGATORS

Principal Investigator	Parameters	Institution
Howard Freeland	Climate change, XBTs, ADCP	IOS
C.S. Wong	Climate chemistry TCO_2, A_T, CFCs, ^{13}C, ^{14}C, ^{18}O, underway pCO_2	IOS
Ron Perkin	Physical measurements: CTD, salinity	IOS
Frank Whitney	Chemical measurements: Oxygen, nutrients, chlorophyll a, meteorology, bathymetry, thermosalinograph	IOS

CRUISE PARTICIPANTS - LEG 1

Individual	Responsibility	Institution
John Garrett	chief scientist	IOS
Frank Whitney	coordinator, hydro. data	IOS
Dario Stucchi	CTD data processing	IOS
John Love	electronics, sampling, salinity	IOS
Bernard Minkley	sampling, salinity	IOS
Reg Bigham	sampling	IOS
Tim Soutar	sampling	IOS
Ron Bellegay	sampling	IOS
Valerie Knight	carbonates	IOS
Galina Pavlova	carbonates	POI
Linda White	nutrients	IOS
Andrei Andreev	nutrients	POI
Pavel Tishchenko	CFCs	POI
Ruslan Chichkin	CFCs	POI
Leo Rebele	CFCs	student
Sarah Thornton	oxygen	student
Marie Robert	sampling	IOS
Louise Timmermans	sampling	student
Mary-Beth Bérubé	sampling	IOS

APPENDIX 1. PRINCIPAL INVESTIGATORS AND CRUISE PARTICIPANTS

CRUISE PARTICIPANTS - LEG 2

Individual	Responsibility	Institution
Howard Freeland	chief scientist	IOS
Ron Perkin	CTD data	IOS
Bernard Minkley	hydro data	IOS
John Love	electronics, sampling, salinity	IOS
Reg Bigham	sampling,	IOS
Neil Sutherland	sampling	IOS
Dennis Sinnott	sampling	IOS
Hugh Maclean	sampling	UBC
Keith Johnson	carbonates	IOS
Marty Davelaar	carbonates	IOS
Janet Barwell-Clarke	nutrients	IOS
Mary O'Brien	nutrients	IOS
Wendy Richardson	CFCs	IOS
Carol Stewart	CFCs	IOS
Tracy Feeney	CFCs	student
Bob Wilson	oxygen	IOS
Taimi Mulder	sampling	student
Rhiannon Johnson	sampling	student
Robin Brown	sampling	IOS
	Abbreviations:	
IOS	Institute of Ocean Sciences, Sidney, B.C. Canada	
POI	Pacific Oceanological Institute, Vladivostok, Russia	
UBC	University of British Columbia Vancouver, B.C. Canada	

APPENDIX 2. STATION SUMMARY FILES

Appendix 2 contains the summary files (9403.SUM) for Legs 1 and 2 of WOCE Cruise P15N.

The cast numbers are sequential, every over-the-side operation or discrete sampling at a station is assigned a sequential cast number. Every CTD/ROS or CTD cast was broken into two casts - a down cast and an up cast - and given separate cast numbers.

Abbreviations and codes used in -.SUM Files (from WOCE Report 67/91).

Mnemonic	Abr.	Full Title
EXPOCODE		WOCE (World Ocean Circulation Experiment) Expedition Code
WHP-ID		WOCE Hydrographic Programme Identifier
STNNBR		Station No.
TYPE:		Type of Cast
	BOT	Bottle Cast
	CTD	CTD
	DRF	Drifter deployment
	ROS	Rosette
	USW	Sample from uncontaminated sea water line at 5 m
	XBT	Expendable bathythermograph
UTC		Universal Time Clock
CODE:		
	BE	Beginning point of cast
	BO	Bottom of cast
	EN	End of cast

Parameter numbers, mnemonics, and units used in -.SUM and -.SEA files.

Parameter number	Parameter	Mnemonic	Scientific unit
1	Salinity	SALNTY	PSS-78
2	Oxygen	OXYGEN	umol/kg
3	Silicate	SILCAT	umol/kg
4	Nitrate	NITRAT	umol/kg
5	Nitrite	NITRIT	umol/kg
6	Phosphate	PHSPHT	umol/kg
7	Freon-11 (trichlorofluoromethane)	CFC-11	pmol/kg
8	Freon-12 (dichlorodifluoromethane)	CFC-12	pmol/kg
12	^{14}Carbon	DELC14	per mille
13	^{13}Carbon	DELC13	per mille
20	$^{18}O/^{16}O$ ratio	O18/O16	per mille
23	Total carbon	TCARBN	umol/kg
24	Total Alkalinity	ALKALI	umol/kg
25	Partial pressure of CO_2	PCO2	uatm
31	Methane	CH4	nmol/kg
34	Chlorophyll a	CHLORA	ug/kg

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	POSITION LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	PR6	JF01	1	USW	090794	600	BE	48	16.00	N	123	30.00	W	GPS	171	5	1	1,3-6,34
18DD9403/1	PR6	JF02	1	USW	090794	751	BE	48	17.99	N	124	0.15	W	GPS	187	5	1	1,3-6,34
18DD9403/1	PR6	JF03	1	USW	090794	1010	BE	48	26.99	N	124	30.02	W	GPS	215	5	1	1,3-6,34
18DD9403/1	PR6	JF04	1	USW	090794	1220	BE	48	32.36	N	125	0.70	W	GPS	67	5	1	1,3-6,34
18DD9403/1	PR6	P01	1	USW	090794	1438	BE	48	34.69	N	125	32.81	W	GPS	105	5	1	1,3-6,34
18DD9403/1	PR6	P02	1	USW	090794	1624	BE	48	36.00	N	126	0.00	W	GPS	115	5	1	1,3-6,34
18DD9403/1	PR6	P03	1	USW	090794	1752	BE	48	37.00	N	126	20.00	W	GPS	748	5	1	1,3-6,34
18DD9403/1	PR6	P04	1	USW	090794	1923	BE	48	38.95	N	126	39.94	W	GPS	1310	5	1	1,3-6,34
18DD9403/1	PR6	P04	2	ROS	090794	2006	BE	48	39.40	N	126	39.24	W	GPS	1290			
18DD9403/1	PR6	P04	2	ROS	090794	2034	BO	48	39.39	N	126	39.24	W	GPS		1313		
18DD9403/1	PR6	P04	3	ROS	090794	2035	BE	48	39.38	N	126	38.81	W	GPS	1310	1314	23	1-6,13,20,23,24
18DD9403/1	PR6	P04	3	ROS	090794	2119	EN	48	39.48	N	126	38.54	W	GPS				
18DD9403/1	PR6	P05	1	USW	090794	2359	BE	48	41.60	N	126	10.30	W	GPS		5	1	1,3-6,34
18DD9403/1	PR6	P06	1	USW	090894	0216	BE	48	44.60	N	127	41.20	W	GPS	2511	5	1	1,3-6,34
18DD9403/1	PR6	P08	1	USW	090894	0644	BE	48	49.00	N	128	40.00	W	GPS	2486	5	1	1,3-6,34
18DD9403/1	PR6	P09	1	USW	090894	0847	BE	48	51.37	N	129	9.95	W	GPS	2330	5	1	1,3-6,34
18DD9403/1	PR6	P10	1	USW	090894	1047	BE	48	53.56	N	129	39.72	W	GPS	2675	5	1	1,3-6,34
18DD9403/1	PR6	P11	1	USW	090894	1253	BE	48	56.00	N	130	10.00	W	GPS	2710	5	1	1,3-6,34
18DD9403/1	PR6	P12	1	USW	090894	1505	BE	48	58.00	N	130	39.70	W	GPS		5	1	1,3-6,34
18DD9403/1	PR6	P13	1	USW	090894	1947	BE	49	2.64	N	131	39.88	W	GPS		5	1	1,3-6,34
18DD9403/1	PR6	P13	2	ROS	090894	1944	BE	49	2.64	N	131	39.88	W	GPS				
18DD9403/1	PR6	P13	2	ROS	090894	2031	BO	49	2.93	N	131	39.24	W	GPS		3027		
18DD9403/1	PR6	P13	3	ROS	090894	2032	BE	49	2.93	N	131	39.23	W	GPS	3040	3021	23	1-8,23,24
18DD9403/1	PR6	P13	3	ROS	090894	2146	EN	49	3.38	N	131	38.32	W	GPS				
18DD9403/1	PR6	P14	1	USW	090994	0226	BE	49	7.35	N	132	39.87	W	GPS	3263	5	1	1,3-6,34
18DD9403/1	PR6	P15	1	USW	090994	0638	BE	49	12.00	N	133	39.55	W	GPS	3339	5	1	1,3-6,34
18DD9403/1	PR6	P16	1	USW	090994	1058	BE	49	17.02	N	134	40.18	W	GPS	3570	5	1	1,3-6,34
18DD9403/1	PR6	P17	1	USW	090994	1512	BE	49	21.00	N	135	40.20	W	GPS	3511	5	1	1,3-6,34
18DD9403/1	PR6	P18	1	USW	090994	2037	BE	49	24.92	N	136	39.69	W	GPS	3815	5	1	1,3-6,34
18DD9403/1	PR6	P18	2	ROS	090994	2030	BE	49	25.07	N	136	39.67	W	GPS	3816			
18DD9403/1	PR6	P18	2	ROS	090994	2132	BO	49	24.85	N	136	3.98	W	GPS		3869		
18DD9403/1	PR6	P18	3	ROS	090994	2133	BE	49	24.86	N	136	39.78	W	GPS		3870	23	1-8,23,24
18DD9403/1	PR6	P18	3	ROS	090994	2307	EN	49	25.16	N	136	40.45	W	GPS				
18DD9403/1	PR6	P19	1	USW	091094	421	BE	49	39.04	N	137	40.00	W	GPS	3782	5	1	1,3-6,34
18DD9403/1	PR6	P20	1	USW	091094	937	BE	49	33.99	N	138	40.03	W	GPS	3938	5	1	1,3-6,34
18DD9403/1	PR6	P21	1	USW	091094	1410	BE	49	37.98	N	139	40.00	W	GPS	3880	5	1	1,3-6,34
18DD9403/1	PR6	P22	1	USW	091094	1833	BE	49	42.07	N	140	39.76	W	GPS	3931	5	1	1,3-6,34
18DD9403/1	PR6	P23	1	USW	091094	2244	BE	49	46.02	N	141	40.17	W	GPS	2930	5	1	1,3-6,34
18DD9403/1	PR6	P24	1	USW	091194	240	BE	49	50.10	N	142	39.50	W	GPS	3959	5	1	1,3-6,34
18DD9403/1	PR6	P25	1	USW	091194	0629	BE	50	0.00	N	143	36.19	W	GPS	4104	5	1	1,3-6,34
18DD9403/1	PR6	P35	1	USW	091194	0916	BE	50	0.07	N	144	18.22	W	GPS	4117	5	1	1,3-6,34
18DD9403/1	PR6	PRS1	1	BTL	091194	1223	BE	50	0.12	N	144	9.42	W	GPS	4212	70		
18DD9403/1	PR6	PRS1	2	USW	091194	1227	BE	50	0.18	N	144	59.07	W	GPS	4212	5	1	1,3-6,34
18DD9403/1	PR6	PRS1	3	ROS	091194	1417	BE	50	0.37	N	144	58.26	W	GPS	4204			

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
18DD9403/1	PR6	PRS1	3	ROS	091194	1433	BO	50	3.50	N	144	58.25	W	GPS	4210	1003		
18DD9403/1	PR6	PRS1	4	ROS	091194	1433	BE	50	0.35	N	144	58.25	W	GPS	4210	1003		
18DD9403/1	PR6	PRS1	4	ROS	091194	1451	EN	50	0.35	N	144	58.25	W	GPS				
18DD9403/1	PR6	PRS1	5	ROS	091194	1451	BE	50	0.31	N	144	58.36	W	GPS			5	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	5	ROS	091194	1502	BO	50	0.31	N	144	58.36	W	GPS		300		
18DD9403/1	PR6	PRS1	6	ROS	091194	1502	BE	50	0.25	N	144	58.36	W	GPS			5	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	6	ROS	091194	1504	EN	50	0.26	N	144	58.36	W	GPS		50		
18DD9403/1	PR6	PRS1	7	ROS	091194	1504	BE	50	0.26	N	144	58.35	W	GPS			1	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	7	ROS	091194	1507	BO	50	0.23	N	144	58.39	W	GPS	4214	25		
18DD9403/1	PR6	PRS1	8	ROS	091194	1540	BE	50	0.10	N	144	58.81	W	GPS	4211			
18DD9403/1	PR6	PRS1	8	ROS	091194	1639	BO	50	59.90	N	144	58.26	W	GPS		4321		
18DD9403/1	PR6	PRS1	9	ROS	091194	1643	BE	50	59.93	N	144	58.26	W	GPS		4321	21	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	9	ROS	091194	1825	EN	50	0.04	N	144	57.76	W	GPS				
18DD9403/1		P146	1	USW	091194	2322	BE	50	12.38	N	146	0.55	W	GPS	4315	5	1	1,3-6,34
18DD9403/1		P147	1	USW	091294	409	BE	50	24.06	N	147	0.21	W	GPS	4465	5	1	1,3-6,34
18DD9403/1		P148	1	USW	091294	916	BE	50	35.76	N	148	0.57	W	GPS	4578	5	1	1,3-6,34
18DD9403/1		P149	1	USW	091294	1436	BE	50	47.19	N	149	0.23	W	GPS		5	1	1,3-6,34
18DD9403/1		P150	1	USW	091294	2207	BE	50	58.78	N	150	0.50	W	GPS	3998	5	1	1,3-6,34
18DD9403/1		P151	1	USW	091394	447	BE	51	12.50	N	151	13.10	W	GPS	4549	5	1	1,3-6,34
18DD9403/1		P152	1	USW	091394	830	BE	51	21.58	N	152	0.44	W	GPS	4793	5	1	1,3-6,34
18DD9403/1		P153	1	USW	091394	1318	BE	51	33.00	N	153	0.42	W	GPS	4656	5	1	1,3-6,34
18DD9403/1			1	XBT	091394	1655	BE	51	41.50	N	153	45.90	W	GPS	4400			
18DD9403/1		P154	1	USW	091394	1819	BE	51	44.89	N	154	3.69	W	GPS	4112	5	1	1,3-6,34
18DD9403/1		P155	1	USW	091394	2335	BE	51	55.47	N	155	0.05	W	GPS	4842	5	1	1,3-6,34
18DD9403/1		P156	1	USW	091494	750	BE	52	6.73	N	156	0.09	W	GPS		5	1	1,3-6,34
18DD9403/1			1	XBT	091494	1614	BE	52	17.50	N	156	58.80	W	GPS				
18DD9403/1		P157	1	USW	091494	1624	BE	52	17.73	N	157	0.00	W	GPS	4960	5	1	1,3-6,34
18DD9403/1		P158	1	USW	091594	144	BE	52	29.30	N	158	1.30	W	GPS		5	1	1,3-6,34
18DD9403/1		P159	1	USW	091594	1144	BE	52	40.01	N	159	0.01	W	GPS		5	1	1,3-6,34
18DD9403/1			1	XBT	091594	1652	BE	52	47.30	N	159	38.40	W	GPS				
18DD9403/1		P160	1	USW	091594	2042	BE	52	52.49	N	160	7.07	W	GPS		5	1	1,3-6,34
18DD9403/1		P161	1	USW	091694	218	BE	53	2.50	N	161	7.70	W	GPS	5012	5	1	1,3-6,34
18DD9403/1		P162	1	USW	091694	657	BE	53	10.98	N	162	1.45	W	GPS	5824	5	1	1,3-6,34
18DD9403/1		P163	1	USW	091694	1132	BE	53	17.21	N	163	0.01	W	GPS	5962	5	1	1,3-6,34
18DD9403/1		P164	1	USW	091694	1637	BE	53	23.66	N	164	0.05	W	GPS	4561	5	1	1,3-6,34
18DD9403/1			1	XBT	091694	1906	BE	53	27.18	N	164	26.49	W	GPS				
18DD9403/1		P165	1	USW	091694		BE	53	38.45	N	164	59.90	W	GPS	400	5	1	1,3-6,34
18DD9403/1	P15N	W001	1	ROS	091894	1504	BE	53	55.28	N	164	59.43	W	GPS	92			
18DD9403/1	P15N	W001	1	ROS	091894	1506	BO	53	55.24	N	164	59.38	W	GPS		86		
18DD9403/1	P15N	W001	2	ROS	091894	1507	BE	53	55.24	N	164	59.37	W	GPS		88	3	
18DD9403/1	P15N	W001	3	USW	091894	1507	BE	53	55.24	N	164	59.37	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W001	2	ROS	091894	1516	EN	53	55.23	N	164	59.18	W	GPS				
18DD9403/1	P15N	W002	1	ROS	091994	350	BE	53	44.68	N	164	59.36	W	GPS	195			
18DD9403/1	P15N	W002	2	USW	091994	355	BE	53	44.68	N	164	59.36	W	GPS		5	1	1,3-6,13,20,23,24,34

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE		POSITION	LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W002	1	ROS	091994	358	BO	53	44.95	N	164	59.25	W	GPS		173		
18DD9403/1	P15N	W002	3	ROS	091994	400	BE	53	44.66	N	164	59.30	W	GPS		179	8	1-6,13,20,23,24
18DD9403/1	P15N	W002	3	ROS	091994	412	EN	53	44.73	N	164	59.22	W	GPS				
18DD9403/1	P15N	W003	1	ROS	091994	615	BE	53	30.02	N	164	59.74	W	GPS	1430			
18DD9403/1	P15N	W003	2	USW	091994	634	BE	53	30.02	N	164	59.74	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W003	1	ROS	091994	641	BO	53	29.87	N	164	59.75	W	GPS		1482		
18DD9403/1	P15N	W003	3	ROS	091994	641	BE	53	29.86	N	164	59.75	W	GPS		1480	11	1-8
18DD9403/1	P15N	W003	3	ROS	091994	719	EN	53	29.63	N	164	60.00	W	GPS				
18DD9403/1	P15N	W004	1	ROS	091994	905	BE	53	14.94	N	165	0.90	W	GPS	3698			
18DD9403/1	P15N	W004	2	USW	091994	908	BE	53	14.94	N	165	0.90	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W004	1	ROS	091994	1003	BO	53	14.52	N	165	1.73	W	GPS		3694		
18DD9403/1	P15N	W004	3	ROS	091994	1003	BE	53	14.52	N	165	1.73	W	GPS	3690	3692	23	1-8,12,13,23,24
18DD9403/1	P15N	W004	3	ROS	091994	1132	EN	53	13.49	N	165	3.82	W	GPS				
18DD9403/1	P15N	W005	1	ROS	091994	1330	BE	52	59.90	N	165	0.16	W	GPS	3926			
18DD9403/1	P15N	W005	2	USW	091994	1338	BE	52	59.89	N	165	0.22	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W005	1	ROS	091994	1429	BO	52	59.76	N	165	0.58	W	GPS		3986		
18DD9403/1	P15N	W005	3	ROS	091994	1432	BE	52	59.76	N	165	0.59	W	GPS		3985	23	1-8
18DD9403/1	P15N	W005	3	ROS	091994	1606	EN	52	59.56	N	165	1.24	W	GPS				
18DD9403/1	P15N	W006	1	ROS	091994	1801	BE	52	44.79	N	164	59.66	W	GPS				
18DD9403/1	P15N	W006	2	USW	091994	1852	BE	52	44.39	N	165	0.18	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W006	1	ROS	091994	1909	BO	52	44.22	N	165	0.19	W	GPS		4134		
18DD9403/1	P15N	W006	3	ROS	091994	1909	BE	52	44.22	N	165	0.18	W	GPS		4136	23	1,3-8
18DD9403/1	P15N	W006	3	ROS	091994	2049	EN	52	44.25	N	164	59.77	W	GPS				
18DD9403/1	P15N	W006	4	DRF	091994	2112	DE	52	44.56	N	164	59.58	W	GPS				
18DD9403/1	P15N	W006	5	DRF	091994	2120	DE	52	44.47	N	164	58.79	W	GPS				
18DD9403/1	P15N	W007	1	USW	092094	148	BE	52	14.28	N	165	29.74	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W009	1	USW	092094	1318	BE	51	21.50	N	165	8.50	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W010	1	DRF	092094	1604	DE	51	0.32	N	164	59.84	W	GPS				
18DD9403/1	P15N	W010	2	DRF	092094	1611	DE	50	59.57	N	164	59.66	W	GPS				
18DD9403/1	P15N	W010	3	USW	092094	1621	BE	50	58.03	N	164	59.45	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N		1	XBT	092094	1700	BE	50	52.48	N	164	59.58	W	GPS	4780			
18DD9403/1	P15N	W011	1	USW	092094	1930	BE	50	29.94	N	164	59.59	W	GPS	4874	5	1	1,3-6,34
18DD9403/1	P15N	W011	2	ROS	092094	2004	BE	50	29.46	N	164	59.26	W	GPS	4872			
18DD9403/1	P15N	W011	2	ROS	092094	2111	BO	50	28.83	N	164	59.25	W	GPS		5010		
18DD9403/1	P15N	W011	3	ROS	092094	2111	BE	50	28.83	N	164	59.25	W	GPS		5008	23	1-8,13,20,23,24,31
18DD9403/1	P15N	W011	3	ROS	092094	2304	EN	50	27.95	N	164	59.57	W	GPS				
18DD9403/1	P15N	W012	1	USW	092194	232	BE	50	0.02	N	165	0.18	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W012	2	ROS	092194	232	BE	50	0.02	N	165	0.18	W	GPS	4950			
18DD9403/1	P15N	W012	2	ROS	092194	351	BO	50	0.37	N	165	0.13	W	GPS		5102		
18DD9403/1	P15N	W012	3	ROS	092194	351	BE	50	0.37	N	165	0.13	W	GPS		5105	23	1-8,12,23,24
18DD9403/1	P15N	W012	3	ROS	092194	544	EN	50	0.74	N	164	59.22	W	GPS				
18DD9403/1	P15N	W013	1	ROS	092194	934	BE	49	29.92	N	164	59.97	W	GPS	5085			
18DD9403/1	P15N	W013	2	USW	092194	940	BE	49	29.61	N	164	59.94	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W013	1	ROS	092194	1042	BO	49	29.61	N	164	59.94	W	GPS		5174		

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE			POSITION LONGITUDE				NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W013	3	ROS	092194	1043	BO	49	29.62	N	164	59.95	W	GPS			5176	23	1-8
18DD9403/1	P15N	W013	3	ROS	092194	1242	EN	49	29.33	N	165	0.13	W	GPS					
18DD9403/1	P15N	W013	4	DRF	092194	1306	DE	49	29.69	N	165	0.04	W	GPS					
18DD9403/1	P15N	W013	5	DRF	092194	1310	DE	49	29.69	N	165	0.69	W	GPS					
18DD9403/1	P15N	W013	6	DRF	092194	1314	DE	49	30.12	N	165	0.71	W	GPS					
18DD9403/1	P15N	W013	7	DRF	092194	1317	DE	49	30.15	N	165	0.01	W	GPS					
18DD9403/1	P15N	W013	8	DRF	092194	1328	DE	49	30.17	N	164	59.45	W	GPS					
18DD9403/1	P15N	W013	9	DRF	092194	1334	DE	49	29.69	N	164	59.47	W	GPS					
18DD9403/1	P15N	W014	1	USW	092194	1656	BE	49	0.25	N	165	0.44	W	GPS			5	1	1,3-6,23,24,34
18DD9403/1	P15N	W014	2	ROS	092194	1656	BE	49	0.25	N	165	0.44	W	GPS	5111			4	1-8,23,24
18DD9403/1	P15N	W014	2	ROS	092194	1802	BO	48	59.93	N	165	0.12	W	GPS			5218		
18DD9403/1	P15N	W014	3	ROS	092194	1819	BE	49	0.08	N	165	0.18	W	GPS			4503	19	1-8,23,24
18DD9403/1	P15N	W014	3	ROS	092194	1943	EN	49	0.47	N	165	0.47	W	GPS					
18DD9403/1	P15N	W015	1	ROS	092194	2312	BE	48	30.01	N	165	0.00	W	GPS	5290				
18DD9403/1	P15N	W015	2	USW	092194	2316	BE	48	30.01	N	165	0.00	W	GPS			5	1	1,3-6,34
18DD9403/1	P15N	W015	1	ROS	092294	28	BO	48	28.82	N	164	58.80	W	GPS			5255		
18DD9403/1	P15N	W015	3	ROS	092294	29	BE	48	28.82	N	164	58.79	W	GPS			5254	23	1-8
18DD9403/1	P15N	W015	3	ROS	092294	213	EN	48	27.97	N	164	55.93	W	GPS					
18DD9403/1	P15N	W015	4	DRF	092294	258	DE	48	30.26	N	164	59.69	W	GPS					
18DD9403/1	P15N	W015	5	DRF	092294	302	DE	48	29.78	N	164	59.65	W	GPS					
18DD9403/1	P15N	W015	6	DRF	092294	305	DE	48	29.83	N	165	0.00	W	GPS					
18DD9403/1	P15N	W015	7	DRF	092294	307	DE	48	29.78	N	165	0.33	W	GPS					
18DD9403/1	P15N	W015	8	DRF	092294	312	DE	48	30.24	N	165	0.34	W	GPS					
18DD9403/1	P15N	W016	1	ROS	092294	641	BE	48	0.00	N	165	0.03	W	GPS	4940				
18DD9403/1	P15N	W016	2	USW	092294	654	BE	47	59.97	N	164	59.96	W	GPS			5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W016	1	ROS	092294	753	BO	48	0.03	N	165	0.30	W	GPS			5135		
18DD9403/1	P15N	W016	3	ROS	092294	753	BE	48	0.03	N	165	0.30	W	GPS				23	1-8,13,20,23,24
18DD9403/1	P15N	W016	3	ROS	092294	939	EN	48	0.39	N	165	0.46	W	GPS					
18DD9403/1	P15N	W017	1	ROS	092294	1316	BE	47	30.00	N	165	0.00	W	GPS	5265				
18DD9403/1	P15N	W017	2	USW	092294	1321	BE	47	30.23	N	164	59.49	W	GPS			5	1	1,3-6,34
18DD9403/1	P15N	W017	1	ROS	092294	1440	BO	47	31.08	N	164	58.70	W	GPS			5343		
18DD9403/1	P15N	W017	3	ROS	092294	1440	BE	47	31.08	N	164	58.70	W	GPS			5345	23	1-8
18DD9403/1	P15N	W017	3	ROS	092294	1623	EN	47	32.18	N	164	56.70	W	GPS					
18DD9403/1	P15N	W018	1	DRF	092294	1934	DE	47	4.99	N	165	0.01	W	GPS					
18DD9403/1	P15N	W018	2	ROS	092294	2033	BE	46	59.99	N	164	59.91	W	GPS	5326				
18DD9403/1	P15N	W018	2	ROS	092294	2136	BO	47	0.67	N	164	59.47	W	GPS			5409		
18DD9403/1	P15N	W018	3	ROS	092294	2136	BE	47	0.67	N	164	59.47	W	GPS			5400	23	1-8,23,24
18DD9403/1	P15N	W018	4	USW	092294	2157	BE	47	0.76	N	164	59.73	W	GPS			5	1	1,3-6,23,24,34
18DD9403/1	P15N	W018	3	ROS	092294	2319	EN	47	0.24	N	164	59.84	W	GPS					
18DD9403/1	P15N	W019	1	USW	092394	449	EN	46	29.88	N	165	0.02	W	GPS			5	1	1,3-6,34
18DD9403/1	P15N	W020	1	USW	092394	931	BE	45	59.51	N	164	59.98	W	GPS			5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W021	1	USW	092494	57	BE	45	30.24	N	165	9.76	W	GPS	5244		5	1	1,3-6,34
18DD9403/1	P15N	W021	2	XBT	092494	57	BE	45	30.24	N	165	9.76	W	GPS					
18DD9403/1	P15N	W022	1	USW	092494	358	BE	44	59.80	N	164	45.34	W	GPS			5	1	1,3-6,23,24,34

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE		POSITION	LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W022	2	XBT	092494	400	BE	44	59.44	N	164	45.21	W	GPS	5400			
18DD9403/1	P15N	W023	1	XBT	092494	738	BE	44	30.01	N	164	45.24	W	GPS				
18DD9403/1	P15N	W023	2	USW	092494	748	BE	44	30.01	N	164	47.41	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W023	3	CTD	092494	931	BE	44	30.58	N	164	59.39	W	GPS	5453			
18DD9403/1	P15N	W023	3	CTD	092494	1118	EN	44	30.74	N	164	58.53	W	GPS		4500		
18DD9403/1	P15N	W024	1	CTD	092494	1451	BE	43	58.67	N	164	59.69	W	GPS	5514			
18DD9403/1	P15N	W024	2	USW	092494	1452	BE	43	59.70	N	164	59.71	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W024	1	CTD	092494	1557	BO	43	59.08	N	164	58.64	W	GPS		4832		
18DD9403/1	P15N	W024	3	CTD	092494	1558	BE	43	59.06	N	164	58.62	W	GPS	5500			
18DD9403/1	P15N	W024	3	CTD	092494	1648	EN	43	58.86	N	164	58.16	W	GPS				
18DD9403/1	P15N	W025	1	ROS	092494	2018	BE	43	29.31	N	165	0.48	W	GPS	5538			
18DD9403/1	P15N	W025	2	USW	092494	2024	BE	43	29.23	N	165	0.56	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W025	1	ROS	092494	2030	BO	43	29.15	N	165	0.54	W	GPS				
18DD9403/1	P15N	W025	3	ROS	092494	2030	BE	43	29.15	N	165	0.54	W	GPS		598	11	1-8,12,13,20,23,24
18DD9403/1	P15N	W025	3	ROS	092494	2049	EN	43	28.90	N	165	0.47	W	GPS				
18DD9403/1	P15N	W025	4	ROS	092494	2124	BE	43	28.58	N	165	0.56	W	GPS				
18DD9403/1	P15N	W025	4	ROS	092494	2235	BO	43	28.10	N	165	0.57	W	GPS		5675		
18DD9403/1	P15N	W025	5	ROS	092494	2235	BE	43	28.10	N	165	0.57	W	GPS			23	1-8
18DD9403/1	P15N	W025	5	ROS	092594	27	EN	43	27.77	N	165	0.61	W	GPS				
18DD9403/1	P15N	W026	1	ROS	092594	339	BE	43	0.08	N	164	59.81	W	GPS	5654			
18DD9403/1	P15N	W026	2	USW	092594	400	EN	43	0.80	N	164	59.40	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W026	1	ROS	092594	447	BO	43	0.51	N	164	59.45	W	GPS				
18DD9403/1	P15N	W026	3	ROS	092594	448	BE	43	0.51	N	164	59.44	W	GPS			23	1-8,12,23,24,31
18DD9403/1	P15N	W026	3	ROS	092594	641	EN	43	1.08	N	164	57.91	W	GPS				
18DD9403/1	P15N	W027	1	ROS	092594	1003	BE	42	29.98	N	164	59.98	W	GPS	5822		23	1-8
18DD9403/1	P15N	W027	2	USW	092594	1005	BE	42	30.00	N	164	59.95	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W027	1	ROS	092594	1310	EN	42	30.53	N	164	59.33	W	GPS		5927		
18DD9403/1	P15N	W028	1	ROS	092594	1630	BE	41	59.98	N	164	59.94	W	GPS	5780			
18DD9403/1	P15N	W028	2	USW	092594	1646	BE	41	59.98	N	164	59.71	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W028	1	ROS	092594	1746	BO	42	0.16	N	164	59.22	W	GPS		5912		
18DD9403/1	P15N	W028	3	ROS	092594	1747	BE	42	0.16	N	164	59.22	W	GPS			17	1-8,13,20,23,24
18DD9403/1	P15N	W028	3	ROS	092594	1907	EN	42	0.20	N	164	58.50	W	GPS				
18DD9403/1	P15N	W028	4	ROS	092594	2056	BE	42	0.26	N	164	57.69	W	GPS			6	1-8,13,20,23,24
18DD9403/1	P15N	W028	4	ROS	092594	2122	EN	42	0.26	N	164	57.51	W	GPS				
18DD9403/1	P15N	W028	5	ROS	092594	2155	BE	42	0.24	N	164	57.38	W	GPS				
18DD9403/1	P15N	W028	5	ROS	092594	2209	BO	42	0.25	N	164	57.25	W	GPS				
18DD9403/1	P15N	W028	6	ROS	092594	2209	BE	42	0.24	N	164	57.25	W	GPS			11	1-8,13,20,23,24
18DD9403/1	P15N	W028	6	ROS	092594	2232	EN	42	0.15	N	164	57.16	W	GPS				
18DD9403/1	P15N	W029	1	USW	092694	203	BE	41	29.81	N	164	59.83	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W029	2	ROS	092694	203	BE	41	29.81	N	164	59.83	W	GPS	5408			
18DD9403/1	P15N	W029	2	ROS	092694	313	BO	41	29.38	N	164	59.09	W	GPS				
18DD9403/1	P15N	W029	3	ROS	092694	313	BE	41	29.38	N	164	59.05	W	GPS			23	1-8,34
18DD9403/1	P15N	W029	3	ROS	092694	502	EN	41	27.73	N	164	57.62	W	GPS				
18DD9403/1	P15N	W030	1	ROS	092694	823	BE	40	59.91	N	165	0.24	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W030	2	USW	092694	834	BE	40	59.86	N	165	0.35	W	GPS				
18DD9403/1	P15N	W030	1	ROS	092694	933	BO	40	59.79	N	165	0.81	W	GPS		5475		
18DD9403/1	P15N	W030	3	ROS	092694	933	BE	40	59.78	N	165	0.81	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W030	3	ROS	092694	1130	EN	40	59.79	N	165	0.81	W	GPS				
18DD9403/1	P15N	W031	1	ROS	092694	1438	BE	40	59.68	N	165	0.35	W	GPS	5814			
18DD9403/1	P15N	W031	2	USW	092694	1536	BE	40	29.66	N	165	1.40	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W031	1	ROS	092694	1552	BO	40	29.28	N	165	1.94	W	GPS				
18DD9403/1	P15N	W031	3	ROS	092694	1552	BE	40	29.28	N	165	1.94	W	GPS			23	1-8
18DD9403/1	P15N	W031	3	ROS	092694	1553	EN	40	29.26	N	165	1.97	W	GPS		5900		
18DD9403/1	P15N	W031	4	ROS	092694	1553	BE	40	29.26	N	165	1.97	W	GPS				
18DD9403/1	P15N	W031	4	ROS	092694	1750	EN	40	26.86	N	165	4.98	W	GPS				
18DD9403/1	P15N	W031	5	ROS	092694	1839	BE	40	30.24	N	165	0.26	W	GPS				
18DD9403/1	P15N	W031	5	ROS	092694	1848	BO	40	30.41	N	165	0.39	W	GPS				
18DD9403/1	P15N	W031	6	ROS	092694	1848	BE	40	30.42	N	165	0.40	W	GPS			11	1-8
18DD9403/1	P15N	W031	6	ROS	092694	1907	EN	40	30.63	N	165	0.58	W	GPS				
18DD9403/1	P15N	W032	1	ROS	092694	2244	BE	40	0.08	N	165	0.00	W	GPS	5746			
18DD9403/1	P15N	W032	2	USW	092694	2253	BE	40	0.08	N	165	0.00	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W032	1	ROS	092694	2359	BO	40	1.07	N	164	59.67	W	GPS		5673		
18DD9403/1	P15N	W032	3	ROS	092694	2359	BE	40	1.07	N	164	59.67	W	GPS			23	1-8,13,20,23,24
18DD9403/1	P15N	W032	3	ROS	062794	207	EN	40	1.95	N	164	58.00	W	GPS				
18DD9403/1	P15N	W033	1	ROS	092794	629	BE	39	29.89	N	164	59.52	W	GPS	5531			
18DD9403/1	P15N	W033	2	USW	092794	640	BE	39	29.89	N	164	54.43	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W033	1	ROS	092794	746	BO	39	29.80	N	164	58.94	W	GPS		5658		
18DD9403/1	P15N	W033	3	ROS	092794	746	BE	39	29.80	N	164	58.94	W	GPS			23	1-8
18DD9403/1	P15N	W033	3	ROS	092794	939	EN	39	29.98	N	164	59.77	W	GPS				
18DD9403/1	P15N	W034	1	ROS	092794	1247	BE	38	59.95	N	165	0.02	W	GPS	5434			
18DD9403/1	P15N	W034	2	USW	092794	1247	BE	38	59.95	N	165	0.02	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W034	1	ROS	092794	1407	BO	39	0.12	N	165	0.51	W	GPS		5518		
18DD9403/1	P15N	W034	3	ROS	092794	1407	BE	39	0.12	N	165	0.51	W	GPS			23	1-8,12,23,24
18DD9403/1	P15N	W034	3	ROS	092794	1558	EN	38	59.59	N	165	3.59	W	GPS				
18DD9403/1	P15N	W034	4	ROS	092794	1649	BE	38	59.93	N	165	0.34	W	GPS	5428			
18DD9403/1	P15N	W034	4	ROS	092794	1658	BO	39	0.09	N	165	0.53	W	GPS		496		
18DD9403/1	P15N	W034	5	ROS	092794	1658	BE	39	0.09	N	165	0.53	W	GPS			9	1-8,12,23,24
18DD9403/1	P15N	W034	5	ROS	092794	1720	EN	39	0.45	N	165	1.27	W	GPS				
18DD9403/1	P15N	W035	1	ROS	092794	2051	BE	38	30.29	N	164	59.90	W	GPS	5513			
18DD9403/1	P15N	W035	2	USW	092794	2111	BE	38	30.29	N	164	59.90	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W035	1	ROS	092794	2209	BO	38	30.26	N	164	58.71	W	GPS				
18DD9403/1	P15N	W035	3	ROS	092794	2208	BE	38	30.25	N	164	58.70	W	GPS			23	1-8
18DD9403/1	P15N	W035	3	ROS	092894	35	EN	38	29.40	N	164	58.13	W	GPS				
18DD9403/1	P15N	W036	1	ROS	092894	336	BE	37	59.92	N	165	0.21	W	GPS	5370			
18DD9403/1	P15N	W036	2	USW	092894	345	BE	37	59.90	N	165	0.20	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W036	1	ROS	092894	446	BO	37	59.75	N	165	0.68	W	GPS		5496		
18DD9403/1	P15N	W036	3	ROS	092894	447	BE	37	59.73	N	165	0.68	W	GPS			23	1-8,23,24,31
18DD9403/1	P15N	W036	3	ROS	092894	637	EN	38	0.23	N	165	1.14	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE		POSITION	LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W037	1	ROS	092894	956	BE	37	30.11	N	165	0.11	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W037	2	USW	092894	959	BE	37	30.11	N	165	0.11	W	GPS		5282		
18DD9403/1	P15N	W037	1	ROS	092894	1110	BO	37	30.90	N	164	59.92	W	GPS			23	1-8
18DD9403/1	P15N	W037	3	ROS	092894	1111	BE	37	30.89	N	164	59.94	W	GPS				
18DD9403/1	P15N	W037	3	ROS	092894	1309	EN	37	32.28	N	164	58.03	W	GPS				
18DD9403/1	P15N	W038	1	ROS	092894	1633	BE	36	59.88	N	164	59.96	W	GPS	5730			
18DD9403/1	P15N	W038	2	USW	092894	1635	BE	36	59.88	N	164	59.96	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W038	1	ROS	092894	1743	BO	37	0.06	N	164	59.46	W	GPS				
18DD9403/1	P15N	W038	3	ROS	092894	1743	BE	37	0.07	N	164	59.47	W	GPS			23	1-8,13,20,23,24
18DD9403/1	P15N	W038	3	ROS	092894	1955	EN	36	58.78	N	164	58.96	W	GPS				
18DD9403/1	P15N	W039	1	ROS	092894	2319	BE	36	30.21	N	165	0.16	W	GPS				
18DD9403/1	P15N	W039	1	ROS	092894	2332	BO	36	30.27	N	165	0.38	W	GPS				
18DD9403/1	P15N	W039	2	ROS	092894	2333	BE	36	30.28	N	165	0.37	W	GPS			11	1-8
18DD9403/1	P15N	W039	2	ROS	092894	2357	EN	36	30.60	N	165	0.48	W	GPS				
18DD9403/1	P15N	W039	3	USW	092894	2334	BE	36	30.28	N	165	0.37	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W039	4	ROS	092994	27	BE	36	31.16	N	165	0.50	W	GPS	5900			
18DD9403/1	P15N	W039	4	ROS	092994	139	BO	36	31.95	N	165	1.00	W	GPS				
18DD9403/1	P15N	W039	5	ROS	092994	139	BE	36	31.95	N	165	1.00	W	GPS		5995	23	1-8
18DD9403/1	P15N	W039	5	ROS	092994	343	EN	36	31.80	N	165	3.70	W	GPS				
18DD9403/1	P15N	W040	1	ROS	092994	721	BE	35	59.93	N	165	0.04	W	GPS				
18DD9403/1	P15N	W040	2	USW	092994	732	BE	35	59.88	N	165	0.12	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W040	1	ROS	092994	840	BO	35	59.27	N	165	0.76	W	GPS		5812		
18DD9403/1	P15N	W040	3	ROS	092994	841	BE	35	59.23	N	165	0.76	W	GPS		5809	23	1-8,23,24
18DD9403/1	P15N	W040	3	ROS	092994	1101	EN	35	58.21	N	165	2.46	W	GPS				
18DD9403/1	P15N	W041	1	ROS	092994	1404	BE	35	29.94	N	164	59.91	W	GPS				
18DD9403/1	P15N	W041	1	ROS	092994	1413	BO	35	29.90	N	164	59.97	W	GPS				
18DD9403/1	P15N	W041	2	ROS	092994	1413	BE	35	29.89	N	164	59.98	W	GPS			1	1-8
18DD9403/1	P15N	W041	2	ROS	092994	1420	EN	35	29.86	N	164	59.98	W	GPS				
18DD9403/1	P15N	W041	2	ROS	092994	1420	BE	35	29.86	N	164	59.98	W	GPS			10	1-8
18DD9403/1	P15N	W041	2	ROS	092994	1436	EN	35	29.78	N	165	0.06	W	GPS				
18DD9403/1	P15N	W041	3	ROS	092994	1459	BE	35	29.70	N	165	0.25	W	GPS	5820			
18DD9403/1	P15N	W041	4	USW	092994	1511	BE	35	29.70	N	165	0.25	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W041	3	ROS	092994	1605	BO	35	29.45	N	165	0.62	W	GPS				
18DD9403/1	P15N	W041	5	ROS	092994	1605	BE	35	29.45	N	165	0.61	W	GPS	5820	5928	23	1-8
18DD9403/1	P15N	W041	5	ROS	092994	1758	EN	35	28.82	N	165	1.07	W	GPS				
18DD9403/1	P15N	W042	1	ROS	092994	2113	BE	35	0.01	N	164	59.78	W	GPS				
18DD9403/1	P15N	W042	2	USW	092994	2122	BE	35	0.05	N	164	59.72	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W042	1	ROS	092994	2227	BO	35	0.02	N	164	59.66	W	GPS				
18DD9403/1	P15N	W042	3	ROS	092994	2227	BE	35	0.02	N	164	59.66	W	GPS			23	1-8,12,13,20,23,24
18DD9403/1	P15N	W042	3	ROS	093094	35	EN	35	0.28	N	164	59.02	W	GPS				
18DD9403/1	P15N	W043	1	ROS	093094	355	BE	34	30.15	N	165	0.20	W	GPS	5719			
18DD9403/1	P15N	W043	1	ROS	093094	510	BO	34	30.60	N	165	0.00	W	GPS		5819		
18DD9403/1	P15N	W043	2	ROS	093094	511	BE	34	30.61	N	165	0.01	W	GPS			23	1-8
18DD9403/1	P15N	W043	3	USW	093094	627	BE	34	30.88	N	165	0.05	W	GPS		5	1	1,3-6,34

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W043	2	ROS	093094	716	EN	34	30.60	N	164	59.57	W	GPS				
18DD9403/1	P15N	W044	1	ROS	093094	1110	BE	34	0.12	N	165	0.04	W	GPS			11	1-8,23,24
18DD9403/1	P15N	W044	2	USW	093094	1115	BE	34	0.08	N	164	59.63	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W044	1	ROS	093094	1121	BO	34	0.08	N	164	59.63	W	GPS				
18DD9403/3	P15N	W044	3	ROS	093094	1121	BE	34	0.08	N	164	59.63	W	GPS				
18DD9403/4	P15N	W044	3	ROS	093094	1141	EN	34	0.02	N	164	59.54	W	GPS				
18DD9403/5	P15N	W044	4	ROS	093094	1233	BE	33	59.92	N	164	59.40	W	GPS				
18DD9403/6	P15N	W044	4	ROS	093094	1333	BO	33	59.52	N	164	59.26	W	GPS				
18DD9403/7	P15N	W044	5	ROS	093094	1333	BE	33	59.52	N	164	59.25	W	GPS			23	1-8,23,24
18DD9403/8	P15N	W044	5	ROS	093094	1533	EN	33	59.33	N	164	56.70	W	GPS				
18DD9403/9	P15N	W045	1	ROS	093094	1906	BE	33	29.99	N	165	0.00	W	GPS	5850			
18DD9403/1	P15N	W045	2	USW	093094	1912	EN	33	29.78	N	165	0.01	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W045	1	ROS	093094	2026	BO	33	29.68	N	165	0.67	W	GPS		5978		
18DD9403/1	P15N	W045	3	ROS	093094	2026	BE	33	29.68	N	165	0.68	W	GPS			23	1-8
18DD9403/1	P15N	W045	3	ROS	093094	2221	EN	33	28.01	N	165	1.51	W	GPS				
18DD9403/1	P15N	W045	4	ROS	093094	2251	BE	33	28.01	N	165	1.51	W	GPS			11	1-8
18DD9403/1	P15N	W045	4	ROS	093094	2303	BO	33	27.82	N	165	1.60	W	GPS				
18DD9403/1	P15N	W045	4	ROS	093094	2355	EN	33	25.52	N	165	1.94	W	GPS				
18DD9403/1	P15N	W046	1	ROS	100194	311	BE	32	59.94	N	165	0.54	W	GPS	5680			
18DD9403/1	P15N	W046	2	USW	100194	422	BE	32	59.72	N	165	0.87	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W046	1	ROS	100194	427	BO	32	59.75	N	165	0.88	W	GPS				
18DD9403/2	P15N	W046	3	ROS	100194	427	BE	32	59.75	N	165	0.88	W	GPS			23	1-8,13,20,23,24,31
18DD9403/2	P15N	W046	3	ROS	100194	631	EN	32	59.41	N	165	0.63	W	GPS				
18DD9403/2	P15N	W047	1	ROS	100194	1043	BE	32	30.30	N	164	59.75	W	GPS				
18DD9403/1	P15N	W047	2	USW	100194	1043	BE	32	30.30	N	164	59.75	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W047	1	ROS	100194	1055	BO	32	30.28	N	164	59.57	W	GPS				
18DD9403/1	P15N	W047	2	ROS	100194	1055	BE	32	30.28	N	164	59.57	W	GPS		602	11	1-8
18DD9403/1	P15N	W047	2	ROS	100194	1116	EN	32	30.14	N	164	59.46	W	GPS				
18DD9403/1	P15N	W047	3	ROS	100194	1155	BE	32	29.52	N	164	59.37	W	GPS	5579			
18DD9403/1	P15N	W047	3	ROS	100194	1304	BO	32	29.13	N	164	58.72	W	GPS		5670		
18DD9403/1	P15N	W047	4	ROS	100194	1304	BE	32	29.13	N	164	58.72	W	GPS			23	1-8
18DD9403/1	P15N	W047	4	ROS	100194	1453	EN	32	98.33	N	164	59.25	W	GPS				
18DD9403/1	P15N	W048	1	ROS	100194	1914	BE	31	59.88	N	164	59.75	W	GPS	5897			
18DD9403/1	P15N	W048	2	USW	100194	2033	EN	31	59.86	N	164	59.74	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W048	1	ROS	100194	2032	BO	31	59.66	N	164	59.83	W	GPS		5986		
18DD9403/1	P15N	W048	3	ROS	100194	2034	BE	31	59.67	N	164	59.84	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W048	3	ROS	100194	2234	EN	31	58.74	N	164	59.72	W	GPS				
18DD9403/1	P15N	W049	1	ROS	100294	206	BE	31	30.98	N	165	0.22	W	GPS	5885			
18DD9403/1	P15N	W049	2	USW	100294	213	BE	31	30.19	N	165	0.36	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W049	1	ROS	100294	220	BO	31	30.26	N	165	0.44	W	GPS		800		
18DD9403/1	P15N	W049	3	ROS	100294	221	BE	31	30.26	N	165	0.44	W	GPS			11	1-8,
18DD9403/1	P15N	W049	3	ROS	100294	243	EN	31	30.36	N	165	1.00	W	GPS				
18DD9403/1	P15N	W049	4	ROS	100294	317	BE	31	29.96	N	165	0.06	W	GPS	5884			
18DD9403/1	P15N	W049	4	ROS	100294	429	BO	31	30.30	N	165	0.79	W	GPS		6003		

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	POSITION LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W049	5	ROS	100294	429	BE	31	30.30	N	165	0.79	W	GPS			23	1-8
18DD9403/1	P15N	W049	5	ROS	100294	637	EN	31	30.76	N	164	59.60	W	GPS				
18DD9403/1	P15N	W050	1	ROS	100294	1013	BE	31	0.22	N	165	0.39	W	GPS	5906			
18DD9403/1	P15N	W050	2	USW	100294	1031	BE	31	0.22	N	165	0.39	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W050	1	ROS	100294	1134	BO	31	1.58	N	165	0.51	W	GPS				
18DD9403/1	P15N	W050	3	ROS	100294	1134	BE	31	1.58	N	165	0.51	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W050	3	ROS	100294	1352	EN	31	2.27	N	165	1.41	W	GPS				
18DD9403/1	P15N	W051	1	ROS	100294	1735	BE	30	30.19	N	165	0.04	W	GPS	5438			
18DD9403/1	P15N	W051	2	USW	100294	1744	BE	30	30.19	N	165	0.04	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W051	1	ROS	100294	1750	BO	30	30.23	N	164	59.97	W	GPS				
18DD9403/1	P15N	W051	3	ROS	100294	1750	BE	30	30.23	N	164	59.97	W	GPS			11	1-8
18DD9403/1	P15N	W051	3	ROS	100294	1814	EN	30	30.02	N	164	59.97	W	GPS				
18DD9403/1	P15N	W051	4	ROS	100294	1843	BE	30	30.51	N	164	59.89	W	GPS				
18DD9403/1	P15N	W051	4	ROS	100294	2002	BO	30	30.79	N	165	0.27	W	GPS				
18DD9403/1	P15N	W051	5	ROS	100294	2002	BE	30	30.79	N	165	0.27	W	GPS			23	1-8
18DD9403/1	P15N	W051	5	ROS	100294	2149	EN	30	30.93	N	165	1.29	W	GPS				
18DD9403/1	P15N	W052	1	USW	100394	147	BE	30	0.40	N	164	59.06	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W052	2	ROS	100394	405	BE	30	0.13	N	164	59.97	W	GPS				
18DD9403/1	P15N	W052	2	ROS	100394	517	BO	30	0.40	N	164	59.88	W	GPS		5519		
18DD9403/1	P15N	W052	3	ROS	100394	517	BE	30	0.40	N	164	59.87	W	GPS			23	1-8,12,13,20,23,24
18DD9403/1	P15N	W052	3	ROS	100394	721	EN	30	0.96	N	164	59.06	W	GPS				
18DD9403/1	P15N	W053	1	ROS	100394	1108	BE	29	30.23	N	164	59.72	W	GPS				
18DD9403/1	P15N	W053	2	USW	100394	1119	BE	29	30.27	N	164	59.67	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W053	1	ROS	100394	1119	BO	29	30.47	N	164	59.46	W	GPS		600		
18DD9403/1	P15N	W053	3	ROS	100394	1119	BE	29	30.27	N	164	59.67	W	GPS			11	1-8
18DD9403/1	P15N	W053	3	ROS	100394	1141	EN	29	30.47	N	164	59.46	W	GPS				
18DD9403/1	P15N	W053	4	ROS	100394	1204	BE	29	30.72	N	164	59.36	W	GPS	5417			
18DD9403/1	P15N	W053	4	ROS	100394	1321	BO	29	31.51	N	164	59.21	W	GPS		5526		
18DD9403/1	P15N	W053	5	ROS	100394	1321	BE	29	31.51	N	164	59.21	W	GPS			23	1-8
18DD9403/1	P15N	W053	5	ROS	100394	1522	EN	29	32.65	N	164	59.00	W	GPS				
18DD9403/1	P15N	W054	1	ROS	100394	1857	BE	29	0.03	N	164	59.77	W	GPS	5253			
18DD9403/1	P15N	W054	2	USW	100394	1908	EN	29	0.11	N	164	59.65	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W054	1	ROS	100394	2012	BO	29	0.59	N	164	59.11	W	GPS		5372		
18DD9403/1	P15N	W054	3	ROS	100394	2012	BE	29	0.59	N	164	59.11	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W054	3	ROS	100394	2208	EN	29	2.18	N	164	58.62	W	GPS				
18DD9403/1	P15N	W055	1	USW	100494	148	BE	28	30.22	N	165	0.05	W	GPS	5341	5	1	1,3-6,34
18DD9403/1	P15N	W055	2	ROS	100494	159	BE	28	30.44	N	165	0.10	W	GPS				
18DD9403/1	P15N	W055	2	ROS	100494	215	BO	28	30.71	N	165	0.27	W	GPS		1003		
18DD9403/1	P15N	W055	3	ROS	100494	223	BE	28	30.69	N	165	4.32	W	GPS			11	1-8
18DD9403/1	P15N	W055	3	ROS	100494	248	EN	28	30.88	N	164	59.94	W	GPS				
18DD9403/1	P15N	W055	4	ROS	100494	321	BE	28	29.96	N	165	0.01	W	GPS	5344			
18DD9403/1	P15N	W055	4	ROS	100494	455	BO	28	30.56	N	164	59.35	W	GPS				
18DD9403/1	P15N	W055	5	ROS	100494	456	BE	28	30.55	N	164	59.34	W	GPS		5429	23	1-8
18DD9403/1	P15N	W055	5	ROS	100494	655	EN	28	31.10	N	164	57.76	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W056	1	ROS	100494	1051	BE	27	59.99	N	164	59.92	W	GPS	5070		9	1-8,13,20,23,24,31
18DD9403/1	P15N	W056	2	USW	100494	1110	BE	27	59.99	N	164	59.92	W	GPS			1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W056	1	ROS	100494	1112	BO	28	0.46	N	164	59.45	W	GPS		1000		
18DD9403/1	P15N	W056	1	ROS	100494	1151	EN	28	0.30	N	164	58.89	W	GPS				
18DD9403/1	P15N	W057	1	CTD	100494	1556	BE	27	30.72	N	164	58.60	W	GPS	5181			
18DD9403/1	P15N	W057	2	USW	100494	1601	BE	27	30.76	N	164	58.46	W	GPS			1	1,3-6,34
18DD9403/1	P15N	W057	1	CTD	100494	1637	BO	27	30.93	N	164	58.54	W	GPS		2900		
18DD9403/1	P15N	W057	3	CTD	100494	1637	BE	27	30.93	N	164	58.54	W	GPS				
18DD9403/1	P15N	W057	3	CTD	100494	1717	EN	27	31.41	N	164	58.73	W	GPS				
18DD9403/1	P15N	W058	1	ROS	100494	2103	BE	27	0.51	N	164	59.65	W	GPS	4820			
18DD9403/1	P15N	W058	2	USW	100494	2105	BE	27	0.51	N	164	59.65	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W058	1	ROS	100494	2218	BO	27	1.00	N	164	58.99	W	GPS				
18DD9403/1	P15N	W058	3	ROS	100494	2218	BE	27	1.00	N	164	58.99	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W058	3	ROS	100494	2354	EN	27	2.86	N	164	57.90	W	GPS				
18DD9403/1	P15N	W059	1	ROS	100594	358	BE	26	29.96	N	165	0.00	W	GPS	4757			
18DD9403/1	P15N	W059	2	USW	100594	400	BE	26	29.95	N	165	0.09	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W059	1	ROS	100594	409	BO	26	30.07	N	165	0.19	W	GPS		602		
18DD9403/1	P15N	W059	3	ROS	100594	409	BE	26	30.07	N	165	0.19	W	GPS			11	1-8
18DD9403/1	P15N	W059	3	ROS	100594	426	EN	26	30.12	N	165	0.45	W	GPS				
18DD9403/1	P15N	W059	4	ROS	100594	448	BE	26	30.15	N	165	0.62	W	GPS	4760			
18DD9403/1	P15N	W059	4	ROS	100594	559	BO	26	30.40	N	165	0.64	W	GPS		4803		
18DD9403/1	P15N	W059	5	ROS	100594	559	BE	26	30.39	N	165	0.63	W	GPS			23	1-8
18DD9403/1	P15N	W059	5	ROS	100594	742	EN	26	30.30	N	165	0.71	W	GPS				
18DD9403/1	P15N	W060	1	ROS	100594	1102	BE	25	59.70	N	165	0.35	W	GPS	4665			
18DD9403/1	P15N	W060	2	USW	100594	1110	BE	25	59.70	N	165	0.35	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W060	1	ROS	100594	1215	BO	25	58.27	N	165	1.73	W	GPS		4649		
18DD9403/1	P15N	W060	3	ROS	100594	1216	BE	25	58.32	N	165	1.72	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W060	3	ROS	100594	1357	EN	25	57.73	N			W	GPS				
18DD9403/1	P15N	W061	1	ROS	100594	1711	BE	25	30.16	N	164	59.90	W	GPS	4867			
18DD9403/1	P15N	W061	2	USW	100594	1730	BE	25	30.30	N	164	59.79	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W061	1	ROS	100594	1815	BO	25	30.52	N	164	59.63	W	GPS		4938		
18DD9403/1	P15N	W061	3	ROS	100594	1815	BE	25	30.52	N	164	59.63	W	GPS			23	1-8
18DD9403/1	P15N	W061	3	ROS	100594	1955	EN	25	31.81	N	164	59.76	W	GPS				
18DD9403/1	P15N	W062	1	ROS	100594	2354	BE	25	0.13	N	164	59.95	W	GPS				
18DD9403/1	P15N	W062	2	USW	100694	3	BE	25	0.32	N	164	59.91	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W062	1	ROS	100694	100	BO	25	0.39	N	164	59.72	W	GPS		5041		
18DD9403/1	P15N	W062	3	ROS	100694	100	BE	25	0.39	N	164	59.72	W	GPS			23	1-8,12,13,20,23,24
18DD9403/1	P15N	W062	3	ROS	100694	231	EN	25	0.91	N	164	59.74	W	GPS				
18DD9403/1	P15N	W063	1	ROS	100694	651	BE	24	29.96	N	165	0.10	W	GPS	4906			
18DD9403/1	P15N	W063	2	USW	100694	712	BE	24	29.89	N	165	0.05	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W063	1	ROS	100694	802	BO	24	30.03	N	165	0.04	W	GPS		4984		
18DD9403/1	P15N	W063	3	ROS	100694	803	BE	24	30.03	N	165	0.04	W	GPS		4984	23	1-8
18DD9403/1	P15N	W063	3	ROS	100694	951	EN	24	30.33	N	164	59.18	W	GPS				
18DD9403/1	P15N	W064	1	ROS	100694	1404	BE	23	59.70	N	164	59.81	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W064	2	USW	100694	1404	BE	23	59.71	N	164	59.82	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W064	1	ROS	100694	1503	BO	23	59.29	N	164	59.92	W	GPS		4360		
18DD9403/1	P15N	W064	3	ROS	100694	1504	BE	23	59.30	N	164	59.94	W	GPS			23	1-8, 23,24
18DD9403/1	P15N	W064	3	ROS	100694	1656	EN	23	58.89	N	165	0.82	W	GPS				
18DD9403/1	P15N	W065	1	ROS	100694	2008	BE	23	30.05	N	165	18.87	W	GPS	4077			
18DD9403/1	P15N	W065	2	USW	100694	2026	EN	23	30.29	N	165	19.06	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W065	1	ROS	100694	2110	BO	23	31.12	N	165	19.52	W	GPS		4105		
18DD9403/1	P15N	W065	3	ROS	100694	2110	BE	23	31.13	N	165	19.53	W	GPS			23	1-8
18DD9403/1	P15N	W065	3	ROS	100694	2300	EN	23	30.49	N	165	18.97	W	GPS				
18DD9403/1	P15N	W066	1	ROS	100794	313	BE	22	55.08	N	165	28.01	W	GPS	4740			
18DD9403/1	P15N	W066	2	USW	100794	330	BE	22	55.02	N	165	27.79	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W066	1	ROS	100794	417	BO	22	54.84	N	165	27.57	W	GPS		4810		
18DD9403/1	P15N	W066	3	ROS	100794	417	BE	22	54.84	N	165	27.57	W	GPS			23	1-8, 23,24,31
18DD9403/1	P15N	W066	3	ROS	100794	555	EN	22	54.52	N	165	27.36	W	GPS				
18DD9403/1	P15N	W067	1	ROS	100794	848	BE	22	30.01	N	165	33.93	W	GPS	4664			
18DD9403/1	P15N	W067	2	USW	100794	858	BE	22	30.04	N	165	34.05	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W067	1	ROS	100794	951	BO	22	30.06	N	165	33.78	W	GPS		4721		
18DD9403/1	P15N	W067	3	ROS	100794	951	BE	22	30.06	N	165	33.78	W	GPS			23	1-8
18DD9403/1	P15N	W067	3	ROS	100794	1159	EN	22	30.63	N	165	34.12	W	GPS				
18DD9403/1	P15N	W068	1	ROS	100794	1505	BE	21	59.21	N	165	42.19	W	GPS	4624			
18DD9403/1	P15N	W068	2	USW	100794	1508	BE	21	59.21	N	165	42.19	W	GPS		5	1	1,3-6,13,20,23,24
18DD9403/1	P15N	W068	1	ROS	100794	1606	BO	21	58.94	N	165	41.90	W	GPS		4678		
18DD9403/1	P15N	W068	3	ROS	100794	1606	BE	21	58.94	N	165	41.90	W	GPS			20	1-8,13,20,23,24
18DD9403/1	P15N	W068	3	ROS	100794	1742	EN	21	58.56	N	165	41.36	W	GPS				
18DD9403/1	P15N	W069	1	ROS	100794	2022	BE	21	30.00	N	165	49.75	W	GPS	4696			
18DD9403/1	P15N	W069	1	ROS	100794	2125	BO	21	30.50	N	165	50.34	W	GPS		4776		
18DD9403/1	P15N	W069	2	ROS	100794	2125	BE	21	30.50	N	165	50.34	W	GPS			23	1-8
18DD9403/1	P15N	W069	2	ROS	100794	2316	EN	21	31.10	N	165	50.97	W	GPS				
18DD9403/1	P15N	W070	1	ROS	100894	258	BE	20	53.94	N	165	58.65	W	GPS	4841			
18DD9403/1	P15N	W070	1	ROS	100894	306	BO	20	53.87	N	165	58.73	W	GPS		501		
18DD9403/1	P15N	W070	2	ROS	100894	307	BE	20	53.88	N	165	58.75	W	GPS			11	1-8,23,24
18DD9403/1	P15N	W070	2	ROS	100894	323	EN	20	53.88	N	165	58.96	W	GPS				
18DD9403/1	P15N	W070	3	ROS	100894	344	BE	20	53.94	N	165	58.68	W	GPS	4843			
18DD9403/1	P15N	W070	3	ROS	100894	448	BO	20	53.98	N	165	59.60	W	GPS		4925		
18DD9403/1	P15N	W070	4	ROS	100894	448	BE	20	53.98	N	165	59.60	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W070	5	USW	100894	457	EN	20	53.95	N	165	59.68	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W070	4	ROS	100894	635	EN	20	53.92	N	166	0.42	W	GPS				
18DD9403/1	P15N	FREON	1	ROS	100894	1843	BE	20	59.27	N	164	1.77	W	GPS	4905			
18DD9403/1	P15N	FREON	1	ROS	100894	1907	BO	20	59.50	N	164	1.98	W	GPS		1501		
18DD9403/1	P15N	FREON	2	ROS	100894	1907	BE	20	59.51	N	164	1.98	W	GPS			11	1,2,7,8
18DD9403/1	P15N	FREON	2	ROS	100894	1933	EN	20	59.63	N	164	2.17	W	GPS				
18DD9403/1	P15N	FREON	3	ROS	100894	1952	BE	20	59.81	N	164	2.33	W	GPS				
18DD9403/1	P15N	FREON	3	ROS	100894	2014	BO	20	59.93	N	164	2.51	W	GPS		1507		
18DD9403/1	P15N	FREON	4	ROS	100894	2015	BE	20	59.93	N	164	2.51	W	GPS			23	1,2

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	FREON	4	ROS	100894	2049	EN	21	0.06	N	164	2.74	W	GPS				
18DD9403/1	P15N	FREON	5	CTD	100894	2159	BE	21	0.45	N	164	3.50	W	GPS	4907			
18DD9403/1	P15N	FREON	5	CTD	100894	2255	BO	21	0.57	N	164	4.19	W	GPS				
18DD9403/1	P15N	FREON	6	CTD	100894	2256	BE	21	0.57	N	164	4.19	W	GPS				
18DD9403/1	P15N	FREON	6	CTD	100894	2342	EN	21	0.66	N	164	4.89	W	GPS				
18DD9403/1	P15N	FREON	7	ROS	100994	27	BE	21	0.80	N	164	5.58	W	GPS				
18DD9403/1	P15N	FREON	7	ROS	100994	133	BO	21	0.95	N	164	6.63	W	GPS			23	7,8
18DD9403/1	P15N	FREON	8	ROS	100994	143	BE	21	0.93	N	164	6.79	W	GPS				
18DD9403/1	P15N	FREON	8	ROS	100994	309	EN	21	0.96	N	164	7.75	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	X	1	ROS	101694	113	BE	21	11.09	N	158	30.14	W	GPS	2940			
18DD9403/2	P15N	X	1	ROS	101694	159	BO	21	10.76	N	158	32.79	W	GPS		2955		
18DD9403/2	P15N	X	2	ROS	101694	159	BE	21	10.77	N	158	32.79	W	GPS			17	1-6,23
18DD9403/2	P15N	X	3	USW	101694	219	EN	21	10.70	N	158	32.88	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	X	2	ROS	101694	304	EN	21	10.48	N	158	33.23	W	GPS				
18DD9403/2	P15N	W071	1	ROS	101794	1606	BE	20	30.27	N	166	5.18	W	GPS	4886			
18DD9403/2	P15N	W071	2	USW	101894	1620	BE	20	30.53	N	166	5.17	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W071	1	ROS	101894	1715	BO	20	31.50	N	166	5.12	W	GPS		4924		
18DD9403/2	P15N	W071	3	ROS	101894	1715	BE	20	31.51	N	166	5.12	W	GPS			23	1-8,
18DD9403/2	P15N	W071	3	ROS	101894	1917	EN	20	31.80	N	166	4.91	W	GPS				
18DD9403/2	P15N	W072	1	ROS	101894	2338	BE	20	0.27	N	166	12.02	W	GPS	5165			
18DD9403/2	P15N	W072	1	ROS	101894	2357	BO	20	0.74	N	166	12.02	W	GPS		1006		
18DD9403/2	P15N	W072	2	ROS	101994	2357	BE	20	0.74	N	166	12.05	W	GPS			11	1-8,13,20,23,24,31
18DD9403/2	P15N	W072	3	USW	101994	35	BE	20	1.00	N	166	11.36	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W072	2	ROS	101994	32	EN	20	0.98	N	166	11.34	W	GPS				
18DD9403/2	P15N	W072	4	ROS	101994	114	BE	20	1.02	N	166	11.87	W	GPS	5165			
18DD9403/2	P15N	W072	4	ROS	101994	223	BO	20	1.54	N	166	11.83	W	GPS		5148		
18DD9403/2	P15N	W072	5	ROS	101994	223	BE	20	1.52	N	166	11.83	W	GPS			18	1-8,13,20,23,24,31
18DD9403/2	P15N	W072	5	ROS	101994	359	EN	20	3.14	N	166	13.35	W	GPS				
18DD9403/2	P15N	W073	1	ROS	101994	842	BE	19	30.07	N	166	19.78	W	GPS	5270			
18DD9403/2	P15N	W073	1	ROS	101994	900	BO	19	30.06	N	166	19.60	W	GPS		1000		
18DD9403/2	P15N	W073	2	ROS	101994	900	BE	19	30.06	N	166	19.60	W	GPS			11	1-8,
18DD9403/2	P15N	W073	2	ROS	101994	926	EN	19	30.00	N	166	19.28	W	GPS				
18DD9403/2	P15N	W073	3	ROS	101994	951	BE	19	30.14	N	166	19.08	W	GPS				
18DD9403/2	P15N	W073	4	USW	101994	954	EN	19	30.13	N	166	19.03	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W073	3	ROS	101994	1100	BO	19	30.27	N	166	18.63	W	GPS		5354		
18DD9403/2	P15N	W073	5	ROS	101994	1100	BE	19	30.26	N	166	18.63	W	GPS			20	1-8,
18DD9403/2	P15N	W073	5	ROS	101994	1304	EN	19	31.92	N	166	18.83	W	GPS				
18DD9403/2	P15N	W074	1	ROS	101994	1739	BE	19	0.14	N	166	27.85	W	GPS	5466			
18DD9403/2	P15N	W074	1	ROS	101994	1754	BO	19	0.08	N	166	27.39	W	GPS		1000		
18DD9403/2	P15N	W074	2	ROS	101994	1755	BE	19	0.08	N	166	27.39	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W074	2	ROS	101994	1826	EN	19	0.08	N	166	26.67	W	GPS				
18DD9403/2	P15N	W074	3	USW	101994	1849	EN	19	0.15	N	166	26.35	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W075	1	ROS	101994	2253	BE	18	30.16	N	166	34.89	W	GPS				
18DD9403/2	P15N	W075	1	ROS	101994	2308	BO	18	30.21	N	166	34.92	W	GPS		331		
18DD9403/2	P15N	W075	2	CTD	101994	2335	BE	18	30.09	N	166	34.39	W	GPS				
18DD9403/2	P15N	W075	2	CTD	102094	41	BO	18	30.36	N	166	33.73	W	GPS		5000		
18DD9403/2	P15N	W075	3	CTD	102094	41	BE	18	30.37	N	166	33.72	W	GPS				
18DD9403/2	P15N	W075	3	CTD	102094	142	EN	18	30.29	N	166	33.22	W	GPS				
18DD9403/2	P15N	W076	1	CTD	102094	553	BE	18	0.02	N	166	42.79	W	GPS	5313			
18DD9403/2	P15N	W076	1	CTD	102094	706	BO	18	0.22	N	166	41.33	W	GPS		5012		

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W076	2	CTD	102094	706	BE	18	0.21	N	166	41.33	W	GPS				
18DD9403/2	P15N	W076	3	USW	102094	714	BE	18	0.09	N	166	41.46	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W076	2	CTD	102094	817	EN	17	59.60	N	166	41.54	W	GPS				
18DD9403/2	P15N	W077	1	CTD	102094	1203	BE	17	29.80	N	166	50.98	W	GPS				
18DD9403/2	P15N	W077	1	CTD	102094	1318	BO	17	28.92	N	166	50.52	W	GPS		5002		
18DD9403/2	P15N	W077	2	CTD	102094	1319	BE	17	28.92	N	166	50.52	W	GPS				
18DD9403/2	P15N	W077	3	USW	102094	1320	BE	17	28.78	N	166	50.59	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W077	2	CTD	102094	1417	EN	17	28.48	N	166	50.50	W	GPS				
18DD9403/2	P15N	W078	1	ROS	102094	1758	BE	16	59.82	N	166	58.25	W	GPS	5354			
18DD9403/2	P15N	W078	1	ROS	102094	1920	BO	16	58.44	N	166	59.47	W	GPS		5292		
18DD9403/2	P15N	W078	2	USW	102094	1937	BE	16	58.23	N	166	59.66	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W078	3	ROS	102094	1921	BE	16	58.43	N	166	59.47	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W078	3	ROS	102094	2133	EN	16	58.80	N	166	58.75	W	GPS				
18DD9403/2	P15N	W079	1	ROS	102194	58	BE	16	59.92	N	167	6.27	W	GPS	5390			
18DD9403/2	P15N	W079	1	ROS	102194	207	BO	16	29.80	N	167	6.42	W	GPS		5342		
18DD9403/2	P15N	W079	2	ROS	102194	207	BE	16	29.80	N	167	6.42	W	GPS			23	1-8,
18DD9403/2	P15N	W079	3	USW	102194	232	BE	16	29.69	N	167	6.49	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W079	2	ROS	102194	357	EN	16	28.94	N	167	6.66	W	GPS				
18DD9403/2	P15N	W080	1	ROS	102194	732	BE	15	59.69	N	167	13.23	W	GPS	4500			
18DD9403/2	P15N	W080	2	USW	102194	812	EN	15	59.58	N	167	13.69	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W080	1	ROS	102194	844	BO	15	59.60	N	167	14.01	W	GPS		4748		
18DD9403/2	P15N	W080	3	ROS	102194	844	BE	15	59.60	N	167	14.01	W	GPS			23	1-6,13,20,23,24
18DD9403/2	P15N	W080	3	ROS	102194	1025	EN	15	59.45	N	167	14.96	W	GPS				
18DD9403/2	P15N	W081	1	ROS	102194	1332	BE	15	29.90	N	167	20.98	W	GPS	5100			
18DD9403/2	P15N	W081	2	USW	102194	1350	BE	15	29.90	N	167	20.99	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W081	1	ROS	102194	1446	BO	15	29.47	N	167	21.97	W	GPS		5270		
18DD9403/2	P15N	W081	3	ROS	102194	1446	BE	15	29.46	N	167	22.00	W	GPS			23	1-8,34
18DD9403/2	P15N	W081	3	ROS	102194	1651	EN	15	29.27	N	167	23.66	W	GPS				
18DD9403/2	P15N	W082	1	ROS	102194	1959	BE	14	59.99	N	167	28.95	W	GPS	5200			
18DD9403/2	P15N	W082	2	USW	102194	2030	BE	14	59.93	N	167	29.79	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W082	1	ROS	102194	2105	BO	14	59.93	N	167	29.79	W	GPS		5261		
18DD9403/2	P15N	W082	3	ROS	102194	2105	BE	14	59.93	N	167	29.79	W	GPS			23	1-8,23,24,31
18DD9403/2	P15N	W082	3	ROS	102194	2257	EN	15	0.15	N	167	30.76	W	GPS				
18DD9403/2	P15N	W083	1	ROS	102294	215	BE	14	29.91	N	167	36.52	W	GPS	5137			
18DD9403/2	P15N	W083	2	USW	102294	240	BE	14	29.69	N	167	36.98	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W083	1	ROS	102294	322	BO	14	29.53	N	167	37.51	W	GPS		5221		
18DD9403/2	P15N	W083	3	ROS	102294	323	BE	14	29.51	N	167	37.53	W	GPS			23	1-8,
18DD9403/2	P15N	W083	3	ROS	102294	502	EN	14	29.28	N	167	39.13	W	GPS				
18DD9403/2	P15N	W084	1	ROS	102294	818	BE	13	58.83	N	167	44.25	W	GPS	1581			
18DD9403/2	P15N	W084	1	ROS	102294	843	BO	13	58.70	N	167	44.61	W	GPS		1573		
18DD9403/2	P15N	W084	2	ROS	102294	843	BE	13	58.70	N	167	44.61	W	GPS			16	1-8,13,20,23,24

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W084	3	USW	102294	911	BE	13	58.57	N	167	45.01	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W084	2	ROS	102294	923	EN	13	58.51	N	167	45.24	W	GPS				
18DD9403/2	P15N	W085	1	ROS	102294	1232	BE	13	29.57	N	167	52.22	W	GPS	5172			
18DD9403/2	P15N	W085	2	USW	102294	1253	BE	13	29.58	N	167	52.27	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W085	1	ROS	102294	1353	BO	13	29.30	N	167	52.73	W	GPS		5298		
18DD9403/2	P15N	W085	3	ROS	102294	1354	BE	13	29.30	N	167	52.73	W	GPS			23	1-8,
18DD9403/2	P15N	W085	3	ROS	102294	1548	EN	13	28.70	N	167	53.73	W	GPS				
18DD9403/2	P15N	W086	1	ROS	102294	1850	BE	13	0.01	N	167	59.16	W	GPS	5450			
18DD9403/2	P15N	W086	2	USW	102294	1918	BE	13	0.02	N	167	58.97	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W086	1	ROS	102294	2006	BO	12	59.91	N	167	59.15	W	GPS		5475		
18DD9403/2	P15N	W086	3	ROS	102294	2006	BE	12	59.91	N	167	59.15	W	GPS			23	1-8,12,23,24
18DD9403/2	P15N	W086	3	ROS	102294	2151	EN	12	59.54	N	167	59.68	W	GPS				
18DD9403/2	P15N	W087	1	ROS	102394	108	BE	12	29.94	N	168	7.02	W	GPS				
18DD9403/2	P15N	W087	2	USW	102394	120	BE	12	29.76	N	168	7.13	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W087	1	ROS	102394	220	BO	12	29.49	N	168	7.07	W	GPS		5544		
18DD9403/2	P15N	W087	3	ROS	102394	220	BE	12	29.49	N	168	7.07	W	GPS			22	1-8,
18DD9403/2	P15N	W087	3	ROS	102394	429	EN	12	28.50	N	168	8.12	W	GPS				
18DD9403/2	P15N	W088	1	ROS	102394	729	BE	11	59.98	N	168	14.92	W	GPS	5420			
18DD9403/2	P15N	W088	2	USW	102394	806	BE	11	59.77	N	168	15.01	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W088	1	ROS	102394	843	BO	12	0.05	N	168	15.21	W	GPS		5400		
18DD9403/2	P15N	W088	3	ROS	102394	844	BE	12	0.07	N	168	15.22	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W088	3	ROS	102394	1030	EN	12	1.03	N	168	15.38	W	GPS				
18DD9403/2	P15N	W089	1	ROS	102394	1343	BE	11	29.89	N	168	22.10	W	GPS	5109			
18DD9403/2	P15N	W089	2	USW	102394	1401	BE	11	29.63	N	168	22.52	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W089	1	ROS	102394	1447	BO	11	29.42	N	168	22.62	W	GPS		5174		
18DD9403/2	P15N	W089	3	ROS	102394	1447	BE	11	29.42	N	168	22.62	W	GPS			23	1-8,
18DD9403/2	P15N	W089	3	ROS	102394	1647	EN	11	28.58	N	168	23.44	W	GPS				
18DD9403/2	P15N	W090	1	ROS	102394	1948	BE	11	0.10	N	168	30.00	W	GPS	5420			
18DD9403/2	P15N	W090	1	ROS	102394	2056	BO	11	0.38	N	168	30.72	W	GPS		5498		
18DD9403/2	P15N	W090	2	ROS	102394	2056	BE	11	0.38	N	168	30.72	W	GPS			22	1-8,23,24
18DD9403/2	P15N	W090	3	USW	102394	2100	BE	11	0.38	N	168	30.72	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W090	2	ROS	102394	2240	EN	10	59.98	N	168	31.83	W	GPS				
18DD9403/2	P15N	W091	1	ROS	102494	148	BE	10	29.94	N	168	37.12	W	GPS	5399			
18DD9403/2	P15N	W091	2	USW	102494	200	BE	10	29.97	N	168	37.39	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W091	1	ROS	102494	304	BO	10	29.93	N	168	37.42	W	GPS		5480		
18DD9403/2	P15N	W091	3	ROS	102494	304	BE	10	29.93	N	168	37.42	W	GPS			22	1-8,
18DD9403/2	P15N	W091	3	ROS	102494	448	EN	10	29.83	N	168	38.18	W	GPS				
18DD9403/2	P15N	W092	1	ROS	102494	800	BE	10	0.06	N	168	44.81	W	GPS	5230			
18DD9403/2	P15N	W092	2	USW	102494	824	BE	10	0.41	N	168	44.76	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W092	1	ROS	102494	906	BO	10	0.96	N	168	44.84	W	GPS		5304		
18DD9403/2	P15N	W092	3	ROS	102494	907	BE	10	0.97	N	168	44.84	W	GPS			23	1-8,13,20,23,24

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W092	3	ROS	102494	1048	EN	10	1.46	N	168	43.46	W	GPS				
18DD9403/2	P15N	W093	1	ROS	102494	1408	BE	9	29.82	N	168	44.92	W	GPS				
18DD9403/2	P15N	W093	2	USW	102494	1420	BE	9	29.65	N	168	44.94	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W093	1	ROS	102494	1524	BO	9	29.28	N	168	45.35	W	GPS		5255		
18DD9403/2	P15N	W093	3	ROS	102494	1524	BE	9	29.28	N	168	45.35	W	GPS			22	1-8,
18DD9403/2	P15N	W093	3	ROS	102494	1705	EN	9	28.52	N	168	46.08	W	GPS				
18DD9403/2	P15N	W094	1	ROS	102494	2010	BE	8	59.95	N	168	44.98	W	GPS	4995			
18DD9403/2	P15N	W094	2	USW	102494	2020	BE	8	59.78	N	168	45.06	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W094	1	ROS	102494	2102	BO	8	59.72	N	168	45.24	W	GPS		5084		
18DD9403/2	P15N	W094	3	ROS	102494	2102	BE	8	59.71	N	168	45.25	W	GPS			23	1-8,12,23,24,31
18DD9403/2	P15N	W094	3	ROS	102494	2242	EN	8	59.56	N	168	45.40	W	GPS				
18DD9403/2	P15N	W095	1	ROS	102594	300	BE	8	30.07	N	168	45.14	W	GPS	4948			
18DD9403/2	P15N	W095	2	USW	102594	318	BE	8	30.06	N	168	45.26	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W095	1	ROS	102594	407	BO	8	30.39	N	168	45.33	W	GPS		4956		
18DD9403/2	P15N	W095	3	ROS	102594	408	BE	8	30.39	N	168	45.33	W	GPS			23	1-8,
18DD9403/2	P15N	W095	3	ROS	102594	553	EN	8	30.40	N	168	45.85	W	GPS				
18DD9403/2	P15N	W096	1	ROS	102594	910	BE	8	0.11	N	168	44.74	W	GPS	5095			
18DD9403/2	P15N	W096	2	USW	102594	934	BE	8	0.11	N	168	44.60	W	GPS		5	1	1,3-6,13,.20,23,24,34
18DD9403/2	P15N	W096	1	ROS	102594	1013	BO	8	0.27	N	168	44.19	W	GPS		5175		
18DD9403/2	P15N	W096	3	ROS	102594	1014	BE	8	0.28	N	168	44.19	W	GPS			21	1-8,13,20,23,24
18DD9403/2	P15N	W096	3	ROS	102594	1208	EN	8	0.66	N	168	43.31	W	GPS				
18DD9403/2	P15N	W097	1	ROS	102594	1556	BE	7	29.85	N	168	44.60	W	GPS	5148			
18DD9403/2	P15N	W097	2	USW	102594	1612	BE	7	29.61	N	168	44.47	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W097	1	ROS	102594	1659	BO	7	29.44	N	168	44.31	W	GPS		5240		
18DD9403/2	P15N	W097	3	ROS	102594	1700	BE	7	29.44	N	168	44.32	W	GPS			23	1-8,
18DD9403/2	P15N	W097	3	ROS	102594	1847	EN	7	29.15	N	168	44.05	W	GPS				
18DD9403/2	P15N	W098	1	ROS	102594	2310	BE	7	0.09	N	168	44.68	W	GPS	5369			
18DD9403/2	P15N	W098	2	USW	102594	2330	BE	7	0.17	N	168	43.84	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W098	1	ROS	102694	30	BO	7	0.29	N	168	42.80	W	GPS		5306		
18DD9403/2	P15N	W098	3	ROS	102694	31	BE	7	0.29	N	168	42.80	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W098	3	ROS	102694	237	EN	6	59.61	N	168	41.36	W	GPS				
18DD9403/2	P15N	W099	1	ROS	102694	605	BE	6	30.07	N	168	44.80	W	GPS	5400			
18DD9403/2	P15N	W099	1	ROS	102694	716	BO	6	30.18	N	168	43.80	W	GPS		5500		
18DD9403/2	P15N	W099	2	ROS	102694	716	BE	6	30.18	N	168	43.80	W	GPS			23	1-8,
18DD9403/2	P15N	W099	3	USW	102694	740	EN	6	30.21	N	168	43.57	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W099	2	ROS	102694	908	EN	6	30.60	N	168	42.14	W	GPS				
18DD9403/2	P15N	W100	1	ROS	102694	1230	BE	6	0.04	N	168	44.92	W	GPS				
18DD9403/2	P15N	W100	2	USW	102694	1305	BE	6	0.11	N	168	44.52	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W100	1	ROS	102694	1352	BO	6	0.21	N	168	44.22	W	GPS		5615		
18DD9403/2	P15N	W100	3	ROS	102694	1352	BE	6	0.28	N	168	44.23	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W100	3	ROS	102694	1555	EN	6	0.72	N	168	43.74	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W101	1	ROS	102694	1919	BE	5	29.98	N	168	44.82	W	GPS	5549			
18DD9403/2	P15N	W101	1	ROS	102694	1938	BO	5	29.80	N	168	44.64	W	GPS		992		
18DD9403/2	P15N	W101	2	ROS	102694	1938	BE	5	29.80	N	168	44.64	W	GPS			11	1-8,
18DD9403/2	P15N	W101	2	ROS	102694	2007	EN	5	29.31	N	168	44.48	W	GPS				
18DD9403/2	P15N	W101	3	ROS	102694	2030	BE	5	28.89	N	168	44.38	W	GPS	5570			
18DD9403/2	P15N	W101	4	USW	102694	2044	BE	5	28.68	N	168	44.36	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W101	3	ROS	102694	2148	BO	5	27.84	N	168	44.10	W	GPS		5695		
18DD9403/2	P15N	W101	5	ROS	102694	2148	BE	5	27.84	N	168	44.10	W	GPS			23	1-8,
18DD9403/2	P15N	W101	5	ROS	102694	2348	EN	5	26.44	N	168	43.47	W	GPS				
18DD9403/2	P15N	W102	1	ROS	102794	820	BE	4	59.90	N	168	44.87	W	GPS	5658			
18DD9403/2	P15N	W102	2	USW	102794	841	BE	4	59.84	N	168	44.84	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W102	1	ROS	102794	930	BO	4	59.67	N	168	44.67	W	GPS		5701		
18DD9403/2	P15N	W102	3	ROS	102794	931	BE	4	56.67	N	168	44.68	W	GPS			23	1-8,23,24,31
18DD9403/2	P15N	W102	3	ROS	102794	1139	EN	4	58.75	N	168	44.52	W	GPS				
18DD9403/2	P15N	W103	1	ROS	102794	1443	BE	4	29.76	N	168	45.07	W	GPS	5020			
18DD9403/2	P15N	W103	2	USW	102794	1450	BE	4	29.08	N	168	45.12	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W103	1	ROS	102794	1455	BO	4	29.58	N	168	45.02	W	GPS		1000		
18DD9403/2	P15N	W103	3	ROS	102794	1455	BE	4	29.58	N	168	45.01	W	GPS			11	1-8,
18DD9403/2	P15N	W103	3	ROS	102794	1524	EN	4	29.27	N	168	44.99	W	GPS				
18DD9403/2	P15N	W103	4	ROS	102794	1611	BE	4	29.97	N	168	45.16	W	GPS				
18DD9403/2	P15N	W103	4	ROS	102794	1716	BO	4	29.67	N	168	45.09	W	GPS		5005		
18DD9403/2	P15N	W103	5	ROS	102794	1716	BE	4	29.67	N	168	45.09	W	GPS			21	1-8,
18DD9403/2	P15N	W103	5	ROS	102794	1848	EN	4	29.36	N	168	44.59	W	GPS				
18DD9403/2	P15N	W104	1	ROS	102794	2202	BE	4	0.16	N	168	44.80	W	GPS	5444			
18DD9403/2	P15N	W104	1	ROS	102794	2301	BO	4	0.40	N	168	44.94	W	GPS		5408		
18DD9403/2	P15N	W104	2	ROS	102794	2301	BE	4	0.41	N	168	44.90	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W104	3	USW	102794	2320	BE	4	0.43	N	168	45.01	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W104	2	ROS	102894	108	EN	4	0.80	N	168	45.14	W	GPS				
18DD9403/2	P15N	W105	1	ROS	102894	435	BE	3	30.05	N	168	44.98	W	GPS	5450			
18DD9403/2	P15N	W105	1	ROS	102894	459	BO	3	29.96	N	168	44.96	W	GPS		998		
18DD9403/2	P15N	W105	2	ROS	102894	459	BE	3	29.96	N	168	44.96	W	GPS			11	1-8,14
18DD9403/2	P15N	W105	2	ROS	102894	526	EN	3	29.87	N	168	44.94	W	GPS				
18DD9403/2	P15N	W105	3	ROS	102894	602	BE	3	29.78	N	168	44.87	W	GPS	5498			
18DD9403/2	P15N	W105	4	USW	102894	608	BE	3	29.79	N	168	44.86	W	GPS		5	1	1,3-6,12,34
18DD9403/2	P15N	W105	3	ROS	102894	711	BO	3	29.63	N	168	44.79	W	GPS		5540		
18DD9403/2	P15N	W105	5	ROS	102894	711	BE	3	29.63	N	168	44.79	W	GPS			23	1-8,12,23,24
18DD9403/2	P15N	W105	5	ROS	102894	906	EN	3	29.72	N	168	45.00	W	GPS				
18DD9403/2	P15N	W106	1	ROS	102894	1226	BE	3	0.07	N	168	45.12	W	GPS	5098			
18DD9403/2	P15N	W106	2	USW	102894	1300	BE	3	0.25	N	168	45.60	W	GPS		5	1	1,3-6.13,20,23,24,34
18DD9403/2	P15N	W106	1	ROS	102894	1338	BO	3	0.45	N	168	45.75	W	GPS		5256		
18DD9403/2	P15N	W106	3	ROS	102894	1338	BE	3	0.45	N	168	45.75	W	GPS			23	1-8,13,20,23,24

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W106	3	ROS	102894	1537	EN	3	1.34	N	168	46.27	W	GPS				
18DD9403/2	P15N	W107	1	ROS	102894	1918	BE	2	30.14	N	168	45.00	W	GPS	5400			
18DD9403/2	P15N	W107	1	ROS	102894	1933	BO	2	30.30	N	168	45.00	W	GPS		1000		
18DD9403/2	P15N	W107	2	ROS	102894	1934	BE	2	30.30	N	168	45.00	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W107	2	ROS	102894	2007	EN	2	30.78	N	168	45.15	W	GPS				
18DD9403/2	P15N	W107	3	ROS	102894	2034	BE	2	31.12	N	168	45.26	W	GPS	5401			
18DD9403/2	P15N	W107	4	USW	102894	2055	BE	2	31.40	N	168	45.34	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W107	3	ROS	102894	2137	BO	2	31.74	N	168	45.48	W	GPS		5461		
18DD9403/2	P15N	W107	5	ROS	102894	2137	BE	2	31.74	N	168	45.48	W	GPS			21	1-8,23,24
18DD9403/2	P15N	W107	5	ROS	102894	2322	EN	2	32.60	N	168	45.83	W	GPS				
18DD9403/2	P15N	W108	1	ROS	102994	317	BE	2	0.15	N	168	45.03	W	GPS				
18DD9403/2	P15N	W108	1	ROS	102994		BO			N			W	GPS				
18DD9403/2	P15N	W108	2	ROS	102994		BE			N			W	GPS			0	
18DD9403/2	P15N	W108	2	ROS	102994	625	EN	2	1.64	N	168	45.54	W	GPS				
18DD9403/2	P15N	W108	3	ROS	102994	918	BE	2	0.47	N	168	44.94	W	GPS	5419			
18DD9403/2	P15N	W108	4	USW	102994	931	BE	2	0.61	N	168	45.02	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W108	3	ROS	102994	1019	BO	2	0.81	N	168	45.31	W	GPS		5000		
18DD9403/2	P15N	W108	5	ROS	102994	1023	BE	2	0.84	N	168	45.36	W	GPS			0	
18DD9403/2	P15N	W108	5	ROS	102994	1156	EN	2	1.32	N	168	46.05	W	GPS				
18DD9403/2	P15N	W108	6	ROS	102994	1255	BE	1	59.90	N	168	45.11	W	GPS				
18DD9403/2	P15N	W108	6	ROS	102994	1400	BO	2	0.33	N	168	45.65	W	GPS		5002		
18DD9403/2	P15N	W108	7	ROS	102994	1400	BE	2	0.33	N	168	45.65	W	GPS			11	1-8,13,20,23,24,
18DD9403/2	P15N	W108	7	ROS	102994	1533	EN	2	0.90	N	168	46.06	W	GPS				
18DD9403/2	P15N	W108	8	ROS	102994	1644	BE	2	0.12	N	168	45.12	W	GPS	5390			
18DD9403/2	P15N	W108	8	ROS	102994	1713	BO	2	0.37	N	168	45.32	W	GPS		1498		
18DD9403/2	P15N	W108	9	ROS	102994	1713	BE	2	0.38	N	168	45.32	W	GPS			11	1-8,13,20,23,24,
18DD9403/2	P15N	W108	9	ROS	102994	1748	EN	2	0.65	N	168	45.47	W	GPS				
18DD9403/2	P15N	W109	1	ROS	102994	2244	BE	1	31.12	N	168	45.94	W	GPS	5373			
18DD9403/2	P15N	W109	2	USW	102994	2258	BE	1	31.29	N	168	45.73	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W109	1	ROS	102994	2345	BO	1	31.73	N	168	45.94	W	GPS		5456		
18DD9403/2	P15N	W109	3	ROS	102994	2345	BE	1	31.73	N	168	45.94	W	GPS			16	1-8,23,24
18DD9403/2	P15N	W109	3	ROS	103094	141	EN	1	32.93	N	168	46.51	W	GPS				
18DD9403/2	P15N	W110	1	ROS	103094	523	BE	1	0.08	N	168	45.04	W	GPS	5340			
18DD9403/2	P15N	W110	1	ROS	103094	630	BO	1	0.52	N	168	45.16	W	GPS		5443		
18DD9403/2	P15N	W110	2	ROS	103094	630	BE	1	0.52	N	168	45.16	W	GPS			17	1-8,13,20,23,24
18DD9403/2	P15N	W110	3	USW	103094	639	BE	1	0.56	N	168	45.19	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W110	2	ROS	103094	839	EN	1	1.03	N	168	45.63	W	GPS				
18DD9403/2	P15N	W111	1	ROS	103094	1532	BE	0	29.84	N	168	45.24	W	GPS	5460			
18DD9403/2	P15N	W111	1	ROS	103094	1642	BO	0	29.34	N	168	45.65	W	GPS		5568		
18DD9403/2	P15N	W111	2	ROS	103094	1642	BE	0	29.34	N	168	45.65	W	GPS			23	1-8,20,23,24
18DD9403/2	P15N	W111	3	USW	103094	1652	BE	0	29.34	N	168	45.64	W	GPS		5	1	1,3-6,34

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W111	2	ROS	103094	1841	EN	0	28.76	N	168	46.33	W	GPS				
18DD9403/2	P15N	XBT6	1	XBT	103094	2010	BE	0	14.60	N	168	45.60	W	GPS				
18DD9403/2	P15N	W112	1	ROS	103094	2141	BE	0	0.08	N	168	44.97	W	GPS	5550			
18DD9403/2	P15N	W112	2	USW	103094	2158	BE	0	0.19	S	168	45.04	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W112	1	ROS	103094	2245	BO	0	0.54	S	168	45.34	W	GPS		5642		
18DD9403/2	P15N	W112	3	ROS	103094	2246	BE	0	0.58	S	168	45.33	W	GPS			23	1-8,13,20,23,24,31
18DD9403/2	P15N	W112	3	ROS	103194	33	EN	0	1.34	S	168	45.73	W	GPS				
18DD9403/2	P15N	W113	1	ROS	103194	1550	BE	0	30.35	S	168	45.25	W	GPS				
18DD9403/2	P15N	W113	1	ROS	103194	1610	BO	0	30.66	S	168	45.44	W	GPS		1000		
18DD9403/2	P15N	W113	2	ROS	103194	1611	BE	0	30.67	S	168	45.44	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W113	2	ROS	103194	1640	EN	0	31.04	S	168	45.47	W	GPS				
18DD9403/2	P15N	W113	3	ROS	103194	1724	BE	0	30.17	S	168	45.06	W	GPS				
18DD9403/2	P15N	W113	4	USW	103194	1745	BE	0	30.65	S	168	45.15	W	GPS	5450	5	1	1,3-6,34
18DD9403/2	P15N	W113	3	ROS	103194	1833	BO	0	31.02	S	168	45.40	W	GPS		5530		
18DD9403/2	P15N	W113	5	ROS	103194	1834	BE	0	31.06	S	168	45.37	W	GPS			22	1-8,23,24
18DD9403/2	P15N	W113	5	ROS	103194	2019	EN	0	31.99	S	168	45.86	W	GPS				
18DD9403/2	P15N	XBT7	1	XBT	103194	2136	BE	0	45.45	S	168	45.33	W	GPS				
18DD9403/2	P15N	XBT8	2	XBT	103194	2142	BE	0	45.43	S	168	45.28	W	GPS				
18DD9403/2	P15N	W114	1	ROS	103194	2311	BE	1	0.03	S	168	44.99	W	GPS	5774			
18DD9403/2	P15N	W114	1	ROS	110194	19	BO	1	0.55	S	168	44.96	W	GPS		5889		
18DD9403/2	P15N	W114	2	ROS	110194	20	BE	1	0.55	S	168	44.96	W	GPS			23	1-8,13,20,23,24,
18DD9403/2	P15N	W114	3	USW	110194	105	BE	1	0.71	S	168	44.87	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W114	2	ROS	110194	224	EN	1	1.51	S	168	44.89	W	GPS				
18DD9403/2	P15N	W115	1	ROS	110194	521	BE	1	30.27	S	168	45.01	W	GPS	6040		23	1-8,12,23,24
18DD9403/2	P15N	W115	2	USW	110194	537	BE	1	30.41	S	168	45.04	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W115	1	ROS	110194	635	BO	1	30.91	S	168	45.11	W	GPS		6000		
18DD9403/2	P15N	W115	1	ROS	110194	836	EN	1	31.85	S	168	45.19	W	GPS				
18DD9403/2	P15N	W115	3	ROS	110194	901	BE	1	32.34	S	168	45.14	W	GPS				
18DD9403/2	P15N	W115	3	ROS	110194	916	BO	1	32.55	S	168	45.11	W	GPS		1001		
18DD9403/2	P15N	W115	4	ROS	110194	919	BE	1	32.60	S	168	45.13	W	GPS			11	1-8,12,23,24
18DD9403/2	P15N	W115	4	ROS	110194	950	EN	1	33.07	S	168	45.23	W	GPS				
18DD9403/2	P15N	W116	1	ROS	110194	1243	BE	2	0.19	S	168	44.77	W	GPS	3255			
18DD9403/2	P15N	W116	2	USW	110194	1330	BE	2	0.62	S	168	44.57	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W116	1	ROS	110194	1334	BO	2	0.63	S	168	44.59	W	GPS		3313		
18DD9403/2	P15N	W116	3	ROS	110194	1335	BE	2	0.64	S	168	44.60	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W116	3	ROS	110194	1449	EN	2	1.30	S	168	44.73	W	GPS				
18DD9403/2	P15N	W117	1	ROS	110194	1749	BE	2	30.16	S	168	44.76	W	GPS				
18DD9403/2	P15N	W117	1	ROS	110194	1808	BO	2	30.42	S	168	44.61	W	GPS		1000		
18DD9403/2	P15N	W117	2	ROS	110194	1808	BE	2	30.42	S	168	44.61	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W117	2	ROS	110194	1836	EN	2	30.78	S	168	44.57	W	GPS				
18DD9403/2	P15N	W117	3	ROS	110194	1906	BE	2	30.36	S	168	45.03	W	GPS	5320			

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W117	4	USW	110194	1923	BE	2	30.41	S	168	44.94	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W117	3	ROS	110194	2016	BO	2	30.73	S	168	44.90	W	GPS		5420		
18DD9403/2	P15N	W117	5	ROS	110194	2016	BE	2	30.72	S	168	44.88	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W117	5	ROS	110194	2201	EN	2	31.33	S	168	44.54	W	GPS				
18DD9403/2	P15N	W118	1	ROS	110294	58	BE	3	0.05	S	168	45.11	W	GPS	5350			
18DD9403/2	P15N	W118	2	USW	110294	130	BE	3	0.20	S	168	45.42	W	GPS		5	1	1,3-6,13,23,24.34
18DD9403/2	P15N	W118	1	ROS	110294	202	BO	3	0.36	S	168	45.52	W	GPS		5455		
18DD9403/2	P15N	W118	3	ROS	110294	202	BE	3	0.26	S	168	45.54	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W118	3	ROS	110294	359	EN	3	0.89	S	168	46.13	W	GPS				
18DD9403/2	P15N	W119	1	ROS	110294	710	BE	3	30.03	S	168	45.05	W	GPS	4990			
18DD9403/2	P15N	W119	1	ROS	110294	724	BO	3	30.01	S	168	44.92	W	GPS		1000		
18DD9403/2	P15N	W119	2	ROS	110294	725	BE	3	30.00	S	168	44.92	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W119	2	ROS	110294	758	EN	3	29.83	S	168	44.71	W	GPS				
18DD9403/2	P15N	W119	3	ROS	110294	821	BE	3	29.80	S	168	44.56	W	GPS				
18DD9403/2	P15N	W119	4	USW	110294	829	EN	3	29.78	S	168	44.47	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W119	3	ROS	110294	920	BO	3	29.82	S	168	44.09	W	GPS		5077		
18DD9403/2	P15N	W119	5	ROS	110294	921	BE	3	29.83	S	168	44.10	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W119	5	ROS	110294	1110	EN	3	30.18	S	168	44.11	W	GPS				
18DD9403/2	P15N	W120	1	ROS	110294	1423	BE	3	59.96	S	168	45.05	W	GPS	5065			
18DD9403/2	P15N	W120	2	USW	110294	1455	EN	3	59.87	S	168	45.29	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W120	1	ROS	110294	1535	BO	3	59.65	S	168	45.50	W	GPS		5140		
18DD9403/2	P15N	W120	3	ROS	110294	1535	BE	3	59.65	S	168	45.50	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W120	3	ROS	110294	1727	EN	3	59.16	S	168	45.18	W	GPS				
18DD9403/2	P15N	W121	1	ROS	110294	2053	BE	4	29.93	S	168	44.96	W	GPS				
18DD9403/2	P15N	W121	1	ROS	110294	2108	BO	4	29.80	S	168	44.96	W	GPS		1004		
18DD9403/2	P15N	W121	2	ROS	110294	2108	BE	4	29.78	S	168	44.96	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W121	2	ROS	110294	2142	EN	4	29.61	S	168	44.75	W	GPS				
18DD9403/2	P15N	W121	3	ROS	110294	2204	BE	4	29.41	S	168	44.58	W	GPS	5246			
18DD9403/2	P15N	W121	4	USW	110294	2219	EN	4	29.35	S	168	44.53	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W121	3	ROS	110294	2303	BO	4	29.31	S	168	44.40	W	GPS		5356		
18DD9403/2	P15N	W121	5	ROS	110294	2304	BE	4	29.32	S	168	44.41	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W121	5	ROS	110394	49	EN	4	29.07	S	168	44.60	W	GPS				
18DD9403/2	P15N	W122	1	ROS	110394	433	BE	5	0.01	S	168	45.07	W	GPS	5556			
18DD9403/2	P15N	W122	1	ROS	110394	540	BO	5	0.27	S	168	45.16	W	GPS		5655		
18DD9403/2	P15N	W122	2	ROS	110394	540	BE	5	0.27	S	168	45.17	W	GPS			23	1-8,23,24,31
18DD9403/2	P15N	W122	3	USW	110394	543	EN	5	0.28	S	168	45.17	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W122	2	ROS	110394	735	EN	5	0.89	S	168	45.86	W	GPS				
18DD9403/2	P15N	W123	1	ROS	110394	1041	BE	5	30.04	S	168	44.96	W	GPS	5322			
18DD9403/2	P15N	W123	1	ROS	110394	1055	BO	5	30.09	S	168	45.15	W	GPS		1000		
18DD9403/2	P15N	W123	2	ROS	110394	1055	BE	5	30.09	S	168	45.15	W	GPS			11	1-8,
18DD9403/2	P15N	W123	3	USW	110394	1120	EN	5	30.23	S	168	45.31	W	GPS		5	1	1,3-6,23,24,34

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully

SHIP/CRS EXPOCOD	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE			POSITION LONGITUDE				NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W123	2	ROS	110394	1123	EN	5	30.23	S	168	45.31	W	GPS					
18DD9403/2	P15N	W123	4	ROS	110394	1149	BE	5	30.88	S	168	45.09	W	GPS	5400				
18DD9403/2	P15N	W123	4	ROS	110394	1308	BO	5	30.27	S	168	45.59	W	GPS		5398			
18DD9403/2	P15N	W123	5	ROS	110394	1308	BE	5	30.27	S	168	45.59	W	GPS			23	1-8,	
18DD9403/2	P15N	W123	5	ROS	110394	1453	EN	5	30.89	S	168	45.76	W	GPS					
18DD9403/2	P15N	W124	1	ROS	110394	1745	BE	6	0.11	S	168	45.45	W	GPS	5630				
18DD9403/2	P15N	W124	1	ROS	110394	1857	BO	6	0.98	S	168	45.45	W	GPS		5652			
18DD9403/2	P15N	W124	2	ROS	110394	1858	BE	6	0.99	S	168	45.46	W	GPS			23	1-8,13,20,23,24	
18DD9403/2	P15N	W124	3	USW	110394	1931	EN	6	1.08	S	168	45.55	W	GPS		5	1	1,3-6,13,20,23,24,34	
18DD9403/2	P15N	W124	2	ROS	110394	2048	EN	6	1.43	S	168	45.88	W	GPS					
18DD9403/2	P15N	W125	1	ROS	110394	2347	BE	6	30.07	S	168	45.13	W	GPS	5523				
18DD9403/2	P15N	W125	1	ROS	110494	9	BO	6	30.27	S	168	45.38	W	GPS		1001			
18DD9403/2	P15N	W125	2	ROS	110494	9	BE	6	30.26	S	168	45.37	W	GPS			11	1-8,	
18DD9403/2	P15N	W125	3	USW	110494	335	EN	6	30.23	S	168	45.35	W	GPS		5	1	1,3-6,23,24,34	
18DD9403/2	P15N	W125	2	ROS	110494	36	EN	6	30.41	S	168	45.51	W	GPS					
18DD9403/2	P15N	W125	4	ROS	110494	58	BE	6	30.10	S	168	45.04	W	GPS					
18DD9403/2	P15N	W125	4	ROS	110494	207	BO	6	30.33	S	168	45.14	W	GPS		5631			
18DD9403/2	P15N	W125	5	ROS	110494	209	BE	6	30.31	S	168	45.14	W	GPS			13	1-8,	
18DD9403/2	P15N	W125	5	ROS	110494	316	EN	6	30.33	S	168	45.15	W	GPS					
18DD9403/2	P15N	W125	6	ROS	110494	316	BE	6	30.33	S	168	45.15	W	GPS		2498	10	1-8,	
18DD9403/2	P15N	W125	6	ROS	110494	405	EN	6	30.51	S	168	45.24	W	GPS					
18DD9403/2	P15N	W126	1	ROS	110494	700	BE	7	0.20	S	168	45.00	W	GPS	5580				
18DD9403/2	P15N	W126	2	USW	110494	744	EN	7	0.78	S	168	44.76	W	GPS		5	1	1,3-6,12,23,24,34	
18DD9403/2	P15N	W126	1	ROS	110494	812	BO	7	0.98	S	168	44.71	W	GPS		5782			
18DD9403/2	P15N	W126	3	ROS	110494	812	BE	7	0.98	S	168	44.71	W	GPS			23	1-8,12,23,24	
18DD9403/2	P15N	W126	3	ROS	110494	958	EN	7	2.21	S	168	44.92	W	GPS					
18DD9403/2	P15N	W127	1	ROS	110494	1254	BE	7	30.14	S	168	44.84	W	GPS	5260				
18DD9403/2	P15N	W127	1	ROS	110494	1316	BO	7	30.23	S	168	44.61	W	GPS		1005			
18DD9403/2	P15N	W127	2	ROS	110494	1317	BE	7	30.23	S	168	44.61	W	GPS			11	1-8,	
18DD9403/2	P15N	W127	2	ROS	110494	1344	EN	7	30.38	S	168	44.56	W	GPS					
18DD9403/2	P15N	W127	3	ROS	110494	1408	BE	7	29.99	S	168	44.94	W	GPS	5250				
18DD9403/2	P15N	W127	4	USW	110494	1412	EN	7	30.03	S	168	44.87	W	GPS		5	1	1,3-6,23,24,34	
18DD9403/2	P15N	W127	3	ROS	110494	1522	BO	7	30.47	S	168	44.42	W	GPS		5370			
18DD9403/2	P15N	W127	5	ROS	110494	1522	BE	7	30.47	S	168	44.42	W	GPS			23	1-8,	
18DD9403/2	P15N	W127	5	ROS	110494	1717	EN	7	31.89	S	168	43.15	W	GPS					
18DD9403/2	P15N	W128	1	ROS	110494	2018	BE	8	0.20	S	168	45.00	W	GPS	4890				
18DD9403/2	P15N	W128	2	USW	110494	2035	EN	8	0.50	S	168	44.83	W	GPS		5	1	1,3-6,13,20,23,24,34	
18DD9403/2	P15N	W128	1	ROS	110494	2125	BO	8	1.00	S	168	44.73	W	GPS		4998			
18DD9403/2	P15N	W128	3	ROS	110494	2126	BE	8	1.01	S	168	44.74	W	GPS			23	1-8,13,20,23,24	
18DD9403/2	P15N	W128	3	ROS	110494	2308	EN	8	2.52	S	168	44.35	W	GPS					
18DD9403/2	P15N	W129	1	ROS	110594	150	BE	8	30.07	S	168	44.98	W	GPS	5090				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W129	2	USW	110594	242	EN	8	30.21	S	168	44.83	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W129	1	ROS	110594	259	BO	8	30.31	S	168	44.81	W	GPS		5215		
18DD9403/2	P15N	W129	3	ROS	110594	300	BE	8	30.32	S	168	44.82	W	GPS			23	1-6,
18DD9403/2	P15N	W129	3	ROS	110594	445	EN	8	31.76	S	168	45.29	W	GPS				
18DD9403/2	P15N	W130	1	ROS	110594	745	BE	9	0.05	S	169	0.02	W	GPS	4610			
18DD9403/2	P15N	W130	2	USW	110594	759	BE	9	0.21	S	169	0.01	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W130	1	ROS	110594	848	BO	9	0.80	S	169	0.02	W	GPS		4769		
18DD9403/2	P15N	W130	3	ROS	110594	849	BE	9	0.80	S	169	0.02	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W130	3	ROS	110594	1029	EN	9	1.64	S	168	59.85	W	GPS				
18DD9403/2	P15N	W131	1	ROS	110594	1329	BE	9	30.11	S	168	59.89	W	GPS	5262			
18DD9403/2	P15N	W131	2	USW	110594	1400	BE	9	30.44	S	169	0.25	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W131	1	ROS	110594	1443	BO	9	30.47	S	169	0.08	W	GPS		5412		
18DD9403/2	P15N	W131	3	ROS	110594	1444	BE	9	30.47	S	169	0.08	W	GPS			23	1-8,
18DD9403/2	P15N	W131	3	ROS	110594	1634	EN	9	31.21	S	169	0.25	W	GPS				
18DD9403/2	P15N	W132	1	ROS	110594	2036	BE	10	0.10	S	169	29.97	W	GPS	5226			
18DD9403/2	P15N	W132	2	USW	110594	2054	BE	10	0.14	S	169	30.08	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W132	1	ROS	110594	2145	BO	10	0.02	S	169	30.35	W	GPS				
18DD9403/2	P15N	W132	3	ROS	110594	2145	BE	10	0.02	S	169	30.35	W	GPS			23	1-8,13,20,23,24,31
18DD9403/2	P15N	W132	3	ROS	110594	2340	EN	9	59.78	S	169	31.05	W	GPS				
18DD9403/2	P15N	SG01	1	CTD	110694	532	BE	10	0.22	S	168	29.87	W	GPS	4100			
18DD9403/2	P15N	SG01	1	CTD	110694	624	BO	10	0.10	S	168	29.94	W	GPS		4335		
18DD9403/2	P15N	SG01	2	CTD	110694	625	BE	10	0.10	S	168	29.90	W	GPS				
18DD9403/2	P15N	SG01	2	CTD	110694	718	EN	10	0.09	S	168	30.51	W	GPS				
18DD9403/2	P15N	SG02	1	CTD	110694	1009	BE	9	59.78	S	168	59.89	W	GPS	4300			
18DD9403/2	P15N	SG02	1	CTD	110694	1101	BO	9	59.52	S	168	59.98	W	GPS				
18DD9403/2	P15N	SG02	2	CTD	110694	1102	BE	9	59.51	S	168	59.99	W	GPS				
18DD9403/2	P15N	SG02	2	CTD	110694	1148	EN	9	59.07	S	169	0.13	W	GPS				
18DD9403/2	P15N	SG03	1	CTD	110694	1728	BE	10	0.05	S	170	0.04	W	GPS	4925			
18DD9403/2	P15N	SG03	1	CTD	110694	1828	BO	9	59.69	S	170	0.62	W	GPS		5070		
18DD9403/2	P15N	SG03	2	CTD	110694	1828	BE	9	59.69	S	170	0.63	W	GPS				
18DD9403/2	P15N	SG03	2	CTD	110694	1919	EN	9	59.42	S	170	0.98	W	GPS				
18DD9403/2	P15N	SG04	1	CTD	110794	132	BE	10	0.10	S	170	29.95	W	GPS	4494			
18DD9403/2	P15N	SG04	1	CTD	110794	232	BO	10	0.01	S	170	30.04	W	GPS		3822		
18DD9403/2	P15N	SG04	2	CTD	110794	233	BE	10	0.01	S	170	30.03	W	GPS				
18DD9403/2	P15N	SG04	2	CTD	110794	322	EN	10	0.16	S	170	30.19	W	GPS				
18DD9403/2	P15N	SG05	1	CTD	110794	635	BE	10	0.17	S	171	0.08	W	GPS	3870			
18DD9403/2	P15N	SG05	1	CTD	110794	730	BO	10	0.25	S	171	0.40	W	GPS		3660		
18DD9403/2	P15N	SG05	2	CTD	110794	731	BE	10	0.28	S	171	0.37	W	GPS				
18DD9403/2	P15N	SG05	2	CTD	110794	829	EN	10	0.48	S	171	1.04	W	GPS				
18DD9403/2	P15N	W133	1	ROS	110794	1556	BE	10	29.93	S	170	0.31	W	GPS	4818			
18DD9403/2	P15N	W133	2	USW	110794	1625	BE	10	29.89	S	170	0.93	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully

SHIP/CRS EXPOCOD	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W133	1	ROS	110794	1658	BO	10	29.95	S	170	1.35	W	GPS		3500		
18DD9403/2	P15N	W133	3	ROS	110794	1658	BE	10	29.95	S	170	1.35	W	GPS			23	1-8,
18DD9403/2	P15N	W133	3	ROS	110794	1831	EN	10	30.18	S	170	2.65	W	GPS				
18DD9403/2	P15N	W134	1	ROS	110794	2138	BE	11	0.08	S	169	59.81	W	GPS	5060			
18DD9403/2	P15N	W134	2	USW	110794	2154	BE	11	0.26	S	169	59.85	W	GPS		5	1	1,3-6,23,23,34
18DD9403/2	P15N	W134	1	ROS	110794	2223	BO	10	59.84	S	169	59.78	W	GPS		3507		
18DD9403/2	P15N	W134	3	ROS	110794	2225	BE	10	59.82	S	169	59.78	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W134	3	ROS	110794	2351	EN	10	59.46	S	170	0.07	W	GPS				
18DD9403/2	P15N	W135	1	ROS	110894	327	BE	11	30.23	S	170	0.15	W	GPS	4997			
18DD9403/2	P15N	W135	2	USW	110894	345	BE	11	30.39	S	170	0.00	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W135	1	ROS	110894	430	BO	11	30.50	S	169	59.81	W	GPS		3502		
18DD9403/2	P15N	W135	3	ROS	110894	430	BE	11	30.50	S	169	59.81	W	GPS			23	1-8,
18DD9403/2	P15N	W135	3	ROS	110894	602	EN	11	30.56	S	169	59.35	W	GPS				
18DD9403/2	P15N	W136	1	ROS	110894	913	BE	11	59.92	S	169	59.91	W	GPS	4980			
18DD9403/2	P15N	W136	2	USW	110894	930	BE	11	59.94	S	169	89.65	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W136	1	ROS	110894	1007	BO	11	59.88	S	169	89.27	W	GPS		3500		
18DD9403/2	P15N	W136	3	ROS	110894	1008	BE	11	59.87	S	169	59.28	W	GPS			22	1-8,13,20,23,24,
18DD9403/2	P15N	W136	3	ROS	110894	1132	EN	12	0.10	S	169	58.06	W	GPS				
18DD9403/2	P15N	W137	1	CTD	110894	1956	BE	12	30.17	S	169	59.79	W	GPS	4946			
18DD9403/2	P15N	W137	2	USW	110894	2021	EN	12	30.23	S	169	59.49	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W137	1	CTD	110894	2042	BO	12	30.14	S	169	59.26	W	GPS		3506		
18DD9403/2	P15N	W137	3	CTD	110894	2043	BE	12	30.14	S	169	59.26	W	GPS				
18DD9403/2	P15N	W137	3	CTD	110894	2129	EN	12	30.24	S	169	58.66	W	GPS				
18DD9403/2	P15N	W138	1	CTD	110994	120	BE	13	0.93	S	169	59.51	W	GPS				
18DD9403/2	P15N	W138	1	CTD	110994	224	BO	13	1.04	S	169	59.38	W	GPS		3821		
18DD9403/2	P15N	W138	2	CTD	110994	224	BE	13	1.04	S	169	59.38	W	GPS				
18DD9403/2	P15N	W138	3	USW	110994	230	EN	13	1.14	S	169	59.31	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W138	2	CTD	110994	339	EN	13	1.56	S	169	58.54	W	GPS				
18DD9403/2	P15N	W139	1	CTD	110994	653	BE	13	29.98	S	169	59.46	W	GPS	4824			
18DD9403/2	P15N	W139	2	USW	110994	711	EN	13	29.93	S	169	59.72	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W139	1	CTD	110994	740	BO	13	30.11	S	169	59.87	W	GPS		3512		
18DD9403/2	P15N	W139	3	CTD	110994	741	BE	13	30.12	S	169	59.44	W	GPS				
18DD9403/2	P15N	W139	3	CTD	110994	915	EN	13	30.66	S	169	58.72	W	GPS				
18DD9403/2	P15N	W140	1	CTD	110994	1234	BE	14	0.27	S	169	59.78	W	GPS	2690			
18DD9403/2	P15N	W140	2	USW	110994	1244	EN	14	0.43	S	169	59.73	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W140	1	CTD	110994	1332	BO	14	0.65	S	169	59.86	W	GPS		2726		
18DD9403/2	P15N	W140	3	CTD	110994	1332	BE	14	0.65	S	169	59.86	W	GPS				
18DD9403/2	P15N	W140	3	CTD	110994	1400	EN	14	0.66	S	170	0.00	W	GPS				
18DD9403/2	P15N	W141	1	CTD	110994	1713	BE	14	29.99	S	170	0.03	W	GPS	970			
18DD9403/2	P15N	W141	1	CTD	110994	1734	BO	14	29.89	S	169	59.95	W	GPS		950		
18DD9403/2	P15N	W141	2	CTD	110994	1734	BE	14	29.89	S	169	59.95	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W141	3	USW	110994	1741	EN	14	29.85	S	169	59.90	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W141	2	CTD	110994	1747	EN	14	29.84	S	169	59.86	W	GPS				
18DD9403/2	P15N	W142	1	CTD	110994	2115	BE	15	0.03	S	170	0.04	W	GPS	4757			
18DD9403/2	P15N	W142	2	USW	110994	2127	BE	15	0.08	S	169	59.97	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W142	1	CTD	110994	2214	BO	15	0.14	S	169	59.82	W	GPS		3765		
18DD9403/2	P15N	W142	3	CTD	110994	2216	BE	15	0.14	S	169	59.82	W	GPS				
18DD9403/2	P15N	W142	3	CTD	110994	2316	EN	15	0.22	S	169	59.41	W	GPS				

APPENDIX 3. STATION BOTTLE DATA (-.SEA) FILES

Appendix 3 contains the Station Bottle Data for the first 12 stations on WOCE Cruise P15N.

Each sampling bottle on a cast must be accompanied by a quality flag as defined below which indicates whether there were problems noted while drawing samples or from differences in the measured values (from WOCE Report 67/91).

Flag Value	Definition
1	Bottle information unavailable
2	No problems noted
3	Leaking
4	Did not trip correctly
5	Not reported
9	Samples not drawn from this bottle

All WOCE water sample measurements are assigned quality flags as defined below. All measured values are reported including questionable or bad values. See Appendix 2 for Units and Mnemonics used in -.SEA files.

FLAG VALUE	DEFINITION
1	Sample for this measurement was drawn from water bottle but analysis not received
2	Acceptable measurement
3	Questionable measurement
4	Bad measurement
5	Not reported
6	Mean of replicate measurements
7	Manual chromotagraphic peak measurement
8	Irregular Chromatographic peak integration
9	Sample not drawn for this measurement from this bottle

APPENDIX 3. STATION BOTTLE DATA (-.SEA) LEG 1 WOCE SECTION P15N

EXPOCODE 18DD9403/1 WHP-ID P15N CRUISE DATES 082994 TO 100594

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS (DBAR)	CTDTMP	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	DELC14 /MILLE	DELC13 /MILLE	O18/O16 /MILLE	TCARBN UMOL/KG	ALKALI UMOL/KG	QUALIT1
			********			********	********	********	********	********	********	********	********	********	********	********	********	********	*
W001	3	L51	USW	5.0	-9.000	31.9360	-9.0	21.7	10.1	0.30	1.13	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W001	2	125	3	10.0	-9.000	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	49999999999999
W001	2	126	2	50.0	-9.000	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	49999999999999
W001	2	127	1	80.0	-9.000	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	49999999999999
W002	2	L52	USW	5.0	-9.000	31.8090	-9.0	15.4	6.6	0.21	0.92	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229991199
W002	3	128	8	9.3	8.437	31.8148	284.0	17.5	7.5	0.24	0.96	5.090	2.057	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	129	7	49.6	7.311	32.1652	262.3	27.1	12.9	0.31	1.42	5.351	2.156	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	130	6	49.9	7.318	32.1718	262.0	27.1	13.2	0.31	1.34	5.077	2.090	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	131	5	75.2	5.805	32.4512	249.0	27.5	18.0	0.15	1.57	5.114	2.230	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	132	4	98.0	5.254	32.8726	203.7	42.6	24.2	0.16	1.94	4.316	1.885	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	133	3	100.2	5.216	32.8874	201.7	41.4	24.7	0.16	1.95	4.358	1.845	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	134	2	150.4	4.923	33.5363	140.1	56.8	32.4	0.07	2.38	2.853	1.743	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	135	1	176.9	4.541	33.6771	119.1	65.7	35.1	0.05	2.53	2.815	1.332	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W003	2	L53	USW	5.0	-9.000	31.6000	-9.0	12.2	4.1	0.18	0.70	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W003	3	136	11	10.1	9.148	31.5916	288.8	12.4	4.2	0.17	0.71	4.911	1.937	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	137	10	48.6	7.344	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	99999999999999
W003	3	138	9	97.5	5.038	32.9819	243.0	34.4	22.3	0.03	1.76	4.219	1.870	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	139	8	201.3	4.166	33.7696	111.9	69.7	37.2	0.00	2.64	2.484	1.145	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	140	7	297.6	3.990	33.9293	52.4	87.5	41.1	0.00	2.92	1.433	0.629	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	141	6	399.3	3.891	34.0091	37.1	96.6	42.5	0.00	3.02	1.245	0.928	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	142	5	597.3	3.653	-9.0000	22.5	117.0	44.9	0.00	3.21	0.379	0.266	-9.0	-9.0	-9.00	-9.0	-9.0	29222222299999
W003	3	143	4	802.3	3.410	34.2400	19.3	124.5	43.5	0.00	3.10	0.192	0.161	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	144	3	1000.5	3.110	34.3263	17.7	135.3	43.6	0.00	3.12	0.132	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	145	2	1251.3	2.795	34.3998	19.0	146.9	43.8	0.00	3.12	0.005	0.072	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	146	1	1461.4	2.485	34.4655	32.5	155.5	43.0	0.00	3.06	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222225599999
W004	2	L54	USW	5.0	-9.000	31.9740	-9.0	9.0	3.7	0.14	0.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W004	3	147	23	9.5	9.778	31.9671	285.8	9.0	3.7	0.11	0.66	5.288	2.102	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	148	22	50.8	9.457	32.2327	285.6	8.4	4.9	0.14	0.80	5.378	2.102	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	149	21	99.3	4.592	32.9694	242.9	36.3	23.1	0.01	1.81	4.975	2.142	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	150	20	199.4	4.097	33.8165	72.6	77.4	40.4	0.00	2.84	2.023	0.935	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	151	19	300.6	3.903	33.9613	34.9	93.1	43.5	0.00	3.05	1.217	0.568	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	152	18	397.9	3.802	34.0625	25.4	104.6	43.8	0.00	3.08	0.596	0.327	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	153	17	602.5	3.515	34.1957	17.8	120.0	43.8	0.00	3.09	0.232	0.158	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	154	16	806.0	3.113	34.3135	18.0	135.6	43.9	0.00	3.11	0.088	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	155	15	1007.4	2.815	34.3897	18.5	145.0	43.8	0.00	3.11	0.057	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	156	14	1256.7	2.502	34.4592	25.4	155.7	43.9	0.00	3.08	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	157	13	1504.6	2.225	34.5165	39.5	162.6	43.1	0.00	3.06	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	158	12	1748.8	2.021	34.5596	52.4	165.9	42.3	0.00	2.96	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291999
W004	3	159	11	1998.4	1.867	34.5925	66.2	168.3	41.4	0.00	2.89	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	160	10	2241.7	1.759	34.6154	80.6	168.3	40.7	0.00	2.83	0.007	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291999
W004	3	161	9	2501.5	1.660	34.6337	95.6	167.4	40.0	0.00	2.75	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	162	8	2751.0	1.603	34.6459	108.1	165.9	39.1	0.00	2.71	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	163	7	2998.9	1.548	34.6569	119.9	164.7	38.5	0.00	2.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229911919
W004	3	164	6	3252.3	1.492	34.6675	129.1	161.6	37.8	0.00	2.61	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	165	5	3487.2	1.462	34.6740	138.5	160.7	37.3	0.00	2.54	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	166	4	3491.5	1.462	34.6745	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999991999
W004	3	167	3	3681.9	1.428	34.6807	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999991999
W004	3	168	2	3685.4	1.428	34.6805	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999991999
W004	3	169	1	3686.5	1.428	34.6809	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999911999
W005	2	L55	USW	5.0	-9.000	32.2440	-9.0	5.6	3.2	0.11	0.65	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W005	3	170	23	10.3	10.405	32.2454	282.1	5.0	3.1	0.10	0.64	4.807	1.825	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	171	22	50.2	4.516	32.6058	306.8	17.5	15.1	0.73	1.41	5.792	2.481	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	172	21	99.5	4.360	33.2816	175.1	48.7	30.3	0.01	2.22	3.803	1.734	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	173	20	200.8	3.942	33.8502	56.3	82.1	42.1	0.01	2.96	1.769	0.815	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999

APPENDIX 3. STATION BOTTLE DATA (-.SEA) LEG 1 WOCE SECTION P15N

EXPOCODE 18DD9403/1 WHP-ID P15N CRUISE DATES 082994 TO 100594

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS (DBAR)	CTDTMP	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	DELC14 /MILLE	DELC13 /MILLE	O18/O16 /MILLE	TCARBN UMOL/KG	ALKALI UMOL/KG	QUALIT1
			********			********	********	********	********	********	********	********	********	********	********	********	********	********	
W005	3	174	19	301.0	3.852	33.9944	26.9	97.4	43.9	0.00	3.13	0.938	0.489	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	175	18	398.8	3.715	34.1057	21.4	109.0	44.3	0.00	3.13	0.479	0.259	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	176	17	398.4	3.715	34.1057	20.1	109.3	44.2	0.00	3.10	0.457	0.279	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	177	16	598.8	3.413	34.2380	17.1	124.0	44.1	0.00	3.11	0.168	0.148	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	178	15	799.7	3.078	34.3304	15.2	137.0	44.3	0.00	3.58	0.073	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222242299999
W005	3	179	14	999.4	2.746	34.4019	19.8	147.6	44.4	0.00	3.10	0.029	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	180	13	1249.7	2.438	34.4713	26.3	156.9	44.0	0.00	3.57	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222242299999
W005	3	181	12	1499.7	2.151	34.5317	40.1	162.3	43.4	0.00	3.03	0.006	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	182	11	1499.5	2.151	34.5304	41.1	163.5	43.1	0.00	3.02	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	183	10	1750.2	1.967	34.5710	54.6	167.3	42.4	0.00	2.96	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	184	9	1998.5	1.816	34.6012	71.6	168.7	41.3	0.00	2.88	0.034	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	185	8	2249.0	1.715	34.6218	86.9	168.7	40.6	0.00	2.83	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	186	7	2499.1	1.641	34.6367	99.5	168.0	39.5	0.00	2.76	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	187	6	2748.3	1.584	34.6484	109.8	167.0	38.8	0.00	2.71	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	188	5	2999.7	1.522	34.6599	123.1	163.2	38.0	0.00	2.64	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	189	4	3250.2	1.484	34.6683	131.0	161.1	37.4	0.00	2.60	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	190	3	3500.1	1.460	34.6743	139.2	160.4	36.9	0.00	2.56	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	191	2	3748.0	1.396	34.6851	154.2	154.7	36.1	0.00	2.49	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	192	1	3986.4	1.397	34.6882	158.6	153.2	35.7	0.00	2.47	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W006	2	L56	USW	5.0	-9.000	32.1860	-9.0	5.9	3.7	0.13	0.59	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999911
W006	3	193	23	1.6	9.981	32.2187	-9.0	5.9	3.6	0.09	0.56	5.193	2.060	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	194	22	46.8	4.991	32.5551	-9.0	14.4	12.8	0.64	1.34	5.901	2.664	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	195	21	102.4	4.388	33.3496	-9.0	51.7	31.2	0.00	2.32	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	196	20	201.0	3.897	33.8870	-9.0	86.5	42.3	0.00	2.99	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	197	19	239.8	3.829	33.9410	-9.0	92.9	42.8	0.00	3.05	1.542	0.681	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	198	18	265.5	3.825	33.9853	-9.0	97.0	43.8	0.00	3.15	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	199	17	400.2	3.689	34.1017	-9.0	109.9	43.5	0.02	3.12	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	200	16	604.0	3.381	34.2322	-9.0	125.1	44.0	0.02	3.16	0.138	0.121	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	201	15	998.9	2.705	34.4099	-9.0	148.2	43.7	0.00	3.14	0.012	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	202	14	1249.0	2.358	34.4853	-9.0	158.9	43.5	0.00	3.08	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	203	13	1249.3	2.357	34.4812	-9.0	157.4	43.0	0.01	3.09	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	204	12	1503.3	2.090	34.5385	-9.0	164.9	42.8	0.01	3.10	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	205	11	1749.1	1.954	34.4802	-9.0	160.7	40.5	0.00	2.97	0.013	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	34922222299999
W006	3	206	10	2000.4	1.831	34.5918	-9.0	167.2	41.4	0.06	3.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	207	9	2253.2	1.743	34.6097	-9.0	166.0	39.5	0.00	2.88	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22923229999999
W006	3	208	8	2502.5	1.667	34.6285	-9.0	165.2	39.9	0.03	2.87	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	209	7	2748.6	1.595	34.6442	-9.0	163.1	38.4	0.02	2.81	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	210	6	2995.6	1.535	34.6570	-9.0	160.9	38.2	0.00	2.77	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	211	5	2999.4	1.533	34.6584	-9.0	161.7	38.0	0.00	2.70	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	212	4	3499.4	1.461	34.6723	-9.0	158.9	36.5	0.00	2.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	213	3	4007.4	1.447	34.6733	-9.0	154.1	36.2	0.00	2.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	214	2	4005.3	1.447	34.6817	-9.0	154.5	36.2	0.00	2.66	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	215	1	4147.4	1.448	34.6826	-9.0	153.2	35.1	0.00	2.62	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W007	1	L57	USW	5.0	-9.000	32.2910	-9.0	4.0	4.3	0.15	0.66	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W009	1	L58	USW	5.0	-9.000	32.2740	-9.0	5.5	4.6	0.20	0.70	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W010	3	L59	USW	5.0	-9.000	32.2750	-9.0	6.6	5.3	0.17	0.78	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999911
W011	1	L60	USW	5.0	-9.000	32.2670	-9.0	8.2	6.1	0.10	0.78	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W011	3	216	23	9.8	9.620	33.5831	103.3	88.2	35.1	0.03	2.74	0.034	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	44444444491144
W011	3	217	22	49.1	4.683	32.8604	318.0	33.4	19.8	0.18	1.93	6.140	2.494	-9.0	-9.0	-9.00	-9.0	-9.0	22222242291111
W011	3	218	21	104.0	3.817	33.0420	288.9	39.5	24.0	0.02	2.06	5.689	2.470	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	219	20	200.0	3.480	33.7701	116.3	78.4	37.2	0.00	2.86	2.689	1.290	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	220	19	298.4	3.503	33.9123	70.6	93.5	40.6	0.00	3.04	1.854	0.830	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	221	18	402.9	3.483	34.0407	43.8	107.1	42.1	0.03	3.15	0.949	0.407	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	222	17	601.8	3.313	34.2112	25.4	123.2	43.2	0.00	3.21	0.365	0.139	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111

APPENDIX 3. STATION BOTTLE DATA (-.SEA) LEG 1 WOCE SECTION P15N

EXPOCODE 18DD9403/1 WHP-ID P15N CRUISE DATES 082994 TO 100594

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS (DBAR)	CTDTMP	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	DELC14 /MILLE	DELC13 /MILLE	O18/O16 /MILLE	TCARBN UMOL/KG	ALKALI UMOL/KG	QUALIT1
			********			********	********	********	********	********	********	********	********	********	********	********	********	********	*
W011	3	223	16	803.2	3.039	34.3121	25.7	135.7	43.3	0.00	3.21	0.175	0.139	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	224	15	803.0	3.038	34.3122	24.9	134.7	43.4	0.00	3.19	0.167	0.155	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291119
W011	3	225	14	1005.6	2.736	-9.0000	25.2	150.1	44.6	0.00	3.29	0.105	0.109	-9.0	-9.0	-9.00	-9.0	-9.0	29222222291111
W011	3	226	13	1206.1	2.490	34.4528	29.8	152.9	43.2	0.00	3.17	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291119
W011	3	227	12	1496.9	2.227	34.5153	37.5	160.9	42.8	0.00	3.18	0.174	0.306	-9.0	-9.0	-9.00	-9.0	-9.0	22222223391111
W011	3	228	11	1754.6	2.050	34.5560	49.9	163.4	42.0	0.00	3.06	0.050	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	229	10	1997.0	1.909	34.5861	63.0	164.7	41.5	0.00	3.00	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	230	9	2252.6	1.785	34.6126	78.3	165.4	40.8	0.00	2.92	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	231	8	2500.1	1.690	34.6309	91.7	165.4	39.9	0.00	2.87	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	232	7	2752.5	1.621	34.6443	105.7	163.8	39.1	0.00	2.78	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	233	6	3000.4	1.565	34.6549	114.9	161.8	38.4	0.00	2.71	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	234	5	3252.9	1.528	34.6619	124.2	159.9	37.9	0.00	2.69	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	235	4	3489.8	1.500	34.6697	132.0	159.4	37.2	0.00	2.63	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	236	3	3996.1	1.474	34.6787	143.0	159.4	36.9	0.00	2.55	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	237	2	4497.3	1.494	34.6847	150.0	158.3	36.3	0.00	2.51	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	238	1	5003.6	1.530	34.6877	159.2	159.0	36.0	0.00	2.49	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991119
W012	1	L61	USW	5.0	-9.000	32.3950	-9.0	12.2	9.2	0.15	0.94	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229991111
W012	3	239	23	9.4	9.140	32.4228	289.3	13.4	9.9	0.15	1.04	4.927	1.921	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	240	22	49.8	4.706	32.8587	317.4	34.5	19.9	0.16	1.76	6.266	2.487	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299911
W012	3	241	21	99.6	3.671	33.1570	259.2	46.3	26.8	0.00	2.03	5.143	2.257	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	242	20	200.9	3.387	33.7930	101.9	83.9	38.7	0.00	2.76	2.590	1.122	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	243	19	295.1	3.384	33.9017	64.6	98.1	41.8	0.00	3.00	1.796	0.845	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299919
W012	3	244	18	400.3	3.487	34.0396	45.3	108.0	42.5	0.00	3.04	1.023	0.502	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	245	17	600.8	3.311	34.2303	26.9	125.8	43.0	0.00	3.12	0.364	0.218	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	246	16	801.1	2.985	34.3269	23.6	148.4	43.3	0.00	3.12	0.159	0.139	-9.0	-9.0	-9.00	-9.0	-9.0	22242222219911
W012	3	247	15	1005.8	2.713	34.4021	26.4	147.9	43.5	0.00	3.13	0.077	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	248	14	1252.9	2.460	34.4619	31.3	155.4	43.4	0.00	3.13	0.044	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	249	13	1500.8	2.231	34.5153	40.7	163.1	43.5	0.00	3.17	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222242299911
W012	3	250	12	1749.0	2.052	34.5571	51.4	165.1	42.5	0.00	3.04	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	251	11	1999.7	1.909	34.5863	71.5	167.9	41.8	0.00	2.93	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	252	10	2248.2	1.788	34.6139	79.4	168.3	41.1	0.00	2.85	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	253	9	2501.5	1.690	34.6319	95.7	166.7	40.1	0.00	2.77	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	254	8	2749.4	1.620	34.6457	104.1	165.5	39.5	0.00	2.72	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	255	7	3000.2	1.563	34.6567	113.6	163.4	38.7	0.00	2.66	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229919991
W012	3	256	6	3000.1	1.563	34.6564	115.7	163.6	38.7	0.00	2.65	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	257	5	3499.7	1.498	34.6703	132.7	160.8	37.7	0.00	2.56	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	258	4	4002.1	1.475	34.6797	143.4	159.2	37.1	0.00	2.49	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	259	3	4501.4	1.493	34.6857	149.0	159.9	36.5	0.00	2.45	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	260	2	4752.3	1.511	34.6871	151.8	159.6	36.6	0.00	2.48	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999919
W012	3	261	1	5102.5	1.533	34.6884	155.2	157.1	36.4	0.00	2.43	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229919911

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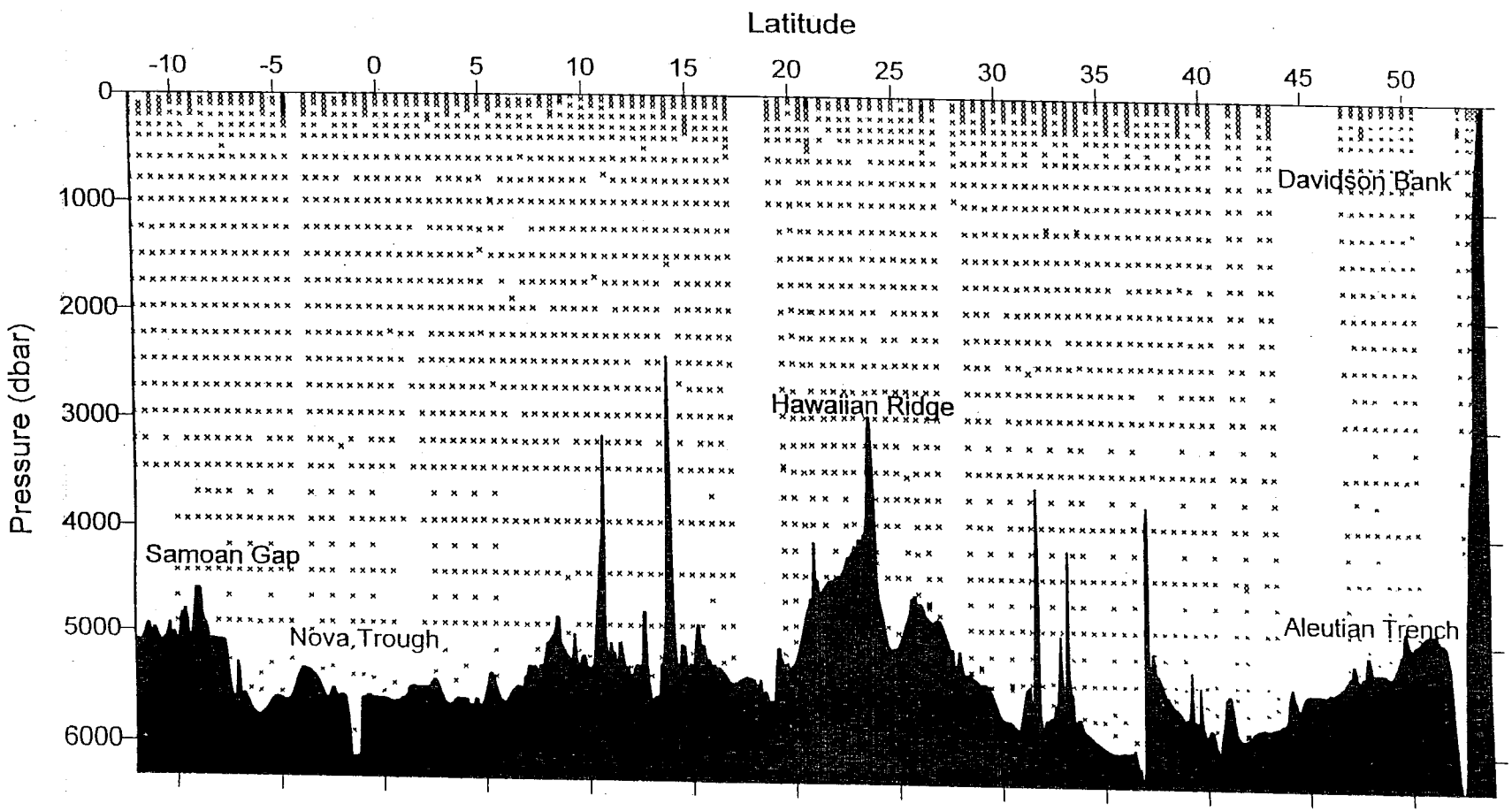
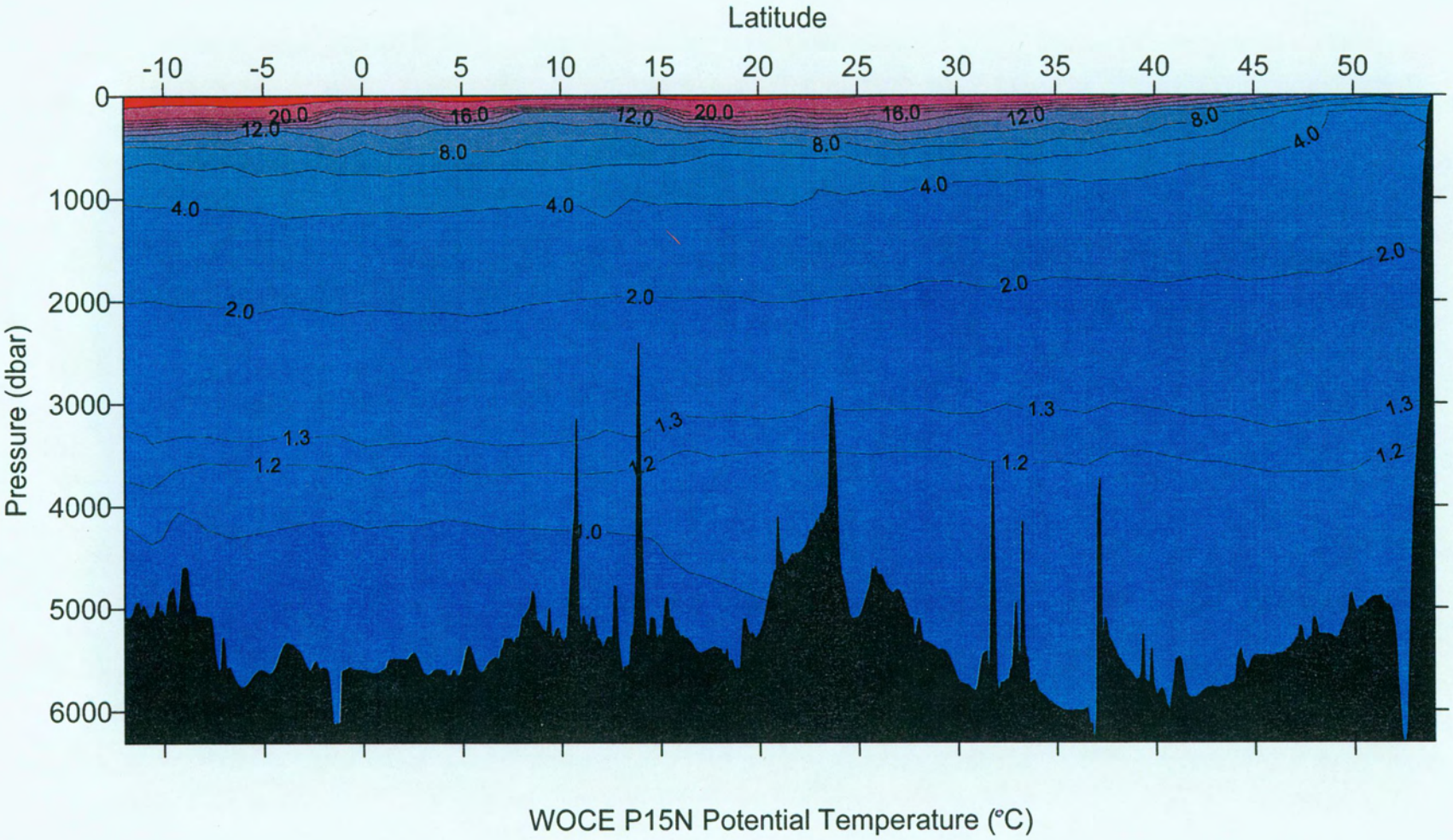
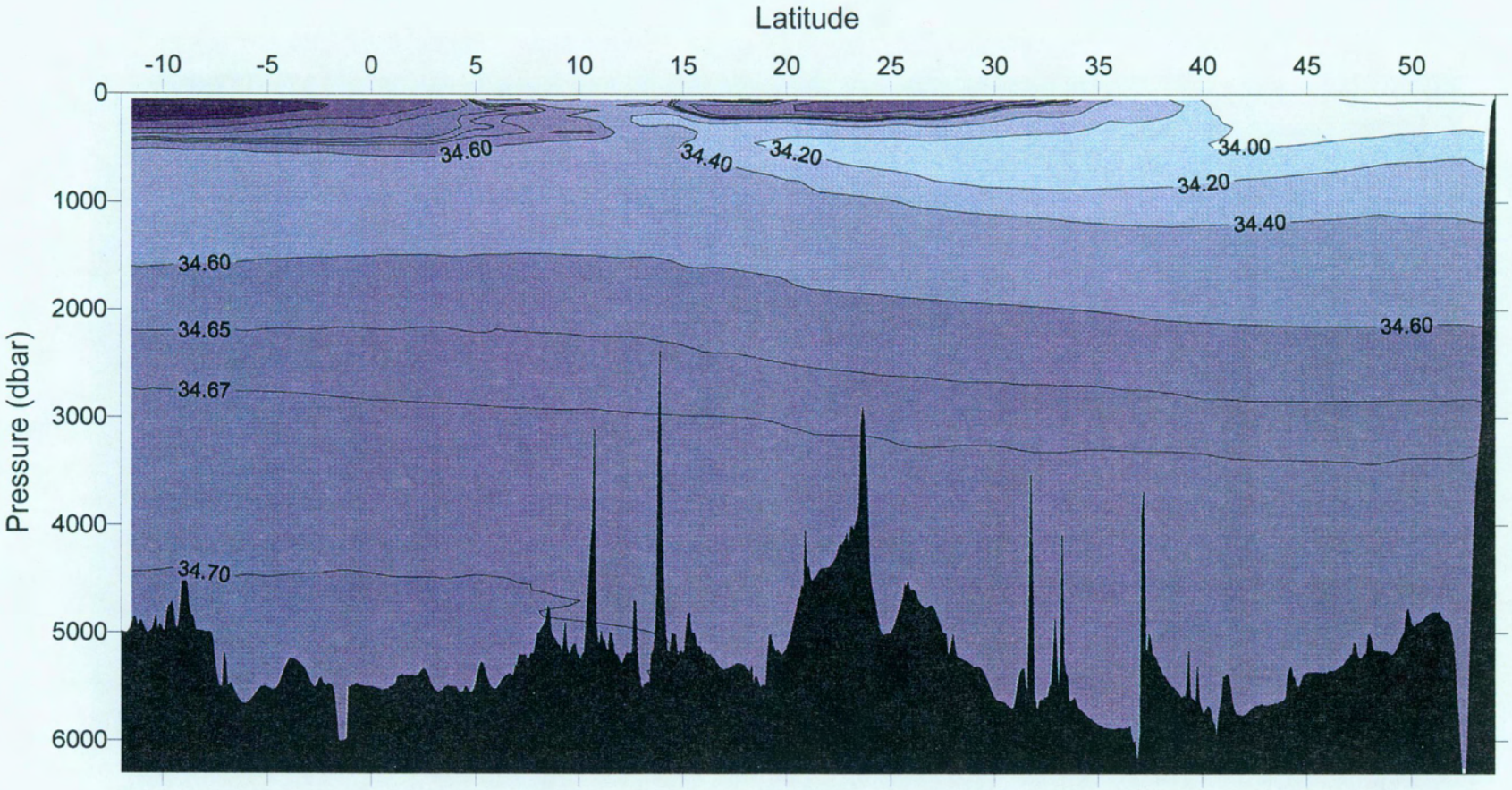
APPENDIX 4. HYDROGRAPHIC SECTION PLOTS P15N

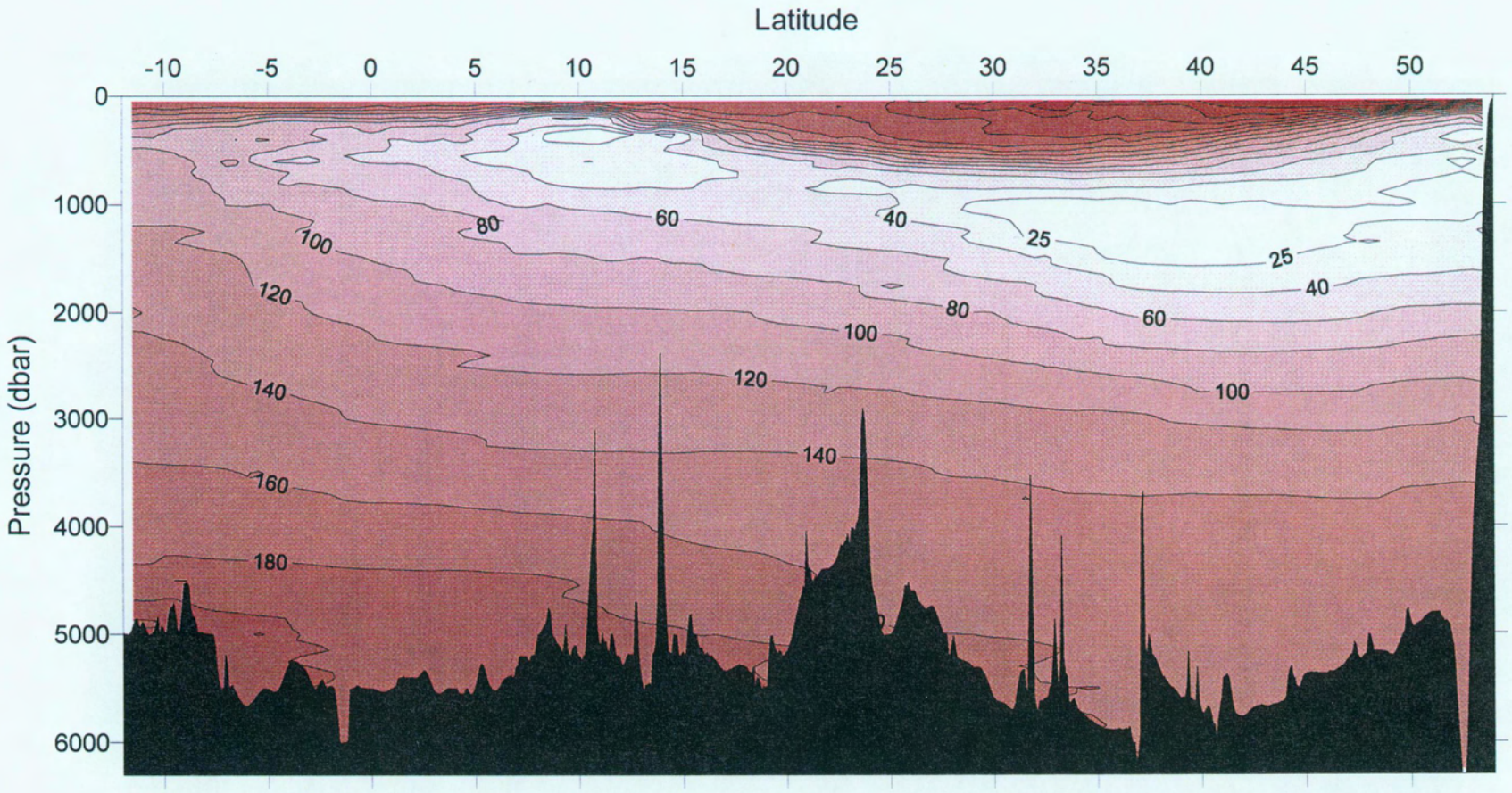


WOCE P15N SEPTEMBER - NOVEMBER 1994
BOTTOM TOPOGRAPHY AND LOCATION OF SAMPLE BOTTLES

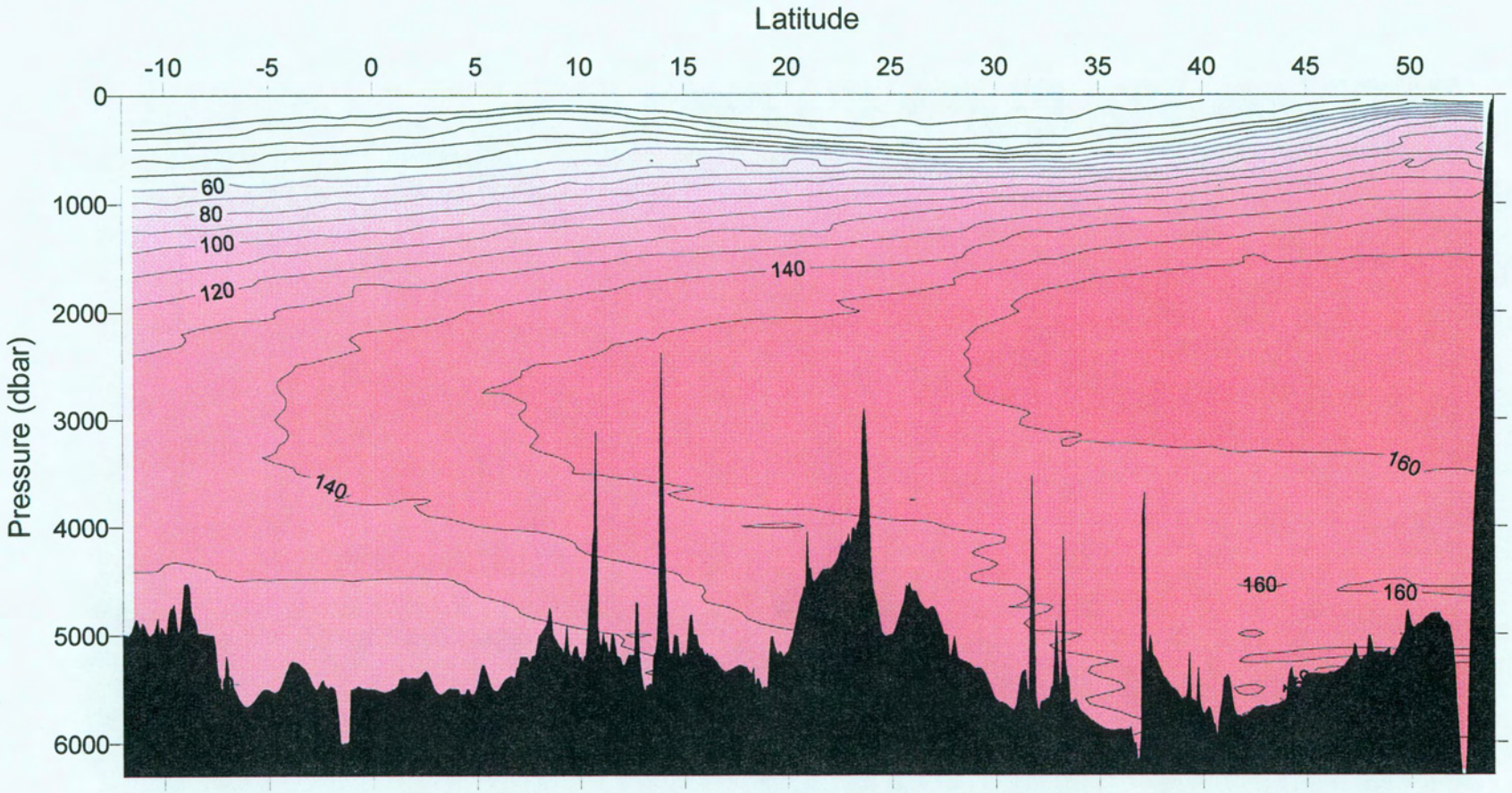

Latitude
-10
-5
0
5
10
15
20
25
30
35
40
45
50
Pressure (dbar)
0
1000
2000
3000
4000
5000
6000
20.0
16.0
12.0
8.0
4.0
2.0
1.3
1.2
1.0
WOCE P15N Potential Temperature (°C)



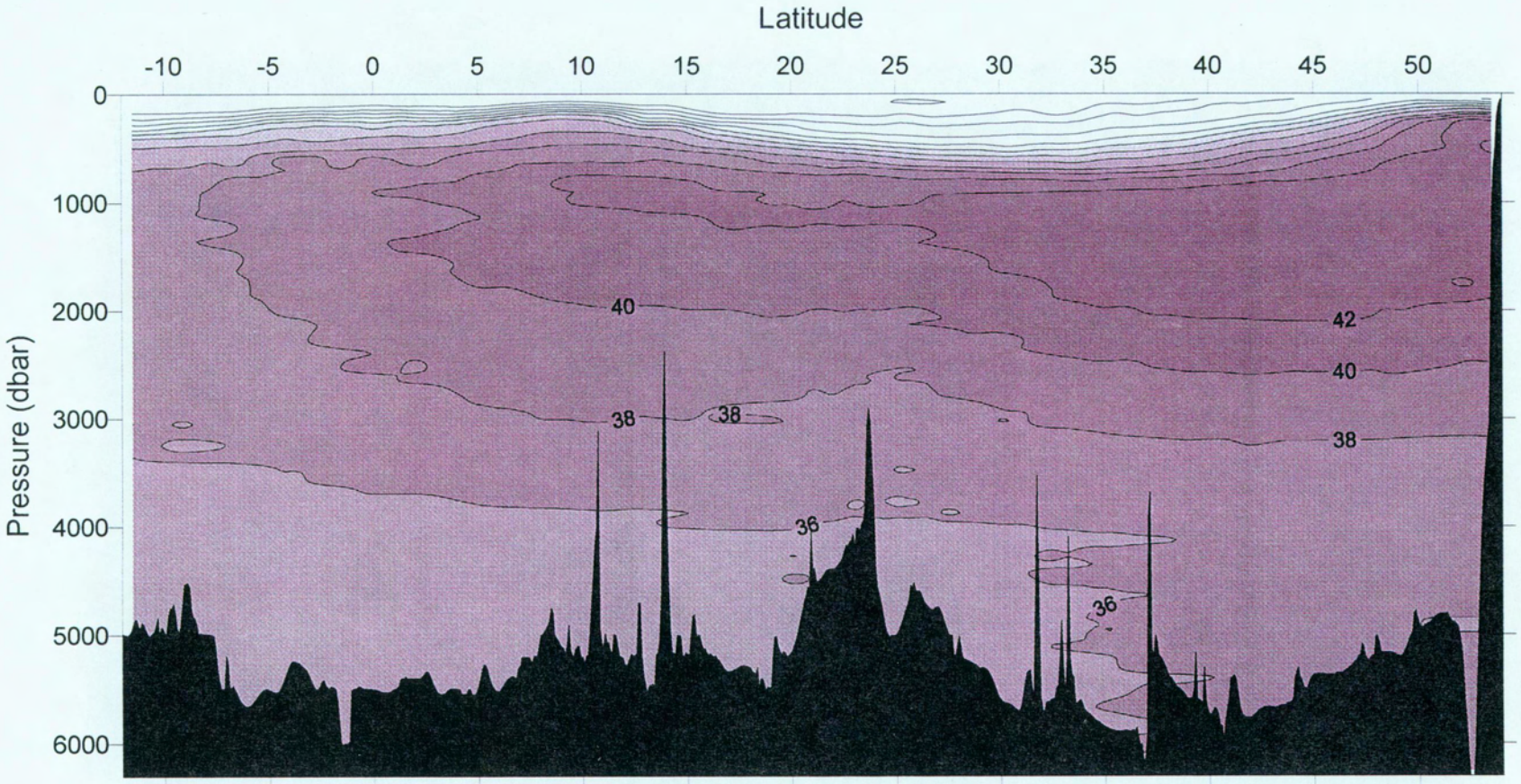
WOCE P15N Salinity (PSS-78)



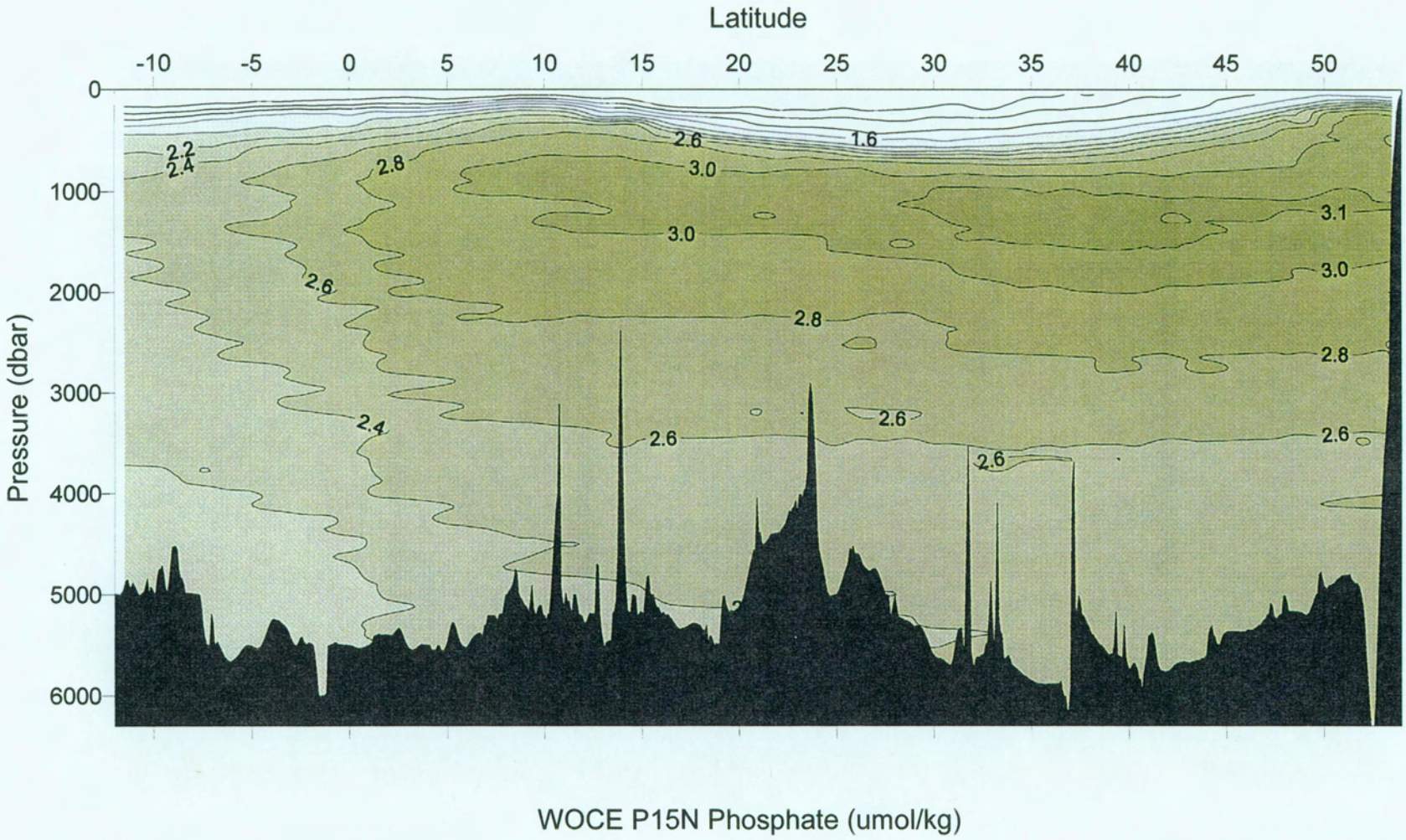
WOCE P15N Oxygen (umol/kg)

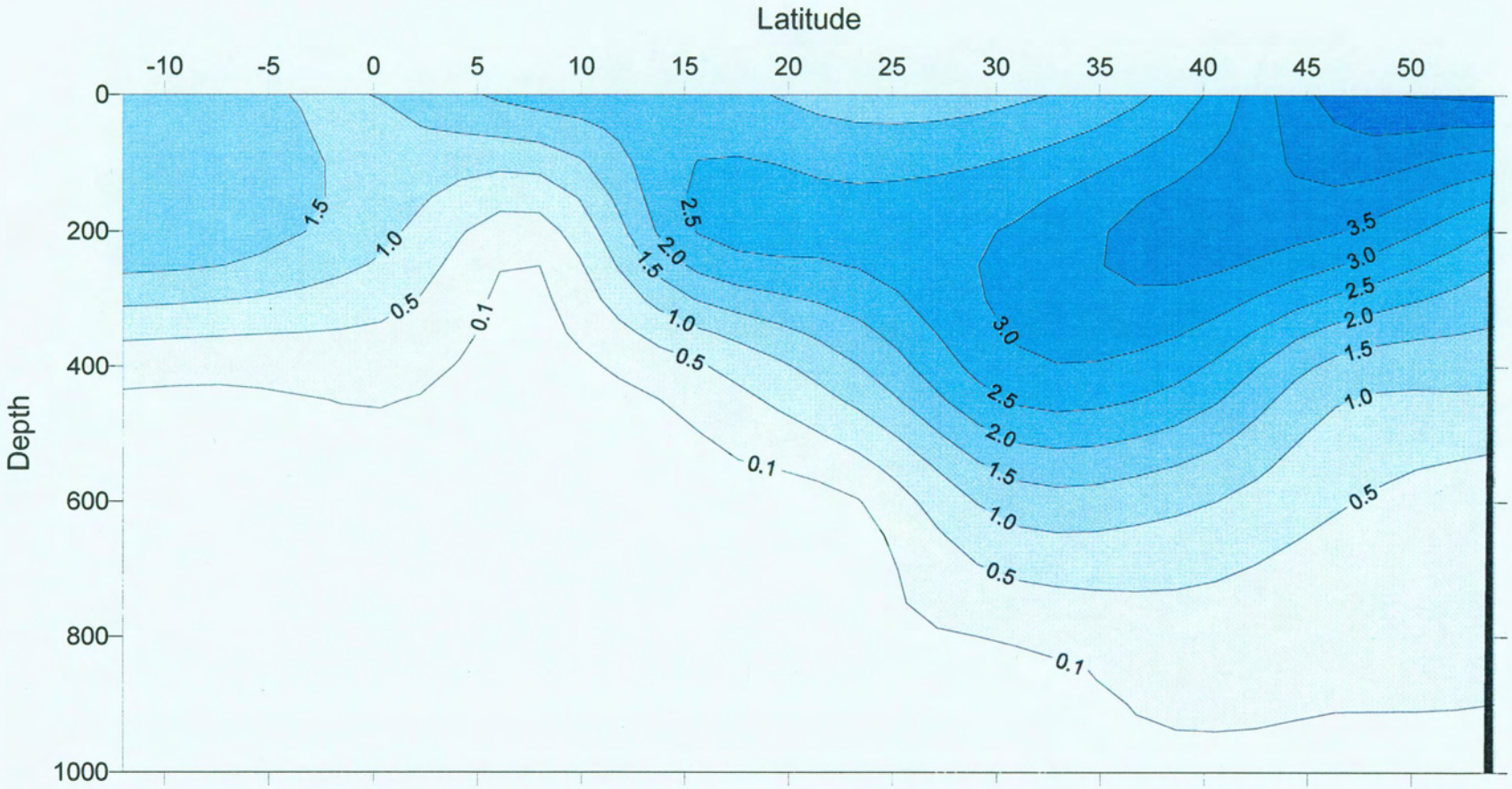


WOCE P15N Silicate (umol/kg)

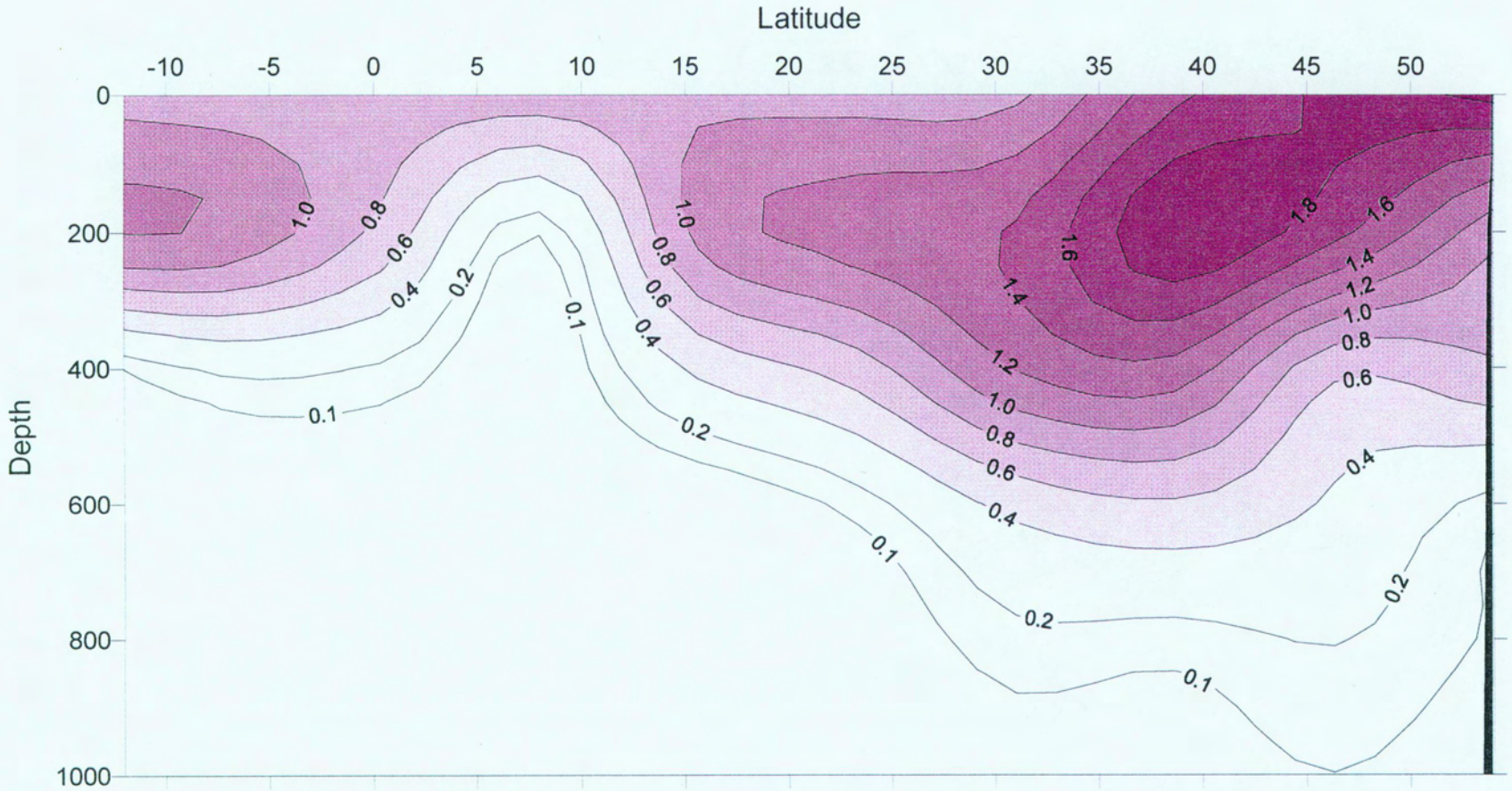


WOCE P15N Nitrate (umol/kg)


Latitude
-10
-5
0
5
10
15
20
25
30
35
40
45
50
Pressure (dbar)
0
1000
2000
3000
4000
5000
6000
2.2
2.4
2.8
2.6
3.0
1.6
3.1
2.4
2.6
2.8
3.0
2.8
2.6
2.6
2.6
2.6
WOCE P15N Phosphate (umol/kg)

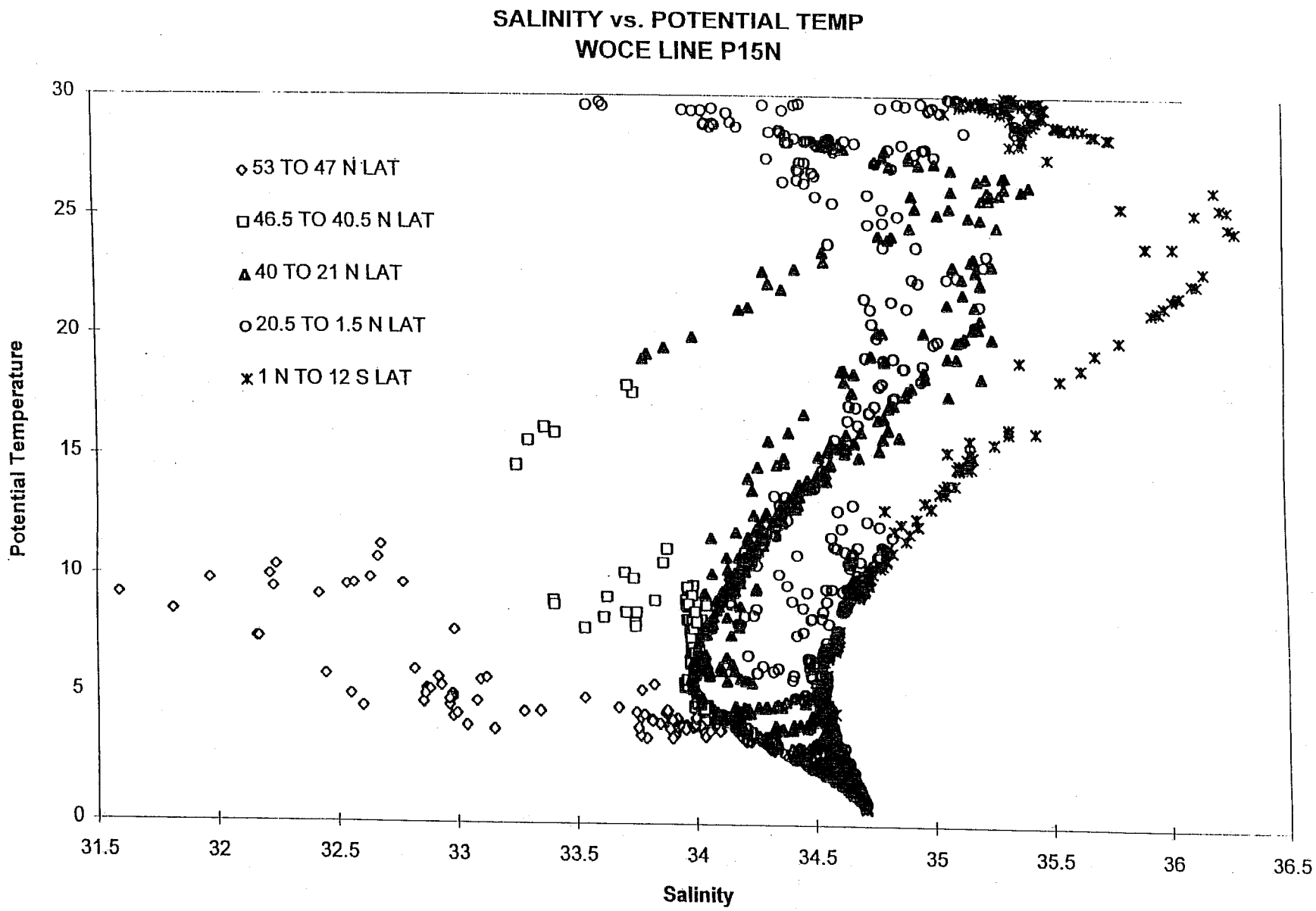


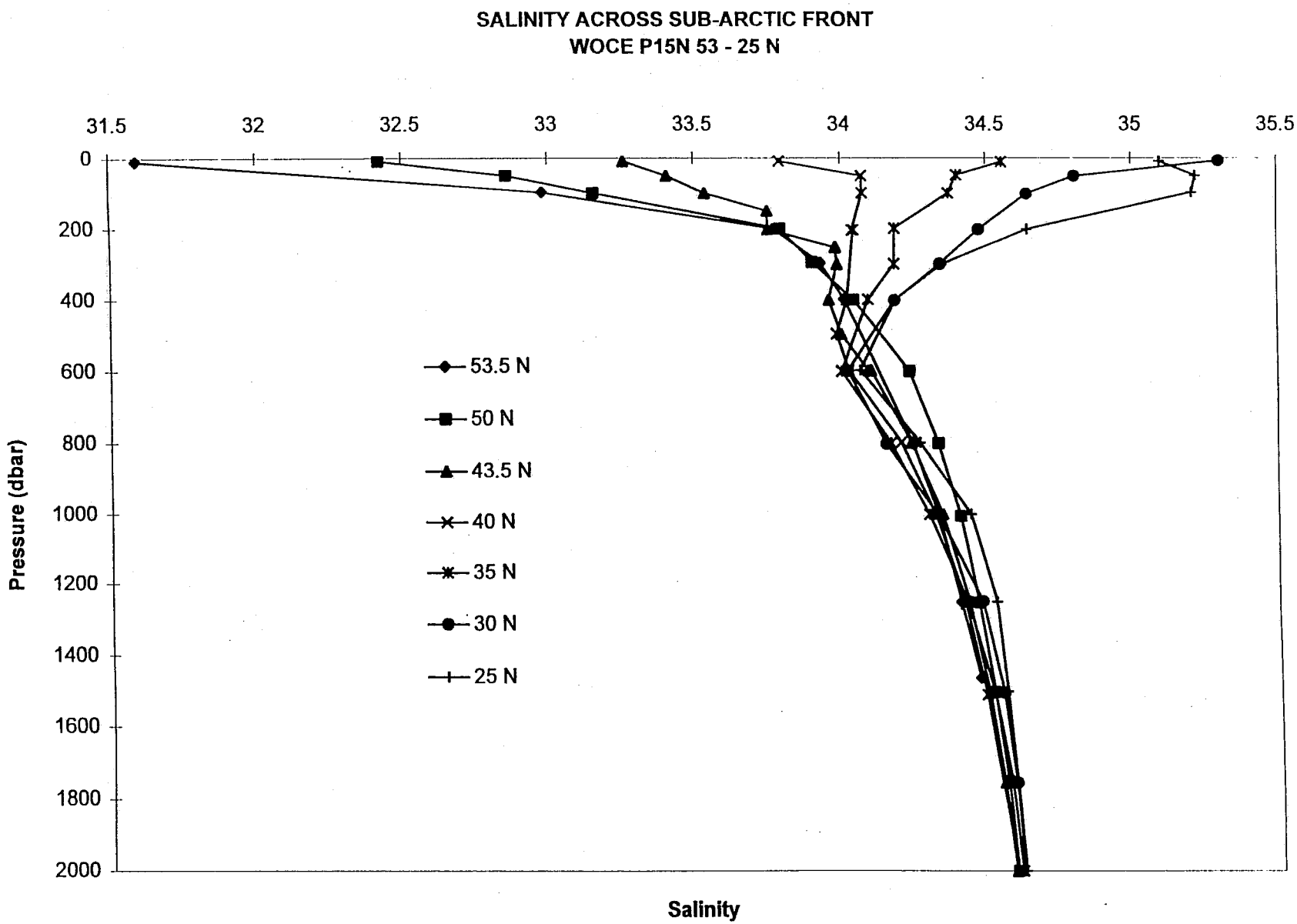
WOCE P15N CFC-11 (pM/kg)

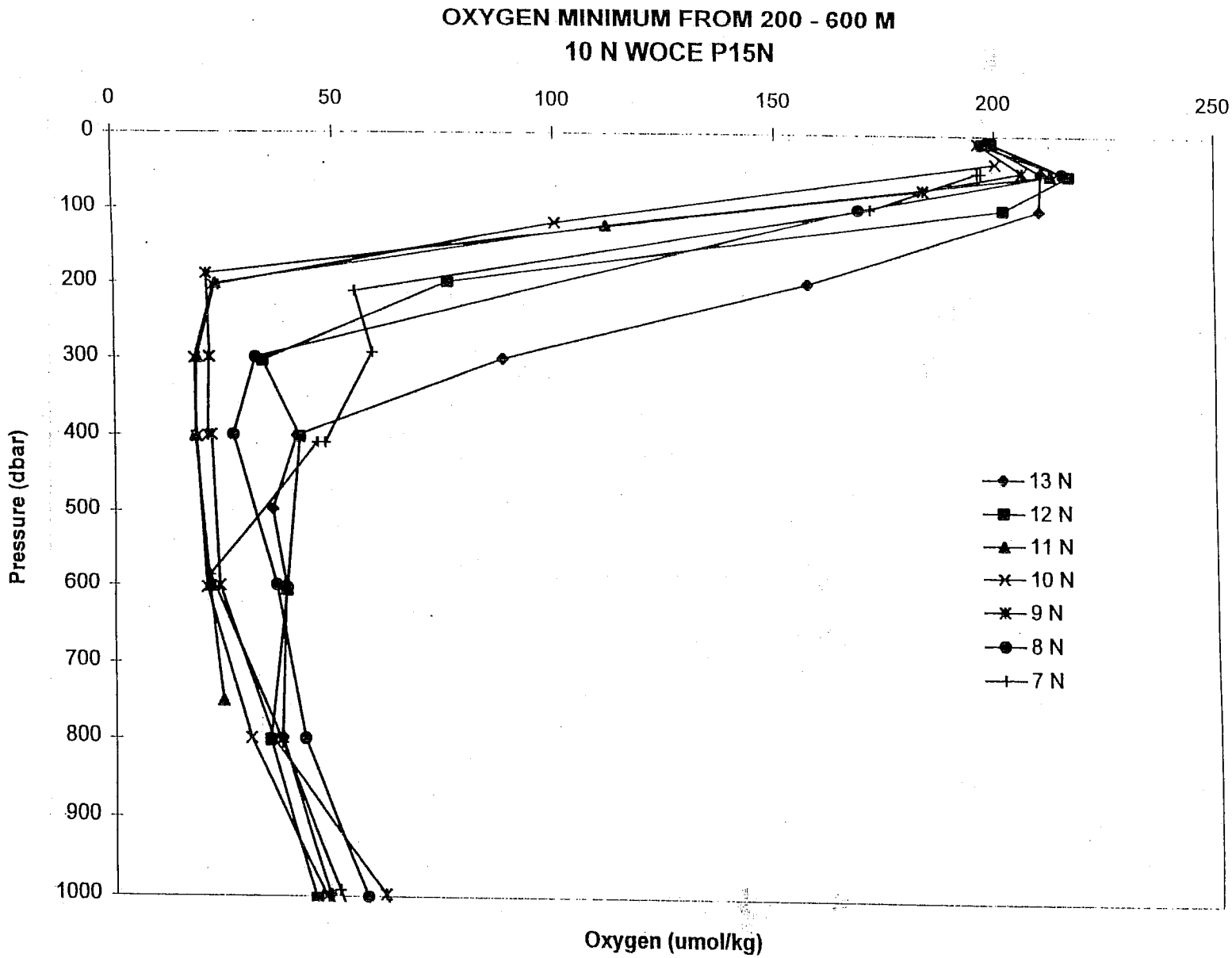


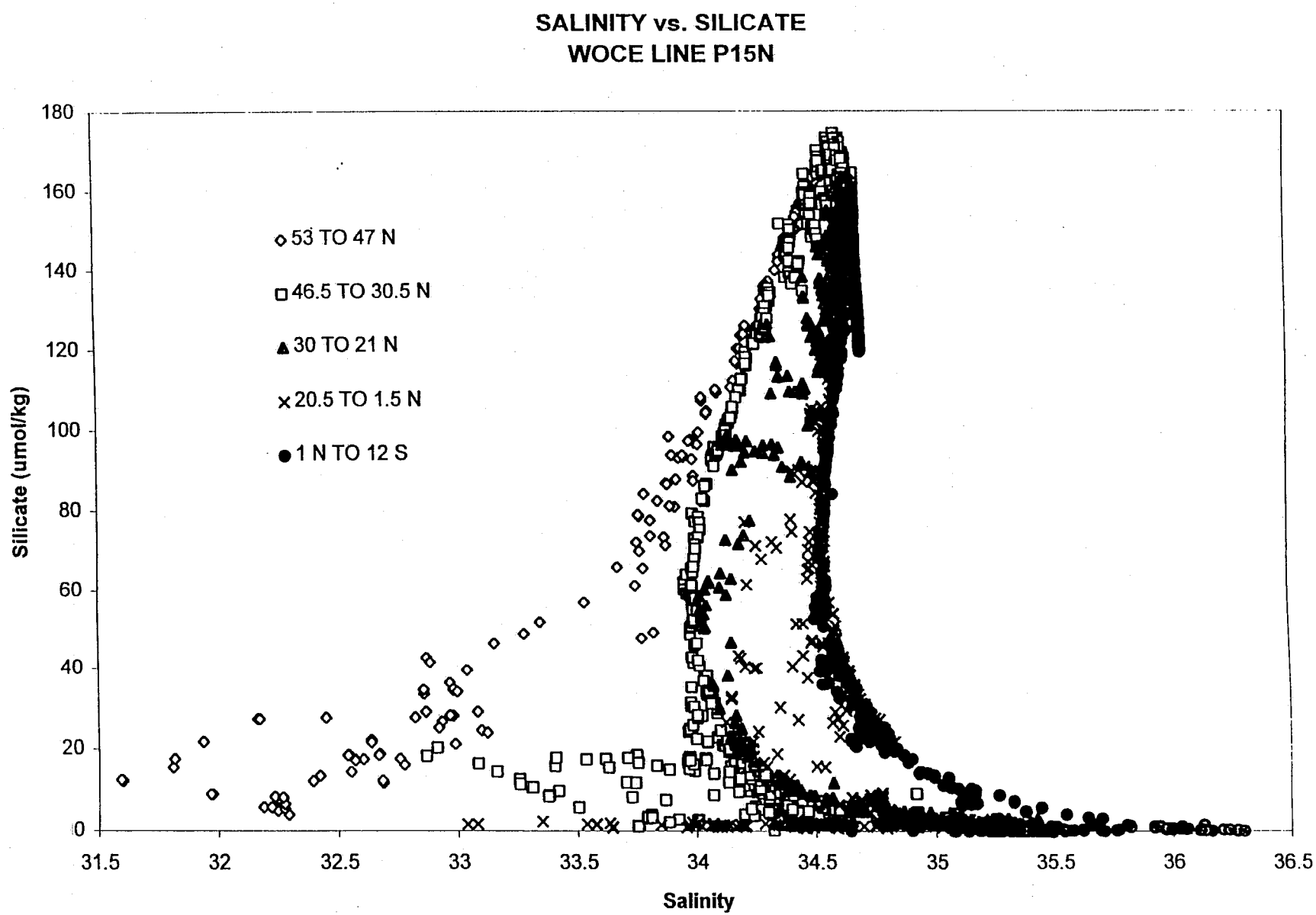
WOCE P15N CFC-12 (pM/kg)

APPENDIX 5. HYDROGRAPHIC FEATURES OF SECTION P15N


SALINITY vs. POTENTIAL TEMP
WOCE LINE P15N
53 TO 47 N LAT
46.5 TO 40.5 N LAT
40 TO 21 N LAT
20.5 TO 1.5 N LAT
1 N TO 12 S LAT
Potential Temperature
Salinity
30
25
20
15
10
5
0
31.5
32
32.5
33
33.5
34
34.5
35
35.5
36
36.5


SALINITY ACROSS SUB-ARCTIC FRONT
WOCE P15N 53 - 25 N
31.5
32
32.5
33
33.5
34
34.5
35
35.5
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Pressure (dbar)
Salinity
53.5 N
50 N
43.5 N
40 N
35 N
30 N
25 N


OXYGEN MINIMUM FROM 200 - 600 M
10 N WOCE P15N
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000
Pressure (dbar)
Oxygen (umol/kg)
13 N
12 N
11 N
10 N
9 N
8 N
7 N


SALINITY vs. SILICATE
WOCE LINE P15N
53 TO 47 N
46.5 TO 30.5 N
30 TO 21 N
20.5 TO 1.5 N
1 N TO 12 S
Silicate (umol/kg)
Salinity
180
160
140
120
100
80
60
40
20
0
31.5
32
32.5
33
33.5
34
34.5
35
35.5
36
36.5

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WOCE SECTION P15N HYDROGRAPHIC SECTION OF THE PACIFIC OCEAN FROM DUTCH HARBOR, ALASKA TO AMERICAN SAMOA

by

F. Whitney and J. Barwell-Clarke

Institute of Ocean Sciences
Department of Fisheries and Oceans
Sidney, B.C.

1997

CANADIAN TECHNICAL REPORT OF HYDROGRAPHY AND OCEAN SCIENCES NO. 184

Fisheries and Oceans Pêches et Océans

Canada

Canadian Technical Report of Hydrography and Ocean Sciences

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Cat. No. 0711-6764 ISSN Fs 97-18/184E

Correct citation for this publication:
Whitney, F. and J. Barwell-Clarke. 1997. WOCE Section P15N: Hydrographic section of the Pacific Ocean from Dutch Harbor, Alaska to American Samoa. Can. Tech. Rep. Hydrogr. Ocean Sci. 184: v + 61 p.

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From September 6 to November 10, 1994, scientists aboard the research vessel CSS *John P. Tully* completed detailed hydrographic measurements in the central north Pacific as part of the World Ocean Circulation Experiment (WOCE). Section P15N started near Dutch Harbor, Alaska and continued to 15 ° south. A total of 128 CTD/rosette stations were occupied along this line, almost all of them extending from the surface to the bottom. This report includes details of the cruise report submitted to the WOCE Hydrographic Programme Office (WHPO), the station summary files as submitted to WHPO, a description of the water sample data (salinity, temperature, oxygen, nutrients, CFCs), vertical section plots, and detailed plots of features along Section P15N.

Key words: CFCs, hydrography, nitrate, north Pacific, oceanography, phosphate, oxygen, salinity, silicate, temperature, World Ocean Circulation Experiment (WOCE).

RÉSUMÉ

Whitney, F. and J. Barwell-Clarke. 1997. WOCE Section P15N: Hydrographic section of the Pacific Ocean from Dutch Harbor, Alaska to American Samoa. Can. Tech. Rep. Hydrogr. Ocean Sci. 184: v + 61 p.

Du six septembre au dix novembre, 1994, des chercheurs à bord du navire de recherche *John P. Tully* ont complété des mesures hydrographiques détaillées du centranord Pacifique dans le cadre du World Ocean Circulation Experiment (WOCE). La section P15N commença près de Dutch Harbor, Alaska et continua jusqu'à 15 ° sud. Un total de 128 stations de CTD/rosette ont été visitées le long de cette ligne, presque toutes allant de la surface jusqu'au fond. Ce rapport inclut des détails du rapport de l'expédition soumi au WOCE Hydrographic Programme Office (WHPO), les dossiers de sommaires des stations soumis au WHPO, une déscription des données d'échantillon d'eau (salinité, température, oxygène, éléments nutritifs, CFCs, des profils verticaux, et des diagrammes détaillés des caractéristiques le long de la section P15N.

Mots-clés:

CFCs, le nord du Pacifique, nitrate, océanographie, oxygène, phosphate, salinité, silicate, température, World Ocean Circulation Experiment (WOCE).

1.0. INTRODUCTION

1.1. OBJECTIVES

The World Ocean Circulation Experiment (WOCE) is a global project aimed at understanding the role of the ocean in the world's climate system. As we question our impact on global climate, information on the rates of heat transport in the oceans and the capacity of the ocean to absorb greenhouse gases, becomes invaluable. It is also becoming apparent that understanding these large scale ocean processes is crucial in resolving causes of variability in fish stocks that dramatically impact coastal communities of Canada. The scale of WOCE is such that a global effort is needed to complete one of its major aims, an intensive survey of water properties of the world's oceans over a short period (1990 to 1997). Details of WOCE data collection activities can be obtained from their web site:

(http://www.cms.udel.edu/woce/dacs.html)

In 1991, the Institute of Ocean Sciences (IOS) received funding from the Canadian Government's Green Plan - Ocean Climate Program to participate in the WOCE program. IOS agreed to undertake a major section (P15N) in the Pacific along 165 W from the Aleutian Islands (55 °N) to 10 °S. To meet the high standards imposed by WOCE, IOS had to modify its deep ocean sampling and analytical procedures. Between 1991 and 1994 changes were made to both our research vessel, the *CSS John P. Tully*, and our oceanographic protocols, and were subsequently tested on several coastal cruises. On September 6, 1994, the *Tully* left IOS to begin a 3 month round trip to American Samoa which covered over 20,000 km. More than 3300 sea water samples were collected and analyzed for a variety of parameters which were intended to help describe ocean circulation. The goals of P15N included investigating such processes and features as: carbon dioxide penetration into the North Pacific, the Alaska Stream, sub-arctic front, 2200 m silicate maximum (37° to 43°N), shallow oxygen minimum north of the equator, equatorial upwelling, and flow of Antarctic water through the Samoan Gap. This report summarizes our results from water sampling along WOCE Section P15N, and documents our submissions to the WOCE Hydrographic Programme Office.

1.2. CRUISE NARRATIVE

1.2.1. Cruise Track

The cruise track and the CTD/rosette stations are given in Figure 1. Cruise P15N started on September 6, 1994 when the CSS *John P. Tully* sailed west from the mouth of Juan de Fuca Strait. Four stations were sampled on line PR6, including Station PRS1 (Station Papa), then the vessel sailed for Dutch Harbor, where it refueled. Section P15N started at 53°55.28'N, 164°59.43'W, and continued south along 165°W. At 24°N, the cruise track shifted to the west to coincide with a previous National Oceanic and Atmospheric Administration (NOAA) section and the planned route of P15S. At 20°53.94'N, 165°58.65'W (Stn. W070) the ship headed to Honolulu for a crew change. The ship resumed station work at 20°30.27'N, 166°5.18'W (Stn. W071). The cruise track gradually moved westward to 168°45'W at 10°N and remained on this longitude through the equator, then began a second southwestward course at 8°30'S to 170°W at 10°S. The last WOCE station (Stn. W142) on the P15N section was made at 15°0.03'S, 170°0.04'W, and the vessel arrived in American Samoa on November 10, 1994.

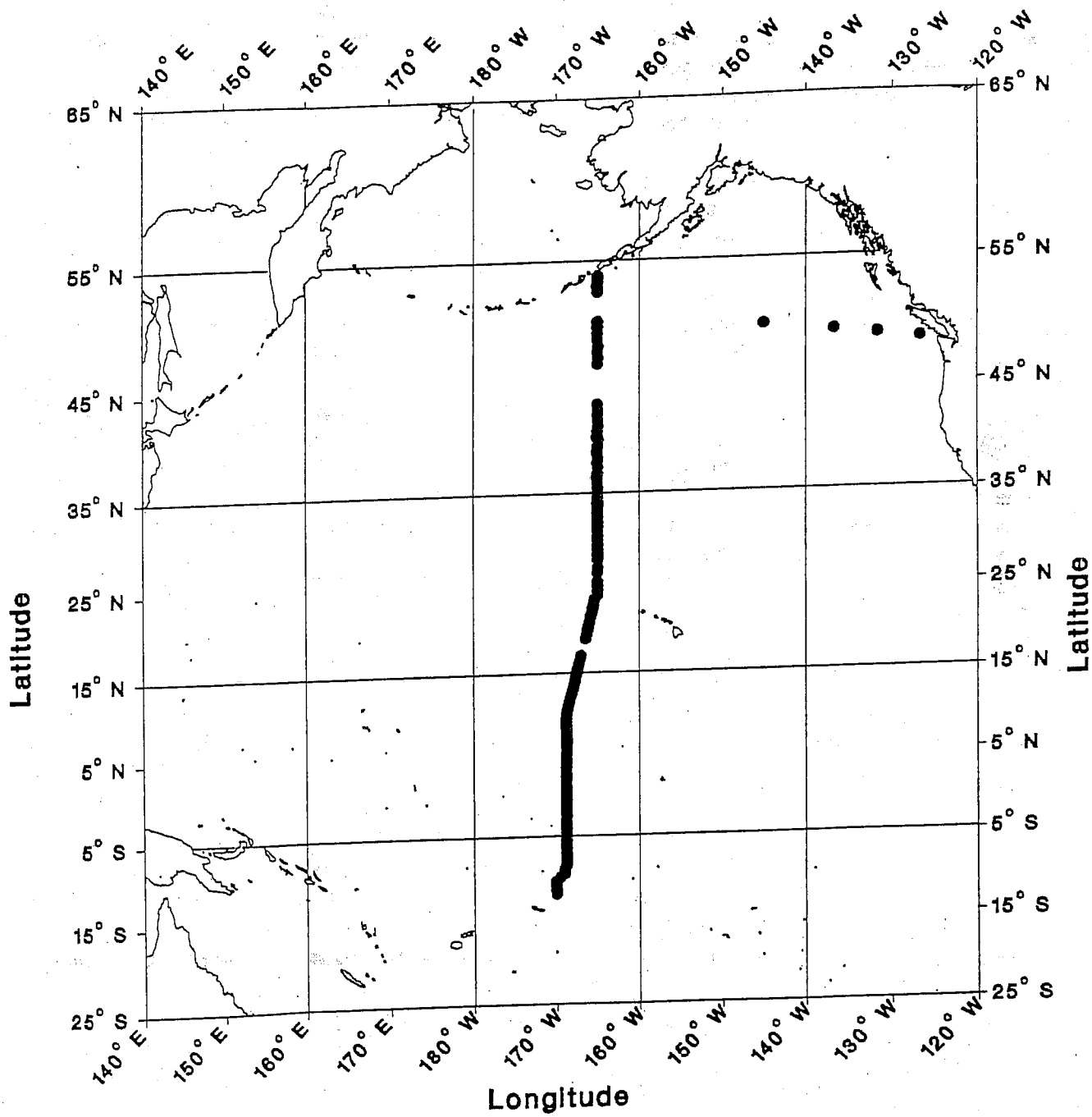

Figure 1. WOCE Section P15N aboard CSS *John P. Tully*

1.2.2. Stations and Sampling

The total stations occupied on both legs of the cruise are listed in Table 1. A total of 128 CTD/rosette stations were occupied on Line P15N. Two rosettes were used to collect samples for onboard analysis of salinity, oxygen, nutrients, CFCs, total CO_2 and alkalinity. Additional samples were stored for ^{13}C, ^{14}C, ^{18}O and CH_4. Continuous measurements of air and seawater CO_2 were taken from the scientific seawater supply (Uncontaminated Sea Water). USW was also sampled for salinity, nutrients, and chlorophyll *a* at most cast stations, and each degree of longitude between PRS1 and Dutch Harbor. Tracers were occasionally collected from the USW supply.

TABLE 1. Table of stations occupied on Section P15N

Sample type:	No. Stations:	Max. depth:
Rosette/CTD casts	128	6040 dbar
CTD casts	17	5070 dbar
Drifters	4	120 m
Loop stations	189	5 m

1.2.3. Floats, Drifters, and Moorings

At four stations, a total of 15 Argos drifters (seven 20 m and eight 120 m drogues) were deployed. A single meteorological drifter was deployed for the Department of the Environment near 47°N. Several dozen wine bottles containing postcards were deployed at locations selected by a local school class. No moorings were deployed or recovered on this cruise.

1.2.4. Meteorological Log

A SAIL (Standard ASCII Interface Loop) system onboard ship polled several sensors at two minute intervals. Data were stored on a micro computer and subsequently processed in a format accessible for general use. Ship's officers measured the ship's course and speed, true wind direction and speed, barometric pressure, and dry and wet bulb temperature every four hours.

1.2.5. Sea Floor Topography along P15N Line

The sea floor topography along the cruise track was digitized from British Admiralty charts and is shown in the Hydrographic Section Plots (Section 6.0.). The main topographic features along P15N from north to south are: Davidson Bank, Aleutian Trench, Hawaiian Ridge, Nova Trough and the Samoan Gap.

1.2.6. Cruise Personnel

The Principal Investigators and Cruise Participants are listed in Appendix 1.

2.0. HYDROGRAPHIC MEASUREMENT TECHNIQUES AND CALIBRATIONS

2.1. WATER SAMPLING

A 23 bottle rosette with a Guildline Model 8737 CTD was the primary sampling system (Niskin bottles numbers 1 to 23). An 11 bottle rosette with a Guildline 8705 CTD was used for shallow casts (Niskin bottles number S1 to S11).

Water samples were collected from rosettes by CFC analysts (Freons only) and sampling teams. Samples were drawn in the order: CFCs, oxygen, carbonate suite (TCO_2, alkalinity, ^{13}C, ^{14}C) and methane; then nutrients, salinity and ^{18}O in any order.

CFC samples were drawn into 100 mL glass syringes that were thoroughly rinsed in a continuous stream of sample. CFC samplers checked each Niskin bottle for leakage by pushing in the sample spigot before opening the air vent. Gas samples were drawn through amber or Tygon tubing and were all allowed to overflow from one to two volumes. Carbonate samples were poisoned with 200 µL of saturated $HgCl_2$ solution per 250 mL. Methane samples were drawn through amber tubing into glass bottles. Rubber septa, with syringe needles piercing their centers, were used to eliminate air from the samples. Septa were crimp sealed in place and samples were refrigerated.

Other sample containers were rinsed 3 times and filled as required. Nutrient samples were refrigerated until analysis. Salinity samples were warmed to lab temperature before being analyzed. ^{18}O samples were tightly stoppered and refrigerated.

2.2. CTD MEASUREMENTS

The three CTD probes used during this cruise were made by Guildline Instruments of Smiths Falls, Ontario, Canada. The primary instrument was the WOCE CTD (model 8737) which was used for most of the deep casts using the 24 bottle rosette. The 12 bottle rosette, used for shallow casts, was equipped with a standard Guildline Digital CTD (model 8705) referred to as Ocean Physics (OP) CTD. An additional Guildline CTD with a high precision pressure sensor was used when weather would not allow rosette casts.

The parameters CTDPRS and CTDTMP, found in Appendix 3, are data sets extracted (as the Niskin samplers were closed) from pre-cruise calibrated data files onboard ship.

WOCE CTD, Guildline Model 8737, SN 59901

This CTD was usually mounted in a bottle slot on a custom made 24 bottle rosette and was used for most of the casts in this cruise. It was interfaced to a General Oceanics (GO) pylon which triggered the 10-liter bottles in the remaining 23 slots. No post-cruise change to pressure was required for the WOCE CTD. It was initially calibrated for temperature with the post-cruise calibration of (offset, slope) = (-0.0015, 0.999938). To account for changes which occurred during the cruise, temperature offsets ranging from -0.00215 to 0.008967 were applied.

OP CTD, Guildline Model 8705, SN 58483

This CTD was used mainly for casts with the 12-bottle rosette to depths not exceeding 1500 dbar. Its main function was to provide temperature and pressure data for the bottles since each station was covered by full depth profile by one of the other CTD's. Comparisons in the upper 1500 m of the water column with the other CTD's showed a great deal of scatter due to water column variability so a lowered accuracy is claimed for this data. The post-cruise pressure correction was -4.6 dbar and the temperature correction was 0.0074 ° C.

2.3. CFC ANALYSIS

CFC-11 and CFC-12 were analyzed by the method of Bullister and Weiss (1988).

Data reduction was carried out using an adapted Scripps program (Weiss). This program requires salinity and temperature for calculations; the former was taken from salinometer data; and the latter was read from the sample bucket when the syringe was removed and attached to the extraction system.

Carrier blanks, stripper blanks, and restripped samples were analyzed throughout the cruise. Syringe air samples (Table 1) were usually taken at noon from above the bridge, the aft deck (where sampling was done), and inside the lab container .

TABLE 2. Freon levels of air (ppt)

Stn	Above bridge		Sampling deck		Lab	
	F-11	F-12	F-11	F-12	F-11	F-12
74	252.4	612.2	280.1	853.0	300.2	615.3
74	281.2	504.4			287.3	595.1
86			271.6	507.9	315.6	366.2
86					277.8	602.3
98	279.7	673.5	271.1	571.6	274.0	493.6
101	272.0	531.5	281.4	1301.1	279.9	820.7
106	249.6	528.6	258.5	673.5	264.2	1194.8
108	263.1	518.8	261.7	516.6	265.4	689.6
113	360.3	580.2	271.2	765.4	321.1	524.5

The values reported were initially calculated with the Freon analysis program. If a particular station had a stripper blank run, the program automatically subtracted this before printing the final results. If a station did not have a stripper blank, a manual blank subtraction was applied to the calculated results based on deep water values.

Working standard tank number 63098 was used for Stns. 71, 72, 73 and 74 and tank number 63100 was used for the remaining stations. (Tank 63100 values: F-11, 583.1 ppt, standard deviation 2.1, and F-12, 279.2 ppt, standard deviation 1.0. Tank 63098 values: F-11, 443.6 ppt, standard deviation 2.6 and F-12, 502.8, standard deviation 1.9).

These standards were made up of outside air. The tanks were calibrated against Centre of Ocean Climate Chemistry (COCC) lab standard tank number 63088 (F-11, 457.6 ppt, standard deviation 0.6; and F-12, 263.1 ppt standard deviation 0.8). This COCC lab standard was calibrated by John Bullister's lab (Pacific Marine Environmental Lab, Seattle, WA) in October 1993.

There were some difficulties encountered throughout the cruise that hampered obtaining optimal results:

- Our use of an aging Hewlett-Packard GC created problems. For the first days on Line PR6, corrosion on a circuit board shut the system down. Then as we sailed from Honolulu, the GC failed completely and we had to return to pick up another that was flown to us from IOS. Stations were occasionally skipped as columns were cleaned after they saturated with CFCs.
- A problem with the consistency of the quality of the carrier gas meant having to subtract higher than normal stripper blanks.
- The results of stations 83 to 97 may show zero at the 300 to 400 m depth because the threshold was initially set as per the 5890 GC program. This was modified for later stations in order to have very small peaks integrated. Thus these zero values may be a factor of threshold setting rather than a complete absence of Freon.

During some of the earlier stations we encountered samples affected by some sort of interference. This resulted in the F-11 peak being split or at other times summed, usually in the fifty meter sample. Neither using the split value nor a summed value seemed to give a reasonable result so these samples were flagged as questionable or bad. This problem was also encountered on the first leg of the cruise. Contamination for F-12 was variable from day to day and detection limits were estimated each day as 3 times the standard deviation of deep sample concentrations. Thus from 2 to 7 samples were used to assess LODs in the range 0.025 to 0.244 pmol/kg. Any value below this limit of detection was reported as zero.

Both carrier gas and bottle blanks (deep ocean samples) were consistently zero for F-11. The lowest discernible value was 0.045 pmol/kg.

The restrips of water samples demonstrated the high stripper efficiency of the Freon analysis system.

2.4. OXYGEN

Oxygen samples were drawn immediately following CFC and carbonate samples through either amber rubber or Tygon tubing into calibrated 125 mL iodine flasks. The flasks were allowed to overflow twice their volume before being stoppered then unstoppered, fixed with manganous and iodide reagents according to Carpenter (1965), restoppered and shaken thoroughly. Sample temperatures were measured before initial stoppering to ±0.5°C. To avoid outgassing during analysis, samples were initially all refrigerated at 4°C for 1 to 24 hours, before being titrated with an auto-burette (Brinkman Dosimat) to an iodine colorimetric endpoint.

By station W042, samples from the mixed layer were pulling in sizable air bubbles when they were cooled. At 2 stations (W050 and W058), the effect of air contamination of pickled samples was tested and shown to add 1 to 3 μmol/kg oxygen to surface samples that are

cooled. This bias remains in surface layer data from stations W042 to W050, and will vary in amount depending on the amount of cooling (volume change) for each sample. Surface layer samples from W051 to W070 were not cooled.

On Leg 2, flasks were sealed with tap water around the lip of the flask. This greatly reduced the amount of oxygen that entered a flask during cooling. Samples were routinely refrigerated before being analyzed. Standards were prepared as outlined in WOCE Report 73/91.

2.5. TOTAL CO_2

The coulometric procedure outlined in DOE (1994) was used to measure carbon dioxide in sea water. Samples were collected in 250 mL glass stoppered bottles, fixed with 200 μL of saturated $HgCl_2$ solution, and cool stored until analyzed.

2.6. ALKALINITY

Following the method of DOE (1994), alkalinity was determined using a temperature stable (25°C) closed titration cell, a Metrohm 665 Dosimat, a Metrohm 649 stir apparatus and an Orion model 720A pH meter.

2.7. NUTRIENTS

Samples were collected in 50 mL polyethylene tubes and refrigerated for a maximum of 12 h (rosette) or 30 h (USW) before being analyzed. A four channel Technicon Autoanalyzer was used to measure NO_3 + NO_2, NO_2, PO_4 and dissolved Si. Analytical procedures are essentially those described by Koroleff and Grasshoff (1983).

Concentrated standards were prepared from oven dried (80°C) reagents shortly before sailing on Leg 1 and again in Honolulu. Working standards were made every 1 to 2 days by diluting 1 to 6 mL of stock solutions to 250 mL with 3.2% NaCl (w/v in double run Milli-Q water). Nitrate, nitrite and silicate standards were compared to Sagami standards. The nitrate standards agreed to within 0.1 μmol/l, but the silicate concentrations differed by 2%, an unusual finding since our prepared standards usually agree very well with the stable Sagami standards. Our silicate standard was checked on a recent cruise and again compared to Sagami and it was found to be low by 2.2%. We compared our results with data from one matching station on the Cruise TT190 of the R/V *Thomas Thompson* in 1985 and found that below 1000 m our silicate results are comparatively low by an average of 2.2%. No corrections have been applied to our data, although in consultation with a WOCE DQE, this might be done.

Nutrient lab temperatures were recorded approximately hourly during analyses.

Phosphate samples were occasionally contaminated during the second half of the first leg. A nitrate reagent containing phosphoric acid was spilt on September 30 when Stations W044, W045, and W046 were analyzed. On October 1 it was noted in the nutrient log that the crew were washing the deck with soap - Stations W047, W048 and W049 were analyzed on this day.

Our water demineralizing system failed during Leg 2, which forced us to use low nutrient sea water to establish a baseline during analyses, and for the preparation of standards. Each day, a sample of 3.2% NaCl in double run Milli-Q water was analyzed to assess zero concentrations. Silicate and phosphate in low nutrient wash water was typically 2 and 0.2 µM higher than the clean salt solution.

Crystals developed in the nitrite line from Station 123 onwards. This data has been labeled quality 3 for nitrite. An error is introduced into nitrate data since nitrite is subtracted from the NO3 & NO2 analysis results. Consequently, nitrates have also been assessed as questionable (quality 3) although the actual offset is only 0.1 to 0.3 umol/kg. Summing nitrite and nitrate will provide correct NO_3 + NO_2 values.

2.8. SALINITY

Samples were collected in glass bottles and analyzed onboard ship using a Guildline Model 8410 Portasal. The Portasal was standardized daily with IAPSO standard sea water Batch P125. Salinity and nutrient measurements were made in an air conditioned lab.

2.9. PRECISION OF MEASUREMENTS

Standard Deviations of Pairs (S*p*) were calculated from replicates drawn from Niskin bottles tripped within 2.3 dbar of each other, using the following formula:

$$Sp = \{\Sigma d^2/2k\}^{0.5}$$

where d = differences between pairs and k = number of pairs.

Using this as a measure of precision includes all discrepancies introduced by leaking water samplers, sample collection, sample storage and analysis.

TABLE 3. Standard deviation of pairs (S_P)

Parameter	Range	S*p*	k
Salinity (PSS-78)	33.576 - 35.923	0.003	46
Oxygen (umol/kg)	20.86 - 203.41	1.02	45
Silicate (umol/kg)	0.02 - 149.8	0.34	46
Nitrate (umol/kg)	0 - 42.9	0.11	44
Nitrite (umol/kg)	0 - 1.406	0.008	46
Phosphate (umol/kg)	0.04 - 3.13	0.02	46
CFC-11 (pmol/kg)	0.415 - 2.587	0.076	11
CFC-12 (pmol/kg)	0.263 - 1.359	0.040	11

3.0. UNDERWAY MEASUREMENTS

3.1. NAVIGATION AND BATHYMETRY

A SAIL (Standard ASCII Interface Loop) system onboard ship polls several sensors at 2 minute intervals. Data is stored on a micro computer and is subsequently processed in a format that is accessible for general use. Ship's speed, heading, and position plus ocean depth are logged.

3.2. ACOUSTIC DOPPLER CURRENT PROFILER (ADCP)

A hull mounted current profiler logged upper layer currents every 5 minutes throughout the cruise.

3.3. THERMOSALINOGRAPH AND UNDERWAY DISSOLVED GASSES

Temperature and conductivity sensors were installed near the intake of a sea water line that is used as a scientific supply in the laboratory. Data is logged on SAIL.

Uncontaminated Sea Water (USW) was continuously pumped to the laboratory and used for half hourly measurements of pCO_2, continuous fluorometry (chlorophyll a) and discrete sampling at stations.

An infrared CO_2/H_20 analyzer (LI-COR Model 6262) was used to measure air, sea water and standard CO_2 concentrations every 30 minutes throughout the cruise. Sea water was equilibrated within a trapped air space to provide samples for measurements of pCO_2 in surface sea water (DOE 1994).

Chlorophyll *a* samples were collected from the USW supply at most stations, and filtered through Whatman GF/F filters. Samples were then frozen for transport back to IOS.

3.4. EXPENDABLE BATHYTHERMOGRAPH AND SALINITY MEASUREMENTS

XBTs (Type T-5, 1830 m) were used at several stations when bad weather prevented use of CTDs.

3.5. METEOROLOGICAL OBSERVATIONS

The meteorological observations include: ship's course and speed, true wind direction and speed, barometric pressure, and dry and wet bulb temperature.

4.0. PRELIMINARY RESULTS

4.1. GOALS ACHIEVED

Features such as the Alaska Stream, sub-arctic front, 2200 m silicate maximum (37 to 43°N), shallow oxygen minimum north of the equator, equatorial upwelling, and flow of Antarctic water through the Samoan Gap, are readily identified in this data set. Surface waters in the subarctic region of the Pacific are evidently a strong sink for CO_2 in September.

Our deep ocean winch, rosette/CTD and heave compensation equipment worked very well to 6000 m, the first test it has had below 4200 m. Sampling from the *Tully* was equally successful. The ship was able to hold station in 40 knot winds, and aft deck sampling proved comfortable and safe in most conditions. Sampling was suspended whenever the rosette unweighted excessively, as recorded on a load sensor mounted between the rosette and cable.

4.2. MAJOR PROBLEMS AND GOALS NOT ACHIEVED

Several stations were omitted due to high winds (reaching 70 knots), and CTD casts only were attempted at another 12 stations in marginal conditions. Sampling intervals were spaced to 250 or 500 m below 3000 m at many stations, allowing us to save time by carrying out only a single rosette cast. This spacing should result in negligible loss of information, since there is little structure in North Pacific deep waters.

Our deep ocean winch was damaged beyond repair following a cast at 10°S. Subsequent sampling was restricted to a maximum depth of 3800 m.

There were difficulties encountered throughout the cruise that hampered obtaining optimal results for CFC-11 and CFC-12. About 75 % of the stations were successfully analyzed. We had to return to Honolulu to pick up a replacement Gas Chromatograph at the beginning of Leg 2, costing us 3 days of ship time. The inconsistent quality of the carrier gas resulted in higher than normal stripper blanks. The zero values of stations 83 to 97 may be a factor of threshold setting rather than a complete absence of CFCs. Some F11 samples were affected by interference so these samples have been flagged as questionable.

Our water demineralizing system failed during Leg 2. Low nutrient sea water (LNSW) from the sea water loop was used as a baseline and in preparation of standards for nutrients. LNSW was also used to rinse samples tubes after acid cleaning.

Some phosphate samples were contaminated during the second half of Leg 1 likely due to a spill of a phosphoric acid containing reagent or washing of the decks with a soap solution. Nitrite values for Stns. W123 to W137 were higher than expected for deep samples due to a crystal build up in the nitrite line. Data quality has been labeled 3 for both nitrite and nitrate for these samples.

5.0. CTD AND ROSETTE STATION DATA

5.1. STATION SUMMARY

A station summary file including station number, cast type, date, time, position, bottom depth and parameters measured at each station is submitted to the WOCE Hydrographic Programme Office (WHPO) with the cruise report. The summary files (Legs 1 and 2) for P15N are listed in Appendix 2 as well as abbreviations and codes used for sample parameters.

5.2. ROSETTE SAMPLE DATA

The data collected from the rosette bottles during the cruise is submitted to WHPO as a -.SEA file. The WOCE parameters included salinity, oxygen, nutrients, CFC-11, CFC-12, total carbon and alkalinity. Investigators evaluated the quality of their measurements for water bottles and water samples and included this as part of the data record. The Quality Flag definitions for water bottles and water samples is listed in Appendix 3. The data are later independently evaluated by data quality evaluators (DQEs), who assign a second quality flag to the record for each measurement.

The parameters CTDPRS and CTDTEMP refer to the CTD values as the Niskin samplers were closed, and were extracted from uncorrected data files onboard ship.

A sample of the -.SEA files for the first twelve WOCE stations is listed in Appendix 3.
The -.SEA files for Legs 1 and 2 were submitted to WHPO and were used to produce the section plots found in Appendix 4.

5.3. CTD DATA

CTD data has been processed and submitted to WHPO. Following a proprietary use period, it can be requested from the Institute of Ocean Sciences.

5.4 STATUS AND AVAILABILITY OF DATA

Data is available from WHPO or through principal investigators.

WOCE information is available from the Data Information Unit which updates its files daily.

WOCE Data Information Unit
College of Marine Studies
University of Delaware
Lewes, DE 19958 USA

World Wide Web Site: http://www.cms.udel.edu/woce/dacs.html

The WHP Office has prepared an electronic atlas of onetime Pacific survey data including data files and plots that are accessed either by a web browser or via ftp. This data is password protected and is only available to PIs who have submitted onetime data to the WHPO. Availability of the atlas outside the group of PIs is strictly limited and will not be given without prior notification or approval.

Data can also be requested from principal investigators at the Institute of Ocean Sciences.

Institute of Ocean Sciences
Department of Fisheries and Oceans
9860 West Saanich Rd.
P.O. Box 6000
Sidney, British Columbia
Canada
V8L 4B2

6.0. HYDROGRAPHIC SECTIONS

6.1. SEA FLOOR TOPOGRAPHY AND SAMPLING LOCATIONS

Sea floor topography and bottle sampling locations are found in Appendix 4. The crosses indicated discrete water samples at each station and the bottom topography is digitized from British Admiralty charts.

6.2. VERTICAL SECTIONS

Vertical sections plots of P15N from 0 to 6300 dbar for potential temperature, salinity, oxygen, silicate, nitrate, phosphate, and from 0 to 1000 dbar for CFC-11 and CFC-12 are in Appendix 4. The potential temperature was computed from pre-cruise calibrated CTD data which are accurate to better than 0.01 C. Depth is correct to within 5 dbar on all section plots.

6.3. FEATURES ALONG P15N

Bathymetric features from north to south include:
a narrow continental shelf off the Aleutian Islands; Aleutian trench which exceeds 6000 m depth; generally deep waters (over 5000 m) which exceed 6000 m through the Mendocino Fracture Zone at 37 N until the Hawaiian Islands are approached at 25 N; shoaling at the western end of the Line Islands at 10 N; and the Samoan Gap at 10 S (a passage which connects the southern and northern abyssal Pacific).

Oceanographic features observable in vertical sections include:
the Alaskan Stream; western edge of the Alaskan Gyre; Subarctic front near 40 N; North Pacific Intermediate Waters (NPIW) which intrude from the north to at least 20 N, to a depth of 1000 m; the North Pacific oxygen minimum and nutrient maximum which is situated below the NPIW; silicate maximum in northern waters centered at 2200 m; upwelling of low oxygen and high nutrient waters at 10 N; and strong northward flow through the Samoan Gap.

7.0. ACKNOWLEDGEMENTS

The officers and crew of the research vessel CSS *John P. Tully*, lead by Captain John Anderson, undertook both Section P15N and the preparatory PR6 Lines with great zeal. Their good humor and competence made this voyage an experience to remember. The group of ocean-going staff and contractors at IOS, with their wisdom and experience, solved the challenges that faced a program of this size. Four chemists from the Pacific Oceanological Institute in Vladivostok provided skilled assistance in handling the heavy analytical workload. Thanks to other Department of Fisheries and Oceans groups, especially the Canadian Hydrographic Service, who permitted their staff to participate. Volunteers were an integral part of this section. In particular, the participation of 6 university students brought some youthful inquisitiveness and energy to the program. The overall enthusiasm of all participants was greatly appreciated.

Support for this work was supplied by the Department of Fisheries and Oceans, Panel for Energy Research Development Project #48105 (C. S. Wong) and Green Plan Ocean Climate Project W1 (Howard Freeland) of the Government of Canada.

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APPENDIX 1. PRINCIPAL INVESTIGATORS AND CRUISE PARTICIPANTS

PRINCIPAL INVESTIGATORS

Principal Investigator	Parameters	Institution
Howard Freeland	Climate change, XBTs, ADCP	IOS
C.S. Wong	Climate chemistry TCO_2, A_T, CFCs, ^{13}C, ^{14}C, ^{18}O, underway pCO_2	IOS
Ron Perkin	Physical measurements: CTD, salinity	IOS
Frank Whitney	Chemical measurements: Oxygen, nutrients, chlorophyll a, meteorology, bathymetry, thermosalinograph	IOS

CRUISE PARTICIPANTS - LEG 1

Individual	Responsibility	Institution
John Garrett	chief scientist	IOS
Frank Whitney	coordinator, hydro. data	IOS
Dario Stucchi	CTD data processing	IOS
John Love	electronics, sampling, salinity	IOS
Bernard Minkley	sampling, salinity	IOS
Reg Bigham	sampling	IOS
Tim Soutar	sampling	IOS
Ron Bellegay	sampling	IOS
Valerie Knight	carbonates	IOS
Galina Pavlova	carbonates	POI
Linda White	nutrients	IOS
Andrei Andreev	nutrients	POI
Pavel Tishchenko	CFCs	POI
Ruslan Chichkin	CFCs	POI
Leo Rebele	CFCs	student
Sarah Thornton	oxygen	student
Marie Robert	sampling	IOS
Louise Timmermans	sampling	student
Mary-Beth Bérubé	sampling	IOS

APPENDIX 1. PRINCIPAL INVESTIGATORS AND CRUISE PARTICIPANTS

CRUISE PARTICIPANTS - LEG 2

Individual	Responsibility	Institution
Howard Freeland	chief scientist	IOS
Ron Perkin	CTD data	IOS
Bernard Minkley	hydro data	IOS
John Love	electronics, sampling, salinity	IOS
Reg Bigham	sampling,	IOS
Neil Sutherland	sampling	IOS
Dennis Sinnott	sampling	IOS
Hugh Maclean	sampling	UBC
Keith Johnson	carbonates	IOS
Marty Davelaar	carbonates	IOS
Janet Barwell-Clarke	nutrients	IOS
Mary O'Brien	nutrients	IOS
Wendy Richardson	CFCs	IOS
Carol Stewart	CFCs	IOS
Tracy Feeney	CFCs	student
Bob Wilson	oxygen	IOS
Taimi Mulder	sampling	student
Rhiannon Johnson	sampling	student
Robin Brown	sampling	IOS
	Abbreviations:	
IOS	Institute of Ocean Sciences, Sidney, B.C. Canada	
POI	Pacific Oceanological Institute, Vladivostok, Russia	
UBC	University of British Columbia Vancouver, B.C. Canada	

APPENDIX 2. STATION SUMMARY FILES

Appendix 2 contains the summary files (9403.SUM) for Legs 1 and 2 of WOCE Cruise P15N.

The cast numbers are sequential, every over-the-side operation or discrete sampling at a station is assigned a sequential cast number. Every CTD/ROS or CTD cast was broken into two casts - a down cast and an up cast - and given separate cast numbers.

Abbreviations and codes used in -.SUM Files (from WOCE Report 67/91).

Mnemonic	Abr.	Full Title
EXPOCODE		WOCE (World Ocean Circulation Experiment) Expedition Code
WHP-ID		WOCE Hydrographic Programme Identifier
STNNBR		Station No.
TYPE:		Type of Cast
	BOT	Bottle Cast
	CTD	CTD
	DRF	Drifter deployment
	ROS	Rosette
	USW	Sample from uncontaminated sea water line at 5 m
	XBT	Expendable bathythermograph
UTC		Universal Time Clock
CODE:		
	BE	Beginning point of cast
	BO	Bottom of cast
	EN	End of cast

Parameter numbers, mnemonics, and units used in -.SUM and -.SEA files.

Parameter number	Parameter	Mnemonic	Scientific unit
1	Salinity	SALNTY	PSS-78
2	Oxygen	OXYGEN	umol/kg
3	Silicate	SILCAT	umol/kg
4	Nitrate	NITRAT	umol/kg
5	Nitrite	NITRIT	umol/kg
6	Phosphate	PHSPHT	umol/kg
7	Freon-11 (trichlorofluoromethane)	CFC-11	pmol/kg
8	Freon-12 (dichlorodifluoromethane)	CFC-12	pmol/kg
12	^{14}Carbon	DELC14	per mille
13	^{13}Carbon	DELC13	per mille
20	$^{18}O/^{16}O$ ratio	O18/O16	per mille
23	Total carbon	TCARBN	umol/kg
24	Total Alkalinity	ALKALI	umol/kg
25	Partial pressure of CO_2	PCO2	uatm
31	Methane	CH4	nmol/kg
34	Chlorophyll a	CHLORA	ug/kg

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
18DD9403/1	PR6	JF01	1	USW	090794	600	BE	48	16.00	N	123	30.00	W	GPS	171	5	1	1,3-6,34
18DD9403/1	PR6	JF02	1	USW	090794	751	BE	48	17.99	N	124	0.15	W	GPS	187	5	1	1,3-6,34
18DD9403/1	PR6	JF03	1	USW	090794	1010	BE	48	26.99	N	124	30.02	W	GPS	215	5	1	1,3-6,34
18DD9403/1	PR6	JF04	1	USW	090794	1220	BE	48	32.36	N	125	0.70	W	GPS	67	5	1	1,3-6,34
18DD9403/1	PR6	P01	1	USW	090794	1438	BE	48	34.69	N	125	32.81	W	GPS	105	5	1	1,3-6,34
18DD9403/1	PR6	P02	1	USW	090794	1624	BE	48	36.00	N	126	0.00	W	GPS	115	5	1	1,3-6,34
18DD9403/1	PR6	P03	1	USW	090794	1752	BE	48	37.00	N	126	20.00	W	GPS	748	5	1	1,3-6,34
18DD9403/1	PR6	P04	1	USW	090794	1923	BE	48	38.95	N	126	39.94	W	GPS	1310	5	1	1,3-6,34
18DD9403/1	PR6	P04	2	ROS	090794	2006	BE	48	39.40	N	126	39.24	W	GPS	1290			
18DD9403/1	PR6	P04	2	ROS	090794	2034	BO	48	39.39	N	126	39.24	W	GPS		1313		
18DD9403/1	PR6	P04	3	ROS	090794	2035	BE	48	39.38	N	126	38.81	W	GPS	1310	1314	23	1-6,13,20,23,24
18DD9403/1	PR6	P04	3	ROS	090794	2119	EN	48	39.48	N	126	38.54	W	GPS				
18DD9403/1	PR6	P05	1	USW	090794	2359	BE	48	41.60	N	126	10.30	W	GPS		5	1	1,3-6,34
18DD9403/1	PR6	P06	1	USW	090894	0216	BE	48	44.60	N	127	41.20	W	GPS	2511	5	1	1,3-6,34
18DD9403/1	PR6	P08	1	USW	090894	0644	BE	48	49.00	N	128	40.00	W	GPS	2486	5	1	1,3-6,34
18DD9403/1	PR6	P09	1	USW	090894	0847	BE	48	51.37	N	129	9.95	W	GPS	2330	5	1	1,3-6,34
18DD9403/1	PR6	P10	1	USW	090894	1047	BE	48	53.56	N	129	39.72	W	GPS	2675	5	1	1,3-6,34
18DD9403/1	PR6	P11	1	USW	090894	1253	BE	48	56.00	N	130	10.00	W	GPS	2710	5	1	1,3-6,34
18DD9403/1	PR6	P12	1	USW	090894	1505	BE	48	58.00	N	130	39.70	W	GPS		5	1	1,3-6,34
18DD9403/1	PR6	P13	1	USW	090894	1947	BE	49	2.64	N	131	39.88	W	GPS		5	1	1,3-6,34
18DD9403/1	PR6	P13	2	ROS	090894	1944	BE	49	2.64	N	131	39.88	W	GPS				
18DD9403/1	PR6	P13	2	ROS	090894	2031	BO	49	2.93	N	131	39.24	W	GPS		3027		
18DD9403/1	PR6	P13	3	ROS	090894	2032	BE	49	2.93	N	131	39.23	W	GPS	3040	3021	23	1-8,23,24
18DD9403/1	PR6	P13	3	ROS	090894	2146	EN	49	3.38	N	131	38.32	W	GPS				
18DD9403/1	PR6	P14	1	USW	090994	0226	BE	49	7.35	N	132	39.87	W	GPS	3263	5	1	1,3-6,34
18DD9403/1	PR6	P15	1	USW	090994	0638	BE	49	12.00	N	133	39.55	W	GPS	3339	5	1	1,3-6,34
18DD9403/1	PR6	P16	1	USW	090994	1058	BE	49	17.02	N	134	40.18	W	GPS	3570	5	1	1,3-6,34
18DD9403/1	PR6	P17	1	USW	090994	1512	BE	49	21.00	N	135	40.20	W	GPS	3511	5	1	1,3-6,34
18DD9403/1	PR6	P18	1	USW	090994	2037	BE	49	24.92	N	136	39.69	W	GPS	3815	5	1	1,3-6,34
18DD9403/1	PR6	P18	2	ROS	090994	2030	BE	49	25.07	N	136	39.67	W	GPS	3816			
18DD9403/1	PR6	P18	2	ROS	090994	2132	BO	49	24.85	N	136	3.98	W	GPS		3869		
18DD9403/1	PR6	P18	3	ROS	090994	2133	BE	49	24.86	N	136	39.78	W	GPS		3870	23	1-8,23,24
18DD9403/1	PR6	P18	3	ROS	090994	2307	EN	49	25.16	N	136	40.45	W	GPS				
18DD9403/1	PR6	P19	1	USW	091094	421	BE	49	39.04	N	137	40.00	W	GPS	3782	5	1	1,3-6,34
18DD9403/1	PR6	P20	1	USW	091094	937	BE	49	33.99	N	138	40.03	W	GPS	3938	5	1	1,3-6,34
18DD9403/1	PR6	P21	1	USW	091094	1410	BE	49	37.98	N	139	40.00	W	GPS	3880	5	1	1,3-6,34
18DD9403/1	PR6	P22	1	USW	091094	1833	BE	49	42.07	N	140	39.76	W	GPS	3931	5	1	1,3-6,34
18DD9403/1	PR6	P23	1	USW	091094	2244	BE	49	46.02	N	141	40.17	W	GPS	2930	5	1	1,3-6,34
18DD9403/1	PR6	P24	1	USW	091194	240	BE	49	50.10	N	142	39.50	W	GPS	3959	5	1	1,3-6,34
18DD9403/1	PR6	P25	1	USW	091194	0629	BE	50	0.00	N	143	36.19	W	GPS	4104	5	1	1,3-6,34
18DD9403/1	PR6	P35	1	USW	091194	0916	BE	50	0.07	N	144	18.22	W	GPS	4117	5	1	1,3-6,34
18DD9403/1	PR6	PRS1	1	BTL	091194	1223	BE	50	0.12	N	144	9.42	W	GPS	4212	70		
18DD9403/1	PR6	PRS1	2	USW	091194	1227	BE	50	0.18	N	144	59.07	W	GPS	4212	5	1	1,3-6,34
18DD9403/1	PR6	PRS1	3	ROS	091194	1417	BE	50	0.37	N	144	58.26	W	GPS	4204			

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	PR6	PRS1	3	ROS	091194	1433	BO	50	3.50	N	144	58.25	W	GPS	4210	1003		
18DD9403/1	PR6	PRS1	4	ROS	091194	1433	BE	50	0.35	N	144	58.25	W	GPS	4210	1003		
18DD9403/1	PR6	PRS1	4	ROS	091194	1451	EN	50	0.35	N	144	58.25	W	GPS				
18DD9403/1	PR6	PRS1	5	ROS	091194	1451	BE	50	0.31	N	144	58.36	W	GPS			5	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	5	ROS	091194	1502	BO	50	0.31	N	144	58.36	W	GPS		300		
18DD9403/1	PR6	PRS1	6	ROS	091194	1502	BE	50	0.25	N	144	58.36	W	GPS			5	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	6	ROS	091194	1504	EN	50	0.26	N	144	58.36	W	GPS		50		
18DD9403/1	PR6	PRS1	7	ROS	091194	1504	BE	50	0.26	N	144	58.35	W	GPS			1	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	7	ROS	091194	1507	BO	50	0.23	N	144	58.39	W	GPS	4214	25		
18DD9403/1	PR6	PRS1	8	ROS	091194	1540	BE	50	0.10	N	144	58.81	W	GPS	4211			
18DD9403/1	PR6	PRS1	8	ROS	091194	1639	BO	50	59.90	N	144	58.26	W	GPS		4321		
18DD9403/1	PR6	PRS1	9	ROS	091194	1643	BE	50	59.93	N	144	58.26	W	GPS		4321	21	1-8,13,20,23,24
18DD9403/1	PR6	PRS1	9	ROS	091194	1825	EN	50	0.04	N	144	57.76	W	GPS				
18DD9403/1		P146	1	USW	091194	2322	BE	50	12.38	N	146	0.55	W	GPS	4315	5	1	1,3-6,34
18DD9403/1		P147	1	USW	091294	409	BE	50	24.06	N	147	0.21	W	GPS	4465	5	1	1,3-6,34
18DD9403/1		P148	1	USW	091294	916	BE	50	35.76	N	148	0.57	W	GPS	4578	5	1	1,3-6,34
18DD9403/1		P149	1	USW	091294	1436	BE	50	47.19	N	149	0.23	W	GPS		5	1	1,3-6,34
18DD9403/1		P150	1	USW	091294	2207	BE	50	58.78	N	150	0.50	W	GPS	3998	5	1	1,3-6,34
18DD9403/1		P151	1	USW	091394	447	BE	51	12.50	N	151	13.10	W	GPS	4549	5	1	1,3-6,34
18DD9403/1		P152	1	USW	091394	830	BE	51	21.58	N	152	0.44	W	GPS	4793	5	1	1,3-6,34
18DD9403/1		P153	1	USW	091394	1318	BE	51	33.00	N	153	0.42	W	GPS	4656	5	1	1,3-6,34
18DD9403/1			1	XBT	091394	1655	BE	51	41.50	N	153	45.90	W	GPS	4400			
18DD9403/1		P154	1	USW	091394	1819	BE	51	44.89	N	154	3.69	W	GPS	4112	5	1	1,3-6,34
18DD9403/1		P155	1	USW	091394	2335	BE	51	55.47	N	155	0.05	W	GPS	4842	5	1	1,3-6,34
18DD9403/1		P156	1	USW	091494	750	BE	52	6.73	N	156	0.09	W	GPS		5	1	1,3-6,34
18DD9403/1			1	XBT	091494	1614	BE	52	17.50	N	156	58.80	W	GPS				
18DD9403/1		P157	1	USW	091494	1624	BE	52	17.73	N	157	0.00	W	GPS	4960	5	1	1,3-6,34
18DD9403/1		P158	1	USW	091594	144	BE	52	29.30	N	158	1.30	W	GPS		5	1	1,3-6,34
18DD9403/1		P159	1	USW	091594	1144	BE	52	40.01	N	159	0.01	W	GPS		5	1	1,3-6,34
18DD9403/1			1	XBT	091594	1652	BE	52	47.30	N	159	38.40	W	GPS				
18DD9403/1		P160	1	USW	091594	2042	BE	52	52.49	N	160	7.07	W	GPS		5	1	1,3-6,34
18DD9403/1		P161	1	USW	091694	218	BE	53	2.50	N	161	7.70	W	GPS	5012	5	1	1,3-6,34
18DD9403/1		P162	1	USW	091694	657	BE	53	10.98	N	162	1.45	W	GPS	5824	5	1	1,3-6,34
18DD9403/1		P163	1	USW	091694	1132	BE	53	17.21	N	163	0.01	W	GPS	5962	5	1	1,3-6,34
18DD9403/1		P164	1	USW	091694	1637	BE	53	23.66	N	164	0.05	W	GPS	4561	5	1	1,3-6,34
18DD9403/1			1	XBT	091694	1906	BE	53	27.18	N	164	26.49	W	GPS				
18DD9403/1		P165	1	USW	091694		BE	53	38.45	N	164	59.90	W	GPS	400	5	1	1,3-6,34
18DD9403/1	P15N	W001	1	ROS	091894	1504	BE	53	55.28	N	164	59.43	W	GPS	92			
18DD9403/1	P15N	W001	1	ROS	091894	1506	BO	53	55.24	N	164	59.38	W	GPS		86		
18DD9403/1	P15N	W001	2	ROS	091894	1507	BE	53	55.24	N	164	59.37	W	GPS		88	3	
18DD9403/1	P15N	W001	3	USW	091894	1507	BE	53	55.24	N	164	59.37	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W001	2	ROS	091894	1516	EN	53	55.23	N	164	59.18	W	GPS				
18DD9403/1	P15N	W002	1	ROS	091994	350	BE	53	44.68	N	164	59.36	W	GPS	195			
18DD9403/1	P15N	W002	2	USW	091994	355	BE	53	44.68	N	164	59.36	W	GPS		5	1	1,3-6,13,20,23,24,34

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	POSITION LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W002	1	ROS	091994	358	BO	53	44.95	N	164	59.25	W	GPS		173		
18DD9403/1	P15N	W002	3	ROS	091994	400	BE	53	44.66	N	164	59.30	W	GPS		179	8	1-6,13,20,23,24
18DD9403/1	P15N	W002	3	ROS	091994	412	EN	53	44.73	N	164	59.22	W	GPS				
18DD9403/1	P15N	W003	1	ROS	091994	615	BE	53	30.02	N	164	59.74	W	GPS	1430			
18DD9403/1	P15N	W003	2	USW	091994	634	BE	53	30.02	N	164	59.74	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W003	1	ROS	091994	641	BO	53	29.87	N	164	59.75	W	GPS		1482		
18DD9403/1	P15N	W003	3	ROS	091994	641	BE	53	29.86	N	164	59.75	W	GPS		1480	11	1-8
18DD9403/1	P15N	W003	3	ROS	091994	719	EN	53	29.63	N	164	60.00	W	GPS				
18DD9403/1	P15N	W004	1	ROS	091994	905	BE	53	14.94	N	165	0.90	W	GPS	3698			
18DD9403/1	P15N	W004	2	USW	091994	908	BE	53	14.94	N	165	0.90	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W004	1	ROS	091994	1003	BO	53	14.52	N	165	1.73	W	GPS		3694		
18DD9403/1	P15N	W004	3	ROS	091994	1003	BE	53	14.52	N	165	1.73	W	GPS	3690	3692	23	1-8,12,13,23,24
18DD9403/1	P15N	W004	3	ROS	091994	1132	EN	53	13.49	N	165	3.82	W	GPS				
18DD9403/1	P15N	W005	1	ROS	091994	1330	BE	52	59.90	N	165	0.16	W	GPS	3926			
18DD9403/1	P15N	W005	2	USW	091994	1338	BE	52	59.89	N	165	0.22	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W005	1	ROS	091994	1429	BO	52	59.76	N	165	0.58	W	GPS		3986		
18DD9403/1	P15N	W005	3	ROS	091994	1432	BE	52	59.76	N	165	0.59	W	GPS		3985	23	1-8
18DD9403/1	P15N	W005	3	ROS	091994	1606	EN	52	59.56	N	165	1.24	W	GPS				
18DD9403/1	P15N	W006	1	ROS	091994	1801	BE	52	44.79	N	164	59.66	W	GPS				
18DD9403/1	P15N	W006	2	USW	091994	1852	BE	52	44.39	N	165	0.18	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W006	1	ROS	091994	1909	BO	52	44.22	N	165	0.19	W	GPS		4134		
18DD9403/1	P15N	W006	3	ROS	091994	1909	BE	52	44.22	N	165	0.18	W	GPS		4136	23	1,3-8
18DD9403/1	P15N	W006	3	ROS	091994	2049	EN	52	44.25	N	164	59.77	W	GPS				
18DD9403/1	P15N	W006	4	DRF	091994	2112	DE	52	44.56	N	164	59.58	W	GPS				
18DD9403/1	P15N	W006	5	DRF	091994	2120	DE	52	44.47	N	164	58.79	W	GPS				
18DD9403/1	P15N	W007	1	USW	092094	148	BE	52	14.28	N	165	29.74	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W009	1	USW	092094	1318	BE	51	21.50	N	165	8.50	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W010	1	DRF	092094	1604	DE	51	0.32	N	164	59.84	W	GPS				
18DD9403/1	P15N	W010	2	DRF	092094	1611	DE	50	59.57	N	164	59.66	W	GPS				
18DD9403/1	P15N	W010	3	USW	092094	1621	BE	50	58.03	N	164	59.45	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N		1	XBT	092094	1700	BE	50	52.48	N	164	59.58	W	GPS	4780			
18DD9403/1	P15N	W011	1	USW	092094	1930	BE	50	29.94	N	164	59.59	W	GPS	4874	5	1	1,3-6,34
18DD9403/1	P15N	W011	2	ROS	092094	2004	BE	50	29.46	N	164	59.26	W	GPS	4872			
18DD9403/1	P15N	W011	2	ROS	092094	2111	BO	50	28.83	N	164	59.25	W	GPS		5010		
18DD9403/1	P15N	W011	3	ROS	092094	2111	BE	50	28.83	N	164	59.25	W	GPS		5008	23	1-8,13,20,23,24,31
18DD9403/1	P15N	W011	3	ROS	092094	2304	EN	50	27.95	N	164	59.57	W	GPS				
18DD9403/1	P15N	W012	1	USW	092194	232	BE	50	0.02	N	165	0.18	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W012	2	ROS	092194	232	BE	50	0.02	N	165	0.18	W	GPS	4950			
18DD9403/1	P15N	W012	2	ROS	092194	351	BO	50	0.37	N	165	0.13	W	GPS		5102		
18DD9403/1	P15N	W012	3	ROS	092194	351	BE	50	0.37	N	165	0.13	W	GPS		5105	23	1-8,12,23,24
18DD9403/1	P15N	W012	3	ROS	092194	544	EN	50	0.74	N	164	59.22	W	GPS				
18DD9403/1	P15N	W013	1	ROS	092194	934	BE	49	29.92	N	164	59.97	W	GPS	5085			
18DD9403/1	P15N	W013	2	USW	092194	940	BE	49	29.61	N	164	59.94	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W013	1	ROS	092194	1042	BO	49	29.61	N	164	59.94	W	GPS		5174		

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W013	3	ROS	092194	1043	BO	49	29.62	N	164	59.95	W	GPS		5176	23	1-8
18DD9403/1	P15N	W013	3	ROS	092194	1242	EN	49	29.33	N	165	0.13	W	GPS				
18DD9403/1	P15N	W013	4	DRF	092194	1306	DE	49	29.69	N	165	0.04	W	GPS				
18DD9403/1	P15N	W013	5	DRF	092194	1310	DE	49	29.69	N	165	0.69	W	GPS				
18DD9403/1	P15N	W013	6	DRF	092194	1314	DE	49	30.12	N	165	0.71	W	GPS				
18DD9403/1	P15N	W013	7	DRF	092194	1317	DE	49	30.15	N	165	0.01	W	GPS				
18DD9403/1	P15N	W013	8	DRF	092194	1328	DE	49	30.17	N	164	59.45	W	GPS				
18DD9403/1	P15N	W013	9	DRF	092194	1334	DE	49	29.69	N	164	59.47	W	GPS				
18DD9403/1	P15N	W014	1	USW	092194	1656	BE	49	0.25	N	165	0.44	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W014	2	ROS	092194	1656	BE	49	0.25	N	165	0.44	W	GPS	5111		4	1-8,23,24
18DD9403/1	P15N	W014	2	ROS	092194	1802	BO	48	59.93	N	165	0.12	W	GPS		5218		
18DD9403/1	P15N	W014	3	ROS	092194	1819	BE	49	0.08	N	165	0.18	W	GPS		4503	19	1-8,23,24
18DD9403/1	P15N	W014	3	ROS	092194	1943	EN	49	0.47	N	165	0.47	W	GPS				
18DD9403/1	P15N	W015	1	ROS	092194	2312	BE	48	30.01	N	165	0.00	W	GPS	5290			
18DD9403/1	P15N	W015	2	USW	092194	2316	BE	48	30.01	N	165	0.00	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W015	1	ROS	092294	28	BO	48	28.82	N	164	58.80	W	GPS		5255		
18DD9403/1	P15N	W015	3	ROS	092294	29	BE	48	28.82	N	164	58.79	W	GPS		5254	23	1-8
18DD9403/1	P15N	W015	3	ROS	092294	213	EN	48	27.97	N	164	55.93	W	GPS				
18DD9403/1	P15N	W015	4	DRF	092294	258	DE	48	30.26	N	164	59.69	W	GPS				
18DD9403/1	P15N	W015	5	DRF	092294	302	DE	48	29.78	N	164	59.65	W	GPS				
18DD9403/1	P15N	W015	6	DRF	092294	305	DE	48	29.83	N	165	0.00	W	GPS				
18DD9403/1	P15N	W015	7	DRF	092294	307	DE	48	29.78	N	165	0.33	W	GPS				
18DD9403/1	P15N	W015	8	DRF	092294	312	DE	48	30.24	N	165	0.34	W	GPS				
18DD9403/1	P15N	W016	1	ROS	092294	641	BE	48	0.00	N	165	0.03	W	GPS	4940			
18DD9403/1	P15N	W016	2	USW	092294	654	BE	47	59.97	N	164	59.96	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W016	1	ROS	092294	753	BO	48	0.03	N	165	0.30	W	GPS		5135		
18DD9403/1	P15N	W016	3	ROS	092294	753	BE	48	0.03	N	165	0.30	W	GPS			23	1-8,13,20,23,24
18DD9403/1	P15N	W016	3	ROS	092294	939	EN	48	0.39	N	165	0.46	W	GPS				
18DD9403/1	P15N	W017	1	ROS	092294	1316	BE	47	30.00	N	165	0.00	W	GPS	5265			
18DD9403/1	P15N	W017	2	USW	092294	1321	BE	47	30.23	N	164	59.49	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W017	1	ROS	092294	1440	BO	47	31.08	N	164	58.70	W	GPS		5343		
18DD9403/1	P15N	W017	3	ROS	092294	1440	BE	47	31.08	N	164	58.70	W	GPS		5345	23	1-8
18DD9403/1	P15N	W017	3	ROS	092294	1623	EN	47	32.18	N	164	56.70	W	GPS				
18DD9403/1	P15N	W018	1	DRF	092294	1934	DE	47	4.99	N	165	0.01	W	GPS				
18DD9403/1	P15N	W018	2	ROS	092294	2033	BE	46	59.99	N	164	59.91	W	GPS	5326			
18DD9403/1	P15N	W018	2	ROS	092294	2136	BO	47	0.67	N	164	59.47	W	GPS		5409		
18DD9403/1	P15N	W018	3	ROS	092294	2136	BE	47	0.67	N	164	59.47	W	GPS		5400	23	1-8,23,24
18DD9403/1	P15N	W018	4	USW	092294	2157	BE	47	0.76	N	164	59.73	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W018	3	ROS	092294	2319	EN	47	0.24	N	164	59.84	W	GPS				
18DD9403/1	P15N	W019	1	USW	092394	449	EN	46	29.88	N	165	0.02	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W020	1	USW	092394	931	BE	45	59.51	N	164	59.98	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W021	1	USW	092494	57	BE	45	30.24	N	165	9.76	W	GPS	5244	5	1	1,3-6,34
18DD9403/1	P15N	W021	2	XBT	092494	57	BE	45	30.24	N	165	9.76	W	GPS				
18DD9403/1	P15N	W022	1	USW	092494	358	BE	44	59.80	N	164	45.34	W	GPS		5	1	1,3-6,23,24,34

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE		POSITION	LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W022	2	XBT	092494	400	BE	44	59.44	N	164	45.21	W	GPS	5400			
18DD9403/1	P15N	W023	1	XBT	092494	738	BE	44	30.01	N	164	45.24	W	GPS				
18DD9403/1	P15N	W023	2	USW	092494	748	BE	44	30.01	N	164	47.41	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W023	3	CTD	092494	931	BE	44	30.58	N	164	59.39	W	GPS	5453			
18DD9403/1	P15N	W023	3	CTD	092494	1118	EN	44	30.74	N	164	58.53	W	GPS		4500		
18DD9403/1	P15N	W024	1	CTD	092494	1451	BE	43	58.67	N	164	59.69	W	GPS	5514			
18DD9403/1	P15N	W024	2	USW	092494	1452	BE	43	59.70	N	164	59.71	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W024	1	CTD	092494	1557	BO	43	59.08	N	164	58.64	W	GPS		4832		
18DD9403/1	P15N	W024	3	CTD	092494	1558	BE	43	59.06	N	164	58.62	W	GPS	5500			
18DD9403/1	P15N	W024	3	CTD	092494	1648	EN	43	58.86	N	164	58.16	W	GPS				
18DD9403/1	P15N	W025	1	ROS	092494	2018	BE	43	29.31	N	165	0.48	W	GPS	5538			
18DD9403/1	P15N	W025	2	USW	092494	2024	BE	43	29.23	N	165	0.56	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W025	1	ROS	092494	2030	BO	43	29.15	N	165	0.54	W	GPS				
18DD9403/1	P15N	W025	3	ROS	092494	2030	BE	43	29.15	N	165	0.54	W	GPS		598	11	1-8,12,13,20,23,24
18DD9403/1	P15N	W025	3	ROS	092494	2049	EN	43	28.90	N	165	0.47	W	GPS				
18DD9403/1	P15N	W025	4	ROS	092494	2124	BE	43	28.58	N	165	0.56	W	GPS				
18DD9403/1	P15N	W025	4	ROS	092494	2235	BO	43	28.10	N	165	0.57	W	GPS		5675		
18DD9403/1	P15N	W025	5	ROS	092494	2235	BE	43	28.10	N	165	0.57	W	GPS			23	1-8
18DD9403/1	P15N	W025	5	ROS	092594	27	EN	43	27.77	N	165	0.61	W	GPS				
18DD9403/1	P15N	W026	1	ROS	092594	339	BE	43	0.08	N	164	59.81	W	GPS	5654			
18DD9403/1	P15N	W026	2	USW	092594	400	EN	43	0.80	N	164	59.40	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W026	1	ROS	092594	447	BO	43	0.51	N	164	59.45	W	GPS				
18DD9403/1	P15N	W026	3	ROS	092594	448	BE	43	0.51	N	164	59.44	W	GPS			23	1-8,12,23,24,31
18DD9403/1	P15N	W026	3	ROS	092594	641	EN	43	1.08	N	164	57.91	W	GPS				
18DD9403/1	P15N	W027	1	ROS	092594	1003	BE	42	29.98	N	164	59.98	W	GPS	5822		23	1-8
18DD9403/1	P15N	W027	2	USW	092594	1005	BE	42	30.00	N	164	59.95	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W027	1	ROS	092594	1310	EN	42	30.53	N	164	59.33	W	GPS		5927		
18DD9403/1	P15N	W028	1	ROS	092594	1630	BE	41	59.98	N	164	59.94	W	GPS	5780			
18DD9403/1	P15N	W028	2	USW	092594	1646	BE	41	59.98	N	164	59.71	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W028	1	ROS	092594	1746	BO	42	0.16	N	164	59.22	W	GPS		5912		
18DD9403/1	P15N	W028	3	ROS	092594	1747	BE	42	0.16	N	164	59.22	W	GPS			17	1-8,13,20,23,24
18DD9403/1	P15N	W028	3	ROS	092594	1907	EN	42	0.20	N	164	58.50	W	GPS				
18DD9403/1	P15N	W028	4	ROS	092594	2056	BE	42	0.26	N	164	57.69	W	GPS			6	1-8,13,20,23,24
18DD9403/1	P15N	W028	4	ROS	092594	2122	EN	42	0.26	N	164	57.51	W	GPS				
18DD9403/1	P15N	W028	5	ROS	092594	2155	BE	42	0.24	N	164	57.38	W	GPS				
18DD9403/1	P15N	W028	5	ROS	092594	2209	BO	42	0.25	N	164	57.25	W	GPS				
18DD9403/1	P15N	W028	6	ROS	092594	2209	BE	42	0.24	N	164	57.25	W	GPS			11	1-8,13,20,23,24
18DD9403/1	P15N	W028	6	ROS	092594	2232	EN	42	0.15	N	164	57.16	W	GPS				
18DD9403/1	P15N	W029	1	USW	092694	203	BE	41	29.81	N	164	59.83	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W029	2	ROS	092694	203	BE	41	29.81	N	164	59.83	W	GPS	5408			
18DD9403/1	P15N	W029	2	ROS	092694	313	BO	41	29.38	N	164	59.09	W	GPS				
18DD9403/1	P15N	W029	3	ROS	092694	313	BE	41	29.38	N	164	59.05	W	GPS			23	1-8,34
18DD9403/1	P15N	W029	3	ROS	092694	502	EN	41	27.73	N	164	57.62	W	GPS				
18DD9403/1	P15N	W030	1	ROS	092694	823	BE	40	59.91	N	165	0.24	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W030	2	USW	092694	834	BE	40	59.86	N	165	0.35	W	GPS				
18DD9403/1	P15N	W030	1	ROS	092694	933	BO	40	59.79	N	165	0.81	W	GPS		5475		
18DD9403/1	P15N	W030	3	ROS	092694	933	BE	40	59.78	N	165	0.81	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W030	3	ROS	092694	1130	EN	40	59.79	N	165	0.81	W	GPS				
18DD9403/1	P15N	W031	1	ROS	092694	1438	BE	40	59.68	N	165	0.35	W	GPS	5814			
18DD9403/1	P15N	W031	2	USW	092694	1536	BE	40	29.66	N	165	1.40	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W031	1	ROS	092694	1552	BO	40	29.28	N	165	1.94	W	GPS				
18DD9403/1	P15N	W031	3	ROS	092694	1552	BE	40	29.28	N	165	1.94	W	GPS			23	1-8
18DD9403/1	P15N	W031	3	ROS	092694	1553	EN	40	29.26	N	165	1.97	W	GPS		5900		
18DD9403/1	P15N	W031	4	ROS	092694	1553	BE	40	29.26	N	165	1.97	W	GPS				
18DD9403/1	P15N	W031	4	ROS	092694	1750	EN	40	26.86	N	165	4.98	W	GPS				
18DD9403/1	P15N	W031	5	ROS	092694	1839	BE	40	30.24	N	165	0.26	W	GPS				
18DD9403/1	P15N	W031	5	ROS	092694	1848	BO	40	30.41	N	165	0.39	W	GPS				
18DD9403/1	P15N	W031	6	ROS	092694	1848	BE	40	30.42	N	165	0.40	W	GPS			11	1-8
18DD9403/1	P15N	W031	6	ROS	092694	1907	EN	40	30.63	N	165	0.58	W	GPS				
18DD9403/1	P15N	W032	1	ROS	092694	2244	BE	40	0.08	N	165	0.00	W	GPS	5746			
18DD9403/1	P15N	W032	2	USW	092694	2253	BE	40	0.08	N	165	0.00	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W032	1	ROS	092694	2359	BO	40	1.07	N	164	59.67	W	GPS		5673		
18DD9403/1	P15N	W032	3	ROS	092694	2359	BE	40	1.07	N	164	59.67	W	GPS			23	1-8,13,20,23,24
18DD9403/1	P15N	W032	3	ROS	062794	207	EN	40	1.95	N	164	58.00	W	GPS				
18DD9403/1	P15N	W033	1	ROS	092794	629	BE	39	29.89	N	164	59.52	W	GPS	5531			
18DD9403/1	P15N	W033	2	USW	092794	640	BE	39	29.89	N	164	54.43	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W033	1	ROS	092794	746	BO	39	29.80	N	164	58.94	W	GPS		5658		
18DD9403/1	P15N	W033	3	ROS	092794	746	BE	39	29.80	N	164	58.94	W	GPS			23	1-8
18DD9403/1	P15N	W033	3	ROS	092794	939	EN	39	29.98	N	164	59.77	W	GPS				
18DD9403/1	P15N	W034	1	ROS	092794	1247	BE	38	59.95	N	165	0.02	W	GPS	5434			
18DD9403/1	P15N	W034	2	USW	092794	1247	BE	38	59.95	N	165	0.02	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W034	1	ROS	092794	1407	BO	39	0.12	N	165	0.51	W	GPS		5518		
18DD9403/1	P15N	W034	3	ROS	092794	1407	BE	39	0.12	N	165	0.51	W	GPS			23	1-8,12,23,24
18DD9403/1	P15N	W034	3	ROS	092794	1558	EN	38	59.59	N	165	3.59	W	GPS				
18DD9403/1	P15N	W034	4	ROS	092794	1649	BE	38	59.93	N	165	0.34	W	GPS	5428			
18DD9403/1	P15N	W034	4	ROS	092794	1658	BO	39	0.09	N	165	0.53	W	GPS		496		
18DD9403/1	P15N	W034	5	ROS	092794	1658	BE	39	0.09	N	165	0.53	W	GPS			9	1-8,12,23,24
18DD9403/1	P15N	W034	5	ROS	092794	1720	EN	39	0.45	N	165	1.27	W	GPS				
18DD9403/1	P15N	W035	1	ROS	092794	2051	BE	38	30.29	N	164	59.90	W	GPS	5513			
18DD9403/1	P15N	W035	2	USW	092794	2111	BE	38	30.29	N	164	59.90	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W035	1	ROS	092794	2209	BO	38	30.26	N	164	58.71	W	GPS				
18DD9403/1	P15N	W035	3	ROS	092794	2208	BE	38	30.25	N	164	58.70	W	GPS			23	1-8
18DD9403/1	P15N	W035	3	ROS	092894	35	EN	38	29.40	N	164	58.13	W	GPS				
18DD9403/1	P15N	W036	1	ROS	092894	336	BE	37	59.92	N	165	0.21	W	GPS	5370			
18DD9403/1	P15N	W036	2	USW	092894	345	BE	37	59.90	N	165	0.20	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W036	1	ROS	092894	446	BO	37	59.75	N	165	0.68	W	GPS		5496		
18DD9403/1	P15N	W036	3	ROS	092894	447	BE	37	59.73	N	165	0.68	W	GPS			23	1-8,23,24,31
18DD9403/1	P15N	W036	3	ROS	092894	637	EN	38	0.23	N	165	1.14	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	POSITION LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W037	1	ROS	092894	956	BE	37	30.11	N	165	0.11	W	GPS				
18DD9403/1	P15N	W037	2	USW	092894	959	BE	37	30.11	N	165	0.11	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W037	1	ROS	092894	1110	BO	37	30.90	N	164	59.92	W	GPS		5282		
18DD9403/1	P15N	W037	3	ROS	092894	1111	BE	37	30.89	N	164	59.94	W	GPS			23	1-8
18DD9403/1	P15N	W037	3	ROS	092894	1309	EN	37	32.28	N	164	58.03	W	GPS				
18DD9403/1	P15N	W038	1	ROS	092894	1633	BE	36	59.88	N	164	59.96	W	GPS	5730			
18DD9403/1	P15N	W038	2	USW	092894	1635	BE	36	59.88	N	164	59.96	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W038	1	ROS	092894	1743	BO	37	0.06	N	164	59.46	W	GPS				
18DD9403/1	P15N	W038	3	ROS	092894	1743	BE	37	0.07	N	164	59.47	W	GPS			23	1-8,13,20,23,24
18DD9403/1	P15N	W038	3	ROS	092894	1955	EN	36	58.78	N	164	58.96	W	GPS				
18DD9403/1	P15N	W039	1	ROS	092894	2319	BE	36	30.21	N	165	0.16	W	GPS				
18DD9403/1	P15N	W039	1	ROS	092894	2332	BO	36	30.27	N	165	0.38	W	GPS				
18DD9403/1	P15N	W039	2	ROS	092894	2333	BE	36	30.28	N	165	0.37	W	GPS			11	1-8
18DD9403/1	P15N	W039	2	ROS	092894	2357	EN	36	30.60	N	165	0.48	W	GPS				
18DD9403/1	P15N	W039	3	USW	092894	2334	BE	36	30.28	N	165	0.37	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W039	4	ROS	092994	27	BE	36	31.16	N	165	0.50	W	GPS	5900			
18DD9403/1	P15N	W039	4	ROS	092994	139	BO	36	31.95	N	165	1.00	W	GPS				
18DD9403/1	P15N	W039	5	ROS	092994	139	BE	36	31.95	N	165	1.00	W	GPS		5995	23	1-8
18DD9403/1	P15N	W039	5	ROS	092994	343	EN	36	31.80	N	165	3.70	W	GPS				
18DD9403/1	P15N	W040	1	ROS	092994	721	BE	35	59.93	N	165	0.04	W	GPS				
18DD9403/1	P15N	W040	2	USW	092994	732	BE	35	59.88	N	165	0.12	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W040	1	ROS	092994	840	BO	35	59.27	N	165	0.76	W	GPS		5812		
18DD9403/1	P15N	W040	3	ROS	092994	841	BE	35	59.23	N	165	0.76	W	GPS		5809	23	1-8,23,24
18DD9403/1	P15N	W040	3	ROS	092994	1101	EN	35	58.21	N	165	2.46	W	GPS				
18DD9403/1	P15N	W041	1	ROS	092994	1404	BE	35	29.94	N	164	59.91	W	GPS				
18DD9403/1	P15N	W041	1	ROS	092994	1413	BO	35	29.90	N	164	59.97	W	GPS				
18DD9403/1	P15N	W041	2	ROS	092994	1413	BE	35	29.89	N	164	59.98	W	GPS			1	1-8
18DD9403/1	P15N	W041	2	ROS	092994	1420	EN	35	29.86	N	164	59.98	W	GPS				
18DD9403/1	P15N	W041	2	ROS	092994	1420	BE	35	29.86	N	164	59.98	W	GPS			10	1-8
18DD9403/1	P15N	W041	2	ROS	092994	1436	EN	35	29.78	N	165	0.06	W	GPS				
18DD9403/1	P15N	W041	3	ROS	092994	1459	BE	35	29.70	N	165	0.25	W	GPS	5820			
18DD9403/1	P15N	W041	4	USW	092994	1511	BE	35	29.70	N	165	0.25	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W041	3	ROS	092994	1605	BO	35	29.45	N	165	0.62	W	GPS				
18DD9403/1	P15N	W041	5	ROS	092994	1605	BE	35	29.45	N	165	0.61	W	GPS	5820	5928	23	1-8
18DD9403/1	P15N	W041	5	ROS	092994	1758	EN	35	28.82	N	165	1.07	W	GPS				
18DD9403/1	P15N	W042	1	ROS	092994	2113	BE	35	0.01	N	164	59.78	W	GPS				
18DD9403/1	P15N	W042	2	USW	092994	2122	BE	35	0.05	N	164	59.72	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W042	1	ROS	092994	2227	BO	35	0.02	N	164	59.66	W	GPS				
18DD9403/1	P15N	W042	3	ROS	092994	2227	BE	35	0.02	N	164	59.66	W	GPS			23	1-8,12,13,20,23,24
18DD9403/1	P15N	W042	3	ROS	093094	35	EN	35	0.28	N	164	59.02	W	GPS				
18DD9403/1	P15N	W043	1	ROS	093094	355	BE	34	30.15	N	165	0.20	W	GPS	5719			
18DD9403/1	P15N	W043	1	ROS	093094	510	BO	34	30.60	N	165	0.00	W	GPS		5819		
18DD9403/1	P15N	W043	2	ROS	093094	511	BE	34	30.61	N	165	0.01	W	GPS			23	1-8
18DD9403/1	P15N	W043	3	USW	093094	627	BE	34	30.88	N	165	0.05	W	GPS		5	1	1,3-6,34

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W043	2	ROS	093094	716	EN	34	30.60	N	164	59.57	W	GPS				
18DD9403/1	P15N	W044	1	ROS	093094	1110	BE	34	0.12	N	165	0.04	W	GPS			11	1-8,23,24
18DD9403/1	P15N	W044	2	USW	093094	1115	BE	34	0.08	N	164	59.63	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W044	1	ROS	093094	1121	BO	34	0.08	N	164	59.63	W	GPS				
18DD9403/3	P15N	W044	3	ROS	093094	1121	BE	34	0.08	N	164	59.63	W	GPS				
18DD9403/4	P15N	W044	3	ROS	093094	1141	EN	34	0.02	N	164	59.54	W	GPS				
18DD9403/5	P15N	W044	4	ROS	093094	1233	BE	33	59.92	N	164	59.40	W	GPS				
18DD9403/6	P15N	W044	4	ROS	093094	1333	BO	33	59.52	N	164	59.26	W	GPS				
18DD9403/7	P15N	W044	5	ROS	093094	1333	BE	33	59.52	N	164	59.25	W	GPS			23	1-8,23,24
18DD9403/8	P15N	W044	5	ROS	093094	1533	EN	33	59.33	N	164	56.70	W	GPS				
18DD9403/9	P15N	W045	1	ROS	093094	1906	BE	33	29.99	N	165	0.00	W	GPS	5850			
18DD9403/1	P15N	W045	2	USW	093094	1912	EN	33	29.78	N	165	0.01	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W045	1	ROS	093094	2026	BO	33	29.68	N	165	0.67	W	GPS		5978		
18DD9403/1	P15N	W045	3	ROS	093094	2026	BE	33	29.68	N	165	0.68	W	GPS			23	1-8
18DD9403/1	P15N	W045	3	ROS	093094	2221	EN	33	28.01	N	165	1.51	W	GPS				
18DD9403/1	P15N	W045	4	ROS	093094	2251	BE	33	28.01	N	165	1.51	W	GPS			11	1-8
18DD9403/1	P15N	W045	4	ROS	093094	2303	BO	33	27.82	N	165	1.60	W	GPS				
18DD9403/1	P15N	W045	4	ROS	093094	2355	EN	33	25.52	N	165	1.94	W	GPS				
18DD9403/1	P15N	W046	1	ROS	100194	311	BE	32	59.94	N	165	0.54	W	GPS	5680			
18DD9403/1	P15N	W046	2	USW	100194	422	BE	32	59.72	N	165	0.87	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W046	1	ROS	100194	427	BO	32	59.75	N	165	0.88	W	GPS				
18DD9403/2	P15N	W046	3	ROS	100194	427	BE	32	59.75	N	165	0.88	W	GPS			23	1-8,13,20,23,24,31
18DD9403/2	P15N	W046	3	ROS	100194	631	EN	32	59.41	N	165	0.63	W	GPS				
18DD9403/2	P15N	W047	1	ROS	100194	1043	BE	32	30.30	N	164	59.75	W	GPS				
18DD9403/1	P15N	W047	2	USW	100194	1043	BE	32	30.30	N	164	59.75	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W047	1	ROS	100194	1055	BO	32	30.28	N	164	59.57	W	GPS				
18DD9403/1	P15N	W047	2	ROS	100194	1055	BE	32	30.28	N	164	59.57	W	GPS		602	11	1-8
18DD9403/1	P15N	W047	2	ROS	100194	1116	EN	32	30.14	N	164	59.46	W	GPS				
18DD9403/1	P15N	W047	3	ROS	100194	1155	BE	32	29.52	N	164	59.37	W	GPS	5579			
18DD9403/1	P15N	W047	3	ROS	100194	1304	BO	32	29.13	N	164	58.72	W	GPS		5670		
18DD9403/1	P15N	W047	4	ROS	100194	1304	BE	32	29.13	N	164	58.72	W	GPS			23	1-8
18DD9403/1	P15N	W047	4	ROS	100194	1453	EN	32	98.33	N	164	59.25	W	GPS				
18DD9403/1	P15N	W048	1	ROS	100194	1914	BE	31	59.88	N	164	59.75	W	GPS	5897			
18DD9403/1	P15N	W048	2	USW	100194	2033	EN	31	59.86	N	164	59.74	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W048	1	ROS	100194	2032	BO	31	59.66	N	164	59.83	W	GPS		5986		
18DD9403/1	P15N	W048	3	ROS	100194	2034	BE	31	59.67	N	164	59.84	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W048	3	ROS	100194	2234	EN	31	58.74	N	164	59.72	W	GPS				
18DD9403/1	P15N	W049	1	ROS	100294	206	BE	31	30.98	N	165	0.22	W	GPS	5885			
18DD9403/1	P15N	W049	2	USW	100294	213	BE	31	30.19	N	165	0.36	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W049	1	ROS	100294	220	BO	31	30.26	N	165	0.44	W	GPS		800		
18DD9403/1	P15N	W049	3	ROS	100294	221	BE	31	30.26	N	165	0.44	W	GPS			11	1-8,
18DD9403/1	P15N	W049	3	ROS	100294	243	EN	31	30.36	N	165	1.00	W	GPS				
18DD9403/1	P15N	W049	4	ROS	100294	317	BE	31	29.96	N	165	0.06	W	GPS	5884			
18DD9403/1	P15N	W049	4	ROS	100294	429	BO	31	30.30	N	165	0.79	W	GPS		6003		

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully

SHIP/CRS EXPOCODE	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	POSITION LATITUDE			LONGITUDE			NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
18DD9403/1	P15N	W049	5	ROS	100294	429	BE	31	30.30	N	165	0.79	W	GPS			23	1-8
18DD9403/1	P15N	W049	5	ROS	100294	637	EN	31	30.76	N	164	59.60	W	GPS				
18DD9403/1	P15N	W050	1	ROS	100294	1013	BE	31	0.22	N	165	0.39	W	GPS	5906			
18DD9403/1	P15N	W050	2	USW	100294	1031	BE	31	0.22	N	165	0.39	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W050	1	ROS	100294	1134	BO	31	1.58	N	165	0.51	W	GPS				
18DD9403/1	P15N	W050	3	ROS	100294	1134	BE	31	1.58	N	165	0.51	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W050	3	ROS	100294	1352	EN	31	2.27	N	165	1.41	W	GPS				
18DD9403/1	P15N	W051	1	ROS	100294	1735	BE	30	30.19	N	165	0.04	W	GPS	5438			
18DD9403/1	P15N	W051	2	USW	100294	1744	BE	30	30.19	N	165	0.04	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W051	1	ROS	100294	1750	BO	30	30.23	N	164	59.97	W	GPS				
18DD9403/1	P15N	W051	3	ROS	100294	1750	BE	30	30.23	N	164	59.97	W	GPS			11	1-8
18DD9403/1	P15N	W051	3	ROS	100294	1814	EN	30	30.02	N	164	59.97	W	GPS				
18DD9403/1	P15N	W051	4	ROS	100294	1843	BE	30	30.51	N	164	59.89	W	GPS				
18DD9403/1	P15N	W051	4	ROS	100294	2002	BO	30	30.79	N	165	0.27	W	GPS				
18DD9403/1	P15N	W051	5	ROS	100294	2002	BE	30	30.79	N	165	0.27	W	GPS			23	1-8
18DD9403/1	P15N	W051	5	ROS	100294	2149	EN	30	30.93	N	165	1.29	W	GPS				
18DD9403/1	P15N	W052	1	USW	100394	147	BE	30	0.40	N	164	59.06	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W052	2	ROS	100394	405	BE	30	0.13	N	164	59.97	W	GPS				
18DD9403/1	P15N	W052	2	ROS	100394	517	BO	30	0.40	N	164	59.88	W	GPS		5519		
18DD9403/1	P15N	W052	3	ROS	100394	517	BE	30	0.40	N	164	59.87	W	GPS			23	1-8,12,13,20,23,24
18DD9403/1	P15N	W052	3	ROS	100394	721	EN	30	0.96	N	164	59.06	W	GPS				
18DD9403/1	P15N	W053	1	ROS	100394	1108	BE	29	30.23	N	164	59.72	W	GPS				
18DD9403/1	P15N	W053	2	USW	100394	1119	BE	29	30.27	N	164	59.67	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W053	1	ROS	100394	1119	BO	29	30.47	N	164	59.46	W	GPS		600		
18DD9403/1	P15N	W053	3	ROS	100394	1119	BE	29	30.27	N	164	59.67	W	GPS			11	1-8
18DD9403/1	P15N	W053	3	ROS	100394	1141	EN	29	30.47	N	164	59.46	W	GPS				
18DD9403/1	P15N	W053	4	ROS	100394	1204	BE	29	30.72	N	164	59.36	W	GPS	5417			
18DD9403/1	P15N	W053	4	ROS	100394	1321	BO	29	31.51	N	164	59.21	W	GPS		5526		
18DD9403/1	P15N	W053	5	ROS	100394	1321	BE	29	31.51	N	164	59.21	W	GPS			23	1-8
18DD9403/1	P15N	W053	5	ROS	100394	1522	EN	29	32.65	N	164	59.00	W	GPS				
18DD9403/1	P15N	W054	1	ROS	100394	1857	BE	29	0.03	N	164	59.77	W	GPS	5253			
18DD9403/1	P15N	W054	2	USW	100394	1908	EN	29	0.11	N	164	59.65	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W054	1	ROS	100394	2012	BO	29	0.59	N	164	59.11	W	GPS		5372		
18DD9403/1	P15N	W054	3	ROS	100394	2012	BE	29	0.59	N	164	59.11	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W054	3	ROS	100394	2208	EN	29	2.18	N	164	58.62	W	GPS				
18DD9403/1	P15N	W055	1	USW	100494	148	BE	28	30.22	N	165	0.05	W	GPS	5341	5	1	1,3-6,34
18DD9403/1	P15N	W055	2	ROS	100494	159	BE	28	30.44	N	165	0.10	W	GPS				
18DD9403/1	P15N	W055	2	ROS	100494	215	BO	28	30.71	N	165	0.27	W	GPS		1003		
18DD9403/1	P15N	W055	3	ROS	100494	223	BE	28	30.69	N	165	4.32	W	GPS			11	1-8
18DD9403/1	P15N	W055	3	ROS	100494	248	EN	28	30.88	N	164	59.94	W	GPS				
18DD9403/1	P15N	W055	4	ROS	100494	321	BE	28	29.96	N	165	0.01	W	GPS	5344			
18DD9403/1	P15N	W055	4	ROS	100494	455	BO	28	30.56	N	164	59.35	W	GPS				
18DD9403/1	P15N	W055	5	ROS	100494	456	BE	28	30.55	N	164	59.34	W	GPS		5429	23	1-8
18DD9403/1	P15N	W055	5	ROS	100494	655	EN	28	31.10	N	164	57.76	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	W056	1	ROS	100494	1051	BE	27	59.99	N	164	59.92	W	GPS	5070		9	1-8,13,20,23,24,31
18DD9403/1	P15N	W056	2	USW	100494	1110	BE	27	59.99	N	164	59.92	W	GPS			1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W056	1	ROS	100494	1112	BO	28	0.46	N	164	59.45	W	GPS		1000		
18DD9403/1	P15N	W056	1	ROS	100494	1151	EN	28	0.30	N	164	58.89	W	GPS				
18DD9403/1	P15N	W057	1	CTD	100494	1556	BE	27	30.72	N	164	58.60	W	GPS	5181			
18DD9403/1	P15N	W057	2	USW	100494	1601	BE	27	30.76	N	164	58.46	W	GPS			1	1,3-6,34
18DD9403/1	P15N	W057	1	CTD	100494	1637	BO	27	30.93	N	164	58.54	W	GPS		2900		
18DD9403/1	P15N	W057	3	CTD	100494	1637	BE	27	30.93	N	164	58.54	W	GPS				
18DD9403/1	P15N	W057	3	CTD	100494	1717	EN	27	31.41	N	164	58.73	W	GPS				
18DD9403/1	P15N	W058	1	ROS	100494	2103	BE	27	0.51	N	164	59.65	W	GPS	4820			
18DD9403/1	P15N	W058	2	USW	100494	2105	BE	27	0.51	N	164	59.65	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W058	1	ROS	100494	2218	BO	27	1.00	N	164	58.99	W	GPS				
18DD9403/1	P15N	W058	3	ROS	100494	2218	BE	27	1.00	N	164	58.99	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W058	3	ROS	100494	2354	EN	27	2.86	N	164	57.90	W	GPS				
18DD9403/1	P15N	W059	1	ROS	100594	358	BE	26	29.96	N	165	0.00	W	GPS	4757			
18DD9403/1	P15N	W059	2	USW	100594	400	BE	26	29.95	N	165	0.09	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W059	1	ROS	100594	409	BO	26	30.07	N	165	0.19	W	GPS		602		
18DD9403/1	P15N	W059	3	ROS	100594	409	BE	26	30.07	N	165	0.19	W	GPS			11	1-8
18DD9403/1	P15N	W059	3	ROS	100594	426	EN	26	30.12	N	165	0.45	W	GPS				
18DD9403/1	P15N	W059	4	ROS	100594	448	BE	26	30.15	N	165	0.62	W	GPS	4760			
18DD9403/1	P15N	W059	4	ROS	100594	559	BO	26	30.40	N	165	0.64	W	GPS		4803		
18DD9403/1	P15N	W059	5	ROS	100594	559	BE	26	30.39	N	165	0.63	W	GPS			23	1-8
18DD9403/1	P15N	W059	5	ROS	100594	742	EN	26	30.30	N	165	0.71	W	GPS				
18DD9403/1	P15N	W060	1	ROS	100594	1102	BE	25	59.70	N	165	0.35	W	GPS	4665			
18DD9403/1	P15N	W060	2	USW	100594	1110	BE	25	59.70	N	165	0.35	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W060	1	ROS	100594	1215	BO	25	58.27	N	165	1.73	W	GPS		4649		
18DD9403/1	P15N	W060	3	ROS	100594	1216	BE	25	58.32	N	165	1.72	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W060	3	ROS	100594	1357	EN	25	57.73	N			W	GPS				
18DD9403/1	P15N	W061	1	ROS	100594	1711	BE	25	30.16	N	164	59.90	W	GPS	4867			
18DD9403/1	P15N	W061	2	USW	100594	1730	BE	25	30.30	N	164	59.79	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W061	1	ROS	100594	1815	BO	25	30.52	N	164	59.63	W	GPS		4938		
18DD9403/1	P15N	W061	3	ROS	100594	1815	BE	25	30.52	N	164	59.63	W	GPS			23	1-8
18DD9403/1	P15N	W061	3	ROS	100594	1955	EN	25	31.81	N	164	59.76	W	GPS				
18DD9403/1	P15N	W062	1	ROS	100594	2354	BE	25	0.13	N	164	59.95	W	GPS				
18DD9403/1	P15N	W062	2	USW	100694	3	BE	25	0.32	N	164	59.91	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/1	P15N	W062	1	ROS	100694	100	BO	25	0.39	N	164	59.72	W	GPS		5041		
18DD9403/1	P15N	W062	3	ROS	100694	100	BE	25	0.39	N	164	59.72	W	GPS			23	1-8,12,13,20,23,24
18DD9403/1	P15N	W062	3	ROS	100694	231	EN	25	0.91	N	164	59.74	W	GPS				
18DD9403/1	P15N	W063	1	ROS	100694	651	BE	24	29.96	N	165	0.10	W	GPS	4906			
18DD9403/1	P15N	W063	2	USW	100694	712	BE	24	29.89	N	165	0.05	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W063	1	ROS	100694	802	BO	24	30.03	N	165	0.04	W	GPS		4984		
18DD9403/1	P15N	W063	3	ROS	100694	803	BE	24	30.03	N	165	0.04	W	GPS		4984	23	1-8
18DD9403/1	P15N	W063	3	ROS	100694	951	EN	24	30.33	N	164	59.18	W	GPS				
18DD9403/1	P15N	W064	1	ROS	100694	1404	BE	23	59.70	N	164	59.81	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
18DD9403/1	P15N	W064	2	USW	100694	1404	BE	23	59.71	N	164	59.82	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W064	1	ROS	100694	1503	BO	23	59.29	N	164	59.92	W	GPS		4360		
18DD9403/1	P15N	W064	3	ROS	100694	1504	BE	23	59.30	N	164	59.94	W	GPS			23	1-8, 23,24
18DD9403/1	P15N	W064	3	ROS	100694	1656	EN	23	58.89	N	165	0.82	W	GPS				
18DD9403/1	P15N	W065	1	ROS	100694	2008	BE	23	30.05	N	165	18.87	W	GPS	4077			
18DD9403/1	P15N	W065	2	USW	100694	2026	EN	23	30.29	N	165	19.06	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W065	1	ROS	100694	2110	BO	23	31.12	N	165	19.52	W	GPS		4105		
18DD9403/1	P15N	W065	3	ROS	100694	2110	BE	23	31.13	N	165	19.53	W	GPS			23	1-8
18DD9403/1	P15N	W065	3	ROS	100694	2300	EN	23	30.49	N	165	18.97	W	GPS				
18DD9403/1	P15N	W066	1	ROS	100794	313	BE	22	55.08	N	165	28.01	W	GPS	4740			
18DD9403/1	P15N	W066	2	USW	100794	330	BE	22	55.02	N	165	27.79	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W066	1	ROS	100794	417	BO	22	54.84	N	165	27.57	W	GPS		4810		
18DD9403/1	P15N	W066	3	ROS	100794	417	BE	22	54.84	N	165	27.57	W	GPS			23	1-8, 23,24,31
18DD9403/1	P15N	W066	3	ROS	100794	555	EN	22	54.52	N	165	27.36	W	GPS				
18DD9403/1	P15N	W067	1	ROS	100794	848	BE	22	30.01	N	165	33.93	W	GPS	4664			
18DD9403/1	P15N	W067	2	USW	100794	858	BE	22	30.04	N	165	34.05	W	GPS		5	1	1,3-6,34
18DD9403/1	P15N	W067	1	ROS	100794	951	BO	22	30.06	N	165	33.78	W	GPS		4721		
18DD9403/1	P15N	W067	3	ROS	100794	951	BE	22	30.06	N	165	33.78	W	GPS			23	1-8
18DD9403/1	P15N	W067	3	ROS	100794	1159	EN	22	30.63	N	165	34.12	W	GPS				
18DD9403/1	P15N	W068	1	ROS	100794	1505	BE	21	59.21	N	165	42.19	W	GPS	4624			
18DD9403/1	P15N	W068	2	USW	100794	1508	BE	21	59.21	N	165	42.19	W	GPS		5	1	1,3-6,13,20,23,24
18DD9403/1	P15N	W068	1	ROS	100794	1606	BO	21	58.94	N	165	41.90	W	GPS		4678		
18DD9403/1	P15N	W068	3	ROS	100794	1606	BE	21	58.94	N	165	41.90	W	GPS			20	1-8,13,20,23,24
18DD9403/1	P15N	W068	3	ROS	100794	1742	EN	21	58.56	N	165	41.36	W	GPS				
18DD9403/1	P15N	W069	1	ROS	100794	2022	BE	21	30.00	N	165	49.75	W	GPS	4696			
18DD9403/1	P15N	W069	1	ROS	100794	2125	BO	21	30.50	N	165	50.34	W	GPS		4776		
18DD9403/1	P15N	W069	2	ROS	100794	2125	BE	21	30.50	N	165	50.34	W	GPS			23	1-8
18DD9403/1	P15N	W069	2	ROS	100794	2316	EN	21	31.10	N	165	50.97	W	GPS				
18DD9403/1	P15N	W070	1	ROS	100894	258	BE	20	53.94	N	165	58.65	W	GPS	4841			
18DD9403/1	P15N	W070	1	ROS	100894	306	BO	20	53.87	N	165	58.73	W	GPS		501		
18DD9403/1	P15N	W070	2	ROS	100894	307	BE	20	53.88	N	165	58.75	W	GPS			11	1-8,23,24
18DD9403/1	P15N	W070	2	ROS	100894	323	EN	20	53.88	N	165	58.96	W	GPS				
18DD9403/1	P15N	W070	3	ROS	100894	344	BE	20	53.94	N	165	58.68	W	GPS	4843			
18DD9403/1	P15N	W070	3	ROS	100894	448	BO	20	53.98	N	165	59.60	W	GPS		4925		
18DD9403/1	P15N	W070	4	ROS	100894	448	BE	20	53.98	N	165	59.60	W	GPS			23	1-8,23,24
18DD9403/1	P15N	W070	5	USW	100894	457	EN	20	53.95	N	165	59.68	W	GPS		5	1	1,3-6,23,24,34
18DD9403/1	P15N	W070	4	ROS	100894	635	EN	20	53.92	N	166	0.42	W	GPS				
18DD9403/1	P15N	FREON	1	ROS	100894	1843	BE	20	59.27	N	164	1.77	W	GPS	4905			
18DD9403/1	P15N	FREON	1	ROS	100894	1907	BO	20	59.50	N	164	1.98	W	GPS		1501		
18DD9403/1	P15N	FREON	2	ROS	100894	1907	BE	20	59.51	N	164	1.98	W	GPS			11	1,2,7,8
18DD9403/1	P15N	FREON	2	ROS	100894	1933	EN	20	59.63	N	164	2.17	W	GPS				
18DD9403/1	P15N	FREON	3	ROS	100894	1952	BE	20	59.81	N	164	2.33	W	GPS				
18DD9403/1	P15N	FREON	3	ROS	100894	2014	BO	20	59.93	N	164	2.51	W	GPS		1507		
18DD9403/1	P15N	FREON	4	ROS	100894	2015	BE	20	59.93	N	164	2.51	W	GPS			23	1,2

APPENDIX 2. STATION SUMMARY LEG 1 WOCE SECTION P15N

P15N Leg 1 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCODE	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/1	P15N	FREON	4	ROS	100894	2049	EN	21	0.06	N	164	2.74	W	GPS				
18DD9403/1	P15N	FREON	5	CTD	100894	2159	BE	21	0.45	N	164	3.50	W	GPS	4907			
18DD9403/1	P15N	FREON	5	CTD	100894	2255	BO	21	0.57	N	164	4.19	W	GPS				
18DD9403/1	P15N	FREON	6	CTD	100894	2256	BE	21	0.57	N	164	4.19	W	GPS				
18DD9403/1	P15N	FREON	6	CTD	100894	2342	EN	21	0.66	N	164	4.89	W	GPS				
18DD9403/1	P15N	FREON	7	ROS	100994	27	BE	21	0.80	N	164	5.58	W	GPS				
18DD9403/1	P15N	FREON	7	ROS	100994	133	BO	21	0.95	N	164	6.63	W	GPS			23	7,8
18DD9403/1	P15N	FREON	8	ROS	100994	143	BE	21	0.93	N	164	6.79	W	GPS				
18DD9403/1	P15N	FREON	8	ROS	100994	309	EN	21	0.96	N	164	7.75	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	X	1	ROS	101694	113	BE	21	11.09	N	158	30.14	W	GPS	2940			
18DD9403/2	P15N	X	1	ROS	101694	159	BO	21	10.76	N	158	32.79	W	GPS		2955		
18DD9403/2	P15N	X	2	ROS	101694	159	BE	21	10.77	N	158	32.79	W	GPS			17	1-6,23
18DD9403/2	P15N	X	3	USW	101694	219	EN	21	10.70	N	158	32.88	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	X	2	ROS	101694	304	EN	21	10.48	N	158	33.23	W	GPS				
18DD9403/2	P15N	W071	1	ROS	101794	1606	BE	20	30.27	N	166	5.18	W	GPS	4886			
18DD9403/2	P15N	W071	2	USW	101894	1620	BE	20	30.53	N	166	5.17	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W071	1	ROS	101894	1715	BO	20	31.50	N	166	5.12	W	GPS		4924		
18DD9403/2	P15N	W071	3	ROS	101894	1715	BE	20	31.51	N	166	5.12	W	GPS			23	1-8,
18DD9403/2	P15N	W071	3	ROS	101894	1917	EN	20	31.80	N	166	4.91	W	GPS				
18DD9403/2	P15N	W072	1	ROS	101894	2338	BE	20	0.27	N	166	12.02	W	GPS	5165			
18DD9403/2	P15N	W072	1	ROS	101894	2357	BO	20	0.74	N	166	12.02	W	GPS		1006		
18DD9403/2	P15N	W072	2	ROS	101994	2357	BE	20	0.74	N	166	12.05	W	GPS			11	1-8,13,20,23,24,31
18DD9403/2	P15N	W072	3	USW	101994	35	BE	20	1.00	N	166	11.36	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W072	2	ROS	101994	32	EN	20	0.98	N	166	11.34	W	GPS				
18DD9403/2	P15N	W072	4	ROS	101994	114	BE	20	1.02	N	166	11.87	W	GPS	5165			
18DD9403/2	P15N	W072	4	ROS	101994	223	BO	20	1.54	N	166	11.83	W	GPS		5148		
18DD9403/2	P15N	W072	5	ROS	101994	223	BE	20	1.52	N	166	11.83	W	GPS			18	1-8,13,20,23,24,31
18DD9403/2	P15N	W072	5	ROS	101994	359	EN	20	3.14	N	166	13.35	W	GPS				
18DD9403/2	P15N	W073	1	ROS	101994	842	BE	19	30.07	N	166	19.78	W	GPS	5270			
18DD9403/2	P15N	W073	1	ROS	101994	900	BO	19	30.06	N	166	19.60	W	GPS		1000		
18DD9403/2	P15N	W073	2	ROS	101994	900	BE	19	30.06	N	166	19.60	W	GPS			11	1-8,
18DD9403/2	P15N	W073	2	ROS	101994	926	EN	19	30.00	N	166	19.28	W	GPS				
18DD9403/2	P15N	W073	3	ROS	101994	951	BE	19	30.14	N	166	19.08	W	GPS				
18DD9403/2	P15N	W073	4	USW	101994	954	EN	19	30.13	N	166	19.03	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W073	3	ROS	101994	1100	BO	19	30.27	N	166	18.63	W	GPS		5354		
18DD9403/2	P15N	W073	5	ROS	101994	1100	BE	19	30.26	N	166	18.63	W	GPS			20	1-8,
18DD9403/2	P15N	W073	5	ROS	101994	1304	EN	19	31.92	N	166	18.83	W	GPS				
18DD9403/2	P15N	W074	1	ROS	101994	1739	BE	19	0.14	N	166	27.85	W	GPS	5466			
18DD9403/2	P15N	W074	1	ROS	101994	1754	BO	19	0.08	N	166	27.39	W	GPS		1000		
18DD9403/2	P15N	W074	2	ROS	101994	1755	BE	19	0.08	N	166	27.39	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W074	2	ROS	101994	1826	EN	19	0.08	N	166	26.67	W	GPS				
18DD9403/2	P15N	W074	3	USW	101994	1849	EN	19	0.15	N	166	26.35	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W075	1	ROS	101994	2253	BE	18	30.16	N	166	34.89	W	GPS				
18DD9403/2	P15N	W075	1	ROS	101994	2308	BO	18	30.21	N	166	34.92	W	GPS		331		
18DD9403/2	P15N	W075	2	CTD	101994	2335	BE	18	30.09	N	166	34.39	W	GPS				
18DD9403/2	P15N	W075	2	CTD	102094	41	BO	18	30.36	N	166	33.73	W	GPS		5000		
18DD9403/2	P15N	W075	3	CTD	102094	41	BE	18	30.37	N	166	33.72	W	GPS				
18DD9403/2	P15N	W075	3	CTD	102094	142	EN	18	30.29	N	166	33.22	W	GPS				
18DD9403/2	P15N	W076	1	CTD	102094	553	BE	18	0.02	N	166	42.79	W	GPS	5313			
18DD9403/2	P15N	W076	1	CTD	102094	706	BO	18	0.22	N	166	41.33	W	GPS		5012		

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W076	2	CTD	102094	706	BE	18	0.21	N	166	41.33	W	GPS				
18DD9403/2	P15N	W076	3	USW	102094	714	BE	18	0.09	N	166	41.46	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W076	2	CTD	102094	817	EN	17	59.60	N	166	41.54	W	GPS				
18DD9403/2	P15N	W077	1	CTD	102094	1203	BE	17	29.80	N	166	50.98	W	GPS				
18DD9403/2	P15N	W077	1	CTD	102094	1318	BO	17	28.92	N	166	50.52	W	GPS		5002		
18DD9403/2	P15N	W077	2	CTD	102094	1319	BE	17	28.92	N	166	50.52	W	GPS				
18DD9403/2	P15N	W077	3	USW	102094	1320	BE	17	28.78	N	166	50.59	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W077	2	CTD	102094	1417	EN	17	28.48	N	166	50.50	W	GPS				
18DD9403/2	P15N	W078	1	ROS	102094	1758	BE	16	59.82	N	166	58.25	W	GPS	5354			
18DD9403/2	P15N	W078	1	ROS	102094	1920	BO	16	58.44	N	166	59.47	W	GPS		5292		
18DD9403/2	P15N	W078	2	USW	102094	1937	BE	16	58.23	N	166	59.66	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W078	3	ROS	102094	1921	BE	16	58.43	N	166	59.47	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W078	3	ROS	102094	2133	EN	16	58.80	N	166	58.75	W	GPS				
18DD9403/2	P15N	W079	1	ROS	102194	58	BE	16	59.92	N	167	6.27	W	GPS	5390			
18DD9403/2	P15N	W079	1	ROS	102194	207	BO	16	29.80	N	167	6.42	W	GPS		5342		
18DD9403/2	P15N	W079	2	ROS	102194	207	BE	16	29.80	N	167	6.42	W	GPS			23	1-8,
18DD9403/2	P15N	W079	3	USW	102194	232	BE	16	29.69	N	167	6.49	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W079	2	ROS	102194	357	EN	16	28.94	N	167	6.66	W	GPS				
18DD9403/2	P15N	W080	1	ROS	102194	732	BE	15	59.69	N	167	13.23	W	GPS	4500			
18DD9403/2	P15N	W080	2	USW	102194	812	EN	15	59.58	N	167	13.69	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W080	1	ROS	102194	844	BO	15	59.60	N	167	14.01	W	GPS		4748		
18DD9403/2	P15N	W080	3	ROS	102194	844	BE	15	59.60	N	167	14.01	W	GPS			23	1-6,13,20,23,24
18DD9403/2	P15N	W080	3	ROS	102194	1025	EN	15	59.45	N	167	14.96	W	GPS				
18DD9403/2	P15N	W081	1	ROS	102194	1332	BE	15	29.90	N	167	20.98	W	GPS	5100			
18DD9403/2	P15N	W081	2	USW	102194	1350	BE	15	29.90	N	167	20.99	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W081	1	ROS	102194	1446	BO	15	29.47	N	167	21.97	W	GPS		5270		
18DD9403/2	P15N	W081	3	ROS	102194	1446	BE	15	29.46	N	167	22.00	W	GPS			23	1-8,34
18DD9403/2	P15N	W081	3	ROS	102194	1651	EN	15	29.27	N	167	23.66	W	GPS				
18DD9403/2	P15N	W082	1	ROS	102194	1959	BE	14	59.99	N	167	28.95	W	GPS	5200			
18DD9403/2	P15N	W082	2	USW	102194	2030	BE	14	59.93	N	167	29.79	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W082	1	ROS	102194	2105	BO	14	59.93	N	167	29.79	W	GPS		5261		
18DD9403/2	P15N	W082	3	ROS	102194	2105	BE	14	59.93	N	167	29.79	W	GPS			23	1-8,23,24,31
18DD9403/2	P15N	W082	3	ROS	102194	2257	EN	15	0.15	N	167	30.76	W	GPS				
18DD9403/2	P15N	W083	1	ROS	102294	215	BE	14	29.91	N	167	36.52	W	GPS	5137			
18DD9403/2	P15N	W083	2	USW	102294	240	BE	14	29.69	N	167	36.98	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W083	1	ROS	102294	322	BO	14	29.53	N	167	37.51	W	GPS		5221		
18DD9403/2	P15N	W083	3	ROS	102294	323	BE	14	29.51	N	167	37.53	W	GPS			23	1-8,
18DD9403/2	P15N	W083	3	ROS	102294	502	EN	14	29.28	N	167	39.13	W	GPS				
18DD9403/2	P15N	W084	1	ROS	102294	818	BE	13	58.83	N	167	44.25	W	GPS	1581			
18DD9403/2	P15N	W084	1	ROS	102294	843	BO	13	58.70	N	167	44.61	W	GPS		1573		
18DD9403/2	P15N	W084	2	ROS	102294	843	BE	13	58.70	N	167	44.61	W	GPS			16	1-8,13,20,23,24

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W084	3	USW	102294	911	BE	13	58.57	N	167	45.01	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W084	2	ROS	102294	923	EN	13	58.51	N	167	45.24	W	GPS				
18DD9403/2	P15N	W085	1	ROS	102294	1232	BE	13	29.57	N	167	52.22	W	GPS	5172			
18DD9403/2	P15N	W085	2	USW	102294	1253	BE	13	29.58	N	167	52.27	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W085	1	ROS	102294	1353	BO	13	29.30	N	167	52.73	W	GPS		5298		
18DD9403/2	P15N	W085	3	ROS	102294	1354	BE	13	29.30	N	167	52.73	W	GPS			23	1-8,
18DD9403/2	P15N	W085	3	ROS	102294	1548	EN	13	28.70	N	167	53.73	W	GPS				
18DD9403/2	P15N	W086	1	ROS	102294	1850	BE	13	0.01	N	167	59.16	W	GPS	5450			
18DD9403/2	P15N	W086	2	USW	102294	1918	BE	13	0.02	N	167	58.97	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W086	1	ROS	102294	2006	BO	12	59.91	N	167	59.15	W	GPS		5475		
18DD9403/2	P15N	W086	3	ROS	102294	2006	BE	12	59.91	N	167	59.15	W	GPS			23	1-8,12,23,24
18DD9403/2	P15N	W086	3	ROS	102294	2151	EN	12	59.54	N	167	59.68	W	GPS				
18DD9403/2	P15N	W087	1	ROS	102394	108	BE	12	29.94	N	168	7.02	W	GPS				
18DD9403/2	P15N	W087	2	USW	102394	120	BE	12	29.76	N	168	7.13	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W087	1	ROS	102394	220	BO	12	29.49	N	168	7.07	W	GPS		5544		
18DD9403/2	P15N	W087	3	ROS	102394	220	BE	12	29.49	N	168	7.07	W	GPS			22	1-8,
18DD9403/2	P15N	W087	3	ROS	102394	429	EN	12	28.50	N	168	8.12	W	GPS				
18DD9403/2	P15N	W088	1	ROS	102394	729	BE	11	59.98	N	168	14.92	W	GPS	5420			
18DD9403/2	P15N	W088	2	USW	102394	806	BE	11	59.77	N	168	15.01	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W088	1	ROS	102394	843	BO	12	0.05	N	168	15.21	W	GPS		5400		
18DD9403/2	P15N	W088	3	ROS	102394	844	BE	12	0.07	N	168	15.22	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W088	3	ROS	102394	1030	EN	12	1.03	N	168	15.38	W	GPS				
18DD9403/2	P15N	W089	1	ROS	102394	1343	BE	11	29.89	N	168	22.10	W	GPS	5109			
18DD9403/2	P15N	W089	2	USW	102394	1401	BE	11	29.63	N	168	22.52	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W089	1	ROS	102394	1447	BO	11	29.42	N	168	22.62	W	GPS		5174		
18DD9403/2	P15N	W089	3	ROS	102394	1447	BE	11	29.42	N	168	22.62	W	GPS			23	1-8,
18DD9403/2	P15N	W089	3	ROS	102394	1647	EN	11	28.58	N	168	23.44	W	GPS				
18DD9403/2	P15N	W090	1	ROS	102394	1948	BE	11	0.10	N	168	30.00	W	GPS	5420			
18DD9403/2	P15N	W090	1	ROS	102394	2056	BO	11	0.38	N	168	30.72	W	GPS		5498		
18DD9403/2	P15N	W090	2	ROS	102394	2056	BE	11	0.38	N	168	30.72	W	GPS			22	1-8,23,24
18DD9403/2	P15N	W090	3	USW	102394	2100	BE	11	0.38	N	168	30.72	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W090	2	ROS	102394	2240	EN	10	59.98	N	168	31.83	W	GPS				
18DD9403/2	P15N	W091	1	ROS	102494	148	BE	10	29.94	N	168	37.12	W	GPS	5399			
18DD9403/2	P15N	W091	2	USW	102494	200	BE	10	29.97	N	168	37.39	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W091	1	ROS	102494	304	BO	10	29.93	N	168	37.42	W	GPS		5480		
18DD9403/2	P15N	W091	3	ROS	102494	304	BE	10	29.93	N	168	37.42	W	GPS			22	1-8,
18DD9403/2	P15N	W091	3	ROS	102494	448	EN	10	29.83	N	168	38.18	W	GPS				
18DD9403/2	P15N	W092	1	ROS	102494	800	BE	10	0.06	N	168	44.81	W	GPS	5230			
18DD9403/2	P15N	W092	2	USW	102494	824	BE	10	0.41	N	168	44.76	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W092	1	ROS	102494	906	BO	10	0.96	N	168	44.84	W	GPS		5304		
18DD9403/2	P15N	W092	3	ROS	102494	907	BE	10	0.97	N	168	44.84	W	GPS			23	1-8,13,20,23,24

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W092	3	ROS	102494	1048	EN	10	1.46	N	168	43.46	W	GPS				
18DD9403/2	P15N	W093	1	ROS	102494	1408	BE	9	29.82	N	168	44.92	W	GPS				
18DD9403/2	P15N	W093	2	USW	102494	1420	BE	9	29.65	N	168	44.94	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W093	1	ROS	102494	1524	BO	9	29.28	N	168	45.35	W	GPS		5255		
18DD9403/2	P15N	W093	3	ROS	102494	1524	BE	9	29.28	N	168	45.35	W	GPS			22	1-8,
18DD9403/2	P15N	W093	3	ROS	102494	1705	EN	9	28.52	N	168	46.08	W	GPS				
18DD9403/2	P15N	W094	1	ROS	102494	2010	BE	8	59.95	N	168	44.98	W	GPS	4995			
18DD9403/2	P15N	W094	2	USW	102494	2020	BE	8	59.78	N	168	45.06	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W094	1	ROS	102494	2102	BO	8	59.72	N	168	45.24	W	GPS		5084		
18DD9403/2	P15N	W094	3	ROS	102494	2102	BE	8	59.71	N	168	45.25	W	GPS			23	1-8,12,23,24,31
18DD9403/2	P15N	W094	3	ROS	102494	2242	EN	8	59.56	N	168	45.40	W	GPS				
18DD9403/2	P15N	W095	1	ROS	102594	300	BE	8	30.07	N	168	45.14	W	GPS	4948			
18DD9403/2	P15N	W095	2	USW	102594	318	BE	8	30.06	N	168	45.26	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W095	1	ROS	102594	407	BO	8	30.39	N	168	45.33	W	GPS		4956		
18DD9403/2	P15N	W095	3	ROS	102594	408	BE	8	30.39	N	168	45.33	W	GPS			23	1-8,
18DD9403/2	P15N	W095	3	ROS	102594	553	EN	8	30.40	N	168	45.85	W	GPS				
18DD9403/2	P15N	W096	1	ROS	102594	910	BE	8	0.11	N	168	44.74	W	GPS	5095			
18DD9403/2	P15N	W096	2	USW	102594	934	BE	8	0.11	N	168	44.60	W	GPS		5	1	1,3-6,13,.20,23,24,34
18DD9403/2	P15N	W096	1	ROS	102594	1013	BO	8	0.27	N	168	44.19	W	GPS		5175		
18DD9403/2	P15N	W096	3	ROS	102594	1014	BE	8	0.28	N	168	44.19	W	GPS			21	1-8,13,20,23,24
18DD9403/2	P15N	W096	3	ROS	102594	1208	EN	8	0.66	N	168	43.31	W	GPS				
18DD9403/2	P15N	W097	1	ROS	102594	1556	BE	7	29.85	N	168	44.60	W	GPS	5148			
18DD9403/2	P15N	W097	2	USW	102594	1612	BE	7	29.61	N	168	44.47	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W097	1	ROS	102594	1659	BO	7	29.44	N	168	44.31	W	GPS		5240		
18DD9403/2	P15N	W097	3	ROS	102594	1700	BE	7	29.44	N	168	44.32	W	GPS			23	1-8,
18DD9403/2	P15N	W097	3	ROS	102594	1847	EN	7	29.15	N	168	44.05	W	GPS				
18DD9403/2	P15N	W098	1	ROS	102594	2310	BE	7	0.09	N	168	44.68	W	GPS	5369			
18DD9403/2	P15N	W098	2	USW	102594	2330	BE	7	0.17	N	168	43.84	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W098	1	ROS	102694	30	BO	7	0.29	N	168	42.80	W	GPS		5306		
18DD9403/2	P15N	W098	3	ROS	102694	31	BE	7	0.29	N	168	42.80	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W098	3	ROS	102694	237	EN	6	59.61	N	168	41.36	W	GPS				
18DD9403/2	P15N	W099	1	ROS	102694	605	BE	6	30.07	N	168	44.80	W	GPS	5400			
18DD9403/2	P15N	W099	1	ROS	102694	716	BO	6	30.18	N	168	43.80	W	GPS		5500		
18DD9403/2	P15N	W099	2	ROS	102694	716	BE	6	30.18	N	168	43.80	W	GPS			23	1-8,
18DD9403/2	P15N	W099	3	USW	102694	740	EN	6	30.21	N	168	43.57	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W099	2	ROS	102694	908	EN	6	30.60	N	168	42.14	W	GPS				
18DD9403/2	P15N	W100	1	ROS	102694	1230	BE	6	0.04	N	168	44.92	W	GPS				
18DD9403/2	P15N	W100	2	USW	102694	1305	BE	6	0.11	N	168	44.52	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W100	1	ROS	102694	1352	BO	6	0.21	N	168	44.22	W	GPS		5615		
18DD9403/2	P15N	W100	3	ROS	102694	1352	BE	6	0.28	N	168	44.23	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W100	3	ROS	102694	1555	EN	6	0.72	N	168	43.74	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W101	1	ROS	102694	1919	BE	5	29.98	N	168	44.82	W	GPS	5549			
18DD9403/2	P15N	W101	1	ROS	102694	1938	BO	5	29.80	N	168	44.64	W	GPS		992		
18DD9403/2	P15N	W101	2	ROS	102694	1938	BE	5	29.80	N	168	44.64	W	GPS			11	1-8,
18DD9403/2	P15N	W101	2	ROS	102694	2007	EN	5	29.31	N	168	44.48	W	GPS				
18DD9403/2	P15N	W101	3	ROS	102694	2030	BE	5	28.89	N	168	44.38	W	GPS	5570			
18DD9403/2	P15N	W101	4	USW	102694	2044	BE	5	28.68	N	168	44.36	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W101	3	ROS	102694	2148	BO	5	27.84	N	168	44.10	W	GPS		5695		
18DD9403/2	P15N	W101	5	ROS	102694	2148	BE	5	27.84	N	168	44.10	W	GPS			23	1-8,
18DD9403/2	P15N	W101	5	ROS	102694	2348	EN	5	26.44	N	168	43.47	W	GPS				
18DD9403/2	P15N	W102	1	ROS	102794	820	BE	4	59.90	N	168	44.87	W	GPS	5658			
18DD9403/2	P15N	W102	2	USW	102794	841	BE	4	59.84	N	168	44.84	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W102	1	ROS	102794	930	BO	4	59.67	N	168	44.67	W	GPS		5701		
18DD9403/2	P15N	W102	3	ROS	102794	931	BE	4	56.67	N	168	44.68	W	GPS			23	1-8,23,24,31
18DD9403/2	P15N	W102	3	ROS	102794	1139	EN	4	58.75	N	168	44.52	W	GPS				
18DD9403/2	P15N	W103	1	ROS	102794	1443	BE	4	29.76	N	168	45.07	W	GPS	5020			
18DD9403/2	P15N	W103	2	USW	102794	1450	BE	4	29.08	N	168	45.12	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W103	1	ROS	102794	1455	BO	4	29.58	N	168	45.02	W	GPS		1000		
18DD9403/2	P15N	W103	3	ROS	102794	1455	BE	4	29.58	N	168	45.01	W	GPS			11	1-8,
18DD9403/2	P15N	W103	3	ROS	102794	1524	EN	4	29.27	N	168	44.99	W	GPS				
18DD9403/2	P15N	W103	4	ROS	102794	1611	BE	4	29.97	N	168	45.16	W	GPS				
18DD9403/2	P15N	W103	4	ROS	102794	1716	BO	4	29.67	N	168	45.09	W	GPS		5005		
18DD9403/2	P15N	W103	5	ROS	102794	1716	BE	4	29.67	N	168	45.09	W	GPS			21	1-8,
18DD9403/2	P15N	W103	5	ROS	102794	1848	EN	4	29.36	N	168	44.59	W	GPS				
18DD9403/2	P15N	W104	1	ROS	102794	2202	BE	4	0.16	N	168	44.80	W	GPS	5444			
18DD9403/2	P15N	W104	1	ROS	102794	2301	BO	4	0.40	N	168	44.94	W	GPS		5408		
18DD9403/2	P15N	W104	2	ROS	102794	2301	BE	4	0.41	N	168	44.90	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W104	3	USW	102794	2320	BE	4	0.43	N	168	45.01	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W104	2	ROS	102894	108	EN	4	0.80	N	168	45.14	W	GPS				
18DD9403/2	P15N	W105	1	ROS	102894	435	BE	3	30.05	N	168	44.98	W	GPS	5450			
18DD9403/2	P15N	W105	1	ROS	102894	459	BO	3	29.96	N	168	44.96	W	GPS		998		
18DD9403/2	P15N	W105	2	ROS	102894	459	BE	3	29.96	N	168	44.96	W	GPS			11	1-8,14
18DD9403/2	P15N	W105	2	ROS	102894	526	EN	3	29.87	N	168	44.94	W	GPS				
18DD9403/2	P15N	W105	3	ROS	102894	602	BE	3	29.78	N	168	44.87	W	GPS	5498			
18DD9403/2	P15N	W105	4	USW	102894	608	BE	3	29.79	N	168	44.86	W	GPS		5	1	1,3-6,12,34
18DD9403/2	P15N	W105	3	ROS	102894	711	BO	3	29.63	N	168	44.79	W	GPS		5540		
18DD9403/2	P15N	W105	5	ROS	102894	711	BE	3	29.63	N	168	44.79	W	GPS			23	1-8,12,23,24
18DD9403/2	P15N	W105	5	ROS	102894	906	EN	3	29.72	N	168	45.00	W	GPS				
18DD9403/2	P15N	W106	1	ROS	102894	1226	BE	3	0.07	N	168	45.12	W	GPS	5098			
18DD9403/2	P15N	W106	2	USW	102894	1300	BE	3	0.25	N	168	45.60	W	GPS		5	1	1,3-6.13,20,23,24,34
18DD9403/2	P15N	W106	1	ROS	102894	1338	BO	3	0.45	N	168	45.75	W	GPS		5256		
18DD9403/2	P15N	W106	3	ROS	102894	1338	BE	3	0.45	N	168	45.75	W	GPS			23	1-8,13,20,23,24

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W106	3	ROS	102894	1537	EN	3	1.34	N	168	46.27	W	GPS				
18DD9403/2	P15N	W107	1	ROS	102894	1918	BE	2	30.14	N	168	45.00	W	GPS	5400			
18DD9403/2	P15N	W107	1	ROS	102894	1933	BO	2	30.30	N	168	45.00	W	GPS		1000		
18DD9403/2	P15N	W107	2	ROS	102894	1934	BE	2	30.30	N	168	45.00	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W107	2	ROS	102894	2007	EN	2	30.78	N	168	45.15	W	GPS				
18DD9403/2	P15N	W107	3	ROS	102894	2034	BE	2	31.12	N	168	45.26	W	GPS	5401			
18DD9403/2	P15N	W107	4	USW	102894	2055	BE	2	31.40	N	168	45.34	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W107	3	ROS	102894	2137	BO	2	31.74	N	168	45.48	W	GPS		5461		
18DD9403/2	P15N	W107	5	ROS	102894	2137	BE	2	31.74	N	168	45.48	W	GPS			21	1-8,23,24
18DD9403/2	P15N	W107	5	ROS	102894	2322	EN	2	32.60	N	168	45.83	W	GPS				
18DD9403/2	P15N	W108	1	ROS	102994	317	BE	2	0.15	N	168	45.03	W	GPS				
18DD9403/2	P15N	W108	1	ROS	102994		BO			N			W	GPS				
18DD9403/2	P15N	W108	2	ROS	102994		BE			N			W	GPS			0	
18DD9403/2	P15N	W108	2	ROS	102994	625	EN	2	1.64	N	168	45.54	W	GPS				
18DD9403/2	P15N	W108	3	ROS	102994	918	BE	2	0.47	N	168	44.94	W	GPS	5419			
18DD9403/2	P15N	W108	4	USW	102994	931	BE	2	0.61	N	168	45.02	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W108	3	ROS	102994	1019	BO	2	0.81	N	168	45.31	W	GPS		5000		
18DD9403/2	P15N	W108	5	ROS	102994	1023	BE	2	0.84	N	168	45.36	W	GPS			0	
18DD9403/2	P15N	W108	5	ROS	102994	1156	EN	2	1.32	N	168	46.05	W	GPS				
18DD9403/2	P15N	W108	6	ROS	102994	1255	BE	1	59.90	N	168	45.11	W	GPS				
18DD9403/2	P15N	W108	6	ROS	102994	1400	BO	2	0.33	N	168	45.65	W	GPS		5002		
18DD9403/2	P15N	W108	7	ROS	102994	1400	BE	2	0.33	N	168	45.65	W	GPS			11	1-8,13,20,23,24,
18DD9403/2	P15N	W108	7	ROS	102994	1533	EN	2	0.90	N	168	46.06	W	GPS				
18DD9403/2	P15N	W108	8	ROS	102994	1644	BE	2	0.12	N	168	45.12	W	GPS	5390			
18DD9403/2	P15N	W108	8	ROS	102994	1713	BO	2	0.37	N	168	45.32	W	GPS		1498		
18DD9403/2	P15N	W108	9	ROS	102994	1713	BE	2	0.38	N	168	45.32	W	GPS			11	1-8,13,20,23,24,
18DD9403/2	P15N	W108	9	ROS	102994	1748	EN	2	0.65	N	168	45.47	W	GPS				
18DD9403/2	P15N	W109	1	ROS	102994	2244	BE	1	31.12	N	168	45.94	W	GPS	5373			
18DD9403/2	P15N	W109	2	USW	102994	2258	BE	1	31.29	N	168	45.73	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W109	1	ROS	102994	2345	BO	1	31.73	N	168	45.94	W	GPS		5456		
18DD9403/2	P15N	W109	3	ROS	102994	2345	BE	1	31.73	N	168	45.94	W	GPS			16	1-8,23,24
18DD9403/2	P15N	W109	3	ROS	103094	141	EN	1	32.93	N	168	46.51	W	GPS				
18DD9403/2	P15N	W110	1	ROS	103094	523	BE	1	0.08	N	168	45.04	W	GPS	5340			
18DD9403/2	P15N	W110	1	ROS	103094	630	BO	1	0.52	N	168	45.16	W	GPS		5443		
18DD9403/2	P15N	W110	2	ROS	103094	630	BE	1	0.52	N	168	45.16	W	GPS			17	1-8,13,20,23,24
18DD9403/2	P15N	W110	3	USW	103094	639	BE	1	0.56	N	168	45.19	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W110	2	ROS	103094	839	EN	1	1.03	N	168	45.63	W	GPS				
18DD9403/2	P15N	W111	1	ROS	103094	1532	BE	0	29.84	N	168	45.24	W	GPS	5460			
18DD9403/2	P15N	W111	1	ROS	103094	1642	BO	0	29.34	N	168	45.65	W	GPS		5568		
18DD9403/2	P15N	W111	2	ROS	103094	1642	BE	0	29.34	N	168	45.65	W	GPS			23	1-8,20,23,24
18DD9403/2	P15N	W111	3	USW	103094	1652	BE	0	29.34	N	168	45.64	W	GPS		5	1	1,3-6,34

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully

SHIP/CRS EXPOCOD	WOCE SECT	STNNBR	CASTNO	CAST TYPE	DATE	UTC TIME	EVENT CODE	LATITUDE			LONGITUDE				NAV	UNC DEPTH	MAX PRESS	NO. OF BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W111	2	ROS	103094	1841	EN	0	28.76	N	168	46.33	W	GPS					
18DD9403/2	P15N	XBT6	1	XBT	103094	2010	BE	0	14.60	N	168	45.60	W	GPS					
18DD9403/2	P15N	W112	1	ROS	103094	2141	BE	0	0.08	N	168	44.97	W	GPS	5550				
18DD9403/2	P15N	W112	2	USW	103094	2158	BE	0	0.19	S	168	45.04	W	GPS			5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W112	1	ROS	103094	2245	BO	0	0.54	S	168	45.34	W	GPS			5642		
18DD9403/2	P15N	W112	3	ROS	103094	2246	BE	0	0.58	S	168	45.33	W	GPS				23	1-8,13,20,23,24,31
18DD9403/2	P15N	W112	3	ROS	103194	33	EN	0	1.34	S	168	45.73	W	GPS					
18DD9403/2	P15N	W113	1	ROS	103194	1550	BE	0	30.35	S	168	45.25	W	GPS					
18DD9403/2	P15N	W113	1	ROS	103194	1610	BO	0	30.66	S	168	45.44	W	GPS			1000		
18DD9403/2	P15N	W113	2	ROS	103194	1611	BE	0	30.67	S	168	45.44	W	GPS				11	1-8,23,24
18DD9403/2	P15N	W113	2	ROS	103194	1640	EN	0	31.04	S	168	45.47	W	GPS					
18DD9403/2	P15N	W113	3	ROS	103194	1724	BE	0	30.17	S	168	45.06	W	GPS					
18DD9403/2	P15N	W113	4	USW	103194	1745	BE	0	30.65	S	168	45.15	W	GPS	5450		5	1	1,3-6,34
18DD9403/2	P15N	W113	3	ROS	103194	1833	BO	0	31.02	S	168	45.40	W	GPS			5530		
18DD9403/2	P15N	W113	5	ROS	103194	1834	BE	0	31.06	S	168	45.37	W	GPS				22	1-8,23,24
18DD9403/2	P15N	W113	5	ROS	103194	2019	EN	0	31.99	S	168	45.86	W	GPS					
18DD9403/2	P15N	XBT7	1	XBT	103194	2136	BE	0	45.45	S	168	45.33	W	GPS					
18DD9403/2	P15N	XBT8	2	XBT	103194	2142	BE	0	45.43	S	168	45.28	W	GPS					
18DD9403/2	P15N	W114	1	ROS	103194	2311	BE	1	0.03	S	168	44.99	W	GPS	5774				
18DD9403/2	P15N	W114	1	ROS	110194	19	BO	1	0.55	S	168	44.96	W	GPS			5889		
18DD9403/2	P15N	W114	2	ROS	110194	20	BE	1	0.55	S	168	44.96	W	GPS				23	1-8,13,20,23,24,
18DD9403/2	P15N	W114	3	USW	110194	105	BE	1	0.71	S	168	44.87	W	GPS			5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W114	2	ROS	110194	224	EN	1	1.51	S	168	44.89	W	GPS					
18DD9403/2	P15N	W115	1	ROS	110194	521	BE	1	30.27	S	168	45.01	W	GPS	6040			23	1-8,12,23,24
18DD9403/2	P15N	W115	2	USW	110194	537	BE	1	30.41	S	168	45.04	W	GPS			5	1	1,3-6,34
18DD9403/2	P15N	W115	1	ROS	110194	635	BO	1	30.91	S	168	45.11	W	GPS			6000		
18DD9403/2	P15N	W115	1	ROS	110194	836	EN	1	31.85	S	168	45.19	W	GPS					
18DD9403/2	P15N	W115	3	ROS	110194	901	BE	1	32.34	S	168	45.14	W	GPS					
18DD9403/2	P15N	W115	3	ROS	110194	916	BO	1	32.55	S	168	45.11	W	GPS			1001		
18DD9403/2	P15N	W115	4	ROS	110194	919	BE	1	32.60	S	168	45.13	W	GPS				11	1-8,12,23,24
18DD9403/2	P15N	W115	4	ROS	110194	950	EN	1	33.07	S	168	45.23	W	GPS					
18DD9403/2	P15N	W116	1	ROS	110194	1243	BE	2	0.19	S	168	44.77	W	GPS	3255				
18DD9403/2	P15N	W116	2	USW	110194	1330	BE	2	0.62	S	168	44.57	W	GPS			5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W116	1	ROS	110194	1334	BO	2	0.63	S	168	44.59	W	GPS			3313		
18DD9403/2	P15N	W116	3	ROS	110194	1335	BE	2	0.64	S	168	44.60	W	GPS				23	1-8,13,20,23,24
18DD9403/2	P15N	W116	3	ROS	110194	1449	EN	2	1.30	S	168	44.73	W	GPS					
18DD9403/2	P15N	W117	1	ROS	110194	1749	BE	2	30.16	S	168	44.76	W	GPS					
18DD9403/2	P15N	W117	1	ROS	110194	1808	BO	2	30.42	S	168	44.61	W	GPS			1000		
18DD9403/2	P15N	W117	2	ROS	110194	1808	BE	2	30.42	S	168	44.61	W	GPS				11	1-8,23,24
18DD9403/2	P15N	W117	2	ROS	110194	1836	EN	2	30.78	S	168	44.57	W	GPS					
18DD9403/2	P15N	W117	3	ROS	110194	1906	BE	2	30.36	S	168	45.03	W	GPS	5320				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W117	4	USW	110194	1923	BE	2	30.41	S	168	44.94	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W117	3	ROS	110194	2016	BO	2	30.73	S	168	44.90	W	GPS		5420		
18DD9403/2	P15N	W117	5	ROS	110194	2016	BE	2	30.72	S	168	44.88	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W117	5	ROS	110194	2201	EN	2	31.33	S	168	44.54	W	GPS				
18DD9403/2	P15N	W118	1	ROS	110294	58	BE	3	0.05	S	168	45.11	W	GPS	5350			
18DD9403/2	P15N	W118	2	USW	110294	130	BE	3	0.20	S	168	45.42	W	GPS		5	1	1,3-6,13,23,24.34
18DD9403/2	P15N	W118	1	ROS	110294	202	BO	3	0.36	S	168	45.52	W	GPS		5455		
18DD9403/2	P15N	W118	3	ROS	110294	202	BE	3	0.26	S	168	45.54	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W118	3	ROS	110294	359	EN	3	0.89	S	168	46.13	W	GPS				
18DD9403/2	P15N	W119	1	ROS	110294	710	BE	3	30.03	S	168	45.05	W	GPS	4990			
18DD9403/2	P15N	W119	1	ROS	110294	724	BO	3	30.01	S	168	44.92	W	GPS		1000		
18DD9403/2	P15N	W119	2	ROS	110294	725	BE	3	30.00	S	168	44.92	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W119	2	ROS	110294	758	EN	3	29.83	S	168	44.71	W	GPS				
18DD9403/2	P15N	W119	3	ROS	110294	821	BE	3	29.80	S	168	44.56	W	GPS				
18DD9403/2	P15N	W119	4	USW	110294	829	EN	3	29.78	S	168	44.47	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W119	3	ROS	110294	920	BO	3	29.82	S	168	44.09	W	GPS		5077		
18DD9403/2	P15N	W119	5	ROS	110294	921	BE	3	29.83	S	168	44.10	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W119	5	ROS	110294	1110	EN	3	30.18	S	168	44.11	W	GPS				
18DD9403/2	P15N	W120	1	ROS	110294	1423	BE	3	59.96	S	168	45.05	W	GPS	5065			
18DD9403/2	P15N	W120	2	USW	110294	1455	EN	3	59.87	S	168	45.29	W	GPS		5	1	1,3-6,13,23,24,34
18DD9403/2	P15N	W120	1	ROS	110294	1535	BO	3	59.65	S	168	45.50	W	GPS		5140		
18DD9403/2	P15N	W120	3	ROS	110294	1535	BE	3	59.65	S	168	45.50	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W120	3	ROS	110294	1727	EN	3	59.16	S	168	45.18	W	GPS				
18DD9403/2	P15N	W121	1	ROS	110294	2053	BE	4	29.93	S	168	44.96	W	GPS				
18DD9403/2	P15N	W121	1	ROS	110294	2108	BO	4	29.80	S	168	44.96	W	GPS		1004		
18DD9403/2	P15N	W121	2	ROS	110294	2108	BE	4	29.78	S	168	44.96	W	GPS			11	1-8,23,24
18DD9403/2	P15N	W121	2	ROS	110294	2142	EN	4	29.61	S	168	44.75	W	GPS				
18DD9403/2	P15N	W121	3	ROS	110294	2204	BE	4	29.41	S	168	44.58	W	GPS	5246			
18DD9403/2	P15N	W121	4	USW	110294	2219	EN	4	29.35	S	168	44.53	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W121	3	ROS	110294	2303	BO	4	29.31	S	168	44.40	W	GPS		5356		
18DD9403/2	P15N	W121	5	ROS	110294	2304	BE	4	29.32	S	168	44.41	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W121	5	ROS	110394	49	EN	4	29.07	S	168	44.60	W	GPS				
18DD9403/2	P15N	W122	1	ROS	110394	433	BE	5	0.01	S	168	45.07	W	GPS	5556			
18DD9403/2	P15N	W122	1	ROS	110394	540	BO	5	0.27	S	168	45.16	W	GPS		5655		
18DD9403/2	P15N	W122	2	ROS	110394	540	BE	5	0.27	S	168	45.17	W	GPS			23	1-8,23,24,31
18DD9403/2	P15N	W122	3	USW	110394	543	EN	5	0.28	S	168	45.17	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W122	2	ROS	110394	735	EN	5	0.89	S	168	45.86	W	GPS				
18DD9403/2	P15N	W123	1	ROS	110394	1041	BE	5	30.04	S	168	44.96	W	GPS	5322			
18DD9403/2	P15N	W123	1	ROS	110394	1055	BO	5	30.09	S	168	45.15	W	GPS		1000		
18DD9403/2	P15N	W123	2	ROS	110394	1055	BE	5	30.09	S	168	45.15	W	GPS			11	1-8,
18DD9403/2	P15N	W123	3	USW	110394	1120	EN	5	30.23	S	168	45.31	W	GPS		5	1	1,3-6,23,24,34

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W123	2	ROS	110394	1123	EN	5	30.23	S	168	45.31	W	GPS				
18DD9403/2	P15N	W123	4	ROS	110394	1149	BE	5	30.88	S	168	45.09	W	GPS	5400			
18DD9403/2	P15N	W123	4	ROS	110394	1308	BO	5	30.27	S	168	45.59	W	GPS		5398		
18DD9403/2	P15N	W123	5	ROS	110394	1308	BE	5	30.27	S	168	45.59	W	GPS			23	1-8,
18DD9403/2	P15N	W123	5	ROS	110394	1453	EN	5	30.89	S	168	45.76	W	GPS				
18DD9403/2	P15N	W124	1	ROS	110394	1745	BE	6	0.11	S	168	45.45	W	GPS	5630			
18DD9403/2	P15N	W124	1	ROS	110394	1857	BO	6	0.98	S	168	45.45	W	GPS		5652		
18DD9403/2	P15N	W124	2	ROS	110394	1858	BE	6	0.99	S	168	45.46	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W124	3	USW	110394	1931	EN	6	1.08	S	168	45.55	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W124	2	ROS	110394	2048	EN	6	1.43	S	168	45.88	W	GPS				
18DD9403/2	P15N	W125	1	ROS	110394	2347	BE	6	30.07	S	168	45.13	W	GPS	5523			
18DD9403/2	P15N	W125	1	ROS	110494	9	BO	6	30.27	S	168	45.38	W	GPS		1001		
18DD9403/2	P15N	W125	2	ROS	110494	9	BE	6	30.26	S	168	45.37	W	GPS			11	1-8,
18DD9403/2	P15N	W125	3	USW	110494	335	EN	6	30.23	S	168	45.35	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W125	2	ROS	110494	36	EN	6	30.41	S	168	45.51	W	GPS				
18DD9403/2	P15N	W125	4	ROS	110494	58	BE	6	30.10	S	168	45.04	W	GPS				
18DD9403/2	P15N	W125	4	ROS	110494	207	BO	6	30.33	S	168	45.14	W	GPS		5631		
18DD9403/2	P15N	W125	5	ROS	110494	209	BE	6	30.31	S	168	45.14	W	GPS			13	1-8,
18DD9403/2	P15N	W125	5	ROS	110494	316	EN	6	30.33	S	168	45.15	W	GPS				
18DD9403/2	P15N	W125	6	ROS	110494	316	BE	6	30.33	S	168	45.15	W	GPS		2498	10	1-8,
18DD9403/2	P15N	W125	6	ROS	110494	405	EN	6	30.51	S	168	45.24	W	GPS				
18DD9403/2	P15N	W126	1	ROS	110494	700	BE	7	0.20	S	168	45.00	W	GPS	5580			
18DD9403/2	P15N	W126	2	USW	110494	744	EN	7	0.78	S	168	44.76	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W126	1	ROS	110494	812	BO	7	0.98	S	168	44.71	W	GPS		5782		
18DD9403/2	P15N	W126	3	ROS	110494	812	BE	7	0.98	S	168	44.71	W	GPS			23	1-8,12,23,24
18DD9403/2	P15N	W126	3	ROS	110494	958	EN	7	2.21	S	168	44.92	W	GPS				
18DD9403/2	P15N	W127	1	ROS	110494	1254	BE	7	30.14	S	168	44.84	W	GPS	5260			
18DD9403/2	P15N	W127	1	ROS	110494	1316	BO	7	30.23	S	168	44.61	W	GPS		1005		
18DD9403/2	P15N	W127	2	ROS	110494	1317	BE	7	30.23	S	168	44.61	W	GPS			11	1-8,
18DD9403/2	P15N	W127	2	ROS	110494	1344	EN	7	30.38	S	168	44.56	W	GPS				
18DD9403/2	P15N	W127	3	ROS	110494	1408	BE	7	29.99	S	168	44.94	W	GPS	5250			
18DD9403/2	P15N	W127	4	USW	110494	1412	EN	7	30.03	S	168	44.87	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W127	3	ROS	110494	1522	BO	7	30.47	S	168	44.42	W	GPS		5370		
18DD9403/2	P15N	W127	5	ROS	110494	1522	BE	7	30.47	S	168	44.42	W	GPS			23	1-8,
18DD9403/2	P15N	W127	5	ROS	110494	1717	EN	7	31.89	S	168	43.15	W	GPS				
18DD9403/2	P15N	W128	1	ROS	110494	2018	BE	8	0.20	S	168	45.00	W	GPS	4890			
18DD9403/2	P15N	W128	2	USW	110494	2035	EN	8	0.50	S	168	44.83	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W128	1	ROS	110494	2125	BO	8	1.00	S	168	44.73	W	GPS		4998		
18DD9403/2	P15N	W128	3	ROS	110494	2126	BE	8	1.01	S	168	44.74	W	GPS			23	1-8,13,20,23,24
18DD9403/2	P15N	W128	3	ROS	110494	2308	EN	8	2.52	S	168	44.35	W	GPS				
18DD9403/2	P15N	W129	1	ROS	110594	150	BE	8	30.07	S	168	44.98	W	GPS	5090			

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W129	2	USW	110594	242	EN	8	30.21	S	168	44.83	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W129	1	ROS	110594	259	BO	8	30.31	S	168	44.81	W	GPS		5215		
18DD9403/2	P15N	W129	3	ROS	110594	300	BE	8	30.32	S	168	44.82	W	GPS			23	1-6,
18DD9403/2	P15N	W129	3	ROS	110594	445	EN	8	31.76	S	168	45.29	W	GPS				
18DD9403/2	P15N	W130	1	ROS	110594	745	BE	9	0.05	S	169	0.02	W	GPS	4610			
18DD9403/2	P15N	W130	2	USW	110594	759	BE	9	0.21	S	169	0.01	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W130	1	ROS	110594	848	BO	9	0.80	S	169	0.02	W	GPS		4769		
18DD9403/2	P15N	W130	3	ROS	110594	849	BE	9	0.80	S	169	0.02	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W130	3	ROS	110594	1029	EN	9	1.64	S	168	59.85	W	GPS				
18DD9403/2	P15N	W131	1	ROS	110594	1329	BE	9	30.11	S	168	59.89	W	GPS	5262			
18DD9403/2	P15N	W131	2	USW	110594	1400	BE	9	30.44	S	169	0.25	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W131	1	ROS	110594	1443	BO	9	30.47	S	169	0.08	W	GPS		5412		
18DD9403/2	P15N	W131	3	ROS	110594	1444	BE	9	30.47	S	169	0.08	W	GPS			23	1-8,
18DD9403/2	P15N	W131	3	ROS	110594	1634	EN	9	31.21	S	169	0.25	W	GPS				
18DD9403/2	P15N	W132	1	ROS	110594	2036	BE	10	0.10	S	169	29.97	W	GPS	5226			
18DD9403/2	P15N	W132	2	USW	110594	2054	BE	10	0.14	S	169	30.08	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W132	1	ROS	110594	2145	BO	10	0.02	S	169	30.35	W	GPS				
18DD9403/2	P15N	W132	3	ROS	110594	2145	BE	10	0.02	S	169	30.35	W	GPS			23	1-8,13,20,23,24,31
18DD9403/2	P15N	W132	3	ROS	110594	2340	EN	9	59.78	S	169	31.05	W	GPS				
18DD9403/2	P15N	SG01	1	CTD	110694	532	BE	10	0.22	S	168	29.87	W	GPS	4100			
18DD9403/2	P15N	SG01	1	CTD	110694	624	BO	10	0.10	S	168	29.94	W	GPS		4335		
18DD9403/2	P15N	SG01	2	CTD	110694	625	BE	10	0.10	S	168	29.90	W	GPS				
18DD9403/2	P15N	SG01	2	CTD	110694	718	EN	10	0.09	S	168	30.51	W	GPS				
18DD9403/2	P15N	SG02	1	CTD	110694	1009	BE	9	59.78	S	168	59.89	W	GPS	4300			
18DD9403/2	P15N	SG02	1	CTD	110694	1101	BO	9	59.52	S	168	59.98	W	GPS				
18DD9403/2	P15N	SG02	2	CTD	110694	1102	BE	9	59.51	S	168	59.99	W	GPS				
18DD9403/2	P15N	SG02	2	CTD	110694	1148	EN	9	59.07	S	169	0.13	W	GPS				
18DD9403/2	P15N	SG03	1	CTD	110694	1728	BE	10	0.05	S	170	0.04	W	GPS	4925			
18DD9403/2	P15N	SG03	1	CTD	110694	1828	BO	9	59.69	S	170	0.62	W	GPS		5070		
18DD9403/2	P15N	SG03	2	CTD	110694	1828	BE	9	59.69	S	170	0.63	W	GPS				
18DD9403/2	P15N	SG03	2	CTD	110694	1919	EN	9	59.42	S	170	0.98	W	GPS				
18DD9403/2	P15N	SG04	1	CTD	110794	132	BE	10	0.10	S	170	29.95	W	GPS	4494			
18DD9403/2	P15N	SG04	1	CTD	110794	232	BO	10	0.01	S	170	30.04	W	GPS		3822		
18DD9403/2	P15N	SG04	2	CTD	110794	233	BE	10	0.01	S	170	30.03	W	GPS				
18DD9403/2	P15N	SG04	2	CTD	110794	322	EN	10	0.16	S	170	30.19	W	GPS				
18DD9403/2	P15N	SG05	1	CTD	110794	635	BE	10	0.17	S	171	0.08	W	GPS	3870			
18DD9403/2	P15N	SG05	1	CTD	110794	730	BO	10	0.25	S	171	0.40	W	GPS		3660		
18DD9403/2	P15N	SG05	2	CTD	110794	731	BE	10	0.28	S	171	0.37	W	GPS				
18DD9403/2	P15N	SG05	2	CTD	110794	829	EN	10	0.48	S	171	1.04	W	GPS				
18DD9403/2	P15N	W133	1	ROS	110794	1556	BE	10	29.93	S	170	0.31	W	GPS	4818			
18DD9403/2	P15N	W133	2	USW	110794	1625	BE	10	29.89	S	170	0.93	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																			
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W133	1	ROS	110794	1658	BO	10	29.95	S	170	1.35	W	GPS		3500		
18DD9403/2	P15N	W133	3	ROS	110794	1658	BE	10	29.95	S	170	1.35	W	GPS			23	1-8,
18DD9403/2	P15N	W133	3	ROS	110794	1831	EN	10	30.18	S	170	2.65	W	GPS				
18DD9403/2	P15N	W134	1	ROS	110794	2138	BE	11	0.08	S	169	59.81	W	GPS	5060			
18DD9403/2	P15N	W134	2	USW	110794	2154	BE	11	0.26	S	169	59.85	W	GPS		5	1	1,3-6,23,23,34
18DD9403/2	P15N	W134	1	ROS	110794	2223	BO	10	59.84	S	169	59.78	W	GPS		3507		
18DD9403/2	P15N	W134	3	ROS	110794	2225	BE	10	59.82	S	169	59.78	W	GPS			23	1-8,23,24
18DD9403/2	P15N	W134	3	ROS	110794	2351	EN	10	59.46	S	170	0.07	W	GPS				
18DD9403/2	P15N	W135	1	ROS	110894	327	BE	11	30.23	S	170	0.15	W	GPS	4997			
18DD9403/2	P15N	W135	2	USW	110894	345	BE	11	30.39	S	170	0.00	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W135	1	ROS	110894	430	BO	11	30.50	S	169	59.81	W	GPS		3502		
18DD9403/2	P15N	W135	3	ROS	110894	430	BE	11	30.50	S	169	59.81	W	GPS			23	1-8,
18DD9403/2	P15N	W135	3	ROS	110894	602	EN	11	30.56	S	169	59.35	W	GPS				
18DD9403/2	P15N	W136	1	ROS	110894	913	BE	11	59.92	S	169	59.91	W	GPS	4980			
18DD9403/2	P15N	W136	2	USW	110894	930	BE	11	59.94	S	169	89.65	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W136	1	ROS	110894	1007	BO	11	59.88	S	169	89.27	W	GPS		3500		
18DD9403/2	P15N	W136	3	ROS	110894	1008	BE	11	59.87	S	169	59.28	W	GPS			22	1-8,13,20,23,24,
18DD9403/2	P15N	W136	3	ROS	110894	1132	EN	12	0.10	S	169	58.06	W	GPS				
18DD9403/2	P15N	W137	1	CTD	110894	1956	BE	12	30.17	S	169	59.79	W	GPS	4946			
18DD9403/2	P15N	W137	2	USW	110894	2021	EN	12	30.23	S	169	59.49	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W137	1	CTD	110894	2042	BO	12	30.14	S	169	59.26	W	GPS		3506		
18DD9403/2	P15N	W137	3	CTD	110894	2043	BE	12	30.14	S	169	59.26	W	GPS				
18DD9403/2	P15N	W137	3	CTD	110894	2129	EN	12	30.24	S	169	58.66	W	GPS				
18DD9403/2	P15N	W138	1	CTD	110994	120	BE	13	0.93	S	169	59.51	W	GPS				
18DD9403/2	P15N	W138	1	CTD	110994	224	BO	13	1.04	S	169	59.38	W	GPS		3821		
18DD9403/2	P15N	W138	2	CTD	110994	224	BE	13	1.04	S	169	59.38	W	GPS				
18DD9403/2	P15N	W138	3	USW	110994	230	EN	13	1.14	S	169	59.31	W	GPS		5	1	1,3-6,12,23,24,34
18DD9403/2	P15N	W138	2	CTD	110994	339	EN	13	1.56	S	169	58.54	W	GPS				
18DD9403/2	P15N	W139	1	CTD	110994	653	BE	13	29.98	S	169	59.46	W	GPS	4824			
18DD9403/2	P15N	W139	2	USW	110994	711	EN	13	29.93	S	169	59.72	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W139	1	CTD	110994	740	BO	13	30.11	S	169	59.87	W	GPS		3512		
18DD9403/2	P15N	W139	3	CTD	110994	741	BE	13	30.12	S	169	59.44	W	GPS				
18DD9403/2	P15N	W139	3	CTD	110994	915	EN	13	30.66	S	169	58.72	W	GPS				
18DD9403/2	P15N	W140	1	CTD	110994	1234	BE	14	0.27	S	169	59.78	W	GPS	2690			
18DD9403/2	P15N	W140	2	USW	110994	1244	EN	14	0.43	S	169	59.73	W	GPS		5	1	1,3-6,13,20,23,24,34
18DD9403/2	P15N	W140	1	CTD	110994	1332	BO	14	0.65	S	169	59.86	W	GPS		2726		
18DD9403/2	P15N	W140	3	CTD	110994	1332	BE	14	0.65	S	169	59.86	W	GPS				
18DD9403/2	P15N	W140	3	CTD	110994	1400	EN	14	0.66	S	170	0.00	W	GPS				
18DD9403/2	P15N	W141	1	CTD	110994	1713	BE	14	29.99	S	170	0.03	W	GPS	970			
18DD9403/2	P15N	W141	1	CTD	110994	1734	BO	14	29.89	S	169	59.95	W	GPS		950		
18DD9403/2	P15N	W141	2	CTD	110994	1734	BE	14	29.89	S	169	59.95	W	GPS				

APPENDIX 2. STATION SUMMARY LEG 2 WOCE SECTION P15N

P15N Leg 2 on R/V John P Tully																		
SHIP/CRS	WOCE			CAST		UTC	EVENT			POSITION					UNC	MAX	NO. OF	
EXPOCOD	SECT	STNNBR	CASTNO	TYPE	DATE	TIME	CODE	LATITUDE			LONGITUDE			NAV	DEPTH	PRESS	BOTTLES	PARAMETERS
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18DD9403/2	P15N	W141	3	USW	110994	1741	EN	14	29.85	S	169	59.90	W	GPS		5	1	1,3-6,34
18DD9403/2	P15N	W141	2	CTD	110994	1747	EN	14	29.84	S	169	59.86	W	GPS				
18DD9403/2	P15N	W142	1	CTD	110994	2115	BE	15	0.03	S	170	0.04	W	GPS	4757			
18DD9403/2	P15N	W142	2	USW	110994	2127	BE	15	0.08	S	169	59.97	W	GPS		5	1	1,3-6,23,24,34
18DD9403/2	P15N	W142	1	CTD	110994	2214	BO	15	0.14	S	169	59.82	W	GPS		3765		
18DD9403/2	P15N	W142	3	CTD	110994	2216	BE	15	0.14	S	169	59.82	W	GPS				
18DD9403/2	P15N	W142	3	CTD	110994	2316	EN	15	0.22	S	169	59.41	W	GPS				

APPENDIX 3. STATION BOTTLE DATA (-.SEA) FILES

Appendix 3 contains the Station Bottle Data for the first 12 stations on WOCE Cruise P15N.

Each sampling bottle on a cast must be accompanied by a quality flag as defined below which indicates whether there were problems noted while drawing samples or from differences in the measured values (from WOCE Report 67/91).

Flag Value	Definition
1	Bottle information unavailable
2	No problems noted
3	Leaking
4	Did not trip correctly
5	Not reported
9	Samples not drawn from this bottle

All WOCE water sample measurements are assigned quality flags as defined below. All measured values are reported including questionable or bad values. See Appendix 2 for Units and Mnemonics used in -.SEA files.

FLAG VALUE	DEFINITION
1	Sample for this measurement was drawn from water bottle but analysis not received
2	Acceptable measurement
3	Questionable measurement
4	Bad measurement
5	Not reported
6	Mean of replicate measurements
7	Manual chromotagraphic peak measurement
8	Irregular Chromatographic peak integration
9	Sample not drawn for this measurement from this bottle

APPENDIX 3. STATION BOTTLE DATA (-.SEA) LEG 1 WOCE SECTION P15N

EXPOCODE 18DD9403/1 WHP-ID P15N CRUISE DATES 082994 TO 100594

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS (DBAR)	CTDTMP	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	DELC14 /MILLE	DELC13 /MILLE	O18/O16 /MILLE	TCARBN UMOL/KG	ALKALI UMOL/KG	QUALIT1
			********			********	********	********	********	********	********	********	********	********	********	********	********	********	*
W001	3	L51	USW	5.0	-9.000	31.9360	-9.0	21.7	10.1	0.30	1.13	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W001	2	125	3	10.0	-9.000	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	49999999999999
W001	2	126	2	50.0	-9.000	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	49999999999999
W001	2	127	1	80.0	-9.000	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	49999999999999
W002	2	L52	USW	5.0	-9.000	31.8090	-9.0	15.4	6.6	0.21	0.92	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229991199
W002	3	128	8	9.3	8.437	31.8148	284.0	17.5	7.5	0.24	0.96	5.090	2.057	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	129	7	49.6	7.311	32.1652	262.3	27.1	12.9	0.31	1.42	5.351	2.156	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	130	6	49.9	7.318	32.1718	262.0	27.1	13.2	0.31	1.34	5.077	2.090	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	131	5	75.2	5.805	32.4512	249.0	27.5	18.0	0.15	1.57	5.114	2.230	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	132	4	98.0	5.254	32.8726	203.7	42.6	24.2	0.16	1.94	4.316	1.885	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	133	3	100.2	5.216	32.8874	201.7	41.4	24.7	0.16	1.95	4.358	1.845	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	134	2	150.4	4.923	33.5363	140.1	56.8	32.4	0.07	2.38	2.853	1.743	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W002	3	135	1	176.9	4.541	33.6771	119.1	65.7	35.1	0.05	2.53	2.815	1.332	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W003	2	L53	USW	5.0	-9.000	31.6000	-9.0	12.2	4.1	0.18	0.70	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W003	3	136	11	10.1	9.148	31.5916	288.8	12.4	4.2	0.17	0.71	4.911	1.937	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	137	10	48.6	7.344	-9.0000	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	99999999999999
W003	3	138	9	97.5	5.038	32.9819	243.0	34.4	22.3	0.03	1.76	4.219	1.870	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	139	8	201.3	4.166	33.7696	111.9	69.7	37.2	0.00	2.64	2.484	1.145	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	140	7	297.6	3.990	33.9293	52.4	87.5	41.1	0.00	2.92	1.433	0.629	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	141	6	399.3	3.891	34.0091	37.1	96.6	42.5	0.00	3.02	1.245	0.928	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	142	5	597.3	3.653	-9.0000	22.5	117.0	44.9	0.00	3.21	0.379	0.266	-9.0	-9.0	-9.00	-9.0	-9.0	29222222299999
W003	3	143	4	802.3	3.410	34.2400	19.3	124.5	43.5	0.00	3.10	0.192	0.161	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	144	3	1000.5	3.110	34.3263	17.7	135.3	43.6	0.00	3.12	0.132	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	145	2	1251.3	2.795	34.3998	19.0	146.9	43.8	0.00	3.12	0.005	0.072	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W003	3	146	1	1461.4	2.485	34.4655	32.5	155.5	43.0	0.00	3.06	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222225599999
W004	2	L54	USW	5.0	-9.000	31.9740	-9.0	9.0	3.7	0.14	0.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W004	3	147	23	9.5	9.778	31.9671	285.8	9.0	3.7	0.11	0.66	5.288	2.102	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	148	22	50.8	9.457	32.2327	285.6	8.4	4.9	0.14	0.80	5.378	2.102	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	149	21	99.3	4.592	32.9694	242.9	36.3	23.1	0.01	1.81	4.975	2.142	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	150	20	199.4	4.097	33.8165	72.6	77.4	40.4	0.00	2.84	2.023	0.935	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	151	19	300.6	3.903	33.9613	34.9	93.1	43.5	0.00	3.05	1.217	0.568	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	152	18	397.9	3.802	34.0625	25.4	104.6	43.8	0.00	3.08	0.596	0.327	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	153	17	602.5	3.515	34.1957	17.8	120.0	43.8	0.00	3.09	0.232	0.158	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	154	16	806.0	3.113	34.3135	18.0	135.6	43.9	0.00	3.11	0.088	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	155	15	1007.4	2.815	34.3897	18.5	145.0	43.8	0.00	3.11	0.057	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	156	14	1256.7	2.502	34.4592	25.4	155.7	43.9	0.00	3.08	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	157	13	1504.6	2.225	34.5165	39.5	162.6	43.1	0.00	3.06	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291911
W004	3	158	12	1748.8	2.021	34.5596	52.4	165.9	42.3	0.00	2.96	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291999
W004	3	159	11	1998.4	1.867	34.5925	66.2	168.3	41.4	0.00	2.89	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222211911
W004	3	160	10	2241.7	1.759	34.6154	80.6	168.3	40.7	0.00	2.83	0.007	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291999
W004	3	161	9	2501.5	1.660	34.6337	95.6	167.4	40.0	0.00	2.75	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	162	8	2751.0	1.603	34.6459	108.1	165.9	39.1	0.00	2.71	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	163	7	2998.9	1.548	34.6569	119.9	164.7	38.5	0.00	2.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229911919
W004	3	164	6	3252.3	1.492	34.6675	129.1	161.6	37.8	0.00	2.61	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	165	5	3487.2	1.462	34.6740	138.5	160.7	37.3	0.00	2.54	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991911
W004	3	166	4	3491.5	1.462	34.6745	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999991999
W004	3	167	3	3681.9	1.428	34.6807	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999991999
W004	3	168	2	3685.4	1.428	34.6805	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999991999
W004	3	169	1	3686.5	1.428	34.6809	-9.0	-9.0	-9.0	-9.00	-9.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22999999911999
W005	2	L55	USW	5.0	-9.000	32.2440	-9.0	5.6	3.2	0.11	0.65	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W005	3	170	23	10.3	10.405	32.2454	282.1	5.0	3.1	0.10	0.64	4.807	1.825	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	171	22	50.2	4.516	32.6058	306.8	17.5	15.1	0.73	1.41	5.792	2.481	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	172	21	99.5	4.360	33.2816	175.1	48.7	30.3	0.01	2.22	3.803	1.734	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	173	20	200.8	3.942	33.8502	56.3	82.1	42.1	0.01	2.96	1.769	0.815	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999

APPENDIX 3. STATION BOTTLE DATA (-.SEA) LEG 1 WOCE SECTION P15N

EXPOCODE 18DD9403/1 WHP-ID P15N CRUISE DATES 082994 TO 100594

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS (DBAR)	CTDTMP	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	DELC14 /MILLE	DELC13 /MILLE	O18/O16 /MILLE	TCARBN UMOL/KG	ALKALI UMOL/KG	QUALIT1
			********			********	********	********	********	********	********	********	********	********	********	********	********	********	
W005	3	174	19	301.0	3.852	33.9944	26.9	97.4	43.9	0.00	3.13	0.938	0.489	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	175	18	398.8	3.715	34.1057	21.4	109.0	44.3	0.00	3.13	0.479	0.259	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	176	17	398.4	3.715	34.1057	20.1	109.3	44.2	0.00	3.10	0.457	0.279	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	177	16	598.8	3.413	34.2380	17.1	124.0	44.1	0.00	3.11	0.168	0.148	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	178	15	799.7	3.078	34.3304	15.2	137.0	44.3	0.00	3.58	0.073	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222242299999
W005	3	179	14	999.4	2.746	34.4019	19.8	147.6	44.4	0.00	3.10	0.029	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	180	13	1249.7	2.438	34.4713	26.3	156.9	44.0	0.00	3.57	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222242299999
W005	3	181	12	1499.7	2.151	34.5317	40.1	162.3	43.4	0.00	3.03	0.006	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	182	11	1499.5	2.151	34.5304	41.1	163.5	43.1	0.00	3.02	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	183	10	1750.2	1.967	34.5710	54.6	167.3	42.4	0.00	2.96	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	184	9	1998.5	1.816	34.6012	71.6	168.7	41.3	0.00	2.88	0.034	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299999
W005	3	185	8	2249.0	1.715	34.6218	86.9	168.7	40.6	0.00	2.83	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	186	7	2499.1	1.641	34.6367	99.5	168.0	39.5	0.00	2.76	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	187	6	2748.3	1.584	34.6484	109.8	167.0	38.8	0.00	2.71	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	188	5	2999.7	1.522	34.6599	123.1	163.2	38.0	0.00	2.64	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	189	4	3250.2	1.484	34.6683	131.0	161.1	37.4	0.00	2.60	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	190	3	3500.1	1.460	34.6743	139.2	160.4	36.9	0.00	2.56	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	191	2	3748.0	1.396	34.6851	154.2	154.7	36.1	0.00	2.49	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W005	3	192	1	3986.4	1.397	34.6882	158.6	153.2	35.7	0.00	2.47	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999999
W006	2	L56	USW	5.0	-9.000	32.1860	-9.0	5.9	3.7	0.13	0.59	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999911
W006	3	193	23	1.6	9.981	32.2187	-9.0	5.9	3.6	0.09	0.56	5.193	2.060	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	194	22	46.8	4.991	32.5551	-9.0	14.4	12.8	0.64	1.34	5.901	2.664	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	195	21	102.4	4.388	33.3496	-9.0	51.7	31.2	0.00	2.32	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	196	20	201.0	3.897	33.8870	-9.0	86.5	42.3	0.00	2.99	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	197	19	239.8	3.829	33.9410	-9.0	92.9	42.8	0.00	3.05	1.542	0.681	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	198	18	265.5	3.825	33.9853	-9.0	97.0	43.8	0.00	3.15	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	199	17	400.2	3.689	34.1017	-9.0	109.9	43.5	0.02	3.12	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	200	16	604.0	3.381	34.2322	-9.0	125.1	44.0	0.02	3.16	0.138	0.121	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	201	15	998.9	2.705	34.4099	-9.0	148.2	43.7	0.00	3.14	0.012	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	202	14	1249.0	2.358	34.4853	-9.0	158.9	43.5	0.00	3.08	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	203	13	1249.3	2.357	34.4812	-9.0	157.4	43.0	0.01	3.09	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	204	12	1503.3	2.090	34.5385	-9.0	164.9	42.8	0.01	3.10	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922222299999
W006	3	205	11	1749.1	1.954	34.4802	-9.0	160.7	40.5	0.00	2.97	0.013	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	34922222299999
W006	3	206	10	2000.4	1.831	34.5918	-9.0	167.2	41.4	0.06	3.00	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	207	9	2253.2	1.743	34.6097	-9.0	166.0	39.5	0.00	2.88	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22923229999999
W006	3	208	8	2502.5	1.667	34.6285	-9.0	165.2	39.9	0.03	2.87	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	209	7	2748.6	1.595	34.6442	-9.0	163.1	38.4	0.02	2.81	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	210	6	2995.6	1.535	34.6570	-9.0	160.9	38.2	0.00	2.77	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	211	5	2999.4	1.533	34.6584	-9.0	161.7	38.0	0.00	2.70	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	212	4	3499.4	1.461	34.6723	-9.0	158.9	36.5	0.00	2.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	213	3	4007.4	1.447	34.6733	-9.0	154.1	36.2	0.00	2.67	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	214	2	4005.3	1.447	34.6817	-9.0	154.5	36.2	0.00	2.66	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W006	3	215	1	4147.4	1.448	34.6826	-9.0	153.2	35.1	0.00	2.62	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W007	1	L57	USW	5.0	-9.000	32.2910	-9.0	4.0	4.3	0.15	0.66	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W009	1	L58	USW	5.0	-9.000	32.2740	-9.0	5.5	4.6	0.20	0.70	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W010	3	L59	USW	5.0	-9.000	32.2750	-9.0	6.6	5.3	0.17	0.78	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999911
W011	1	L60	USW	5.0	-9.000	32.2670	-9.0	8.2	6.1	0.10	0.78	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229999999
W011	3	216	23	9.8	9.620	33.5831	103.3	88.2	35.1	0.03	2.74	0.034	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	44444444491144
W011	3	217	22	49.1	4.683	32.8604	318.0	33.4	19.8	0.18	1.93	6.140	2.494	-9.0	-9.0	-9.00	-9.0	-9.0	22222242291111
W011	3	218	21	104.0	3.817	33.0420	288.9	39.5	24.0	0.02	2.06	5.689	2.470	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	219	20	200.0	3.480	33.7701	116.3	78.4	37.2	0.00	2.86	2.689	1.290	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	220	19	298.4	3.503	33.9123	70.6	93.5	40.6	0.00	3.04	1.854	0.830	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	221	18	402.9	3.483	34.0407	43.8	107.1	42.1	0.03	3.15	0.949	0.407	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	222	17	601.8	3.313	34.2112	25.4	123.2	43.2	0.00	3.21	0.365	0.139	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111

APPENDIX 3. STATION BOTTLE DATA (-.SEA) LEG 1 WOCE SECTION P15N

EXPOCODE 18DD9403/1 WHP-ID P15N CRUISE DATES 082994 TO 100594

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS (DBAR)	CTDTMP	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	DELC14 /MILLE	DELC13 /MILLE	O18/O16 /MILLE	TCARBN UMOL/KG	ALKALI UMOL/KG	QUALIT1
			********			********	********	********	********	********	********	********	********	********	********	********	********	********	*
W011	3	223	16	803.2	3.039	34.3121	25.7	135.7	43.3	0.00	3.21	0.175	0.139	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	224	15	803.0	3.038	34.3122	24.9	134.7	43.4	0.00	3.19	0.167	0.155	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291119
W011	3	225	14	1005.6	2.736	-9.0000	25.2	150.1	44.6	0.00	3.29	0.105	0.109	-9.0	-9.0	-9.00	-9.0	-9.0	29222222291111
W011	3	226	13	1206.1	2.490	34.4528	29.8	152.9	43.2	0.00	3.17	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291119
W011	3	227	12	1496.9	2.227	34.5153	37.5	160.9	42.8	0.00	3.18	0.174	0.306	-9.0	-9.0	-9.00	-9.0	-9.0	22222223391111
W011	3	228	11	1754.6	2.050	34.5560	49.9	163.4	42.0	0.00	3.06	0.050	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	229	10	1997.0	1.909	34.5861	63.0	164.7	41.5	0.00	3.00	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222291111
W011	3	230	9	2252.6	1.785	34.6126	78.3	165.4	40.8	0.00	2.92	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	231	8	2500.1	1.690	34.6309	91.7	165.4	39.9	0.00	2.87	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	232	7	2752.5	1.621	34.6443	105.7	163.8	39.1	0.00	2.78	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	233	6	3000.4	1.565	34.6549	114.9	161.8	38.4	0.00	2.71	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	234	5	3252.9	1.528	34.6619	124.2	159.9	37.9	0.00	2.69	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	235	4	3489.8	1.500	34.6697	132.0	159.4	37.2	0.00	2.63	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	236	3	3996.1	1.474	34.6787	143.0	159.4	36.9	0.00	2.55	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	237	2	4497.3	1.494	34.6847	150.0	158.3	36.3	0.00	2.51	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991111
W011	3	238	1	5003.6	1.530	34.6877	159.2	159.0	36.0	0.00	2.49	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229991119
W012	1	L61	USW	5.0	-9.000	32.3950	-9.0	12.2	9.2	0.15	0.94	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22922229991111
W012	3	239	23	9.4	9.140	32.4228	289.3	13.4	9.9	0.15	1.04	4.927	1.921	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	240	22	49.8	4.706	32.8587	317.4	34.5	19.9	0.16	1.76	6.266	2.487	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299911
W012	3	241	21	99.6	3.671	33.1570	259.2	46.3	26.8	0.00	2.03	5.143	2.257	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	242	20	200.9	3.387	33.7930	101.9	83.9	38.7	0.00	2.76	2.590	1.122	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	243	19	295.1	3.384	33.9017	64.6	98.1	41.8	0.00	3.00	1.796	0.845	-9.0	-9.0	-9.00	-9.0	-9.0	22222222299919
W012	3	244	18	400.3	3.487	34.0396	45.3	108.0	42.5	0.00	3.04	1.023	0.502	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	245	17	600.8	3.311	34.2303	26.9	125.8	43.0	0.00	3.12	0.364	0.218	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	246	16	801.1	2.985	34.3269	23.6	148.4	43.3	0.00	3.12	0.159	0.139	-9.0	-9.0	-9.00	-9.0	-9.0	22242222219911
W012	3	247	15	1005.8	2.713	34.4021	26.4	147.9	43.5	0.00	3.13	0.077	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	248	14	1252.9	2.460	34.4619	31.3	155.4	43.4	0.00	3.13	0.044	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	249	13	1500.8	2.231	34.5153	40.7	163.1	43.5	0.00	3.17	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222242299911
W012	3	250	12	1749.0	2.052	34.5571	51.4	165.1	42.5	0.00	3.04	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	251	11	1999.7	1.909	34.5863	71.5	167.9	41.8	0.00	2.93	0.000	0.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222222219911
W012	3	252	10	2248.2	1.788	34.6139	79.4	168.3	41.1	0.00	2.85	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	253	9	2501.5	1.690	34.6319	95.7	166.7	40.1	0.00	2.77	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	254	8	2749.4	1.620	34.6457	104.1	165.5	39.5	0.00	2.72	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	255	7	3000.2	1.563	34.6567	113.6	163.4	38.7	0.00	2.66	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229919991
W012	3	256	6	3000.1	1.563	34.6564	115.7	163.6	38.7	0.00	2.65	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	257	5	3499.7	1.498	34.6703	132.7	160.8	37.7	0.00	2.56	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	258	4	4002.1	1.475	34.6797	143.4	159.2	37.1	0.00	2.49	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	259	3	4501.4	1.493	34.6857	149.0	159.9	36.5	0.00	2.45	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999911
W012	3	260	2	4752.3	1.511	34.6871	151.8	159.6	36.6	0.00	2.48	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229999919
W012	3	261	1	5102.5	1.533	34.6884	155.2	157.1	36.4	0.00	2.43	-9.000	-9.000	-9.0	-9.0	-9.00	-9.0	-9.0	22222229919911

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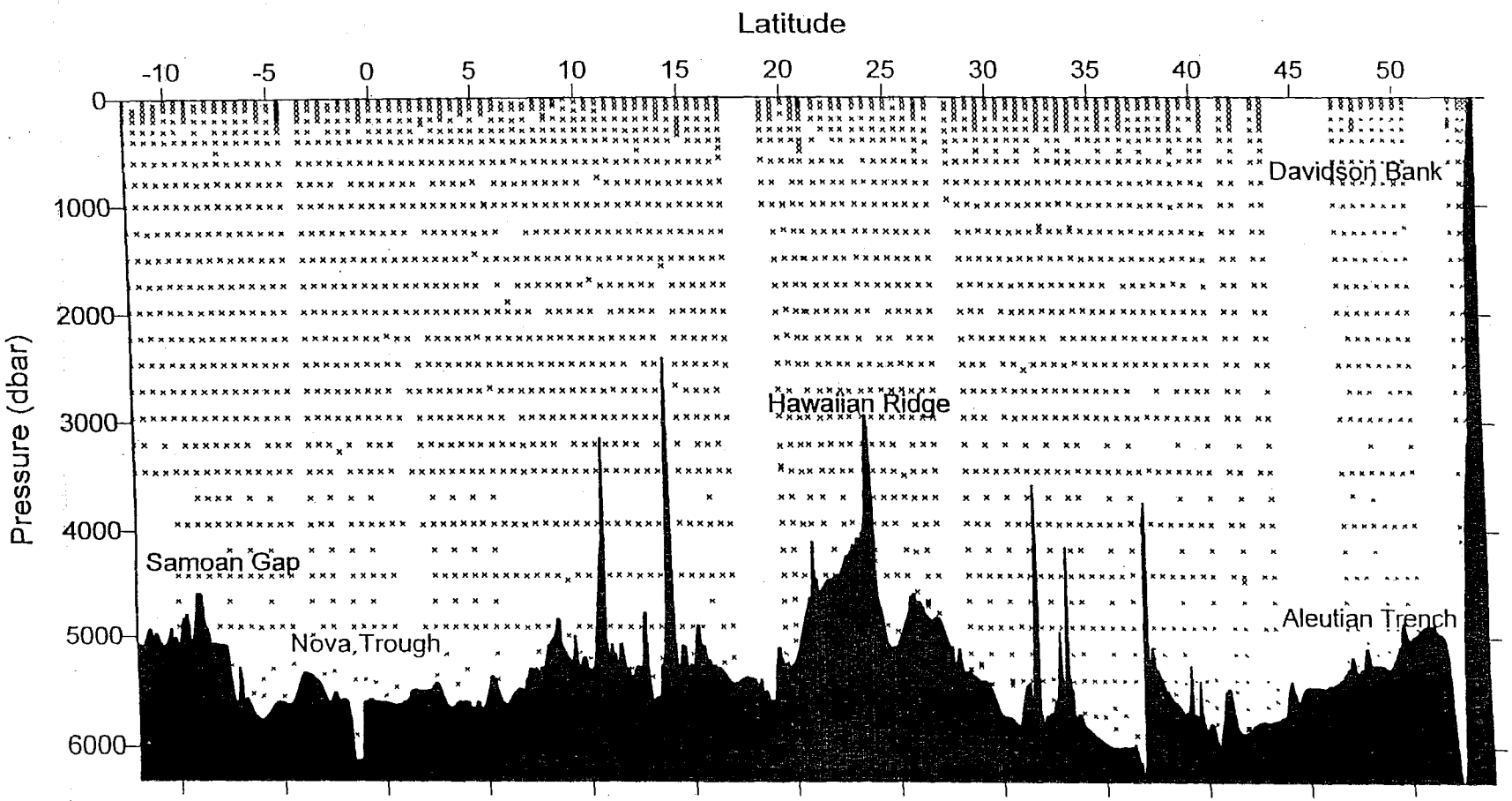
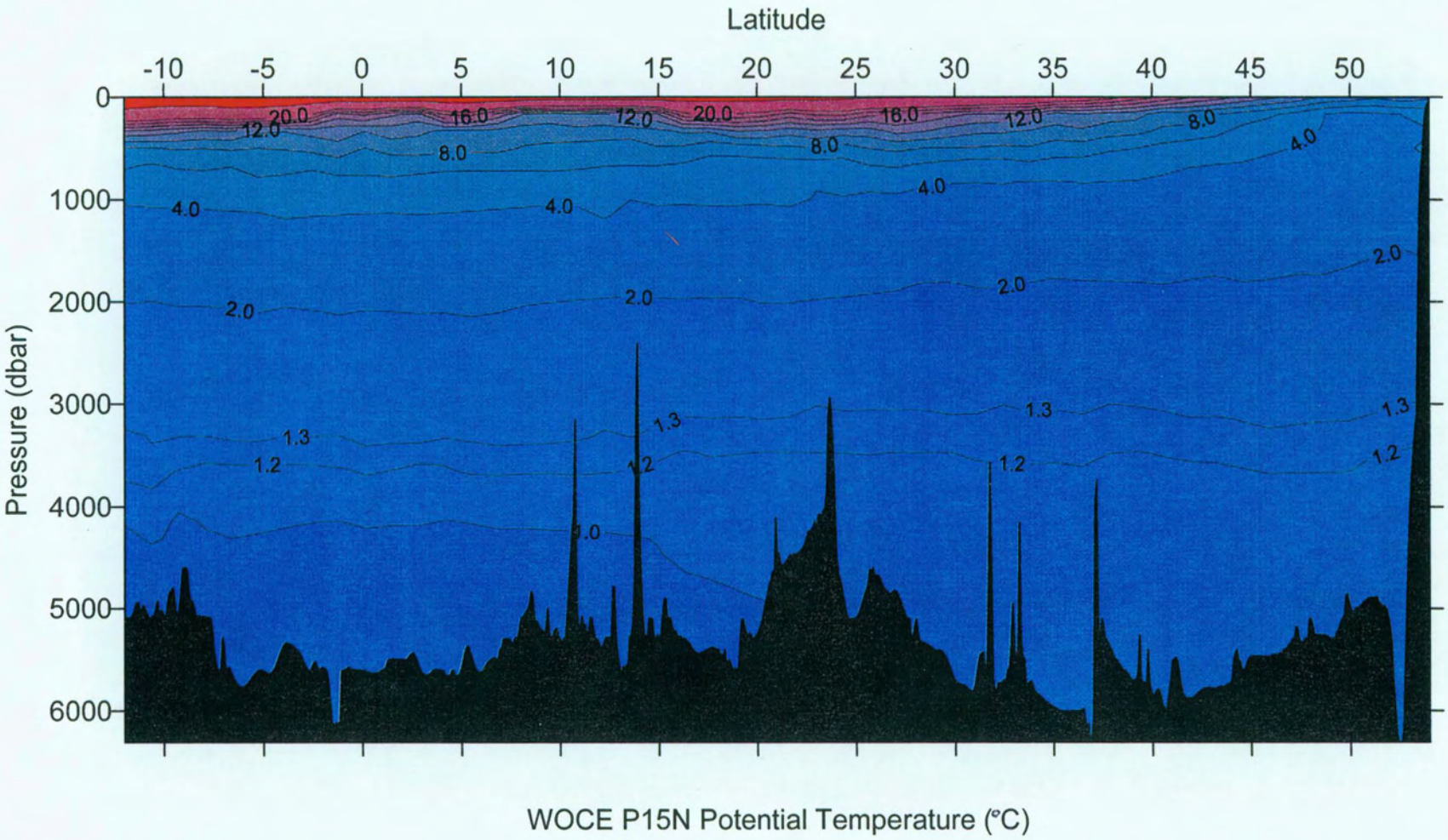
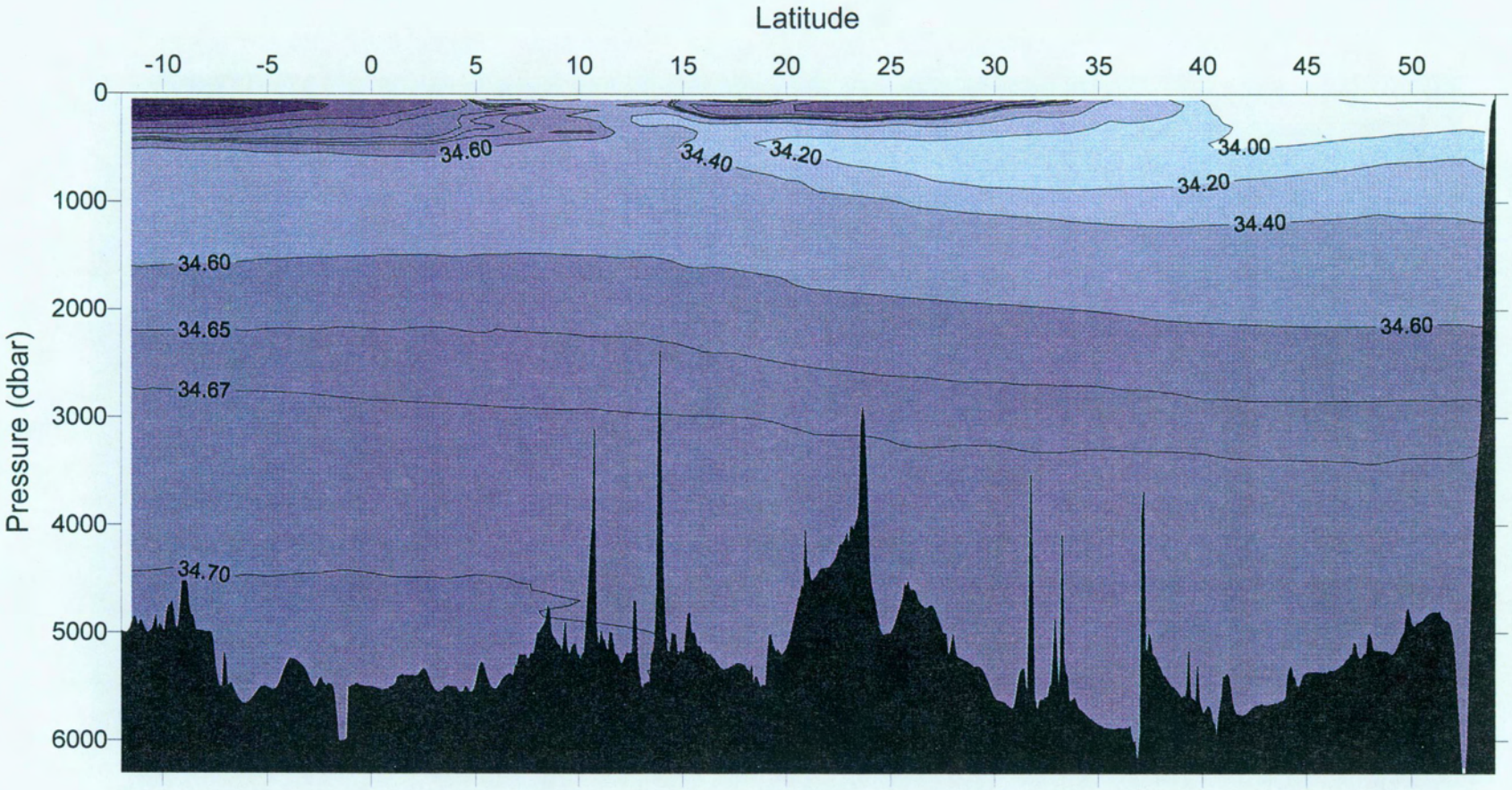
APPENDIX 4. HYDROGRAPHIC SECTION PLOTS P15N

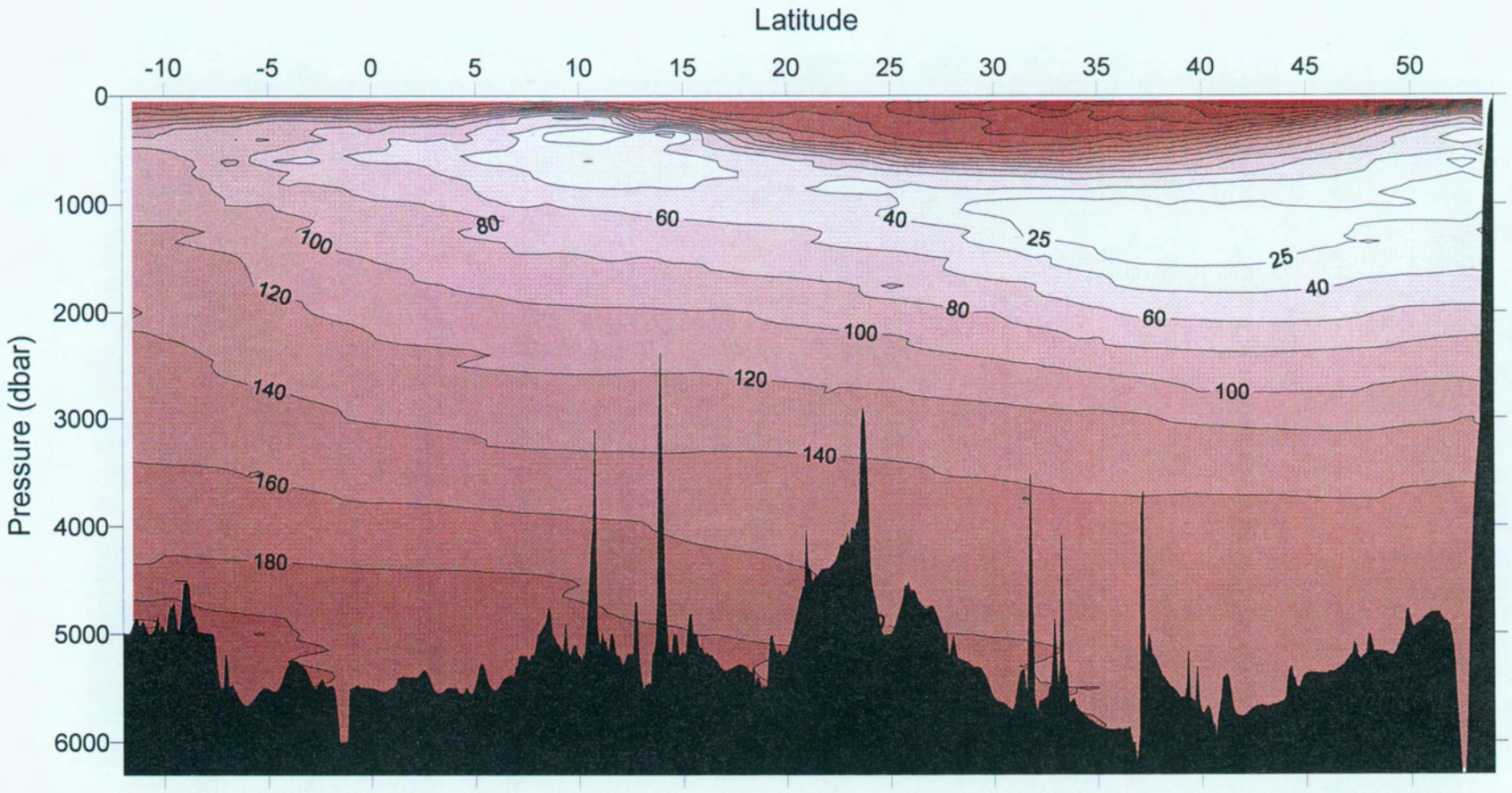


WOCE P15N SEPTEMBER - NOVEMBER 1994
BOTTOM TOPOGRAPHY AND LOCATION OF SAMPLE BOTTLES

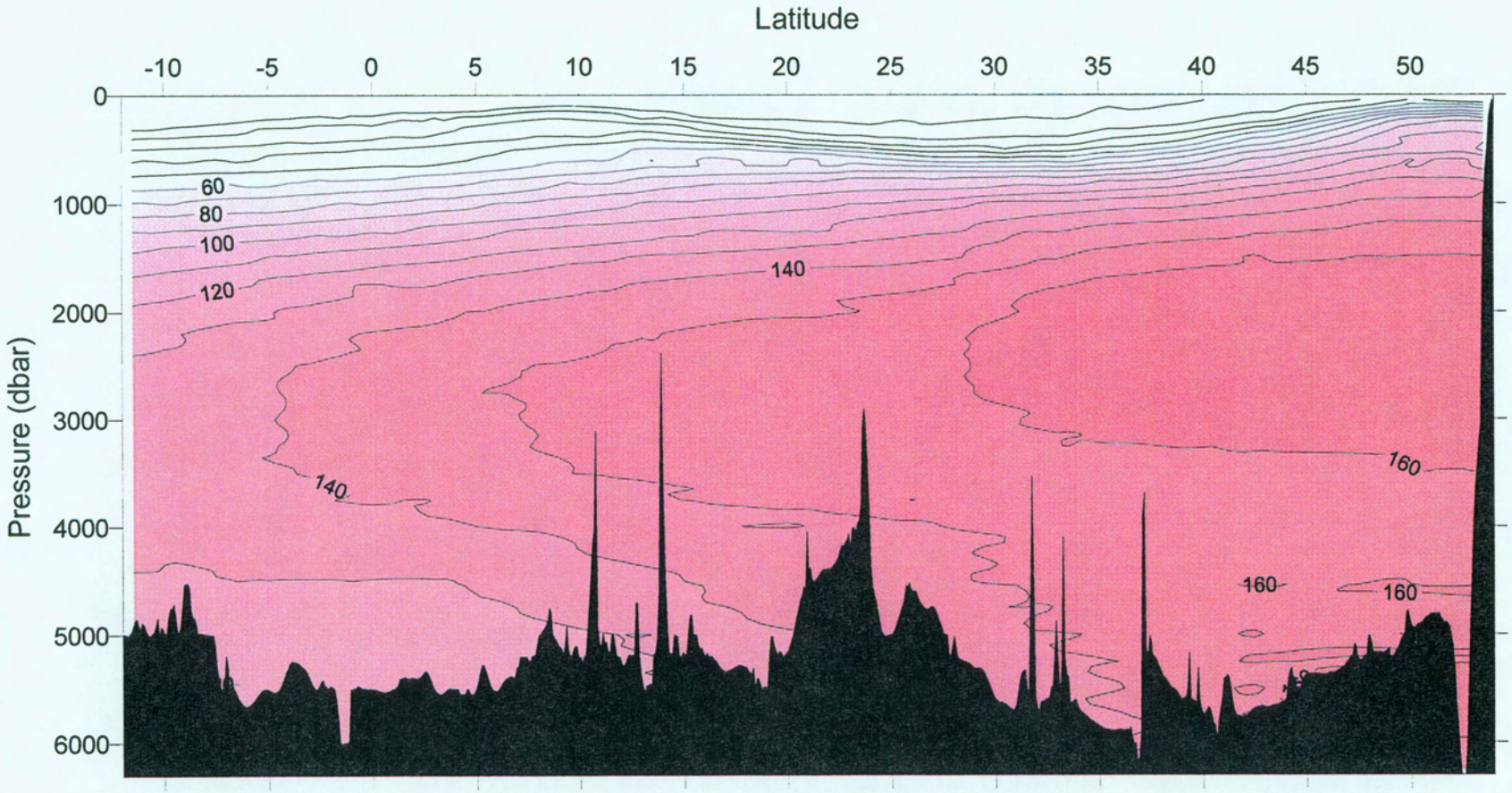

Latitude
-10
-5
0
5
10
15
20
25
30
35
40
45
50
Pressure (dbar)
0
1000
2000
3000
4000
5000
6000
20.0
16.0
12.0
8.0
4.0
2.0
1.3
1.2
1.0
WOCE P15N Potential Temperature (°C)



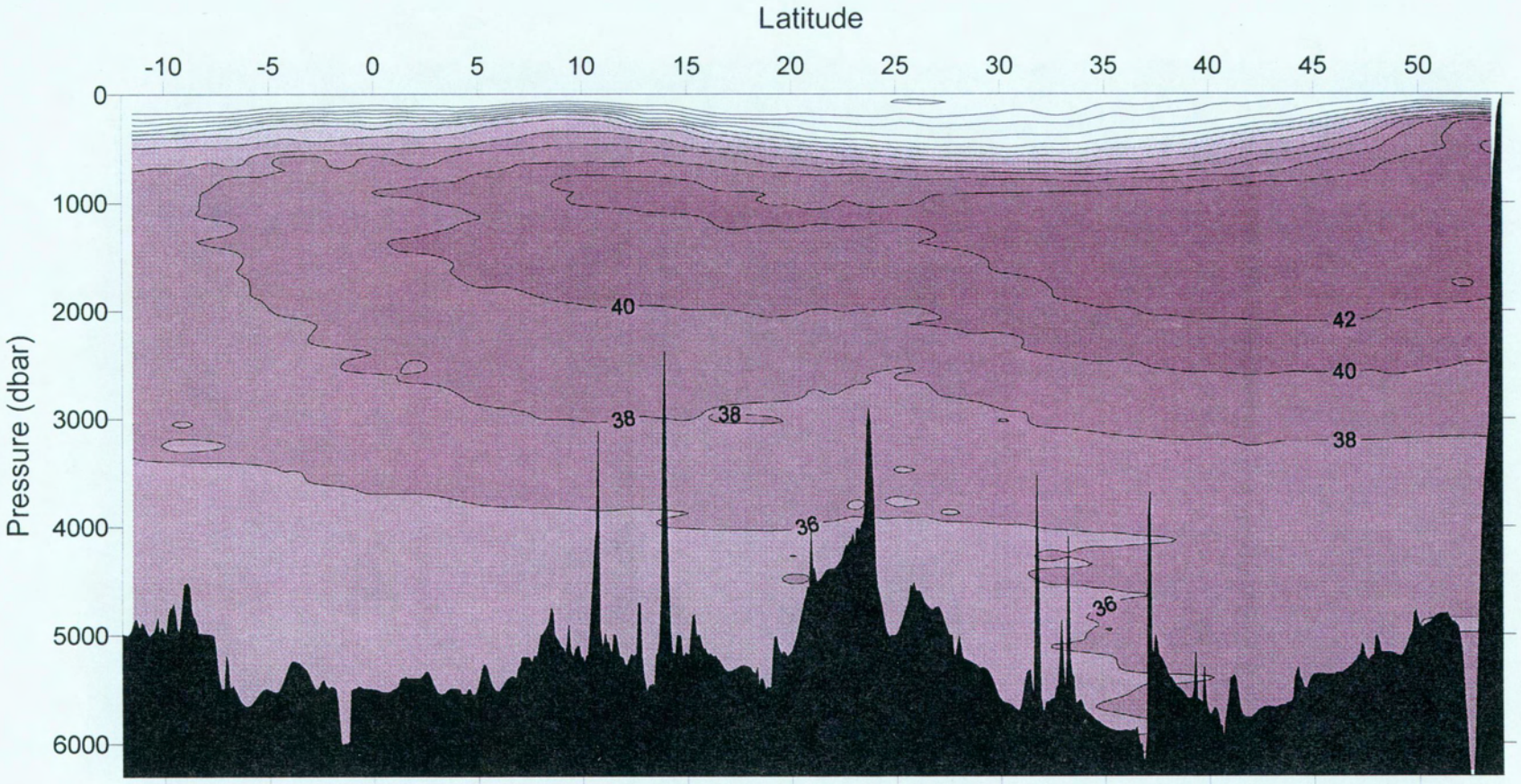
WOCE P15N Salinity (PSS-78)



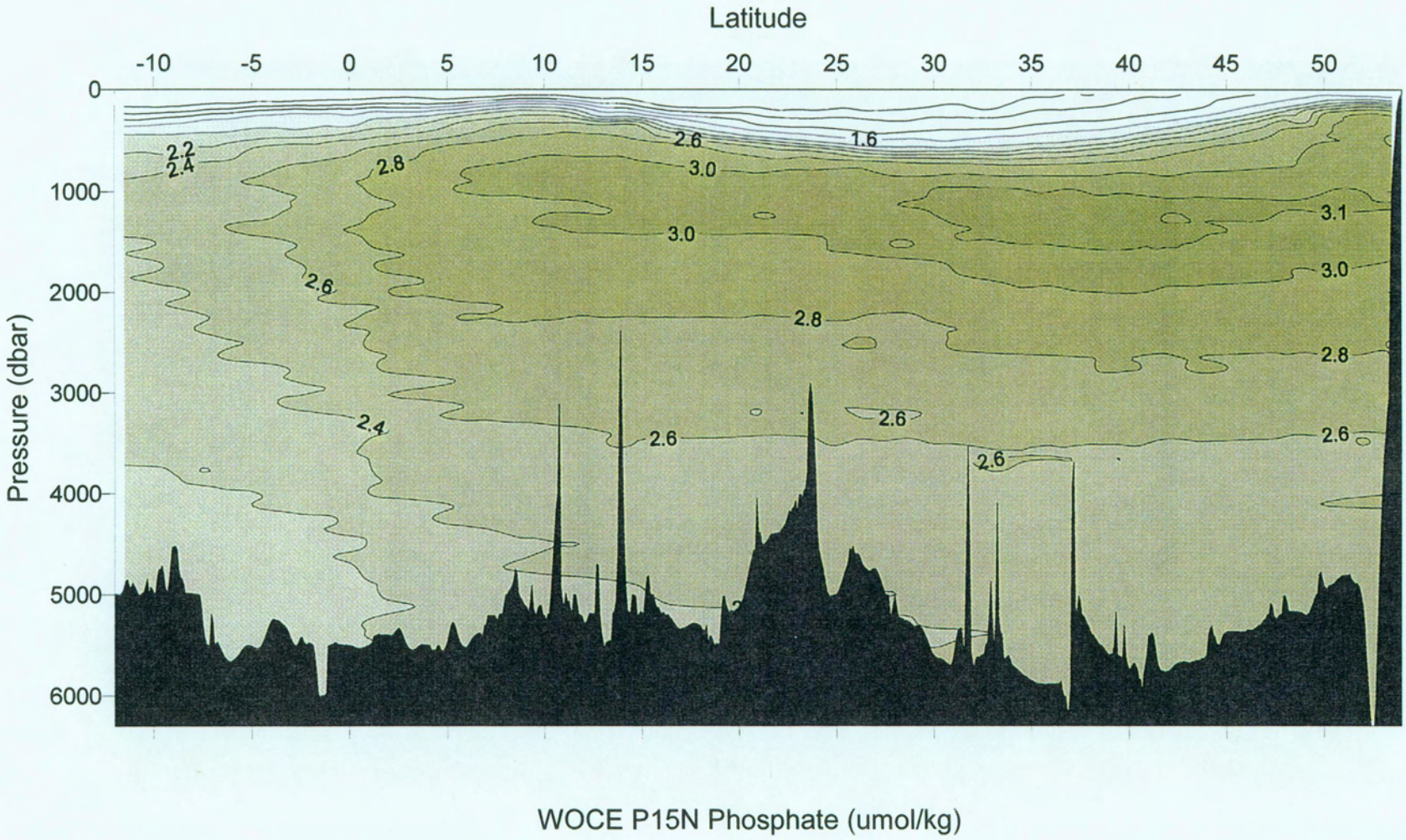
WOCE P15N Oxygen (umol/kg)

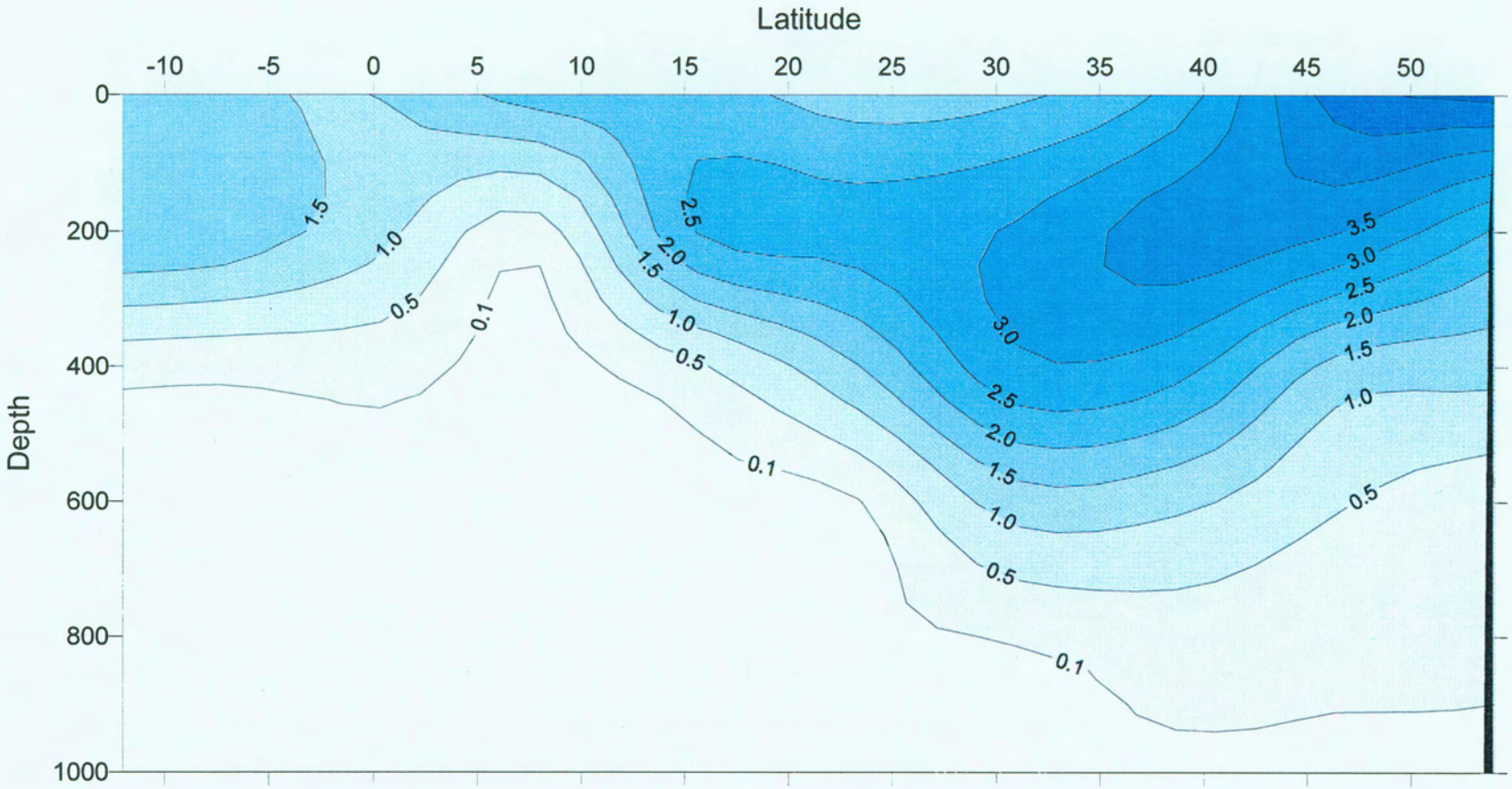


WOCE P15N Silicate (umol/kg)

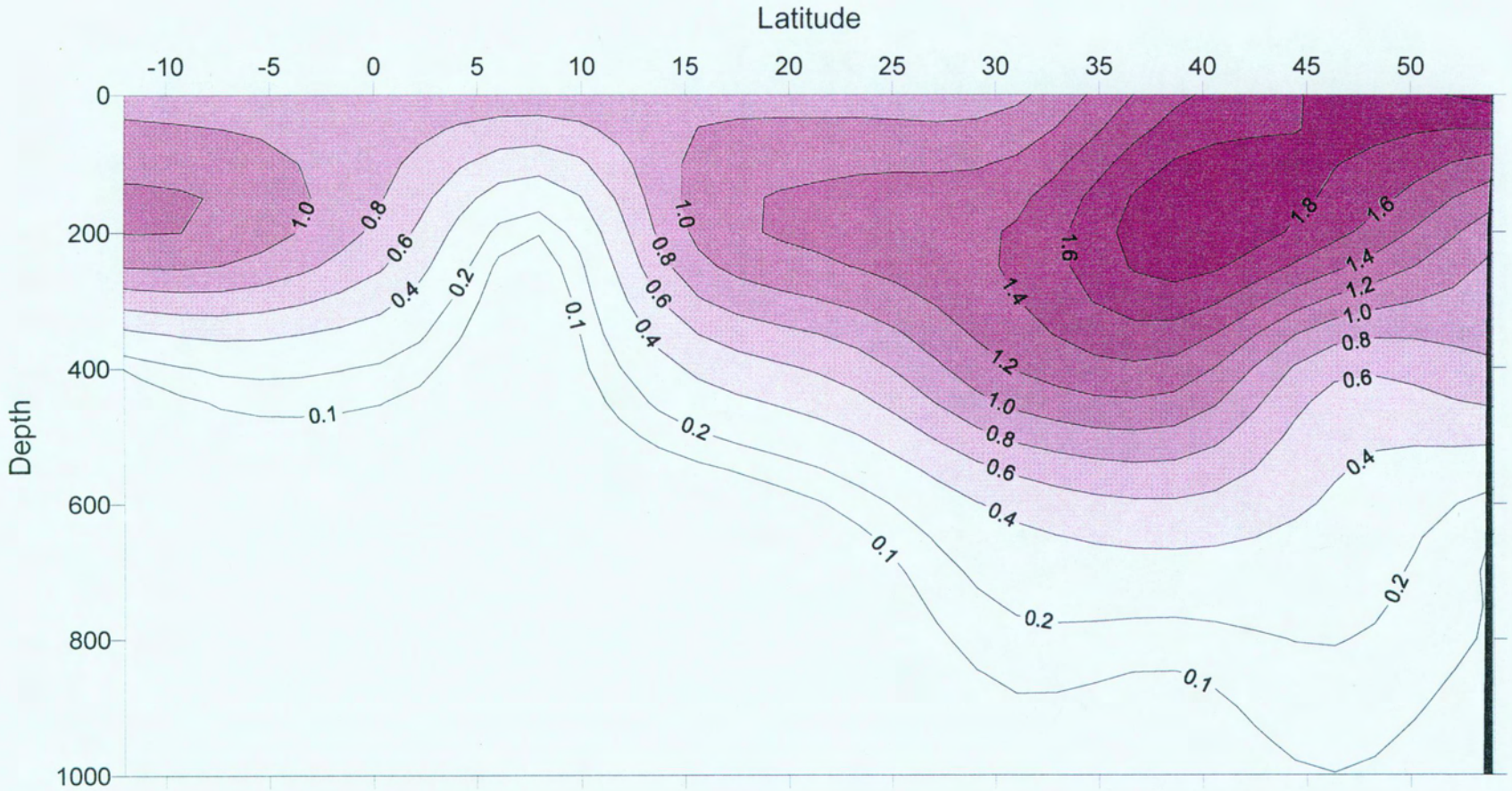


WOCE P15N Nitrate (umol/kg)


Latitude
-10
-5
0
5
10
15
20
25
30
35
40
45
50
Pressure (dbar)
0
1000
2000
3000
4000
5000
6000
2.2
2.4
2.8
2.6
3.0
1.6
3.1
2.4
2.6
2.8
3.0
2.8
2.6
2.6
2.6
2.6
WOCE P15N Phosphate (umol/kg)

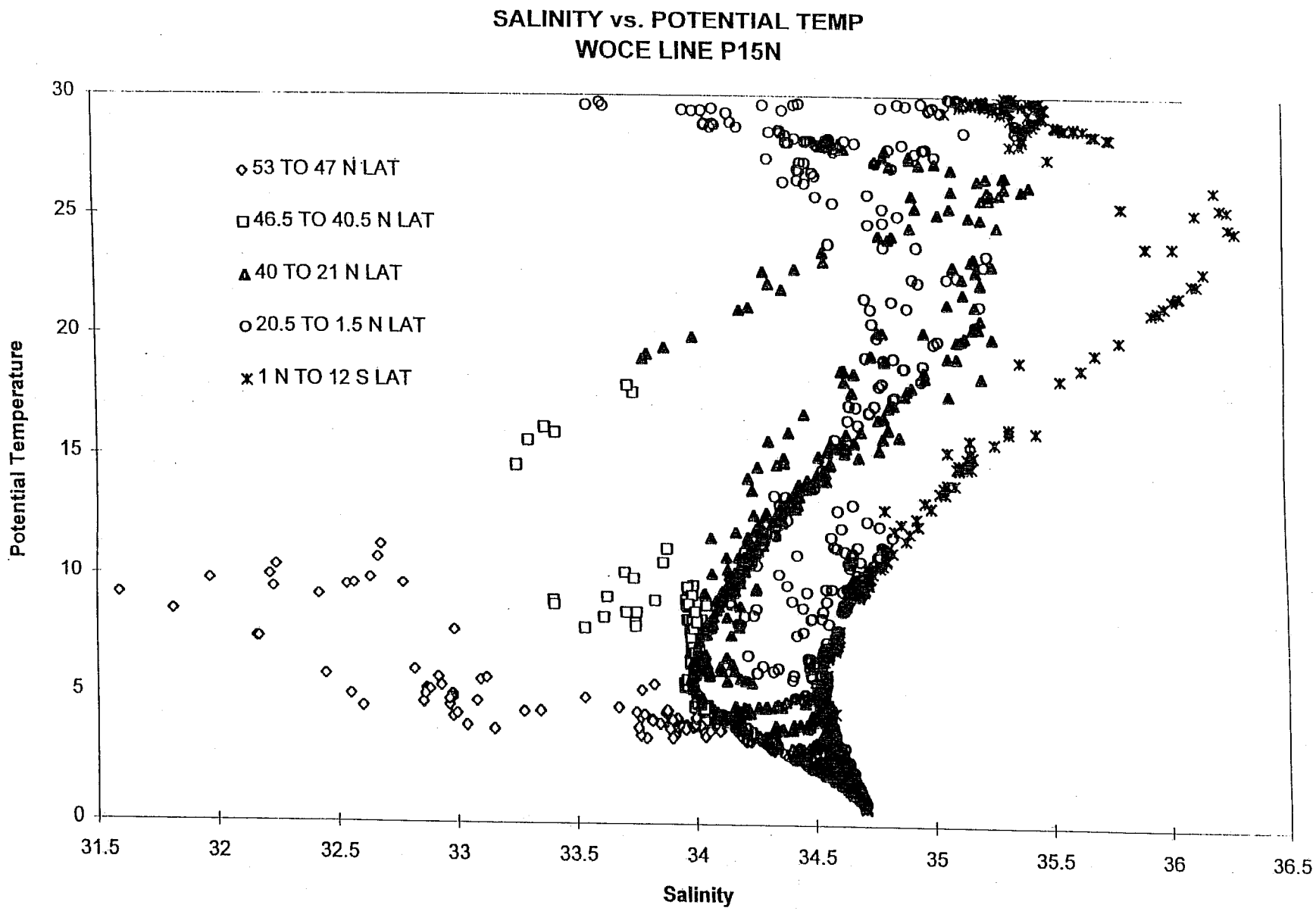


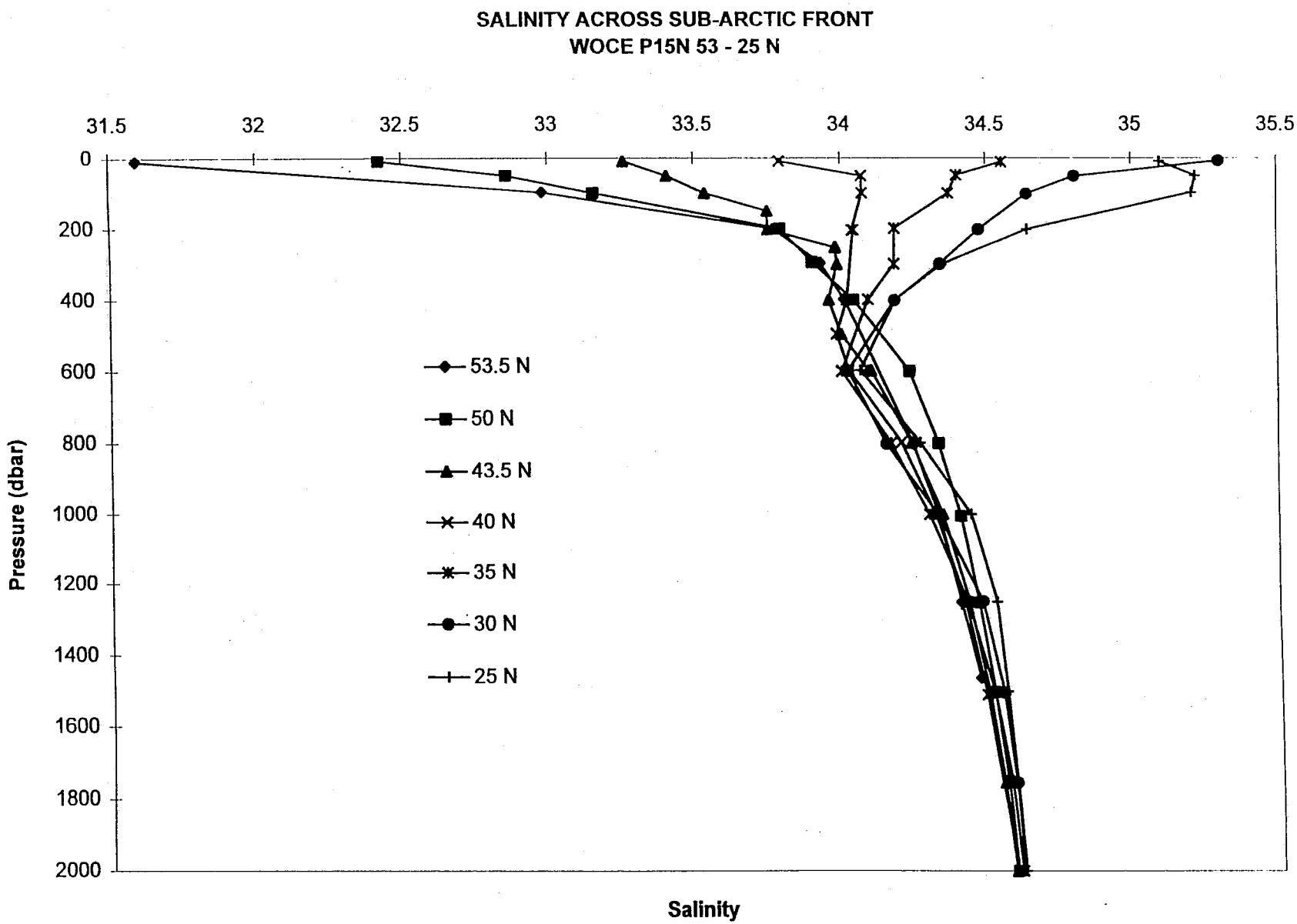
WOCE P15N CFC-11 (pM/kg)

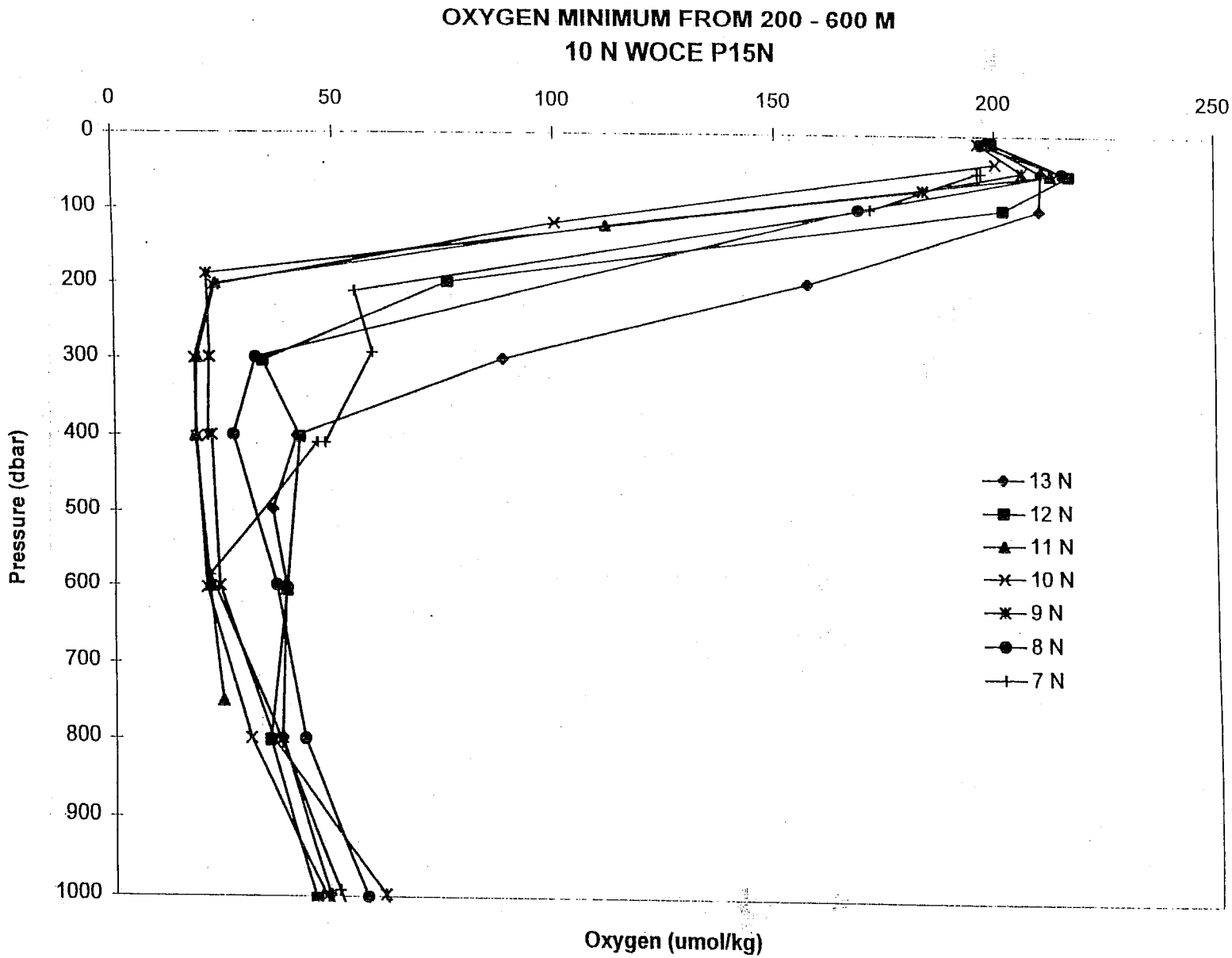


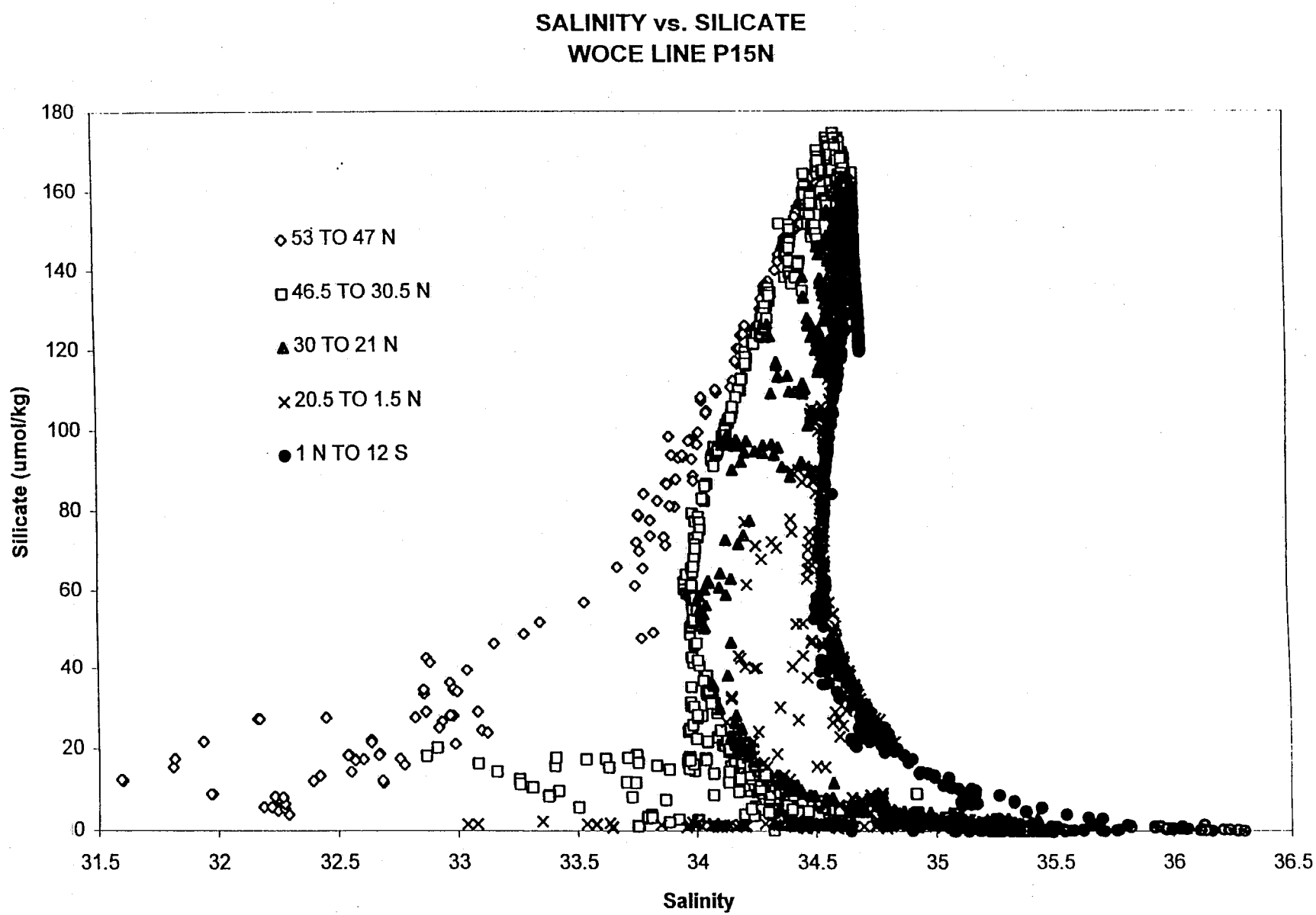
WOCE P15N CFC-12 (pM/kg)

APPENDIX 5. HYDROGRAPHIC FEATURES OF SECTION P15N


SALINITY vs. POTENTIAL TEMP
WOCE LINE P15N
53 TO 47 N LAT
46.5 TO 40.5 N LAT
40 TO 21 N LAT
20.5 TO 1.5 N LAT
1 N TO 12 S LAT
Potential Temperature
Salinity
30
25
20
15
10
5
0
31.5
32
32.5
33
33.5
34
34.5
35
35.5
36
36.5


SALINITY ACROSS SUB-ARCTIC FRONT
WOCE P15N 53 - 25 N
31.5
32
32.5
33
33.5
34
34.5
35
35.5
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Pressure (dbar)
Salinity
53.5 N
50 N
43.5 N
40 N
35 N
30 N
25 N


OXYGEN MINIMUM FROM 200 - 600 M
10 N WOCE P15N
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000
Pressure (dbar)
Oxygen (umol/kg)
13 N
12 N
11 N
10 N
9 N
8 N
7 N


SALINITY vs. SILICATE
WOCE LINE P15N
53 TO 47 N
46.5 TO 30.5 N
30 TO 21 N
20.5 TO 1.5 N
1 N TO 12 S
Silicate (umol/kg)
Salinity
180
160
140
120
100
80
60
40
20
0
31.5
32
32.5
33
33.5
34
34.5
35
35.5
36
36.5