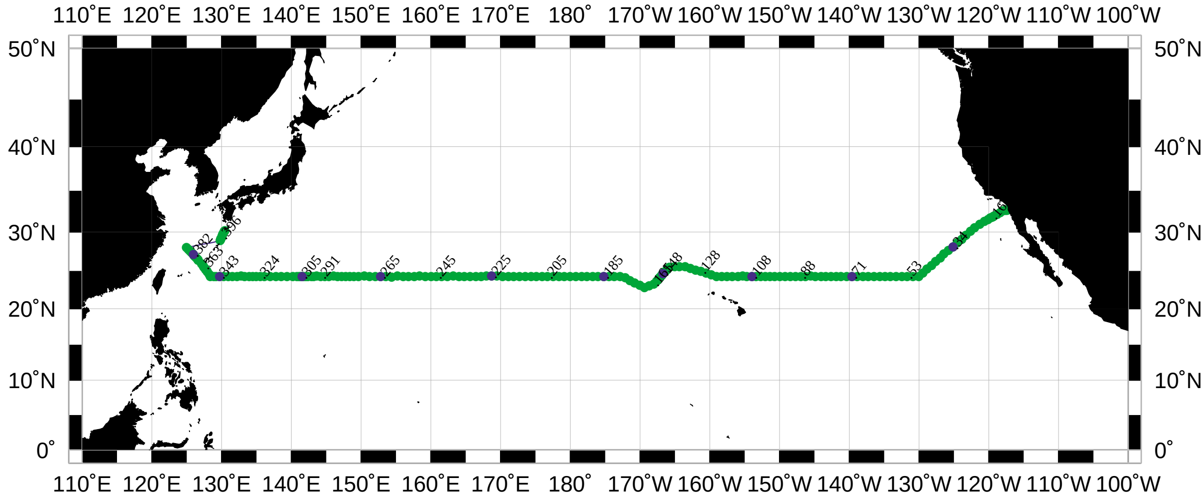
A. Cruise Narrative: A Transpacific Section Along 24 N (P03)



A.1. Highlights

WHP Cruise Summary Information

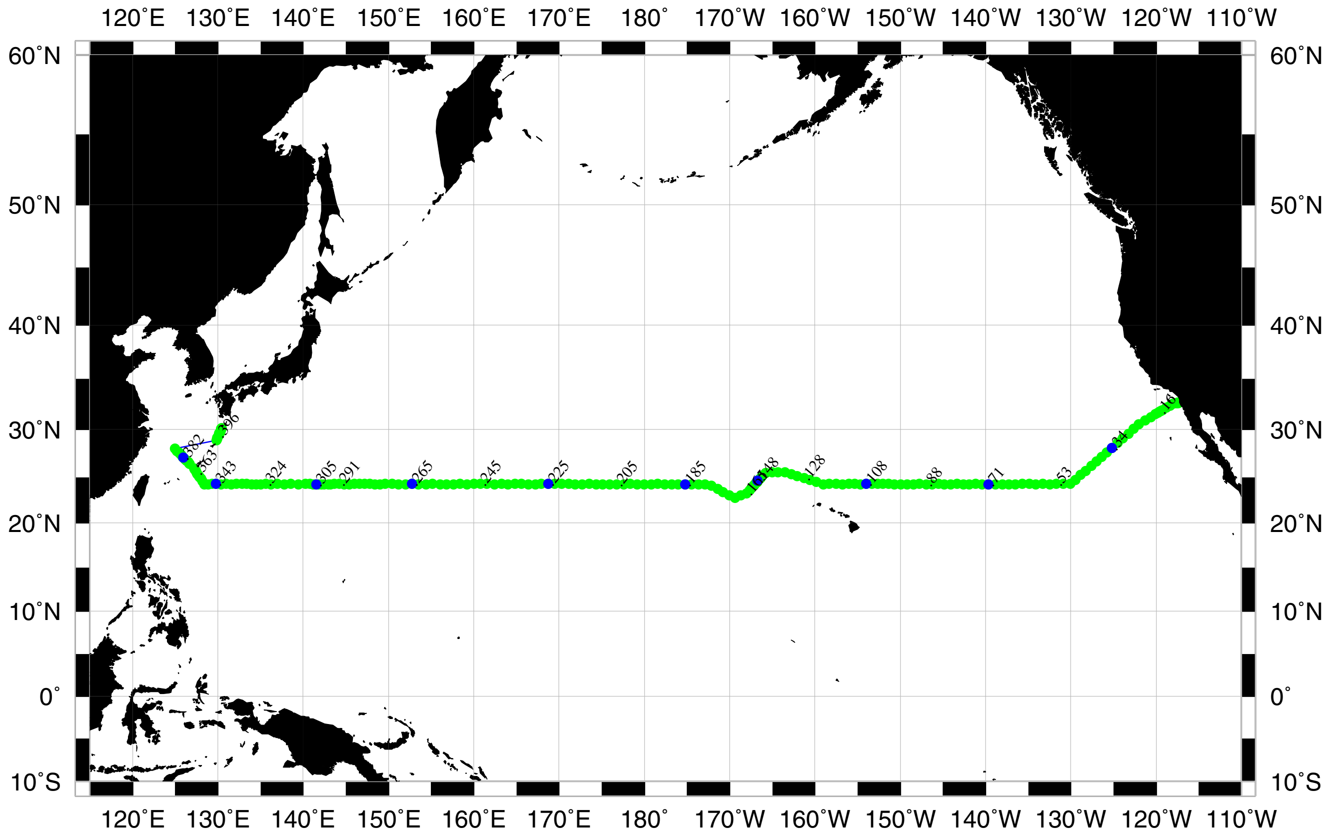
WOCE section designation	**P03**
Expedition designation (EXPOCODE)	**31TTTPS24_1**
Chief Scientist(s) and their affiliation	James H. Swift/SIO, Melinda M Hall/WHOI
Expedition designation (EXPOCODE)	**31TTTPS24_2**
Chief Scientist(s) and their affiliation	Dean H Roemmich/SIO, Harry L Bryden/WHOI
Dates	1985.03.30 - 1985.06.03
Ship	R/V Thomas G. Thompson
Ports of call	San Diego, Midway, Yokohama
Number of stations	216
Geographic boundaries of the stations	32° 39.8' N 124° 59.3' E 117° 19.8' W 22° 44.8' N
Floats and drifters deployed	none
Moorings deployed or recovered	none
Contributing Authors:	James H. Swift, Norma L. Mantyla, John R. Osborne, Peter K. Salameh, ODF

WHP Cruise and Data Information

Instructions: Click on any item to locate primary reference(s) or use navigation tools above.

Cruise Summary Information	Hydrographic Measurements
Description of scientific program	CTD - general
	CTD - pressure
Geographic boundaries of the survey	CTD - temperature
Cruise track (figure)	CTD - conductivity/salinity
Description of stations	CTD - dissolved oxygen
Description of parameters sampled	
	Salinity
	Oxygen
	Nutrients
	CFCs
Principal Investigators for all measurements	
Cruise Participants	Tritium
Problems and goals not achieved	
Other incidents of note	
	Acknowledgments
	References
	DQE Reports
	CFCs
	Data Processing Notes

Station locations for P03 : SWIFT / ROEMMICH



Produced from .sum file by WHPO-SIO

N.B. The following paragraphs are condensed from Scripps Technical Report SIO-90-36 entitled:

A Transpacific Section Along 24 N
(TPS24)
Physical, Chemical, and CTD Data Report
30 March 1985 - 3 June 1985
RV Thomas Thompson TT 188
Legs 1 and 2

1 Introduction

A nearly zonal CTD/hydrographic section across the subtropical North Pacific was occupied by the R/V Thomas Thompson from March 30 to April 30, 1985, and May 4 to June 3, 1985 on cruise TT 188, Legs 1 and 2. The cruise track was primarily along 24 15'N except over the Hawaiian Ridge and at the continental boundaries, where effort was made to cross isobaths perpendicularly. The section began off San Diego, at about 33 N, and angled southwest to 24 15'N. At the completion of the main Pacific crossing near 28 N, 125 E, in the East China Sea, a short section of 10 stations was occupied across the Tokara Strait in order to examine the Kuroshio as it issued from the East China Sea.

The expedition occupied 216 high quality, full water-column CTD/hydrographic stations. Additional components of the physical oceanographic program were continuous acoustic Doppler current profiling (T. Joyce, WHOI), and expendable current profilers (XCPs; P. Niiler, SIO).

Each station consisted of a CTD lowering with a rosette carrying 36 10-liter Niskin bottles. Water samples were collected on the up-cast. Salinity, oxygen and nutrient analyses were performed at sea by the Oceanographic Data Facility at SIO (at that time called the Physical and Chemical Oceanographic Data Facility). Initial CTD processing was accomplished at sea by ODF. In addition to this standard suite of measurements water samples from the same casts were made available for analyses by other investigators. The chlorofluorocarbons (freons) F-11 and F-12 were analyzed at sea by R. Weiss' group from SIO; their results are included in this data report and will also be available in a separate data report from R. Weiss. Samples for tritium analyses were collected for processing by the tritium laboratory of the University of Miami (G. Ostlund and R. Fine); partial results are included in this data report. A separate, complete tritium data listing is available from G. Ostlund. Chlorophyll-a and phaeopigment measurements were made by E. Venrick's group at SIO. High- performance liquid chromatography pigment measurements were made by R. Bidigare's group at Texas A&M University; results are available in a separate data report (Bidigare, et at., 1987). Samples were collected for helium-3, total carbon, manganese, plutonium and rare earth elements for analyses by other investigators. In addition to the basic CTD/hydrographic stations included in this report, approximately one shallow bottle cast was made per day for primary productivity measurements by E. Venrick's group at SIO.

2. Discrete Data - Methods

2.1. Temperature and Salinity

Pressure and temperature for the discrete hydrography tabulations were taken from the calibrated CTD data; calibrations are discussed in Section 3. Reversing thermometers were mounted on 4 to 5 Niskin bottles on each cast. They were used to verify rosette trip sequence and to monitor the CTD temperature calibration for shifts. No such shifts were observed within the resolution of the measurements. The pre- and post-cruise CTD laboratory calibrations agreed with this, suggesting there was at most a 0.001 C shift in temperature calibration from the beginning to the end of the cruise. Depths were calculated from corrected CTD pressures (Saunders, 1981).

Salinity samples were analyzed at sea using one of two Guildline Autosal inductive salinometers located in a tightly temperature controlled van (+/-0.5 C). All salinities were calculated from conductivity using the 1978 practical salinity scale (UNESCO, 1981a) and are tabulated to three decimal places. Fresh IAPSO Standard Seawater vials from Wormley batch P96 were used for calibration at the beginning and end of each station's analyses; hydrography and CTD salinities are reported herein relative to P96 and have not been adjusted further. Mantyla (1987) reported differences between various other batches of standard seawater and P96. Precision of the bottle salinities is +/-0.002 psu.

Bottle salinities were compared with CTD salinities to identify leaking bottles or salinometer malfunctions. Calibrated CTD salinities replace bottle salinities in the event of problems and are indicated by the letter ODD in this data report. The spread in deep bottle salinities is approximately +/-0.001 psu.

2.2. Oxygen and Nutrients

Dissolved oxygen content was determined at sea by the Winkler method as modified by Carpenter (1965), using the equipment and procedures outlined by Anderson (1971). Oxygen measurements are given in ml STP per liter of water at 1 atmosphere and at the potential temperature of the sample. A small number of oxygen outliers were discarded. The precision of the oxygen measurements within a single cast is 0.01 ml/l and the accuracy is 1%.

Silicate, phosphate, nitrate and nitrite were analyzed at sea using a Technicon AutoAnalyzer installed in an analytic van with a tight tolerance continuous flow air conditioning system which maintained a laboratory temperature steady within +/-0.5 C. The procedures are similar to those described in Atlas et al. (1971). Nutrient measurements are reported here in micromoles/liter at 1 atmosphere and 25 C, which is assumed to be the laboratory temperature. The precision of nutrient measurements (within a single cast) is better than 0.5% and the station-to-station, cruise-to-cruise accuracy is 2% to 3%.

Silicate data from stations 199-237 appearing in TPS-24 data releases issued prior to this report are low by 2.8%. The two silicate standards compared for these stations differed by this amount, and subsequent data mapping by L. Talley (SIO) showed that the standard originally chosen as correct was the defective one.

2.3. Chlorofluorocarbons

Concentrations of the dissolved atmospheric chlorofluorocarbons (CFCs) F-11 (trichlorofluoromethane) and F-12 (dichlorodifluoromethane) were measured by shipboard electron-capture gas chromatography, according to the methods described by Bullister and Weiss (1988). The results have been corrected for sampling and analysis blanks, the statistical variations of which are responsible for occasional negative values near the detection limit. Sampling blanks generally decrease at the beginning of an expedition, as the equipment becomes cleaner with use. The following median F-11 and F-12 sampling blanks in picomoles per kilogram, as determined from analyses of deep waters which we believe to be CFC-free, were subtracted from all dissolved CFC measurements in the listed station intervals:

Station	F-11	F-12
1 -106	0.0176	0.0050
108 - 195	0.0133	0.0050
199 - 408	0.0090	0.0106

We attribute the higher-than-usual F-11 sampling blanks during this expedition to the use of silicone spray on the water sampling bottles and rosette. Silicones are extremely persistent and are known to absorb very large amounts of F-11. In addition, higher than normal F-12 levels in the ship's air due to refrigeration leaks, resulted in the higher F-12 sampling blanks during leg 2 of the expedition.

It is important to emphasize that the data have been edited to remove serious flyers and contaminated samples, and to correct gross numerical errors. However, the data have not yet been subjected to the level of scrutiny associated with careful interpretive work. Readers are therefore requested to contact R. Weiss' group at SIO for any revisions in the data which may post-date this report, and to draw to their attention any suspected inconsistencies. The results are reported on the SIO 1986 calibration scale. The precision (+/- one s.d.) of the measurements, as determined from replicate analyses, is about 1% or about 0.005 pmol/kg, whichever is greater, for both CFCs, except where the sampling blanks are significantly higher than 0.005 pmol/kg, in which case the low-level CFC measurements have an error of about 0.01 pmol/kg (see table above). The estimated accuracy of the calibrations is about 1.3% for F-11 and 0.5% for F-12, Individual replicated analyses are listed in a separate table, and their mean values are reported in the main bottle data listings, annotated with an R.

The following single-character footnotes appear the CFC data listings:

R = mean of replicate measurements
M = manual peak integration
I = irregular digital integration

2.4. Tritium

Tritium was measured by electrolytic enrichment and low level gas counting, according to Ostlund and Dorsey (1977). The listed tritium values are the measured tritium ratios (T/H x E-18). To obtain tritium data to match other tritium data reported as "TU81N", multiply the values reported here by the factor 1.316. Thus multiplied, the resulting TU81N values are then reported in the "new NBS scale" based on the NBS standard #4926 as on 1961/09/03, with the new half-life of 12.43 years, i.e., a decay rate of 5.576% per year, age corrected back to the reference data of 1981/01/01. All TU81N data are directly comparable without further age correction. Negative TU values are reported as such for the benefit of allowing the user unbiased statistical treatment of sets of the data. For other applications, 0.0 TU should be used. The errors are mostly 3.5% or 0.05, whichever is larger.

3. CTD Data

3.1. Processing Summary

216 CTD casts were completed using a 36-bottle rosette sampling system. ODF CTD #1 (a modified NBIS Mark Iil) was employed exclusively for all CTD casts. The CTD data were initially processed into a filtered, 1-second average time- series during data acquisition. The pressure and PRT temperature channels were corrected using laboratory calibrations. The conductivity channel was calibrated to salinity check samples acquired on each cast. The CTD time-series data were then pressure-sequenced into two decibar pressure intervals.

3.2. CTD Laboratory Calibrations

3.2.1. Pressure Transducer Calibration

The CTD pressure transducer was calibrated in a temperature-controlled bath to the ODF Ashcroft (pre-cruise) and Ruska (post-cruise) deadweight-tester pressure standards. Thermal response-time, thermal hysteresis and mechanical hysteresis were measured. The mechanical hysteresis loading curves were measured at 0 and 23 C and at maximum loadings of 1480 and 8830 PSI. The transducer thermal response-time was derived from the pressure response to a thermal step-change from 23 to 0 C.

3.2.2. PRT Temperature Calibration

The CTD PRT temperature transducer was calibrated in a temperature-controlled bath to a Leeds and Northrup PRT temperature standard (pre-cruise) and to an NBIS ATB temperature standard PRT (post-cruise). Calibration temperatures of 0, 5, 11, 18, 24 and 30 C (pre-cruise) and 0, 4, 7, 12, 19 and 23 C (post- cruise) were measured.

3.3. CTD DATA PROCESSING

3.3.1. CTD Data Acquisition

Seven channels (pressure, temperature, conductivity, dissolved oxygen, elapsed time, altimeter and voltage) were acquired at a data rate of 31.25 FPS. The FSK CTD signal was demodulated by an ODF-designed deck unit and output to an IEEE-488 bus interface. An IBM CS-9000 served as the real-time data acquisition processor.

Data acquisition consisted of storing all raw binary data on hard disk (and later on nine-track magnetic tape) and generating a corrected and filtered one-second average time-series. Data calculated from this time series were reported and plotted during the cast. A ten-second average of the time-series data was calculated for each water sample collected during the data acquisition.

Generating the one-second time-series involved applying single-frame absolute value and gradient filters, then performing a two-pass standard-deviation test to all channels, rejecting points exceeding 4 standard deviations from the mean on the first pass, then repeating the rejection using 2 standard deviations as the criterion. The pre-cruise laboratory calibration data were applied to pressure and temperature. Pressure and conductivity were lagged to match the thermal response of the PRT temperature transducer. The conductivity channel was corrected for thermal and pressure effects.

3.3.2. CTD Dissolved Oxygen Data

The dissolved oxygen channel was not processed beyond averaging the raw oxygen current. Raw CTD oxygen data were continuously examined for signal quality.

3.3.3. Pressure, Temperature, and Conductivity Corrections

A maximum of 36 salinity check samples and 6 thermometric pressure and temperature measurements were collected on each cast. A ten-second average of the CTD time-series was calculated for each water sample. Differences between bottle and CTD data were then used to verify the pre- and post-cruise pressure and temperature calibrations and to derive CTD conductivity calibrations.

3.3.3.1. CTD Pressure Corrections

A modification to the pre-cruise pressure calibration was determined from the post-cruise calibration and applied to the CTD data. The shipboard processing pressures differ from the revised calibrated pressures by up to 2 decibars in deeper water and up to 6 decibars in the thermocline areas as a result of the new pressure model. No significant drift was apparent in comparisons between CTD and thermometric pressures.

3.3.3.2. CTD Temperature Corrections

No significant drift was apparent in comparisons between CTD and thermometric temperatures over the time scale of the cruise, nor was a systematic difference between CTD and thermometric temperatures evident.

3.3.3.3. CTD Conductivity Corrections

Check sample conductivities were calculated from the sample salinities and from CTD pressures and temperatures. The differences between sample and CTD conductivities were fit to CTD conductivity using a linear least-squares fit. Values greater than two standard deviations from the fit were rejected. The resulting conductivity correction slopes for each cast were fit to station number, giving a continuous smoothed conductivity slope correction as a function of station number. Conductivity correction slopes were then derived from this smoothed fit.

Conductivity differences were calculated for each cast after applying the conductivity slope correction. These differences were fit to station number, giving a continuous conductivity offset correction as a function of station number. Conductivity correction offsets were then generated for each cast. The offsets were manually fine-tuned to account for discontinuous shifts in the conductivity transducer response and to insure a consistent-deep T-S relationship from station to station. Approximately 11% of the casts were manually adjusted from 0.001 to 0.004 psu. Conductivity offset corrections for shallow casts were determined from adjacent deep casts.

3.3.4. Additional Processing

A spike filter was employed to remove large pressure, temperature and conductivity spikes from the time-series data. The down-cast portion of each time-series was then pressure-sequenced into 2 decibar pressure intervals. A "ship-roll" filter was applied to disallow pressure reversals.

3.4. General Comments/Problems

There were 228 CTD rosette casts. 12 were aborted and were neither processed nor included in the report. One pressure-sequenced CTD data set exists for each CTD station. All data was simultaneously recorded on audio cassette tape. Due to deck-unit malfunction, stations 1, 2, 38, 69, 110, 221, 235 and 394 were redigitized from the audio tape following the cruise, with no degradation of quality.

Up-cast thermocline data were typically noisier than the corresponding downcast data, possibly due to the positioning of the CTD near the bottom of the large rosette package. Four up-casts were used as final data instead of down-casts because of conductivity offsets or other instrument-related problems on the down-casts. The up-casts are: 36, 58, 134 and 217.

Because ship-roll effects cause more severe thermocline density inversions on the up-casts, some down-casts were included despite deep ca. 0.002 psu salinity offsets, apparently caused by an intermittent CTD malfunction. The following casts are affected: 84, 106, 221 and 245.

Intermittent single-level gaps in the data are due to the removal of ship-roll effects and filtering. Seven stations had a significantly larger percentage of single-level data gaps than the rest of the stations (more than two percent versus less than 0.2 percent gaps). The weather log for stations 74 through 79, 100 through 134, 157 through 177, 275 through 285, 343 through 355, and 386 through the end of the cruise indicates that the majority of these casts occurred in 20+ knot winds and/or 8 to 10 foot waves, both much larger than recorded for the other casts. Multi-level data gaps where data were not recorded occurred at stations 26, 28, 38, 69, 132, 173, 203, 221, 231, 235 and 237.

The deep T-S relationship was examined for calibration problems and consistency. Instrument problems have been corrected where possible and otherwise documented.

Remaining density inversions in high-gradient regions cannot be accounted for by a mismatch of pressure, temperature, and conductivity sensor response. Detailed examination of the raw data shows significant mixing occurring as a consequence of ship roll. The ship-roll filter, applied to most casts to disallow pressure reversals, resulted in a reduction in the amount and/or size of density inversions in the upper 500 meters of the water column.

A "Missing and Doubtful Data" tabulation for the TPS-24 expedition is held by the Scripps Oceanographic Data Facility. Copies were furnished to D. Roemmich and J. Swift. The file tracks each problem and notes the action taken, if any. Because the tabulation frequently refers to ODF internal files, procedures, and formats, it is not of sufficient general utility to be included in this report. However, any or all of this information will be provided on request.

4. Data Tables

CTD and bottle data are listed together for each station. CTD data are reported at selected standard intervals chosen from the processed 2 decibar pressure series and smoothed over 10 decibars using a Gaussian filter. Salinity was calculated as described above. Potential temperature referenced to 0 decibars and potential densities referenced to 0, 2000 and 4000 decibars are calculated from EOS80 (UNESCO, 1 981 b) and listed, along with specific volume anomaly (SVA). Dynamic height in dynamic meters was calculated by integrating from the sea surface. If there was a missing temperature and/or salinity at the sea-surface, values at the surface were linearly extrapolated from those below. Brunt- Vaisala frequency, N. was calculated from the slope of a least squares fit of a straight line to specific volume anomaly over 60 decibars centered at the desired pressure; Gaussian weighting was used in the fit. Because of the large interval over which N^2 was computed, no values were calculated at pressures less than 30 decibars. The large interval was necessary to reduce noise in the calculation; nevertheless, occasional negative N^2 values were obtained in the deep water. Negative values have been replaced by blanks in this report. Negative values occurred primarily when the absolute value of N^2 was less than 0.005 (cph)2, corresponding to expected uncertainties in density of order 10-7 over 60 decibars.

Discrete data are reported at all observed depths. Oxygen is reported in ml STP per liter at the potential temperature of the sample and nutrients are reported in micromoles per liter at 25 C. Oxygen percent saturations were calculated from the equations of Weiss (1970). Potential temperature and potential density were calculated as for CTD data. CFC data were provided by Weiss. Tritium data were provided by Ostlund (1987).

5. Station Plots

Potential temperature, salinity, and sigma theta versus pressure for the upper 1500 db and potential temperature versus salinity for all cast data are plotted from the 2 decibar CTD series for all stations. The same scale factors have been used throughout to facilitate comparisons.

4. Acknowledgements

We are grateful to Fred Crowe of the S.I.O. Publications and Illustration Facility for designing the covers and overseeing all aspects of publication. The acquisition and publication of this data set would not have been possible without the continuing support, advice, and encouragement from our program managers at the National Science Foundation. The work was funded under NSF Grants OCE83- 17389 and OCE85-041 25 (hydrography and CTD work), OCE83-1 6602 (chlorofluorocarbons), and OCE85-1 0842 (tritium).

5. References

Anderson, G.C., compiler, 1971. Oxygen Analysis." Marine Technician's Handbook, SIO Ref. No. 71-8, Sea Grant Pub. No. 9.

Atlas, E.L., J.C. Caraway, R.D. Tomlinson, L.I. Gordon, L. Barstow, and P.K. Park, 1971. A Practical Manual for Use of the Technicon Z9 AutoAnalyzer Nutrient Analysis; Revised. Oregon State University Technical Report 215, Reference No. 71-22.

Bidigare, R.R., M. Ondrusek, S. Sweet and J.M. Brooks, 1987. Trans-Pacific data repon. Geochemical and Environmental Research Group, Department of Oceanography, Texas A&M University.

Bullister, J.L. and R.F. Weiss, 1988. Determination of CC13F and CC12F2 in seawater and air. Deep-Sea. Res., 35, 839-853.

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

Mantyla, A.W., 1987. Standard seawater comparisons updated. J. Phys. Oceanogr., 1 7, 543-548.

Ostlund, H.G., 1987. TPS24 - Transpacific Cruise 1985, Tritium Results. Tritium Laboratory Data Release #87-35. University of Miami Tritium Laboratory, Rosenstiel School of Marine and Atmospheric Science, 4600 Rickenbacker Causeway, Miami, FL 33149.

Ostlund, H.G., and H.G. Dorsey, 1977. Rapid electrolytic enrichment and hydrogen gas proportional counting of tritium. In Low-Radioactivity Measurements and Applications, Proceedings of the International Conference on Low- Radioactivity Measurements and Applications, 6-10 October 1975. The High Tatras, Czechoslovakia, Slovenske Pedagogicke Nakladatel'stvo, Bratislava.

Saunders, P.M., 1981. Practical conversion of pressure to depth. J. Phys. Oceanogr., 11, 573-574.

Swift, J., N.L. Mantyla, J.R. Osborne, and P.K. Salameh, 1990. A transpacific section along 24 N (TPS24), Physical, chemical and CTD data report 30 March 1985 - 3 June 1985, RV Thomas Thompson TT 188, Legs 1 and 2. Scripps Institution of Oceanography, SIO Reference 90-36.

UNESCO, 1981a. Background papers and supporting data on the Practical Salinity Scale, 1978. UNESCO Tech. PaP. in Mar. Sci., No. 37, 144 pp.

UNESCO, 1981b. Background papers and supporting data on the International Equation of State 1980. UNESCO Tech. PaP. in Mar. Sd., No. 38, 192 pp.

Weiss, R. F., 1970. The solubility of nitrogen, oxygen and argon in water and seawater. Deep-Sea Res.. 17. 721-735.

6. List of Cruise Participants

SHIPBOARD SCENTFIC PARTY, LEG I

Chief Scientist	**Co-chief Scientist**
James H. Swift	Melinda M Hall
Scripps Institution of Oceanography	Woods Hole Oceanographic Institution

Massachusetts Institute of Technology
- Elizabeth J Callahan
- William R Young

Scripps Institution of Oceanography
- Jian-Hwa Hu
- Cecelia A. Kemper
- Peter K Salemeh
- Frederick A VanWoy

Scripps Institution of Oceanography - ODF
- Jama P Costello
- Frank M Delahoyde
- Douglas M Masten
- Carl W Mattson
- David A Muus
- Ronald G Patrick
- Paul R Sweet

Texas A & M University
- Michael E Ondrusek
- Stephen T Sweet

University of California, Santa Barbara
- Tracy A. McCallister

University of Washington
- Thomas W. Lehman

Woods Hole Oceanographic Institution
- Richard W Gregory-Allen

SHIPBOARD SCIENTIFIC PARTY, LEG 2

Chief Scientist
Dean H Roemmich
Scripps Institution of Oceanography

Co-chief Scientist
Harry L Bryden
Woods Hole Oceanographic Institution

Massachusetts Institute of Technology
- Barry C Grant
- Chris Measures

Scripps Institution of Oceanography
- Cecelia A. Kemper
- Dong-Kyu Lee
- Margie M Mitchell
- Mark J. Warner
- Jean Washington

Scripps Institution of Oceanography- ODF
- James P Castello
- Frank M Delahoyde
- Douglas M. Masten
- Carl W Mattson
- David A. Muus
- Ronald G. Patrick
- Brian Willhoite

Texas A & M University
- Debra A Defreitas
- Stephen T Sweet

Nationa1 Oceanic and Atmospheric Administration
- Dave Wisegarver

University of Washington
- Ted H Benson

Woods Hole Oceanographic Institution
- Richard W Gregory-Allen

Final CFC Data Quality Evaluation (DQE) Comments on tps24 (P03).
(David Wisegarver)
Dec 2000

During the initial DQE review of the CFC data, a small number of samples were given QUALT2 flags which differed from the initial QUALT1 flags assigned by the PI. After discussion, the PI concurred with the DQE assigned flags and updated the QUAL1 flags for these samples.

The CFC concentrations have been adjusted to the SIO98 calibration Scale (Prinn et al. 2000) so that all of the Pacific WOCE CFC data will be on a common calibration scale.

For further information, comments or questions, please, contact the CFC PI for this section (R. Weiss, rfw@gaslab.ucsd.edu) or David Wisegarver (wise@pmel.noaa.gov).

Additional information on WOCE CFC synthesis may be available at: http://www.pmel.noaa.gov/cfc.

****

Prinn, R. G., R. F. Weiss, P. J. Fraser, P. G. Simmonds, D. M. Cunnold, F. N. Alyea, S. O'Doherty, P. Salameh, B. R. Miller, J. Huang, R. H. J. Wang, D. E. Hartley, C. Harth, L. P. Steele, G. Sturrock, P. M. Midgley, and A. McCulloch, A history of chemically and radiatively important gases in air deduced from ALE/GAGE/AGAGE. Journal of Geophysical Research, 105, 17,751-17,792, 2000.

****

Data Processing Notes:					
Date	**Contact**	**Data Type**	**Data Status**	**Summary**	
11/1/90	Gordon	NUTs	DQE Begun		
11/9/90	Mantyla	NUTs/S/O	Sent to DQE		
7/9/96	Salameh	CFCs	Submitted for DQE		
4/17/98	Diggs	CTD/BTL	Data are Public		
7/7/98	Lupton	HELIUM	Final Data Rcvd @ WHPO		
1/12/99	Talley	CFCs	Submitted	see note:	
	I am ftping a file with the CFC data from Ray Weiss, courtesy of Peter Salameh, for the two old cruises TPS47 (P01) and TPS24 (P03).I will have Danie merge them and then the final files should be placed in the WHPO public site. I will also contact John Lupton about helium data and the Miami lab about tritium data for the same cruises.				
1/21/99	Talley	TRITUM	Submitted for DQE	by Charlene Grall	

The files on the floppy disk include only samples on which Cl4 or T (or both) have been measured. File format is DOS, as it comes on the IBM PC, as ASCII characters.

The data files (nnnnnnn.PLT) form integers of the actual numbers multiplied by FACTOR below. Missing data are indicated by blanks.

BYTES	WIDTH	DATA, (right justified)	FACTOR
1-6	6	Station number	1
7-12	6	Cast, Niskin bottle number	1
13-18	6	Depth in m or pressure in dB, supplied by chief scientist	1
19-24	6	Potential temperature calculated by the equations of Bryden (1973)	1000
25-30	6	Salinity, in S-units, supplied by chief scientist	1000
31-36	6	Sigma Theta, calculated according to equations of Millero and Poisson (1981)	1000
37-42	6	TU in old scale at time of sampling	1000
43-48	6	Error, 1 Sigma, in TU	1000
49-54	6	TCO2 in moles/kg. Note: On TTO there are TCO2 data available on more samples, not listed here	1000
55-60	6	dC13 (o/oo) vs PDB, of our CO2 preparations	1000
61-68	8	DC14 in internationally adopted scale	1000
69-72	4	Gerard sampler #	1
73-78	6	Available	-
79	1	CR	-
80	1	LF	-

Files with attribute .LOC are station locations etc. as follows:

BYTES	WIDTH	INFORMATION
1-8	8	Station number
9-16	8	Date, yrmoda
17-24	8	Bottom depth in meters
25-32	8	Latitude degmin. North is positive
33-40	8	Longitude degmin. East is positive
41-78	38	Available
79	1	CR
80	1	LF

	The Tritium Lab is responsible only for the TU, eTU,dC13 and DC14 data to be accurate. For up-to-date hydrography, TCO2, and other parameters, please contact persons in charge of scientific cruise. The Tritium Lab is responsible only for the TU, eTU,dC13 and DC14 data to be accurate. For up-to-date hydrography, TCO2, and other parameters, please contact Scripps Data Facility. ^^ Charlene Grall * University of Miami 4600 Rickenbacker Cswy. * Miami, FL 33149 PH: 305/361-4119 * FX: 305/361-4112			
3/30/99	Bartolacci	He/Tr	Website Updated	data OnLine, encrypted
	Website now has an encrypted version of the bottle data file that contains helium and tritium in addition to the public version of the bottle file.			
10/25/99	Swift	He/Tr	Data are Public	See note:
	there is no reason that any data from the "pre-WOCE WOCE lines" (P1, P3, A16, etc.) should be encrypted.			
7/5/00	Bartolacci	HELIUM	Website Updated	
	delhe3/helium re-merged into btl file/online Bottle: (helium, delhe3, qualt1) Re-merged delhe3 and helium into both P03 legs (sent by L. Evans, different flags) replaced online files, updated webpages to indicate the change. As per J. Swift, 1999.10.25 email left these files as entirely public and unencrypted.			
7/5/00	Bartolacci	He/Tr	Website Updated	data are public
7/17/00	Key	CO2	No Data Submitted: problems with precision and accuracy	
	On TPS cruises which were sampled for TCO2, there were problems with precision and accuracy. These data have never been reported to either me of CDIAC. Feely's group did what sampling there was for the various carbon parameters. I believe that he does have alk values for at least one of the three TPS lines. Note that carbon data from the Japanese zonal line(s) is available from Feely (at least he has the data) and permissions.			
6/22/01	Uribe	CTD/BTL	Website Updated	CSV File Added
	CTD and Bottle files in exchange format have been put online.			
9/5/01	Bartolacci	BTL	Data Update	CFC updated, ready to merge
	I have placed updated CFC values into the P03/original directory. These files were sent by D. Wisegarver on 2001.07.09 and are ready for merging.			
9/6/01	Muus	CFCs	Notes on P03 CFC merging	
	1. New CFC-11 and CFC-12 from: /usr/export/html-public/data/onetime/pacific/p03/original/ 20010709_P03_CFC_UPDT_WISEGARVER/20010709.165533_WISEGARVER _P03/20010709.165533_WISEGARVER_P03_tps24_CFC_DQE.dat merged into web SEA files as of Sept 6, 2001: 20000703WHPOSIODMB File names changed from p03a (second leg) to p03w and p03b (first leg) to p03e One file contained new CFC data for both legs. No SEA file QUALT2 words so added QUALT2 identical to QUALT1 prior to merging. CFC file has 3 digit sampno as Cast# & Bottle# while .SEA files have SAMPNO as Bottle# only. CFC file has -9 for Bottle numbers. Changed CFC files by deleting Cast# portion of sampno in order to merge.			

	2. SUMMARY files: Leg 1 (20010326WHPOSIOKJU) Leg 2 (no version code) have "INT" (interpolated?) as NAV entry numerous times. "INT" not a NAV code per WOCE Manual. EVENT CODE is BO, EN, BE rather than normal sequence of BE, BO, EN. All three position and time entries for each station are identical since this is a Pre-WOCE cruise. Left NAV and EVENT CODEs unchanged. EXPOCODEs for Leg 2 SUMMARY file changed from 31TTTPS24/2 to 31TTTPS24_2. EXPOCODEs for Leg 1 SUMMARY file already okay as 31TTTPS24_1. 3. Exchange files checked using Java Ocean Atlas.			
9/7/01	Bartolacci	BTL/SUM	Website Updated: SUM reformatted, CFCs merged	
	New CFC's were merged into the bottle file for each leg. These new files have replaced current online files. updated (reformatted) sumfiles have also replaced current versions. Notes on merging and reformatting will be sent via email to meta data manager.			
9/27/01	Bartolacci	CTD	Website Updated	CTD corrected, new file online
	It was found that the ctd station file for station 320 was mistakenly labeled as station 310. The file name was corrected, and new zipped ctd files are online. Since station 310 is missing from even the original files forwarded from WHOI, ODF has been contacted in an attempt to obtain a new ctd data set, or at least the station 310 file.			
10/2/01	Bartolacci	CTD	Update Needed	CTD station files missing
	As per Sharon Escher there are 4 CTD station files missing from the on line CTD zipped file. This matter is being investigated at this time. Sharon Escher wrote-Could you check on 4 stations for me in p03? Stations 388, 365, 257, and 1 used to have ctd data (from Lynne's original work that I am using as a template for making these new plots), but these 4 are not in the dataset I downloaded from the web site. If you could give me information on these, I can either wait for the data or go ahead without them. There is bottle data for these stations, but no ctd data.			
10/9/01	Anderson	CTD	Data Update	Reformatted data online
	Sharon Escher found 5 stations missing from the CTD zipped files. Found the stations, reformatted, added headers, and rezipped files. The missing stations were 1, 257, 310, 365, and 388. The old files were renamed and moved to the original directory. New files were put online.			