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CTD MEASUREMENTS DURING 2003 AND 2004 AS PART OF THE TAO/TRITON PROGRAM

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Abstract. During 2003 and 2004, CTD data were collected in the equatorial Pacific Ocean during cruises to service the TAO/TRITON array, a network of deep ocean moored buoys deployed to support ENSO research and forecasting. Summaries of Sea-Bird CTD measurements and hydrographic data acquired on 16 cruises are presented. Composite potential temperature-salinity diagrams and section plots of oceanographic variables along 95°W, 110°W, 125°W, 140°W, 155°W, 170°W, 180°, and 165°E meridians are given. Profiles including station location, meteorological conditions, and abbreviated CTD data listings are shown on the report CD for each cast. Hydrographic data are listed for each cruise on the report CD.

1. Introduction

CTD data are collected in the equatorial Pacific Ocean in conjunction with the maintenance of the Tropical Atmosphere Ocean (TAO)/TRITON array. TAO/TRITON servicing cruises (and the shipboard measurements that are an integral part of them) are support for NOAA's strategic plan element to Implement Seasonal-to-Interannual Climate Forecasts, and support of the International Climate Variability and Predictability (CLIVAR) program, the El Niño/Southern Oscillation (ENSO) Observing System, the Global Ocean Observing System (GOOS), and the Global Climate Observing System (GCOS).

The TAO/TRITON array, completed in 1994, consists of approximately 70 deep ocean moorings within 8 degrees of the equator spanning the Pacific Basin from 95°W to 137°E. Moorings west of 165°E are maintained by the Japan Agency for Marine Earth Science and Technology (JAMSTEC). High quality oceanographic and surface meteorological data are recorded and reported in real time using the Argos satellite data telemetry system. These data are used to improve understanding, modeling, and prediction of the global interannual climate fluctuations associated with the El Niño-Southern Oscillation phenomena in the tropical Pacific Ocean.

The primary objective of TAO/TRITON cruises is the recovery and deployment of moorings. Each mooring line is occupied twice a year, once during the first half of the year, and again approximately 4–7 months later. Figures 1a and b show the CTD station locations for each half-yearly occupation during 2003–2004. Many CTD stations were skipped during the second occupation of 125°W and 140°W during 2004 owing to the ship's mechanical problems. At a minimum, CTD casts supporting the TAO/TRITON program are conducted at each mooring site to a depth of 1000 m. As time allows, additional CTD work is prioritized as follows: (1) 1000 m casts at 1-degree intervals between 12°N and 8°S along the ship's trackline, (2) deep casts at mooring sites to a minimum depth of 3000 m or a maximum depth 200 m above the bottom, (3) 1000 m casts every one-half degree of latitude between 3°N and 3°S. Although there are no TAO/TRITON moorings north of 8°N, CTD profiles are collected to 12°N along the ship's trackline whenever possible to measure across the North Equatorial Counter Current. Physical underway operations include shipboard Acoustic Doppler Current Profiler (ADCP) measurements, sea surface temperature (SST) and salinity (SSS) measurements, and routine weather observations.

CTD measurements are used to verify moored temperature sensor data, calculate dynamic height, and at many sites, are the only calibrated in situ observations of the equatorial Pacific salinity field. CTD measurements are also used to aid in the calibration of moored conductivity sensor data. These CTD data are quickly processed, calibrated, and distributed internationally to a wide variety of users: biological, chemical, and physical oceanographers at universities and government laboratories, including NOAA/NCEP, for improvement of ENSO predictions.

Summaries of CTD measurements and hydrographic data collected on 16 cruises during 2003 and 2004 are presented here. Data include meridional sections across the equator along 95°W, 110°W, 125°W, 140°W, 155°W, 170°W, 180°, and 165°E. Figures 2a–p show the cruise track and CTD station locations for each cruise. Tables 1a–p summarize CTD station information for each cruise. Cruise name notation is GPx-yy-zz, where x is the sequential cruise number during each year, yy is the year (03 or 04), and zz is the ship code (KA for the NOAA ship *Ka'imimoana*, RB for the NOAA ship *Ronald H. Brown*). Sea-Bird 911plus systems are used to acquire CTD data on all cruises. Pressure, temperature, and conductivity are sampled at a rate of 24 Hz. A Sea-Bird 43 oxygen sensor was added to the primary sensor suite during GP603, GP304, and GP504. Water samples are collected on the upcast using an electronically fired rosette sampler and used to calibrate CTD data (see section 6). Salinity is analyzed using an autosalinometer (see section 4). Sample oxygen concentrations during GP603, GP304, and GP504 were measured using the Winkler method as specified in the WOCE Operations Manual (1994).

2. Sea-Bird 911plus CTD System

The Sea-Bird Electronics, Inc. (SBE) 911plus CTD system is a real-time data system with the CTD data from the SBE 9plus underwater unit transmitted via a conducting cable to the SBE 11plus deck unit. The serial data from the underwater unit are sent to the deck unit in RS-232 NRZ format. The deck unit decodes the serial data and sends it to a personal computer for display and storage using Sea-Bird SEASOFT software program SEASAVE. The SBE 911plus CTD system transmits data from its primary and auxiliary sensors in the form of binary number equivalents of the frequency or voltage outputs from those sensors. These are referred to as the raw data. The calculations required to convert raw data to engineering units are performed in the software, either in real time, or after the data has been stored in a disk file (Seasoft, 1994).

2.1 Conductivity

The flow-through conductivity sensing element is a glass tube (cell) with three platinum electrodes. The resistance measured between the center electrode and end electrode pair is determined by the cell geometry and the specific conductance of the fluid within the cell, and controls the output frequency of a Wien Bridge circuit. The sensor has a frequency output of approximately 3 to 12 kHz corresponding to conductivity from 0 to 7 Siemens/meter (0 to 70 mmho/cm). The SBE conductivity sensor has a typical accuracy/stability of ±0.0003 S/m/month, and resolution of 0.00004 S/m at 24 Hz.

Sensor calibrations are performed at Sea-Bird Electronics, Inc. in Bellevue, Washington on a roughly annual basis. Conductivity calibration certificates show an equation containing the appropriate pressure-dependent correction term to account for the effect of hydrostatic loading (pressure) on the conductivity cell:

$$C(\mathrm{S/m}) = (g + hf^2 + if^3 + jf^4)/[10(1 + \mathit{ctcor}\ t + \mathit{cpcor}\ p)]$$

where g, h, i, j, *ctcor*, and *cpcor* are calibration coefficients, f is the instrument frequency (kHz), t is the water temperature (°C), and p is the water pressure (dbar). SEASOFT automatically implements this equation.

2.2 Temperature

The temperature sensing element is a glass-coated thermistor bead, pressure-protected by a stainless steel tube. The sensor output frequency ranges from approximately 5 to 13 kHz corresponding to temperature from −5 to 35 degrees Celsius. The output frequency is inversely proportional to the square root of the thermistor resistance which controls the output of a patented Wien Bridge circuit. The thermistor resistance is exponentially related to temperature. The SBE thermometer has a typical accuracy/stability of ±0.004°C per year; and resolution of 0.0003°C at 24 Hz. The SBE thermometer has a fast response time of 0.070 seconds.

Sensor calibrations are performed at Sea-Bird Electronics, Inc. on a roughly annual basis. Temperature (ITS-90) is computed according to

$$T(^\circ\mathrm{C}) = 1/\{g + h[\ln(f0/f)] + i[\ln^2(f0/f)] + j[\ln^3(f0/f)]\} - 273.15$$

where g, h, i, j, and $f0$ are calibration coefficients, and f is the instrument frequency (kHz). SEASOFT automatically implements this equation, and converts between ITS-90 and IPTS-68 temperature scales when selected.

2.3 Pressure

The Paroscientific series 4000 Digiquartz high pressure transducer uses a quartz crystal resonator whose frequency of oscillation varies with pressure induced stress measuring changes in pressure as small as 0.01 parts per million with an absolute range of 0 to 10,000 psia (0 to 6885 decibars). Also, a quartz crystal temperature signal is used to compensate for a wide range of temperature changes. Repeatability, hysteresis, and pressure conformance are 0.005% FS. The nominal pressure frequency (0 to full scale) is 34 to 38 kHz. The nominal temperature frequency is 172 kHz + 50 ppm/°C.

Periodic sensor calibrations are performed at Sea-Bird Electronics, Inc. Pressure coefficients are first formulated into

$$\begin{aligned} c &= c1 + c2U + c3U^2 \\ d &= d1 + d2U \\ t0 &= t1 + t2U + t3U^2 + t4U^3 + t5U^4 \end{aligned}$$

where U is temperature in degrees Celsius. Then pressure is computed according to

$$P(\text{psia}) = c[1 - (t0^2/t^2)]\{1 - d[1 - (t0^2/t^2)]\}$$

where t is pressure period (μs). SEASOFT automatically implements this equation.

2.4 Oxygen

The SBE-43 oxygen sensor uses an electrochemical cell that is constantly polarized. The sensor is temperature compensated using special temperature sensing and an internal microcomputer. The interface electronics reports voltages for oxygen current only. A linear equation of the form $I = mV + b$, where $m = 1.0\text{e}{-6}$ and $b = 0.0$, yields sensor current as a function of sensor output voltage. The sensor has a thermal time constant of approximately 2.5 s; and an oxygen response time constant that is temperature dependent, increasing with cooler temperatures, ranging from 2 to 12 s.

Pre-cruise sensor calibrations are performed at Sea-Bird Electronics, Inc., providing slope, bias, tcor, and pcor coefficients. SEASOFT computes dissolved oxygen according to Owens and Millard (1985).

3. Data Acquisition

The package enters the water and is held at 10 m for 60 seconds after the pumps turn on in order to prime the system. The package is brought back to just beneath the surface and the acquisition program is restarted. Under ideal conditions the package should be lowered at a rate of 30 m/min to 50 m, 45 m/min to 200 m, and 60 m/min to depth. Ship heave may cause substantial variation about these mean lowering rates. Cable tension is monitored at the winch box display. Maximum cast depth is 200 m from the bottom as reported by the ship's fathometer.

Nominally 8–12 water samples are collected during the upcast using an SBE rosette. Five or ten-liter Niskin sample bottles are used depending on the cruise. Bottle closures are performed through the SEASOFT software.

Digitized data are collected on two PCs simultaneously. Raw data files are archived on CD-ROM.

4. Salinity Analysis

Bottle salinity analyses are performed in temperature-controlled environments using Guildline Model 8400B inductive autosalinometers equipped with Ocean Scientific International, Ltd. ACI2000 computer interface and standardized with IAPSO Standard Seawater. The autosalinometer is standardized before each run and the correction is applied in the software. Ten scans of data are averaged for each reading. Three readings are taken per sample and averaged for one sample salinity value. Bottle salinities are compared to preliminary CTD salinities at sea to aid in the identification of leaking bottles as well as to monitor the CTD conductivity cells' performance and drift. Their use in calibrating CTD conductivity on shore is detailed in section 6. The expected precision of the autosalinometer with an accomplished operator is 0.001 PSS-78, with an accuracy of 0.002.

5. SEASOFT Processing

SEASOFT consists of modular menu-driven routines for acquisition, display, processing, and archiving of oceanographic data acquired with Sea-Bird equipment and is designed to work with an IBM or compatible personal computer. Raw data are acquired from the instruments and stored unmodified. The conversion module DATCNV uses instrument configuration and precruise calibration files to create a converted engineering unit data file that is operated on by all SEASOFT post processing modules. The following describes each processing module used and notes the specifications in the reduction of TAO CTD data.

ALIGNCTD advances secondary conductivity relative to temperature by 0.073 s. This is the typical net advance of ducted temperature and conductivity sensors with a 3000-rpm pump. The SBE 11plus deck unit automatically advances primary conductivity. ROSSUM creates a summary of the bottle data. Pressure, temperature, and conductivity are averaged over a 2-s interval after the confirm bit in the upcast data stream. WILDEDIT marks extreme outliers in the data files. The first pass obtains an accurate estimate of the true standard deviation of the data. The data are read in blocks of 100 scans. Data greater than two standard deviations are flagged. The second pass computes a standard deviation over the same 100 scans excluding the flagged values. Values greater than 20 standard deviations are marked bad. All flagged data are excluded. FILTER performs a low-pass filter on pressure with a time constant of 0.15 s. In order to produce a zero phase (no time shift) the filter first runs forward through the file and then runs backwards through the file. CELLTM uses a recursive filter to remove conductivity cell thermal mass effects from the measured conductivity. Nominal values are used for thermal anomaly amplitude ($\alpha = 0.03$) and the time constant ($1/\beta = 7.0$). LOOPEDIT excludes scans where the minimum velocity of the package is less than 0.25 m/s or the package has reversed its direction owing to ship heave. BINAVG averages the data into 1-dbar pressure bins starting at 1 dbar (no surface bin). The center value of the first bin is set equal to the bin size. The bin minimum and maximum values are the center value plus or minus half the bin size. DERIVE computes selected variables such as salinity, potential temperature, and potential density.

6. Post-Cruise Calibrations

6.1 Conductivity

PMEL Fortran program SBECAL combines SEASOFT bottle files into one listing. PMEL Fortran program ADDSAL reads bottle salinity data received from the ship's survey personnel and adds it to the combined listing by station/sample number. MATLAB functions CALCOSn are used to determine the best fit of CTD and bottle data, where n is the order of the station-dependent linear or polynomial fit. CALCOSn recursively throws out data greater than a specified number of standard deviations (usually 2.8). CALCOSn returns a single conductivity bias and a conductivity slope for each station. A station-dependent slope coefficient best models the gradual shift in the conductivity sensor within each station grouping with time. CALCOPn additionally returns a linear pressure term (modified beta) that is multiplied by CTD pressure and added to conductivity. The order of the polynomial was chosen to keep the standard deviation of each grouping to a minimum while avoiding fitting to fluctuations due to noise in standardizations of salinity sample runs.

Table 2 lists the conductivity calibration coefficients determined for each station grouping. Calibrated profiles were compared to historical deep theta-salinity profiles. For two cruises, GP603 and GP703, an additional offset had to be applied to CTD salinity in order to bring the profiles into agreement with the historical envelope of deep profiles.

PMEL Fortran program CALMSTR applies post-cruise calibrations to temperature and conductivity, and computes final salinity values. Final pressure calibrations were pre-cruise. CTD-bottle conductivity differences (Figs. 3a–h) are used to verify the success of the fit parameters.

6.2 Temperature

Normally, adjustments are made to the bias of the thermistors using a linear fit of the sensor drift history from calibration data taken over the previous few years, projected to the midpoint of each cruise. These drift corrections are small (order 1.0e−3°C). Drift corrections were not computed for the cruises presented here, however, except for GP604. For temperature sensor S/N 1455 used during GP604, a drift correction of −0.0007°C was applied. Also, a uniform correction was applied to all sensors for heating of the thermistor owing to viscous effects. Thermistors are biased high by this effect and were adjusted down by 0.6e−03°C. This adjustment results in errors of no more than ±0.15e−03°C from this effect for the full range of oceanographic temperature and salinity.

6.3 Oxygen

Significant hysteresis between the down and up oxygen profiles at deep stations warranted using the downcast oxygen data for calibration. Primary sensor data were extracted from the .BTL files using SBECAL1K.f for GP603 and GP304. Secondary sensor data were extracted from the .BTL files using SBECAL2K.f for GP504. Sample salinities were matched to CTD records by station/sample number using ADDSALK.f. Sample oxygen data were matched to CTD records by station/sample number using ADDOXYK.f.

Upcast bottle data were matched to downcast profile data by sigma-2 using MATCH_SG2_312K.m or MATCH_SG2_313K.m. For GP603, RUN_OXYGEN_CAL_1.m was used to determine a least squares fit with a linear station dependent slope. Final coefficients stored in FINAL.mat and applied to oxygen sensor S/N 312 were slopes ranging from 0.3138 to 0.3202, bias = −0.5847, lag = 8.6 s, tcor = 0.0008, pcor = 0.0001, and weight = 0. 90% of the 72 data points were used in the fit with a standard deviation of 0.6 μmol/kg. Calibrated up/down profiles with bottles overplotted were examined to verify the fit using PLOT_OX.m. For GP603, it was evident that the 8.6 s lag was overshooting on both sides of the steep thermocline owing to too few points to constrain the fitting routine. So the lag was forced to be 4.0 s when the calibrations were applied and this resulted in more acceptable minimums.

For GP304, the least squares fit weighted the deep water column and the final coefficients applied to oxygen sensor S/N 313 were slopes ranging from 0.3309 to 0.3392, bias = −0.5423, lag = 3.6 s, tcor = 0.0036, pcor = 0.0001, and weight = 0. 100% of the 63 data points were used in the fit with a standard deviation of 1.9 μmol/kg. Although the upcast and downcast oxygen traces were separated by as much as 20 dbar, the lag seemed appropriate with no over- or undershooting in oxygen, even in high gradient regions.

For GP504, a regular least squares fit produced the final coefficients applied to oxygen sensor S/N 313, where slopes ranged from 0.4013 to 0.4041, bias = −0.5590, lag = 6.2 s, tcor = −0.0041, pcor = −0.0001, and weight = 0. 99% of the 64 data points were used in the fit with a standard deviation of 1.6 μmol/kg.

CTD-bottle oxygen differences are plotted against station number and pressure to show the stability of the calibrated CTD oxygens relative to the bottle oxygens (Figs. 4a–b).

7. Additional Processing

SEASOFT processing modules are followed by PMEL Fortran program CNV_EPS. CNV_EPS applies post-cruise calibrations to conductivity and converts the 1-dbar averaged CTD data to NetCDF format. CNV_EPS creates a WOCE quality flag associated with each record of pressure, temperature, and CTD salinity. Quality flag definitions can be found in the WOCE Operations Manual (1994). CNV_EPS skips bad records near the surface and also any records flagged bad by SEASOFT. Measured data are copied back to 0 dbar and gaps are linearly interpolated such that a record exits every 1 dbar. WOCE flags are amended to reflect these changes. CNV_EPS calculates ITS-90 temperature and salinity (PSS-78), as well as potential temperature (IPTS-68), sigma-t, and sigma-theta using the 1980 equation of state algorithms described by Fofonoff and Millard (1983). Dynamic height in dynamic meters is calculated by integrating down from the sea surface.

PMEL Fortran program CLB_EPS creates individual bottle files in NetCDF format for each cast.

When oxygen data are present, CALCTD_K.m applies all post-cruise corrections and calibrations to the profile data, and CNV_EPSO.f converts it into NetCDF format. Likewise for bottle data, CALCLO_K.m applies the calibrations to the discrete data, and CLB_EPSO.f converts it into NetCDF format.

8. Data Presentation and Access

The majority of plots in this report were produced using Plot Plus Scientific Graphics System (Denbo, 1992). Figures 5–58 are potential temperature, salinity, and sigma-theta sections for each meridian. Oxygen sections are also included for 95°W and 110°W from GP603, 125°W and 140°W from GP504, and 155°W and 170°W from GP304. Figures 59–74 are composite potential temperature-salinity (θ-S) diagrams for each meridian. Figures 75–77 are composite potential temperature-oxygen (θ-O_2) diagrams for each meridian of GP603, GP304, and GP504. Tables 3–7 define the abbreviations and units used in the CTD data summary listings that are presented alongside $0-1000$ m profiles of each cast for each cruise on the report CD. Hydrographic bottle data at discrete depths are also given for each cruise on the report CD.

These and previous TAO/TRITON data are available via the World Wide Web at `www.epic.noaa.gov/epic/ewb/` using EPIC. EPIC is a set of programs developed at PMEL to manage large numbers of hydrographic and time series oceanographic in situ data sets collected as part of NOAA climate study programs. The EPIC Web Browser is a Web application that provides interactive on-line data access to EPIC hydrographic data sets. Multiple data file formats include netCDF data format, Classic EPIC format, and formatted ASCII data format. Users select data by specifying data type, latitude, longitude, and time range. The EPIC system contains a full suite of routines to provide graphical display, data analysis, and calculation of oceanographic parameters.

9. Acknowledgments

The assistance of the officers, crew, and scientific parties of the NOAA ships *Ka'imimoana* and *Ronald H. Brown* are gratefully acknowledged. Oxygen titration data were submitted by Jan Kaiser of Princeton University. This research was supported by the NOAA Office of Global Programs.

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FIGURES AND TABLES

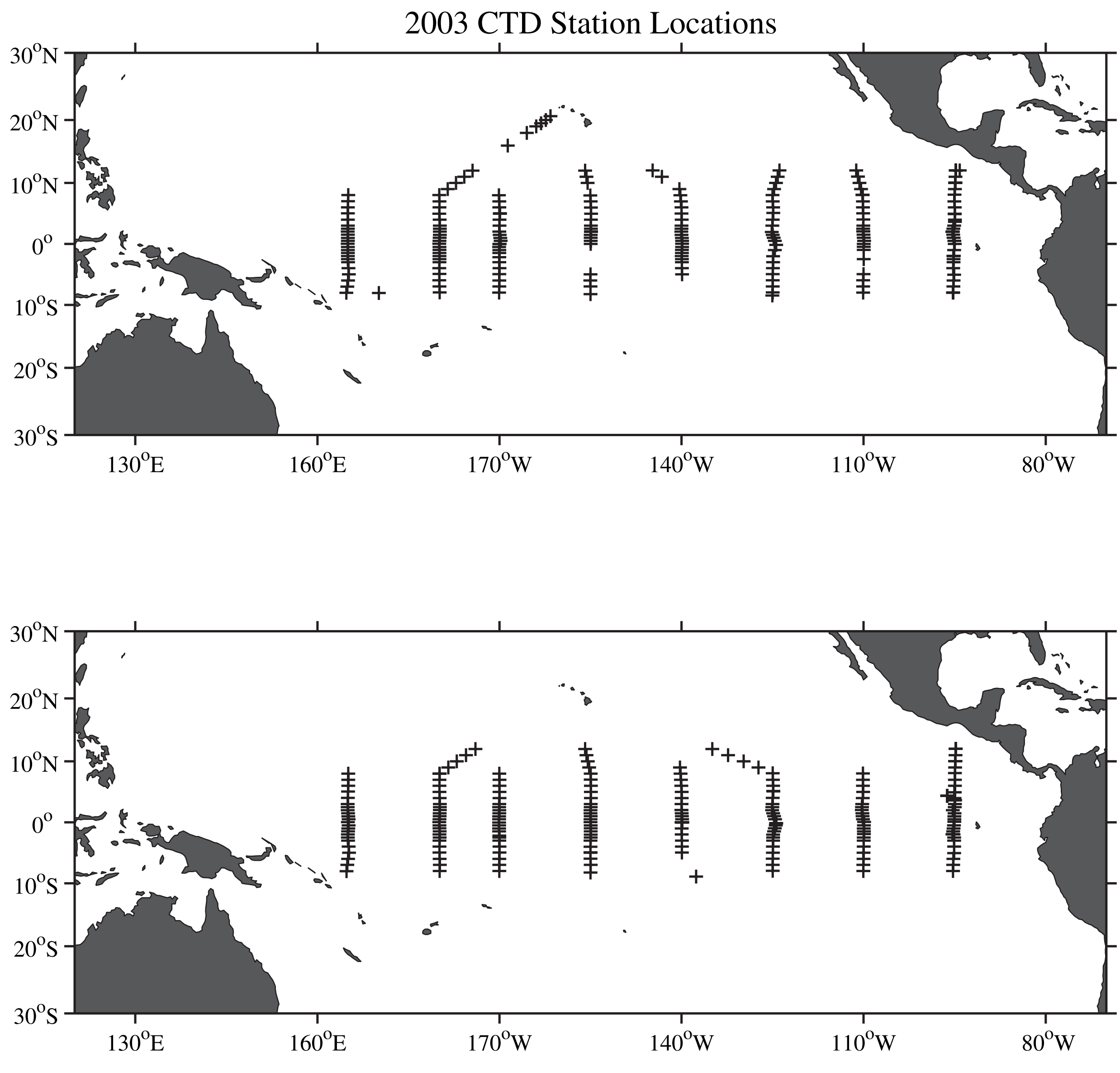

Figure 1a: 2003 CTD station locations for the first half of the year (upper panel) and the second half of the year (lower panel).

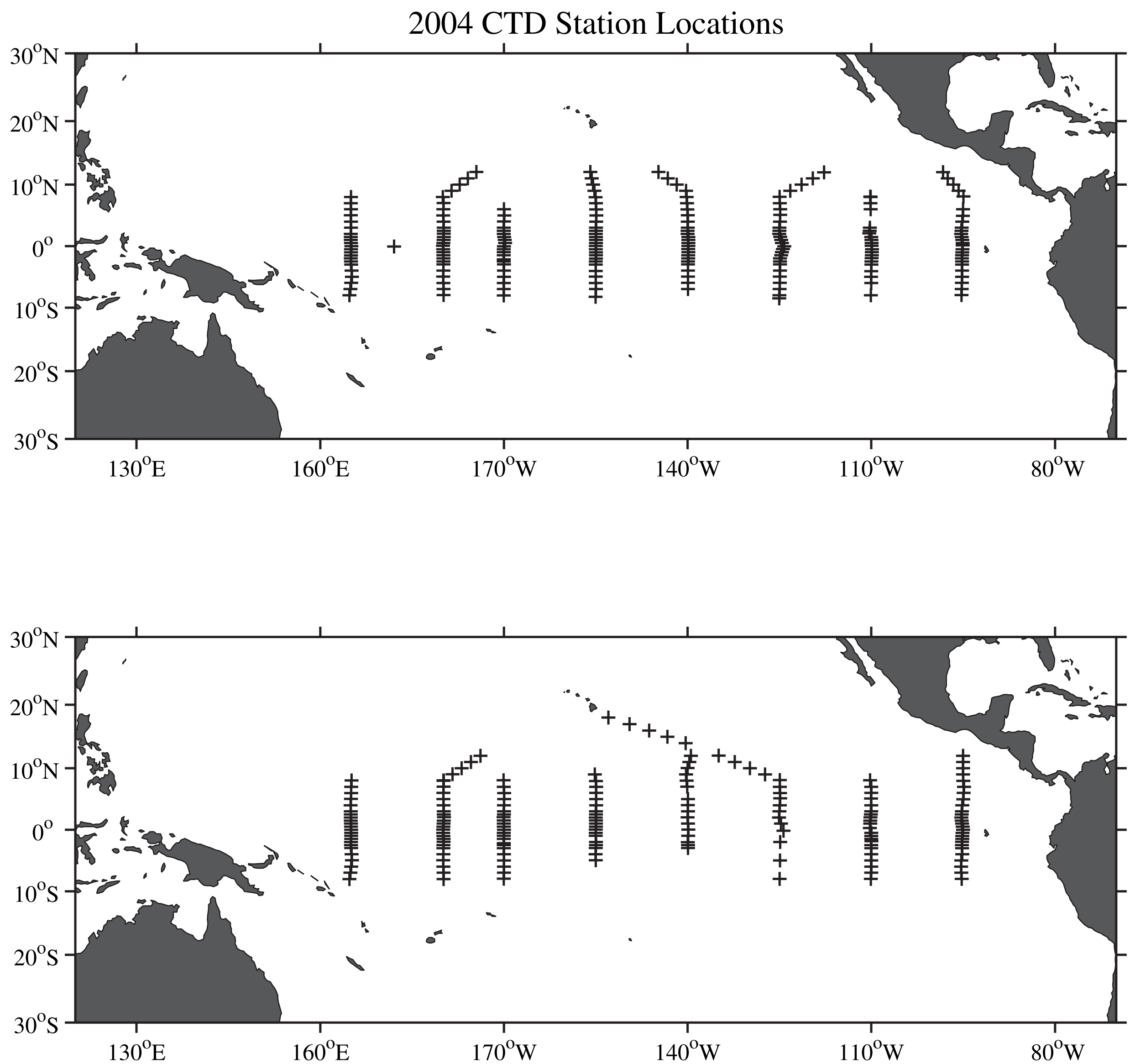

Figure 1b: 2004 CTD station locations for the first half of the year (upper panel) and the second half of the year (lower panel).

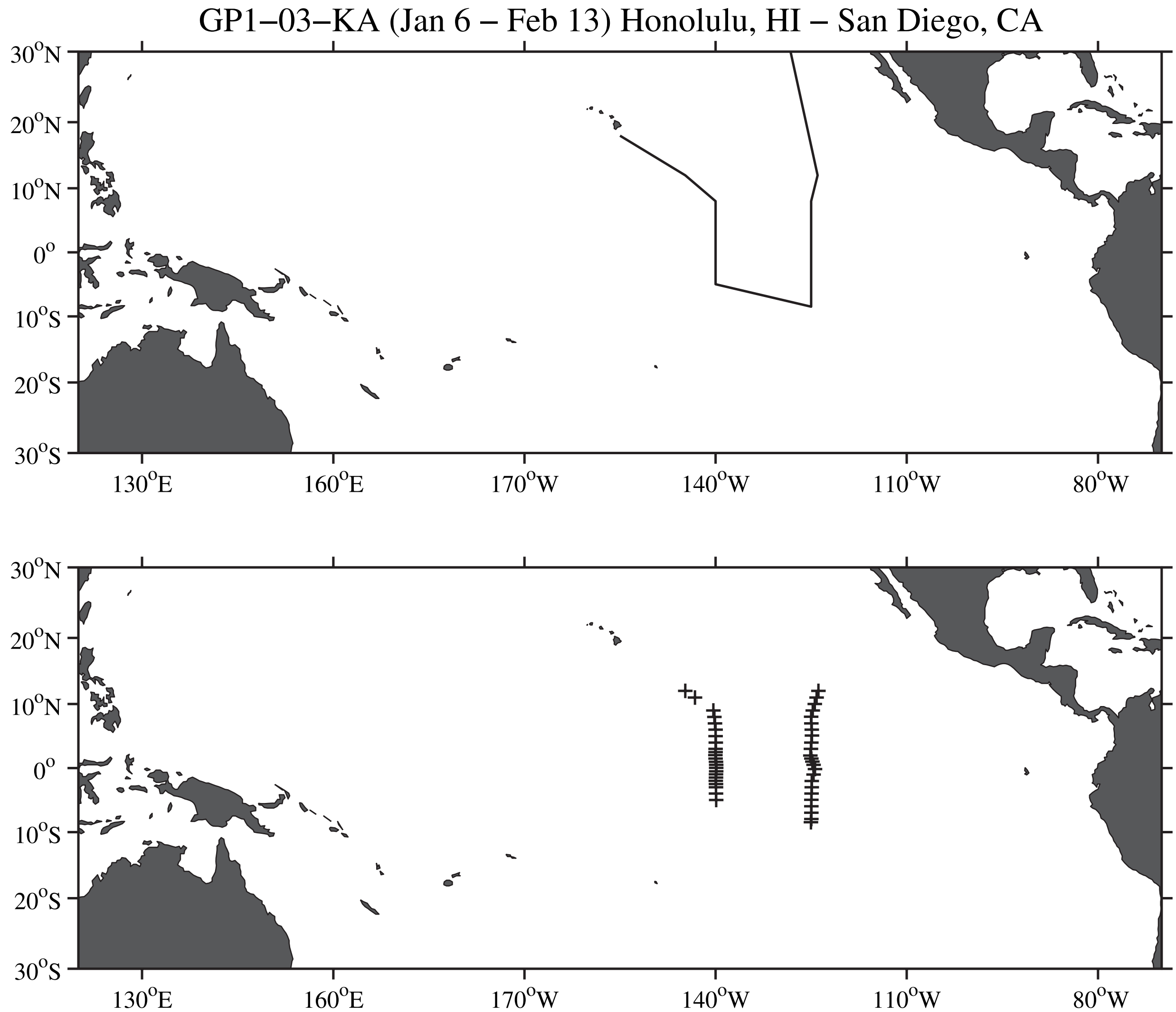

Figure 2a: GP1-03-KA cruise track and station locations.

Table 1a: GP1-03-KA CTD Cast Summary

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12° 0.7′N	144° 46.27′W	11 Jan 03	1118	0	15	5210	1002
21	11° 0.3′N	143° 15.17′W	12 Jan 03	116	50	22	5309	1003
31	8° 59.8′N	140° 21.17′W	13 Jan 03	911	325	14	4973	3005
41	8° 0.4′N	140° 11.27′W	14 Jan 03	358	60	21	5136	1004
51	7° 0.1′N	140° 6.57′W	14 Jan 03	1140	80	20	3264	1018
61	6° 0.1′N	140° 1.17′W	14 Jan 03	1958	80	23	4695	1004
71	5° 0.5′N	139° 59.67′W	15 Jan 03	916	86	20	4446	3009
81	3° 59.5′N	139° 58.97′W	16 Jan 03	441	88	14	4342	1003
91	3° 0.1′N	140° 0.57′W	16 Jan 03	1205	112	16	4307	1016
101	2° 29.6′N	140° 0.67′W	16 Jan 03	1628	100	15	4400	1006
111	2° 1.7′N	140° 2.07′W	16 Jan 03	2010	130	15	4377	1003
121	1° 30.1′N	139° 59.57′W	17 Jan 03	203	105	15	4476	1004
131	0° 59.7′N	139° 57.27′W	17 Jan 03	623	100	13	4320	1001
141	0° 30.2′N	139° 55.07′W	17 Jan 03	1038	110	14	4351	1001
151	0° 1.0′N	139° 53.87′W	18 Jan 03	328	100	15	4356	3020
161	0° 29.6′S	139° 54.47′W	18 Jan 03	854	111	16	4270	1002
171	0° 59.9′S	139° 55.87′W	18 Jan 03	1324	90	18	4223	1008
181	1° 30.1′S	139° 56.67′W	18 Jan 03	1745	94	16	4341	1003
191	1° 59.9′S	139° 58.37′W	19 Jan 03	654	94	15	4313	1006
201	2° 29.9′S	139° 56.27′W	19 Jan 03	1147	108	14	4410	1006
211	3° 0.0′S	139° 57.17′W	19 Jan 03	1602	100	17	4342	1002
221	3° 59.6′S	139° 56.17′W	19 Jan 03	2338	120	18	4515	1008
231	4° 59.7′S	139° 54.07′W	20 Jan 03	845	80	20	4354	3719
241	8° 28.8′S	125° 2.97′W	27 Jan 03	1102	96	14	4525	3560
251	7° 58.2′S	124° 58.47′W	28 Jan 03	2133	100	10	4504	1004
261	6° 59.8′S	124° 58.07′W	29 Jan 03	1300	115	15	4466	1005
271	5° 59.6′S	124° 57.67′W	29 Jan 03	1949	104	13	4407	1003
281	4° 57.7′S	124° 58.07′W	30 Jan 03	705	109	13	4606	3703
291	4° 0.4′S	124° 56.37′W	31 Jan 03	203	110	15	4488	1006
301	3° 0.4′S	124° 55.27′W	31 Jan 03	910	110	16	4629	1004
311	2° 1.9′S	124° 54.97′W	1 Feb 03	54	125	19	4650	1004
321	1° 0.0′S	124° 37.57′W	1 Feb 03	859	110	10	4675	1007
331	0° 10.3′S	124° 24.37′W	1 Feb 03	1637	95	13	4779	1002
341	0° 30.3′N	124° 38.27′W	2 Feb 03	29	120	13	4600	1007
351	1° 0.0′N	124° 48.17′W	2 Feb 03	444	110	13	4715	1003
361	1° 30.3′N	124° 58.37′W	2 Feb 03	848	103	14	4653	1003
371	1° 57.7′N	125° 8.37′W	2 Feb 03	1326	100	13	4665	3506
381	3° 0.0′N	125° 2.47′W	3 Feb 03	819	106	16	4456	1004
391	4° 0.1′N	124° 57.77′W	4 Feb 03	340	70	20	4357	1018
401	5° 6.6′N	124° 52.97′W	4 Feb 03	340	70	20	4357	3711
411	5° 59.9′N	124° 55.67′W	5 Feb 03	100	112	14	4383	1002
421	6° 59.7′N	124° 57.87′W	5 Feb 03	731	146	12	4665	1005
431	8° 1.4′N	125° 0.37′W	6 Feb 03	4	40	12	4647	1019
441	9° 0.7′N	124° 44.47′W	6 Feb 03	727	70	6	5016	1004
451	9° 59.9′N	124° 26.97′W	6 Feb 03	1537	70	8	4635	1001
461	10° 59.9′N	124° 9.17′W	6 Feb 03	2341	120	10	4593	1008
471	12° 0.5′N	123° 52.27′W	7 Feb 03	716	39	13	4530	1004

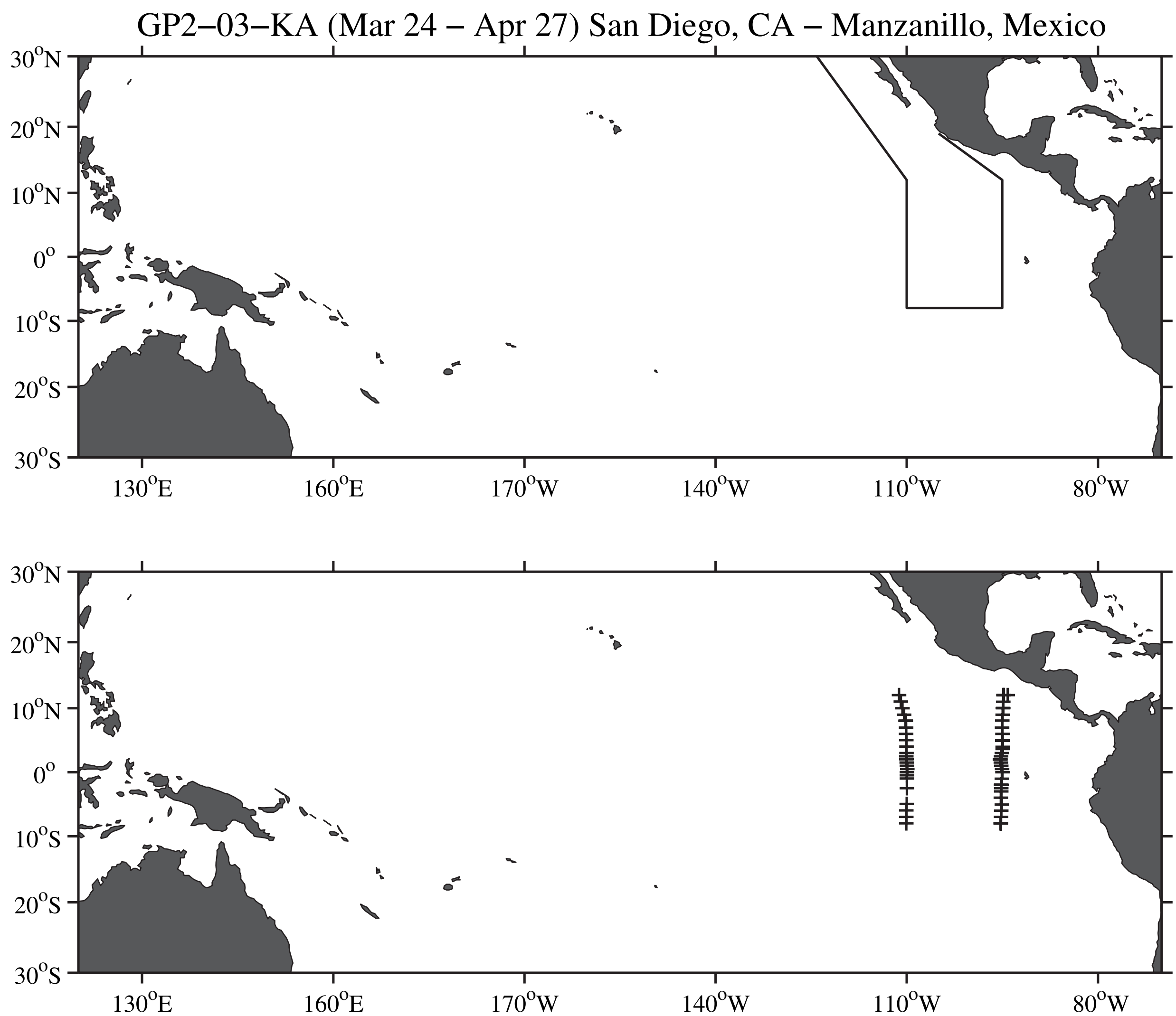

Figure 2b: GP2-03-KA cruise track and station locations.

Table 1b: GP2-03-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12° 0.8′N	111° 12.8′W	30 Mar 03	1413	101	8	3852	3004
21	11° 0.8′N	110° 56.4′W	30 Mar 03	2243	30	11	3522	1021
31	10° 0.4′N	110° 41.3′W	31 Mar 03	655	95	25	3883	1000
41	9° 0.2′N	110° 25.1′W	31 Mar 03	1524	40	14	3807	1007
51	8° 3.1′N	110° 10.8′W	1 Apr 03	208	90	15	4373	3806
52	8° 3.3′N	110° 9.8′W	2 Apr 03	10	200	10	4270	1003
61	7° 0.2′N	110° 6.2′W	1 Apr 03	1053	60	20	3971	1008
71	6° 0.3′N	110° 5.5′W	2 Apr 03	1855	70	18	3804	1000
81	5° 1.4′N	110° 3.7′W	3 Apr 03	416	120	13	3930	1001
91	4° 0.8′N	110° 2.7′W	3 Apr 03	1229	110	12	3911	1002
101	3° 0.1′N	110° 3.5′W	3 Apr 03	2016	120	14	3882	1002
111	2° 30.3′N	110° 3.7′W	4 Apr 03	50	90	11	3732	1002
121	2° 3.7′N	110° 4.5′W	4 Apr 03	543	100	13	3850	3651
122	2° 3.0′N	110° 3.0′W	4 Apr 03	2243	120	9	3740	1002
131	1° 30.5′N	110° 1.3′W	5 Apr 03	337	130	8	3821	1007
141	1° 0.2′N	109° 58.6′W	5 Apr 03	816	120	13	3816	673
151	0° 30.8′N	109° 55.0′W	6 Apr 03	117	59	6	3824	505
161	0° 0.6′N	109° 59.1′W	6 Apr 03	420	75	5	3817	3605
171	0° 29.3′S	109° 59.0′W	7 Apr 03	218	130	5	4007	1002
181	0° 59.6′S	109° 58.3′W	7 Apr 03	654	130	5	3954	1005
201	2° 29.7′S	109° 59.4′W	7 Apr 03	2128	130	11	3883	1002
231	4° 59.1′S	110° 0.8′W	8 Apr 03	1516	100	16	3379	1002
241	5° 59.7′S	110° 5.0′W	8 Apr 03	2352	110	15	3494	1001
251	6° 59.8′S	110° 4.2′W	9 Apr 03	718	120	14	3556	1002
261	7° 59.5′S	110° 4.6′W	10 Apr 03	4	135	11	3407	3202
271	7° 59.4′S	95° 15.0′W	14 Apr 03	229	114	11	3963	3701
272	7° 59.7′S	95° 15.3′W	14 Apr 03	1711	150	16	3979	501
281	7° 0.1′S	95° 12.2′W	15 Apr 03	14	150	17	3857	1001
291	6° 0.2′S	95° 10.1′W	15 Apr 03	724	160	17	3824	1007
301	5° 3.5′S	95° 4.5′W	15 Apr 03	2128	90	11	3854	1001
311	3° 59.7′S	95° 13.4′W	16 Apr 03	551	120	12	3626	1001
321	2° 59.9′S	95° 11.0′W	16 Apr 03	1259	125	5	3500	1004
331	2° 29.8′S	95° 11.0′W	16 Apr 03	1706	135	5	3445	1005
341	1° 59.4′S	95° 10.9′W	16 Apr 03	2117	70	3	3442	769
342	1° 58.8′S	95° 11.0′W	16 Apr 03	2211	70	3	3445	503
343	1° 58.8′S	95° 10.9′W	16 Apr 03	2314	70	3	3445	1000
361	1° 0.0′S	95° 4.8′W	17 Apr 03	638	90	8	3376	1004
381	0° 0.5′N	94° 59.4′W	17 Apr 03	2059	130	12	3306	1011
391	0° 30.4′N	95° 2.4′W	18 Apr 03	354	130	12	3273	1002
401	1° 0.0′N	95° 9.7′W	18 Apr 03	750	150	13	3425	1003
411	1° 30.4′N	95° 15.0′W	18 Apr 03	1200	145	13	2590	1001
421	2° 0.5′N	95° 20.7′W	18 Apr 03	1604	155	19	2867	1002
422	2° 0.0′N	95° 20.6′W	18 Apr 03	1721	155	19	2941	503
423	2° 1.6′N	95° 20.4′W	18 Apr 03	1807	155	19	2922	502
431	2° 29.8′N	95° 13.1′W	18 Apr 03	2144	180	14	2559	1002
441	3° 0.2′N	95° 5.4′W	19 Apr 03	146	165	15	3160	1002
451	3° 37.9′N	94° 56.7′W	19 Apr 03	645	170	17	3086	1002
461	4° 0.3′N	94° 57.0′W	19 Apr 03	957	135	14	3312	1018
471	4° 57.2′N	94° 59.4′W	19 Apr 03	1618	160	13	3491	501
472	4° 56.6′N	94° 59.6′W	19 Apr 03	1717	160	13	3497	501
473	4° 58.3′N	94° 59.6′W	19 Apr 03	1821	160	13	3553	1005
481	6° 0.0′N	94° 59.4′W	20 Apr 03	113	175	6	3212	1001
491	6° 59.9′N	95° 3.7′W	20 Apr 03	812	210	3	3656	1002
501	8° 5.4′N	95° 0.0′W	21 Apr 03	259	90	4	3683	1002
511	9° 0.4′N	94° 56.6′W	21 Apr 03	1004	40	3	3515	1001

Table 1b: (continued).

Cast #	Latitude		Longitude		Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
521	10°	1.1′N	94°	53.3′W	21 Apr 03	1701	40	8	3873	502
522	10°	0.8′N	94°	54.0′W	21 Apr 03	1740	40	8	3870	502
523	10°	1.4′N	94°	53.5′W	21 Apr 03	1832	40	8	3860	1003
531	11°	0.0′N	94°	51.0′W	22 Apr 03	127	155	1	3992	1001
541	12°	1.0′N	94°	47.1′W	22 Apr 03	920	290	4	4007	3803
542	12°	0.4′N	94°	49.4′W	22 Apr 03	1224	320	7	4032	501
543	12°	1.5′N	94°	9.8′W	22 Apr 03	1305	320	7	4028	501

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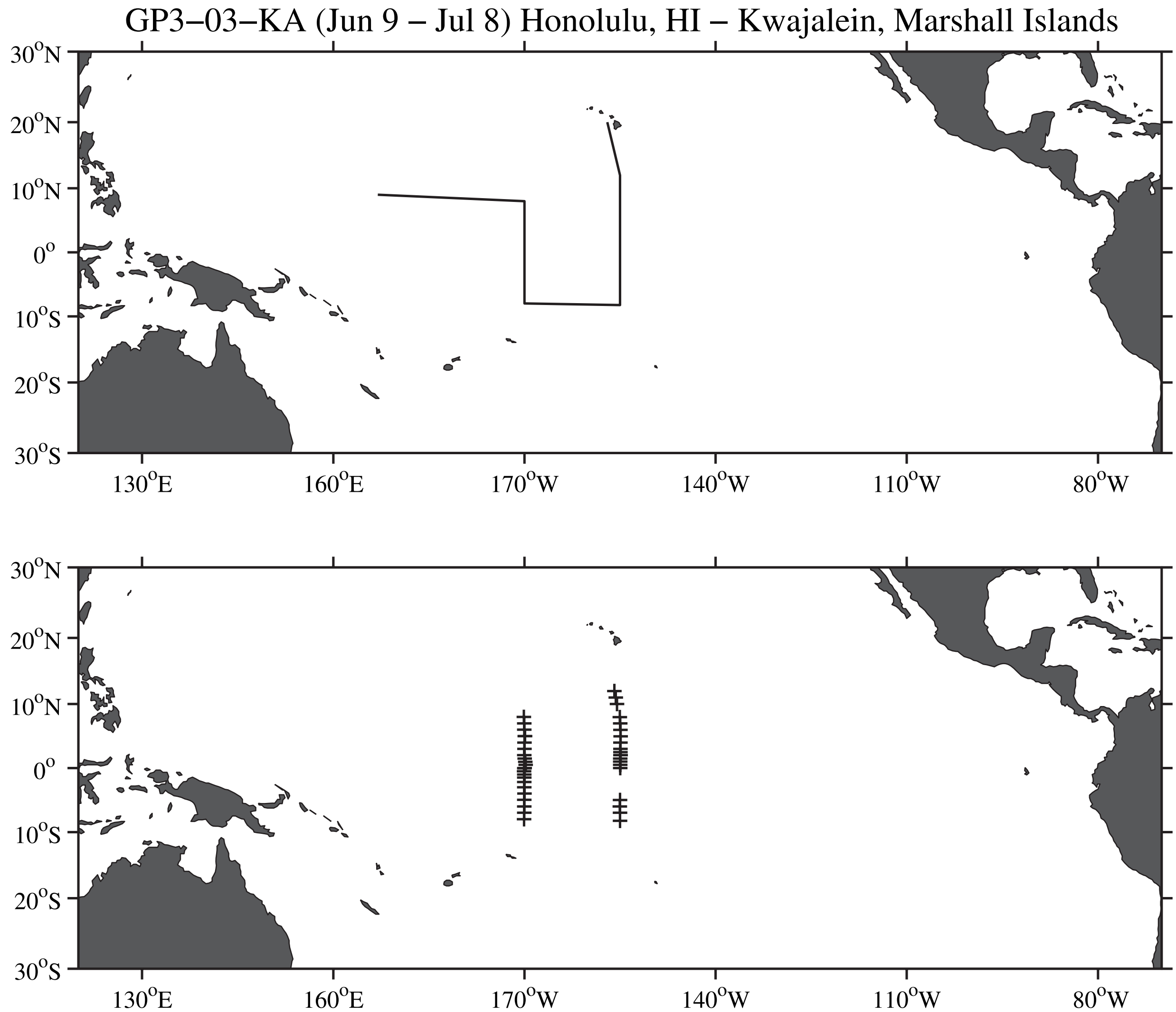

Figure 2c: GP3-03-KA cruise track and station locations.

Table 1c: GP3-03-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12° 0.3′N	155° 53.1′W	12 Jun 03	842	60	12	5175	1005
21	11° 0.2′N	155° 40.0′W	12 Jun 03	1622	60	20	5206	1003
31	10° 0.4′N	155° 28.2′W	13 Jun 03	32	60	17	5256	1007
41	7° 57.2′N	155° 1.1′W	14 Jun 03	739	80	7	5207	1002
51	6° 59.6′N	154° 58.3′W	14 Jun 03	1449	70	10	4980	1002
61	5° 59.8′N	154° 56.4′W	14 Jun 03	2134	65	7	4839	1004
71	4° 58.2′N	154° 54.5′W	15 Jun 03	458	70	3	4610	1004
81	4° 0.3′N	154° 55.6′W	15 Jun 03	1156	0	1	4697	1002
91	3° 0.4′N	154° 56.2′W	15 Jun 03	1938	165	7	4806	1000
101	2° 30.2′N	154° 56.4′W	16 Jun 03	39	90	7	4837	1001
111	2° 1.5′N	154° 55.6′W	16 Jun 03	1000	0	0	4555	4003
112	2° 2.6′N	154° 54.5′W	16 Jun 03	1238	0	1	4705	202
121	1° 30.1′N	154° 58.3′W	17 Jun 03	201	180	8	4648	1002
131	1° 0.3′N	154° 58.0′W	17 Jun 03	616	120	11	4760	1004
141	0° 30.3′N	154° 58.6′W	17 Jun 03	1229	120	7	4780	1006
151	0° 0.8′N	154° 58.7′W	18 Jun 03	451	120	12	4654	1015
161	5° 0.0′S	154° 59.1′W	19 Jun 03	1512	20	5	5018	1002
171	6° 0.0′S	155° 1.0′W	19 Jun 03	2247	40	10	5240	1002
181	7° 0.0′S	155° 0.3′W	20 Jun 03	540	40	10	5148	1003
191	8° 14.8′S	155° 0.4′W	20 Jun 03	1536	30	12	5303	1002
201	7° 59.5′S	170° 3.3′W	24 Jun 03	1719	0	6	5396	1009
211	7° 0.1′S	170° 2.3′W	25 Jun 03	1034	280	6	4683	1003
221	5° 59.9′S	170° 2.3′W	25 Jun 03	1723	0	0	4879	1003
231	4° 59.0′S	170° 1.2′W	26 Jun 03	758	50	10	5302	1003
241	3° 59.6′S	170° 0.7′W	26 Jun 03	1521	50	6	5740	1002
251	3° 0.5′S	170° 2.0′W	26 Jun 03	2224	0	0	5216	1002
261	2° 10.9′S	170° 1.3′W	27 Jun 03	831	0	0	5050	1001
271	1° 30.0′S	170° 1.9′W	28 Jun 03	311	0	0	5551	1008
281	1° 0.1′S	170° 2.6′W	28 Jun 03	727	0	0	5066	1000
291	0° 30.3′S	170° 2.8′W	28 Jun 03	1140	0	0	5727	1000
301	0° 2.7′S	170° 1.2′W	28 Jun 03	1731	350	8	5537	1002
302	0° 0.0′S	169° 58.8′W	29 Jun 03	801	330	17	5322	3001
311	0° 30.5′N	169° 48.6′W	30 Jun 03	744	100	13	5443	1003
321	0° 59.8′N	169° 52.9′W	30 Jun 03	1225	130	11	5551	1002
331	1° 29.9′N	169° 57.4′W	30 Jun 03	1641	120	14	5538	1001
341	2° 1.7′N	170° 1.7′W	1 Jul 03	610	120	13	5393	1000
351	3° 0.2′N	170° 0.2′W	1 Jul 03	1324	130	13	5488	1002
361	3° 59.7′N	170° 0.6′W	1 Jul 03	2017	130	11		1002
371	5° 1.0′N	169° 56.8′W	2 Jul 03	804	60	11		3002
372	5° 0.9′N	169° 56.2′W	2 Jul 03	957	70	14		202
381	6° 0.0′N	170° 1.0′W	3 Jul 03	427	80	14	5579	1003
391	6° 59.9′N	170° 1.8′W	3 Jul 03	1137	100	11		1005
401	7° 59.8′N	170° 4.6′W	3 Jul 03	1851	90	10		1000

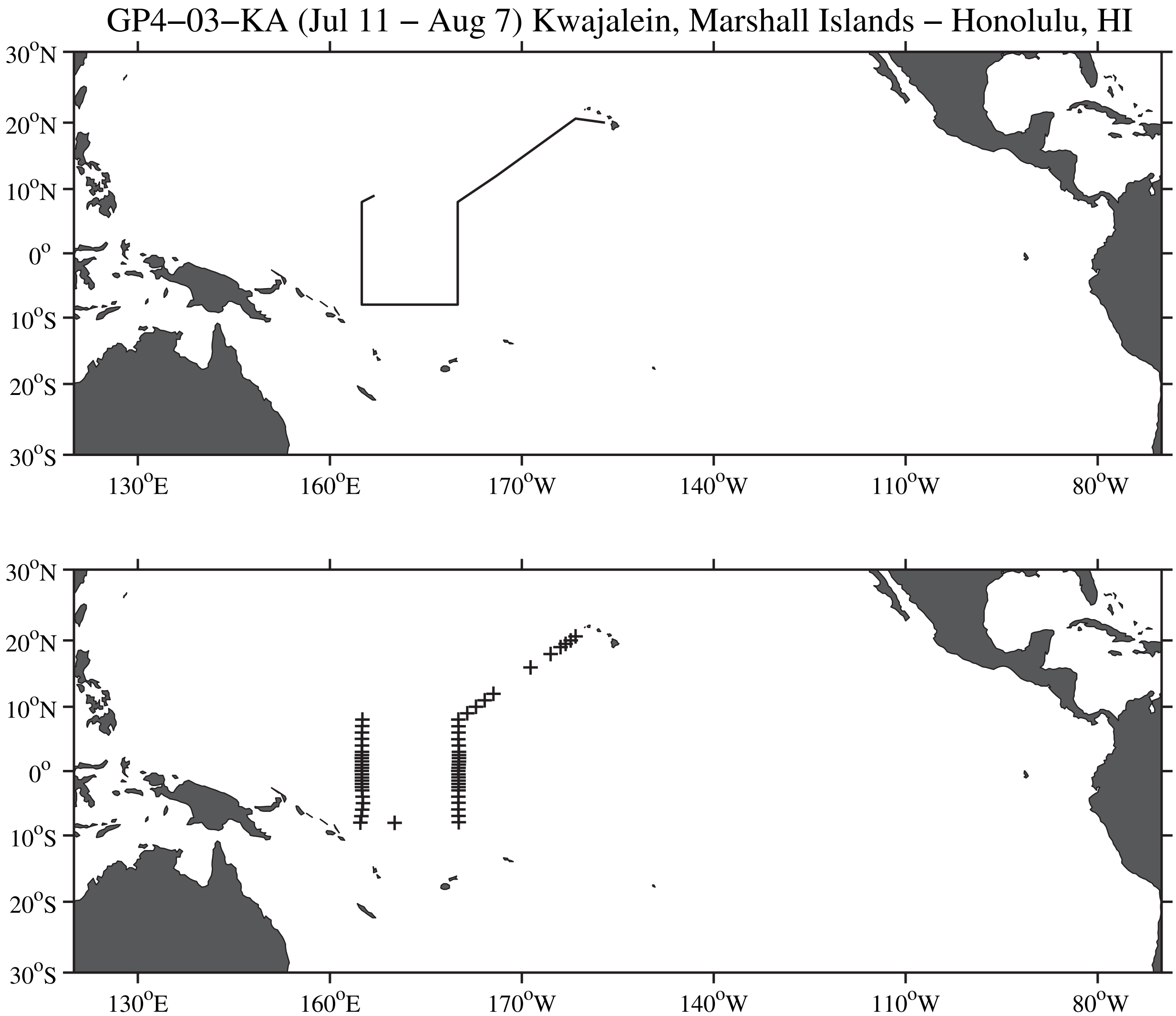

Figure 2d: GP4-03-KA cruise track and station locations.

Table 1d: GP4-03-KA CTD Cast Summary

Cast #	Latitude		Longitude		Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	8°	1.2′N	165°	5.8′E	12 Jul 03	1803	80	16	5216	3503
21	7°	0.5′N	165°	3.5′E	13 Jul 03	1144	70	16	5163	1002
31	6°	0.1′N	165°	2.1′E	13 Jul 03	1910	100	8	5009	1004
41	5°	3.0′N	165°	0.3′E	14 Jul 03	226	100	6	4787	1002
51	4°	0.3′N	165°	0.3′E	14 Jul 03	1117	140	7	4495	1002
61	2°	59.9′N	165°	1.2′E	14 Jul 03	1833	80	13	4255	1003
71	2°	30.2′N	165°	0.7′E	14 Jul 03	2247	90	11	4123	1002
81	2°	1.0′N	164°	59.3′E	15 Jul 03	1005	50	16	4167	1001
91	1°	30.4′N	165°	0.4′E	15 Jul 03	1445	30	11	4261	1011
101	0°	59.9′N	165°	0.9′E	15 Jul 03	1856	0	0	4333	1002
111	0°	30.2′N	165°	0.7′E	15 Jul 03	2305	100	7	4366	1004
121	0°	1.2′N	165°	0.1′E	16 Jul 03	901	30	5	4411	4001
131	0°	30.1′S	165°	0.9′E	16 Jul 03	1514	0	0	4440	1004
141	1°	0.2′S	165°	1.0′E	16 Jul 03	1924	70	4	4437	1003
151	1°	29.7′S	165°	0.5′E	16 Jul 03	2328	120	7	4458	1002
161	2°	0.2′S	165°	0.7′E	17 Jul 03	343	50	6	4467	1003
171	2°	29.7′S	165°	1.7′E	17 Jul 03	812	120	10	2688	1001
181	2°	59.7′S	165°	3.7′E	17 Jul 03	1224	110	9	4204	1004
191	4°	0.2′S	165°	7.6′E	17 Jul 03	1934	120	20	3383	1003
201	4°	59.6′S	165°	10.6′E	18 Jul 03	316	110	11	2498	1005
211	5°	59.9′S	165°	3.2′E	18 Jul 03	1038	110	11	3597	1001
221	7°	0.4′S	164°	55.0′E	18 Jul 03	1739	80	12	3716	1002
231	8°	2.0′S	164°	46.0′E	19 Jul 03	811	110	7	3893	2034
241	8°	3.8′S	170°	7.2′E	20 Jul 03	2002	120	17	4575	1002
251	7°	58.5′S	179°	51.1′W	23 Jul 03	1459	100	12	5541	4006
261	7°	0.3′S	179°	52.6′W	23 Jul 03	2335	340	8	5075	386
271	5°	59.6′S	179°	54.7′W	24 Jul 03	706	50	6	4782	1005
281	4°	56.9′S	179°	52.4′W	25 Jul 03	553	30	6	5666	1002
291	4°	0.1′S	179°	55.4′W	25 Jul 03	1255	90	5	5694	1001
301	3°	0.2′S	179°	54.1′W	25 Jul 03	2012	90	8	5310	1001
311	2°	30.5′S	179°	53.6′W	26 Jul 03	31	130	7	5433	1002
321	1°	59.0′S	179°	52.4′W	26 Jul 03	502	90	10	5351	1003
331	1°	29.8′S	179°	53.3′W	26 Jul 03	904	70	12	5228	1005
341	0°	59.9′S	179°	54.0′W	26 Jul 03	1314	60	10	5357	1006
351	0°	29.9′S	179°	53.6′W	26 Jul 03	1723	100	9	4521	1003
361	0°	1.2′N	179°	55.5′W	26 Jul 03	2237	130	4	5364	3002
371	0°	30.0′N	179°	52.7′W	27 Jul 03	354	100	7	5700	1002
381	1°	0.1′N	179°	51.2′W	27 Jul 03	812	100	10	5834	1002
391	1°	29.9′N	179°	49.6′W	27 Jul 03	1224	80	10	5570	1003
401	2°	1.8′N	179°	48.6′W	27 Jul 03	1746	80	8	5481	1002
411	2°	30.5′N	179°	49.0′W	28 Jul 03	721	30	6	5344	1008
421	2°	59.9′N	179°	50.4′W	28 Jul 03	1118	80	8	5663	1002
431	3°	59.8′N	179°	52.1′W	28 Jul 03	1817	50	5		1002
441	4°	57.8′N	179°	55.4′W	29 Jul 03	900	80	8	5574	1002
451	6°	0.2′N	179°	53.6′W	29 Jul 03	1607	0	0	5392	1002
461	6°	59.9′N	179°	53.2′W	29 Jul 03	2239	200	10	5803	1002
471	8°	0.8′N	179°	55.6′W	30 Jul 03	1041	120	8	5965	4001
481	9°	0.3′N	178°	31.9′W	31 Jul 03	1103	70	15	6019	1012
491	10°	0.2′N	177°	10.6′W	31 Jul 03	2304	80	15	5189	999
501	11°	0.0′N	175°	47.9′W	1 Aug 03	1238	60	16	5496	1004
511	12°	0.0′N	174°	25.4′W	2 Aug 03	110	70	18	5512	1002
521	16°	0.0′N	168°	37.2′W	4 Aug 03	218	70	14	5180	1010
531	18°	0.0′N	165°	30.2′W	5 Aug 03	208	80	12	5532	1002
541	19°	0.1′N	163°	56.0′W	5 Aug 03	1453	80	12	5468	1006
551	19°	29.9′N	163°	8.9′W	5 Aug 03	2139	70	9	5095	1003
561	20°	0.1′N	162°	21.2′W	6 Aug 03	434	50	14	4977	1003
571	20°	35.3′N	161°	36.4′W	6 Aug 03	2147	100	9	4760	1007

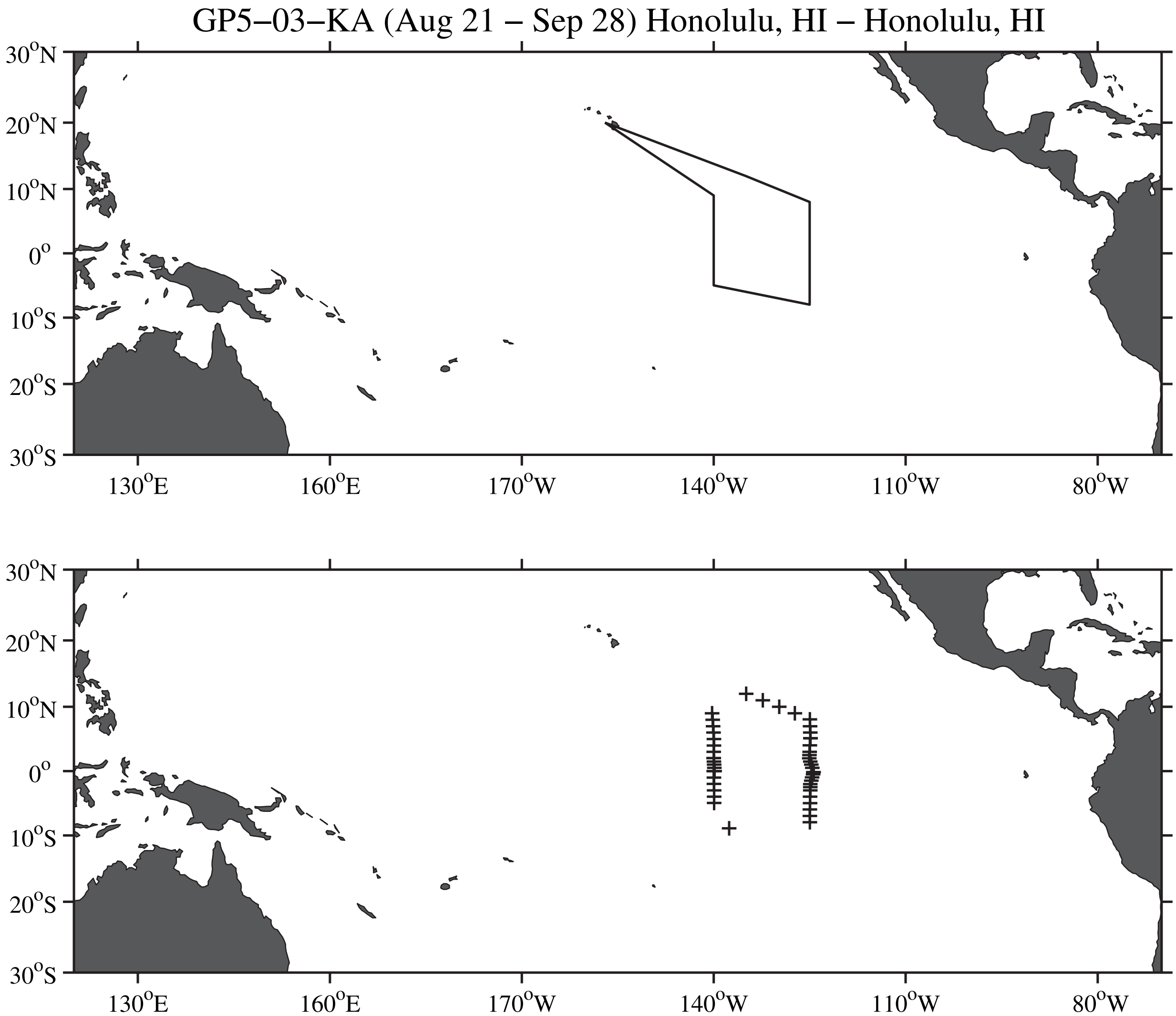

Figure 2e: GP5-03-KA cruise track and station locations.

Table 1e: GP5-03-KA CTD Cast Summary.

Cast #	Latitude		Longitude		Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	11°	59.9′N	134°	55.4′W	28 Aug 03	1621	220	19	4854	1001
21	10°	59.8′N	132°	19.7′W	29 Aug 03	1041	186	12	5038	1000
31	10°	0.0′N	129°	44.9′W	30 Aug 03	410	194	9	4773	1007
41	8°	59.5′N	127°	18.9′W	30 Aug 03	2011	217	14	4538	1032
51	8°	3.4′N	124°	58.9′W	31 Aug 03	1150	242	18	4574	4401
61	6°	59.9′N	124°	56.9′W	1 Sep 03	29	174	20	4600	1001
71	5°	59.9′N	124°	55.5′W	1 Sep 03	758	148	22	4427	1001
81	5°	7.8′N	124°	53.6′W	1 Sep 03	1432	145	18	4392	1008
82	5°	7.6′N	124°	52.0′W	2 Sep 03	27	152	15	4365	502
91	4°	0.5′N	124°	57.6′W	2 Sep 03	843	147	17	4424	1006
101	3°	0.5′N	125°	0.8′W	2 Sep 03	1705	118	14	4421	1001
111	2°	30.4′N	125°	1.9′W	2 Sep 03	2141	129	14	4612	1001
121	2°	0.7′N	125°	4.3′W	3 Sep 03	518	131	11	4688	4402
131	1°	30.3′N	124°	54.5′W	5 Sep 03	2126	120	15	4644	1002
141	1°	0.3′N	124°	45.7′W	6 Sep 03	202	84	13	4609	1002
151	0°	30.5′N	124°	36.2′W	6 Sep 03	636	90	14	4608	1023
161	0°	9.6′S	124°	23.6′W	6 Sep 03	1255	54	14	4767	4009
162	0°	9.9′S	124°	23.5′W	7 Sep 03	125	91	21	4767	250
171	0°	29.6′S	124°	28.4′W	7 Sep 03	647	90	18	4590	1006
181	0°	59.9′S	124°	37.3′W	7 Sep 03	1108	113	12	4662	1001
191	1°	29.8′S	124°	45.5′W	7 Sep 03	1513	102	14	4597	1003
201	2°	2.2′S	124°	54.7′W	7 Sep 03	1940	111	12	4653	1000
211	2°	30.1′S	124°	55.2′W	8 Sep 03	15	99	20	4590	1002
221	2°	59.7′S	124°	55.5′W	8 Sep 03	411	109	14	4622	1002
231	3°	59.6′S	124°	56.1′W	8 Sep 03	1113	107	18	4510	1000
241	4°	59.9′S	124°	56.5′W	8 Sep 03	1841	118	14	4539	1003
251	5°	59.8′S	124°	57.7′W	9 Sep 03	155	124	17	4408	1002
261	7°	0.0′S	124°	58.0′W	9 Sep 03	850	136	12	4465	1004
271	7°	57.5′S	124°	59.2′W	9 Sep 03	2356	135	10	4570	1004
281	8°	55.1′S	137°	35.2′W	12 Sep 03	2318	81	19	4221	252
291	4°	58.8′S	139°	55.6′W	18 Sep 03	308	82	8	4312	1003
301	4°	0.0′S	139°	55.9′W	18 Sep 03	1041	68	9	4518	1002
311	3°	0.1′S	139°	56.9′W	18 Sep 03	1745	107	14	4327	1004
321	1°	59.3′S	139°	58.2′W	19 Sep 03	125	104	6	4318	1003
331	1°	0.1′S	139°	58.8′W	19 Sep 03	830	112	12	4245	1002
341	0°	0.7′N	139°	59.9′W	20 Sep 03	631	156	8	4324	4106
351	0°	0.0′N	139°	52.7′W	20 Sep 03	1016	154	4	4354	251
361	0°	0.9′N	139°	54.3′W	20 Sep 03	2141	150	7	4361	1001
371	0°	29.9′N	139°	55.2′W	21 Sep 03	206	134	8	4351	1006
381	1°	0.3′N	139°	57.3′W	21 Sep 03	617	114	7	4327	1003
391	1°	29.8′N	139°	59.0′W	21 Sep 03	1023	153	10	4471	1001
401	2°	1.1′N	140°	0.6′W	21 Sep 03	1508	144	6	4386	251
411	2°	1.5′N	140°	0.6′W	22 Sep 03	48	159	8	4391	1001
421	3°	0.0′N	140°	0.5′W	22 Sep 03	754	153	9	4305	1001
431	3°	59.0′N	139°	57.5′W	22 Sep 03	1502	158	9	4317	1003
441	5°	0.3′N	139°	58.7′W	23 Sep 03	133	160	2	4468	1001
451	5°	59.9′N	140°	1.9′W	23 Sep 03	904	162	8	4820	1001
461	7°	0.3′N	140°	6.4′W	23 Sep 03	1557	178	7	4994	1002
471	7°	59.9′N	140°	9.8′W	23 Sep 03	2236	200	10	5162	1010
481	9°	0.0′N	140°	14.8′W	24 Sep 03	534	194	1	4814	1004

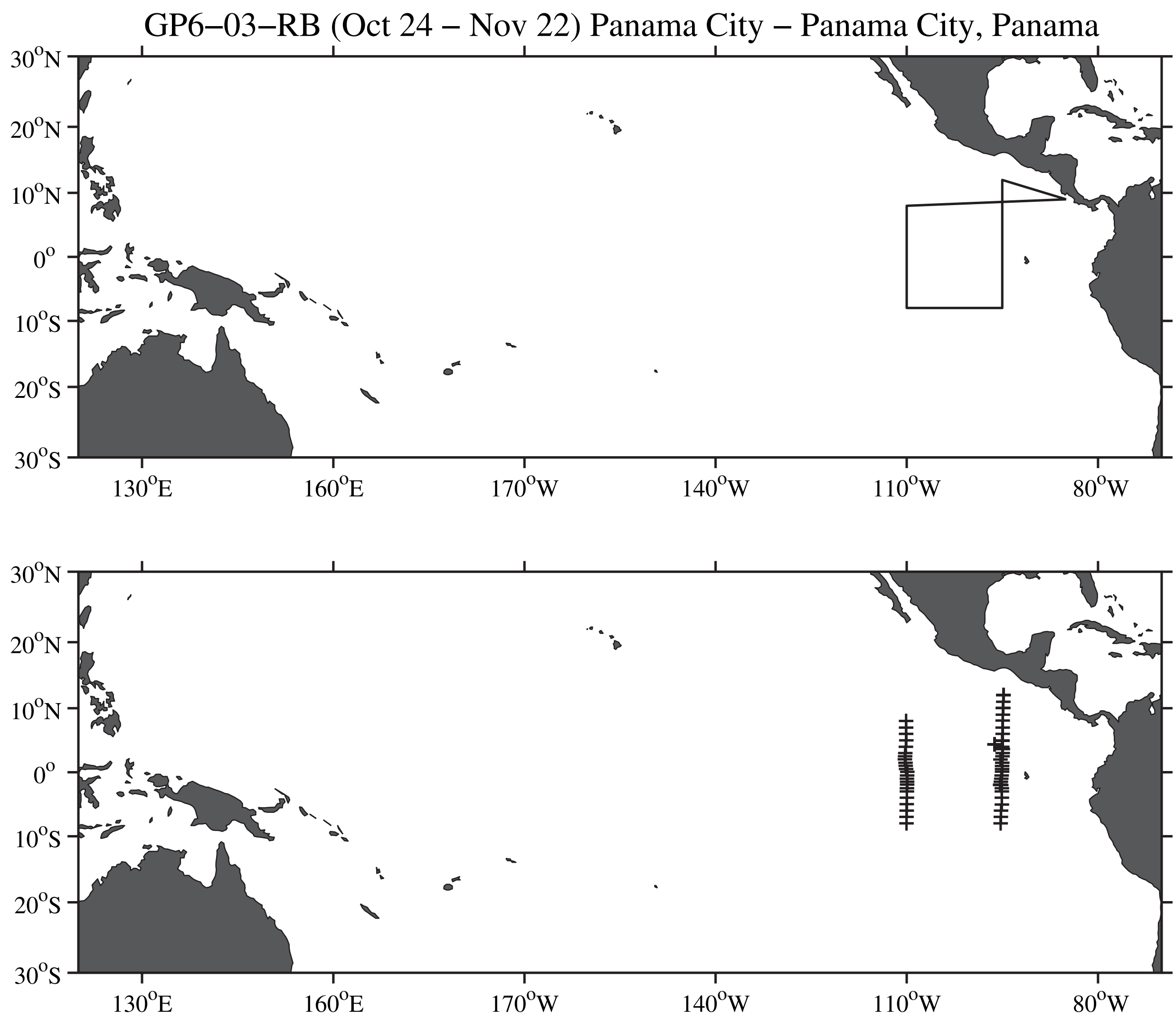

Figure 2f: GP6-03-RB cruise track and station locations.

Table 1f: GP6-03-RB CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12° 0.9′N	94° 49.6′W	27 Oct 03	2003	330	9	4027	202
12	12° 0.8′N	94° 49.6′W	27 Oct 03	2036	340	9	4029	201
13	12° 0.8′N	94° 49.7′W	28 Oct 03	45	330	9	4028	1000
21	11° 0.0′N	94° 52.1′W	28 Oct 03	632	290	5	4028	1001
31	10° 0.9′N	94° 53.8′W	28 Oct 03	1200	290	12	3868	202
32	10° 1.0′N	94° 54.0′W	28 Oct 03	1227	280	12	3879	201
33	10° 0.9′N	94° 54.0′W	28 Oct 03	1307	270	15	3875	1002
41	9° 0.0′N	94° 55.3′W	28 Oct 03	2126	310	8	3540	1001
51	8° 5.1′N	94° 57.2′W	29 Oct 03	720	270	17	3653	3463
61	7° 0.0′N	94° 57.9′W	30 Oct 03	13	240	14	3676	1002
71	6° 0.0′N	94° 57.0′W	30 Oct 03	558	240	13	3762	1002
81	4° 56.9′N	94° 59.8′W	30 Oct 03	1156	230	14	3504	201
82	4° 56.6′N	94° 59.6′W	30 Oct 03	1224	230	14	3499	201
83	4° 56.4′N	95° 3.7′W	30 Oct 03	2013	210	13	3506	1001
91	4° 22.5′N	96° 13.4′W	31 Oct 03	1536	220	15	3430	201
92	4° 22.4′N	96° 13.5′W	31 Oct 03	1603	210	17	3428	200
101	3° 59.9′N	95° 0.1′W	1 Nov 03	321	200	16	3448	1001
111	3° 39.0′N	94° 56.7′W	1 Nov 03	650	210	15	3225	203
112	3° 38.8′N	94° 56.8′W	1 Nov 03	713	220	16	3258	202
121	3° 0.1′N	94° 58.0′W	1 Nov 03	1925	200	13	2713	1001
131	2° 30.0′N	94° 59.0′W	1 Nov 03	2243	200	13	2744	1001
141	1° 59.9′N	95° 18.6′W	2 Nov 03	651	190	12	3111	1001
151	1° 30.0′N	95° 0.9′W	2 Nov 03	1051	200	10	2811	1002
161	0° 59.9′N	95° 2.1′W	2 Nov 03	1416	160	13	3475	1003
171	0° 29.9′N	95° 3.1′W	2 Nov 03	1738	160	12	3300	1001
181	0° 5.0′N	95° 3.4′W	2 Nov 03	2257	150	10	3277	3002
191	0° 30.0′S	95° 7.3′W	3 Nov 03	346	130	5	3359	1001
201	1° 0.0′S	95° 11.0′W	3 Nov 03	727	130	5	3338	1002
211	1° 30.0′S	95° 14.7′W	3 Nov 03	1058	140	7	3378	1003
221	1° 58.1′S	95° 19.6′W	3 Nov 03	1402	140	8	3405	203
222	1° 58.1′S	95° 19.5′W	3 Nov 03	1427	140	8	3406	200
223	1° 59.2′S	95° 11.2′W	3 Nov 03	2242	150	10	3424	1002
231	2° 30.0′S	95° 4.9′W	4 Nov 03	309	150	12	3494	1001
241	3° 0.3′S	95° 4.8′W	4 Nov 03	630	160	14	3499	1001
251	4° 0.0′S	95° 4.8′W	4 Nov 03	1210	130	12	3675	1001
261	5° 3.6′S	95° 5.2′W	4 Nov 03	2205	160	12	3856	1003
271	6° 0.0′S	95° 11.8′W	5 Nov 03	431	120	11	3694	1001
281	7° 0.1′S	95° 13.6′W	5 Nov 03	1000	110	12	3878	1002
291	7° 59.7′S	95° 15.7′W	5 Nov 03	2236	90	19	3996	3803
301	7° 59.9′S	110° 3.5′W	8 Nov 03	1942	110	13	3423	3203
311	7° 0.0′S	110° 3.0′W	9 Nov 03	150	130	12	3478	1001
321	6° 0.0′S	110° 1.5′W	9 Nov 03	739	100	12	3395	1002
331	4° 59.4′S	110° 0.3′W	9 Nov 03	1952	100	15	3682	1001
341	4° 0.0′S	109° 59.7′W	10 Nov 03	205	120	11	3616	1000
351	3° 0.0′S	109° 59.6′W	10 Nov 03	744	140	11	3735	1002
361	2° 30.0′S	109° 59.5′W	10 Nov 03	1108	140	13	3885	1001
371	1° 56.8′S	109° 56.1′W	10 Nov 03	2056	130	13	3981	1002
381	1° 30.0′S	109° 57.0′W	11 Nov 03	28	120	12	3870	1002
391	1° 0.0′S	109° 58.2′W	11 Nov 03	353	130	3	3943	1001
401	0° 30.0′S	109° 57.1′W	11 Nov 03	719	140	10	3966	1001
411	0° 3.5′N	109° 55.8′W	11 Nov 03	1840	130	13	3817	3501
421	0° 30.1′N	110° 6.8′W	12 Nov 03	840	140	12	3767	1001
431	1° 0.0′N	110° 9.4′W	12 Nov 03	1206	120	13	3796	1001
441	1° 30.1′N	110° 13.0′W	12 Nov 03	1524	160	10	3811	1000
451	2° 1.9′N	110° 17.3′W	12 Nov 03	1921	160	15	3738	1001
461	2° 30.0′N	110° 15.5′W	12 Nov 03	2240	160	16	3687	1002

Table 1f: (continued).

Cast #	Latitude		Longitude		Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
471	3°	0.0′N	110°	13.2′W	13 Nov 03	208	160	18	3828	1001
481	4°	0.0′N	110°	9.1′W	13 Nov 03	756	190	14	3921	1001
491	5°	0.2′N	110°	4.3′W	13 Nov 03	2108	180	12	4255	1000
501	6°	0.1′N	110°	5.5′W	14 Nov 03	306	190	12	3853	1002
511	7°	0.0′N	110°	5.6′W	14 Nov 03	840	180	13	3813	1001
521	8°	0.8′N	110°	5.8′W	14 Nov 03	1554	190	9	4202	4002

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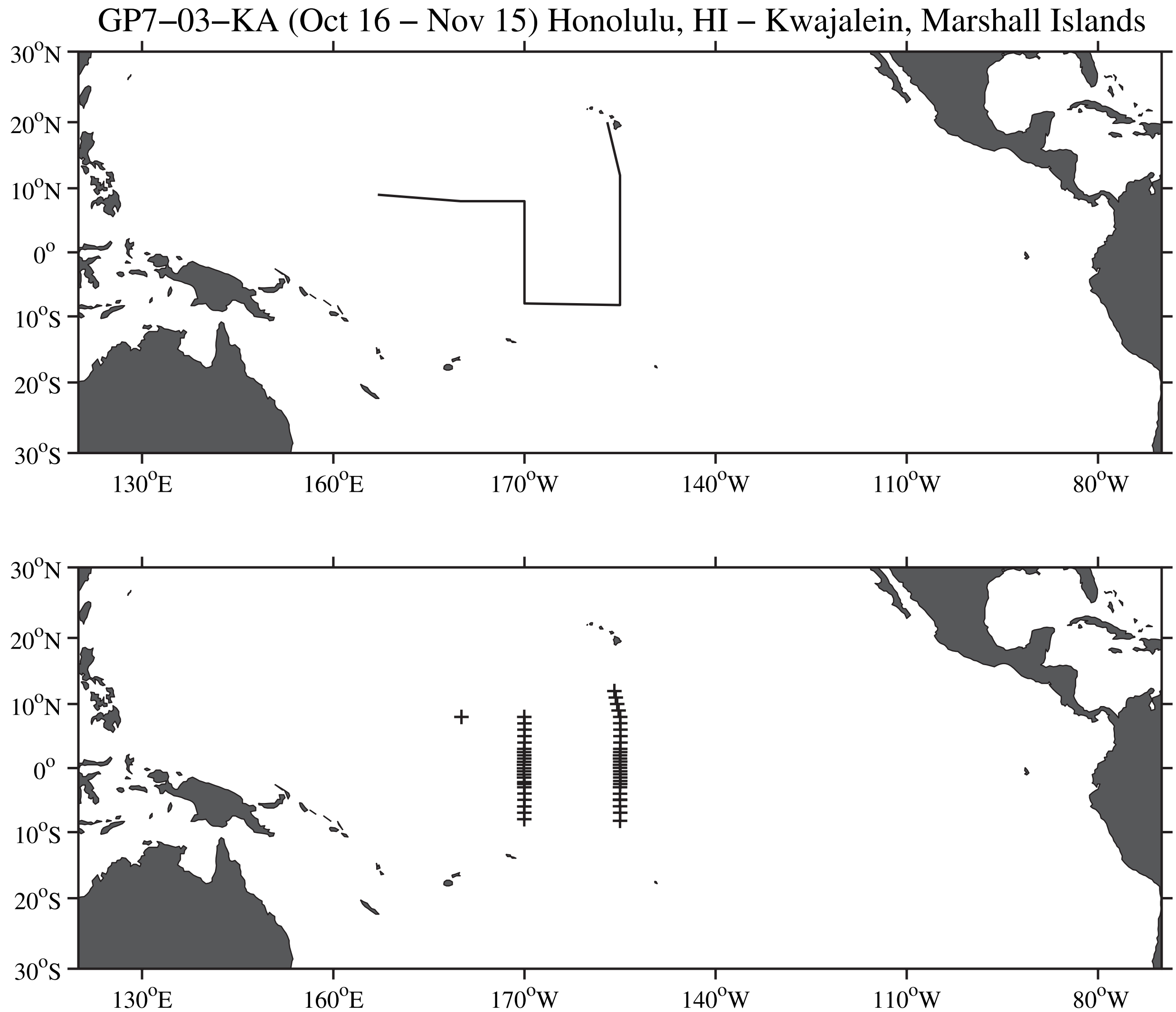

Figure 2g: GP7-03-KA cruise track and station locations.

Table 1g: GP7-03-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12° 0.1′N	155° 52.7′W	19 Oct 03	1146	97	11	5206	1003
21	11° 0.7′N	155° 39.9′W	19 Oct 03	1906	100	8	5173	1001
31	10° 0.3′N	155° 26.0′W	20 Oct 03	234	73	11	5336	1003
41	9° 0.3′N	155° 12.6′W	20 Oct 03	1009	94	6	5278	1004
51	7° 59.0′N	154° 58.4′W	20 Oct 03	1841	92	14	5249	3002
61	7° 0.4′N	154° 57.8′W	21 Oct 03	344	123	11	4994	1005
71	6° 0.3′N	154° 56.7′W	21 Oct 03	1132	202	7	4757	1004
81	4° 59.6′N	154° 55.3′W	22 Oct 03	341	97	9	4594	1006
91	3° 59.8′N	154° 56.8′W	22 Oct 03	1138	3	7	4707	1002
101	3° 0.2′N	154° 58.0′W	22 Oct 03	1852	160	11	4767	1011
111	2° 30.0′N	154° 58.1′W	22 Oct 03	2304	132	8	4833	1002
121	1° 59.0′N	154° 59.3′W	23 Oct 03	347	137	7	4684	1008
131	1° 30.2′N	155° 0.1′W	23 Oct 03	753	86	12	4658	1002
141	1° 0.0′N	154° 59.0′W	23 Oct 03	1202	150	5	4763	1001
151	0° 30.2′N	154° 59.2′W	23 Oct 03	1558	129	11	4783	1004
161	0° 1.7′N	155° 0.6′W	24 Oct 03	515	150	7	4673	1001
171	0° 29.9′S	154° 58.4′W	24 Oct 03	957	150	12	4886	1001
181	0° 59.7′S	154° 57.6′W	24 Oct 03	1401	139	6	4757	1003
191	1° 29.8′S	154° 58.1′W	24 Oct 03	1806	131	10	4883	1001
201	2° 1.8′S	154° 57.5′W	25 Oct 03	755	110	6	4974	3003
211	2° 30.3′S	154° 58.5′W	25 Oct 03	1243	104	9	4959	1002
221	2° 59.8′S	154° 59.7′W	25 Oct 03	1633	125	5	4924	1002
231	4° 0.6′S	155° 0.4′W	25 Oct 03	2347	68	4	1706	1023
241	4° 55.6′S	154° 59.4′W	26 Oct 03	802	99	6	5186	4803
242	4° 59.4′S	155° 0.2′W	27 Oct 03	104	111	7	4912	1005
251	5° 59.8′S	154° 59.4′W	27 Oct 03	804	98	8	4971	1002
261	6° 59.8′S	154° 58.8′W	27 Oct 03	1451	28	7	5218	1002
271	8° 15.6′S	155° 0.3′W	27 Oct 03	2336	73	4	5336	1002
281	8° 0.3′S	170° 2.4′W	3 Nov 03	1735	141	5	4652	1803
291	7° 0.0′S	170° 1.2′W	4 Nov 03	1127	351	3	4641	1002
301	6° 0.2′S	170° 1.1′W	4 Nov 03	1822	183	1	4726	1002
311	4° 58.6′S	169° 59.9′W	5 Nov 03	338	114	3	5417	1002
321	3° 59.7′S	170° 0.3′W	5 Nov 03	1025	18	1	5748	1004
331	3° 0.1′S	170° 1.6′W	5 Nov 03	1722	66	4	5132	1001
341	2° 30.2′S	170° 2.0′W	5 Nov 03	2126	82	5	1001	
351	2° 11.3′S	170° 1.5′W	6 Nov 03	122	77	4	5006	1002
361	1° 30.3′S	170° 2.8′W	6 Nov 03	715	83	5	5177	1000
371	1° 0.0′S	170° 2.7′W	6 Nov 03	1139	71	8	4462	1002
381	0° 30.0′S	170° 3.0′W	6 Nov 03	1554	87	8	5271	1003
391	0° 2.3′S	170° 4.0′W	6 Nov 03	2044	96	6	4678	3002
401	0° 29.5′N	170° 4.5′W	7 Nov 03	229	101	8	5582	1003
411	0° 59.9′N	170° 3.1′W	7 Nov 03	653	63	12	5469	1004
421	1° 30.2′N	170° 2.1′W	7 Nov 03	1112	83	7	5519	1003
431	1° 59.7′N	170° 1.0′W	7 Nov 03	1620	112	8	5142	3003
441	2° 30.1′N	170° 2.8′W	8 Nov 03	751	152	7		1001
451	3° 0.7′N	170° 2.6′W	8 Nov 03	1212	129	19	4820	1007
461	4° 0.0′N	169° 59.9′W	8 Nov 03	1904	131	19		1001
471	5° 1.1′N	170° 0.3′W	9 Nov 03	228	113	16		1003
481	6° 1.2′N	169° 59.5′W	9 Nov 03	909	131	12	4379	1000
491	6° 59.9′N	170° 0.5′W	9 Nov 03	1557	79	13	5914	1002
501	8° 0.3′N	170° 0.8′W	10 Nov 03	922	91	16	5526	1002
511	8° 0.1′N	179° 52.9′W	12 Nov 03	2237	146	12	5943	1002

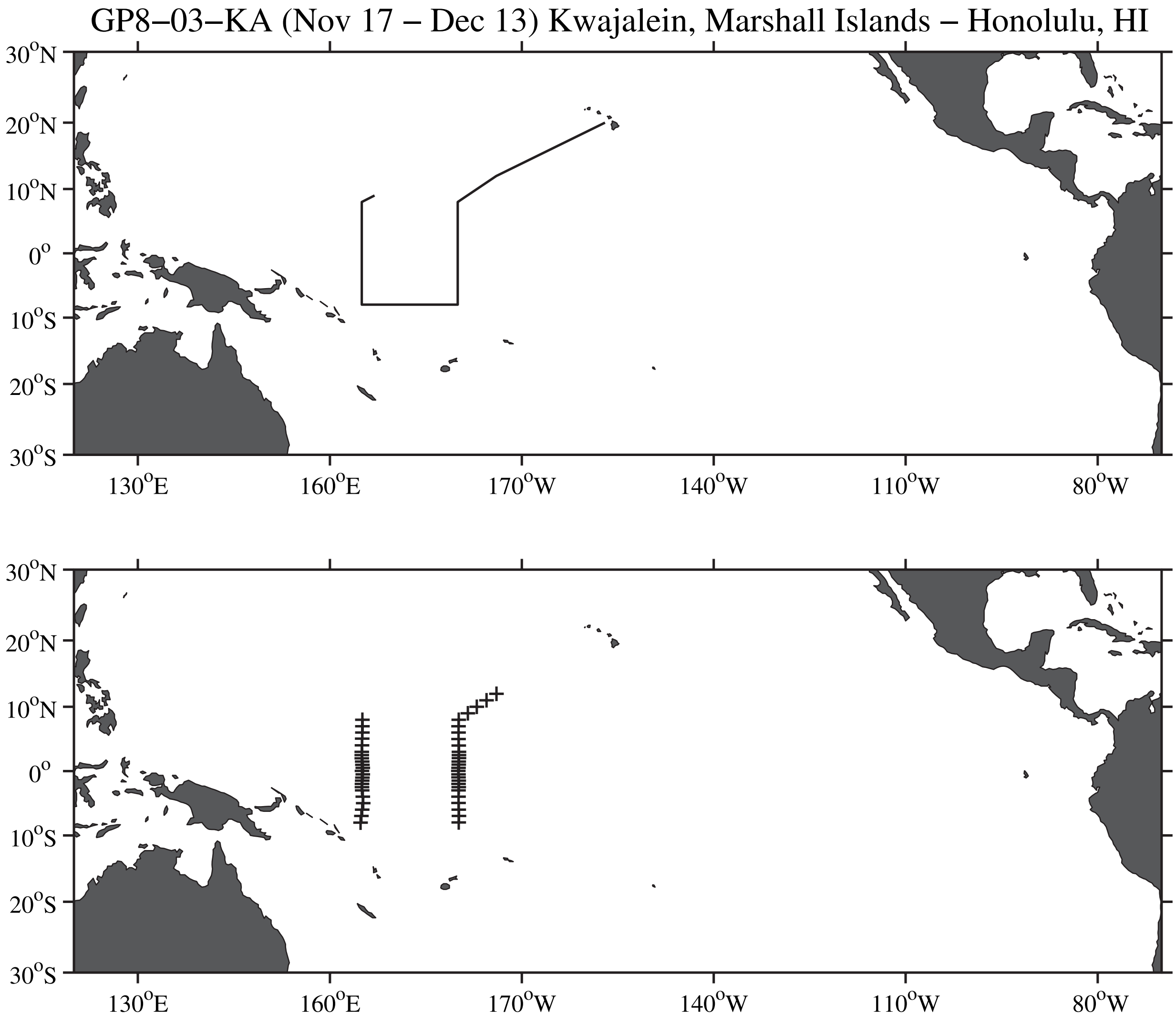

Figure 2h: GP8-03-KA cruise track and station locations.

Table 1h: GP8-03-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	7° 59.5′N	165° 5.4′E	18 Nov 03	2103	210	8	5217	1010
21	7° 0.1′N	165° 5.0′E	19 Nov 03	408	197	13	5169	1003
31	5° 59.9′N	165° 4.8′E	19 Nov 03	1129	218	12	5017	1001
41	5° 3.1′N	165° 3.8′E	19 Nov 03	1824	172	10	4772	1002
51	4° 1.1′N	165° 0.3′E	20 Nov 03	1139	119	10	4497	1001
61	3° 0.6′N	165° 0.0′E	20 Nov 03	2010	128	8	4231	1002
71	2° 30.0′N	164° 59.4′E	21 Nov 03	37	37	2	4125	1008
81	2° 0.3′N	164° 58.9′E	21 Nov 03	519	52	8	4175	1002
91	1° 30.3′N	165° 2.6′E	21 Nov 03	939	76	13	4261	1003
101	0° 59.9′N	165° 5.0′E	21 Nov 03	1403	55	10	4333	1002
111	0° 30.2′N	165° 8.2′E	21 Nov 03	1811	49	12	4372	1007
121	0° 1.6′N	165° 0.8′E	22 Nov 03	617	303	13	4412	1003
131	0° 30.2′S	165° 9.1′E	22 Nov 03	1202	353	3	4416	1001
141	1° 0.6′S	165° 5.6′E	22 Nov 03	1605	31	5	4090	1004
151	1° 30.2′S	165° 3.0′E	22 Nov 03	1957	18	6	4456	1000
161	2° 0.7′S	165° 0.6′E	23 Nov 03	718	57	5	4469	1002
171	2° 30.1′S	165° 1.9′E	23 Nov 03	1210	95	2	2754	1002
181	3° 0.2′S	165° 3.9′E	23 Nov 03	1610	98	4	4214	1002
191	4° 0.0′S	165° 8.8′E	23 Nov 03	2250	117	7	3379	1004
201	4° 59.5′S	165° 12.8′E	24 Nov 03	932	246	12	2548	2302
211	5° 59.9′S	165° 4.0′E	25 Nov 03	603	32	1	3604	1002
221	6° 59.9′S	164° 56.3′E	25 Nov 03	1302	261	1	3718	1004
231	8° 2.3′S	164° 48.3′E	25 Nov 03	2119	171	4	3898	3701
241	7° 59.1′S	179° 50.6′W	29 Nov 03	1807	44	6	5543	1602
251	7° 0.3′S	179° 50.1′W	30 Nov 03	1035	94	8	5316	1004
261	6° 0.0′S	179° 52.3′W	30 Nov 03	1732	55	5	5204	1001
271	4° 58.5′S	179° 52.7′W	1 Dec 03	58	14	5	5638	1000
281	4° 0.0′S	179° 53.2′W	1 Dec 03	806	40	5	6026	1002
291	2° 59.8′S	179° 52.6′W	1 Dec 03	1513	56	5	5156	1004
301	2° 30.2′S	179° 52.2′W	1 Dec 03	1920	98	7	5408	1003
311	2° 0.1′S	179° 53.2′W	2 Dec 03	636	95	10	5063	1002
321	1° 29.6′S	179° 52.3′W	2 Dec 03	1051	85	10	5205	1002
331	0° 59.8′S	179° 53.1′W	2 Dec 03	1448	97	6	5040	1002
341	0° 30.0′S	179° 53.9′W	2 Dec 03	1850	122	10	4589	1002
351	0° 1.7′N	179° 55.5′W	3 Dec 03	736	120	3	5081	5002
361	0° 30.3′N	179° 53.5′W	3 Dec 03	1316	135	9	5308	1029
371	1° 0.2′N	179° 52.0′W	3 Dec 03	1715	112	11	5821	1001
381	1° 30.0′N	179° 50.8′W	3 Dec 03	2107	139	12	5586	1001
391	2° 1.1′N	179° 49.8′W	4 Dec 03	121	129	11	5477	1002
401	2° 30.0′N	179° 49.9′W	4 Dec 03	505	109	11	5151	1003
411	3° 0.3′N	179° 50.2′W	4 Dec 03	853	145	11	5649	1001
421	3° 59.9′N	179° 51.9′W	4 Dec 03	1531	155	5		1001
431	4° 59.7′N	179° 53.8′W	4 Dec 03	2212	127	10	5672	1002
441	6° 0.2′N	179° 52.9′W	5 Dec 03	523	115	9	5412	1005
451	7° 0.2′N	179° 53.2′W	5 Dec 03	1234	130	6	5796	1003
461	8° 0.4′N	179° 51.7′W	5 Dec 03	2055	70	15	5943	5006
471	9° 0.3′N	178° 26.0′W	6 Dec 03	1002	68	15	5738	1002
481	10° 0.1′N	177° 2.2′W	6 Dec 03	2332	82	17	5901	1001
491	11° 0.6′N	175° 30.2′W	7 Dec 03	1322	71	15	5462	1002
501	12° 0.2′N	173° 57.9′W	8 Dec 03	239	65	13	5643	1004

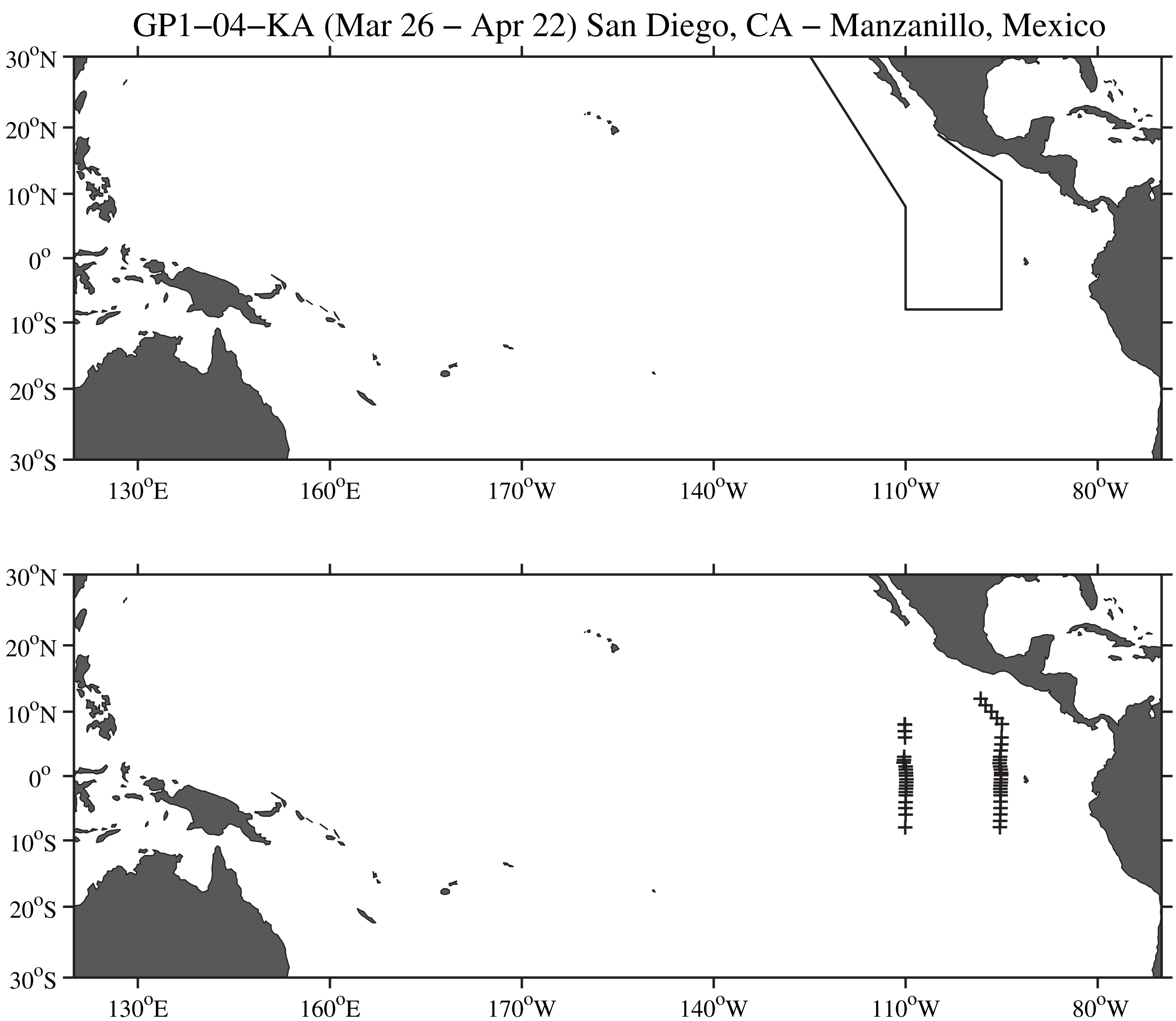

Figure 2i: GP1-04-KA cruise track and station locations.

Table 1i: GP1-04-KA CTD Cast Summary.

Cast #	Latitude		Longitude		Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	8°	0.57′N	110°	6.7′W	31 Mar 04	1347	35	12	3383	3001
21	8°	3.57′N	110°	9.9′W	31 Mar 04	2300	83	8	3358	504
31	7°	0.37′N	110°	7.8′W	1 Apr 04	542	33	8	3702	1001
41	6°	0.37′N	110°	5.9′W	1 Apr 04	1209	64	10	3816	1000
51	3°	0.17′N	110°	13.6′W	2 Apr 04	1405	100	12	3822	1001
61	2°	30.67′N	110°	15.5′W	2 Apr 04	1809	59	12	3716	1000
71	2°	5.07′N	110°	19.1′W	3 Apr 04	310	108	9	3772	3503
81	1°	30.37′N	110°	0.1′W	3 Apr 04	2314	108	12	3774	1001
91	1°	0.47′N	109°	58.0′W	4 Apr 04	304	89	8	3796	1001
101	0°	30.07′N	109°	56.4′W	4 Apr 04	716	62	3	3756	1002
111	0°	4.27′N	109°	56.2′W	4 Apr 04	1122	59	6	3801	3503
121	0°	30.07′S	109°	53.9′W	5 Apr 04	455	53	4	3827	1004
131	0°	59.97′S	109°	54.3′W	5 Apr 04	825	54	7	3947	1002
141	1°	30.07′S	109°	55.5′W	5 Apr 04	1205	29	8	3892	1001
151	1°	57.67′S	109°	56.9′W	5 Apr 04	1610	46	10	3947	1002
161	2°	29.97′S	109°	58.8′W	5 Apr 04	2000	63	9	3867	1003
171	2°	59.87′S	109°	59.5′W	5 Apr 04	2328	53	19	3786	1002
181	4°	5.07′S	110°	0.1′W	6 Apr 04	633	72	17	3812	1001
191	4°	59.87′S	110°	1.9′W	6 Apr 04	1244	79	14	3486	1002
201	6°	0.07′S	110°	1.0′W	6 Apr 04	1923	77	17	3325	1004
211	7°	59.67′S	110°	4.9′W	7 Apr 04	1233	62	11	3385	3207
221	7°	58.67′S	95°	15.7′W	11 Apr 04	1738	86	13	3969	3002
231	7°	0.17′S	95°	13.5′W	12 Apr 04	45	106	16	3869	1002
241	5°	59.87′S	95°	12.8′W	12 Apr 04	707	95	12	3776	1002
251	4°	59.97′S	95°	10.7′W	12 Apr 04	1501	115	16	3826	1001
261	4°	0.17′S	95°	11.2′W	12 Apr 04	2129	95	12	3650	1003
271	3°	0.27′S	95°	11.3′W	13 Apr 04	402	84	11	3511	1002
281	2°	30.07′S	95°	10.9′W	13 Apr 04	814	72	12	3437	1002
291	1°	59.07′S	95°	12.6′W	13 Apr 04	1219	293	0	3388	1007
301	1°	29.87′S	95°	9.8′W	13 Apr 04	1901	64	3	3327	1001
311	1°	0.07′S	95°	8.2′W	13 Apr 04	2338	110	8	3322	1003
321	0°	29.77′S	95°	6.0′W	14 Apr 04	406	139	12	3382	1002
331	0°	8.27′N	95°	4.0′W	14 Apr 04	1033	118	4	3155	3005
341	0°	30.47′N	95°	4.5′W	15 Apr 04	210	122	5	3278	1000
351	1°	0.27′N	95°	9.2′W	15 Apr 04	538	134	7	3424	1004
361	1°	30.27′N	95°	15.1′W	15 Apr 04	938	65	4	2482	1006
371	2°	0.27′N	95°	19.6′W	15 Apr 04	1314	84	7	2837	1001
381	2°	30.17′N	95°	16.4′W	15 Apr 04	2042	111	6	2445	1001
391	3°	0.17′N	95°	14.2′W	16 Apr 04	30	123	7	2709	1004
401	4°	0.07′N	95°	8.5′W	16 Apr 04	716	121	6	3581	1001
411	4°	56.07′N	95°	3.2′W	16 Apr 04	1343	220	6	3298	1003
421	6°	0.17′N	95°	1.8′W	16 Apr 04	2217	6	5	3694	1001
431	8°	5.27′N	94°	56.7′W	17 Apr 04	2155	19	14	3634	3001
441	9°	0.67′N	95°	44.7′W	18 Apr 04	717	45	17	3664	1002
451	10°	0.67′N	96°	36.4′W	18 Apr 04	1514	65	17	3901	1013
461	11°	0.17′N	97°	30.3′W	19 Apr 04	230	12	14	4102	1003
471	12°	0.37′N	98°	16.8′W	19 Apr 04	1150	61	20	4019	1005

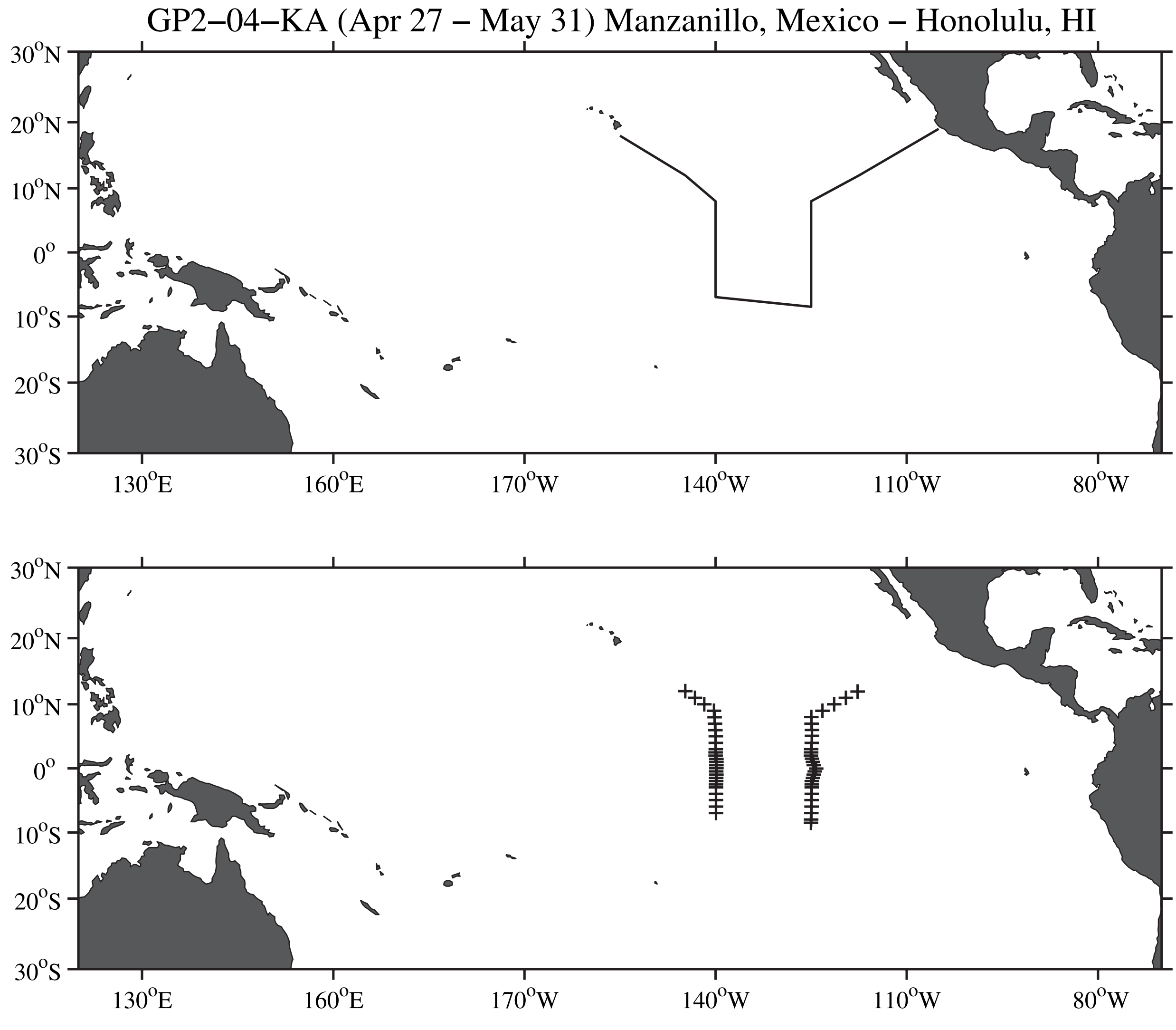

Figure 2j: GP2-04-KA cruise track and station locations.

Table 1j: GP2-04-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	11° 58.3′N	117° 42.4′W	1 May 04	1947	41	14	4353	1001
21	11° 0.5′N	119° 34.1′W	2 May 04	835	42	9	4241	1003
31	10° 0.0′N	121° 23.9′W	2 May 04	2108	31	8	4419	1003
41	9° 0.4′N	123° 13.2′W	3 May 04	903	30	1	4439	1001
51	8° 1.5′N	124° 58.6′W	4 May 04	347	193	6	4732	4002
61	6° 59.9′N	124° 56.2′W	4 May 04	1150	120	11	4600	1002
71	6° 0.0′N	124° 53.7′W	4 May 04	1839	86	8	4403	1002
81	5° 6.4′N	124° 52.7′W	5 May 04	112	109	10	4367	1002
91	3° 59.8′N	124° 55.6′W	5 May 04	823	103	12	4484	1002
101	2° 59.7′N	124° 59.5′W	5 May 04	1504	120	12	4472	1001
111	2° 30.6′N	125° 1.1′W	5 May 04	1853	76	12	4553	1002
121	1° 59.4′N	125° 2.3′W	5 May 04	2304	85	12	4674	1002
131	1° 30.9′N	124° 53.7′W	6 May 04	524	25	11	4762	1003
141	1° 0.6′N	124° 44.2′W	6 May 04	1002	128	16	4610	1002
151	0° 30.8′N	124° 35.3′W	6 May 04	1459	332	10	4569	1002
161	0° 1.8′S	124° 12.3′W	7 May 04	521	113	12	4612	4308
171	0° 29.2′S	124° 26.9′W	8 May 04	106	110	15	4531	1017
181	0° 59.6′S	124° 34.8′W	8 May 04	518	34	15	4687	1002
191	1° 29.4′S	124° 43.1′W	8 May 04	946	30	10	4608	1002
201	1° 59.8′S	124° 53.8′W	8 May 04	1406	45	13	4727	1001
211	2° 29.5′S	124° 54.1′W	9 May 04	416	40	11	4589	1001
221	2° 59.6′S	124° 54.6′W	9 May 04	811	45	13	4634	1002
231	3° 59.0′S	124° 55.2′W	9 May 04	1511	75	15	4507	1002
241	4° 58.7′S	124° 56.4′W	10 May 04	438	76	14	4549	4003
251	5° 59.6′S	124° 56.8′W	11 May 04	219	72	14	4482	1003
261	6° 59.9′S	124° 58.5′W	11 May 04	912	59	13	4559	1002
271	7° 59.7′S	124° 59.8′W	11 May 04	1601	43	12	4510	1003
281	8° 29.2′S	125° 1.6′W	12 May 04	415	57	13	4763	4302
291	6° 59.9′S	139° 55.8′W	20 May 04	836	58	8	4188	1001
301	5° 59.6′S	139° 55.8′W	20 May 04	1503	68	7	4136	1001
311	4° 59.2′S	139° 55.8′W	20 May 04	2131	53	7	4196	1002
321	3° 59.9′S	139° 56.2′W	21 May 04	404	72	9	4517	1001
331	2° 59.6′S	139° 56.2′W	21 May 04	1018	62	6	4469	1001
341	2° 30.1′S	139° 56.4′W	21 May 04	1359	74	9	4422	1000
351	2° 0.4′S	139° 55.2′W	22 May 04	132	59	9	4331	1003
361	1° 30.0′S	139° 53.8′W	22 May 04	515	41	8	4355	1004
371	0° 59.7′S	139° 53.2′W	22 May 04	847	42	7	4231	1001
381	0° 29.3′S	139° 54.1′W	22 May 04	1249	72	8	4266	1000
391	0° 2.3′N	139° 51.9′W	23 May 04	505	69	9	4348	4102
401	0° 30.3′N	139° 52.2′W	23 May 04	1022	67	3	4331	1002
411	1° 0.2′N	139° 52.7′W	23 May 04	1355	88	7	4336	1001
421	1° 30.3′N	139° 53.2′W	23 May 04	1734	67	4	3874	1002
431	2° 0.6′N	140° 0.8′W	24 May 04	303	153	8	4386	1001
441	2° 30.2′N	139° 59.8′W	24 May 04	715	68	8	4387	1001
451	3° 0.3′N	139° 58.9′W	24 May 04	1037	91	6	4296	1002
461	4° 0.2′N	139° 57.7′W	24 May 04	1645	107	12	4315	1001
471	5° 1.2′N	139° 57.6′W	25 May 04	555	83	4	4476	4202
481	5° 59.8′N	140° 1.4′W	26 May 04	330	166	6	4803	1001
491	7° 0.1′N	140° 6.0′W	26 May 04	1010	239	1	4988	1002
501	8° 0.1′N	140° 10.4′W	26 May 04	1641	114	3	5107	1002
511	9° 0.6′N	140° 15.1′W	27 May 04	600	132	6	4809	1002
521	10° 0.2′N	141° 45.9′W	27 May 04	1633	359	9	5021	1001
531	11° 0.4′N	143° 14.8′W	28 May 04	229	11	5	5407	1001
541	12° 0.8′N	144° 46.0′W	28 May 04	1432	28	6	5214	5004

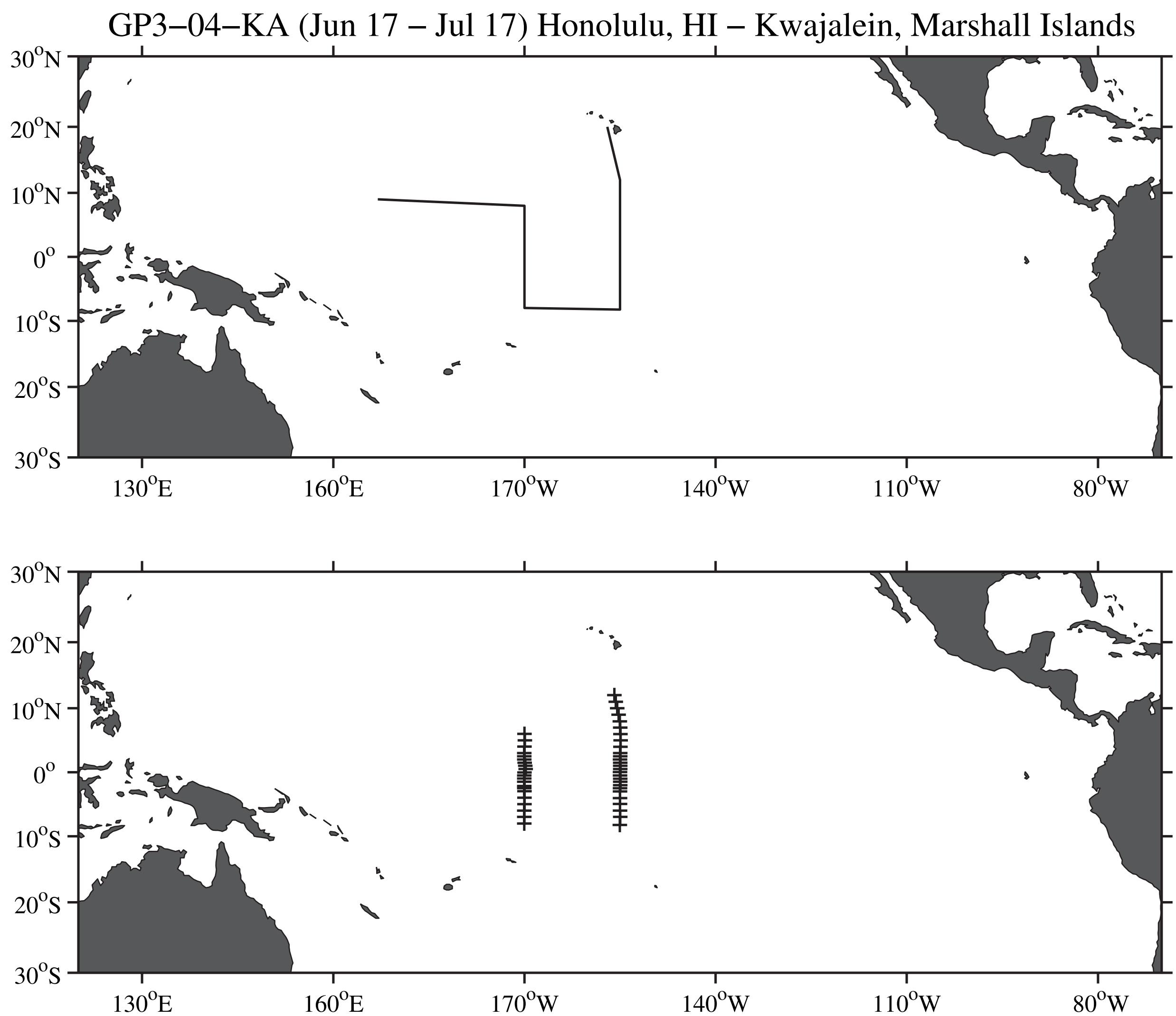

Figure 2k: GP3-04-KA cruise track and station locations.

Table 1k: GP3-04-KA CTD Cast Summary.

Cast #	Latitude		Longitude		Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12°	0.6′N	155°	52.7′W	20 Jun 04	1044	53	18	5185	1001
21	11°	0.2′N	155°	40.0′W	20 Jun 04	1737	79	19	5201	1004
31	10°	0.3′N	155°	26.5′W	21 Jun 04	40	48	15	5343	1002
41	9°	0.1′N	155°	13.7′W	21 Jun 04	734	38	20	5281	1000
51	7°	57.6′N	155°	1.7′W	21 Jun 04	1553	41	20	5274	3501
61	6°	59.8′N	154°	58.1′W	22 Jun 04	930	184	4	4980	1002
71	5°	59.8′N	154°	56.7′W	22 Jun 04	1618	19	3	4838	1003
81	5°	0.6′N	154°	55.2′W	23 Jun 04	719	98	15	4598	1002
91	4°	0.2′N	154°	56.1′W	23 Jun 04	1434	91	9	4704	1006
101	3°	0.1′N	154°	57.7′W	23 Jun 04	2112	96	11	4788	1003
111	2°	30.6′N	154°	57.8′W	24 Jun 04	230	77	6	4837	1003
121	2°	0.6′N	154°	59.5′W	24 Jun 04	808	77	9	4711	4403
131	1°	29.6′N	154°	57.8′W	25 Jun 04	501	107	12	4668	1007
141	1°	0.3′N	154°	58.4′W	25 Jun 04	852	78	12	4764	1002
151	0°	30.3′N	154°	58.1′W	25 Jun 04	1259	89	13	4761	1005
161	0°	2.3′N	154°	59.3′W	25 Jun 04	1730	93	13	4659	4404
171	0°	29.8′S	154°	59.3′W	25 Jun 04	2338	86	15	4888	1003
181	1°	0.0′S	154°	58.5′W	26 Jun 04	320	58	11	4751	1004
191	1°	30.0′S	154°	59.0′W	26 Jun 04	712	63	16	4870	1001
201	2°	2.3′S	154°	58.8′W	26 Jun 04	1222	87	14	4931	1002
211	2°	30.0′S	154°	59.6′W	26 Jun 04	1607	92	11	4899	1002
221	3°	0.0′S	155°	0.6′W	26 Jun 04	2005	73	16	4954	1003
231	4°	2.7′S	155°	0.3′W	27 Jun 04	402	76	13	2031	1006
241	4°	58.3′S	155°	0.1′W	27 Jun 04	1312	80	11	4818	4503
251	5°	59.9′S	154°	59.7′W	28 Jun 04	754	64	10	5265	1002
261	7°	0.1′S	154°	59.0′W	28 Jun 04	1411	0	7	5328	1001
271	8°	15.3′S	155°	1.2′W	29 Jun 04	619	57	11	5292	1001
281	8°	1.4′S	170°	1.5′W	5 Jul 04	1606	236	8	5380	5102
291	6°	59.8′S	170°	1.6′W	6 Jul 04	124	147	2	4677	1002
301	6°	0.0′S	170°	1.0′W	6 Jul 04	832	289	4	4751	1001
311	5°	0.4′S	170°	0.3′W	6 Jul 04	1504	270	5	5416	1002
321	3°	59.8′S	170°	0.6′W	7 Jul 04	816	15	8	5739	1000
331	2°	59.5′S	170°	0.1′W	7 Jul 04	1437	11	8	5077	1005
341	2°	29.9′S	170°	0.8′W	7 Jul 04	1816	319	10	2150	1003
351	2°	10.0′S	170°	1.8′W	8 Jul 04	517	26	7	4961	1002
361	1°	30.0′S	170°	1.0′W	8 Jul 04	1015	5	8	5377	1001
371	0°	59.8′S	170°	1.2′W	8 Jul 04	1353	66	8	5036	1003
381	0°	30.2′S	170°	1.0′W	8 Jul 04	1739	183	1	5705	1005
391	0°	1.1′S	169°	59.5′W	9 Jul 04	951	326	5	5453	5003
401	0°	29.9′N	169°	48.9′W	10 Jul 04	647	321	2	5467	1004
411	1°	0.1′N	169°	52.9′W	10 Jul 04	1028	332	2	4788	1001
421	1°	30.0′N	169°	57.7′W	10 Jul 04	1417	294	5	5525	1002
431	2°	0.7′N	170°	1.9′W	10 Jul 04	1759	287	6	5388	1001
441	2°	30.2′N	170°	2.1′W	10 Jul 04	2157	357	7	5453	1001
451	3°	0.5′N	170°	0.8′W	11 Jul 04	155	15	7	5228	1002
461	4°	0.5′N	169°	59.1′W	11 Jul 04	802	41	12	5682	1002
471	5°	1.1′N	169°	56.8′W	11 Jul 04	1511	9	5	5807	3504
481	6°	0.3′N	169°	59.6′W	12 Jul 04	1023	31	10	5413	1001

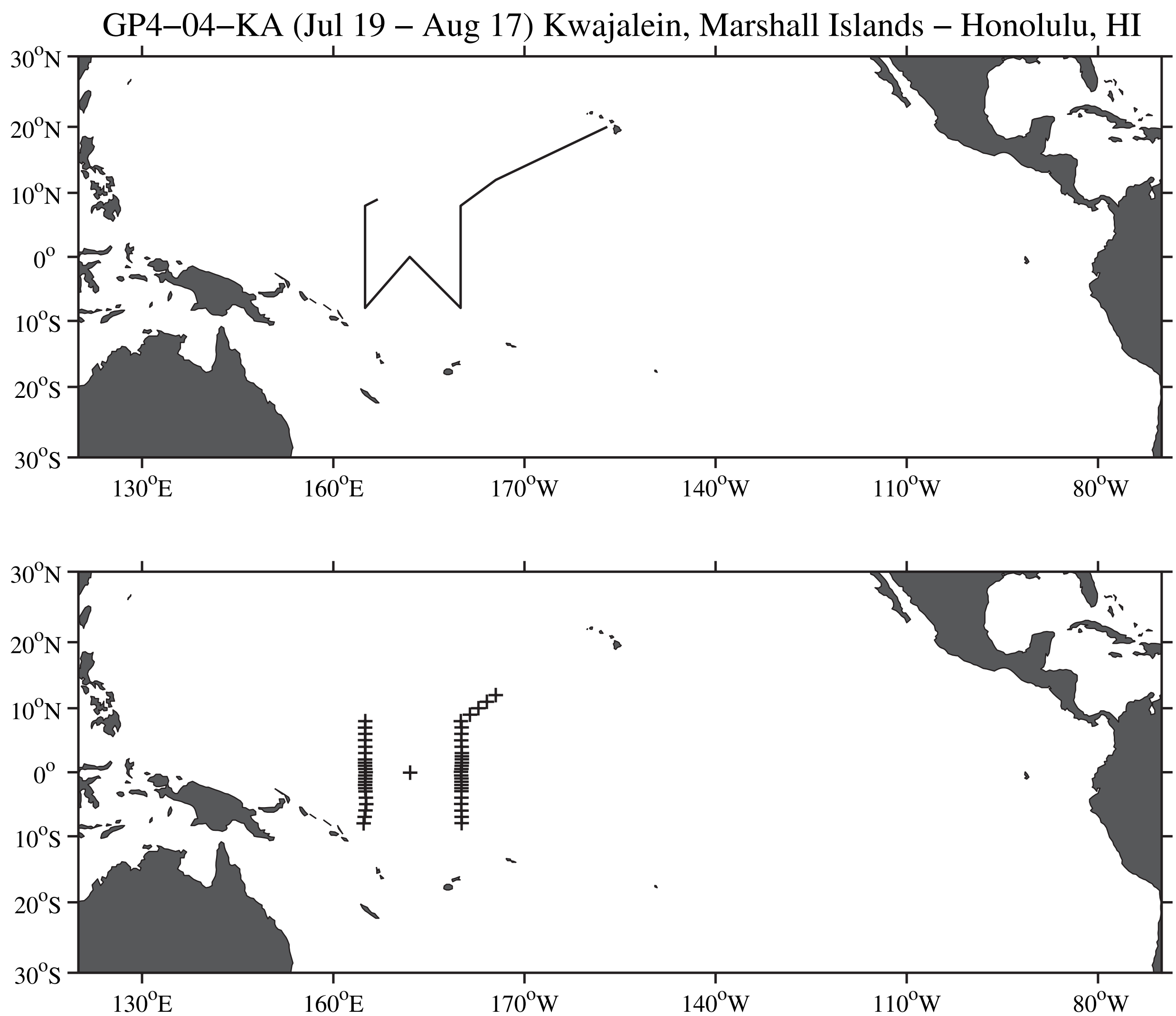

Figure 2l: GP4-04-KA cruise track and station locations.

Table 1l: GP4-04-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	8° 0.5′N	165° 0.4′E	21 Jul 04	813	304	6	5214	5001
21	7° 0.3′N	164° 59.8′E	21 Jul 04	1632	286	4	5155	1005
31	6° 0.4′N	165° 1.0′E	21 Jul 04	2306	278	4	5006	1002
41	5° 2.1′N	165° 0.1′E	22 Jul 04	551	1	3	4791	1014
51	3° 59.9′N	165° 1.5′E	22 Jul 04	1247	122	6	4493	1001
61	2° 59.8′N	165° 1.4′E	22 Jul 04	1910	36	0	4248	1001
71	2° 0.6′N	164° 59.4′E	23 Jul 04	858	74	3	4174	1001
81	1° 30.1′N	164° 59.5′E	23 Jul 04	1315	86	3	4263	1002
91	1° 0.3′N	165° 0.2′E	23 Jul 04	1653	21	1	4334	1002
101	0° 30.0′N	165° 1.4′E	23 Jul 04	2052	229	2	4374	1001
111	0° 0.8′N	165° 4.2′E	24 Jul 04	623	171	3	4409	4202
121	0° 30.0′S	165° 1.8′E	24 Jul 04	1218	230	4	4435	1002
131	1° 0.3′S	165° 1.7′E	24 Jul 04	1559	172	4	4435	1001
141	1° 30.6′S	165° 1.1′E	24 Jul 04	1954	148	1	4458	1002
151	2° 0.2′S	164° 59.6′E	25 Jul 04	255	9	10	4466	1001
161	2° 29.5′S	165° 1.1′E	25 Jul 04	720	28	10	2586	1005
171	2° 59.8′S	165° 2.4′E	25 Jul 04	1110	331	7	4191	1001
181	3° 59.5′S	165° 7.6′E	25 Jul 04	1747	18	10	3391	1001
191	4° 59.9′S	165° 10.6′E	26 Jul 04	47	96	0	2496	1002
201	5° 59.6′S	165° 3.7′E	26 Jul 04	749	28	5	3601	1002
211	6° 59.7′S	164° 55.6′E	26 Jul 04	1423	65	5	3720	1001
221	8° 0.0′S	164° 45.2′E	27 Jul 04	202	76	10	3899	3705
231	0° 3.2′S	172° 3.0′E	29 Jul 04	2329	213	2	4504	1001
241	7° 58.6′S	179° 51.8′W	1 Aug 04	1759	83	11	5544	5304
251	7° 0.0′S	179° 51.8′W	2 Aug 04	1204	45	12	5267	1005
261	5° 59.9′S	179° 52.4′W	2 Aug 04	1840	42	11	5189	1004
271	4° 58.0′S	179° 55.1′W	3 Aug 04	915	35	8	5638	1002
281	3° 59.7′S	179° 52.9′W	3 Aug 04	1555	82	8	5896	1003
291	2° 59.6′S	179° 52.5′W	3 Aug 04	2234	51	9	5562	1003
301	2° 29.9′S	179° 52.6′W	4 Aug 04	216	90	10	5587	1001
311	1° 59.2′S	179° 53.2′W	4 Aug 04	609	81	12	5342	1002
321	1° 29.7′S	179° 53.3′W	4 Aug 04	955	59	10	5228	1001
331	0° 59.8′S	179° 53.9′W	4 Aug 04	1326	54	9	5332	1001
341	0° 29.9′S	179° 55.2′W	4 Aug 04	1709	333	7	5101	1002
351	0° 3.2′N	179° 57.1′W	4 Aug 04	2159	351	2	4506	4101
361	0° 30.1′N	179° 53.8′W	5 Aug 04	345	52	7	5273	1001
371	1° 0.1′N	179° 51.9′W	5 Aug 04	746	41	8	5793	1001
381	1° 30.3′N	179° 50.3′W	5 Aug 04	1151	28	7	5571	1001
391	2° 2.3′N	179° 49.4′W	5 Aug 04	1703	14	6	4564	4117
401	2° 30.2′N	179° 48.6′W	6 Aug 04	756	16	12	5296	1000
411	3° 0.5′N	179° 50.3′W	6 Aug 04	1145	52	15		1001
421	4° 0.2′N	179° 52.2′W	6 Aug 04	1807	100	6	5223	1003
431	5° 0.8′N	179° 54.5′W	7 Aug 04	853	57	8	5653	1002
441	6° 0.3′N	179° 54.0′W	7 Aug 04	1538	55	11	5529	1000
451	7° 0.4′N	179° 52.0′W	9 Aug 04	2108	32	15	5644	1002
461	8° 0.1′N	179° 58.2′W	10 Aug 04	938	42	13	5943	5502
471	9° 0.3′N	178° 33.5′W	11 Aug 04	948	73	13	6016	1007
481	10° 0.4′N	177° 13.5′W	11 Aug 04	2030	57	13	4957	1002
491	11° 0.5′N	175° 53.4′W	12 Aug 04	734	76	14	5522	1001
501	12° 0.4′N	174° 29.4′W	12 Aug 04	1824	22	12	5533	1000

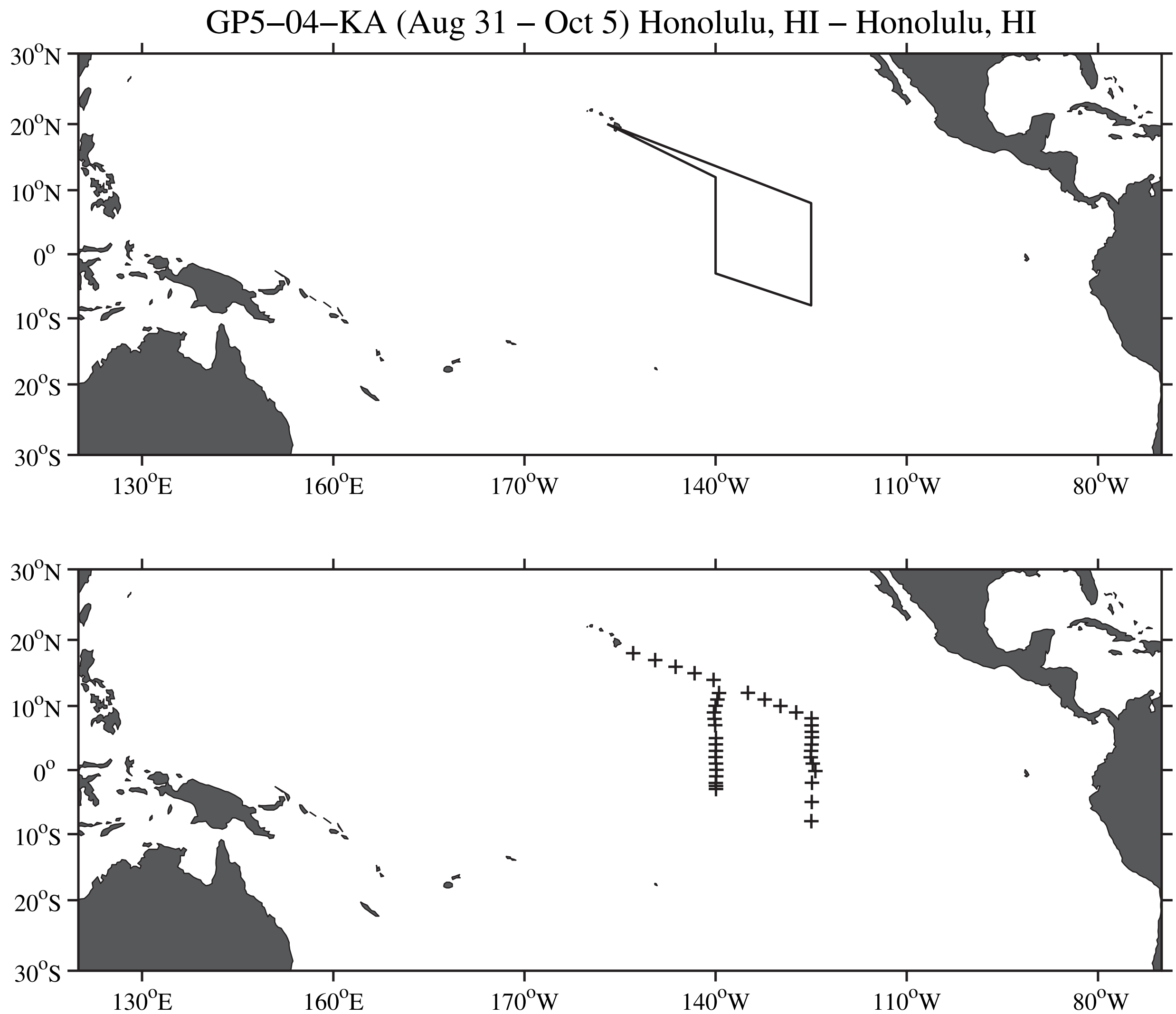

Figure 2m: GP5-04-KA cruise track and station locations.

Table 1m: GP5-04-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	12° 0.3′N	139° 27.8′W	7 Sep 04	605	25	12	4941	1002
21	11° 0.6′N	139° 43.9′W	7 Sep 04	1415	40	14	4798	1002
31	10° 0.9′N	139° 59.4′W	7 Sep 04	2222	9	7	4937	1001
41	8° 59.8′N	140° 15.6′W	8 Sep 04	727	52	8	5114	1001
51	8° 0.2′N	140° 10.2′W	8 Sep 04	1533	172	18	3971	1008
61	7° 1.4′N	140° 4.8′W	9 Sep 04	31	165	9	4989	1012
71	5° 0.1′N	139° 56.6′W	9 Sep 04	1734	122	12	5006	1001
81	4° 0.7′N	139° 57.5′W	10 Sep 04	525	79	10	4328	1001
91	3° 0.3′N	139° 56.8′W	10 Sep 04	1211	74	7	4280	1001
101	2° 2.4′N	140° 0.3′W	11 Sep 04	633	102	10	4406	1006
111	1° 0.4′N	139° 56.3′W	11 Sep 04	1356	93	11	4336	1001
121	0° 2.2′N	139° 52.5′W	12 Sep 04	902	115	14	4352	4100
131	0° 59.6′S	139° 54.3′W	13 Sep 04	1104	62	13	4191	1001
141	2° 2.0′S	139° 57.5′W	13 Sep 04	1826	178	13	4344	1002
151	2° 29.6′S	139° 56.9′W	13 Sep 04	2219	117	10	4388	1002
161	2° 59.4′S	139° 57.0′W	14 Sep 04	219	80	10	4391	1003
171	7° 59.4′S	124° 59.0′W	21 Sep 04	115	77	12	4412	1003
181	5° 0.5′S	124° 55.5′W	21 Sep 04	1814	83	16	4542	1002
191	2° 0.7′S	124° 53.0′W	22 Sep 04	1102	75	11	4723	1002
201	0° 10.0′S	124° 21.1′W	23 Sep 04	4	104	15	4712	3002
211	1° 0.4′N	124° 44.9′W	23 Sep 04	859	104	11	4584	1000
221	1° 58.9′N	125° 4.5′W	23 Sep 04	1454	100	12	4647	1001
231	3° 0.5′N	125° 0.6′W	24 Sep 04	442	108	13	4421	1007
241	4° 0.2′N	124° 56.0′W	24 Sep 04	1044	94	13	4496	1004
251	5° 8.6′N	124° 51.9′W	25 Sep 04	52	132	13	4368	1005
261	5° 59.5′N	124° 54.1′W	25 Sep 04	702	117	7	4371	1001
271	6° 59.7′N	124° 56.9′W	25 Sep 04	1328	170	3	4606	1002
281	8° 4.6′N	124° 56.6′W	26 Sep 04	116	86	5	4543	4301
291	8° 59.9′N	127° 20.6′W	27 Sep 04	1014	124	2	4527	1002
301	9° 59.8′N	129° 49.5′W	28 Sep 04	127	261	6	4766	1001
311	11° 0.5′N	132° 17.3′W	28 Sep 04	1651	47	8	4957	1002
321	12° 0.4′N	134° 56.7′W	29 Sep 04	843	27	14	4877	1001
331	14° 0.1′N	140° 19.0′W	30 Sep 04	1346	17	16	4852	201
341	15° 0.3′N	143° 17.7′W	1 Oct 04	537	41	13	4997	202
351	16° 0.1′N	146° 16.6′W	1 Oct 04	2114	95	8	5408	202
361	17° 0.2′N	149° 29.6′W	2 Oct 04	1344	35	16	5431	201
371	18° 0.4′N	152° 57.0′W	3 Oct 04	721	195	15	5138	203

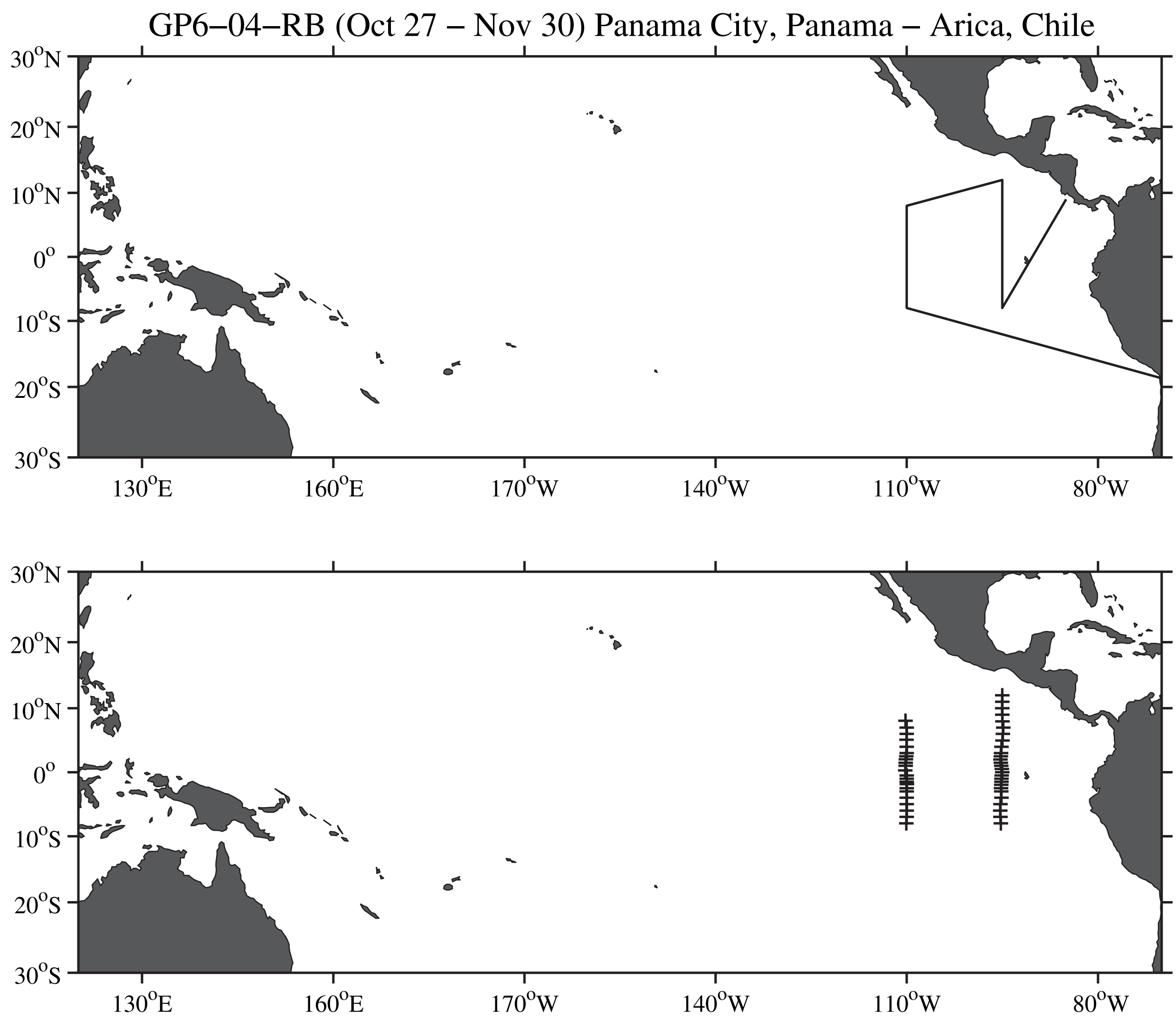

Figure 2n: GP6-04-RB cruise track and station locations.

Table 1n: GP6-04-RB CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	7° 59.3′S	95° 14.7′W	2 Nov 04	353	130	13	3968	1002
21	7° 0.0′S	95° 17.3′W	2 Nov 04	1226	130	13	3969	1002
31	6° 0.0′S	95° 19.0′W	2 Nov 04	2014	140	12	3927	1001
41	5° 0.1′S	95° 18.2′W	3 Nov 04	420	140	12	3867	3002
51	4° 0.0′S	95° 8.0′W	4 Nov 04	337	125	12	3672	1002
61	3° 0.0′S	95° 11.0′W	4 Nov 04	938	140	11	3546	1002
71	2° 29.8′S	95° 12.6′W	4 Nov 04	1306	145	12	3468	1002
81	1° 58.8′S	95° 10.4′W	5 Nov 04	153	165	11	3443	1002
91	1° 30.0′S	95° 9.0′W	5 Nov 04	523	150	7	3326	1002
101	1° 0.0′S	95° 8.0′W	5 Nov 04	840	170	9	3337	1001
111	0° 30.0′S	95° 6.0′W	5 Nov 04	1302	225	10	3380	1002
121	0° 0.0′S	95° 0.7′W	6 Nov 04	236	160	4	3318	1002
131	0° 30.0′N	95° 5.0′W	6 Nov 04	629	0	0	3299	1002
141	1° 0.0′N	95° 10.0′W	6 Nov 04	950	200	10	3433	1001
151	1° 30.0′N	95° 15.0′W	6 Nov 04	1320	190	15	2477	1002
161	2° 0.4′N	95° 18.2′W	7 Nov 04	126	180	12	2974	1002
171	2° 30.0′N	95° 14.5′W	7 Nov 04	521	220	15	2457	1002
181	3° 0.0′N	95° 12.5′W	7 Nov 04	841	180	10	2698	1003
191	4° 0.1′N	95° 8.0′W	7 Nov 04	1432	200	16	3664	1003
201	4° 57.4′N	94° 59.2′W	8 Nov 04	137	170	10	3569	1002
211	6° 0.0′N	94° 56.0′W	8 Nov 04	822	220	11	3504	1002
221	6° 59.9′N	94° 51.9′W	8 Nov 04	1425	255	6	3782	1001
231	7° 58.1′N	94° 58.8′W	9 Nov 04	8	320	9	3723	1001
241	9° 0.0′N	95° 0.0′W	9 Nov 04	1044	20	12	3543	1001
251	10° 0.0′N	95° 0.0′W	9 Nov 04	1840	50	9	3838	1002
261	11° 0.0′N	95° 0.0′W	10 Nov 04	50	10	12	4071	1001
271	12° 0.0′N	95° 0.0′W	10 Nov 04	1133	20	12	4031	1002
281	8° 4.4′N	110° 11.3′W	14 Nov 04	1124	130	5	4242	1002
291	6° 59.9′N	110° 0.0′W	15 Nov 04	111	90	9	3751	1001
301	6° 0.0′N	110° 0.0′W	15 Nov 04	719	180	6	3694	1002
311	5° 6.8′N	110° 2.1′W	15 Nov 04	1309	200	11	3932	1001
321	4° 0.0′N	110° 0.0′W	15 Nov 04	2040	200	14	3877	1001
331	2° 59.9′N	110° 0.2′W	16 Nov 04	230	170	12	3884	1002
341	2° 30.0′N	110° 4.0′W	16 Nov 04	601	170	15	3752	1001
351	2° 2.6′N	110° 7.5′W	16 Nov 04	1008	180	15	3811	1001
361	1° 29.9′N	110° 9.3′W	16 Nov 04	1352	160	18	3817	1001
371	1° 0.0′N	110° 10.0′W	16 Nov 04	1721	160	15	3742	1000
381	0° 16.5′N	110° 13.1′W	17 Nov 04	235	150	16	3838	3001
391	0° 30.0′S	109° 59.9′W	18 Nov 04	2142	130	10	3904	1002
401	1° 0.1′S	110° 0.0′W	19 Nov 04	143	160	10	3965	1002
411	1° 30.0′S	110° 0.0′W	19 Nov 04	554	140	17	3851	1001
421	1° 52.2′S	109° 58.3′W	19 Nov 04	921	140	14	3931	1002
431	2° 30.0′S	110° 0.0′W	19 Nov 04	2141	150	15	3928	1001
441	3° 0.0′S	110° 0.0′W	20 Nov 04	152	150	16	3767	1002
451	4° 0.0′S	110° 0.0′W	20 Nov 04	740	130	15	3824	1002
461	4° 59.5′S	109° 59.8′W	20 Nov 04	2030	100	13	3612	1002
471	6° 0.2′S	110° 0.1′W	21 Nov 04	237	90	15	3751	1001
481	7° 0.0′S	110° 0.0′W	21 Nov 04	822	110	16	3457	1002
491	7° 59.5′S	110° 4.3′W	21 Nov 04	2235	110	13	3420	3028

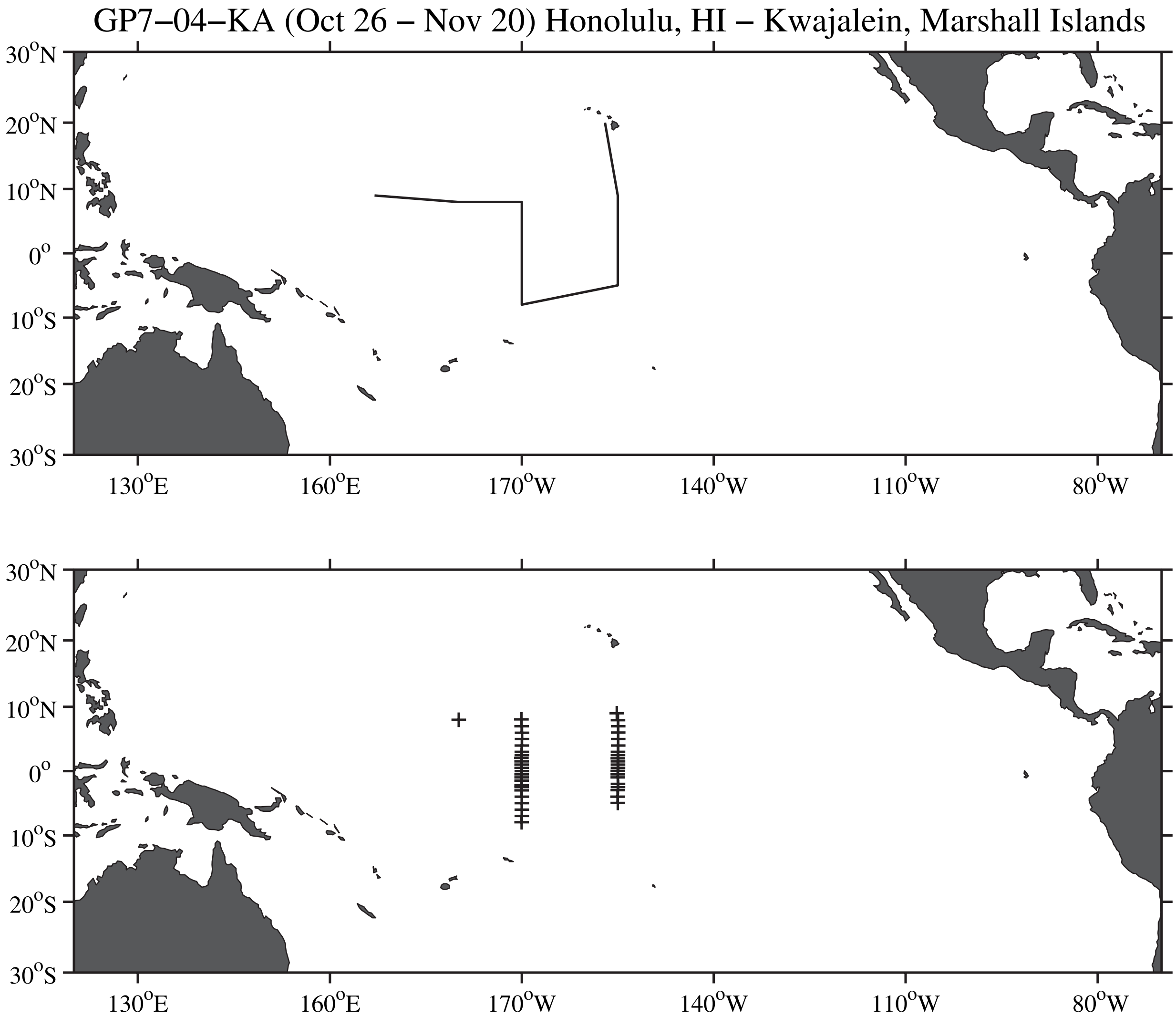

Figure 2o: GP7-04-KA cruise track and station locations.

Table 1o: GP7-04-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	9° 0.3′N	155° 8.8′W	30 Oct 04	441	70	6	5359	999
21	7° 56.5′N	154° 57.5′W	30 Oct 04	1256	138	0	5275	4801
31	7° 0.3′N	154° 57.1′W	30 Oct 04	2124	74	7	4811	1000
41	6° 0.4′N	154° 55.4′W	31 Oct 04	629	96	7	4833	1002
51	4° 59.5′N	154° 55.4′W	31 Oct 04	1508	102	5	4596	2003
61	4° 0.4′N	154° 56.9′W	1 Nov 04	840	123	13	4704	1001
71	3° 0.3′N	154° 57.5′W	1 Nov 04	1526	104	20	4805	1001
81	2° 30.6′N	154° 57.7′W	1 Nov 04	1947	107	16	4836	1002
91	2° 0.5′N	154° 59.5′W	1 Nov 04	2348	118	15	4270	1002
101	1° 30.4′N	154° 58.8′W	2 Nov 04	359	92	15	4638	1001
111	1° 0.4′N	154° 57.9′W	2 Nov 04	755	98	13	4759	1010
121	0° 30.6′N	154° 58.3′W	2 Nov 04	1201	99	14	4767	1001
131	0° 2.4′N	154° 59.2′W	2 Nov 04	1600	87	19	4641	2001
141	0° 29.6′S	154° 59.6′W	3 Nov 04	753	95	17	4881	1002
151	0° 59.8′S	154° 59.2′W	3 Nov 04	1127	180	0	4738	1002
161	2° 0.7′S	154° 59.0′W	4 Nov 04	245	89	9	4981	1001
171	2° 29.8′S	154° 58.5′W	4 Nov 04	658	105	9	4960	1000
181	2° 59.5′S	154° 59.1′W	4 Nov 04	1037	109	9	4916	1001
191	3° 59.9′S	155° 2.2′W	4 Nov 04	1702	84	11	2478	1001
201	4° 58.8′S	155° 0.2′W	5 Nov 04	17	82	6	4805	4602
211	7° 57.4′S	170° 2.4′W	8 Nov 04	1417	66	13	5378	5102
221	6° 59.8′S	170° 0.4′W	9 Nov 04	1005	66	12	4743	1004
231	6° 0.0′S	170° 0.0′W	9 Nov 04	1631	77	15	4799	1001
241	5° 1.1′S	170° 0.1′W	9 Nov 04	2247	118	13	5399	1001
251	4° 0.0′S	170° 0.6′W	10 Nov 04	528	118	16	5730	1002
261	2° 59.8′S	170° 1.0′W	10 Nov 04	1149	99	16	5029	1002
271	2° 29.9′S	170° 1.2′W	10 Nov 04	1534	114	12	5571	1002
281	2° 11.3′S	170° 1.1′W	10 Nov 04	1809	124	11	5007	1000
291	1° 29.8′S	170° 1.5′W	11 Nov 04	158	80	21	5583	1000
301	0° 59.8′S	170° 1.8′W	11 Nov 04	551	84	14	5842	1001
311	0° 29.7′S	170° 2.0′W	11 Nov 04	1003	88	14	5678	1010
321	0° 0.5′N	170° 0.6′W	11 Nov 04	1458	103	8	5342	5014
331	0° 30.4′N	170° 2.0′W	11 Nov 04	2317	130	10	5517	1001
341	1° 0.0′N	170° 2.1′W	12 Nov 04	303	131	8	5454	1000
351	1° 30.4′N	170° 2.4′W	12 Nov 04	705	129	7	5515	1001
361	2° 3.8′N	170° 3.2′W	12 Nov 04	1450	160	8	5380	5101
371	2° 29.8′N	170° 0.0′W	13 Nov 04	816	140	5	5349	1001
381	3° 0.0′N	170° 0.4′W	13 Nov 04	1208	108	2	5472	1002
391	3° 59.5′N	169° 59.6′W	13 Nov 04	1917	136	5	5672	1002
401	5° 0.3′N	169° 57.5′W	14 Nov 04	224	78	2	5802	1002
411	5° 59.5′N	169° 58.4′W	14 Nov 04	900	34	4	5421	1000
421	6° 59.6′N	170° 1.2′W	14 Nov 04	1547	60	9	5870	1001
431	8° 3.0′N	170° 4.4′W	15 Nov 04	1023	75	18	5510	5013
441	8° 0.0′N	179° 51.8′W	17 Nov 04	1742	67	8	5947	1002

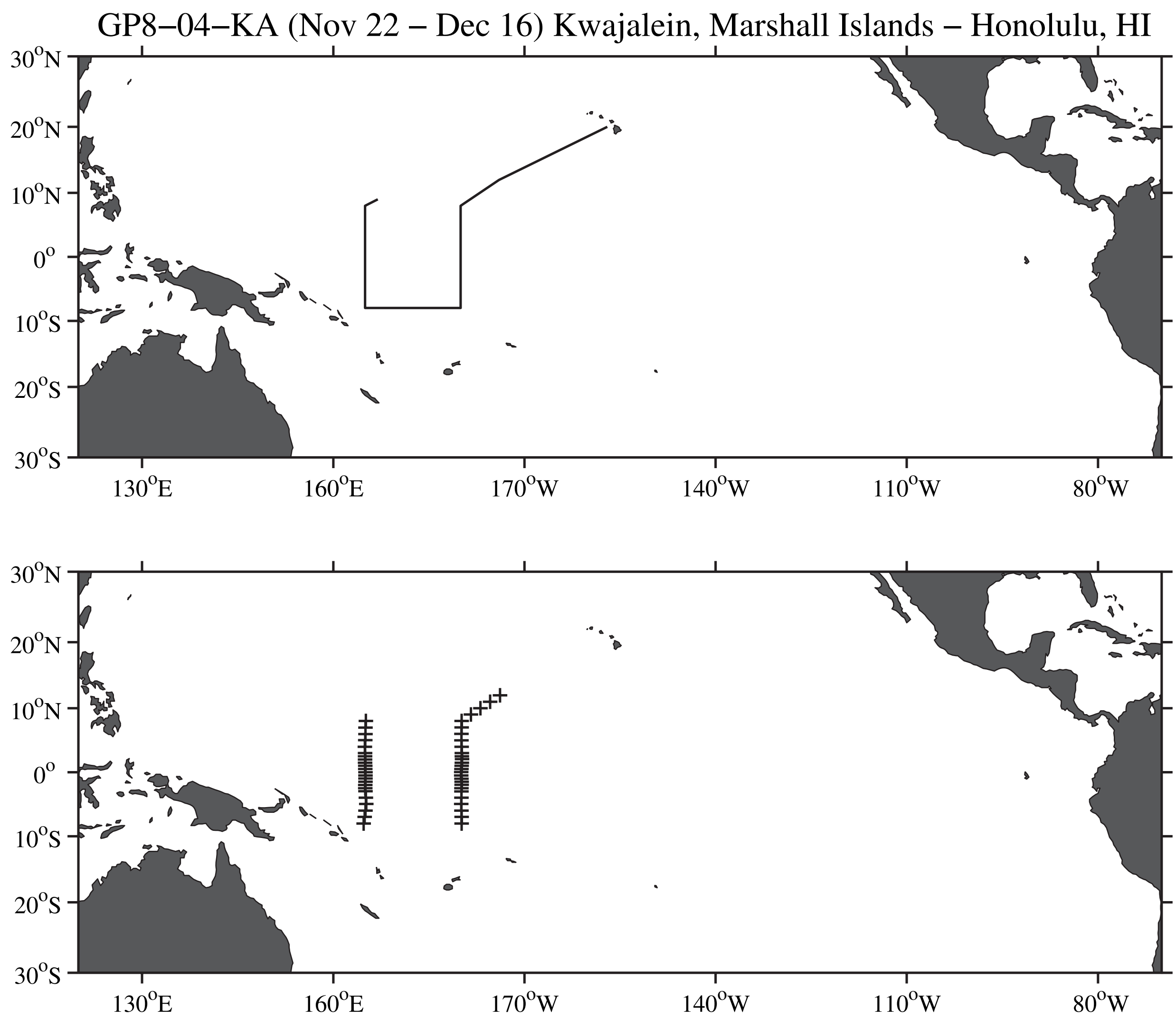

Figure 2p: GP8-04-KA cruise track and station locations.

Table 1p: GP8-04-KA CTD Cast Summary.

Cast #	Latitude	Longitude	Date	Time	W/D T	W/S (kts)	Depth (m)	Cast (db)
11	8° 1.3′N	165° 6.1′E	23 Nov 04	2123	149	5	5209	4903
21	7° 0.1′N	165° 3.8′E	24 Nov 04	540	57	1	5154	1001
31	5° 59.8′N	165° 3.0′E	24 Nov 04	1202	12	1	5008	1002
41	5° 1.6′N	165° 0.7′E	24 Nov 04	1806	30	6	4772	1000
51	4° 0.3′N	164° 57.3′E	25 Nov 04	945	70	8	4485	1001
61	3° 0.1′N	164° 58.5′E	25 Nov 04	1604	76	17	4202	1000
71	2° 30.1′N	164° 58.8′E	25 Nov 04	1944	93	11	4118	1001
81	1° 59.4′N	164° 58.4′E	25 Nov 04	2325	175	7	4173	1002
91	1° 30.1′N	164° 59.6′E	26 Nov 04	310	213	4	4258	1000
101	1° 0.2′N	165° 0.6′E	26 Nov 04	702	211	7	4328	1001
111	0° 30.8′N	165° 1.6′E	26 Nov 04	1105	244	8	4364	1000
121	0° 0.5′S	165° 3.1′E	26 Nov 04	1550	284	7	4373	4100
131	0° 29.5′S	165° 2.6′E	27 Nov 04	1058	150	8	4423	1001
141	0° 59.6′S	165° 2.5′E	27 Nov 04	1505	163	5	4543	1000
151	1° 30.0′S	165° 2.4′E	27 Nov 04	1920	154	5	4451	1002
161	2° 0.7′S	165° 1.2′E	28 Nov 04	309	348	5	4463	1002
171	2° 29.8′S	165° 1.2′E	28 Nov 04	921	13	7	2522	1008
181	2° 59.6′S	165° 3.1′E	28 Nov 04	1255	31	7	4192	1003
191	4° 0.0′S	165° 7.6′E	28 Nov 04	1915	6	11	3380	1001
201	4° 57.9′S	165° 11.4′E	29 Nov 04	422	4	10	2522	1000
211	6° 0.1′S	165° 3.2′E	29 Nov 04	1411	49	7	3596	1001
221	6° 59.8′S	164° 55.1′E	29 Nov 04	2052	351	12	3713	1001
231	8° 2.2′S	164° 46.0′E	30 Nov 04	409	26	12	3891	3002
241	8° 1.0′S	179° 50.9′W	3 Dec 04	1632	259	12	5527	5203
251	6° 59.9′S	179° 51.9′W	4 Dec 04	203	338	17	5057	1001
261	6° 0.6′S	179° 53.2′W	4 Dec 04	924	1	11	4573	1001
271	4° 57.4′S	179° 54.8′W	4 Dec 04	1654	79	5	5657	1003
281	4° 0.3′S	179° 54.2′W	5 Dec 04	16	32	3	6011	1005
291	2° 59.9′S	179° 54.1′W	5 Dec 04	726	75	3	5355	1002
301	2° 29.8′S	179° 53.6′W	5 Dec 04	1122	123	8	5409	1001
311	1° 58.6′S	179° 51.8′W	5 Dec 04	1551	109	6	5358	3003
321	1° 29.7′S	179° 51.9′W	6 Dec 04	554	115	7	5189	1001
331	1° 0.4′S	179° 53.5′W	6 Dec 04	943	111	11	5349	1001
341	0° 29.9′S	179° 54.4′W	6 Dec 04	1341	87	13	4657	1002
351	0° 2.8′N	179° 54.3′W	7 Dec 04	536	76	8	5390	5103
361	0° 29.9′N	179° 53.3′W	7 Dec 04	1035	71	2	5714	1003
371	1° 0.0′N	179° 51.5′W	7 Dec 04	1403	251	0	5434	1004
381	1° 30.2′N	179° 49.8′W	7 Dec 04	1734	259	4	5564	1001
391	2° 3.1′N	179° 47.8′W	7 Dec 04	2151	217	7	5460	999
401	2° 30.3′N	179° 48.8′W	8 Dec 04	108	220	7	5314	1000
411	3° 0.2′N	179° 49.7′W	8 Dec 04	425	270	8	5657	1001
421	3° 59.1′N	179° 52.1′W	8 Dec 04	1030	224	12	5695	1003
431	5° 0.0′N	179° 53.6′W	8 Dec 04	1757	160	13	5662	1004
441	5° 59.9′N	179° 53.2′W	9 Dec 04	847	83	16	5317	1000
451	7° 0.8′N	179° 51.6′W	9 Dec 04	1518	75	17	5768	1000
461	8° 2.5′N	179° 51.9′W	9 Dec 04	2310	75	22	5913	4502
471	9° 1.2′N	178° 24.4′W	10 Dec 04	1330	93	23	4262	1001
481	10° 0.5′N	176° 54.0′W	11 Dec 04	406	73	18	6027	1000
491	11° 0.1′N	175° 22.8′W	11 Dec 04	1652	65	24	5453	1003
501	12° 0.1′N	173° 49.4′W	12 Dec 04	617	63	20	5561	1001

Table 2: Station groupings for CTD conductivity calibrations.

Cruise	Station Groupings	Sensor S/N	Standard Seawater	Fitting Routine	Reject Std Dev	Total Points	Percent Points Used	Fit Standard Deviation (mS/cm)	Conductivity Fit Bias (mS/cm)	Pressure Correction Beta	Minimum Fit Slope	Maximum Fit Slope	Salinity Offset (PSS-78)
GP103	1–47	354	P139	Calcos5	2.8	495	83.8	0.0026	−0.00018		0.9998807	1.0001408	
GP203	1–54	1467	P139	Calcos1	2.8	580	85.0	0.0030	−0.00753		1.0003347	1.0005611	
	1–54	1697	P139	Calcop0	2.8	575	86.1	0.0032	0.00436	−5.50e−007	0.9998347	0.9998347	
GP303	1–51	1467	P139	Calcos0	2.8	148	88.5	0.0027	−0.01230		1.0008723	1.0008723	
	1–51	1697	P139	Calcop0	2.8	291	73.9	0.0027	0.00472	−1.59e−006	0.9999931	0.9999931	
GP403	1–57	1697	P141	Calcos0	2.8	641	83.9	0.0039	−0.00531		1.0002480	1.0002480	
GP503	1–27	1697	P141	Calcos0	2.8	323	76.8	0.0018	0.00093	−7.41e−007	0.9999863	0.9999863	
	28–48	1697	P141	Calcos0	2.8	171	85.4	0.0019	−0.00350	−7.41e−007	1.0001628	1.0001628	
GP603	1–52	1177	P141	Calcos1	2.8	570	82.3	0.0029	−0.01716		1.0006714	1.0007877	−0.0060
GP703	1–39	1697	P141	Calcos0	2.8	446	86.3	0.0035	−0.00800		1.0003798	1.0003798	−0.0036
	41–51	1537	P141	Calcos0	2.8	129	78.3	0.0021	−0.00811		1.0001466	1.0001466	−0.0036
	28–51	0303	P141	Calcos0	2.8	92	87.0	0.0011	−0.00728		1.0004869	1.0004869	−0.0036
GP803	1–50	1537	P141	Calcos0	2.8	567	81.0	0.0029	−0.01536		1.0004159	1.0004159	
GP104	1–47	1697	P141/P143	Calcos0	2.8	213	85.0	0.0031	0.00193		0.9998496	0.9998496	
GP204	1–54	1697	P141/P143	Calcos1	2.8	332	91.3	0.0025	0.00033		0.9999423	1.0000239	
GP304	1–27	1697	P143	Calcos1	2.8	159	93.1	0.0030	−0.00163		1.0000882	1.0001423	
	28–48	1697	P143	Calcos1	2.8	120	88.3	0.0023	−0.00222		1.0002412	1.0002700	
GP404	1–50	1537	P143	Calcos0	2.8	303	92.1	0.0040	−0.00472		1.0000978	1.0000978	
GP504	1–37	1537	P143	Calcos0	2.8	242	89.3	0.0022	−0.00555		1.0001857	1.0001857	
GP604	1–49	1177	*	Calcos0	2.8	302	87.1	0.0024	−0.01067		1.0002966	1.0002966	
GP704	1–44	1537	P143	Calcos0	2.8	255	86.7	0.0025	−0.00621		1.0002564	1.0002564	
GP804	1–50	1537	P143	Calcos0	2.8	302	86.4	0.0033	−0.01125		1.0004355	1.0004355	

* P142 for cast 1–5, P143 for casts 6–39, P144 for casts 40–49.

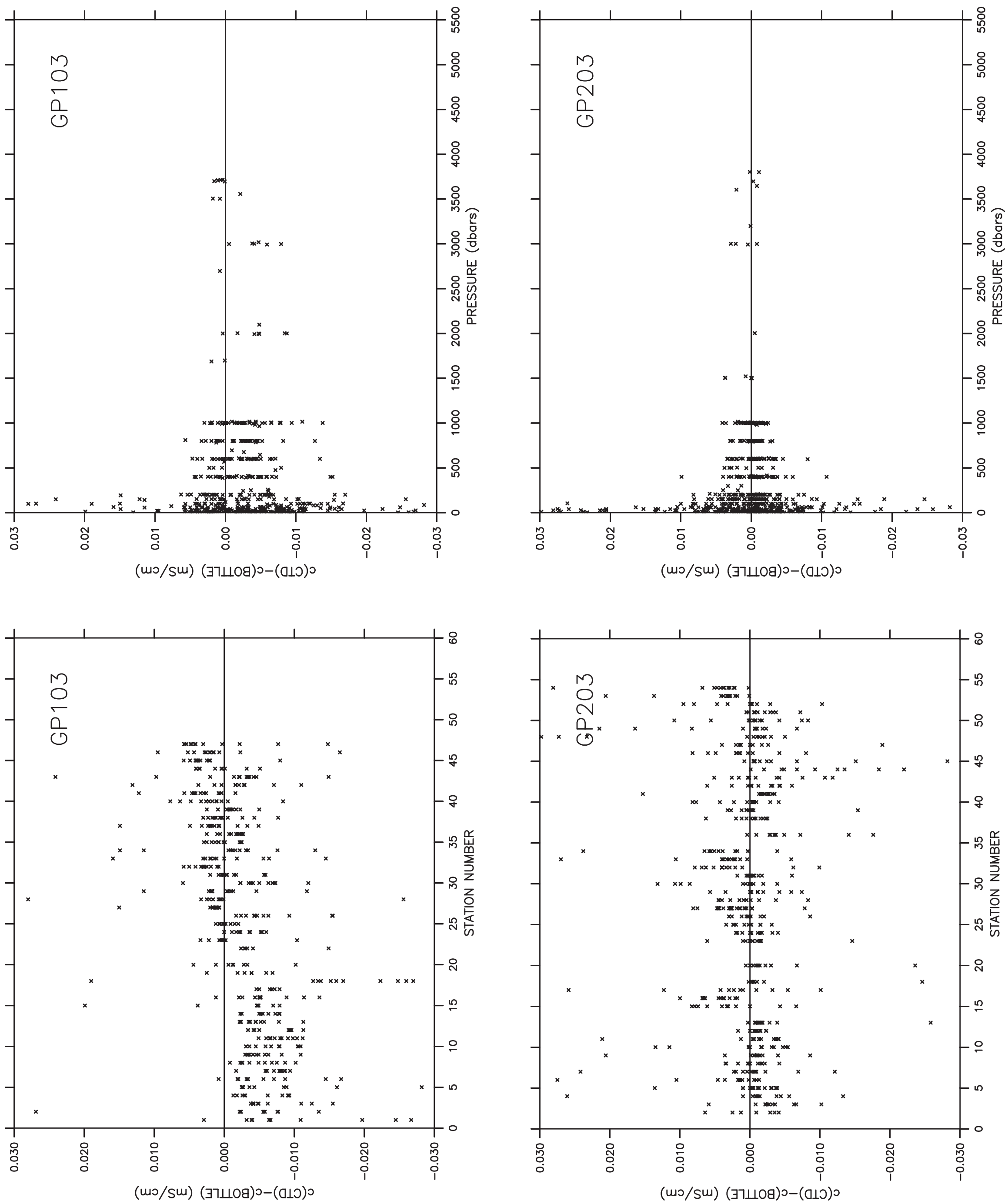

Figure 3a: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP1-03-KA (upper panels) and GP2-03-KA (lower panels).

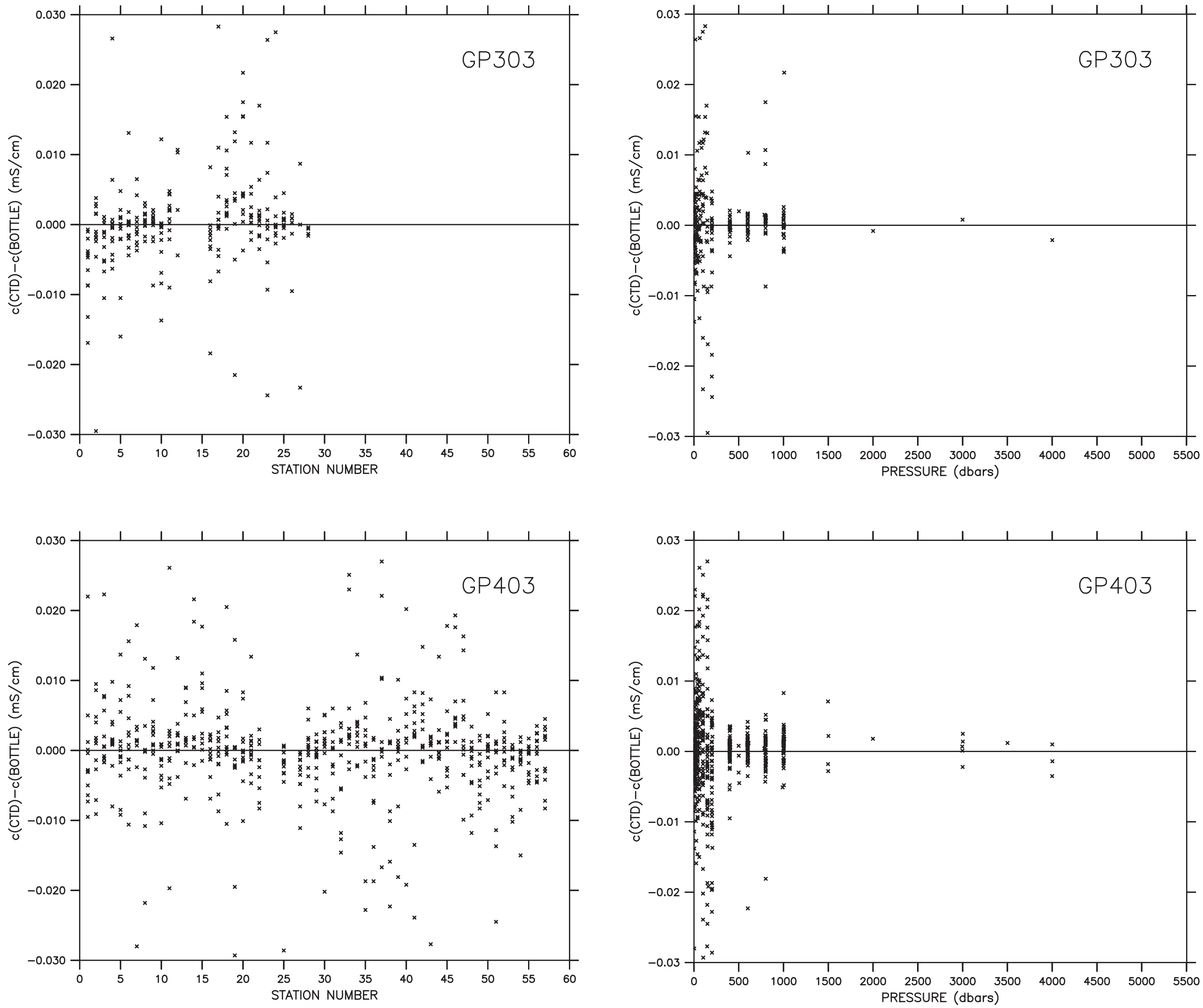

Figure 3b: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP3-03-KA (upper panels) and GP4-03-KA (lower panels).

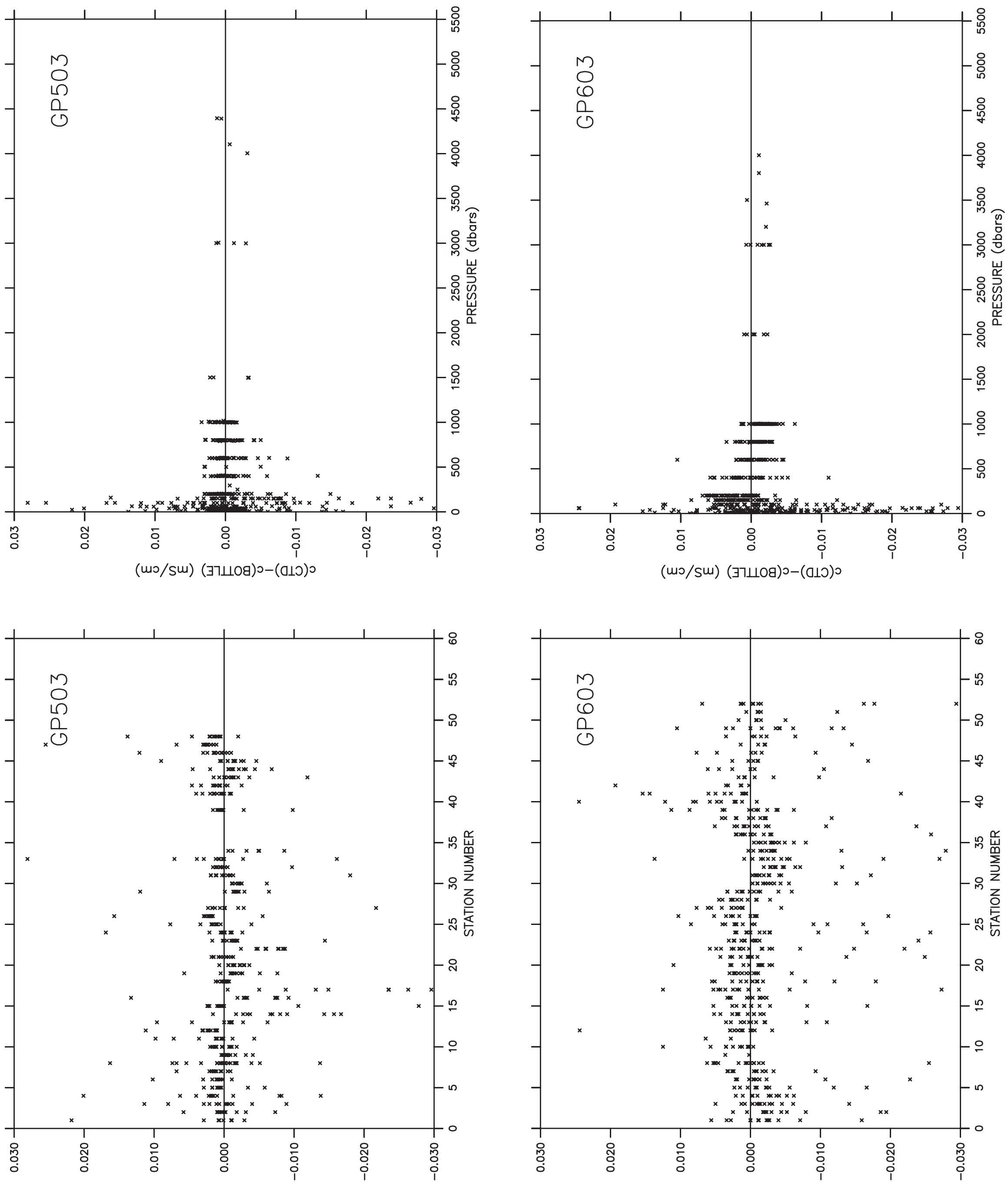

Figure 3c: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP5-03-KA (upper panels) and GP6-03-RB (lower panels).

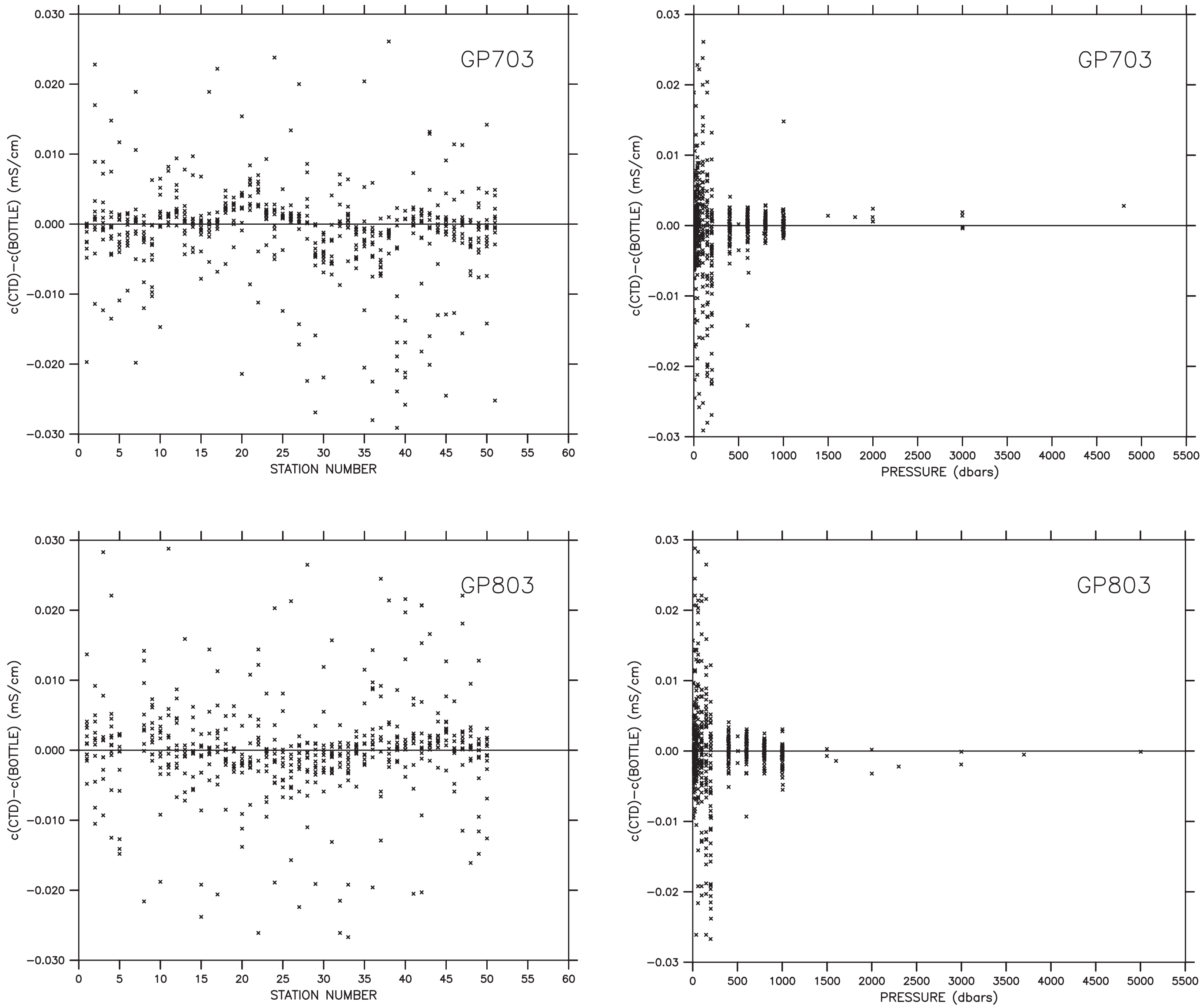

Figure 3d: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP7-03-KA (upper panels) and GP8-03-KA (lower panels).

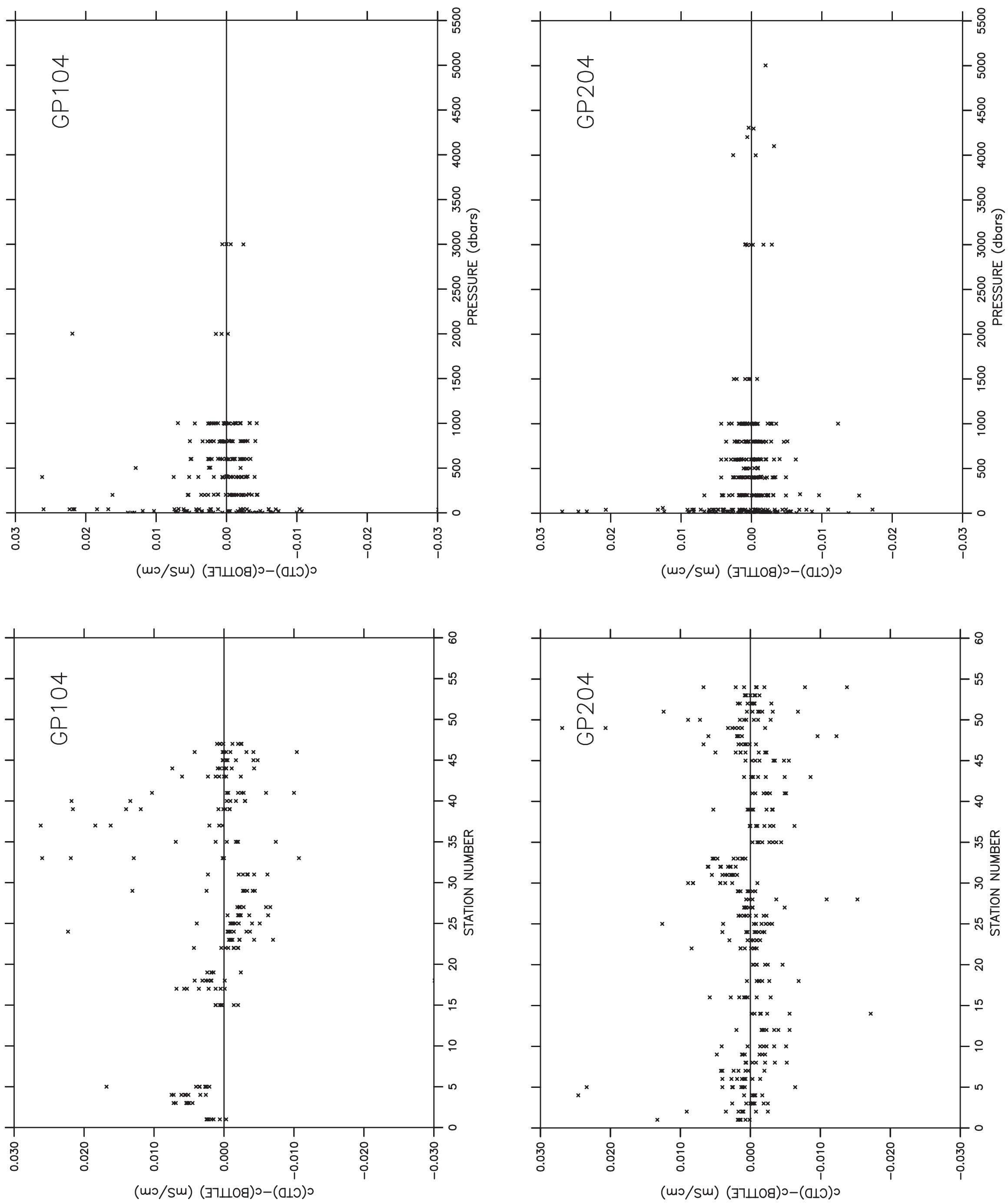

Figure 3e: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP1-04-KA (upper panels) and GP2-04-KA (lower panels).

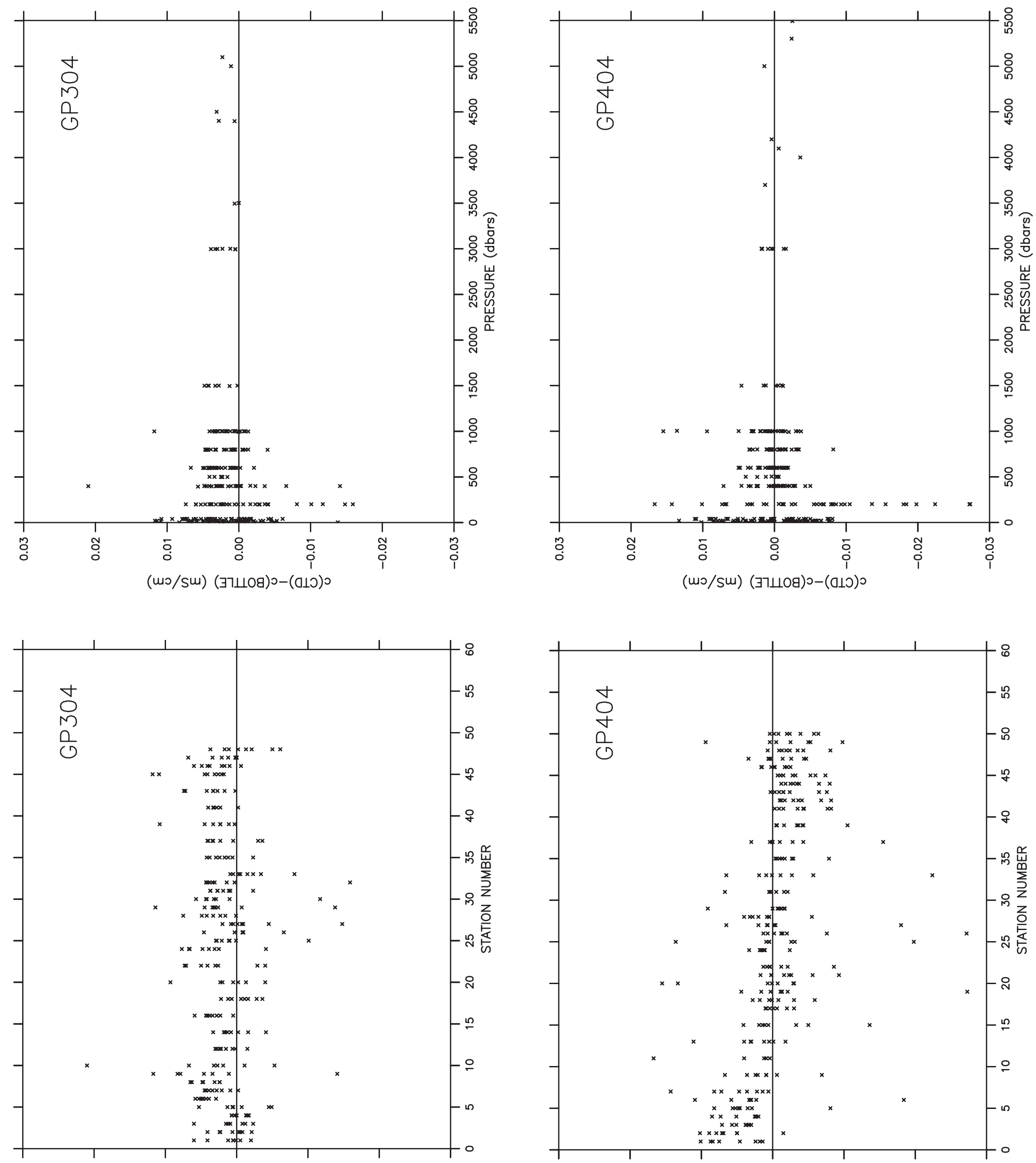

Figure 3f: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP3-04-KA (upper panels) and GP4-04-KA (lower panels).

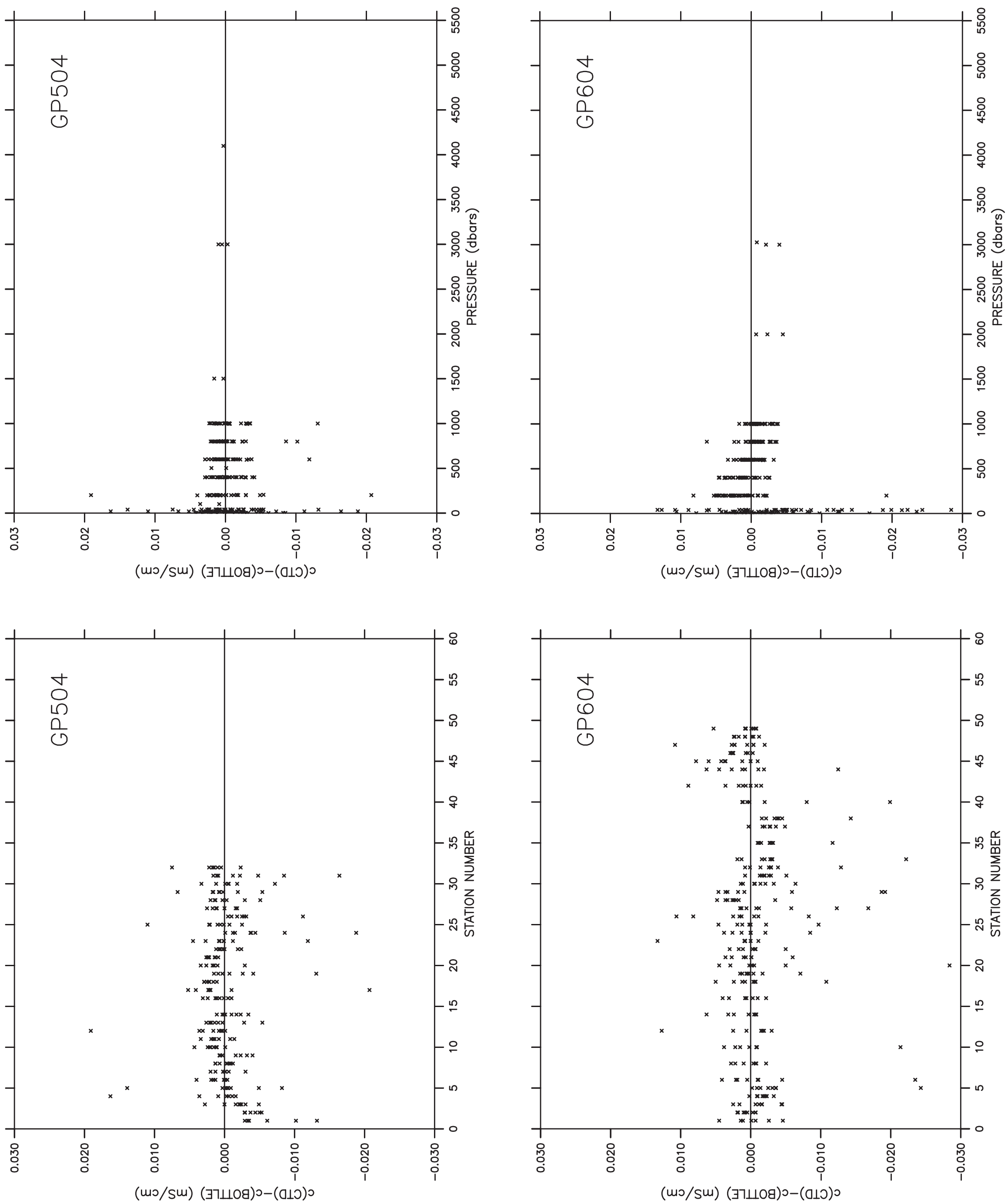

Figure 3g: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP5-04-KA (upper panels) and GP6-04-RB (lower panels).

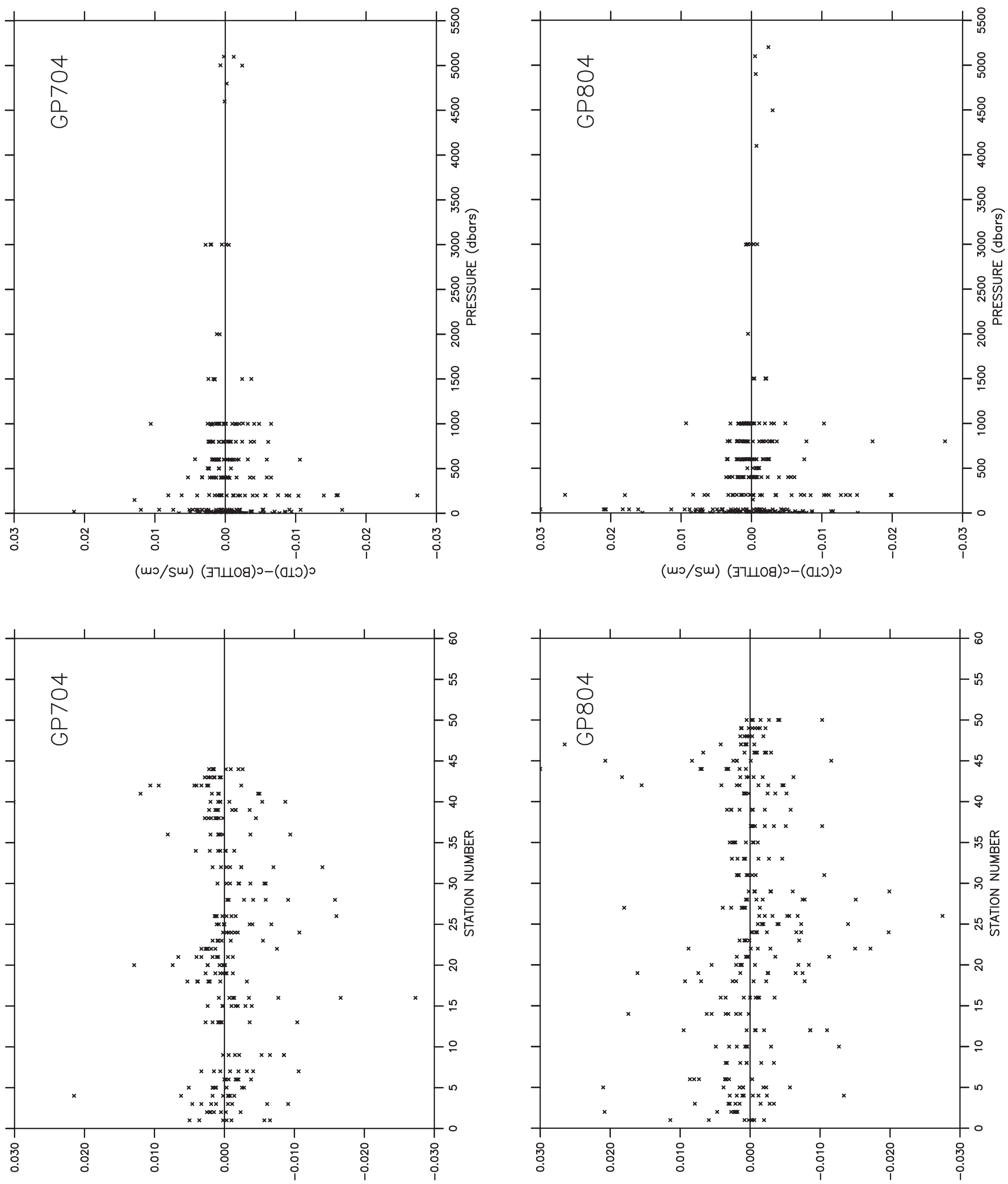

Figure 3h: Calibrated CTD-bottle conductivity differences plotted against station number and pressure for cruises GP7-04-KA (upper panels) and GP8-04-KA (lower panels).

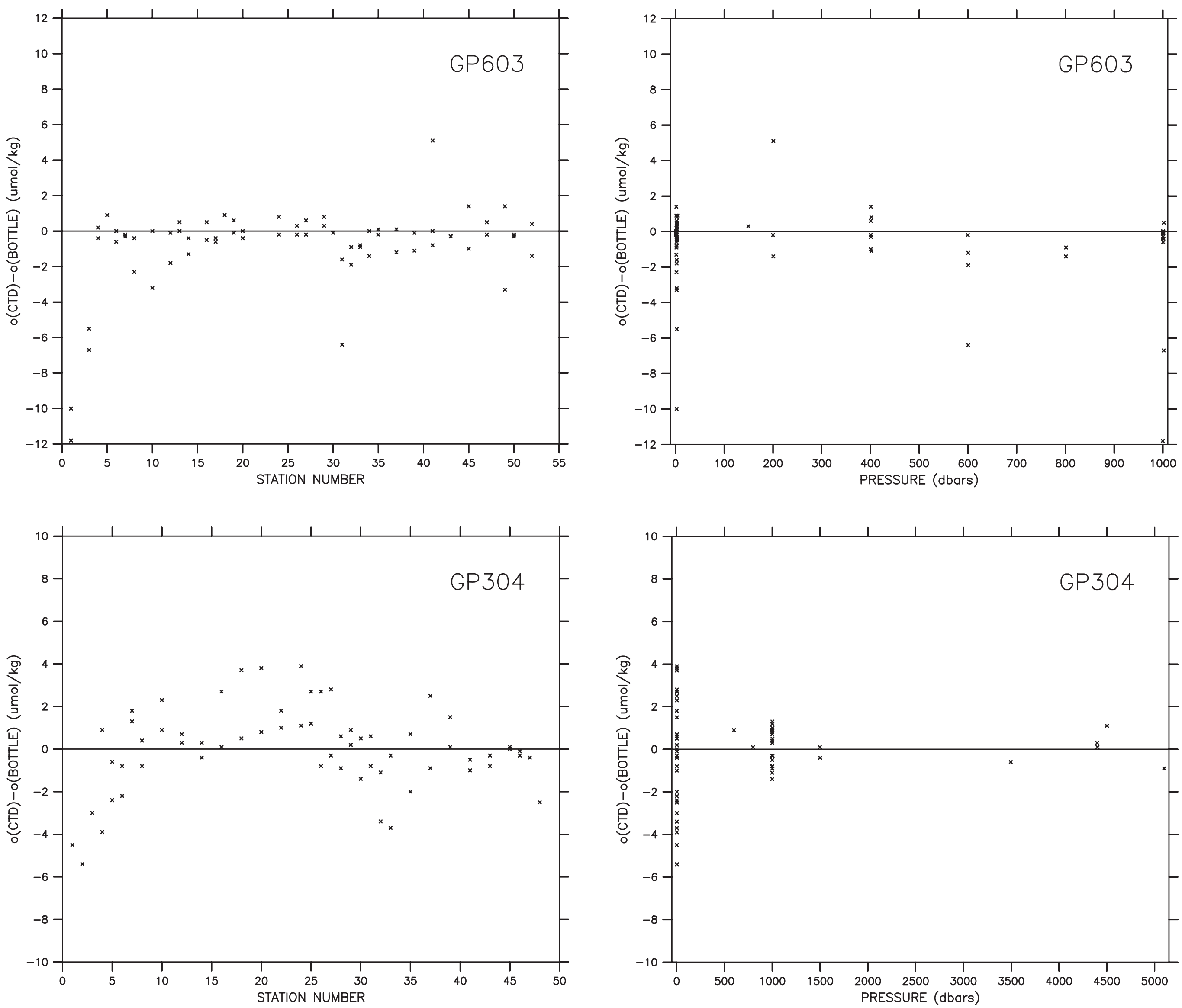

Figure 4a: Calibrated CTD-bottle oxygen differences plotted against station number and pressure for cruises GP6-03-RB (upper panels) and GP3-04-KA (lower panels).

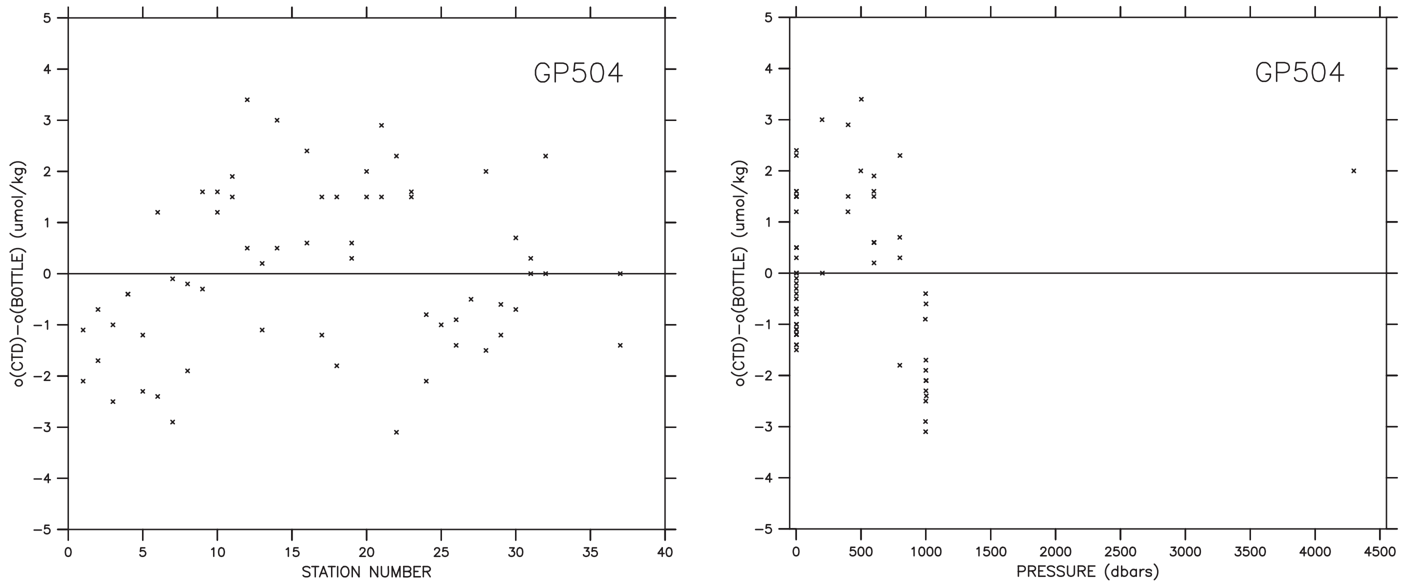

Figure 4b: Calibrated CTD-bottle oxygen differences plotted against station number and pressure for cruise GP5-04-KA.

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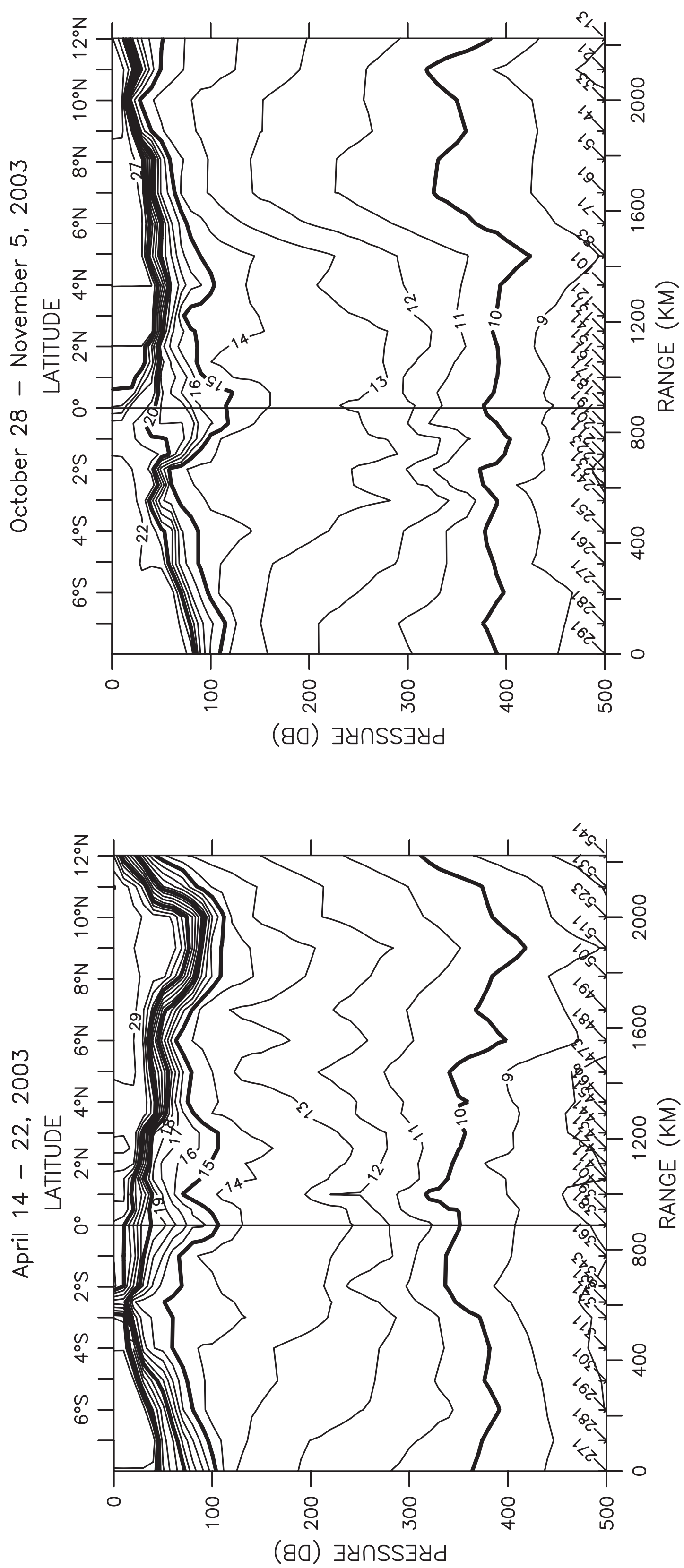

Figure 5: GP2-03-KA spring and GP6-03-RB fall potential temperature (°C) sections along 95°W. Contour intervals are 1°C.

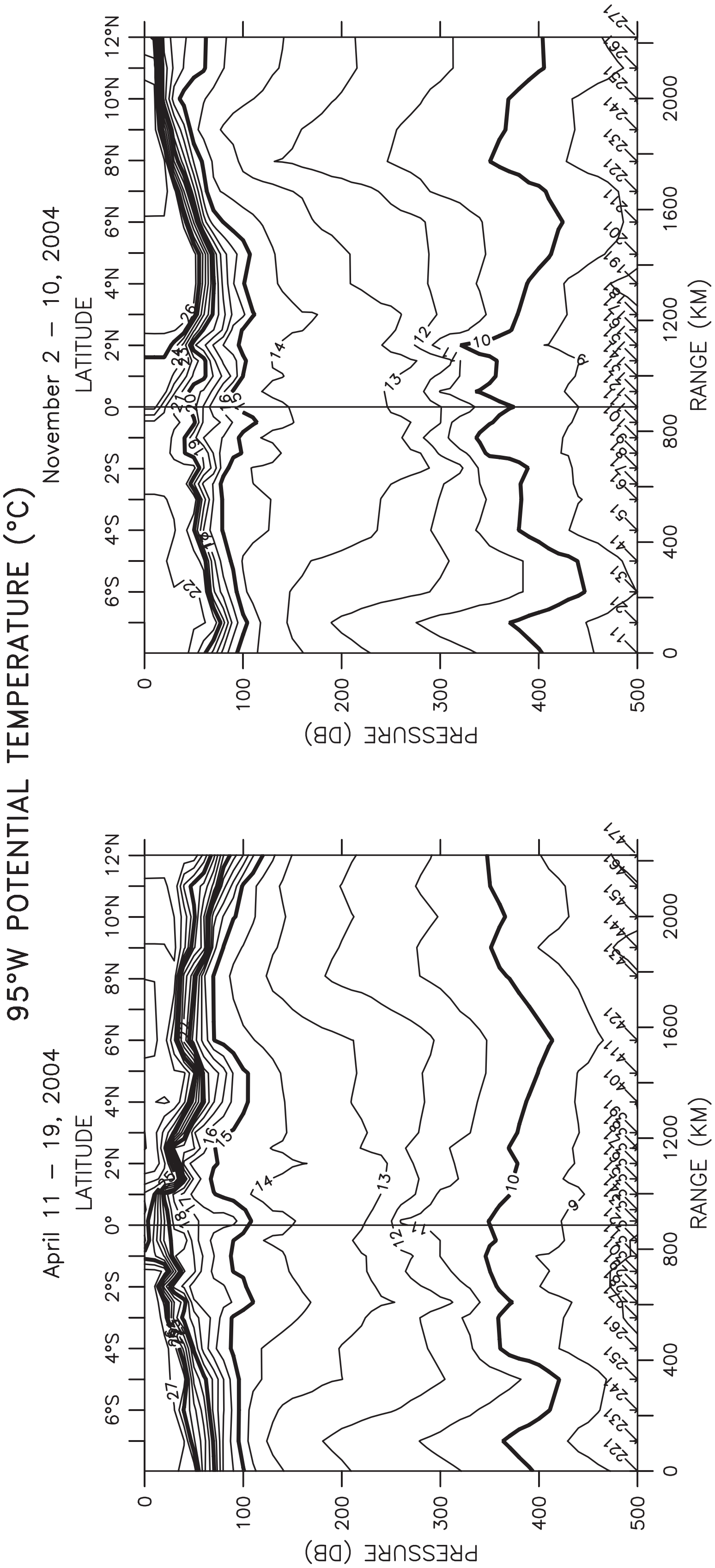

Figure 6: GP1-04-KA spring and GP6-04-RB fall potential temperature (°C) sections along 95°W. Contour intervals are 1°C.

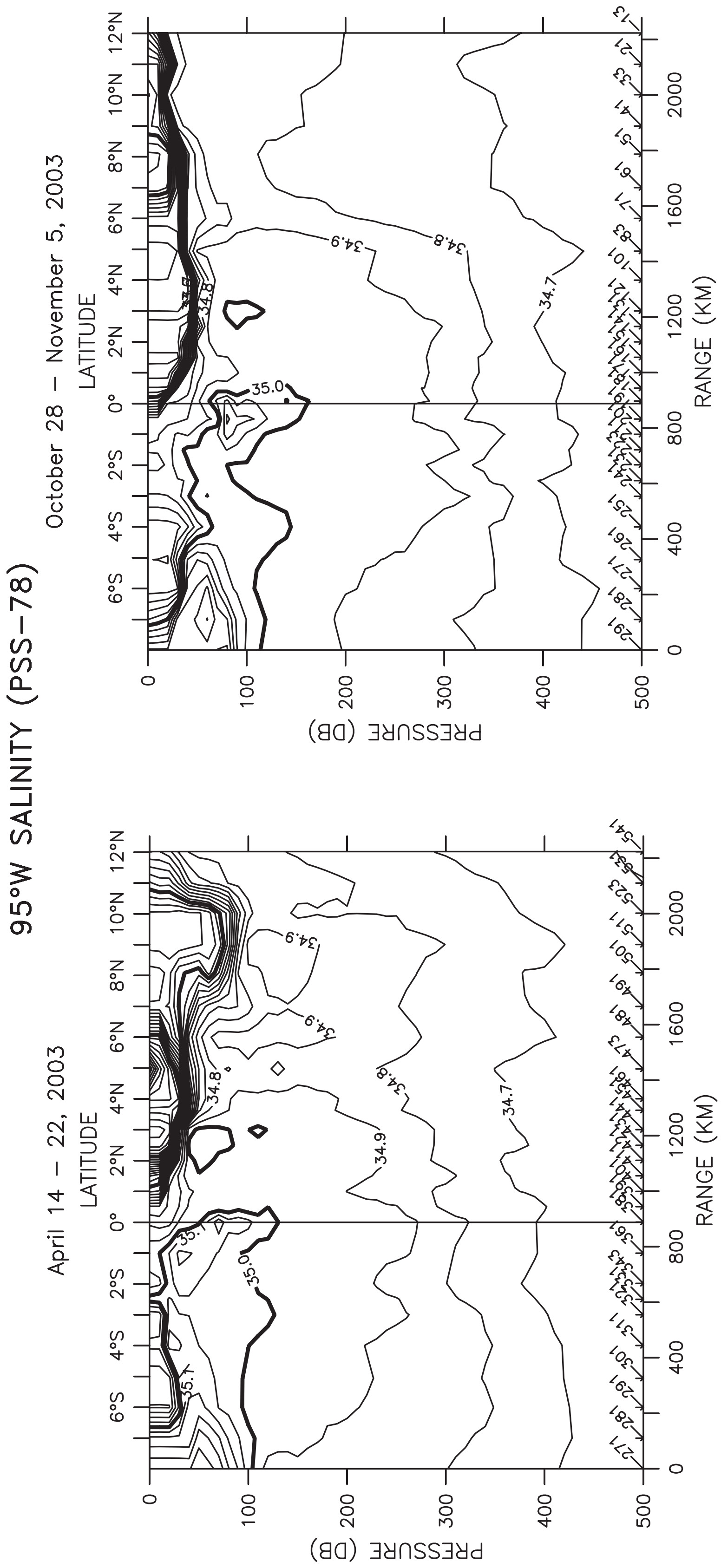

Figure 7: GP2-03-KA spring and GP6-03-RB fall salinity (PSS-78) sections along 95°W. Contour intervals are 0.1 PSS.

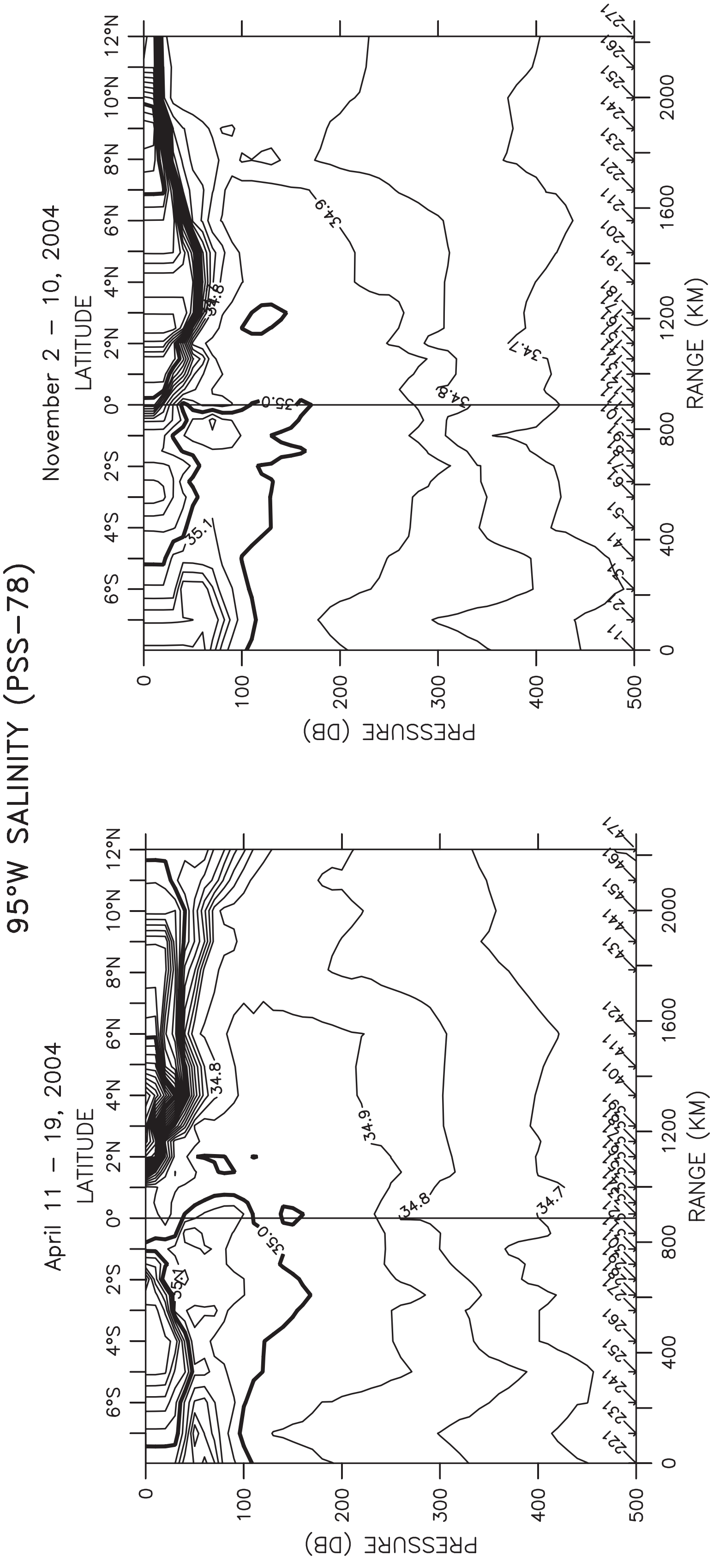

Figure 8: GP1-04-KA spring and GP6-04-RB fall salinity (PSS-78) sections along 95°W. Contour intervals are 0.1 PSS.

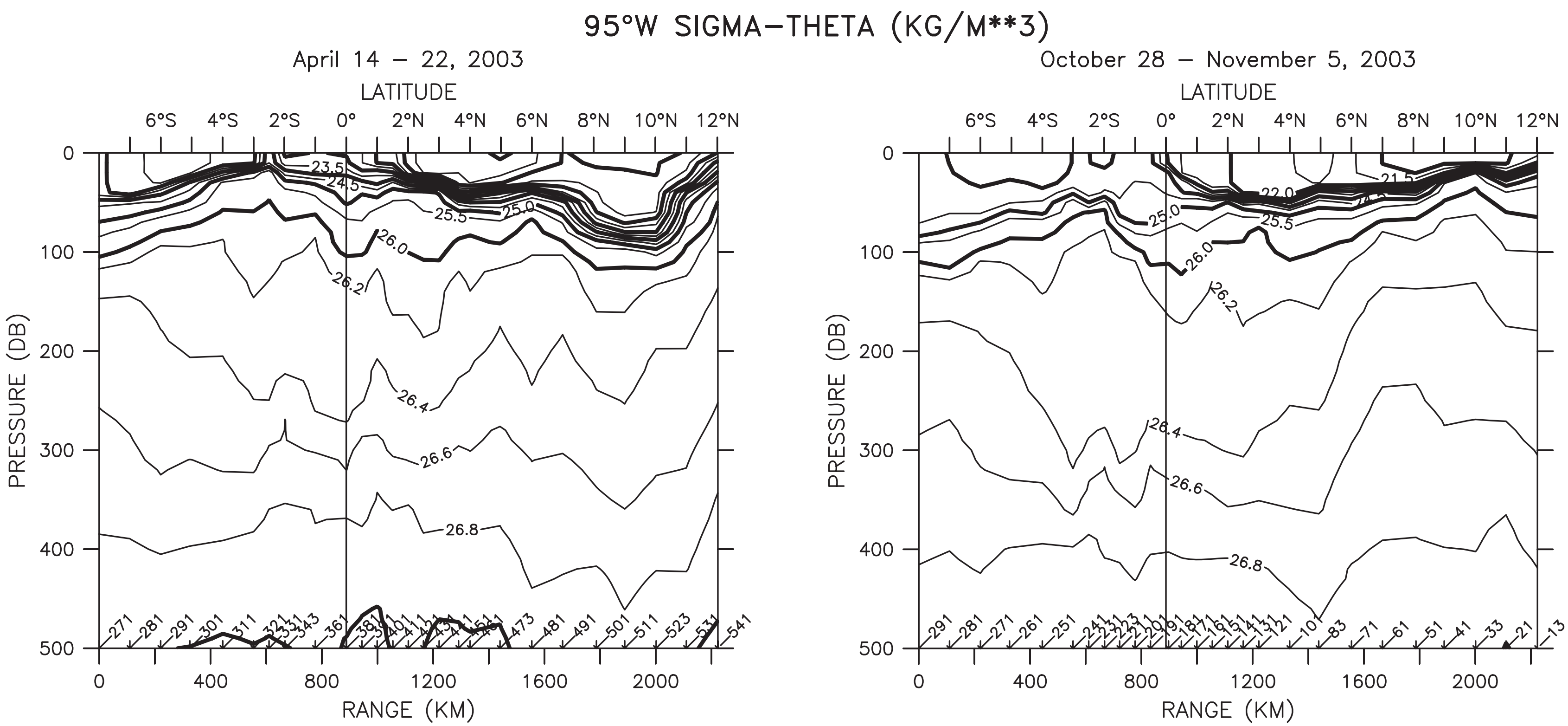

Figure 9: GP2-03-KA spring and GP6-03-RB fall potential density (kg/m^3) sections along 95°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

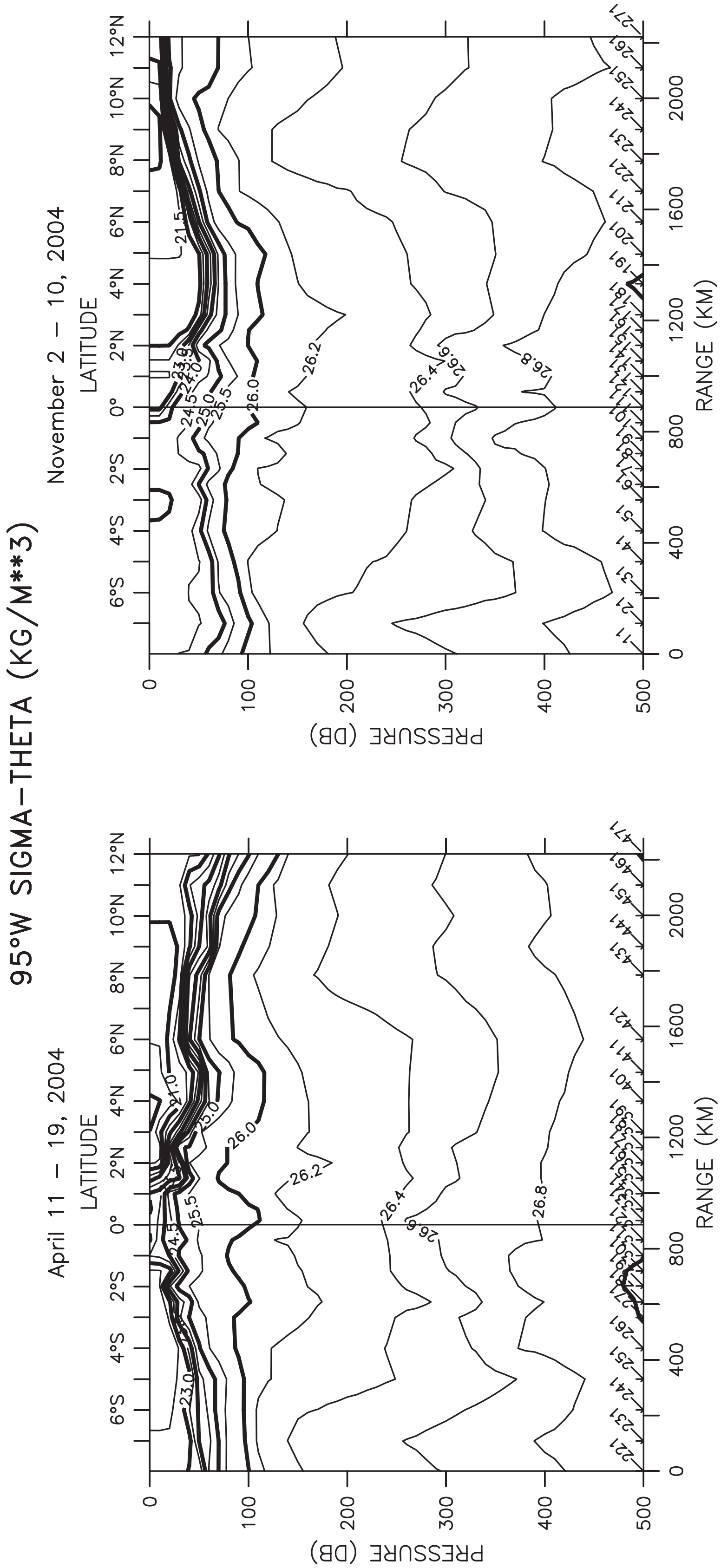

Figure 10: GP1-04-KA spring and GP6-04-RB fall potential density (kg/m^3) sections along 95°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

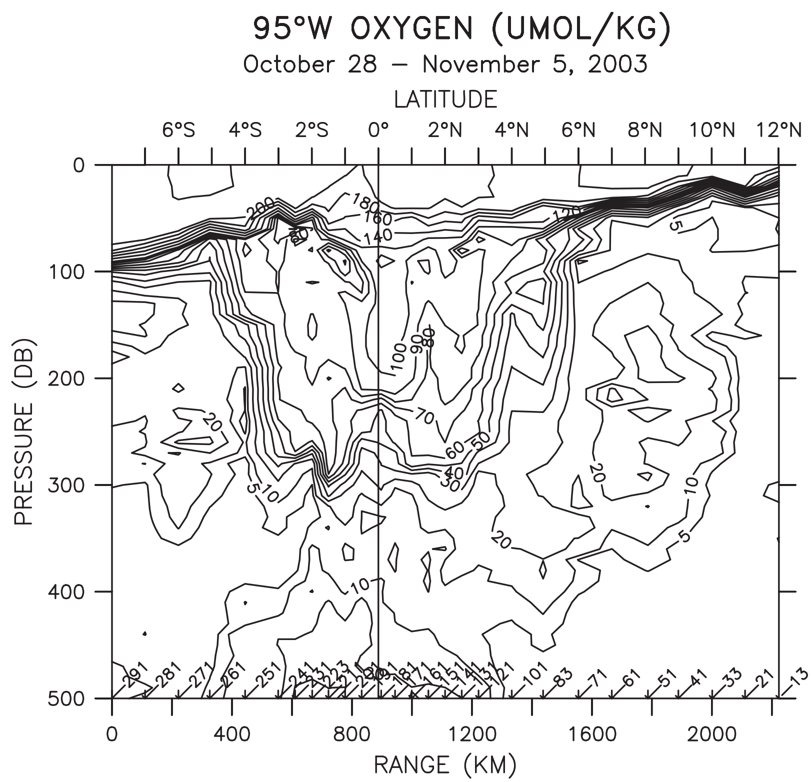

Figure 11: GP6-03-RB fall oxygen (μmol/kg) section along 95°W. Contour intervals are 5 less than 10, 10 between 10 and 100, and 20 greater than 100.

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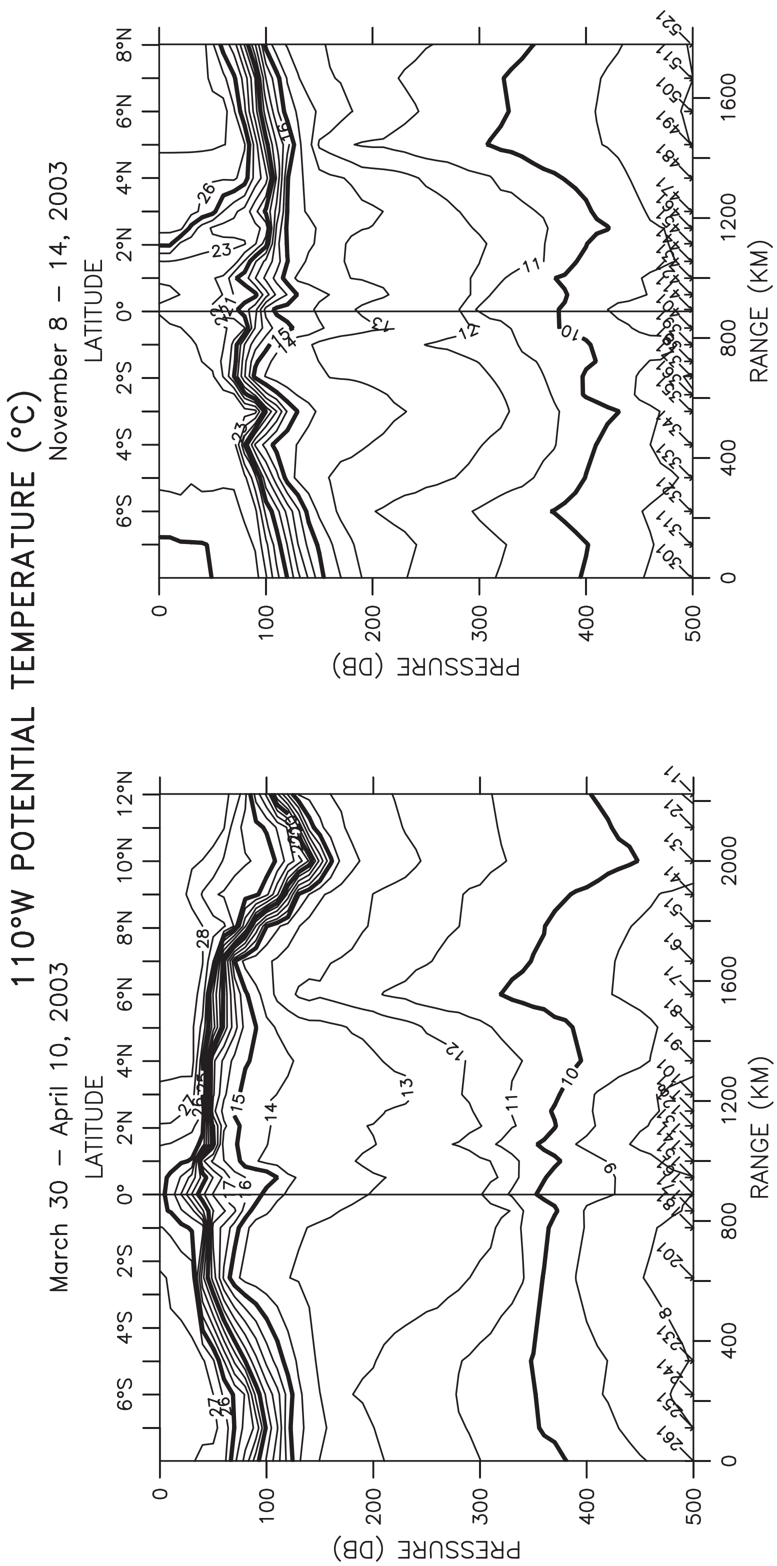

Figure 12: GP2-03-KA spring and GP6-03-RB fall potential temperature (°C) sections along 110°W. Contour intervals are 1°C.

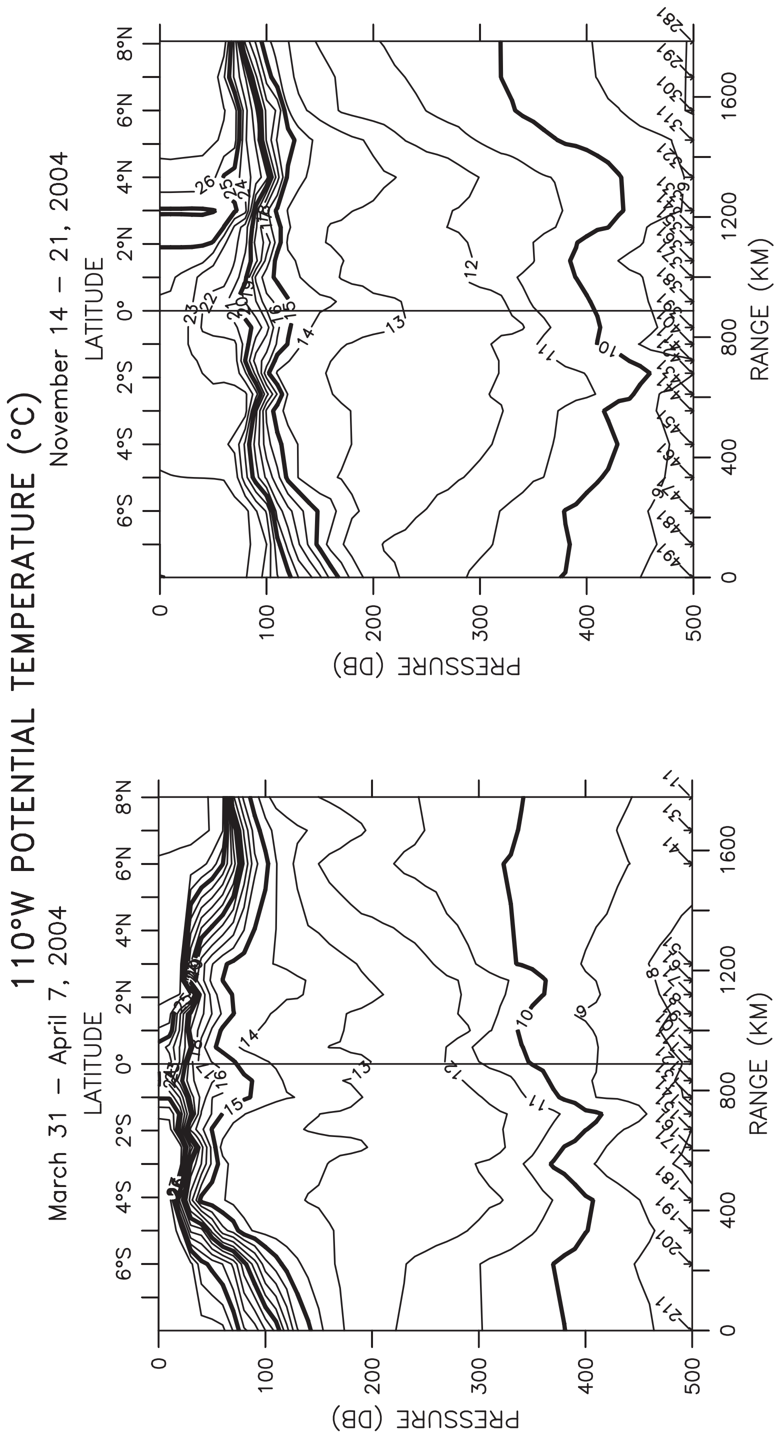

Figure 13: GP1-04-KA spring and GP6-04-RB fall potential temperature (°C) sections along 110°W. Contour intervals are 1°C.

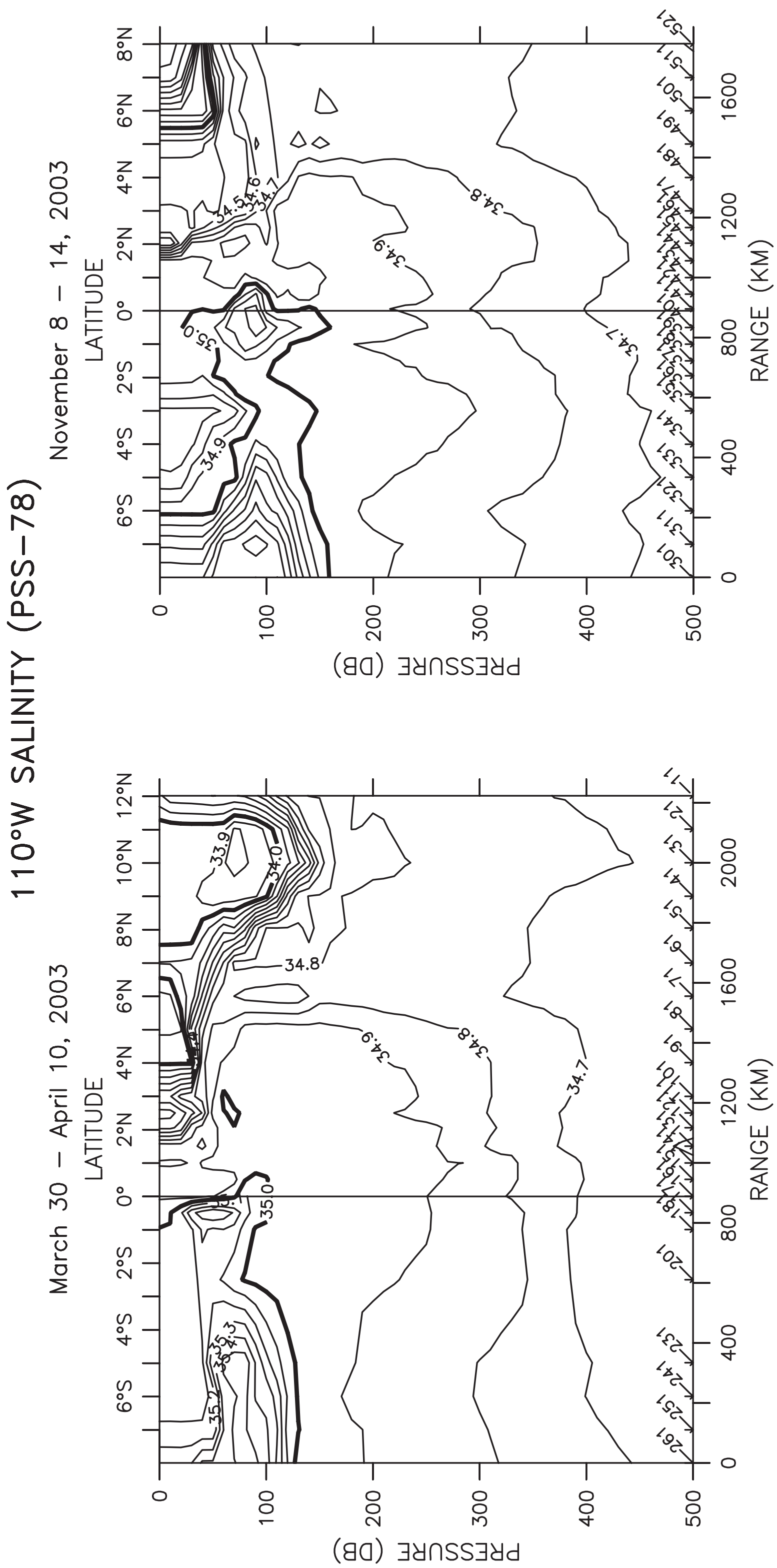

Figure 14: GP2-03-KA spring and GP6-03-RB fall salinity (PSS-78) sections along 110°W. Contour intervals are 0.1 PSS.

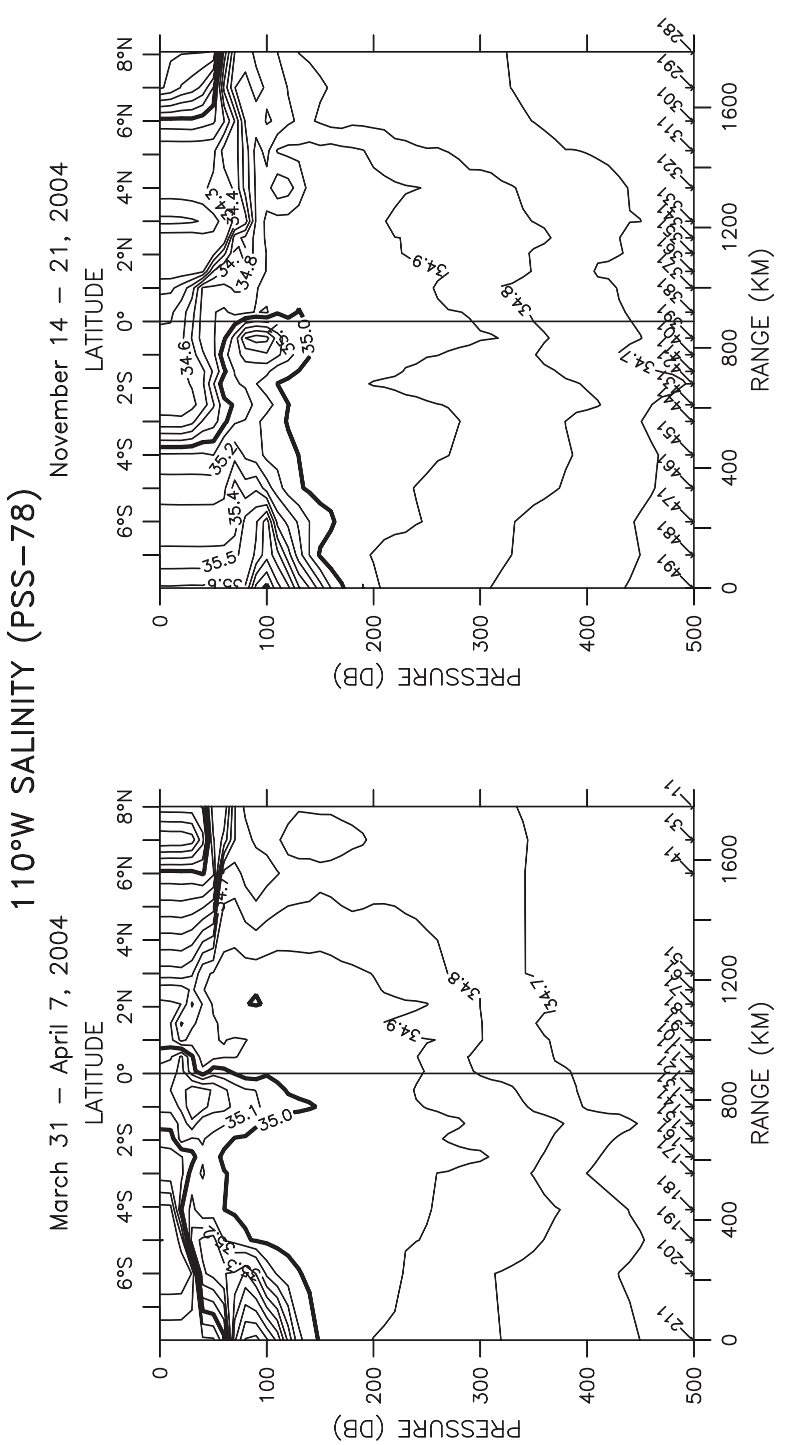

Figure 15: GP1-04-KA spring and GP6-04-RB fall salinity (PSS-78) sections along 110°W. Contour intervals are 0.1 PSS.

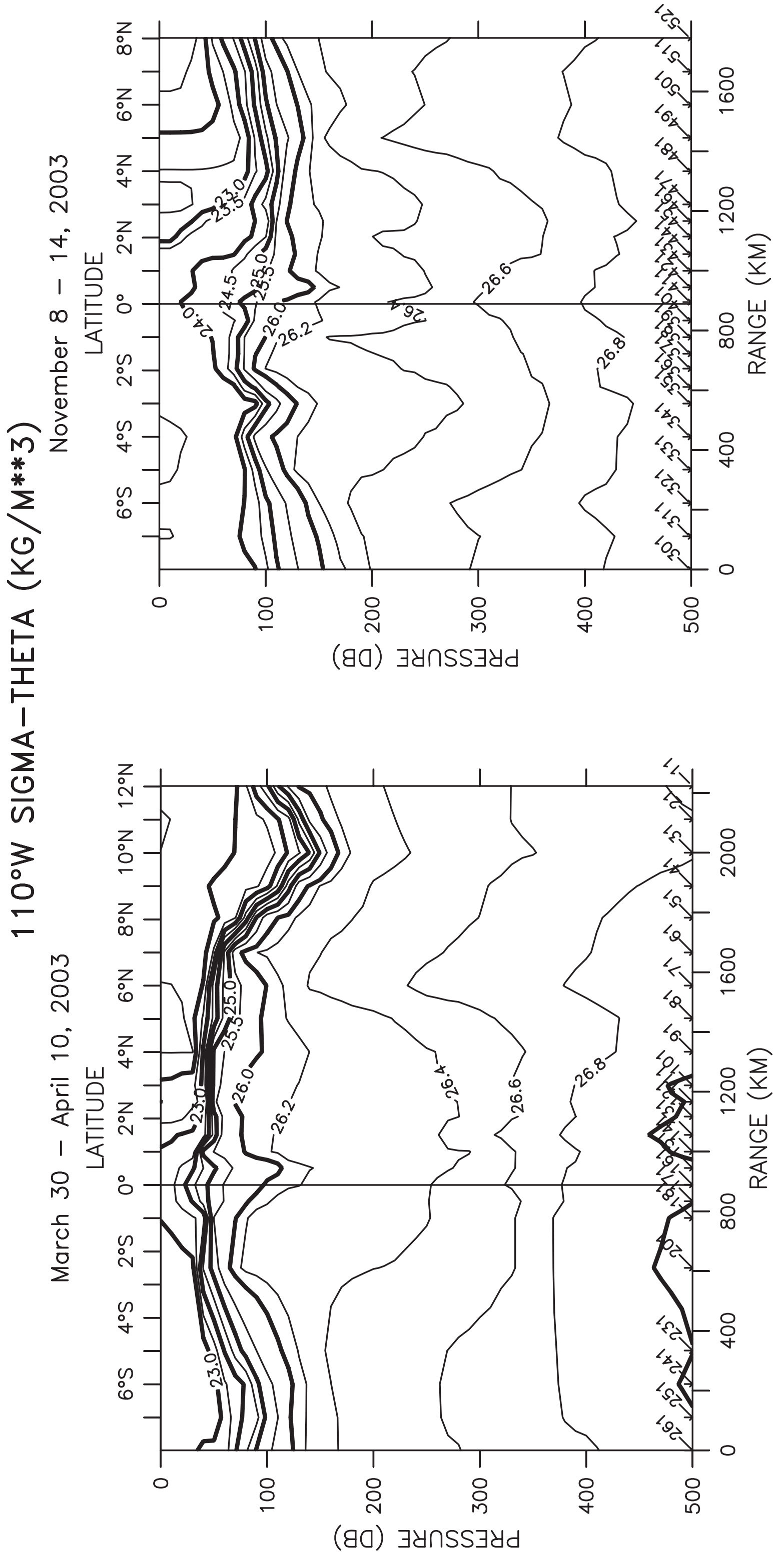

Figure 16: GP2-03-KA spring and GP6-03-RB fall potential density (kg/m^3) sections along 110°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

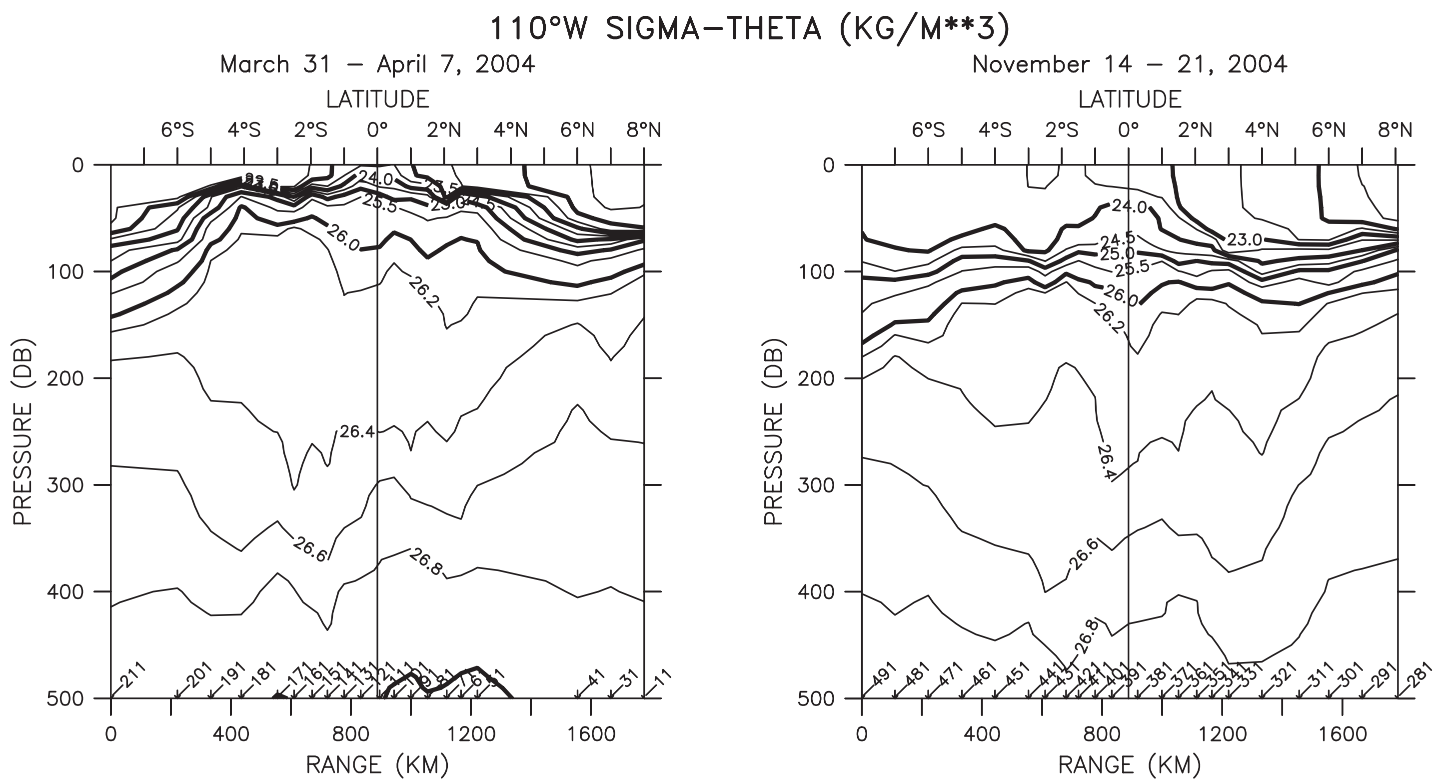

Figure 17: GP1-04-KA spring and GP6-04-RB fall potential density (kg/m^3) sections along 110°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

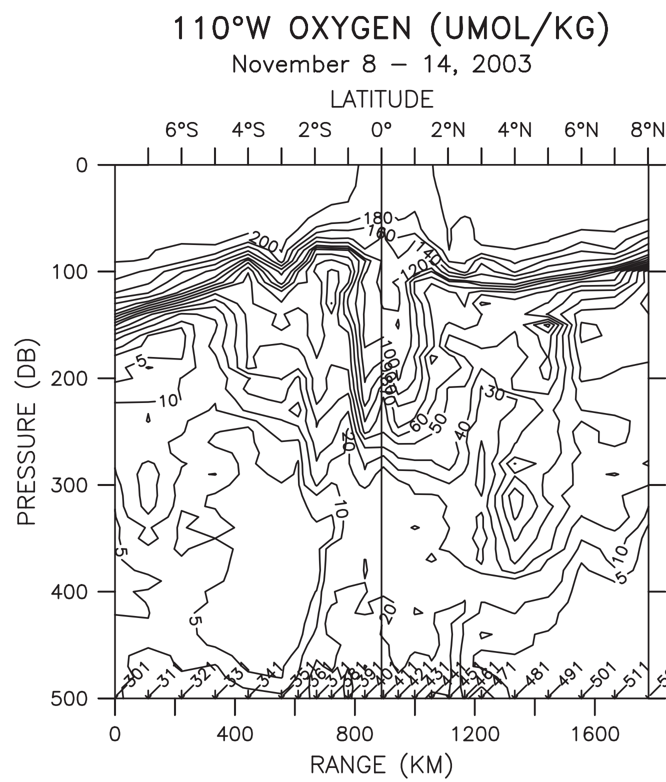

Figure 18: GP6-03-RB fall oxygen (μmol/kg) section along 110°W. Contour intervals are 5 less than 10, 10 between 10 and 100, and 20 greater than 100.

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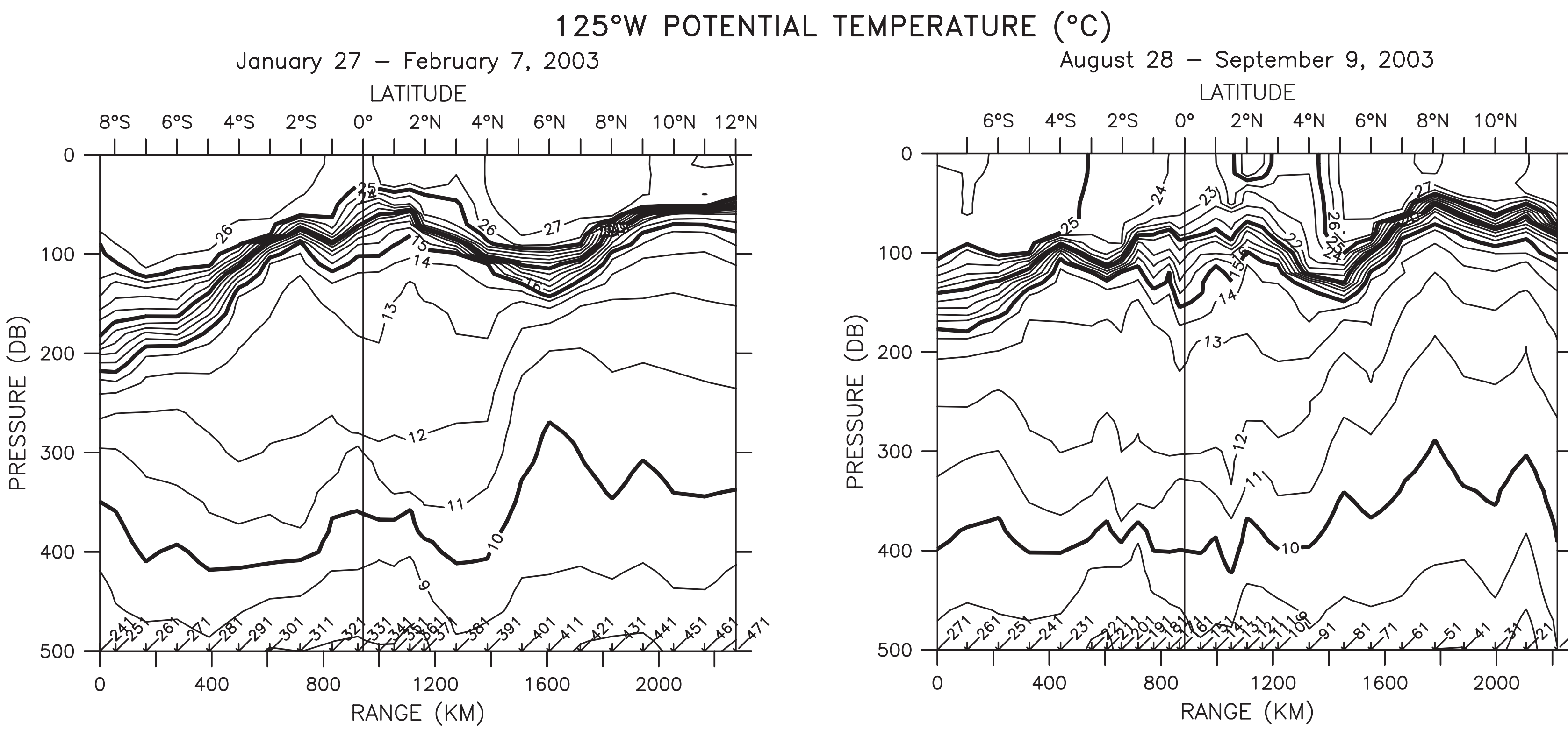

Figure 19: GP1-03-KA winter and GP5-03-KA fall potential temperature (°C) sections along 125°W. Contour intervals are 1°C.

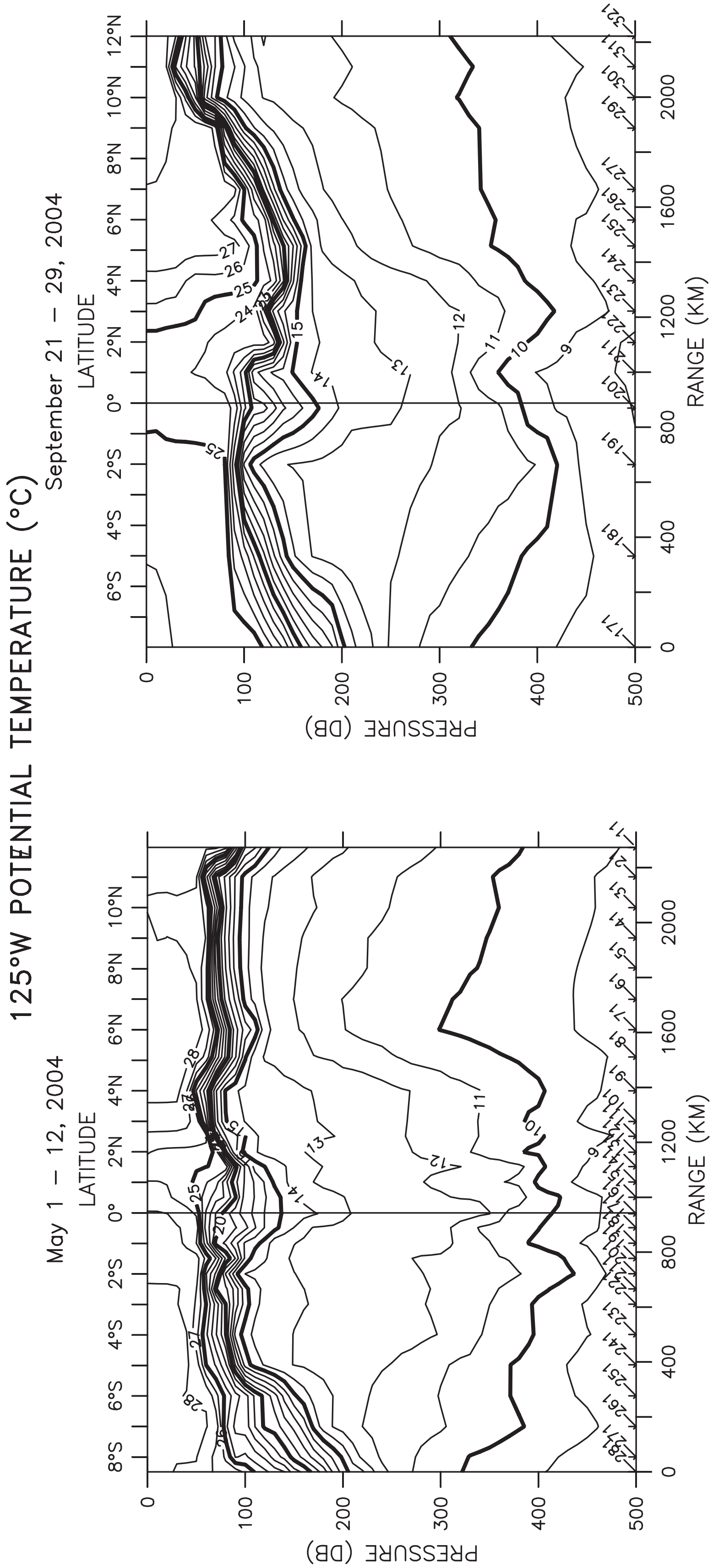

Figure 20: GP2-04-KA spring and GP5-04-KA fall potential temperature (°C) sections along 125°W. Contour intervals are 1°C.

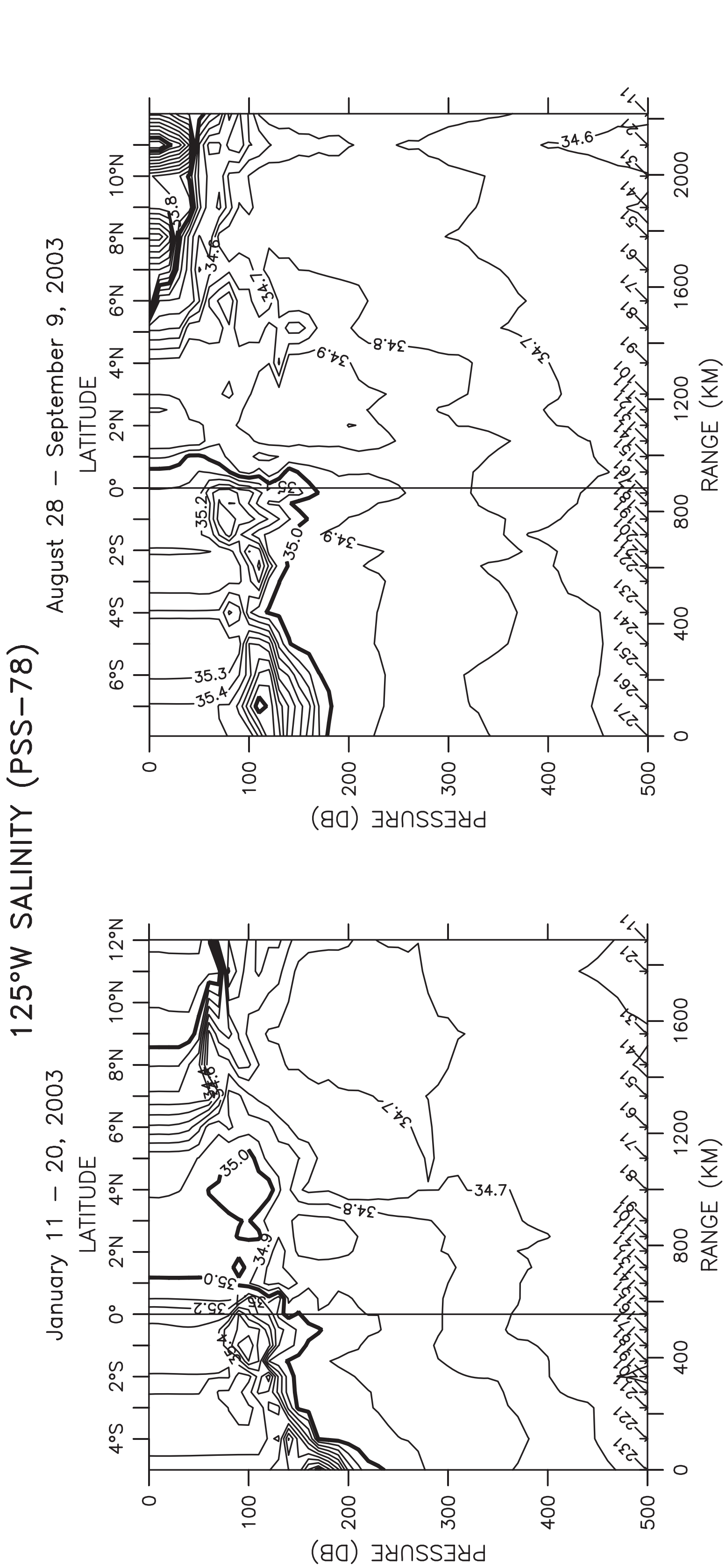

Figure 21: GP1-03-KA winter and GP5-03-KA fall salinity (PSS-78) sections along 125°W. Contour intervals are 0.1 PSS.

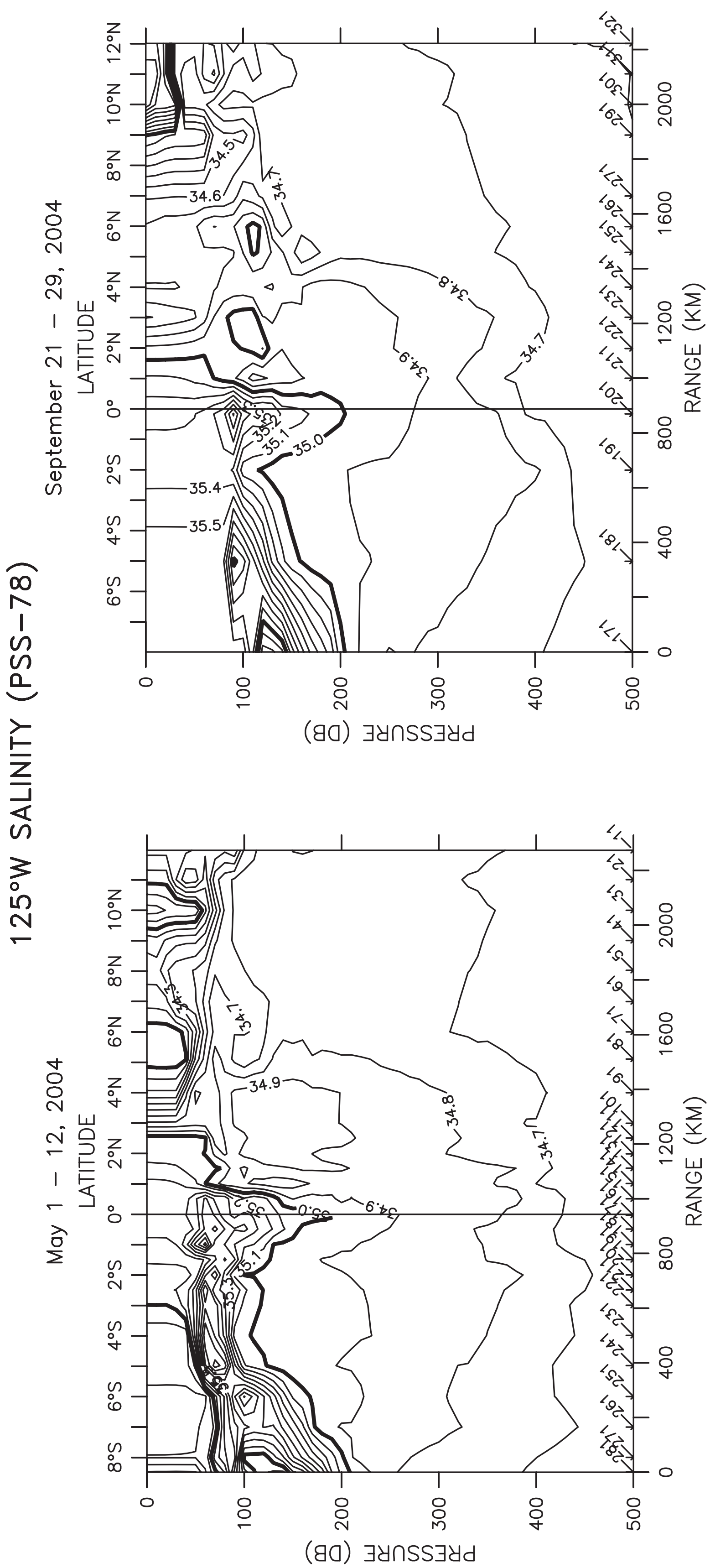

Figure 22: GP2-04-KA spring and GP5-04-KA fall salinity (PSS-78) sections along 125°W. Contour intervals are 0.1 PSS.

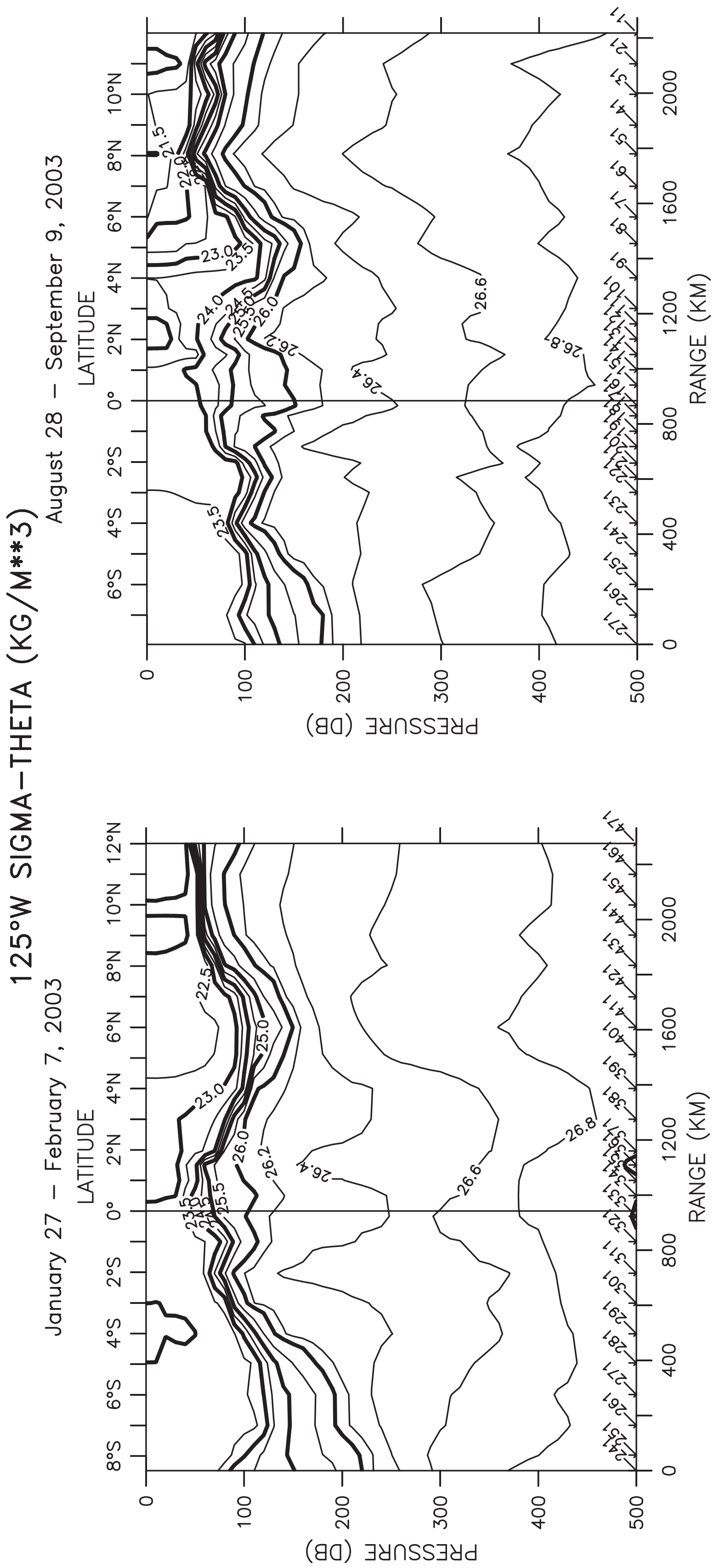

Figure 23: GP1-03-KA winter and GP5-03-KA fall potential density (kg/m^3) sections along 125°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

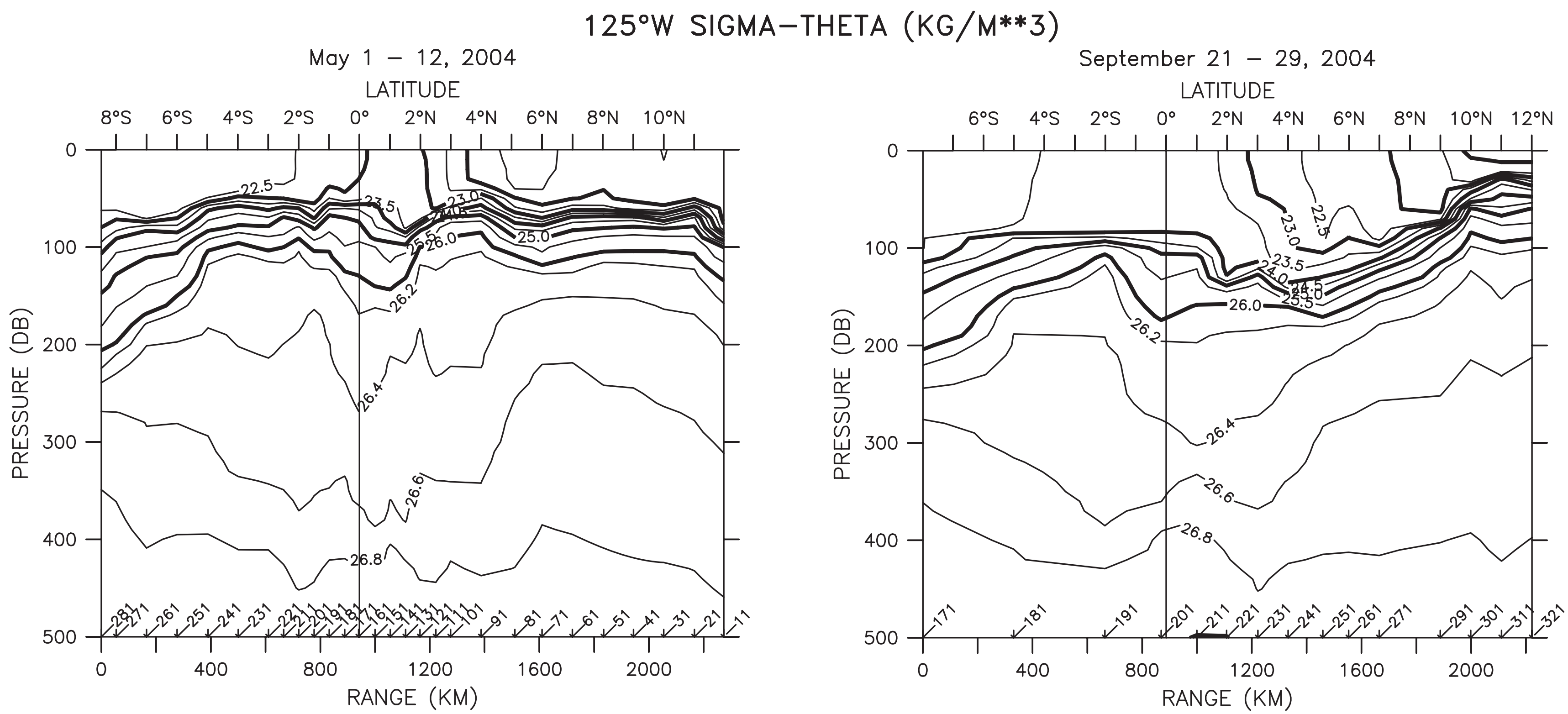

Figure 24: GP2-04-KA spring and GP5-04-KA fall potential density (kg/m^3) sections along 125°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

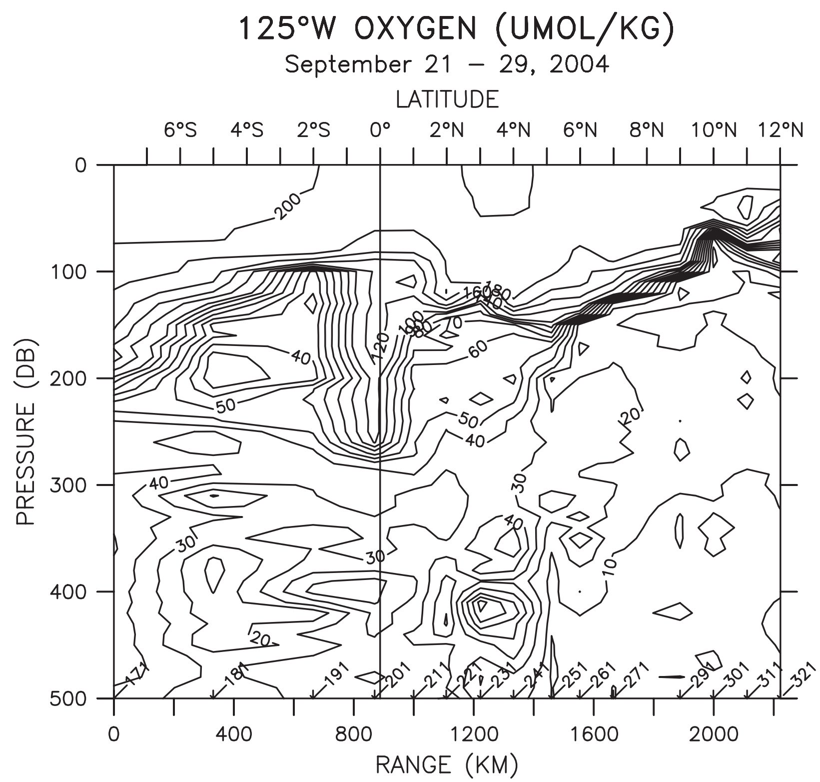

Figure 25: GP5-04-KA fall oxygen (μmol/kg) section along 125°W. Contour intervals are 5 less than 10, 10 between 10 and 100, and 20 greater than 100.

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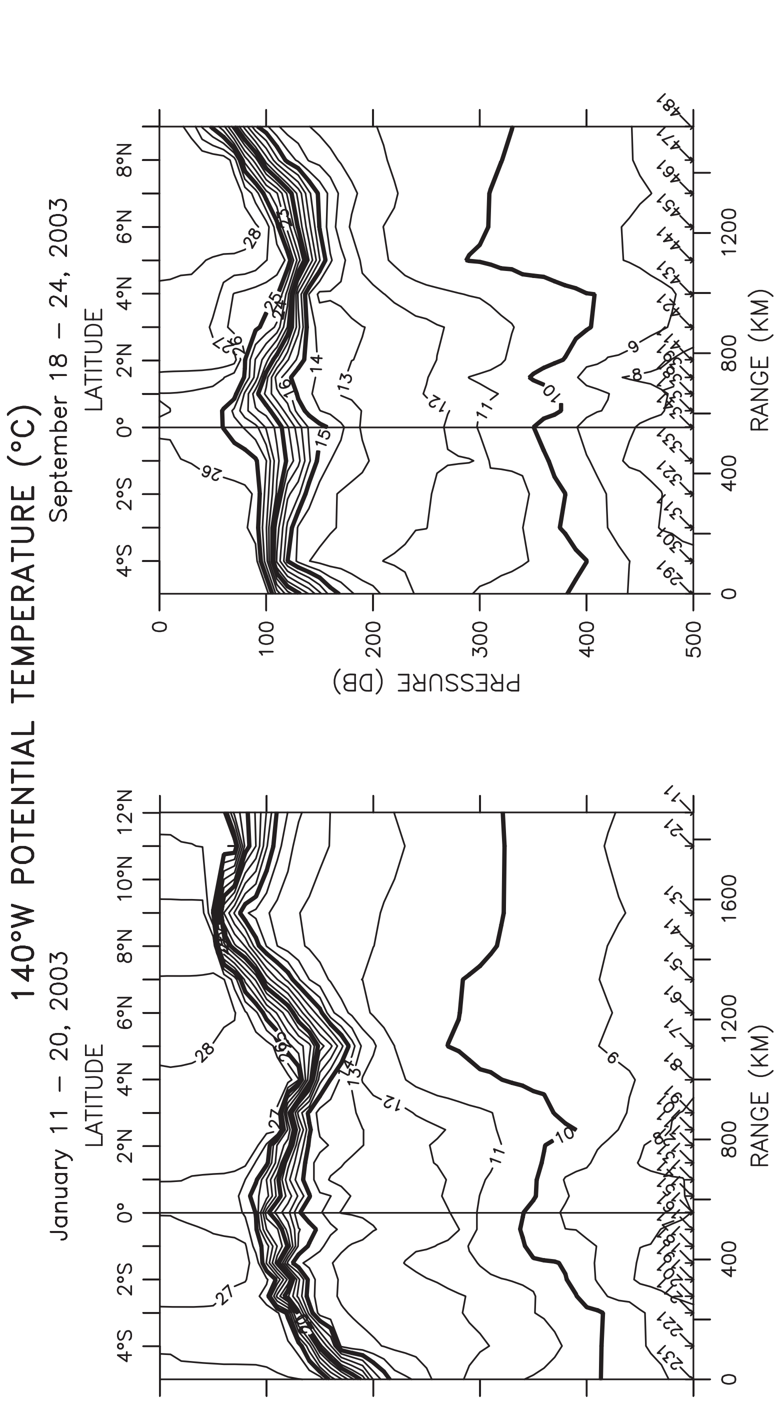

Figure 26: GP1-03-KA winter and GP5-03-KA fall potential temperature (°C) sections along 140°W. Contour intervals are 1°C.

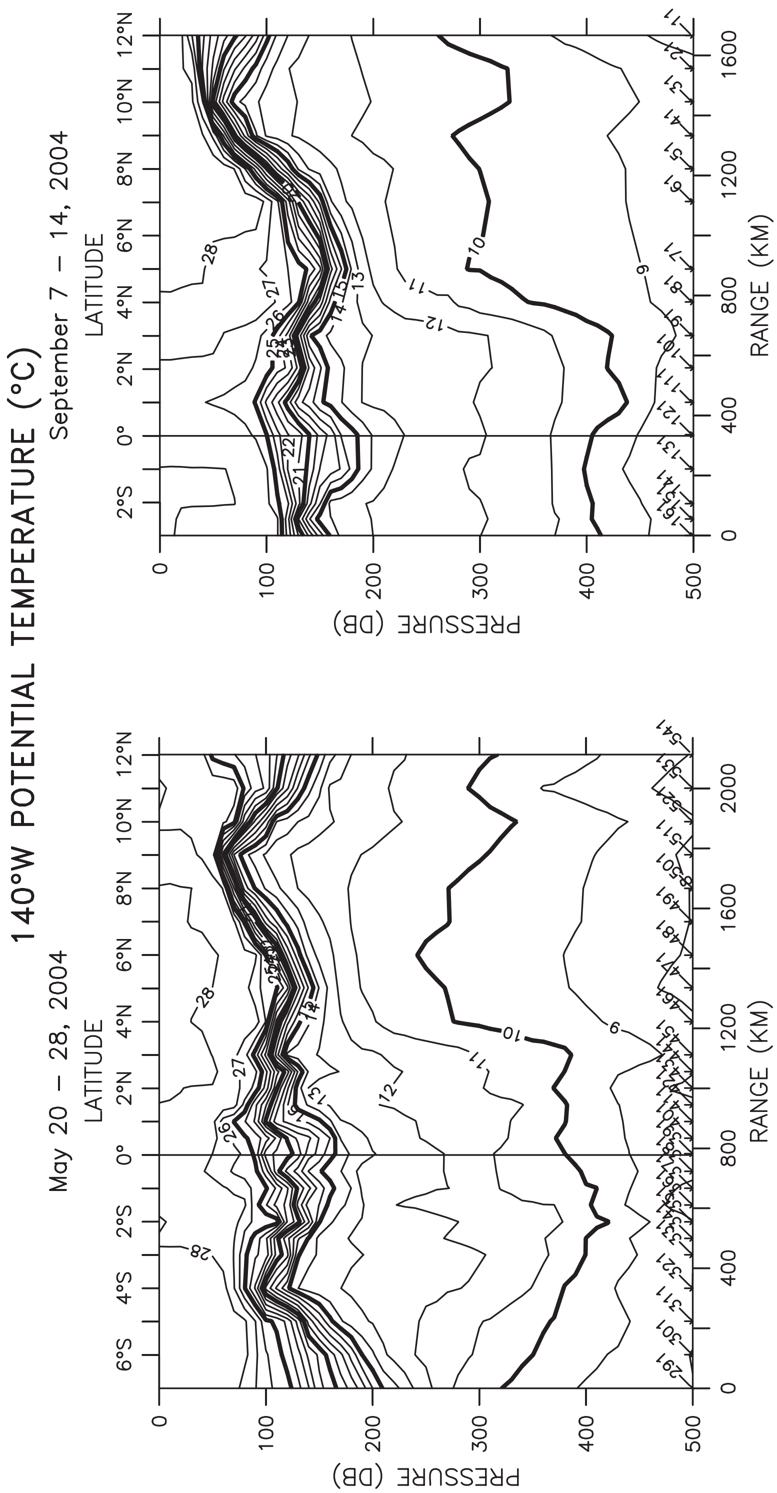

Figure 27: GP2-04-KA spring and GP5-04-KA fall potential temperature (°C) sections along 140°W. Contour intervals are 1°C.

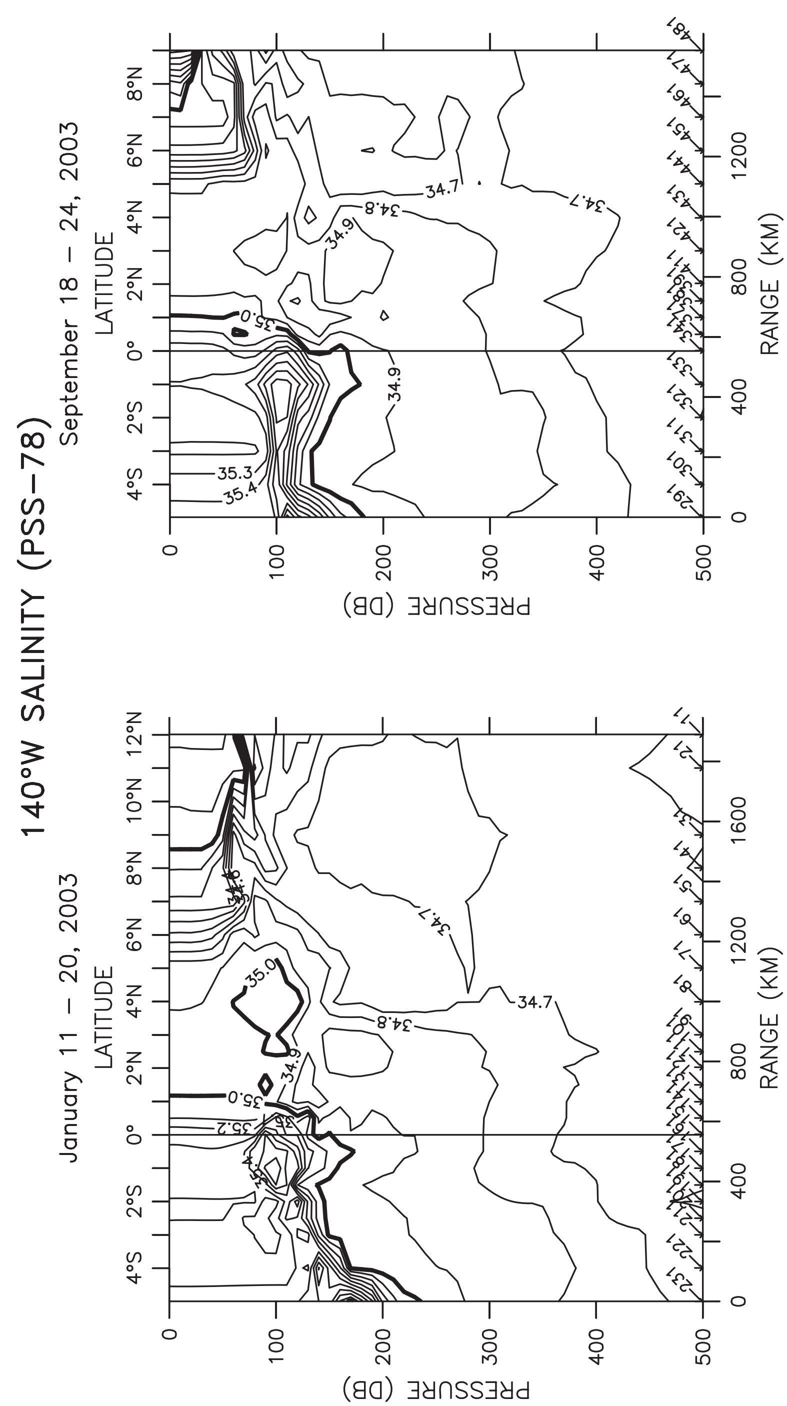

Figure 28: GP1-03-KA winter and GP5-03-KA fall salinity (PSS-78) sections along 140°W. Contour intervals are 0.1 PSS.

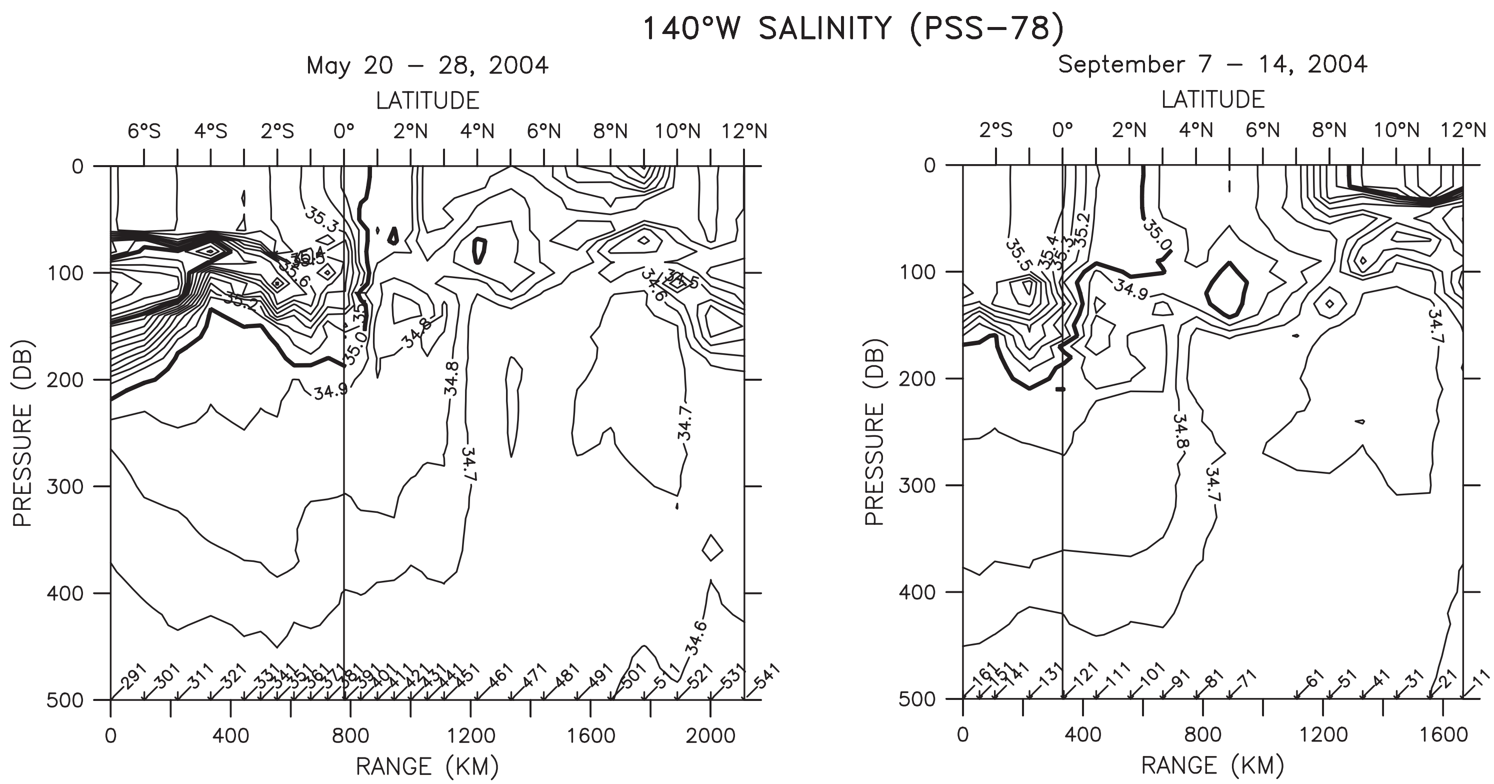

Figure 29: GP2-04-KA spring and GP5-04-KA fall salinity (PSS-78) sections along 140°W. Contour intervals are 0.1 PSS.

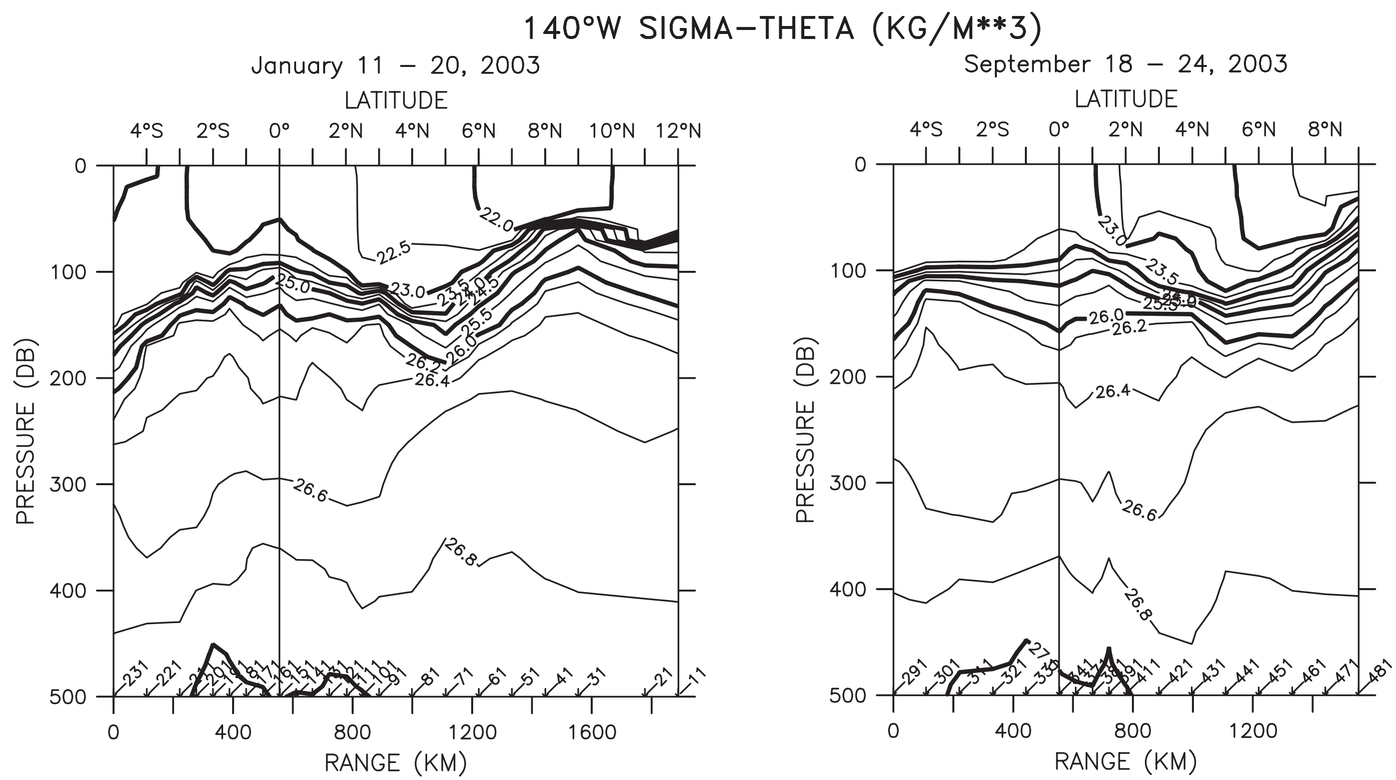

Figure 30: GP1-03-KA winter and GP5-03-KA fall potential density (kg/m^3) sections along 140°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

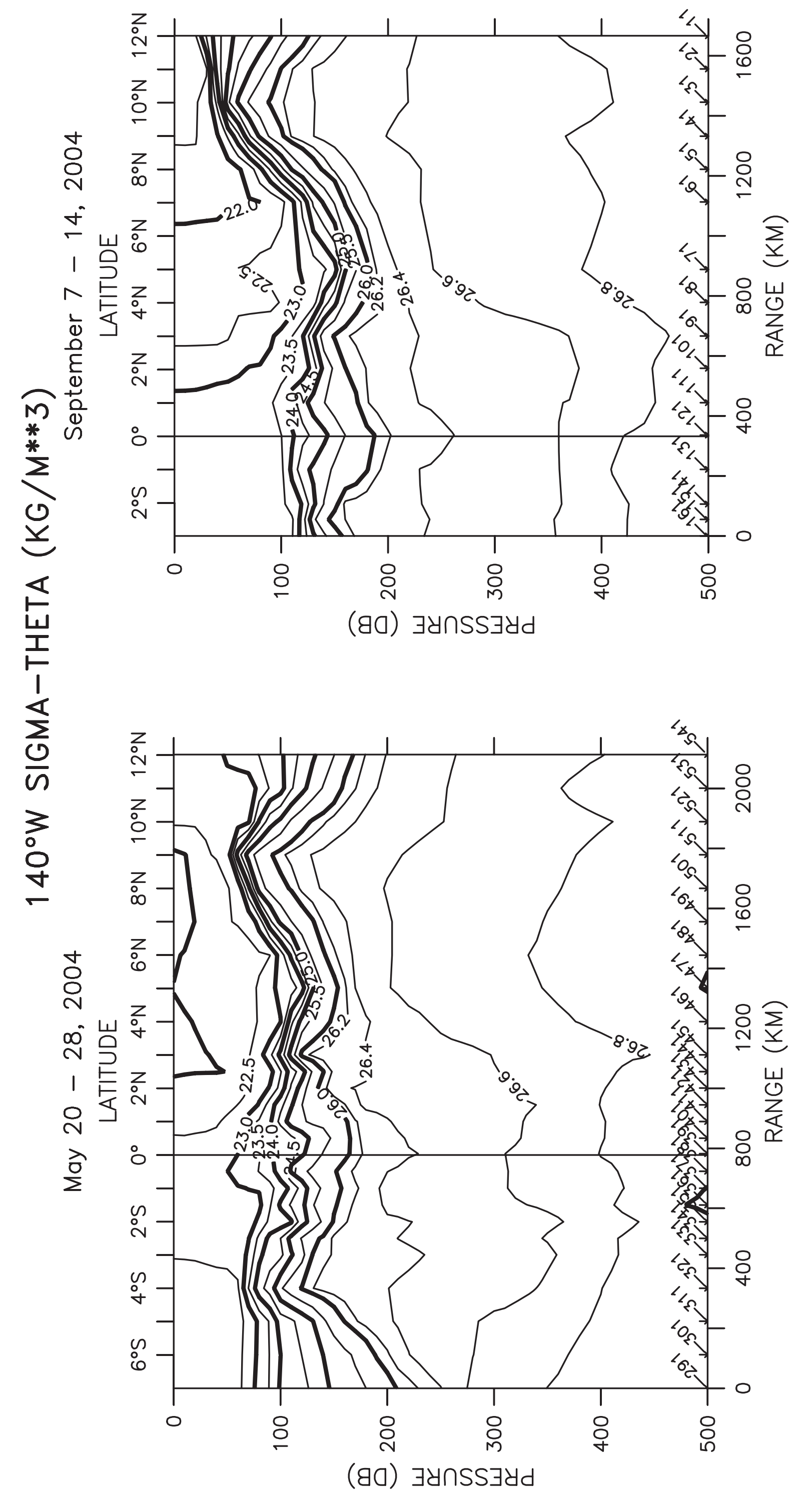

Figure 31: GP2-04-KA spring and GP5-04-KA fall potential density (kg/m^3) sections along 140°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

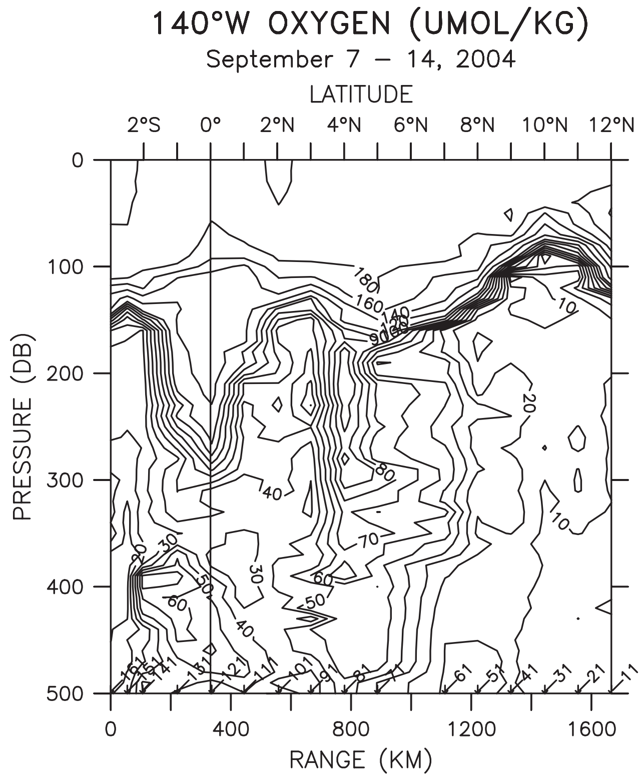

Figure 32: GP5-04-KA fall oxygen (μmol/kg) section along 140°W. Contour intervals are 5 less than 10, 10 between 10 and 100, and 20 greater than 100.

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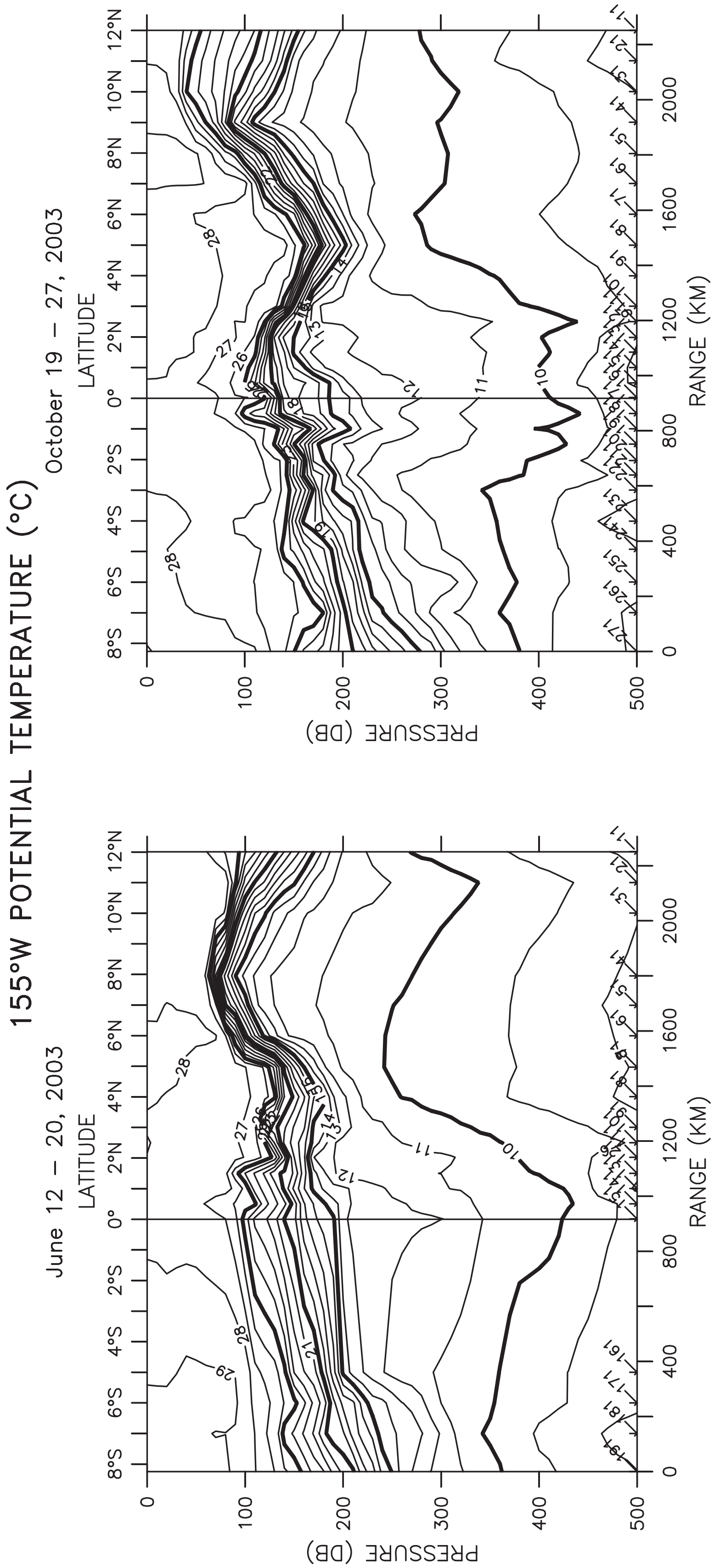

Figure 33: GP3-03-KA summer and GP7-03-KA fall potential temperature (°C) sections along 155°W. Contour intervals are 1°C.

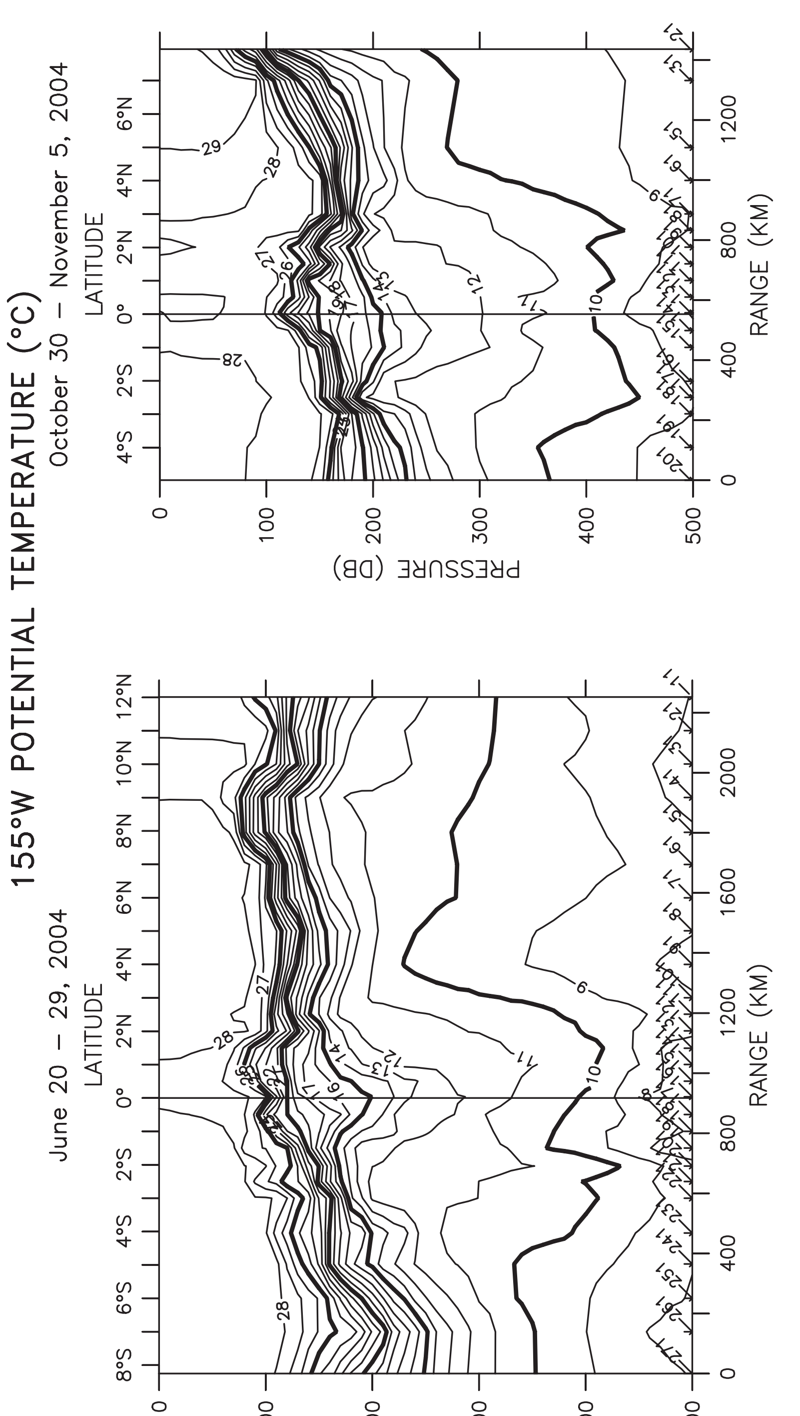

Figure 34: GP3-04-KA summer and GP7-04-KA fall potential temperature (°C) sections along 155°W. Contour intervals are 1°C.

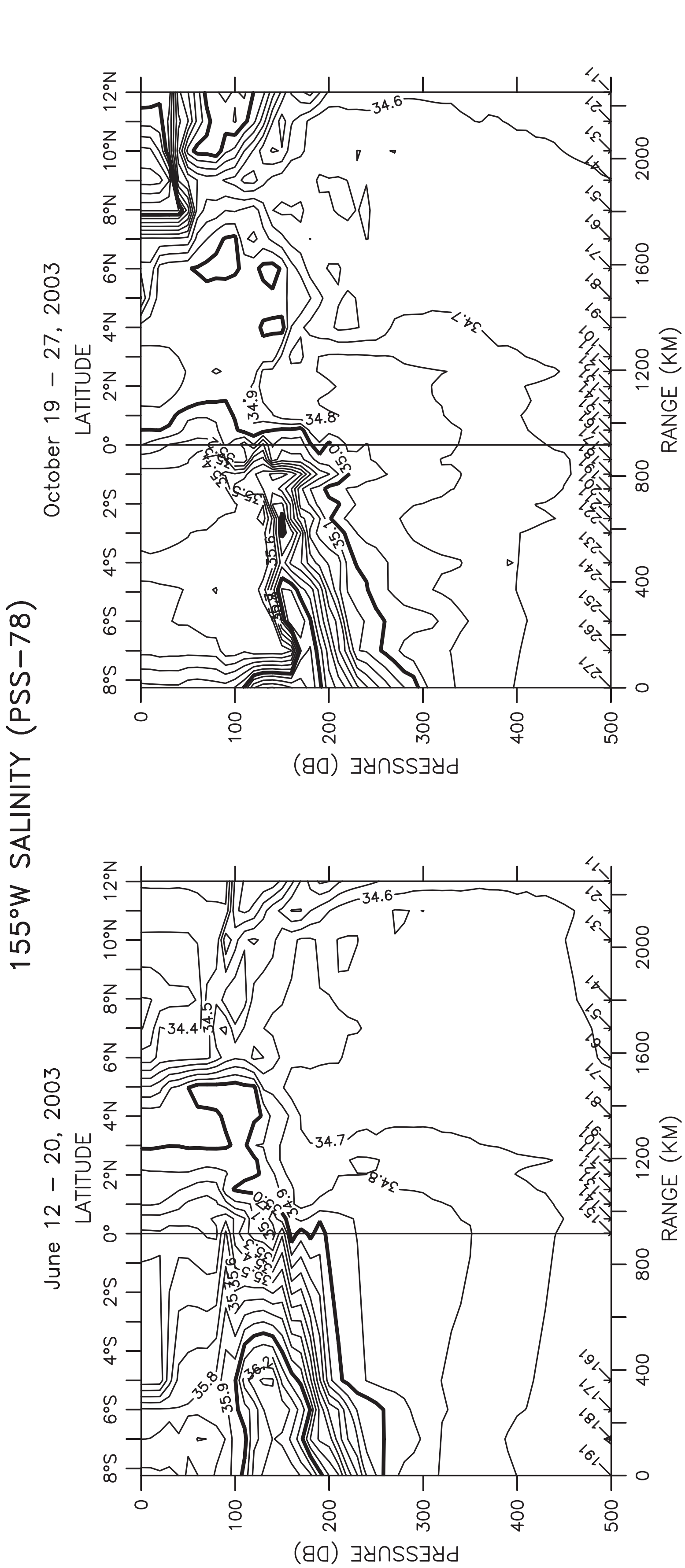

Figure 35: GP3-03-KA summer and GP7-03-KA fall salinity (PSS-78) sections along 155°W. Contour intervals are 0.1 PSS.

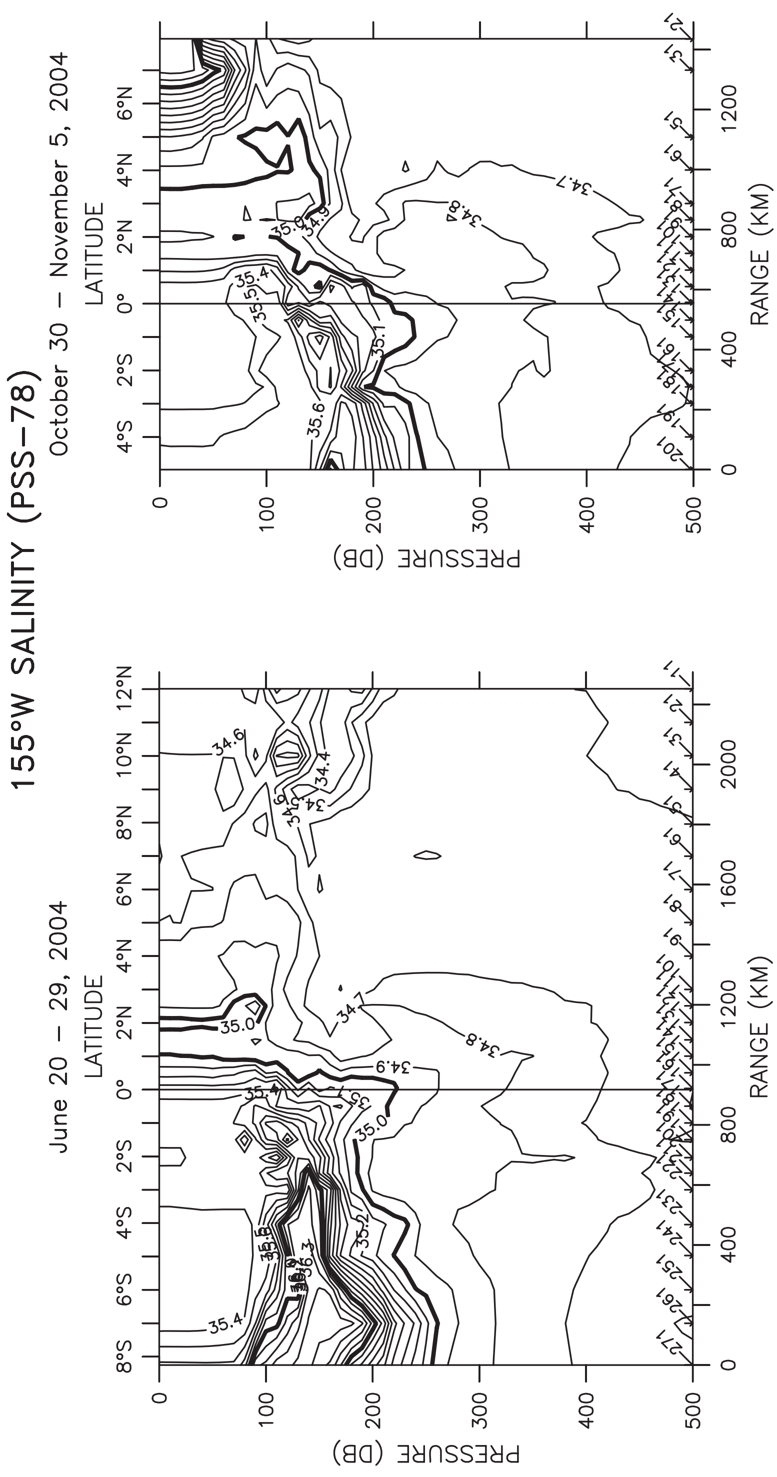

Figure 36: GP3-04-KA summer and GP7-04-KA fall salinity (PSS-78) sections along 155°W. Contour intervals are 0.1 PSS.

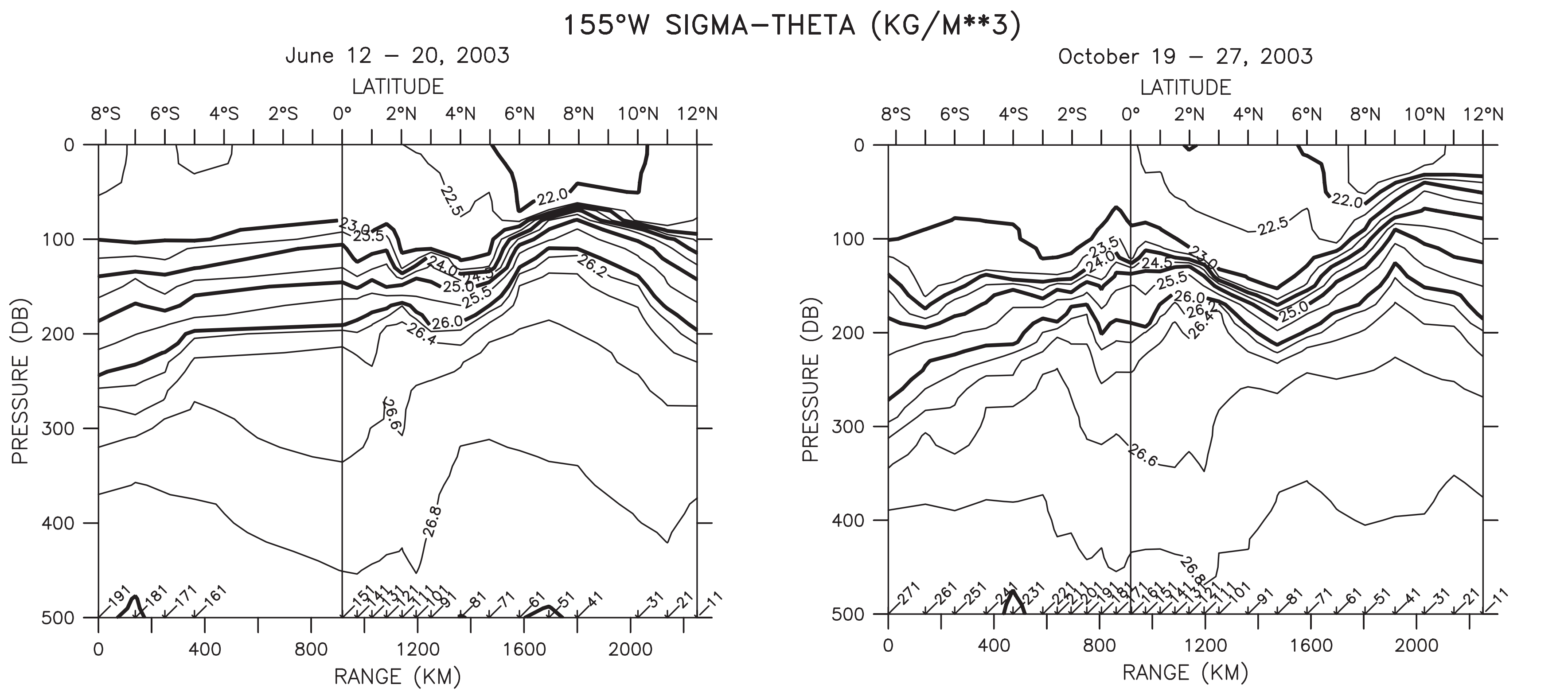

Figure 37: GP3-03-KA summer and GP7-03-KA fall potential density (kg/m^3) sections along 155°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

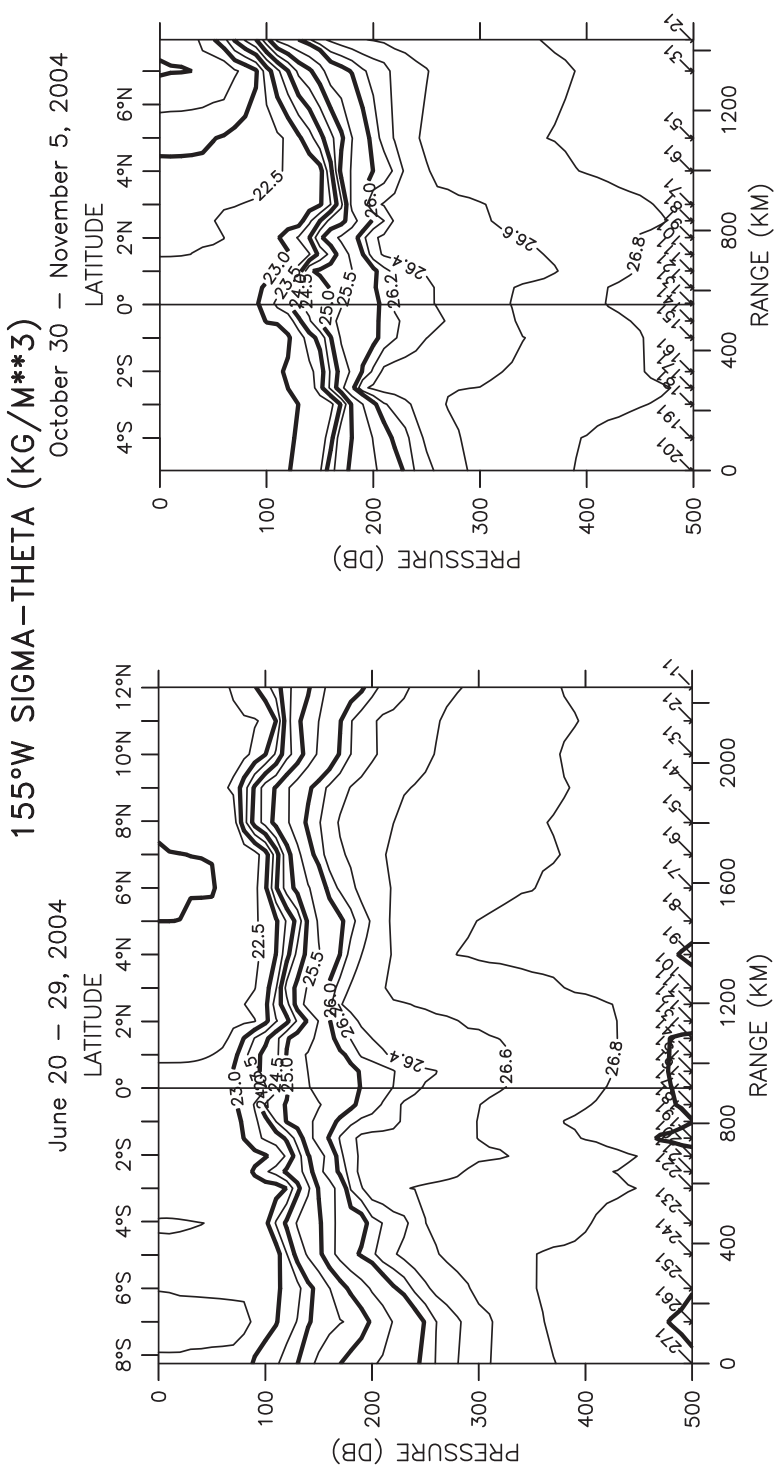

Figure 38: GP3-04-KA summer and GP7-04-KA fall potential density (kg/m^3) sections along 155°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

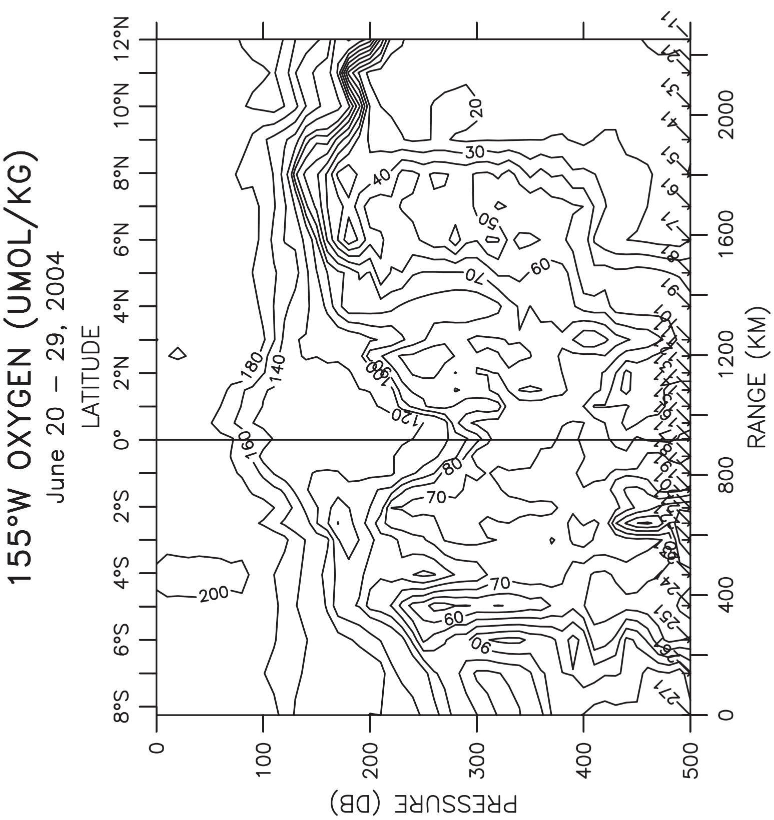

Figure 39: GP3-04-KA summer oxygen (μmol/kg) section along 155°W. Contour intervals are 5 less than 10, 10 between 10 and 100, and 20 greater than 100.

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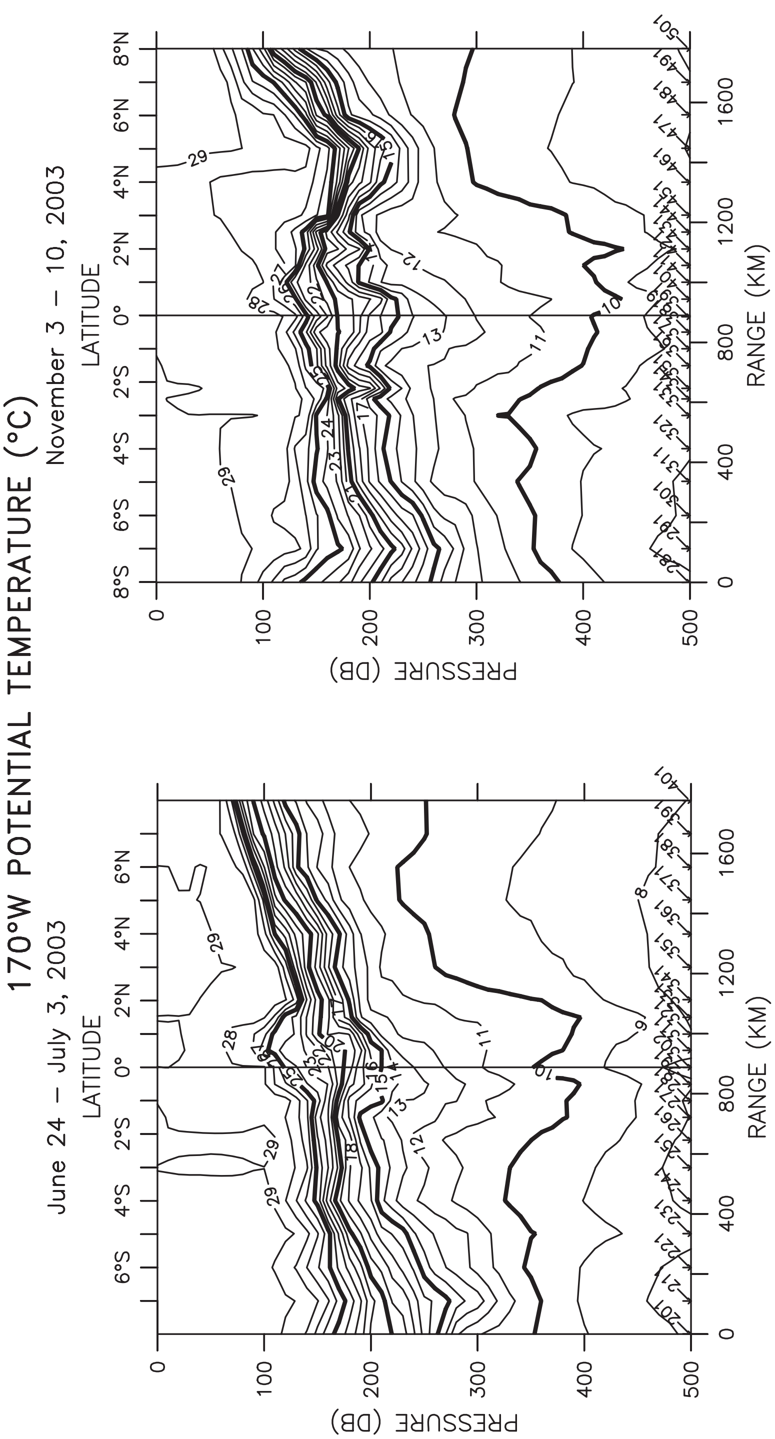

Figure 40: GP3-03-KA summer and GP7-03-KA fall potential temperature (°C) sections along 170°W. Contour intervals are 1°C.

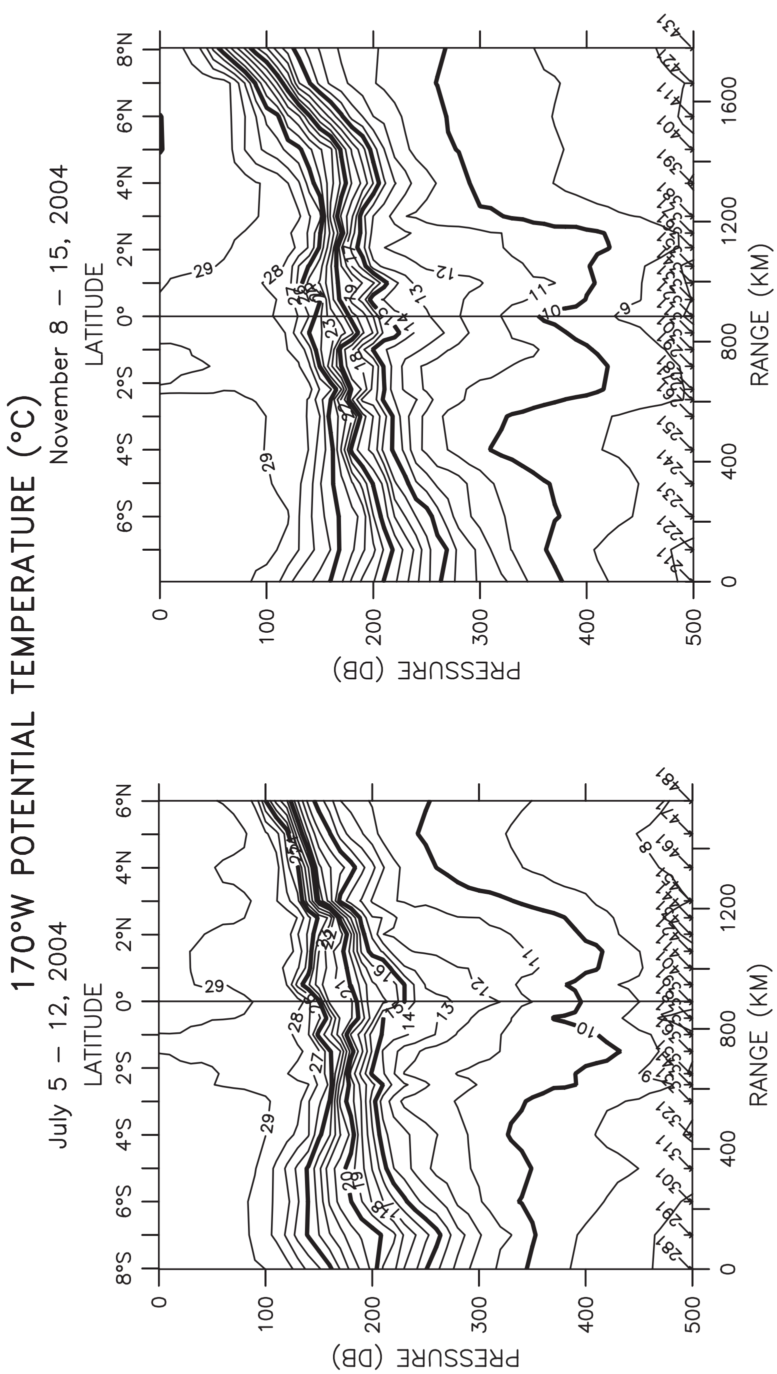

Figure 41: GP3-04-KA summer and GP7-04-KA fall potential temperature (°C) sections along 170°W. Contour intervals are 1°C.

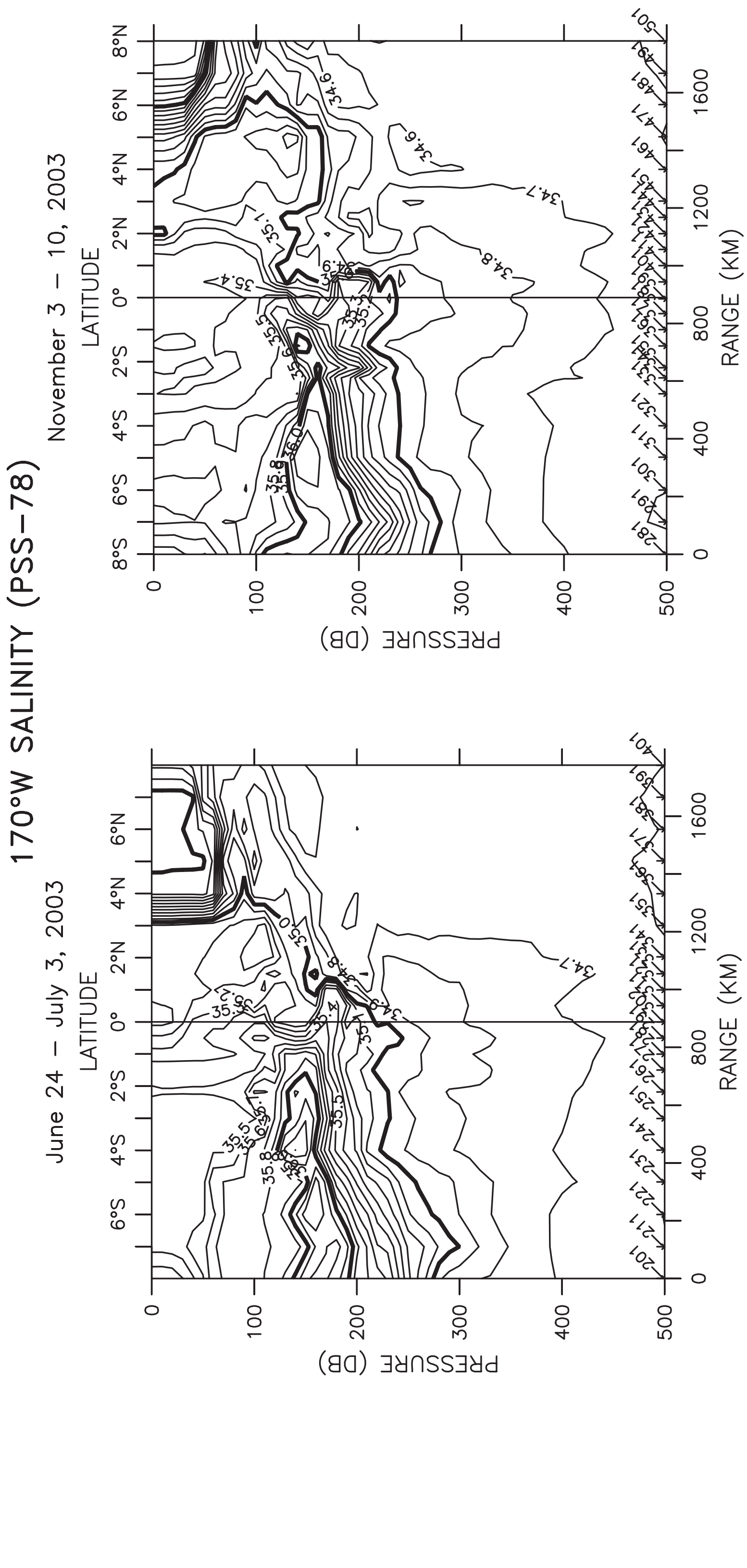

Figure 42: GP3-03-KA summer and GP7-03-KA fall salinity (PSS-78) sections along 170°W. Contour intervals are 0.1 PSS.

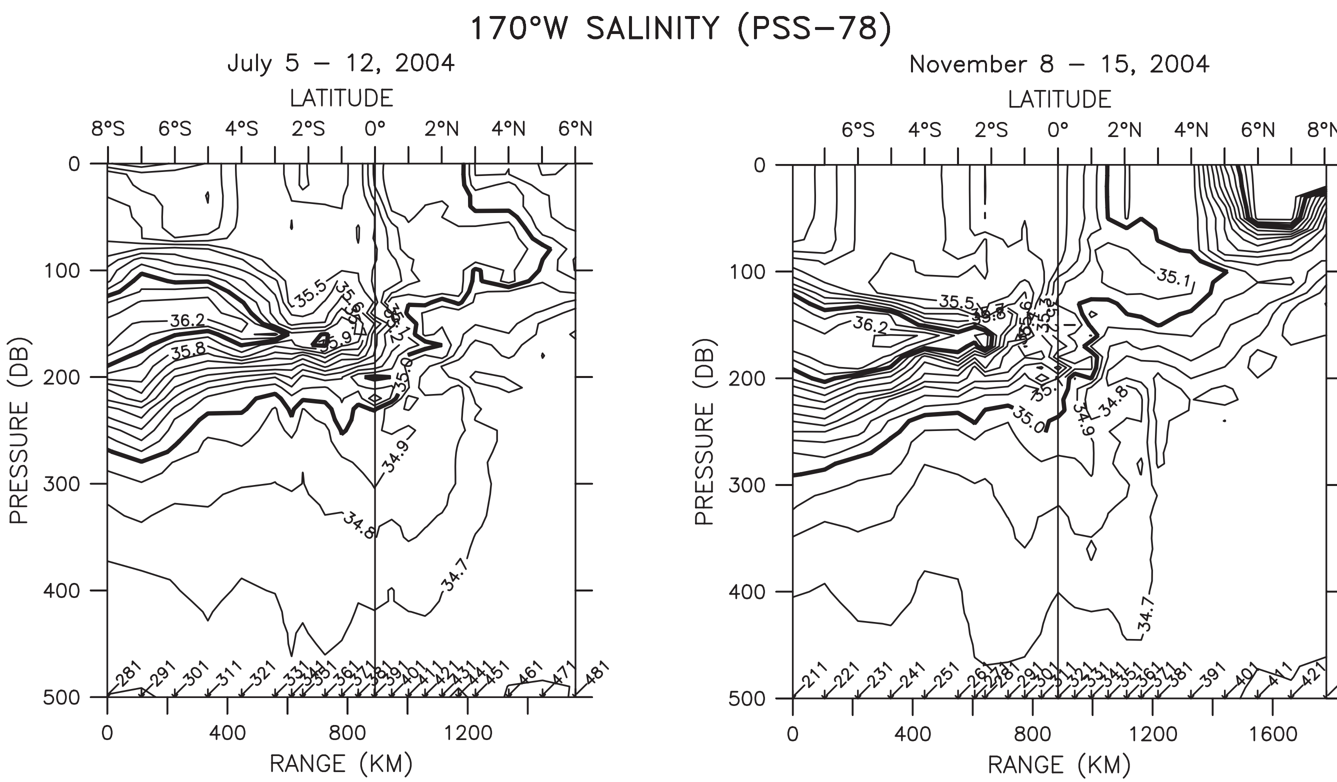

Figure 43: GP3-04-KA summer and GP7-04-KA fall salinity (PSS-78) sections along 170°W. Contour intervals are 0.1 PSS.

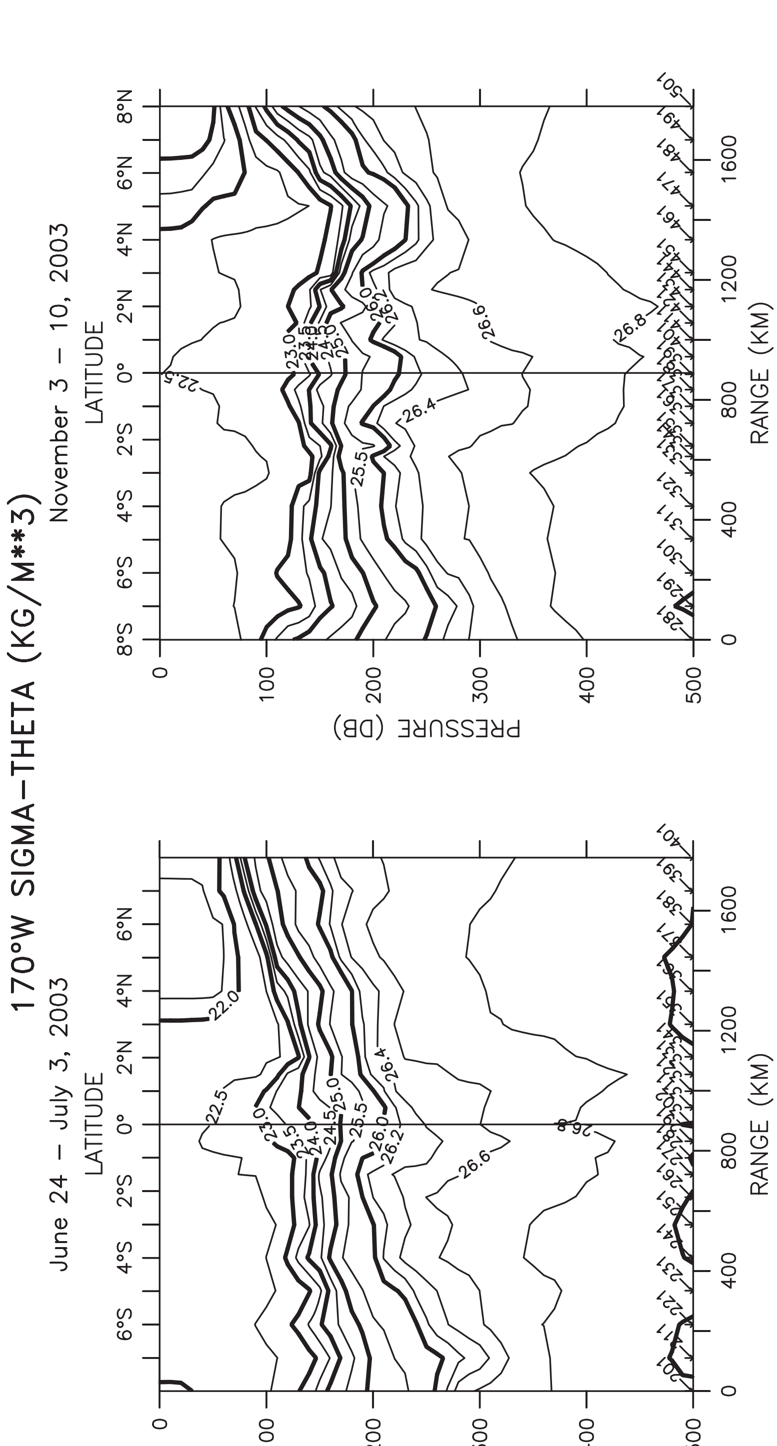

Figure 44: GP3-03-KA summer and GP7-03-KA fall potential density (kg/m^3) sections along 170°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

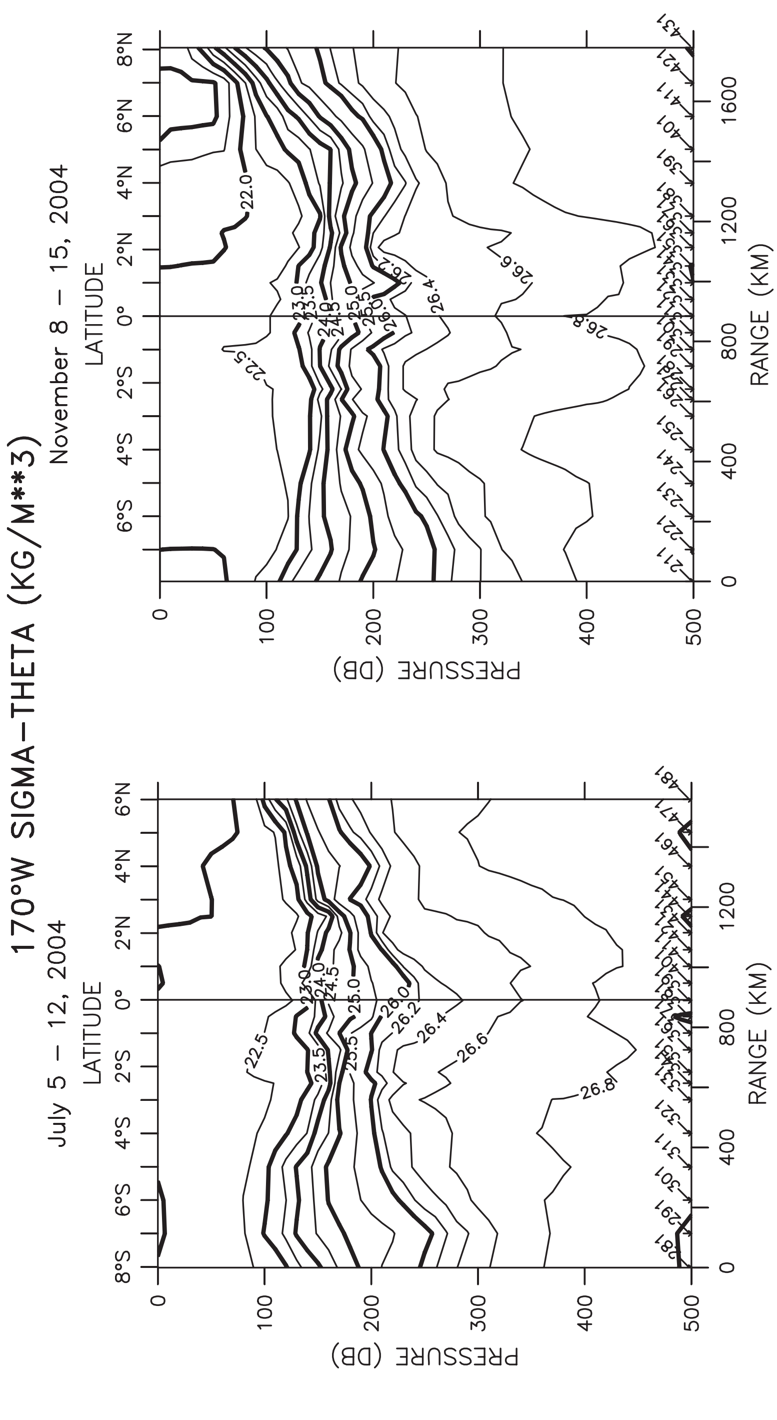

Figure 45: GP3-04-KA summer and GP7-04-KA fall potential density (kg/m^3) sections along 170°W. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

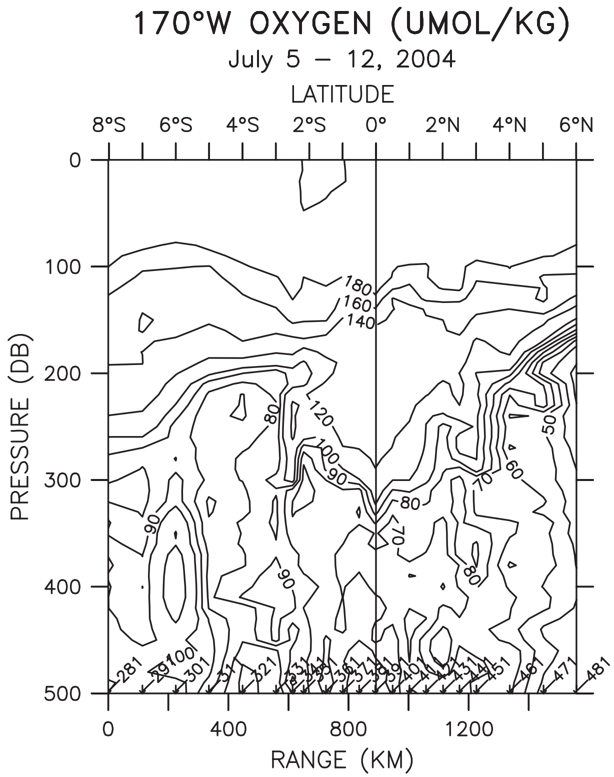

Figure 46: GP3-04-KA summer oxygen (μmol/kg) section along 170°W. Contour intervals are 5 less than 10, 10 between 10 and 100, and 20 greater than 100.

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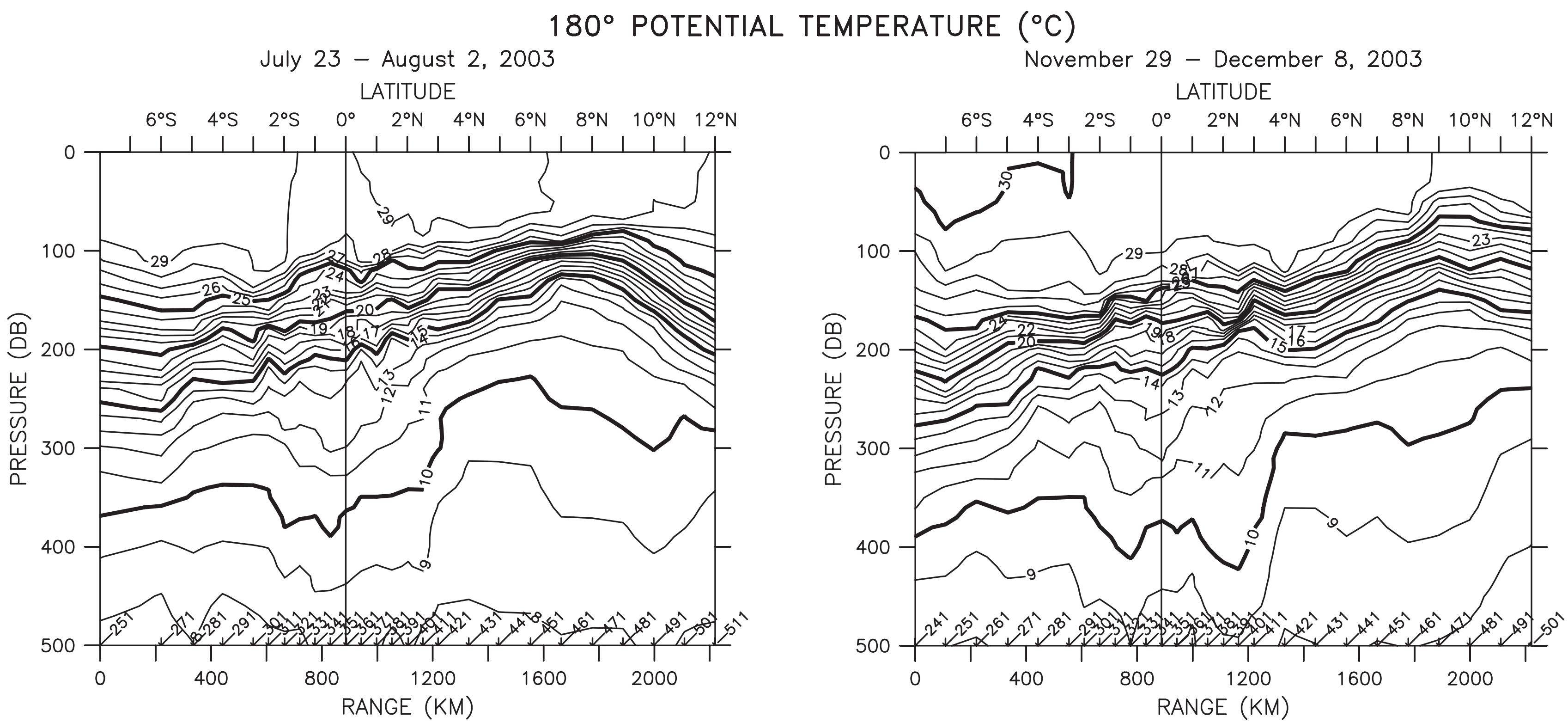

Figure 47: GP4-03-KA summer and GP8-03-KA fall potential temperature (°C) sections along 180°. Contour intervals are 1°C.

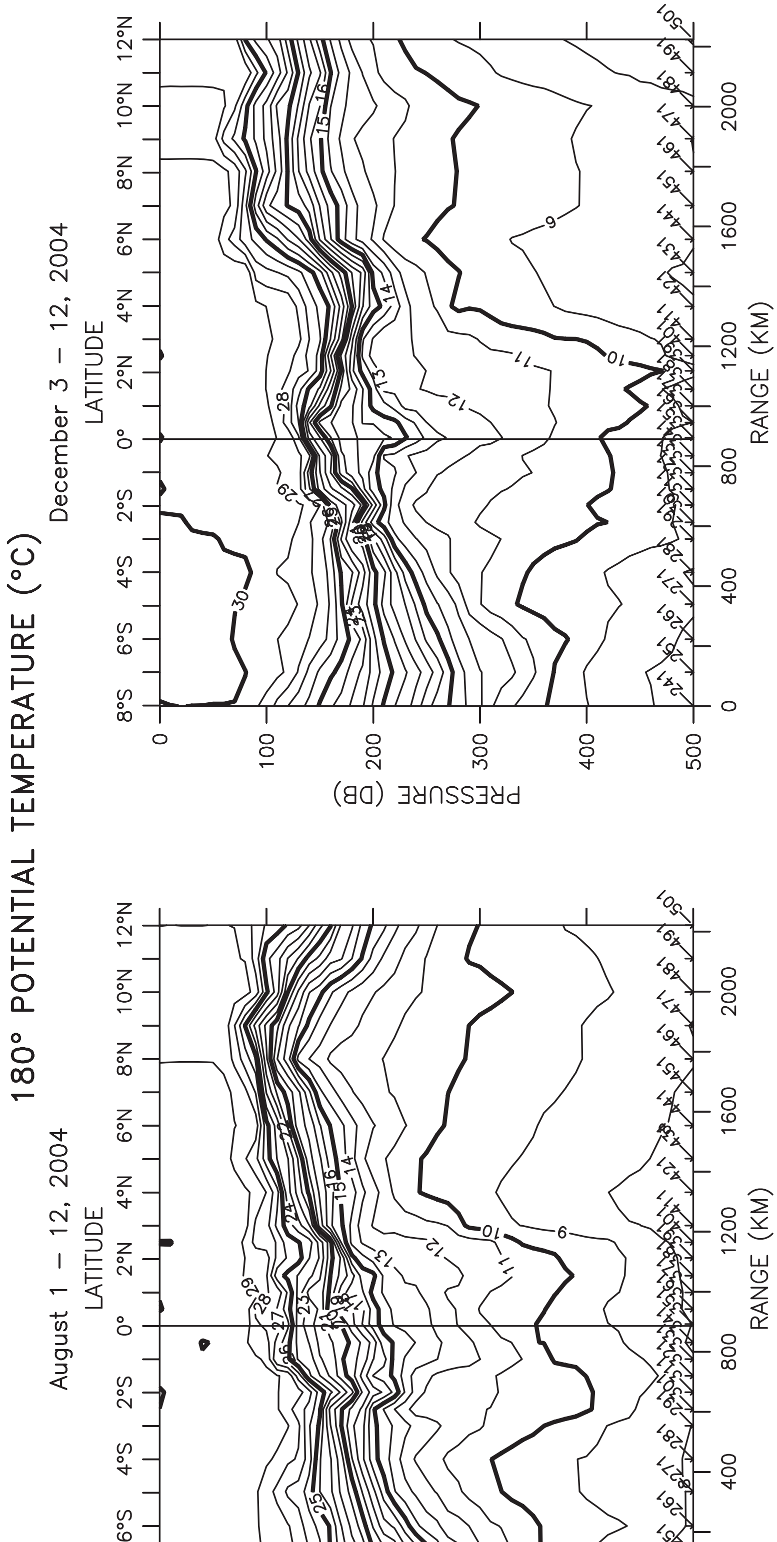

Figure 48: GP4-04-KA summer and GP8-04-KA fall potential temperature (°C) sections along 180°. Contour intervals are 1°C.

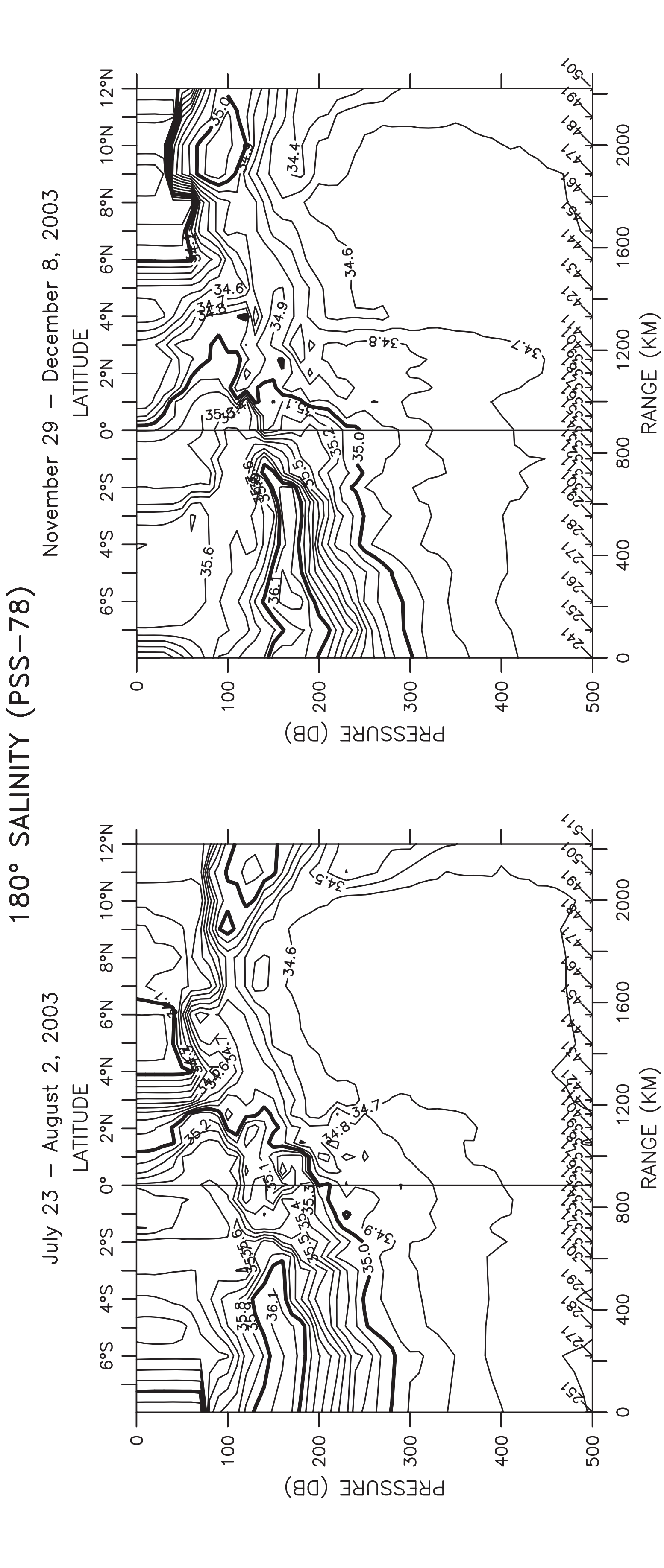

Figure 49: GP4-03-KA summer and GP8-03-KA fall salinity (PSS-78) sections along 180°. Contour intervals are 0.1 PSS.

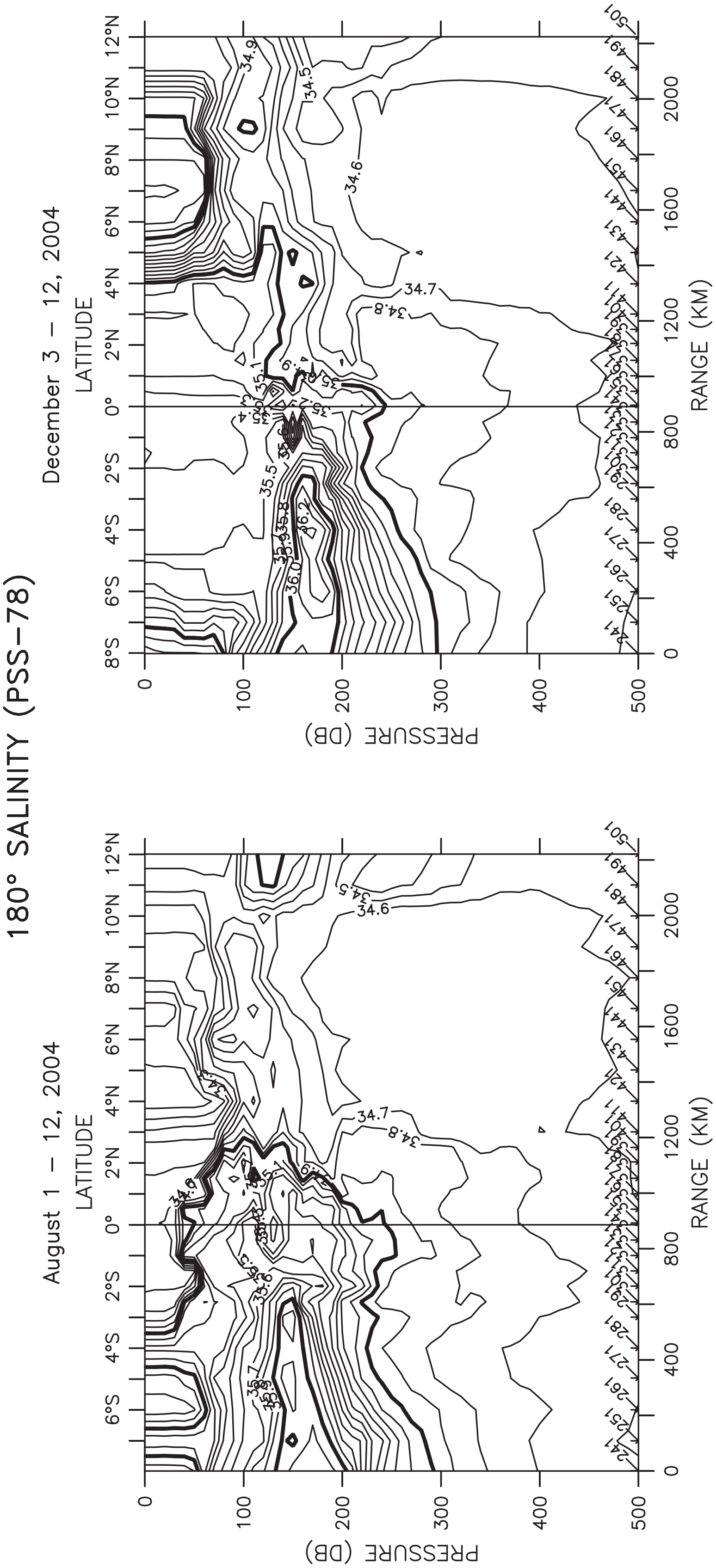

Figure 50: GP4-04-KA summer and GP8-04-KA fall salinity (PSS-78) sections along 180°. Contour intervals are 0.1 PSS.

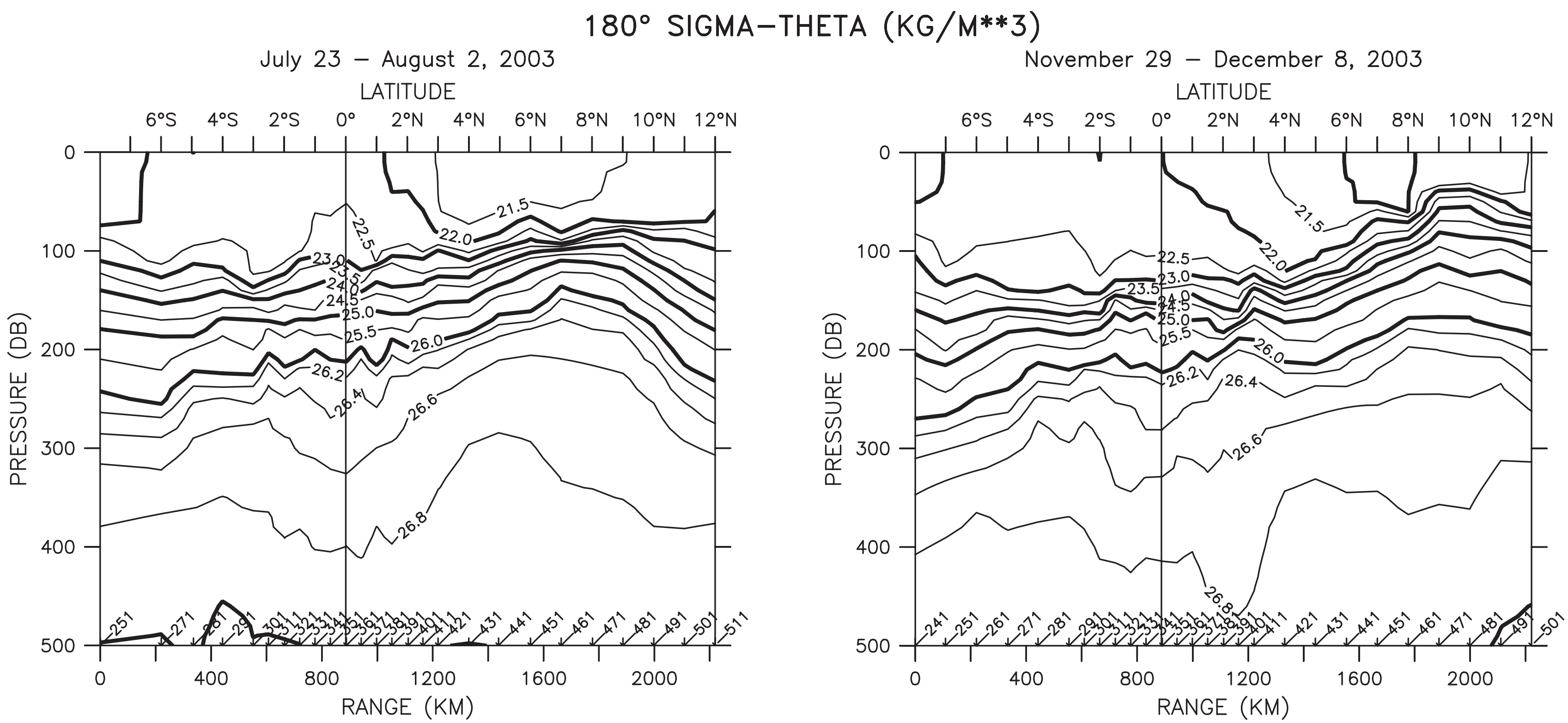

Figure 51: GP4-03-KA summer and GP8-03-KA fall potential density (kg/m^3) sections along 180°. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

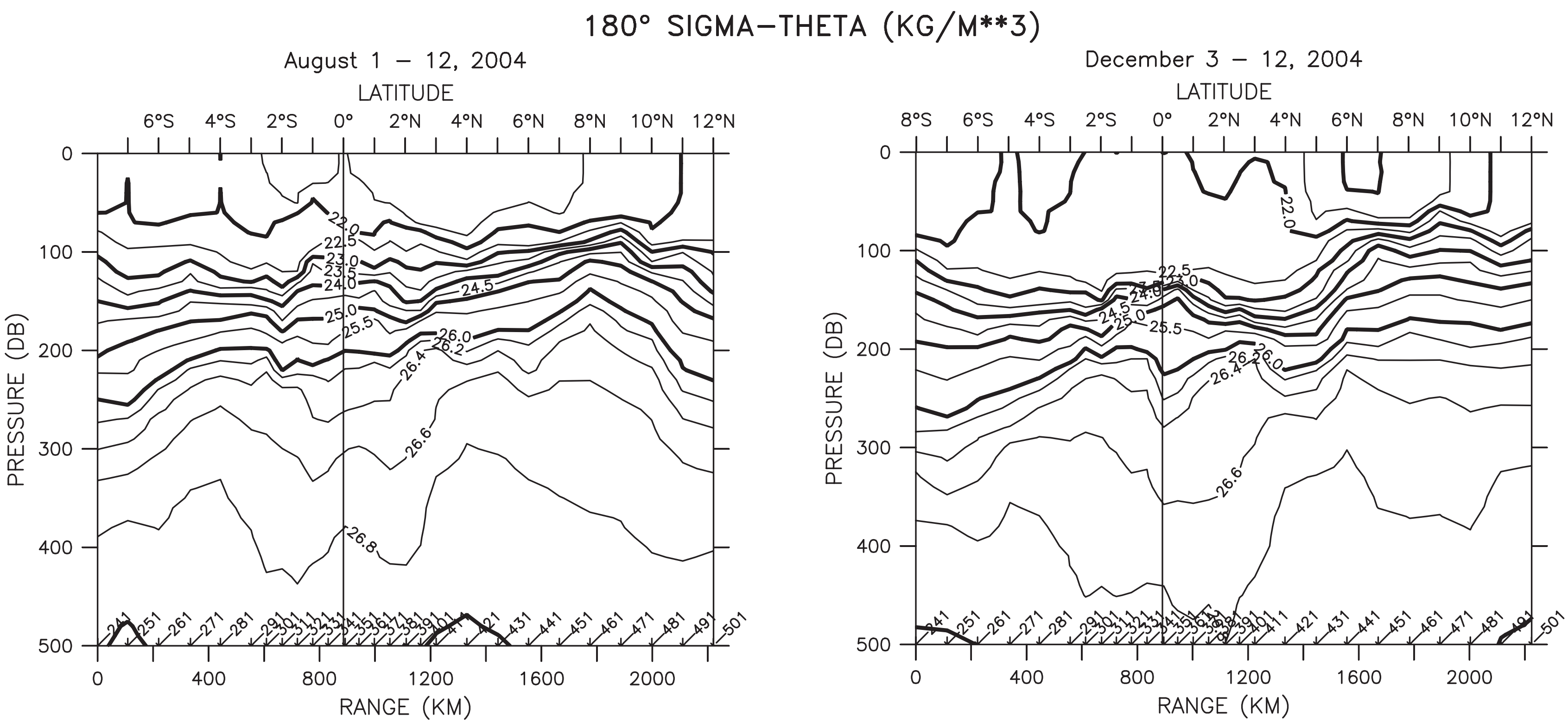

Figure 52: GP4-04-KA summer and GP8-04-KA fall potential density (kg/m^3) sections along 180°. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

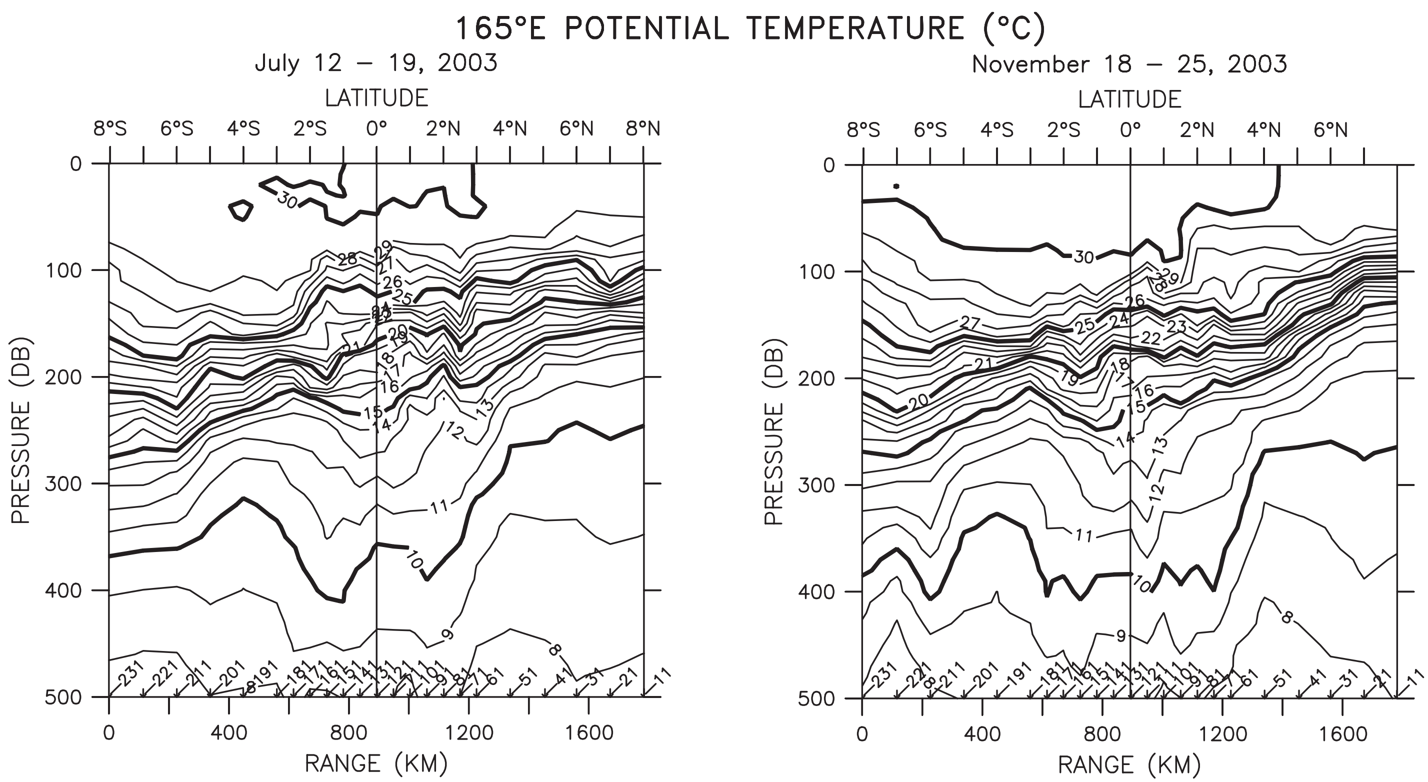

Figure 53: GP4-03-KA summer and GP8-03-KA fall potential temperature (°C) sections along 165°E. Contour intervals are 1°C.

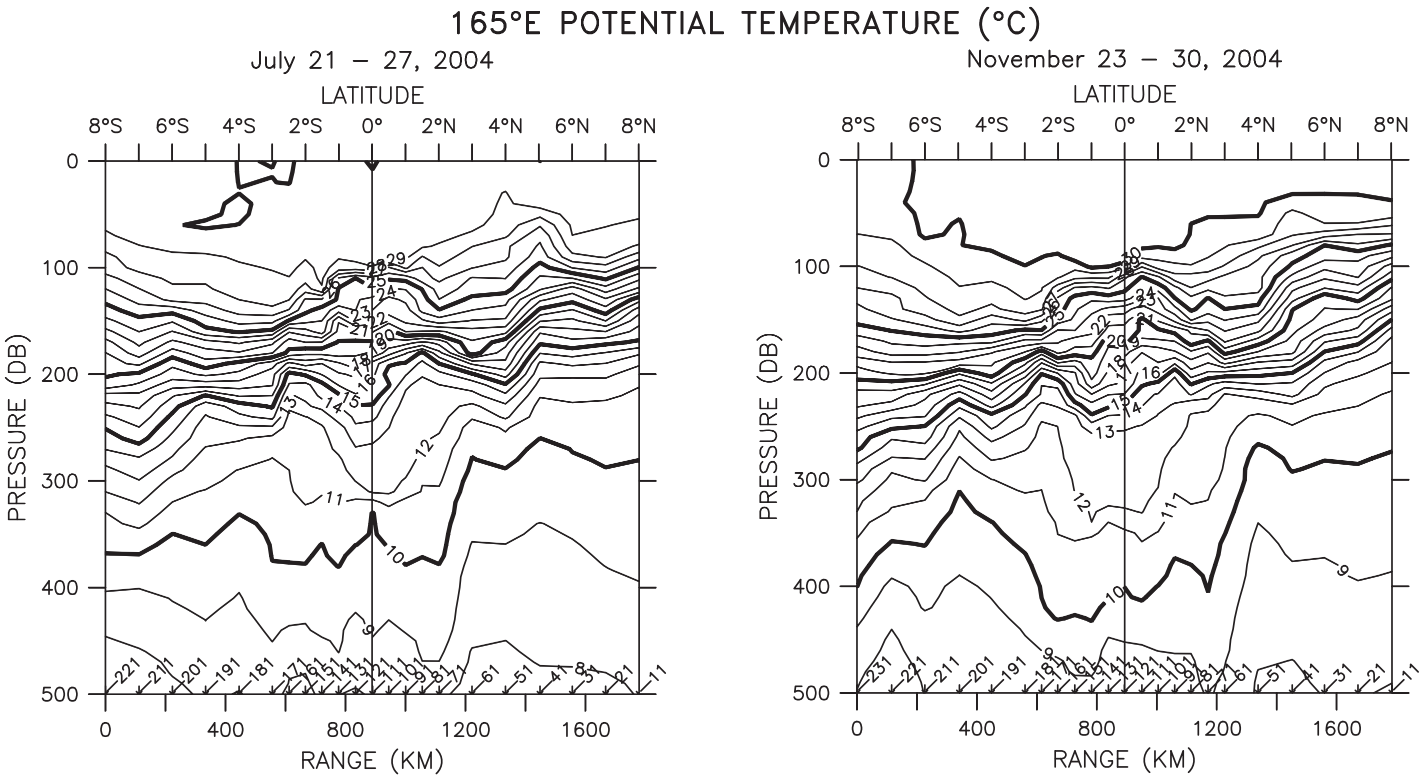

Figure 54: GP4-04-KA summer and GP8-04-KA fall potential temperature (°C) sections along 165°E. Contour intervals are 1°C.

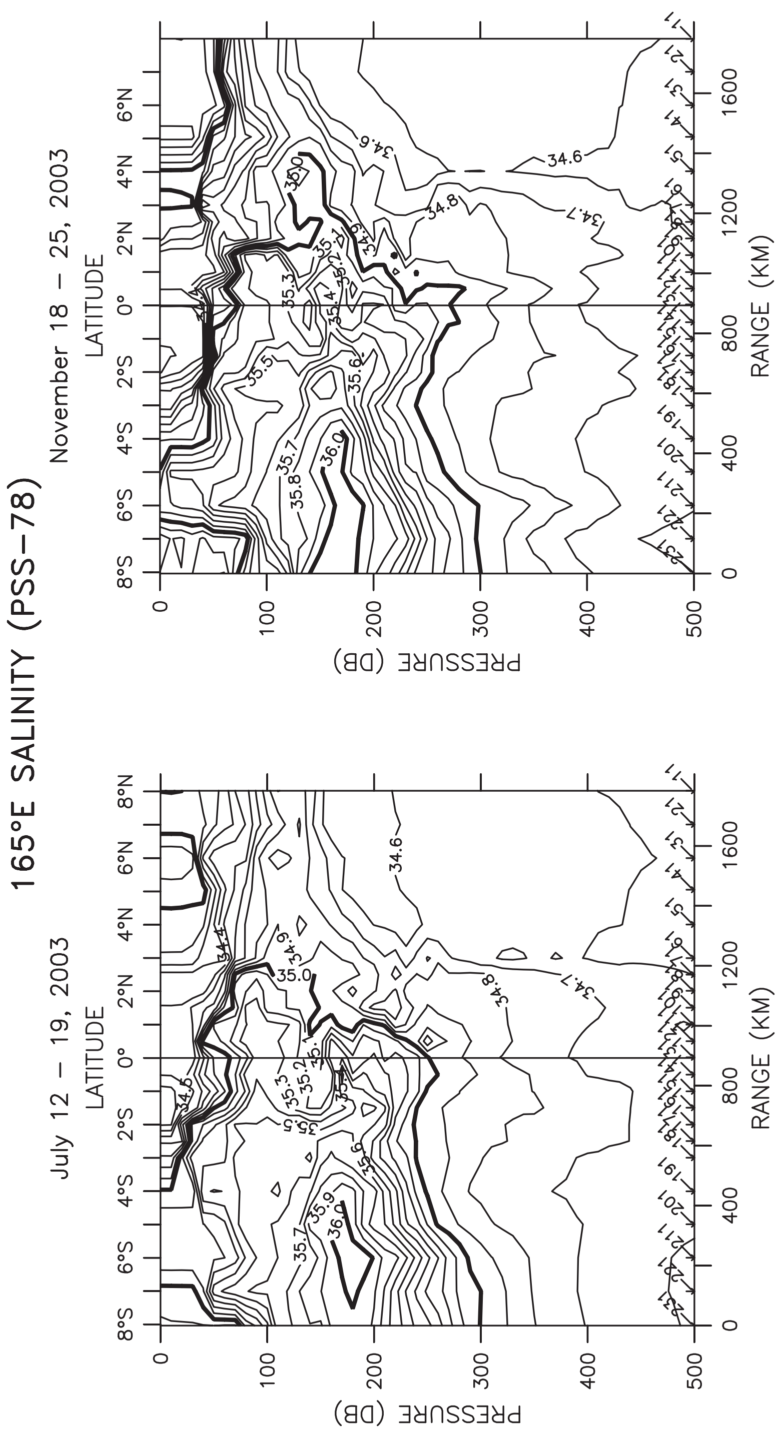

Figure 55: GP4-03-KA summer and GP8-03-KA fall salinity (PSS-78) sections along 165°E. Contour intervals are 0.1 PSS.

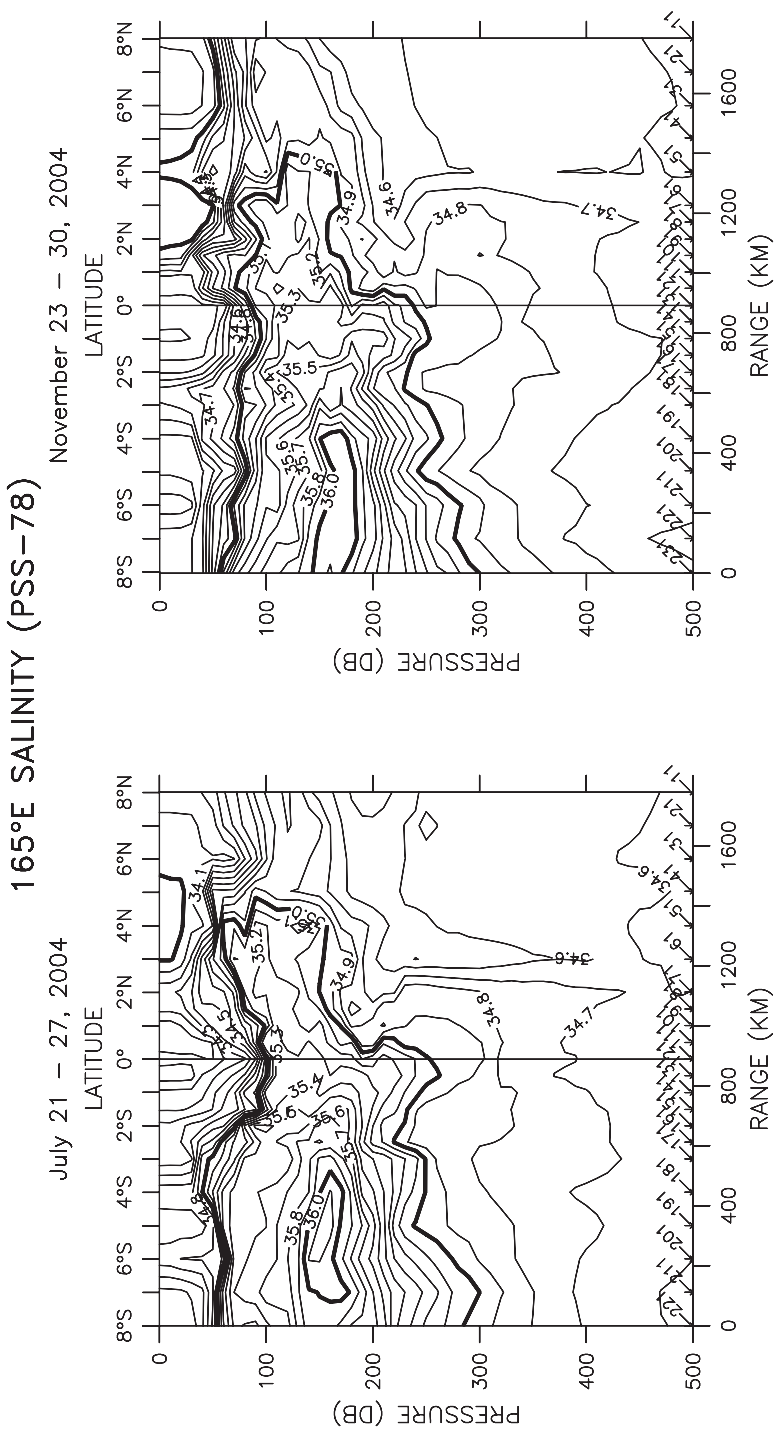

Figure 56: GP4-04-KA summer and GP8-04-KA fall salinity (PSS-78) sections along 165°E. Contour intervals are 0.1 PSS.

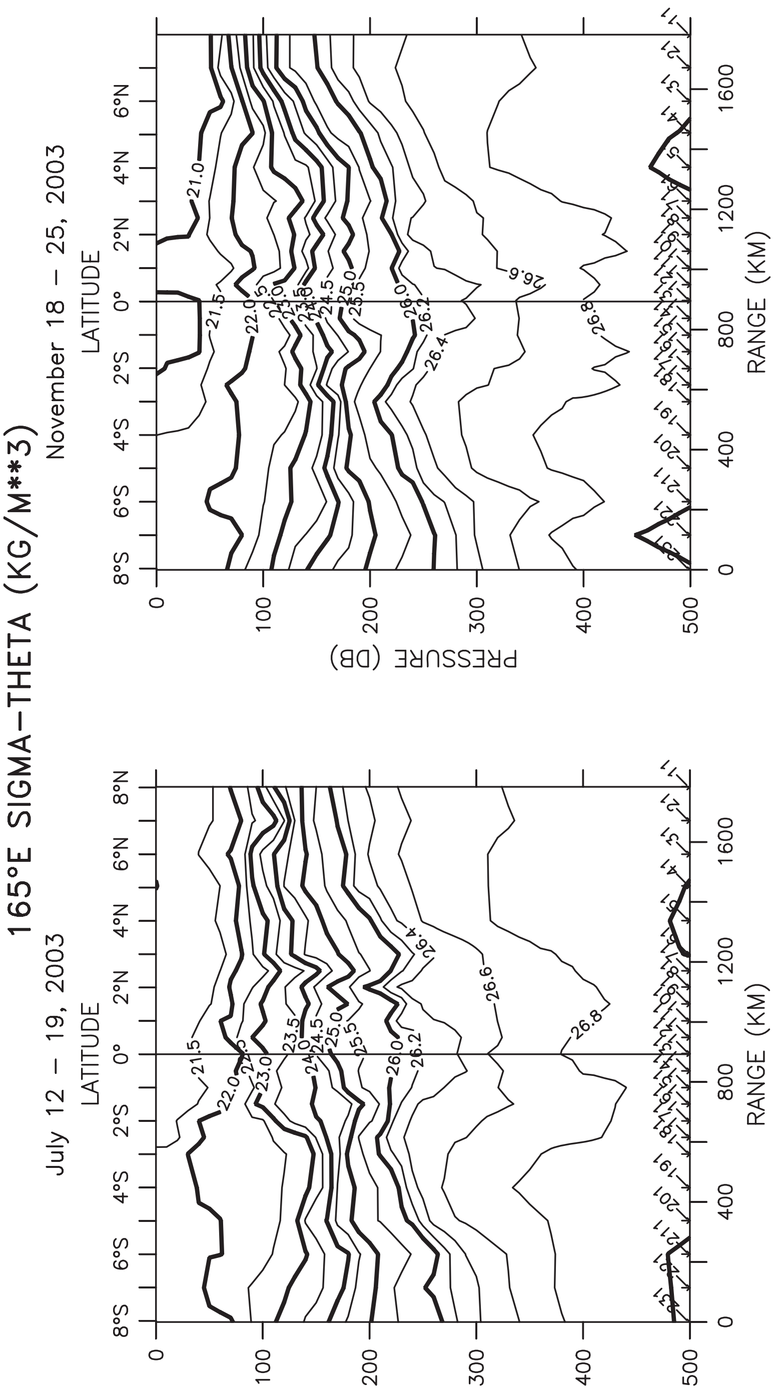

Figure 57: GP4-03-KA summer and GP8-03-KA fall potential density (kg/m^3) sections along 165°E. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

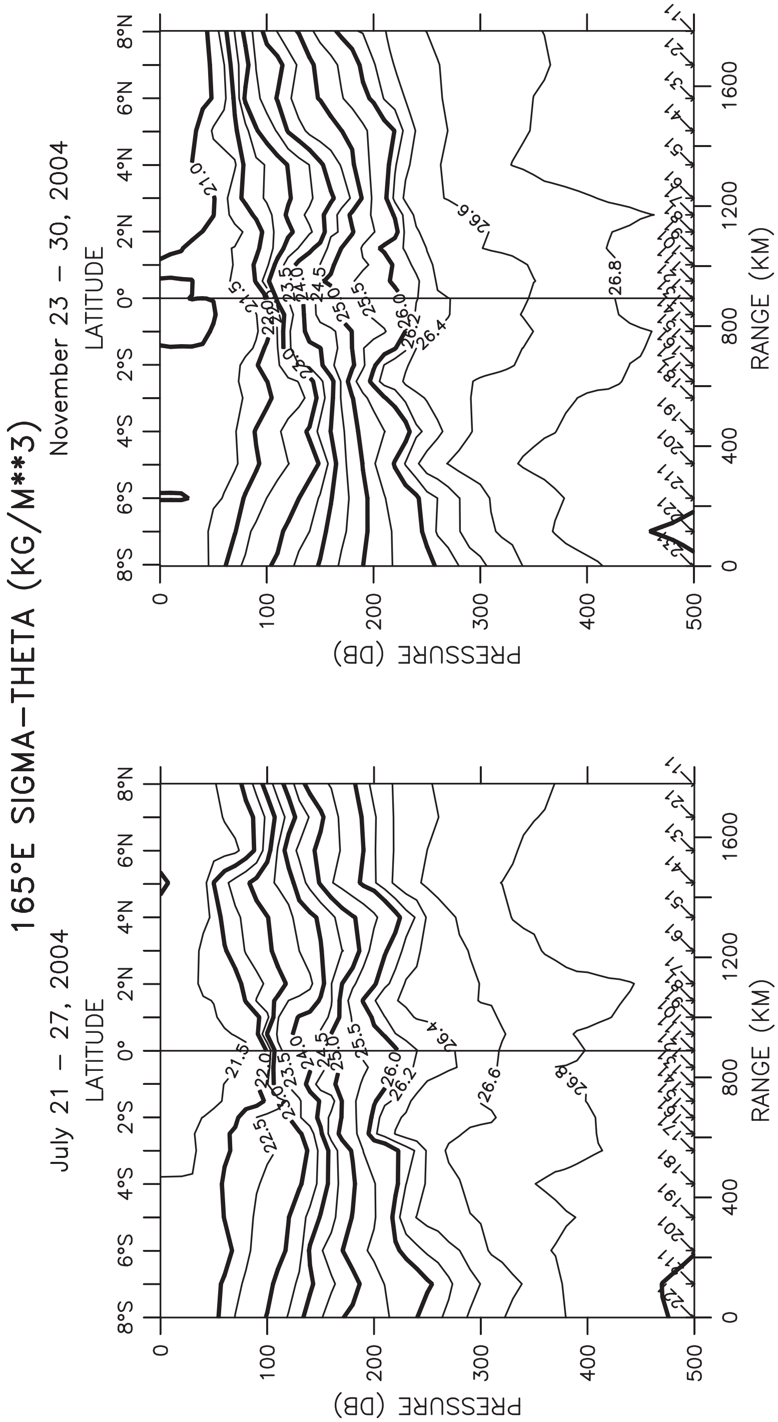

Figure 58: GP4-04-KA summer and GP8-04-KA fall potential density (kg/m^3) sections along 165°E. Contour intervals are 0.5 less than 26.0 and 0.2 greater than 26.0.

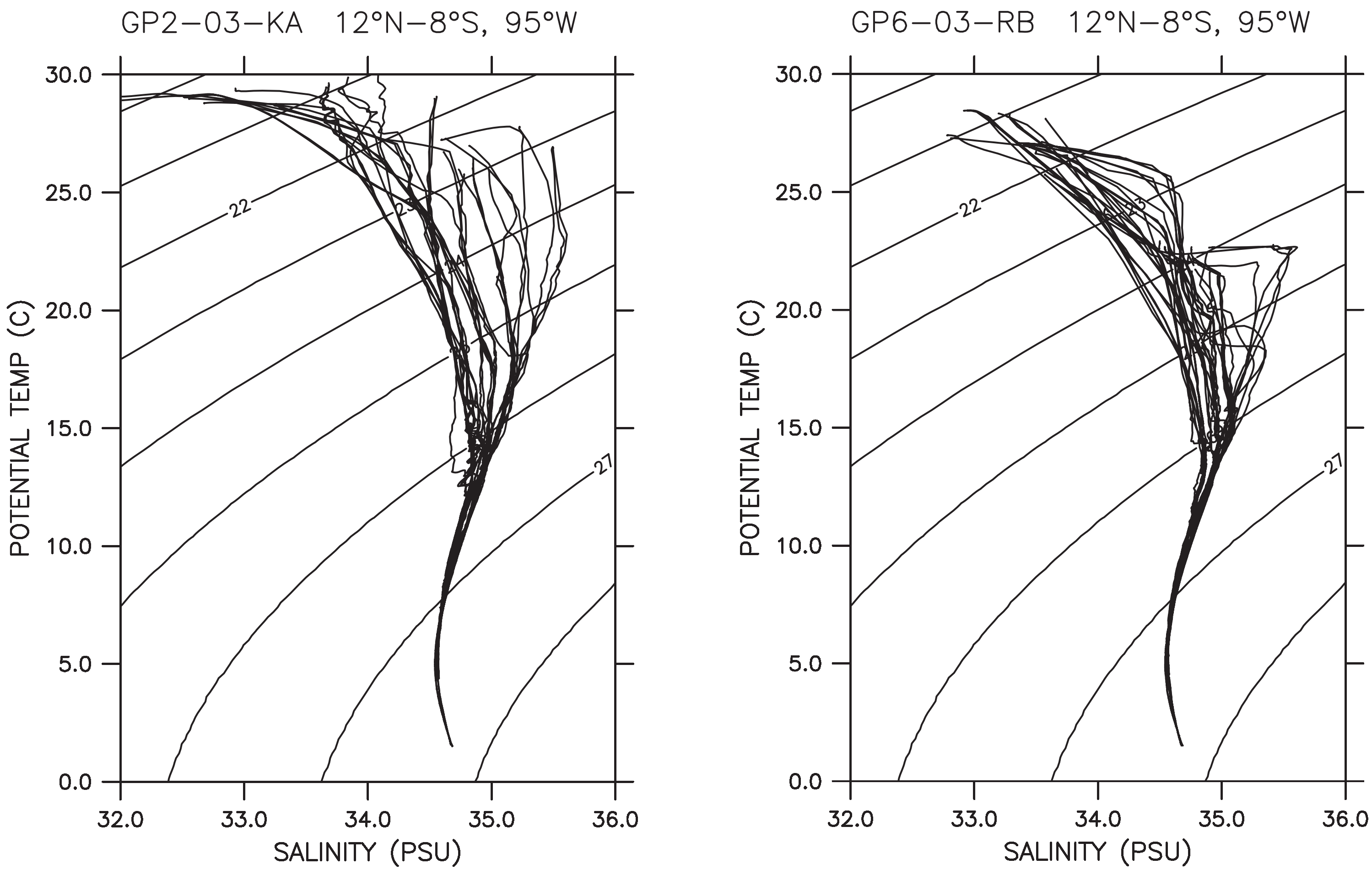

Figure 59: GP2-03-KA spring (April 10−22, 2003) and GP6-03-RB fall (October 27−November 5, 2003) composite θ-S diagrams along 95°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

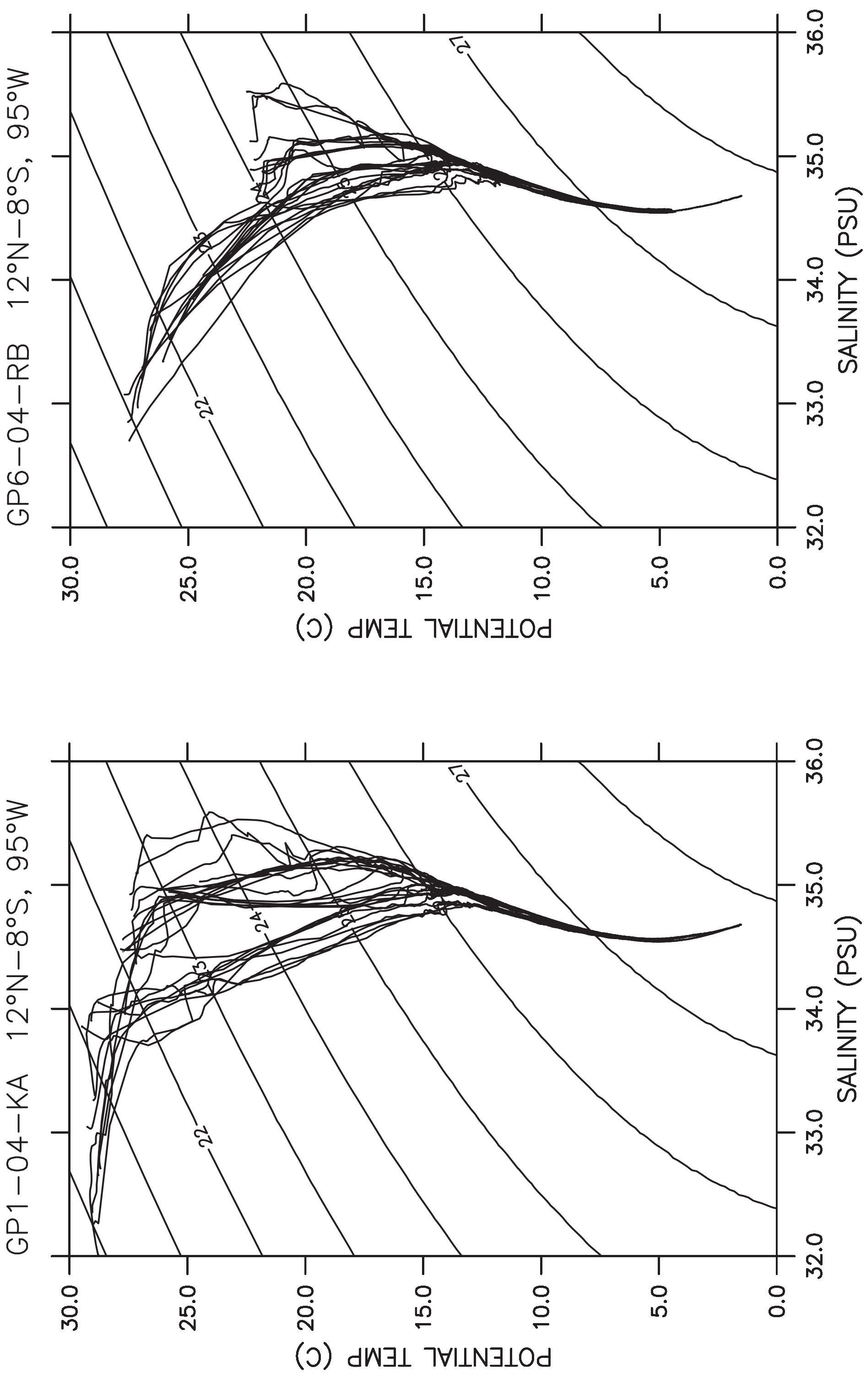

Figure 60: GP1-04-KA spring (April 11−19, 2004) and GP6-04-RB fall (November 2−10, 2004) composite θ-S diagrams along 95°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

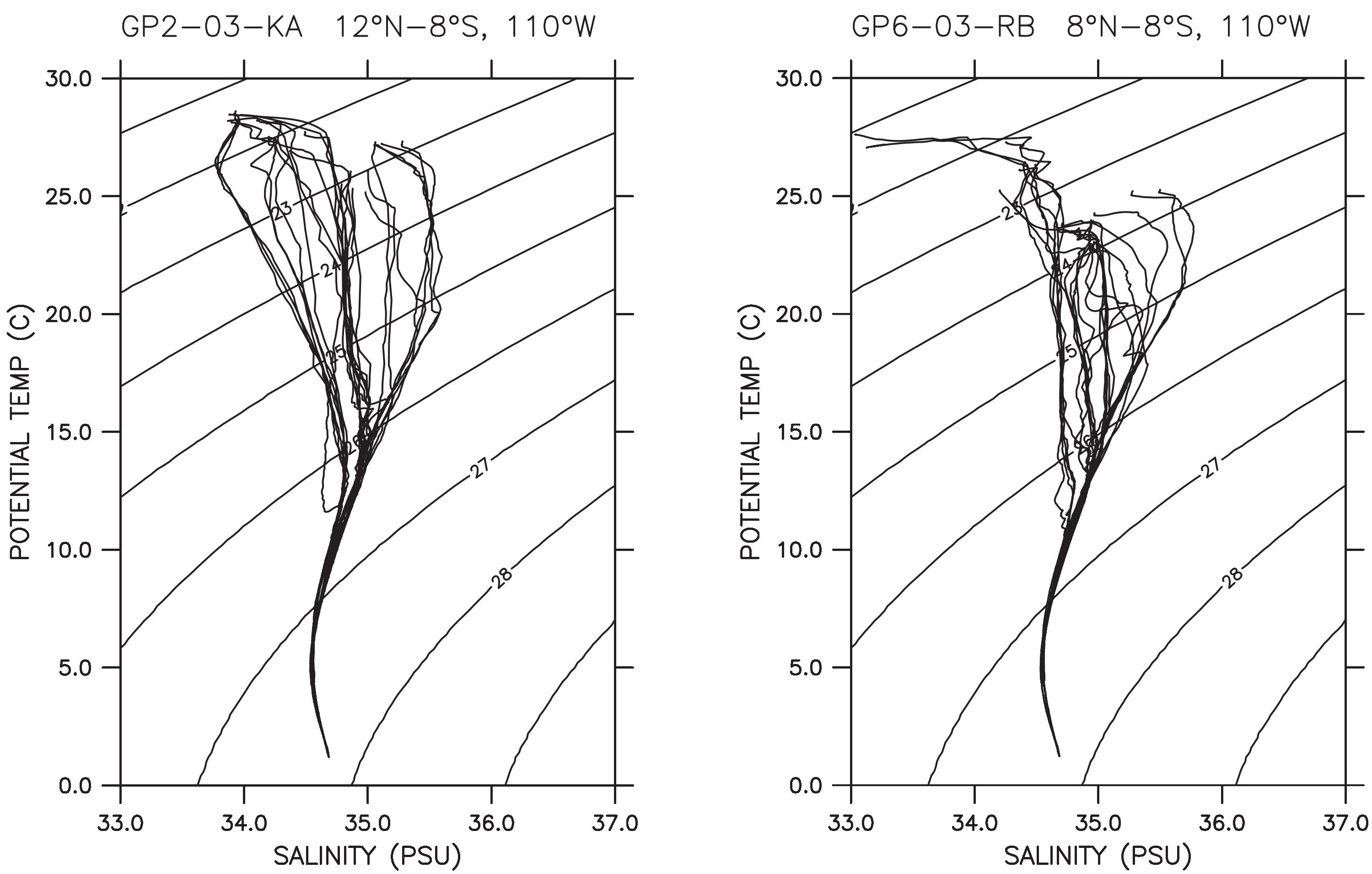

Figure 61: GP2-03-KA spring (March 30−April 10, 2003) and GP6-03-RB fall (November 8−14, 2003) composite θ-S diagrams along 110°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

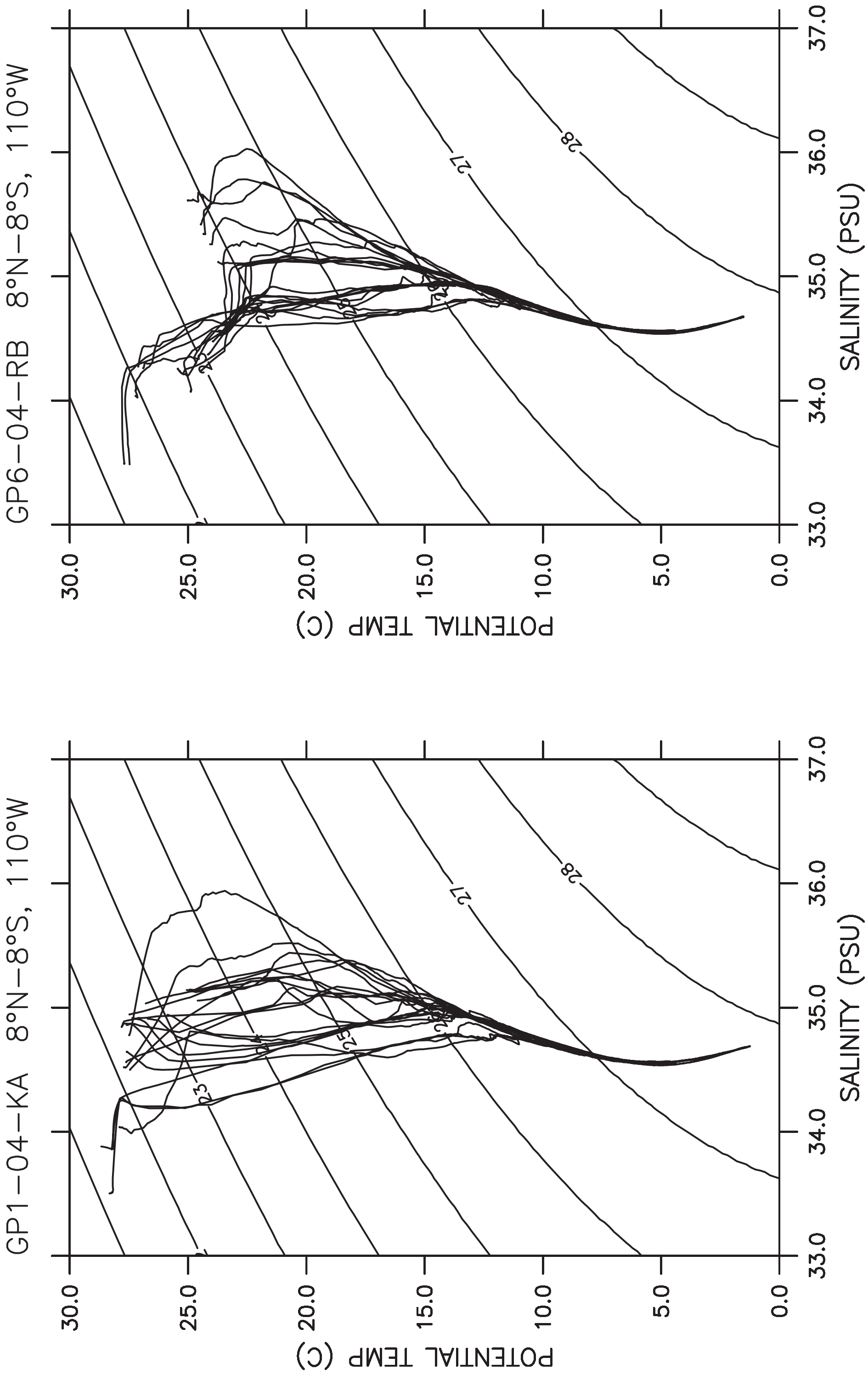

Figure 62: GP1-04-KA spring (March 31−April 7, 2004) and GP6-04-RB fall (November 14−21, 2004) composite θ-S diagrams along 110°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

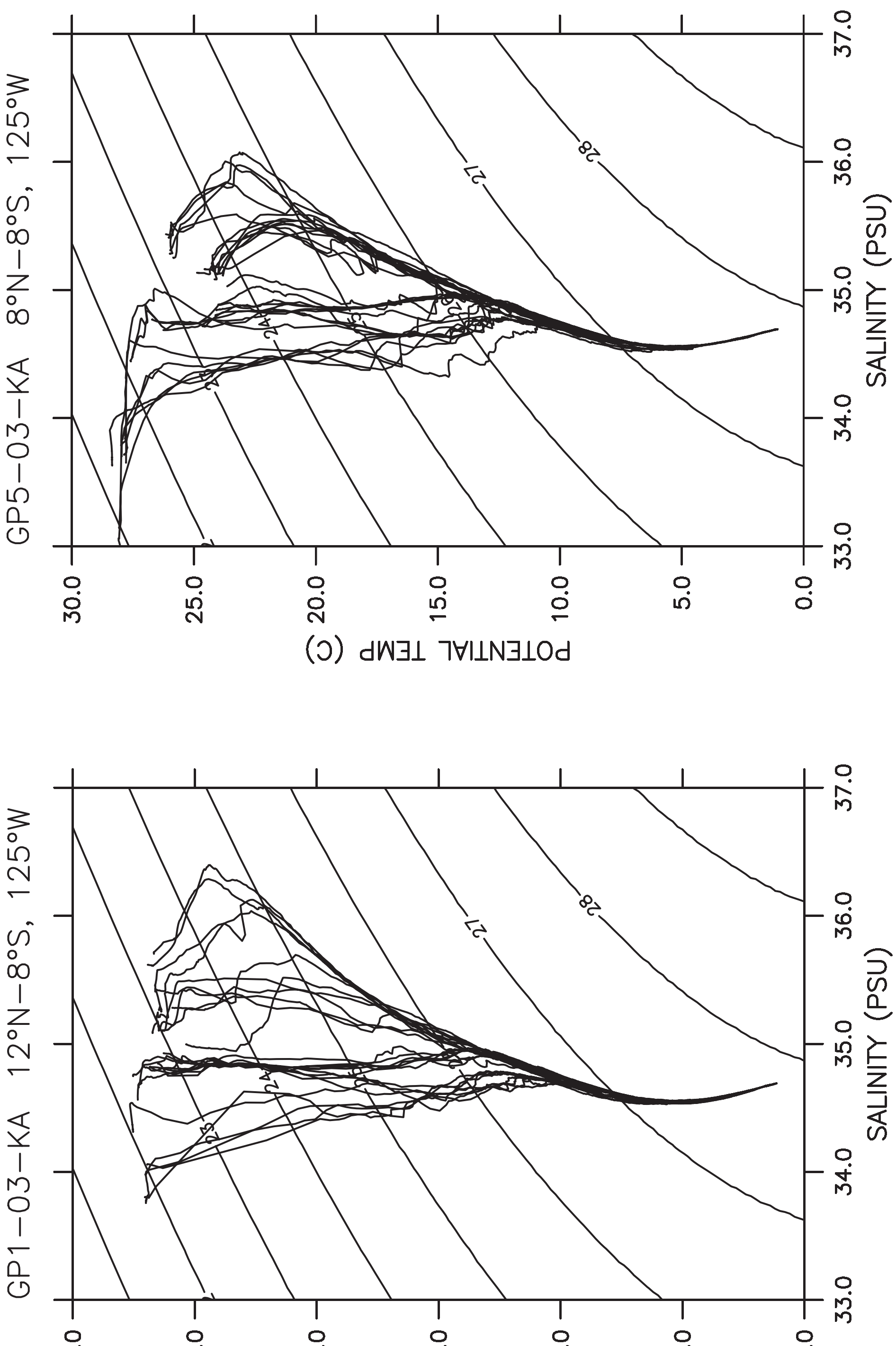

Figure 63: GP1-03-KA winter (January 27−February 7, 2003) and GP5-03-KA summer (August 28−September 9, 2003) composite θ-S diagrams along 125°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

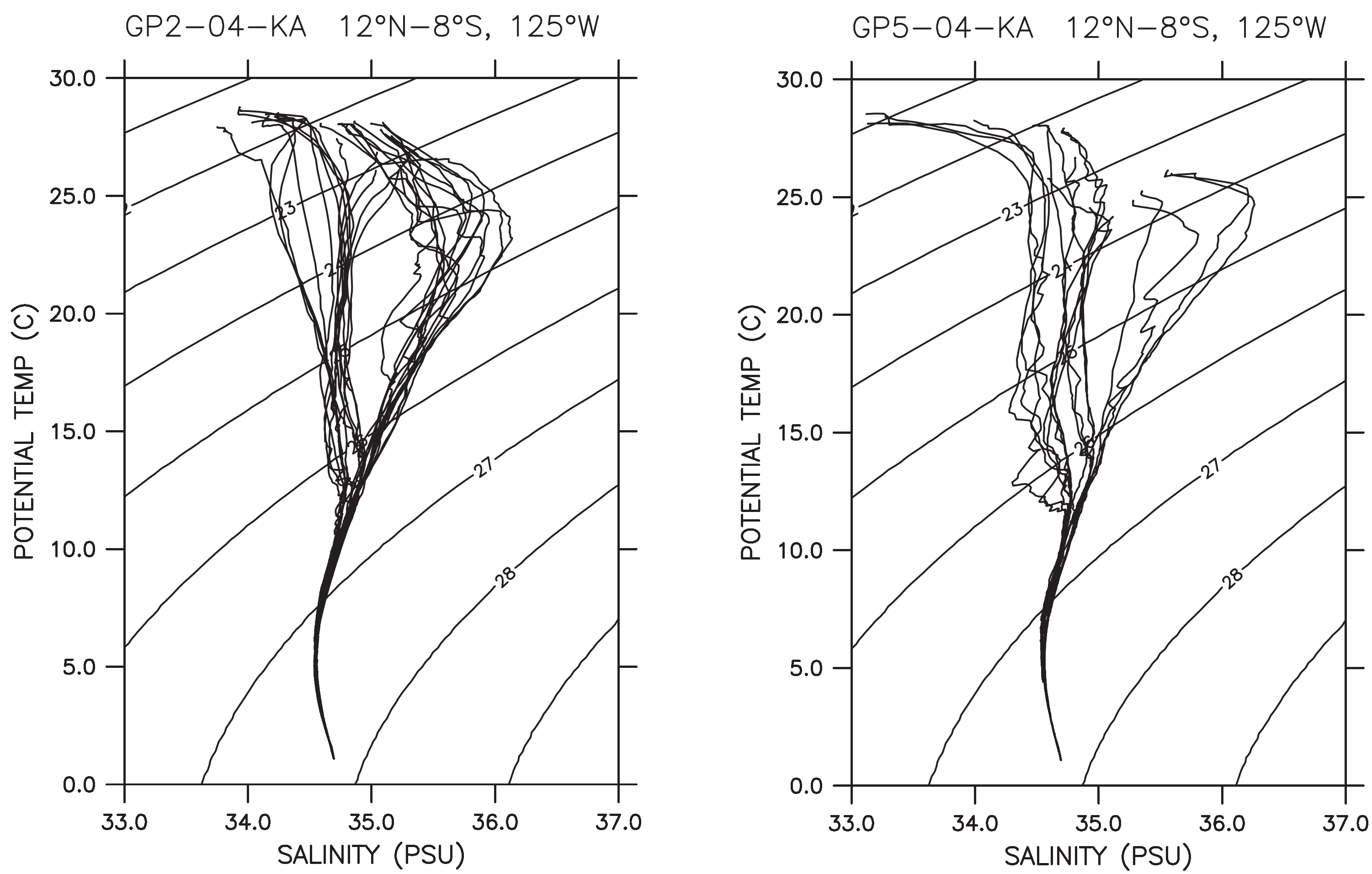

Figure 64: GP2-04-KA spring (May 1−12, 2004) and GP5-04-KA fall (September 21−29, 2004) composite θ-S diagram along 125°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

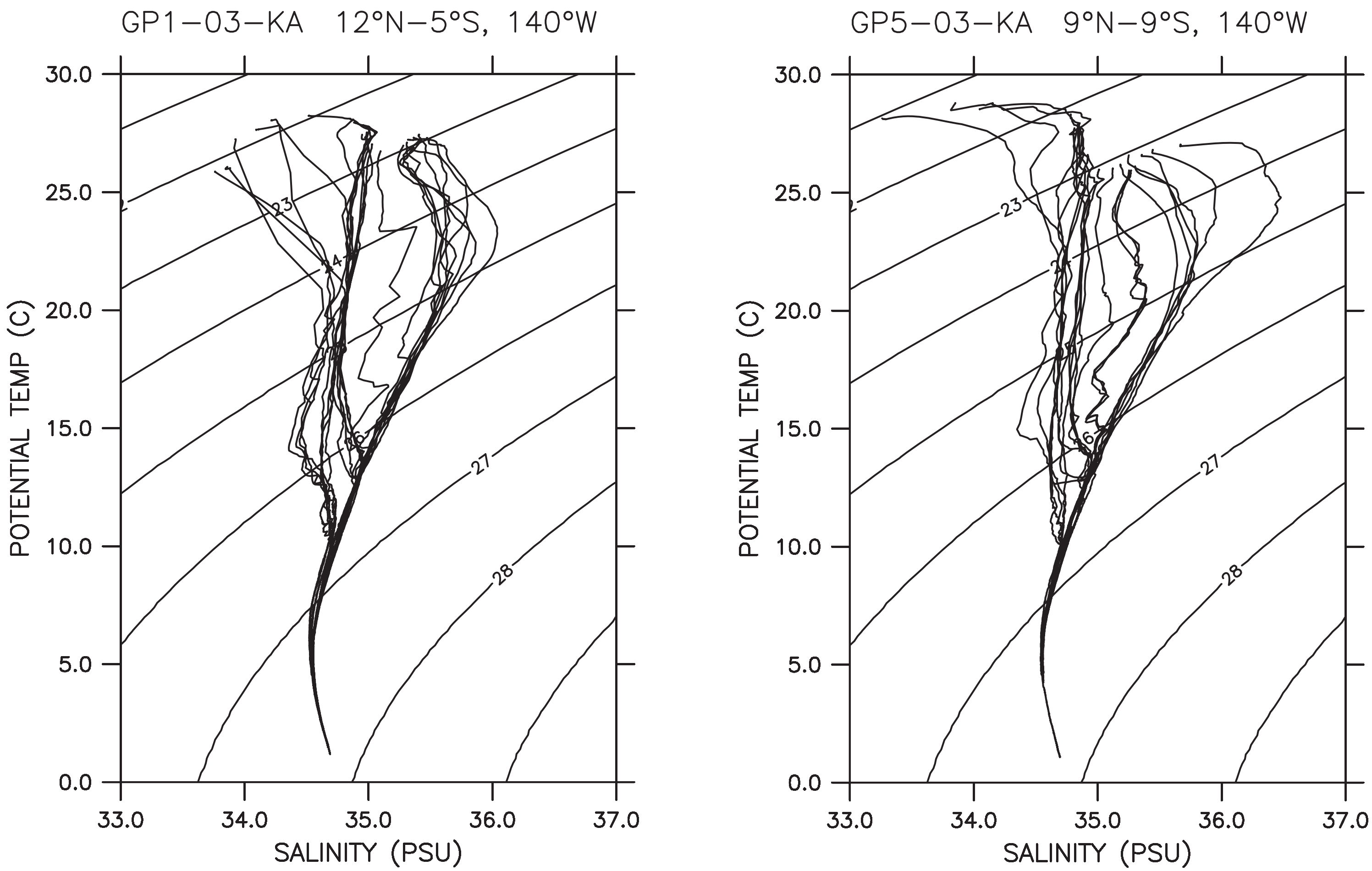

Figure 65: GP1-03-KA winter (January 11−20, 2003) and GP5-03-KA fall (September 12−24, 2003) composite θ-S diagrams along 140°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

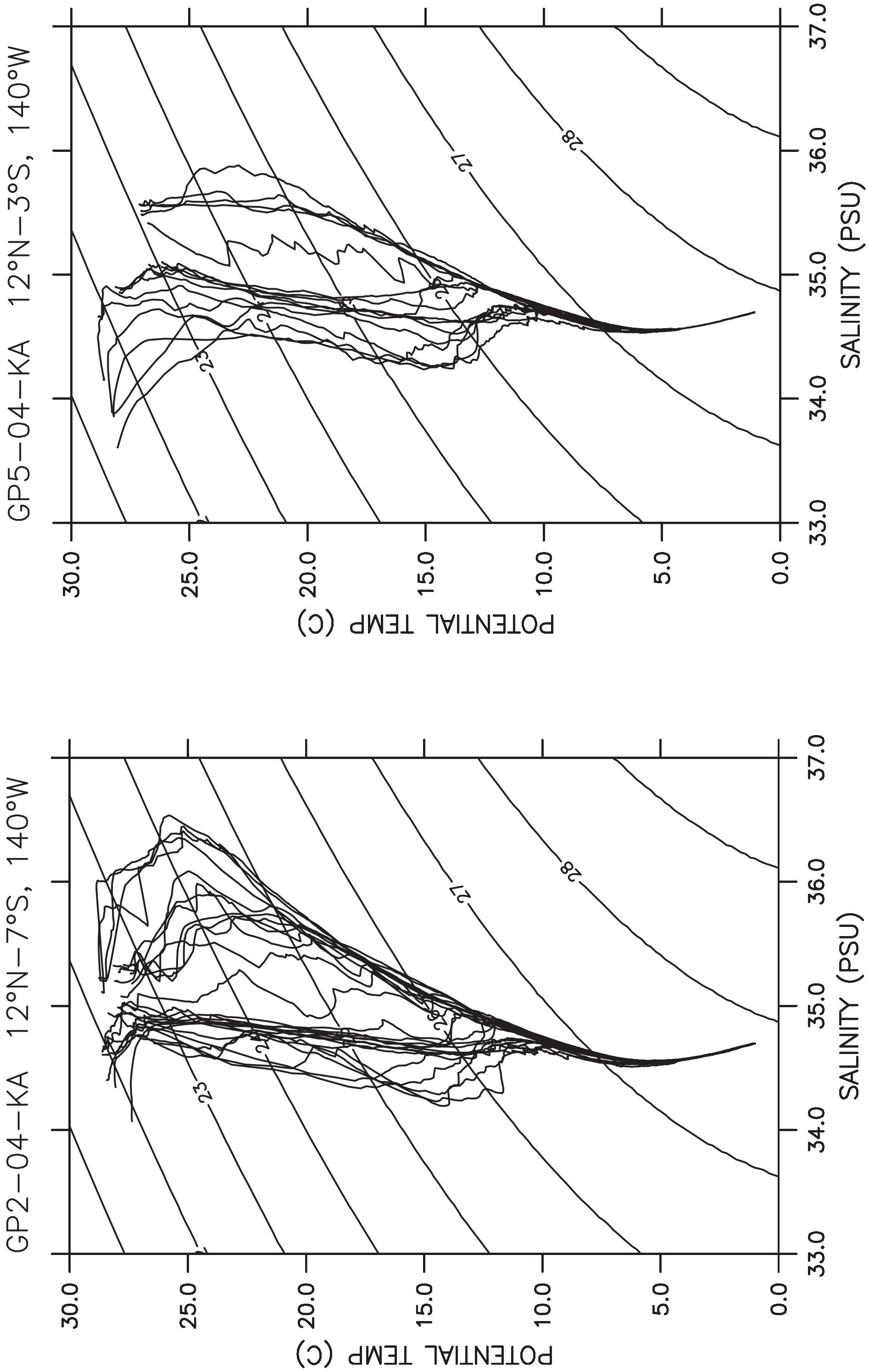

Figure 66: GP2-04-KA spring (May 20−28, 2004) and GP5-04-KA fall (September 7−14, 2004) composite θ-S diagrams along 140°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

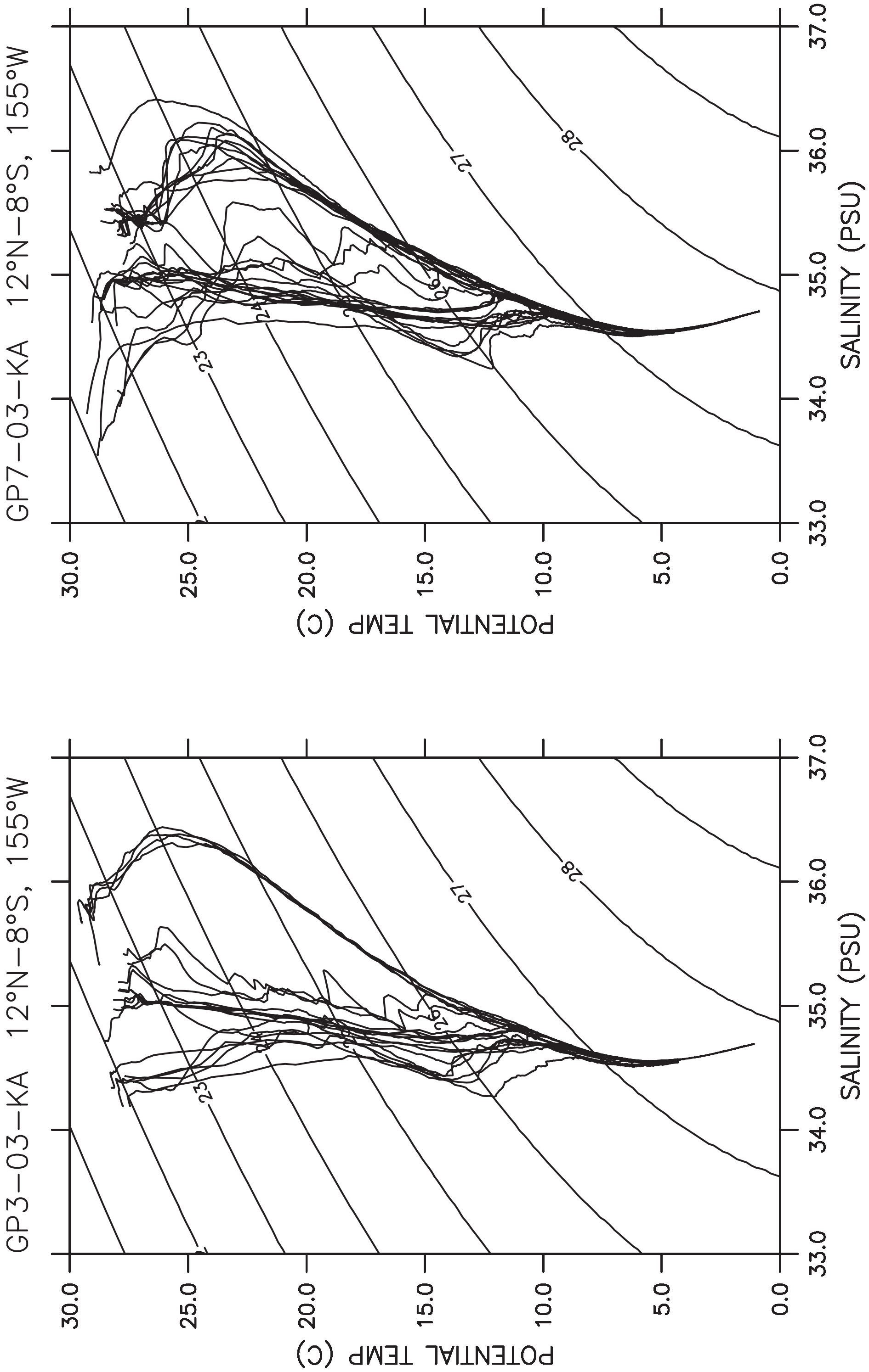

Figure 67: GP3-03-KA summer (June 12–20, 2003) and GP7-03-KA fall (October 19–27, 2003) composite θ-S diagrams along 155°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

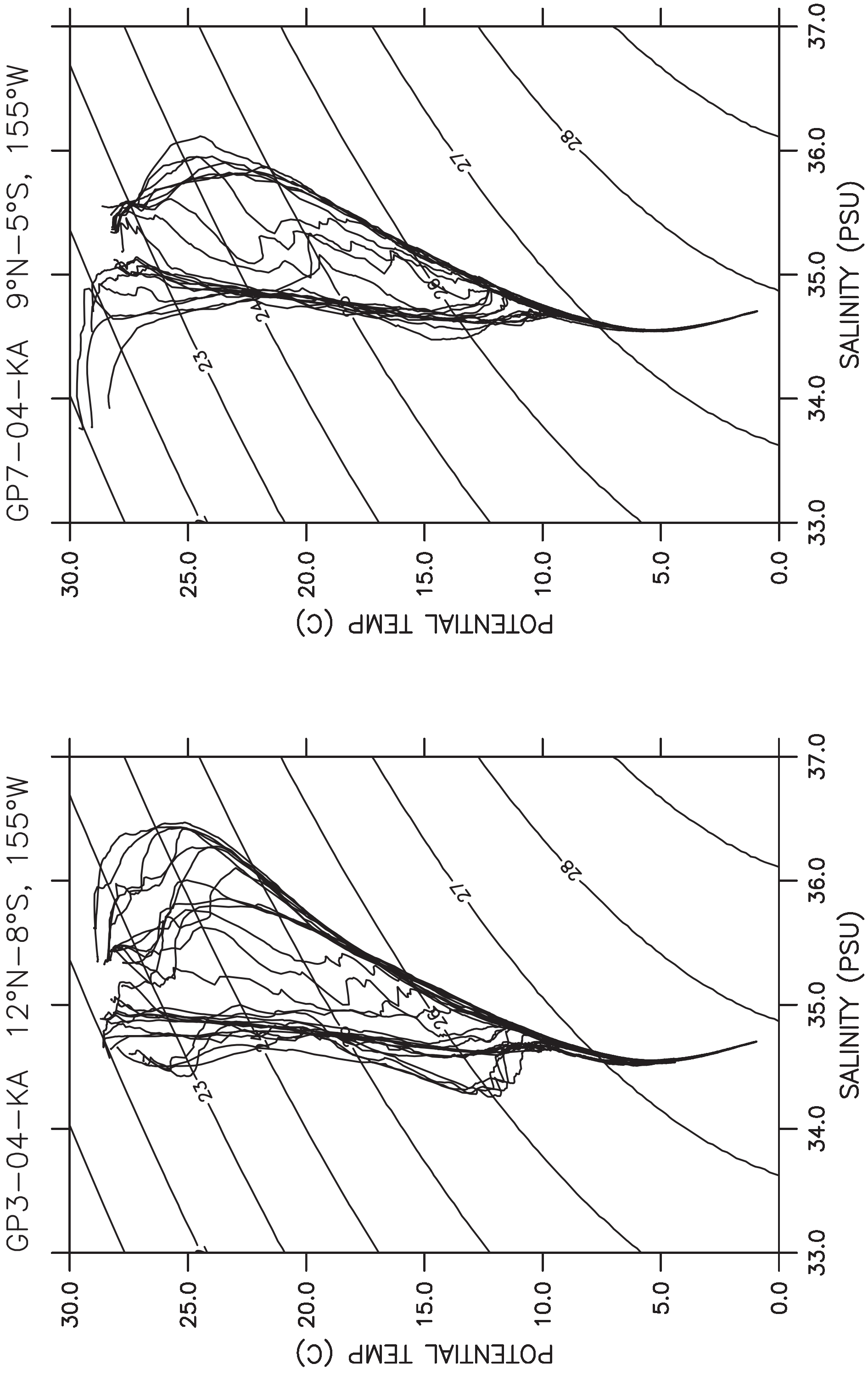

Figure 68: GP3-04-KA summer (June 20−29, 2004) and GP7-04-KA fall (October 30−November 5, 2004) composite θ-S diagrams along 155°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

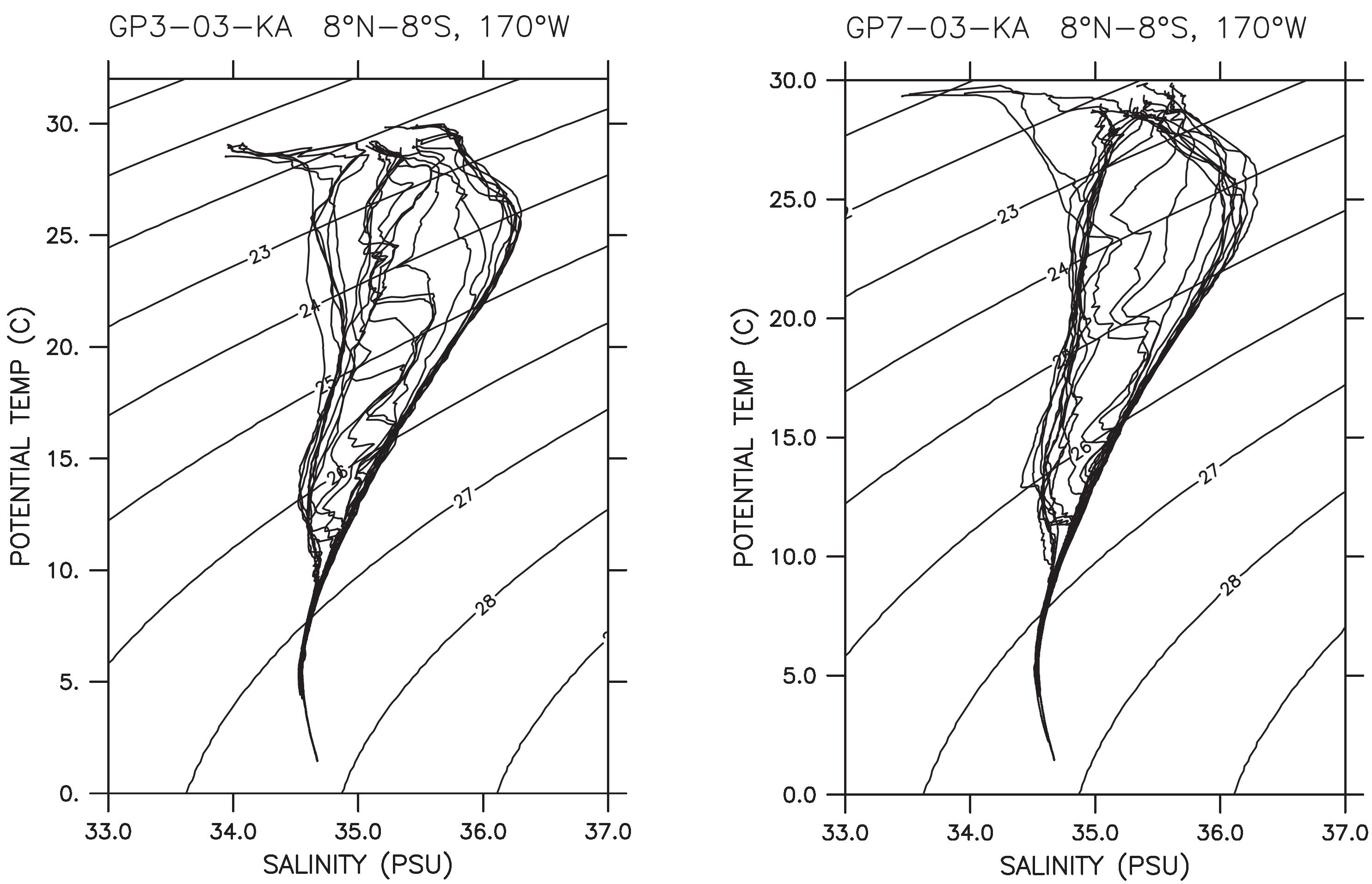

Figure 69: GP3-03-KA summer (June 24−July 3, 2003) and GP7-03-KA fall (November 3−10, 2003) composite θ-S diagrams along 170°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

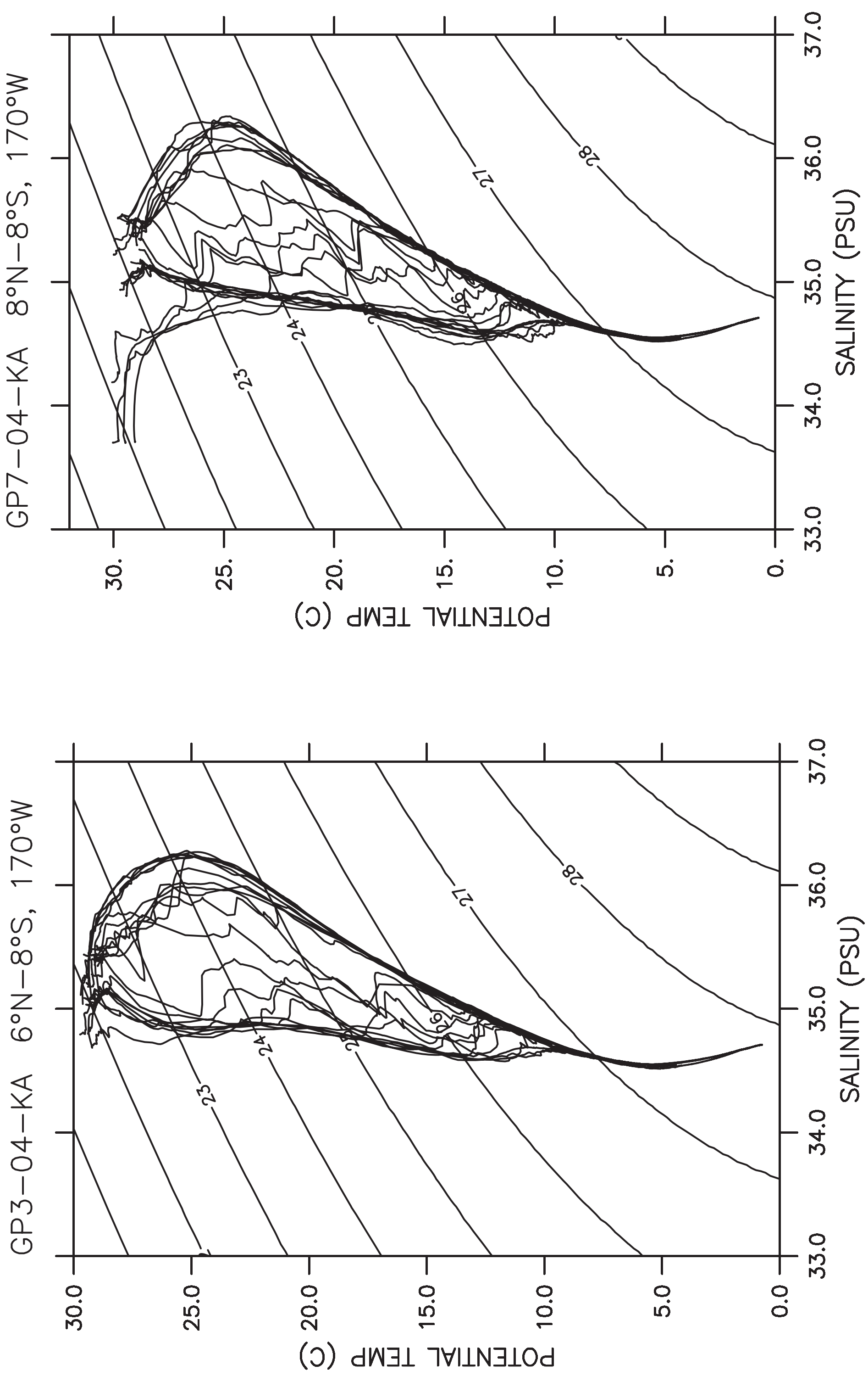

Figure 70: GP3-04-KA summer (June 5−12, 2004) and GP7-04-KA fall (November 8−15, 2004) composite θ-S diagrams along 170°W. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

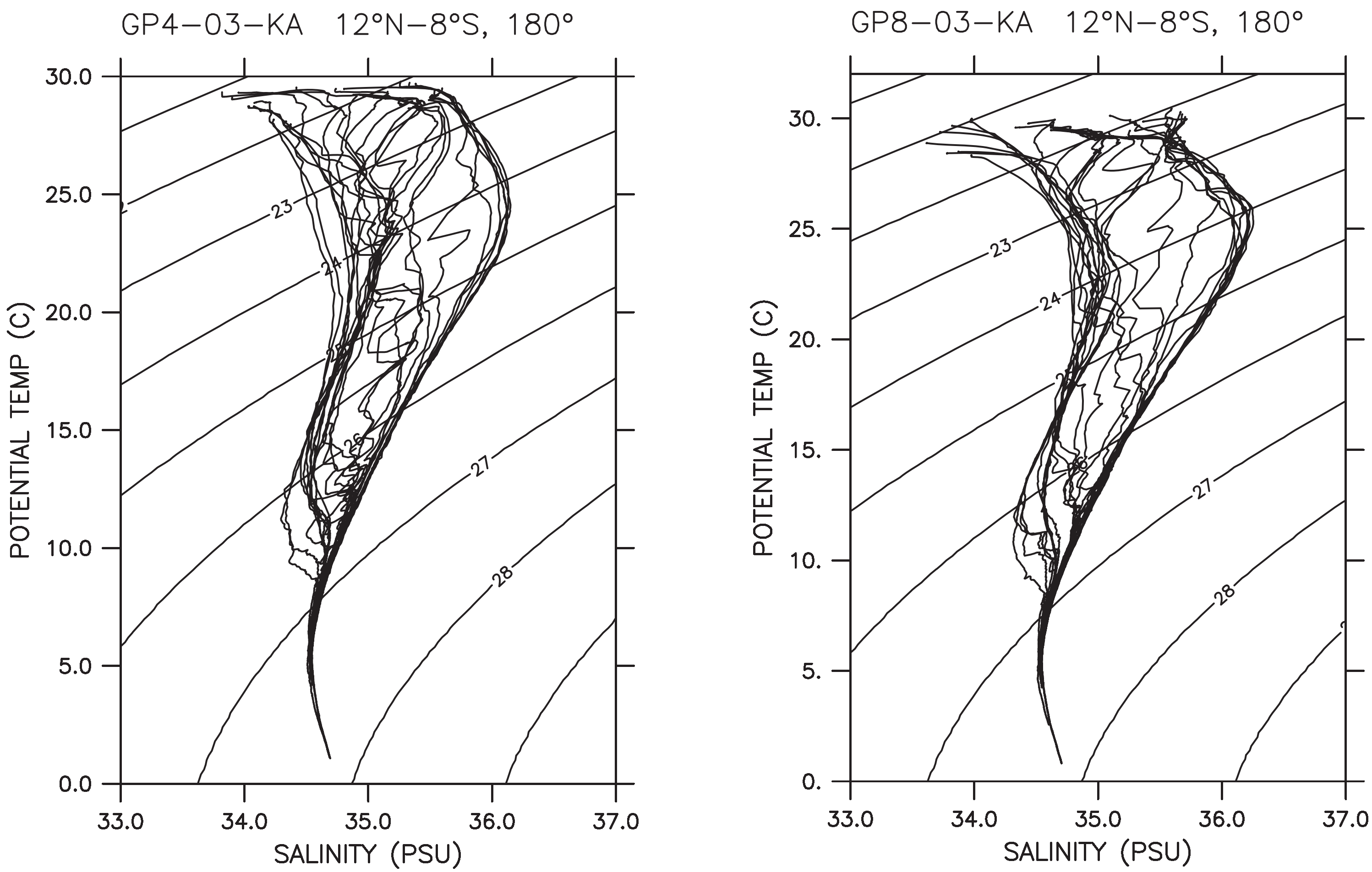

Figure 71: GP4-03-KA summer (July 23−August 2, 2003) and GP8-03-KA fall (November 29−December 8, 2003) composite θ-S diagrams along 180°. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

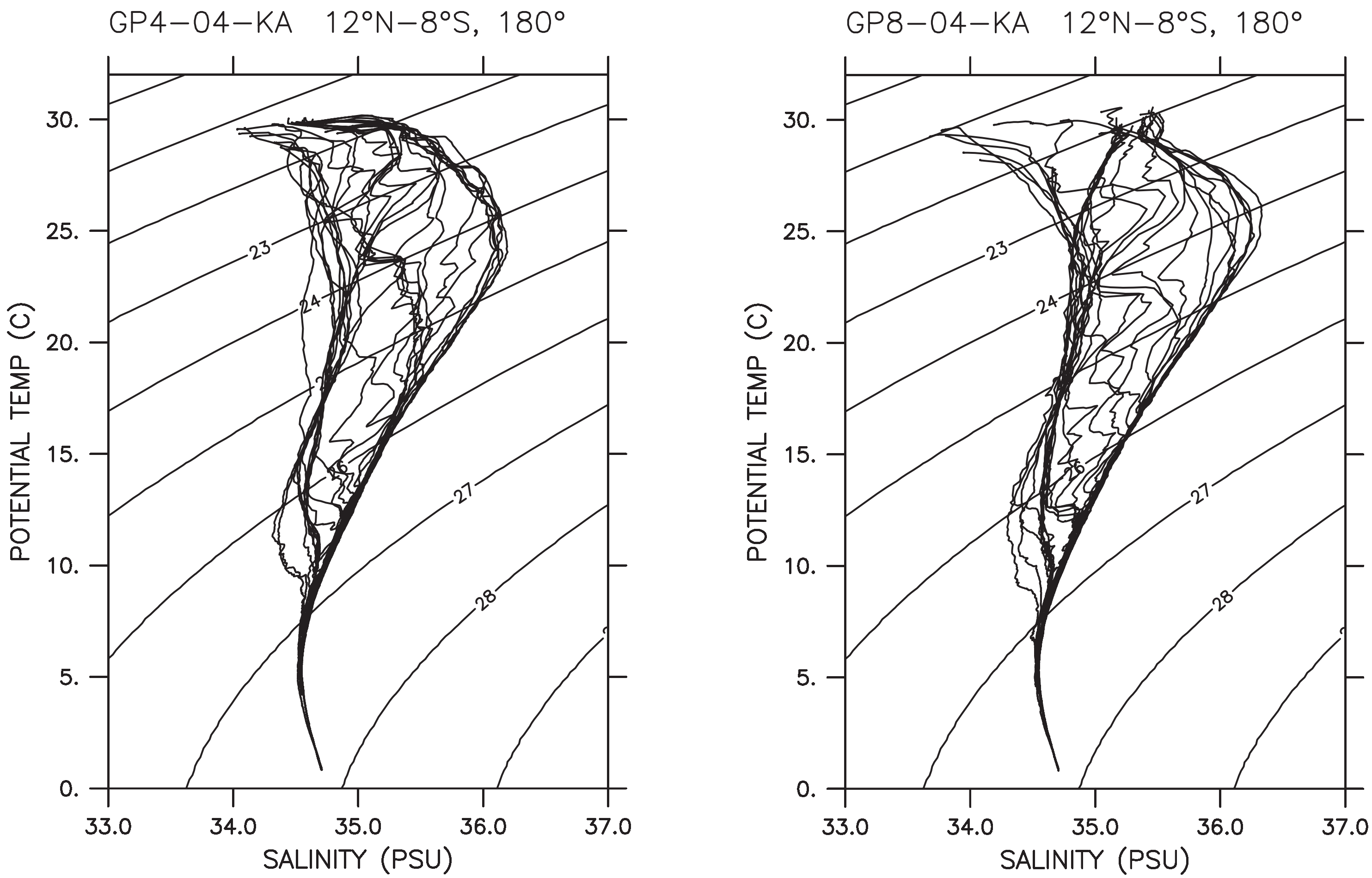

Figure 72: GP4-04-KA summer (August 1–12, 2004) and GP8-04-KA winter (December 3–12, 2004) composite θ-S diagrams along 180°. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

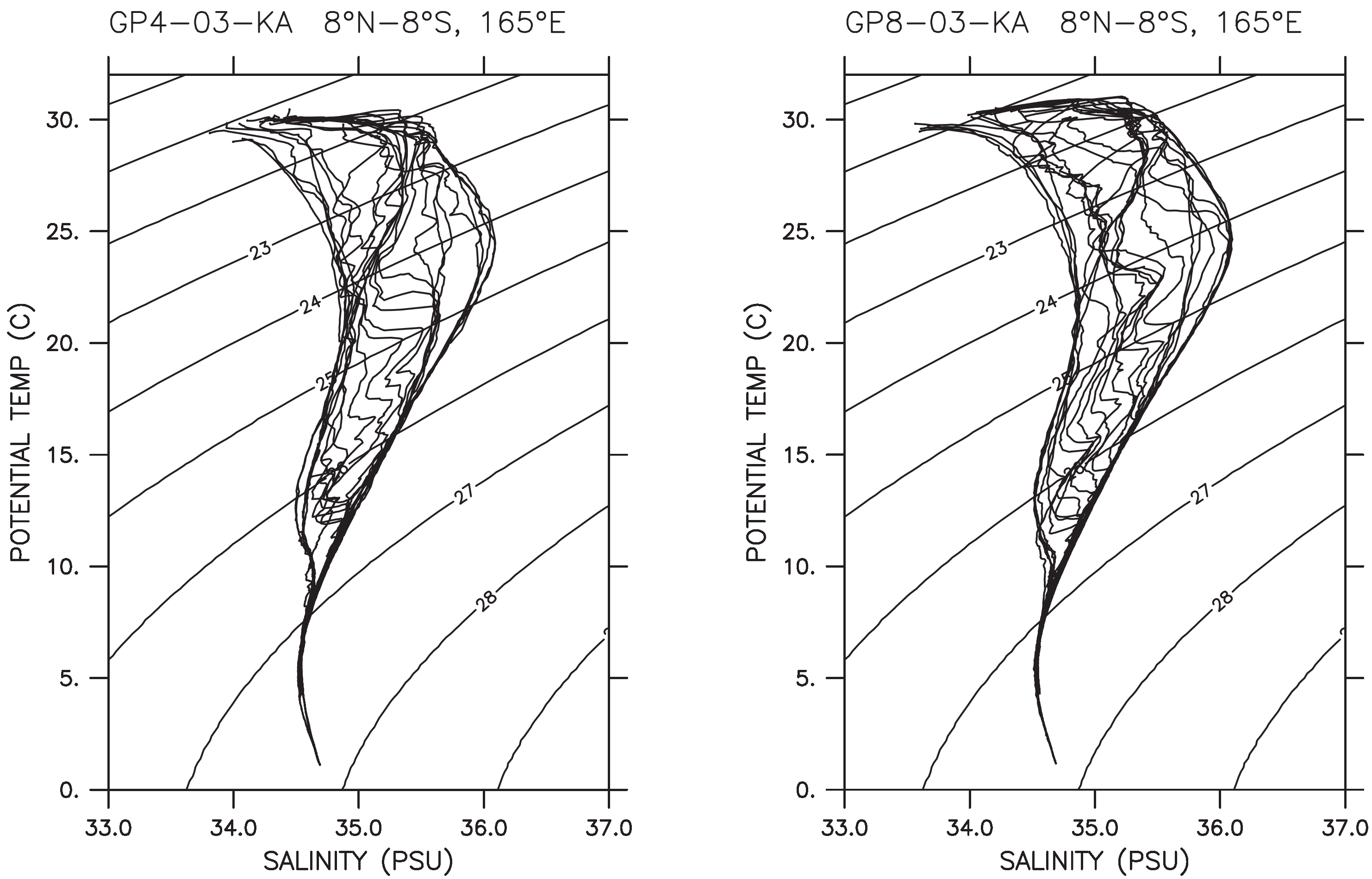

Figure 73: GP4-03-KA summer (July 12−19, 2003) and GP8-03-KA fall (November 18−25, 2003) composite θ-S diagrams along 165°E. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

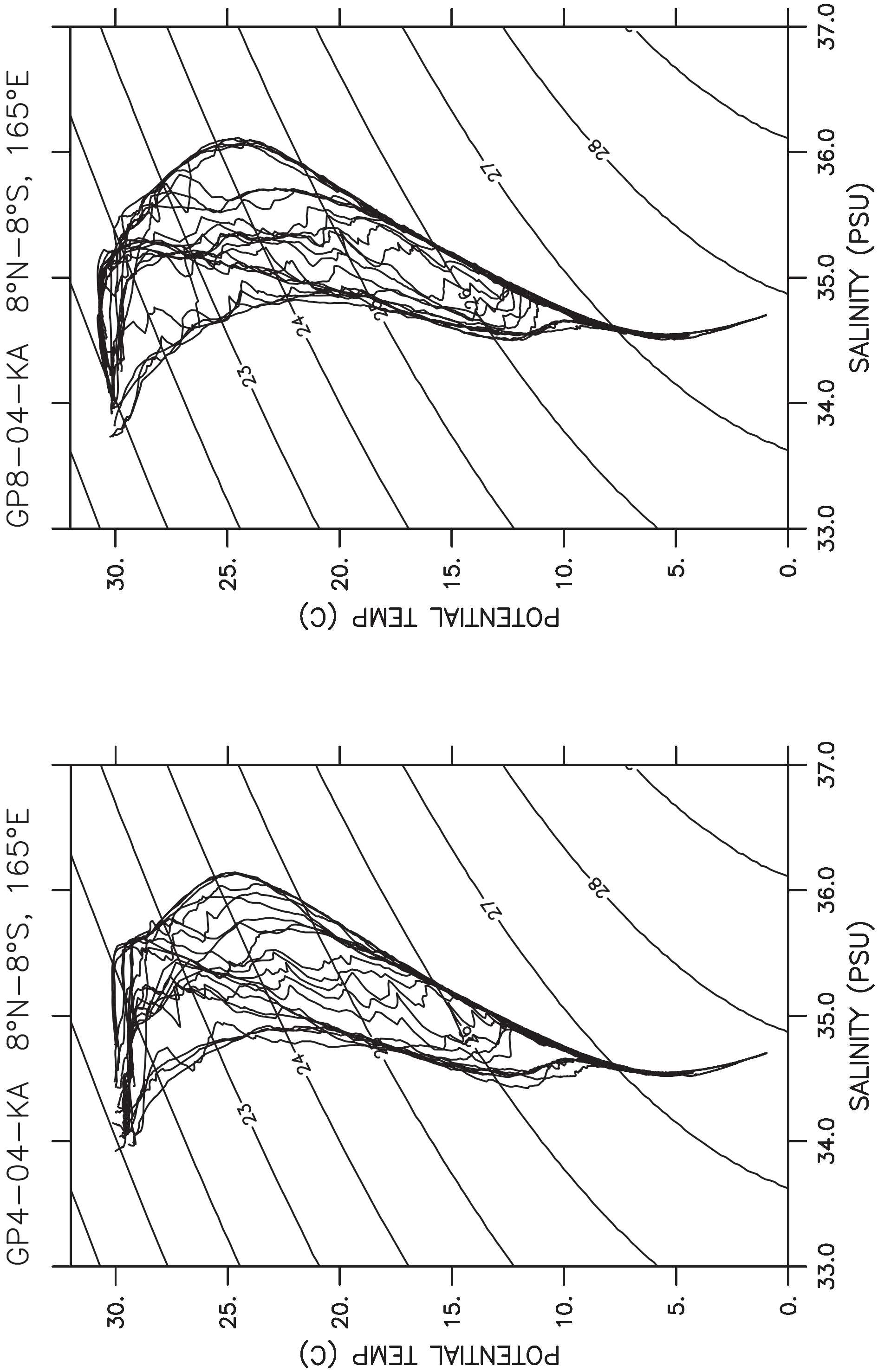

Figure 74: GP4-04-KA summer (July 21−27, 2004) and GP8-04-KA fall (November 23−30, 2004) composite θ-S diagrams along 165°E. Potential density contours are overlaid at 1.0 kg m^{-3} intervals.

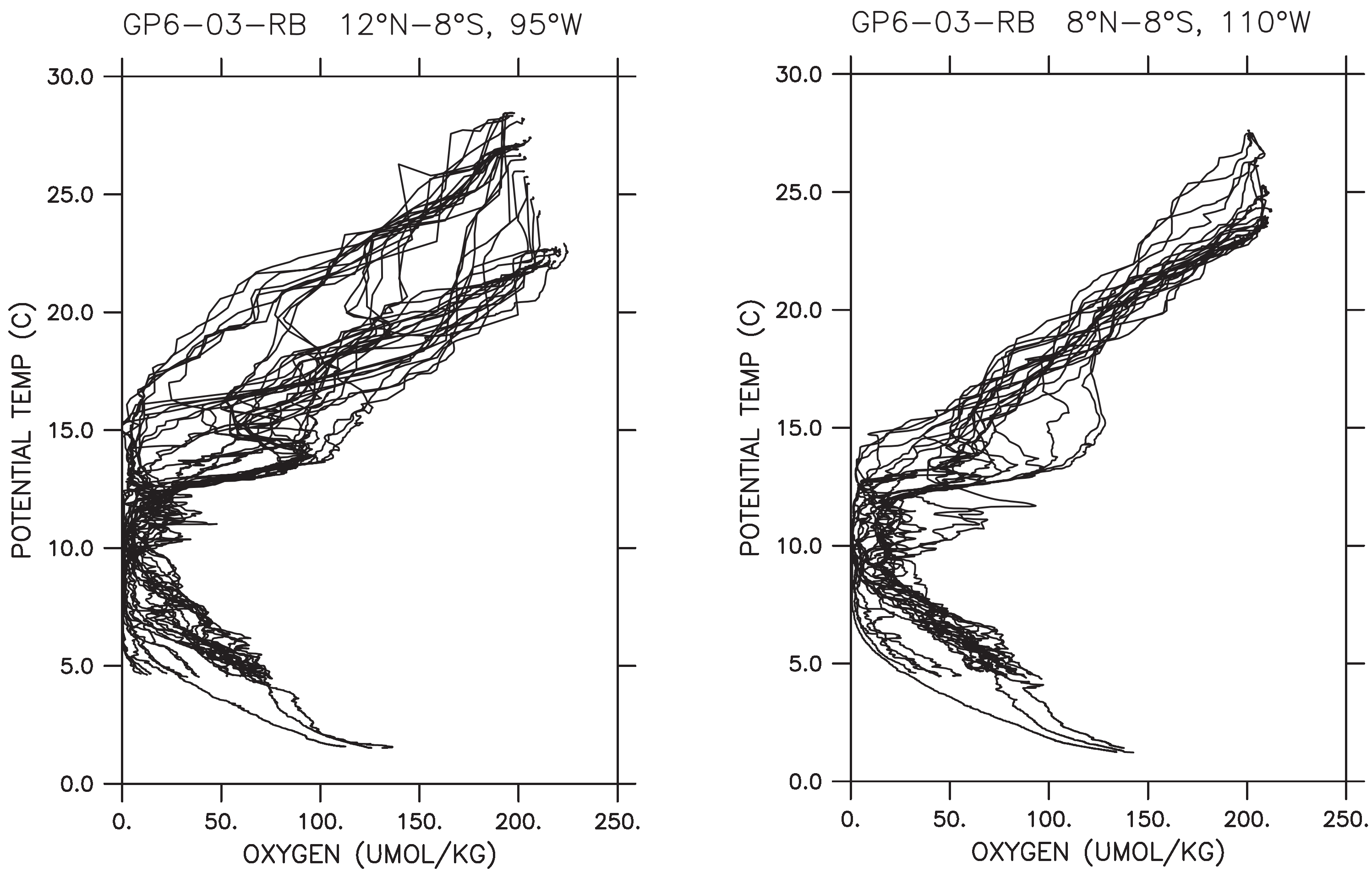

Figure 75: GP6-03-RB fall composite θ-O_2 diagrams along 95°W (October 27−November 5, 2003) and 110°W (November 8−14, 2003).

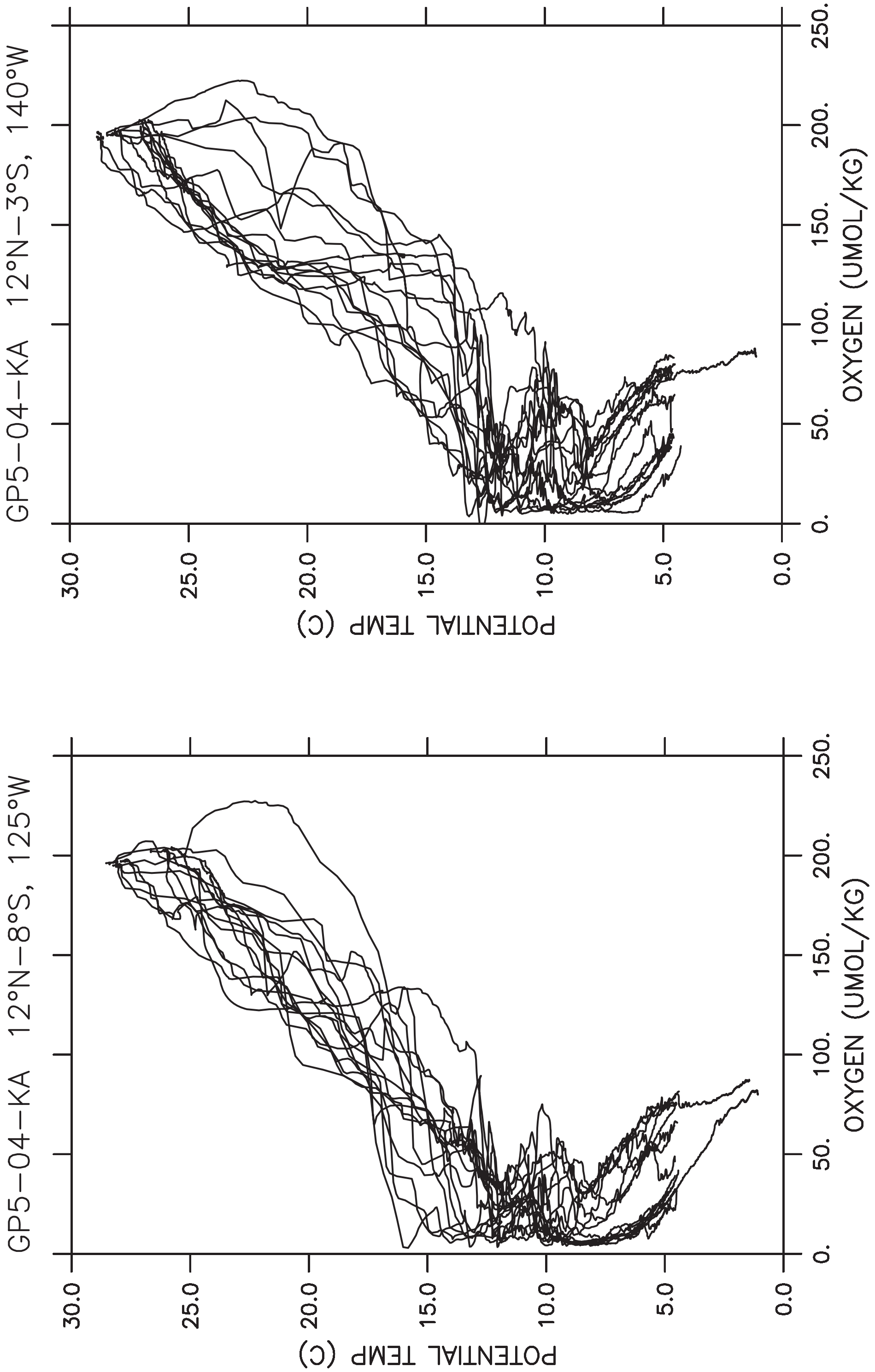

Figure 76: GP5-04-KA fall composite θ-O_2 diagrams along 125°W (September 21−29, 2004) and 140°W (September 7−14, 2004).

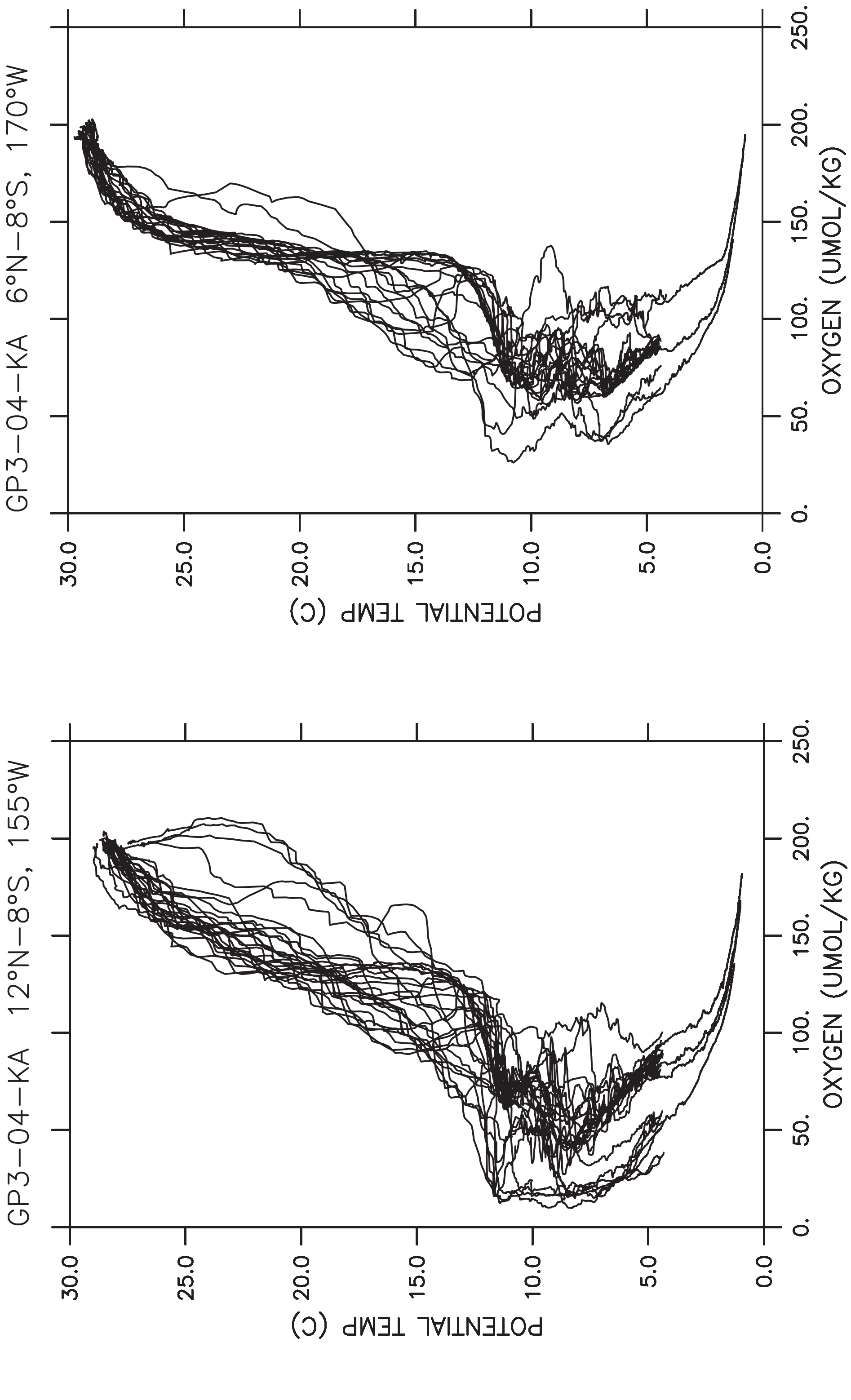

Figure 77: GP3-04-KA summer composite θ-O_2 diagrams along 155°W (June 20−29, 2004) and 170°W (July 5−12, 2004).

Table 3: Weather condition code used to describe each set of CTD measurements.

Code	Weather Condition
0	Clear (no cloud)
1	Partly cloudy
2	Continuous layer(s) of cloud(s)
3	Sandstorm, dust storm, or blowing snow
4	Fog, thick dust or haze
5	Drizzle
6	Rain
7	Snow, or rain and snow mixed
8	Shower(s)
9	Thunderstorms

Table 4: Sea state code used to describe each set of CTD measurements.

Code	Height (meters)	Description
0	0	Calm-glassy
1	0–0.1	Calm-rippled
2	0.1–0.5	Smooth-wavelet
3	0.5–1.25	Slight
4	1.25–2.5	Moderate
5	2.5–4	Rough
6	4–6	Very rough
7	6–9	High
8	9–14	Very high
9	>14	Phenomenal

Table 5: Visibility code used to describe each set of CTD measurements.

Code	Visibility
0	<50 meters
1	50–200 meters
2	200–500 meters
3	500–1,000 meters
4	1–2 km
5	2–4 km
6	4–10 km
7	10–20 km
8	20–50 km
9	50 km or more

Table 6: Cloud type.

Code	**Cloud Types**
0	Cirrus
1	Cirrocumulus
2	Cirrostratus
3	Altocumulus
4	Altostratus
5	Nimbostratus
6	Stratocumulus
7	Stratus
8	Cumulus
9	Cumulonimbus
X	Clouds not visible

Table 7: Cloud amount.

Code	**Cloud Amount**
0	0
1	1/10 or less but not zero
2	2/10–3/10
3	4/10
4	5/10
5	6/10
6	7/10–8/10
7	9/10
8	10/10
9	Sky obscured or not determined