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WOCE SECTION P1W: HYDROGRAPHIC SECTIONS THROUGH THE SEA OF OKHOTSK

by

F. Whitney and M. Quenneville

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

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ABSTRACT

Whitney, F., and M. Quenneville. 1997. WOCE Section P1W: Hydrographic sections through the Sea of Okhotsk. Can. Tech. Rep. Hydrogr. Ocean Sci. 183: v + 43 p.

From August 30 to September 21, 1993, Russian and Canadian scientists aboard the research vessel, *Akademician Alexander Nesmeyanov* completed hydrographic measurements in the Sea of Okhotsk as part of the Word Ocean Circulation Experiment, WOCE, along section P1W. The section sampled ocean properties through the deep basins in the Sea of Okhotsk, from near Bussol' Strait to the north-western shelf near the town of Okhotsk. A total of 38 CTD and hydrographic stations were occupied, extending from the surface to 3400 m. Temperature, salinity, oxygen, nutrient, pH, total CO_2, alkalinity, and CFC data were collected. This report includes details of the cruise report submitted to the WOCE Hydrographic Programme Office (WHPO), the station summary file and water sample data file as submitted to WHPO, vertical section plots, and detailed plots of features along the P1W section.

Keywords: alkalinity, chlorofluorocarbon, hydrography, nitrate, pH, phosphate, oceanography, oxygen, salinity, Sea of Okhotsk, silicate, temperature, total carbon dioxide, World Ocean Circulation Experiment.

RÉSUMÉ

Whitney, F., and M. Quenneville. 1997. WOCE Section P1W: Hydrographic sections through the Sea of Okhotsk. Can. Tech. Rep. Hydrogr. Ocean Sci. 183: v + 43 p.

Du 30 août au 21 septembre, 1994, des chercheurs russes et canadiens à bord du navire de recherche *Akademician Alexander Nesmeyanov* ont complété des mesures hydrographiques le long de la section P1W dans la mer d'Okhotsk dans le cadre du World Ocean Circulation Experiemnt (WOCE). Des échantillons ont été pris à travers des bassins profonds dans la mer d'Okhotsk près du détroit Bussel jusqu'au plateau au nord-ouest, près de la ville d'Okhotsk. Des échantillons hydrographiques et de CTD ont été pris à un total de 38 stations, de la surface jusqu'à une profondeur maximum de 3400 m. Des données de température, de salinité, d'oxygène, d'éléments nutritifs, de pH, de CO_2 total, d'alcalinité et de CFC ont été prélevées. Ce rapport inclut des détails du rapport de l'expédition soumis au WHPO (WOCE Hydrographic Programme Office), les dossiers de sommaires des stations et les dossiers des données d'échantillon d'eau soumis au WHPO, des profils verticaux et des diagrammes détaillés des caractéristiques le long de la section P1W.

Mots-clés: alcalinité, chlorofluorocarbon, CO_2 total, hydrographie, mer d'Okhotsk, nitrate, océanographie, oxygène, pH, phosphate, salinité, silicate, température, World Ocean Circulation Experiment.

WOCE P1W:
HYDROGRAPHIC SECTIONS THROUGH THE SEA OF OKHOTSK

1.0. INTRODUCTION

1.1 OBJECTIVES

The World Ocean Circulation Experiment (WOCE) is the most complex and far reaching ocean survey ever undertaken. Virtually all nations with oceanographic capabilities have contributed to the collection of high quality data that will be used to model the behaviour of our oceans through a period when human fossil fuel use threatens the global climate. The goal of WOCE was to complete a survey of oceans over a short period (1990 and 1997), and this target has been largely reached. Details of WOCE data collection activities can be obtained from their web site:

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

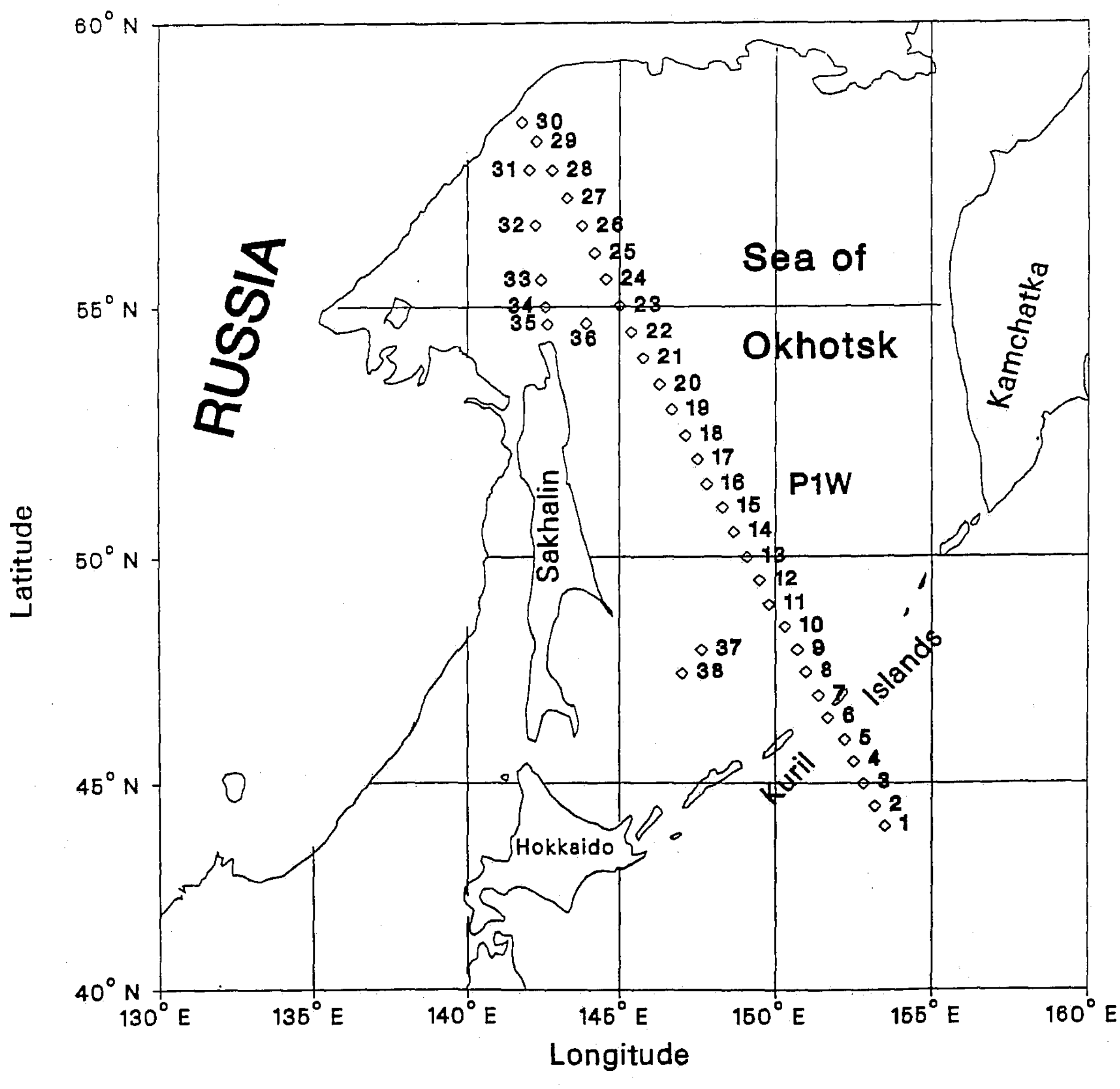
In 1991, we completely changed our deep ocean sampling procedures at the Institute of Ocean Sciences (IOS), in preparation for our major commitment to a one time WOCE survey in the North Pacific Ocean. By 1993, our new instrumentation had been tested on a number of surveys, so when Russia requested that we assist in sampling an important WOCE section through the Sea of Okhotsk, we eagerly joined them for a 3 week cruise on the *Akademician Alexander Nesmeyanov*. Participants on this trip included scientists from the Pacific Oceanological Institute in Vladivostok (chief scientist, A. Bychkov), Woods Hole Oceanographic Institution (lead by L. Keigwin), University of British Columbia (supported by P. LeBlond) and IOS (principal investigators, C.S. Wong and H. Freeland). Between September 1 and 21, we successfully competed this WOCE section, coring up a mid Okhotsk rise, and an additional short section in the northern shelf area of the sea. This report summarizes our results from water sampling along the WOCE section, and documents our submissions to the WOCE Hydrographic Programme Office.

1.2. CRUISE NARRATIVE

1.2.1. <u>Cruise Track</u>

The vessel, the *Akademician Alexander Nesmeyanov* sailed from Pacific Oceanological Institute, Vladivostok, Russia, to commence WOCE cruise 90BM9316/1 at the beginning of Line P1W near Bussol' Strait in the Kuril Islands. Hydrographic and CTD samples were taken every 30 nm along line P1W from this point into the Sea of Okhotsk, ending near the town of Ul'ya in the northwestern corner of the sea (Fig. 1), comprising the first 30 sampling stations of the cruise. Topographic features encompassed by the line included the Kuril Trench, and Bussol' Strait, where water exchange can occur between the north Pacific Ocean and the Sea of Okhotsk; the Kuril and Deryugin Basins in the Sea of Okhotsk, and the northwestern shelf of

Figure 1. Locations of sampling stations



the sea. Subsequent samples were taken along a line from near Ul'ya to the northern tip of Ostrov Sakhalin (Stations 31-35), and then in the Sea of Okhotsk (station 36) and Kuril Basin (Stations 37 and 38).

1.2.2. Sampling Accomplished

Using a Guildline 8737 CTD and 24 bottle General Oceanics Rosette, profiles as deep as 3400 m were taken every 30' latitude from 44° N to 58.5° N. This depth permitted sampling to the bottom in the Sea of Okhotsk while restricting loads placed on winches that were too light for deep ocean work. Onboard analyses included salinity, oxygen, nutrients, CFCs, alkalinity and pH. Additional samples were stored for TCO_2, ^{13}C, ^{14}C, tritium, ^{18}O and alkalinity.

In addition to the WOCE program, Lloyd Keigwin (Woods Hole Oceanographic Institution) and Sergei Gorbarenko (Pacific Oceanological Institute) took gravity and box cores between 3200 and 1000 m up the side of Akademician Nauk Rise in the center of the Sea of Okhotsk.

Our original cruise plan called for several days of coring up the slope of Nauk Rise in the Sea of Okhotsk, followed by a non-stop hydrographic section from south to north through Bussol' Strait and the two major basins of the sea. However, delays caused by shipping and clearing customs caused us to cut travel time by mixing hydrographic and core sampling. This permitted both programs to be completed.

Table 1. Table of Stations by Type

Sample Type	No. stations:	Max. depth:
Surface drifters	3	120 m
CTD/Rosette casts	38	3400 db

1.2.3. Drifters

Surface drifters were deployed at the first three stations, in the region of the Oyashio Current.

1.2.4. Cruise Personnel

The principal investigators and cruise participants are listed in Appendix 1.

1.2.5. Satellite Imaging

In conjunction with this cruise, satellite images of the Sea of Okhotsk were taken by TOPEX/POSEIDON and ERS-1 from June 17 to October 14, 1993. The images were processed at the Colorado Center for Astrodynamics Research in Boulder, Colorado.

2.0. HYDROGRAPHIC MEASUREMENT TECHNIQUES AND CALIBRATIONS

2.1. WATER SAMPLING

A General Oceanics Rosette holding 23 10 liter Niskin samplers was used for routine sampling. At each station, samples were drawn in the order: CFCs, oxygen, TCO_2, ^{13}C, ^{14}C, alkalinity (stored), tritium; then in any order: pH, alkalinity (analyzed onboard), nutrients, salinity and ^{18}O.

Water samples for CFC-11 and CFC-12 were drawn in 100 mL glass syringes. Oxygen was sampled through Tygon™ tubing into 125 mL flasks, with a flushing equal to at least the volume of the flask. Sample temperature was recorded before fixative reagents were added. Total CO_2, ^{13}C, ^{14}C, and total alkalinity samples were collected in the following manner: water was dispensed through Tygon™ tubing to the bottom of the sample bottles, the bottles were allowed to overflow at least 50% of their volume, then water was poured off to create an air space equal to about 1% of the bottle volume. At that time, 200 µL of saturated $HgCl_2$ solution per 250 mL of sample was added. Total CO_2 and ^{13}C samples were stored in 250 mL glass stoppered bottles. Stoppers were greased then taped in place. Total alkalinity samples were collected in 500 mL screw cap bottles. Caps were taped to prevent loosening. ^{14}Carbon samples were collected in 500 mL glass stoppered bottles that were stored with greased and taped stoppers. The samples for pH were collected according to the recommendations for oxygen (Culberson, 1991). Total alkalinity samples that were analyzed onboard were obtained as described by Dickson and Goyet (1991). Nutrient samples were collected in polystyrene tubes (16 x 125 mm). Salinity samples were collected in glass bottles. ^{18}Oxygen samples were collected in 30 or 60 mL polyethylene bottles.

2.2 CTD MEASUREMENTS

A Guildline Model 8737 CTD was used for sampling. Two pairs of reversing digital thermometers and a digital pressure sensor were mounted on Niskin water samplers to check CTD measurements. Precruise calibrations and bottle salinity samples allowed most of the CTD data to be processed. The parameters, CTDTMP and CTDSAL, in Appendix 3, are data sets extracted from uncorrected data files onboard ship, as the Niskin samplers were closed.

2.3. CFC ANALYSIS

Samples were analyzed by gas chromatography following the procedure of Bullister and Weiss (1987). Since the *Nesmeyanov* was badly contaminated with CFCs, all CFC equipment was kept on the aft deck of the vessel. A make-shift laboratory was set up in a shipping container on the aft deck; however, the air still held high concentrations of CFCs, especially CFC-12 (2 to 4 times clean air).
The carrier gas flow regulator leaked when the gas chromatograph was first started and eventually was replaced with an inferior regulator. As a result, gas flow was more variable and blanks were higher than normal.

2.4. OXYGEN

An automated titration system (Brinkman Dosimat), using the micro-Winkler method (Carpenter, 1965), detected the iodine end-point colorimetrically. Standards were prepared as outlined in WOCE Report 73/91.

All 23 Niskin bottles were tripped between 1500 and 1502.6 db on September 16 (station 37). O_2 results ranged between 54.7 and 56.6 µmol kg^{-1} with a standard deviation of 0.49 µmol kg^{-1} (n=23) and a pooled deviation of 0.64 µmol kg^{-1} (n=29).

2.5. TCO_2, ^{13}C, ^{14}C, TOTAL ALKALINITY (STORED)

All samples were stored at 4°C onboard ship and at IOS. Shipping from Vladivostok to IOS, which took about 50 d (Sept. 21 to Nov. 10), was at ambient temperatures.

2. 6. DETERMINATION OF pH

The direct potentiometry method was used for pH determination (Bates, 1973). Measurements were conducted immediately after sampling. The analysis was done at 25±0.1°C with glass (OP-0718) and saturated calomel (OP-0830P) electrodes produced by Radelkis Co. (Hungary). Tris-seawater (Millero, 1986) was used as a standard before and after each data set. The pH value of this buffer and the Nernst slope of the electrode pair were determined using Russian NBS commercial standards: 6.86 (phosphate buffer) and 4.01 (phthalate buffer).

2.7 TOTAL ALKALINITY (ONBOARD ANALYSIS)

Total alkalinity samples were either analyzed immediately after sampling or fixed with 50µl of a saturated solution of mercuric chloride and stored at 4°C.

Total alkalinity was determined by direct titration of seawater with 0.02 N HCl in an open 25 mL cell (Ivanenkov, 1978). The acid had been standardized daily with a solution of Na_2CO_3 dissolved in deionized CO_2 -free water. To remove any carbon dioxide during titration, the sample and standard were flushed into the cell together with a continuous stream of CO_2-free air. Titration was completed at 5.4 to 5.5 when the solution turned from green to light blue, using a mixture of methylene blue and methyl red as indicators. A motor-driven piston burette with ±.01 mL accuracy was used to add the acid. Concentrations obtained were converted from volumetric to weight units using the seawater density at the analytical temperature (Millero and Poisson, 1981).

2.8. NUTRIENTS

Samples were refrigerated for 0 to 20 h before being analyzed. NO_3+NO_2, NO_2, PO_4 and Si were analyzed using the procedure described by Koroleff and Grasshoff (1983) using a four channel Technicon AutoAnalyzer II ™.

Concentrated standards were prepared in deionized water from oven dried reagents. Working standards were made every 1 to 2 days by diluting precise volumes of the concentrated standards to 250 mL with a solution of 3.2% NaCl. Working standards were compared to commercial standards prepared by Wako Pure Chemical Industries, Ltd. and which are guaranteed by the Sagami Research Centre, Japan.

The phosphate colorimeter worked well for the first 9 stations, then developed an electronic problem resulting in a noisy signal for the rest of the cruise. Additionally, the baseline drifted significantly, particularly at the beginning of each run. This caused more variability than usual in the standards calibration, and less reliable data (quality flag code "3").

At station 38, nitrate concentrations at the deeper layers, ranging from 1600 dbar to 3200 dbar have been flagged "3", due to irregularly shaped standard and sample peaks.

2.9. SALINITY

Salinity was analyzed onboard ship using a Guildline Model 8410 Portasal. The salinometer was standardized daily with IAPSO standard sea water batch P121. At station 37, 23 bottles were tripped at 1500 m. The average salinity was 34.480, with a standard deviation of 0.0013. For 29 paired Niskin samplers, Sp = 0.0011.

2.10. ^{18}OXYGEN

When possible (on ship and at IOS) ^{18}O samples were stored at 4°C until analyzed at IOS.

Analyses were performed by equilibrating 5 mL of sample with CO_2 of known isotopic composition. Samples were equilibrated for 15 h at 20° C before the gas was passed through a moisture trap, then fed into a Nuclide Radio Mass Spectrometer. $^{18}O/^{16}O$ ratios are expressed relative to the V-SMOW standard as $\delta^{18}O$. Details of the procedure are given in Paton et al. (1994).

2.11. PRECISION OF MEASUREMENTS

To supply a uniform assessment of analytical precision for all analyses routinely throughout the section, a pair of Niskin bottles was tripped at a single depth on most Rosette casts. The pooled standard deviation of data from these sample pairs is calculated by:

$$Sp = (\sum d^2/2k)^{1/2}$$

where d is the difference between the pairs and k is the number of pairs.

Table 2. Variability of Measurements

Abbreviation	Parameter	Sp	k
CTDPRS	Pressure	1.1 dbar	34
CTDTMP	Temperature	0.018 °C	34
CTDSAL	Salinity	0.0032	34
SALNTY	Salinity	0.0020	34
OXYGEN	Oxygen	0.79 μmol kg^{-1}	31
SILCAT	Silicate	0.61 μmol kg^{-1}	32
NITRAT	Nitrate	0.28 μmol kg^{-1}	33
NITRIT	Nitrite	0.025μmol kg^{-1}	32
PHSPHT	Phosphate	0.04 μmol kg^{-1}	33
CFC-11	Freon-11™	0.114 pmol kg^{-1}	21
CFC-12	Freon-12™	0.094 pmol kg^{-1}	21
ALKALI	Total alkalinity A_T	2.387μmol kg^{-1}	28
PH	pH	0.004	31

3.0. PRELIMINARY RESULTS

Preliminary analysis of data shows that the deep waters of Kuril Basin (bottom depth about 3400 m) are similar to 2300 m (Bussol' Strait sill depth) North Pacific waters in a variety of parameters including density, oxygen and nutrients. However, the waters of Deryugin Basin (bottom depth about 1600 m) in the western-central part of Okhotsk, have high silicate levels, suggesting limited exchange with waters in Kuril Basin.

A cold, shallow layer, between 20 and 150 m, was evident in all northern stations. Temperature gradients between the summer warm layer (12° C) and the near freezing shallow layer (-1.6°C) were as sharp as 10° C in 10 m.

The hydrographical characteristics of the Sea of Okhotsk, from data obtained during this cruise, in relation to formation of North Pacific Intermediate water are discussed by Bychkov, et al (1994) and Freeland, et al. (in press). The rate and dynamics of North Pacific Intermediate water formation from Sea of Okhotsk Intermediate water are addressed by Wong, et al. (in press).

3.1. GOALS ACHIEVED

Section P1W was completed without omissions. Drifters were deployed at the first 3 stations in the region of the Oyashio Current.

3.2. PROBLEMS AND GOALS NOT ACHIEVED

Winches that could not be trusted to great depth restricted sampling to 3400 m in the NW Pacific.

High levels of CFCs in the shipboard air affected the limit of detection for these measurements, and replacement of the primary regulator with one less suitable caused more variability in CFC standards than normally seen.

The PO_4 colorimeter on the AutoAnalyzer™ was unstable many of the days nutrients were measured.

4.0 CTD AND ROSETTE STATION DATA

4.1. STATION SUMMARY INFORMATION

A summary of all stations, as submitted to the WHPO, is presented in Appendix 2. The summary includes information on the station number, type of deployment, date, position, time, bottom depth, number of bottles, parameters measured, and relevant comments. An explanation of the abbreviations used and codes for sample parameters is located in Table 3, Appendix 2.

4.2. ROSETTE SAMPLE DATA

The data collected from the rosette stations, as submitted to the WHPO, are listed in Appendix 3. The parameters are: station numbers, CTD data at the sampling stations (pressure, temperature, and salinity), bottle and sample numbers, oxygen, nutrients, phosphate, CFCs, pH, $^{18}O/^{16}O$ data, and quality flags. Explanations of the abbreviations used and the quality flag codes are located in Table 4, Appendix 3.

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

These data will be made available through WHPO following the priority use period, and can be requested from the Institute of Ocean Sciences. Results for other parameters will be submitted to WHPO as deemed appropriate by the principal investigators and can be requested from the Institute of Ocean Sciences.

4.3 CTD DATA

These data have been submitted to the WHPO. They can also be requested from the Institute of Ocean Sciences.

4.4 STATUS AND AVAILABILITY OF DATA

WOCE data are also available from the WOCE Hydrographic Programme Office. WOCE information can be obtained from the Ocean Information Center (OCEANIC), an electronic on-line information system, (world wide web address: http://www.cms.udel.edu), or from the WOCE Data Information Unit:

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

The data presented in this report can be requested from the principal investigators at the Institute of Ocean Sciences:

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

5.0. HYDROGRAPHIC SECTIONS

Contoured section plots of the potential temperature, salinity, CFC-11, CFC-12, dissolved oxygen, silicate, nitrate, phosphate, and bottle sampling stations are presented in Appendix 4.

Graphs of salinity versus potential temperature, silicate, oxygen, CFC-11, and $^{18}O/^{16}O$ and oxygen versus silicate are presented in Appendix 5.

6.0 ACKNOWLEDGMENTS

This program was not an easy one to accomplish, despite its value to the overall WOCE objectives. Without the persistence of Alex Bychkov in Vladivostok and support from the Canadian WOCE program (Barry Ruddick and Paul LeBlond), we would have faltered. Major financial support for IOS participation came from the Green Plan - Ocean Climate Program (Howard Freeland), Panel for Energy Research and Development (C.S. Wong), and Department of Fisheries and Oceans A-base funds.

Thanks to the Russian and Canadian scientists that worked diligently towards completion of a successful transect through the Sea of Okhotsk, also to the captain and his crew on the *Nesmeyanov* for performing their duties efficiently and competently.

7.0. REFERENCES

Bates, R.G. 1973. Determination of pH, Theory and Practice. Wiley, New York, 368 pp.

Bullister, J.L., and R.F. Weis. 1988. Determination of trichlorofluoromethane and dichlorodifluoromethane in seawater and air. Deep-Sea Res., Part A. 35(5): 839-853.

Bychkov, A., H. Freeland, C.S. Wong, F. Whitney, P. LeBlond, and G. Urasov. 1994. Preliminary results for P1W Hydrographic sections into the Sea of Okhotsk. Conference Abstract, The Oceanographic Society, Honolulu, Hawaii.

Carpenter, J.H. 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. Oceanogr. 10: 141-143.

Culberson, C.H. 1991. Dissolved oxygen, p.1-15. In: T. Joyce, et al. WOCE Operations Manual. Vol 3: The Observational Programme. Section 3.1, WOCE Hydrographic Programme. Part 3.1.3, WHP Operations and Methods. WOCE Hydrographic Programme Office, Woods Hole, Mass. WOCE Report No 68/91.

Culberson, C.H., G. Knapp, M.C. Stalcup, R.T. Williams, and F. Zemlyak. 1991. A comparison of methods for the determination of dissolved oxygen in seawater. Woods Hole Oceanographic Institution, WOCE Hydrographic Programme Office Report WHPO 91-2, 77 pp. WOCE Report No 73/91.

Dickson, A.G., and C. Goyet. 1991. Handbook of Methods for the Analysis of the Various Parameters of the Carbon Dioxide System in Seawater. Dept. of Environment Publ., 89-7A, Version 1.0.

Freeland, H.J., A.S. Bychkov, F. Whitney, C. Taylor, C.S. Wong, and G.I. Yurasov. An oceanographic survey through the Sea of Okhotsk: WOCE survey line P1W. Submitted to: Journal of Geophysical Research.

Ivanenkov, V.N., and Yu. I. Lyakhin. 1978. Determination of alkalinity of seawater. In: Methods of hydrochemical investigation in seawater. Nauka Publ. House, Moskow. pg.110-115. (in Russian)

Joyce, T., C. Corry, and M. Stalcup [eds]. 1994. WOCE Operations Manual. Volume 3, Observational Programme. Section 3.1, WOCE hydrographic programme. Part 3.1.2, Requirements for WOCE Hydrographic Programme data reporting. WOCE Hydrographic Programme Office, Woods Hole, Mass. WOCE Report 67/91.144p.

Koroleff, F., and K. Grasshoff. 1983. Determination of nutrients. In: K. Grasshoff, M. Ehrhardt, K. Kremling, eds. Methods of Seawater Analysis. Verlag Chemie Int., Basel. 419 pp.

Millero, F.J. 1986. The pH of estuarine waters. Limnol. Oceanogr. 31: 839-847.

Millero, F. J., and A. Poisson. 1981. International one-atmosphere equation of state for seawater. Deep-Sea Res. 28: 625-629.

Paton, D.W., A. Abehennah, W. Grieve, and R.W. Macdonald. 1994. NOGAP B.6, Oxygen isotope data from water and ice cores from the Beaufort Sea, September 1990, May 1991 and September 1991. Can. Data Rep. Hydrogr. Oc. Sci. 134, 118 pp.

Wong, C.S., R.J. Matear, H.J. Freeland, F.A. Whitney, and A.S. Bychkov. Chlorofluorocarbons in the Sea of Okhotsk: the role of the Sea of Okhotsk intermediate water in the formation of North Pacific intermediate waters. Submitted to: Journal of Geophysical Research.

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8.0. APPENDICES

APPENDIX 1. CRUISE PARTICIPANTS

Table 3. Principal Investigators

Name	Institute	Responsibility
Alexander Bychkov	POI	Alkalinity, pH
Howard Freeland, Gennady Jurasov	IOS POI	CTD, S
Frank Whitney	IOS	Nutrients, O_2
C.S. Wong	IOS	TCO_2, CFCs, ^{13}C, ^{14}C, tritium, ^{18}O

Table 4. Cruise Participants & Affiliations

Name	Institute	Responsibility
Alex Bychkov	POI	Chief scientist
Frank Whitney	IOS	Co-chief scientist
Gennady Yurasov	POI	CTD operations
Wendy Richardson	IOS	CFCs
Bernard Minkley	IOS	Sampling, S & O_2 data
Hugh MacLean	UBC	Rosette handling and sampling
Colin Taylor	UBC	CTD data processing, sampling
Andrei Andreyev	POI	Nutrients
Pavel Tishchenko	POI	CFCs
Ruslan Chichkin	POI	CFCs
Galina Pavlova	POI	Alkalinity
Nadezhda Sudakova	POI	Oxygen
Victor Savchenko	POI	Salinity
Anatoly Salyuk	POI	Hydro data processing
Valeri Tapinov	POI	CTD data processing
Yuri Shugla	POI	pH, sampling
Alexander Kalabukhov	POI	electronics

IOS: Institute of Ocean Sciences, Sidney, B.C., Canada.
UBC: Department of Oceanography, University of British Columbia, Vancouver, B.C., Canada
POI: Pacific Oceanological Institute, Vladivostok, Russia

APPENDIX 2. STATION SUMMARY DATA

The station summary data, as sent to WOCE, are presented in this appendix.

Table 5. Explanation of Abbreviations Used in Appendix 2

MNEMONIC		FULL TITLE
EXPOCODE		WOCE (World Ocean Circulation Experiment) Expedition Code
WHP-ID		WOCE Hydrographic Programme Identifier
STNNBR		Station No.
TYPE:		Type of cast
	ROS	Rosette
	DRF	Drifter
UTC		Universal Time Clock
CODE:		
	BE	Beginning point of cast
	BO	Bottom of cast
	EN	End of cast
PARAMETERS		
	1	Salinity
	2	Oxygen
	3	Silicate
	4	Nitrate
	5	Nitrite
	6	Phosphate
	7	Freon-11
	8	Freon-12
	9	Tritium
	12	^{14}Carbon
	13	^{13}Carbon
	20	$^{18}O/^{16}O$ ratio
	23	Total carbon, C_T
	24	Total alkalinity, A_T
	26	pH: $-\log_{10}\{[H^+]/(mol/kg)\}$

Appendix 2. Station summary file as submitted to WOCE Hydrographic Programme Office
"Alex S Bychkov, Frank Whitney (code 90BM) cruise number 9316 along WOCE Line P1W"

EXPOCODE	WHP-ID	STNNB	CASTNO	CAST TYPE	Date ddmmyy	Time UTC	CODE	Latitude Deg	Latitude Min	Decimal Latitude	N/S	Longitude Deg	Longitude Min	Decimal Long.	W/E	CODE	Bottom Depth(m)	Press Max(db	No bottles	PARAMETERS	COMMENTS
90BM9316/1	P1W	HS01	1	ROS	30993	1927	BE	43	59.89	43.99817	N	153	30.25	153.5	E	GPS					
90BM9316/1	P1W	HS01	1	ROS	30993	2036	BO	43	59.61	43.9935	N	153	30.51	153.51	E	GPS					
90BM9316/1	P1W	HS01	1	ROS	30993	2158	EN	43	59.24	43.98733	N	153	31.09	153.52	E	GPS	5000	3400	23	1-9, 12, 13, 20, 23, 24, 26"	"Bottles 21, 22, 23 - no trip"
90BM9316/1	P1W	HS01	2	DRF	30993	2208	BE	43	59.9	43.99833	N	153	31.18	153.52	E	GPS				DROGUE #1 3131-20 SN 10565	
90BM9316/1	P1W	HS02	1	ROS	40993	133	BE	44	29.25	44.4875	N	153	11.87	153.2	E	GPS					
90BM9316/1	P1W	HS02	1	ROS	40993	233	BO	44	28.22	44.47033	N	153	11.57	153.19	E	GPS					
90BM9316/1	P1W	HS02	1	ROS	40993	335	EN	44	27.31	44.45517	N	153	11.04	153.18	E	GPS	5160	3400	23	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS02	2	DRF	40993	2208	BE	44	27.12	44.452	N	153	10.92	153.18	E	GPS				DROGUE #2 3131-120 SN 10567	
90BM9316/1	P1W	HS03	1	ROS	40993	714	BE	44	59.9	44.99833	N	152	48.43	152.81	E	GPS					
90BM9316/1	P1W	HS03	1	ROS	40993	804	BO	44	59.89	44.99817	N	152	48.55	152.81	E	GPS					
90BM9316/1	P1W	HS03	1	ROS	40993	906	EN	44	60	45	N	152	48.68	152.81	E	GPS	6760	3400	23	"1-9, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS03	2	DRF	40993	920	BE	45	0.07	45.00117	N	152	48.56	152.81	E	GPS				DROGUE #3 3131-120 SN 10566	
90BM9316/1	P1W	HS04	1	ROS	40993	1215	BE	45	30.46	45.50767	N	152	30.08	152.5	E	GPS					
90BM9316/1	P1W	HS04	1	ROS	40993	1336	BO	45	31.31	45.52183	N	152	30.782	152.51	E	GPS					
90BM9316/1	P1W	HS04	1	ROS	40993	1606	EN	45	32.4	45.54	N	152	32.7	152.55	E	GPS	6460	3401	23	"1-8, 23, 24, 26"	"Winch problems on up cast, 2400db"
90BM9316/1	P1W	HS05	1	ROS	40993	1910	BE	45	59.92	45.99867	N	152	11.98	152.2	E	GPS					"Power to probe interupted, 1000 db"
90BM9316/1	P1W	HS05	1	ROS	40993	1948	BO	45	59.88	45.998	N	152	11.82	152.2	E	GPS	3100				
90BM9316/1	P1W	HS05	1	ROS	40993	2040	EN	45	59.74	45.99567	N	152	11.51	152.19	E	GPS	3070	3001	23	"1-9, 12, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS06	1	ROS	50993	26	BE	46	29.76	46.496	N	151	41.04	151.68	E	GPS					
90BM9316/1	P1W	HS06	1	ROS	50993	59	BO	46	29.76	46.496	N	151	39.94	151.67	E	GPS					
90BM9316/1	P1W	HS06	1	ROS	50993	146	EN	46	29.42	46.49033	N	151	38.53	151.64	E	GPS	2400	2348	23	"1-8, 23, 24, 26"	NISK1 is empty
90BM9316/1	P1W	HS07	1	ROS	50993	453	BE	46	59.73	46.9955	N	151	23.62	151.39	E	GPS					
90BM9316/1	P1W	HS07	1	ROS	50993	543	BO	46	59.68	46.99467	N	151	22.1	151.37	E	GPS					
90BM9316/1	P1W	HS07	1	ROS	50993	655	EN	46	59.21	46.98683	N	151	21.04	151.35	E	GPS	3240	3200	23	"1-9, 13, 20, 23, 24, 26"	2860 up - stop 10 min
90BM9316/1	P1W	HS08	1	ROS	50993	1005	BE	47	30.12	47.502	N	150	59.79	151	E	GPS	3450				
90BM9316/1	P1W	HS08	1	ROS	50993	1105	BO	47	30.59	47.50983	N	150	58.77	150.98	E	GPS	3378	3351	23	"1-8, 23, 24, 26"	May have struck bottom at 3378 db
90BM9316/1	P1W	HS08	1	ROS	50993	1205	EN	47	30.58	47.50967	N	150	57.91	150.97	E	GPS					
90BM9316/1	P1W	HS09	1	ROS	50993	1505	BE	48	0.13	48.00217	N	150	42.05	150.7	E	GPS	3370				
90BM9316/1	P1W	HS09	1	ROS	50993	1557	BO	48	0.19	48.00317	N	150	42.09	150.7	E	GPS	3330	3251	23	"1-9, 12, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS09	1	ROS	50993	1653	EN	48	0.43	48.00717	N	150	41.89	150.7	E	GPS					
90BM9316/1	P1W	HS10	1	ROS	60993	1655	BE	48	30.1	48.50167	N	150	18.19	150 3	E	GPS					
90BM9316/1	P1W	HS10	1	ROS	60993	1780	BO	48	30.23	48.50383	N	150	18.78	150.31	E	GPS	2185	2099	18	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS10	1	ROS	60993	1756	EN	48	30.16	48.50267	N	150	19.65	150.33	E	GPS					
90BM9316/1	P1W	HS11	1	ROS	70993	2043	BE	48	59.38	48.98967	N	149	48.43	149.81	E	GPS					
90BM9316/1	P1W	HS11	1	ROS	70993	2100	BO	48	58.99	48.98317	N	149	48.32	149.81	E	GPS	1350	1300	14	"1-9, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS11	1	ROS	70993	2127	EN	48	58.45	48.97417	N	149	47.92	149 8	E	GPS					
90BM9316/1	P1W	HS12	1	ROS	80993	1645	BE	49	29.87	49.49783	N	149	30.42	149.51	E	GPS					
90BM9316/1	P1W	HS12	1	ROS	80993	1659	BO	49	29.96	49.49933	N	149	30.65	149.51	E	GPS	975	900	13	"1-8, 23, 24, 26"	"Bottle 1 did not close"
90BM9316/1	P1W	HS12	1	ROS	80993	1721	EN	49	30.01	49.50017	N	149	31.05	149.52	E	GPS					#NAME?
90BM9316/1	P1W	HS13	1	ROS	80993	2137	BE	49	59.7	49.995	N	149	6.54	149.11	E	GPS					
90BM9316/1	P1W	HS13	1	ROS	80993	2055	BO	49	59.57	49.99283	N	149	6.57	149.11	E	GPS	1110	1062	12	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS13	1	ROS	80993	2117	EN	49	59.48	49.99133	N	149	6.42	149.11	E	GPS					
90BM9316/1	P1W	HS14	1	ROS	90993	48	BE	50	30.71	50.51183	N	148	41.67	148.69	E	GPS					
90BM9316/1	P1W	HS14	1	ROS	90993	108	BO	50	31.22	50.52033	N	148	41.94	148.7	E	GPS	1250	1198	21	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS14	1	ROS	90993	140	EN	50	32.04	50.534	N	148	42.41	148.71	E	GPS					
90BM9316/1	P1W	HS15	1	ROS	90993	600	BE	51	1.51	51.02517	N	148	19.62	148.33	E	GPS					
90BM9316/1	P1W	HS15	1	ROS	90993	619	BO	51	2.11	51.03517	N	148	20.19	148.34	E	GPS	1310	1250	14	"1-9, 12, 13, 20, 23, 24, 26"	"Bottles 5, 13 did not trip"
90BM9316/1	P1W	HS15	1	ROS	90993	703	EN	51	2.89	51.04817	N	148	20.62	148.34	E	GPS					
90BM9316/1	P1W	HS16	1	ROS	90993	1123	BE	51	29.95	51.49917	N	147	48.22	147.8	E	GPS					
90BM9316/1	P1W	HS16	1	ROS	90993	1153	BO	51	30.42	51.507	N	147	48.61	147.81	E	GPS	1330	1200	14	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS16	1	ROS	90993	1223	EN	51	30.97	51.51617	N	147	48.98	147.82	E	GPS					
90BM9316/1	P1W	HS17	1	ROS	100993	1644	BE	52	0.27	52.0045	N	147	30.7	147.51	E	GPS					
90BM9316/1	P1W	HS17	1	ROS	100993	1720	BO	52	0.72	52.012	N	147	31.74	147.53	E	GPS	1320	1259	14	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS17	1	ROS	100993	1754	EN	52	1.07	52.01783	N	147	32.51	147.54	E	GPS					
90BM9316/1	P1W	HS18	1	ROS	100993	143	BE	52	29.96	52.49933	N	147	6.36	147.11	E	GPS					
90BM9316/1	P1W	HS18	1	ROS	100993	231	BO	52	29.7	52.495	N	147	7.8	147.13	E	GPS	1470	1400	15	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS18	1	ROS	100993	308	EN	52	29.52	52.492	N	147	8.89	147.15	E	GPS					
90BM9316/1	P1W	HS19	1	ROS	100993	647	BE	53	0.15	53.0025	N	146	42.18	146.7	E	GPS					
90BM9316/1	P1W	HS19	1	ROS	100993	722	BO	53	0.25	53 00417	N	146	41.88	146 7	E	GPS	1670	1600	15	"1-9, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS19	1	ROS	100993	756	EN	53	0.65	53.01083	N	146	41 68	146.69	E	GPS					

EXPOCODE	WHP-ID	STNNB	CASTNO	CAST TYPE	Date ddmmyy	Time UTC	CODE	Latitude Deg	Latitude Min	Decimal Latitude	N/S	Longitude Deg	Longitude Min	Decimal Long.	W/E	CODE	Bottom Depth(m)	Press. Max(db	No. bottles	PARAMETERS	COMMENTS
90BM9316/1	P1W	HS24	1	ROS	100993	1354	BE	55	30.63	55 5105	N	144	35.38	144 59	E	GPS					
90BM9316/1	P1W	HS24	1	ROS	100993	1406	BO	55	30.79	55.51317	N	144	35.02	144.58	E	GPS	390	349	9	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS24	1	ROS	100993	1421	EN	55	30 95	55 51583	N	144	34 72	144.58	E	GPS					
90BM9316/1	P1W	HS25	1	ROS	110993	1750	BE	55	59 73	55.9955	N	144	12 32	144.21	E	GPS					
90BM9316/1	P1W	HS25	1	ROS	110993	1800	BO	55	59 78	55.99633	N	144	12.36	144 21	E	GPS	330	300	8	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS25	1	ROS	110993	1813	EN	56	0.01	56 00017	N	144	12.07	144.2	E	GPS					
90BM9316/1	P1W	HS26	1	ROS	110993	2120	BE	56	29.77	56.49617	N	143	48 33	143 81	E	GPS					
90BM9316/1	P1W	HS26	1	ROS	110993	2125	BO	56	29.61	56.4935	N	143	48 41	143 81	E	GPS	270	240	8	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS26	1	ROS	110993	2136	EN	56	29.4	56.49	N	143	48.43	143.81	E	GPS					
90BM9316/1	P1W	HS27	1	ROS	120993	137	BE	57	0.01	57.00017	N	143	18.36	143.31	E	GPS					
90BM9316/1	P1W	HS27	1	ROS	120993	142	BO	56	59.87	56.99783	N	143	18.36	143.31	E	GPS	130	100	5	"1-9, 12, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS27	1	ROS	120993	148	EN	56	59.83	56.99717	N	143	18 29	143.3	E	GPS					
90BM9316/1	P1W	HS28	1	ROS	120993	524	BE	57	29.84	57.49733	N	142	48.51	142 81	E	GPS					
90BM9316/1	P1W	HS28	1	ROS	120993	537	BO	57	29.77	57.49617	N	142	48.64	142.81	E	GPS	190	150	9	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS28	1	ROS	120993	547	EN	57	29.63	57.49383	N	142	48.78	142 81	E	GPS					
90BM9316/1	P1W	HS29	1	ROS	120993	929	BE	57	59.99	57.99983	N	142	17.95	142.3	E	GPS					
90BM9316/1	P1W	HS29	1	ROS	120993	932	BO	57	59.98	57.99967	N	142	17.87	142 3	E	GPS	148	126	6	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS29	1	ROS	120993	940	EN	57	59.97	57.9995	N	142	17.83	142.3	E	GPS					
90BM9316/1	P1W	HS30	1	ROS	120993	1307	BE	58	29.92	58.49867	N	141	48.26	141 8	E	GPS					
90BM9316/1	P1W	HS30	1	ROS	120993	1311	BO	58	19.92	58.332	N	141	48.26	141.8	E	GPS	90	70	5	"1-9, 13, 20, 23, 26"	
90BM9316/1	P1W	HS30	1	ROS	120993	1316	EN	58	29.87	58.49783	N	141	48.23	141.8	E	GPS					
90BM9316/1	P1W	HS31	1	ROS	120993	1859	BE	57	30.01	57.50017	N	142	2.51	142.04	E	GPS					
90BM9316/1	P1W	HS31	1	ROS	120993	1904	BO	57	30.01	57.50017	N	142	2.63	142.04	E	GPS	155	125	6	"1-6, 26"	
90BM9316/1	P1W	HS31	1	ROS	120993	1911	EN	57	30.96	57.516	N	142	2.72	142.05	E	GPS					
90BM9316/1	P1W	HS32	1	ROS	130993	29	BE	56	30.11	56.50183	N	142	15.67	142.26	E	GPS					
90BM9316/1	P1W	HS32	1	ROS	130993	38	BO	56	30.2	56.50333	N	142	15.96	142.27	E	GPS	230	202	8	"1-6, 26"	
90BM9316/1	P1W	HS32	1	ROS	130993	49	EN	56	30.28	56.50467	N	142	16.27	142.27	E	GPS					
90BM9316/1	P1W	HS33	1	ROS	130993	617	BE	55	30.01	55.50017	N	142	28.05	142.47	E	GPS					
90BM9316/1	P1W	HS33	1	ROS	130993	632	BO	55	29.97	55.4995	N	142	27.06	142.45	E	GPS	300	279	7	"1-6, 26"	
90BM9316/1	P1W	HS33	1	ROS	130993	645	EN	55	29.97	55.4995	N	142	27.7	142.46	E	GPS					
90BM9316/1	P1W	HS34	1	ROS	130993	933	BE	54	59.98	54.99967	N	142	35.15	142.59	E	GPS					
90BM9316/1	P1W	HS34	1	ROS	130993	939	BO	54	59.98	54.99967	N	142	35.06	142.58	E	GPS	110	91	4	"1-6, 26"	
90BM9316/1	P1W	HS34	1	ROS	130993	945	EN	54	59.96	54.99933	N	142	34.95	142.58	E	GPS					
90BM9316/1	P1W	HS35	1	ROS	130993	1225	BE	54		54	N	142		142	E	GPS					
90BM9316/1	P1W	HS35	1	ROS	130993	1228	BO	54	40.25	54.67083	N	142	39.84	142.66	E	GPS	72	57	4	"1-6, 26"	
90BM9316/1	P1W	HS35	1	ROS	130993	1232	EN	54	40.32	54.672	N	142	39.73	142.66	E	GPS					
90BM9316/1	P1W	HS36	1	ROS	130993	2311	BE	54	40.39	54.67317	N	143	55.94	143.93	E	GPS					
90BM9316/1	P1W	HS36	1	ROS	130993	2331	BO	54	40.5	54.675	N	143	56.04	143.93	E	GPS	552	540	10	"1-6, 26"	
90BM9316/1	P1W	HS36	1	ROS	130993	2353	EN	54	40.52	54.67533	N	143	56.27	143.94	E	GPS					
90BM9316/1	P1W	HS23	1	ROS	140993	345	BE	55	0.14	55.00233	N	145	0.04	145	E	GPS	1360				
90BM9316/1	P1W	HS23	1	ROS	140993	412	BO	55	0.89	55.01483	N	145	0.25	145	E	GPS	1310	1251	13	"1-9, 13, 20, 23, 24, 26"	
90BM9316/1	P1W	HS23	1	ROS	140993	443	EN	55	1.7	55.02833	N	145	0.25	145	E	GPS					
90BM9316/1	P1W	SH22	1	ROS	140993	806	BE	54	30.15	54.5025	N	145	24.2	145.4	E	GPS					
90BM9316/1	P1W	SH22	1	ROS	140993	836	BO	54	30.54	54.509	N	145	23.67	145 39	E	GPS	1540	1501	15	"1-8, 23, 24, 26"	
90BM9316/1	P1W	SH22	1	ROS	140993	914	EN	54	31.33	54.52217	N	145	22.87	145.38	E	GPS					
90BM9316/1	P1W	HS21	1	ROS	140993	1243	BE	54	0.14	54.00233	N	145	48.2	145.8	E	GPS					
90BM9316/1	P1W	HS21	1	ROS	140993	1323	BO	54	0.88	54.01467	N	145	47.12	145.79	E	GPS	1640	1600	14	"1-8, 12, 20, 23, 24, 26"	
90BM9316/1	P1W	HS21	1	ROS	140993	1404	EN	54	1.58	54.02633	N	145	45.96	145.77	E	GPS					
90BM9316/1	P1W	HS20	1	ROS	140993	2023	BE	53	29.91	53.4985	N	146	18.16	146.3	E	GPS					
90BM9316/1	P1W	HS20	1	ROS	140993	2102	BO	53	29.92	53.49867	N	146	17.96	146.3	E	GPS	1740	1660	15	"1-8, 23, 24, 26"	
90BM9316/1	P1W	HS20	1	ROS	140993	2147	EN	53	29.92	53.49867	N	146	17.55	146.29	E	GPS					
90BM9316/1	P1W	HS37	1	ROS	160993	2334	BE	48	0.7	48.01167	N	147	38.79	147.65	E	GPS					
90BM9316/1	P1W	HS37	1	ROS	160993	2349	BO	48	0.54	48.009	N	147	38.98	147.65	E	GPS	2020	1503	23	"1, 2, 7, 8	
90BM9316/1	P1W	HS37	1	ROS	170993	19	EN	48	0.37	48.00617	N	147	38.18	147.64	E	GPS					
90BM9316/1	P1W	HS38	1	ROS	170993	444	BE	47	30.09	47 5015	N	147	0.6	147.01	E	GPS					
90BM9316/1	P1W	HS38	1	ROS	170993	542	BO	47	29.35	47.48917	N	147	2.13	147.04	E	GPS	3290	3201	22	"1-8, 23, 26"	
90BM9316/1	P1W	HS38	1	ROS	170993	715	EN	47	28.08	47.468	N	147	7.09	147.12	E	GPS					

APPENDIX 3. ROSETTE STATION DATA

The rosette station data (-.sea file), as sent to WOCE, are presented here. The abbreviations are explained in Table 4, below, and the definitions of the quality words are in Table 5. The quality words refer to the quality of the samples taken, in the order presented in the -.sea file. The parameters with a row of asterisks in the column heading are represented in the quality words. They include: bottle number, salinity, oxygen, silicate, $NO_3 + NO_2$, nitrate, phosphate, CFC-11, CFC-12, total carbonate carbon, alkalinity, pH, $^{18}O/^{16}O$, ^{13}C, and tritium; respectively.

Table 6. Explanation of Abbreviations Used in Appendix 3.

Parameter mnemonic	Parameter
EXPOCODE	WOCE expedition code
WHP-ID	WOCE Hydrographic Programme Identifier
STNNBR	Station number
CASTNO	Cast number
SAMPNO	Sample number
BTLNBR	Bottle number
CTDPRS	Pressure, measured by CTD (dbar)
CTDTMP	Temperature, measured by CTD (°C)
CTDSAL	Salinity, measured by CTD (PSS-78)
SALNTY	Salinity, measured by salinometer (PSS-78)
OXYGEN	Oxygen (μmol/kg)
SILCAT	Silicate (μmol/kg)
NO3+NO2	Nitrate + Nitrite (μmol/kg)
NITRIT	Nitrite (μmol/kg)
PHSPHT	Phosphate (μmol/kg)
CFC-11	Freon-11 (pmol/kg)
CFC-12	Freon-12 (pmol/kg)
TCARBN	Total carbon, C_T (μmol/kg)
ALKALI	Total alkalinity, A_T(μmol/kg)
PH	pH
O18/O16	$^{18}O/^{16}O$ ratio (per mille)
DELC13	^{13}Carbon (per mille)
TRITUM	Tritium (TU)
QUALIT1	Quality word, identifying the quality of the measurements

Table 7. **Water sample quality flag codes (from Joyce and Corry, 1994)**

Flag value	Description
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 chromatographic peak measurement
8	Irregular digital chromatographic peak integration
9	Sample not drawn for this measurement from this bottle

EXPOCODE 90BM9316/1 WHP-ID P1W CRUISE DATES 083193 TO 092193

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	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	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
1	1	1	23	10	13.278	32.865	13.2766	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
1	1	2	22	49.9	3.003	33.0908	3.0001	33.0817	316.61	37.8	27.6	-9	1.91	6.303	2.82	-9	-9	7.865	-0.715	-9	-9	2222229222112210
1	1	3	21	99.9	1.516	33.2346	1.5114	33.216	299.48	53.3	29.1	-9	2.22	6.414	2.888	-9	-9	7.74	-0.767	-9	-9	2222229222112210
1	1	4	20	150.9	2.631	33.5483	2.6225	33.5372	168.82	75	36.8	-9	2.71	3.864	1.745	-9	-9	7.594	-0.567	-9	-9	2222229222112210
1	1	5	19	200	2.06	33.6824	2.0496	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
1	1	6	18	299	2.839	33.8653	2.8211	33.8501	88.17	99.3	40.4	-9	2.92	1.914	0.774	-9	-9	7.508	-0.402	-9	-9	2222229222112210
1	1	7	17	399.1	3.079	34.0181	3.0539	34.0064	70.03	111.2	43.3	-9	3.08	1.227	0.551	-9	-9	7.476	-0.347	-9	-9	2222229222112210
1	1	8	16	399.8	3.082	34.0181	3.0568	34.0060	52.85	111.4	43.2	-9	3.1	1.18	0.503	-9	-9	7.486	-0.519	-9	-9	2222229222112210
1	1	9	15	600.7	2.908	34.2133	2.8699	34.2012	35.98	132.1	44.4	-9	3.15	0.512	0.429	-9	-9	7.486	-0.316	-9	-9	2222229222112210
1	1	10	14	799.9	2.725	34.343	2.6739	34.3314	28.92	144.3	43.9	-9	3.18	0.202	0.139	-9	-9	7.493	0.304	-9	-9	2222229222112210
1	1	11	13	1000.3	2.48	34.422	2.4163	34.4112	36.07	153.7	44.7	-9	3.17	0.159	0.087	-9	-9	7.523	-0.216	-9	-9	2222229222112210
1	1	12	12	1199.8	2.292	34.478	2.2154	34.4658	45.58	156.9	44.3	-9	3.11	0.075	0.045	-9	-9	7.54	-0.128	-9	-9	2222229222112210
1	1	13	11	1398.9	2.123	34.5182	2.0332	34.5076	55.83	158.2	32.7	-9	2.97	0.075	0	-9	-9	7.55	-0.203	-9	-9	2222239322112310
1	1	14	10	1600	2.06	34.5626	1.9555	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
1	1	15	9	1800.1	1.955	34.5879	1.8358	34.5759	73.51	161.6	39.8	-9	2.09	0.013	0.008	-9	-9	7.591	-0.132	-9	-9	2222229222112210
1	1	16	8	2000.5	1.855	34.6127	1.7208	34.601	85.49	160.1	39.7	-9	2.95	0.019	0.024	-9	-9	7.601	-0.11	-9	-9	2222229222112210
1	1	17	7	2200.8	1.772	34.6313	1.6222	34.62	95.78	158.9	39.3	-9	2.88	-9	-9	-9	-9	7.621	-0.159	-9	-9	2222229209112210
1	1	18	6	2384.3	1.681	34.6475	1.5169	34.6359	106.94	158.4	37.9	-9	2.85	-9	-9	-9	-9	7.645	-0.135	-9	-9	2222229299112210
1	1	19	5	2599.7	1.617	34.6586	1.4349	34.648	107.1	155.5	37.4	-9	2.79	-9	-9	-9	-9	7.679	-0.195	-9	-9	2222229299112210
1	1	20	4	2798.3	1.561	34.6681	1.3619	34.6572	125.56	154.8	37.5	-9	2.75	-9	-9	-9	-9	7.682	-0.111	-9	-9	2222229299112210
1	1	21	3	2999.8	1.534	34.6736	1.3165	34.6622	131.02	153.5	37.2	-9	2.73	-9	-9	-9	-9	7.696	-0.179	-9	-9	2222229299112210
1	1	22	2	3198.4	1.5	34.68	1.264	34.6682	137.98	152.2	37.4	-9	2.67	-9	-9	-9	-9	7.699	-0.275	-9	-9	2222229299112210
1	1	23	1	3401.5	1.479	34.685	1.2234	34.6729	141.77	150.3	36.8	-9	2.67	-9	-9	-9	-9	7.706	-0.227	-9	-9	2222229299112210
2	1	24	23	9.4	11.901	32.8856	11.8998	32.8993	293.11	10.3	7.57	0.13	0.95	4.561	2.104	-9	-9	8.095	-9	-9	-9	2222222222112990
2	1	25	22	51.6	2.54	33.1453	2.5372	33.1269	303.93	40.9	23	0.4	1.94	6.173	2.682	-9	-9	7.838	-9	-9	-9	2222222222112990
2	1	26	21	98.4	1.374	33.2852	1.3696	33.2228	285.85	51.7	27.49	0.01	2.14	5.998	2.729	-9	-9	7.755	-9	-9	-9	2222222222112990
2	1	27	20	146.4	1.642	33.3866	1.635	33.3631	239.8	62.7	30.49	0.01	2.31	5.156	2.2	-9	-9	7.689	-9	-9	-9	2222222222112990
2	1	28	19	200.2	1.827	33.4784	1.817	33.4659	206.87	70.6	32.67	0.03	2.42	4.608	1.987	-9	-9	7.648	-9	-9	-9	2222222222112990
2	1	29	18	298.5	2.172	33.6517	2.1559	33.6352	157.17	83.7	35.27	0.03	2.83	3.206	1.339	-9	-9	7.61	-9	-9	-9	2222222222112990
2	1	30	17	402.3	3.335	33.9379	3.3069	33.9282	51.65	102.8	43.18	0.02	3.08	1.376	0.51	-9	-9	7.553	-9	-9	-9	2222222222112990
2	1	31	16	600.1	3.012	34.1073	2.9735	34.0954	42.7	120.4	42.89	0.01	3.11	0.846	0.317	-9	-9	7.523	-9	-9	-9	2222222222112990
2	1	32	15	765.9	3.907	34.2356	3.8513	34.2281	31.66	134.8	43	0	3.11	0.416	0.056	-9	-9	7.488	-9	-9	-9	2222222222112990
2	1	33	14	1001.8	2.636	34.3656	2.5711	34.3541	31.92	148.2	42.7	0	3.09	0.207	0	-9	-9	7.527	-9	-9	-9	2222222222112990
2	1	34	13	1199.8	2.447	34.4398	2.369	34.4291	35.31	156.3	43.3	0	3.11	0.093	0	-9	-9	7.532	-9	-9	-9	2222222222112990
2	1	35	12	1400.8	2.206	34.4905	2.1152	34.4802	51.14	160.6	42.4	0	3.02	0.093	0.205	-9	-9	7.562	-9	-9	-9	2222222222112990
2	1	36	11	1600.4	2.141	34.54	2.0354	34.5288	53.53	162.5	42.4	0	2.98	0.024	0.096	-9	-9	7.574	-9	-9	-9	2222222222112990
2	1	37	10	1801.6	2.02	34.5779	1.8998	34.567	65.43	162.7	41.6	0	2.93	0	0	-9	-9	7.586	-9	-9	-9	2222222222112990
2	1	38	9	1997.9	1.898	34.6012	1.7634	34.5903	79.54	162.5	40.6	0	2.87	0	0	-9	-9	7.618	-9	-9	-9	2222222222112990
2	1	39	8	2201.4	1.819	34.6256	1.6684	34.6137	91.94	-9	39.8	0	2.83	-9	-9	-9	-9	7.637	-9	-9	-9	2222122299112990
2	1	40	7	2401.9	1.743	34.6383	1.5763	34.6274	103.59	159.3	39.6	0	2.76	-9	-9	-9	-9	7.643	-9	-9	-9	2222122299112990
2	1	41	6	2599.3	1.664	34.6515	1.4811	34.6413	109.27	159.5	39	0	2.79	-9	-9	-9	-9	7.674	-9	-9	-9	2222122299112990
2	1	42	5	2800.7	1.609	34.6609	1.4087	34.6508	117.13	158.3	38.5	0	2.7	-9	-9	-9	-9	7.689	-9	-9	-9	2222122299112990
2	1	43	4	3001.5	1.561	34.6704	1.3428	34.6596	127.7	155.5	38.1	0	2.67	-9	-9	-9	-9	7.704	-9	-9	-9	2222122299112990
2	1	44	3	3200.1	1.528	34.6774	1.2912	34.6664	135.3	154.7	37.5	0	2.62	-9	-9	-9	-9	7.706	-9	-9	-9	2222122299112990
2	1	45	2	3399	1.498	34.6829	1.2422	34.6713	140.27	153.3	37	0	2.58	0.016	0.041	-9	-9	7.711	-9	-9	-9	2222222222112990
2	1	46	1	3400.3	1.498	34.6833	1.242	34.6711	140.4	152.3	37.6	0	2.58	0.039	0.051	-9	-9	7.716	-9	-9	-9	2222222222112990
3	1	47	23	8.4	13.393	32.8367	13.3919	32.8707	290.91	2.7	4.19	0.11	0.67	4.008	1.957	-9	-9	8.132	-0.927	-9	-9	2222222222112210
3	1	48	22	50.2	2.194	33.152	2.1914	33.1362	305.95	38.1	22.22	0.68	1.95	6.14	2.852	-9	-9	7.821	-0.891	-9	-9	2222222222112210
3	1	49	21	101	1.424	33.2738	1.4194	33.2542	274.71	52.4	27.66	0.04	2.23	5.502	2.541	-9	-9	7.74	-0.711	-9	-9	2222222222112210
3	1	50	20	150.1	1.461	33.3588	1.454	33.3372	248.69	59.1	29.17	0.03	2.35	5.263	2.431	-9	-9	7.706	-0.575	-9	-9	2222222222112210
3	1	51	19	198.7	1.552	33.4242	1.5425	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
3	1	52	18	298.8	1.809	33.5283	1.7938	33.5104	194.85	72.5	32.58	0.02	2.59	4.192	1.963	-9	-9	7.642	-0.521	-9	-9	2222222222112210
3	1	53	17	394.9	2.198	33.6565	2.1762	33.641	154.12	82.8	35.69	0.01	2.75	3.507	1.512	-9	-9	7.598	-0.351	-9	-9	2222222222112210
3	1	54	16	598.4	2.956	33.9659	2.918	33.951	64.57	106.9	41.49	0.01	3.11	1.551	0.685	-9	-9	7.517	-0.324	-9	-9	2222222222112210
3	1	55	15	599.1	2.955	33.9638	2.917	33.9514	64.57	106.9	41.49	0.01	3.1	1.495	0.787	-9	-9	7.52	-0.334	-9	-9	2222222222112210
3	1	56	14	799.5	2.989	34.1762	2.9365	34.1643	35.57	126.6	42.99	0.01	3.16	0.621	0.269	-9	-9	7.51	-0.24	-9	-9	2222222222112210
3	1	57	13	999.1	2.729	34.2907	2.6637	34.2766	34.24	140	43.09	0.01	3.18	0.394	0.256	-9	-9	7.513	-0.334	-9	-9	2222222222112210
3	1	58	12	1199.4	2.57	34.3938	2.491	34.3796	33.63	149.8	43.19	0.01	3.17	0.169	0.041	-9	-9	7.527	-0.156	-9	-9	2222222222112210
3	1	59	11	1399.6	2.395	34.4591	2.3023	34.4457	40.11	156.3	42.69	0.01	3.12	0.081	0.087	-9	-9	7.543	-0.188	-9	-9	2222222222112210
3	1	60	10	1601.3	2.244	34.5091	2.1371	34.4932	45.95	160	42.39	0.01	3.07	0.038	0.021	-9	-9	7.55	-0.138	-9	-9	2222222222112210
3	1	61	9	1798.2	2.128	34.5467	2.0067	34.5306	56.52	161	41.59	0.01	3.02	0.01	0.117	-9	-9	7.578	-0.135	-9	-9	2222222222112210
3	1	62	8	1998.6	2.046	34.5782	1.9092	34.5648	66.59	159.3	41.1	0	2.92	0	0.034	-9	-9	7.598	0.051	-9	-9	2222222222112210
3	1	63	7	2201.4	1.922	34.6083	1.7698	34.5951	78.35	160.5	40.7	0	2.88	-9	-9	-9	-9	7.611	0.11	-9	-9	2222222299112210
3	1	64	6	2401.9	1.818	34.626	1.65	34.6132	86.82	161.8	40	0	2.83	-9	-9	-9	-9	7.637	0.076	-9	-9	2222222299112210
3	1	65	5	2600.7	1.754	34.6421	1.5693	34.6277	100.75	157.4	39.2	0	2.79	-9	-9	-9	-9	7.659	-0.214	-9	-9	2222222299112210
3	1	66	4	2800.2	1.681	34.655	1.4793	34.642	110.84	156.1	38.5	0	2.76	-9	-9	-9	-9	7.672	-0.215	-9	-9	2222222299112210
3	1	67	3	2997.5	1.626	34.6639	1.4068	34.6498	117.31	156.1	38.1	0	2.73	-9	-9	-9	-9	7.679	-0.231	-9	-9	2222222299112210
3	1	68	2	3200.6	1.586	34.6723	1.3479	34.6577	125.84	154.2	37.5	0	2.69	-9	-9	-9	-9	7.692	-0.162	-9	-9	2222222299112210
3	1	69	1	3400.1	1.55	34.6797	1.2928	34.663	132.38	152.6	37.1	0	2.68	0	0.001	-9	-9	7.709	-0.136	-9	-9	2222222222112210
4	1	70	23	8.5	14.765	32.9783	14.7638	33.0019	270.5	1.9	1.83	0.07	0.48	3.655	1.612	-9	-9	8.149	-9	-9	-9	2222222222112990
4	1	71	22	48.9	2.407	33.1416	2.4044	33.1386	298.71	39.5	22.84	0.36	1.95	6.028	2.742	-9	-9	7.828	-9	-9	-9	2222222222112990
4	1	72	21	99.3	1.354	33.237	1.3495	33.2215	289.17	51.2	27.66	0.04	2.2	5.994	2.762	-9	-9	7.767	-9	-9	-9	2222222222112990
4	1	73	20	149	1.739	33.394	1.7317	33.3838	231.93	63.4	30.67	0.03	2.39	4.869	2.171	-9	-9	7.684	-9	-9	-9	2222222222112990

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	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	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
			*******			*******		*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	
4	1	74	19	200.2	1.955	33.5272	1.9447	33.5127	192.52	73.4	32.87	0.03	2.58	4.122	1.781	-9	-9	7.633	-9	-9	-9	222222222112990
4	1	75	18	299.6	2.336	33.7167	2.3194	33.7034	135.05	88	36.18	0.02	2.81	3.012	1.365	-9	-9	7.584	-9	-9	-9	222222222112990
4	1	76	17	399.9	2.563	33.8782	2.5396	33.8686	92.03	101.2	38.19	0.01	2.89	2.133	0.956	-9	-9	7.517	-9	-9	-9	222222222112990
4	1	77	16	599.9	2.942	34.1424	2.9038	34.1349	39.91	124.1	41.09	0.01	3.09	0.759	0.412	-9	-9	7.479	-9	-9	-9	222222222112990
4	1	78	15	800	2.851	34.2859	2.7992	34.275	28.96	138.1	42.59	0.01	3.15	0.288	0.071	-9	-9	7.5	-9	-9	-9	222222222112990
4	1	79	14	999.7	2.53	34.3758	2.466	34.3634	37.76	149.2	42.09	0.01	3.12	0.224	0.136	-9	-9	7.523	-9	-9	-9	222222222112990
4	1	80	13	1201.9	2.423	34.4485	2.345	34.4359	36.77	155.6	42.39	0.01	3.08	0.081	0.038	-9	-9	7.537	-9	-9	-9	222222222112990
4	1	81	12	1401.2	2.26	34.4957	2.1685	34.4833	47.34	158.9	41.39	0.01	3.01	0.051	0.018	-9	-9	7.559	-9	-9	-9	222222222112990
4	1	82	11	1602.5	2.076	34.5187	1.9711	34.5064	60.92	161	40.29	0.01	2.95	0.109	1.019	-9	-9	7.578	-9	-9	-9	222222222112990
4	1	83	10	1801.9	2.086	34.5583	1.9649	34.5455	62.05	161.2	40.09	0.01	2.92	0.001	0.053	-9	-9	7.591	9	-9	-9	222222222112990
4	1	84	9	2000.6	1.958	34.5842	1.8223	34.5707	70.65	163.7	39.39	0.01	2.89	0	0.051	-9	-9	7.605	-9	-9	-9	222222222112990
4	1	85	8	2199.3	1.868	34.6139	1.7168	34.6004	82.33	161.7	39.09	0.01	2.86	0	0.053	-9	-9	7.621	-9	-9	-9	222222222112990
4	1	86	7	2397.9	1.752	34.6387	1.5855	34.6265	97.52	158.4	38.09	0.01	2.79	-9	-9	-9	-9	7.657	-9	-9	-9	222222299112990
4	1	87	6	2400.1	1.769	34.6342	1.602	34.6227	95.52	160	38.49	0.01	2.83	-9	-9	-9	-9	7.654	-9	-9	-9	222222299112990
4	1	88	5	2599.9	1.686	34.6504	1.5026	34.6356	108.08	157.3	37.49	0.01	2.77	-9	-9	-9	-9	7.679	-9	-9	-9	222222299112990
4	1	89	4	2800.7	1.62	34.6616	1.4195	34.65	118.45	156.6	36.89	0.01	2.73	9	-9	-9	-9	7.686	-9	-9	-9	222222299112990
4	1	90	3	2999.8	1.571	34.6704	1.3527	34.6571	127.14	153.8	36.49	0.01	2.7	-9	-9	-9	-9	7.696	-9	-9	-9	222222299112990
4	1	91	2	3200.3	1.54	34.6767	1.3029	34.6648	133.33	152.9	35.89	0.01	2.68	-9	-9	-9	-9	7.706	-9	-9	-9	222222299112990
4	1	92	1	3400.4	1.52	34.6823	1.2635	34.6684	137.78	151.7	35.89	0.01	2.64	0.035	0.192	-9	-9	7.714	-9	-9	-9	222222222112990
5	1	93	23	10.5	8.396	32.892	8.395	32.8864	309.3	17	9.79	0.21	-9	5.163	2.248	-9	-9	8.058	-0.71	-9	-9	222222122112210
5	1	94	22	48.9	3.326	33.1433	3.323	33.1368	298.12	42.1	22.79	0.31	-9	5.682	2.622	-9	-9	7.848	-0.722	-9	-9	222222122112210
5	1	95	21	99.3	1.997	33.2529	1.992	33.2376	285.74	53.5	27.7	0.1	-9	5.698	2.582	-9	-9	7.77	-0.588	-9	-9	222222122112210
5	1	96	20	150.4	1.401	33.3118	1.3941	33.2991	267.82	60.1	30.1	-9	2.39	5.36	2.556	-9	-9	7.726	-0.561	-9	-9	222221222112210
5	1	97	19	199.3	3.092	33.6742	3.0799	33.6566	119.91	83.5	38.5	-9	2.87	2.856	1.332	-9	-9	7.544	-0.457	-9	-9	222221222112210
5	1	98	18	299.4	3.342	33.8837	3.3228	33.8708	59.58	97.2	41.5	-9	3.1	1.644	0.797	-9	-9	7.503	-0.275	-9	-9	222221222112210
5	1	99	17	399.2	3.357	34.0611	3.331	34.0495	33.13	-9	-9	-9	3.14	0.874	0.283	-9	-9	7.476	-0.315	-9	-9	222221222112210
5	1	100	16	598.8	3.191	34.2049	3.1516	34.193	23.94	127.1	42.7	-9	3.14	0.365	0.108	-9	-9	7.478	-0.261	-9	-9	222221222112210
5	1	101	15	799.4	2.949	34.3235	2.8966	34.3114	20.63	140	43.3	-9	3.14	0.118	0	-9	-9	7.51	-0.122	-9	-9	222221222112210
5	1	102	14	998.9	2.569	34.3991	2.5048	34.3856	31.91	-9	-9	-9	-9	0.113	0	-9	-9	7.525	-0.229	-9	-9	222211112112210
5	1	103	13	999.7	2.568	34.3989	2.5037	34.3865	30.65	151	41.9	-9	3.1	0.12	0	-9	-9	7.525	-0.107	-9	-9	222221222112210
5	1	104	12	1200.2	2.191	34.4553	2.1153	34.4415	52.78	158.7	41.1	-9	3.02	0.171	0.006	-9	-9	7.55	-0.097	-9	-9	222221222112210
5	1	105	11	1400.4	2.125	34.5002	2.0351	34.4874	55.69	160.8	40.9	-9	3.01	0.089	0.001	-9	-9	7.571	-0.188	-9	-9	222221222112210
5	1	106	10	1599.2	2.016	34.5328	1.912	34.5186	64.6	162.6	40.5	-9	2.95	-9	-9	-9	-9	7.586	-0.209	-9	-9	222221222112210
5	1	107	9	1800.8	1.914	34.5669	1.7954	34.5526	76.51	162.6	39.6	-9	2.9	-9	-9	-9	-9	7.618	-0.14	-9	-9	222221299112210
5	1	108	8	2001.1	1.866	34.584	1.7317	34.5714	82.08	162.6	39.5	0	2.88	0.007	0.002	-9	-9	7.618	-0.29	-9	-9	222222299112210
5	1	109	7	2199.2	1.8	34.6242	1.6499	34.6099	89.82	162.4	38.9	0	2.9	-9	-9	-9	-9	7.642	-0.117	-9	-9	222222299112210
5	1	110	6	2399.3	1.693	34.6451	1.5274	34.6305	103.53	160.8	38.5	0	2.83	-9	-9	-9	-9	7.655	-0.208	-9	-9	222222299112210
5	1	111	5	2599.9	1.623	34.6582	1.4408	34.6428	113.44	158.4	37	0	2.79	-9	-9	-9	-9	7.676	-0.03	-9	-9	222222299112210
5	1	112	4	2800.9	1.551	34.6708	1.3519	34.6544	124.46	156.4	37.2	0	2.74	-9	-9	-9	-9	7.698	-0.109	-9	-9	222222299112210
5	1	113	3	3002.2	1.496	34.6809	1.2791	34.6644	133.03	154.5	36.7	0	2.69	-9	-9	-9	-9	7.709	-0.161	-9	-9	222222299112210
5	1	114	2	3001.2	1.496	34.6805	1.2792	34.6632	134.28	155.2	36.3	0	2.69	-9	-9	-9	-9	7.708	-0.079	-9	-9	222222299112210
5	1	115	1	3000.5	1.497	34.6812	1.2802	34.6622	134.07	159.1	36.8	0	2.71	0	0.055	-9	-9	7.716	-0.119	-9	-9	222222222112210
6	1	116	22	9.6	3.925	33.1165	3.9244	33.1384	288.64	43.8	21.91	0.19	1.93	5.308	2.533	-9	-9	7.853	-9	-9	-9	222223222112990
6	1	117	21	48.9	2.559	33.3399	2.5563	33.3225	247.32	58.8	27.65	0.15	2.28	4.867	2.32	-9	-9	7.762	-9	-9	-9	222223222112990
6	1	118	19	100.6	2.379	33.3925	2.3736	33.3721	233.9	62.8	29.07	0.13	2.36	4.824	2.193	-9	-9	7.725	-9	-9	-9	222223222112990
6	1	119	18	150.6	2.329	33.4176	2.3209	33.3994	225.55	64.8	29.96	0.14	2.44	4.732	2.126	-9	-9	7.72	-9	-9	-9	222223222112990
6	1	120	17	202.2	2.24	33.4446	2.2292	33.4214	218.97	66.9	30.87	0.13	2.48	4.508	2.051	-9	-9	7.691	-9	-9	-9	222223222112990
6	1	121	16	303.5	2.04	33.5052	2.024	33.4887	202.4	71.7	31.8	0.1	2.56	4.233	1.969	-9	-9	7.665	-9	-9	-9	222223222112990
6	1	122	14	404.2	2.533	33.6058	2.5096	33.5952	160.39	79.6	35.1	0.1	2.78	3.393	1.59	-9	-9	7.606	-9	-9	-9	222223222112990
6	1	123	13	600	2.067	33.7714	2.0334	33.7532	135.56	95.8	36.16	0.04	2.84	2.882	1.428	-9	-9	7.569	-9	-9	-9	222223222112990
6	1	124	12	804.3	2.264	34.1148	2.2159	34.0983	70.01	132.4	40.46	0.04	3.12	1.238	0.544	-9	-9	7.511	-9	-9	-9	222223222112990
6	1	125	10	1005.2	2.321	34.2996	2.2584	34.2846	50.82	148.7	41.86	0.04	3.16	0.561	0.135	-9	-9	7.517	-9	-9	-9	222223222112990
6	1	126	9	1203.1	2.21	34.4183	2.134	34.4015	52.51	156.8	41.66	0.04	3.16	0.292	0	-9	-9	7.545	-9	-9	-9	222223222112990
6	1	127	8	1201.2	2.211	34.4168	2.1352	34.3968	52	156.3	42.16	0.04	3.12	0.318	0.079	-9	-9	7.545	-9	-9	-9	222223222112990
6	1	128	7	1402.2	2.132	34.476	2.0419	34.4605	55.92	160	41.66	0.04	3.09	0.215	0.026	-9	-9	7.561	-9	-9	-9	222223222112990
6	1	129	6	1600.5	2.014	34.5169	1.91	34.5042	66.62	161.7	40.96	0.04	3.02	-9	-9	-9	-9	7.576	-9	-9	-9	222223299112290
6	1	130	5	1797.1	1.893	34.5553	1.775	34.5396	78.39	161.2	39.76	0.04	2.94	0.087	0.135	-9	-9	7.61	-9	-9	-9	222223222112290
6	1	131	4	1997.4	1.878	34.5968	1.7438	34.5813	-9	162.5	40.36	0.04	2.94	0.138	0.002	-9	-9	7.61	-9	-9	-9	221223299112990
6	1	132	3	2195.7	1.731	34.62	1.5824	34.6031	97.39	159.8	39.06	0.04	2.85	0	0.008	-9	-9	7.64	-9	-9	-9	222223222112290
6	1	133	2	2345.5	1.687	34.6406	1.5262	34.6226	102.69	159.3	39.06	0.04	2.82	0	0	-9	-9	7.643	-9	-9	-9	222223222112290
7	1	134	22	9.8	5.086	33.0381	5.0853	33.0578	300.95	34	16.3	0.2	1.51	5.451	2.482	-9	-9	7.904	-0.952	-9	-9	222222222112210
7	1	135	21	48.9	3.205	33.1385	3.2021	33.2425	268.18	51.1	24.02	0.18	2.03	5.115	2.231	-9	-9	7.802	-0.97	-9	-9	222222222112210
7	1	136	20	99.7	3.028	33.301	3.0221	33.2862	258.33	54.6	25.63	0.17	2.15	5.124	2.232	-9	-9	7.777	-9	-9	-9	222222222112110
7	1	137	19	149.9	2.731	33.3315	2.7225	33.3172	249.62	57.4	26.56	0.14	2.21	5.035	2.224	-9	-9	7.55	-9	-9	-9	222222222112110
7	1	138	18	200.6	2.41	33.3701	2.399	33.3528	240.24	60.1	27.88	0.12	2.29	4.89	2.179	-9	-9	7.728	-9	-9	-9	222222222112110
7	1	139	17	300.2	1.938	33.4179	1.9225	33.42	223.18	65.1	30.03	0.07	2.38	4.5	1.993	-9	-9	7.692	-0.836	-9	-9	222222222112210
7	1	140	16	398.8	2.105	33.5688	2.0834	33.558	190.37	78	32.77	0.03	2.56	-9	-9	-9	-9	7.647	-0.82	-9	-9	222222299112210
7	1	141	15	600.3	2.065	33.7787	2.0314	33.7653	134.23	96.7	36.2	0	2.75	2.915	1.227	-9	-9	7.586	-0.673	-9	-9	222222222112210
7	1	142	14	800.4	2.259	34.1257	2.2112	34.1116	64.31	135.3	40.7	0	3.04	1.161	0.455	-9	-9	7.525	-0.522	-9	-9	222222222112210
7	1	143	13	1001.1	2.328	34.2925	2.2657	34.2792	47.77	150.6	41.9	0	3.08	0.503	0.244	-9	-9	7.523	-0.503	-9	-9	222222222112210
7	1	144	12	1198.7	2.236	34.4211	2.1601	34.4058	51.5	156.4	42.2	0	3.1	0.203	0.096	-9	-9	7.549	-0.509	-9	-9	222222222112210
7	1	145	11	1400	2.131	34.4828	2.0411	34.469	55.07	159.3	42.3	0	3.06	0.11	0.001	-9	-9	7.586	-0.498	-9	-9	222222222112210
7	1	146	10	1602.8	2.064	34.516	1.9592	34.5015	59.18	161.4	42.2	0	3.03	0.067	0.018	-9	-9	7.583	-0.493	-9	-9	222222222112210
7	1	147	9	1599	2.065	34.5158	1.9605	34.5004	60.07	160.8	42	0	3.02	0.058	0	-9	-9	7.576	-0.504	-9	-9	222222222112210

STNNBR	CASTNO	SAMPNO	BTLNBR *******	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78 *******	THETA DEG	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 *******	TCARBN UMOL/KG *******	ALKALI UMOL/KG *******	PH *******	O18/O16 /MILLE *******	DELC13 /MILLE *******	TRITUM TU *******	QUALT1
7	1	148	8	1800	1.99	34.5449	1.8705	34.5301	65.74	162.2	41.8	0	2.99	0.029	0.513	-9	-9	7.592	-0.518	-9	-9	2222222222112210
7	1	149	7	2000.3	1.935	34.5665	1.7998	34.551	72.21	166.2	38.1	0	2.98	0.027	0.111	-9	-9	7.592	-0.169	-9	-9	2222222222112210
7	1	150	6	2201.2	1.903	34.5802	1.7512	34.5657	75.04	166.6	38.5	0	2.94	-9	-9	-9	-9	7.616	-0.278	-9	-9	2222222299112210
7	1	151	5	2400.3	1.868	34.5949	1.6994	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
7	1	152	4	2600.3	1.856	34.6028	1.6695	34.5892	82.6	168.6	37.8	0	2.9	-9	-9	-9	-9	7.632	-0.23	-9	-9	2222222299112210
7	1	153	3	2800.6	1.845	34.6108	1.6401	34.5966	85.37	169.6	37.8	0	2.87	-9	-9	-9	-9	7.632	-0.12	-9	-9	2222222299112210
7	1	154	2	2999.2	1.847	34.6149	1.623	34.6017	86.42	171.6	37.64	0.16	2.85	-9	-9	-9	-9	7.63	-0.172	-9	-9	2222223299112210
7	1	155	1	3200.7	1.858	34.6184	1.6138	34.6053	87.08	173.5	37.6	0	2.85	-9	-9	-9	-9	7.649	-0.149	-9	-9	2222222299112210
8	1	156	23	3	8.577	32.8289	8.5767	32.8513	312.08	16.5	6.36	0.14	0.84	5.041	2.318	-9	-9	8.029	-9	-9	-9	2222222222112990
8	1	157	22	49.9	2.719	33.1861	2.7162	33.1874	279.65	45.3	22.03	0.17	1.93	5.713	2.609	-9	-9	7.814	-9	-9	-9	2222222222112990
8	1	158	21	101.6	2.014	33.3179	2.0089	33.3122	250.97	56.9	26.17	0.13	2.22	5.088	2.333	-9	-9	7.741	-9	-9	-9	2222222222112990
8	1	159	20	150.7	2.065	33.3851	2.0572	33.367	237.79	61.7	27.96	0.14	2.32	4.802	2.175	-9	-9	7.731	-9	-9	-9	2222222222112990
8	1	160	19	200.9	2.077	33.4173	2.0665	33.398	228.93	64	28.47	0.13	2.37	4.731	2.089	-9	-9	7.716	-9	-9	-9	2222222222112990
8	1	161	18	300.3	1.321	33.4132	1.307	33.4068	225.82	63	28.89	0.01	2.37	4.78	2.182	-9	-9	7.697	-9	-9	-9	2222222222112990
8	1	162	17	400.6	1.271	33.4797	1.2521	33.4565	213.55	67	30.7	0	2.52	4.624	2.115	-9	-9	7.662	-9	-9	-9	2222222222112990
8	1	163	16	600.1	1.725	33.6711	1.6932	33.6522	159.76	84.2	33.2	0	2.67	3.537	1.661	-9	-9	7.608	-9	-9	-9	2222222222112990
8	1	164	15	800.1	2.056	33.9732	2.0097	33.958	91.65	120.5	38.5	0	2.92	1.807	0.826	-9	-9	7.542	-9	-9	-9	2222222222112990
8	1	165	14	1001.5	2.292	34.2084	2.2301	34.1937	54.24	146.1	37.3	-9	3.14	0.704	0.376	-9	-9	7.529	-9	-9	-9	2222221222112990
8	1	166	13	1201.4	2.3	34.3864	2.2234	34.3731	49.01	154.3	38.5	-9	3.19	0.291	0.13	-9	-9	7.554	-9	-9	-9	2222221222112990
8	1	167	12	1401.5	2.158	34.4586	2.0677	34.445	56.76	159.6	38.2	-9	3.2	0.182	0.06	-9	-9	7.571	-9	-9	-9	2222221222112990
8	1	168	11	1600.9	2.094	34.5026	1.989	34.4892	59.22	161.4	38.2	-9	3.19	0.076	0.078	-9	-9	7.581	-9	-9	-9	2222221222112990
8	1	169	10	1800.1	2.028	34.5294	1.908	34.5168	65.42	162.8	38	-9	3.16	0.053	0.047	-9	-9	7.599	-9	-9	-9	2222221222112990
8	1	170	9	2001.6	1.973	34.5557	1.8371	34.5429	70.19	164.3	38	-9	3.15	0.01	0.027	-9	-9	7.616	-9	-9	-9	2222221222112990
8	1	171	8	2199.5	1.921	34.5747	1.7691	34.5616	74.96	166.7	37.9	-9	3.14	-9	-9	-9	-9	7.616	-9	-9	-9	2222221299112990
8	1	172	7	2400.3	1.883	34.5899	1.7141	34.5768	78.75	167.7	37.9	-9	3.1	-9	-9	-9	-9	7.616	-9	-9	-9	2222221299112990
8	1	173	6	2598.9	1.872	34.5984	1.6854	34.5848	81.72	170.3	38.1	-9	3.1	-9	-9	-9	-9	7.618	-9	-9	-9	2222221299112990
8	1	174	5	2800	1.861	34.6068	1.6558	34.5929	84.65	168.8	38.1	-9	3.07	-9	-9	-9	-9	7.627	-9	-9	-9	2222221299112990
8	1	175	4	2999.6	1.852	34.614	1.6278	34.6008	87.3	170.2	38	-9	3.05	-9	-9	-9	-9	7.628	-9	-9	-9	2222221299112990
8	1	176	3	3199.6	1.85	34.6209	1.6061	34.6062	88.29	177	38.3	-9	3.04	-9	-9	-9	-9	7.647	-9	-9	-9	2222221299112990
8	1	177	2	3351.4	1.85	34.6246	1.5907	34.6102	92.6	167.2	38	-9	2.94	0	0.073	-9	-9	7.647	-9	-9	-9	2222221222112990
8	1	178	1	3350.1	1.85	34.6246	1.5909	34.6094	93.8	166.6	38.4	-9	2.89	0	0	-9	-9	7.65	-9	-9	-9	2222221222112990
9	1	179	23	9.4	11.94	32.4984	11.9388	32.4948	286.52	8.8	0.2	0	0.32	4.391	1.947	-9	-9	8.093	-0.824	-9	-9	2222222222112210
9	1	180	22	50.3	2.191	33.1063	2.1884	33.0944	-9	36.6	18.01	0.19	1.79	5.891	2.623	-9	-9	7.818	-0.676	-9	-9	2225222222112210
9	1	181	21	100	1.768	33.2583	1.7632	33.2398	265.63	48.4	22.56	0.02	2.06	5.556	2.488	-9	-9	7.748	-0.788	-9	-9	2222222222112210
9	1	182	20	150.1	1.534	33.3206	1.527	33.3062	252.93	53.7	24.3	0	2.22	5.159	2.248	-9	-9	7.736	-0.637	-9	-9	2222222222112210
9	1	183	19	199.6	1.559	33.3866	1.5495	33.3683	216.11	59.8	26.6	0	2.37	4.912	2.198	-9	-9	7.698	-0.728	-9	-9	2222222222112210
9	1	184	18	300.9	1.528	33.4839	1.5134	33.4645	212.42	67.5	28.1	0	2.5	4.517	2.058	-9	-9	7.679	-0.759	-9	-9	2222222222112210
9	1	185	17	400.1	1.513	33.5438	1.4933	33.5302	192.39	72.4	30	0	2.61	4.167	1.931	-9	-9	7.637	-0.775	-9	-9	2222222222112210
9	1	186	16	599.4	1.529	33.7162	1.4981	33.7032	143.53	91.6	32.6	0	2.83	3.345	1.472	-9	-9	7.574	-0.833	-9	-9	2222222222112210
9	1	187	15	800.4	2.121	34.0558	2.0741	34.0454	78.45	129.9	37.1	0	3.06	1.513	0.721	-9	-9	7.529	-0.567	-9	-9	2222222222112210
9	1	188	14	1000.9	2.312	34.2593	2.2499	34.2484	48.52	151.1	38.9	0	3.15	0.576	0.342	-9	-9	7.528	-0.503	-9	-9	2222222222112210
9	1	189	13	1198.7	2.247	34.3828	2.1711	34.3718	49.4	155.8	39.3	0	3.16	0.275	0.159	-9	-9	7.54	-0.448	-9	-9	2222222222112210
9	1	190	12	1397.5	2.172	34.4598	2.0819	34.4472	52.33	159.7	38.8	0	3.15	0.13	0.09	-9	-9	7.569	-0.49	-9	-9	2222222222112210
9	1	191	11	1599.2	2.095	34.4963	1.9902	34.4866	58.99	161.7	39.2	0	3.09	0.101	0.068	-9	-9	7.583	-0.502	-9	-9	2222222222112210
9	1	192	10	1799	2.041	34.5298	1.9209	34.5186	62.24	163	38.9	0	3.04	0.049	0.066	-9	-9	7.583	-0.505	-9	-9	2222222222112210
9	1	193	9	1798.6	2.04	34.5301	1.9199	34.5188	63.7	163.2	39.2	0	3.02	0.045	0.065	-9	-9	7.584	-0.451	-9	-9	2222222222112210
9	1	194	8	2000.1	1.993	34.5491	1.857	34.536	67.58	163.7	39	0	3.05	0.024	0.101	-9	-9	7.601	-0.513	-9	-9	3222222222112210
9	1	195	7	2200.8	1.937	34.5701	1.7847	34.5598	74.2	164.5	39.2	0	3.01	0.022	0.048	-9	-9	7.618	-0.528	-9	-9	2222222222112210
9	1	196	6	2400	1.895	34.5868	1.7259	34.5739	79.23	165.4	38.9	0	2.95	0.269	0.073	-9	-9	7.628	-0.531	-9	-9	2222222222112210
9	1	197	5	2599.8	1.872	34.5983	1.6853	34.5868	82.57	165.8	39.1	0	2.95	0.003	0.005	-9	-9	7.623	-0.414	-9	-9	2222222222112210
9	1	198	4	2801	1.859	34.6079	1.6537	34.5962	84.9	166.1	38.7	0	2.94	0.179	0.061	-9	-9	7.638	-0.469	-9	-9	2222222222112210
9	1	199	3	2998.7	1.856	34.6128	1.6318	34.601	87.32	168	38.8	0	2.97	0.003	0.052	-9	-9	7.638	-0.439	-9	-9	2222222222112210
9	1	200	2	3200	1.856	34.6164	1.6119	34.6066	89.06	169.5	38.4	0	2.97	0	0.102	-9	-9	7.623	-0.421	-9	-9	2222222222113210
9	1	201	1	3251.7	1.856	34.6198	1.6067	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
10	1	202	18	10.4	12.108	32.4516	12.1067	32.459	282.53	8.7	0.03	0.07	0.47	4.335	1.886	-9	-9	8.095	-9	-9	-9	2222222322112990
10	1	203	17	51.1	2.281	32.9559	2.2784	32.942	331.92	27	14.26	0.44	1.24	6.217	2.794	-9	-9	7.882	-9	-9	-9	2222222322112990
10	1	204	16	100.5	1.002	33.1863	0.9978	33.172	286.07	42.3	22.98	0.02	1.58	5.93	2.684	-9	-9	7.774	-9	-9	-9	2222222322112990
10	1	205	15	151.9	1.112	33.3302	1.1054	33.299	257.74	52.9	26.28	0.01	2.03	5.529	2.44	-9	-9	7.733	-9	-9	-9	2222222322112990
10	1	206	14	201.4	1.495	33.4184	1.4855	33.398	232.72	66.5	30.49	0.01	2.12	4.993	2.421	-9	-9	7.699	-9	-9	-9	2222222322112990
10	1	207	13	302.5	1.118	33.4631	1.1044	33.445	202.53	67	32.49	0.01	2.22	4.967	2.347	-9	-9	7.638	-9	-9	-9	2222222322112990
10	1	208	12	401.9	1.163	33.5483	1.1443	33.529	185.63	71.6	32.59	0.01	2.35	4.638	2.135	-9	-9	7.621	-9	-9	-9	2222222322112990
10	1	209	11	602.1	1.882	33.8596	1.8491	33.85	115.04	107.7	37.99	0.01	2.56	2.544	1.203	-9	-9	7.571	-9	-9	-9	2222222322112990
10	1	210	10	801.5	2.188	34.1237	2.1405	34.11	67.19	137.5	41.79	0.01	2.93	1.221	0.542	-9	-9	7.532	-9	-9	-9	2222222322112990
10	1	211	9	1001.3	2.324	34.2959	2.2617	34.282	47.51	150.9	42.29	0.01	2.99	0.494	0.271	-9	-9	7.529	-9	-9	-9	2222222322112990
10	1	212	8	1201.4	2.32	34.4102	2.2431	34.397	46.37	157.4	43.39	0.01	2.89	0.187	0.119	-9	-9	7.557	-9	-9	-9	2222222322112990
10	1	213	7	1400.5	2.2	34.4706	2.1093	34.456	54.42	160	42.59	0.01	2.8	0.126	0.161	-9	-9	7.574	-9	-9	-9	2222222322112990
10	1	214	6	1400.3	2.2	34.4702	2.1093	34.456	52.61	160.5	42.69	0.01	2.79	0.105	0.1	-9	-9	7.571	-9	-9	-9	2222222322112990
10	1	215	5	1600.1	2.092	34.5076	1.9871	34.493	59.55	162.6	39.29	0.01	2.84	0.122	0.18	-9	-9	7.584	-9	-9	-9	2222222322112990
10	1	216	4	1798.5	2.009	34.5417	1.8893	34.527	66.48	164.7	39.09	0.01	2.89	0.097	0.072	-9	-9	7.601	-9	-9	-9	2222222322112990
10	1	217	3	1999.3	1.956	34.5651	1.8205	34.55	70.88	166.6	39.29	0.01	2.89	0.06	0.111	-9	-9	7.598	-9	-9	-9	2222222322112990
10	1	218	2	2097.6	1.915	34.5789	1.7719	34.563	74.84	167.3	38.89	0.01	2.85	0.032	0.203	-9	-9	7.601	-9	-9	-9	2222222322112990
10	1	219	1	2100.2	1.916	34.5798	1.7726	34.563	75.11	168	36.99	0.01	2.86	0.019	0.043	-9	-9	7.601	-9	-9	-9	2222222322112990
11	1	220	14	9.2	10.93	32.6199	10.9289	32.6293	291.16	10.3	1.72	0.08	0.43	4.229	2.041	-9	-9	8.074	-1.132	-9	-9	2222222322112210
11	1	221	13	50.1	0.764	33.0151	0.762	32.9902	336.43	30.4	16.82	0.28	1.52	7.398	3.354	-9	-9	7.841	-0.922	-9	-9	2222222322112210

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	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	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
			*******			*******		*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	
11	1	222	12	101.7	0.438	33.1948	0.4342	33.1634	314.26	42.7	22.27	0.03	1.84	6.901	3.15	9	-9	7.775	-0.867	-9	-9	2222222322112210
11	1	223	11	150.4	0.722	33.3214	0.716	33.2942	266.11	52.7	25.9	0	2.1	5.822	2.603	-9	-9	7.709	0.858	-9	-9	2222222322112210
11	1	224	10	201.1	1.061	33.4115	1.0522	33.3837	225.4	61.6	28.6	0	2.26	4.923	2.199	-9	-9	7.649	-0.756	-9	-9	2222222322112210
11	1	225	9	200.1	1.047	33.4081	1.0383	33.3819	226.94	61.6	29	0	2.26	4.692	2.618	-9	-9	7.649	-0.789	-9	-9	2222222322112210
11	1	226	8	303.7	1.265	33.5112	1.2509	33.4864	184.45	71.7	32	0	2.48	4.721	2.264	-9	-9	7.608	-0.807	-9	-9	2222222322112210
11	1	227	7	403.5	1.56	33.6248	1.5399	33.6014	165.94	79.9	32.3	0	2.45	4.049	1.859	-9	-9	7.594	-0.736	-9	-9	2222222322112210
11	1	228	6	601.8	2.155	33.9047	2.1208	33.8846	102.18	108.8	36.7	0	2.66	2.288	1.093	-9	-9	7.54	-0.706	-9	-9	2222222322112210
11	1	229	5	802.5	2.429	34.1725	2.3799	34.1513	54.79	136.9	40.1	0	2.81	0.953	0.427	-9	-9	7.517	-0.69	-9	-9	2222222322112210
11	1	230	4	999.2	2.374	34.3364	2.3114	34.3175	40.44	160	41.2	0	2.82	0.436	0.189	-9	-9	7.515	-0.597	-9	-9	2222222322112210
11	1	231	3	1197.2	2.345	34.3853	2.2683	34.3664	53.96	166	41.4	0	2.87	0.215	0.132	-9	-9	7.523	-0.577	-9	-9	2222222322112210
11	1	232	2	1198.6	2.346	34.3852	2.2691	34.3671	39.32	165.7	42.2	0	2.86	0.208	0.162	-9	-9	7.525	-0.584	-9	-9	2222222322112210
11	1	233	1	1296.7	2.322	34.4305	2.238	34.4096	56.97	166.8	41.8	0	2.8	0.137	0.096	-9	-9	7.542	-0.597	-9	-9	2222222322112210
12	1	234	13	9.6	11.087	32.4346	11.0859	32.4945	301.28	10.8	0.06	0.14	0.34	4.461	2.009	-9	-9	8.081	-9	-9	-9	2222222322112990
12	1	235	12	49.8	0.393	33.0334	0.3912	33.0058	329.8	32.1	18.42	0.18	1.45	6.616	2.888	-9	-9	7.824	-9	-9	9	2222222322112990
12	1	236	11	98.8	0.497	33.2412	0.4933	33.2127	298.85	47.6	25.16	0.14	2.13	6.095	2.8	-9	-9	7.762	-9	-9	-9	2222222322112990
12	1	237	10	149.9	0.968	33.3755	0.9617	33.3505	242.36	59.5	28.9	0	2.15	5.259	2.405	9	-9	7.686	-9	-9	-9	2222222322112990
12	1	238	9	200.3	1.157	33.4432	1.1481	33.419	210.41	67	30.9	0	2.3	4.639	2.067	-9	-9	7.649	-9	-9	-9	2222222322112990
12	1	239	8	300.8	1.113	33.5302	1.0994	33.5046	172.7	77.2	32.8	0	2.5	4.282	1.923	-9	-9	7.591	-9	-9	-9	2222222322112990
12	1	240	7	299.7	1.112	33.53	1.0985	33.5049	172.93	74.6	32.7	0	2.53	4.229	1.874	-9	-9	7.594	-9	-9	-9	2222222322112990
12	1	241	6	400.4	1.572	33.6733	1.552	33.6509	148.92	86.9	33.8	0	2.55	3.497	1.509	-9	-9	7.567	-9	-9	-9	2222222322112990
12	1	242	5	600.3	2.148	33.9663	2.1138	33.9482	83.73	119.1	37.8	0	2.76	1.718	0.754	-9	-9	7.532	-9	-9	-9	2222222322112990
12	1	243	4	799.9	2.489	34.2254	2.4396	34.2106	48.6	140.1	40.6	0	2.9	0.771	0.314	-9	-9	7.529	-9	-9	-9	2222222322112990
12	1	244	3	898.8	2.46	34.3085	2.4038	34.2881	43.96	147.9	40.5	0	2.91	0.458	0.251	-9	-9	7.52	-9	-9	-9	2222222322112990
12	1	245	2	900	2.461	-9	2.456	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	2999999999999990
12	1	246	1	900	2.462	-9	2.457	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4999999999999990
13	1	247	12	9.5	11.507	32.4732	11.5058	32.509	290.42	11.4	0.35	0.05	0.41	4.436	1.983	-9	-9	8.08	-9	-9	-9	2222222322112990
13	1	248	11	49	0.579	32.9895	0.5772	32.9792	336.39	31.4	17.55	0.15	1.53	6.905	3.121	-9	-9	7.831	-9	-9	-9	2222222322112990
13	1	249	10	100	0.372	33.1965	0.3684	33.1694	311.27	45	22.59	0.01	1.88	6.538	2.909	-9	-9	7.772	-9	-9	-9	2222222322112990
13	1	250	9	150.1	0.239	33.2939	0.2336	33.2643	271.22	49.5	24.7	0	2.07	5.814	2.655	-9	-9	7.725	-9	-9	-9	2222222322112990
13	1	251	8	199.3	1.043	33.4447	1.0343	33.3986	202.89	63.8	28.8	0	2.34	4.939	2.255	-9	-9	7.65	-9	-9	-9	2222222322112990
13	1	252	7	299.5	1.395	33.5333	1.3808	33.5137	179.91	75	31.6	0	2.54	4.374	1.924	-9	-9	7.593	-9	-9	-9	2222222322112990
13	1	253	6	399.1	1.511	33.6188	1.4913	33.5976	157.46	81.5	32.4	0	2.66	3.871	1.784	-9	-9	7.579	-9	-9	-9	2222222322112990
13	1	254	5	599.8	2.09	33.9178	2.0562	33.8965	95.93	112.8	36.2	0	2.74	2.105	0.916	-9	-9	7.534	-9	-9	-9	2222222322112990
13	1	255	4	799.3	2.4	34.1966	2.3512	34.1776	51	141.2	38.6	0	2.89	0.807	0.29	-9	-9	7.508	-9	-9	-9	2222222322112990
13	1	256	3	997.7	2.375	34.3523	2.3125	34.3327	39.92	157.7	39.1	0	2.95	0.3	0.124	-9	-9	7.529	-9	-9	-9	2222222322112990
13	1	257	2	1062.1	2.322	34.4071	2.2552	34.3839	40.41	166.8	39	0	2.94	0.204	0.074	-9	-9	7.534	-9	-9	-9	2222222322112990
13	1	258	1	1062.3	2.323	34.4064	2.2562	34.3844	41.32	165.9	39.3	0	2.92	0.216	0	-9	-9	7.542	-9	-9	-9	2222222322112990
14	1	259	21	10.1	11.881	32.3135	11.8797	32.325	284.3	1.9	0.2	0	0.16	4.306	1.917	-9	-9	8.167	-9	-9	-9	2222222322112990
14	1	260	19	51	-0.093	32.9019	-9	32.871	346	25.7	14.96	0.54	1.4	7.14	3.15	-9	-9	7.853	-9	-9	-9	2222222322112990
14	1	261	18	77.7	-0.347	33.0551	-9	33.014	329.19	31.8	17.69	0.01	1.58	6.709	3.02	-9	-9	7.816	-9	-9	-9	2222222322112990
14	1	262	16	101.6	-0.331	33.1785	-9	33.162	310.21	38.1	20.7	0	1.78	6.647	2.947	-9	-9	7.789	-9	-9	-9	2222222322112990
14	1	263	15	153.8	-0.389	33.2994	-9	33.265	264.52	49.7	24.8	0	2.07	6.05	2.814	-9	-9	7.716	-9	-9	-9	2222222322112990
14	1	264	14	210.1	0.688	33.4067	0.6795	33.378	217.28	61.5	28	0	2.33	5.412	2.505	-9	-9	7.64	-9	-9	-9	2222222322112990
14	1	265	13	206.4	0.665	33.4007	0.6567	33.372	219.87	60.7	27.8	0	2.33	5.264	2.301	-9	-9	7.643	-9	-9	-9	2222222322112990
14	1	266	11	304.2	1.004	33.5256	0.9905	33.502	173.39	73	31.1	0	2.6	4.538	2.014	-9	-9	7.594	-9	-9	-9	2222222322112990
14	1	267	10	402.6	1.43	33.6606	1.4103	33.644	147.06	86.5	31.5	0	2.58	3.646	1.603	-9	-9	7.576	-9	-9	-9	2222222322112990
14	1	268	8	602.2	2.09	33.978	2.056	33.96	84.14	121.5	35.8	0	2.74	1.803	0.789	-9	-9	7.552	-9	-9	-9	2222222322112990
14	1	269	7	798.8	2.308	34.1836	2.2599	34.162	53.13	144.5	37.8	0	2.88	0.882	0.331	-9	-9	7.54	-9	-9	-9	2222222322112990
14	1	270	5	998.7	2.377	34.3354	2.3144	34.316	40.71	156	38.5	0	2.88	0.398	0.098	-9	-9	7.532	-9	-9	-9	2222222322112990
14	1	271	3	1199.1	2.288	34.4385	2.2115	34.416	41.16	170.4	38.3	0	2.92	0.165	0.05	-9	-9	7.547	-9	-9	-9	2222222322112990
15	1	272	14	8.9	12.131	32.4162	12.1299	32.425	282.76	5.5	0.2	0	0.27	4.138	1.837	-9	-9	8.124	-1.255	-9	-9	2222222322112210
15	1	273	13	51.1	0.452	32.903	0.4502	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
15	1	274	12	74.3	-0.326	33.0427	-9	33.012	333.05	30	19.93	0.07	1.79	6.821	3.135	-9	-9	7.821	-1.073	-9	-9	2222222322112210
15	1	275	11	104.3	-0.157	33.167	-9	33.13	316.34	39.2	22.69	0.01	1.99	6.605	2.951	-9	-9	7.784	-1.007	-9	-9	2222222322112210
15	1	276	10	103.2	-0.044	33.1698	-9	33.13	316.08	39.2	22.69	0.01	1.99	6.616	3.02	-9	-9	7.787	-1.083	-9	-9	2222222322112210
15	1	277	9	151.1	0.37	33.3101	0.3644	33.286	257.75	50.6	27.59	0.01	2.35	5.747	2.591	-9	-9	7.716	-1.035	-9	-9	2222222322112210
15	1	278	8	199.6	0.803	33.4111	0.7947	33.385	213.01	61.8	31.19	0.01	2.62	5.19	2.346	-9	-9	7.638	-0.958	-9	-9	2222222322112210
15	1	279	7	303.7	1.182	33.5481	1.1681	33.525	159.18	77.1	35.09	0.01	2.91	4.253	1.881	-9	-9	7.561	-0.881	-9	-9	2222222322113210
15	1	280	6	402.8	1.518	33.7018	1.498	33.675	135.83	90.4	35.29	0.01	2.9	3.328	1.43	-9	-9	7.561	-0.714	-9	-9	2222222322112210
15	1	281	5	601.8	2.142	34.0047	2.108	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	4299999999999990
15	1	282	4	802	2.329	34.1979	2.2805	34.18	49.67	144.4	41.09	0.01	3.16	0.781	0.28	-9	-9	7.523	-0.496	-9	-9	2222222322112210
15	1	283	3	1001.6	2.354	34.3355	2.2914	34.316	36.68	162.4	41.89	0.01	3.23	0.307	0.114	-9	-9	7.527	-0.412	-9	-9	2222222322112210
15	1	284	2	1201	2.297	34.4294	2.2203	34.41	37.84	170.5	41.79	0.01	3.2	0.158	0.038	-9	-9	7.547	-0.446	-9	-9	2222222322112210
15	1	285	1	1248.2	2.265	34.4514	2.1851	34.433	41.22	173.5	40.79	0.01	3.28	0.205	0.025	-9	-9	7.552	-0.438	-9	-9	2222222322112210
16	1	286	14	9.9	12.074	32.5755	12.0727	32.584	283.27	10.1	0.2	0	0.31	4.216	1.925	-9	-9	8.132	-9	-9	-9	2222222322112990
16	1	287	13	48.3	-0.008	32.9325	-9	32.872	353.89	22	13.92	0.48	1.6	7.425	3.474	-9	-9	7.855	-9	-9	-9	2222222322112990
16	1	288	12	76	-0.298	33.0476	-9	33.01	336.71	31.9	19.59	0.01	1.82	7.232	3.421	-9	-9	7.807	-9	-9	-9	2222222322112990
16	1	289	11	99.8	-0.489	33.1247	-9	33.1	306.42	36.3	21.49	0.01	1.94	6.662	3.12	-9	-9	7.787	-9	-9	-9	2222222322112990
16	1	290	10	151.3	0.601	33.3464	0.5951	33.319	242.6	56.2	28.49	0.01	2.44	5.383	2.537	-9	-9	7.689	-9	-9	-9	2222222322112990
16	1	291	9	201.3	0.768	33.4276	0.7597	33.394	204.55	64.7	31.69	0.01	2.69	5.02	2.361	-9	-9	7.628	-9	-9	-9	2222222322112990
16	1	292	8	302.3	0.956	33.5223	0.9428	33.497	169.31	73.9	33.19	0.01	2.89	4.426	2.122	-9	-9	7.579	-9	-9	-9	2222222322112990
16	1	293	7	401.3	1.342	33.6417	1.3227	33.619	147.87	84.6	33.99	0.01	2.85	3.646	1.718	-9	-9	7.571	-9	-9	-9	2222222322112990
16	1	294	6	400.8	1.345	33.6418	1.3257	33.619	147.95	84.1	33.49	0.01	2.9	3.805	1.847	-9	-9	7.579	-9	-9	-9	2222222322112990
16	1	295	5	601.1	2.134	33.9684	2.0998	33.95	77.15	119.7	37.99	0.01	3.06	1.756	0.885	-9	-9	7.545	-9	-9	-9	2222222322112990

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	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	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
16	1	296	4	798.9	2.319	34.193	2.2708	34.175	40.47	144	39.99	0.01	3.1	0.816	0.44	-9	-9	7.523	-9	-9	-9	2222222322112990
16	1	297	3	998.3	2.358	34.3362	2.2956	34.319	37.39	159.8	42.29	0.01	3.15	0.301	0.246	-9	-9	7.534	-9	-9	-9	2222222322112990
16	1	298	2	1198.8	2.314	34.4166	2.2374	34.399	35.33	172.8	42.19	0.01	3.19	0.139	0.158	-9	-9	7.529	-9	-9	-9	2222222322112990
16	1	299	1	1279.3	2.25	34.4612	2.1679	34.442	42.48	171.2	41.99	0.01	3.17	0.163	0.158	-9	-9	7.537	-9	-9	-9	2222222322112990
17	1	300	14	9.2	11.621	32.5786	11.6199	32.592	287.92	6.4	0.38	0.02	0.3	4.295	1.901	-9	-9	8.068	-9	-9	-9	2222222322112990
17	1	301	13	50.9	0.163	32.9448	0.1613	32.912	324.35	26.5	15.83	0.67	1.58	7.162	3.194	-9	-9	7.833	-9	-9	-9	2222222322112990
17	1	302	12	75.7	-0.502	33.0379	-9	33.011	336.25	31.2	19.38	0.02	1.77	6.867	3.133	-9	-9	7.799	-9	-9	-9	2222222322112990
17	1	303	11	101.1	0.106	33.1828	0.1025	33.154	314.08	42.1	23.69	0.01	2.04	6.469	2.92	-9	-9	7.776	-9	-9	-9	2222222322112990
17	1	304	10	150.6	0.487	33.3209	0.4813	33.294	257.03	53.5	28.39	0.01	2.37	5.647	2.564	-9	-9	7.691	-9	-9	-9	2222222322112990
17	1	305	9	202.5	0.704	33.4036	0.6958	33.38	210.68	63.8	31.60	0.01	2.65	5.122	2.368	-9	-9	7.617	-9	-9	-9	2222222322112990
17	1	306	8	301.2	1.129	33.5324	1.1154	33.506	159.27	76.5	35.30	0.01	2.91	-9	-9	-9	-9	7.554	-9	-9	-9	2222222399112990
17	1	307	7	403	1.501	33.6587	1.4811	33.638	142.19	87.3	35.69	0.01	2.88	-9	-9	-9	-9	7.554	-9	-9	-9	2222222399112990
17	1	308	6	602.9	2.158	33.9772	2.1236	33.958	82.22	119.9	40.19	0.01	3.06	1.797	0.895	-9	-9	7.529	-9	-9	-9	2222222322112990
17	1	309	5	802.7	2.303	34.1933	2.2546	34.175	48.61	146.8	40.29	0.01	3.17	0.709	0.421	-9	-9	7.527	-9	-9	-9	2222222322112990
17	1	310	4	801.8	2.302	34.1922	2.2537	34.175	48.54	146.8	41.19	0.01	3.18	0.807	0.422	-9	-9	7.512	-9	-9	-9	2222222322112990
17	1	311	3	999.9	2.361	34.3219	2.2985	34.303	36.45	159.7	41.89	0.01	3.24	0.341	0.242	-9	-9	7.501	-9	-9	-9	2222222322113990
17	1	312	2	1200	2.32	34.4118	2.2432	34.395	36.63	170.3	42.59	0.01	3.18	0.168	0.137	-9	-9	7.529	-9	-9	-9	2222222322112990
17	1	313	1	1259	2.267	34.4182	2.1863	34.419	35.8	187.8	41.29	0.01	3.18	0.066	0.053	-9	-9	7.539	-9	-9	-9	2222222322112990
18	1	314	15	9.2	12.259	32.6707	12.2578	32.686	280.37	1.5	0.58	0.02	0.5	4.119	1.869	-9	-9	8.1	-9	-9	-9	2222222322112990
18	1	315	14	50.8	0.04	32.9548	0.0383	32.853	358.54	20.4	13.57	0.43	1.5	7.445	3.355	-9	-9	7.875	-9	-9	-9	2222222322112990
18	1	316	13	73.5	-0.772	32.964	-9	32.932	346.34	25.8	17.25	0.15	1.65	7.351	3.269	-9	-9	7.826	-9	-9	-9	2222222322112990
18	1	317	12	99.8	-0.87	33.0918	-9	33.055	328.79	31.9	20.19	0.01	1.88	7.019	3.277	-9	-9	7.788	-9	-9	-9	2222222322112990
18	1	318	11	150.4	0.144	33.3162	0.1387	33.281	248.15	56.4	28.19	0.01	2.45	5.583	2.555	-9	-9	7.666	-9	-9	-9	2222222322112990
18	1	319	10	200.6	0.663	33.4158	0.6549	33.396	195.04	67.2	33.39	0.01	2.79	4.914	2.491	-9	-9	7.603	-9	-9	-9	2222222322112990
18	1	320	9	301.5	0.996	33.5256	0.9827	33.503	155.4	77.5	35.89	0.01	2.98	4.249	1.985	-9	-9	7.542	-9	-9	-9	2222222322112990
18	1	321	8	400.9	1.399	33.6625	1.3795	33.644	133.37	89.7	36.19	0.01	2.96	3.595	1.619	-9	-9	7.539	-9	-9	-9	2222222322112990
18	1	322	7	603.8	2.147	34.006	2.1126	33.99	73.47	123.8	40.29	0.01	3.12	1.556	0.772	-9	-9	7.5	-9	-9	-9	2222222322112990
18	1	323	6	601	2.143	34.0036	2.1088	33.988	73.99	123.8	40.29	0.01	3.11	1.537	0.741	-9	-9	7.505	-9	-9	-9	2222222322112990
18	1	324	5	801.9	2.327	34.1989	2.2785	34.182	45.78	146.8	41.09	0.01	3.21	0.752	0.478	-9	-9	7.505	-9	-9	-9	2222222322112990
18	1	325	4	999.4	2.364	34.3357	2.3014	34.321	33.24	163.6	42.89	0.01	-9	0.313	0.223	-9	-9	7.497	-9	-9	-9	2222222122112990
18	1	326	3	1199.9	2.325	34.4106	2.2482	34.397	31.28	175.2	42.39	0.01	3.23	0.136	0.154	-9	-9	7.514	-9	-9	-9	2222222322112990
18	1	327	2	1399.7	2.3	34.4454	2.2084	34.43	29.8	198.9	42.49	0.01	3.26	0.109	0.227	-9	-9	7.515	-9	-9	-9	2222222322112990
18	1	328	1	1400.3	2.3	34.4449	2.2083	34.428	30.15	198.4	42.09	0.01	3.24	0.106	0.146	-9	-9	7.517	-9	-9	-9	2222222322112990
19	1	329	15	11	12.356	32.1992	12.3546	32.238	282.54	1.9	0.48	0.02	0.34	4.162	1.934	-9	-9	8.092	-1.325	-9	-9	2222222222112210
19	1	330	14	50.6	-0.597	32.9053	-9	32.875	358.02	22.8	15.15	0.45	1.53	7.541	3.543	-9	-9	7.845	-1.132	-9	-9	2222222222112210
19	1	331	13	76.8	-0.878	33.0288	-9	32.984	340.44	30.2	19.46	0.04	1.69	7.24	3.415	-9	-9	7.801	-1.053	-9	-9	2222222222112210
19	1	332	12	101.1	-1.016	33.1251	-9	33.087	323.21	33.8	21.37	0.03	1.85	6.853	3.207	-9	-9	7.781	-1.059	-9	-9	2222222222112210
19	1	333	11	146.2	0.106	33.3072	0.1009	33.286	245.55	55.7	28.78	0.02	2.4	5.815	2.729	-9	-9	7.662	-1.001	-9	-9	2222222222112210
19	1	334	10	199.2	0.665	33.4124	0.657	33.391	199.38	66.7	32.59	0.01	2.64	5.155	2.423	-9	-9	7.605	-0.767	-9	-9	2222222222112210
19	1	335	9	299	0.995	33.5279	0.9818	33.508	154.45	78.3	35.79	0.01	2.86	4.425	2.047	-9	-9	7.548	-0.732	-9	-9	2222222222112210
19	1	336	8	394.9	1.366	33.658	1.3469	33.639	135.84	89.9	35.89	0.01	2.88	3.646	1.743	-9	-9	-9	-0.683	-9	-9	2222222222119210
19	1	337	7	600.9	2.107	33.9783	2.073	33.963	78.69	122.3	39.59	0.01	2.98	1.781	0.862	-9	-9	7.532	-0.58	-9	-9	2222222222112210
19	1	338	6	802.1	2.322	34.1898	2.2736	34.173	47.23	145.3	41.79	0.01	3.11	0.787	0.545	-9	-9	7.517	-0.373	-9	-9	2222222222112210
19	1	339	5	998.1	2.368	34.3297	2.3055	34.315	33.57	161.3	42.29	0.01	3.09	0.278	0.036	-9	-9	7.507	-0.479	-9	-9	2222222222112210
19	1	340	4	997.6	2.368	34.3299	2.3056	34.314	33.65	160.7	42.49	0.01	3.06	0.338	0.36	-9	-9	-9	-0.53	-9	-9	2222222222119210
19	1	341	3	1200	2.33	34.4073	2.2531	34.391	29.89	176.5	42.59	0.01	3.09	0.15	0.081	-9	-9	7.534	-0.56	-9	-9	2222222222112210
19	1	342	2	1398.8	2.318	34.4318	2.2263	34.417	28.6	187.2	41.99	0.01	3.12	0.088	0.052	-9	-9	7.531	-0.532	-9	-9	2222222222112210
19	1	343	1	1600.9	2.325	34.4464	2.2173	34.431	24.22	210.7	42.19	0.01	3.21	0.122	0.108	-9	-9	7.527	-0.529	-9	-9	2222222222112210
20	1	472	15	10.4	11.296	32.5984	11.2947	32.6	284.35	3	1.18	0.02	0.44	4.355	1.904	-9	-9	8.09	-9	-9	-9	2222222222112990
20	1	473	14	50.7	-0.378	32.9181	-9	32.893	349.49	15.3	14.52	0.38	1.52	7.446	3.306	-9	-9	7.845	-9	-9	-9	2222222222112990
20	1	474	13	99.9	-1.075	33.1398	-9	33.109	318.01	33	21.58	0.02	1.78	6.813	3.135	-9	-9	7.779	-9	-9	-9	2222222222112990
20	1	475	12	150.7	0.474	33.3582	0.4683	33.346	220.2	61.8	31.09	0.01	2.5	5.168	2.355	-9	-9	7.643	-9	-9	-9	2222222222112990
20	1	476	11	199.6	0.86	33.4489	0.8516	33.427	186.93	69.7	33.88	0.02	2.67	4.706	2.08	-9	-9	7.571	-9	-9	-9	2222222222112990
20	1	477	10	299.2	1.165	33.5569	1.1514	33.535	133.89	79.9	35.99	0.01	2.82	3.902	1.698	-9	-9	7.531	-9	-9	-9	2222222222112990
20	1	478	9	374.6	1.389	33.649	1.3709	33.629	132.1	87.9	36.18	0.02	2.81	3.472	1.57	-9	-9	7.531	-9	-9	-9	2222222222112990
20	1	479	8	599.5	2.136	34.0003	2.1019	33.983	74.65	124.4	39.58	0.02	2.95	1.554	0.634	-9	-9	7.517	-9	-9	-9	2222222222112990
20	1	480	7	800	2.321	34.1997	2.2727	34.183	46.67	148.9	41.27	0.03	3.06	0.724	0.314	-9	-9	7.5	-9	-9	-9	2222222222112990
20	1	481	6	799.8	2.321	34.2002	2.2727	34.184	46.05	147.9	41.68	0.02	3.05	0.71	0.27	-9	-9	-9	-9	-9	-9	2222222222119990
20	1	482	5	999.6	2.363	34.3406	2.3004	34.323	32.27	164.3	42.45	0.05	3.09	0.247	0.099	-9	-9	7.515	-9	-9	-9	2222222222112990
20	1	483	4	1199.5	2.326	34.411	2.2492	34.394	29.96	178.7	42.36	0.04	3.09	0.121	0.01	-9	-9	7.531	-9	-9	-9	2222222222112990
20	1	484	3	1399.4	2.314	34.4348	2.2223	34.419	27.95	190.9	42.37	0.03	3.12	0.072	0	-9	-9	7.532	-9	-9	-9	2222222222112990
20	1	485	2	1599.4	2.326	34.4474	2.2184	34.431	22.16	218	42.2	0	3.22	0.065	0.025	-9	-9	7.527	-9	-9	-9	2222222222112990
20	1	486	1	1660.1	2.332	34.4493	2.2195	34.432	21.91	221.6	42.1	0	3.19	0.134	0	-9	-9	7.519	-9	-9	-9	2222222222112990
21	1	458	14	10.6	12.055	31.8903	12.0537	31.897	280.46	0.2	0.1	0	0.28	4.084	1.799	-9	-9	8.112	-9	-9	-9	2222222222112990
21	1	459	13	50.1	0.114	32.9073	0.1123	32.868	363.32	15.5	12.83	0.27	1.3	7.406	3.193	-9	-9	7.88	-9	-9	-9	2222222222112990
21	1	460	12	102.9	-1.077	33.065	-9	33.027	337.33	29.3	20.48	0.02	1.64	7.215	3.164	-9	-9	7.813	-9	-9	-9	2222222222112990
21	1	461	11	101.4	-1.052	33.0739	-9	33.034	335.14	31.4	20.79	0.01	1.69	7.22	3.087	-9	-9	7.815	-9	-9	-9	2222222222112990
21	1	462	10	152	0.371	33.3271	0.3654	33.295	242.22	56.2	30.18	0.02	2.31	5.591	2.411	-9	-9	7.656	-9	-9	-9	2222222222112990
21	1	463	9	202.2	0.861	33.435	0.8525	33.41	175.2	-9	-9	-9	-9	5.001	2.178	-9	-9	7.586	-9	-9	-9	2222111122112990
21	1	464	8	301.5	1.103	33.532	1.0894	33.509	154.47	78	36.59	0.01	2.77	4.283	1.801	-9	-9	7.544	-9	-9	-9	2222222222112990
21	1	465	7	403.1	1.55	33.6771	1.5299	33.657	134.8	90.1	36.79	0.01	2.73	3.469	1.499	-9	-9	7.544	-9	-9	-9	2222222222112990
21	1	466	6	601.9	2.139	33.9731	2.1047	33.955	81.4	121.6	40.59	0.01	2.9	1.798	0.72	-9	-9	7.531	-9	-9	-9	2222222222112990
21	1	467	5	802.4	2.367	34.2156	2.3182	34.197	43.14	148.3	42.99	0.01	3.04	0.713	0.241	-9	-9	7.497	-9	-9	-9	2222222222112990
21	1	468	4	1001.4	2.361	34.3522	2.2983	34.336	33.1	167.2	43.59	0.01	3.06	0.26	0.13	-9	-9	7.514	-9	-9	-9	2222222222112990

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	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	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
			....			....		....	....	....	....	....	....	....	....	....	....	....	....	....	....	
21	1	469	3	1201.2	2.325	34.4129	2.2481	34.392	30.81	178.9	43.89	0.01	3.08	0.126	0.008	-9	-9	7.526	-9	-9	-9	222222222112990
21	1	470	2	1399.3	2.313	34.4369	2.2213	34.42	27.98	191.9	44.18	0.02	3.1	0.084	0	-9	-9	7.526	-9	-9	-9	222222222112990
21	1	471	1	1600.1	2.326	34.4488	2.2184	34.43	25.32	217.5	43.38	0.02	3.18	0.152	0.058	-9	-9	7.531	-9	-9	-9	222222222112990
22	1	444	15	10.8	10.633	31.4676	10.6318	31.476	294.25	2.2	1.15	0.05	0.36	4.423	1.971	-9	-9	8.102	-9	-9	9	222222222112990
22	1	445	14	50.5	0.346	32.9333	0.3442	32.901	354	9.7	13.05	0.25	1.45	7.167	3.193	-9	-9	7.877	-9	-9	-9	222222222112990
22	1	446	13	100	-0.722	33.102	-9	33.066	328.63	33.9	21.78	0.02	1.78	7.245	3.222	-9	-9	7.796	-9	-9	-9	222222222112990
22	1	447	12	150	0.489	33.3088	0.4833	33.283	251.15	54.8	28.78	0.02	2.29	5.711	2.537	-9	-9	7.673	-9	-9	-9	222222222112990
22	1	448	11	203.3	1.05	33.4185	1.0412	33.392	208.76	65.4	32.48	0.02	2.52	4.976	2.194	-9	-9	7.623	-9	-9	-9	222222222112990
22	1	449	10	301	1.165	33.516	1.1513	33.493	162.56	76.1	35.04	0.06	2.73	4.312	1.853	-9	-9	7.546	-9	-9	-9	222223222112990
22	1	450	9	401.9	1.442	33.634	1.4223	33.613	139.48	86.6	35.48	0.02	2.71	3.606	1.559	-9	-9	7.536	-9	-9	-9	222222222112990
22	1	451	8	601.8	2.096	33.9411	2.062	33.925	86.96	117.5	39.37	0.03	2.89	1.881	0.762	-9	-9	7.519	-9	-9	-9	222222222112990
22	1	452	7	799.6	2.335	34.1756	2.2867	34.159	48.43	144.5	42.08	0.02	3.04	0.827	0.316	-9	-9	7.517	-9	-9	-9	222222222112990
22	1	453	6	998.9	2.36	34.3333	2.2975	34.318	34.02	165.4	42.98	0.02	3.03	0.316	0.109	-9	-9	7.504	-9	-9	-9	222222222112990
22	1	454	5	1195.7	2.333	34.4072	2.2564	34.39	31.72	178.6	43.29	0.01	3.06	0.168	0	-9	-9	7.526	-9	-9	-9	222222222112990
22	1	455	4	1198	2.333	34.4077	2.2563	34.391	31.62	178.6	43.47	0.03	3.09	0.168	0.054	-9	-9	7.526	-9	-9	-9	222223222112990
22	1	456	3	1398.5	2.321	34.4334	2.2293	34.417	29.9	189.8	43.57	0.03	3.12	0.119	0	-9	-9	7.514	-9	9	-9	222223222112990
22	1	457	1	1501.7	2.323	34.4435	2.2232	34.424	27.33	212.2	43.55	0.05	3.14	0.131	0.024	-9	-9	7.526	-9	-9	-9	222223222112990
23	1	431	13	10.6	9.355	31.4202	9.3539	31.503	315.41	3.2	2.54	0.06	0.47	5.075	2.218	-9	-9	8.078	-1.631	-9	-9	222222322112210
23	1	432	12	51.7	-0.086	32.9846	-9	32.945	343.95	17.1	15.49	0.31	1.54	7.338	3.22	-9	-9	7.843	-0.62	-9	-9	222222322112210
23	1	433	11	102	-0.529	33.1118	-9	33.081	327.59	36.9	22.9	0	1.79	6.969	3.069	-9	-9	7.789	-0.934	-9	-9	222222322112210
23	1	434	10	152.8	0.912	33.343	0.9056	33.318	242.11	58.4	30.3	0	2.24	5.396	2.378	-9	-9	7.669	-0.85	-9	-9	222222322112210
23	1	435	9	203	0.935	33.4075	0.9264	33.373	215.71	63.6	32.2	0	2.35	5.096	2.213	-9	-9	7.635	-0.841	-9	-9	222222322112210
23	1	436	8	302.3	1.069	33.4829	1.0555	33.457	181.17	71.7	34.7	0	2.5	4.513	1.928	-9	-9	7.586	-0.827	-9	-9	222222322112210
23	1	437	7	405.9	1.439	33.6291	1.4191	33.606	141.03	86.2	36.2	0	2.58	3.721	1.602	-9	-9	7.558	-0.856	-9	-9	222222322112210
23	1	438	6	402.2	1.437	33.6295	1.4173	33.607	141.36	87.1	36.4	0	2.57	3.676	1.599	-9	-9	7.554	-0.747	-9	-9	222222322112210
23	1	439	5	602	2.021	33.9857	1.9873	33.965	84.39	126.6	39.7	0	2.69	1.892	0.786	-9	-9	7.524	-0.581	-9	-9	222222322112210
23	1	440	4	798.8	2.231	34.1988	2.1833	34.179	53.01	152.2	41.8	0	2.79	0.914	0.328	-9	-9	7.51	-0.481	-9	-9	222222322112210
23	1	441	3	996.7	2.307	34.2835	2.2452	34.263	41.98	164.1	42.6	0	2.78	0.604	0.216	-9	-9	7.524	-0.551	-9	-9	222222322112210
23	1	442	2	1197.2	2.329	34.3992	2.2524	34.378	30.78	183.2	42.6	0	2.85	0.23	0.067	-9	-9	7.524	-0.488	-9	-9	222222322112210
23	1	443	1	1251.4	2.332	34.401	2.2513	34.376	30.55	184.9	42.7	0	2.83	0.215	0.039	-9	-9	7.509	-0.499	-9	-9	222222322113210
24	1	344	9	9	6.965	32.2891	6.9642	32.289	317.78	10	5.88	0.12	0.85	5.525	2.647	-9	-9	8.024	-9	-9	-9	222222222112990
24	1	345	8	50.8	-0.544	33.0669	-9	33.029	332.59	31.9	19.71	0.09	1.84	7.432	5.211	-9	-9	7.81	-9	-9	-9	222222222112990
24	1	346	7	75.6	-0.183	33.2159	-9	33.033	288.72	47.1	24.46	0.14	2.4	6.458	3.083	-9	-9	7.73	-9	-9	-9	222222222112990
24	1	347	6	102.7	0.632	33.3593	0.628	33.332	228.96	61.3	29.27	0.03	2.49	5.499	2.609	-9	-9	7.649	-9	-9	-9	222222222112990
24	1	348	5	101.1	0.568	33.3586	0.5641	33.326	231.54	60.3	29.07	0.03	2.51	5.571	2.588	-9	-9	7.647	-9	-9	-9	222222222112990
24	1	349	4	150.8	1.047	33.444	1.0405	33.427	185.21	72.4	32.3	0	2.77	4.807	2.161	-9	-9	7.593	-9	-9	-9	222222222112990
24	1	350	3	199.7	1.43	33.5935	1.4206	33.572	134.41	93.1	35	0	2.91	3.835	1.732	-9	-9	7.517	-9	-9	-9	222222222112990
24	1	351	2	298	1.687	33.7586	1.672	33.738	118.74	102.8	36.1	0	2.9	2.956	1.34	-9	-9	7.546	-9	-9	-9	222222222112990
24	1	352	1	349.7	1.712	33.7728	1.6942	33.754	115.93	104.4	36.2	0	2.91	3.137	1.558	-9	-9	7.548	-9	-9	-9	222222222112990
25	1	353	8	10.8	10.678	31.1502	10.6768	31.155	292.33	3.2	0.98	0.02	0.28	4.104	2.061	-9	-9	8.124	-9	-9	-9	222222222112990
25	1	354	7	10.5	10.67	31.1501	10.6688	31.154	292.08	2.7	0.88	0.02	0.27	4.161	2.104	-9	-9	8.127	-9	-9	-9	222222222112990
25	1	355	6	50.4	1.251	32.9905	1.2488	33	312.75	27.6	17.28	0.02	1.87	6.27	2.911	-9	-9	7.821	-9	-9	-9	222222222112990
25	1	356	5	73.6	0.176	33.1333	0.1735	33.105	306.08	37.6	21.48	0.02	1.99	6.45	3.177	-9	-9	7.777	-9	-9	-9	222222222112990
25	1	357	4	98.1	0.031	33.1806	0.0277	33.148	295.69	42.5	23.08	0.02	2.1	6.229	2.892	-9	-9	7.75	-9	-9	-9	222222222112990
25	1	358	3	150.2	0.292	33.2942	0.2865	33.265	255.16	54.5	27.18	0.02	2.38	5.713	2.677	-9	-9	7.678	-9	-9	-9	222222222112990
25	1	359	2	198.6	0.783	33.3981	0.7748	33.37	200.21	70.8	31.18	0.02	2.7	4.816	2.377	-9	-9	7.605	-9	-9	-9	222222222112990
25	1	360	1	300.7	1.272	33.5737	1.258	33.545	142.45	92.4	34.48	0.02	2.91	4.033	1.937	-9	-9	7.534	-9	-9	-9	222222222112990
26	1	361	8	10.9	11.199	31.7778	11.1977	31.784	290.77	4.3	0.07	0.13	0.2	4.167	1.785	-9	-9	8.141	-9	-9	-9	222222222112990
26	1	362	7	48.9	-0.452	33.0695	-9	33.034	313.55	35.6	18.5	0.2	2.06	6.684	2.968	-9	-9	7.776	-9	-9	-9	222222222112990
26	1	363	6	76	-1.089	33.2178	-9	33.172	269.26	50.4	24.84	0.16	2.36	6.3	2.841	-9	-9	7.681	-9	-9	-9	222222222112990
26	1	364	5	75.6	-1.091	33.2127	-9	33.173	270.47	49.9	25.36	0.14	2.38	6.445	2.983	-9	-9	7.684	-9	-9	-9	222222222112990
26	1	365	4	98.9	-1.397	33.2166	-9	33.176	275.69	48.4	25.46	0.14	2.32	6.71	2.931	-9	-9	7.674	-9	-9	-9	222222222112990
26	1	366	3	150.6	-0.959	33.2851	-9	33.244	234.71	60.7	28.4	0	2.59	6.107	2.819	-9	-9	7.595	-9	-9	-9	222222222112990
26	1	367	2	200.7	-0.923	33.3194	-9	33.28	220.97	64.8	29.06	0.04	2.67	6.023	3.061	-9	-9	7.576	-9	-9	-9	222222222112990
26	1	368	1	240.4	-0.816	33.42	-9	33.375	194.7	74.2	29.66	0.04	2.8	5.975	2.891	-9	-9	7.574	-9	-9	-9	222222222112990
27	1	369	13	10.7	6.421	32.1655	6.4201	32.147	323.67	7	5.47	0.13	0.91	5.503	2.225	-9	-9	8.019	-1.304	-9	-9	222222222112210
27	1	370	12	49.9	1.125	32.9628	1.1229	32.93	279.18	39.8	19.2	0.1	2.04	5.992	2.55	-9	-9	7.757	-0.912	-9	-9	222222222112210
27	1	371	11	73.9	0.37	33.0699	0.3673	33.024	272.79	43.6	21.86	0.14	2.22	6.152	2.661	-9	-9	7.708	-0.852	-9	-9	222222222112210
27	1	372	10	100.5	-0.026	33.1508	-9	33.098	261.47	49.9	24.37	0.03	2.37	6.093	2.544	-9	-9	7.683	-0.983	-9	-9	222222222112210
27	1	373	9	101.3	-0.024	33.1524	-9	33.097	261.91	49.4	25.18	0.02	2.33	6.211	2.68	-9	-9	7.679	-0.965	-9	-9	222222222112210
28	1	374	23	10.6	11.15	32.0594	11.1487	32.067	294.24	7	0.15	0.05	0.22	4.393	2.64	-9	-9	8.139	-9	-9	-9	222222332112990
28	1	375	20	50.9	-1.116	33.2334	-9	33.192	270.31	51.7	24.85	0.05	2.2	6.602	3.772	-9	-9	7.661	-9	-9	-9	222222332112990
28	1	376	19	75.8	-1.319	33.271	-9	33.232	262.05	53.1	25.96	0.04	2.25	6.156	3.465	-9	-9	7.644	-9	-9	-9	222222332112990
28	1	377	17	99.3	-1.301	33.2978	-9	33.249	242.19	58.7	27.85	0.05	2.37	6.481	3.593	-9	-9	7.585	-9	-9	-9	222222332112990
28	1	378	16	151.1	-1.713	33.5315	-9	33.477	263.16	54.1	22.94	0.06	2.36	6.981	3.8	-9	-9	7.61	-9	-9	-9	222222332112990
28	1	379	15	151.1	-1.713	33.53	-9	33.474	262.43	54.5	23.34	0.06	2.41	7.137	3.798	-9	-9	7.612	-9	-9	-9	222222332112990
29	1	380	6	10.2	10.992	32.8451	10.9908	32.798	293.93	10.7	0.14	0.06	0.41	4.53	2.63	-9	-9	8.136	-9	-9	-9	222222332112990
29	1	381	5	49.9	-1.485	33.2051	-9	33.169	276.94	47	25.54	0.06	2.21	6.758	3.651	-9	-9	7.661	-9	-9	-9	222222332112990
29	1	382	4	49.5	-1.507	33.2254	-9	33.171	276.36	46.6	25.64	0.06	2.24	6.902	3.817	-9	-9	7.649	-9	-9	-9	222222332112990
29	1	383	3	74.7	-1.205	33.2747	-9	33.233	255.53	54.8	27.74	0.06	2.37	6.558	3.668	-9	-9	7.629	-9	-9	-9	222222332112990
29	1	384	2	99.3	-1.244	33.3116	-9	33.259	225.48	56.9	28.63	0.07	2.43	6.525	3.613	-9	-9	7.608	-9	-9	-9	222222332112990
29	1	385	1	125.9	-1.69	33.4833	-9	33.408	250.02	58.7	24.46	0.04	2.52	7.047	3.868	-9	-9	7.581	-9	-9	-9	222222332112990
30	1	386	11	9.3	9.283	32.3686	9.282	32.546	303.36	2.2	0.16	0.04	0.23	4.762	2.617	-9	-9	8.163	-1.128	-9	-9	222222332112210
30	1	387	10	29.7	0.523	32.9807	0.5219	32.96	374.65	6.7	5.21	0.09	1.02	7.055	3.606	-9	-9	7.943	-1.049	-9	-9	222222332112210

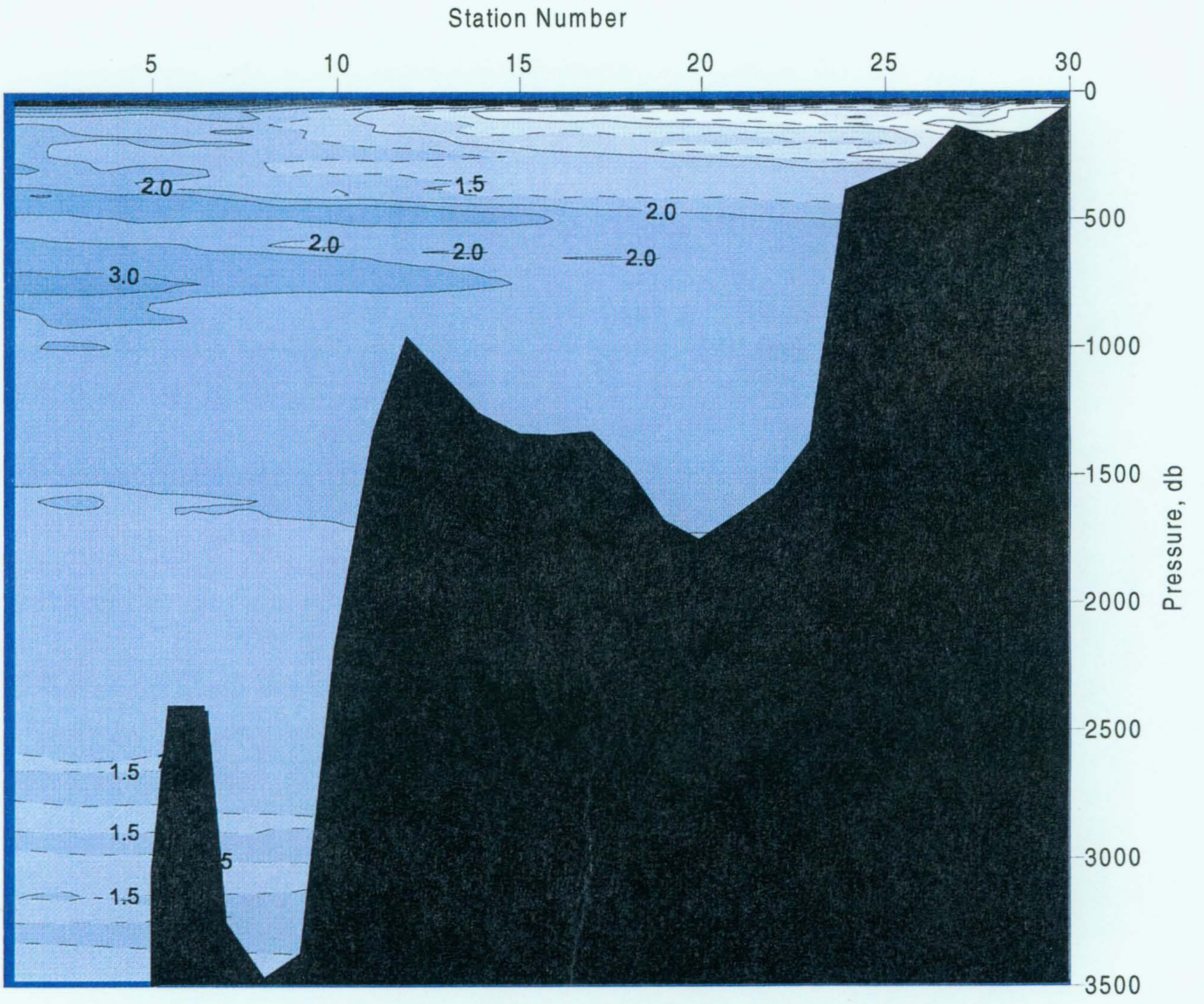
STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	SALNTY PSS-78	OXYGEN UMOL/KG	SILCAT UMOL/KG	NITRAT UMOL/KG	NITRIT UMOL/KG	PHSPHT UMOL/KG	CFC-11 PMOL/KG	CFC-12 PMOL/KG	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
30	1	388	9	49.7	-0.685	33.0324	-9	32.989	342.23	11.5	10.31	0.09	1.52	7.274	3.769	-9	-9	7.818	-1.083	-9	-9	2222223322112210
30	1	389	8	49.5	-0.685	33.034	-9	32.989	342.98	11.7	10.46	0.04	1.52	7.12	3.727	-9	-9	7.816	-1.064	-9	-9	2222223322112210
30	1	390	7	69.8	-0.664	33.0381	-9	32.99	341.1	11.7	10.7	0.1	1.46	6.996	3.588	-9	-9	7.818	-1.053	-9	-9	2222223322112210
31	1	391	6	10	10.611	32.6547	10.6098	32.664	292.53	8.7	0.26	0.04	0.36	-9	-9	-9	-9	8.148	-9	-9	-9	2222223399192990
31	1	392	5	9.7	10.553	32.6572	10.5519	32.663	291.07	8.7	0.2	0.1	0.31	-9	-9	-9	-9	8.15	-9	-9	-9	2222223309192990
31	1	393	4	50.3	-1.567	33.1798	-9	33.142	282.06	41.5	25.06	0.04	2.24	9	9	-9	-9	7.675	-9	-9	-9	2222223399192990
31	1	394	3	75.1	-1.656	33.2497	-9	33.211	278.93	44.6	26.25	0.05	2.26	-9	9	-9	-9	7.66	-9	-9	-9	2222223399192990
31	1	395	2	100	-1.601	33.3079	-9	33.269	272.36	47.4	26.46	0.04	2.37	-9	-9	-9	-9	7.658	-9	-9	-9	2222223399192990
31	1	396	1	125.8	-1.708	33.5646	-9	33.514	255.3	56.5	23.75	0.05	2.54	-9	-9	-9	-9	7.595	-9	-9	-9	2222223399192990
32	1	398	7	10.7	11.635	31.0719	11.6337	31.072	286.13	4.2	0.16	0.04	0.21	-9	-9	-9	-9	8.128	-9	-9	-9	2222223399192990
32	1	399	6	50.6	-0.303	33.1658	-9	33.128	278.45	48.7	26.23	0.07	2.09	-9	-9	-9	-9	7.709	-9	-9	-9	2222223399192990
32	1	401	4	100	-0.366	33.2858	-9	33.243	246.26	58.7	30.26	0.04	2.36	-9	-9	-9	-9	7.634	-9	-9	-9	2222223399192990
32	1	402	3	150.3	-0.81	33.3555	-9	33.311	215.42	66.9	33.56	0.04	2.47	-9	-9	-9	-9	7.583	-9	-9	-9	2222223399192990
32	1	403	2	149.9	-0.83	33.3588	-9	33.311	215.47	66.6	33.46	0.04	2.56	-9	-9	-9	-9	7.578	-9	-9	-9	2222223399192990
32	1	404	1	200	-0.248	-9	-9	33.359	194.74	74.4	35.46	0.04	2.68	-9	-9	-9	-9	7.536	-9	-9	-9	2222223399192990
33	1	405	15	9.6	10.136	30.6318	10.1349	30.825	303.7	5	2.46	0.04	0.51	-9	9	-9	-9	8.074	-1.852	-9	-9	2222223399192990
33	1	406	14	50	-0.472	33.0537	-9	33.032	304.43	40.4	22.29	0.11	1.92	-9	9	-9	-9	7.751	-0.93	-9	-9	2222223399192990
33		407	13	75	-0.4776	-9	-9	-9	-9	-9	-9	-9	-9	-9	9	-9	-9	-9	-9	-9	-9	4999999999999990
33	1	408	12	99.7	-0.825	33.2537	-9	33.212	265.02	52.6	26.94	0.06	2.26	-9	9	-9	-9	7.665	-9	-9	-9	2222223399192990
33	1	409	11	150.2	-0.177	33.358	-9	33.318	220.78	65.2	30.25	0.05	2.47	-9	-9	-9	-9	7.59	-9	-9	-9	2222223399192990
33	1	410	10	150.2	-0.174	33.3491	-9	33.32	-9	66.7	30.86	0.04	2.53	-9	-9	-9	-9	7.59	-9	-9	-9	2225223399192990
33	1	411	9	199.6	-0.727	33.3423	-9	33.317	209.69	67.8	31.35	0.05	2.65	-9	-9	-9	-9	7.553	-9	-9	-9	2222223399192990
33	1	412	8	279.9	-1.535	33.4301	-9	33.361	233.53	60.1	28.54	0.06	2.63	-9	-9	-9	-9	7.565	-9	-9	-9	2222223399192990
34	1	413	20	4.5	10.353	30.8063	10.3525	31.186	317.96	2.3	0.87	0.03	0.4	-9	-9	-9	-9	8.089	-1.777	-9	-9	2222223399192990
34	1	414	19	9.8	2.505	32.8269	2.5045	32.886	383.52	5.7	7.44	0.16	0.92	-9	-9	-9	-9	7.981	-1.093	-9	-9	2222223399192990
34	1	415	18	49.5	-1.361	33.3584	-9	33.351	261.12	44.8	25.61	0.09	2.21	-9	-9	-9	-9	7.641	-0.991	-9	-9	2222223399192990
34	1	416	17	90.7	-1.279	33.4825	-9	33.427	277.14	39.4	21.27	0.13	2.11	-9	-9	-9	-9	7.67	-9	-9	-9	2222223399192990
35	1	417	4	4.8	8.988	31.9339	8.9875	31.923	318.74	2.8	0.07	0.03	0.32	-9	-9	-9	-9	8.102	-1.422	-9	-9	2222223399192990
35	1	418	3	9.8	8.993	31.9618	8.992	31.98	312.45	3	0.08	0.02	0.35	-9	-9	-9	-9	8.104	-1.468	-9	-9	2222223399192990
35	1	419	2	30.3	1.226	33.1722	1.2247	33.173	308.83	19.9	9.51	0.39	1.36	-9	-9	-9	-9	7.873	-1.204	-9	-9	2222223399192990
35	1	420	1	56.7	0.24	33.334	0.238	33.29	305.12	20.6	9.5	0.3	1.51	-9	-9	-9	-9	7.818	-1.173	-9	-9	2222223399192990
36	1	421	10	10.4	10.247	30.8247	10.2458	30.824	299.67	2.8	1.18	0.02	0.31	-9	-9	-9	-9	8.115	-9	-9	-9	2222223399192990
36	1	422	9	10.2	10.239	30.8236	10.2379	30.825	300.12	2.6	0.9	0.2	0.3	-9	-9	-9	-9	8.118	-9	-9	-9	2222223399192990
36	1	423	8	49.9	2.587	32.6281	2.5843	32.62	331.23	16	13.36	0.14	1.29	-9	-9	-9	-9	7.913	-9	-9	-9	2222223399192990
36	1	424	7	74.6	1.48	32.8657	1.4767	32.746	320.35	24.2	17.39	0.11	1.54	-9	-9	-9	-9	7.862	-9	-9	-9	2222223399192990
36	1	425	6	100.2	0.915	32.9803	0.9109	32.97	313	29.9	20.43	0.07	1.67	-9	-9	-9	-9	7.815	-9	-9	-9	2222223399192990
36	1	426	5	150.1	0.066	33.2047	0.0609	33.175	270.33	46.3	26.03	0.07	2.07	-9	-9	-9	-9	7.705	-9	-9	-9	2222223399192990
36	1	427	4	200.3	0.193	33.337	0.1858	33.304	-9	59.4	30.04	0.06	2.29	-9	-9	-9	-9	7.643	-9	-9	-9	2225223399192990
36	1	428	3	300	0.334	33.4109	0.3225	33.379	205.75	68.7	32.42	0.08	2.43	-9	-9	-9	-9	7.589	-9	-9	-9	2222223399192990
36	1	429	2	400.6	0.326	33.475	0.3103	33.441	186.39	76.4	33.06	0.04	2.54	-9	-9	-9	-9	7.553	-9	-9	-9	2222223399192990
36	1	430	1	541.2	1.889	33.9224	1.8596	33.897	93.17	121.7	41.06	0.04	2.73	-9	-9	-9	-9	7.512	-9	-9	-9	2222223399192990
37	1	487	23	1500	2.132	34.5005	2.0344	34.48	56.34	-9	-9	-9	-9	0.097	0.066	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	488	22	1499.4	2.132	34.5004	2.0345	34.481	56.31	-9	-9	-9	-9	0.087	0.052	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	489	21	1500	-9	-9	-9	34.481	56.33	-9	-9	-9	-9	0.116	0.042	-9	-9	-9	-9	-9	-9	2922999922999990
37	1	490	20	1500.8	2.132	34.5006	2.0344	34.481	56.19	-9	-9	-9	-9	0.113	0.046	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	491	19	1501.4	2.131	34.5008	2.0333	34.481	56.29	-9	-9	-9	-9	0.111	0.053	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	492	18	1499.3	2.132	34.5015	2.0345	34.48	56.17	-9	-9	-9	-9	0.387	0.02	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	493	17	1500.3	2.133	34.5007	2.0354	34.479	55.9	-9	-9	-9	-9	0.107	0.068	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	494	16	1500.3	2.132	34.5016	2.0344	34.48	55.67	-9	-9	-9	-9	0.113	0.04	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	495	15	1501.1	2.133	34.5009	2.0353	34.479	55.7	-9	-9	-9	-9	0.113	0.157	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	496	14	1501.9	2.132	34.5012	2.0343	34.479	55.71	-9	-9	-9	-9	0.089	0.033	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	497	13	1500	-9	-9	-9	34.479	55.31	-9	-9	-9	-9	0.135	0.08	-9	-9	-9	-9	-9	-9	2922999922999990
37	1	498	12	1501.6	2.133	34.5014	2.0353	34.479	55.49	-9	-9	-9	-9	0.111	0.037	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	499	11	1501.8	2.133	34.5013	2.0353	34.479	55.47	-9	-9	-9	-9	0.103	0.064	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	500	10	1501.2	2.133	34.502	2.0353	34.481	54.69	-9	-9	-9	-9	0.074	0.05	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	501	9	1502.8	2.133	34.5023	2.0352	34.482	55.86	-9	-9	-9	-9	0.081	0.015	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	502	8	1500.7	2.133	34.502	2.0354	34.479	54.96	-9	-9	-9	-9	0.097	0.007	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	503	7	1503	-9	-9	-9	34.476	55.06	-9	-9	-9	-9	0.096	0.084	-9	-9	-9	-9	-9	-9	2922999922999990
37	1	504	6	1500.3	2.132	34.5027	2.0344	34.48	55.09	-9	-9	-9	-9	0.07	0.014	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	505	5	1501.3	2.132	34.5027	2.0343	34.481	55.11	-9	-9	-9	-9	0.071	0.023	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	506	4	1501.5	2.132	34.5031	2.0343	34.482	55.18	-9	-9	-9	-9	0.097	0.034	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	507	3	1502.3	2.132	34.5031	2.0342	34.479	55.49	-9	-9	-9	-9	0.077	0.015	-9	-9	-9	-9	-9	-9	2222999922999990
37	1	508	2	1503.1	2.132	34.5028	2.0342	34.481	55.43	-9	-9	-9	-9	0.102	0	-9	-9	-9	-9	-9	-9	2222999922990990
37	1	509	1	1501.8	2.132	34.5036	2.0343	34.481	55.45	-9	-9	-9	-9	0.114	0.024	-9	-9	-9	-9	-9	-9	2222999922999990
38	1	510	22	8.7	14.373	32.0143	14.3718	32.069	275.64	0.6	-0.61	0.71	0.09	4.071	1.717	-9	-9	8.132	-9	-9	-9	2222222222192990
38	1	511	21	49.6	-0.666	32.9677	-9	32.944	336.47	4.8	17.85	0.25	1.59	7.274	3.223	-9	-9	7.807	-9	-9	-9	2222222222192990
38	1	512	20	99.8	-0.477	33.2029	-9	33.183	295.62	21.3	22.28	0.02	1.92	6.488	2.893	-9	-9	7.736	-9	-9	-9	2222223222192990
38	1	513	19	151.5	0.355	33.3412	0.3494	33.318	255.1	38.7	26.08	0.02	2.14	5.764	2.464	-9	-9	7.68	-9	-9	-9	2222223222192990
38	1	514	18	201.3	0.488	33.3948	0.4802	33.378	223.74	49.1	29.77	0.03	2.42	5.236	2.395	-9	-9	7.626	-9	-9	-9	2222223222192990
38	1	515	17	301.6	0.923	33.4923	0.9099	33.481	171.5	59.2	31.87	0.03	2.64	4.778	2.113	-9	-9	7.58	-9	-9	-9	2222223222192990
38	1	516	16	404	0.791	33.564	0.7735	33.542	174.32	68.3	33.17	0.03	2.74	4.215	1.904	-9	-9	7.558	-9	-9	-9	2222223222192990
38	1	517	15	601.1	1.854	33.8792	1.8213	33.859	104.17	79.8	37.07	0.03	2.94	2.372	1.064	-9	-9	7.533	-9	-9	-9	2222223222192990
38	1	518	14	802.5	2.233	34.1304	2.1852	34.114	59.44	111.3	41.47	0.03	3.11	1.082	0.454	-9	-9	7.502	-9	-9	-9	2222223222192990
38	1	519	13	1002.5	2.3	34.2898	2.2378	34.272	48.26	141.6	40.77	0.03	3.13	0.561	0.284	-9	-9	-9	-9	-9	-9	2222223222192990

STNNBR	CASTNO	SAMPNO	BTLNBR	CTDPRS DBAR	CTDTMP IPTS-68	CTDSAL PSS-78	THETA DEG	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	TCARBN UMOL/KG	ALKALI UMOL/KG	PH	O18/O16 /MILLE	DELC13 /MILLE	TRITUM TU	QUALT1
			*******			*******		*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	
38	1	520	12	1000	2.299	34.2891	2.237	34.272	48.07	151.3	40.97	0.03	3.13	0.558	0.241	-9	-9	7.526	-9	-9	-9	2222223222192990
38	1	521	11	1200	2.238	34.4055	2.162	34.389	49.07	157.8	41.06	0.04	3.09	0.238	0.097	-9	-9	7.534	-9	-9	-9	2222223222192990
38	1	522	10	1400.3	2.152	34.4777	2.0618	34.463	53.04	160.7	41.45	0.05	3.03	0.092	0.103	-9	-9	7.546	-9	-9	-9	2222223222192990
38	1	523	9	1600.9	2.086	34.5139	1.9811	34.498	59.32	160.7	41.25	0.05	2.89	0.062	0.105	-9	-9	7.551	-9	-9	-9	2222233299192990
38	1	524	8	1798.8	2.021	34.5395	1.9011	34.525	63.6	163.5	39.63	0.07	2.89	0.03	0	-9	-9	7.57	-9	-9	-9	2222233299192990
38	1	525	7	1999.8	1.96	34.5629	1.8245	34.546	71.1	163.7	40.44	0.06	2.86	0.013	0	-9	-9	7.59	-9	-9	-9	2222233299192990
38	1	526	6	2202.2	1.913	34.581	1.761	34.565	76.49	165.8	39.03	0.07	2.84	-9	-9	-9	-9	7.597	-9	-9	-9	2222233299192990
38	1	527	5	2397.7	1.878	34.5956	1.7094	34.579	81.81	166.1	41.33	0.07	2.84	9	-9	-9	-9	7.609	-9	-9	-9	2222233299192990
38	1	528	4	2595.7	1.858	34.6055	1.6719	34.59	82.61	168.6	39.94	0.06	2.85	-9	-9	-9	-9	7.607	-9	-9	-9	2222233299192990
38	1	529	3	2799.5	1.847	34.6134	1.6421	34.597	85.86	169.3	40.03	0.07	2.84	-9	-9	-9	-9	7.614	-9	-9	-9	2222233299192990
38	1	530	2	2996.6	1.847	34.6182	1.6232	34.602	88.01	169.7	39.03	0.07	2.87	0	0	-9	-9	7.622	-9	-9	-9	2222233272192990
38	1	531	1	3200.8	1.853	34.6224	1.6089	34.607	88.55	172.2	40.83	0.07	2.88	-9	-9	-9	-9	7.621	-9	-9	-9	2222233299192990

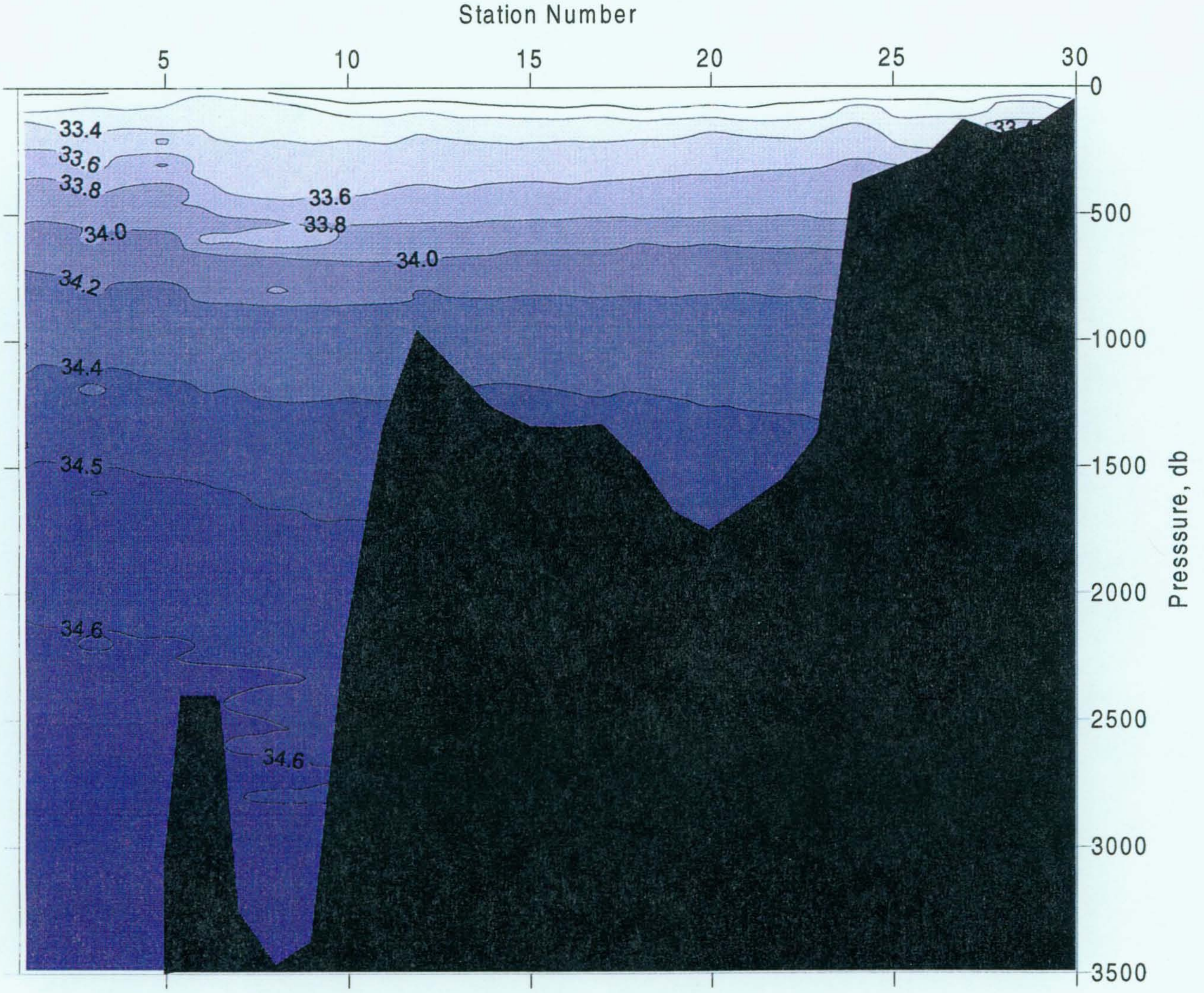
APPENDIX 4. HYDROGRAPHIC SECTIONS

1. Potential Temperature (°C)
2. Salinity (PSS-78)
3. Oxygen (μmol/kg)
4. Silicate (μmol/kg)
5. Nitrate (μmol/kg)
6. Phosphate (μmol/kg)
7. CFC-11 (pmol/kg)
8. CFC-12 (pmol/kg)
9. Sea floor topography and bottle sampling locations (crosses).

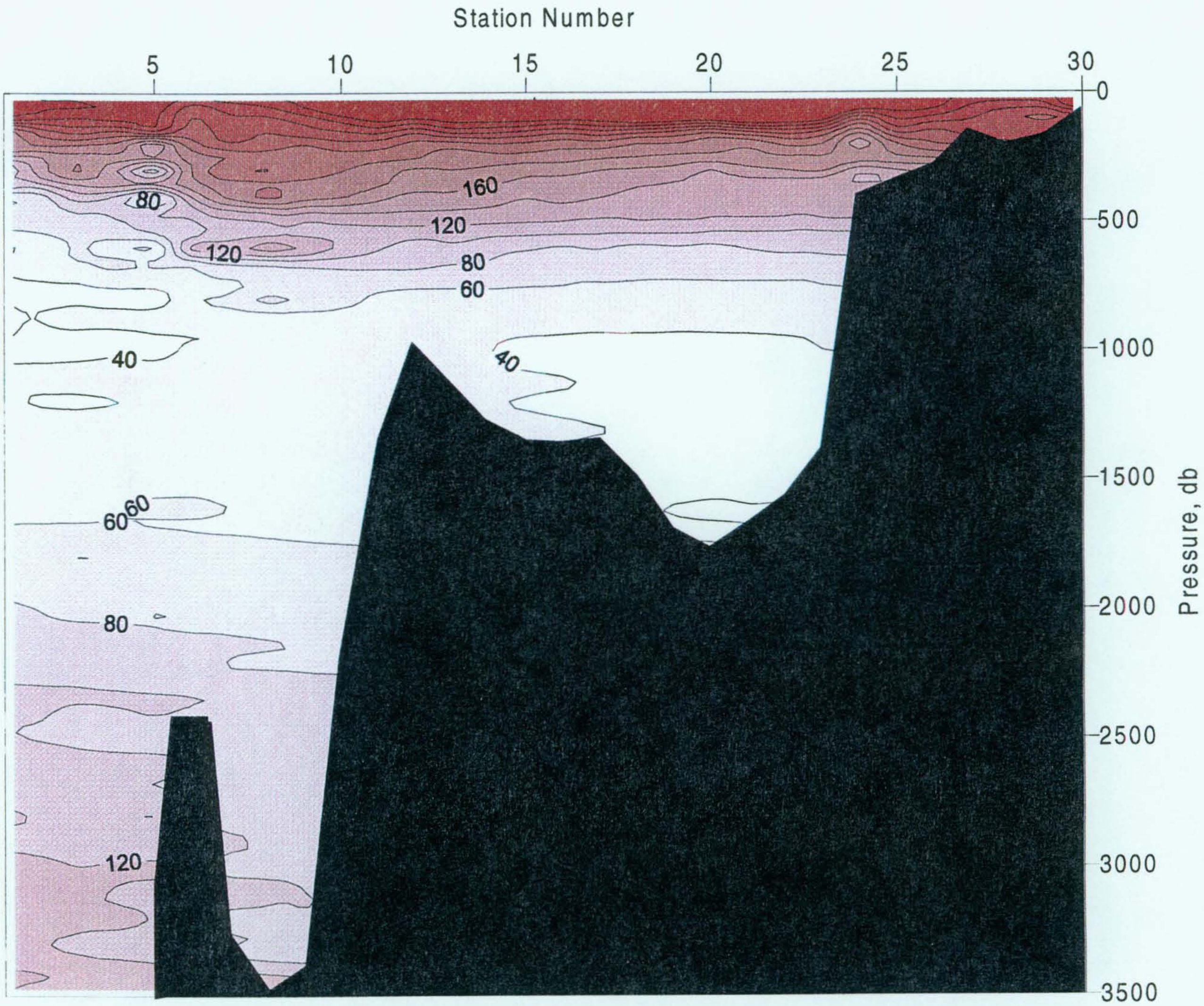
Potential Temperature (C) Line P1W



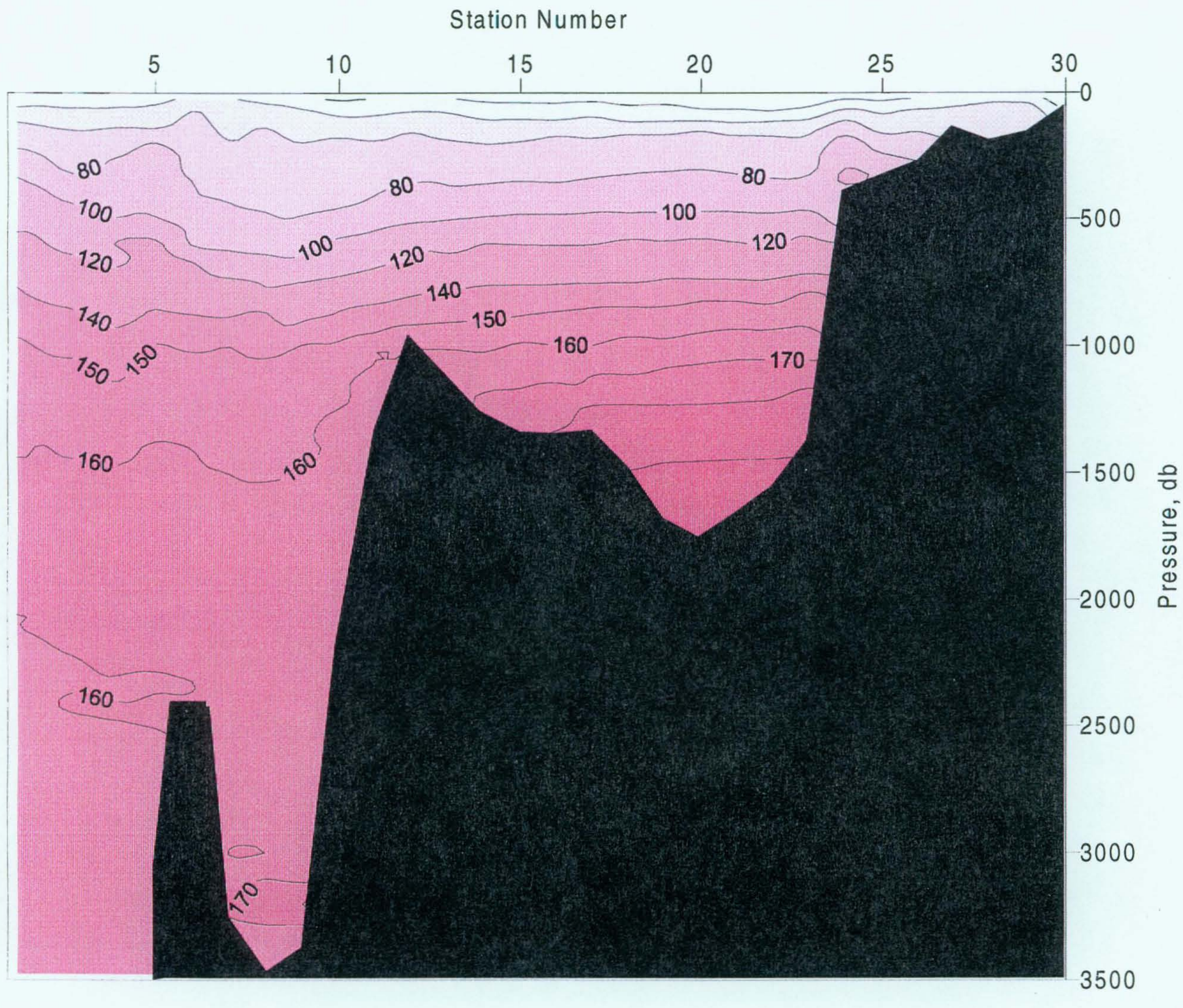
Salinity (PSS-78) Line P1W



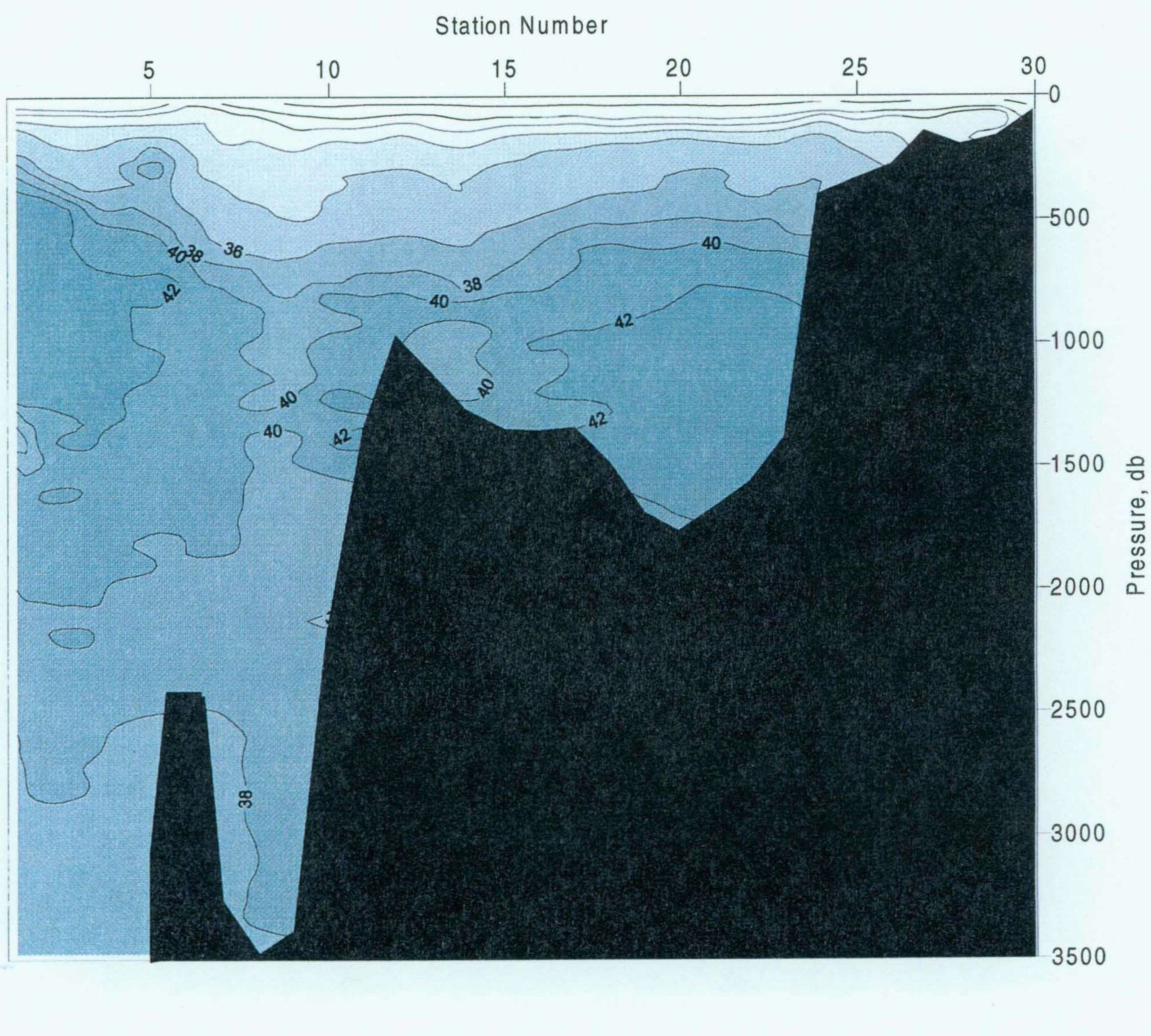
Dissolved Oxygen (umol/kg) Line P1W



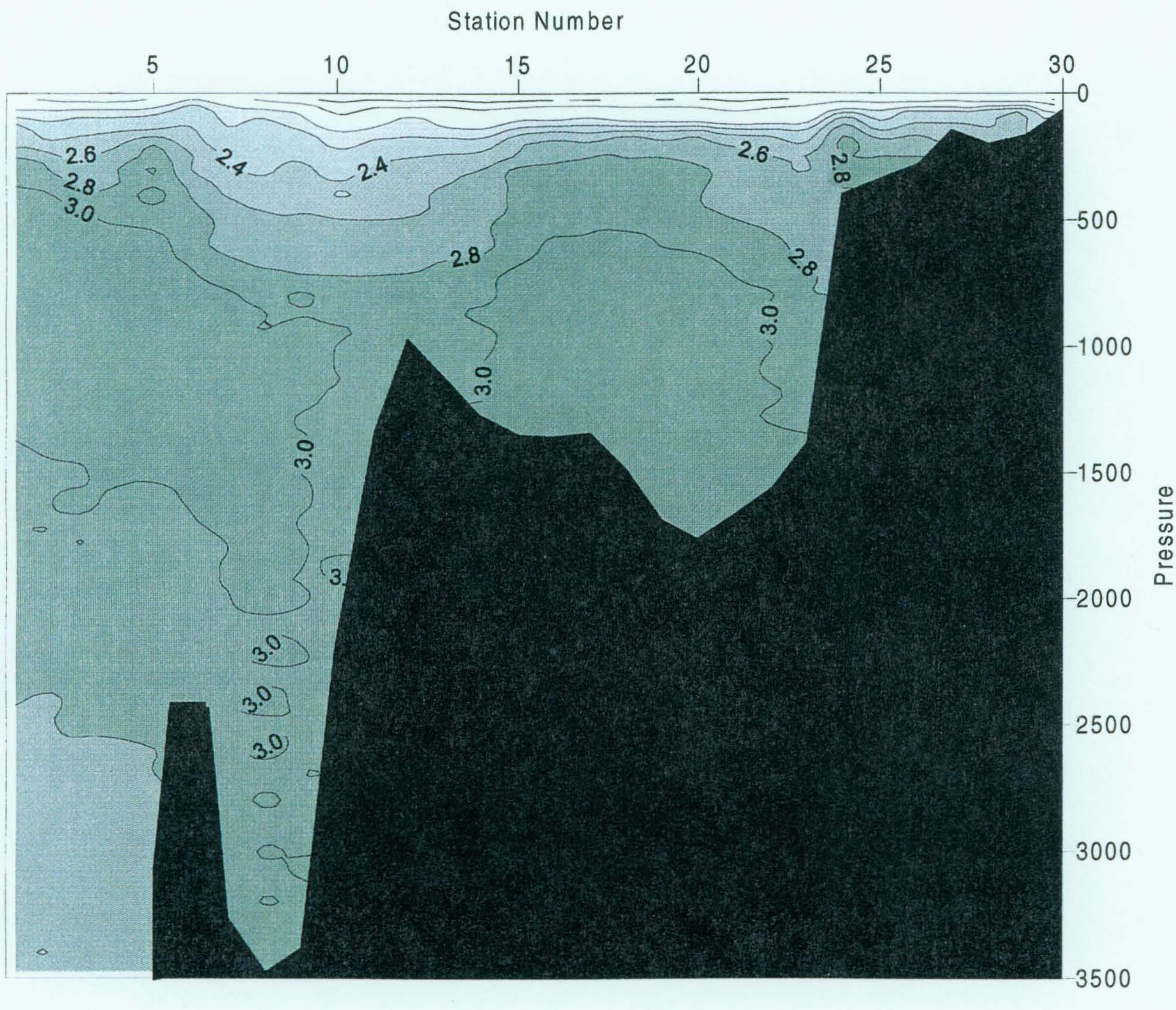
Silicate (umol/kg) Line P1W



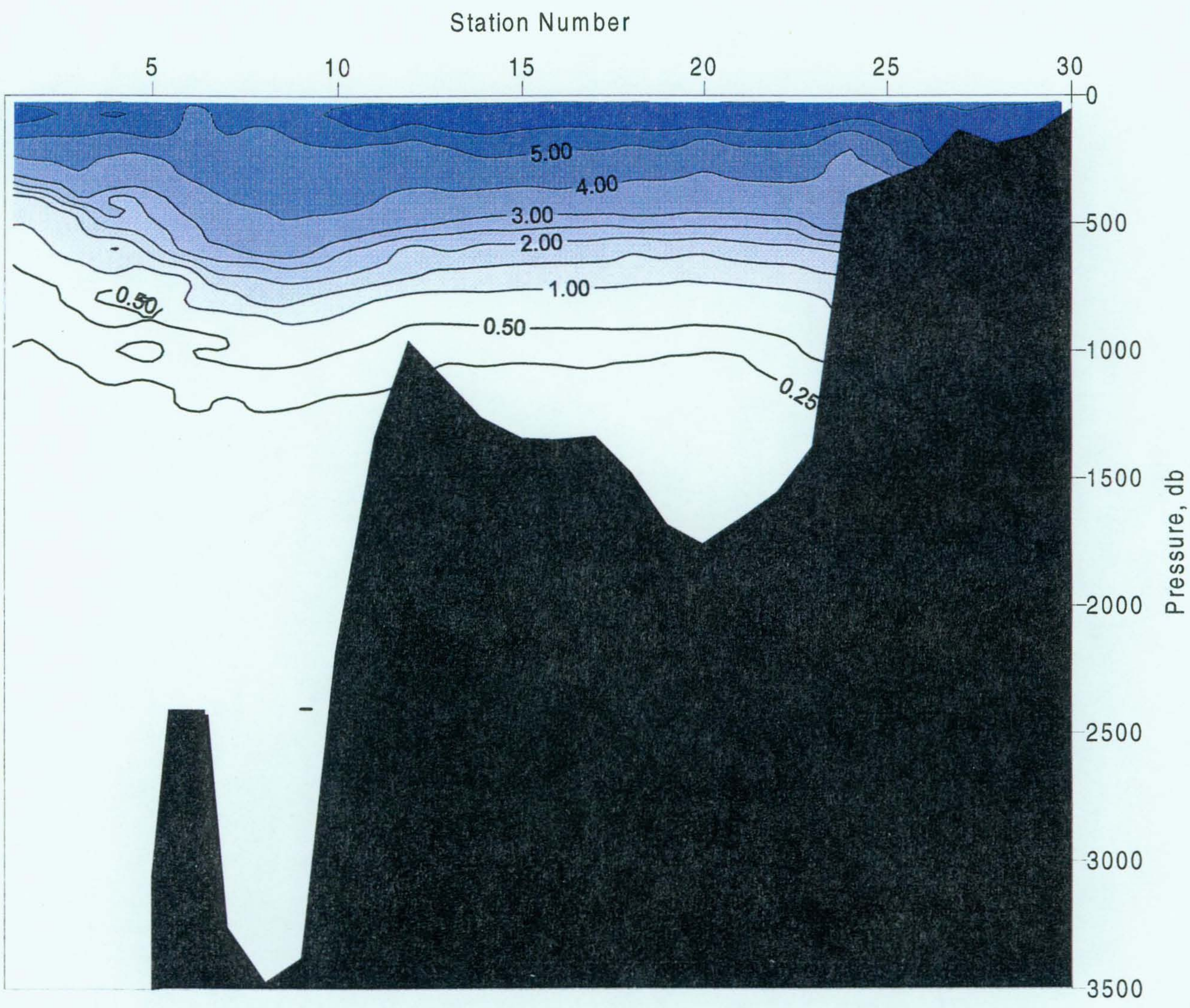
Nitrate (umol/kg) Line P1W



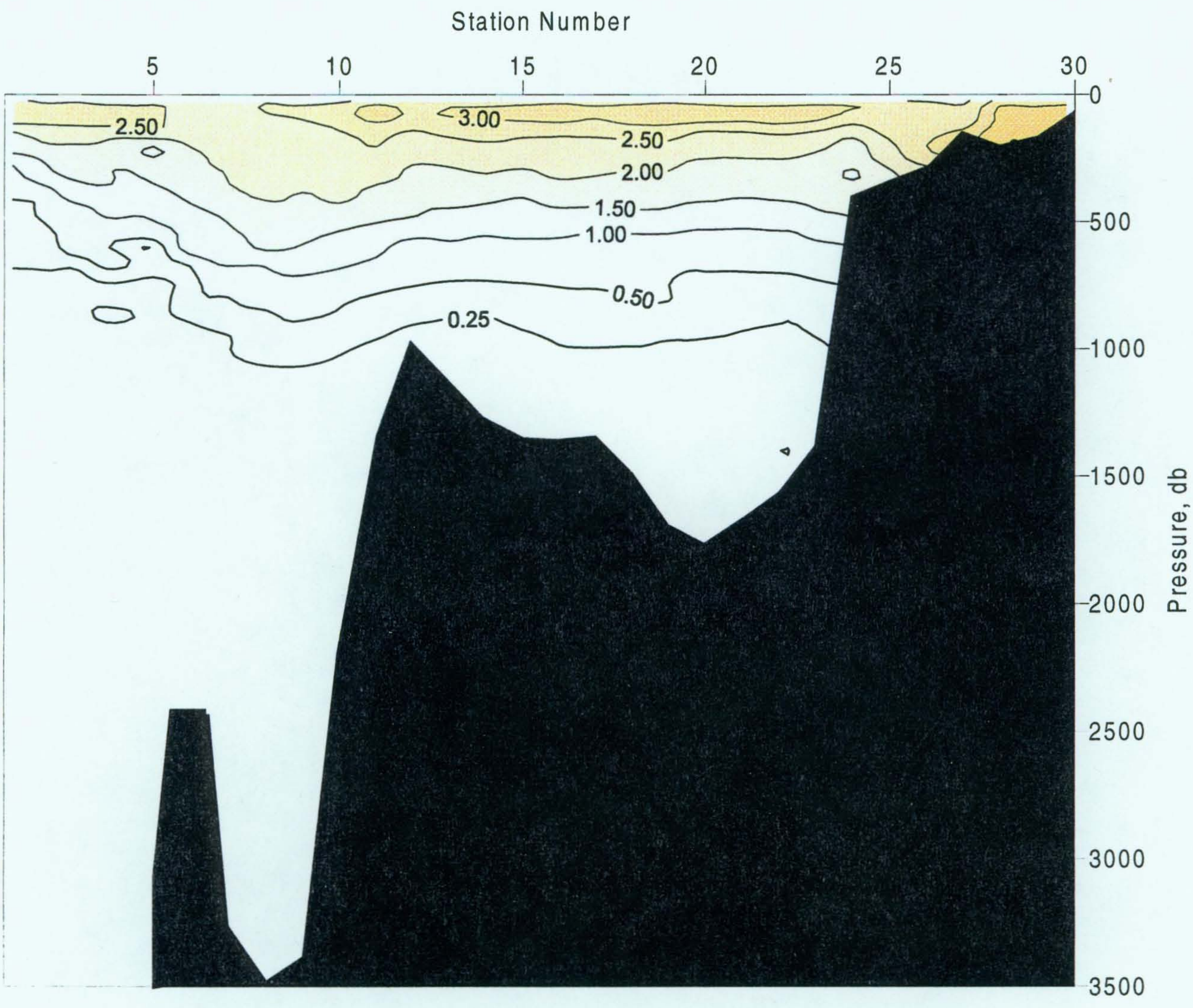
Phosphate (umol/kg) Line P1W



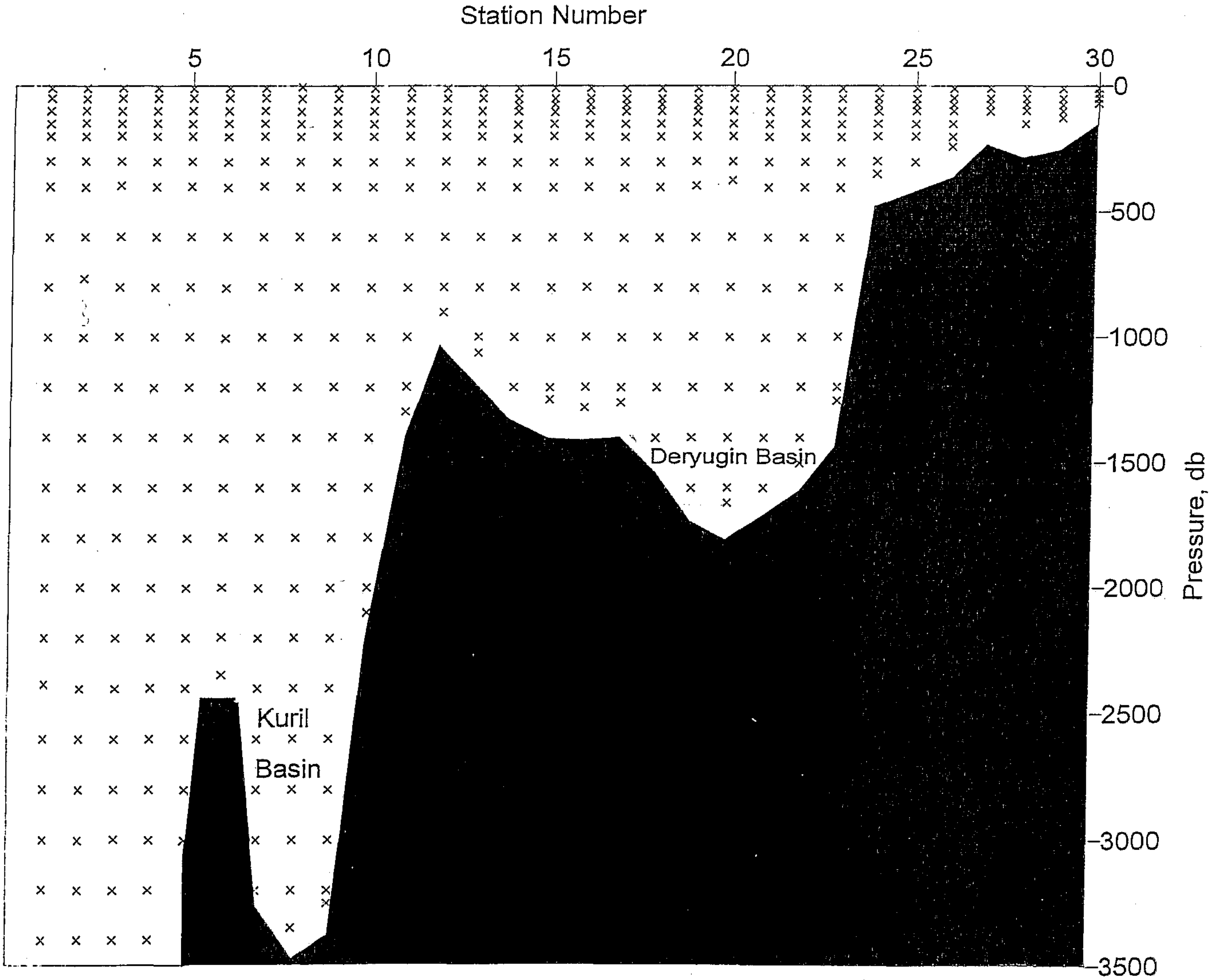
CFC-11 (pmol/kg) Line P1W



CFC-12 (pmol/kg) Line P1W



Sea floor topography and bottle sampling locations, Line P1W



APPENDIX 5. GRAPHS OF HYDROGRAPHIC PARAMETERS.

Various parameters from the Sea of Okhotsk and adjacent North Pacific Ocean have been graphed and are presented in this section. The stations have been grouped by location in the general water bodies: North Pacific, Kuril Basin, Sea of Okhotsk, Deryugin Basin, and the area from Ul'ya to Sakhalin. Bussol' Strait data points have been superimposed on North Pacific and Kuril Basin data points. Data from stations 36, 37, and 38 have been omitted from these graphs.

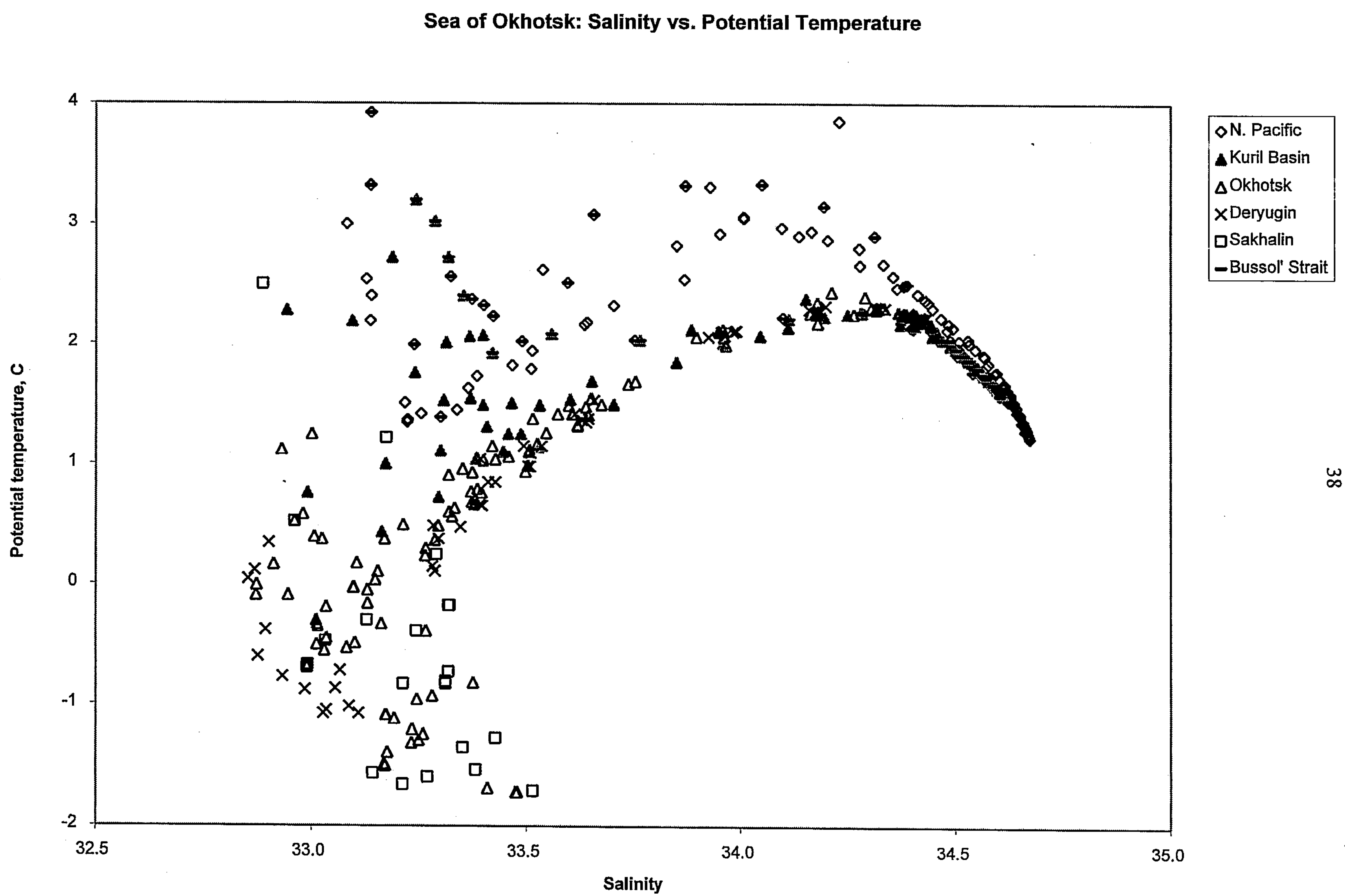
Where salinity has been used as a parameter for the graphs, the laboratory analyzed salinity data have been used, rather than the CTD salinity data.

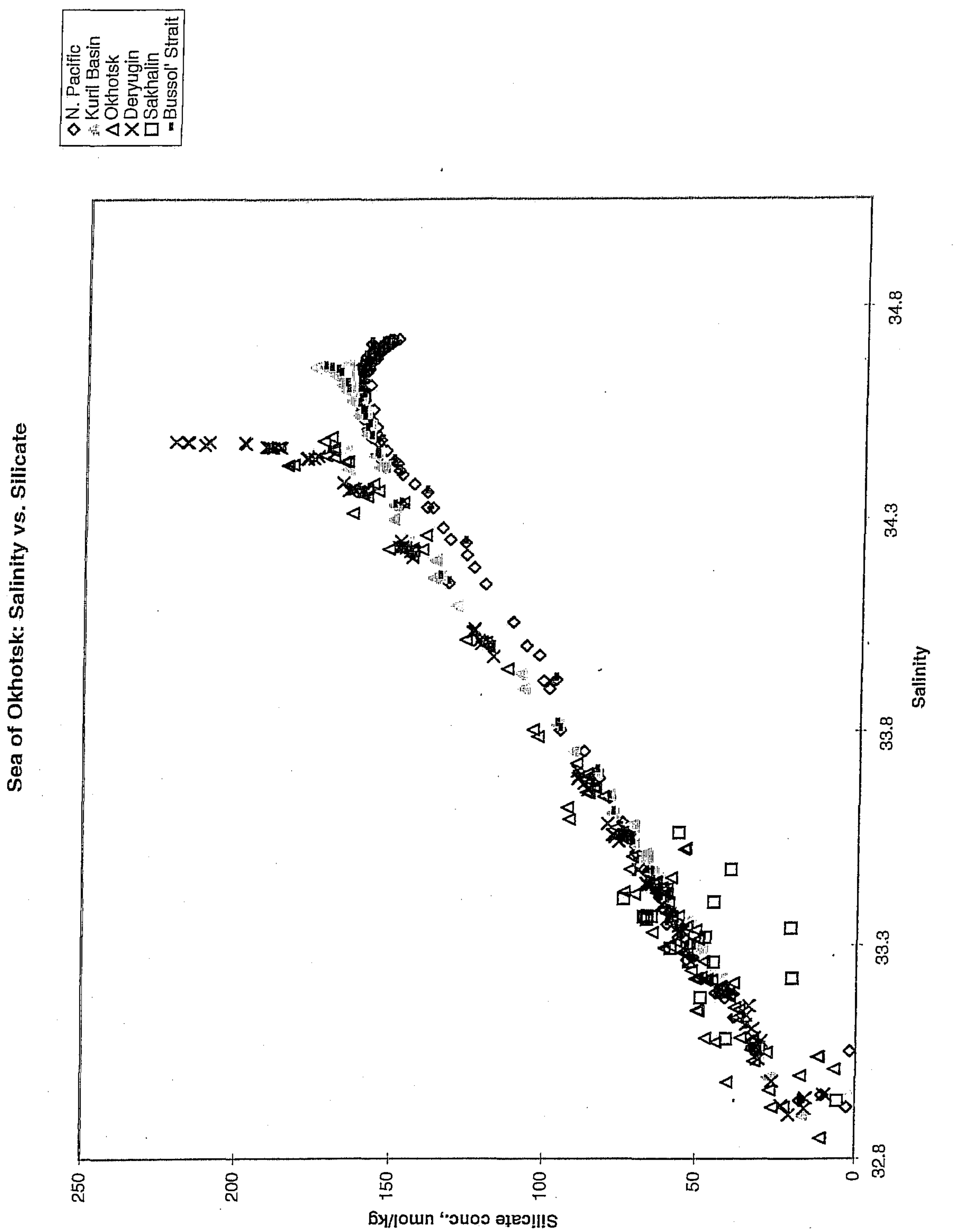
LIST OF GRAPHS:

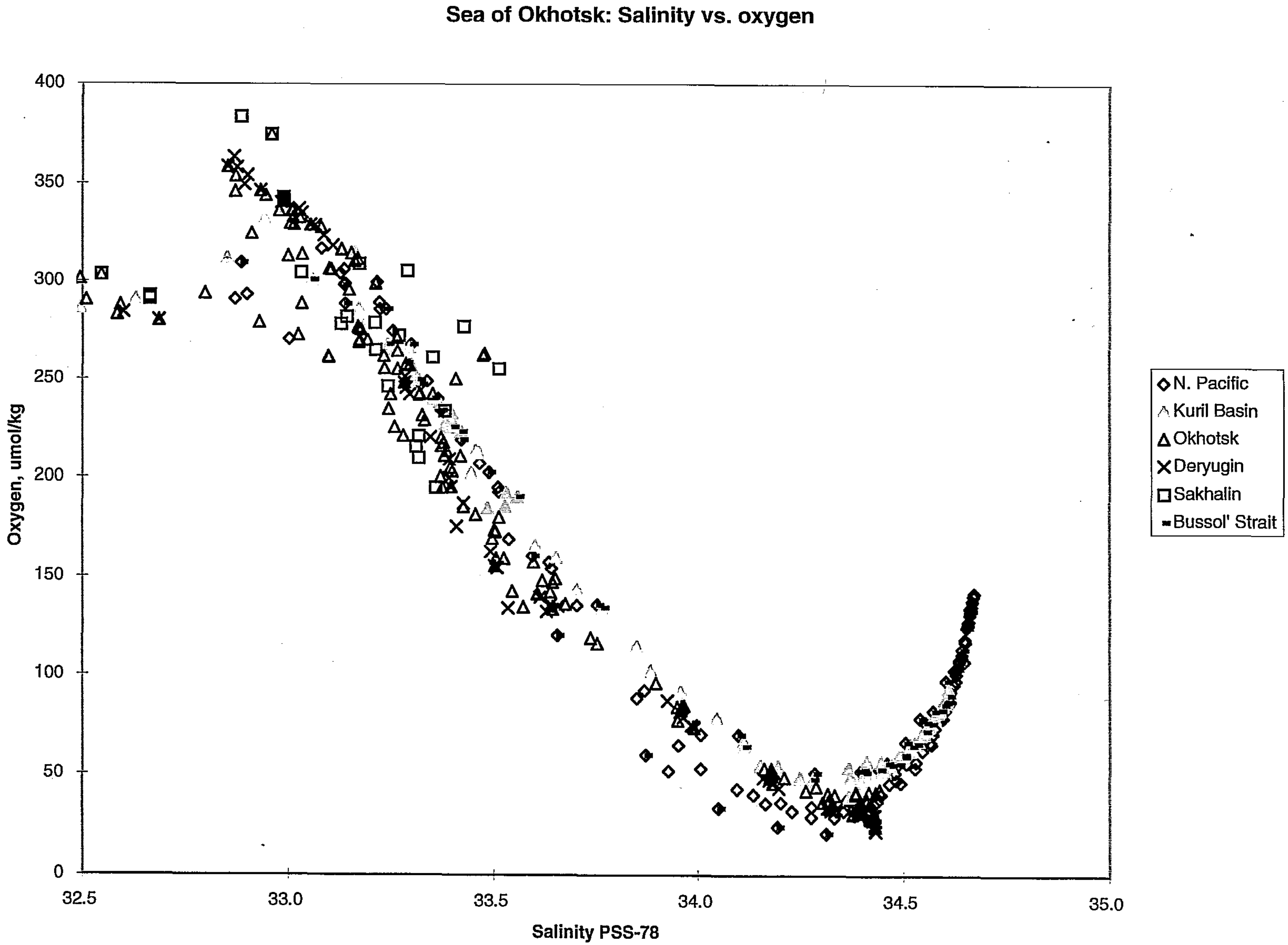
1. Salinity versus potential temperature.
2. Salinity versus silicate concentration.
3. Salinity versus oxygen concentration.
4. Salinity versus CFC-11 concentration.
5. Salinity versus $^{18}O/^{16}O$.
6. Oxygen versus silicate.

TABLE 8. SUMMARY OF LEGENDS FOR GRAPHS 1-4 AND 6:

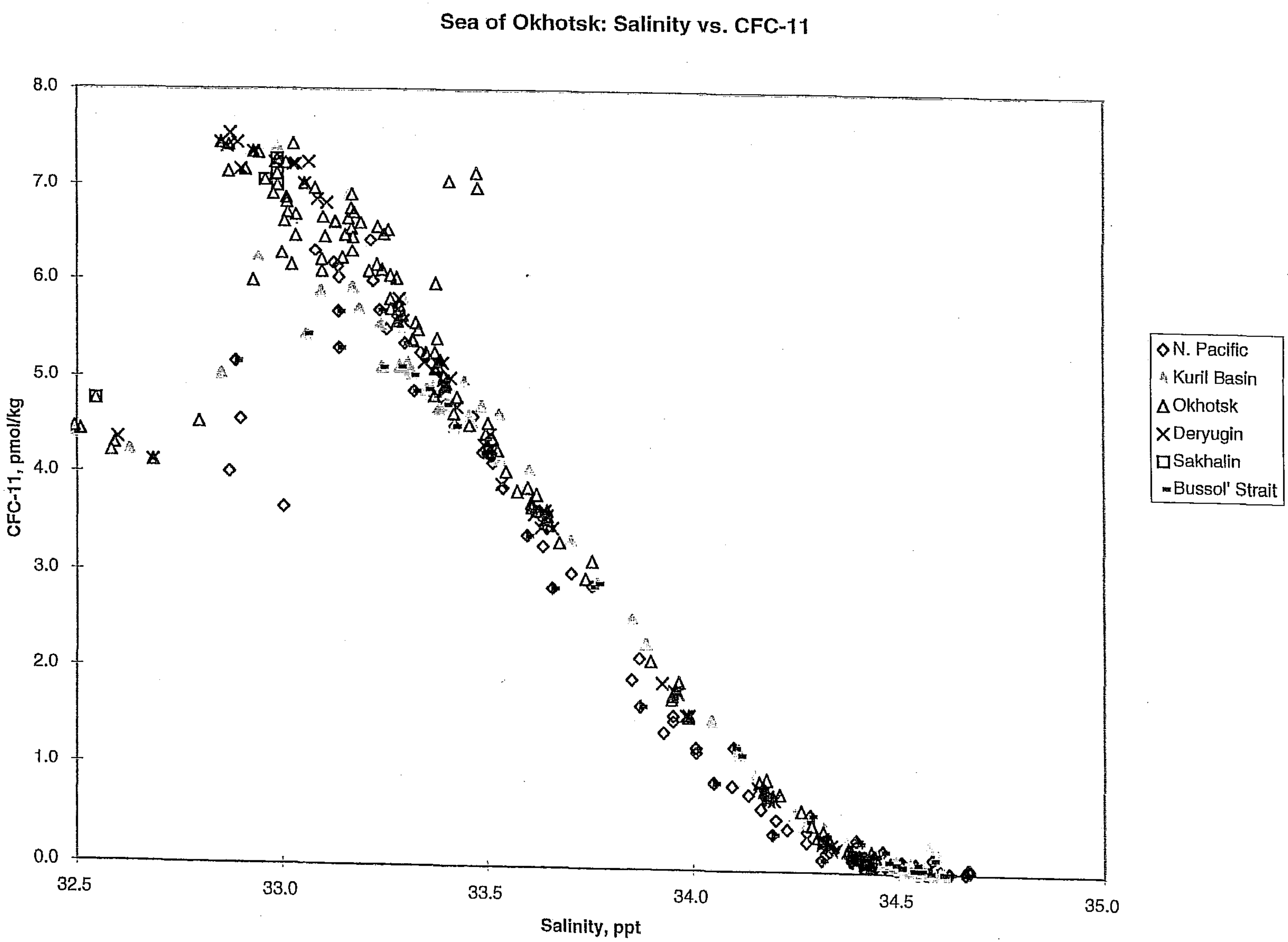
Region	Station Numbers	Symbol
N. Pacific (North Pacific)	1-8	◇
Kuril Basin	7-11	▲
Okhotsk (Sea of Okhotsk)	12-18 and 23-30	△
Deryugin (Deryugin Basin)	18-22	×
Sakhalin (Sakhalinskiy Gulf area)	30-35	□
Bussol' Strait	5-7	-


Sea of Okhotsk: Salinity vs. Potential Temperature
Potential temperature, C
4
3
2
1
0
-1
-2
32.5
33.0
33.5
34.0
34.5
35.0
Salinity
N. Pacific
Kuril Basin
Okhotsk
Deryugin
Sakhalin
Bussol' Strait

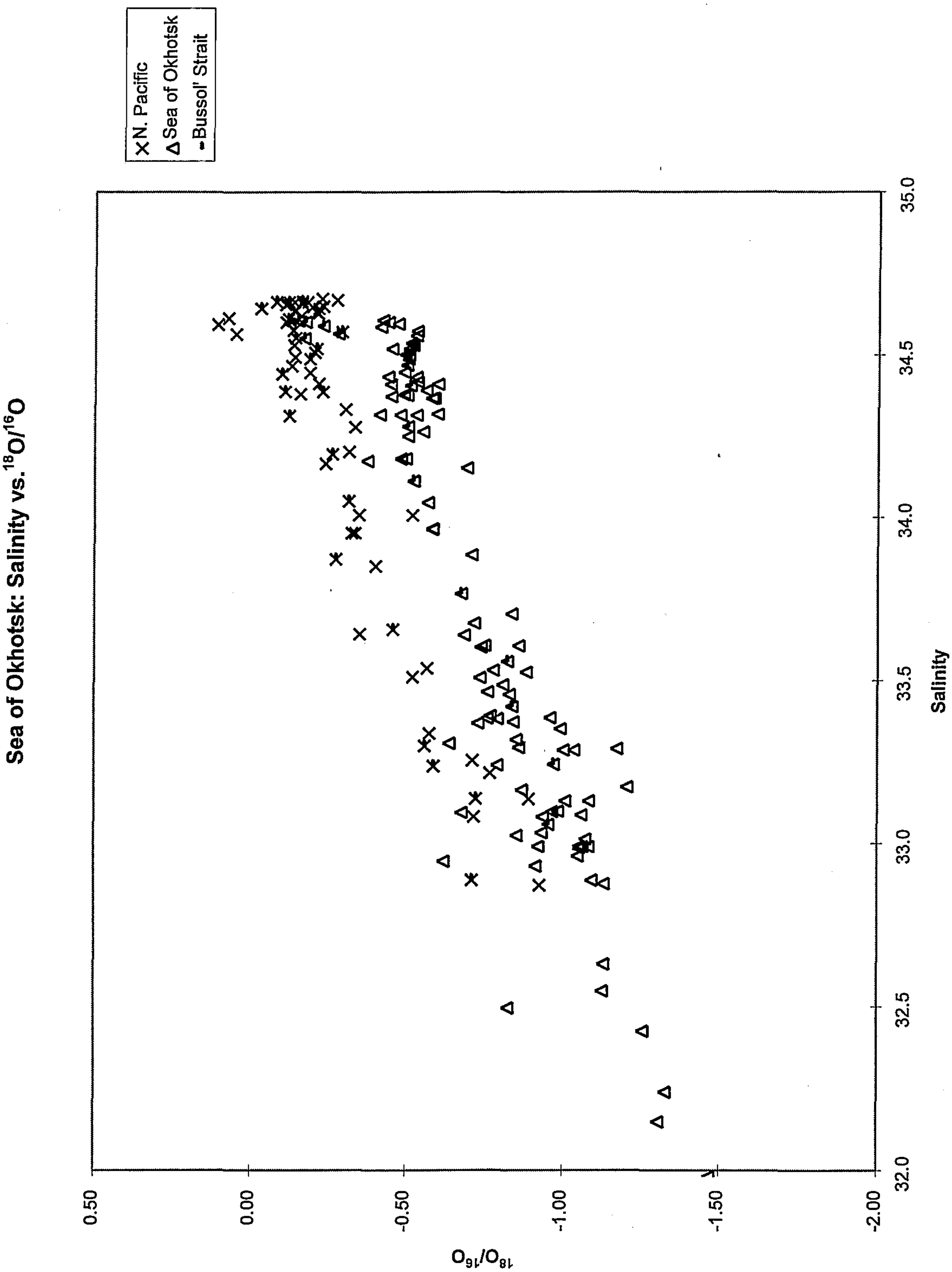

Sea of Okhotsk: Salinity vs. Silicate
N. Pacific
Kuril Basin
Okhotsk
Deryugin
Sakhalin
Bussol' Strait
Silicate conc., umol/kg
250
200
150
100
50
0
32.8
33.3
33.8
34.3
34.8
Salinity

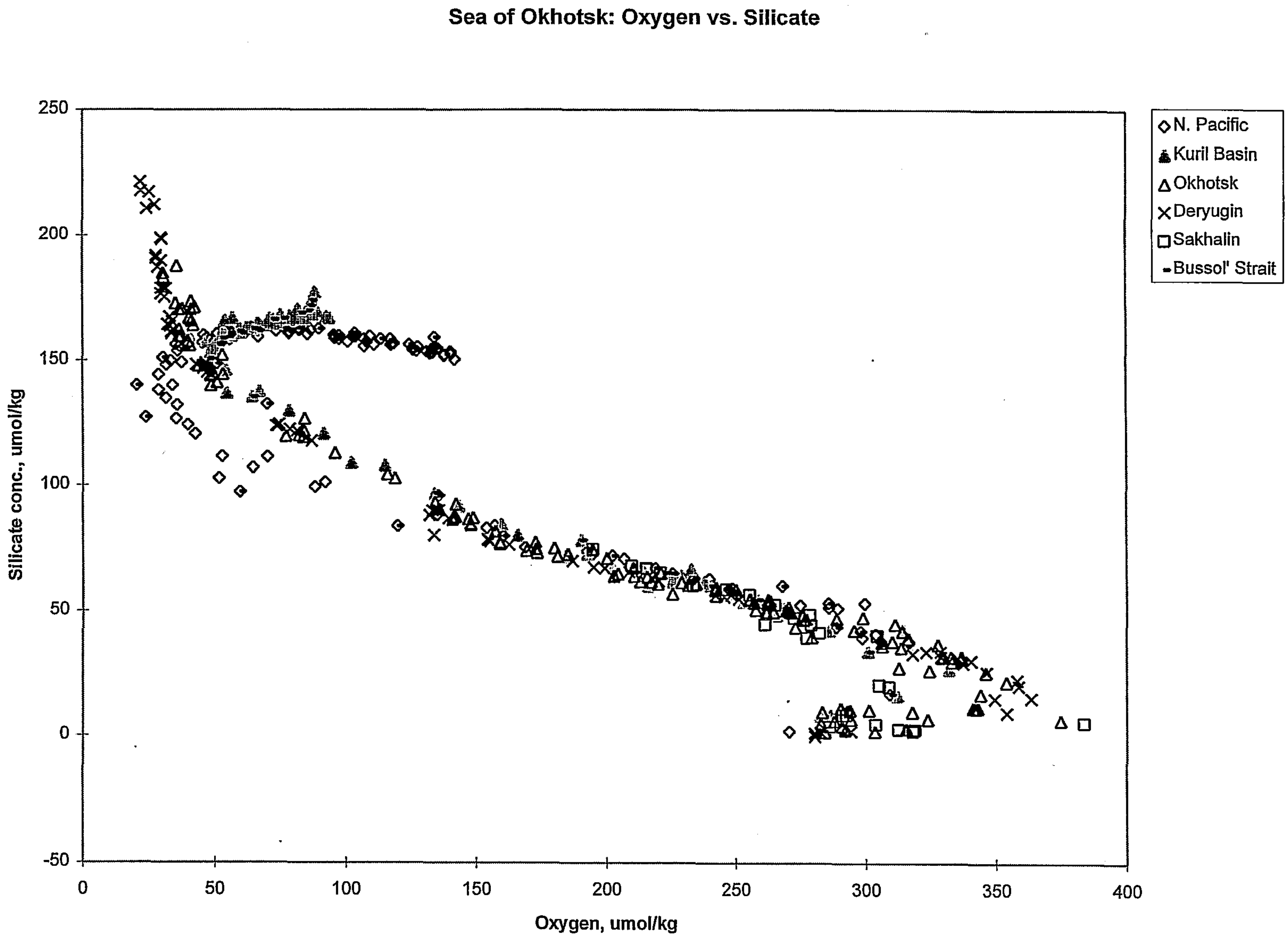


Sea of Okhotsk: Salinity vs. oxygen
Oxygen, umol/kg
Salinity PSS-78
0
50
100
150
200
250
300
350
400
32.5
33.0
33.5
34.0
34.5
35.0
N. Pacific
Kuril Basin
Okhotsk
Deryugin
Sakhalin
Bussol' Strait



Sea of Okhotsk: Salinity vs. CFC-11
CFC-11, pmol/kg
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
32.5
33.0
33.5
34.0
34.5
35.0
Salinity, ppt
N. Pacific
Kuril Basin
Okhotsk
Deryugin
Sakhalin
Bussol' Strait


Sea of Okhotsk: Salinity vs. $^{18}O/^{16}O$
N. Pacific
Sea of Okhotsk
Bussol' Strait
$^{18}O/^{16}O$
0.50
0.00
-0.50
-1.00
-1.50
-2.00
32.0
32.5
33.0
33.5
34.0
34.5
35.0
Salinity


Sea of Okhotsk: Oxygen vs. Silicate
Silicate conc., umol/kg
250
200
150
100
50
0
-50
0
50
100
150
200
250
300
350
400
Oxygen, umol/kg
N. Pacific
Kuril Basin
Okhotsk
Deryugin
Sakhalin
Bussol' Strait