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Physical and Chemical Data Collected in the Beaufort, Chukchi and East Siberian Seas, August - September 1993

R.W. Macdonald, M. O'Brien, E.C. Carmack, R. Pearson, F.A. McLaughlin, D. Sieberg, J. Barwell-Clarke , D.W. Paton and D. Tuele

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Physical and Chemical Data Collected in the Beaufort, Chukchi and East Siberian Seas, August - September 1993

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During a cruise aboard the CCGS *Henry Larsen* water properties were measured in the Beaufort Sea, Canada Basin, Chukchi Sea and East Siberian Sea as part of a study investigating the transport and fate of contaminants in the western Arctic Ocean. The oceanographic support measurements reported here include conductivity-temperature-pressure (CTD) profiles and chemical measurements made on water collected by a rosette sampler (salinity, dissolved oxygen, orthophosphate, reactive silicate, nitrate and nitrite, chlorophyll a, particulate organic nitrogen and carbon and total suspended solids).

Key words: Arctic, Beaufort Sea, Canada Basin, carbon, chlorophyll a, Chukchi Sea, CTD, East Siberian Sea, nitrogen, nutrients, oceanography, oxygen, salinity, temperature, total suspended solids.

Résumé

Macdonald, R.W., M. O'Brien, E.C. Carmack, R. Pearson, F.A. McLaughlin, D. Sieberg, J. Barwell-Clarke, D.W. Paton and D. Tuele 1995. Physical and Chemical Data Collected in the Beaufort, Chukchi and East Siberian Seas, August - September 1993. *Can. Data Rep. Hydrogr. Ocean. Sci.*: **139**, 288pp.

Au cours d'une mission à bord du CCGS *Henry Larsen* certaines propriétés hydrographiques des eaux de la mer de Beaufort, du bassin Canada, de la mer Chukchi et de la mer de Sibérie est ont été mesurées dans le cadre de travaux de recherche sur le transport et le devenir des contaminants dans l'océan Arctiques ouest. Les données océanographiques de support présentées dans ce rapport comprennent des profils conductivité-température-pression (CTD) et des mesures chimiques sur des échantillons d'eau obtenus avec une rosette (salinité, oxygène dissous, orthophosphate, silicate réactif, nitrate et nitrite, chlorophylle a, azote organique et carbone particulaire et solides totaux en suspension).

Mots-clés : Arctique, mer de Beaufort, bassin Canada, carbone, chlorophylle a, mer Chukchi, CTD, mer de Sibérie est, azote, nutriments, océanographie, oxygène, salinité, température, solides totaux en suspension.

Acknowledgments

We are very much indebted to the officers and men of the Canadian Coast Guard Ship *Henry Larsen* for their support in carrying out the sampling. We especially note the willingness of Capt. S.A. Gomes to take advantage of the good ice conditions to extend the work as far east as the Makarov Basin, and the continuing efforts of Captain David Johns and Ivan Côté (Coast Guard Northern, Ottawa) to plan and organize icebreaker support for our program. This work was jointly supported by the Arctic Environmental Strategy Green Plan Program and the PERD Climate Program. We thank S. Thomson for advice on style and text-editing.

1. INTRODUCTION

The objectives of this cruise were (1) to recover, service and redeploy four moorings in the Beaufort Sea at 700m and 3300m and (2) to carry out an oceanographic section in the Canadian Basin comprising the Beaufort, Chukchi and East Siberian seas, measuring water properties and collecting sediment cores. In part, this cruise was a preparation for a major oceanographic section to be carried out in 1994 (AOS-94). Sampling included water, sediments, suspended particulates and zooplankton. The data assembled in the present report includes only the standard supporting oceanographic determinations: conductivity-temperature-pressure profiles; % transmissivity, fluorescence and photosynthetically active radiation (PAR) profiles; bottle measurements for salinity, temperature, nutrients, dissolved oxygen, Chl a, particulate organic carbon and nitrogen, and total suspended solids.

Additional measurements (not reported here) have been or will be made for water-column tracers (freons and carbon tetrachloride, $\delta^{18}O$, helium/tritium, barium) and for contaminants (hexachlorocyclohexanes (HCHs), ^{137}Cs, ^{129}I, $^{239,240}Pu$, ^{90}Sr). Sediments were collected at several stations with a large box corer and were sectioned aboard ship and will be analyzed for contaminants (organochlorines, PAH, metals and radionuclides). Samples of zooplankton were collected for organochlorine determination and large volumes of water were filtered to collect suspended particles for organochlorine determination.

This project was carried out aboard the ice breaker CCGS *Henry Larsen* (IOS mission #9324). The field work was divided into two legs: the first, from 15 to 25 August involved mooring activities in the Beaufort Sea and Canada Basin; the second, from 25 August to 25 September, focused on the oceanography of the Chukchi and East Siberian seas. This expedition was a cooperative mission involving scientists from Canada (Institute of Ocean Sciences and Bedford Institute of Oceanography), Russia (Institute of Nature Conservation) and the United States (University of Washington and Scripps Institution of Oceanography).

Within the context of global change and contaminants, the Larsen-93 expedition had as key scientific objectives :

- To continue time-series measurements at the Arctic Ocean Climate Station sites in the Canada Basin by recovering and redeploying moorings and obtaining ancillary oceanographic measurements.

- To investigate the regional oceanography of the Chukchi and East Siberian shelves.

- To measure contaminant burdens in the water column and in sediments and zooplankton.

1.1 Overview of the Field Work

The sampling program for mission #9324 accomplished the following (data summarized in this report are outlined in **bold font):**

- Collect **conductivity-temperature-depth (CTD) data.**
- Collect **fluorometer, transmissometer and PAR measurements.**
- Collect water samples for the determination of **nitrate plus nitrite, silicate, orthophosphate, salinity, temperature, dissolved oxygen, chlorophyll a, particulate organic carbon and nitrogen, total suspended solids**, CFCs, total CO_2, $\delta^{13}C$, alkalinity, $\delta^{18}O$, tritium/helium, barium, HCHs and radionuclides.
- Collect samples for organochlorine determination from particulate and dissolved phases of the water column (large volume filtration and in-situ pump sampling).
- Collect zooplankton samples for organochlorine analysis using vertical net hauls.
- Collect sediment box cores for a variety of analyses including contaminants (e.g, metals, PAH, organochlorines, radionuclides).
- Recover time series mooring at station A01-92 in the Canada Basin.
- Redeploy time series mooring for a period of 2 years at station A01-93.
- Recover mooring at station AM1-92 in the Mackenzie Canyon.
- Redeploy mooring at station AM10-93 for a period of 2 years at the edge of the Mackenzie Canyon.
- Deploy moorings in Herald Canyon.

- Collect data on current profiles (using Acoustic Doppler Current Profilers) over the Barrow Canyon and Chukchi Slope.

1.2 Station Locations and Information

Figure 1(a-d) is a series of charts showing the station locations in the Beaufort, Chukchi and East Siberian seas during the 9324 mission. The locations for Guildline or FSI CTD casts were determined using a Trimble Transpak GPS located near the CTD acquisition system with an antenna mounted on the starboard side of the ship two decks up from the boat deck. The locations for Sea-Bird CTD casts were taken from the ship's navigation system on the bridge. The positions are expected to be within 100m of the true position.

Table 1 provides a chronological list of the CTD profile locations (start of cast), indicates the instrumentation used in the profiling, and whether or not water sampling was done for that cast. Where more than one cast was done at a station separate coordinates are given for each cast.

2. METHODS

2.1 Field Sampling - Rosette Casts

The water sampling and CTD casts were carried out from the starboard boat deck using a 24-bottle GO (General Oceanics) rosette sampler outfitted with 24 10 L BIO-design bottles. In addition to the CTD instrumentation, the system also included a Sea Tech transmissometer, a Sea Tech Fluorometer, a dissolved oxygen probe, and a PAR sensor. The rosette package was lowered over the side using a crane and winch and the rosette was placed on a flat trolley once on deck and pulled by means of a come-along into a heated container for the water sampling. The instrumental data were collected on a PC located in the CTD/Rosette lab by means of a conducting cable.

2.2 CTD (Conductivity-Temperature-Depth) Systems

Four CTDs were used during the cruise, two from Guildline, one from FSI and one from Sea-Bird. The FSI instrument was the main CTD and was attached to the rosette for the duration of the cruise. For several of the rosette casts we attached one of the Guildline CTDs to the rosette (in place of a bottle) to obtain an intercomparison between the two CTDs on the rosette. Guildline CTDs were also used on their own in cases where water sampling was not needed, and the Sea-Bird CTD was used for CTD-only casts in shallower water. Tables 2-8 list the CTDs, their serial numbers and configurations, external sensors used,

intercomparisons made, and the uncertainties based on instrumental specifications, calibrations, and bottle intercomparison data.

The two Guildline CTDs and the FSI CTD transmitted their data in "real-time" via a 3500 m, three conductor sea-cable to their matching deck units. For each of the three CTDs the data were transmitted at 25 samples per second. The FSI data were logged on an ALR 486 desktop MSDOS computer and the Guildline data were logged on a Toshiba T5200 portable computer. The GO 1016 rosette pylon also communicated real-time with its deck unit via the sea cable and was controlled by the T5200 portable computer.

The general configuration used for sharing the sea-cable between the various instruments was to run the FSI CTD through two of the conductors and to run the rosette underwater unit through the remaining conductor and the shield. When an additional Guildline CTD was mounted on the rosette, it shared the rosette conductors. Sharing a single conductor between the Guildline CTD and the rosette was accomplished by switching between the two manually; the Guildline CTD was powered on the downcast to collect data and then switched manually to the rosette to trip bottles on the up-cast.

The Sea-Bird CTD recorded internally and therefore needed no external conductors. Sea-Bird casts were done by lowering the instrument on the end of a hydrowire. The data were logged at 2 samples per second during the cast and then transferred to the ALR computer by serial cable after the cast was completed.

2.2.1 **Data Collection Methods**

All rosette casts and casts involving the Guildline CTDs along were taken from the ship's starboard boat deck. The rosette and CTDs were positioned over the side using the ship's starboard cargo crane and lowered using a hydraulic winch.

The Sea-Bird CTD casts were taken from the port side of the ship's foredeck. The CTD was positioned over the side and lowered using a hydraulic winch and A-frame.

The temperatures on deck varied from about 5 °C to -10 °C. To prevent freezing of the CTDs and rosette, we stored them in a specially designed "hanger" constructed from a pair of 8'x12' cargo containers. The rosette and CTDs were kept in the container at room temperature until just before the cast when they were rolled out on deck and deployed. The Sea-Bird CTD used from the foredeck was brought into the forecastle between casts.

2.2.2 Instrument Problems

2.2.2.1 FSI Current Setting Too Low

The data from casts 4,5 and 6 taken with the FSI CTD were extremely spiky. This apparently was caused by setting the current level too low for the FSI deck unit power supply. After cast 6 we increased the current level and the FSI CTD performed virtually spike-free for the rest of the cruise.

2.2.2.2 Guildline RF Interference

Both Guildline CTDs suffered from sporadic bursts of noise spikes. We were able to determine coincidence between these bursts and the ship's radio transmissions. A shielded deck-cable running from the winch to the CTD deck units grounded at the deck unit end did not appear to prevent this interference. This has been a common problem with the Guildline CTDs, in our experience, which required data from every cast taken with the instrument to be despiked.

2.2.2.3 Pressure/Time Drift with Guildline Temperature & Conductivity Data

As discussed fully in sections 2.4.3 and 2.4.4, comparisons between the FSI and Guildline CTDs show significant drifts in Guildline temperature and conductivity readings over the duration of each cast. There are also significant offsets in these channels between casts.

Evidence suggests that the drift is due to a difference between the CTD internal temperature and the water temperature. The most likely reason for this problem is that we kept the CTDs at room temperature until just before a cast and then soaked them at the surface only for 2 to 3 minutes before profiling.

2.2.2.4 Air Bubbles Trapped in Guildline Conductivity Cell

For many of the Guildline CTD casts we found that the conductivity readings did not change to surface water values when the CTD was first put in the water and remained close to zero for some time. We attribute this problem to air bubbles trapped in the conductivity cell. We were able to correct the problem by repeatedly lowering the CTD to some depth below 20 m and then bringing it back to the surface (thereby clearing the air bubble). This problem persisted over the duration of the cruise despite efforts to keep the conductivity cells clean and wetted with alcohol at all times when the CTDs were out of the water.

In most cases this problem was identified at the start of the cast and eliminated before the actual cast was recorded. In a few cases, however, the problem was

not identified before the cast started or it was ignored because the Guildline CTD was on the rosette and we knew that we would recover good data from the FSI CTD. Casts corrupted in this way have not been included in this report.

2.2.2.5 **Sea-Bird Electronic Problems**

On the last day of CTD casts (casts 103-115), the Sea-Bird CTD 1031 developed an electronics fault that caused it not to record large sections of data during the casts. Because the Sea-Bird is an internally-recording CTD, we could not tell if this happened until after the cast was completed. Generally, the lost records occurred during the first 50 to 80 m of the cast and then after that the instrument worked well. As a result, we were able to reconstruct the corrupted profiles from the up-cast data. However, this procedure introduces additional uncertainty in the temperature and salinity readings because sampling occurs in the wake of the CTD as it rises through the water producing turbulence and potentially contaminating temperature.

2.2.3 **Data Processing**

The steps outlined below were performed in the processing of each CTD cast.

2.2.3.1 **FSI CTD Data**

1. The raw, binary, data collected from this CTD were converted to an ASCII format. Since pre-cruise pressure, temperature, and conductivity calibration coefficients for this CTD were entered into the CTD itself the values for these channels were in engineering units. However, the values for the transmissometer, fluorometer, and PAR sensor were still raw at this point.

2. The raw ASCII data were converted to engineering units for all channels and salinity was calculated. For the transmissometer and PAR sensors we used pre-cruise calibration coefficients and for the fluorometer we used nominal coefficients based on the fluorometers selected sensitivity range.

3. The casts were processed using an automatic despiking program to remove noise spikes.

4. A 0.45 second delay exponential filter was applied to the conductivity data to match its time response with that of temperature. To compensate time properly for some of the casts, it was also necessary to delay the temperature data by shifting it a number of records relative to the conductivity data.

5. The pressure data were adjusted to match the post-cruise calibration using the following formula:

   Corrected Pressure = Pressure $\times$ 0.999185 + 2.0

6. Based on comparisons with bottle data, the conductivity was corrected using the following formula:

   Corrected Conductivity = Conductivity $\times$ (Julian Day $\times$ 0.5957 $\times$ 10^{-5} +0.99907)

   This formula corrects the conductivity for a slow drift with time over the length of the cruise.

7. All swells and up-casts were removed from the data.

8. The data for each cast were decimated into one-decibar bins using a simple averaging process.

9. The temperature and salinity data were filtered using a 1 decibar low-pass filter to remove spikes from the salinity that could not be adequately removed by time compensation.

10. Derived oceanographic quantities were calculated from the pressure, temperature, and salinity data using the algorithms given by *Fofonoff and Millard* [1983].

2.2.3.2 **Guildline CTD Data**

1. The raw, binary, data collected from this CTD were converted to an ASCII format.

2. The raw ASCII data were converted to engineering units for all channels using pre-cruise calibration coefficients and salinity was calculated.

3. The casts were processed using an automatic despiking program to remove any noise spikes. For some casts, additional manual despiking was required.

4. For two of the casts (68,69), the temperature data time response had to be adjusted to match that of the conductivity. This was done by applying a 0.3 second exponential filter to the temperature data and then delaying the temperature by 2 records relative to the other channels.

5. For the Guildline CTD5 only, the pressure data were adjusted to match the pressures measured by the FSI in casts involving the two CTDs using the formula:

$$\text{Corrected Pressure} = \text{Pressure} \times 1.006667 - 0.6667$$

6. All swells and up-casts were removed from the data.

7. The data for each cast were decimated into one-decibar bins using a simple averaging process.

8. Based on comparisons with the FSI CTD, the conductivity and temperature were corrected using the coefficients A and B listed in Table 3 and applying the following formula:

$$\text{Corrected Value} = \text{Measure Value} + A + B \times \text{Pressure}$$

11. The temperature and salinity data were filtered using a one-decibar low-pass filter to remove spikes from the salinity that could not be adequately removed by time compensation.

12. Derived oceanographic quantities were calculated from the pressure, temperature, and salinity data using the algorithms given by *Fofonoff and Millard* [1983].

2.2.3.3 **Sea-Bird CTD Data**

1. The raw, HEX-ASCII, data from this CTD were converted to an ASCII format.

2. The raw ASCII data were converted to engineering units for all channels using pre-cruise calibration coefficients and salinity was calculated.

3. Each cast was processed to compensate for the differences in the time responses of the temperature sensor and the conductivity cell. This was done by delaying the temperature data by 3 records and the conductivity data by 1.5 records.

4. The pressure, temperature, and conductivity data were filtered using a 3 Hz low-pass filter to smooth out sensor noise and match sensor response times. Salinity was recalculated at this point.

5. Casts 103 to 115 were reconstructed from the up-cast and available sections of the down-cast.

6. All swells and up-casts were removed from the data.

7. The data for each cast were decimated into one-decibar bins using a simple averaging process.

8. Based on comparisons with the Guildline CTD S/N CTD5 data, the conductivity was corrected using the following formula:

$$\text{Corrected Conductivity} = \text{Conductivity} \times 1.06249 - 0.0397$$

9. The salinity data was filtered using a one-decibar low-pass filter to remove spikes from the salinity that could not be adequately removed by time compensation.

10. Derived oceanographic quantities were calculated from the pressure, temperature, and salinity data using the algorithms given by *Fofonoff and Millard* [1983].

2.2.4 **CTD Data Validation**

Data were validated in several ways including comparison of pre-cruise and post-cruise calibrations, comparison of CTD with bottle data, and intercomparisons between CTDs.

2.2.4.1 **Summary of Accepted Uncertainties**

From the following analysis, the accepted uncertainties in the various CTD sensor readings are as follows:

2.2.4.2 **FSI CTD Data**

The first step in validating the data was to assure that the FSI CTD data, as measured for all rosette casts, was accurate. The FSI data were then used as the benchmark for the data from the other CTDs.

Pressure

The pressure sensor electronics in the FSI CTD includes an internal temperature sensor which is used in factory calibrations to determine the temperature effect

on pressure readings. Therefore, the factory calibrated pressure readings are supposed to be fully corrected for instrument temperature.

When we performed a post-cruise calibration in our labs, however, we found that the factory calibration agreed with ours at room temperature but not at freezing temperatures. At 0 °C there was a two-decibar offset at zero decibars, decreasing to a zero offset at 3000 decibars. Since our casts were primarily in water at 2 to -2 °C, we applied a correction to the FSI pressure data to adjust the calibrated readings to match the sensor's response (Corrected Pressure = Pressure × 0.999185 + 2.0)

Temperature

The pre-cruise temperature calibration was compared to the post-cruise calibration and found to agree to within 0.002 C° over the range -2 to 10 °C. We also compared some of the deep potential temperature readings with historical data from the same areas finding agreement to within the accuracy of the instrument. As a result, we considered the temperature values based on the pre-cruise calibration valid.

Conductivity/Salinity

The FSI conductivity data were validated by comparison with the conductivity calculated from the rosette bottle samples. The bottle conductivities were calculated from the bottle salinities (measured using a Guildline Autosal laboratory salinometer) and the CTD temperature measured at the time the bottle was tripped. Bottle and CTD conductivities were used from casts spanning the entire cruise. However, only samples collected deeper than 300 m were used because relatively high gradients in the water column above that depth confound such an intercomparison.

Figure 2, the ratio of bottle conductivity/CTD conductivity vs. pressure, shows no apparent correlation between bottle conductivity/CTD conductivity and pressure. However, Figure 3, a plot of the same bottle conductivity/CTD conductivity ratios vs. Julian Day, shows a general trend in the ratio between the two conductivities as a function of time. The best linear fit (Corrected Conductivity = Conductivity × (Julian Day × 0.5957×10^{-5} + 0.99907)) was used to remove this drift from the FSI CTD data. The CTD salinity was recomputed from the corrected conductivity and the differences between the CTD and bottle salinities were calculated (Table 5; Figure 4).

2.2.4.3 Transmissometer, Fluorometer, and PAR Data:

The transmissometer and PAR data are calculated using pre-cruise calibration coefficients. Because no independent measurement exists for validating these measurements, the data are considered accurate to within the accuracy of the sensors.

The fluorometer was not calibrated prior to the cruise and therefore nominal coefficients have been used to produce chlorphyll concentrations as a function of fluorometer raw readings. The fluorometer will eventually be calibrated based on chlorophyll concentrations measured from the bottle samples.

2.2.4.4 Guildline CTD S/N CTD5 Data

The data from Guildline CTD S/N CTD5 was validated by comparing the 1 metre averaged CTD5 with the "benchmark" FSI CTD data for casts in which both the FSI CTD and CTD5 were lowered on the rosette together (see Table 6 for listing).

Pressure

Pressure readings from the two CTDs were compared by using the pressures associated with key features in the cast profiles including, for example, the maximum depth of the casts. This comparison yielded an adjustment formula for the Guildline CTD S/N CTD5 (Corrected Pressure = Pressure $\times$ 1.006667 - 0.6667) which was applied to all CTD5 data before further processing.

Temperature

The differences between the FSI temperature and CTD5 temperature were calculated and are shown in Figure 5 as a function of pressure. Three things can be readily observed from this plot:

1. The water column above 300 m is variable with depth and the high gradients mask the small temperature offsets sought in the intercomparison.
2. There is a definite drift in the differences as a function of pressure (or time during the cast).
3. There is a varying offset in the temperature differences that does not appear to be a linear function of time. (The cast 75-76 difference is closer to the 52-53 difference, which is 4 days away, than the 77-78 difference which is 2 hours away.)

We believe that the differences between the FSI CTD and CTD5 are not simply a function of pressure but are due to variations in the CTD5 electronics as a function of the difference between internal CTD temperature and ambient temperature. This hypothesis could be tested by performing a number of lab tests using dummy sensors and varying calibration bath temperatures. In the absence of such testing, we have applied only a simple temperature correction as a function of pressure to the CTD5 data (Corrected Temperature = Temperature + Pressure $\times$ 0.35714 $\times$ 10^{-5}). Figure 6, a plot of the difference between the FSI CTD temperature and the CTD5 *corrected* temperature data vs. pressure, indicates that the corrected CTD5 temperatures agree with the FSI temperatures to within ±0.005 C° for the 3 intercomparison casts.

Conductivity/Salinity

As in the case of temperature, the differences between the FSI conductivity and CTD5 conductivity were calculated (Figure 7). The conductivity intercomparison shows trends and offsets similar to those shown in the temperature intercomparison (Figure 5) supporting the notion that the differences arise from a common source -- i.e., electronic drift as a function of internal temperature.

As with the temperature comparison, the best correction that could be applied to the CTD5 data without further extensive laboratory testing was a simple pressure correction (Corrected Conductivity = Conductivity + 0.9 $\times$ 10^{-4} + Pressure $\times$ 0.1 $\times$ 10^{-6}) shown in Figure 8.

The corrected salinities for CTD5 were computed from the corrected temperatures and conductivities and the difference between the FSI salinities and CTD5 corrected salinities were calculated. Figure 9, a plot of the salinity differences as a function of pressure, indicates that the CTD5 corrected salinities agree with the FSI salinities to within ±0.006 PSU.

2.2.4.5 **Guildline CTD S/N 53501 Data**

The data from Guildline CTD S/N 53501 were validated by comparing the 1 metre averaged 53501 and FSI CTD data from simultaneous casts. Only two such casts were performed during the cruise in which both the FSI CTD and 53501 were lowered on the rosette together (Table 7).

Pressure

Pressure readings from the two CTDs, which were compared by matching the pressures associated with key features in the cast profiles, showed agreement to within 1 decibar at all depths.

Temperature

The differences between the FSI temperature and 53501 temperature were calculated. Figure 10 shows an even more pronounced drift in temperature difference with pressure (or time during the cast) than was seen with CTD5, suggesting the problem to be common to both Guildline CTDs. As with CTD5, only a simple pressure correction could be applied without further lab work (Corrected Temperature = Temperature - 0.0135 + Pressure $\times$ 0.1199 $\times$ 10^{-4}). Figure 11 indicates that the corrected 53501 temperatures agree with the FSI temperatures to within ±0.01 C° from 500 metres and below for the casts compared.

Conductivity/Salinity

As with the CTD5, the 53501 conductivity showed a drift in difference from the FSI conductivity as a function of pressure (or time during cast) which was corrected (Figure 13) using a simple formula (Corrected Conductivity = Conductivity - 0.08 $\times$ 10^{-4} + Pressure $\times$ 0.1 $\times$ 10^{-6}).

The corrected salinities for 53501 were computed from the corrected temperatures and conductivities and the difference between the FSI salinities and 53501 corrected salinities were calculated (Figure 14). The 53501 corrected salinities agree with the FSI salinities to within ±0.006 PSU from about 500 metres and deeper.

2.2.4.6 **Sea-Bird CTD Data**

Because there were no casts done using the FSI CTD and the Sea-Bird CTD simultaneously, the "corrected" Guildline CTD5 data were used as the benchmark for the Sea-Bird CTD readings. The data from Sea-Bird CTD S/N 1031 were validated by comparing the 1 metre averaged 1031 and Guildline CTD5 data from a single simultaneous profile (casts #88,89). There are shortcomings associated with this procedure:

1. The Guildline CTD5 has already been shown to have problems with sensor drift over time.
2. The CTD5 cast had unreliable conductivity readings in the first 25 metres, probably the result of an air bubble trapped in the cell.
3. The intercomparison cast was relatively shallow (175 m). In all other intercomparisons we have found the water above approximately 300 m to contain too much environmental variance for sensitive intercalibration.
4. There is only a single intercomparison cast with no way to determine instrument drift over time.

Despite these limitations, the following analysis will show the comparison of these two casts to be useful. From the temperature and salinity profiles of cast 89 (Figure 15) we can see that the best regions (low gradients) for the intercomparison are from 30 dBars to 100 dBars and from 140 dBars to 175 dBars.

Pressure

Pressure readings from the two CTDs, compared by matching the pressures associated with key features in the cast profile, showed agreement to within 1 decibar at all depths.

Temperature

The differences between the CTD5 temperature and 1031 temperature were calculated. From Figure 16 we can see that for the regions where there are not rapid temperature changes with depth, the two CTDs agree to within 0.01 C° which is the specified accuracy of the Sea-Bird CTD. Therefore, the limited data do not suggest that any corrections need be applied to the 1031 temperatures.

Conductivity/Salinity

The differences between the CTD5 conductivity and 1031 conductivity were calculated (Figure 17). The large difference at depths less than 25 m is probably the result of a bubble caught in the CTD5 conductivity cell. However, the conductivity differences below 25 m are due to a calibration problem with 1031 which we corrected with a simple formula (Corrected Conductivity = -0.0397 + Conductivity × 1.06249) and the results are shown in Figure 18. The corrected salinities for 1031 were computed from the corrected conductivities and the difference between the CTD5 salinities and 1031 corrected salinities are shown in Figure 19. From 40 to 100 dBars and from 120 to 175 dBars, the 1031 corrected salinities agree with the FSI salinities to within 0.02 PSU.

2.3 Chemistry Sampling and Analyses

Samples were drawn from the 10 L BOT bottles on the GO rosette inside a heated container. The order of sampling was: CFC; helium/tritium (copper tube); dissolved oxygen; total CO_2; tritium (1L glass bottle); carbon isotopes; nutrients; oxygen isotopes; barium; salinity; chlorophyll a (if sufficient water remaining). Additional bottles were tripped at a given depth when sampling for HCH, TSS, POC/PON, CHLa and radionuclides due to the larger volumes of water required. Each sample bottle on the rosette was given a unique identifier number of six digits. Additional bottles tripped sequentially at the same depth were assigned the same identifier number plus a letter A, B, C or D. CTD casts and water sampling were co-ordinated and the instrumental data at bottle trip depths is reported in Appendices 5.2 and 6.5 together with water chemistry data. See Appendices 6.3 and 6.6 for chemistry profile plots and Appendix 6.4 for property-property plots.

2.3.1 Laboratory Methods

The precision of the methods used was estimated by analysing replicates and is expressed as the pooled standard deviation s_p, which is calculated as

$$s_p = \sqrt{\frac{\sum v_i s_i^2}{\sum v_i}}$$

and where $v_i = n_i - 1$ degrees of freedom, and the n_i and s_i, refer to the number of replicates and their standard deviation for the individual components used in the pooled standard deviation calculation.

2.3.1.1 Temperature

Temperatures at the bottle depths were obtained from the CTD records from the same cast. The pressure was recorded on a log just prior to tripping the bottles and this pressure was used to match to the CTD records. The shallowest CTD records are at 2 decibars. In the chemistry data tables, the CTD salinities and temperatures at the bottle depths are reported along with the chemistry data. See Section 2.2 for further details on the temperature data.

2.3.1.2 **Salinity**

Salinity samples were drawn into 200 mL glass salinity bottles, after 3 rinses, from 10 L BOT bottles. The samples were then tightly capped. and shipped back to IOS for analysis on a Guildline Autosal (model 8410). Data are reported in practical salinity units (psu) [*Lewis and Perkin*, 1978]. The salinometer was standardized against Standard Sea Water of salinity 34.998 (K15 = 0.99994 which was obtained from Standard Sea Water Service, Institute of Oceanography, Wormley, Godalming, Surrey, England. For mission #9324, the overall precision of sampling and analysis was evaluated from a set of 28 duplicates (pairs collected from the same depth and bottle). The pooled standard deviation (s_p) was 0.0025 psu with 27 degrees of freedom. In the data tables, the CTD salinities at the bottle depths are included. See section 2.2 and Figures 2, 3 and 4 for a comparison of CTD and bottle salinities. Differences between salinometer and CTD salinities exhibit more scatter above 300 meters and are not included in this comparison.

2.3.1.3 **Dissolved Oxygen**

Dissolved oxygen samples were "pickled" immediately in the field and taken to the laboratory on the ship for determination by the Micro-Winkler technique [*Carpenter*, 1965]. Analyses were carried out within 24 hours of collection. Calibration of the thio-sulphate solution was performed daily with each titration set by using a Sagami primary standard KIO_3. Precision of the method was monitored during calibration and with blind replicates sampled from the same BOT bottles. The pooled standard deviation for 37 pairs was 1.73 μM.

2.3.1.4 **Nutrients**

Water samples for nutrient determination were collected into glass and polystyrene test tubes (2 glass and 2 polystyrene tubes per sample) after three rinses. Nutrients (silicate, nitrate plus nitrite and orthophosphate) were determined in the laboratory on the ship using Technicon Autoanalyzer II components. Reactive silicate and nitrate plus nitrite were determined according to Technicon Industrial Methods No. 186-72 W and 158-71 W respectively, and soluble orthophosphate was determined using a modified Technicon method [*Brynjolfson*, 1973]. Sagami standards were used to calibrate secondary standards which were prepared daily in 30.5 g/L NaCl solutions. Most of the water samples were analyzed in duplicate and the average is reported in the tables. The precision of the determinations, based on these duplicates, was found to be: silicate, s_p =0.38 μM, degrees of freedom =222; nitrate s_p =0.10 μM, degrees of freedom =220; phosphate s_p =0.02 μM, degrees of freedom =222.

2.3.1.5 **Chlorophyll a and phaeo-pigments**

Chlorophyll samples were taken down to a maximum depth of 325 m and were subsampled directly from the 10 L BOT bottles into 1 L polybottles. Onboard ship, 1 to 2 L samples were filtered onto 24 mm GF/F filters using a low vacuum filtration. The filtration castles were rinsed down with 3.2% NaCl and about one mL of a 1% suspension of $MgCO_3$ was squirted onto the filter just before the filtration was complete. The filters were then folded in half and wrapped in a Whatman filter, labelled, placed in a dark bottle containing dry silica gel and placed in a -20 °C freezer until analysis. During the filtration and storage, the samples were kept dark as much as possible. At IOS, chlorophyll a and phaeo-pigment levels were determined fluorometrically with a Turner Design fluorometer (model 10-AU-005) which was standardized with pure Chlorophyll [*Strickland and Parsons*, 1972]. No deep samples were taken for chlorophyll. Chlorophyll a and phaeo-pigment values were corrected for filter blanks which were treated in exactly the same way as samples and the average filter blank was subtracted from each sample as an equivalent weight (μg) of chlorophyll or phaeo-pigment per filter.

Filter blanks:
0.00089 ± .00091 μg Chla per filter, n=5
0.00369 ± 0.00269 μg Phaeo-pigment per filter, n=5

There were no duplicate samples filtered and analyzed for chlorophyll on this cruise. The precision, based on duplicates from the 1992 data from this series [*Pearson et al*, 1994] was for chlorophyll a, s_p = 0.11 μg/L and for phaeo-pigment, s_p = 0.0059 μg/L for 3 duplicate pairs.

2.3.1.6 **Total Suspended Solids**

The TSS samples were sampled directly from the 10 L BOT bottles into acid cleaned 2 L polybottles. Onboard ship, the samples of 4 to 9 L were filtered onto 47 mm, 0.4 μm polycarbonate nuclepore filters, rinsed 3 times with a 3% ammonium carbonate solution, placed on a Petri-slide and stored in a -20 °C freezer. The nuclepore filters were acid cleaned, DMQ rinsed, dried at 50 °C and pre-weighed on a Mettler M-3 balance to 0.001 mg. The filters were transported frozen back to IOS where they were dried overnight (12 hours) at 50 °C and weighed on a Mettler M3 balance. Large differences in TSS values from samples taken on different days and different casts (station A01) indicate that there may be quite a bit of patchiness in the surface layers. TSS samples were taken at stations A01, B01, TA, TC, E01 and F09 only.

2.3.1.7 **Particulate Organic Carbon and Nitrogen**

Samples of 4 to 10 L were collected in 4.5 L glass jugs from the 10 L BOT bottles and filtered as soon as possible using a low vacuum onto 47 mm quartz fibre filters (precombusted at 300 °C for half an hour) and the glass filtration castle was rinsed 3 times with 3.2 % NaCl. After filtration, the samples were stored frozen at -20 °C in glass petri dishes and brought back to IOS for analysis. In preparation for analysis, the samples were dried at 50 °C overnight and then exposed to fuming HCl in a glass dessicator for 12 hours. The samples were then again left overnight in a 50 °C oven. Fresh HCl was used for each batch and seven filter blanks were also exposed to HCl and analysed in the same manner as the samples. The samples were analysed for carbon and nitrogen on a CE440 Elemental Analyzer. The edges of the filters were carefully cut off and the filters were cut in half using clean scissors. The double-drop feature of the instrument was used; each half of the filter was pressed into a nickel sleeve and both halves were dropped onto the ladle and combusted together. The instrument was calibrated daily with acetanilide and acetanilide was also run as an unknown to check the operation of the instrument. Filter blanks were processed exactly the same as for the samples except that they were not rinsed with 3.2% NaCl in the field. Six filter blanks were run with average carbon and nitrogen results as follows :

Carbon blank = 19.00 μg C ± 10.15 (n = 6)
Nitrogen blank = 0.89 μg N ± 1.05 (n = 6)

The CN ratios appear to be high for station A01 and also, data from the two casts at station A01 show marked differences from each other.

3. LIST OF FIGURES

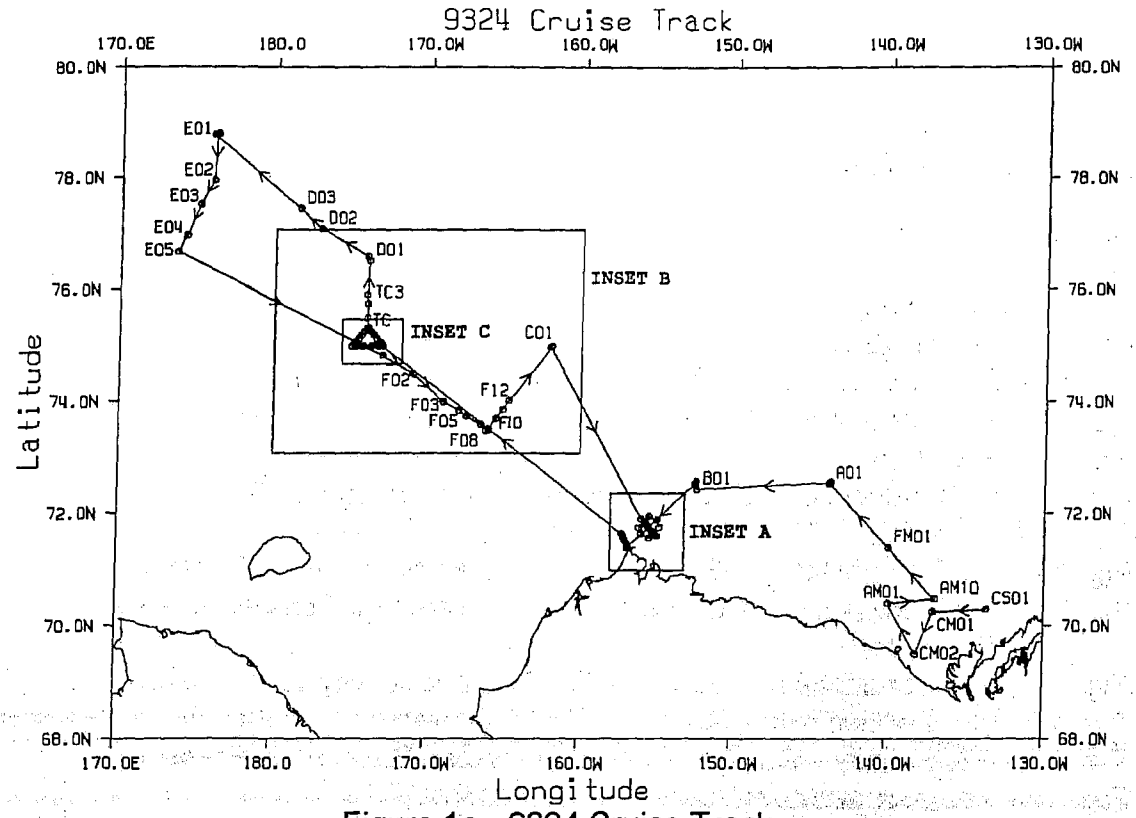

Figure 1a - 9324 Cruise Track

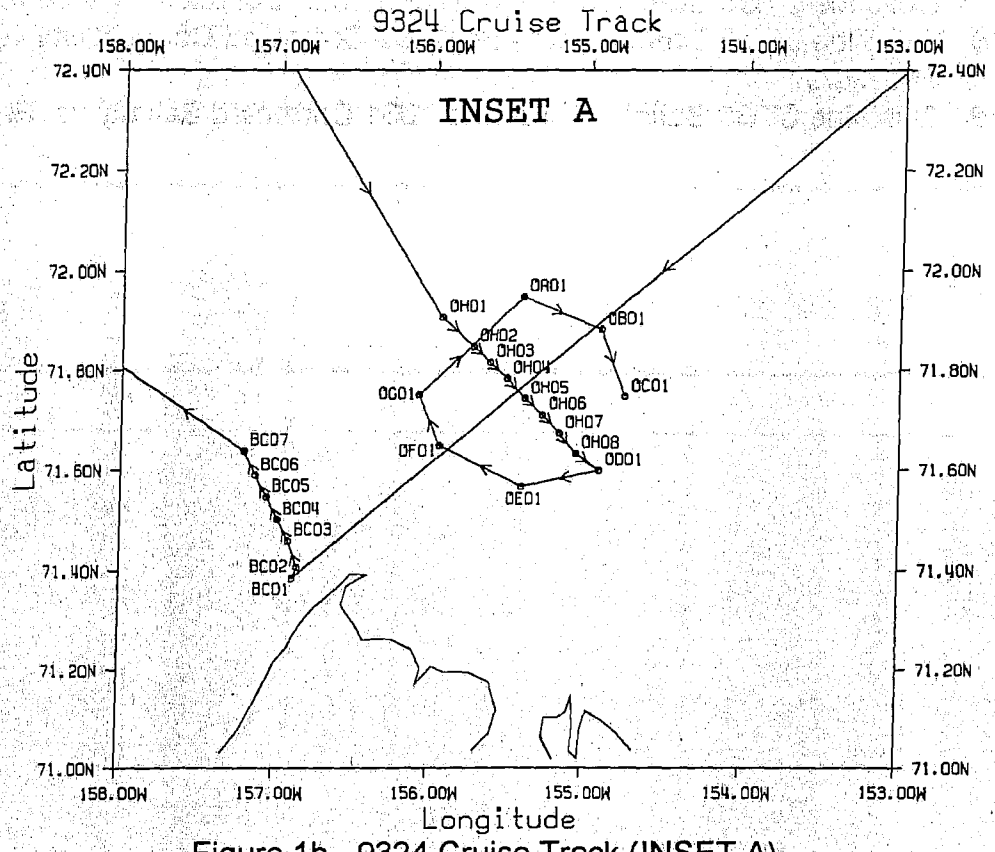

Figure 1b - 9324 Cruise Track (INSET A)

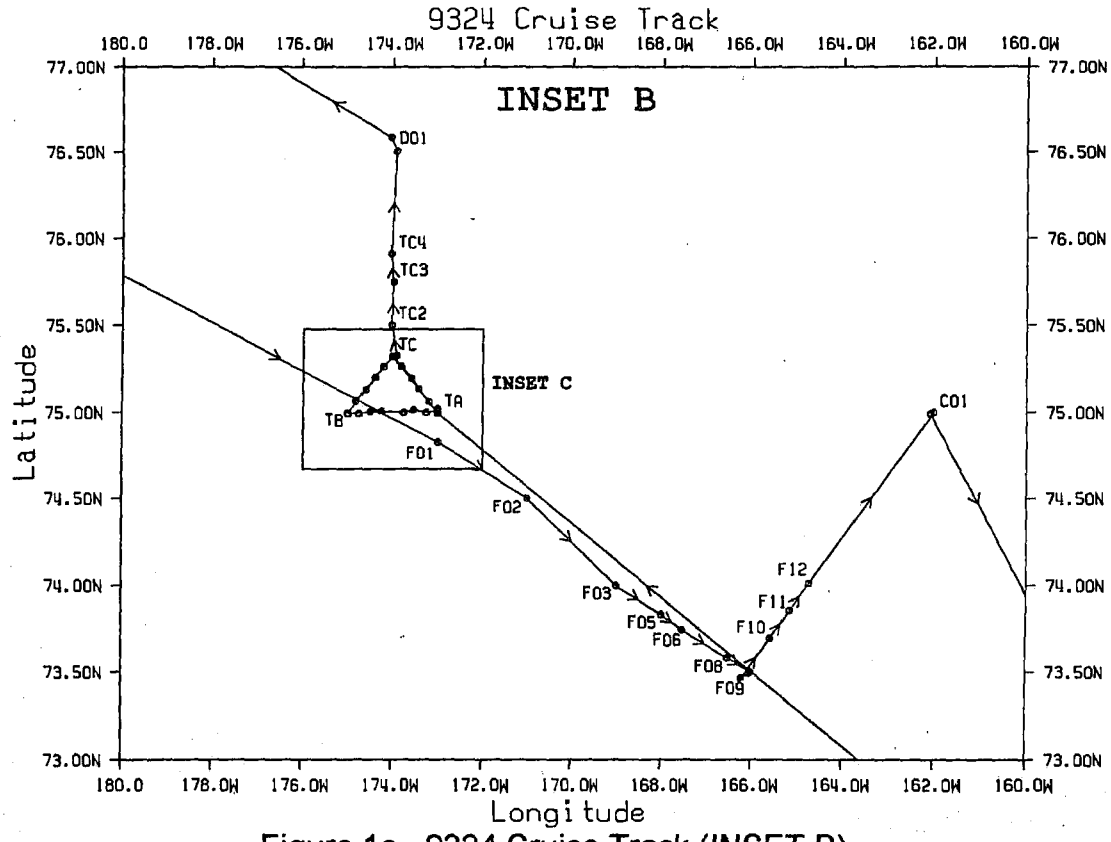

Figure 1c - 9324 Cruise Track (INSET B)

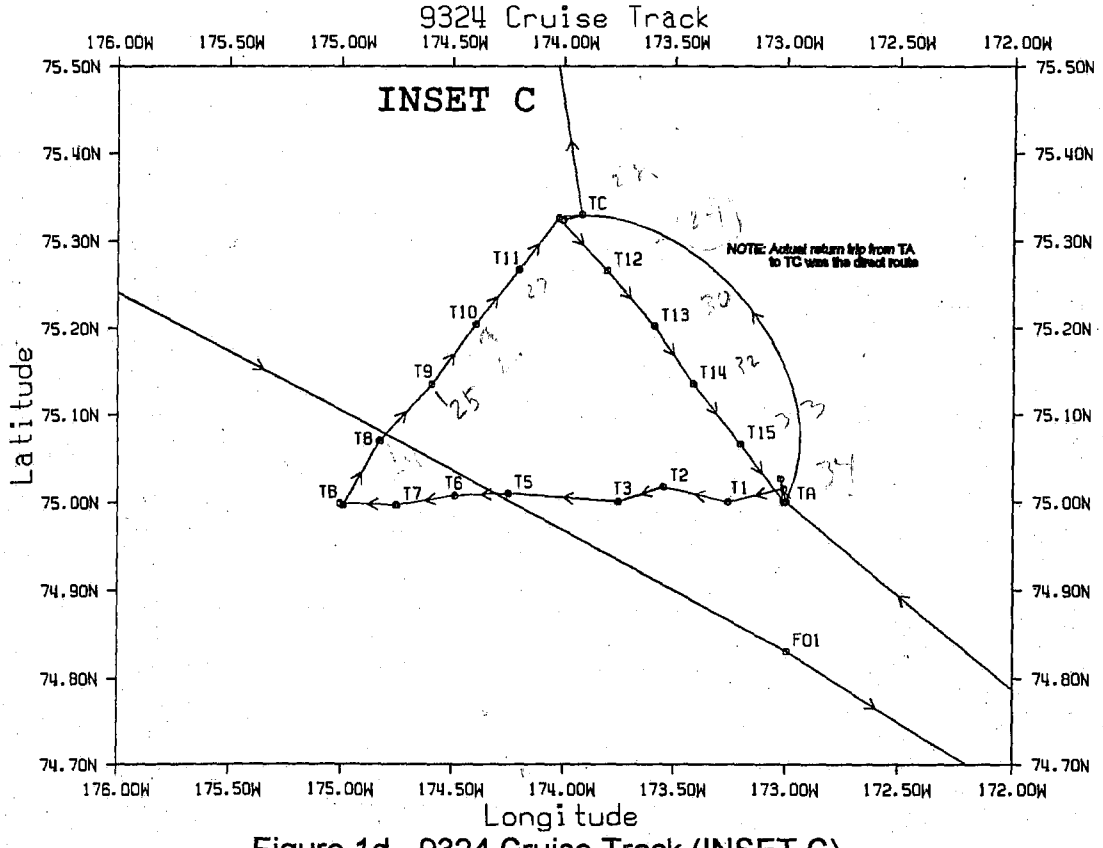

Figure 1d - 9324 Cruise Track (INSET C)

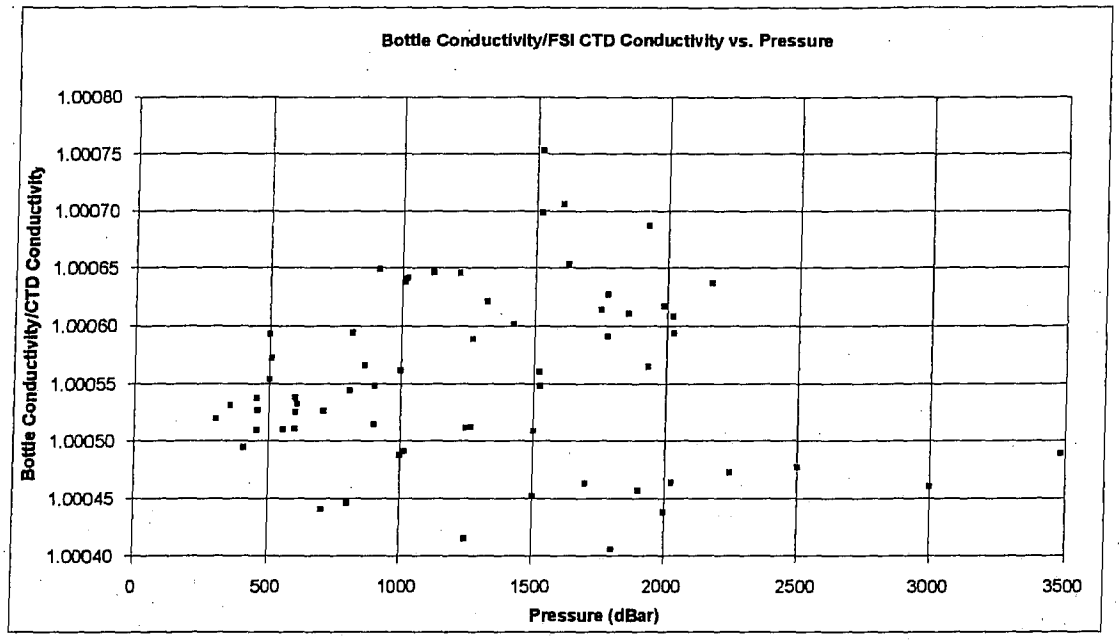

Figure 2 - Bottle Conductivity/FSI CTD Conductivity vs. Pressure

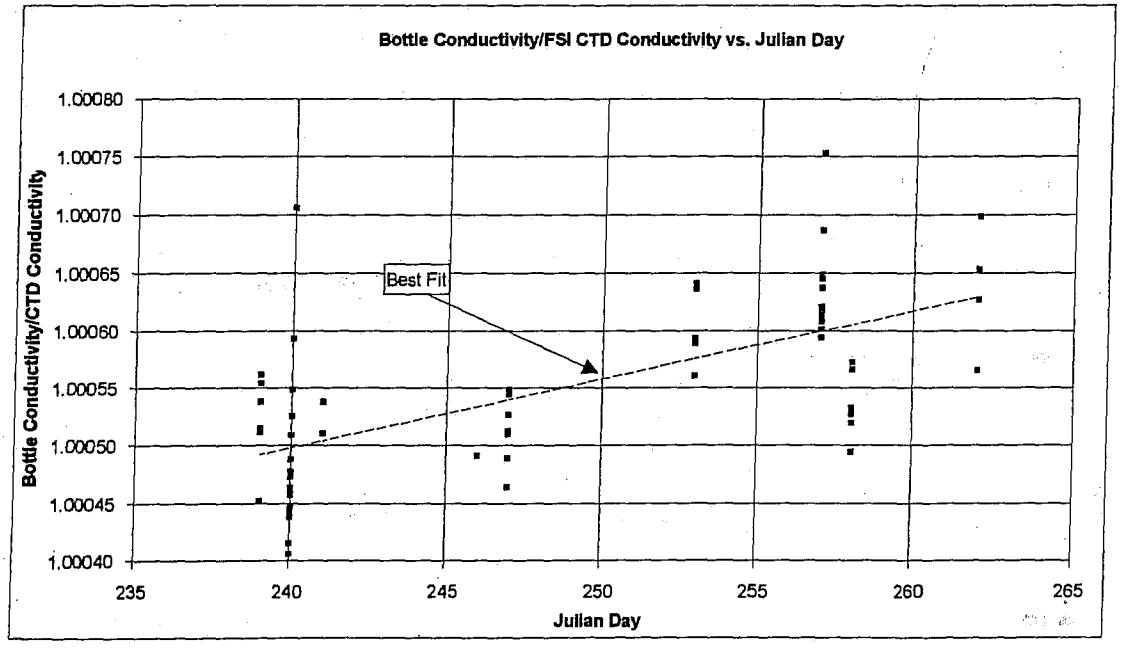

Figure 3 - Bottle Conductivity/FSI CTD Conductivity vs. Julian Day

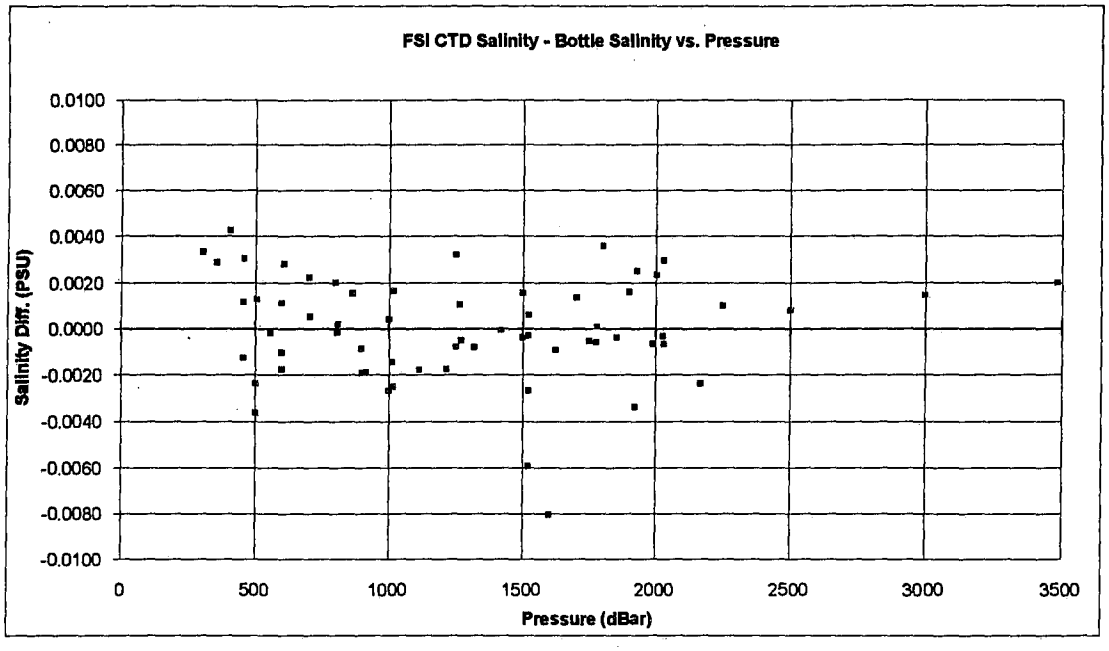

Figure 4 - FSI CTD Salinity - Bottle Salinity vs. Pressure

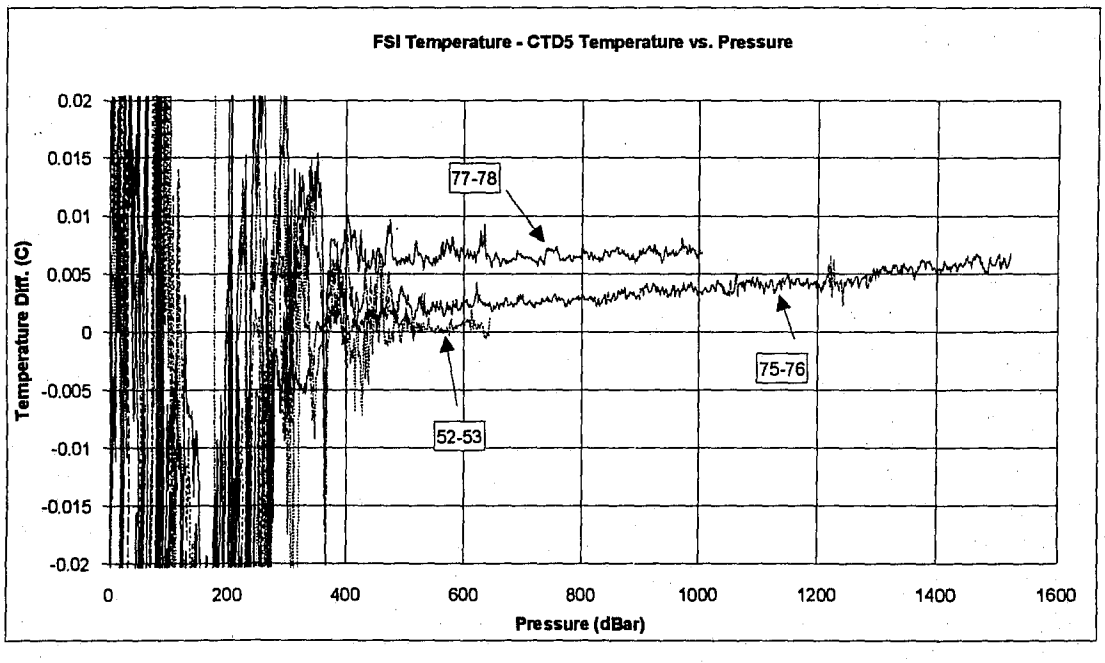

Figure 5 - FSI Temperature - CTD5 Temperature vs. Pressure

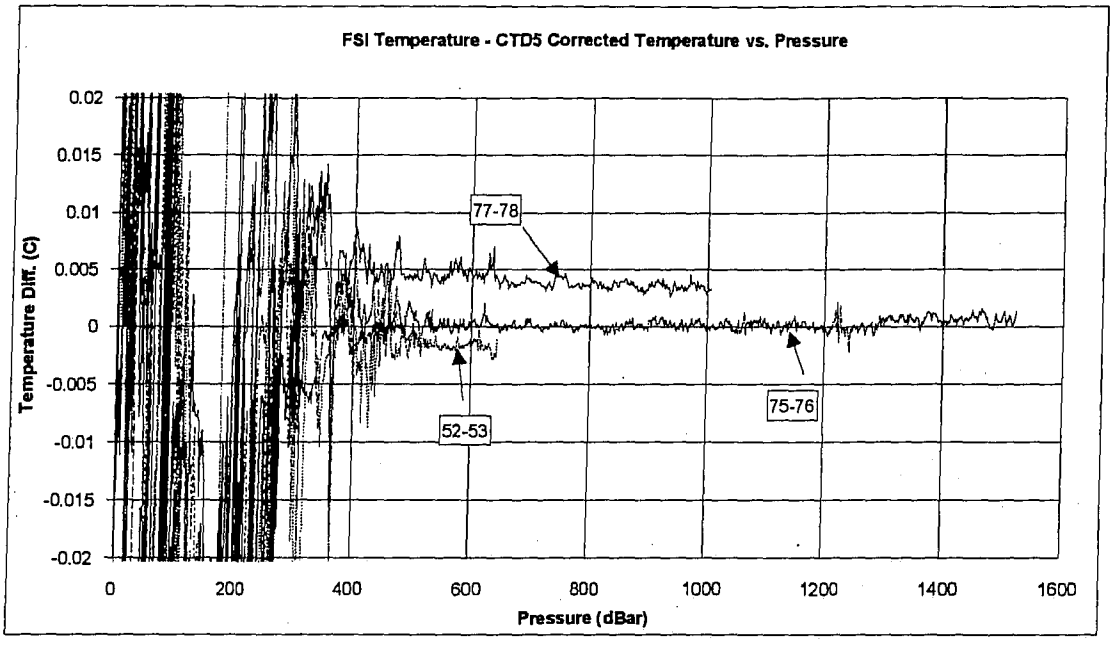

Figure 6 - FSI Temperature - CTD5 Corrected Temperature vs. Pressure

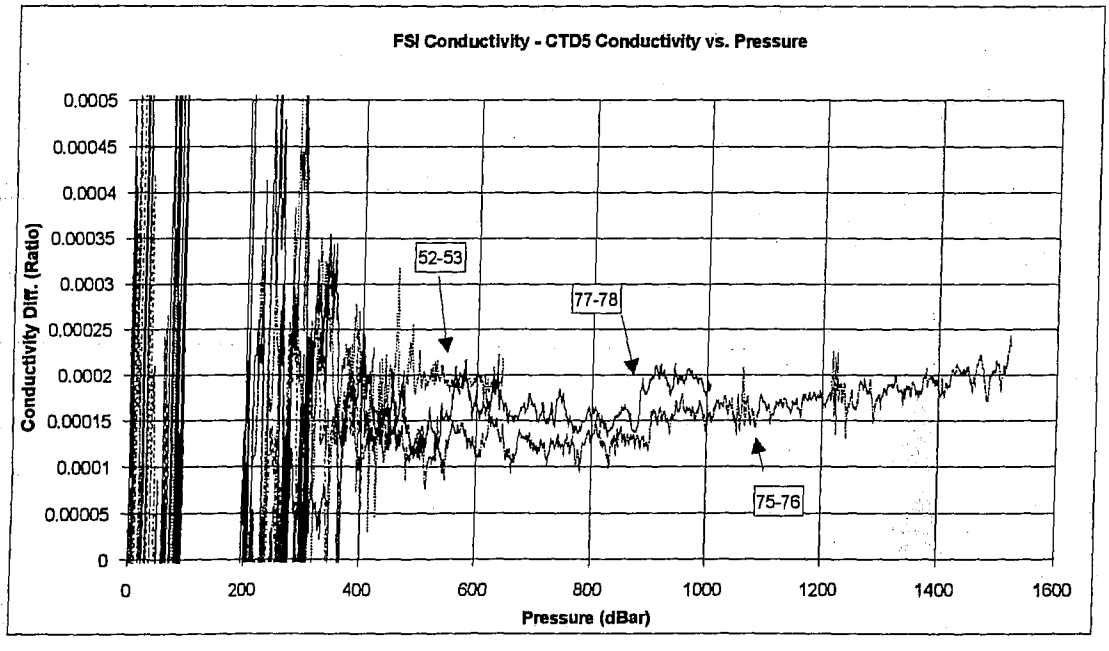

Figure 7 - FSI Conductivity - CTD5 Conductivity vs. Pressure

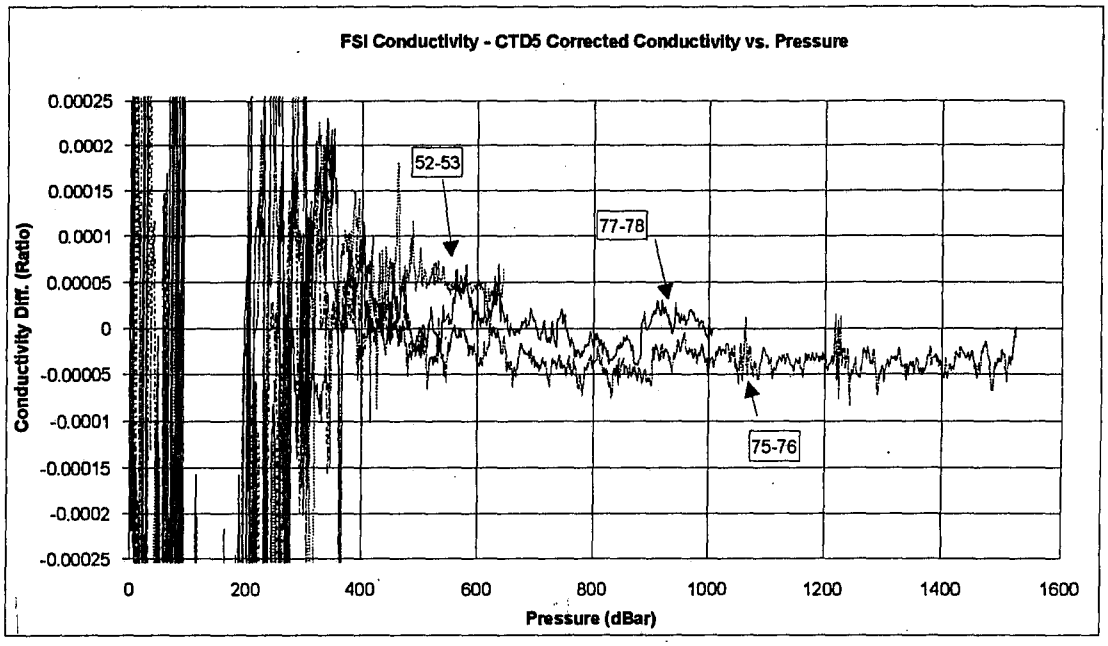

Figure 8 - FSI Conductivity - CTD5 Corrected Conductivity vs. Pressure

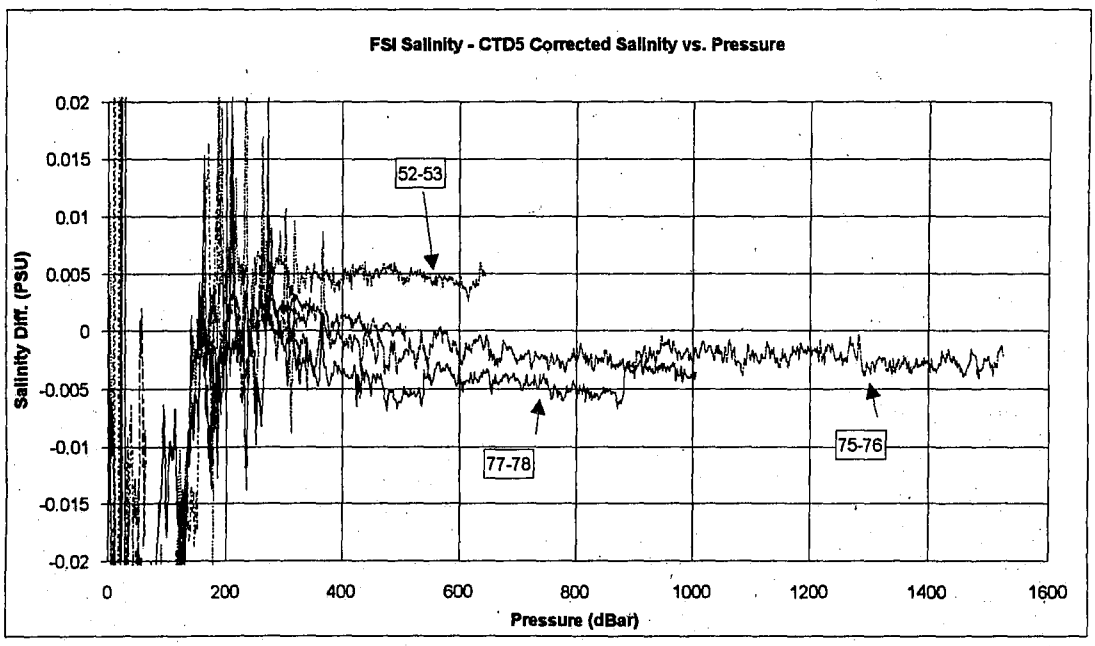

Figure 9 - FSI Salinity - CTD5 Corrected Salinity vs. Pressure

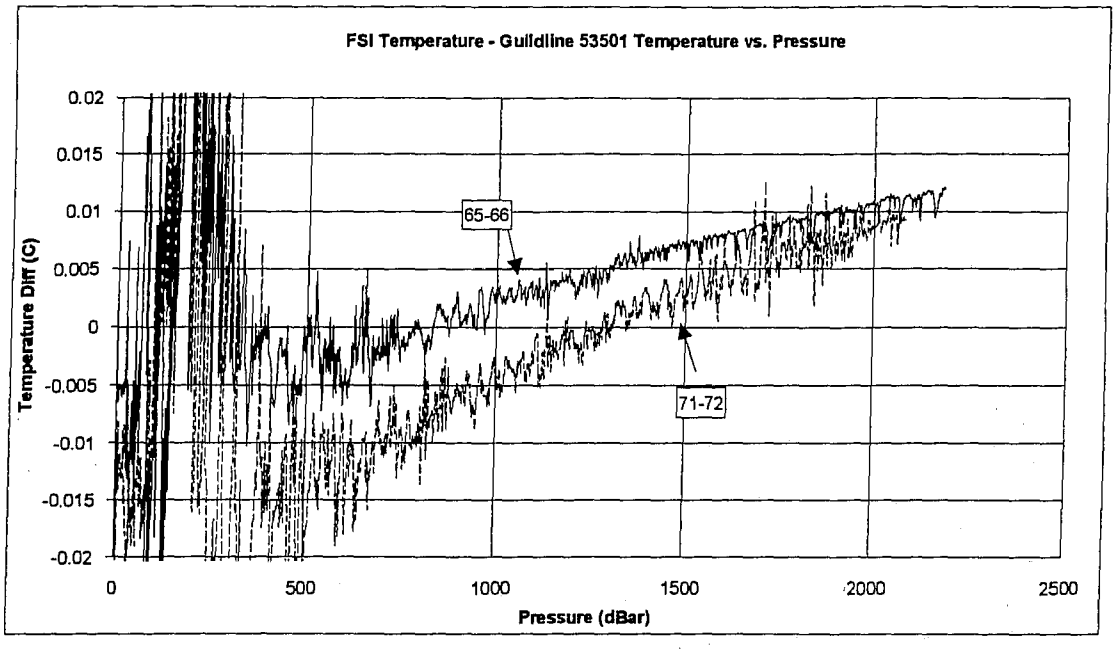

Figure 10 - FSI Temperature - Guildline 53501 Temperature vs. Pressure

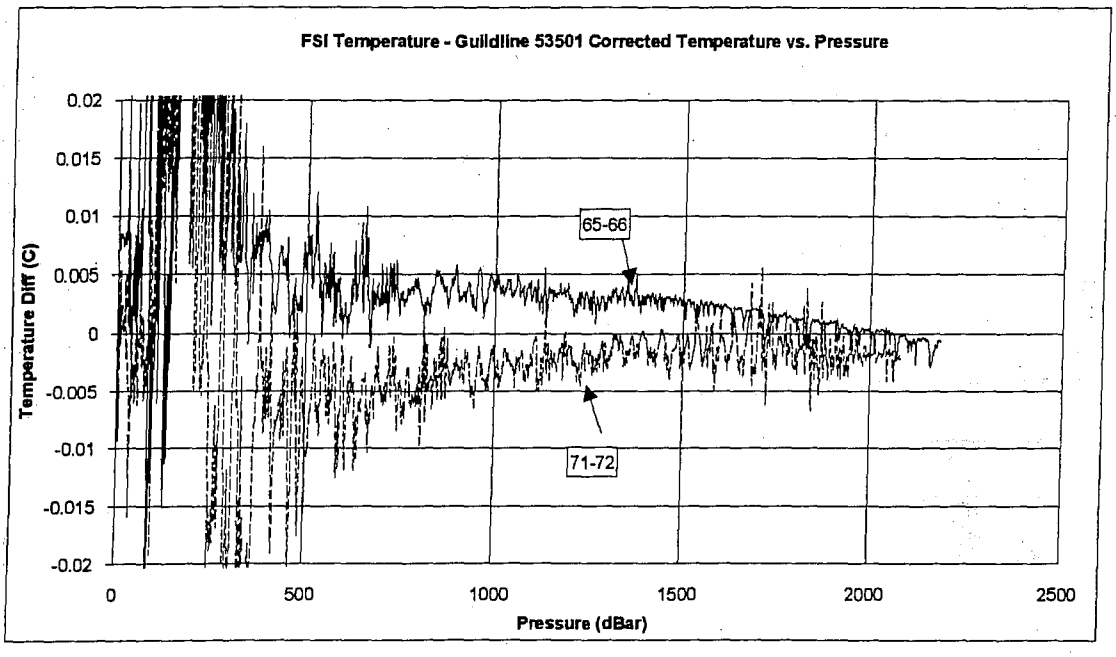

Figure 11 - FSI Temperature - Guildline 53501 Corrected Temperature vs. Pressure

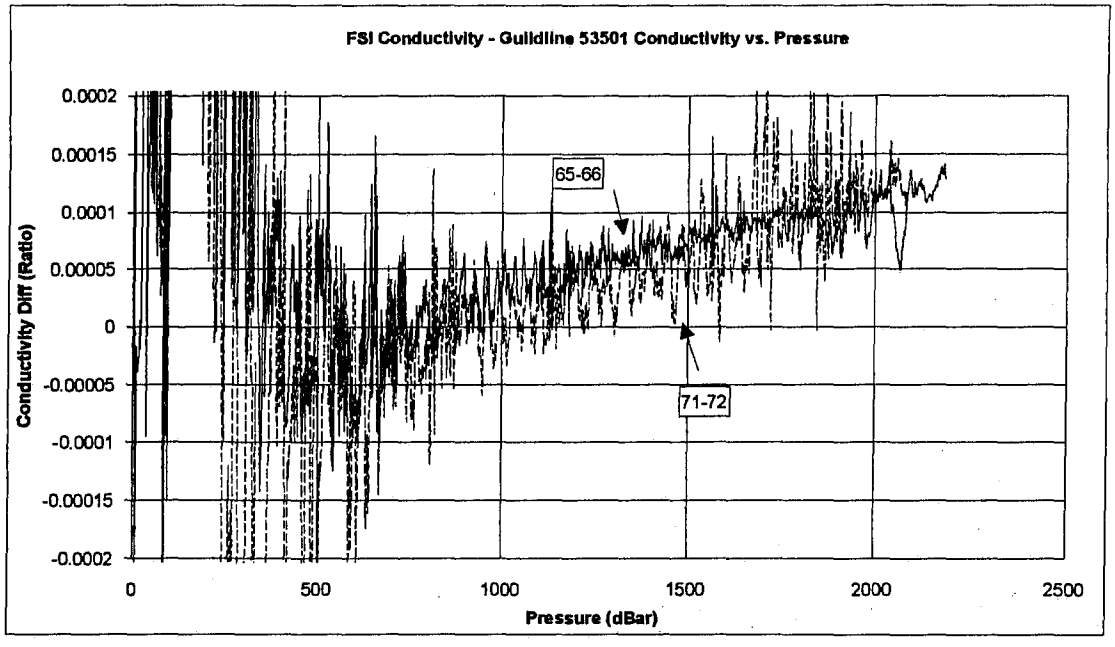

Figure 12 - FSI Conductivity - Guildline 53501 Conductivity vs. Pressure

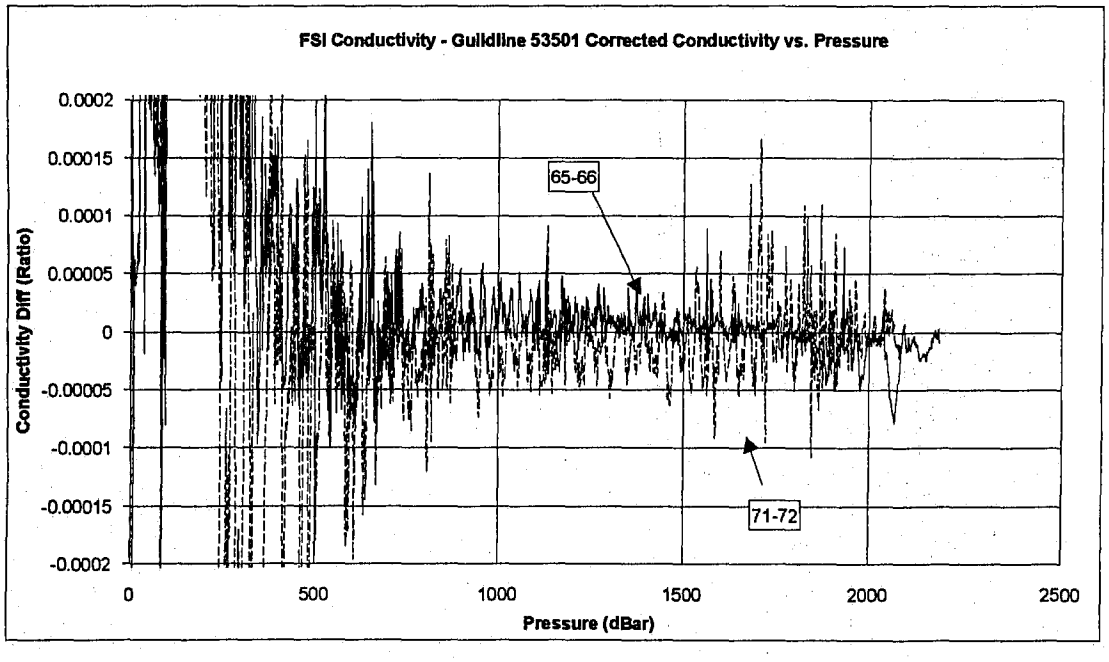

Figure 13 - FSI Conductivity - Guildline 53501 Corrected Conductivity vs. Pressure

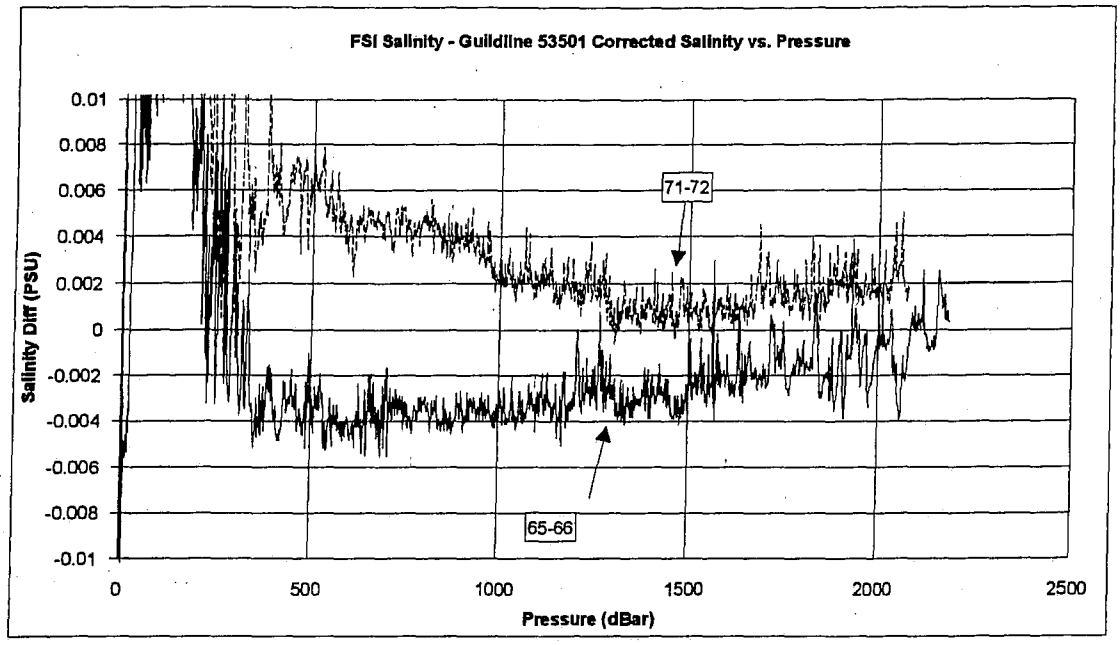

Figure 14 - FSI Salinity - Guildline 53501 Corrected Salinity vs. Pressure

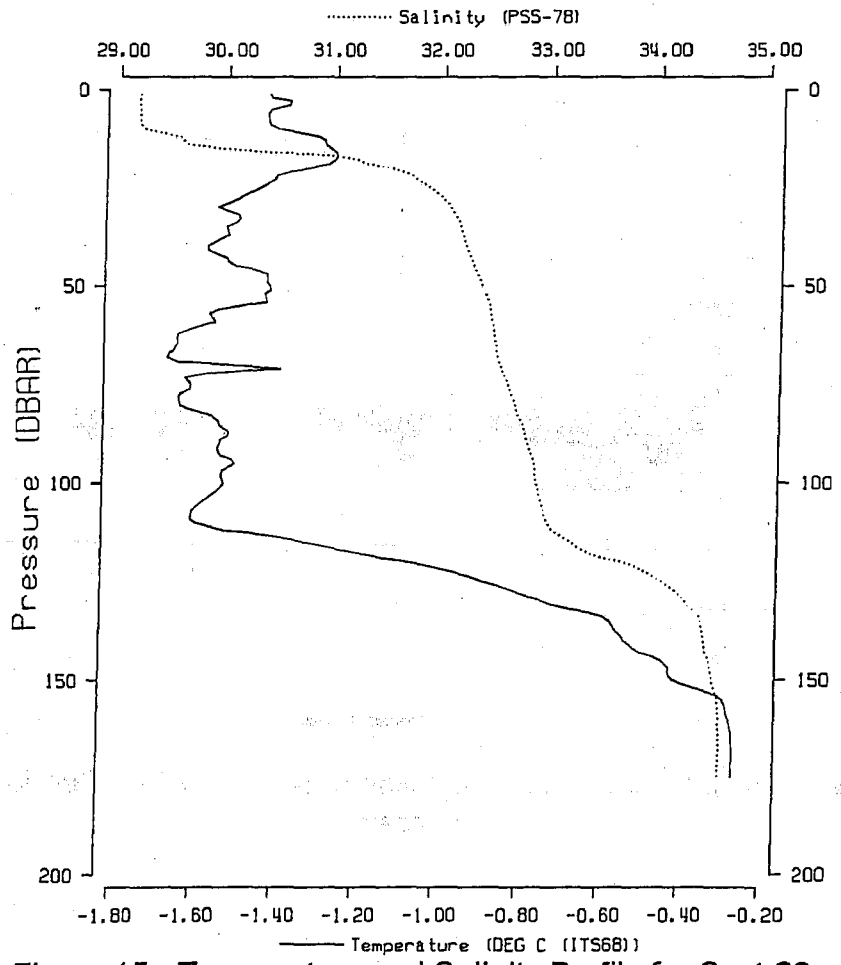

Figure 15 - Temperature and Salinity Profile for Cast 89

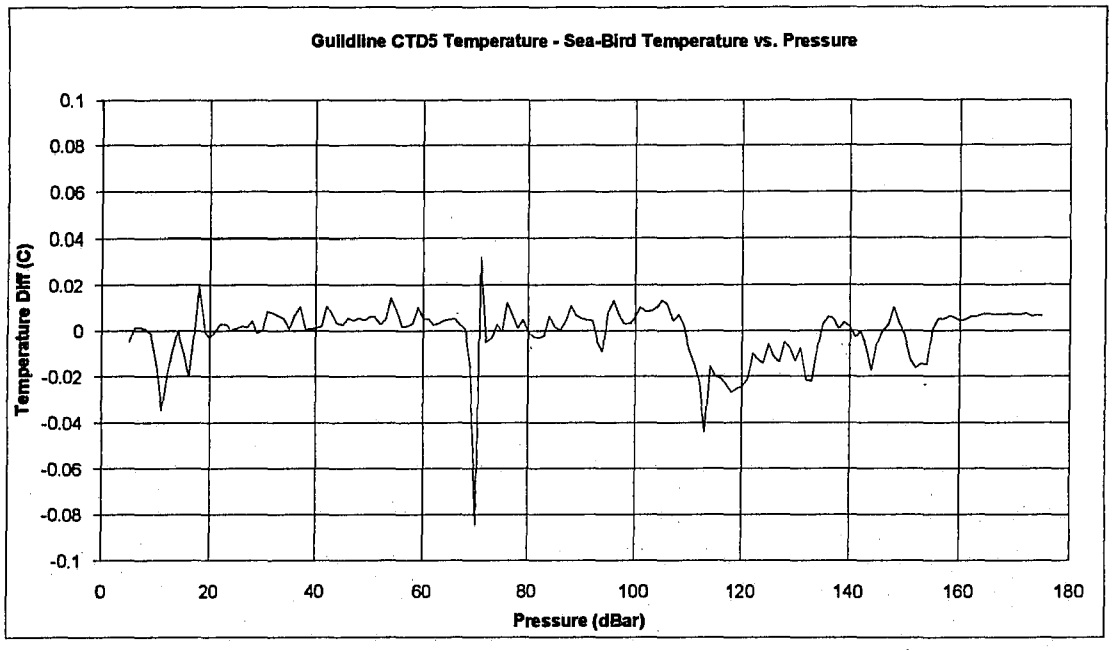

Figure 16 - Guildline CTD5 Temperature - Sea-Bird Temperature vs. Pressure

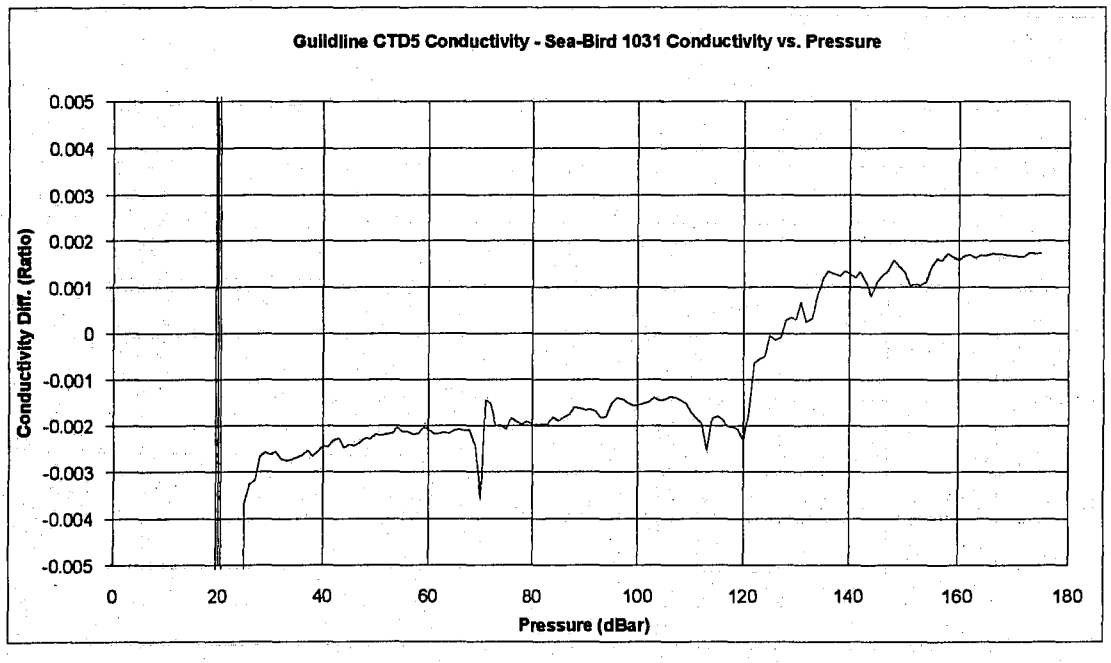

Figure 17 - Guildline CTD5 Conductivity - Sea-Bird 1031 Conductivity vs. Pressure

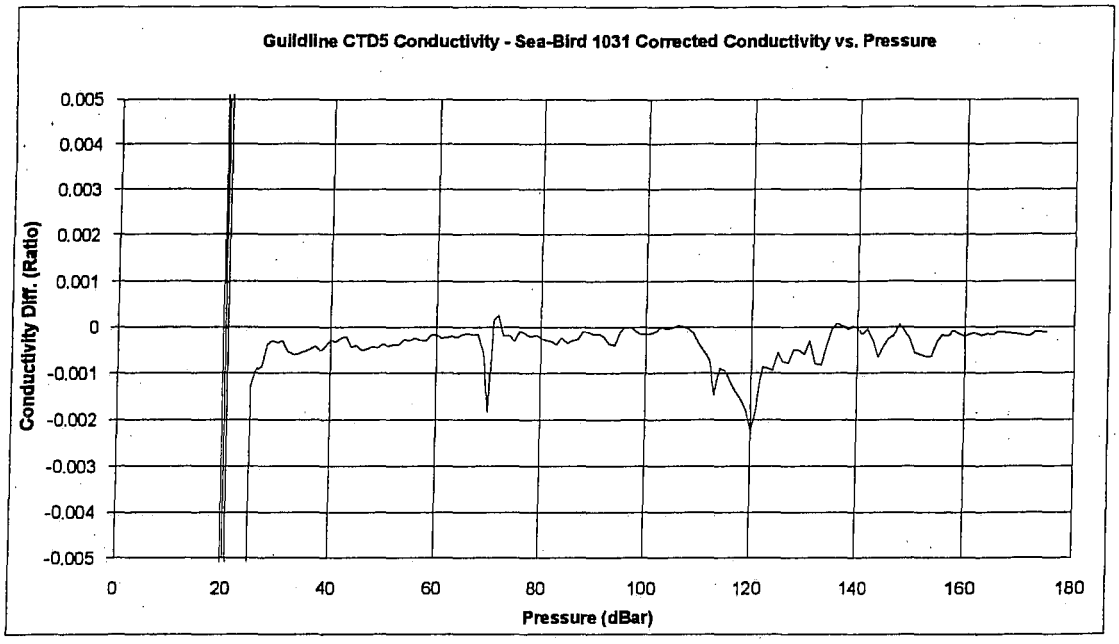

Figure 18 - Guildline CTD5 Conductivity - Sea-Bird Corrected Conductivity vs. Pressure

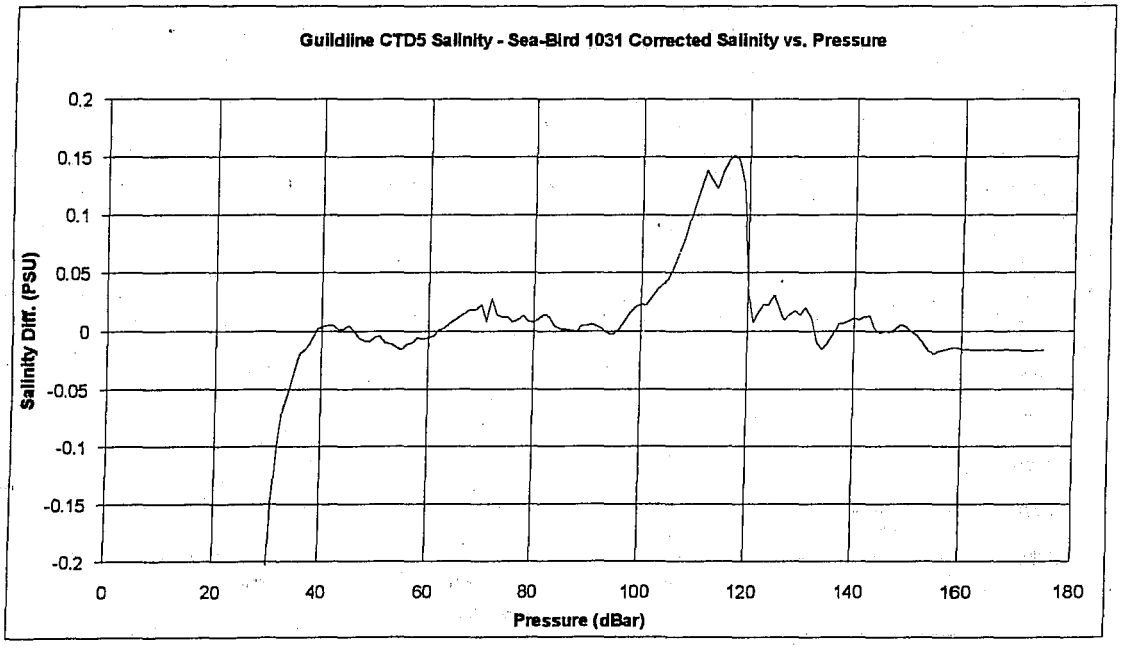

Figure 19 - Guildine CTD5 Salinity - Sea-Bird 1031 Corrected Salinity vs. Pressure

4. LIST OF TABLES

Sta-tion	Cst #	Date	Time	Lat			Long			Bot Depth	Cast Depth	CTD Type	S/N	Ros ett?	Tra ns	Fluo ro	PAR	O2	Comments
				Deg	Min		Deg	Min											
CS01	1	24-Aug-93	19:30	70	17.531	N	133	37.181	W	55	54	SeaBird	1031	N					
CM01	2	25-Aug-93	18:06	70	14.800	N	136	58.900	W	53	53	SeaBird	1031	N					Hit the bottom
CM02	3	26-Aug-93	02:40	69	30.076	N	138	04.831	W	83	81	SeaBird	1031	N					
AM01	4	27-Aug-93	03:56	70	23.758	N	139	52.332	W	532	500	FSI	1329	Y	Y	Y			
AM10	5	28-Aug-93	02:43	70	28.445	N	136	54.231	W	657	545	FSI	1329	Y	Y	Y			
FM01	6	28-Aug-93	14:39	71	23.352	N	139	54.320	W	2500	1699	FSI	1329	Y	Y	Y			
A01	7	29-Aug-93	15:18	72	32.055	N	143	53.901	W	3300	182	FSI	1329	Y	Y	Y	Y		
A01	8	30-Aug-93	15:21	72	32.644	N	143	49.282	W	3300	1601	FSI	1329	Y	Y	Y			
A01	9	31-Aug-93	15:33	72	32.708	N	143	50.509	W	3300	3361	FSI	1329	Y					
A01	10	2-Sep-93	14:32	72	33.667	N	143	48.279	W	3300	557	FSI	1329	Y	Y	Y			
A01	11	2-Sep-93	23:11	72	32.890	N	143	51.050	W	3300	27	Guild	53501	Y					
B01	14	7-Sep-93	15:33	72	25.928	N	152	19.606	W	3200	3361	FSI	1329	Y					
B01	15	8-Sep-93	21:47	72	34.067	N	152	21.523	W	3300	3486	FSI	1329	Y					
B01	16	9-Sep-93	15:16	72	32.224	N	152	27.096	W	3300	178	FSI	1329	Y	Y	Y	Y		
BC01	17	9-Sep-93	18:41	71	23.096	N	156	53.305	W	78	80	Seabird	1031	N	Y			Y	
BC02	18	9-Sep-93	20:15	71	24.434	N	156	51.342	W	92	93	Seabird	1031	N	Y			Y	
BC03	19	9-Sep-93	21:12	71	27.567	N	156	55.045	W	136	137	Seabird	1031	N	Y			Y	
BC04	20	9-Sep-93	22:03	71	30.075	N	156	59.404	W	137	140	Seabird	1031	N	Y			Y	
BC05	21	9-Sep-93	22:52	71	32.797	N	157	03.764	W	108	113	Seabird	1031	N	Y			Y	
BC06	22	9-Sep-93	23:39	71	35.400	N	157	08.232	W	77	83	Seabird	1031	N	Y			Y	
BC07	23	10-Sep-93	00:24	71	38.343	N	157	12.677	W	72	68	Seabird	1031	N	Y			Y	
TA	24	11-Sep-93	15:20	75	00.054	N	172	59.900	W	347	343	FSI	1329	Y	Y	Y			
TA	25	11-Sep-93	15:20	75	00.054	N	172	59.900	W	347	344	Guild	#5	Y					Done Together with 24
TA	28	11-Sep-93	16:54	75	01.602	N	173	01.482	W	347	206	FSI	1329	Y	Y	Y	Y		
TA	29	11-Sep-93	16:54	75	01.602	N	173	01.482	W	347	206	Guild	#5	Y					Done together with 28
TA	32	11-Sep-93	16:16	75	00.933	N	173	00.465	W	347	342	Seabird	1031	N	Y			Y	
T1	33	11-Sep-93	19:28	75	00.041	N	173	15.435	W	333	334	Seabird	1031	N	Y			Y	

Table 1 - 9324 CTD Cast Details

Sta-tion	Cst #	Date	Time	Lat			Long			Bot Depth	Cast Depth	CTD Type	S/N	Ros ett?	Tra ns	Fluo ro	PAR	O2	Comments
				Deg	Min		Deg	Min											
T2	34	11-Sep-93	21:30	75	01.072	N	173	32.878	W	320	321	Seabird	1031	N	Y			Y	
T3	35	11-Sep-93	22:48	75	00.060	N	173	45.159	W	310	306	Seabird	1031	N	Y			Y	
T4	36	12-Sep-93	00:07	75	00.321	N	173	56.686	W	298	296	Seabird	1031	N	Y			Y	
T5	37	12-Sep-93	01:30	75	00.622	N	174	14.847	W	298	289	Seabird	1031	N	Y			Y	
T6	38	12-Sep-93	02:30	75	00.467	N	174	29.343	W	287	283	Seabird	1031	N	Y			Y	
T7	39	12-Sep-93	04:04	74	59.800	N	174	45.133	W	272	277	Seabird	1031	N	Y			Y	
TB	40	12-Sep-93	05:00	74	59.944	N	175	00.288	W	266	260	Seabird	1031	N	Y			Y	
TB	41	12-Sep-93	16:07	74	59.810	N	174	59.412	W	264	265	Seabird	1031	N	Y			Y	
T8	42	12-Sep-93	18:02	75	04.189	N	174	49.651	W	282	285	Seabird	1031	N	Y			Y	
T9	43	12-Sep-93	19:11	75	08.117	N	174	35.566	W	310	314	Seabird	1031	N	Y			Y	
T10	44	12-Sep-93	20:27	75	12.293	N	174	23.705	W	349	345	Seabird	1031	N	Y			Y	
T11	45	12-Sep-93	21:19	75	16.021	N	174	12.036	W	427	415	Seabird	1031	N	Y			Y	
TC	46	12-Sep-93	22:30	75	19.536	N	174	01.362	W	643	656	Seabird	1031	N	Y			Y	
T12	47	12-Sep-93	23:10	75	15.972	N	173	48.214	W	427	423	Seabird	1031	N	Y			Y	
T13	48	13-Sep-93	00:07	75	12.131	N	173	35.408	W	385	375	Seabird	1031	N	Y			Y	
T14	49	13-Sep-93	01:00	75	08.150	N	173	24.960	W	366	353	Seabird	1031	N	Y			Y	
T15	50	13-Sep-93	01:34	75	04.007	N	173	12.100	W	356	345	Seabird	1031	N	Y			Y	
TA	51	13-Sep-93	02:30	75	00.028	N	173	00.476	W	347	331	Seabird	1031	N	Y			Y	
TC	52	13-Sep-93	15:21	75	19.405	N	174	00.065	W	650	642	FSI	1329	Y	Y	Y			
TC	53	13-Sep-93	15:21	75	19.405	N	174	00.065	W	650	644	Guild	#5	Y					Done together with 52
TC	56	13-Sep-93	20:18	75	19.795	N	173	55.217	W	650	506	FSI	1329	Y	Y	Y			
TC	57	13-Sep-93	20:18	75	19.795	N	173	55.217	W	650	506	Guild	#5	Y					Done together with 55
TC2	60	14-Sep-93	01:06	75	30.307	N	174	01.706	W	1350	1330	Guild	#5	N					
TC3	63	14-Sep-93	04:10	75	45.080	N	173	59.610	W	1880	1830	Guild	53501	N					
TC4	64	14-Sep-93	04:10	75	54.770	N	174	02.080	W	2100	2080	Guild	53501	N					
D01	65	14-Sep-93	18:26	76	30.279	N	173	55.298	W	2187	2186	FSI	1329	Y		Y			
D01	66	14-Sep-93	18:26	76	30.279	N	173	55.298	W	2187	2185	Guild	53501	Y					Done together with 65

Table 1 (con't) - 9324 CTD Cast Details

Sta-tion	Cst #	Date	Time	Lat Deg	Lat Min		Long Deg	Long Min		Bot Depth	Cast Depth	CTD Type	S/N	Rosett?	Trans	Fluoro	PAR	O2	Comments
D01	67	15-Sep-93	02:27	76	35.283	N	174	02.933	W	2187	500	FSI	1329	Y	Y	Y			
D02	68	15-Sep-93	16:33	77	04.470	N	177	04.180	W	1380	603	Guild	53501	N					
D02	69	15-Sep-93	17:28	77	04.180	N	177	04.080	W	1380	1370	Guild	53501	N					
D03	70	16-Sep-93	00:25	77	26.930	N	178	31.440	W	1620	1590	Guild	53501	N					
E01	71	17-Sep-93	02:03	78	46.713	N	175	50.174	E	2067	2054	FSI	1329	Y		Y			
E01	72	17-Sep-93	02:03	78	46.713	N	175	50.174	E	2067	2054	Guild	53501	Y					Done together with 71
E01	73	17-Sep-93	04:19	78	46.654	N	175	52.870	E	2067	500	FSI	1329	Y	Y	Y			
E01	74	17-Sep-93	16:19	78	46.916	N	176	02.990	E	2067	200	FSI	1329	Y	Y	Y			
E01	75	17-Sep-93	20:06	78	47.018	N	176	05.846	E	2067	1500	FSI	1329	Y	Y	Y			
E01	76	17-Sep-93	20:06	78	47.018	N	176	05.846	E	2067	1500	Guild	#5	Y					Done together with 75
E01	77	17-Sep-93	21:56	78	47.097	N	176	05.915	E	2067	1000	FSI	1329	Y	Y	Y			
E01	78	17-Sep-93	21:56	78	47.097	N	176	05.915	E	2067	1000	Guild	#5	Y					Done together with 77
E01	79	18-Sep-93	03:35	78	47.917	N	176	05.916	E	2067	400	FSI	1329	Y	Y	Y			
E01	80	18-Sep-93	16:05	78	47.051	N	176	01.620	E	2067	100	FSI	1329	Y	Y	Y			
E01	81	18-Sep-93	17:06	78	46.834	N	176	00.815	E	2055	2030	FSI	1329	Y	Y	Y			
E02	82	19-Sep-93	01:54	77	57.443	N	175	51.820	E	1560	1540	Guild	53501	N					
E03	83	19-Sep-93	07:10	77	30.944	N	175	00.304	E	1220	1205	Guild	#5	N					
E04	84	19-Sep-93	14:57	76	57.526	N	174	08.800	E	870	852	FSI	1329	Y	Y	Y			
E05	85	19-Sep-93	21:15	76	39.381	N	173	37.965	E	406	400	Guild	#5	N					
F01	86	21-Sep-93	16:26	74	49.880	N	172	59.610	W	310	300	Guild	#5	N					
F02	87	21-Sep-93	19:09	74	30.072	N	170	59.580	W	215	200	Guild	#5	N					
F03	88	22-Sep-93	01:36	73	59.978	N	168	59.699	W	178	165	Guild	#5	N					
F03	89	22-Sep-93	01:36	73	59.978	N	168	59.699	W	178	170	SeaBird	1031	N	Y			Y	Done together with 88
F05	90	22-Sep-93	05:23	73	50.000	N	167	59.500	W	170	165	SeaBird	1031	N	Y			Y	
F06	91	22-Sep-93	06:44	73	44.663	N	167	30.904	W	159	150	SeaBird	1031	N	Y			Y	
F08	92	22-Sep-93	08:02	73	34.868	N	166	29.900	W	103	97	SeaBird	1031	N	Y			Y	
F09	93	22-Sep-93	17:42	73	29.978	N	165	59.453	W	91	89	FSI	1329	Y	Y	Y			

Table 1 (con't) - 9324 CTD Cast Details

Sta-tion	Cst #	Date	Time	Lat Deg	Lat Min		Long Deg	Long Min		Bot Depth	Cast Depth	CTD Type	S/N	Rosett?	Trans	Fluoro	PAR	O2	Comments
F09	94	22-Sep-93	18:32	73	29.590	N	166	01.898	W	89	86	FSI	1329	Y	Y	Y	Y		
F09	95	22-Sep-93	21:37	73	28.040	N	166	11.512	W	89	50	FSI	1329	Y	Y	Y	Y		
F10	96	23-Sep-93	03:03	73	41.768	N	165	33.585	W	130	123	SeaBird	1031	N	Y			Y	
F11	97	23-Sep-93	05:01	73	51.435	N	165	07.577	W	160	159	SeaBird	1031	N	Y			Y	
F12	98	23-Sep-93	07:01	74	00.800	N	164	43.377	W	208	208	SeaBird	1031	N	Y			Y	
C01	99	23-Sep-93	16:24	75	00.010	N	162	00.540	W	1965	1971	FSI	1329	Y	Y	Y			
C01	100	23-Sep-93	21:40	74	59.496	N	162	04.525	W	1965	204	FSI	1329	Y	Y	Y	Y		
OH01	101	24-Sep-93	19:58	71	54.452	N	155	56.758	W	87	87	SeaBird	1031	N				Y	
OH02	102	24-Sep-93	21:02	71	50.857	N	155	44.655	W	105	105	SeaBird	1031	N				Y	
OH03	103	24-Sep-93	21:41	71	49.003	N	155	37.935	W	111	111	SeaBird	1031	N				Y	
OH04	104	24-Sep-93	22:19	71	47.016	N	155	31.140	W	130	130	SeaBird	1031	N				Y	
OH05	105	24-Sep-93	23:01	71	44.589	N	155	23.927	W	162	162	SeaBird	1031	N				Y	
OH06	106	24-Sep-93	23:41	71	42.609	N	155	17.084	W	281	281	SeaBird	1031	N				Y	
OH07	107	25-Sep-93	00:29	71	40.417	N	155	10.463	W	162	162	SeaBird	1031	N				Y	
OH08	108	25-Sep-93	01:08	71	37.970	N	155	03.855	W	70	70	SeaBird	1031	N				Y	
OD01	109	25-Sep-93	01:49	71	35.937	N	154	54.680	W	40	40	SeaBird	1031	N				Y	
OE01	110	25-Sep-93	03:24	71	34.003	N	155	24.927	W	67	67	SeaBird	1031	N				Y	
OF01	111	25-Sep-93	05:11	71	38.995	N	155	57.070	W	142	142	SeaBird	1031	N				Y	
OG01	112	25-Sep-93	06:23	71	45.066	N	156	05.151	W	94	94	SeaBird	1031	N				Y	
OA01	113	25-Sep-93	08:57	71	56.911	N	155	25.311	W	189	189	SeaBird	1031	N				Y	
OB01	114	25-Sep-93	10:42	71	52.909	N	154	54.618	W	369	369	SeaBird	1031	N				Y	
OC01	115	25-Sep-93	12:22	71	44.843	N	154	45.040	W	130	130	SeaBird	1031	N				Y	

Table 1 (con't) - 9324 CTD Cast Details

Manufact-urer	S/N	External Sensors	Max Pressure (dBar)
Guildline	CTD5	---------->	1500
		2xThermistors,	1500
Guildline	53501	---------->	6000
		none	
FSI	1329	---------->	
		Transmissometer	2000
		Fluorometer	3000
		PAR	200
Sea-Bird	1031	---------->	600
		Transmissometer	2000
		O2 Probe	2000

Table 2 - CTD Configurations

Parameter	Guildline S/N CTD5		Guildline S/N 53501	
	A	B	A	B
Temperature		.35714e-5	-.135e-1	.119885e-4
Conductivity	.9e-4	.1e-6	-.8e-4	.1e-6

Table 3 - Guildline Temperature and Conductivity Correction Coefficients

CTD Type	S/N	Pressure (dBar)	Temperature (C)	Salinity (PSU)
FSI	1329	1.0	0.002	0.002
Guildline	CTD5	1.0	0.005	0.006
Guildline	53501	1.0	0.010	0.006
Sea-Bird	1031	1.0	0.010	0.020

Table 4 - List of Accepted Uncertainties in CTD Pressure, Temperature, and Salinity Data.

	Mean	Standard Dev.	Count
FSI CTD - Bottle Salinity (PSU)	0.0000	.0023	63

Table 5 - FSI CTD Salinity - Bottle Salinity Statistics

Station	Date & Time	FSI Cast Number	CTD5 Cast Number
TA	Sept 11 15:20	24	25
TA	Sept 11 16:54	28	29
TC	Sept 13 15:21	52	53
TC	Sept 13 20:18	56	57
E01	Sept 17 20:06	75	76
E01	Sept 17 21:56	77	78

Table 6 - Casts Used in FSI vs. Guildline CTD5 Intercomparision

Station	Date & Time	FSI Cast Number	53501 Cast Number
D01	Sept 14 04:10	65	66
E01	Sept 17 02:03	71	72

Table 7 - Casts Used in FSI vs. Guildline 535015 Intercomparision

Station	Date & Time	CTD5 Cast Number	1031 Cast Number
F03	Sept 22 01:36	88	89

Table 8 - Casts Used in Guildline CTD5 vs. Seabird 1031 Intercomparision

5. REFERENCES

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6. APPENDICES

6.1 CTD Data: Tables and Plots

The following appendix contains data plots for each CTD cast taken on the 9324 cruise. Each page displays the data for one cast in four sections:

Header
The header appears in the upper left quadrant of the page. Each header has 6 lines that appear as follows:

NOGAP 1993
Henry Larsen
STATION : CS01
REFERENCE NO: 93-24-001
DATE/TIME : 24/08/93 19:30 UTC
POSITION : 70-17.5N 133-37.2W

The first two lines are the title and sub-title and are the same for each page. The remaining four lines are defined as follows:

STATION - This is the 4 character station name. These names match the names given in Table 1 and in Figure 1.
REFERENCE NO - This number appears as 93-24-###, where ### is the consecutive cast number as referred to in the report text and listed in Table 1.
DATE/TIME - This is the date and time (UTC) at the start of the cast
POSITION - This is the position at the start of the cast.

Profile Plot In the lower left quadrant is the profile plot. Each profile plot shows Potential Temperature, Salinity, and (if available) Transmissivity, as a function of Pressure.

TS Plot In the lower right quadrant is the TS plot. This plot shows Potential Temperature as a function of Salinity. Also shown on each profile are three lines of constant potential density at 25, 26, and 27 kg/m^3, and the freezing point line.

Data Table In the upper right quadrant is a data table showing various measured and derived properties at selected standard depths. Units and abbreviations used in the data table are summarized in a table on the next page.

Also included in this appendix are profile plots of % Transmissivity, Chlorophyll, and PAR as a function of Pressure for the FSI CTD casts.

Quantity	Abbreviation	Units	Notes
Pressure	Pres	DBAR	
Temperature	Temp	Deg C	
Potential Temperature	Theta	Deg C	
Salinity	Sal	PSS-78	
Depth	Dept	metre	
Potential Density	Gam-th	kg/m3	
Geopotential Anomaly	GPA	J/Kg	
% Transmissivity	% Tr	%/metre	Units used for all FSI Transmissometer Data
% Transmissivity	%/5cm	%/5cm	Units used for all Sea-Bird Transmissometer Data
Chlorophyll	Chl	mg/m^3	Chlorophyll has been measured using a Fluorometer and calculated using nominal coefficients.
Photosynthetically Active Radiation	PAR	$\mu E/Sm^2$	

Units and Abbreviations used in APPENDIX Data Tables

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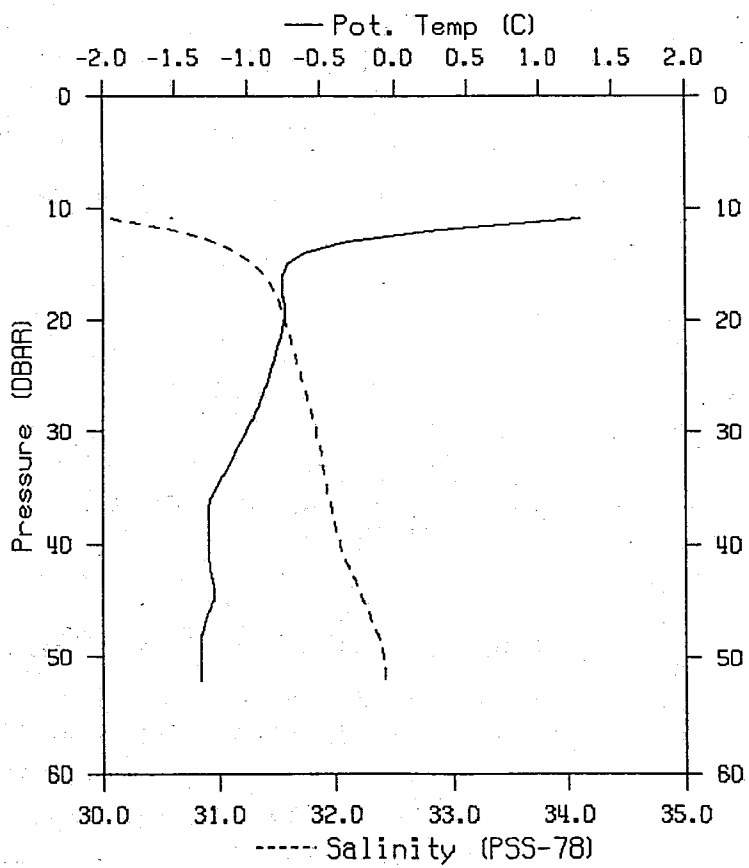
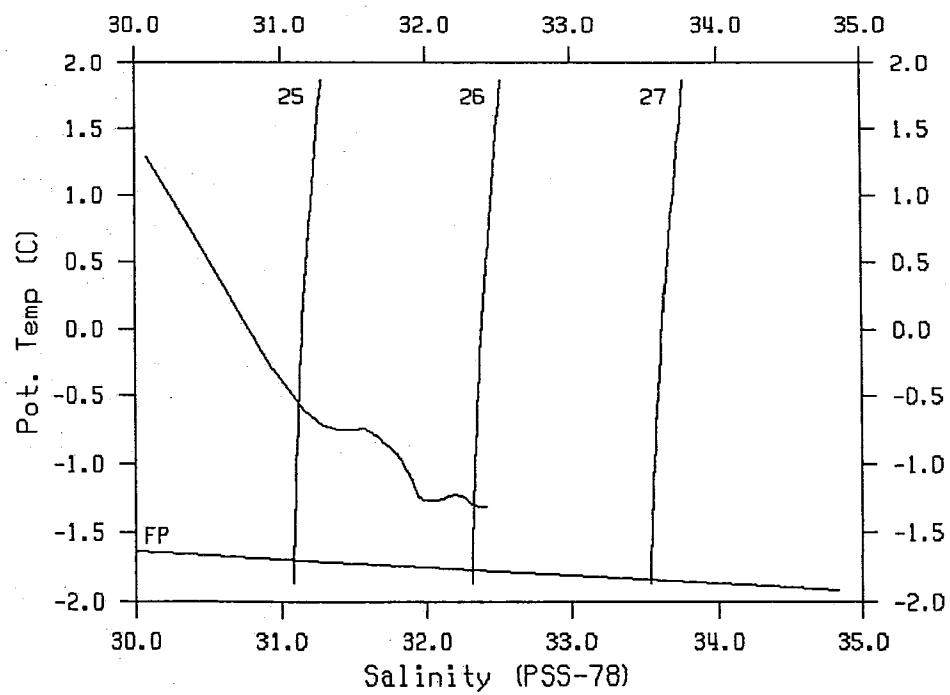
NOGAP 1993
Henry Larsen
STATION : CS01
REFERENCE NO.: 93-24-001
DATE/TIME : 24/08/93 19:30 UTC
POSITION : 70-17.5N 133-37.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	9.3933	9.3932	22.217	1	17.077	.00			
10	2.5664	2.5659	29.266	10	23.343	.68			
20	-.7429	-.7434	31.577	20	25.372	1.03			
30	-1.0057	-1.0063	31.843	30	25.595	1.28			
50	-1.3176	-1.3186	32.406	50	26.060	1.71			
52	-1.3142	-1.3152	32.429	52	26.079	1.75			





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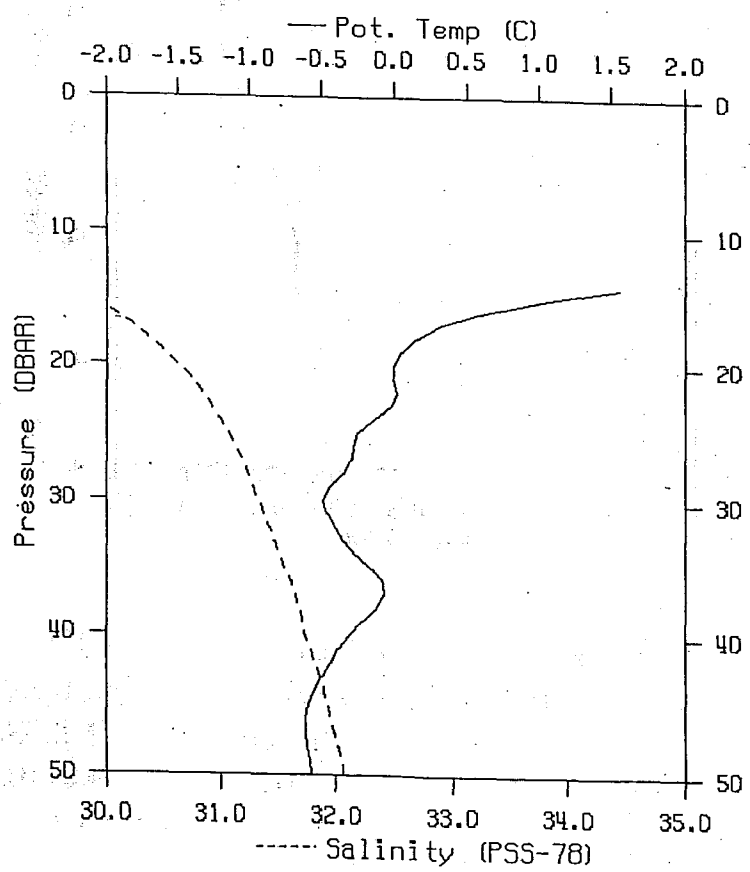
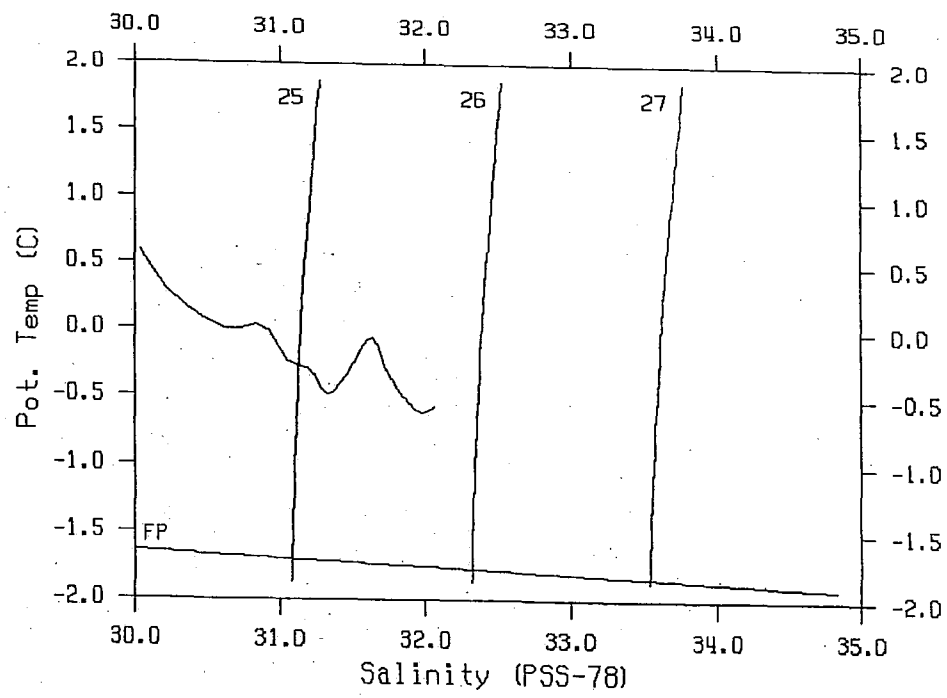
NOGAP 1993
Henry Larsen
STATION : CM01
REFERENCE NO.: 93-24-002
DATE/TIME : 25/08/93 18:06 UTC
POSITION : 70-14.8N 136-58.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	8.1047	8.1046	25.652	1	19.930	.00			
10	4.4005	4.3999	28.101	10	22.267	.60			
20	-.0002	-.0008	30.619	20	24.571	1.05			
30	-.4938	-.4945	31.333	30	25.166	1.35			
50	-.5653	-.5666	32.068	50	25.763	1.85			





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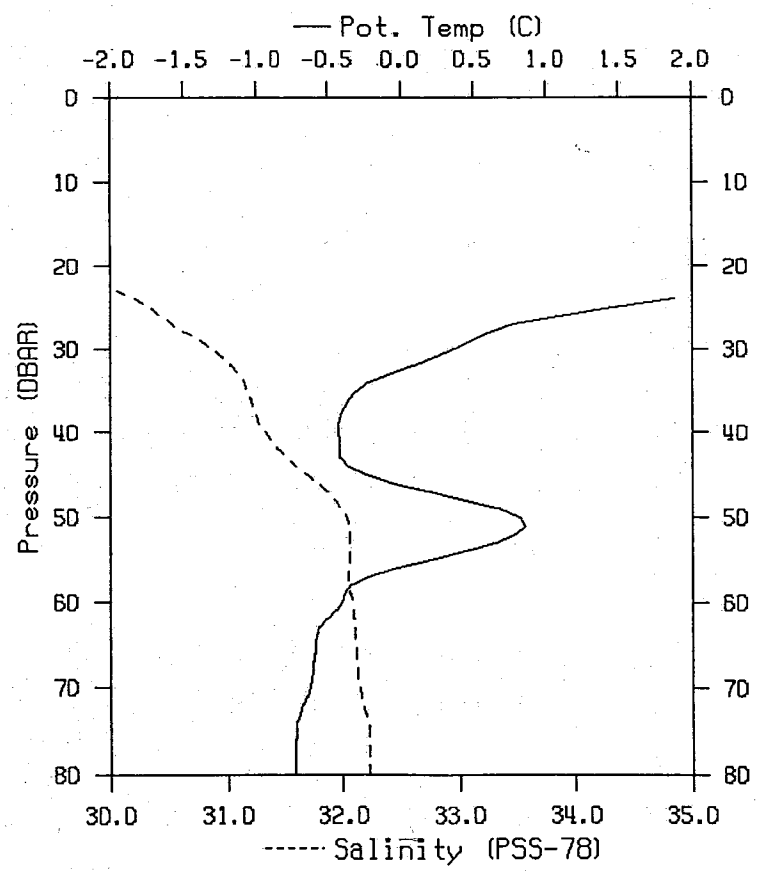
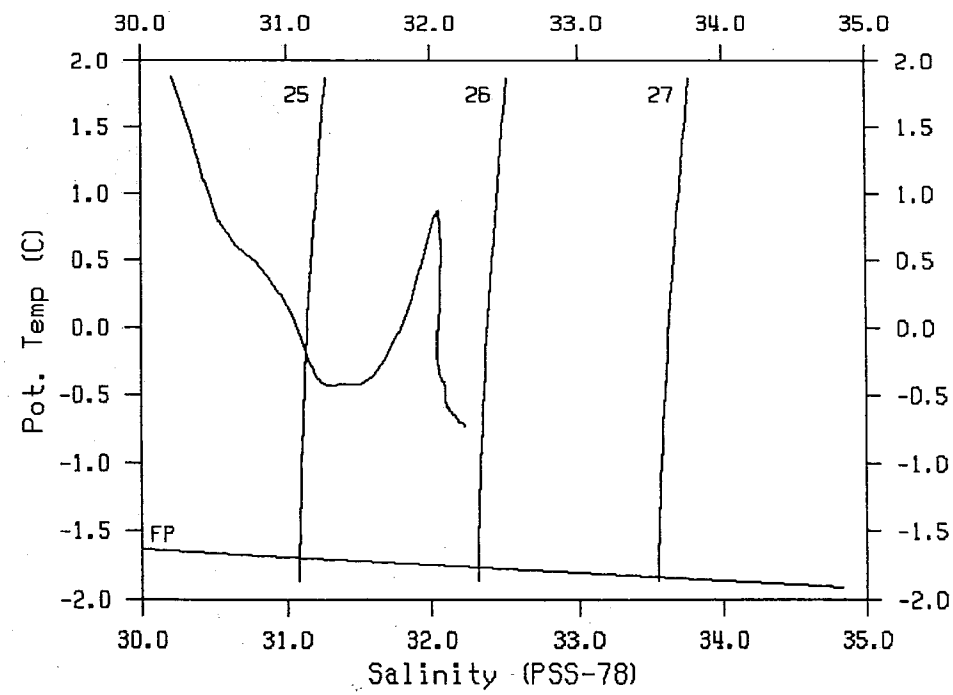
NOGAP 1993
Henry Larsen
STATION : CM02
REFERENCE NO.: 93-24-003
DATE/TIME : 26/08/93 02:40 UTC
POSITION : 69-30.1N 138- 4.8W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	3.6993	3.6993	19.245	1	15.296	.00			
10	4.8863	4.8857	27.078	10	21.413	.84			
20	4.1417	4.1405	29.624	20	23.499	1.38			
30	.3763	.3754	30.870	30	24.757	1.75			
50	.8275	.8256	32.037	50	25.673	2.30			
75	-.7235	-.7254	32.228	75	25.898	2.85			
80	-.7276	-.7296	32.233	79	25.902	2.96			





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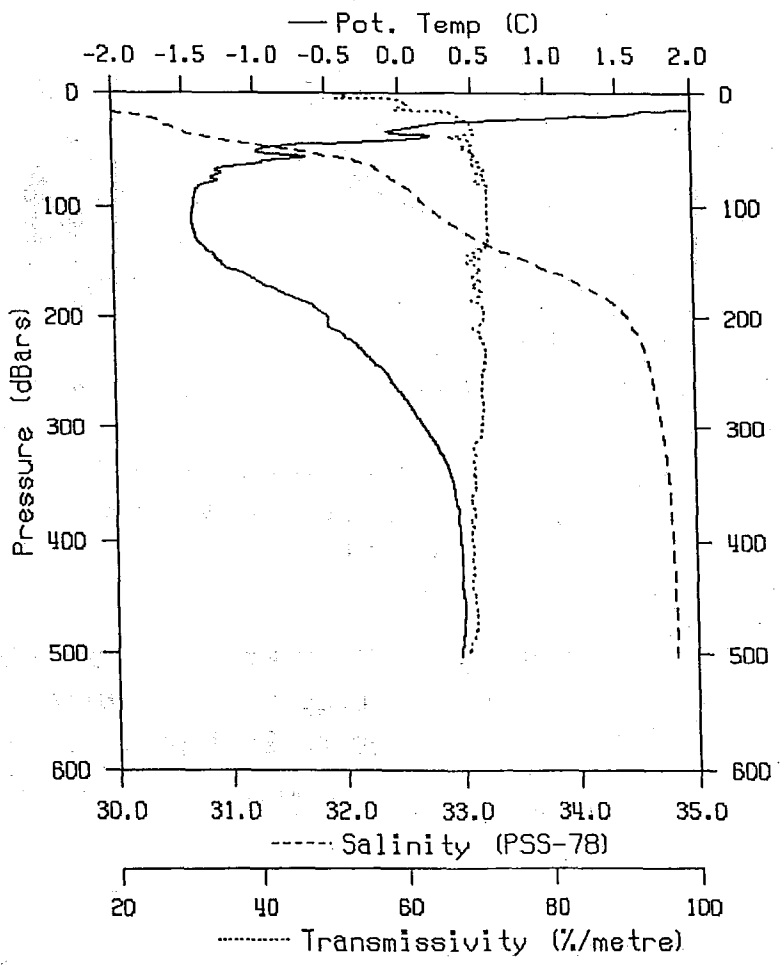
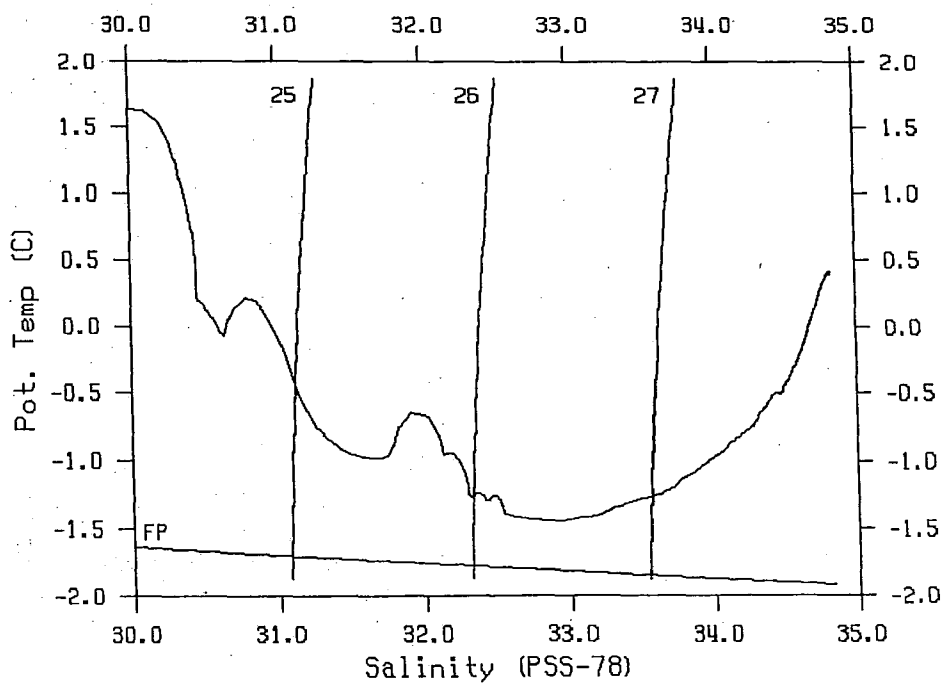
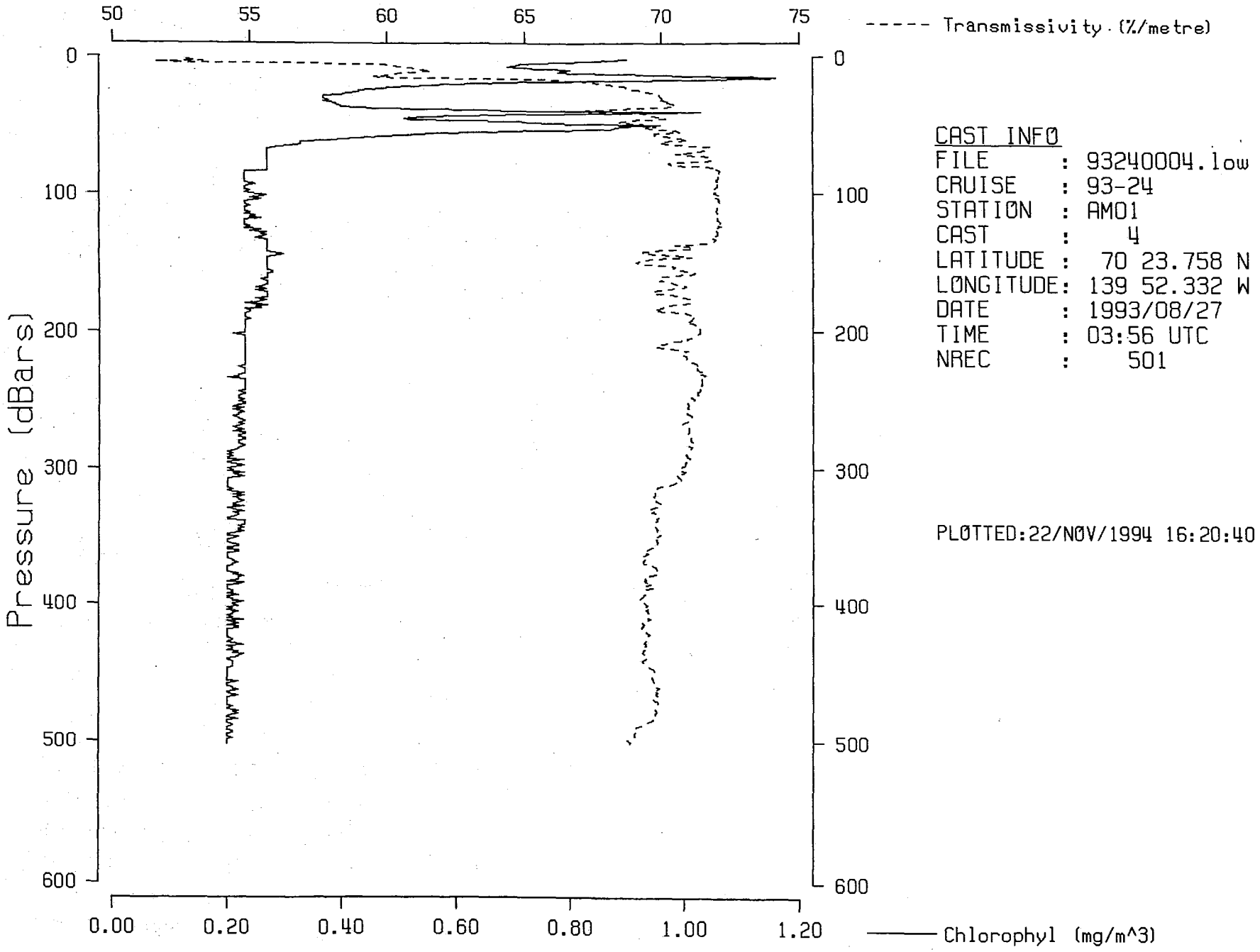
NOGAP 1993
Henry Larsen
STATION : AM01
REFERENCE NO.: 93-24-004
DATE/TIME : 27/08/93 03:56 UTC
POSITION : 70-23.8N 139-52.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	7.475	7.475	25.561	2	19.937	.00	52.7	.90	
10	6.186	6.186	26.605	10	20.907	.59	61.7	.79	
20	1.395	1.394	30.278	20	24.228	1.11	68.1	.59	
30	.126	.125	30.532	30	24.496	1.47	70.1	.37	
50	-.969	-.970	31.587	50	25.387	2.07	69.8	.96	
75	-1.291	-1.293	32.432	74	26.081	2.63	71.9	.27	
100	-1.429	-1.431	32.744	99	26.337	3.08	71.9	.24	
150	-1.231	-1.235	33.633	149	27.054	3.74	69.1	.27	
200	-.494	-.500	34.446	198	27.683	4.09	71.4	.23	
250	-.095	-.104	34.645	248	27.825	4.25	71.2	.23	
300	.166	.154	34.722	297	27.874	4.38	70.6	.20	
400	.407	.390	34.803	396	27.926	4.57	69.4	.21	
500	.411	.389	34.830	495	27.947	4.74	68.8	.20	
502	.411	.389	34.830	497	27.947	4.74	68.8	.20	



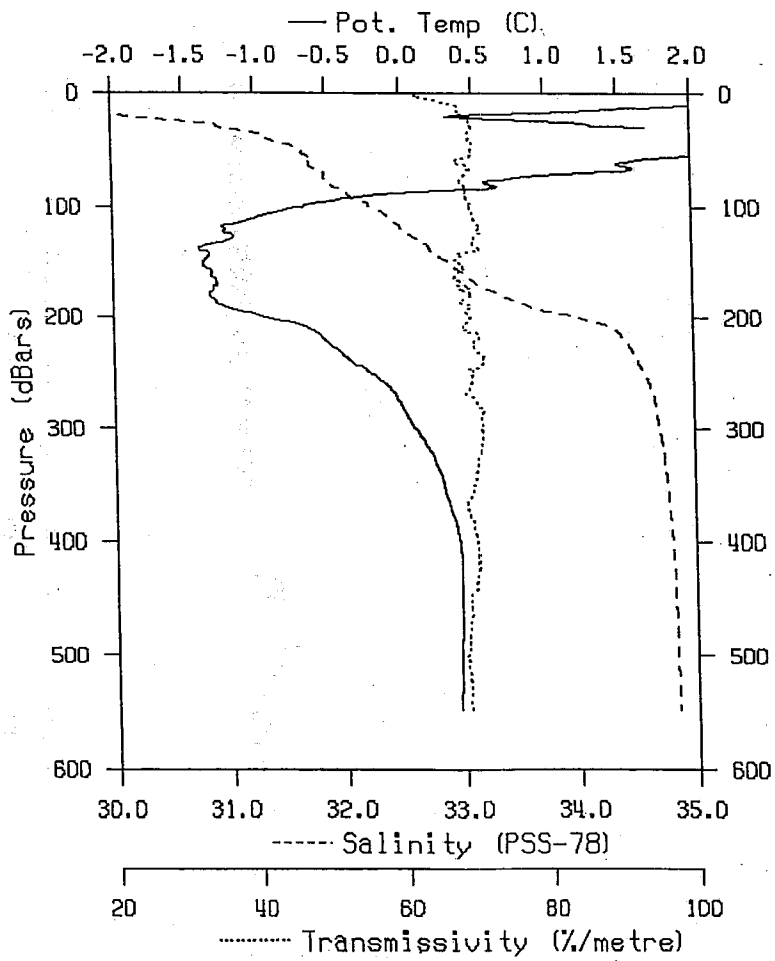


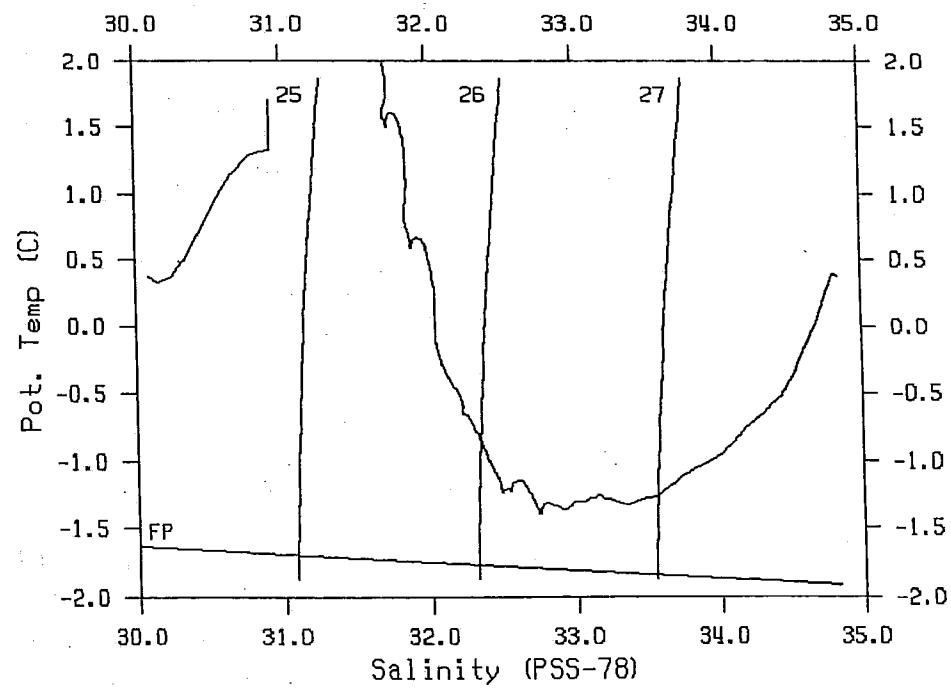

50
55
60
65
70
75
----- Transmissivity (%/metre)
0
100
200
300
400
500
600
Pressure (dBars)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240004.low
CRUISE : 93-24
STATION : AM01
CAST : 4
LATITUDE : 70 23.758 N
LONGITUDE: 139 52.332 W
DATE : 1993/08/27
TIME : 03:56 UTC
NREC : 501
PLOTTED:22/NOV/1994 16:20:40

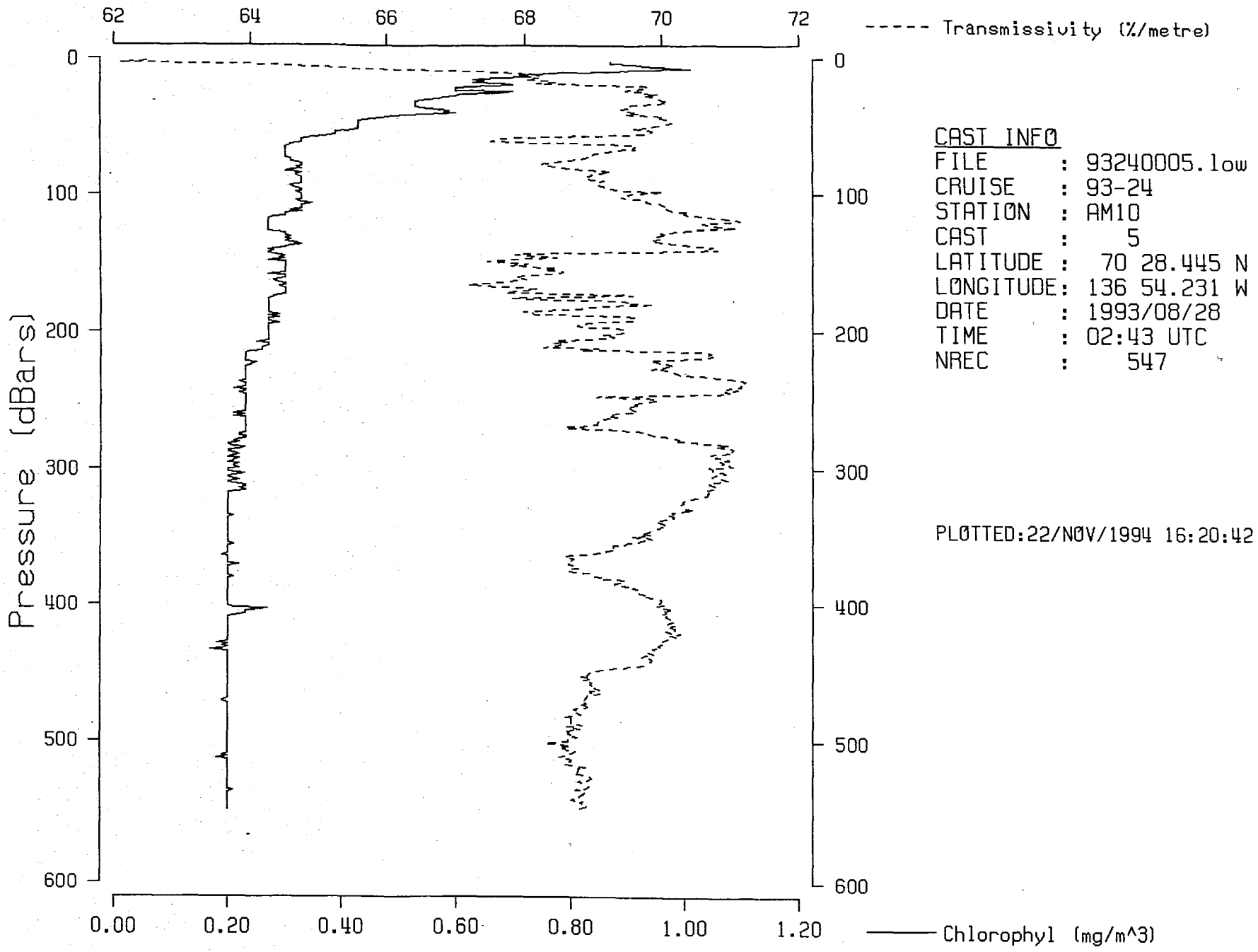
PLOTTED:22/NOV/1994 15:50:49

NOGAP 1993
Henry Larsen
STATION : AM10
REFERENCE NO.: 93-24-005
DATE/TIME : 28/08/93 02:43 UTC
POSITION : 70-28.4N 136-54.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	5.169	5.169	26.794	2	21.160	.00	62.5	.87	
10	1.992	1.992	28.871	10	23.065	.46	67.7	.79	
20	.322	.321	30.151	20	24.180	.88	69.8	.66	
30	1.707	1.706	30.931	30	24.732	1.23	70.0	.55	
50	2.456	2.453	31.649	50	25.254	1.82	69.9	.43	
75	.756	.753	31.858	74	25.533	2.46	68.7	.31	
100	-.663	-.665	32.256	99	25.919	3.03	69.5	.33	
150	-1.355	-1.358	32.902	149	26.464	3.93	68.0	.30	
200	-.927	-.932	34.026	198	27.362	4.49	69.5	.27	
250	-.209	-.218	34.575	248	27.775	4.74	69.9	.23	
300	.100	.088	34.703	297	27.862	4.88	70.8	.20	
400	.391	.375	34.801	396	27.925	5.08	70.0	.20	
500	.402	.380	34.832	495	27.949	5.25	68.6	.20	
548	.395	.371	34.841	542	27.957	5.32	68.8	.20	



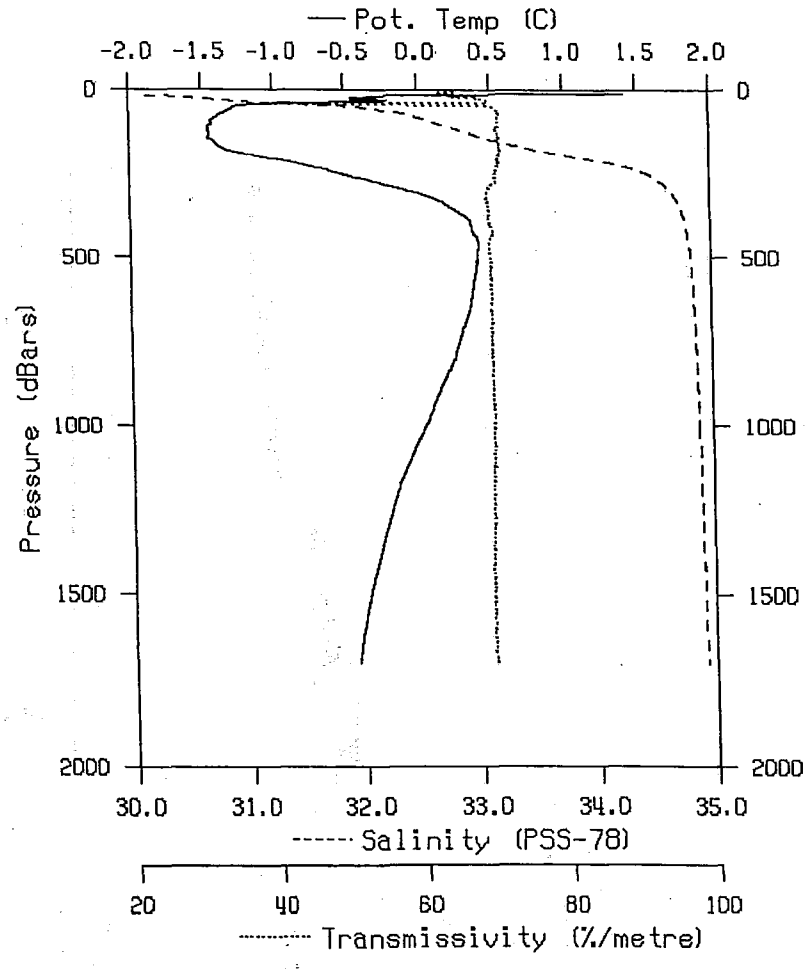


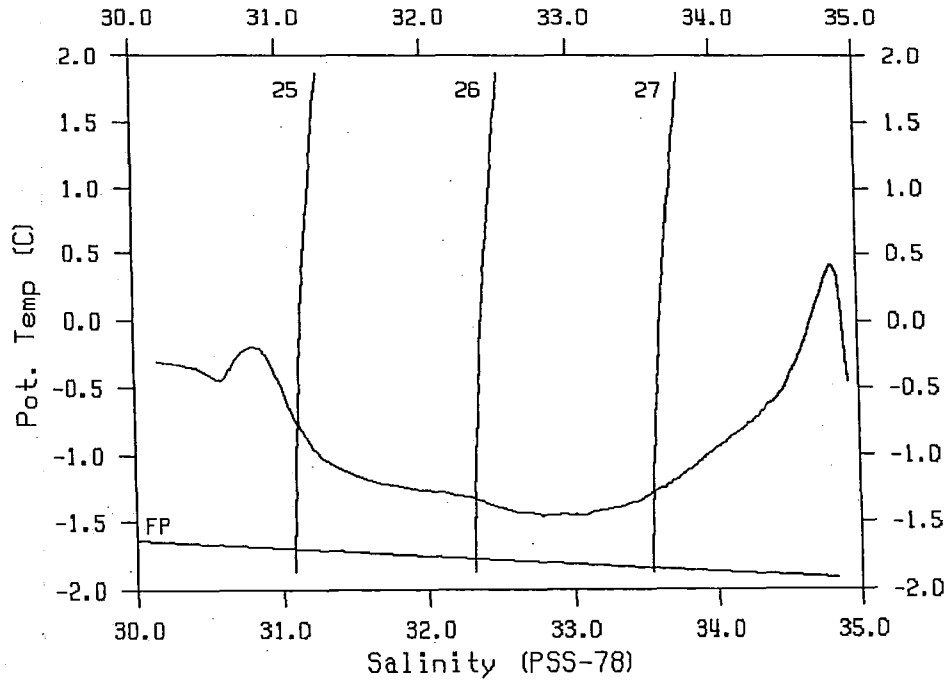

62
64
66
68
70
72
----- Transmissivity (%/metre)
0
100
200
300
400
500
600
Pressure (dBars)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240005.low
CRUISE : 93-24
STATION : AM10
CAST : 5
LATITUDE : 70 28.445 N
LONGITUDE: 136 54.231 W
DATE : 1993/08/28
TIME : 02:43 UTC
NREC : 547
PLOTTED:22/NOV/1994 16:20:42

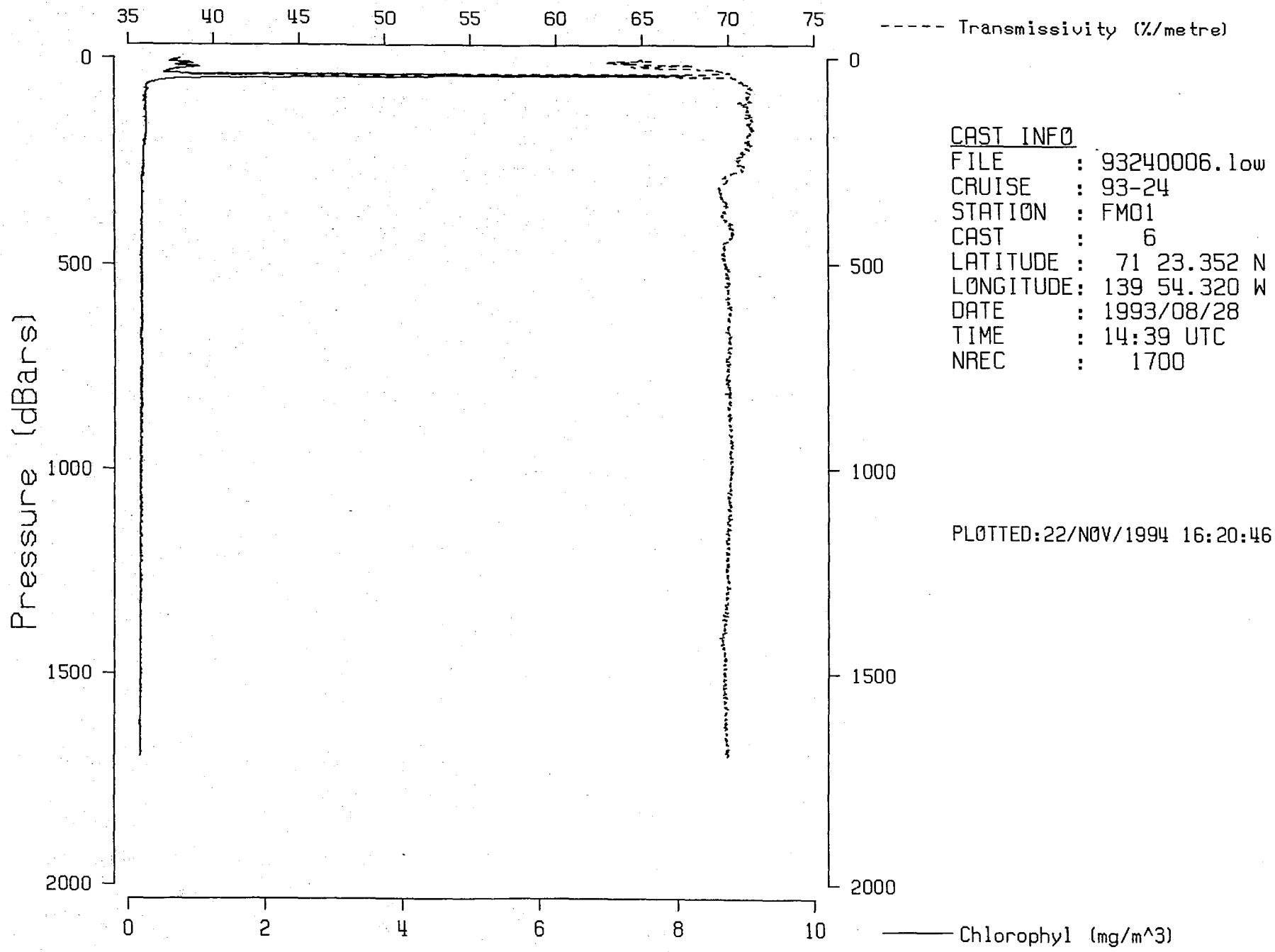
PLOTTED:22/NOV/1994 15:51:14

NOGAP 1993
Henry Larsen
STATION : FM01
REFERENCE NO.: 93-24-006
DATE/TIME : 28/08/93 14:39 UTC
POSITION : 71-23.4N 139-54.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	3.700	3.699	25.350	2	20.142	.00	65.0	.77	
10	2.429	2.429	27.461	10	21.910	.54	63.5	.78	
20	-.323	-.324	30.294	20	24.320	1.01	64.4	1.01	
30	-.198	-.198	30.808	30	24.731	1.35	69.6	.65	
50	-1.269	-1.270	32.006	50	25.734	1.90	70.6	.94	
75	-1.379	-1.381	32.465	74	26.110	2.41	71.4	.24	
100	-1.426	-1.428	32.698	99	26.301	2.86	71.2	.24	
150	-1.412	-1.415	33.186	149	26.696	3.62	71.4	.27	
200	-1.019	-1.025	33.917	198	27.277	4.15	71.2	.26	
250	-.494	-.503	34.478	248	27.710	4.43	70.6	.23	
300	-.043	-.054	34.657	297	27.832	4.59	69.9	.20	
400	.375	.358	34.791	396	27.917	4.81	70.0	.20	
500	.428	.406	34.828	495	27.945	4.98	69.8	.20	
750	.306	.272	34.865	742	27.982	5.34	70.1	.18	
1000	.075	.030	34.887	988	28.014	5.60	70.1	.18	
1250	-.145	-.202	34.902	1234	28.038	5.79	70.0	.17	
1500	-.293	-.363	34.916	1480	28.057	5.91	69.7	.18	
1701	-.366	-.447	34.926	1677	28.070	5.97	69.9	.17	



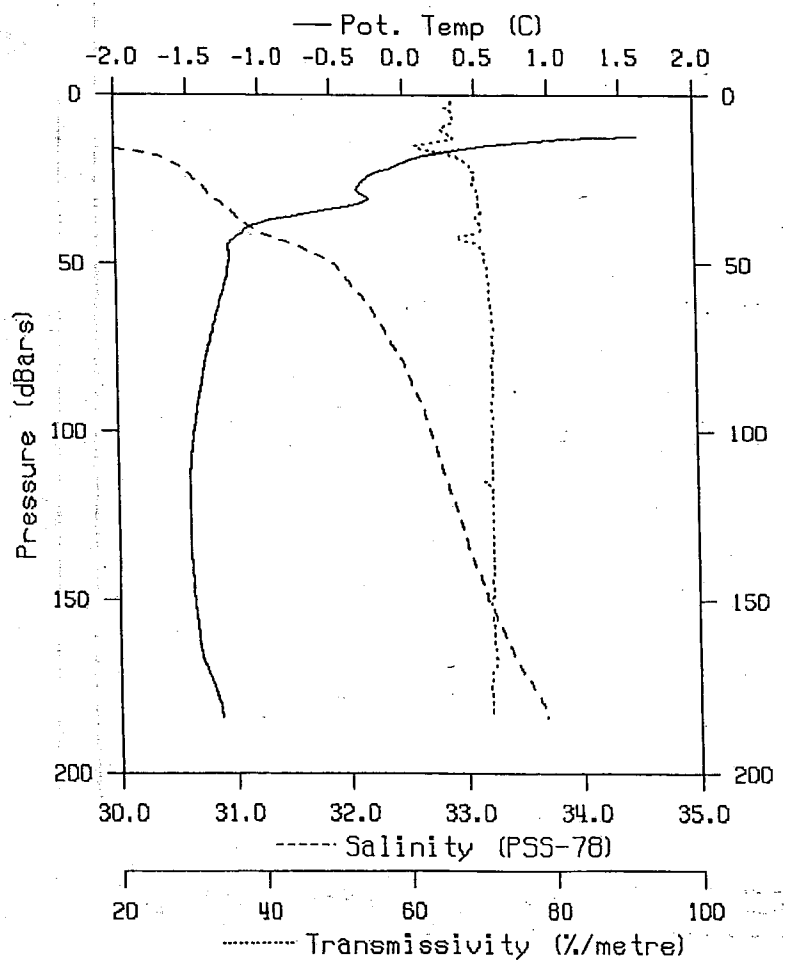


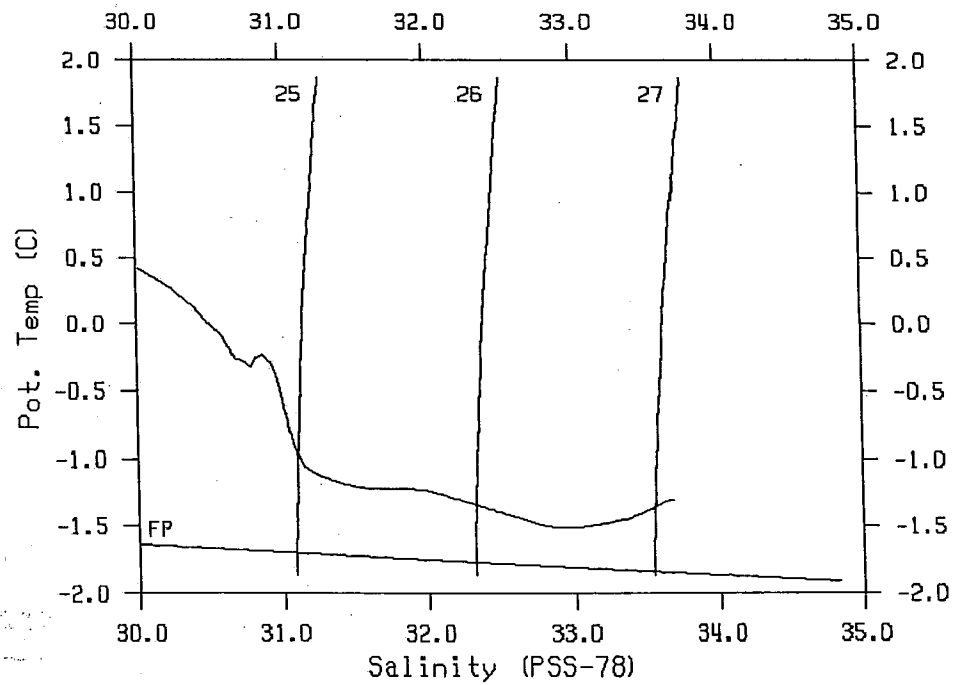

35 40 45 50 55 60 65 70 75
----- Transmissivity (%/metre)
0
500
1000
1500
2000
Pressure (dBars)
0 2 4 6 8 10
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240006.low
CRUISE : 93-24
STATION : FM01
CAST : 6
LATITUDE : 71 23.352 N
LONGITUDE: 139 54.320 W
DATE : 1993/08/28
TIME : 14:39 UTC
NREC : 1700
PLOTTED:22/NOV/1994 16:20:46

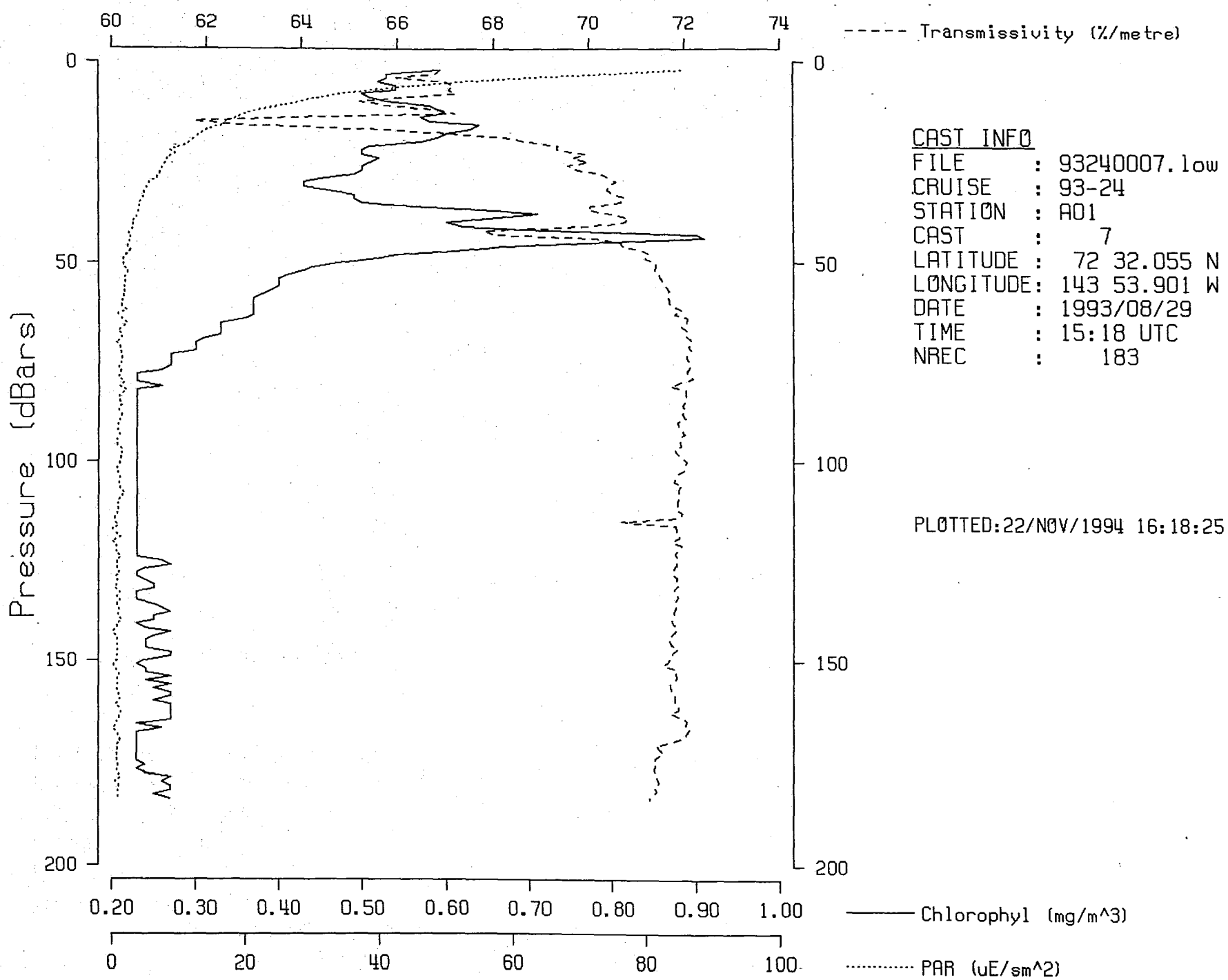
PLOTTED:22/NOV/1994 15:51:43

NOGAP 1993
Henry Larsen
STATION : A01
REFERENCE NO.: 93-24-007
DATE/TIME : 29/08/93 15:18 UTC
POSITION : 72-32.1N 143-53.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	2.894	2.894	26.015	2	20.727	.00	66.9	.59	85.3
10	2.894	2.894	27.114	10	21.604	.53	65.2	.53	28.4
20	-.002	-.002	30.500	20	24.475	1.01	68.7	.57	11.7
30	-.251	-.252	30.826	30	24.748	1.34	70.6	.43	5.6
50	-1.219	-1.220	31.893	50	25.642	1.89	71.4	.47	1.8
75	-1.369	-1.370	32.415	74	26.069	2.43	72.1	.27	1.5
100	-1.471	-1.473	32.718	99	26.318	2.88	72.1	.23	1.3
150	-1.478	-1.481	33.197	149	26.707	3.63	71.7	.24	.8
183	-1.301	-1.306	33.678	181	27.092	4.00	71.3	.25	1.1



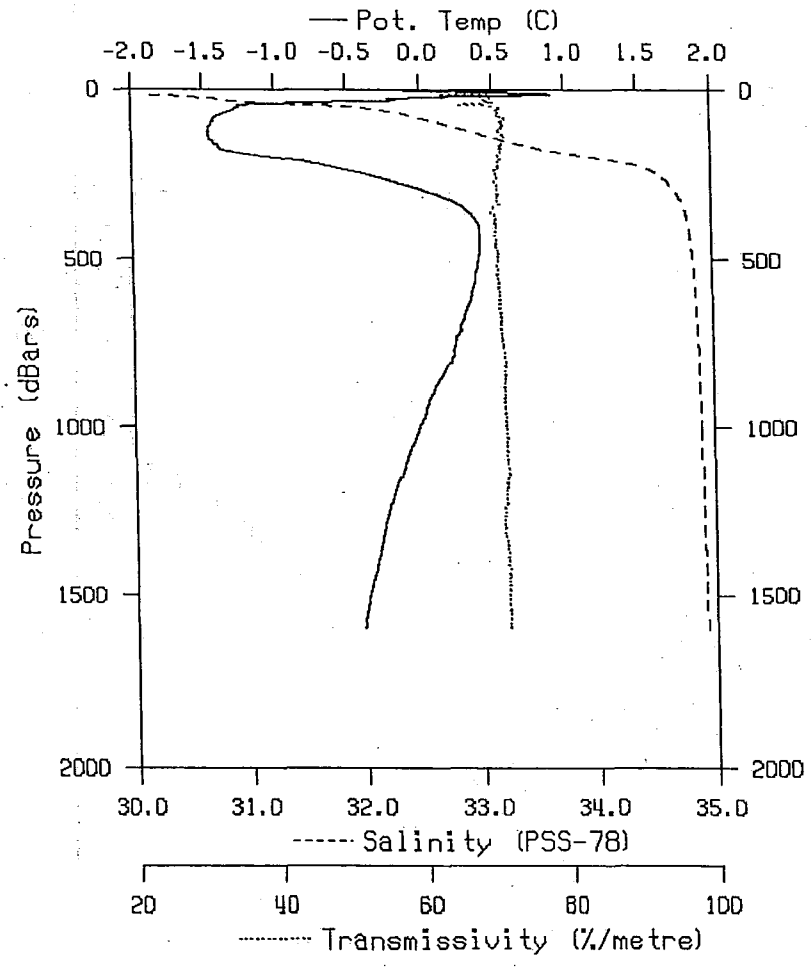


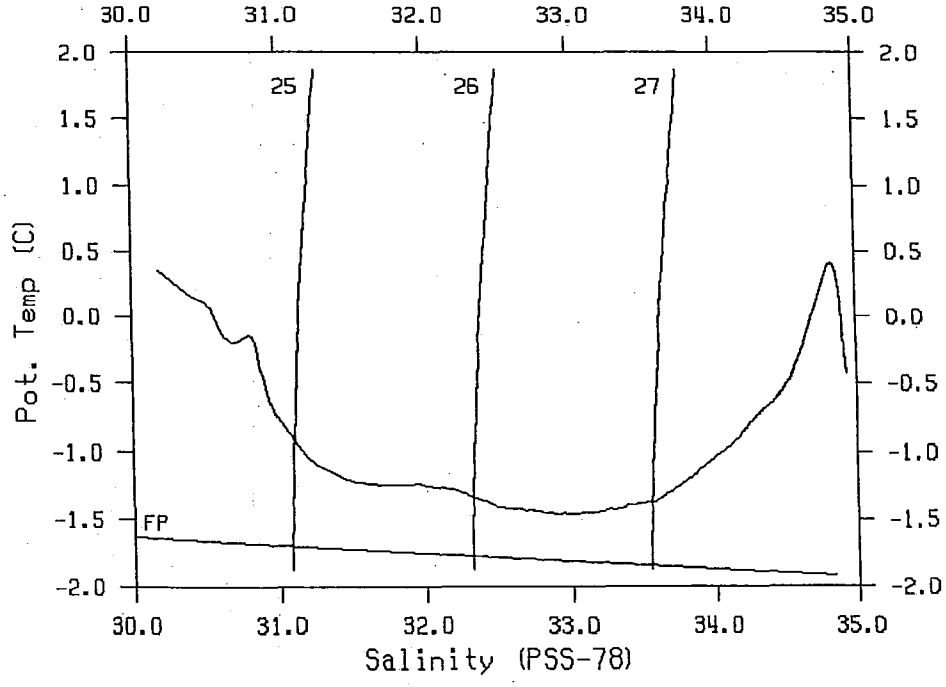

60 62 64 66 68 70 72 74
----- Transmissivity (%/metre)
0 50 100 150 200
Pressure (dBars)
0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
——— Chlorophyl (mg/m^3)
0 20 40 60 80 100
····· PAR (uE/sm^2)
CAST INFO
FILE : 93240007.low
CRUISE : 93-24
STATION : A01
CAST : 7
LATITUDE : 72 32.055 N
LONGITUDE: 143 53.901 W
DATE : 1993/08/29
TIME : 15:18 UTC
NREC : 183
PLOTTED:22/NOV/1994 16:18:25

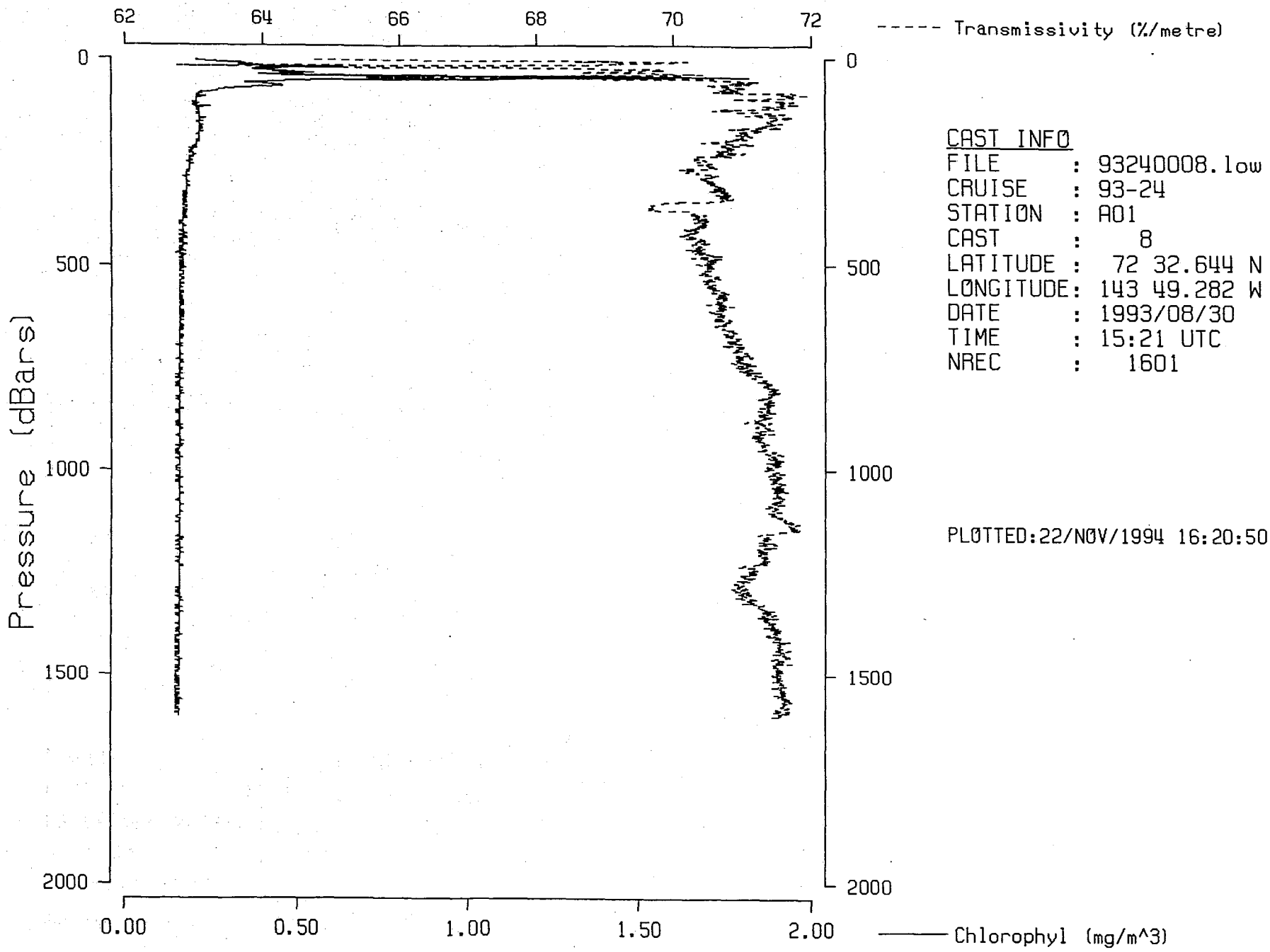
PLOTTED:22/NOV/1994 15:52:06

NOGAP 1993
Henry Larsen
STATION : A01
REFERENCE NO.: 93-24-008
DATE/TIME : 30/08/93 15:21 UTC
POSITION : 72-32.6N 143-49.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-.095	-.095	25.547	2	20.484	.00	64.8	.21	
10	.690	.690	27.161	10	21.760	.53	69.7	.35	
20	.230	.229	30.331	20	24.329	1.01	67.7	.48	
30	-.149	-.150	30.802	30	24.725	1.35	69.0	.43	
50	-1.242	-1.243	31.898	50	25.647	1.91	70.7	.50	
75	-1.366	-1.368	32.418	74	26.072	2.44	70.8	.27	
100	-1.433	-1.435	32.710	99	26.310	2.89	71.6	.21	
150	-1.438	-1.441	33.216	149	26.721	3.64	71.4	.22	
200	-1.018	-1.023	34.029	198	27.367	4.14	70.6	.22	
250	-.348	-.357	34.566	248	27.774	4.39	70.5	.18	
300	.058	.047	34.699	297	27.860	4.53	70.5	.18	
400	.417	.400	34.807	396	27.928	4.73	70.5	.16	
500	.418	.396	34.839	495	27.954	4.89	70.5	.17	
750	.260	.227	34.877	741	27.995	5.21	71.1	.16	
1000	.021	-.023	34.894	988	28.022	5.45	71.4	.16	
1250	-.186	-.242	34.906	1234	28.043	5.62	71.2	.16	
1500	-.309	-.379	34.919	1480	28.060	5.73	71.4	.15	
1602	-.344	-.419	34.924	1580	28.067	5.76	71.5	.16	



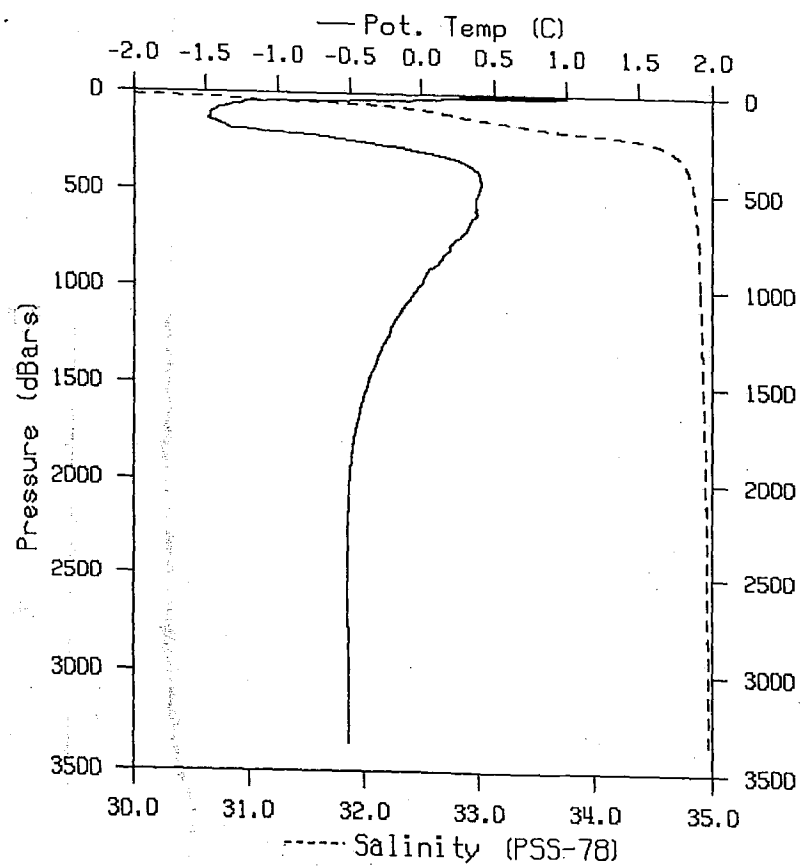


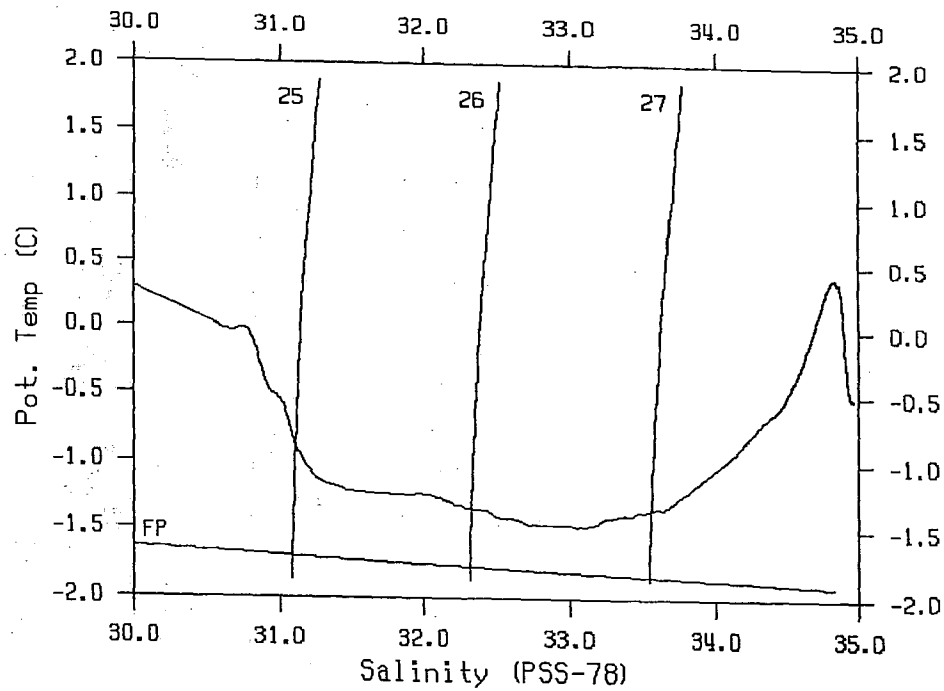

62
64
66
68
70
72
----- Transmissivity (%/metre)
0
500
1000
1500
2000
Pressure (dBars)
0.00
0.50
1.00
1.50
2.00
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240008.low
CRUISE : 93-24
STATION : A01
CAST : 8
LATITUDE : 72 32.644 N
LONGITUDE: 143 49.282 W
DATE : 1993/08/30
TIME : 15:21 UTC
NREC : 1601
PLOTTED:22/NOV/1994 16:20:50

PLOTTED:22/NOV/1994 15:52:34

NOGAP 1993
Henry Larsen
STATION : A01
REFERENCE NO.: 93-24-009
DATE/TIME : 31/08/93 15:33 UTC
POSITION : 72-32.7N 143-50.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	.188	.188	25.478	2	20.422	.00			
10	.910	.909	27.289	10	21.854	.53			
20	.450	.450	29.698	20	23.810	1.03			
30	-.086	-.087	30.819	30	24.735	1.40			
50	-1.233	-1.234	31.805	50	25.571	1.96			
75	-1.357	-1.358	32.436	74	26.086	2.49			
100	-1.456	-1.458	32.726	99	26.324	2.94			
150	-1.416	-1.419	33.239	149	26.739	3.68			
200	-1.018	-1.024	34.031	198	27.369	4.18			
250	-.381	-.389	34.552	248	27.764	4.43			
300	.068	.056	34.702	297	27.863	4.57			
400	.413	.396	34.806	396	27.927	4.77			
500	.418	.396	34.840	495	27.955	4.93			
750	.267	.233	34.878	741	27.995	5.26			
1000	.018	-.027	34.896	988	28.024	5.50			
1250	-.173	-.230	34.908	1234	28.044	5.66			
1500	-.308	-.377	34.920	1480	28.061	5.77			
1750	-.384	-.468	34.932	1725	28.075	5.83			
2000	-.406	-.507	34.941	1971	28.084	5.85			
2500	-.383	-.520	34.952	2460	28.093	5.84			
3000	-.332	-.509	34.957	2949	28.097	5.80			
3361	-.299	-.509	34.957	3301	28.097	5.76			

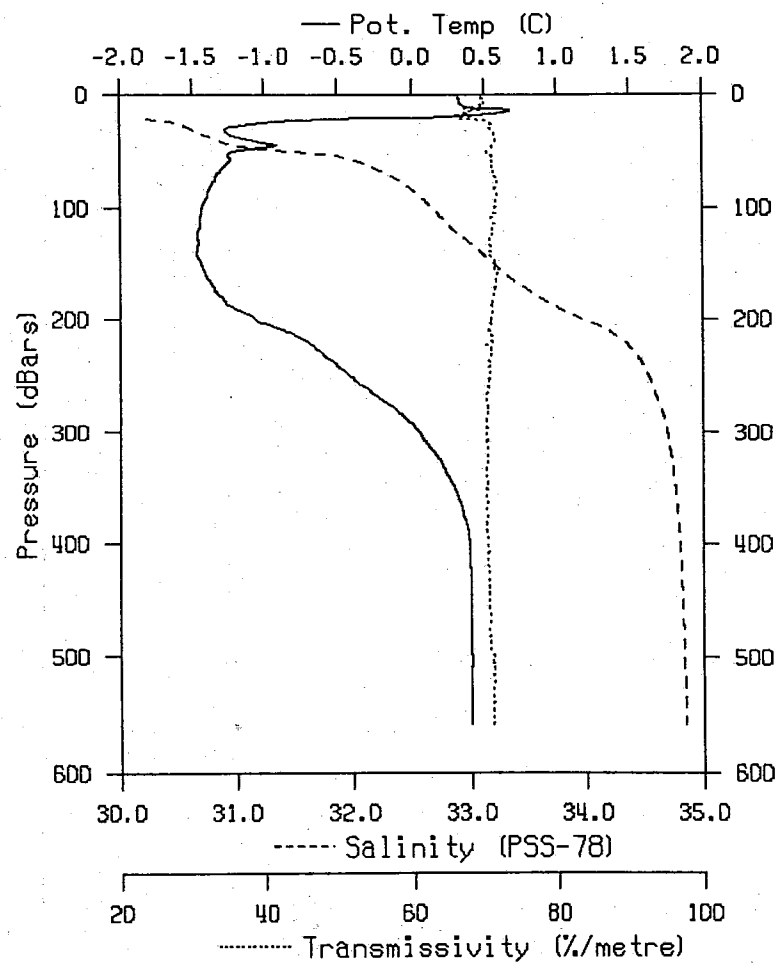


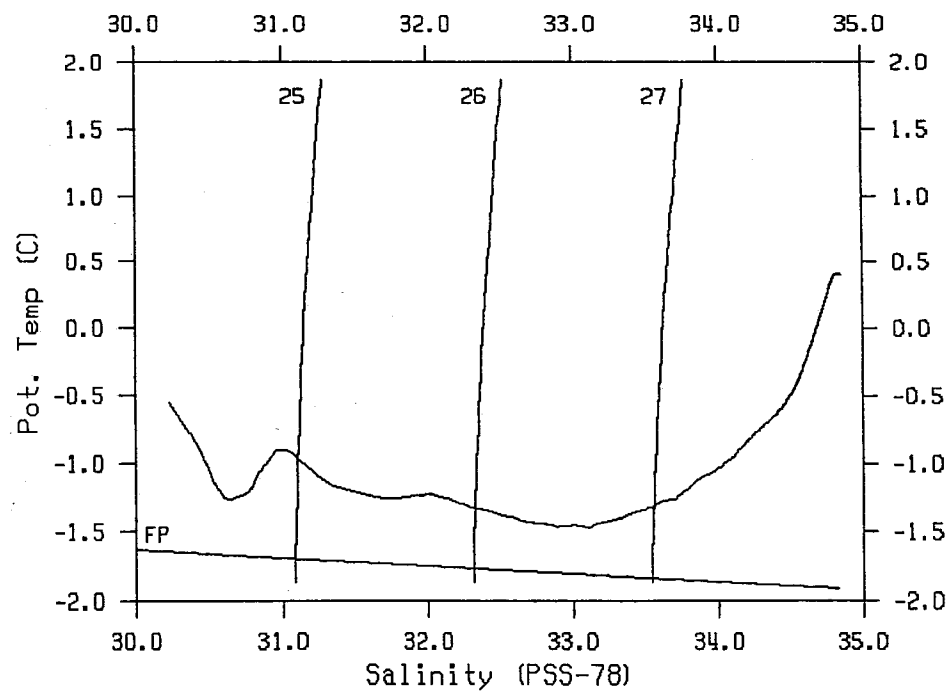


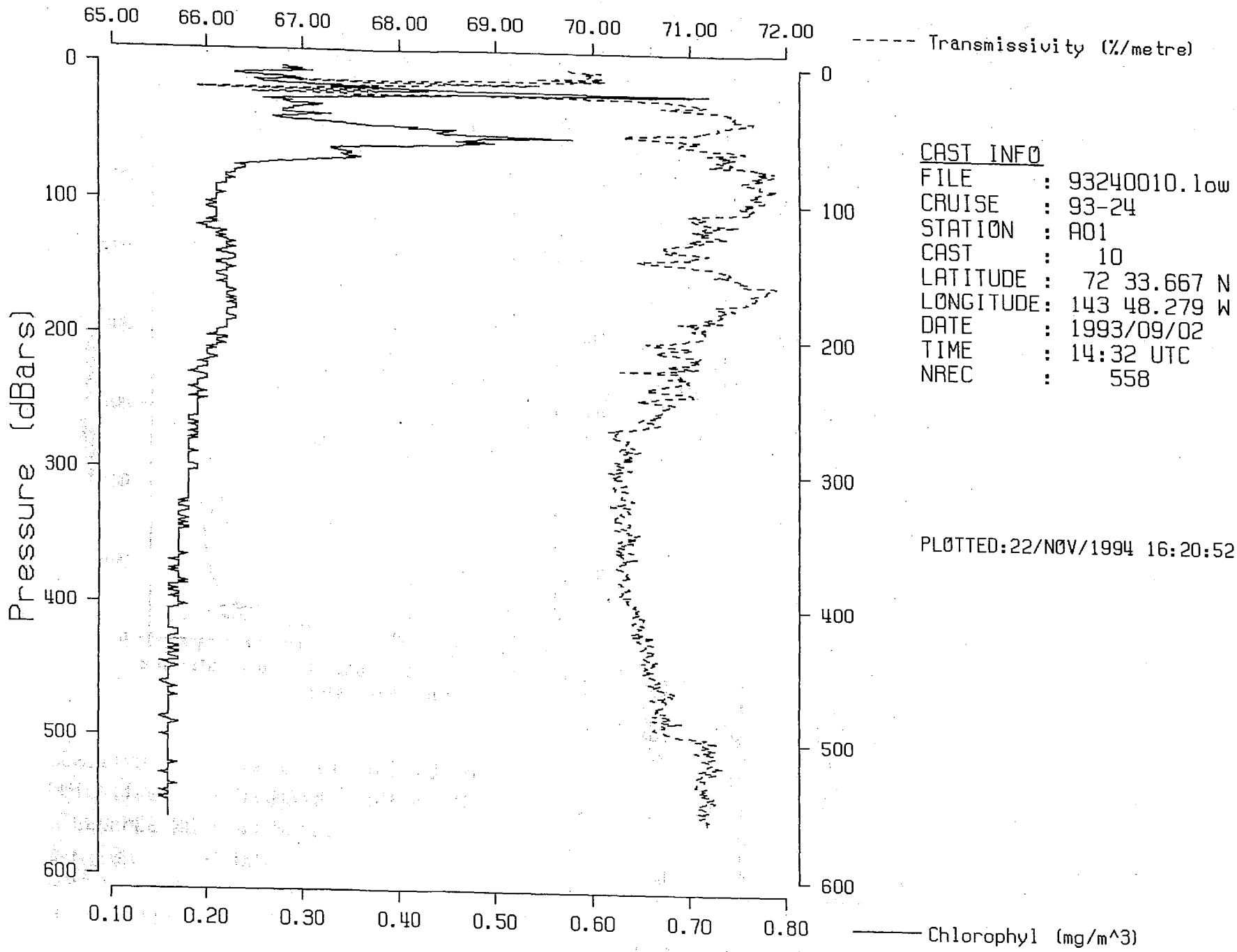
PLOTTED:22/NOV/1994 15:53:04

NOGAP 1993
Henry Larsen
STATION : A01
REFERENCE NO.: 93-24-010
DATE/TIME : 02/09/93 14:32 UTC
POSITION : 72-33.7N 143-48.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	.327	.327	24.831	2	19.898	.00	69.8	.28	
10	.363	.363	26.058	10	20.884	.59	70.1	.29	
20	.040	.039	29.673	20	23.806	1.14	67.0	.72	
30	-1.254	-1.254	30.606	30	24.599	1.51	70.9	.32	
50	-1.210	-1.211	31.478	50	25.305	2.11	70.4	.44	
75	-1.338	-1.340	32.384	74	26.043	2.68	71.9	.23	
100	-1.428	-1.429	32.678	99	26.284	3.14	71.5	.21	
150	-1.430	-1.434	33.204	149	26.711	3.90	71.4	.23	
200	-1.055	-1.061	33.965	198	27.317	4.41	70.9	.21	
250	-.410	-.419	34.541	248	27.756	4.68	70.7	.19	
300	.062	.051	34.699	297	27.860	4.82	70.3	.19	
400	.410	.393	34.805	396	27.927	5.02	70.5	.17	
500	.431	.409	34.841	495	27.955	5.18	71.1	.15	
559	.431	.406	34.855	553	27.967	5.27	71.2	.16	



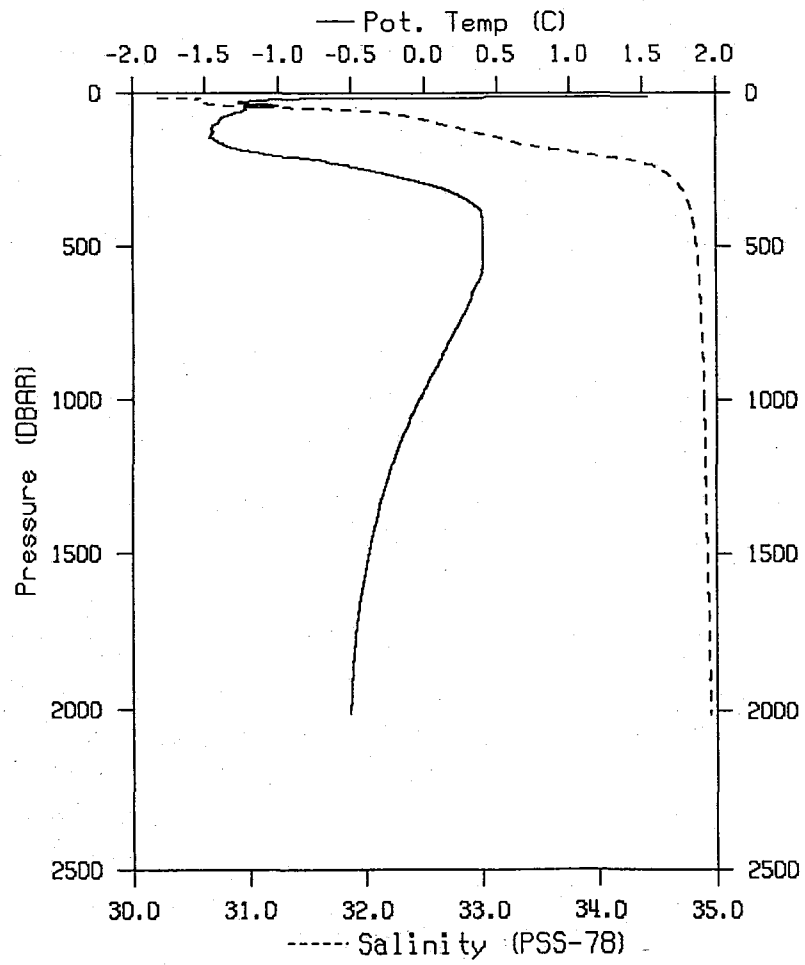


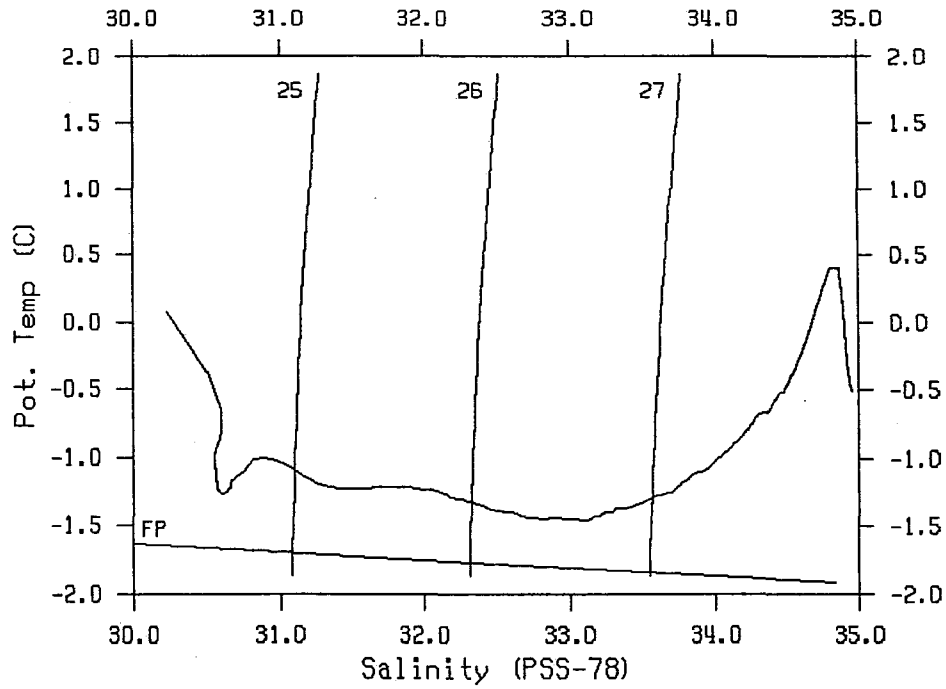

65.00
66.00
67.00
68.00
69.00
70.00
71.00
72.00
----- Transmissivity (%/metre)
Pressure (dBars)
0
100
200
300
400
500
600
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240010.low
CRUISE : 93-24
STATION : A01
CAST : 10
LATITUDE : 72 33.667 N
LONGITUDE: 143 48.279 W
DATE : 1993/09/02
TIME : 14:32 UTC
NREC : 558
PLOTTED:22/NOV/1994 16:20:52

PLOTTED:29/NOV/1994 12:10:23

NOGAP 1993
Henry Larsen
STATION : A01
REFERENCE NO.: 93-24-011
DATE/TIME : 02/09/93 23:11 UTC
POSITION : 72-32.9N 143-51.0W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	4.3072	4.3072	25.771	0	20.428	.00			
10	2.3686	2.3681	27.721	10	22.122	.65			
20	-.9621	-.9624	30.560	20	24.555	1.10			
30	-1.2666	-1.2671	30.601	30	24.595	1.44			
50	-1.2248	-1.2258	31.611	50	25.414	2.03			
75	-1.3510	-1.3525	32.390	74	26.048	2.59			
100	-1.4151	-1.4171	32.649	99	26.261	3.05			
150	-1.4285	-1.4317	33.193	149	26.702	3.82			
200	-1.0648	-1.0701	33.954	198	27.308	4.33			
250	-.3735	-.3820	34.538	248	27.752	4.60			
300	.0692	.0576	34.690	297	27.853	4.74			
400	.4161	.3991	34.801	396	27.923	4.95			
500	.4284	.4066	34.836	495	27.951	5.12			
750	.2746	.2412	34.877	742	27.994	5.45			
1000	.0099	-.0348	34.897	988	28.025	5.69			
1250	-.1874	-.2440	34.912	1234	28.048	5.85			
1500	-.3108	-.3806	34.925	1480	28.066	5.95			
1750	-.3856	-.4699	34.938	1725	28.080	5.99			
2000	-.4079	-.5082	34.950	1971	28.091	6.00			
2013	-.4074	-.5086	34.950	1983	28.092	6.00			

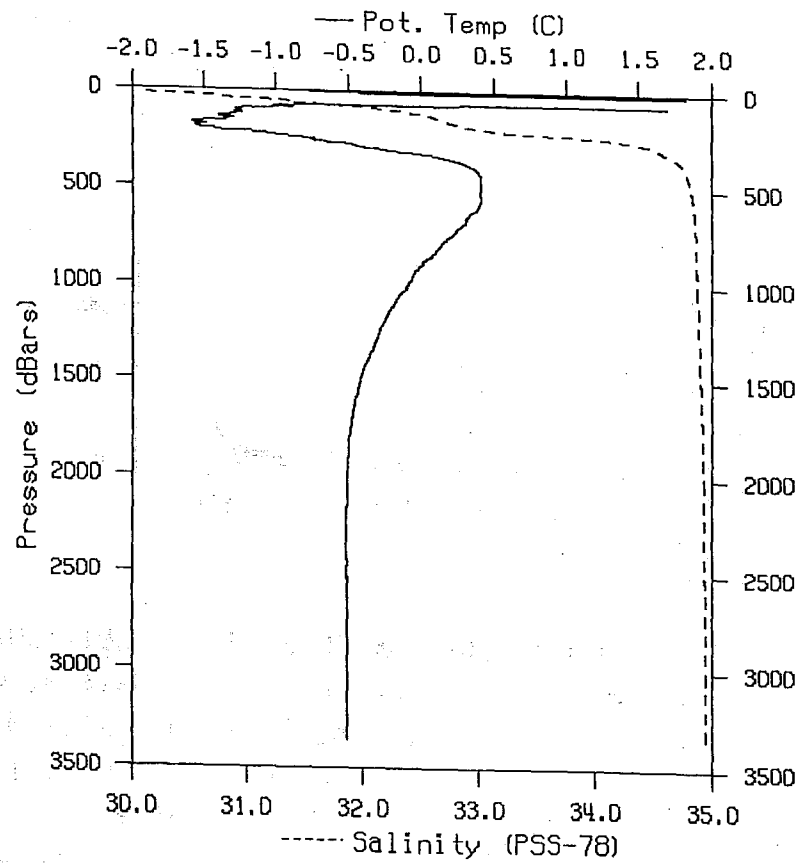


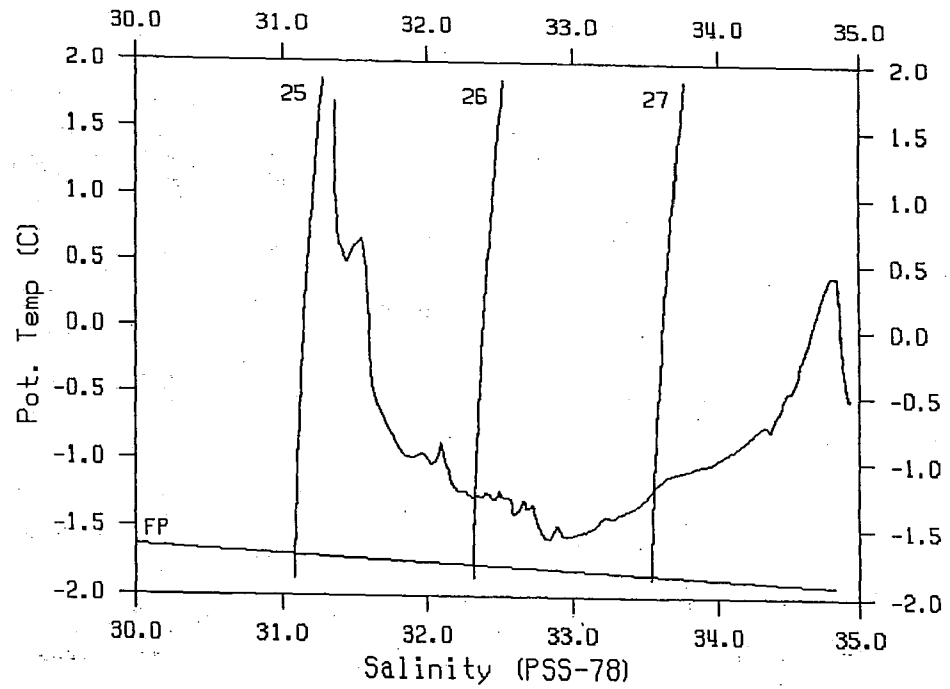


PLOTTED:22/NOV/1994 15:53:28

NOGAP 1993
Henry Larsen
STATION : B01
REFERENCE NO.: 93-24-014
DATE/TIME : 07/09/93 15:33 UTC
POSITION : 72-25.9N 152-19.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-.765	-.765	26.464	2	21.237	.00			
10	-.359	-.359	26.896	10	21.578	.51			
20	3.881	3.880	29.829	20	23.686	1.03			
30	4.843	4.841	30.542	30	24.159	1.43			
50	4.567	4.563	31.215	50	24.721	2.13			
75	-.811	-.813	31.756	75	25.519	2.83			
100	-1.255	-1.257	32.290	99	25.965	3.39			
150	-1.349	-1.353	32.702	149	26.302	4.32			
200	-1.476	-1.480	33.167	198	26.683	5.08			
250	-.729	-.737	34.321	248	27.593	5.53			
300	-.250	-.261	34.581	297	27.781	5.73			
400	.393	.376	34.779	396	27.907	5.98			
500	.433	.411	34.822	495	27.940	6.16			
750	.225	.192	34.858	742	27.981	6.51			
1000	-.052	-.096	34.872	988	28.008	6.78			
1250	-.233	-.289	34.886	1234	28.029	6.98			
1500	-.352	-.422	34.899	1480	28.046	7.12			
1750	-.406	-.490	34.914	1726	28.062	7.21			
2000	-.412	-.512	34.924	1971	28.071	7.26			
2500	-.379	-.516	34.933	2460	28.078	7.31			
3000	-.333	-.510	34.937	2949	28.081	7.34			
3361	-.301	-.510	34.936	3301	28.080	7.36			

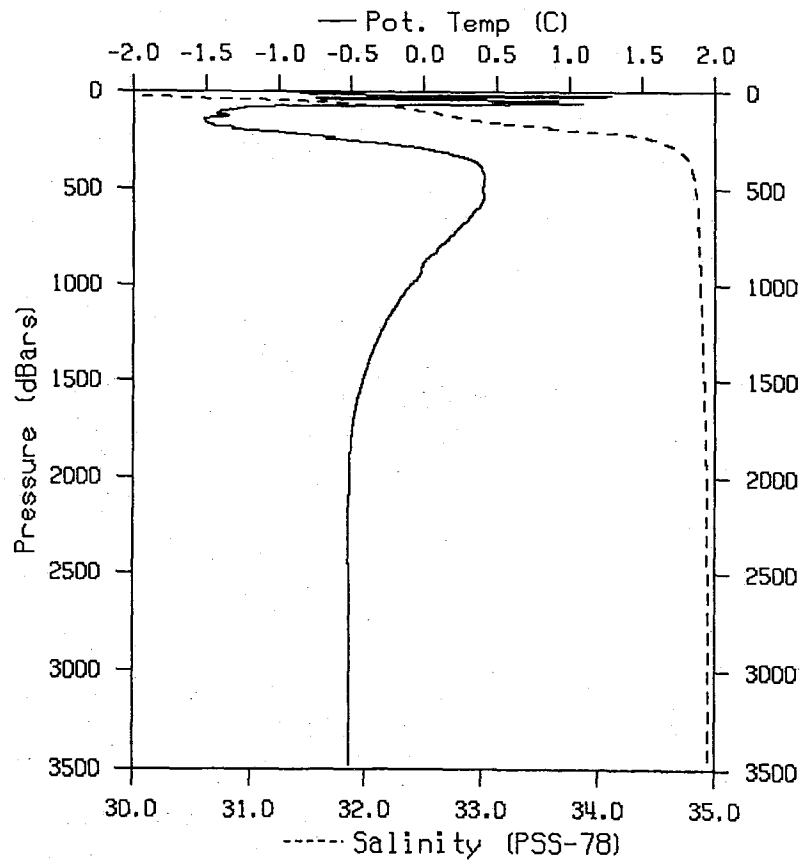


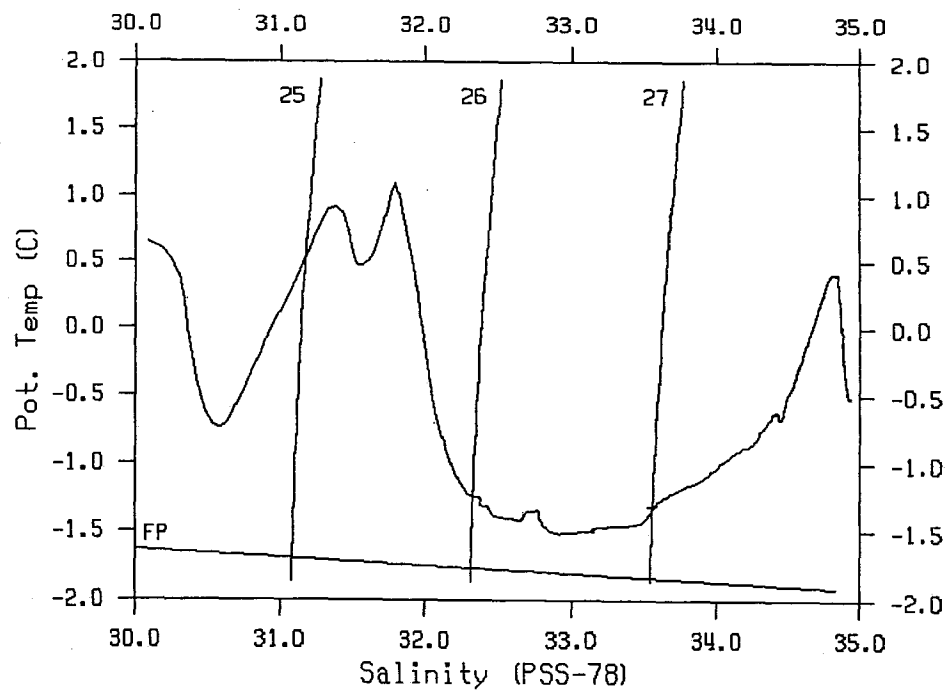


PLOTTED:22/NOV/1994 15:53:58

NOGAP 1993
Henry Larsen
STATION : B01
REFERENCE NO.: 93-24-015
DATE/TIME : 08/09/93 21:47 UTC
POSITION : 72-34.1N 152-21.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
1	-.948	-.948	22.245	1	17.826	.00			
10	-.784	-.784	26.924	10	21.610	.72			
20	.850	.849	28.834	20	23.097	1.27			
30	.200	.199	30.342	30	24.339	1.68			
50	.613	.611	31.496	50	25.249	2.31			
75	-.998	-.999	32.183	75	25.870	2.92			
100	-1.386	-1.388	32.506	99	26.144	3.41			
150	-1.503	-1.506	32.988	149	26.538	4.24			
200	-1.170	-1.175	33.773	198	27.165	4.83			
250	-.514	-.522	34.487	248	27.718	5.14			
300	.064	.053	34.680	297	27.845	5.30			
400	.414	.398	34.794	396	27.918	5.51			
500	.429	.408	34.827	495	27.944	5.68			
750	.207	.174	34.859	742	27.983	6.03			
1000	-.052	-.096	34.876	988	28.011	6.29			
1250	-.240	-.296	34.888	1234	28.031	6.48			
1500	-.350	-.419	34.900	1480	28.047	6.62			
1750	-.408	-.492	34.915	1725	28.063	6.70			
2000	-.413	-.513	34.924	1971	28.071	6.75			
2500	-.379	-.515	34.934	2460	28.079	6.80			
3000	-.333	-.510	34.936	2949	28.080	6.83			
3485	-.289	-.510	34.936	3422	28.081	6.86			

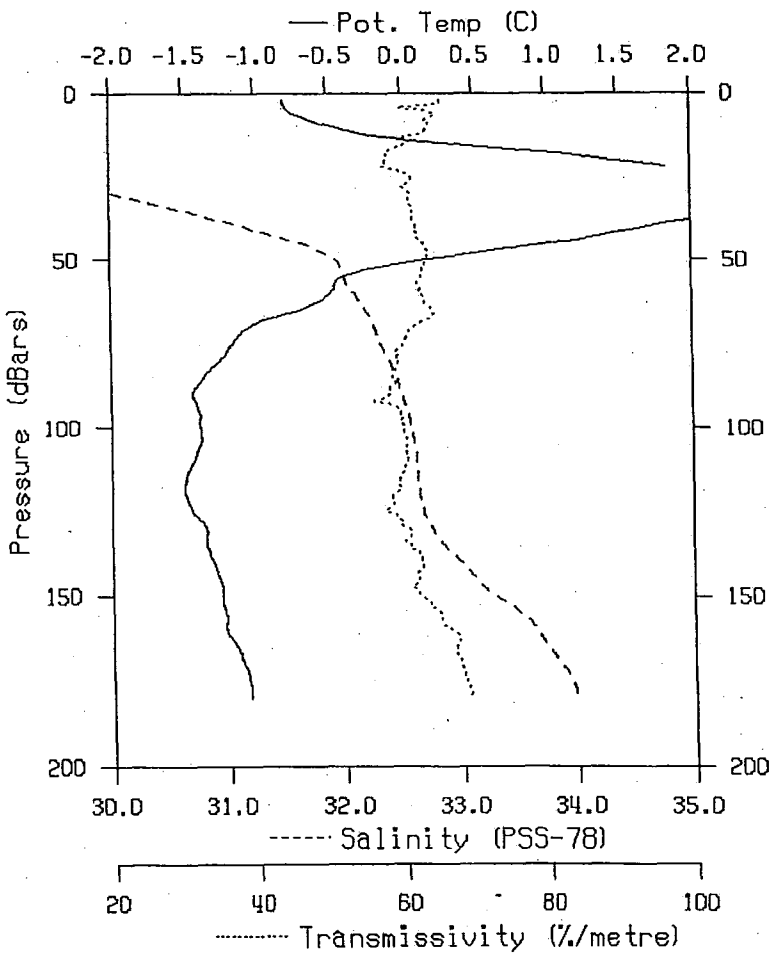


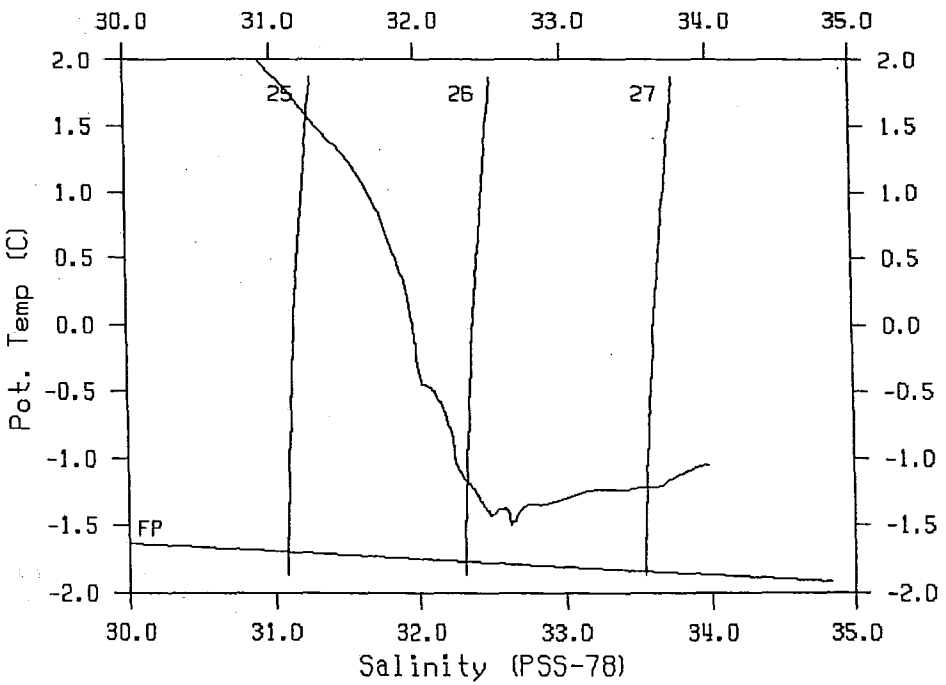


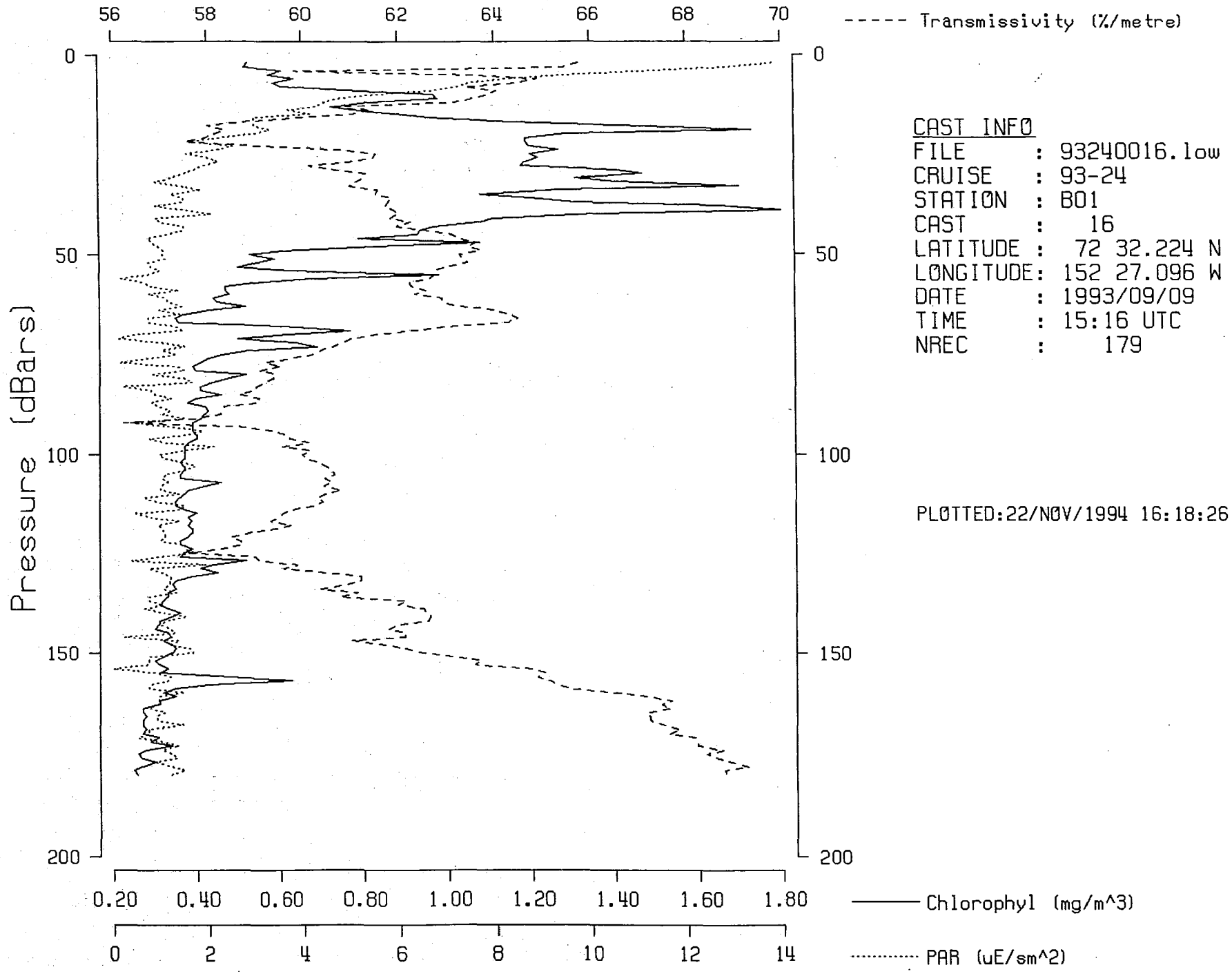
PLOTTED:22/NOV/1994 15:54:28

NOGAP 1993
Henry Larsen
STATION : B01
REFERENCE NO.: 93-24-016
DATE/TIME : 09/09/93 15:16 UTC
POSITION : 72-32.2N 152-27.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-.793	-.793	27.104	2	21.754	.00	65.8	.53	13.9
10	-.446	-.447	27.473	10	22.046	.47	63.8	.97	5.5
20	1.482	1.481	28.697	20	22.955	1.01	58.2	1.29	3.0
30	2.711	2.709	30.032	30	23.944	1.45	61.3	1.47	1.5
50	.196	.195	31.938	50	25.626	2.08	63.3	.53	1.0
75	-1.153	-1.155	32.324	74	25.989	2.62	60.2	.46	1.3
100	-1.384	-1.386	32.574	99	26.198	3.10	60.0	.37	1.0
150	-1.235	-1.239	33.292	149	26.777	3.86	62.5	.34	1.7
180	-1.047	-1.052	33.982	178	27.330	4.16	68.8	.26	1.2



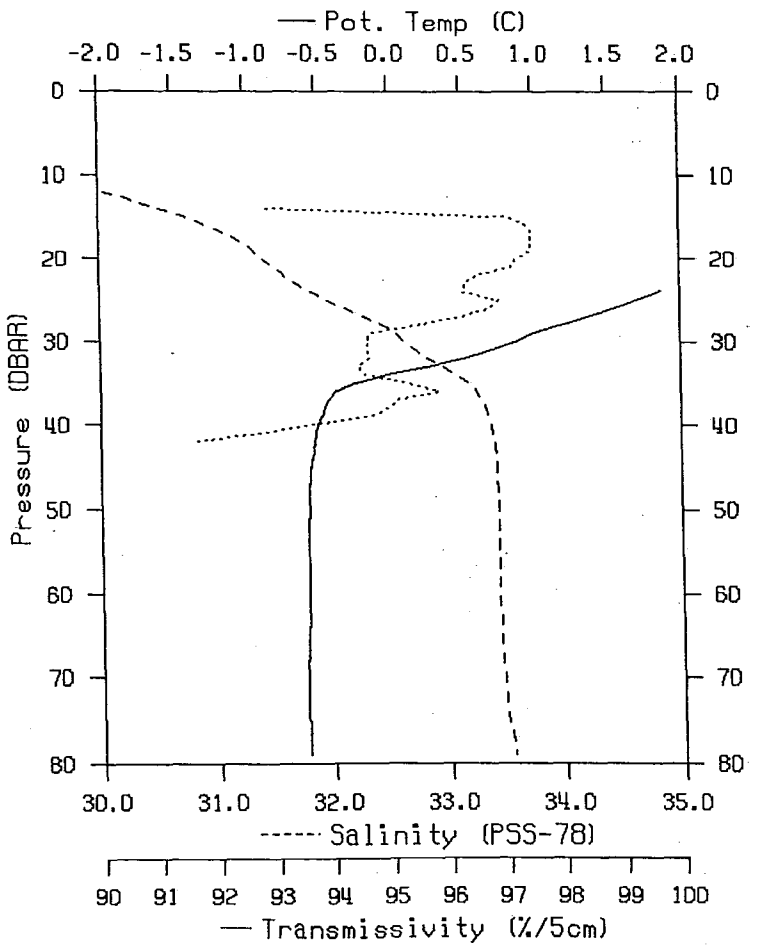


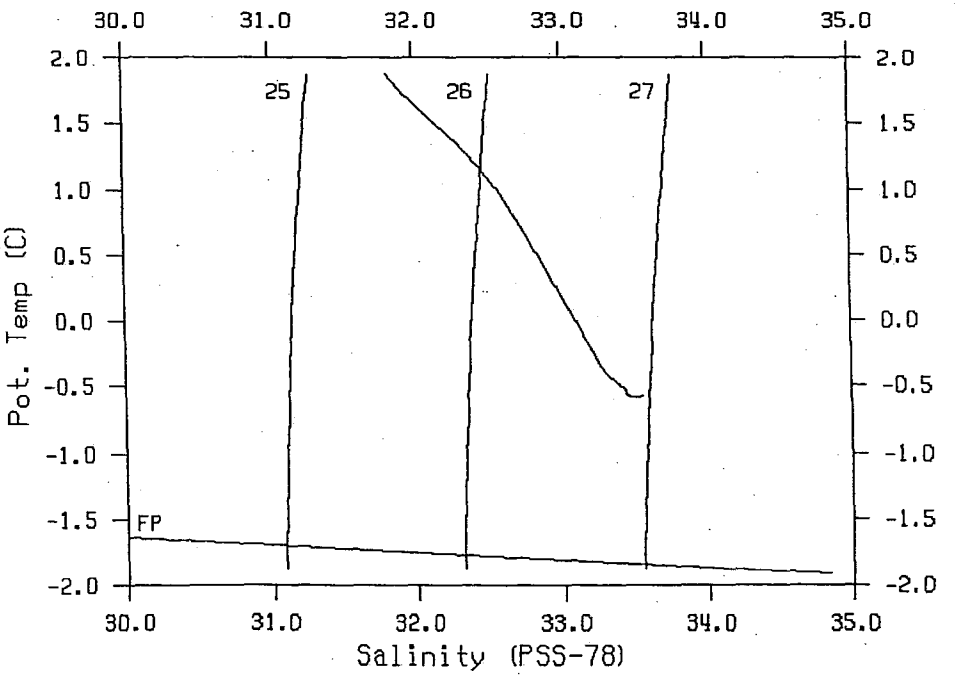

56 58 60 62 64 66 68 70
----- Transmissivity (%/metre)
0 50 100 150 200
Pressure (dBars)
0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80
Chlorophyl (mg/m^3)
0 2 4 6 8 10 12 14
PAR (uE/sm^2)
CAST INFO
FILE : 93240016.low
CRUISE : 93-24
STATION : B01
CAST : 16
LATITUDE : 72 32.224 N
LONGITUDE: 152 27.096 W
DATE : 1993/09/09
TIME : 15:16 UTC
NREC : 179
PLOTTED:22/NOV/1994 16:18:26

PLOTTED:29/NOV/1994 13:55:01

NOGAP 1993
Henry Larsen
STATION : BC01
REFERENCE NO.: 93-24-017
DATE/TIME : 09/09/93 18:41 UTC
POSITION : 71-23.1N 156-53.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.7921	2.7921	29.672	1	23.650	.00	82.76		
10	3.0646	3.0641	29.772	10	23.709	.38	84.63		
20	2.6713	2.6703	31.417	20	25.052	.73	97.24		
30	.8742	.8730	32.648	30	26.162	.97	94.62		
50	-.5651	-.5665	33.438	50	26.871	1.27	82.50		
75	-.5840	-.5861	33.510	74	26.930	1.55	76.34		
79	-.5755	-.5778	33.548	78	26.960	1.60	67.51		

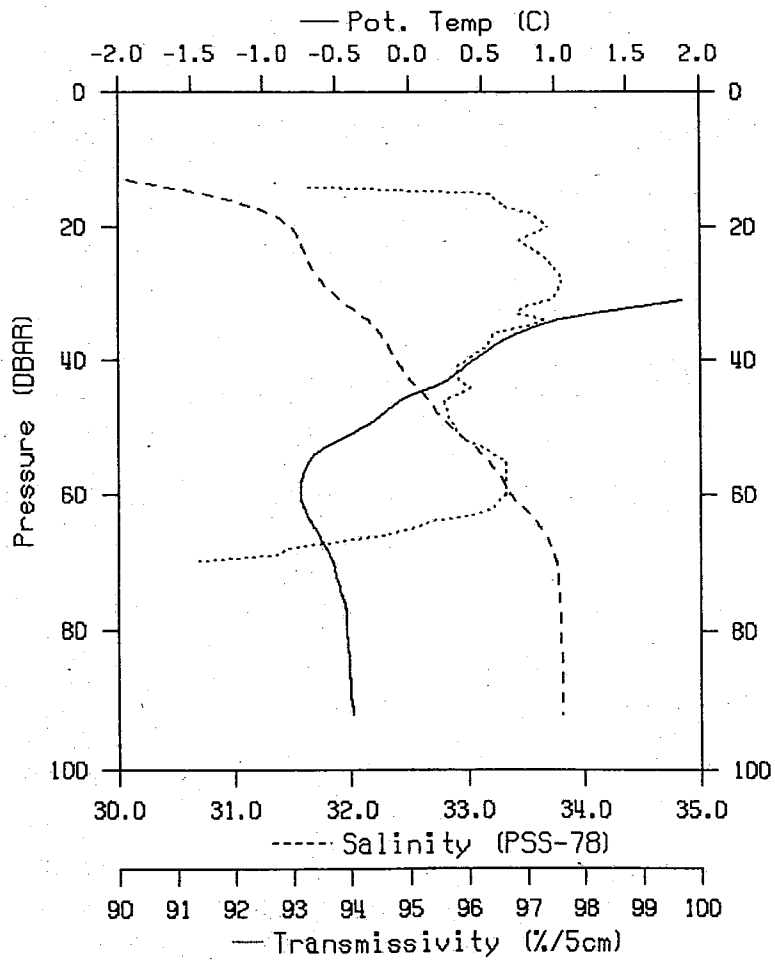


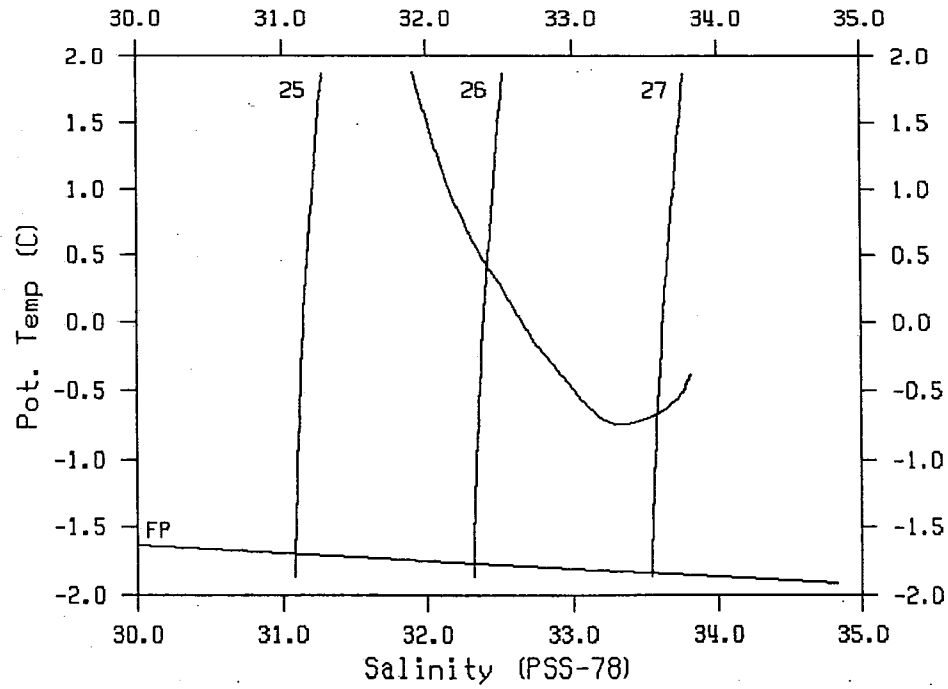


PLOTTED:29/NOV/1994 13:55:06

NOGAP 1993
Henry Larsen
STATION : BC02
REFERENCE NO.: 93-24-018
DATE/TIME : 09/09/93 20:15 UTC
POSITION : 71-24.4N 156-51.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.5665	2.5665	29.218	1	23.305	.00	79.55		
10	2.7377	2.7372	29.482	10	23.503	.40	79.45		
20	3.6988	3.6976	31.489	20	25.022	.77	97.39		
30	2.1348	2.1334	31.846	30	25.435	1.04	97.54		
50	-.3062	-.3077	32.862	50	26.395	1.46	95.81		
75	-.4523	-.4546	33.784	74	27.146	1.77	87.21		
92	-.3839	-.3868	33.809	91	27.163	1.92	68.69		

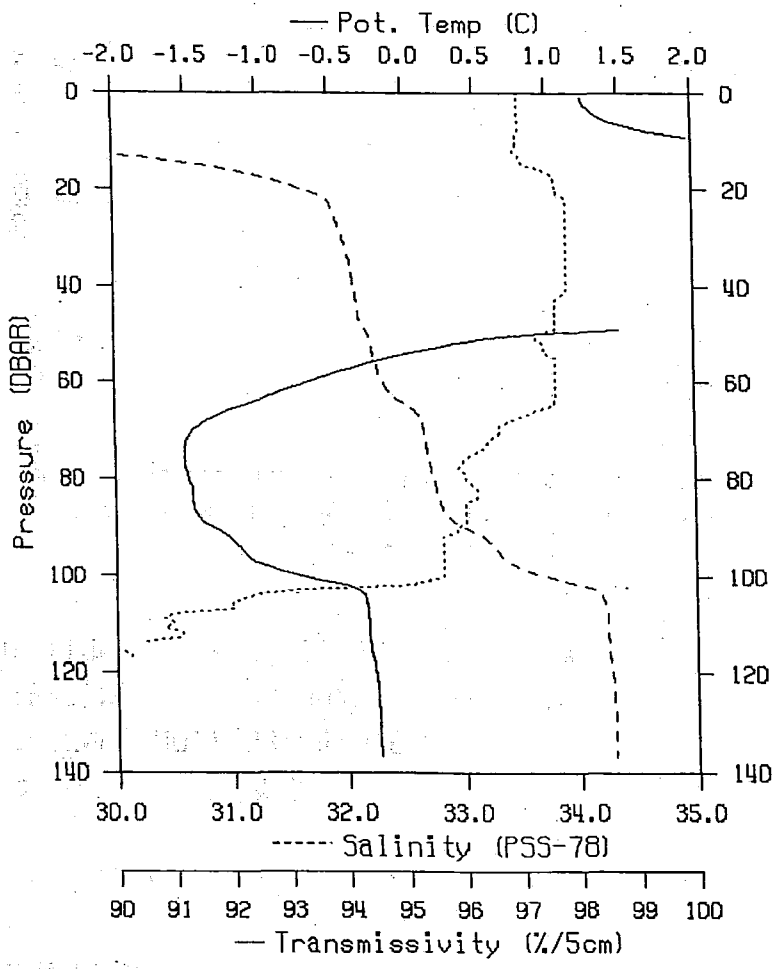


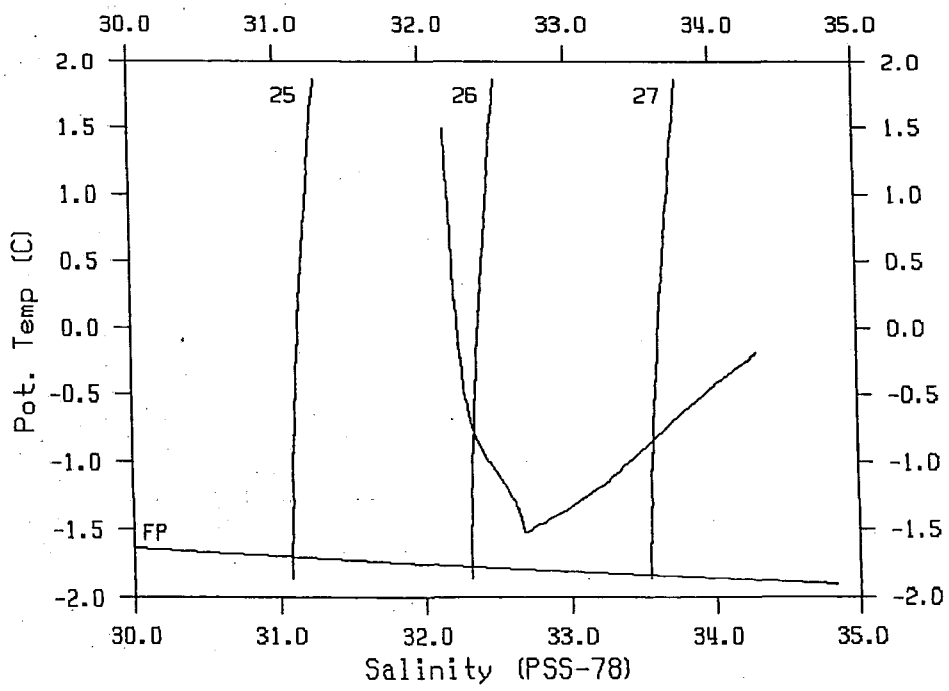


PLOTTED:29/NOV/1994 13:55:12

NOGAP 1993
Henry Larsen
STATION : BC03
REFERENCE NO.: 93-24-019
DATE/TIME : 09/09/93 21:12 UTC
POSITION : 71-27.6N 156-55.0W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	1.2447	1.2447	27.345	1	21.884	.00	97.04		
10	2.3194	2.3190	28.563	10	22.798	.49	97.00		
20	5.5277	5.5262	31.642	20	24.955	.90	97.64		
30	5.3770	5.3748	31.984	30	25.243	1.18	97.84		
50	.9634	.9614	32.197	50	25.794	1.67	97.34		
75	-1.5171	-1.5185	32.698	74	26.303	2.16	96.19		
100	-.7195	-.7223	33.702	99	27.091	2.49	95.66		
137	-.1799	-.1846	34.298	136	27.549	2.77	83.60		

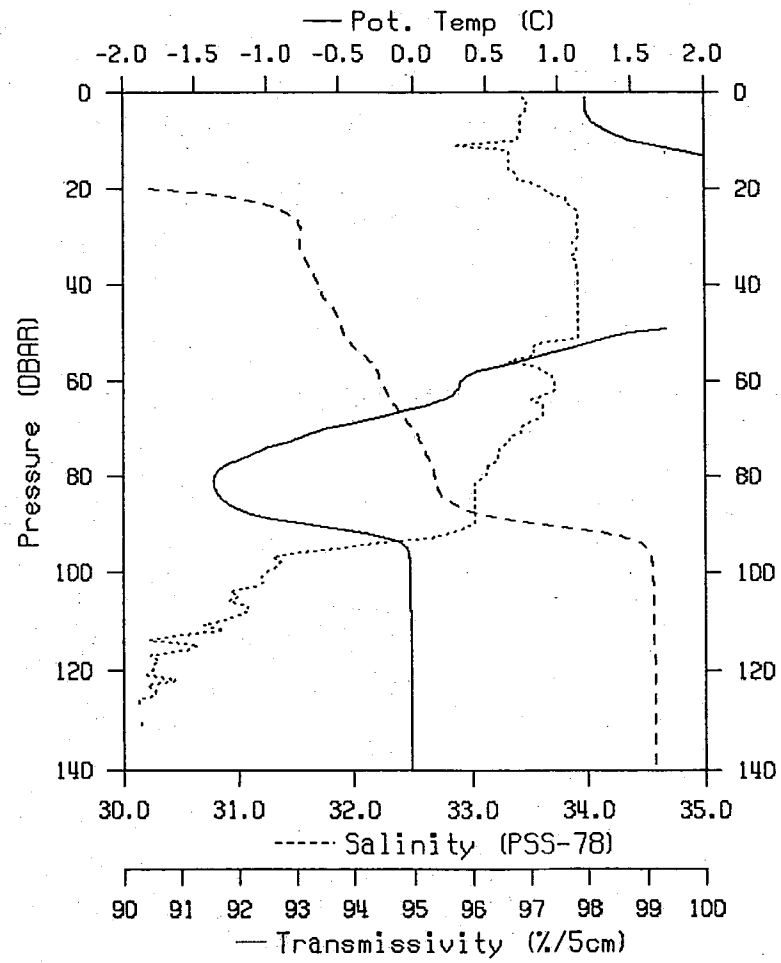


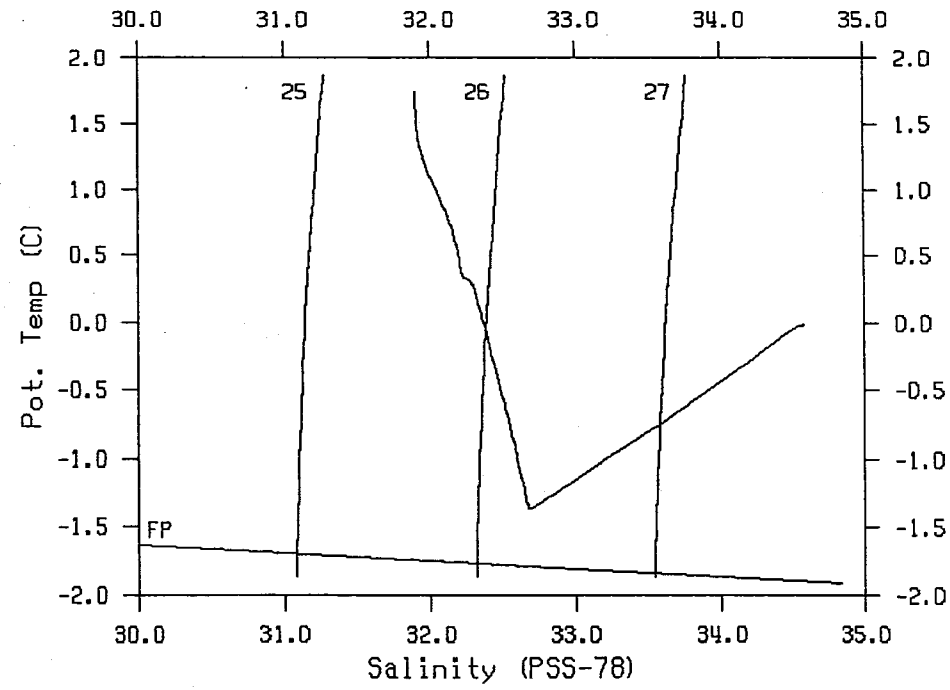


PLOTTED:29/NOV/1994 13:55:20

NOGAP 1993
Henry Larsen
STATION : BC04
REFERENCE NO.: 93-24-020
DATE/TIME : 09/09/93 22:03 UTC
POSITION : 71-30.1N 156-59.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	1.1866	1.1866	27.138	1	21.720	.00	96.91		
10	1.5145	1.5141	27.552	10	22.036	.53	96.80		
20	3.7344	3.7332	30.241	20	24.027	1.02	97.24		
30	4.2980	4.2960	31.540	30	25.006	1.36	97.84		
50	1.4909	1.4887	31.912	50	25.533	1.90	97.84		
75	-1.0571	-1.0588	32.611	74	26.219	2.42	96.45		
100	-.0162	-.0198	34.553	99	27.746	2.69	92.50		
140	-.0043	-.0094	34.570	139	27.760	2.82	87.82		

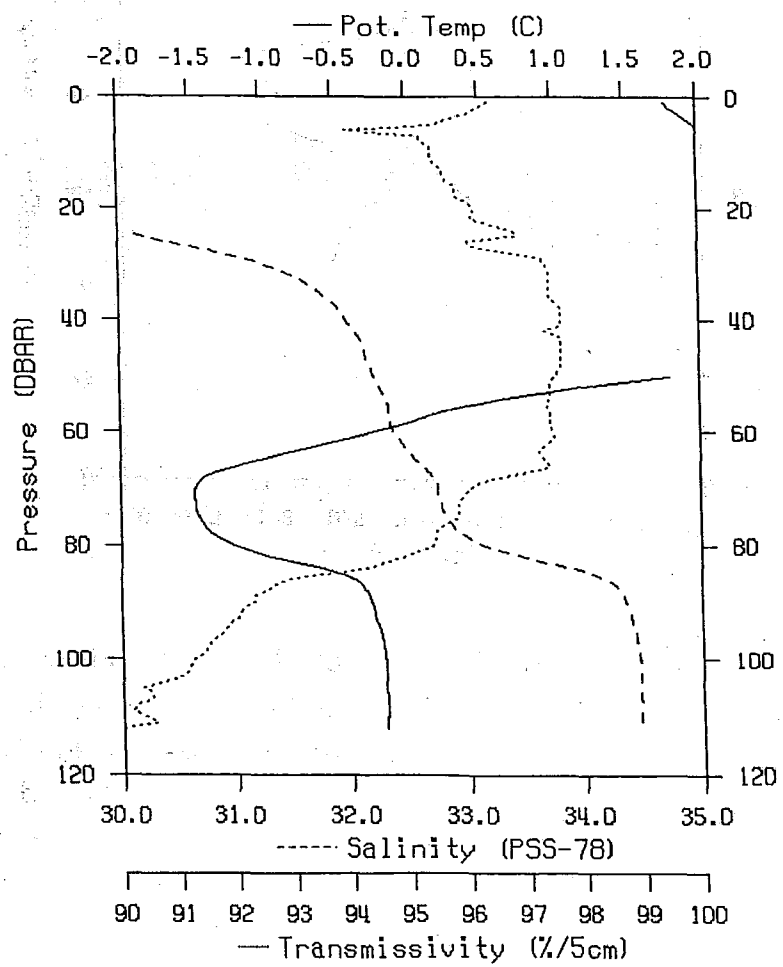


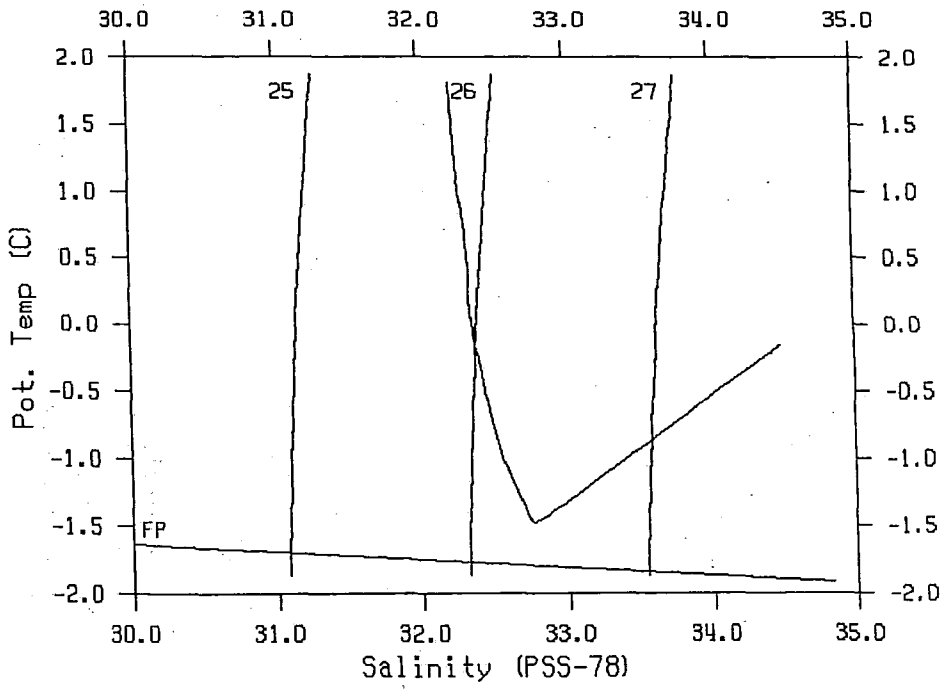


PLOTTED:29/NOV/1994 13:55:26

NOGAP 1993
Henry Larsen
STATION : BC05
REFERENCE NO.: 93-24-021
DATE/TIME : 09/09/93 22:52 UTC
POSITION : 71-32.8N 157- 3.8W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	1.7885	1.7885	27.795	1	22.216	.00	96.45		
10	2.0750	2.0746	28.313	10	22.614	.49	95.46		
20	2.6914	2.6904	29.290	20	23.353	.97	96.15		
30	4.9534	4.9513	31.239	30	24.700	1.36	97.39		
50	1.8119	1.8096	32.220	50	25.758	1.91	97.54		
75	-1.4462	-1.4477	32.826	74	26.405	2.39	95.86		
100	-.1630	-.1664	34.470	99	27.687	2.64	91.26		
112	-.1565	-.1604	34.476	111	27.691	2.68	90.03		

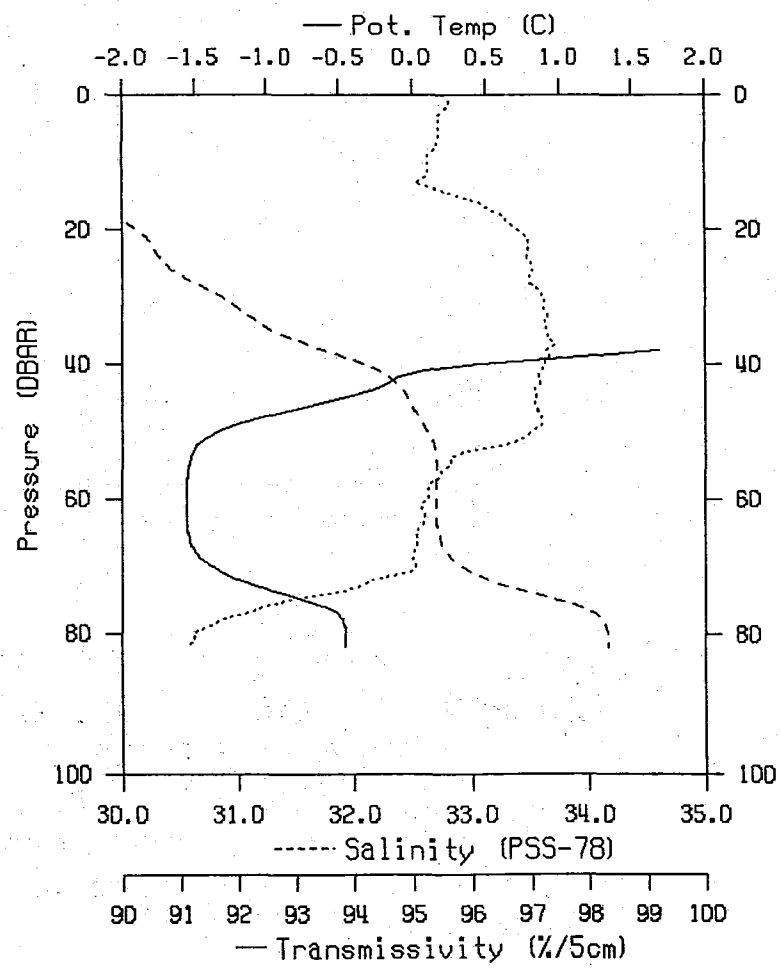


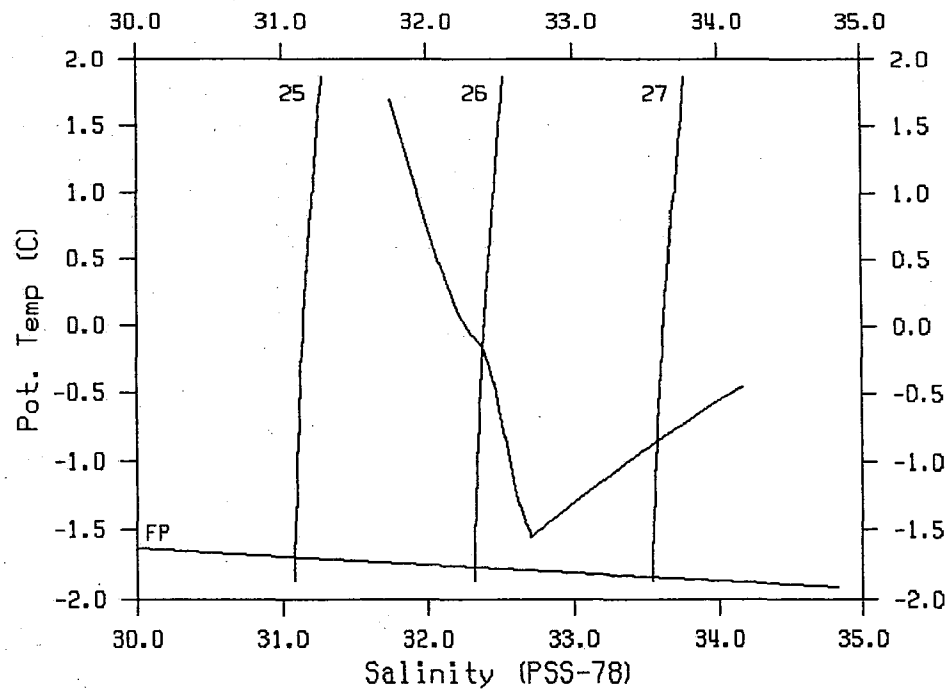


PLOTTED:29/NOV/1994 13:55:32

NOGAP 1993
Henry Larsen
STATION : BC06
REFERENCE NO.: 93-24-022
DATE/TIME : 09/09/93 23:39 UTC
POSITION : 71-35.4N 157- 8.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.3783	2.3783	28.843	1	23.018	.00	95.66		
10	2.5337	2.5332	29.238	10	23.323	.42	95.27		
20	3.6753	3.6741	30.128	20	23.942	.85	96.77		
30	4.2528	4.2509	30.859	30	24.470	1.22	97.24		
50	-1.3216	-1.3226	32.632	50	26.244	1.74	97.04		
75	-.7470	-.7491	33.723	74	27.109	2.08	92.96		
82	-.4514	-.4540	34.168	81	27.457	2.13	91.11		

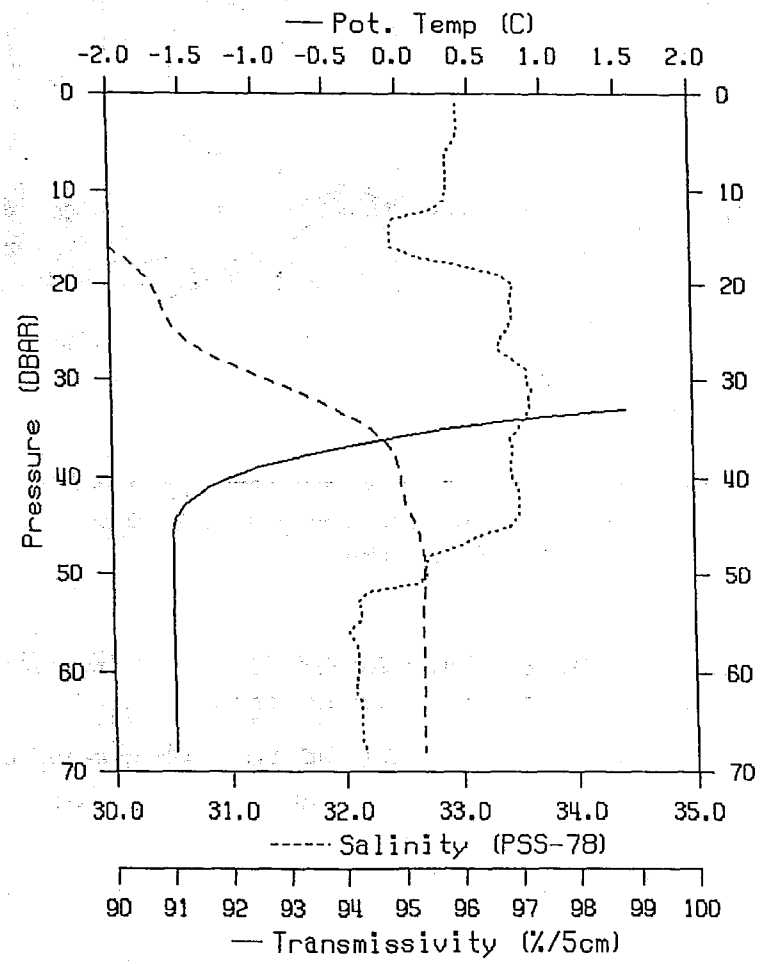


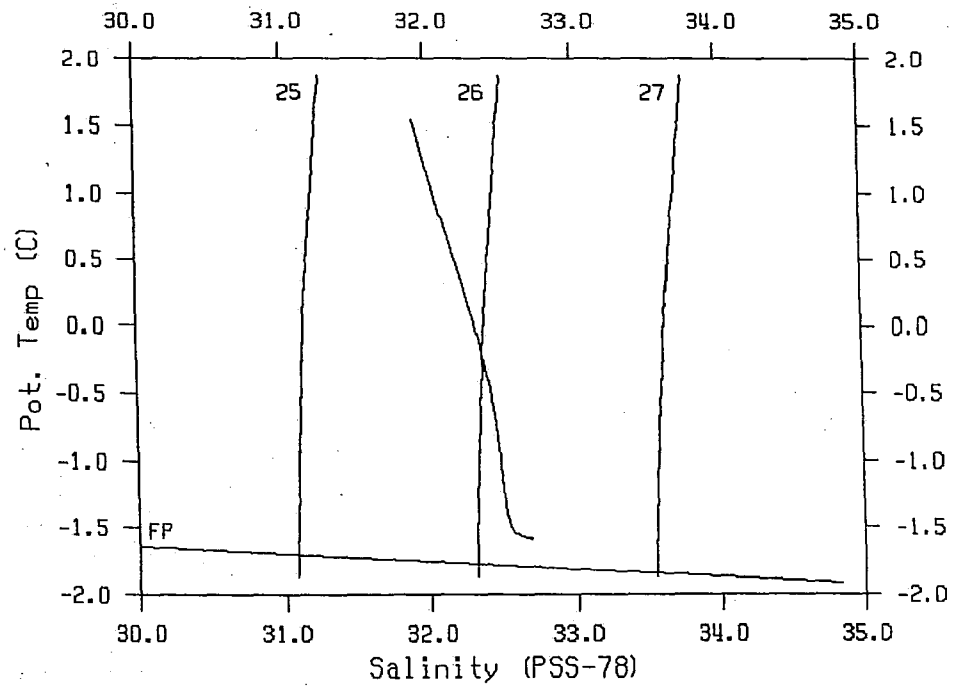


PLOTTED:29/NOV/1994 13:55:36

NOGAP 1993
Henry Larsen
STATION : BC07
REFERENCE NO.: 93-24-023
DATE/TIME : 10/09/93 00:24 UTC
POSITION : 71-38.3N 157-12.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.4947	2.4947	28.975	1	23.115	.00	96.06		
10	2.5611	2.5606	29.279	10	23.353	.42	95.86		
20	3.8905	3.8893	30.366	20	24.112	.83	97.00		
30	3.5210	3.5192	31.343	30	24.922	1.17	97.19		
50	-1.5804	-1.5813	32.694	50	26.301	1.65	95.46		
68	-1.5767	-1.5779	32.675	67	26.286	1.96	94.35		

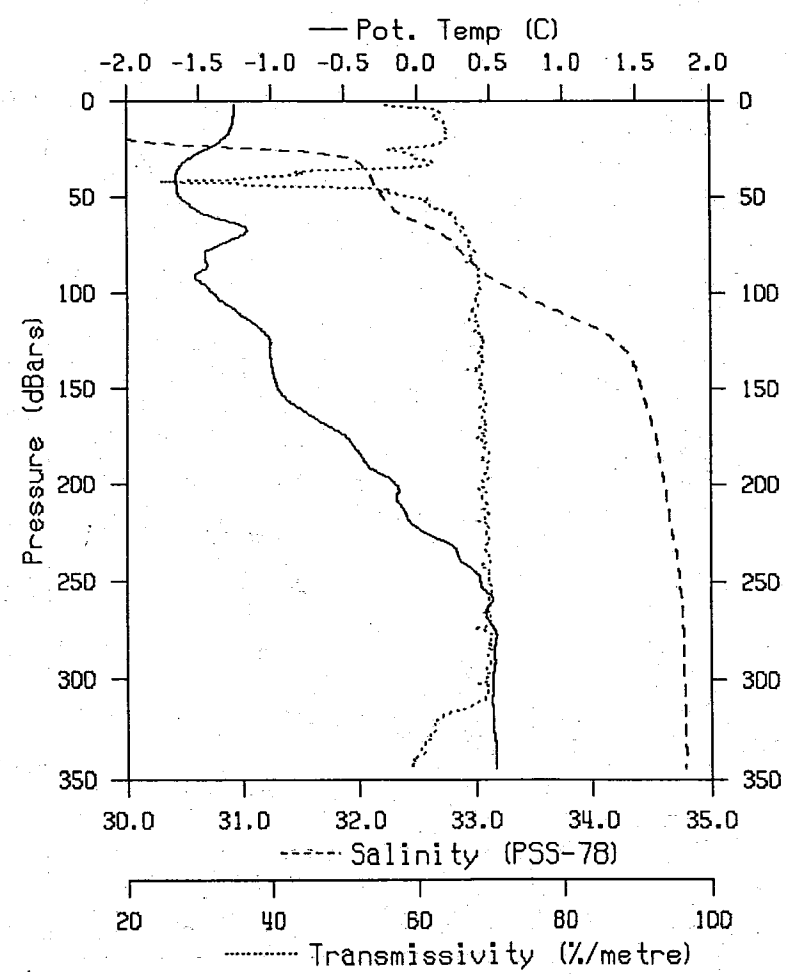


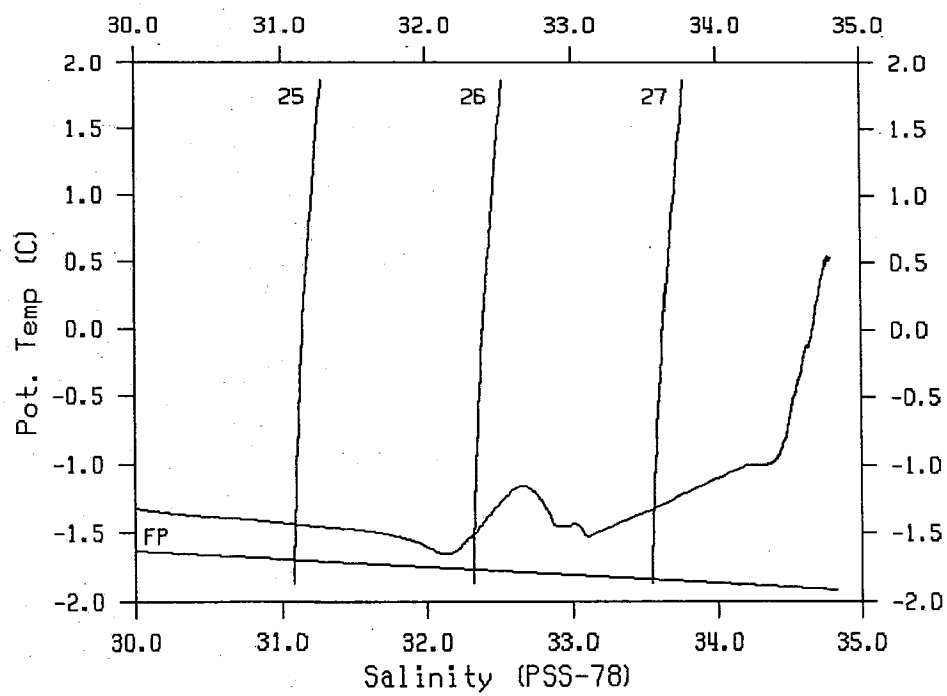


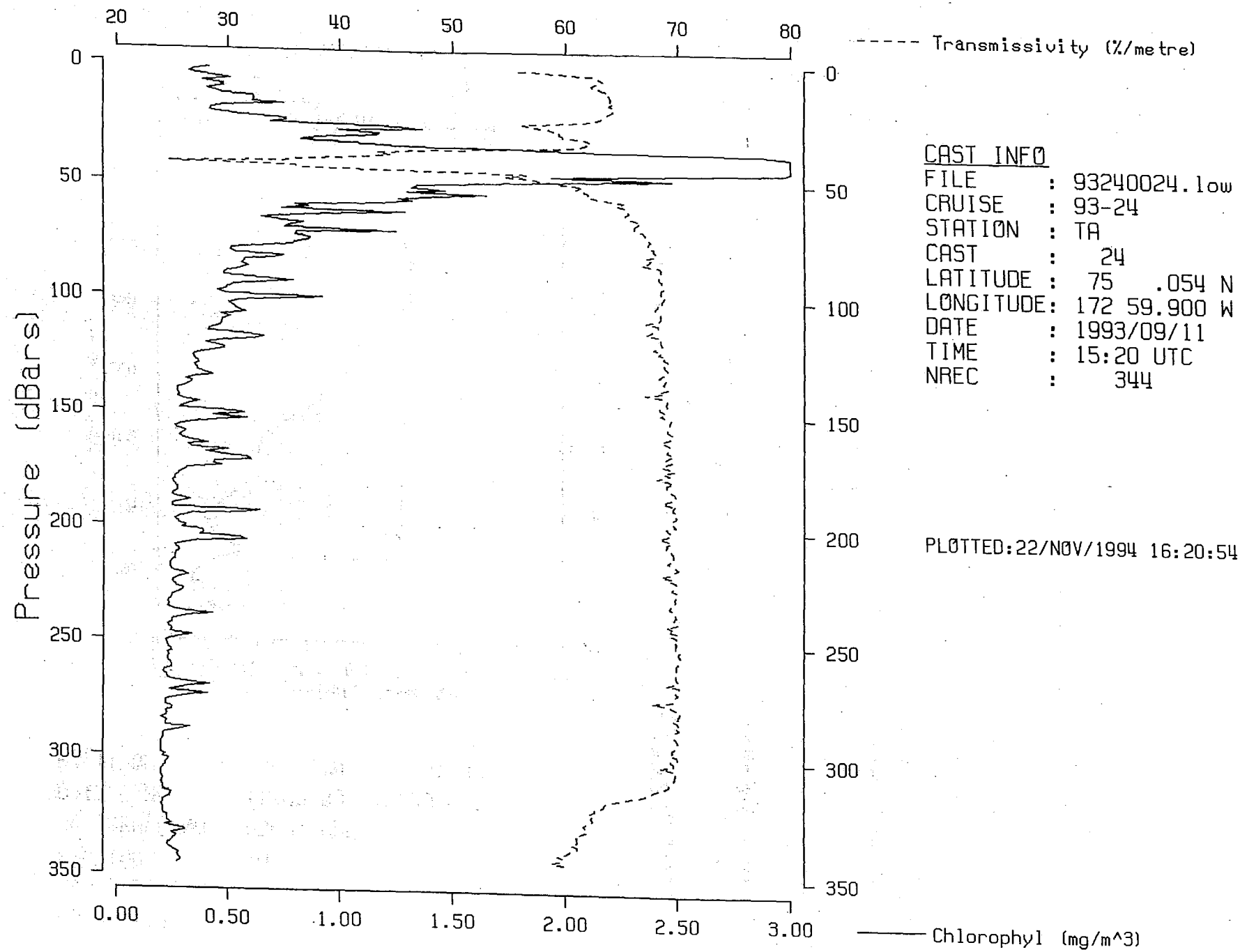
PLOTTED:22/NOV/1994 15:54:51

NOGAP 1993
Henry Larsen
STATION : TA
REFERENCE NO.: 93-24-024
DATE/TIME : 11/09/93 15:20 UTC
POSITION : 75- .1N 172-59.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.249	-1.249	29.679	2	23.648	.00	55.9	.42	
10	-1.255	-1.255	29.700	10	23.864	.32	63.4	.48	
20	-1.327	-1.327	30.004	20	24.112	.71	63.7	.42	
30	-1.564	-1.564	31.934	30	25.683	1.02	59.8	1.16	
50	-1.625	-1.626	32.214	50	25.912	1.46	59.7	1.65	
75	-1.350	-1.352	32.842	74	26.415	1.91	67.3	.86	
100	-1.396	-1.398	33.390	99	26.861	2.26	68.6	.92	
150	-.948	-.952	34.417	149	27.679	2.65	69.0	.52	
200	-.136	-.144	34.616	198	27.804	2.83	69.5	.31	
250	.446	.436	34.740	248	27.872	2.95	69.9	.24	
300	.529	.517	34.777	297	27.897	3.06	69.7	.22	
345	.552	.537	34.788	341	27.905	3.15	59.9	.27	



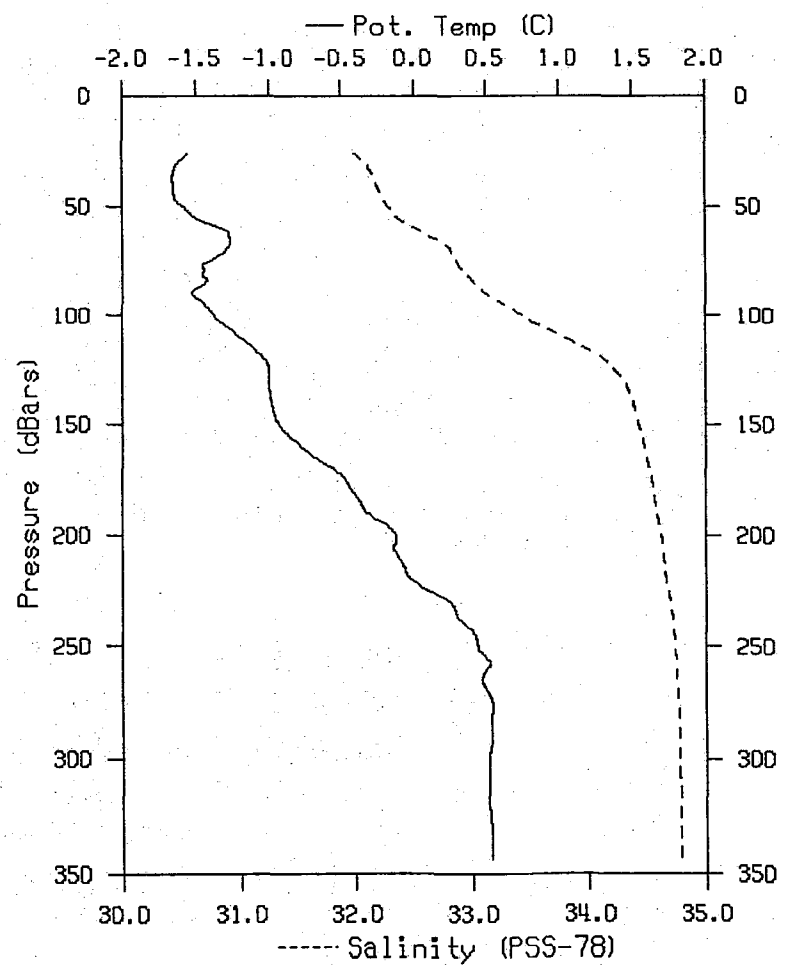


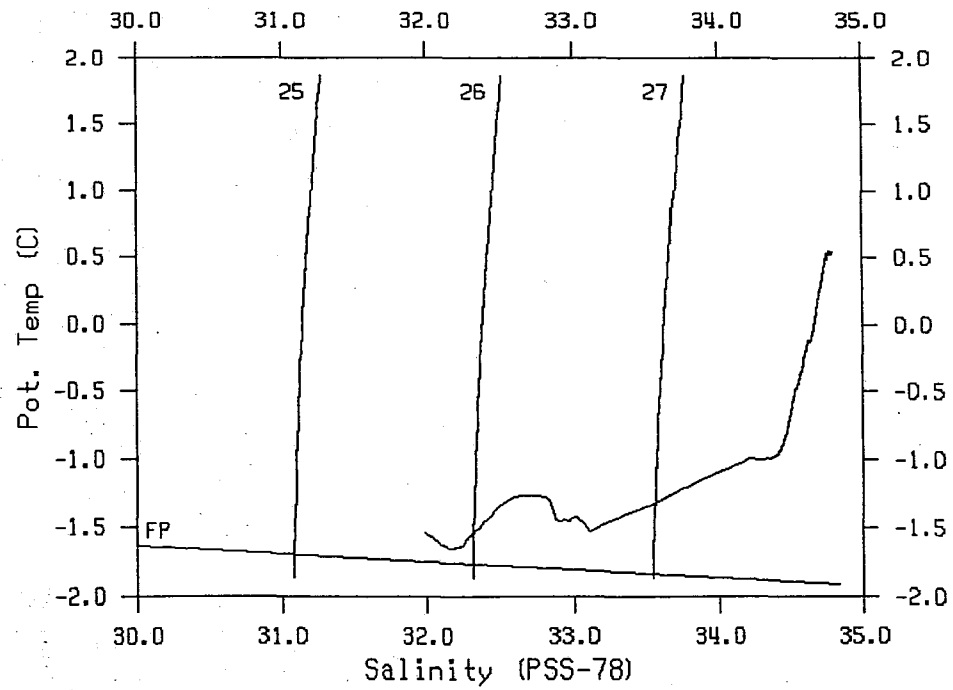

Transmissivity (%/metre)
Chlorophyl (mg/m^3)
Pressure (dBars)
20 30 40 50 60 70 80
0.00 0.50 1.00 1.50 2.00 2.50 3.00
0 50 100 150 200 250 300 350
CAST INFO
FILE : 93240024.low
CRUISE : 93-24
STATION : TA
CAST : 24
LATITUDE : 75 .054 N
LONGITUDE: 172 59.900 W
DATE : 1993/09/11
TIME : 15:20 UTC
NREC : 344
PLOTTED:22/NOV/1994 16:20:54

PLOTTED:29/NOV/1994 12:13:43

NOGAP 1993
Henry Larsen
STATION : TA
REFERENCE NO.: 93-24-025
DATE/TIME : 11/09/93 15:20 UTC
POSITION : 75- .1N 172-59.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
30	-1.6106	-1.6111	32.090	30	25.811	.00			
50	-1.5863	-1.5872	32.285	50	25.969	.42			
75	-1.4089	-1.4104	32.874	74	26.442	.87			
100	-1.3704	-1.3726	33.439	99	26.900	1.21			
150	-.9274	-.9316	34.426	149	27.685	1.59			
200	-.1159	-.1231	34.620	198	27.806	1.76			
250	.4566	.4462	34.739	247	27.870	1.89			
300	.5340	.5212	34.776	297	27.896	1.99			
344	.5567	.5418	34.787	340	27.903	2.08			

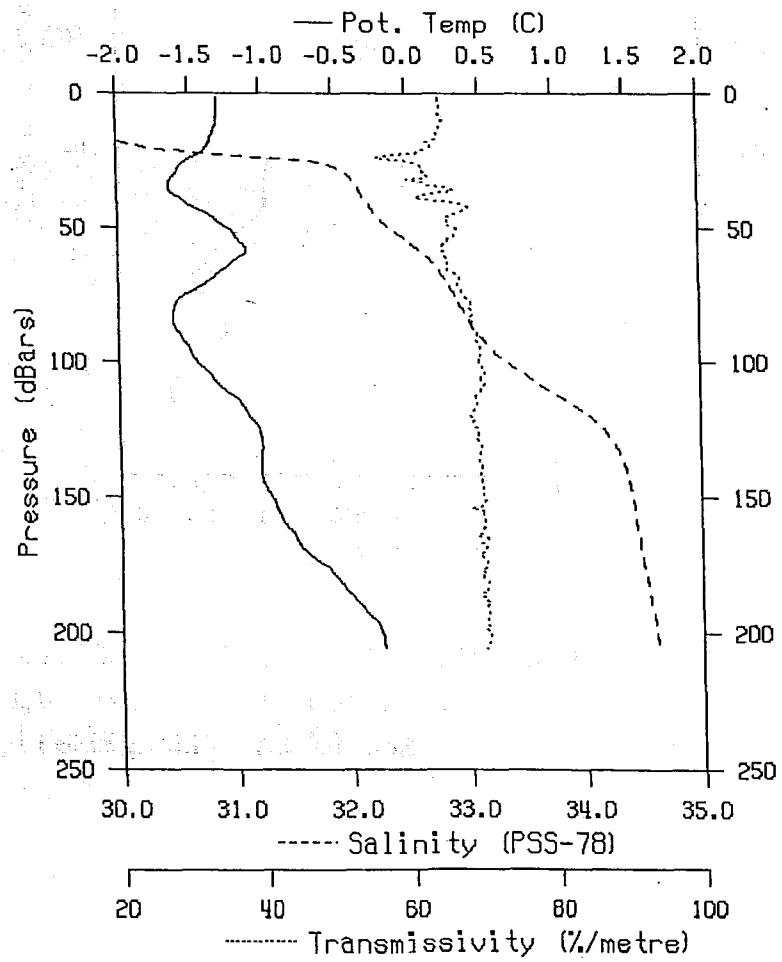


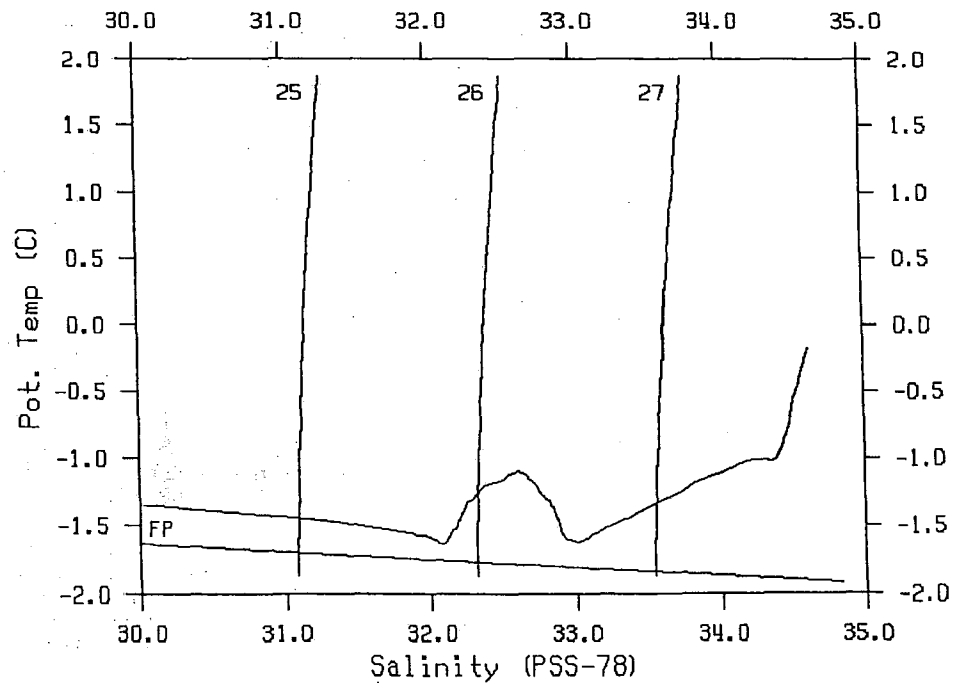


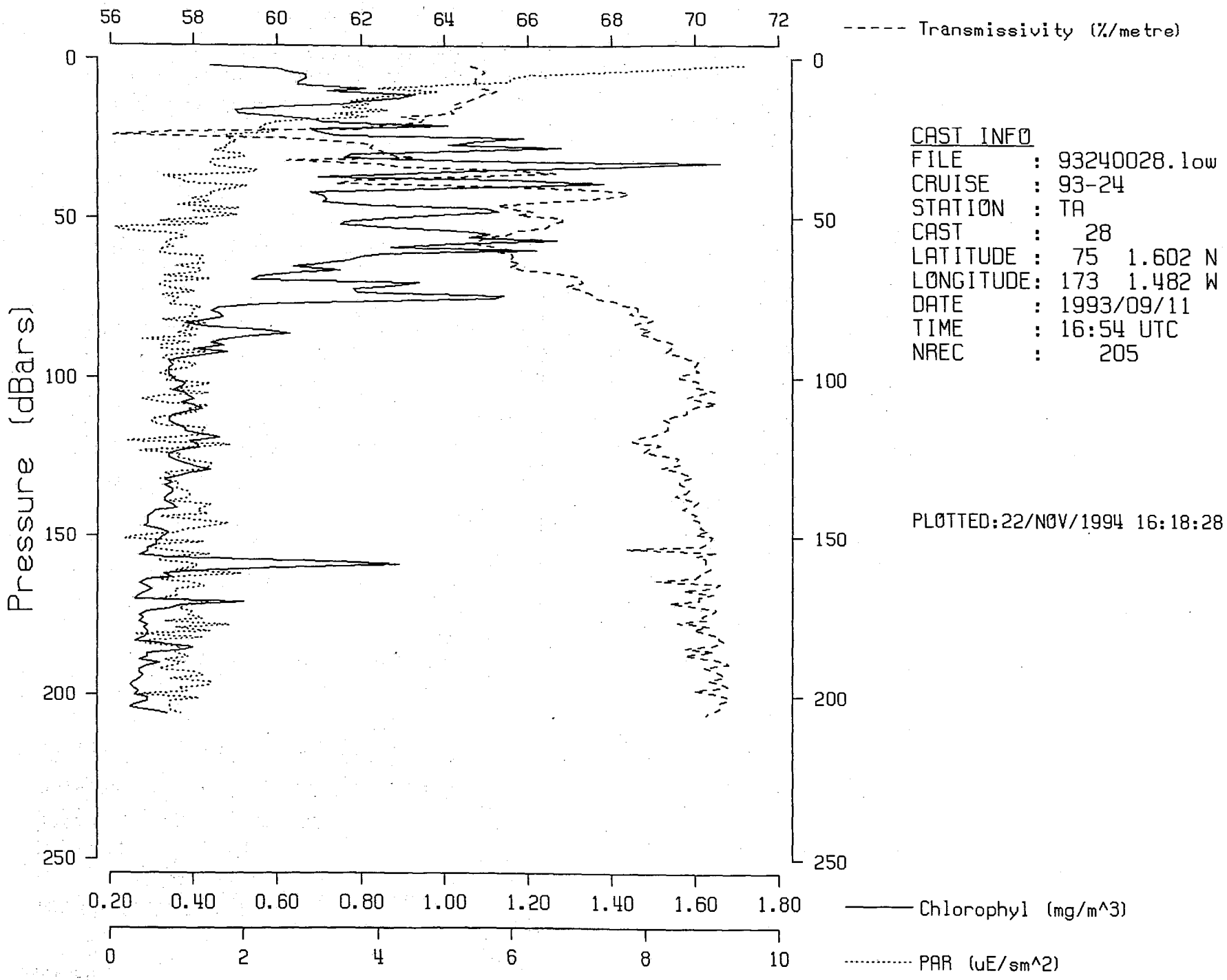
PLOTTED:22/NOV/1994 15:55:29

NOGAP 1993
Henry Larsen
STATION : TA
REFERENCE NO.: 93-24-028
DATE/TIME : 11/09/93 16:54 UTC
POSITION : 75- 1.6N 173- 1.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.293	-1.293	29.731	2	23.891	.00	64.7	.44	9.5
10	-1.299	-1.299	29.752	10	23.908	.32	65.3	.72	4.9
20	-1.365	-1.365	30.224	20	24.292	.70	63.4	.71	2.5
30	-1.590	-1.590	31.996	30	25.734	.99	62.5	.78	2.0
50	-1.228	-1.229	32.360	50	26.021	1.41	66.8	.87	1.5
75	-1.526	-1.527	32.902	74	26.469	1.86	67.6	1.12	1.0
100	-1.449	-1.451	33.347	99	26.828	2.20	69.6	.35	1.0
150	-.939	-.943	34.418	149	27.679	2.60	70.4	.33	.5
200	-.191	-.198	34.607	198	27.799	2.77	70.7	.26	.4
206	-.174	-.182	34.618	204	27.807	2.79	70.3	.34	1.1



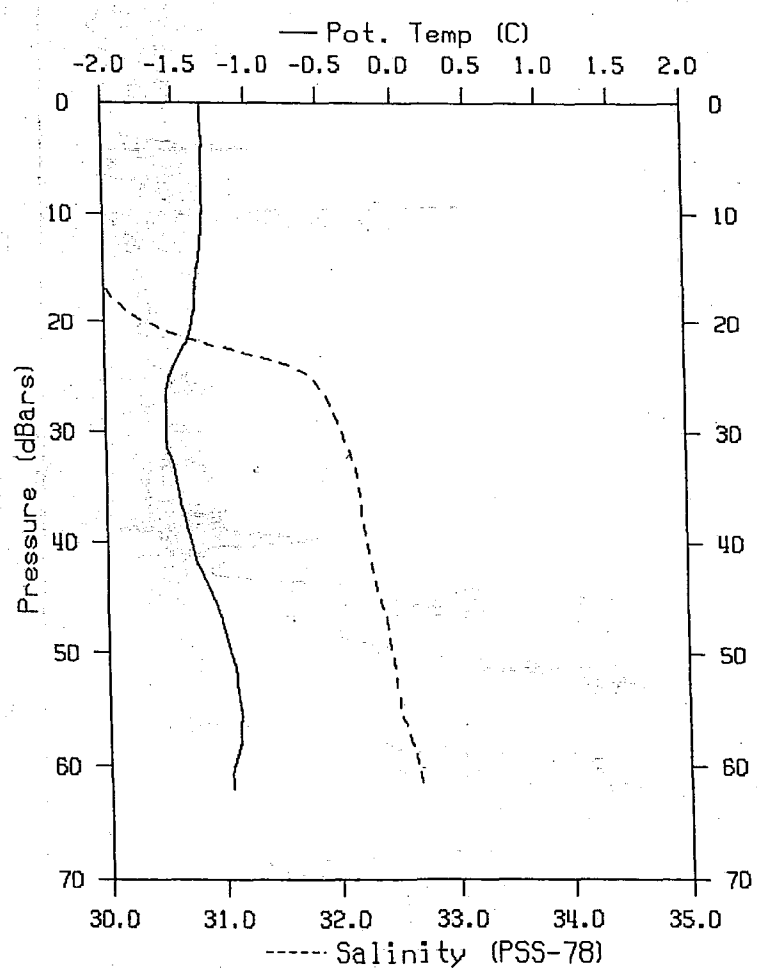


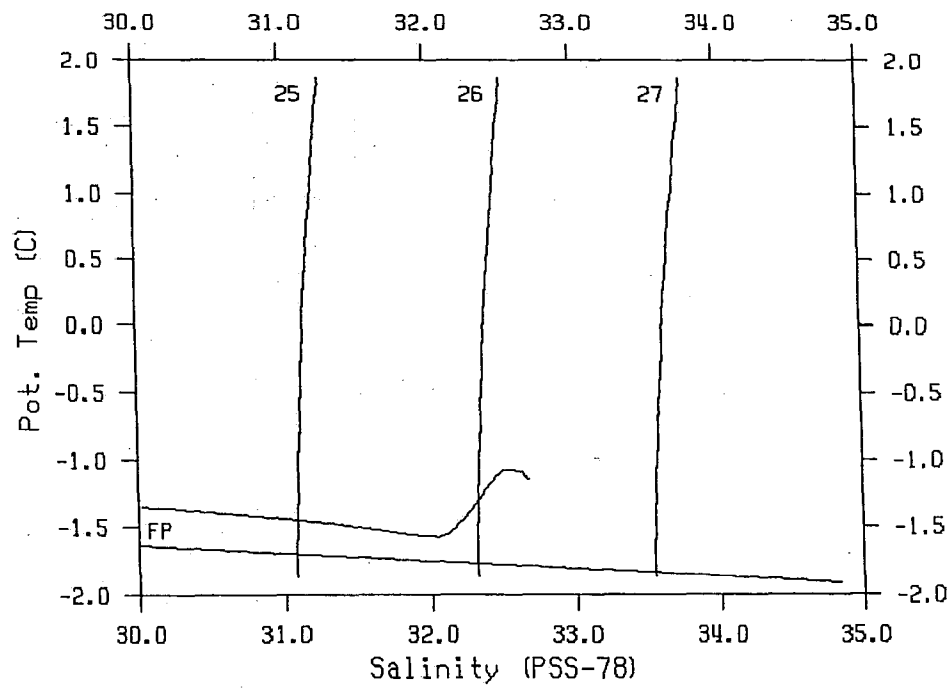

56 58 60 62 64 66 68 70 72
----- Transmissivity (%/metre)
0 50 100 150 200 250
Pressure (dBars)
CAST INFO
FILE : 93240028.low
CRUISE : 93-24
STATION : TA
CAST : 28
LATITUDE : 75 1.602 N
LONGITUDE: 173 1.482 W
DATE : 1993/09/11
TIME : 16:54 UTC
NREC : 205
PLOTTED:22/NOV/1994 16:18:28
0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80
Chlorophyl (mg/m^3)
0 2 4 6 8 10
PAR (uE/sm^2)

PLOTTED:29/NOV/1994 12:14:06

NOGAP 1993
Henry Larsen
STATION : TA
REFERENCE NO.: 93-24-029
DATE/TIME : 11/09/93 16:54 UTC
POSITION : 75- 1.6N 173- 1.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.2977	-1.2977	29.744	0	23.902	.00			
10	-1.3055	-1.3056	29.772	10	23.924	.40			
20	-1.3797	-1.3800	30.364	20	24.405	.77			
30	-1.5714	-1.5719	32.049	30	25.777	1.06			
51	-1.1154	-1.1165	32.472	51	26.109	1.49			
62	-1.1521	-1.1535	32.689	62	26.286	1.69			





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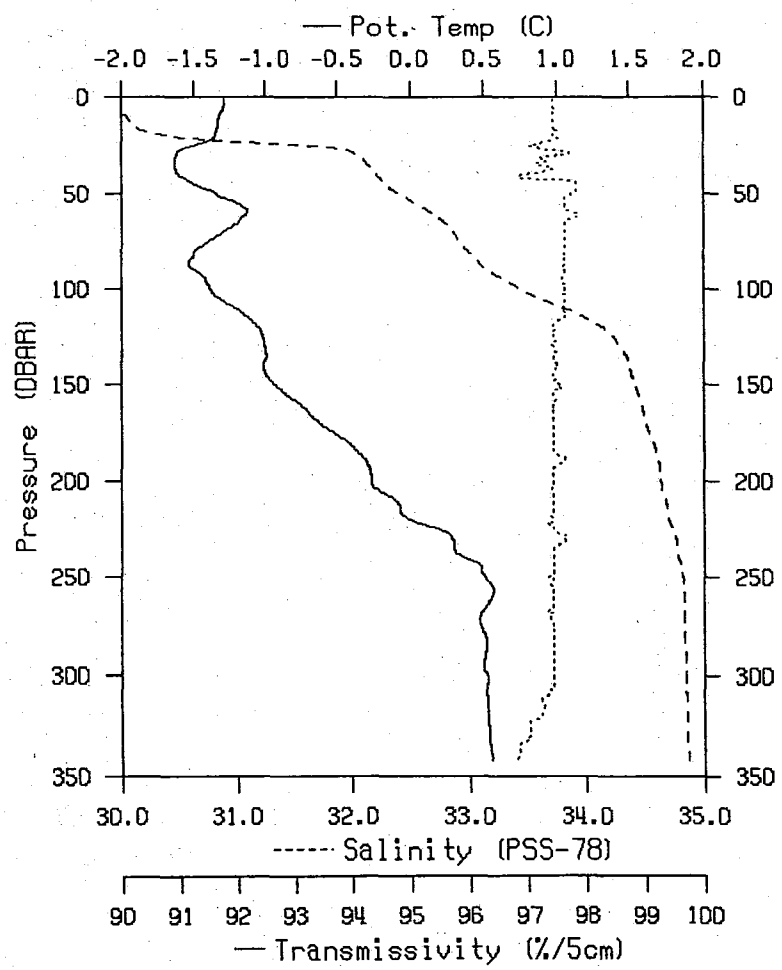
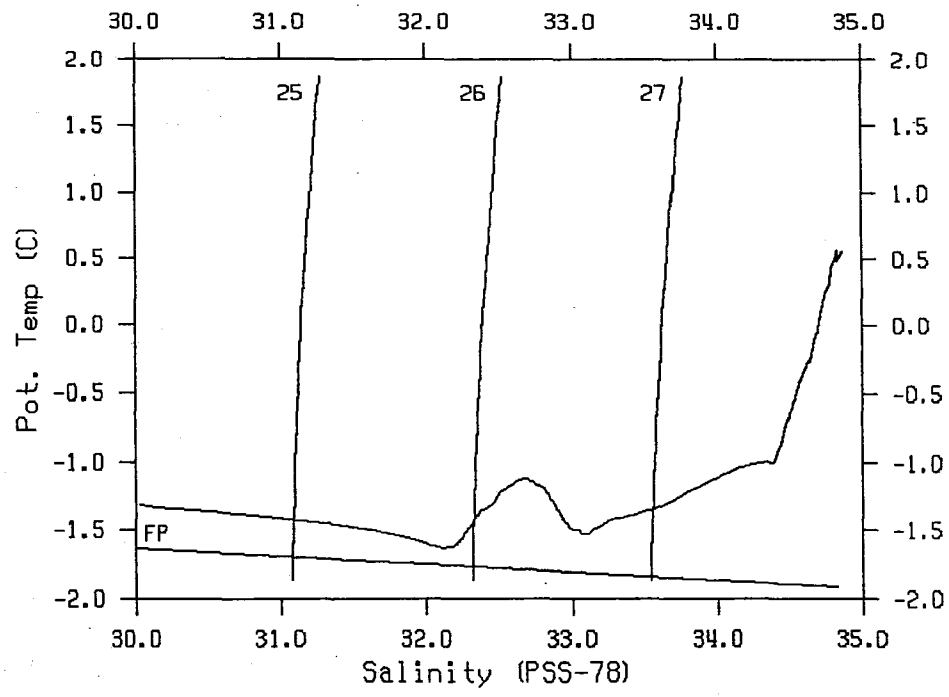
NOGAP 1993
Henry Larsen
STATION : TA
REFERENCE NO.: 93-24-032
DATE/TIME : 11/09/93 16:16 UTC
POSITION : 75- .9N 173- .5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.2794	-1.2794	29.926	1	24.048	.00	97.44		
10	-1.3174	-1.3175	30.050	10	24.149	.34	97.44		
20	-1.3497	-1.3500	30.383	20	24.420	.70	97.44		
30	-1.6167	-1.6172	32.057	30	25.785	.99	97.59		
50	-1.3386	-1.3396	32.408	50	26.063	1.40	97.74		
75	-1.3955	-1.3970	32.926	74	26.485	1.84	97.64		
100	-1.3790	-1.3812	33.438	99	26.899	2.17	97.64		
150	-.9279	-.9321	34.422	149	27.682	2.55	97.54		
200	-.2568	-.2638	34.644	198	27.832	2.72	97.44		
250	.5210	.5105	34.823	248	27.934	2.82	97.34		
300	.5400	.5272	34.852	297	27.957	2.90	97.44		
342	.5705	.5556	34.868	338	27.968	2.96	96.72		





PLOTTED:29/NOV/1994 13:55:54

NOGAP 1993

Henry Larsen

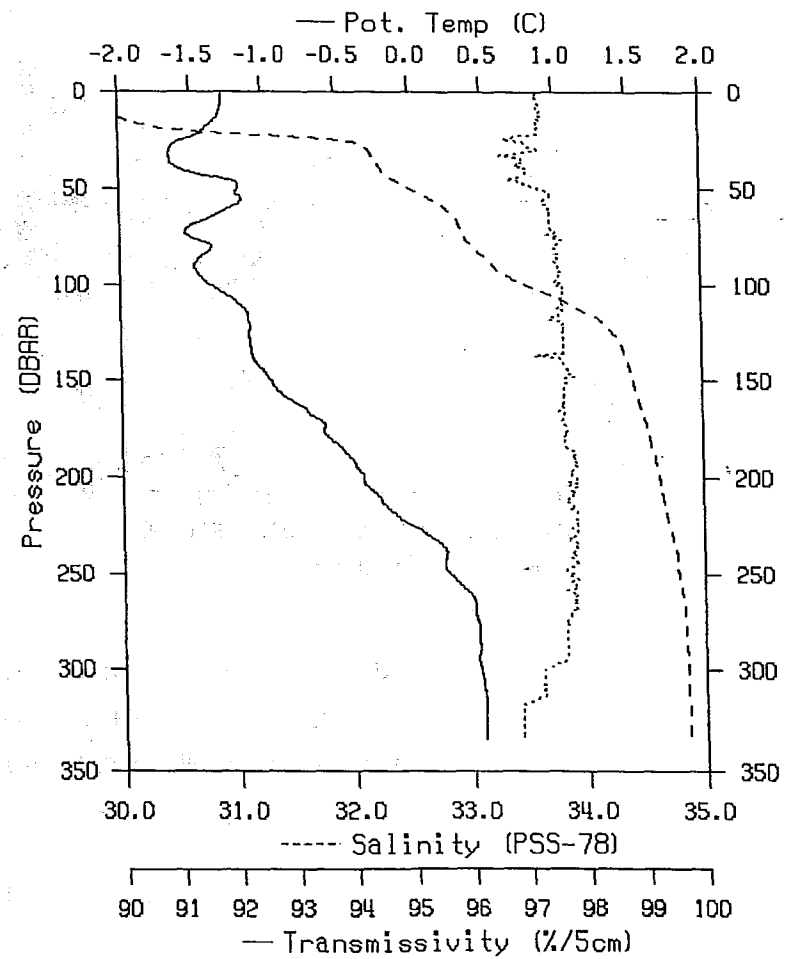
STATION : T1

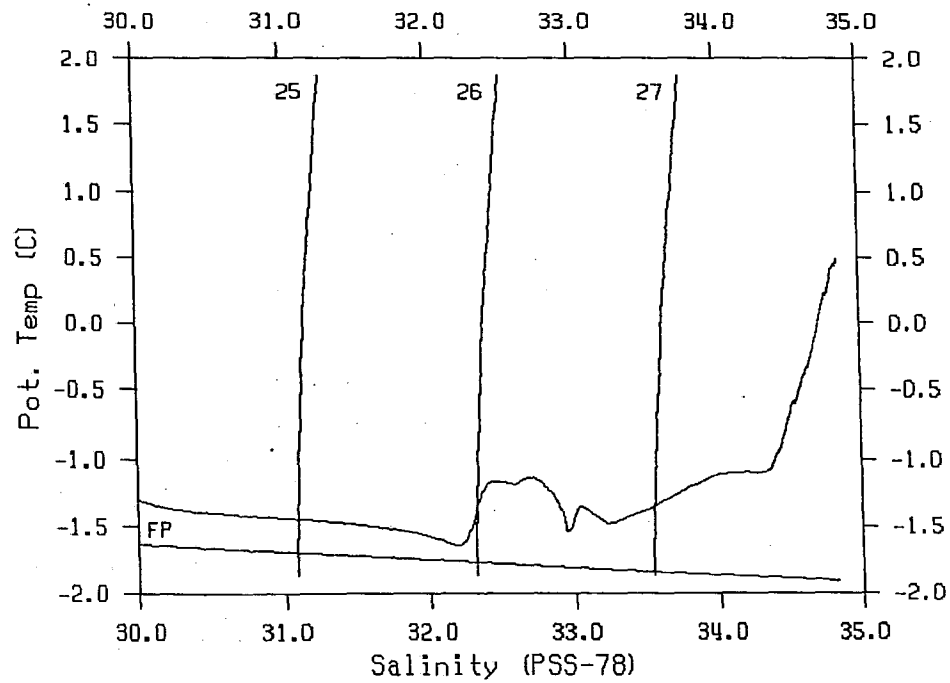
REFERENCE NO.: 93-24-033

DATE/TIME : 11/09/93 19:28 UTC

POSITION : 75- .0N 173-15.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.2751	-1.2751	29.947	1	24.065	.00	97.24		
10	-1.2858	-1.2860	29.962	10	24.078	.34	97.31		
20	-1.4039	-1.4042	30.534	20	24.544	.70	97.24		
30	-1.6366	-1.6371	32.159	30	25.868	.98	97.24		
50	-1.1672	-1.1683	32.517	50	26.146	1.38	97.24		
75	-1.4970	-1.4985	32.988	74	26.538	1.79	97.49		
100	-1.3665	-1.3687	33.511	99	26.959	2.12	97.54		
150	-.9554	-.9596	34.411	149	27.675	2.49	97.64		
200	-.3225	-.3293	34.631	198	27.825	2.65	97.84		
250	.2659	.2559	34.783	248	27.917	2.76	97.79		
300	.4708	.4581	34.849	297	27.959	2.85	97.24		
334	.5024	.4881	34.856	331	27.962	2.89	96.80		





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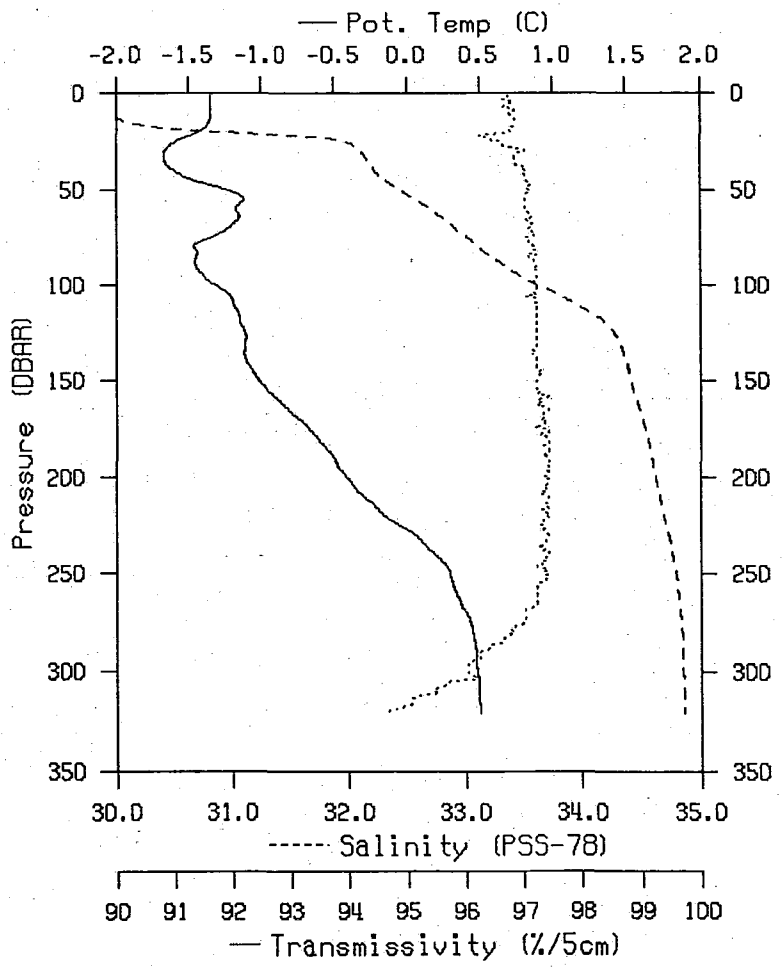
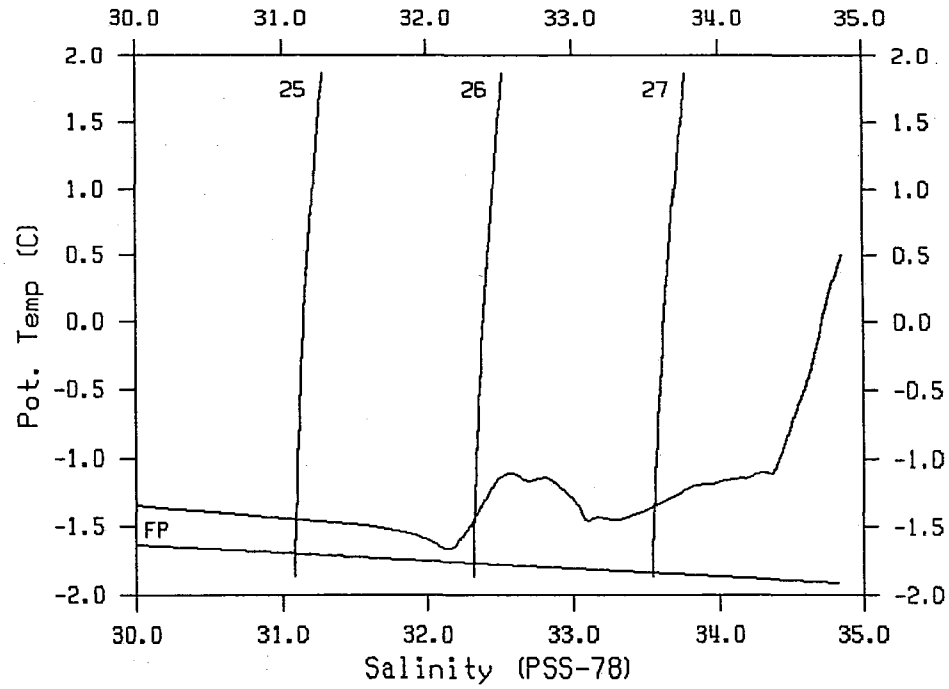
NOGAP 1993
Henry Larsen
STATION : T2
REFERENCE NO.: 93-24-034
DATE/TIME : 11/09/93 21:30 UTC
POSITION : 75- 1.1N 173-32.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.3449	-1.3449	29.959	1	24.076	.00	96.75		
10	-1.3458	-1.3459	29.979	10	24.092	.34	96.75		
20	-1.4323	-1.4326	30.917	20	24.855	.69	96.78		
30	-1.6583	-1.6588	32.110	30	25.828	.95	97.04		
50	-1.2149	-1.2159	32.450	50	26.094	1.36	97.14		
75	-1.3460	-1.3476	33.038	74	26.574	1.78	97.04		
100	-1.3125	-1.3148	33.630	99	27.053	2.08	97.24		
150	-1.0028	-1.0069	34.422	149	27.685	2.43	97.24		
200	-.4039	-.4106	34.627	198	27.826	2.59	97.34		
250	.3101	.3000	34.795	248	27.924	2.70	97.34		
300	.4975	.4848	34.855	297	27.962	2.78	96.06		
321	.5157	.5020	34.860	318	27.964	2.81	94.64		





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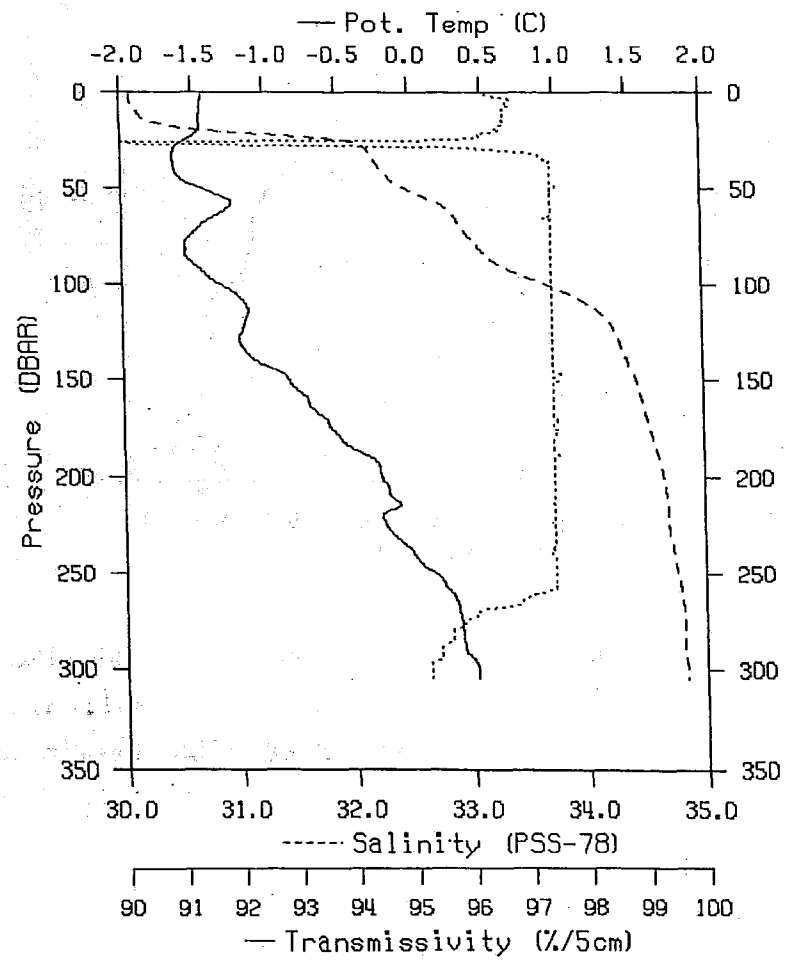
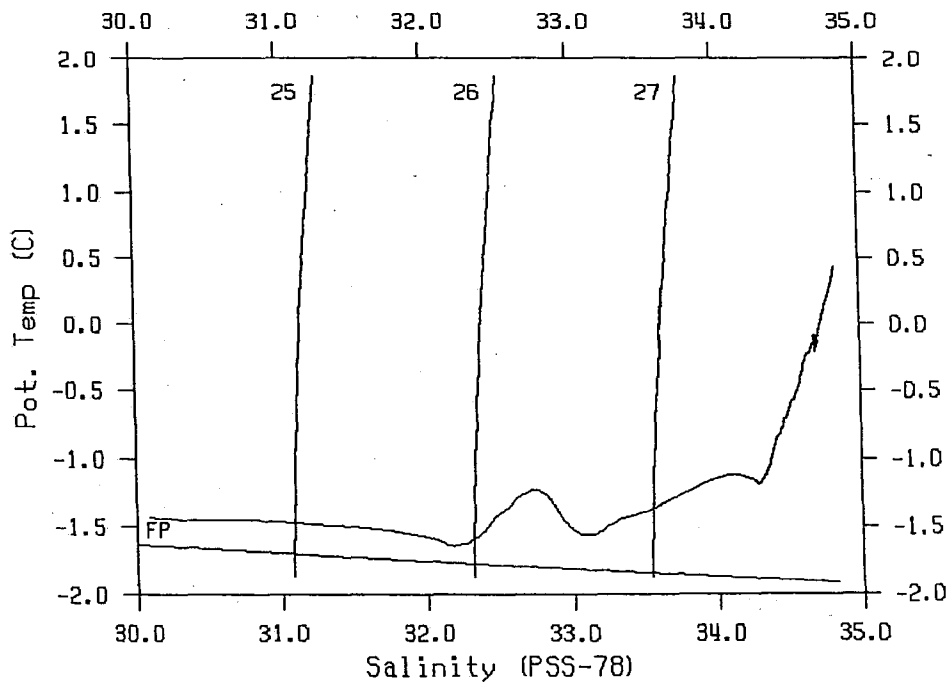
NOGAP 1993
Henry Larsen
STATION : T3
REFERENCE NO.: 93-24-035
DATE/TIME : 11/09/93 22:48 UTC
POSITION : 75- .1N 173-45.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4281	-1.4281	30.089	1	24.184	.00	96.35		
10	-1.4381	-1.4382	30.156	10	24.238	.33	96.60		
20	-1.4531	-1.4534	30.751	20	24.721	.68	96.60		
30	-1.6303	-1.6308	32.146	30	25.857	.94	96.40		
50	-1.4225	-1.4235	32.480	50	26.124	1.35	97.44		
75	-1.5246	-1.5261	33.011	74	26.557	1.76	97.44		
100	-1.3071	-1.3094	33.666	99	27.082	2.07	97.44		
150	-.8385	-.8428	34.428	149	27.684	2.40	97.44		
200	-.2062	-.2132	34.656	198	27.839	2.57	97.44		
250	.1562	.1465	34.770	248	27.913	2.67	97.44		
300	.4441	.4315	34.838	297	27.951	2.76	95.27		
305	.4450	.4322	34.839	302	27.952	2.77	95.27		





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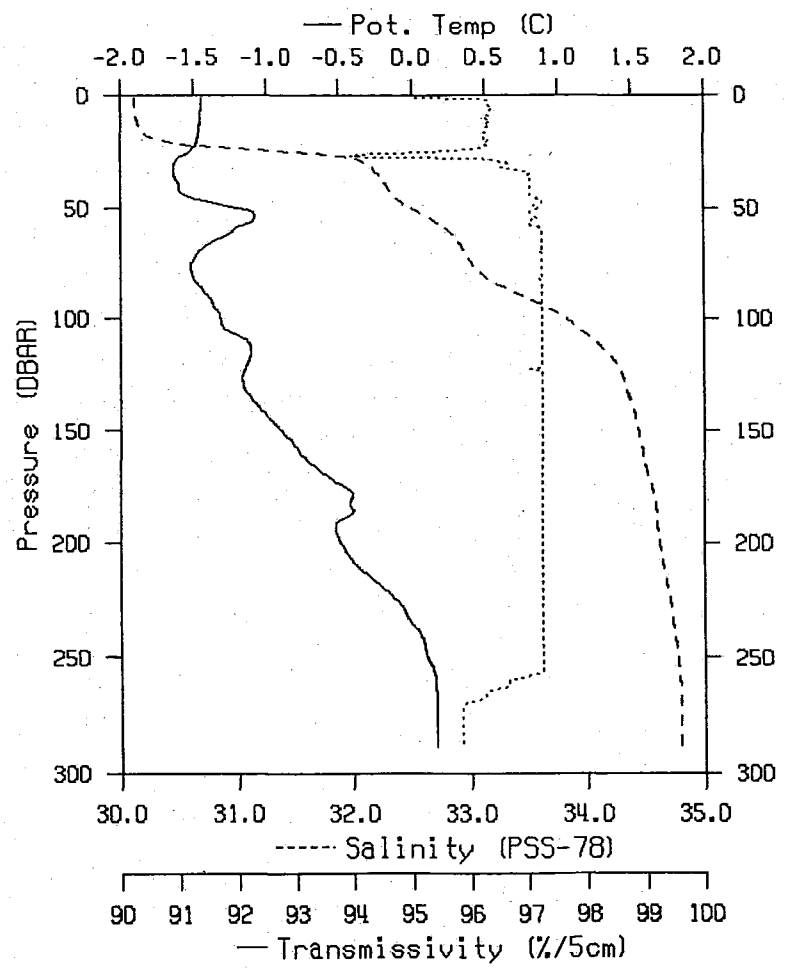
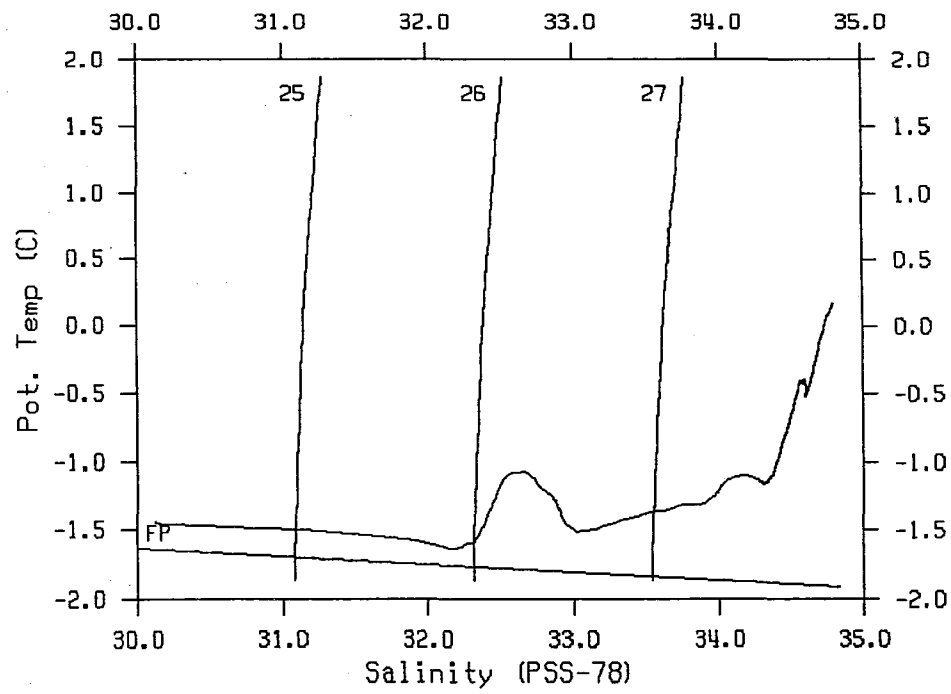
NOGAP 1993
Henry Larsen
STATION : T5
REFERENCE NO.: 93-24-037
DATE/TIME : 12/09/93 01:30 UTC
POSITION : 75- .6N 174-14.8W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4445	-1.4445	30.128	1	24.215	.00	95.07		
10	-1.4523	-1.4524	30.142	10	24.227	.33	96.25		
20	-1.4672	-1.4675	30.363	20	24.406	.69	96.35		
30	-1.6257	-1.6262	32.123	30	25.839	.98	96.65		
50	-1.1941	-1.1952	32.491	50	26.126	1.38	97.19		
75	-1.5069	-1.5084	33.017	74	26.562	1.79	97.24		
100	-1.3132	-1.3155	33.821	99	27.209	2.08	97.24		
150	-.8919	-.8962	34.435	149	27.691	2.39	97.24		
200	-.4761	-.4827	34.617	198	27.821	2.55	97.24		
250	.1126	.1029	34.770	248	27.915	2.66	97.24		
289	.1798	.1684	34.794	286	27.931	2.73	95.86		

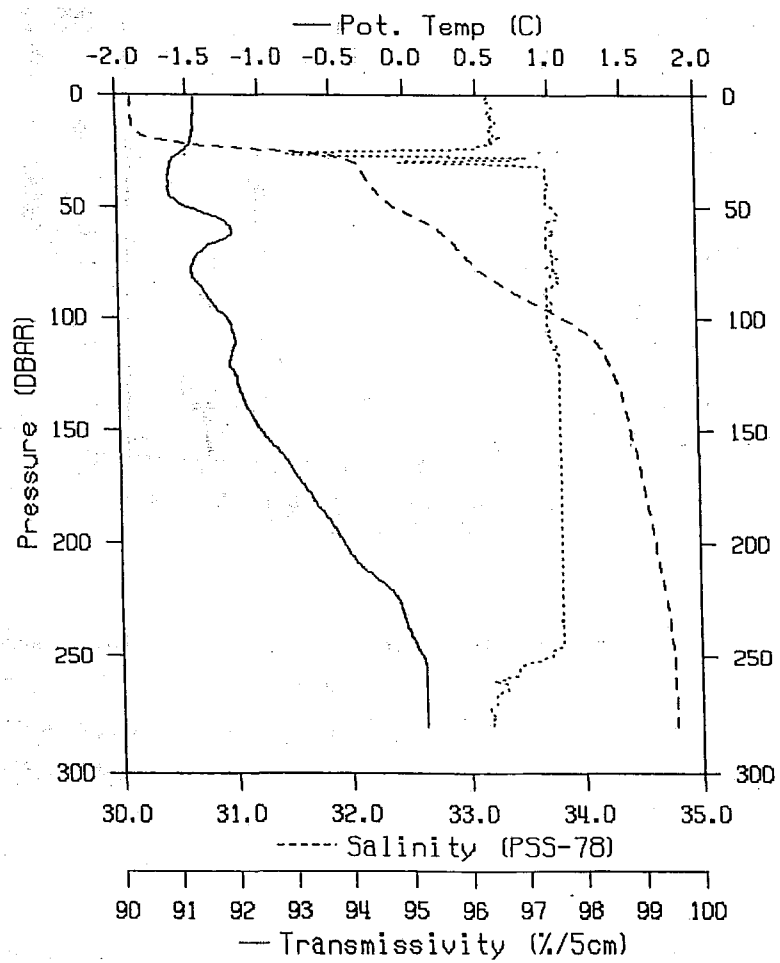


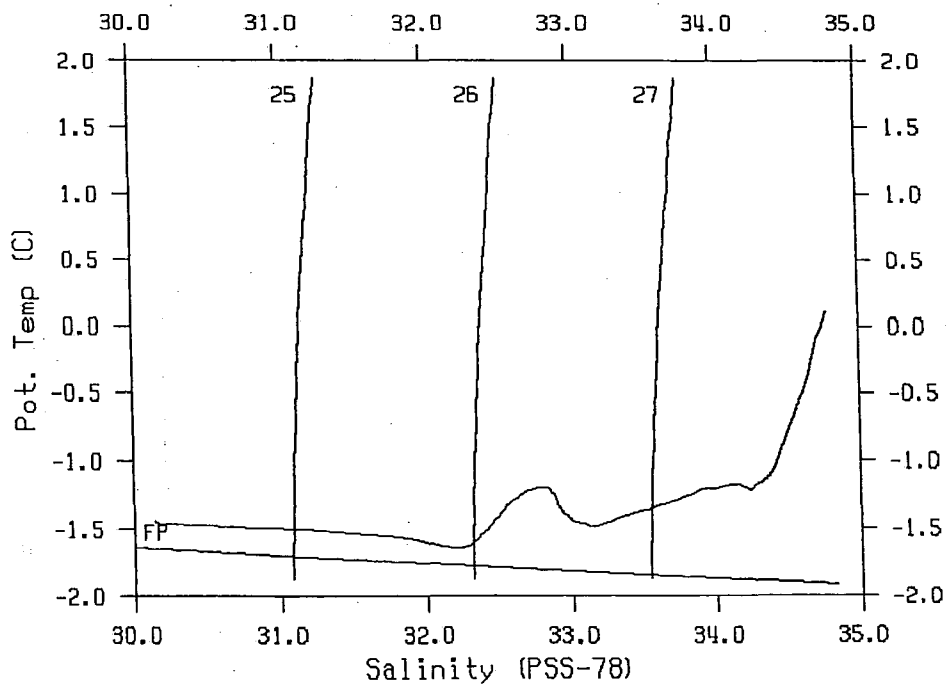


PLOTTED:29/NOV/1994 13:56:28

NØGAP 1993
Henry Larsen
STATION : T6
REFERENCE NØ.: 93-24-038
DATE/TIME : 12/09/93 02:30 UTC
POSITION : 75- .5N 174-29.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4455	-1.4455	30.139	1	24.224	.00	96.45		
10	-1.4493	-1.4494	30.143	10	24.227	.33	96.45		
20	-1.4666	-1.4669	30.368	20	24.411	.69	96.45		
30	-1.6162	-1.6167	32.067	30	25.793	.98	94.93		
50	-1.5052	-1.5061	32.414	50	26.072	1.39	97.54		
75	-1.4576	-1.4591	33.062	74	26.597	1.81	97.54		
100	-1.2315	-1.2339	33.858	99	27.236	2.09	97.44		
150	-1.0008	-1.0049	34.425	149	27.687	2.39	97.64		
200	-.4358	-.4424	34.624	198	27.825	2.55	97.64		
250	.0921	.0825	34.769	248	27.916	2.66	97.44		
280	.1144	.1035	34.778	277	27.922	2.72	96.42		





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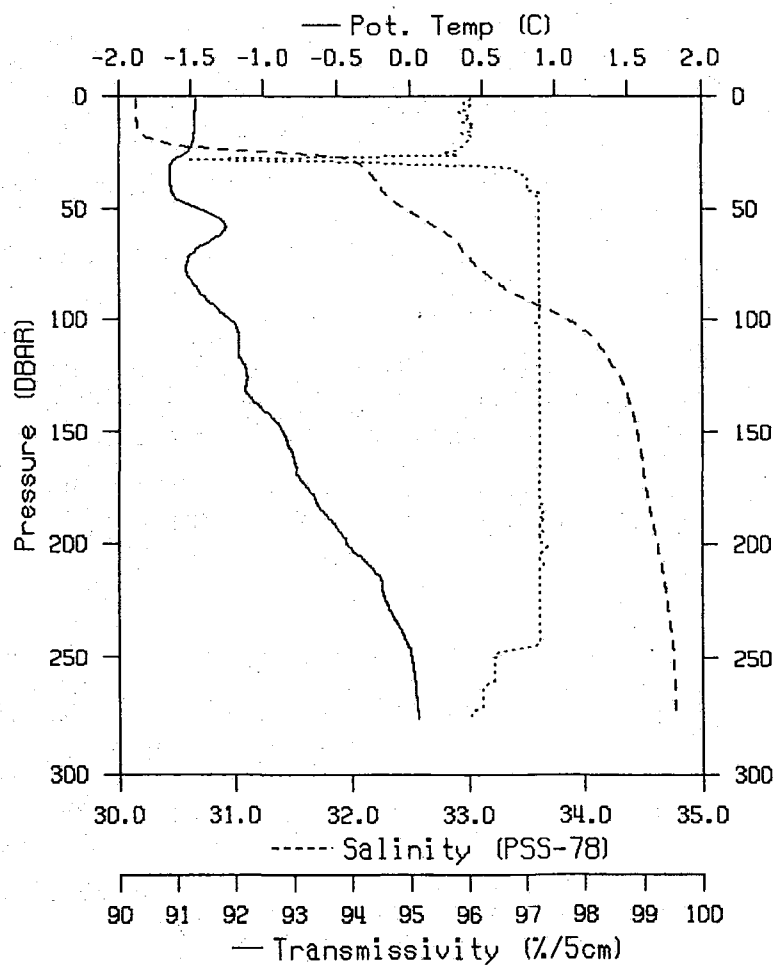
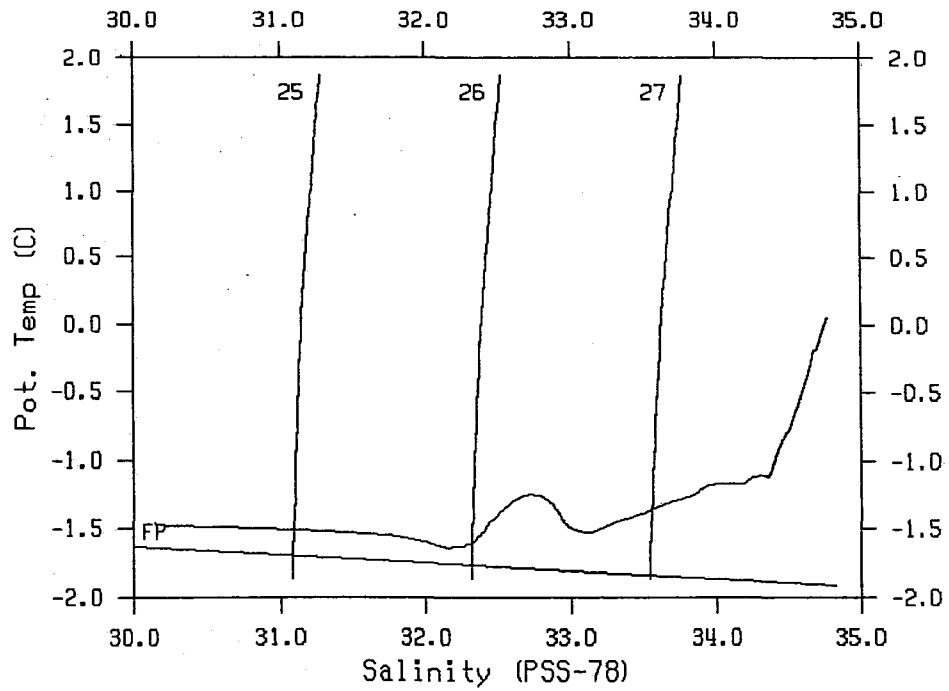
NOGAP 1993
Henry Larsen
STATION : T7
REFERENCE NO.: 93-24-039
DATE/TIME : 12/09/93 04:04 UTC
POSITION : 74-59.8N 174-45.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4633	-1.4633	30.150	1	24.233	.00	96.06		
10	-1.4680	-1.4681	30.156	10	24.238	.33	95.98		
20	-1.4824	-1.4827	30.368	20	24.411	.69	95.99		
30	-1.6292	-1.6297	32.085	30	25.807	.97	94.92		
50	-1.4434	-1.4443	32.461	50	26.108	1.38	97.24		
75	-1.5200	-1.5215	33.067	74	26.602	1.79	97.24		
100	-1.2310	-1.2334	33.862	99	27.240	2.07	97.24		
150	-.8615	-.8658	34.454	149	27.705	2.37	97.24		
200	-.4212	-.4279	34.623	198	27.823	2.53	97.31		
250	.0229	.0134	34.761	248	27.913	2.64	96.45		
276	.0654	.0548	34.771	273	27.918	2.69	96.06		





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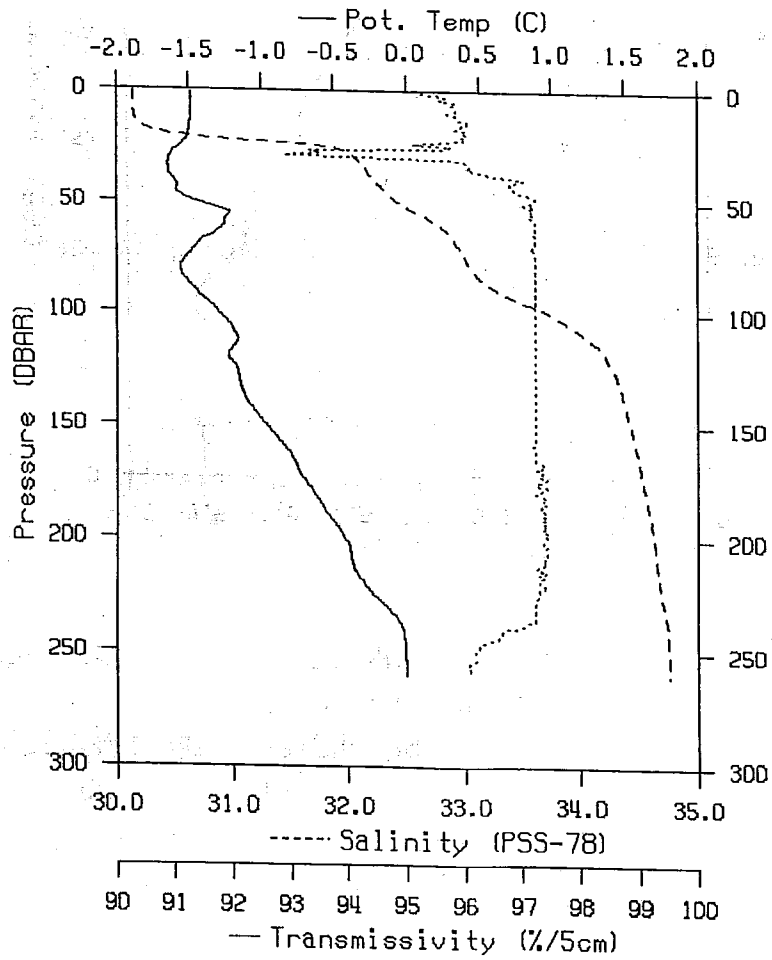
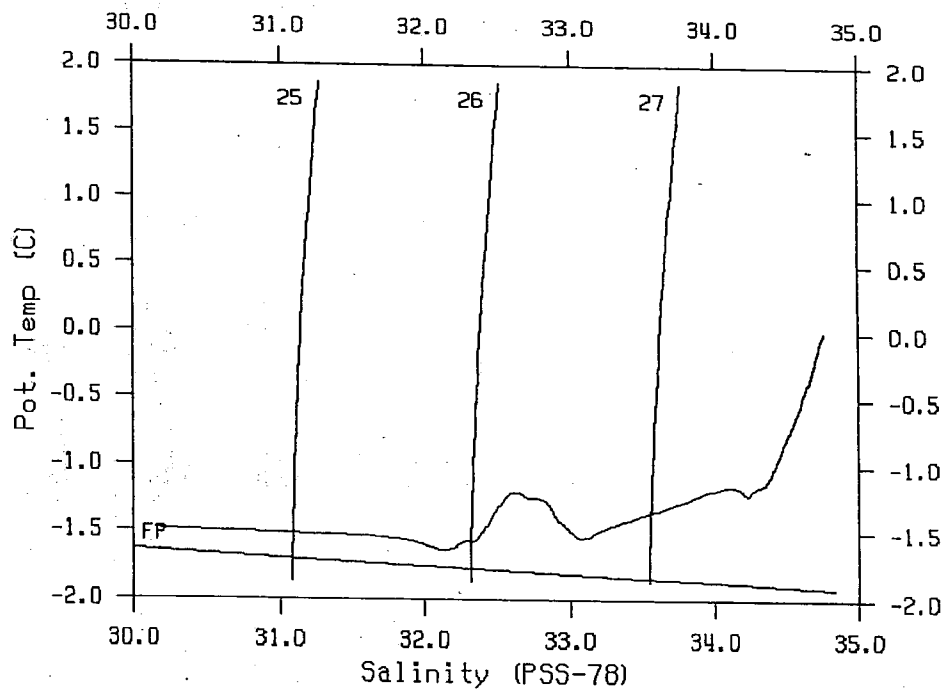
NOGAP 1993
Henry Larsen
STATION : TB
REFERENCE NO.: 93-24-040
DATE/TIME : 12/09/93 05:00 UTC
POSITION : 74-59.9N 175- .3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4775	-1.4775	30.150	1	24.233	.00	95.27		
10	-1.4805	-1.4806	30.156	10	24.239	.33	95.73		
20	-1.4966	-1.4969	30.521	20	24.535	.68	96.06		
30	-1.6246	-1.6251	32.076	30	25.800	.96	94.57		
50	-1.4551	-1.4560	32.435	50	26.087	1.37	97.17		
75	-1.4932	-1.4947	33.009	74	26.555	1.79	97.24		
100	-1.2872	-1.2895	33.742	99	27.144	2.09	97.24		
150	-.9591	-.9633	34.435	149	27.694	2.41	97.24		
200	-.4114	-.4181	34.629	198	27.827	2.57	97.44		
250	.0083	-.0011	34.757	248	27.910	2.69	96.19		
260	.0108	.0010	34.758	257	27.911	2.70	96.09		





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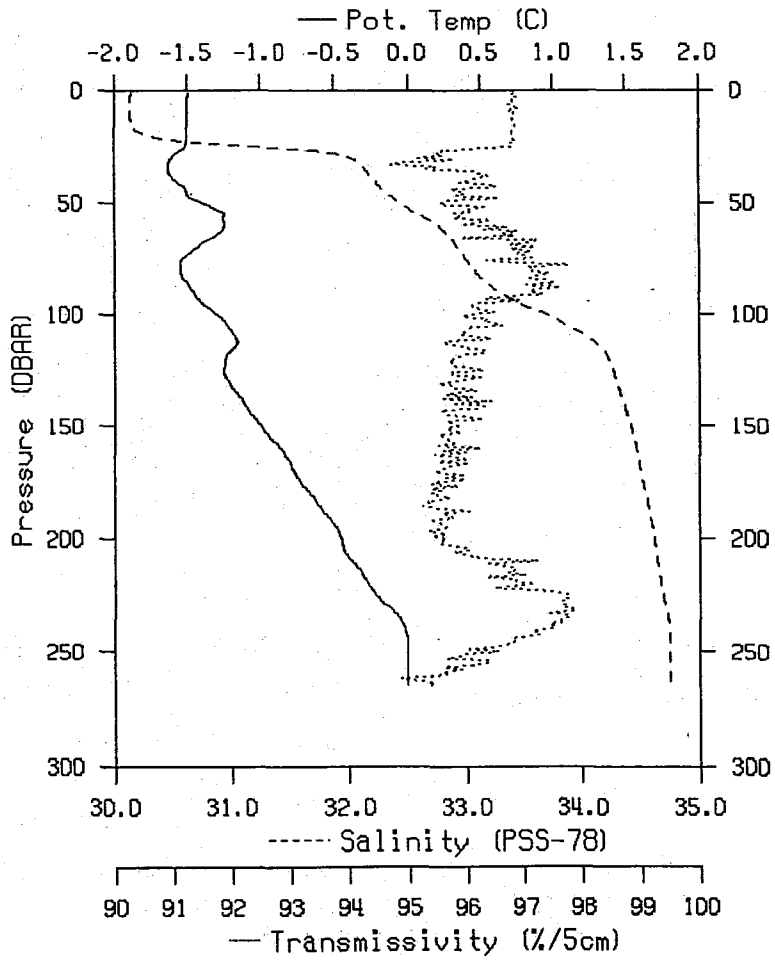
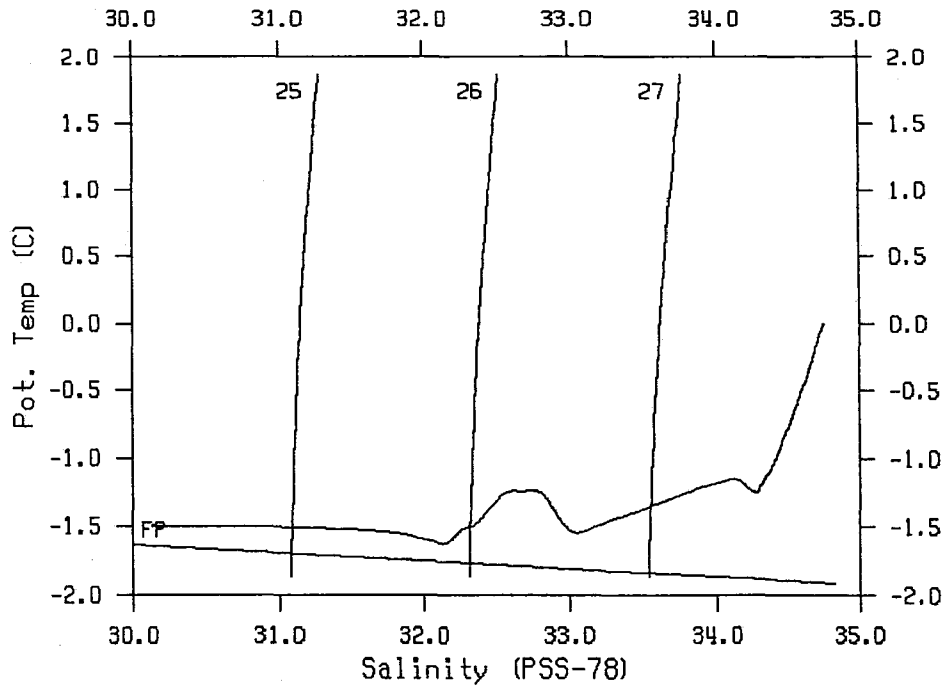
NOGAP 1993
Henry Larsen
STATION : TB
REFERENCE NO.: 93-24-041
DATE/TIME : 12/09/93 16:07 UTC
POSITION : 74-59.8N 174-59.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4912	-1.4912	30.163	1	24.244	.00	96.85		
10	-1.4942	-1.4943	30.138	10	24.224	.33	96.85		
20	-1.4966	-1.4969	30.285	20	24.344	.69	96.81		
30	-1.5964	-1.5969	32.022	30	25.756	.98	95.19		
50	-1.3992	-1.4002	32.436	50	26.087	1.40	95.61		
75	-1.5192	-1.5207	33.000	74	26.548	1.82	97.15		
100	-1.2940	-1.2963	33.690	99	27.102	2.12	96.06		
150	-.9865	-.9906	34.419	149	27.682	2.46	95.86		
200	-.4458	-.4524	34.617	198	27.819	2.62	95.66		
250	.0023	-.0071	34.753	248	27.907	2.74	96.57		
265	.0044	-.0056	34.754	262	27.908	2.77	95.36		





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NOGAP 1993

Henry Larsen

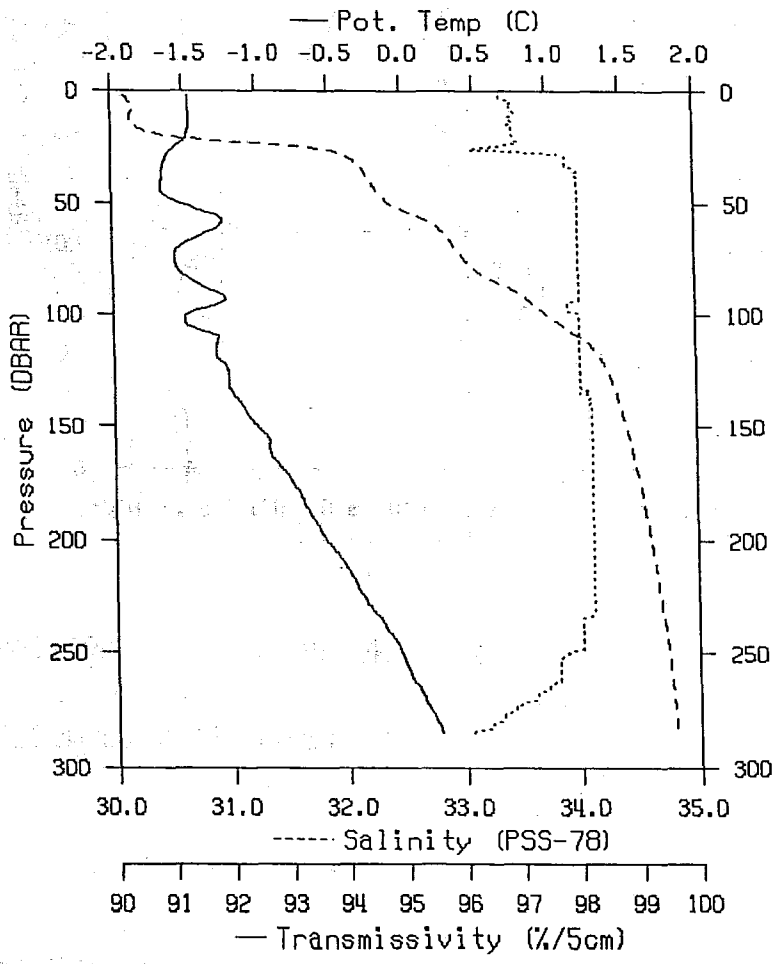
STATION : T8

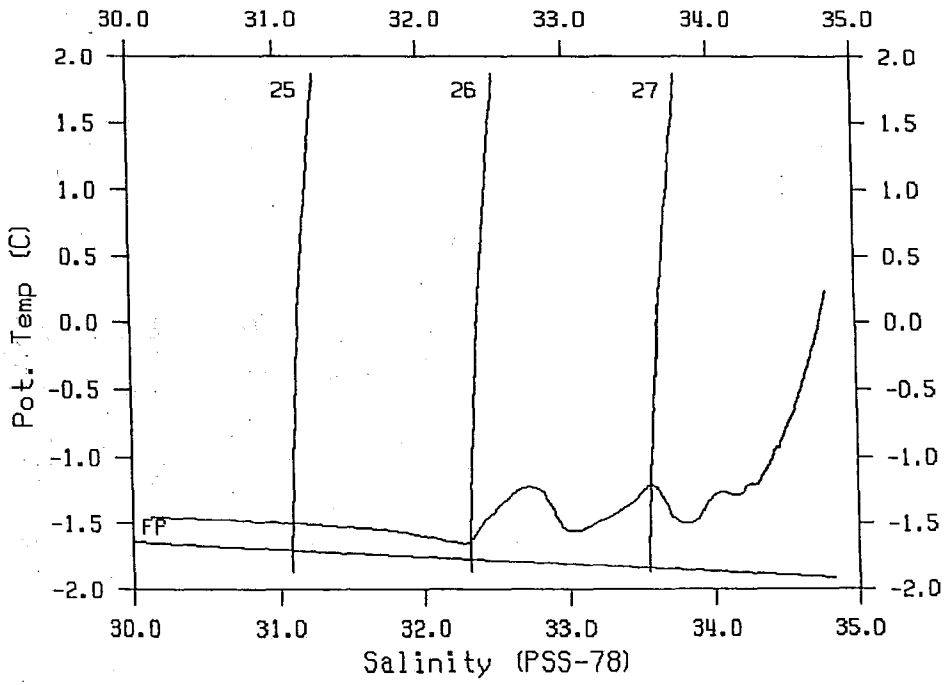
REFERENCE NO.: 93-24-042

DATE/TIME : 12/09/93 18:02 UTC

POSITION : 75- 4.2N 174-49.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
2	-1.4515	-1.4515	30.126	2	24.214	.00	96.72		
10	-1.4516	-1.4517	30.178	10	24.256	.29	96.98		
20	-1.4664	-1.4667	30.486	20	24.506	.65	96.94		
30	-1.6094	-1.6099	32.075	30	25.799	.93	97.84		
50	-1.5149	-1.5158	32.404	50	26.064	1.34	98.03		
75	-1.5555	-1.5569	33.040	74	26.581	1.76	98.03		
100	-1.4812	-1.4834	33.743	99	27.150	2.05	98.03		
150	-1.0010	-1.0051	34.410	149	27.675	2.38	98.23		
200	-.5389	-.5454	34.599	198	27.810	2.55	98.23		
250	-.0205	-.0299	34.743	248	27.901	2.67	97.79		
285	.2489	.2375	34.801	282	27.933	2.73	96.06		





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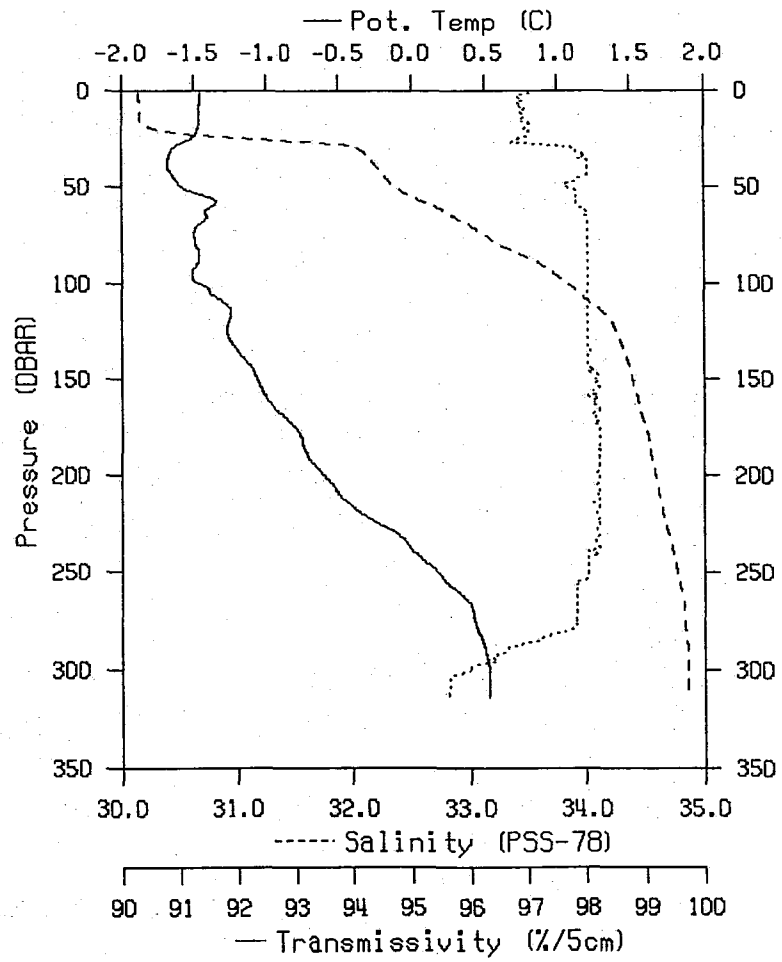
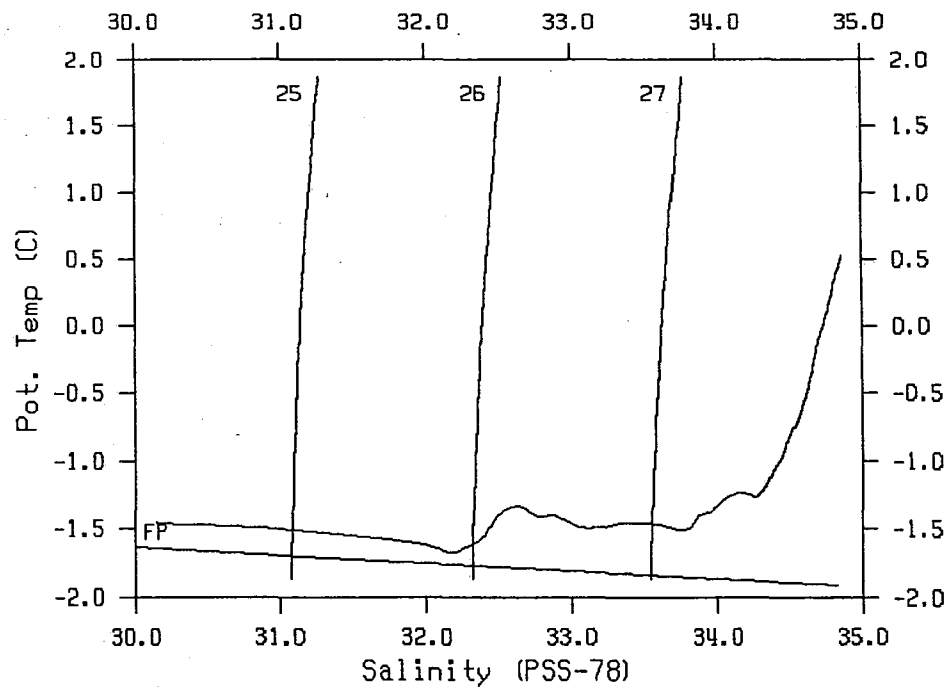
NOGAP 1993
Henry Larsen
STATION : T9
REFERENCE NO.: 93-24-043
DATE/TIME : 12/09/93 19:11 UTC
POSITION : 75- 8.1N 174-35.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4517	-1.4517	30.149	1	24.232	.00	97.04		
10	-1.4583	-1.4584	30.160	10	24.241	.33	96.90		
20	-1.4648	-1.4651	30.291	20	24.348	.69	96.94		
30	-1.6338	-1.6343	32.048	30	25.778	.98	97.84		
50	-1.5782	-1.5791	32.374	50	26.041	1.40	97.64		
75	-1.4934	-1.4949	33.133	74	26.656	1.81	98.03		
100	-1.4610	-1.4632	33.840	99	27.228	2.09	98.03		
150	-1.0539	-1.0580	34.399	149	27.668	2.39	98.16		
200	-.5972	-.6036	34.591	198	27.805	2.57	98.23		
250	.1871	.1773	34.776	248	27.916	2.68	98.03		
300	.5400	.5272	34.866	297	27.968	2.76	96.06		
314	.5381	.5246	34.866	311	27.968	2.78	95.64		





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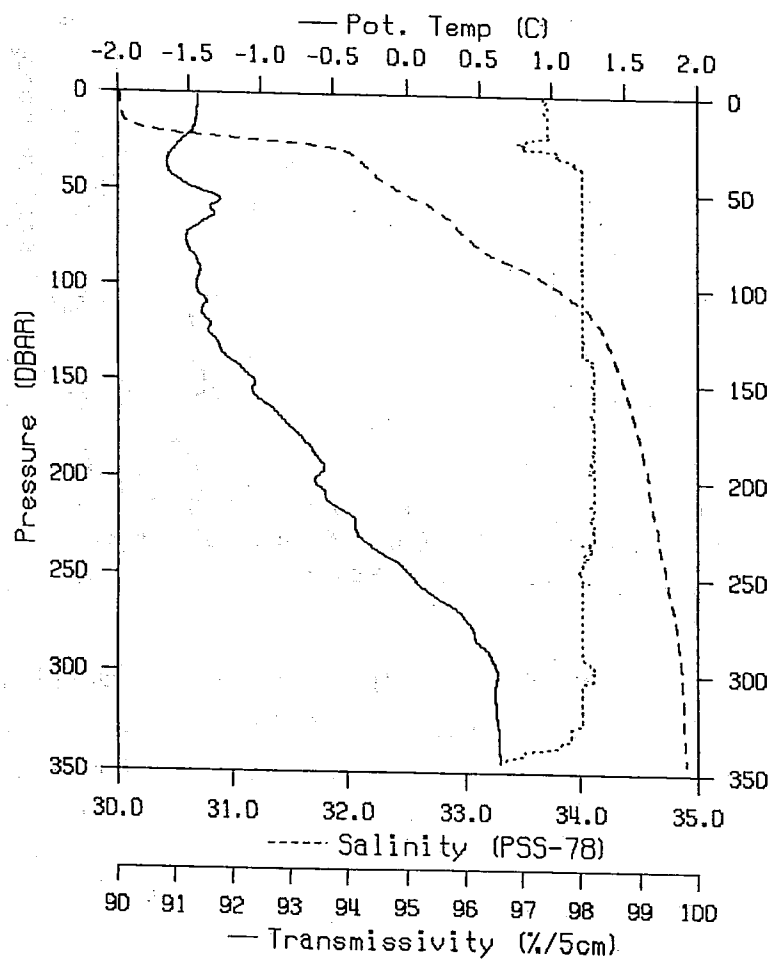
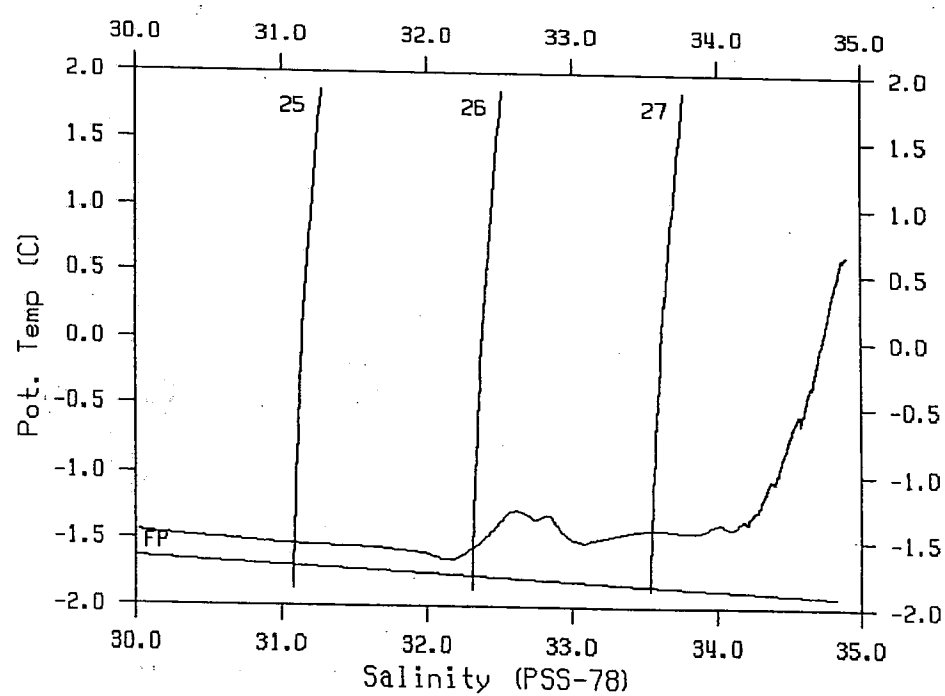
NOGAP 1993
Henry Larsen
STATION : T10
REFERENCE NO.: 93-24-044
DATE/TIME : 12/09/93 20:27 UTC
POSITION : 75-12.3N 174-23.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4383	-1.4383	30.029	1	24.135	.00	97.34		
10	-1.4410	-1.4411	30.036	10	24.140	.34	97.44		
20	-1.4748	-1.4751	30.390	20	24.428	.70	97.51		
30	-1.6100	-1.6105	32.017	30	25.752	.99	97.64		
50	-1.4335	-1.4344	32.458	50	26.106	1.40	98.03		
75	-1.5116	-1.5131	33.058	74	26.595	1.82	98.03		
100	-1.4393	-1.4415	33.804	99	27.198	2.10	98.03		
150	-1.0428	-1.0469	34.371	149	27.645	2.42	98.18		
200	-.6156	-.6219	34.580	198	27.797	2.60	98.23		
250	.0433	.0338	34.741	248	27.895	2.72	98.03		
300	.6425	.6294	34.872	297	27.966	2.81	98.23		
345	.6588	.6435	34.905	341	27.992	2.86	96.65		





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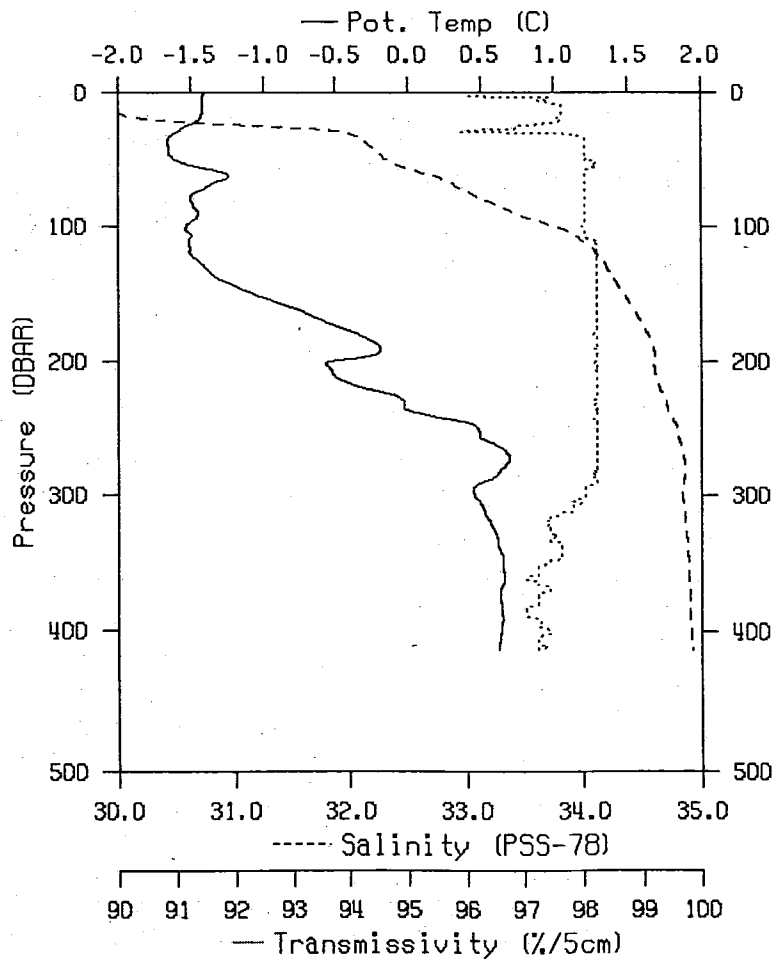
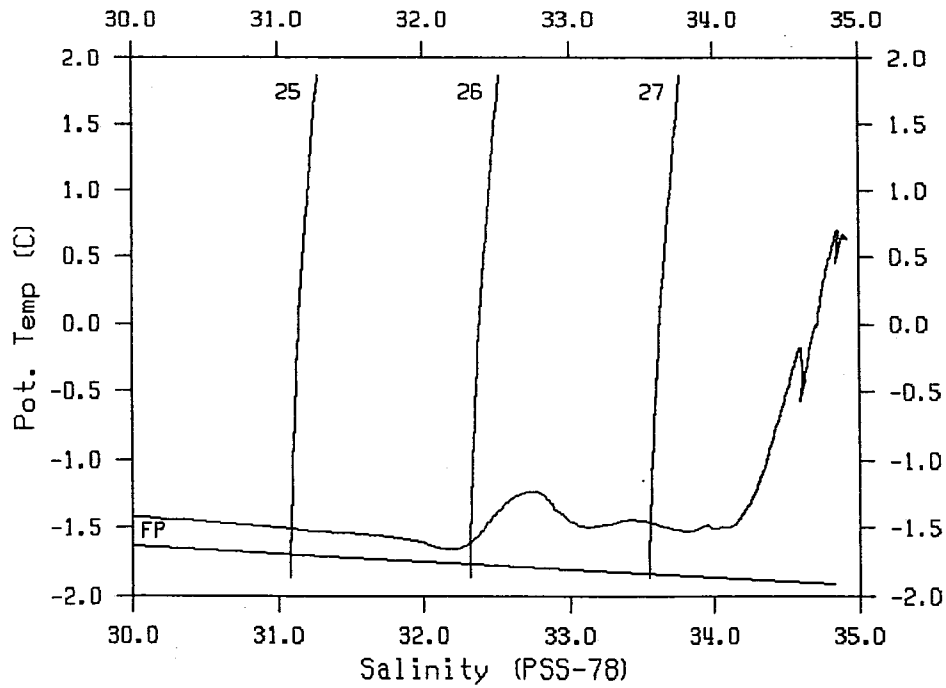
NOGAP 1993
Henry Larsen
STATION : T11
REFERENCE NO.: 93-24-045
DATE/TIME : 12/09/93 21:19 UTC
POSITION : 75-16.0N 174-12.0W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4129	-1.4129	29.914	1	24.041	.00	65.81		
10	-1.4139	-1.4140	29.985	10	24.098	.34	97.64		
20	-1.4361	-1.4364	30.234	20	24.301	.72	97.64		
30	-1.6097	-1.6102	31.993	30	25.732	1.01	96.80		
50	-1.5919	-1.5928	32.341	50	26.015	1.43	98.03		
75	-1.4721	-1.4736	33.038	74	26.578	1.86	98.03		
100	-1.5210	-1.5231	33.764	99	27.169	2.15	97.98		
150	-1.0779	-1.0819	34.343	149	27.624	2.48	98.23		
200	-.5314	-.5379	34.604	198	27.813	2.66	98.23		
250	.4904	.4799	34.799	248	27.917	2.78	98.23		
300	.4706	.4579	34.841	297	27.952	2.86	98.03		
400	.6635	.6456	34.917	396	28.002	2.99	97.44		
414	.6449	.6263	34.923	410	28.007	3.00	97.24		





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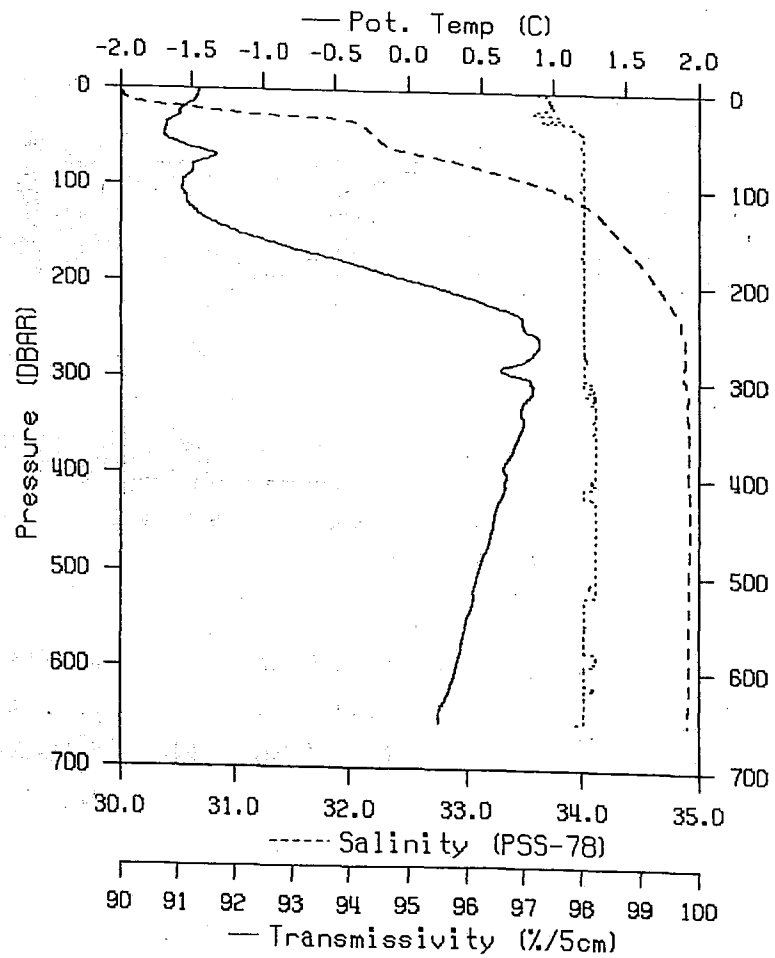
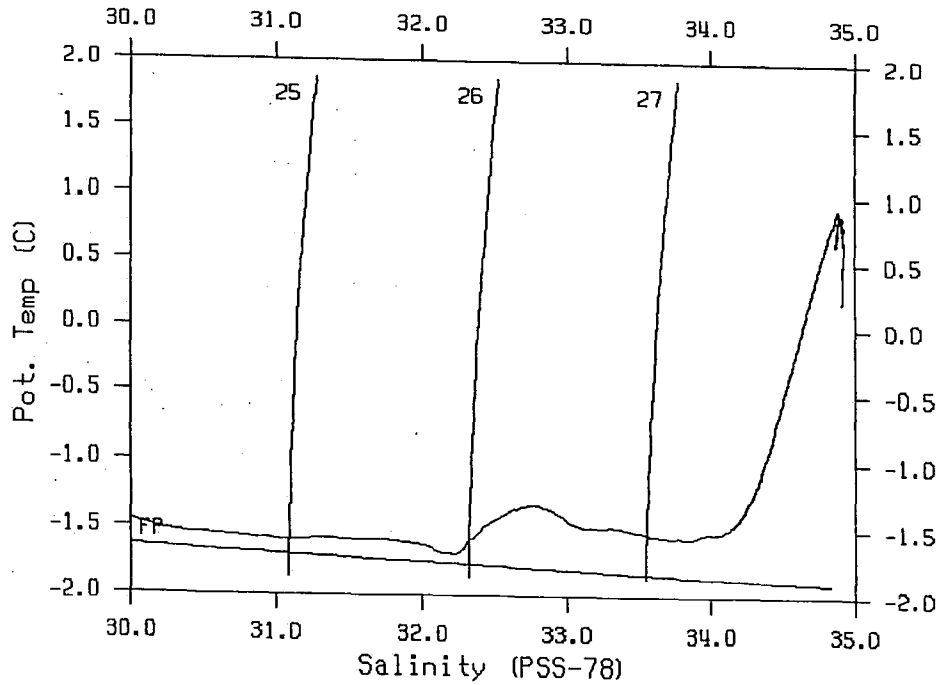
NOGAP 1993
Henry Larsen
STATION : TC
REFERENCE NO.: 93-24-046
DATE/TIME : 12/09/93 22:30 UTC
POSITION : 75-19.5N 174- 1.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4393	-1.4393	29.907	1	24.036	.00	97.24		
10	-1.4616	-1.4617	30.045	10	24.148	.34	97.51		
20	-1.5473	-1.5476	30.589	20	24.591	.70	97.24		
30	-1.6021	-1.6026	31.877	30	25.638	.98	97.31		
50	-1.6873	-1.6881	32.239	50	25.934	1.42	98.03		
75	-1.4132	-1.4147	32.976	74	26.526	1.86	98.03		
100	-1.5605	-1.5626	33.755	99	27.162	2.16	97.97		
150	-1.1433	-1.1472	34.332	149	27.617	2.50	98.03		
200	.1019	.0943	34.654	198	27.822	2.68	98.03		
250	.8615	.8502	34.866	248	27.948	2.79	98.03		
300	.8551	.8414	34.897	297	27.973	2.86	98.13		
400	.6994	.6813	34.919	396	28.001	2.98	98.23		
500	.4991	.4769	34.919	495	28.014	3.08	98.23		
654	.2359	.2074	34.908	647	28.021	3.22	97.84		





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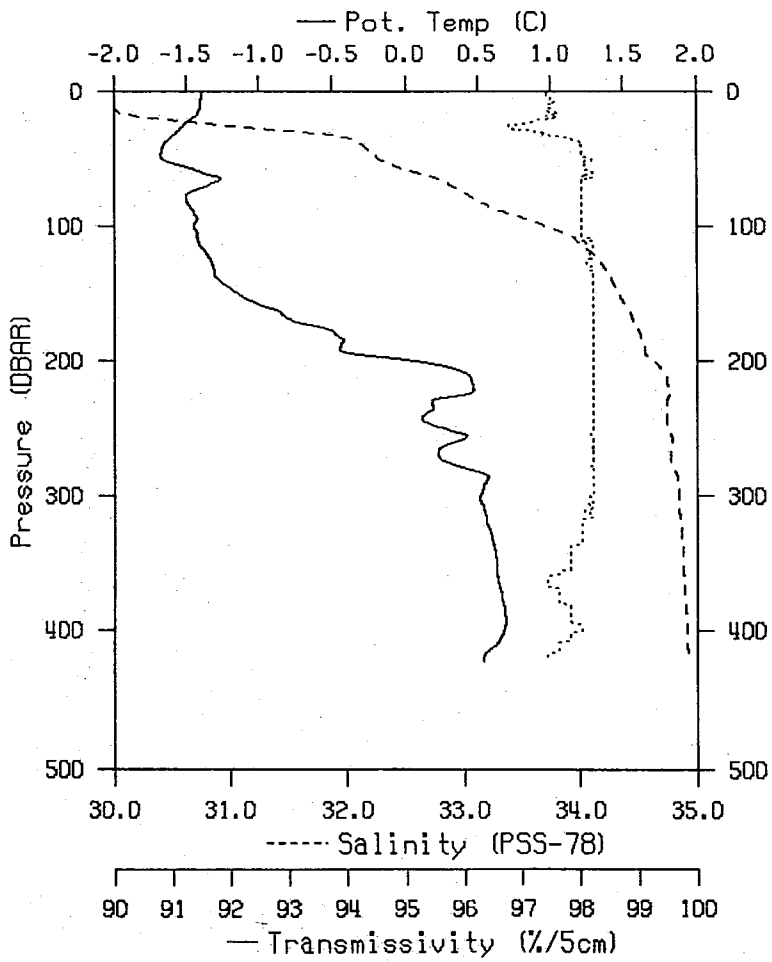
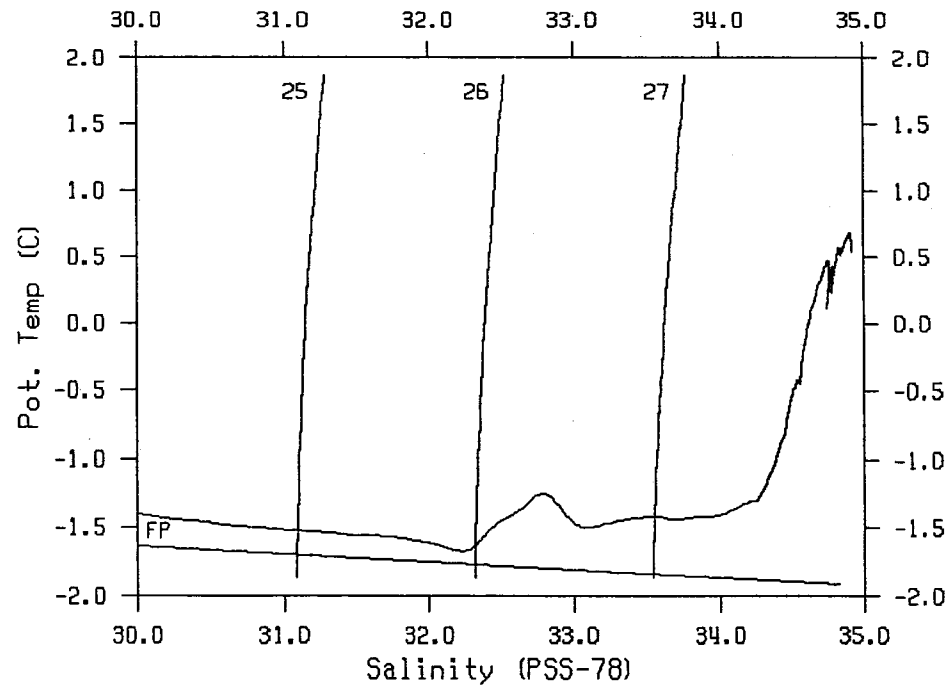
NOGAP 1993
Henry Larsen
STATION : T12
REFERENCE NO.: 93-24-047
DATE/TIME : 12/09/93 23:10 UTC
POSITION : 75-16.0N 173-48.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.3909	-1.3909	29.959	1	24.077	.00	97.44		
10	-1.3994	-1.3995	29.997	10	24.108	.34	97.44		
20	-1.4509	-1.4512	30.363	20	24.406	.71	97.51		
30	-1.5605	-1.5610	31.601	30	25.413	1.01	97.24		
50	-1.6589	-1.6597	32.284	50	25.970	1.47	98.16		
75	-1.4789	-1.4804	33.018	74	26.562	1.90	98.03		
100	-1.4429	-1.4451	33.715	99	27.127	2.20	98.03		
150	-1.1381	-1.1420	34.340	149	27.624	2.54	98.23		
200	.0699	.0624	34.635	198	27.808	2.73	98.23		
250	.2451	.2352	34.761	248	27.900	2.85	98.23		
300	.5324	.5196	34.848	297	27.954	2.93	98.16		
400	.6946	.6766	34.916	396	27.999	3.06	98.03		
423	.5577	.5390	34.922	418	28.012	3.09	97.44		





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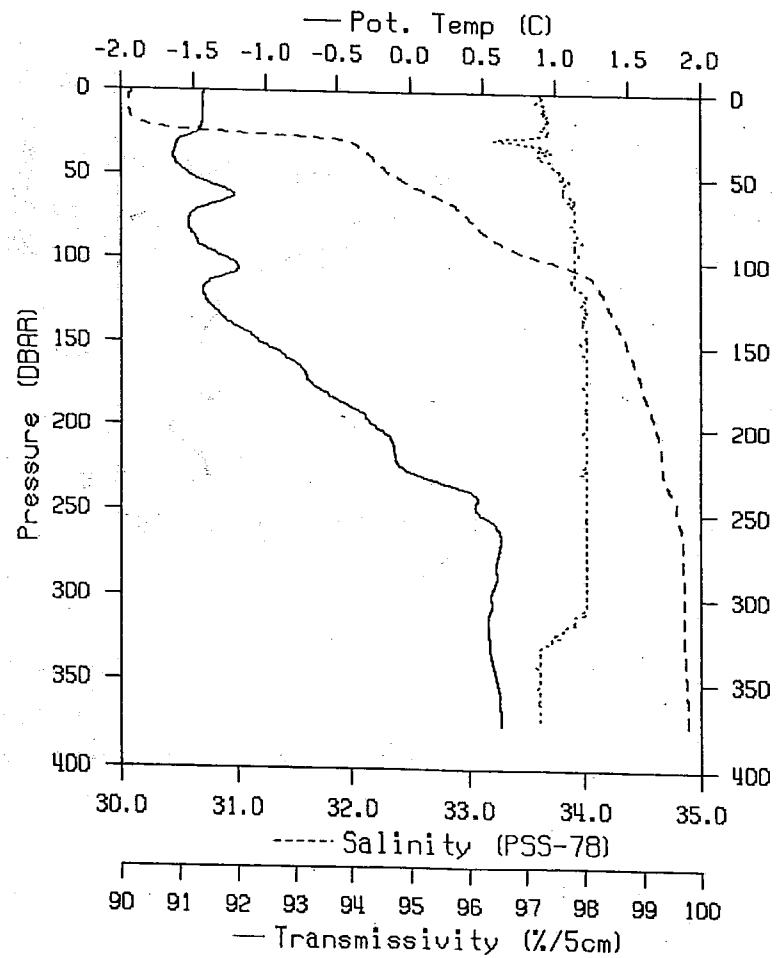
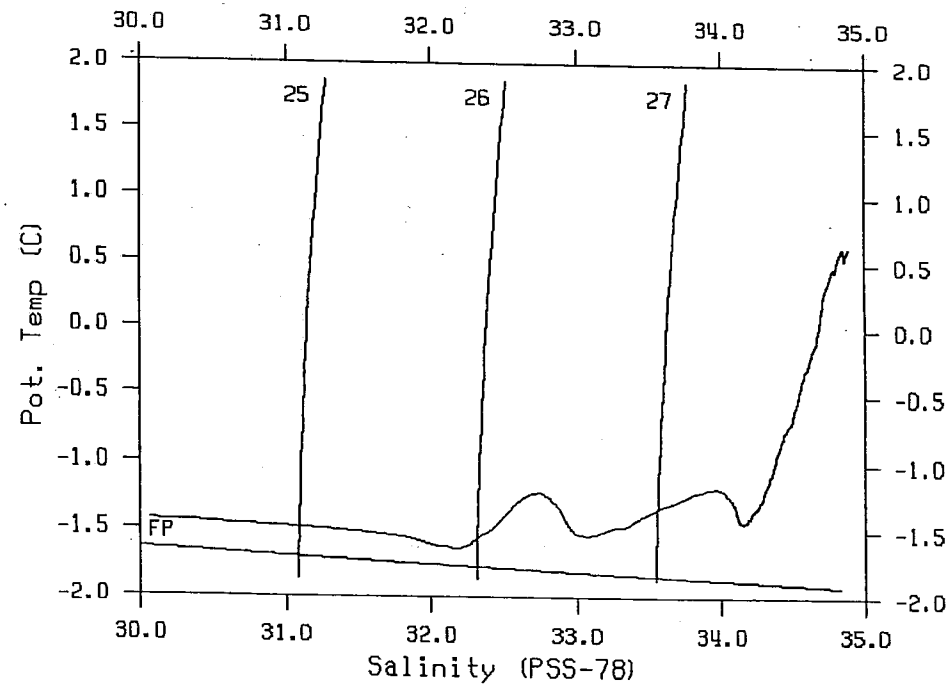
NOGAP 1993
Henry Larsen
STATION : T13
REFERENCE NO.: 93-24-048
DATE/TIME : 13/09/93 00:07 UTC
POSITION : 75-12.1N 173-35.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4305	-1.4305	30.107	1	24.198	.00	97.24		
10	-1.4319	-1.4320	30.074	10	24.171	.34	97.24		
20	-1.4388	-1.4391	30.193	20	24.268	.70	97.29		
30	-1.5918	-1.5923	31.976	30	25.719	1.00	96.91		
50	-1.5294	-1.5303	32.363	50	26.031	1.42	97.64		
75	-1.5219	-1.5234	33.009	74	26.555	1.85	97.84		
100	-1.2653	-1.2676	33.717	99	27.123	2.15	97.84		
150	-1.0296	-1.0337	34.366	149	27.641	2.49	98.03		
200	-.2243	-.2313	34.621	198	27.812	2.67	98.03		
250	.4754	.4650	34.804	248	27.922	2.78	98.03		
300	.5683	.5554	34.859	297	27.961	2.86	98.03		
375	.6454	.6287	34.894	371	27.984	2.96	97.24		





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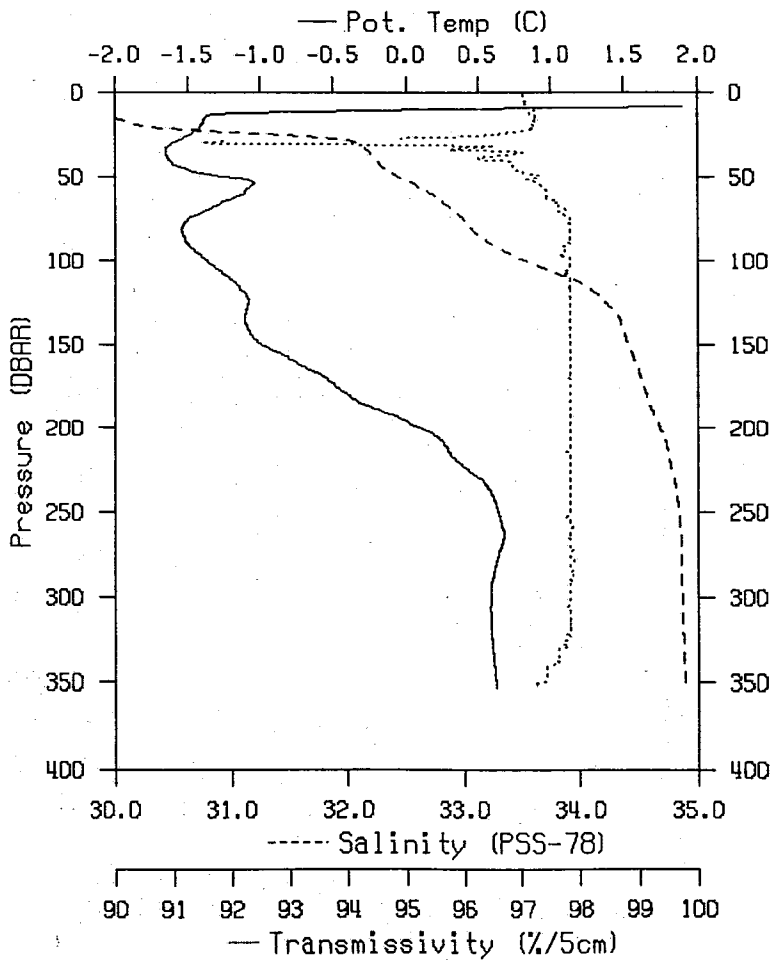
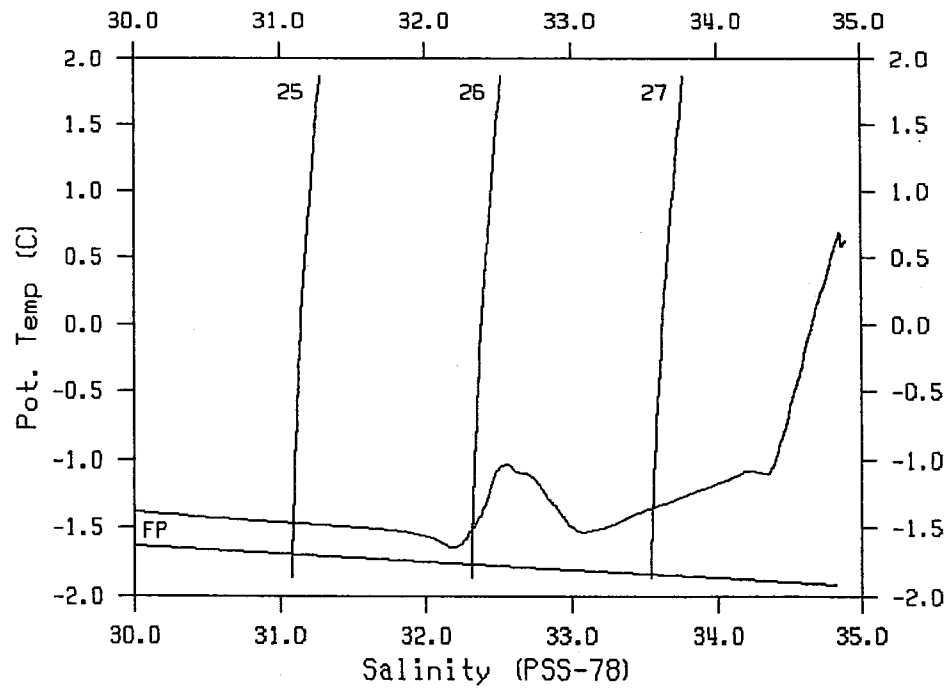
NOGAP 1993
Henry Larsen
STATION : T14
REFERENCE NO.: 93-24-049
DATE/TIME : 13/09/93 01:00 UTC
POSITION : 75- 8.1N 173-25.0W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	3.2823	3.2823	15.279	1	12.166	.00	97.04		
10	.1927	.1925	23.688	10	18.981	1.08	97.17		
20	-1.4058	-1.4061	30.272	20	24.331	1.70	97.24		
30	-1.5981	-1.5986	32.091	30	25.812	1.98	91.51		
50	-1.2612	-1.2622	32.432	50	26.080	2.39	97.34		
75	-1.4837	-1.4852	32.995	74	26.543	2.82	97.84		
100	-1.3648	-1.3670	33.528	99	26.972	3.13	97.84		
150	-.9834	-.9875	34.411	149	27.676	3.50	97.84		
200	.0992	.0916	34.688	198	27.849	3.66	97.84		
250	.6540	.6432	34.843	248	27.942	3.76	97.84		
300	.6054	.5924	34.868	297	27.966	3.84	97.84		
353	.6430	.6274	34.898	349	27.987	3.91	97.24		





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NOGAP 1993

Henry Larsen

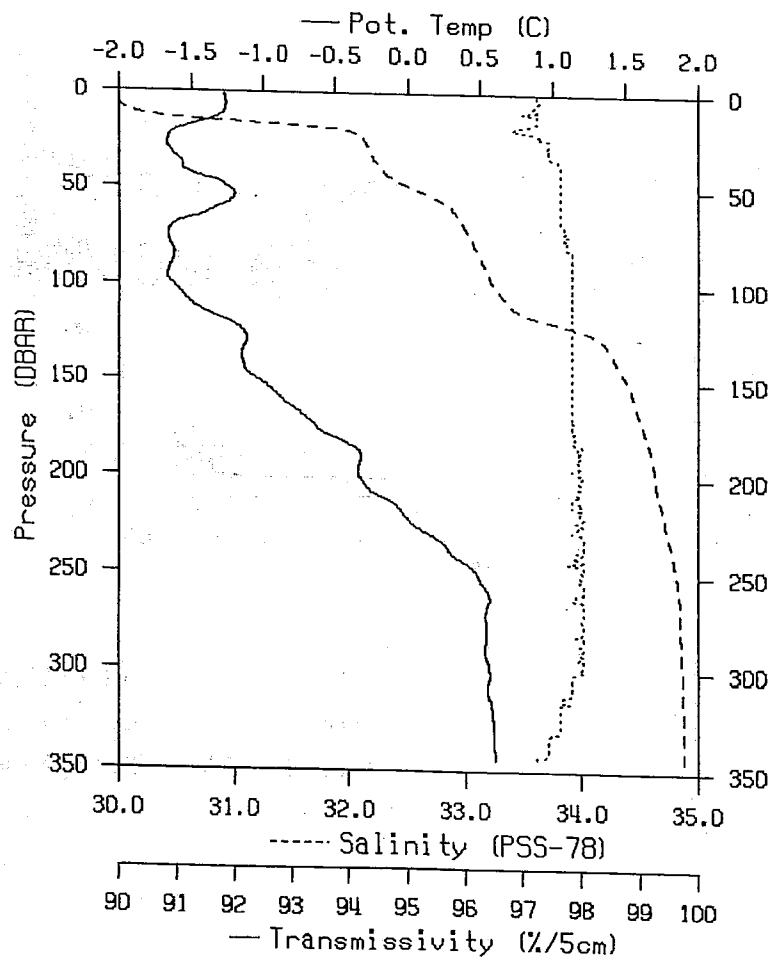
STATION : T15

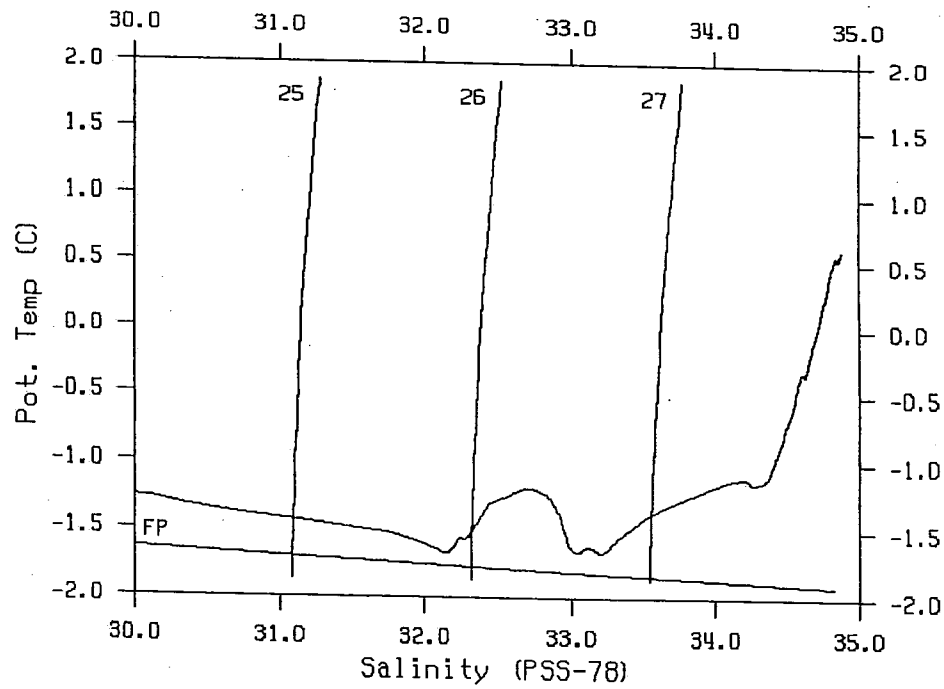
REFERENCE NO.: 93-24-050

DATE/TIME : 13/09/93 01:34 UTC

POSITION : 75- 4.0N 173-12.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.2717	-1.2717	29.986	1	24.097	.00	97.24		
10	-1.2707	-1.2709	30.094	10	24.185	.34	96.98		
20	-1.5966	-1.5969	31.998	20	25.736	.64	96.99		
30	-1.6525	-1.6530	32.177	30	25.883	.86	97.44		
50	-1.2412	-1.2422	32.571	50	26.193	1.25	97.64		
75	-1.6531	-1.6545	33.052	74	26.594	1.65	97.71		
100	-1.6209	-1.6228	33.264	99	26.765	1.99	97.84		
150	-1.0328	-1.0369	34.399	149	27.668	2.41	97.84		
200	-.3280	-.3348	34.633	198	27.827	2.57	97.98		
250	.4982	.4877	34.820	248	27.933	2.68	98.03		
300	.5822	.5692	34.867	297	27.966	2.76	98.03		
345	.6225	.6073	34.886	341	27.979	2.82	97.24		

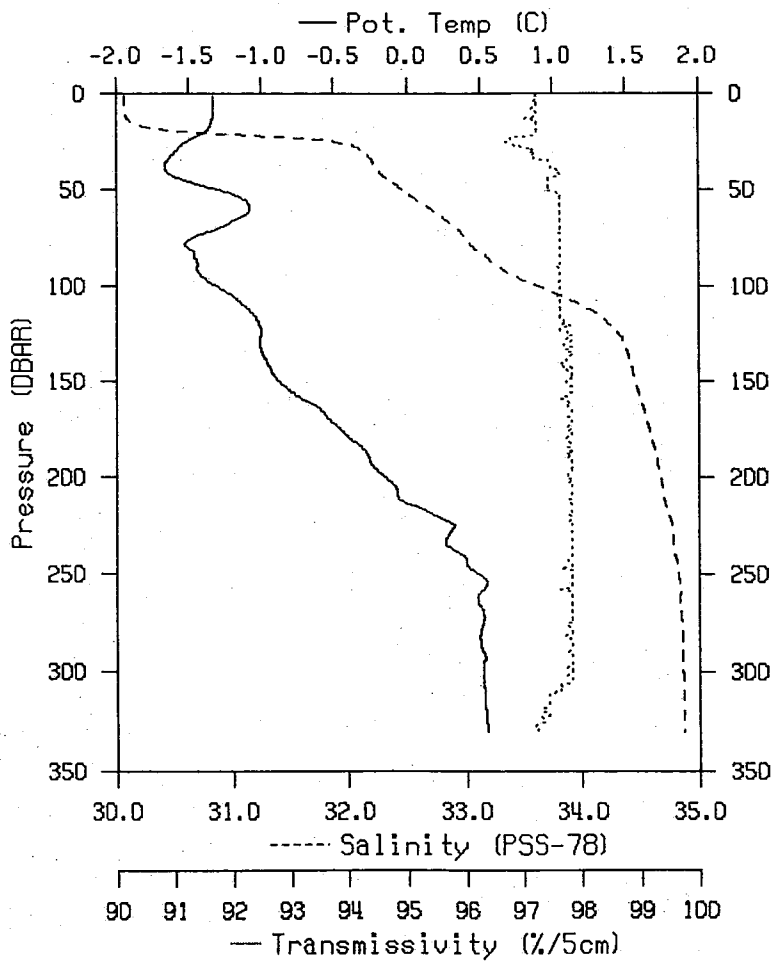


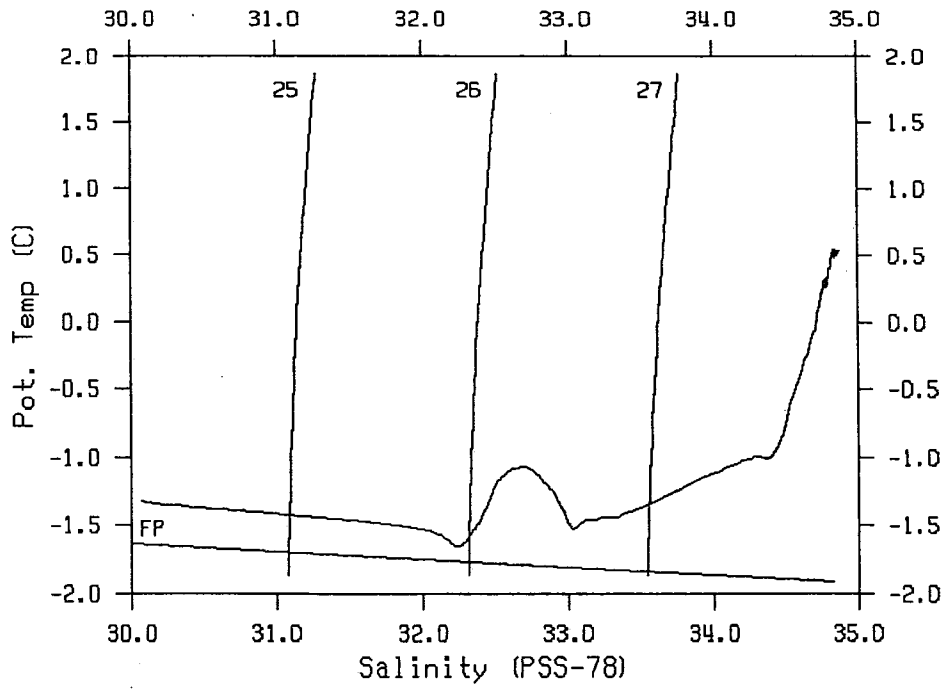


PLOTTED:29/NOV/1994 13:58:24

NOGAP 1993
Henry Larsen
STATION : TA
REFERENCE NO.: 93-24-051
DATE/TIME : 13/09/93 02:30 UTC
POSITION : 75- .0N 173- .5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.3255	-1.3255	30.074	1	24.169	.00	97.24		
10	-1.3274	-1.3275	30.082	10	24.176	.34	97.24		
20	-1.3826	-1.3829	30.600	20	24.597	.69	97.24		
30	-1.5807	-1.5812	32.136	30	25.848	.96	97.09		
50	-1.2933	-1.2943	32.468	50	26.110	1.37	97.39		
75	-1.4679	-1.4694	32.997	74	26.545	1.79	97.64		
100	-1.3090	-1.3113	33.628	99	27.052	2.09	97.64		
150	-.8744	-.8787	34.461	149	27.712	2.43	97.74		
200	-.1419	-.1491	34.675	198	27.852	2.59	97.84		
250	.4898	.4793	34.824	248	27.937	2.69	97.84		
300	.5321	.5193	34.867	297	27.969	2.76	97.84		
330	.5580	.5437	34.877	327	27.976	2.80	97.24		





PLOTTED:22/NOV/1994 15:56:07

NOGAP 1993

Henry Larsen

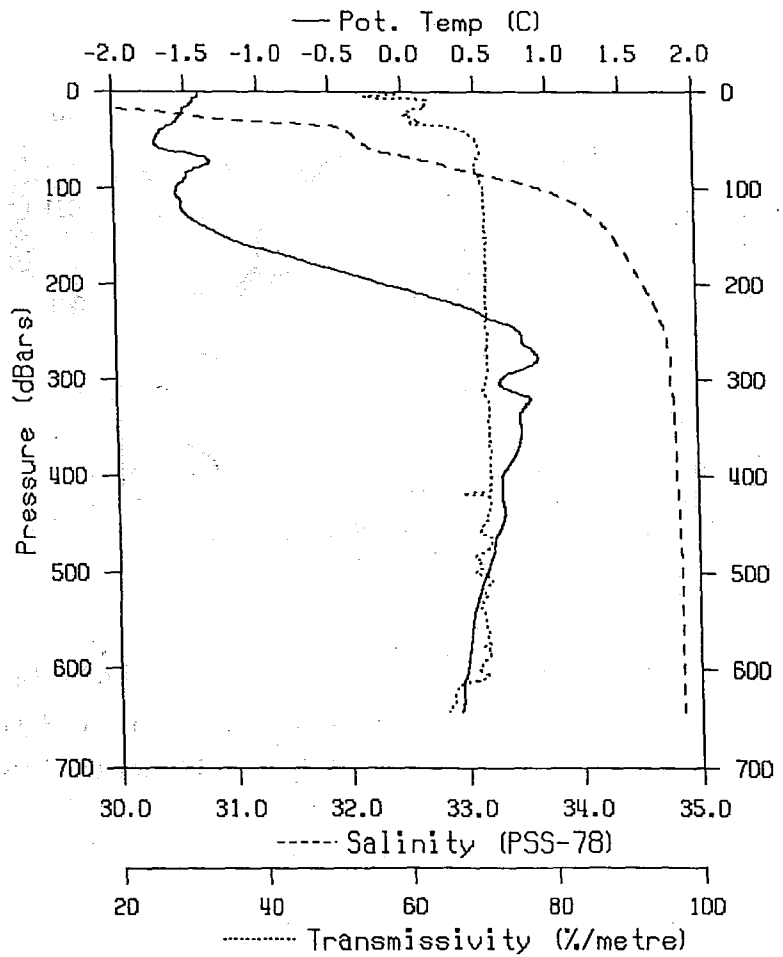
STATION : TC

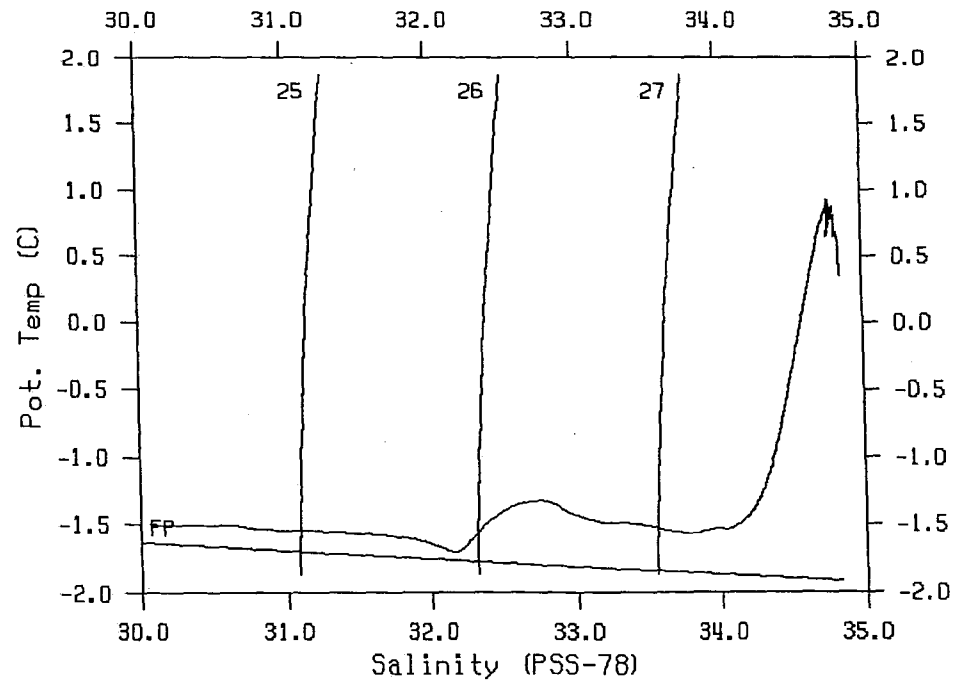
REFERENCE NO.: 93-24-052

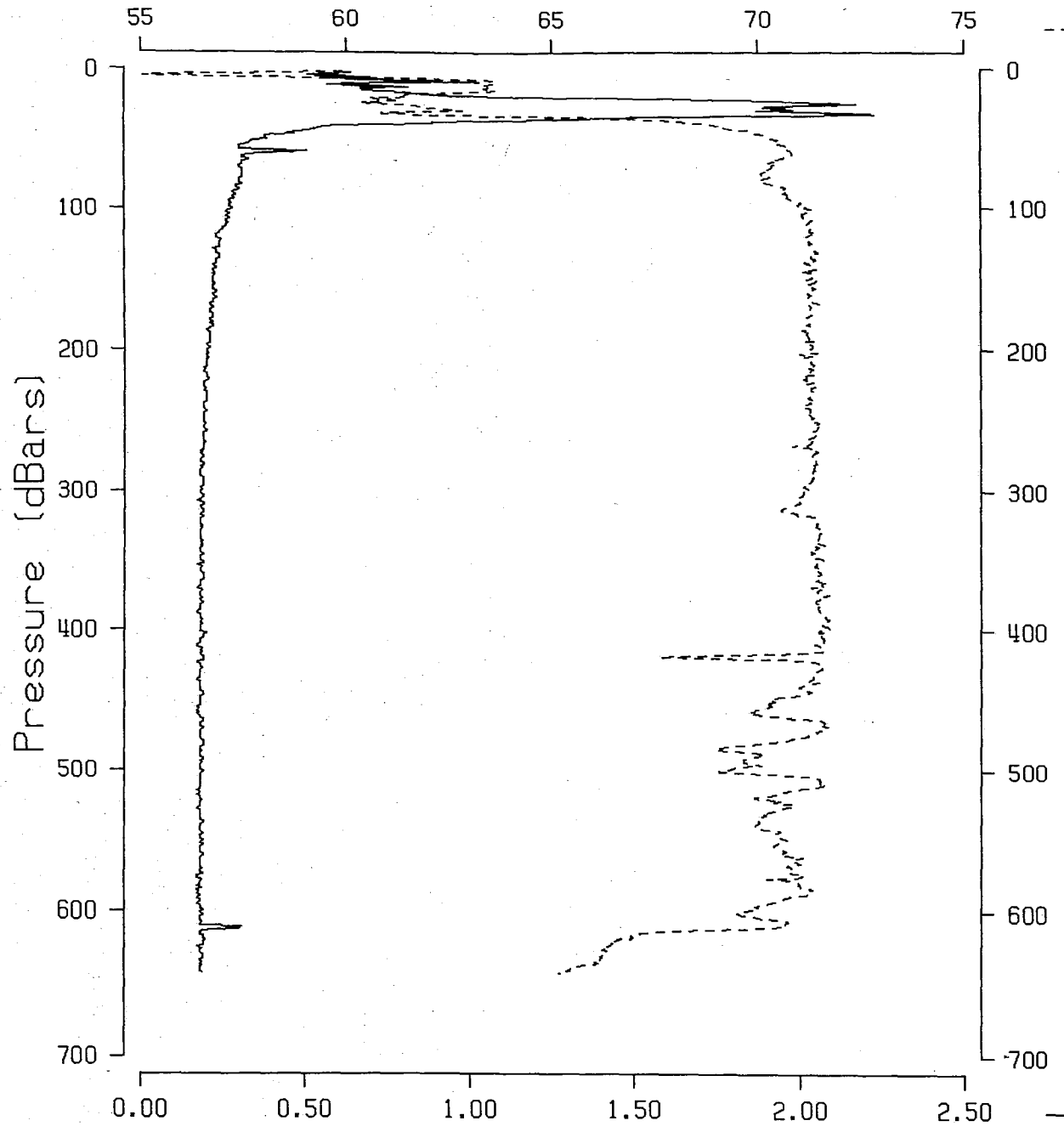
DATE/TIME : 13/09/93 15:21 UTC

POSITION : 75-19.4N 174- .1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.400	-1.400	29.752	2	23.909	.00	59.5	.59	
10	-1.438	-1.438	29.786	10	23.938	.32	63.6	.74	
20	-1.507	-1.507	30.349	20	24.396	.69	61.5	1.11	
30	-1.551	-1.552	31.162	30	25.056	1.01	62.8	1.87	
50	-1.698	-1.699	32.142	50	25.855	1.51	70.3	.38	
75	-1.347	-1.349	32.846	74	26.419	1.98	70.1	.31	
100	-1.554	-1.556	33.681	99	27.102	2.30	71.1	.28	
150	-1.231	-1.235	34.308	149	27.601	2.65	71.2	.22	
200	-.128	-.135	34.552	198	27.751	2.85	71.3	.20	
250	.804	.793	34.741	248	27.851	3.00	71.3	.19	
300	.676	.663	34.768	297	27.881	3.12	71.1	.18	
400	.678	.660	34.820	396	27.923	3.31	71.5	.18	
500	.565	.543	34.845	495	27.951	3.48	69.1	.18	
643	.384	.355	34.855	636	27.969	3.69	65.2	.19	







CAST INFO

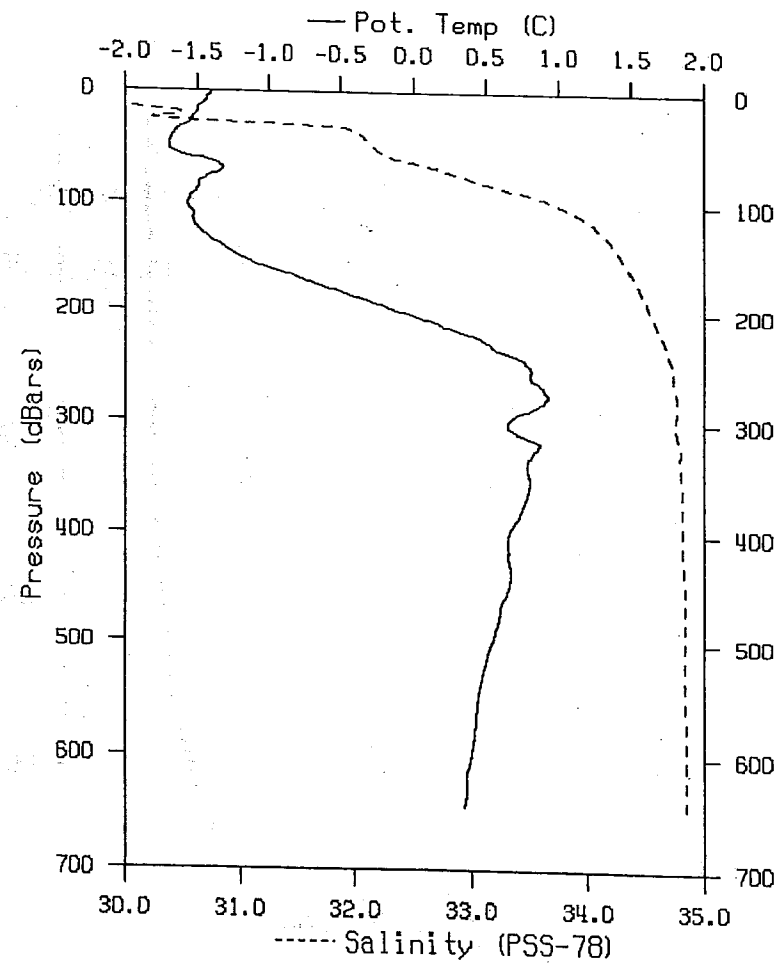
FILE : 93240052.low
CRUISE : 93-24
STATION : TC
CAST : 52
LATITUDE : 75 19.405 N
LONGITUDE: 174 .065 W
DATE : 1993/09/13
TIME : 15:21 UTC
NREC : 642

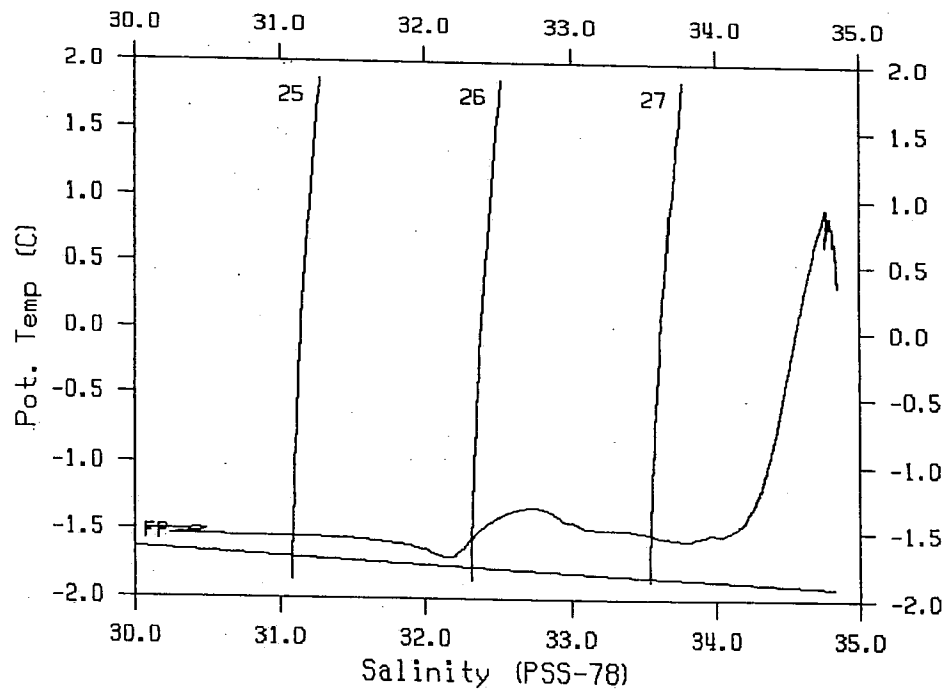
PLOTTED:22/NOV/1994 16:20:57

PLOTTED:29/NOV/1994 12:22:35

NOGAP 1993
Henry Larsen
STATION : TC
REFERENCE NO.: 93-24-053
DATE/TIME : 13/09/93 15:21 UTC
POSITION : 75-19.4N 174- .1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.4016	-1.4016	29.742	0	23.901	.00			
10	-1.4429	-1.4430	29.821	10	23.966	.40			
20	-1.4953	-1.4956	30.479	20	24.501	.76			
30	-1.5607	-1.5612	31.450	30	25.290	1.07			
50	-1.6961	-1.6969	32.162	50	25.871	1.55			
75	-1.3939	-1.3954	32.912	74	26.473	2.00			
100	-1.5595	-1.5616	33.735	99	27.146	2.31			
150	-1.1876	-1.1915	34.311	149	27.602	2.65			
200	-.0621	-.0694	34.550	198	27.746	2.86			
250	.8190	.8079	34.737	248	27.847	3.00			
300	.6704	.6573	34.763	297	27.877	3.12			
400	.6774	.6595	34.816	396	27.920	3.33			
500	.5650	.5426	34.841	495	27.947	3.50			
644	.3809	.3522	34.851	637	27.966	3.71			

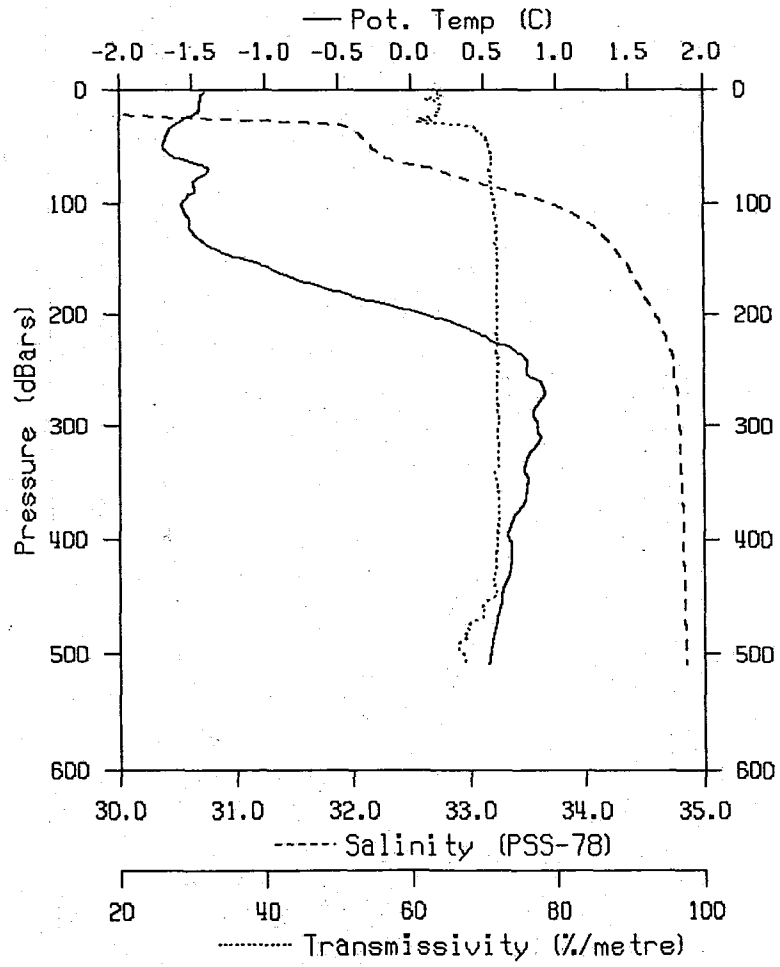


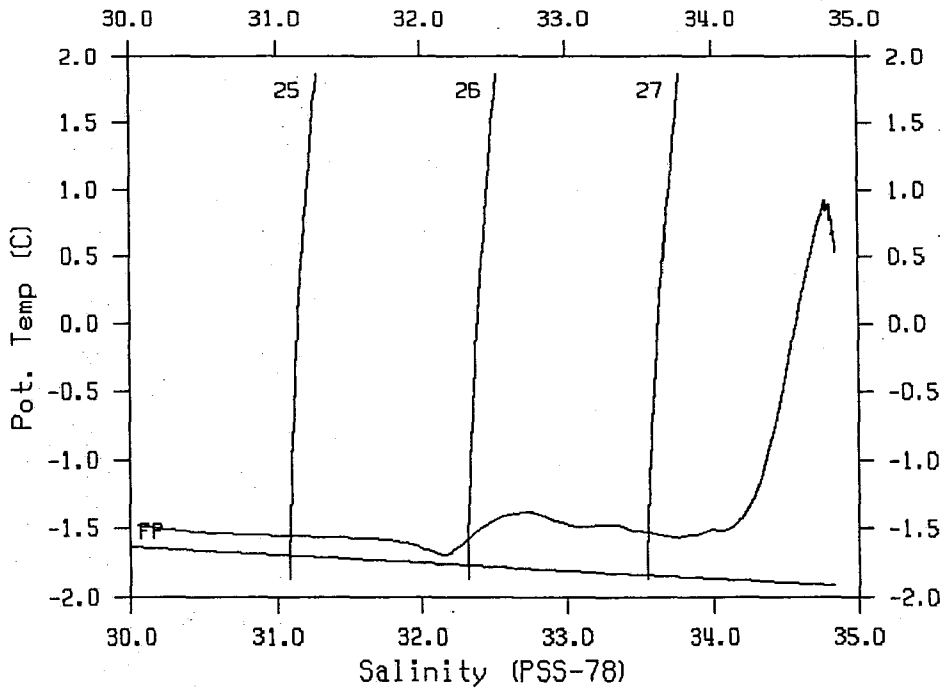


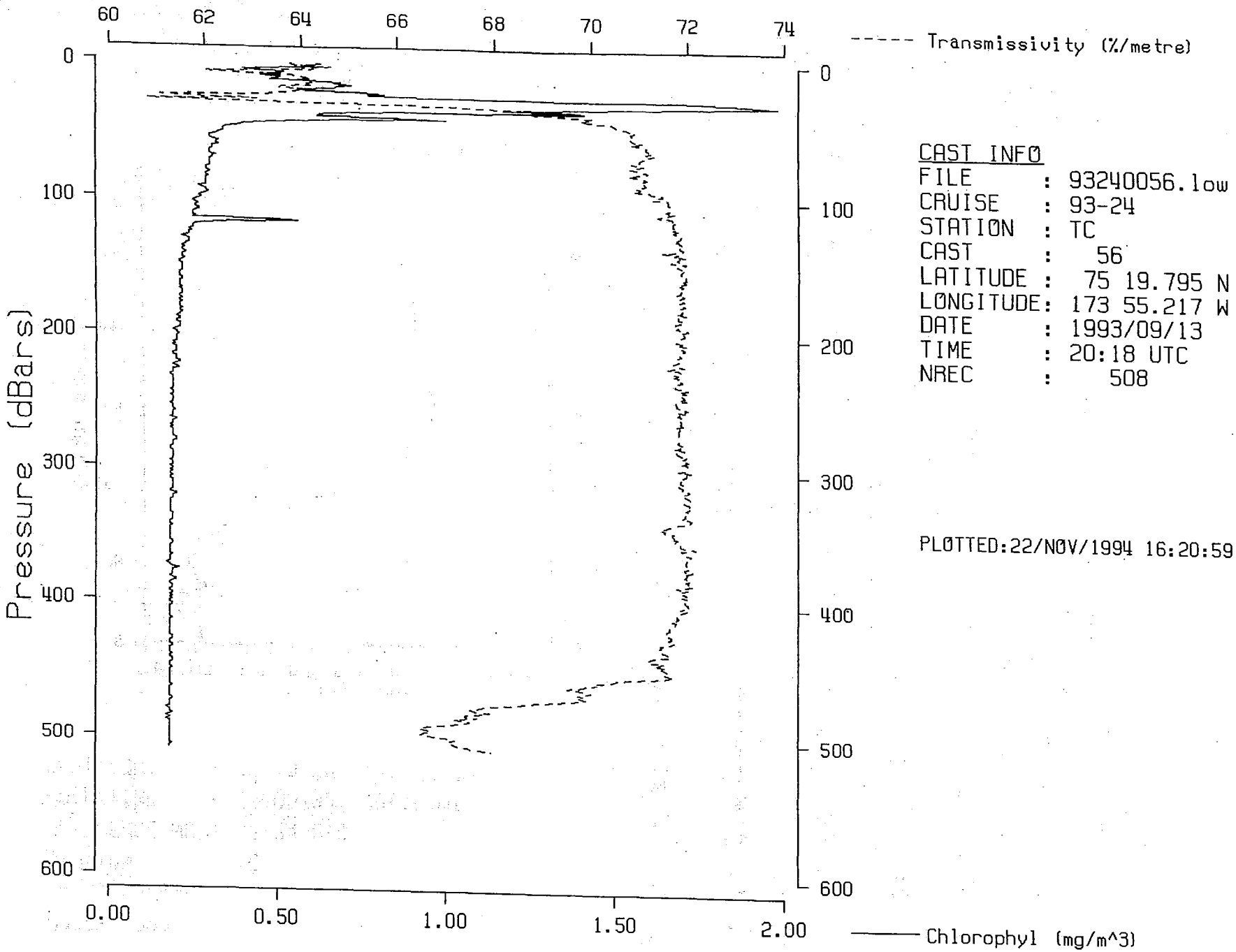
PLOTTED:22/NOV/1994 15:56:23

NOGAP 1993
Henry Larsen
STATION : TC
REFERENCE NO.: 93-24-056
DATE/TIME : 13/09/93 20:18 UTC
POSITION : 75-19.8N 173-55.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.403	-1.403	29.758	2	23.914	.00	63.8	.63	
10	-1.439	-1.439	29.756	10	23.913	.32	63.8	.45	
20	-1.457	-1.457	29.905	20	24.035	.71	64.1	.56	
30	-1.589	-1.589	31.781	30	25.560	1.02	65.1	1.87	
50	-1.692	-1.692	32.165	50	25.873	1.48	70.9	.34	
75	-1.411	-1.413	32.841	74	26.416	1.94	70.8	.30	
100	-1.559	-1.561	33.688	99	27.108	2.26	71.6	.28	
150	-1.156	-1.160	34.325	149	27.612	2.61	71.9	.22	
200	.097	.089	34.594	198	27.774	2.80	71.8	.20	
250	.804	.793	34.745	248	27.854	2.94	71.9	.19	
300	.882	.868	34.797	297	27.891	3.06	72.0	.18	
400	.691	.673	34.823	396	27.925	3.25	71.8	.19	
500	.567	.545	34.846	495	27.951	3.42	67.1	.18	
509	.556	.533	34.847	503	27.952	3.43	68.0	.18	



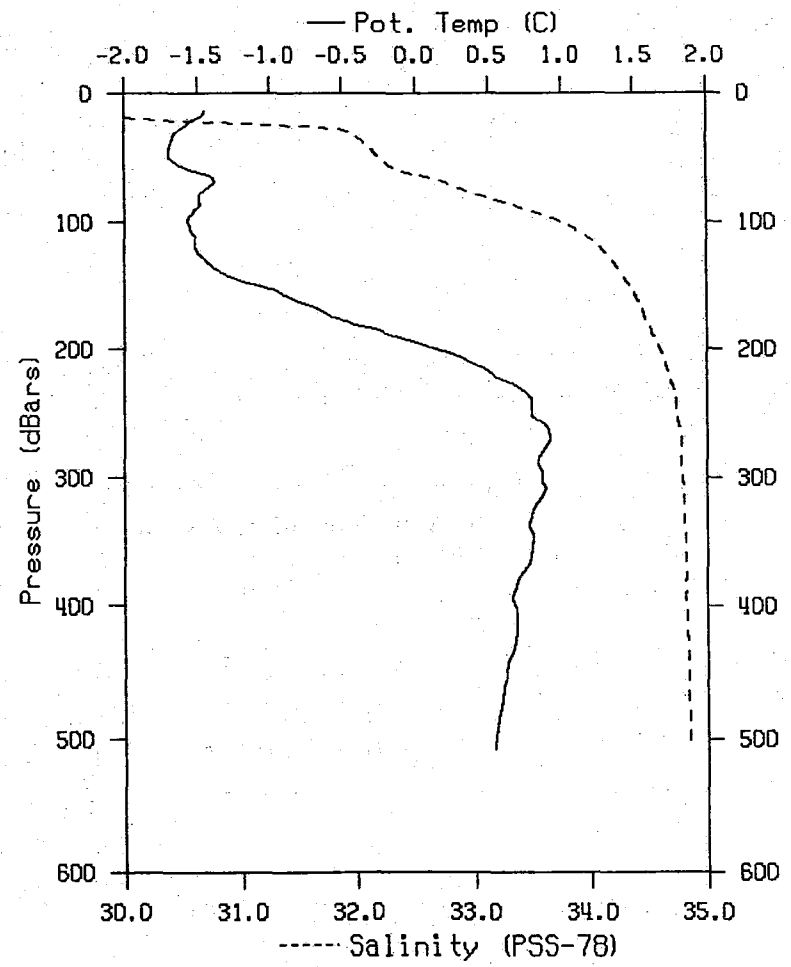


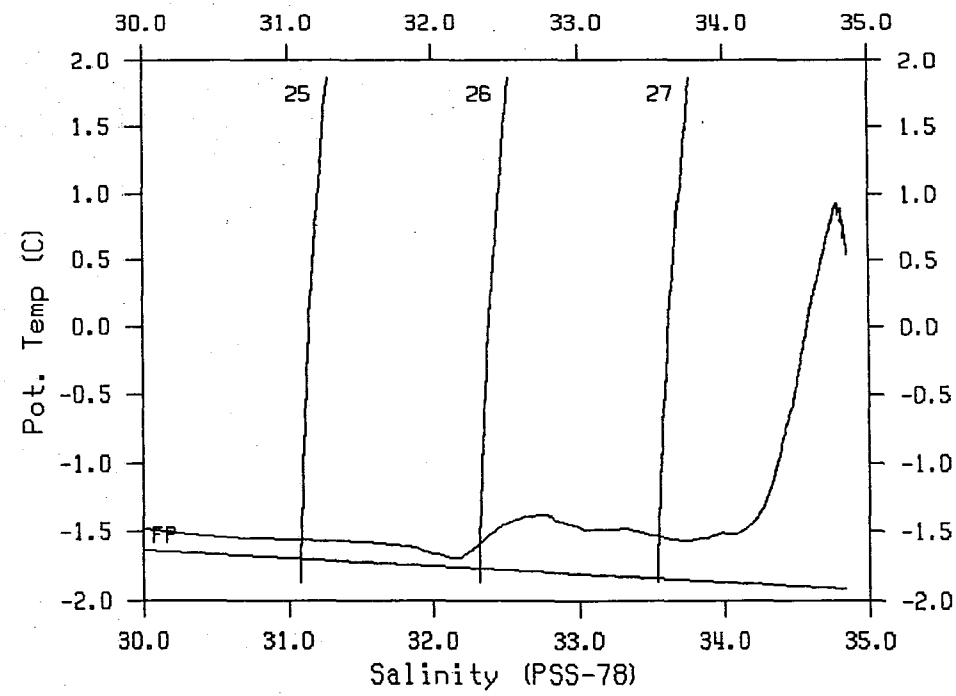

60
62
64
66
68
70
72
74
----- Transmissivity (%/metre)
0
100
200
300
400
500
600
Pressure (dBars)
0.00
0.50
1.00
1.50
2.00
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240056.low
CRUISE : 93-24
STATION : TC
CAST : 56
LATITUDE : 75 19.795 N
LONGITUDE: 173 55.217 W
DATE : 1993/09/13
TIME : 20:18 UTC
NREC : 508
PLOTTED:22/NOV/1994 16:20:59

PLOTTED:29/NOV/1994 12:23:00

NOGAP 1993
Henry Larsen
STATION : TC
REFERENCE NO.: 93-24-057
DATE/TIME : 13/09/93 20:18 UTC
POSITION : 75-19.8N 173-55.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
20	-1.5024	-1.5027	30.160	20	24.242	.00			
30	-1.6309	-1.6314	31.924	30	25.676	.30			
50	-1.6919	-1.6927	32.192	50	25.895	.74			
75	-1.4417	-1.4432	32.911	74	26.474	1.19			
100	-1.5640	-1.5661	33.746	99	27.156	1.50			
150	-1.0804	-1.0844	34.347	149	27.627	1.83			
200	.1452	.1376	34.596	198	27.772	2.02			
250	.8063	.7952	34.745	247	27.854	2.16			
300	.8828	.8691	34.796	297	27.890	2.28			
400	.6955	.6775	34.823	396	27.924	2.47			
500	.5675	.5451	34.846	494	27.951	2.64			
508	.5582	.5354	34.847	502	27.952	2.65			

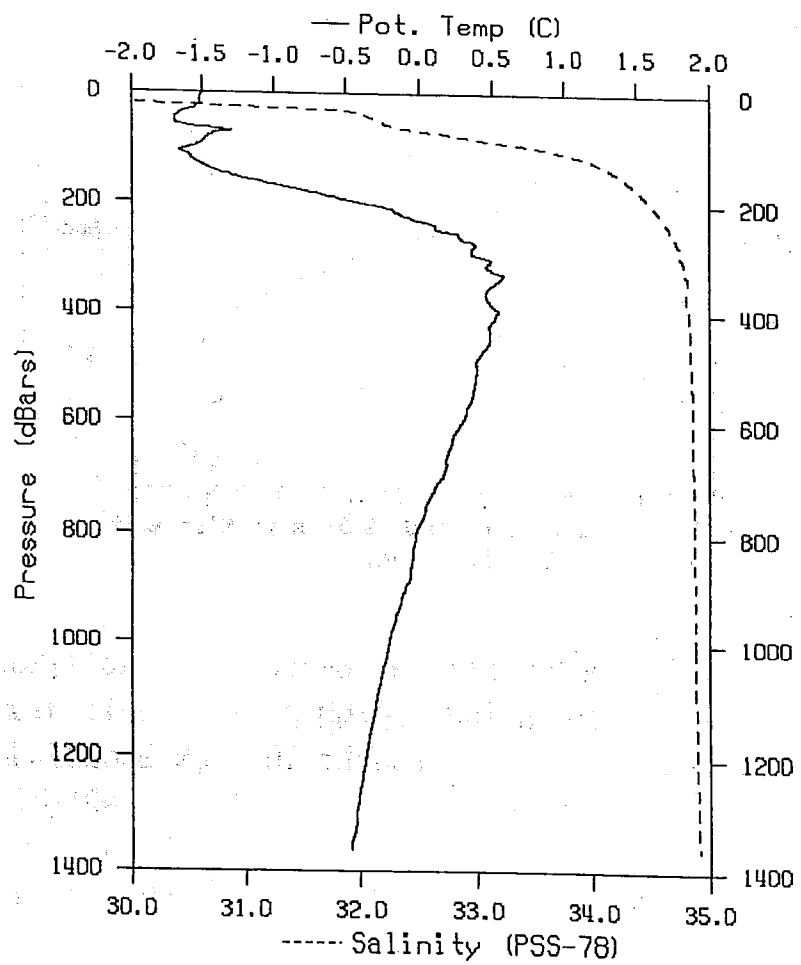


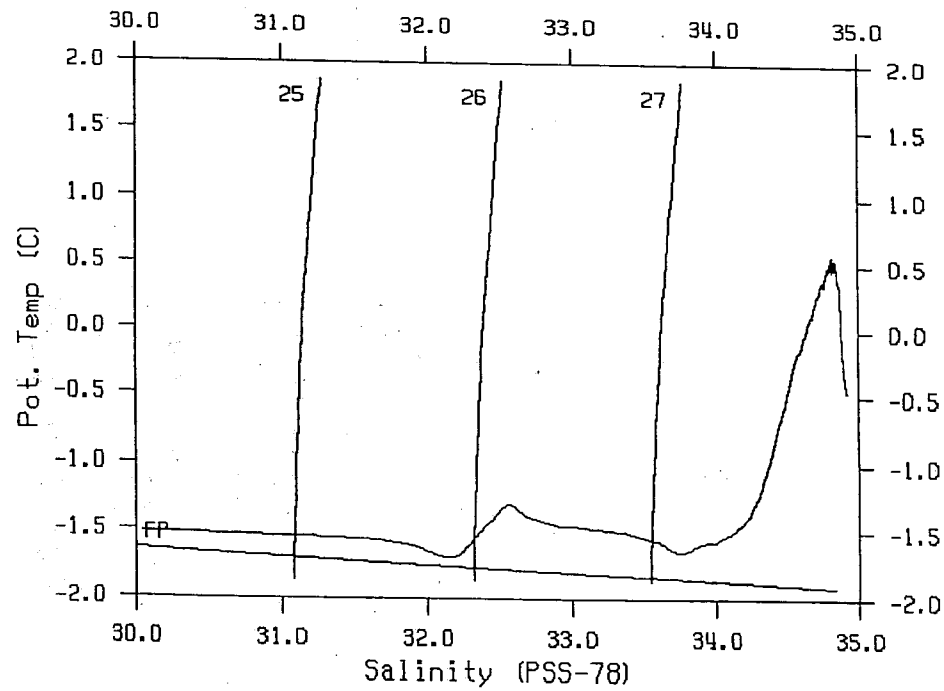


PLOTTED:29/NOV/1994 12:23:24

NOGAP 1993
Henry Larsen
STATION : TC2
REFERENCE NO.: 93-24-060
DATE/TIME : 14/09/93 01:06 UTC
POSITION : 75-30.3N 174- 1.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.4888	-1.4888	29.820	0	23.966	.00			
10	-1.5150	-1.5151	29.859	10	23.998	.39			
20	-1.5192	-1.5195	30.043	20	24.147	.77			
30	-1.5673	-1.5678	31.671	30	25.470	1.09			
50	-1.6942	-1.6950	32.149	50	25.861	1.55			
75	-1.4033	-1.4048	32.735	74	26.329	2.03			
100	-1.5605	-1.5626	33.573	99	27.014	2.36			
150	-1.3156	-1.3193	34.257	149	27.563	2.75			
200	-.3955	-.4022	34.513	198	27.733	2.96			
250	.2014	.1916	34.683	248	27.840	3.11			
300	.5039	.4912	34.779	297	27.900	3.22			
400	.5534	.5359	34.831	396	27.940	3.41			
500	.4157	.3939	34.846	495	27.960	3.56			
750	.0769	.0447	34.867	741	27.997	3.87			
1000	-.1575	-.2008	34.885	988	28.024	4.10			
1250	-.3427	-.3978	34.901	1234	28.046	4.25			
1361	-.4042	-.4648	34.913	1343	28.060	4.29			

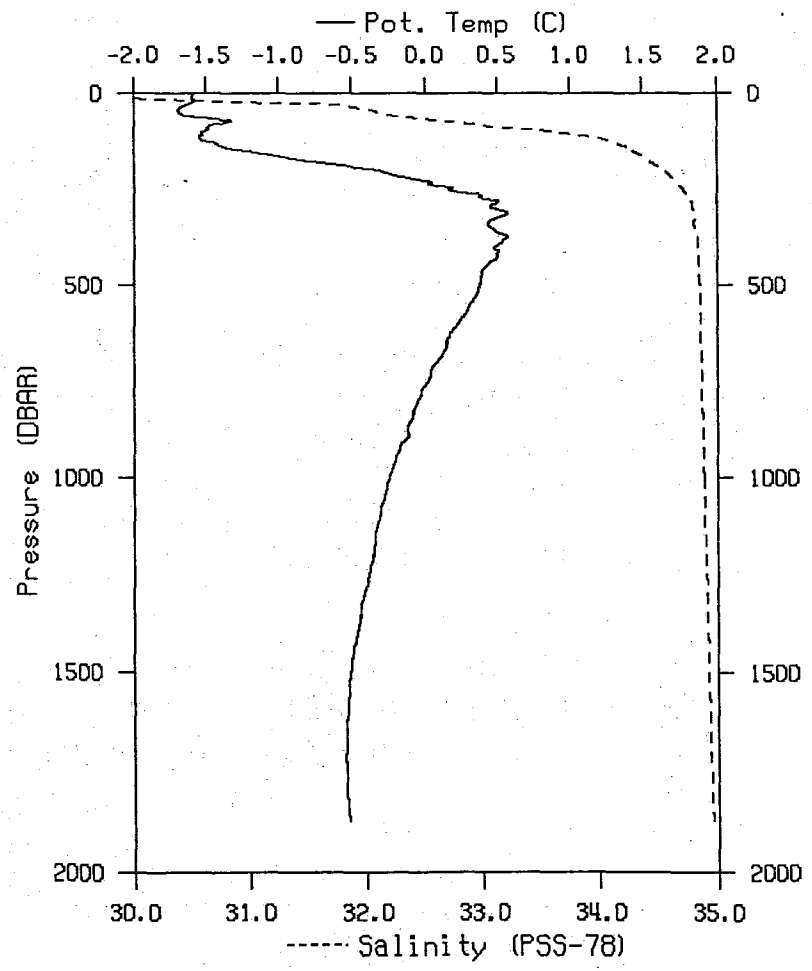


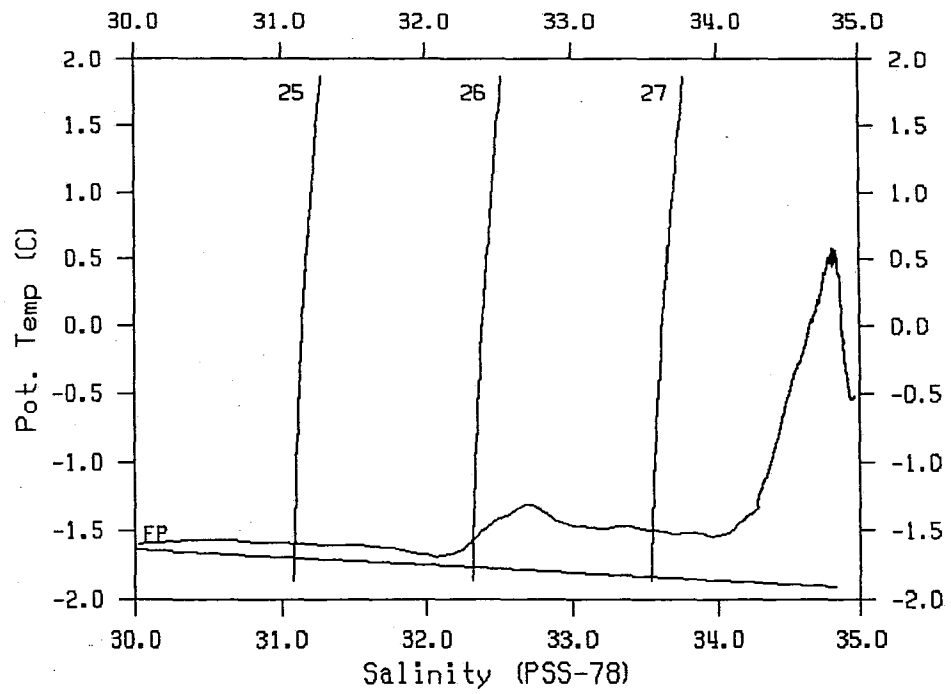


PLOTTED:29/NOV/1994 12:23:51

NOGAP 1993
Henry Larsen
STATION : TC3
REFERENCE NO.: 93-24-063
DATE/TIME : 14/09/93 04:10 UTC
POSITION : 75-45.1N 173-59.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.5888	-1.5888	28.993	0	23.297	.00			
10	-1.5961	-1.5962	29.932	10	24.058	.42			
20	-1.5666	-1.5669	30.583	20	24.587	.78			
30	-1.6286	-1.6291	31.762	30	25.545	1.07			
50	-1.6820	-1.6828	32.120	50	25.837	1.52			
75	-1.3440	-1.3456	32.779	74	26.364	2.00			
100	-1.5044	-1.5065	33.607	99	27.041	2.33			
150	-1.2147	-1.2185	34.300	149	27.594	2.70			
200	-.3161	-.3229	34.553	198	27.761	2.90			
250	.1728	.1630	34.715	248	27.867	3.04			
300	.5165	.5037	34.801	297	27.917	3.14			
400	.4972	.4799	34.836	396	27.947	3.31			
500	.4036	.3819	34.856	495	27.969	3.46			
750	.0568	.0247	34.873	741	28.002	3.75			
1000	-.1986	-.2416	34.890	988	28.030	3.96			
1250	-.3283	-.3835	34.910	1234	28.053	4.09			
1500	-.4397	-.5080	34.928	1479	28.074	4.16			
1750	-.4570	-.5403	34.946	1725	28.090	4.18			
1871	-.4253	-.5169	34.958	1844	28.099	4.17			

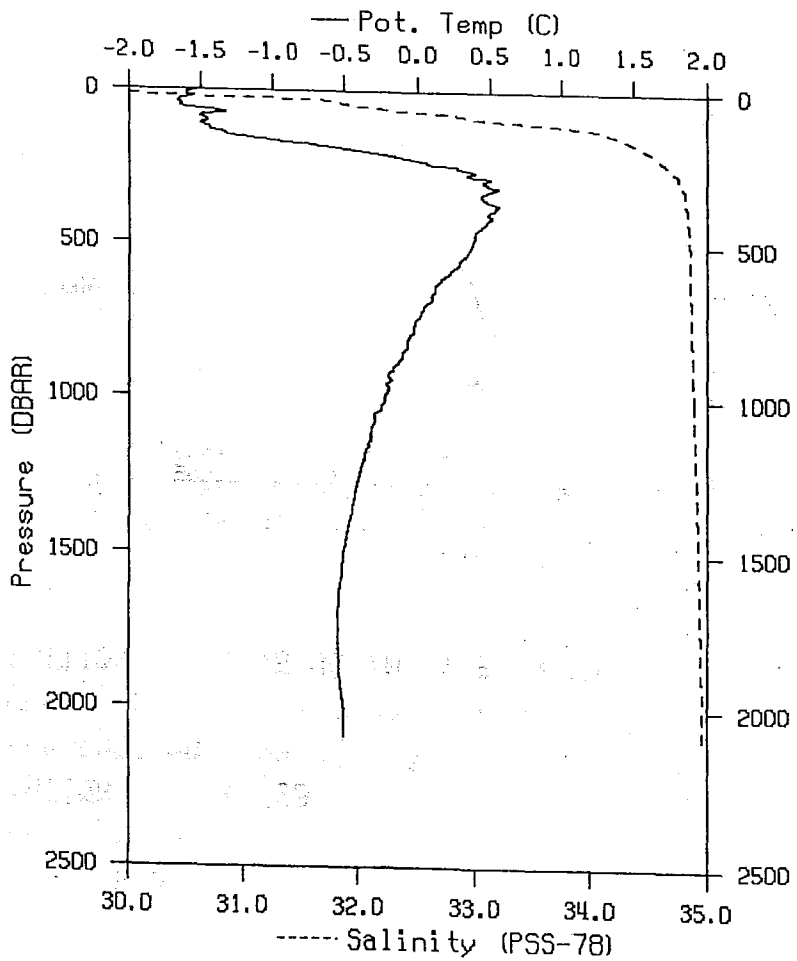


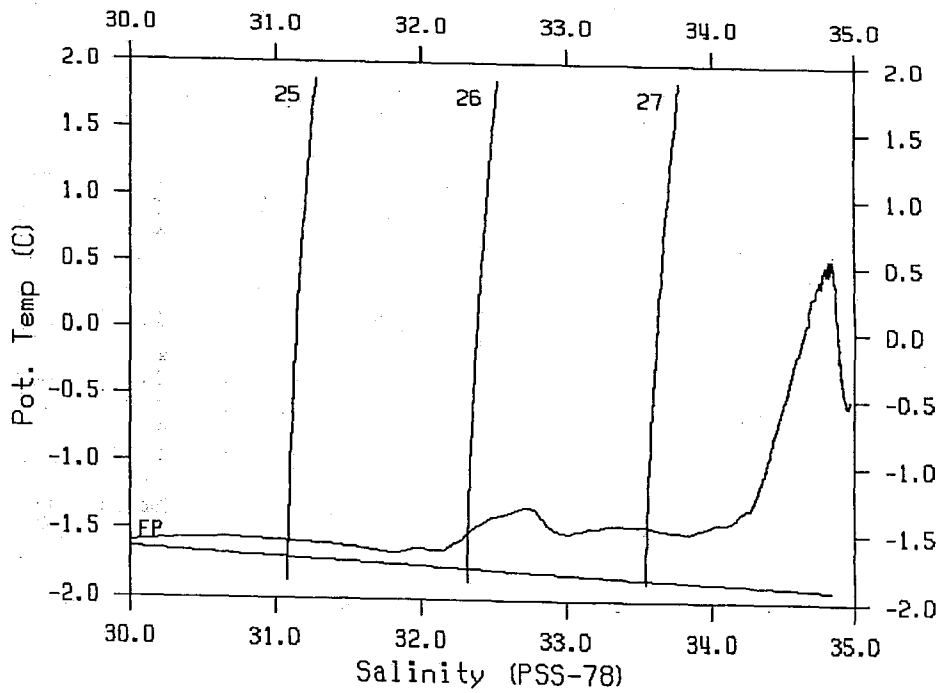


PLOTTED:29/NOV/1994 12:24:19

NOGAP 1993
Henry Larsen
STATION : TC4
REFERENCE NO.: 93-24-064
DATE/TIME : 14/09/93 04:10 UTC
POSITION : 75-54.8N 174- 2.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.5542	-1.5542	29.595	0	23.785	.00			
10	-1.5927	-1.5928	29.987	10	24.103	.40			
20	-1.5778	-1.5781	30.239	20	24.307	.77			
30	-1.6306	-1.6311	31.660	30	25.462	1.07			
50	-1.6357	-1.6365	32.066	50	25.792	1.54			
75	-1.3684	-1.3700	32.812	74	26.391	2.02			
100	-1.4526	-1.4548	33.526	99	26.973	2.35			
150	-1.2102	-1.2140	34.310	149	27.602	2.74			
200	-.2815	-.2884	34.556	198	27.763	2.94			
250	.2888	.2788	34.717	248	27.863	3.07			
300	.4993	.4865	34.798	297	27.915	3.18			
400	.5071	.4897	34.837	396	27.947	3.35			
500	.3938	.3721	34.857	495	27.970	3.49			
750	.0190	-.0129	34.870	741	28.002	3.79			
1000	-.1800	-.2231	34.895	988	28.033	3.99			
1250	-.3419	-.3970	34.913	1234	28.057	4.12			
1500	-.4406	-.5088	34.930	1479	28.075	4.18			
1750	-.4603	-.5435	34.944	1725	28.088	4.20			
2000	-.4062	-.5066	34.963	1970	28.102	4.18			
2093	-.3933	-.5002	34.964	2061	28.102	4.17			

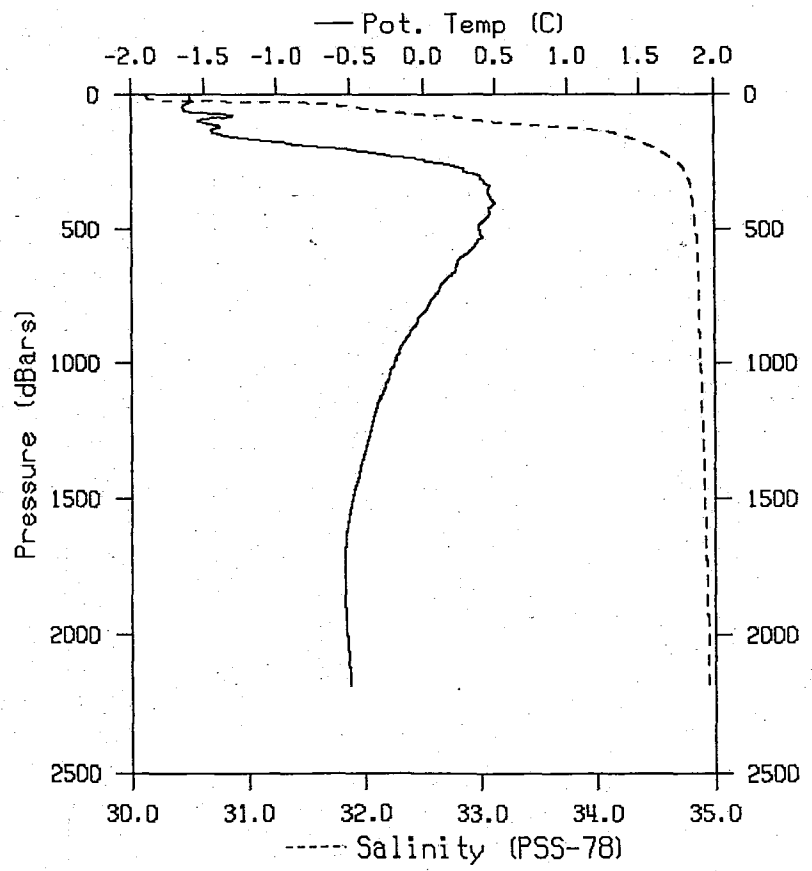


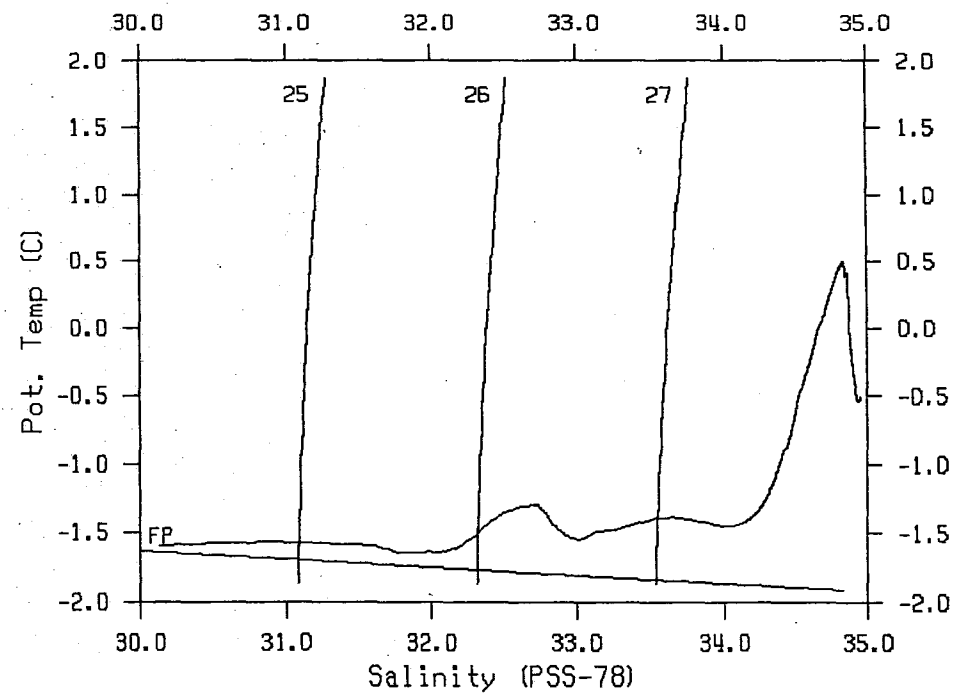


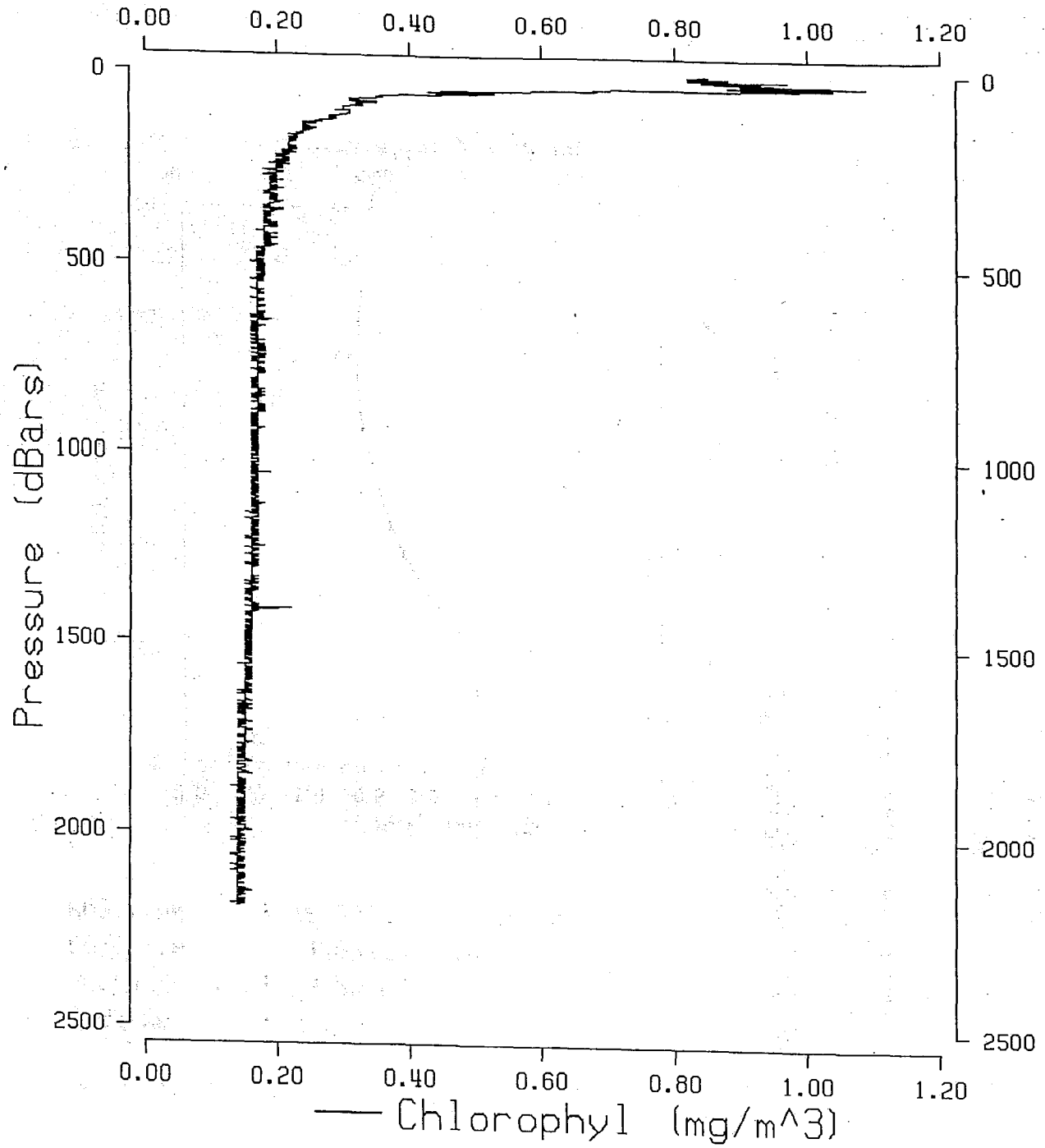
PLOTTED:22/NOV/1994 15:56:48

NOGAP 1993
Henry Larsen
STATION : D01
REFERENCE NO.: 93-24-065
DATE/TIME : 14/09/93 18:26 UTC
POSITION : 76-30.3N 173-55.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.598	-1.598	30.133	2	24.222	.00		.85	
10	-1.596	-1.596	30.138	10	24.226	.29		.85	
20	-1.591	-1.592	30.216	20	24.289	.66		.95	
30	-1.589	-1.589	31.483	30	25.317	.97		.88	
50	-1.638	-1.639	31.978	50	25.721	1.46		.44	
75	-1.314	-1.316	32.590	74	26.210	1.97		.32	
100	-1.529	-1.531	33.068	99	26.603	2.37		.30	
150	-1.367	-1.370	34.208	149	27.525	2.86		.26	
200	-.530	-.537	34.513	198	27.740	3.08		.22	
250	.089	.080	34.693	248	27.854	3.23		.20	
300	.404	.391	34.782	297	27.908	3.34		.19	
400	.517	.500	34.831	396	27.941	3.51		.19	
500	.412	.390	34.847	495	27.961	3.66		.17	
750	.114	.082	34.872	741	27.999	3.97		.17	
1000	-.155	-.199	34.886	988	28.025	4.20		.17	
1250	-.306	-.362	34.904	1234	28.047	4.34		.15	
1500	-.416	-.485	34.920	1479	28.066	4.43		.15	
1750	-.456	-.539	34.935	1725	28.081	4.47		.15	
2000	-.427	-.527	34.947	1970	28.090	4.47		.14	
2186	-.393	-.506	34.954	2152	28.095	4.46		.14	







CAST INFO

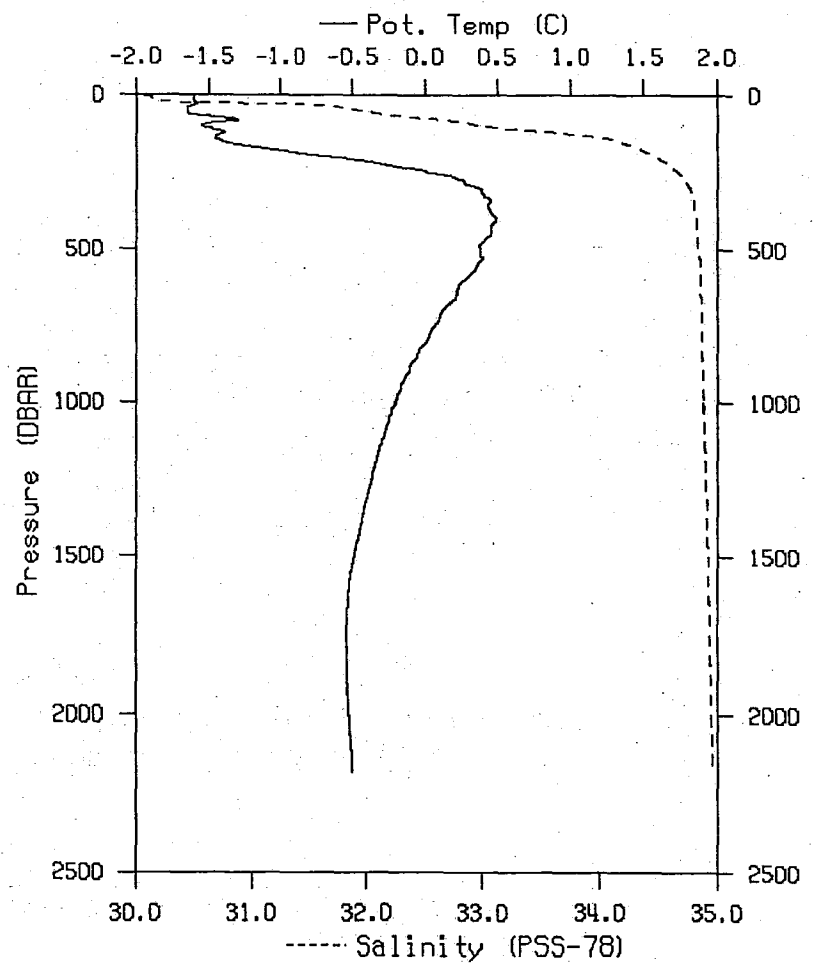
FILE : 93240065.low
CRUISE : 93-24
STATION : D01
CAST : 65
LATITUDE : 76 30.279 N
LONGITUDE: 173 55.298 W
DATE : 1993/09/14
TIME : 18:26 UTC
NREC : 2185

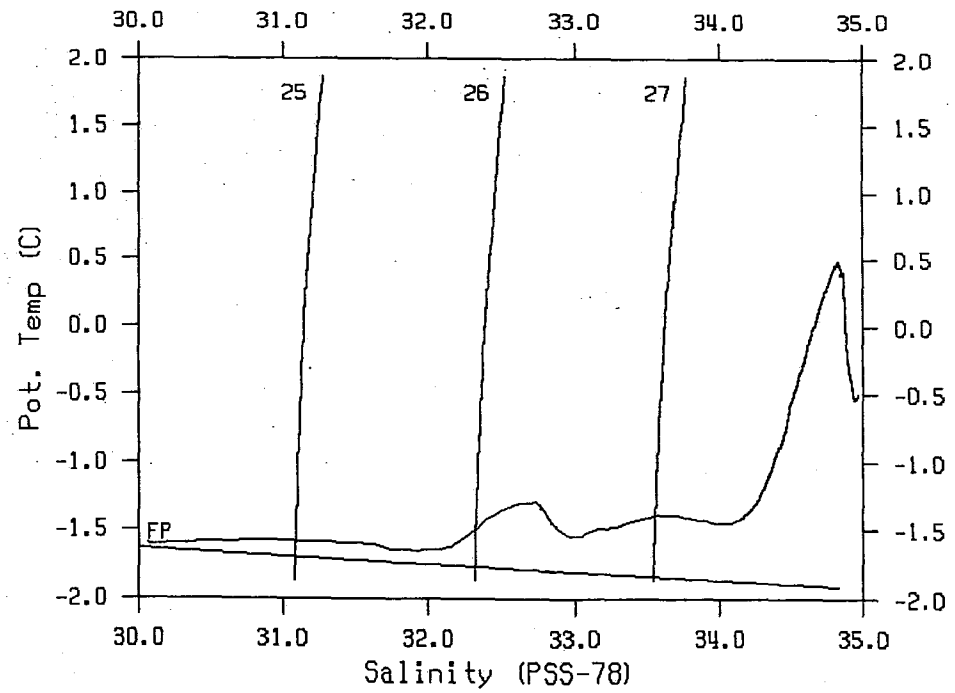
PLOTTED:22/NOV/1994 16:28:23

PLOTTED:29/NOV/1994 12:24:47

NØGAP 1993
Henry Larsen
STATIØN : D01
REFERENCE NØ.: 93-24-066
DATE/TIME : 14/09/93 18:26 UTC
PØSITIØN : 76-30.3N 173-55.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr Chl	PAR
1	-1.6002	-1.6002	30.065	1	24.166	.00		
10	-1.6044	-1.6046	30.135	10	24.223	.33		
20	-1.5996	-1.5999	30.199	20	24.275	.70		
30	-1.5940	-1.5944	31.430	30	25.275	1.02		
50	-1.6464	-1.6472	31.959	50	25.706	1.51		
75	-1.3298	-1.3314	32.547	74	26.175	2.02		
100	-1.5448	-1.5467	33.039	99	26.580	2.43		
150	-1.3821	-1.3857	34.190	149	27.510	2.93		
200	-.5725	-.5789	34.498	198	27.729	3.16		
250	.0655	.0560	34.679	248	27.844	3.31		
300	.3911	.3786	34.773	297	27.902	3.42		
400	.5110	.4937	34.827	396	27.939	3.60		
500	.4056	.3838	34.844	495	27.959	3.75		
750	.1104	.0780	34.871	741	27.998	4.07		
1000	-.1599	-.2032	34.887	988	28.026	4.29		
1250	-.3095	-.3649	34.906	1234	28.049	4.43		
1500	-.4192	-.4877	34.924	1479	28.069	4.51		
1750	-.4568	-.5400	34.938	1725	28.084	4.54		
2000	-.4265	-.5265	34.953	1970	28.095	4.54		
2185	-.3920	-.5054	34.960	2151	28.100	4.52		

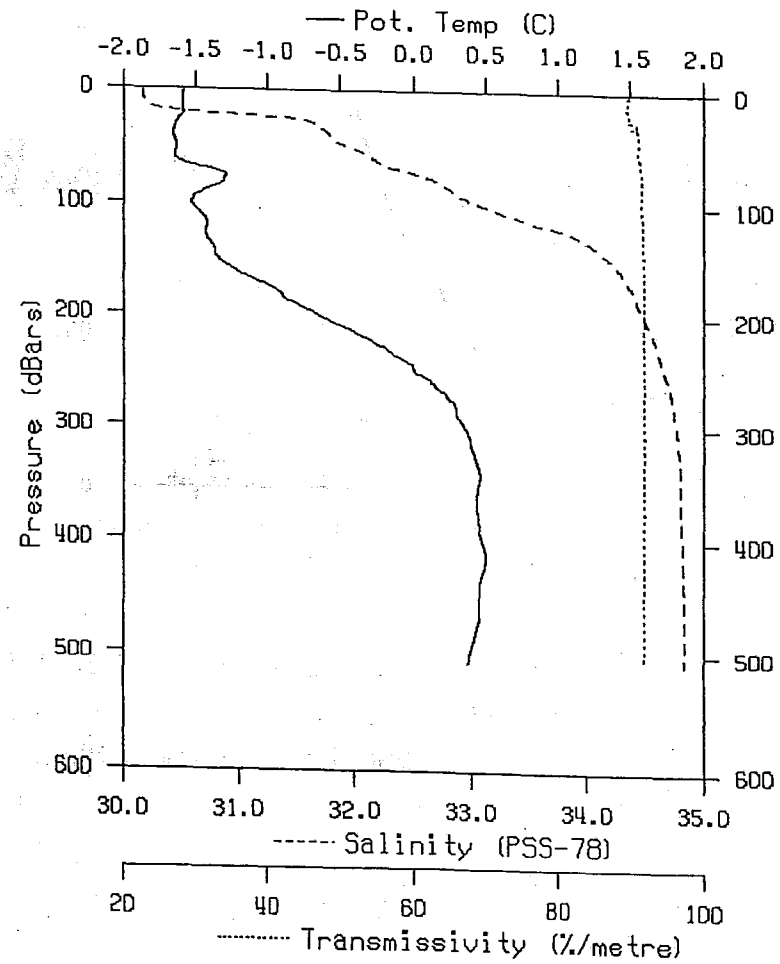


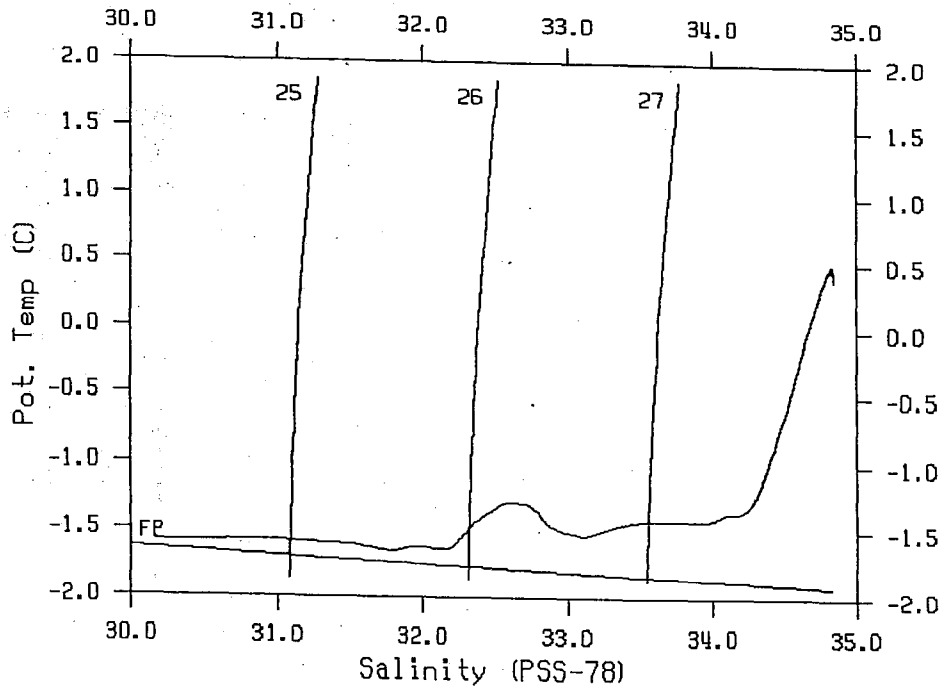


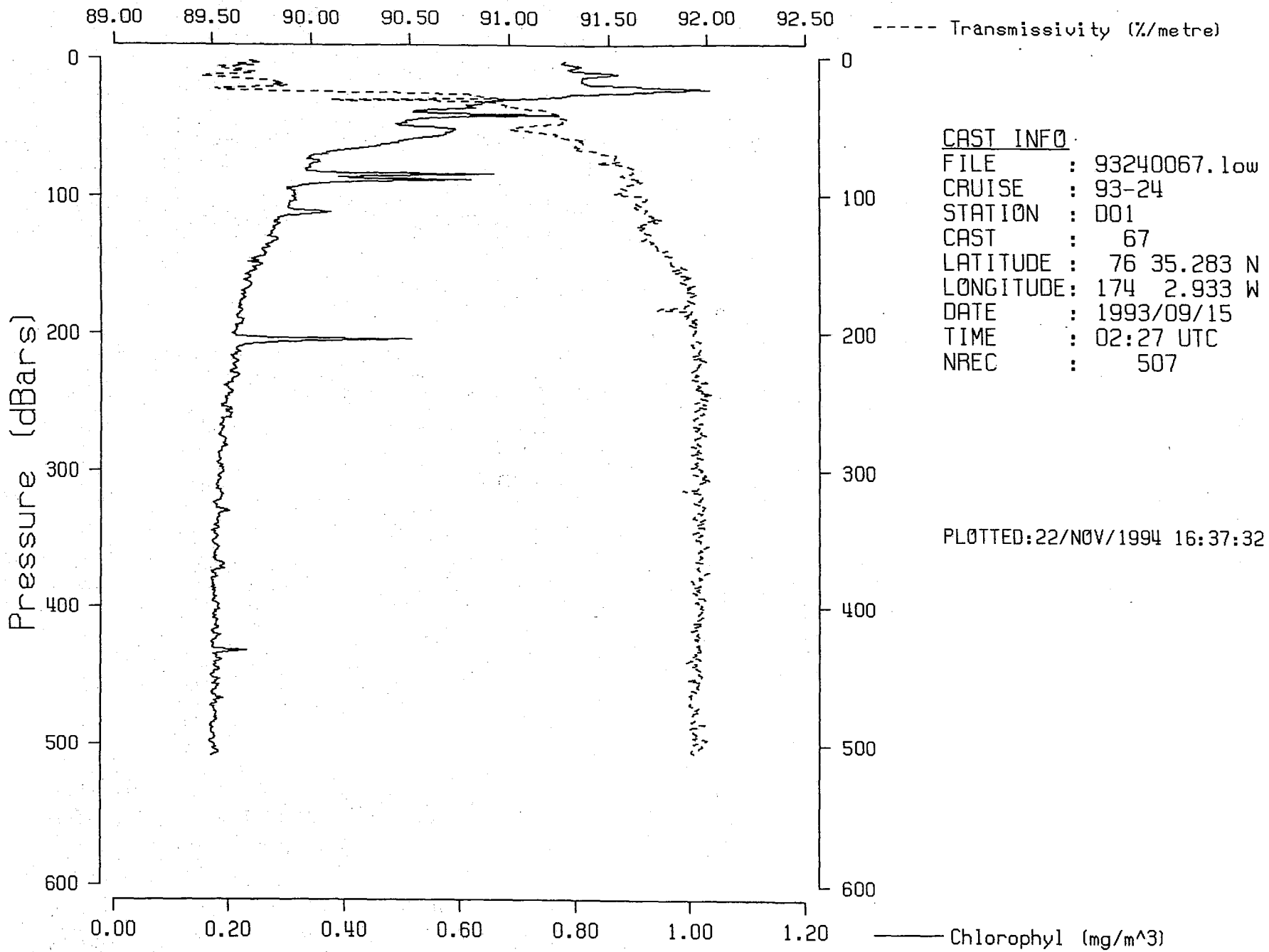
PLOTTED:22/NOV/1994 16:36:41

NOGAP 1993
Henry Larsen
STATION : D01
REFERENCE NO.: 93-24-067
DATE/TIME : 15/09/93 02:27 UTC
POSITION : 76-35.3N 174- 2.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.578	-1.578	30.172	2	24.253	.00	89.7	.78	
10	-1.586	-1.586	30.181	10	24.261	.29	89.7	.83	
20	-1.583	-1.584	30.557	20	24.566	.64	89.9	.90	
30	-1.633	-1.633	31.662	30	25.464	.94	90.1	.69	
50	-1.626	-1.627	31.971	50	25.715	1.41	91.1	.54	
75	-1.279	-1.281	32.592	74	26.210	1.92	91.5	.36	
100	-1.534	-1.536	33.095	99	26.626	2.32	91.7	.31	
150	-1.338	-1.342	34.226	149	27.538	2.80	91.8	.26	
200	-.645	-.651	34.498	198	27.732	3.02	91.9	.20	
250	.027	.017	34.672	248	27.841	3.17	91.9	.19	
300	.371	.359	34.772	297	27.902	3.28	92.0	.19	
400	.496	.479	34.823	396	27.936	3.46	92.0	.18	
500	.412	.390	34.843	495	27.958	3.62	92.0	.17	
508	.404	.382	34.843	502	27.958	3.63	92.0	.17	



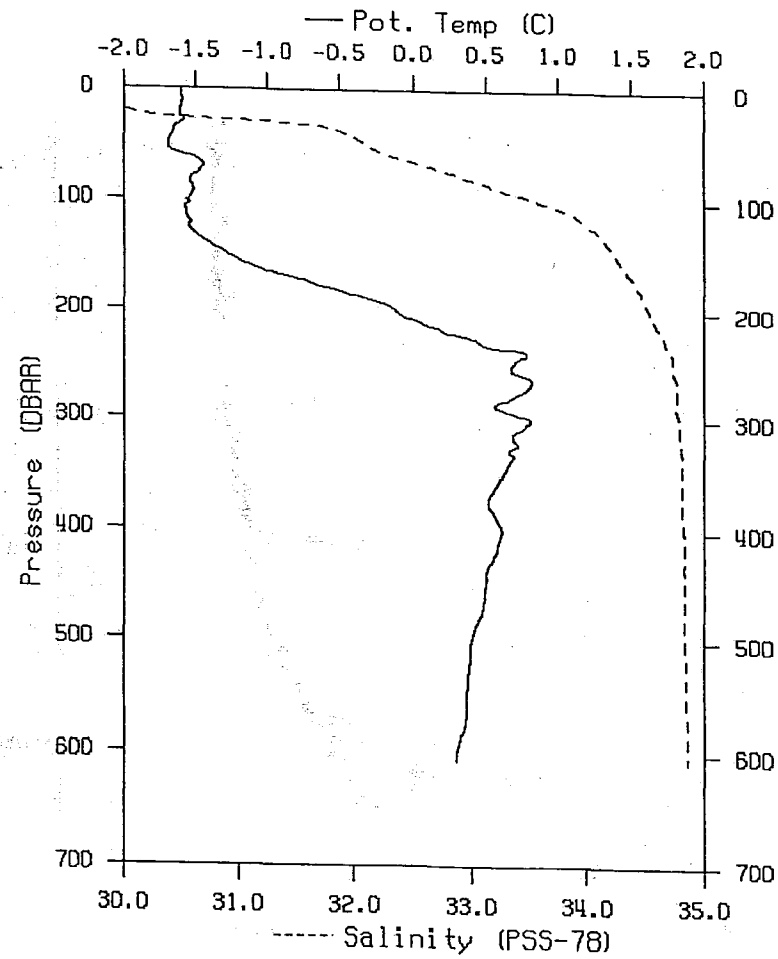


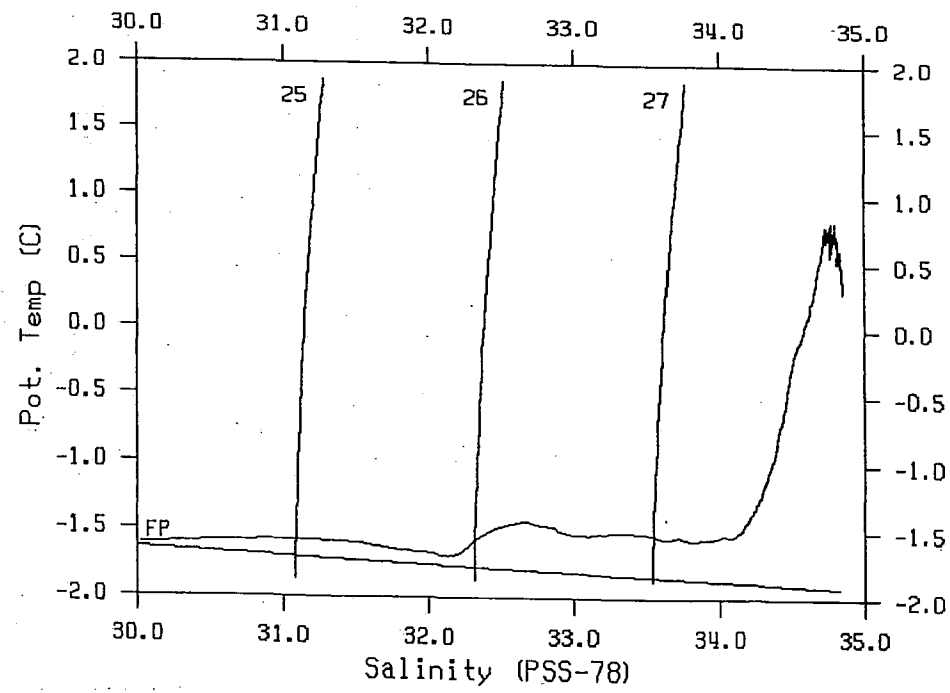

89.00
89.50
90.00
90.50
91.00
91.50
92.00
92.50
----- Transmissivity (%/metre)
Pressure (dBars)
0
100
200
300
400
500
600
0.00
0.20
0.40
0.60
0.80
1.00
1.20
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240067.low
CRUISE : 93-24
STATION : D01
CAST : 67
LATITUDE : 76 35.283 N
LONGITUDE: 174 2.933 W
DATE : 1993/09/15
TIME : 02:27 UTC
NREC : 507
PLOTTED:22/NOV/1994 16:37:32

PLOTTED:29/NOV/1994 12:25:16

NOGAP 1993
Henry Larsen
STATION : D02
REFERENCE NO.: 93-24-068
DATE/TIME : 15/09/93 16:33 UTC
POSITION : 77- 4.5N 177- 4.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
1	-1.5967	-1.5967	29.788	1	23.941	.00			
10	-1.5887	-1.5888	29.783	10	23.938	.36			
20	-1.6059	-1.6062	30.030	20	24.139	.74			
30	-1.5866	-1.5870	31.360	30	25.218	1.07			
50	-1.6860	-1.6868	32.124	50	25.840	1.56			
75	-1.4647	-1.4662	32.837	74	26.414	2.02			
100	-1.5434	-1.5455	33.595	99	27.032	2.35			
150	-1.2579	-1.2617	34.270	149	27.571	2.73			
200	-.0998	-.1070	34.546	198	27.745	2.94			
250	.6964	.6855	34.735	248	27.853	3.08			
300	.8303	.8168	34.800	297	27.897	3.20			
400	.6348	.6170	34.834	396	27.937	3.38			
500	.4269	.4051	34.842	495	27.956	3.54			
607	.3201	.2936	34.857	600	27.975	3.69			

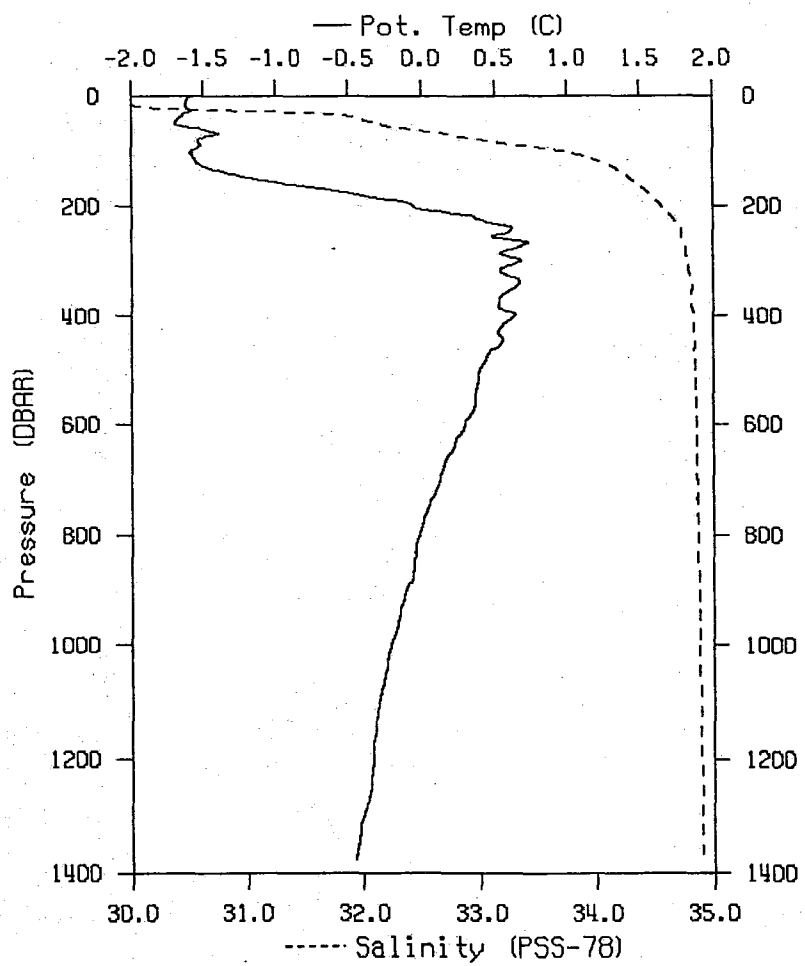


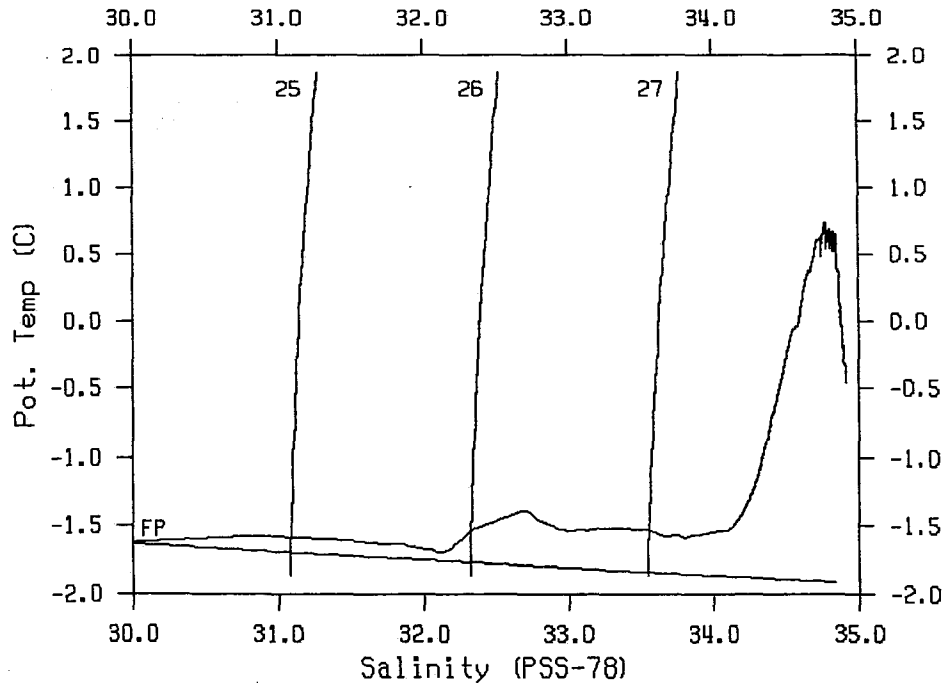


PLOTTED:29/NOV/1994 12:25:41

NOGAP 1993
Henry Larsen
STATION : D02
REFERENCE NO.: 93-24-069
DATE/TIME : 15/09/93 17:28 UTC
POSITION : 77- 4.2N 177- 4.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.5781	-1.5781	29.669	0	23.845	.00			
10	-1.6135	-1.6136	29.809	10	23.959	.40			
20	-1.6153	-1.6155	30.108	20	24.202	.78			
30	-1.6063	-1.6068	31.496	30	25.329	1.10			
50	-1.6924	-1.6932	32.131	50	25.846	1.58			
75	-1.4846	-1.4860	32.860	74	26.433	2.04			
100	-1.5769	-1.5789	33.699	99	27.117	2.35			
150	-1.1566	-1.1605	34.298	149	27.591	2.71			
200	-.0452	-.0525	34.560	198	27.754	2.91			
250	.5956	.5849	34.736	248	27.860	3.05			
300	.6925	.6793	34.799	297	27.905	3.16			
400	.6614	.6436	34.842	396	27.942	3.34			
500	.4198	.3980	34.846	495	27.959	3.49			
750	.0799	.0476	34.868	741	27.997	3.81			
1000	-.1636	-.2069	34.885	988	28.024	4.03			
1250	-.2950	-.3505	34.906	1234	28.048	4.18			
1378	-.3956	-.4573	34.910	1359	28.057	4.23			

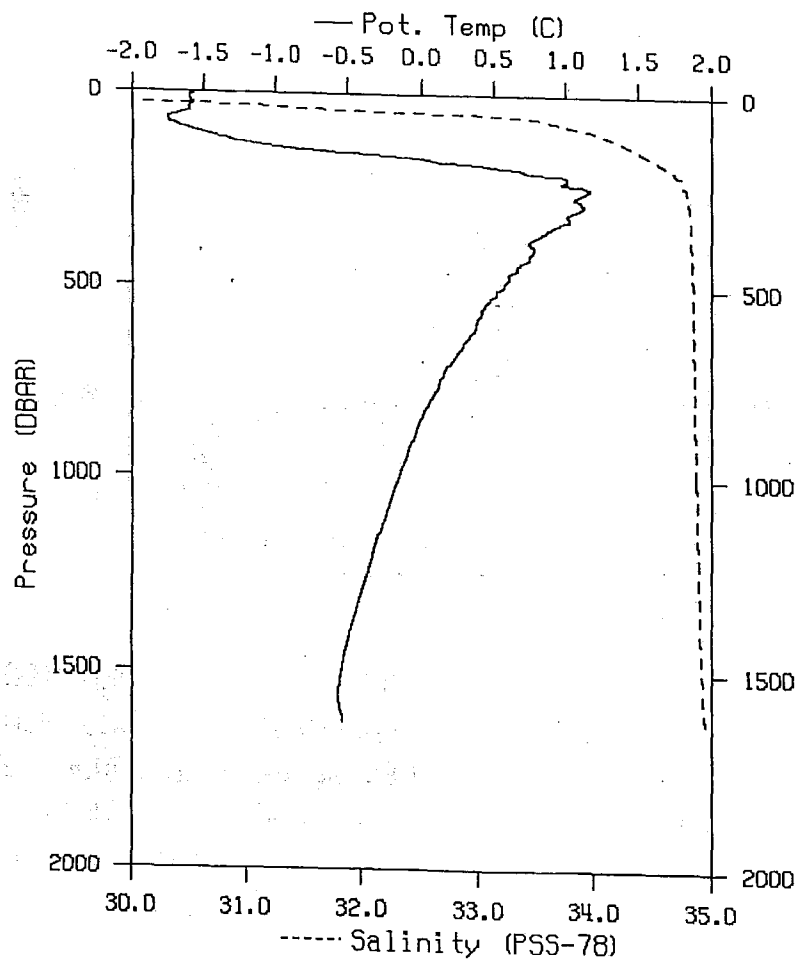


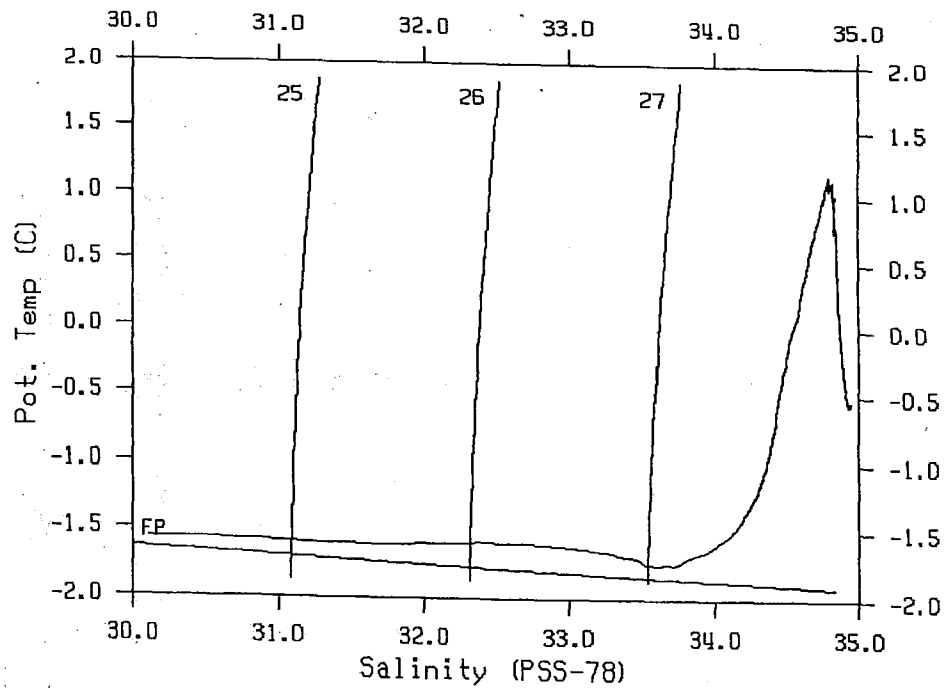


PLOTTED: 29/NOV/1994 12:26:07

NOGAP 1993
Henry Larsen
STATION : D03
REFERENCE NO.: 93-24-070
DATE/TIME : 16/09/93 00:25 UTC
POSITION : 77-26.9N 178-31.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.5632	-1.5632	29.630	0	23.813	.00			
10	-1.5929	-1.5930	29.634	10	23.817	.41			
20	-1.5913	-1.5916	29.653	20	23.832	.81			
30	-1.5653	-1.5657	30.499	30	24.518	1.19			
50	-1.6029	-1.6038	32.815	50	26.400	1.69			
75	-1.7455	-1.7470	33.722	74	27.141	2.00			
100	-1.5519	-1.5541	34.066	99	27.415	2.20			
150	-.6545	-.6591	34.421	149	27.670	2.46			
200	.7246	.7160	34.689	198	27.814	2.64			
250	1.1607	1.1488	34.794	248	27.870	2.76			
300	1.0829	1.0688	34.819	297	27.895	2.87			
400	.8000	.7817	34.839	396	27.931	3.07			
500	.5773	.5549	34.846	494	27.950	3.23			
750	.1578	.1250	34.859	741	27.986	3.57			
1000	-.1045	-.1482	34.876	988	28.014	3.82			
1250	-.3128	-.3682	34.895	1234	28.041	3.99			
1500	-.4748	-.5426	34.920	1479	28.069	4.08			
1629	-.4576	-.5334	34.945	1606	28.089	4.09			

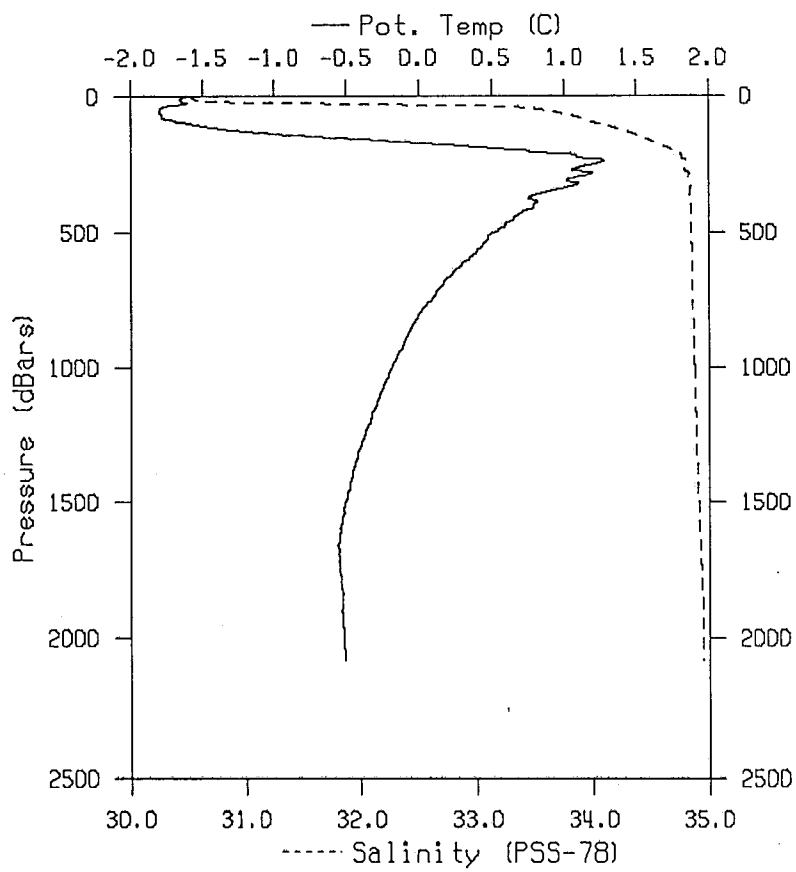


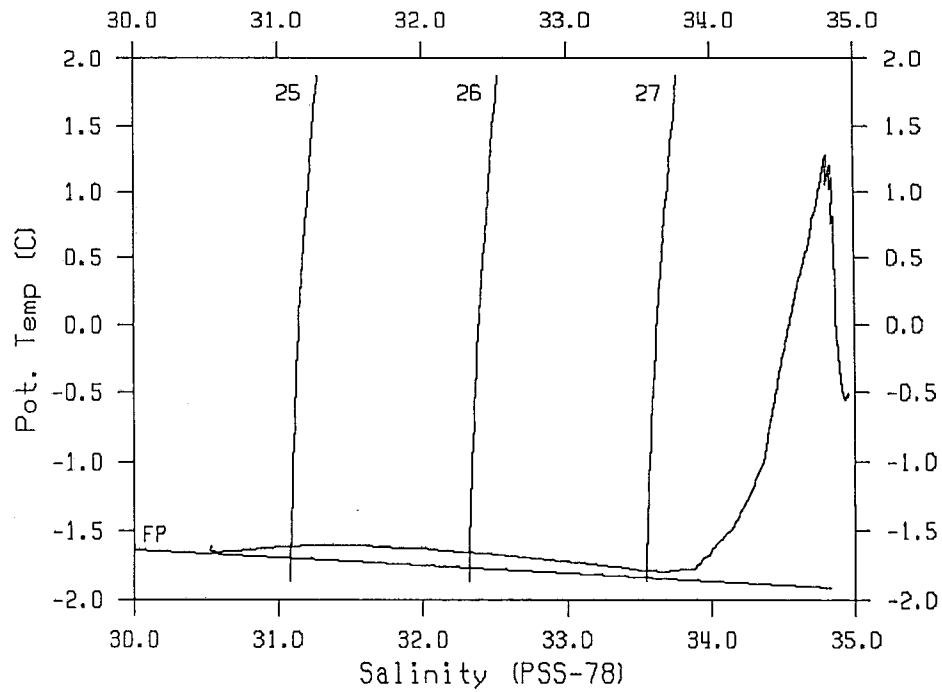


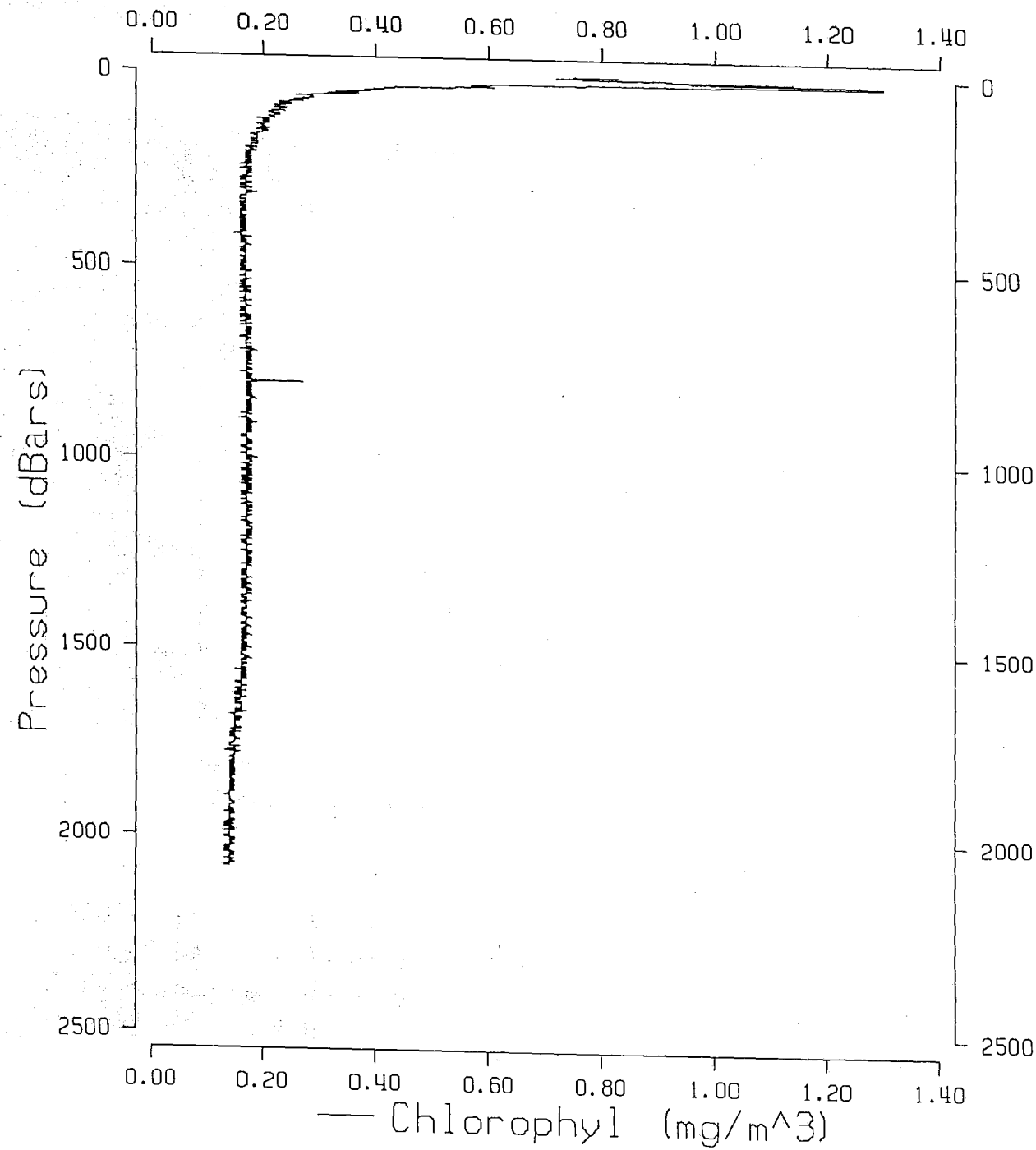
PLOTTED:22/NOV/1994 15:57:41

NØGAP 1993
Henry Larsen
STATIØN : E01
REFERENCE NØ.: 93-24-071
DATE/TIME : 17/09/93 02:03 UTC
PØSITIØN : 78-46.7N 175-50.2E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.612	-1.612	30.544	2	24.556	.00		.75	
10	-1.652	-1.652	30.560	10	24.569	.27		1.14	
20	-1.637	-1.637	30.788	20	24.754	.60		.97	
30	-1.652	-1.652	32.278	30	25.965	.86		.59	
50	-1.792	-1.793	33.576	50	27.023	1.16		.33	
75	-1.783	-1.784	33.842	74	27.239	1.39		.27	
100	-1.587	-1.589	34.046	99	27.400	1.58		.23	
150	-.638	-.643	34.429	149	27.676	1.84		.20	
200	.765	.756	34.700	198	27.820	2.01		.17	
250	1.196	1.184	34.804	247	27.875	2.14		.17	
300	1.066	1.052	34.826	297	27.902	2.24		.17	
400	.806	.787	34.851	396	27.940	2.43		.16	
500	.543	.521	34.854	494	27.959	2.59		.17	
750	.123	.091	34.865	741	27.992	2.91		.18	
1000	-.139	-.183	34.879	987	28.018	3.15		.17	
1250	-.318	-.373	34.895	1233	28.041	3.31		.18	
1500	-.437	-.505	34.912	1479	28.060	3.41		.16	
1750	-.464	-.548	34.935	1725	28.081	3.45		.15	
2000	-.420	-.520	34.952	1970	28.094	3.45		.14	
2083	-.403	-.509	34.955	2051	28.096	3.44		.14	







CAST INFO

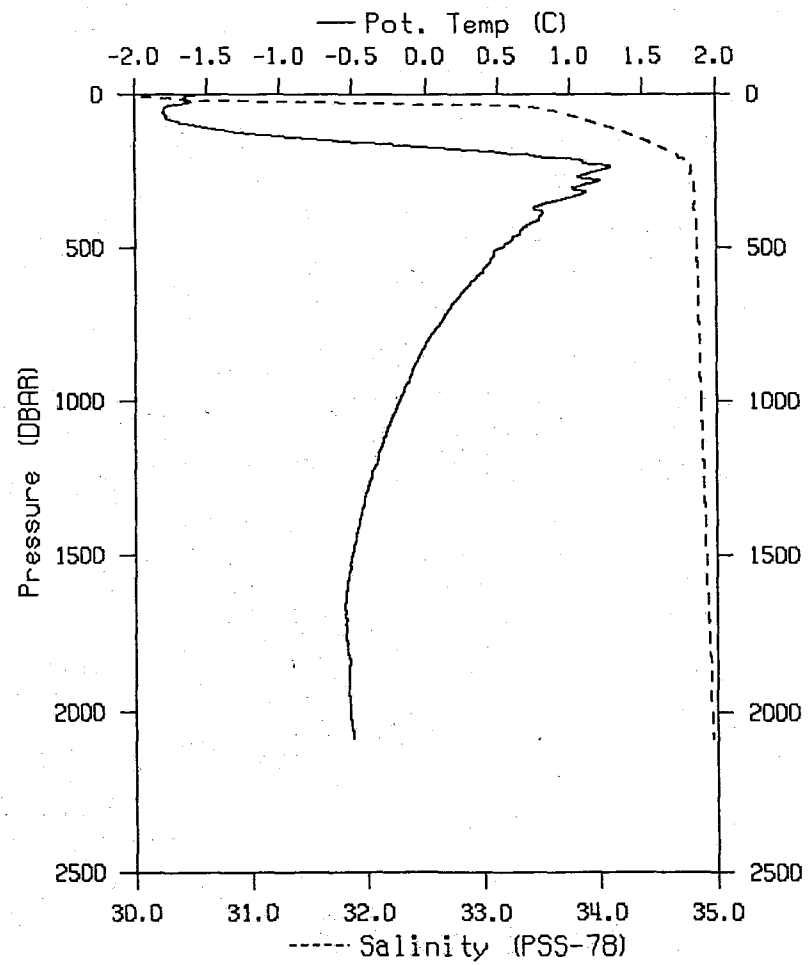
FILE : 93240071.low
CRUISE : 93-24
STATION : E01
CAST : 71
LATITUDE : 78 46.713 N
LONGITUDE: 175 50.174 E
DATE : 1993/09/17
TIME : 02:03 UTC
NREC : 2082

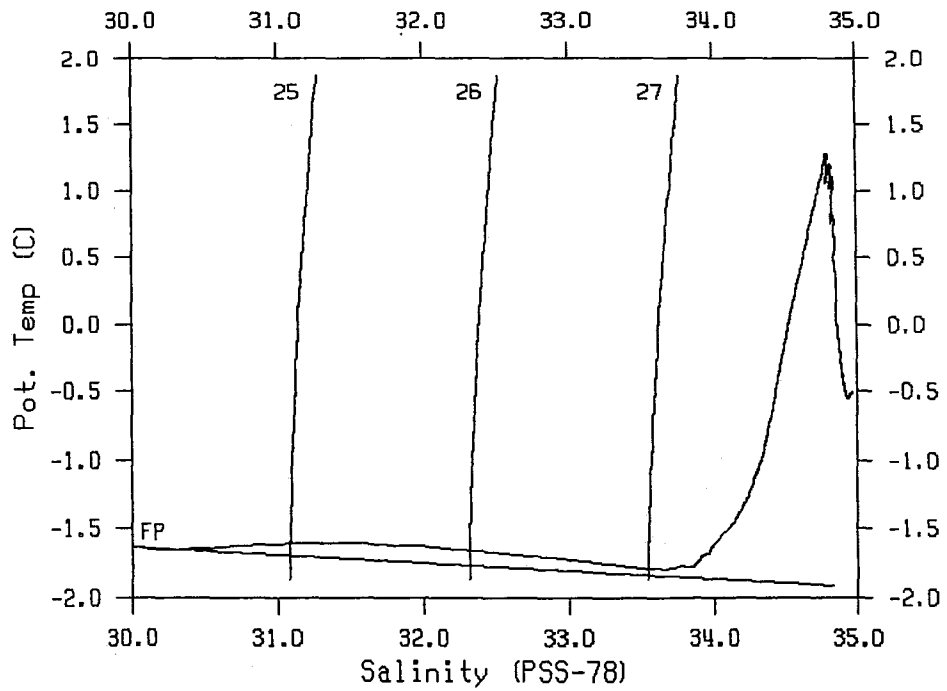
PLOTTED:22/NOV/1994 16:28:28

PLOTTED:29/NOV/1994 12:26:46

NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-072
DATE/TIME : 17/09/93 02:03 UTC
POSITION : 78-46.7N 175-50.2E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.5678	-1.5678	25.412	2	20.391	.00			
10	-1.6531	-1.6532	30.188	10	24.267	.44			
20	-1.6361	-1.6364	30.608	20	24.608	.79			
30	-1.6511	-1.6516	32.221	30	25.918	1.06			
50	-1.7937	-1.7946	33.544	50	26.997	1.37			
75	-1.7794	-1.7808	33.822	74	27.223	1.60			
100	-1.5918	-1.5939	34.015	99	27.374	1.79			
150	-.6712	-.6757	34.401	149	27.655	2.07			
200	.7635	.7548	34.677	198	27.801	2.25			
250	1.2099	1.1980	34.793	247	27.866	2.38			
300	1.0819	1.0677	34.814	297	27.892	2.49			
400	.8103	.7920	34.838	396	27.929	2.69			
500	.5525	.5302	34.840	494	27.947	2.86			
750	.1273	.0947	34.856	741	27.985	3.20			
1000	-.1368	-.1803	34.874	987	28.014	3.45			
1250	-.3158	-.3711	34.893	1233	28.038	3.63			
1500	-.4353	-.5036	34.912	1479	28.061	3.73			
1750	-.4623	-.5455	34.936	1725	28.082	3.77			
2000	-.4177	-.5179	34.956	1970	28.097	3.76			
2085	-.4000	-.5063	34.959	2053	28.099	3.75			

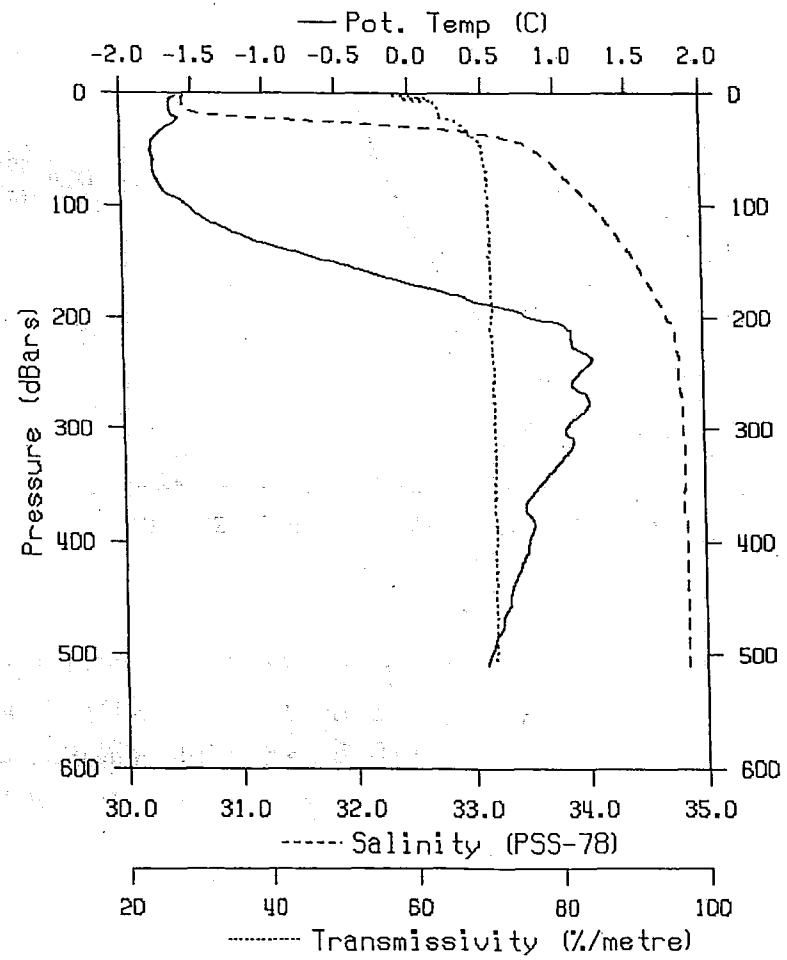


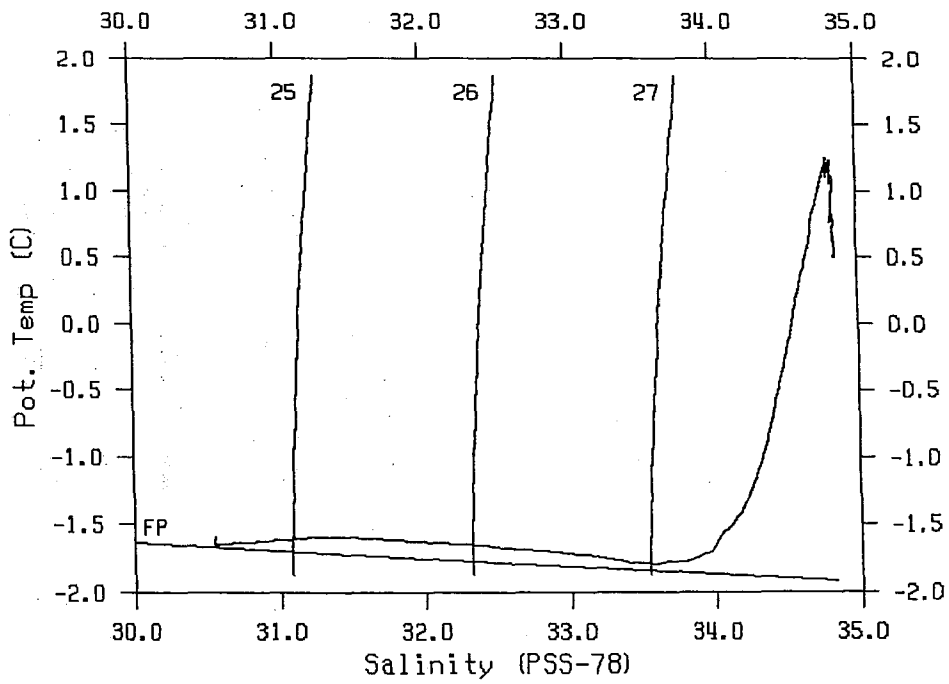


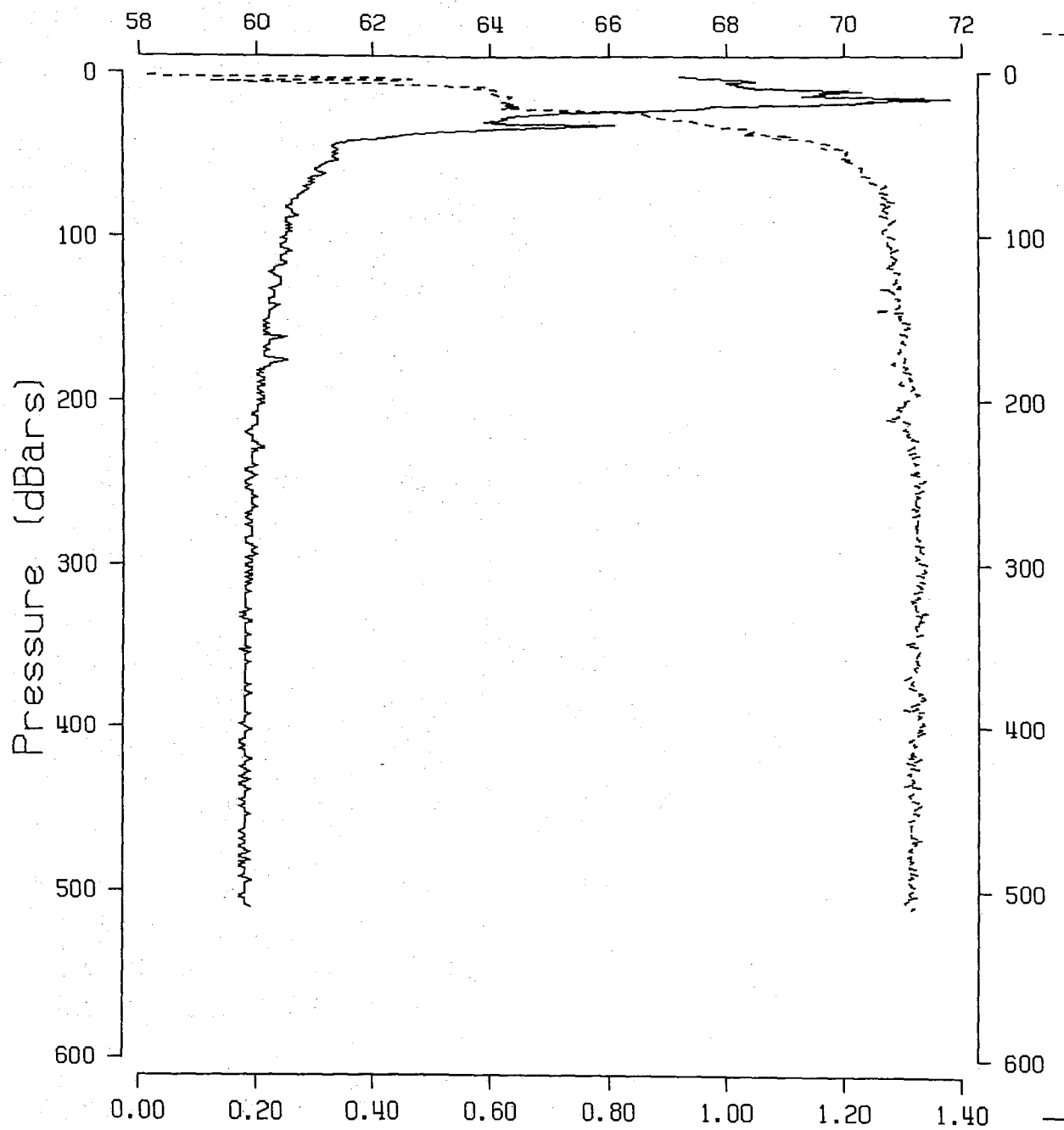
PLOTTED:22/NOV/1994 15:58:10

NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-073
DATE/TIME : 17/09/93 04:19 UTC
POSITION : 78-46.7N 175-52.9E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.596	-1.596	30.561	2	24.569	.00	58.2	.92	
10	-1.649	-1.649	30.556	10	24.566	.27	64.1	1.14	
20	-1.623	-1.623	30.880	20	24.829	.59	64.5	.98	
30	-1.670	-1.671	32.535	30	26.174	.84	67.5	.59	
50	-1.785	-1.786	33.561	50	27.011	1.13	70.1	.34	
75	-1.753	-1.755	33.841	74	27.238	1.36	70.7	.27	
100	-1.541	-1.543	34.082	99	27.427	1.54	70.8	.25	
150	-.529	-.534	34.443	149	27.683	1.80	71.0	.22	
200	.810	.801	34.703	198	27.820	1.97	71.0	.20	
250	1.167	1.155	34.799	247	27.873	2.09	71.2	.18	
300	1.075	1.061	34.824	297	27.900	2.20	71.3	.18	
400	.804	.785	34.846	396	27.936	2.39	71.2	.18	
500	.544	.522	34.849	494	27.955	2.55	71.1	.18	
510	.519	.496	34.850	504	27.957	2.56	71.1	.19	







CAST INFO

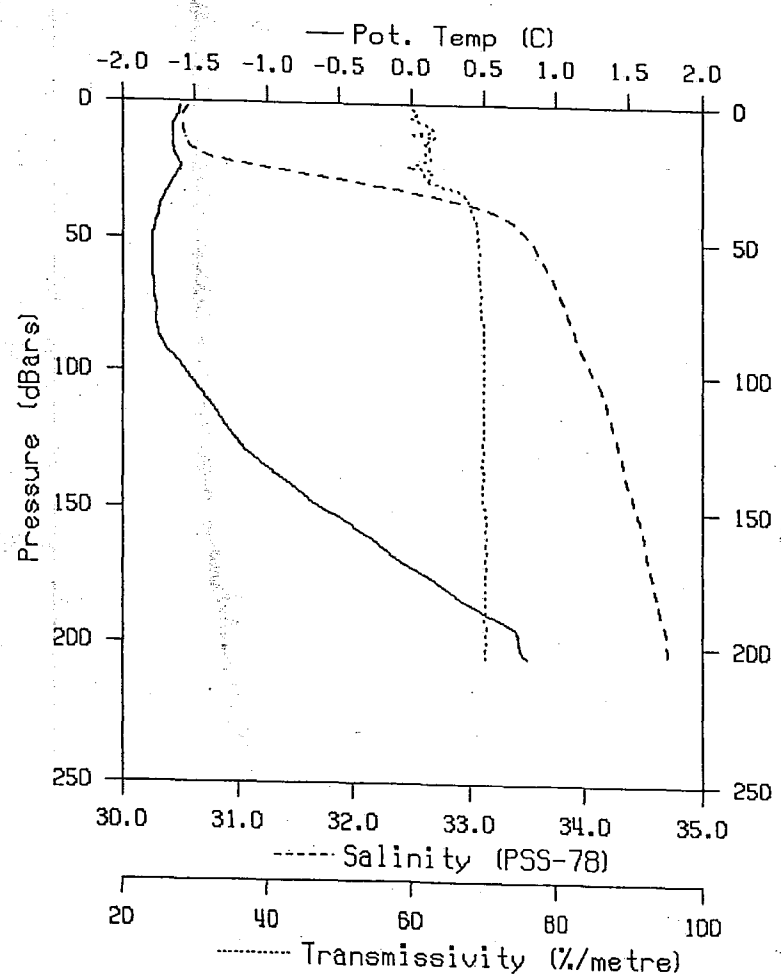
FILE : 93240073.low
CRUISE : 93-24
STATION : E01
CAST : 73
LATITUDE : 78 46.654 N
LONGITUDE: 175 52.870 E
DATE : 1993/09/17
TIME : 04:19 UTC
NREC : 509

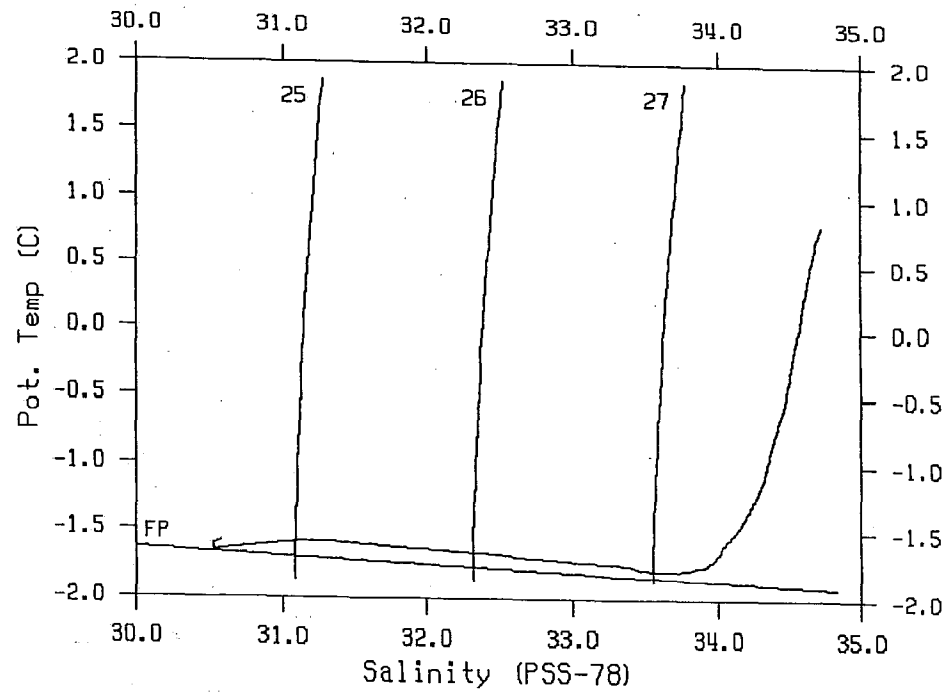
PLOTTED:22/NOV/1994 16:21:01

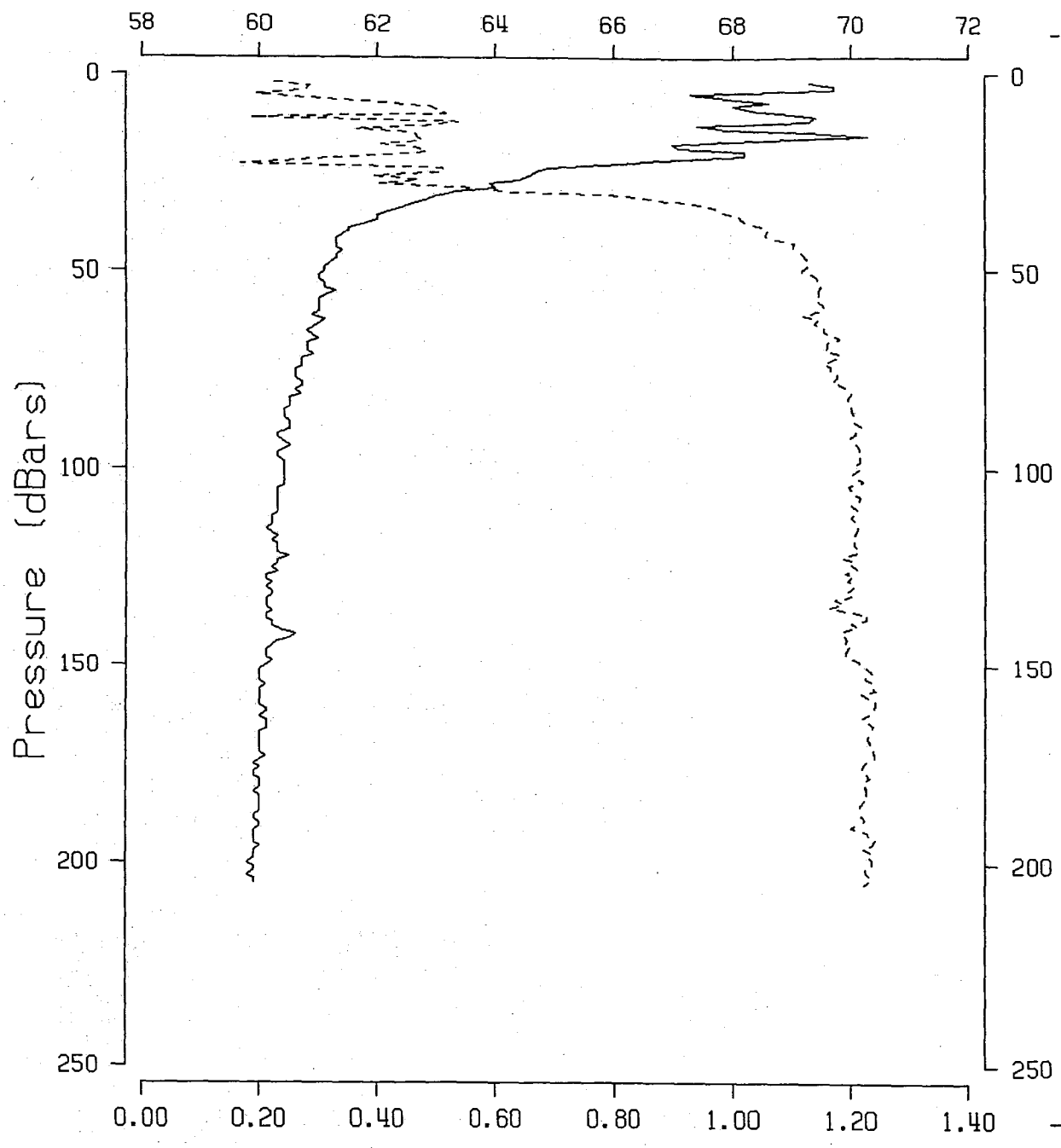
PLOTTED:22/NOV/1994 15:58:35

NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-074
DATE/TIME : 17/09/93 16:19 UTC
POSITION : 78-46.9N 176- 3.0E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.591	-1.591	30.578	2	24.583	.00	60.3	1.13	
10	-1.652	-1.652	30.533	10	24.548	.27	63.2	1.08	
20	-1.623	-1.623	30.761	20	24.732	.60	62.8	1.02	
30	-1.656	-1.656	32.225	30	25.922	.86	64.1	.53	
50	-1.790	-1.791	33.542	50	26.995	1.17	69.2	.31	
75	-1.767	-1.768	33.833	74	27.231	1.41	69.6	.26	
100	-1.554	-1.556	34.078	99	27.424	1.59	70.1	.24	
150	-.612	-.616	34.443	149	27.687	1.85	70.2	.21	
200	.756	.747	34.701	198	27.821	2.02	70.4	.18	
205	.817	.808	34.721	203	27.834	2.03	70.2	.19	







CAST INFO

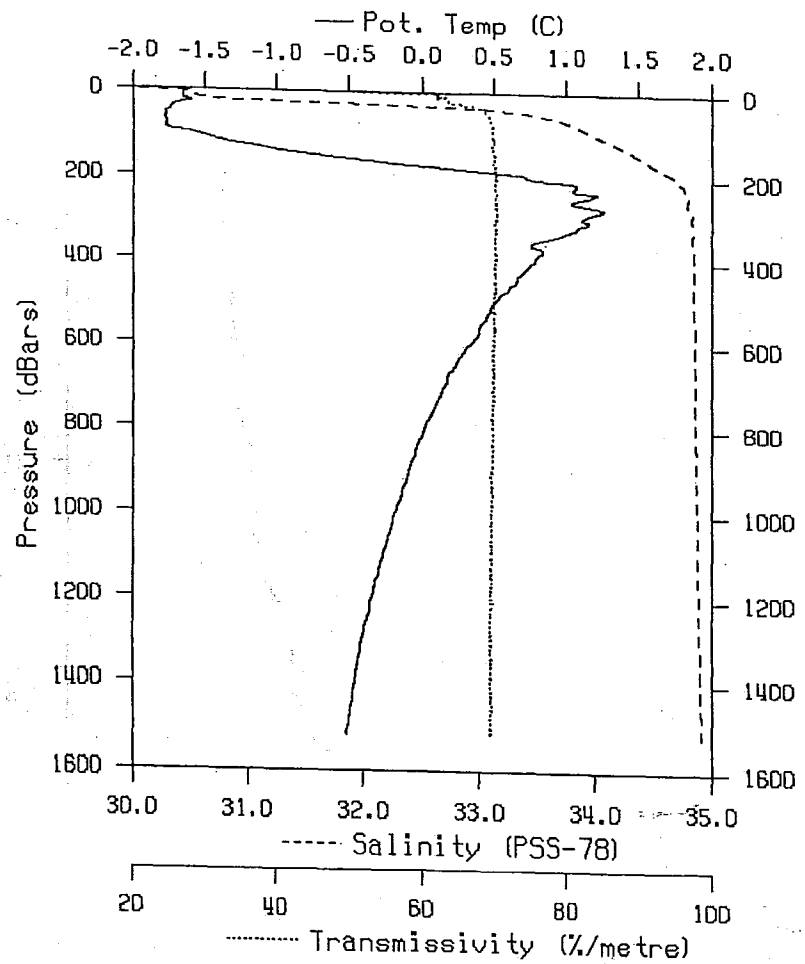
FILE : 93240074.low
CRUISE : 93-24
STATION : E01
CAST : 74
LATITUDE : 78 46.916 N
LONGITUDE: 176 2.990 E
DATE : 1993/09/17
TIME : 16:19 UTC
NREC : 204

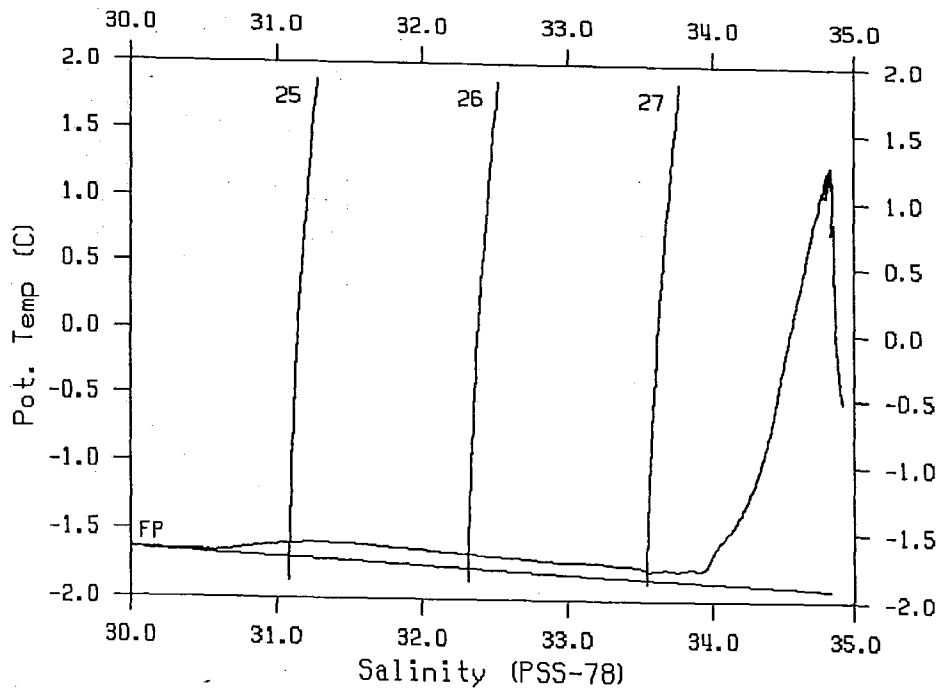
PLOTTED:22/NOV/1994 16:21:02

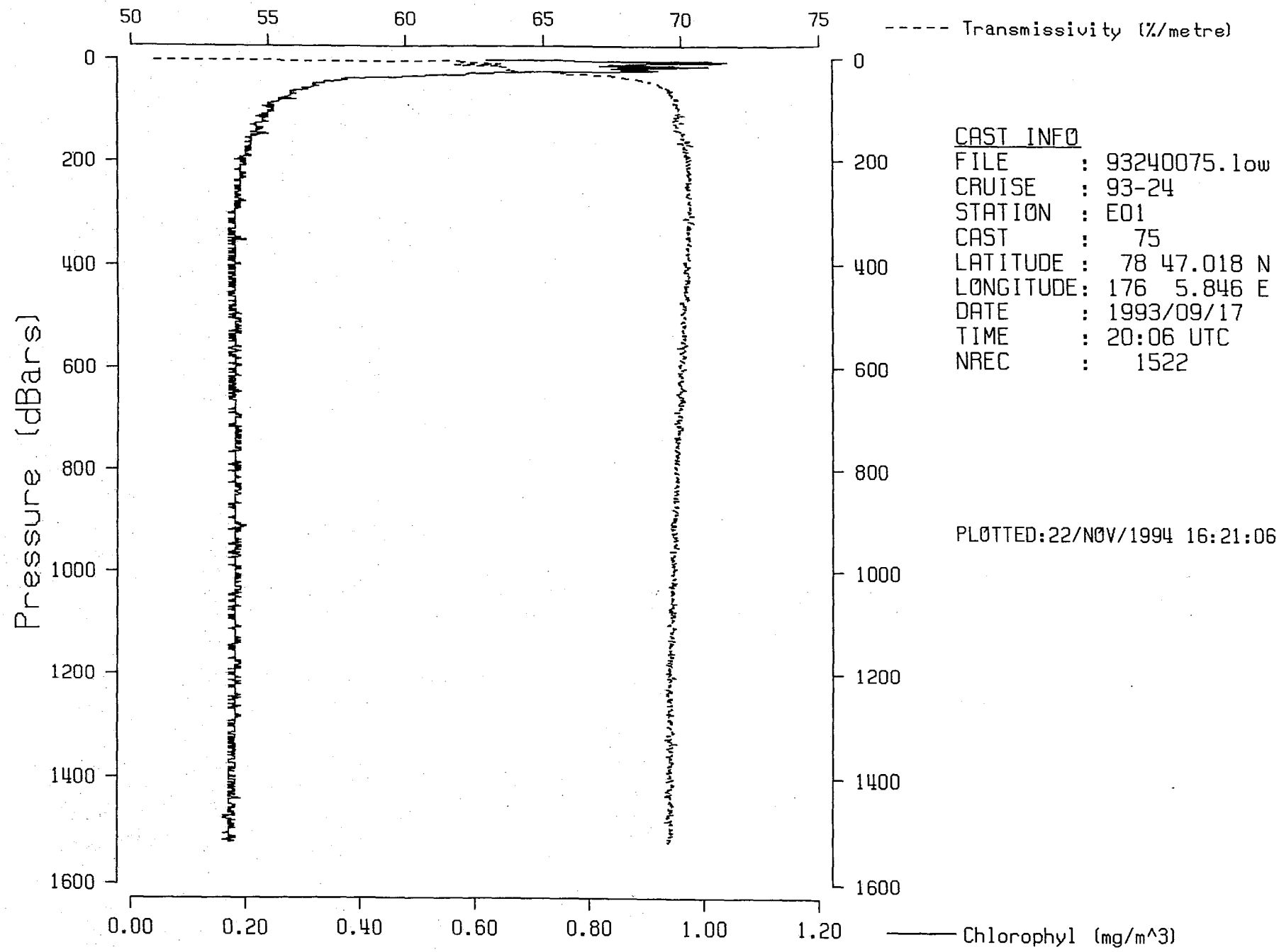
PLOTTED:22/NOV/1994 15:58:58

NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-075
DATE/TIME : 17/09/93 20:06 UTC
POSITION : 78-47.0N 176- 5.8E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
1	-1.592	-1.592	27.895	1	22.405	.00	50.9	.62	
10	-1.648	-1.648	30.534	10	24.548	.40	61.8	.85	
20	-1.640	-1.641	30.663	20	24.653	.73	63.7	.92	
30	-1.653	-1.653	32.160	30	25.868	1.00	66.5	.59	
50	-1.763	-1.764	33.518	50	26.975	1.32	69.2	.32	
75	-1.762	-1.763	33.840	74	27.237	1.55	69.8	.27	
100	-1.579	-1.581	34.044	99	27.398	1.74	69.9	.25	
150	-.708	-.712	34.413	149	27.666	2.01	70.1	.22	
200	.740	.732	34.695	198	27.818	2.18	70.2	.19	
250	1.113	1.101	34.799	247	27.877	2.31	70.3	.18	
300	1.132	1.117	34.837	297	27.907	2.41	70.3	.17	
400	.797	.779	34.852	396	27.941	2.59	70.2	.18	
500	.520	.498	34.851	494	27.958	2.75	70.2	.17	
750	.118	.086	34.864	741	27.992	3.07	69.8	.19	
1000	-.145	-.188	34.878	987	28.018	3.31	69.7	.18	
1250	-.322	-.378	34.896	1233	28.042	3.48	69.5	.18	
1500	-.438	-.506	34.913	1479	28.062	3.57	69.5	.17	
1522	-.445	-.515	34.916	1501	28.064	3.58	69.5	.17	



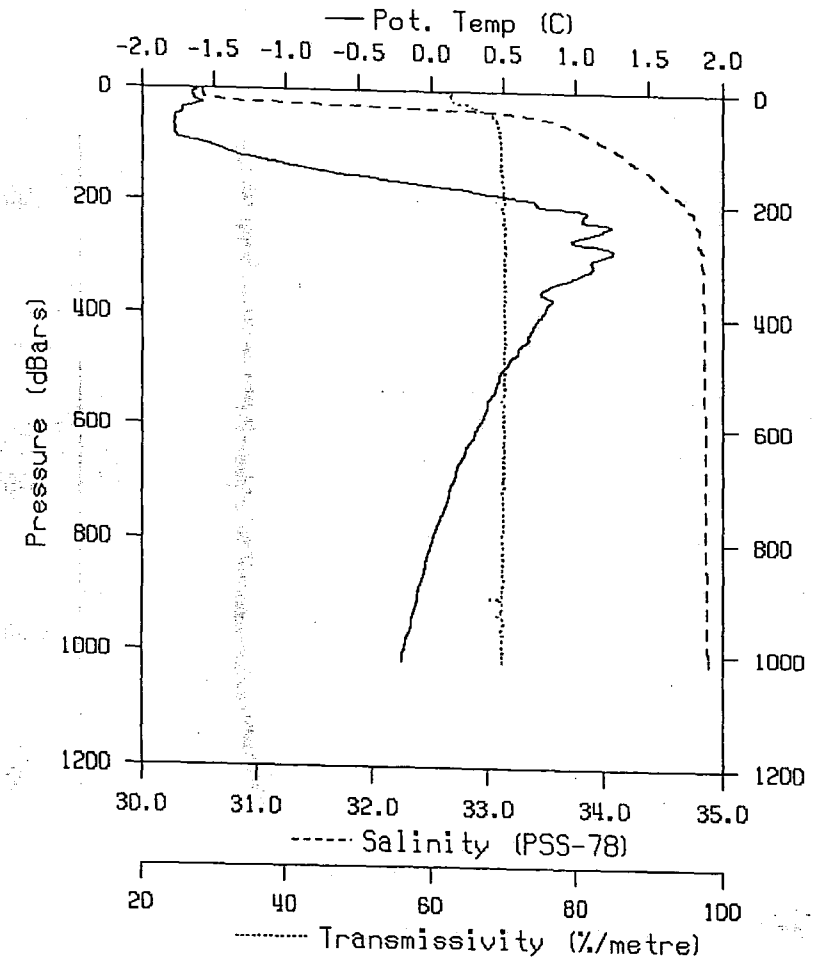


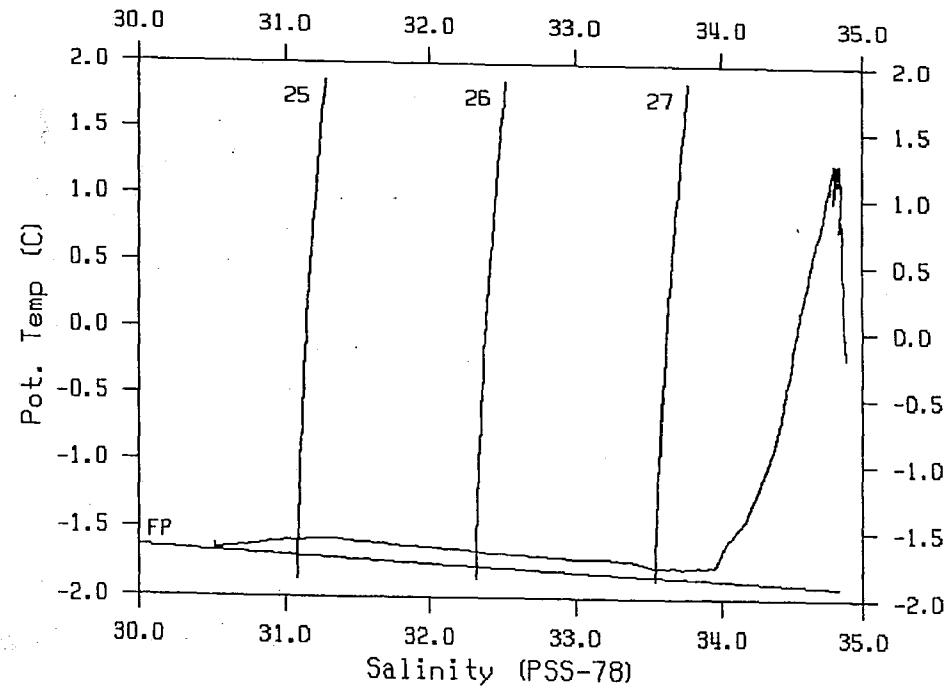

50
55
60
65
70
75
----- Transmissivity (%/metre)
0
200
400
600
800
1000
1200
1400
1600
Pressure (dBars)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240075.low
CRUISE : 93-24
STATION : E01
CAST : 75
LATITUDE : 78 47.018 N
LONGITUDE: 176 5.846 E
DATE : 1993/09/17
TIME : 20:06 UTC
NREC : 1522
PLOTTED:22/NOV/1994 16:21:06

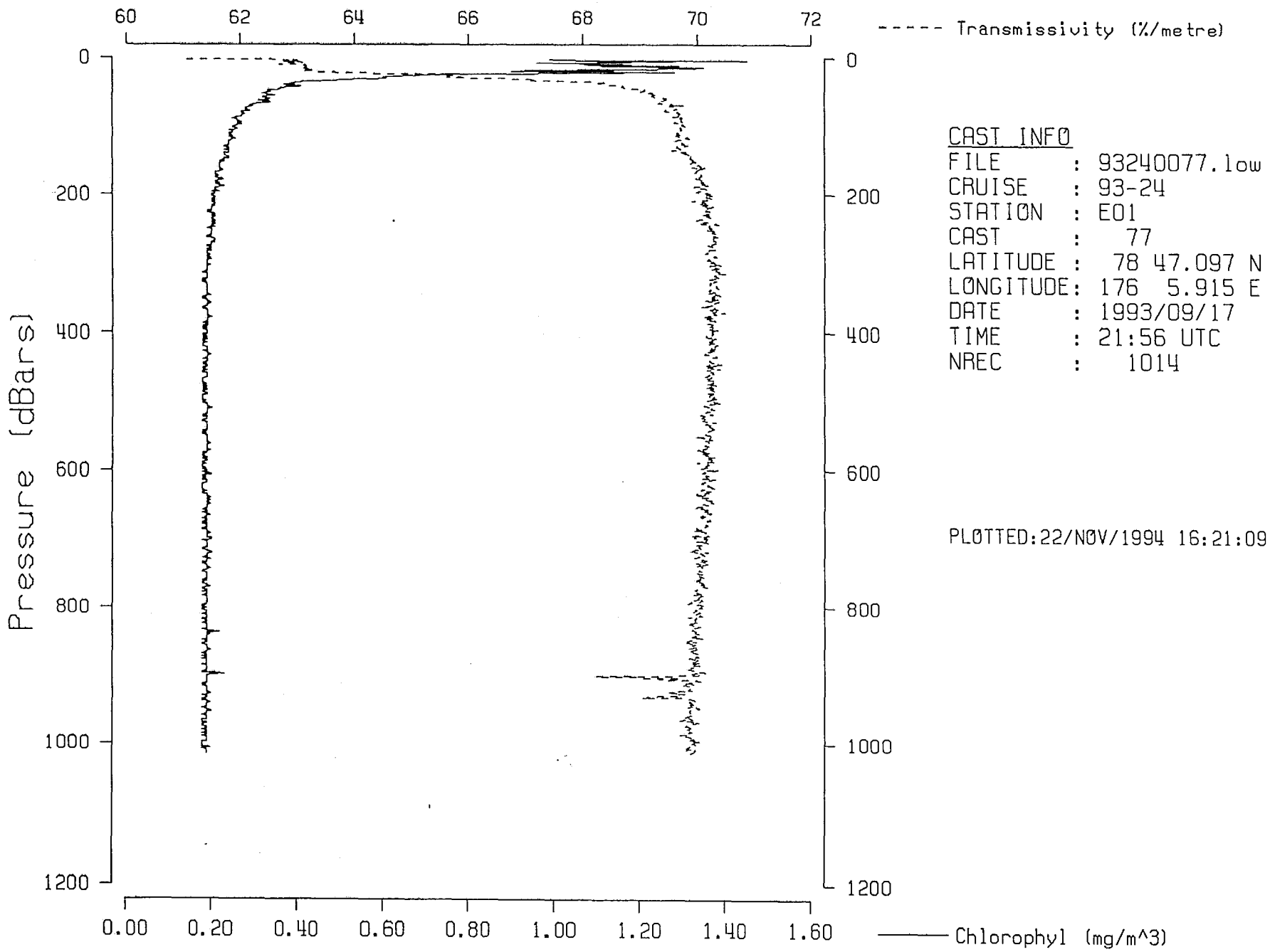
PLOTTED:22/NOV/1994 15:59:26

NØGAP 1993
Henry Larsen
STATIØN : E01
REFERENCE NØ.: 93-24-077
DATE/TIME : 17/09/93 21:56 UTC
PØSITIØN : 78-47.1N 176- 5.9E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.617	-1.617	30.528	2	24.543	.00	61.1	.99	
10	-1.646	-1.646	30.530	10	24.545	.27	62.7	1.07	
20	-1.624	-1.624	30.710	20	24.691	.60	63.2	1.00	
30	-1.648	-1.648	32.169	30	25.876	.87	66.4	.61	
50	-1.774	-1.775	33.539	50	26.993	1.18	69.0	.33	
75	-1.765	-1.766	33.851	74	27.246	1.42	69.6	.28	
100	-1.533	-1.535	34.082	99	27.427	1.60	69.7	.26	
150	-.646	-.651	34.421	149	27.670	1.86	69.9	.23	
200	.734	.726	34.691	198	27.815	2.03	70.1	.20	
250	1.179	1.167	34.800	247	27.873	2.16	70.1	.20	
300	1.132	1.118	34.831	297	27.901	2.27	70.3	.19	
400	.780	.762	34.851	396	27.942	2.45	70.3	.19	
500	.509	.487	34.849	494	27.957	2.61	70.3	.18	
750	.120	.088	34.863	741	27.991	2.93	70.1	.19	
1000	-.151	-.195	34.878	987	28.018	3.17	70.0	.18	
1015	-.155	-.199	34.880	1002	28.020	3.18	70.0	.19	



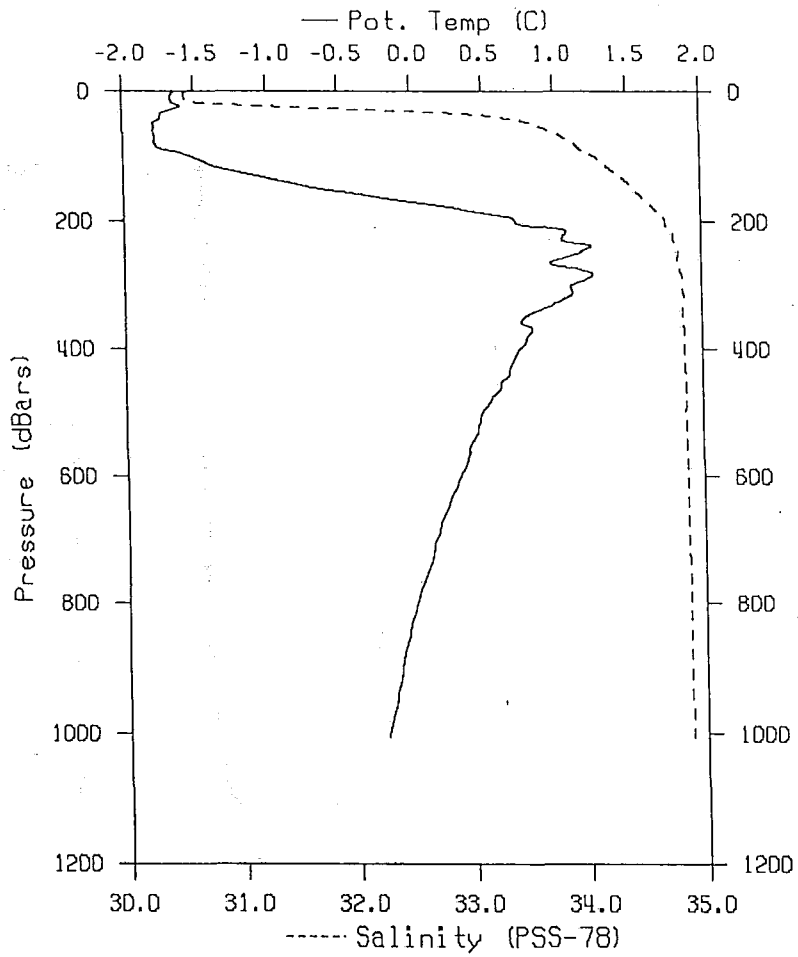


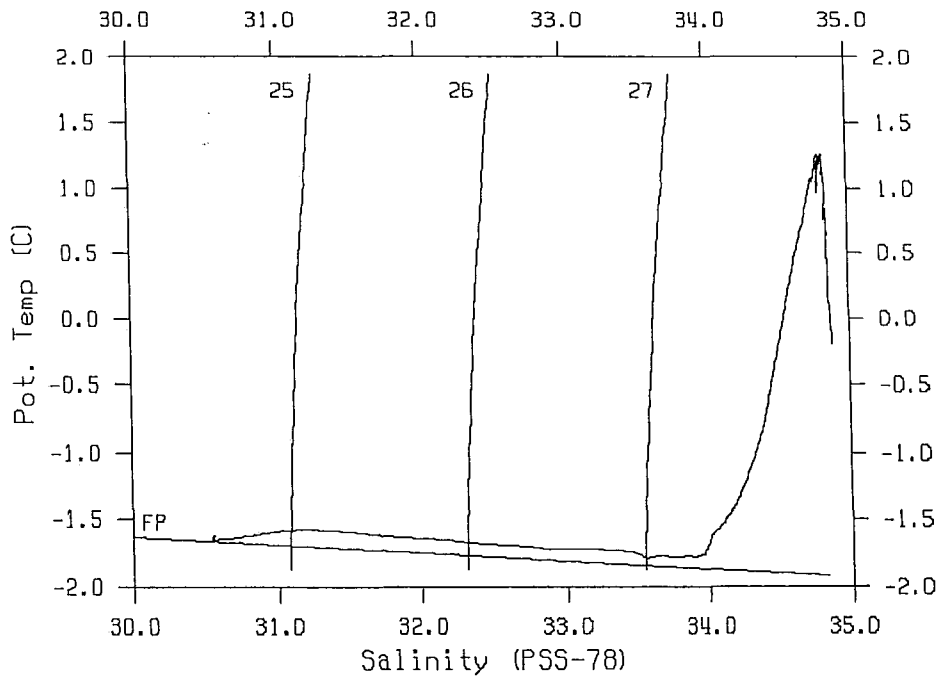

60
62
64
66
68
70
72
----- Transmissivity (%/metre)
0
200
400
600
800
1000
1200
Pressure (dBars)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240077.low
CRUISE : 93-24
STATION : E01
CAST : 77
LATITUDE : 78 47.097 N
LONGITUDE: 176 5.915 E
DATE : 1993/09/17
TIME : 21:56 UTC
NREC : 1014
PLOTTED:22/NOV/1994 16:21:09

PLOTTED:29/NOV/1994 12:27:15

NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-078
DATE/TIME : 17/09/93 21:56 UTC
POSITION : 78-47.1N 176- 5.9E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.6277	-1.6277	30.564	0	24.572	.00			
10	-1.6547	-1.6548	30.553	10	24.564	.34			
20	-1.6052	-1.6055	30.901	20	24.845	.66			
30	-1.6800	-1.6805	32.456	30	26.110	.91			
50	-1.7815	-1.7824	33.577	50	27.023	1.20			
75	-1.7759	-1.7773	33.878	74	27.268	1.42			
100	-1.5212	-1.5234	34.102	99	27.443	1.60			
150	-.6088	-.6134	34.430	149	27.676	1.86			
200	.7325	.7239	34.693	198	27.817	2.03			
250	1.1566	1.1448	34.802	247	27.877	2.15			
300	1.1174	1.1031	34.831	297	27.903	2.26			
400	.7714	.7532	34.854	396	27.945	2.44			
500	.5039	.4818	34.855	494	27.962	2.60			
750	.1155	.0830	34.868	741	27.995	2.91			
1000	-.1547	-.1980	34.882	987	28.021	3.14			
1007	-.1586	-.2023	34.882	994	28.021	3.14			

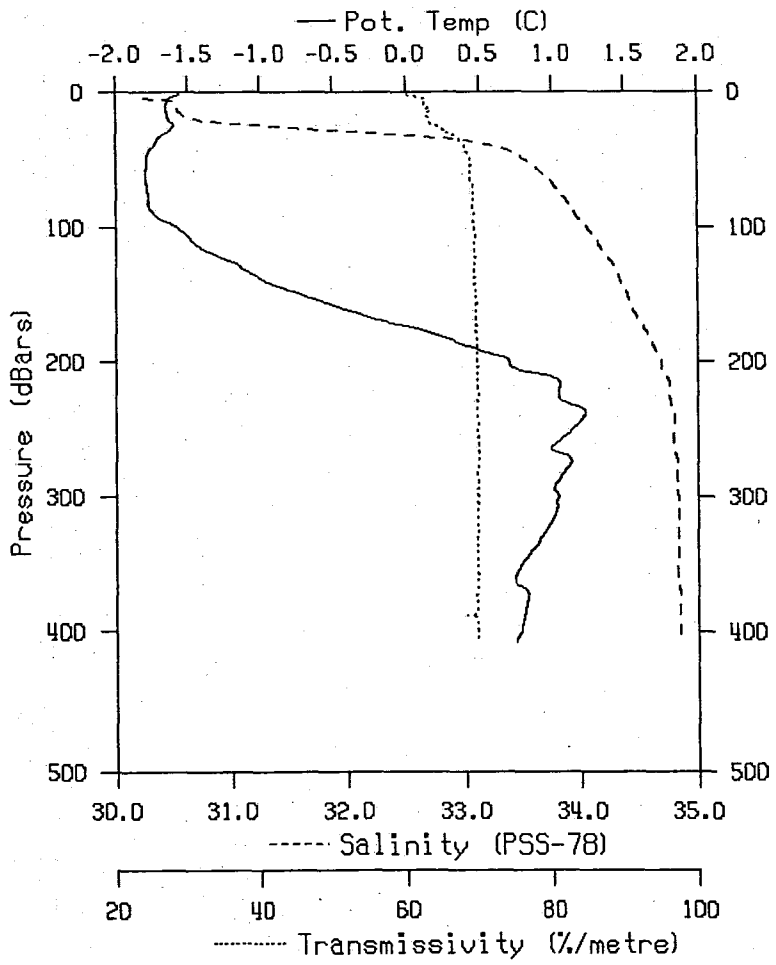


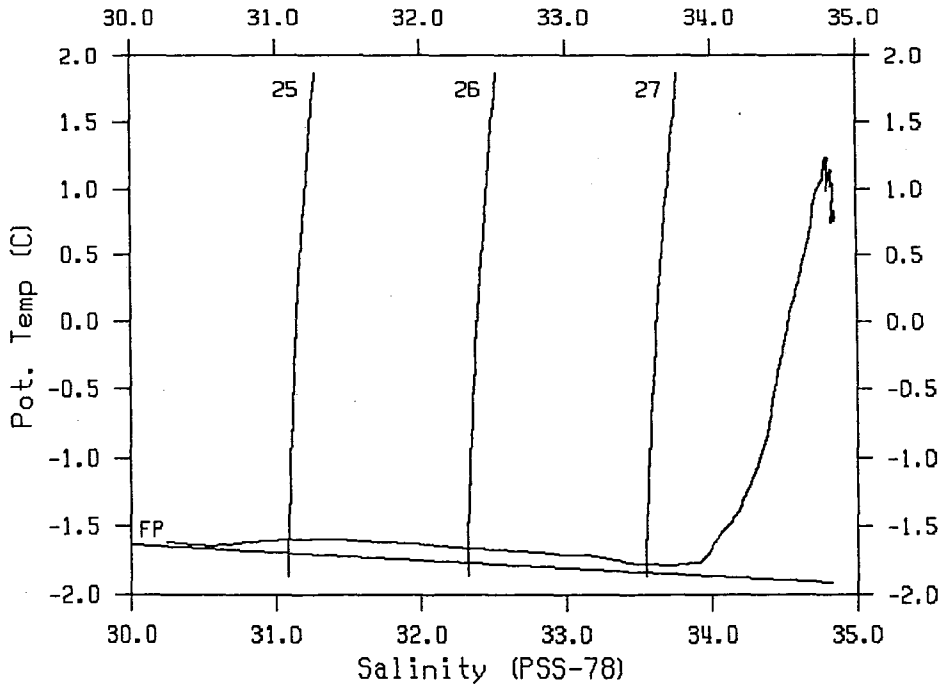


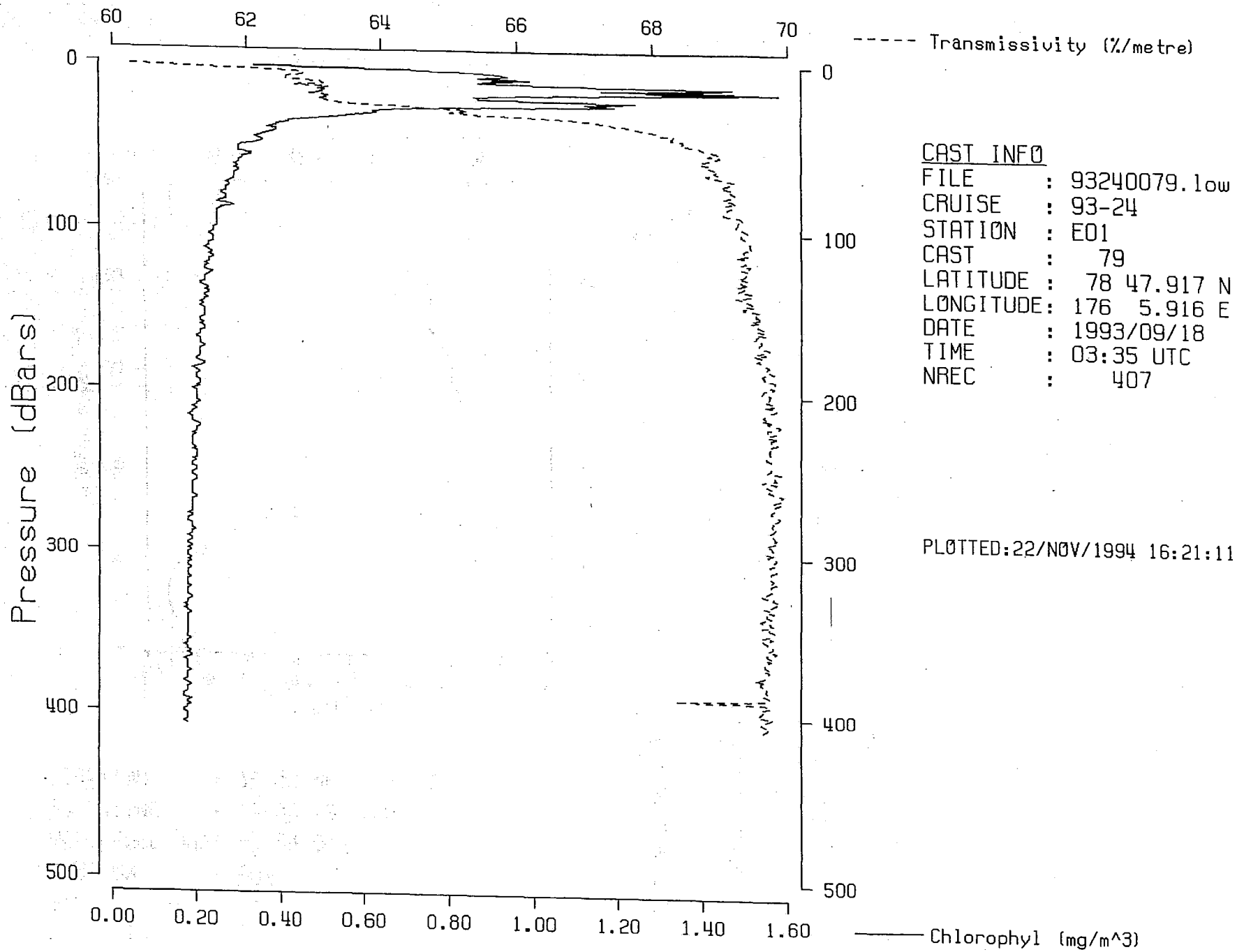
PLOTTED:22/NOV/1994 16:00:05

NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-079
DATE/TIME : 18/09/93 03:35 UTC
POSITION : 78-47.9N 176- 5.9E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.546	-1.546	26.237	2	21.060	.00	60.3	.34	
10	-1.646	-1.646	30.533	10	24.547	.40	62.6	.91	
20	-1.631	-1.632	30.673	20	24.660	.74	63.3	.87	
30	-1.643	-1.643	32.138	30	25.851	1.01	65.4	.61	
50	-1.781	-1.782	33.526	50	26.982	1.33	68.7	.31	
75	-1.775	-1.776	33.828	74	27.227	1.56	69.2	.28	
100	-1.566	-1.568	34.056	99	27.407	1.75	69.3	.24	
150	-.711	-.715	34.405	149	27.659	2.02	69.5	.22	
200	.712	.703	34.691	198	27.816	2.19	69.7	.19	
250	1.157	1.145	34.801	247	27.876	2.32	69.8	.20	
300	1.058	1.044	34.835	297	27.910	2.42	69.8	.19	
400	.804	.785	34.852	396	27.941	2.60	69.7	.17	
408	.767	.748	34.850	404	27.941	2.61	69.6	.18	



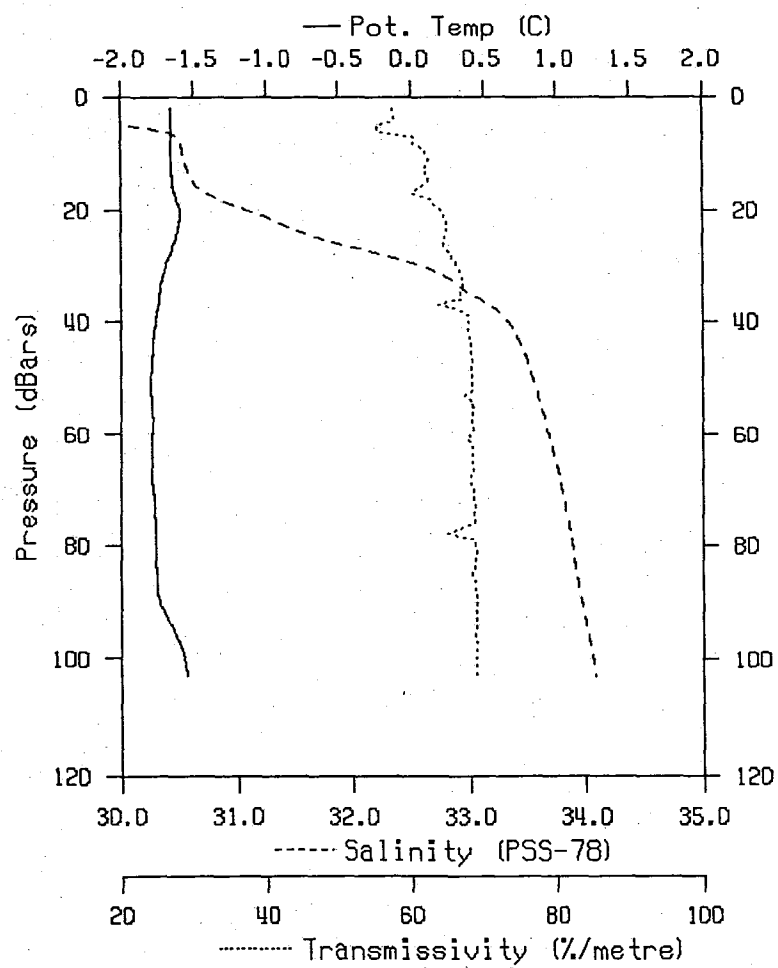


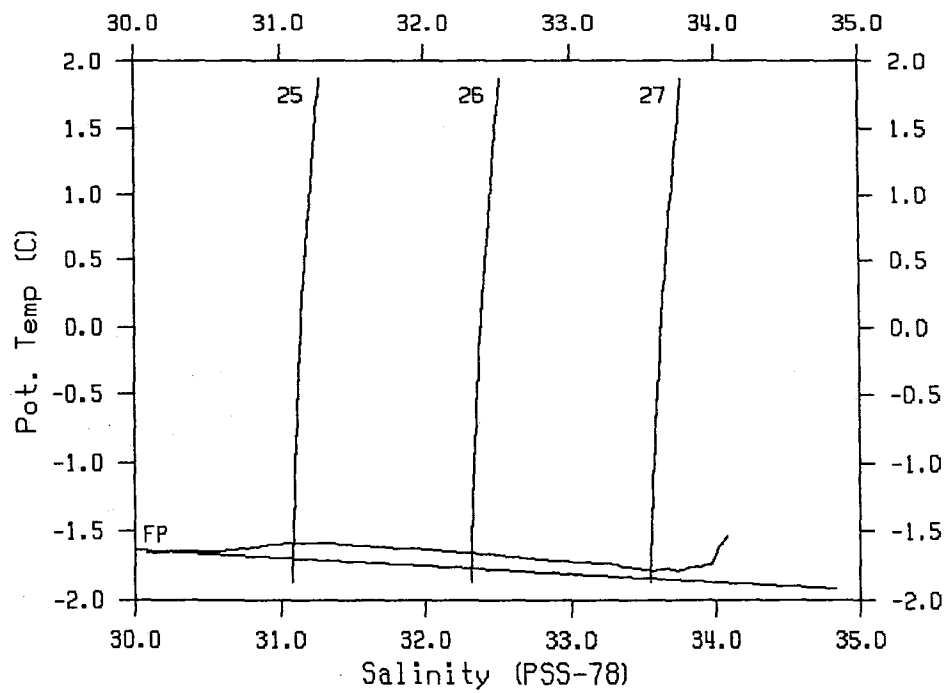

60
62
64
66
68
70
----- Transmissivity (%/metre)
0
100
200
300
400
500
Pressure (dBars)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240079.low
CRUISE : 93-24
STATION : E01
CAST : 79
LATITUDE : 78 47.917 N
LONGITUDE: 176 5.916 E
DATE : 1993/09/18
TIME : 03:35 UTC
NREC : 407
PLOTTED:22/NOV/1994 16:21:11

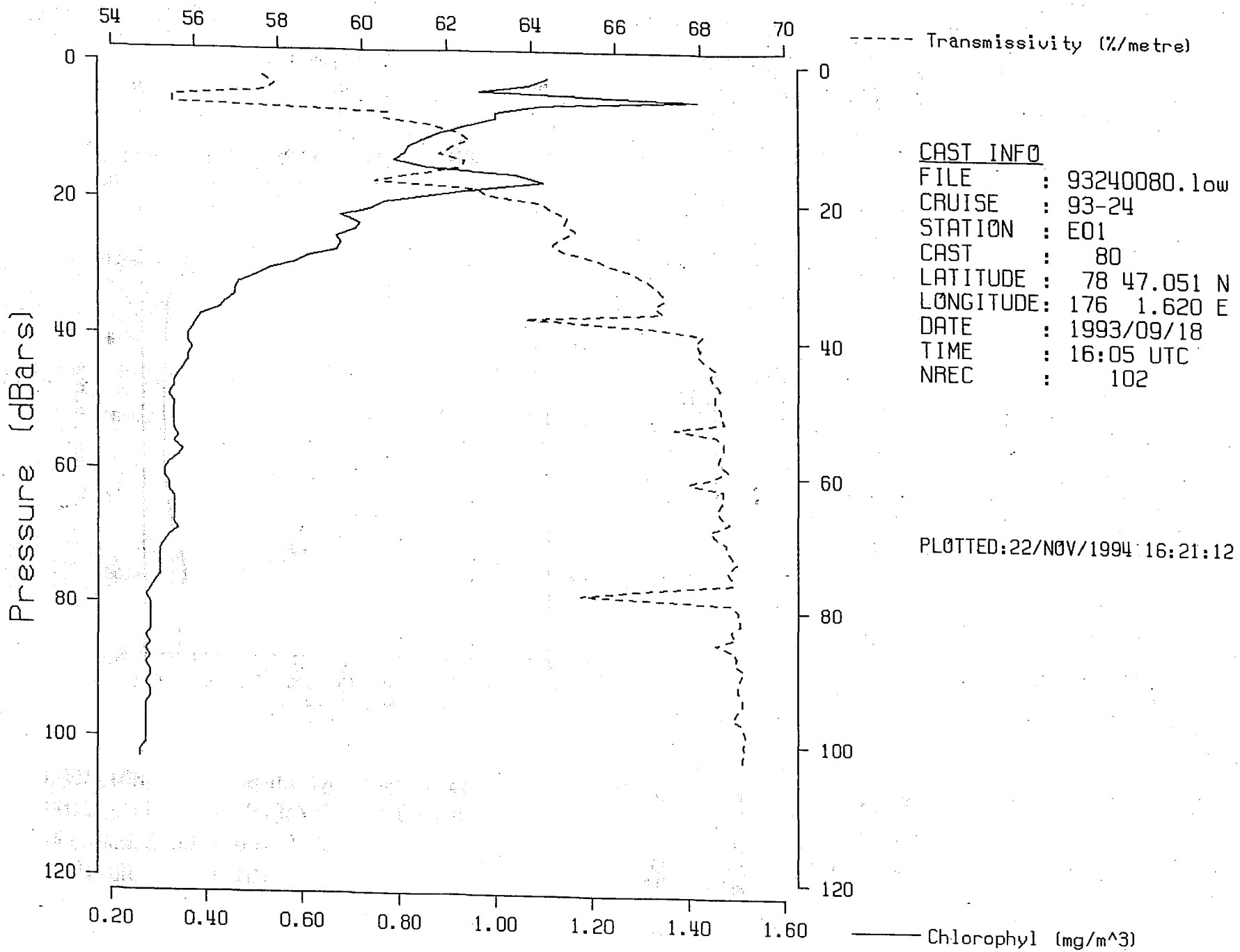
PLOTTED:22/NOV/1994 16:00:29

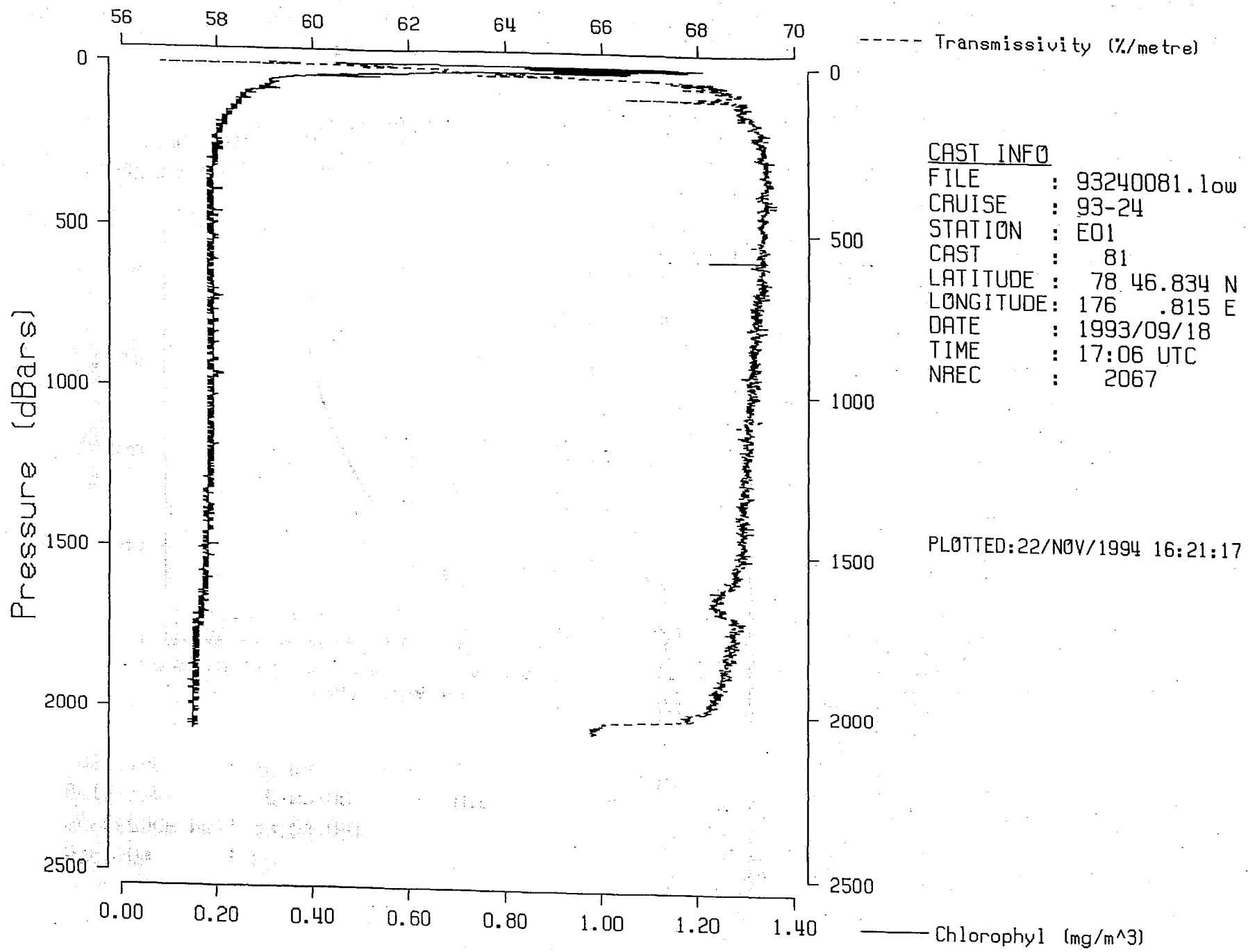
NOGAP 1993
Henry Larsen
STATION : E01
REFERENCE NO.: 93-24-080
DATE/TIME : 18/09/93 16:05 UTC
POSITION : 78-47.1N 176- 1.6E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.649	-1.649	25.081	2	20.122	.00	57.7	1.11	
10	-1.648	-1.648	30.551	10	24.562	.44	62.3	.89	
20	-1.589	-1.589	31.090	20	24.998	.75	64.2	.77	
30	-1.683	-1.684	32.584	30	26.214	.99	66.4	.53	
50	-1.786	-1.787	33.556	50	27.006	1.27	68.5	.33	
75	-1.757	-1.758	33.852	74	27.246	1.50	68.7	.30	
100	-1.556	-1.558	34.069	99	27.418	1.69	69.0	.27	
103	-1.534	-1.536	34.086	102	27.430	1.71	69.0	.26	





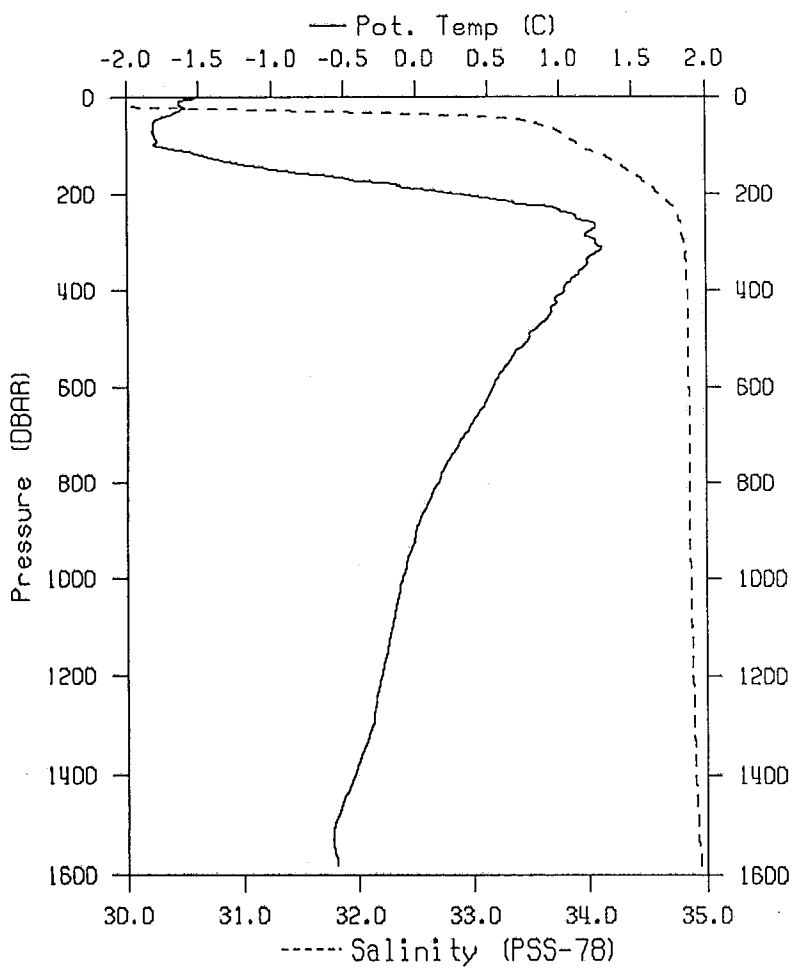

54
56
58
60
62
64
66
68
70
----- Transmissivity (%/metre)
0
20
40
60
80
100
120
Pressure (dBars)
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240080.low
CRUISE : 93-24
STATION : E01
CAST : 80
LATITUDE : 78 47.051 N
LONGITUDE: 176 1.620 E
DATE : 1993/09/18
TIME : 16:05 UTC
NREC : 102
PLOTTED:22/NOV/1994 16:21:12

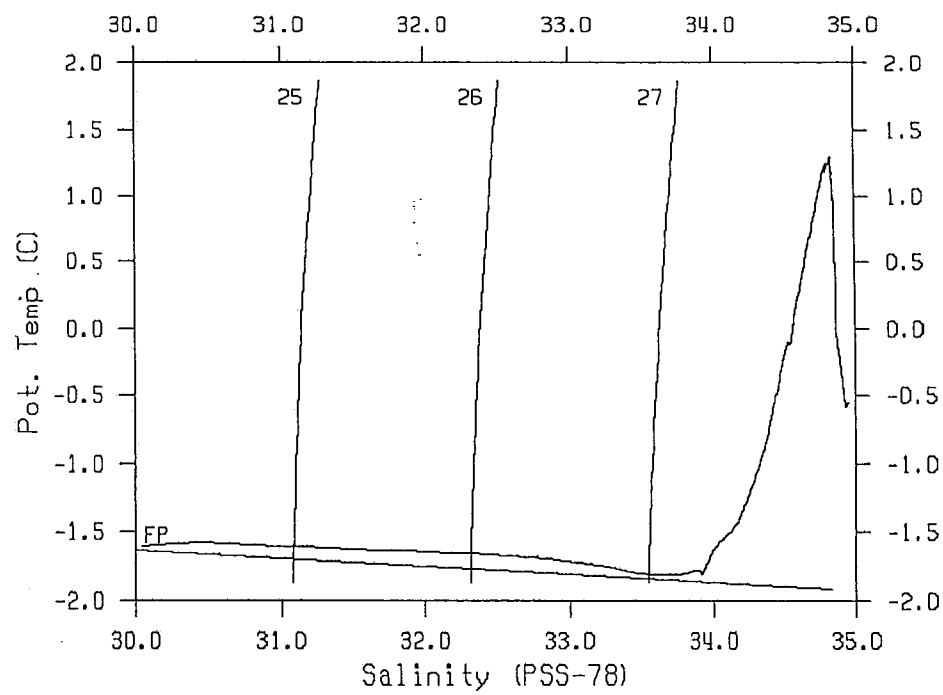

56
58
60
62
64
66
68
70
Transmissivity (%/metre)
0
500
1000
1500
2000
2500
Pressure (dBars)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240081.low
CRUISE : 93-24
STATION : E01
CAST : 81
LATITUDE : 78 46.834 N
LONGITUDE: 176 .815 E
DATE : 1993/09/18
TIME : 17:06 UTC
NREC : 2067
PLOTTED:22/NOV/1994 16:21:17

PLOTTED:29/NOV/1994 12:27:41

NOGAP 1993
Henry Larsen
STATION : E02
REFERENCE NO.: 93-24-082
DATE/TIME : 19/09/93 01:54 UTC
POSITION : 77-57.4N 175-51.8E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
1	-1.5115	-1.5115	28.450	1	22.855	.00			
10	-1.6290	-1.6291	29.829	10	23.975	.40			
20	-1.5976	-1.5979	30.146	20	24.232	.78			
30	-1.6389	-1.6394	31.856	30	25.622	1.08			
50	-1.8005	-1.8014	33.503	50	26.964	1.43			
75	-1.8055	-1.8069	33.782	74	27.191	1.67			
100	-1.7911	-1.7930	33.930	99	27.311	1.87			
150	-.9660	-.9702	34.339	149	27.616	2.17			
200	.3023	.2944	34.615	198	27.779	2.36			
250	1.1329	1.1211	34.772	247	27.854	2.50			
300	1.2641	1.2495	34.821	297	27.884	2.62			
400	1.0550	1.0359	34.845	396	27.919	2.82			
500	.8108	.7874	34.855	494	27.943	3.00			
750	.2702	.2367	34.858	741	27.979	3.37			
1000	-.0467	-.0909	34.870	987	28.006	3.64			
1250	-.2240	-.2803	34.891	1234	28.033	3.84			
1500	-.5073	-.5748	34.925	1479	28.075	3.93			
1581	-.4820	-.5546	34.949	1559	28.093	3.93			

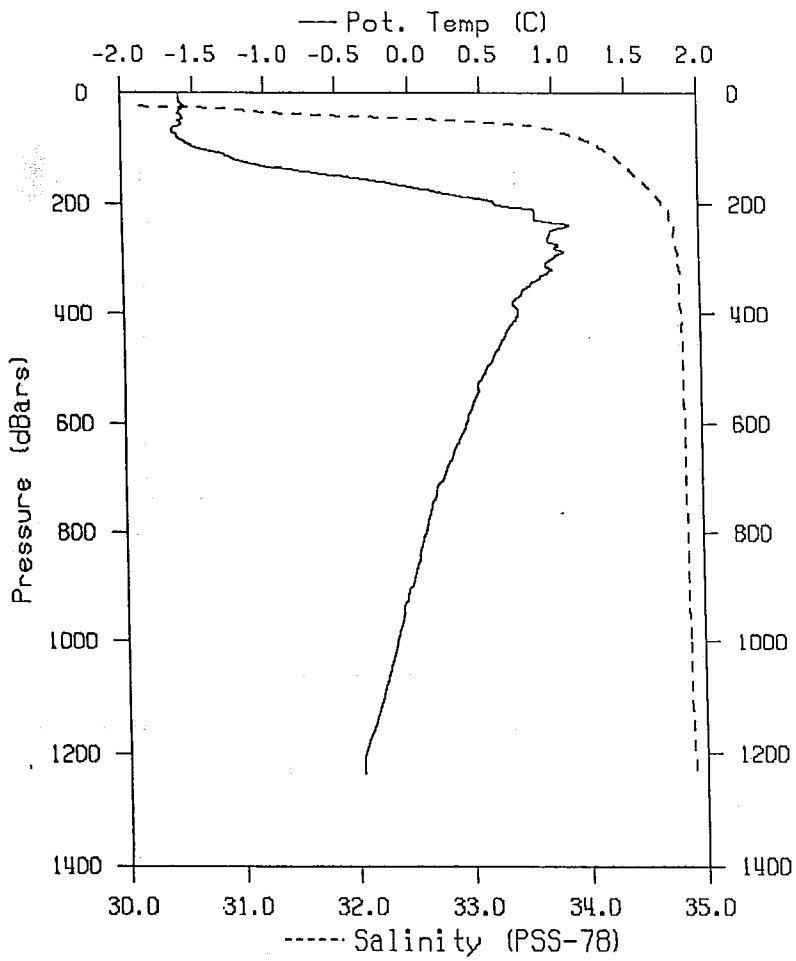


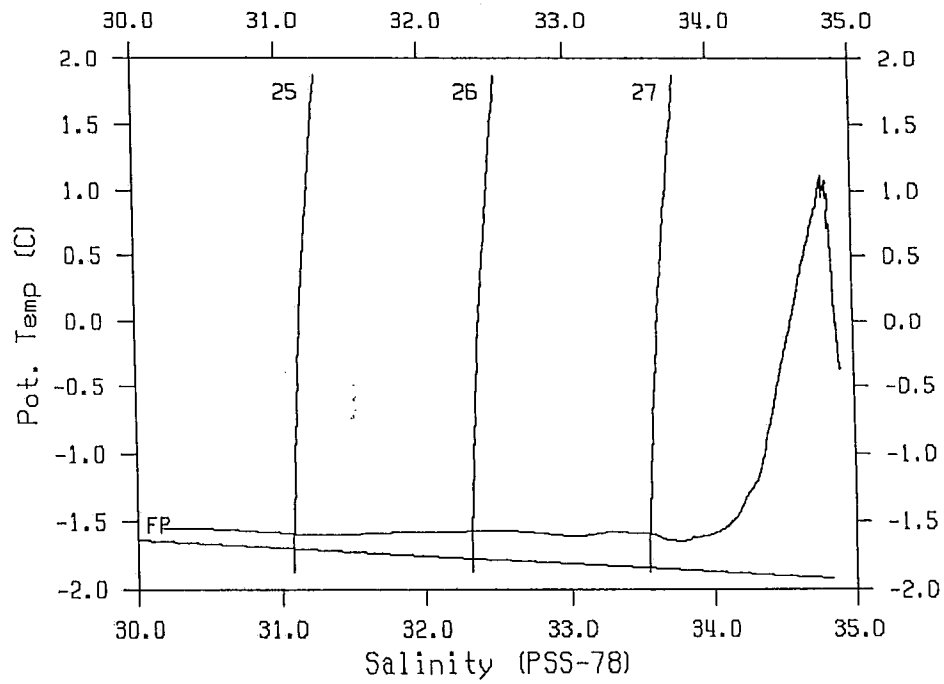


PLOTTED:29/NOV/1994 12:28:06

NOGAP 1993
Henry Larsen
STATION : E03
REFERENCE NO.: 93-24-083
DATE/TIME : 19/09/93 07:10 UTC
POSITION : 77-30.9N 175- .3E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.5914	-1.5914	29.390	0	23.618	.00			
10	-1.5948	-1.5949	29.403	10	23.629	.43			
20	-1.5766	-1.5768	29.572	20	23.766	.85			
30	-1.5860	-1.5864	31.014	30	24.937	1.20			
50	-1.6029	-1.6038	32.984	50	26.537	1.65			
75	-1.6099	-1.6114	33.896	74	27.278	1.93			
100	-1.4561	-1.4584	34.171	99	27.497	2.10			
150	-.4642	-.4690	34.467	149	27.699	2.34			
200	.6044	.5960	34.688	198	27.820	2.50			
250	.9942	.9827	34.790	247	27.878	2.63			
300	1.0039	.9899	34.820	297	27.901	2.73			
400	.7600	.7418	34.842	396	27.936	2.92			
500	.5418	.5195	34.849	494	27.955	3.08			
750	.1626	.1298	34.864	741	27.990	3.41			
1000	-.0816	-.1255	34.882	988	28.018	3.65			
1235	-.3138	-.3683	34.906	1219	28.049	3.80			

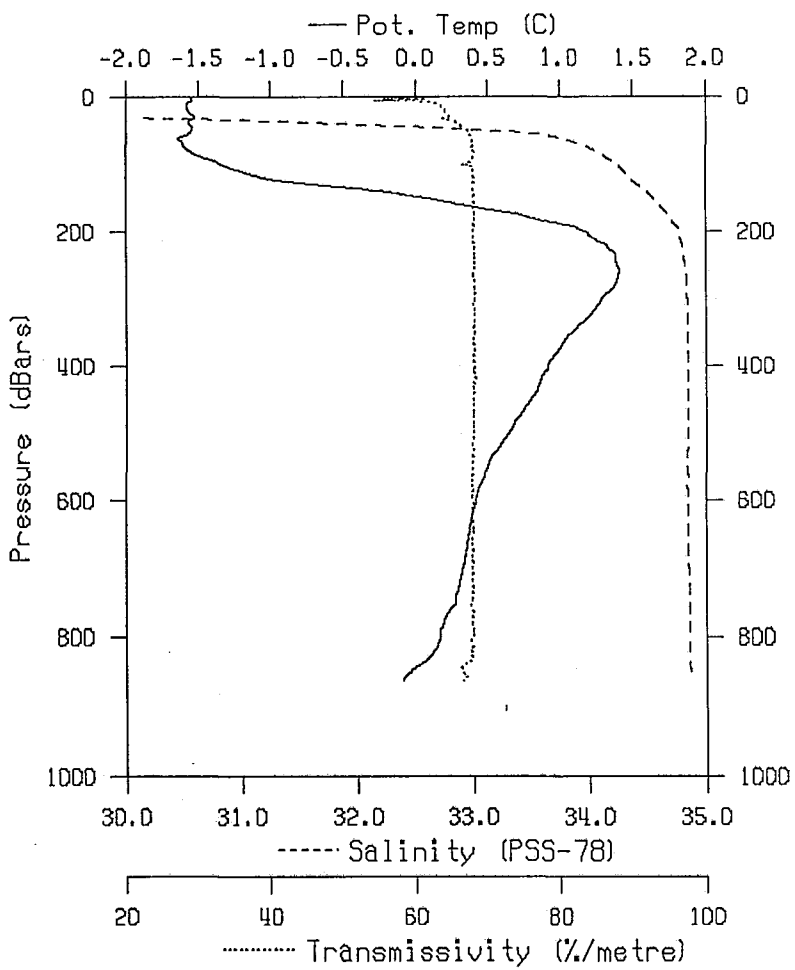


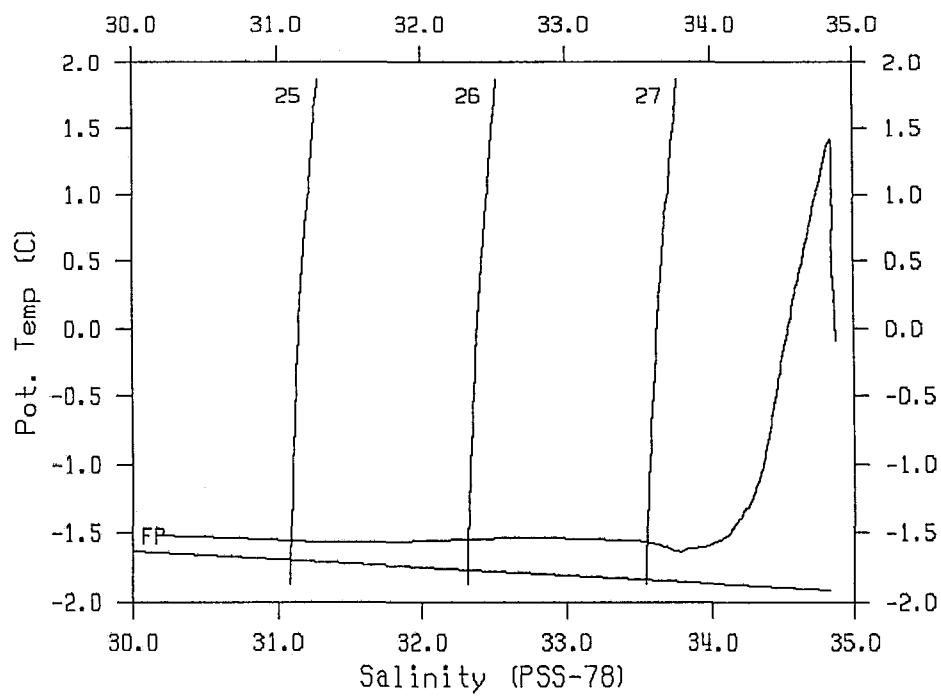


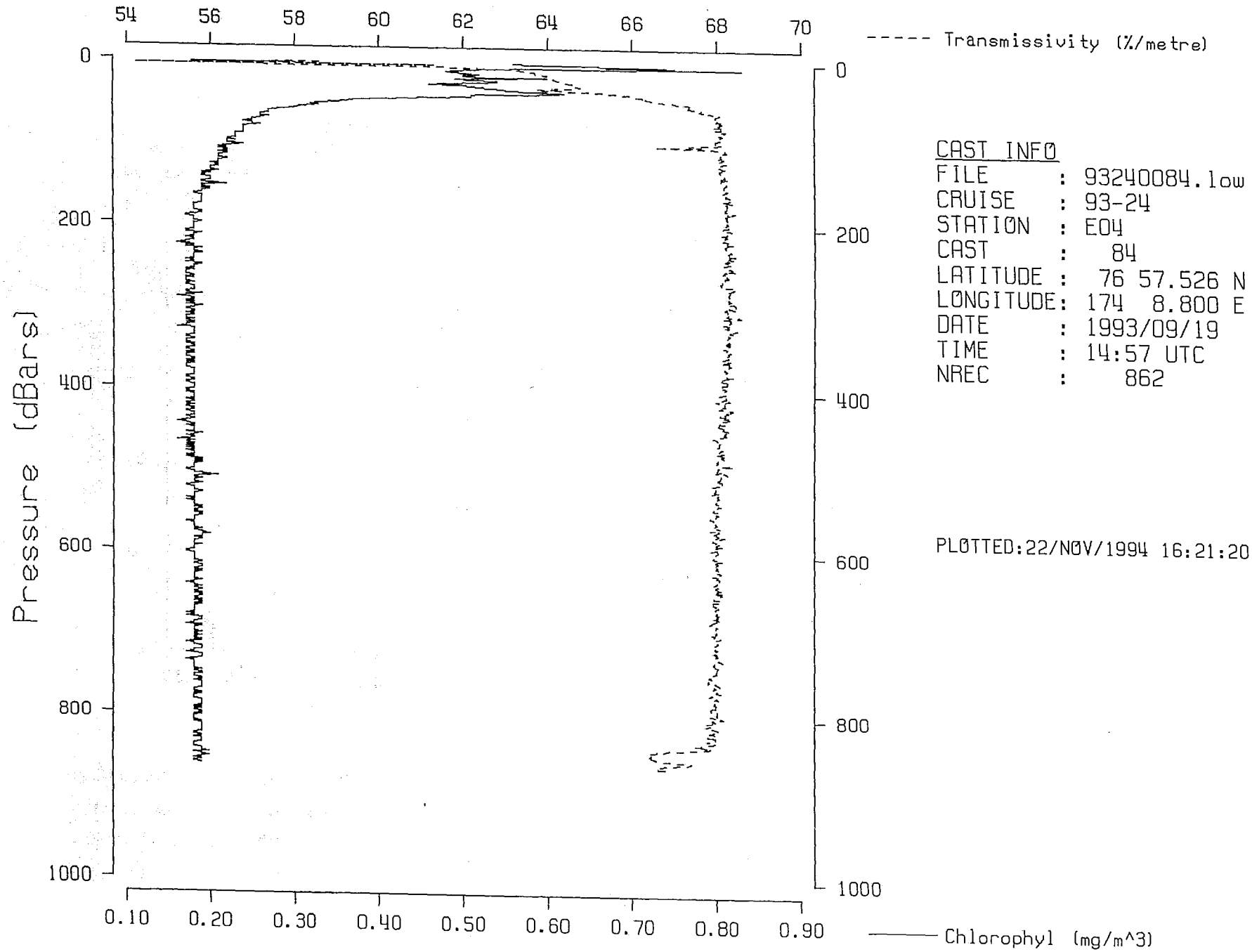
PLOTTED:22/NOV/1994 16:01:21

NOGAP 1993
Henry Larsen
STATION : E04
REFERENCE NO.: 93-24-084
DATE/TIME : 19/09/93 14:57 UTC
POSITION : 76-57.5N 174- 8.8E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.553	-1.553	29.289	2	23.536	.00	58.6	.56	
10	-1.574	-1.574	29.286	10	23.534	.35	63.3	.51	
20	-1.571	-1.571	29.308	20	23.552	.78	64.2	.53	
30	-1.519	-1.520	29.947	30	24.069	1.19	64.8	.51	
50	-1.546	-1.547	33.123	50	26.648	1.71	67.4	.35	
75	-1.585	-1.587	33.997	74	27.360	1.97	67.9	.24	
100	-1.325	-1.328	34.240	99	27.549	2.12	67.6	.22	
150	.078	.073	34.556	149	27.744	2.34	68.2	.19	
200	1.187	1.178	34.778	198	27.855	2.49	68.1	.19	
250	1.406	1.394	34.830	247	27.882	2.60	68.2	.19	
300	1.304	1.289	34.845	297	27.901	2.71	68.3	.17	
400	.941	.922	34.849	396	27.929	2.90	68.1	.18	
500	.676	.654	34.848	494	27.946	3.07	68.1	.18	
750	.316	.282	34.859	741	27.977	3.43	67.9	.18	
863	-.051	-.088	34.872	853	28.008	3.56	66.8	.19	



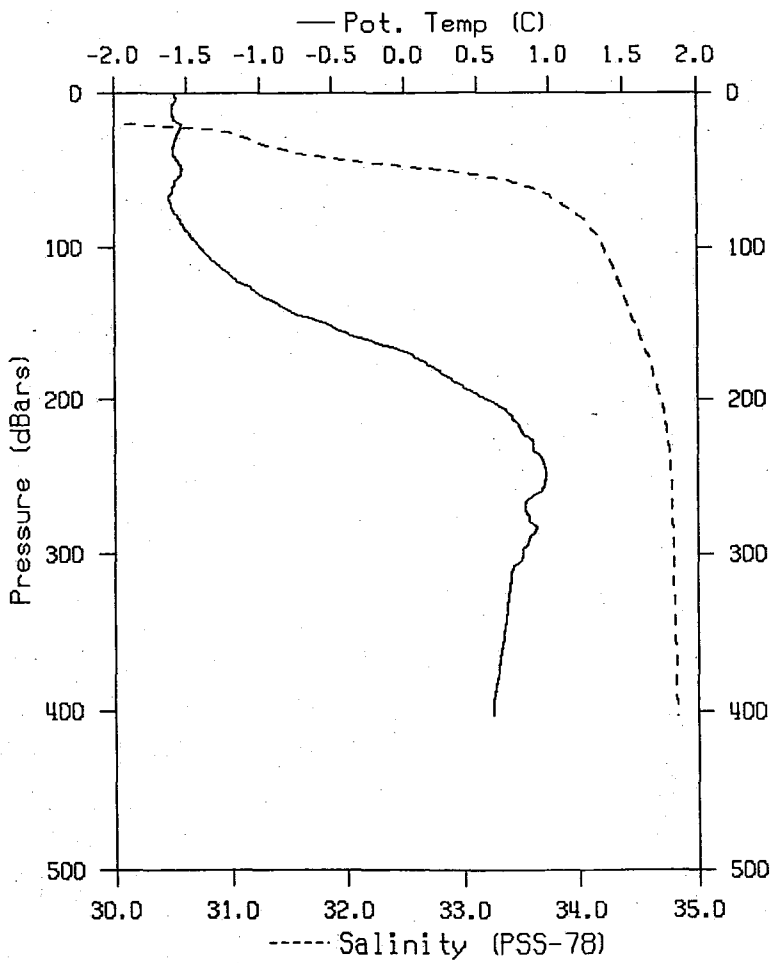


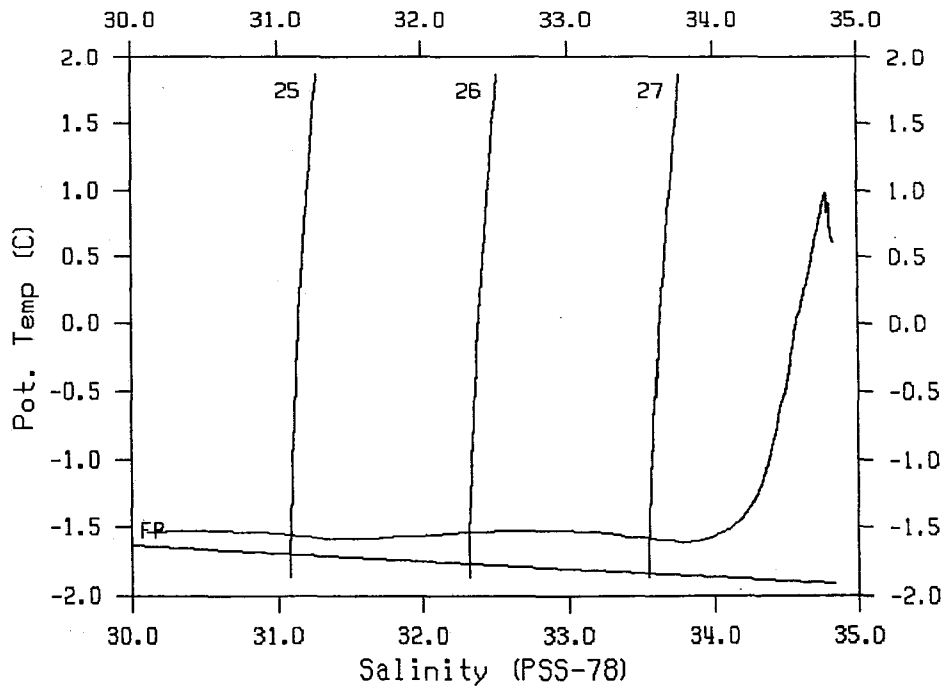

54
56
58
60
62
64
66
68
70
----- Transmissivity (%/metre)
0
200
400
600
800
1000
Pressure (dBars)
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240084.low
CRUISE : 93-24
STATION : E04
CAST : 84
LATITUDE : 76 57.526 N
LONGITUDE: 174 8.800 E
DATE : 1993/09/19
TIME : 14:57 UTC
NREC : 862
PLOTTED:22/NOV/1994 16:21:20

PLOTTED:29/NOV/1994 12:26:34

NOGAP 1993
Henry Larsen
STATION : E05
REFERENCE NO.: 93-24-085
DATE/TIME : 19/09/93 21:15 UTC
POSITION : 76-39.4N 173-38.0E

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
0	-1.5795	-1.5795	28.702	0	23.060	.00			
10	-1.5958	-1.5959	29.273	10	23.523	.46			
20	-1.5366	-1.5369	30.106	20	24.199	.86			
30	-1.5666	-1.5671	31.171	30	25.064	1.19			
50	-1.5258	-1.5267	32.792	50	26.379	1.64			
75	-1.5923	-1.5939	33.922	74	27.299	1.94			
100	-1.3985	-1.4008	34.221	99	27.536	2.10			
150	-.5520	-.5567	34.475	149	27.709	2.33			
200	.5733	.5649	34.690	198	27.824	2.49			
250	.9849	.9734	34.779	248	27.869	2.62			
300	.8281	.8146	34.797	297	27.894	2.72			
400	.6243	.6066	34.825	396	27.930	2.91			
403	.6243	.6064	34.824	399	27.930	2.92			

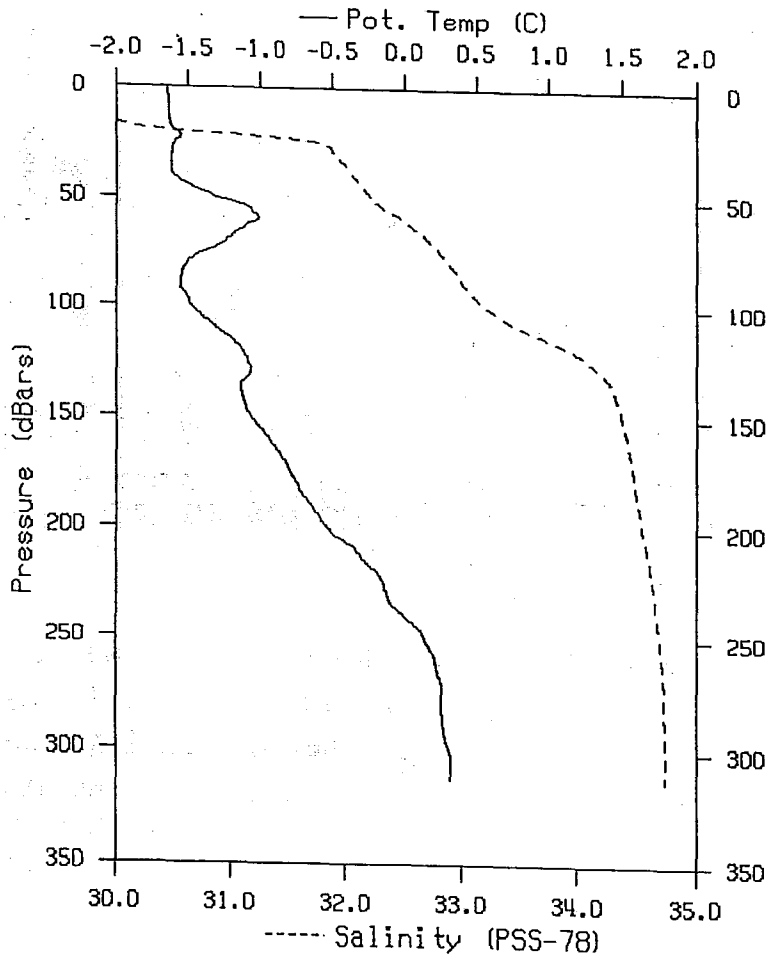


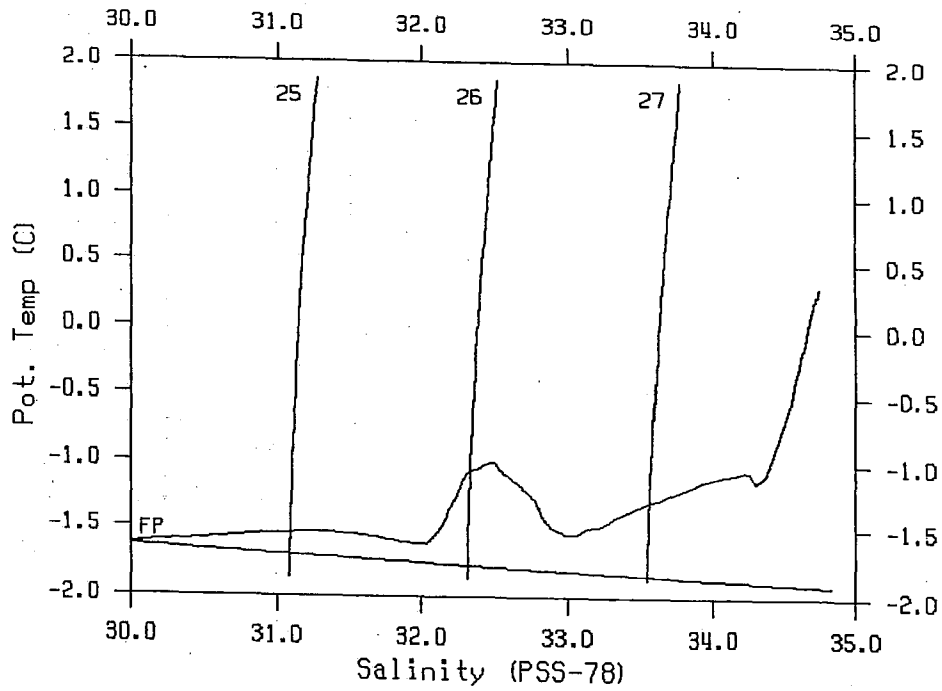


PLOTTED:29/NOV/1994 12:26:58

NOGAP 1993
Henry Larsen
STATION : F01
REFERENCE NO.: 93-24-086
DATE/TIME : 21/09/93 16:26 UTC
POSITION : 74-49.9N 172-59.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr Chl	PAR
0	-1.6358	-1.6358	29.755	0	23.916	.00		
10	-1.6319	-1.6320	29.856	10	23.997	.39		
20	-1.5740	-1.5743	30.600	20	24.601	.75		
30	-1.6074	-1.6079	31.891	30	25.650	1.04		
50	-1.2978	-1.2988	32.229	50	25.917	1.48		
75	-1.3773	-1.3788	32.822	74	26.400	1.94		
100	-1.4734	-1.4755	33.231	99	26.735	2.30		
150	-1.0542	-1.0582	34.379	149	27.653	2.73		
200	-.5303	-.5368	34.547	198	27.767	2.92		
250	.1594	.1497	34.694	248	27.851	3.06		
300	.3310	.3187	34.742	297	27.880	3.17		
313	.3401	.3273	34.744	310	27.882	3.20		

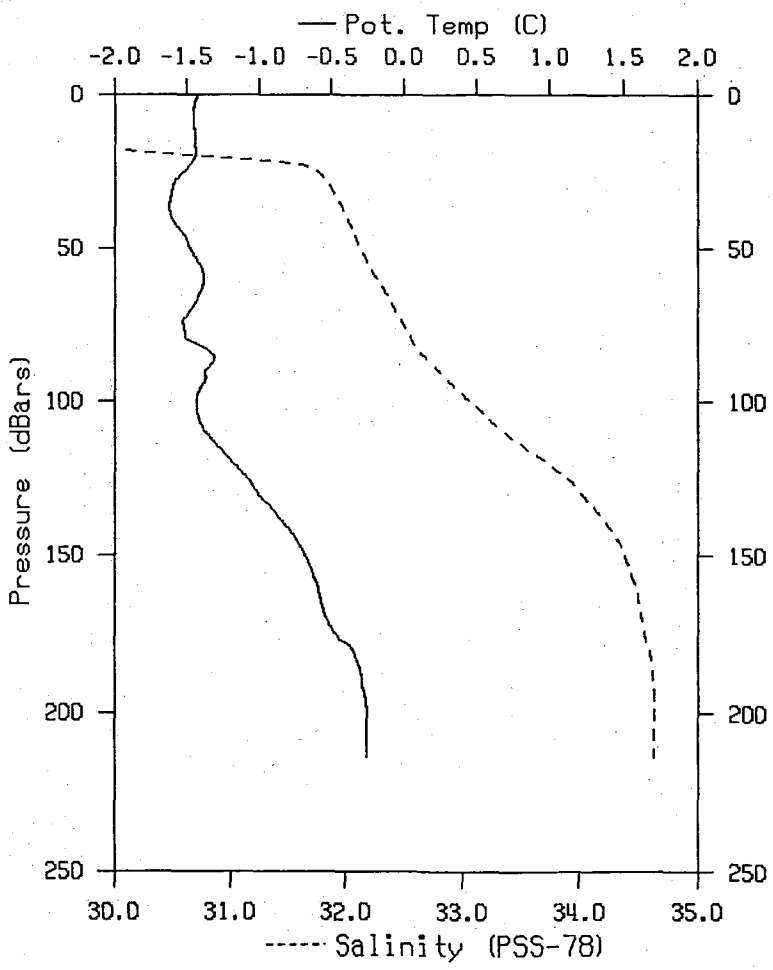


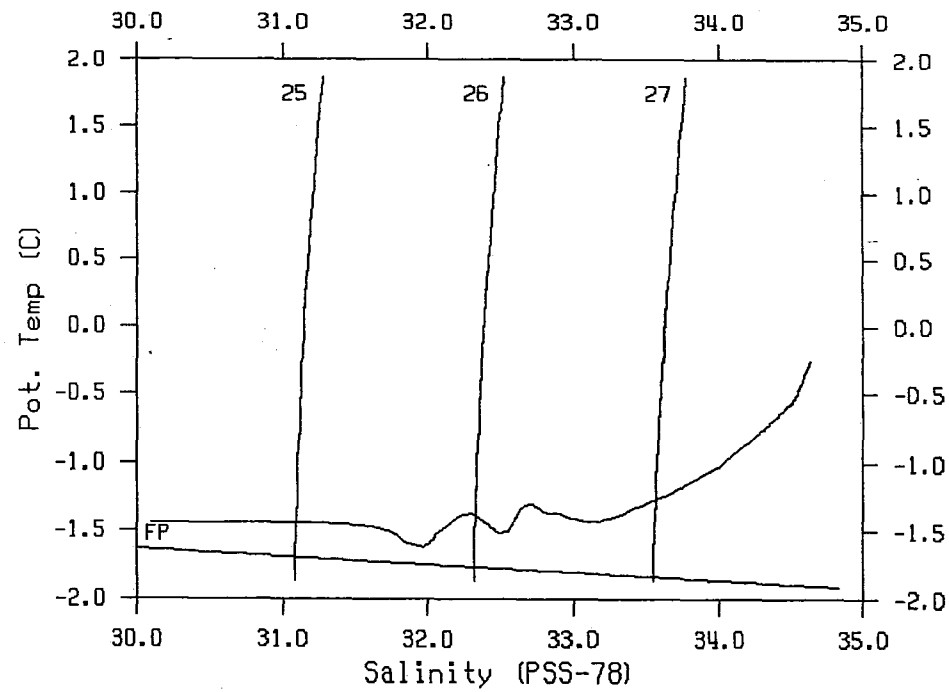


PLOTTED:29/NOV/1994 12:29:22

NOGAP 1993
Henry Larsen
STATION : F02
REFERENCE NO.: 93-24-087
DATE/TIME : 21/09/93 19:09 UTC
POSITION : 74-30.1N 170-59.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr Chl	PAR
0	-1.4259	-1.4259	29.501	0	23.706	.00		
10	-1.4501	-1.4502	29.559	10	23.753	.42		
20	-1.4358	-1.4361	30.791	20	24.753	.78		
30	-1.5935	-1.5940	31.868	30	25.631	1.06		
50	-1.4708	-1.4717	32.133	50	25.843	1.51		
75	-1.5183	-1.5197	32.502	74	26.144	2.01		
100	-1.4274	-1.4295	33.082	99	26.612	2.41		
150	-.6798	-.6843	34.386	149	27.643	2.88		
200	-.2489	-.2559	34.633	198	27.823	3.05		
214	-.2472	-.2547	34.632	212	27.823	3.09		

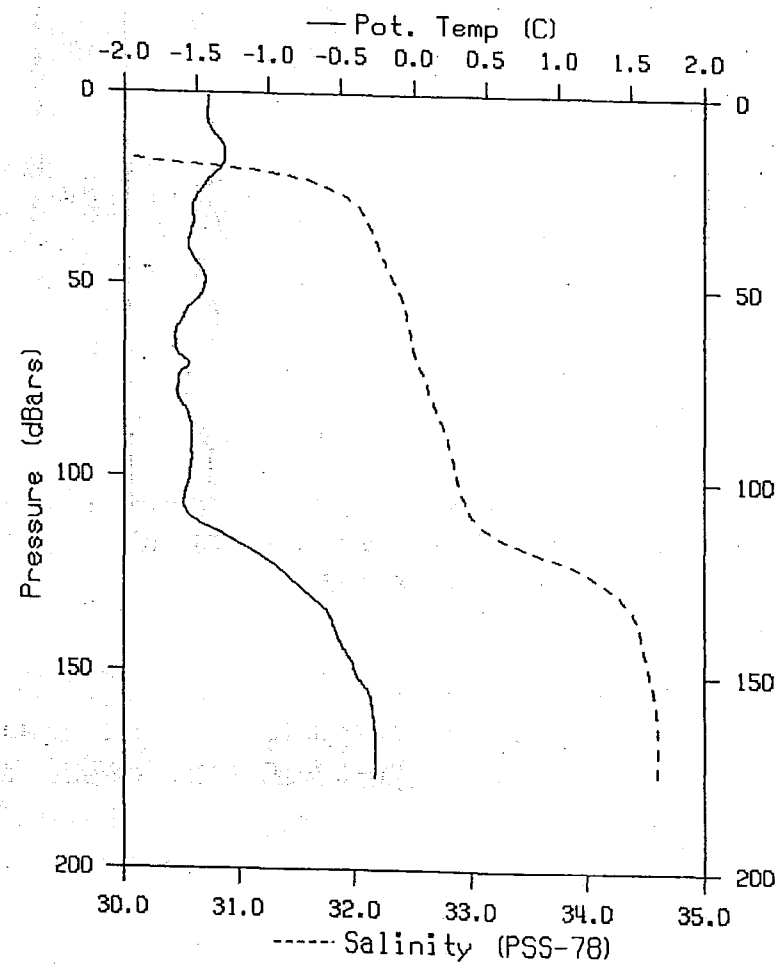


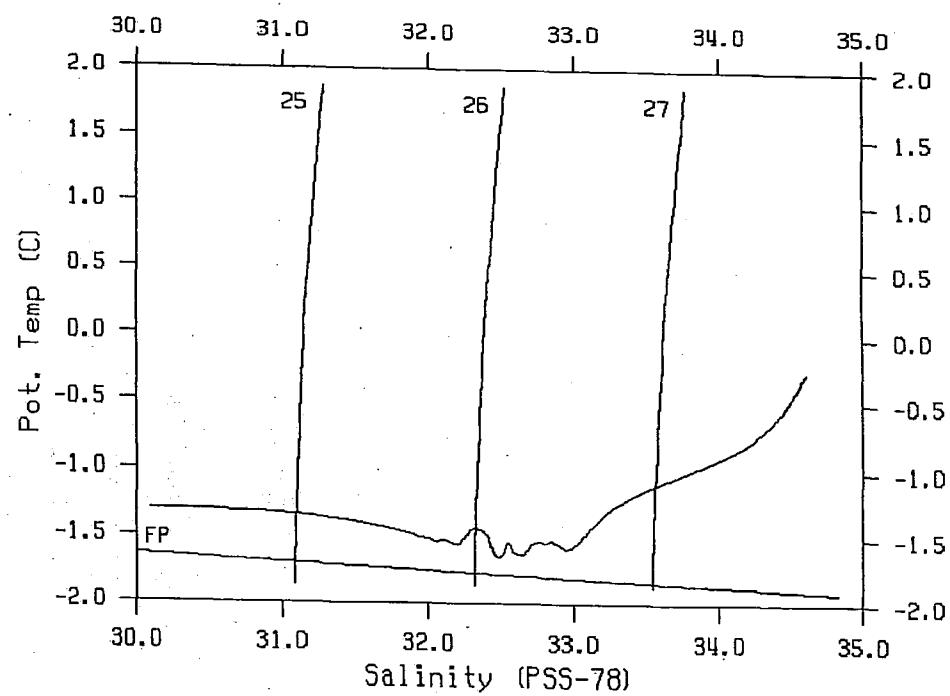


PLOTTED:29/NOV/1994 12:29:45

NOGAP 1993
Henry Larsen
STATION : F03
REFERENCE NO.: 93-24-088
DATE/TIME : 22/09/93 01:36 UTC
POSITION : 73-60.0N 168-59.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
1	-1.4161	-1.4161	28.931	1	23.244	.00			
10	-1.3777	-1.3778	29.148	10	23.419	.41			
20	-1.3402	-1.3405	31.195	20	25.079	.77			
30	-1.5276	-1.5281	32.050	30	25.777	1.03			
50	-1.4358	-1.4367	32.349	50	26.017	1.45			
75	-1.6183	-1.6196	32.606	74	26.231	1.91			
100	-1.5382	-1.5401	32.880	99	26.451	2.33			
150	-.3931	-.3980	34.544	149	27.758	2.80			
176	-.2592	-.2653	34.607	174	27.803	2.88			

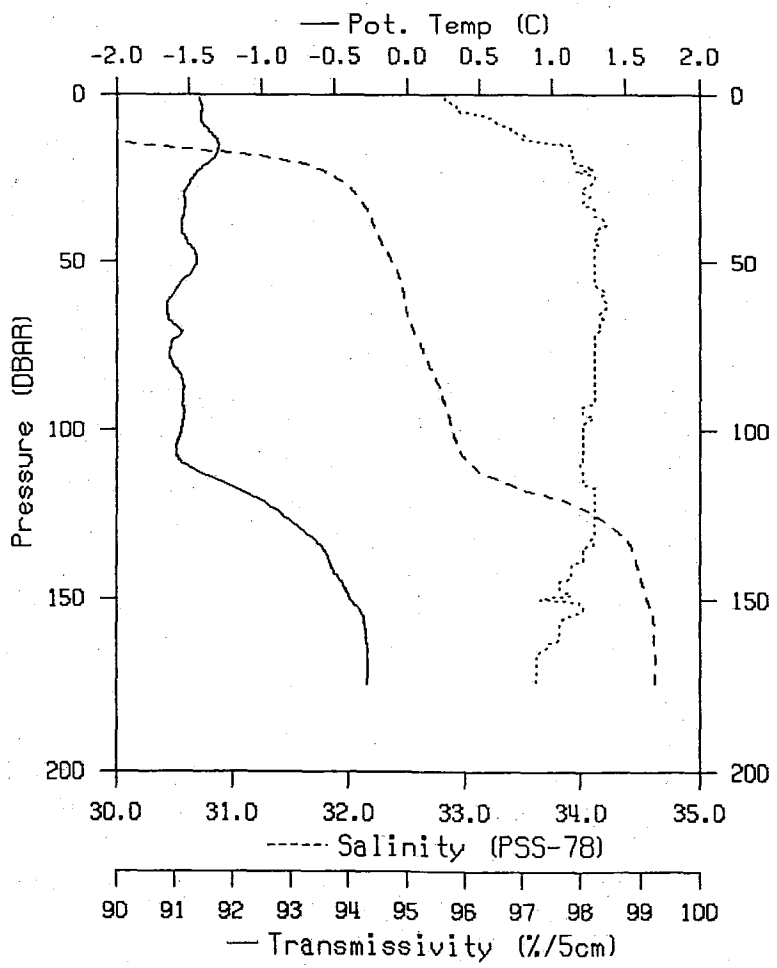


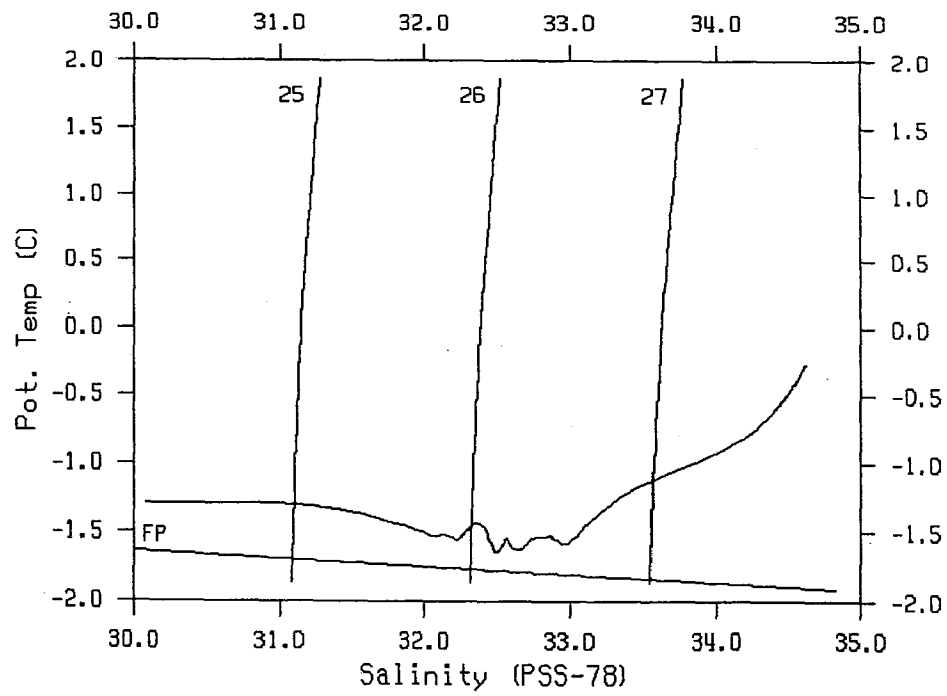


PLOTTED:29/NOV/1994 13:58:39

NOGAP 1993
Henry Larsen
STATION : F03
REFERENCE NO.: 93-24-089
DATE/TIME : 22/09/93 01:36 UTC
POSITION : 73-60.0N 168-59.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4231	-1.4231	29.184	1	23.449	.00	95.66		
10	-1.3739	-1.3740	29.449	10	23.664	.39	96.78		
20	-1.3601	-1.3605	31.535	20	25.355	.73	97.84		
30	-1.5294	-1.5299	32.078	30	25.800	.97	98.16		
50	-1.4415	-1.4424	32.378	50	26.041	1.38	98.23		
75	-1.6207	-1.6220	32.622	74	26.243	1.85	98.23		
100	-1.5450	-1.5469	32.893	99	26.462	2.26	98.03		
150	-.3888	-.3938	34.559	149	27.770	2.73	97.29		
175	-.2656	-.2716	34.623	173	27.816	2.80	97.20		

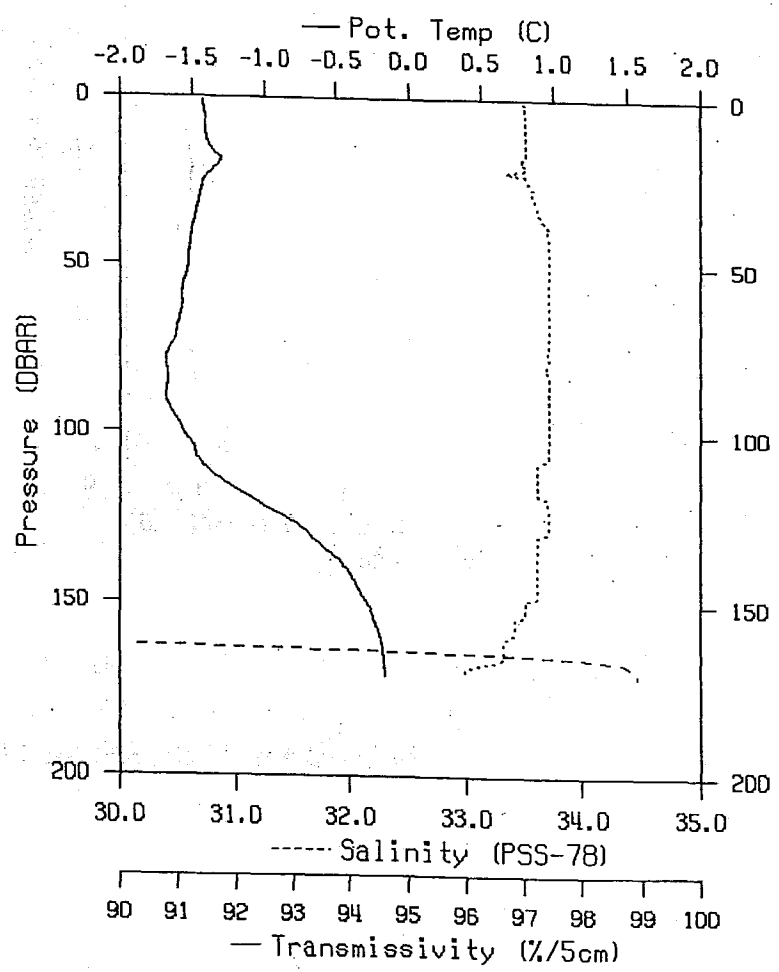


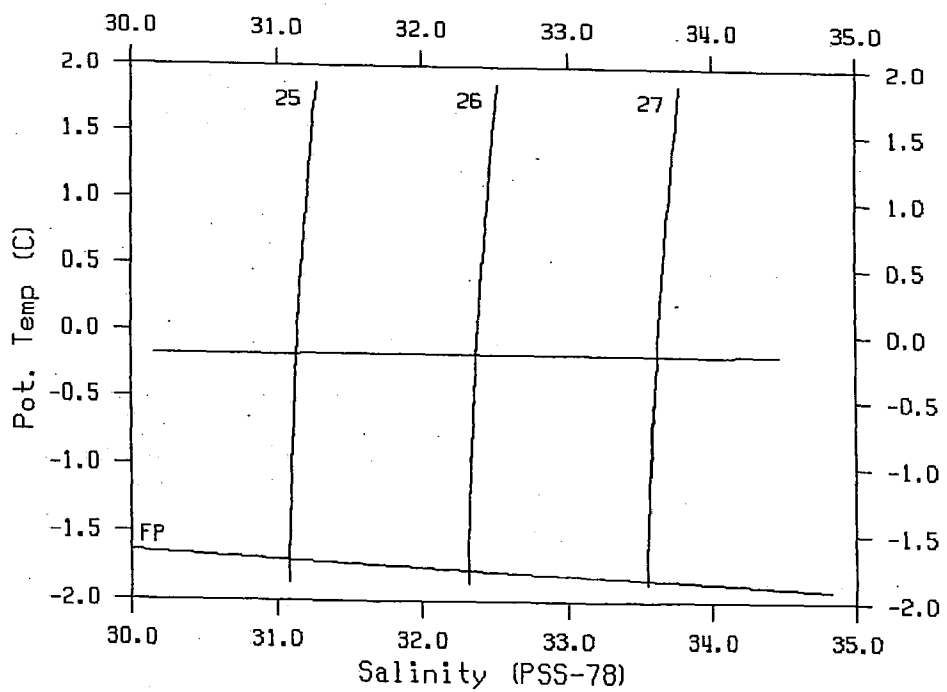


PLOTTED:29/NOV/1994 13:58:46

NOGAP 1993
Henry Larsen
STATION : F05
REFERENCE NO.: 93-24-090
DATE/TIME : 22/09/93 05:23 UTC
POSITION : 73-50.0N 167-59.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.4258	-1.4258	17.388	1	13.888	.00	96.98		
10	-1.4054	-1.4053	17.837	10	14.252	1.21	97.04		
20	-1.3162	-1.3160	17.952	20	14.347	2.54	97.04		
30	-1.4457	-1.4454	18.092	30	14.457	3.85	97.19		
50	-1.5253	-1.5248	18.347	50	14.663	6.44	97.44		
75	-1.6472	-1.6465	18.637	75	14.894	9.63	97.39		
100	-1.5572	-1.5563	18.684	100	14.935	12.79	97.44		
150	-.2752	-.2761	19.754	150	15.816	18.87	97.04		
171	-.1534	-.1594	34.465	171	27.683	20.14	96.06		

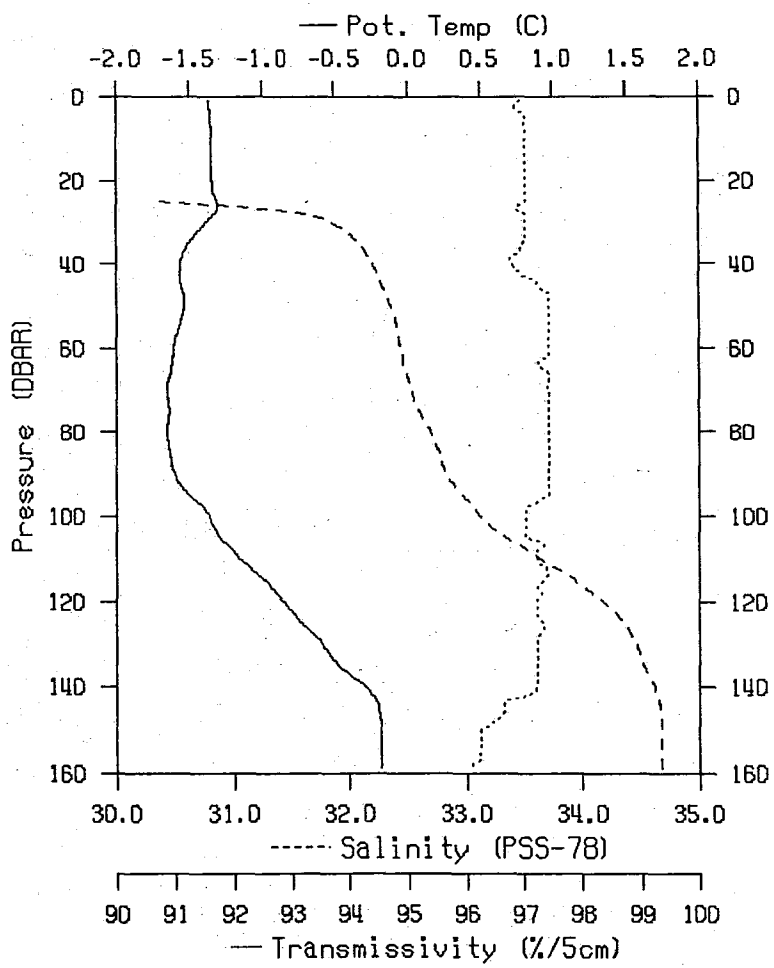


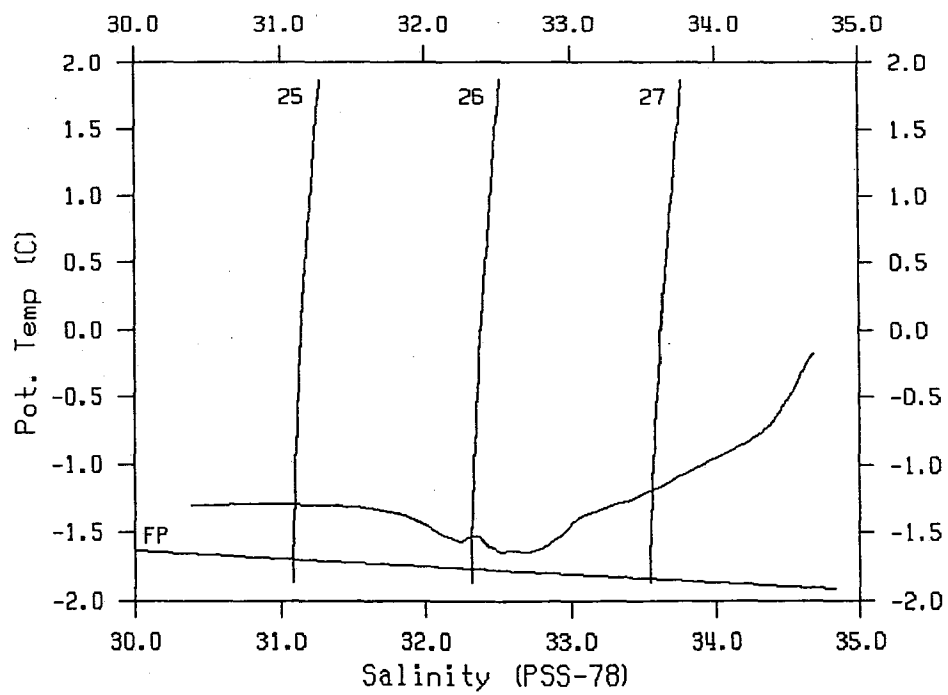


PLOTTED:29/NOV/1994 13:58:52

NOGAP 1993
Henry Larsen
STATION : F06
REFERENCE NO.: 93-24-091
DATE/TIME : 22/09/93 06:44 UTC
POSITION : 73-44.7N 167-30.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.3639	-1.3639	29.070	1	23.356	.00	96.94		
10	-1.3475	-1.3476	29.087	10	23.369	.41	97.04		
20	-1.3413	-1.3416	29.269	20	23.517	.85	97.04		
30	-1.3742	-1.3747	31.849	30	25.610	1.18	97.04		
50	-1.5284	-1.5293	32.357	50	26.026	1.62	97.44		
75	-1.6316	-1.6329	32.603	74	26.229	2.09	97.44		
100	-1.3617	-1.3638	33.127	99	26.647	2.48	97.04		
150	-.1778	-.1831	34.676	149	27.854	2.88	96.25		
159	-.1772	-.1828	34.677	158	27.855	2.90	96.11		

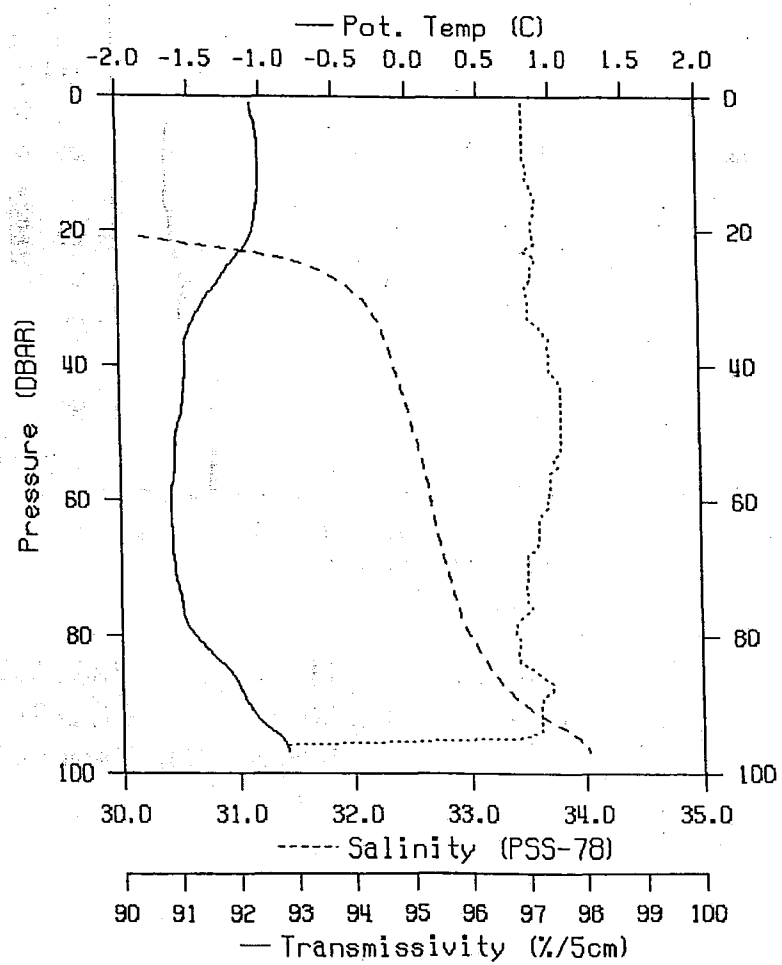


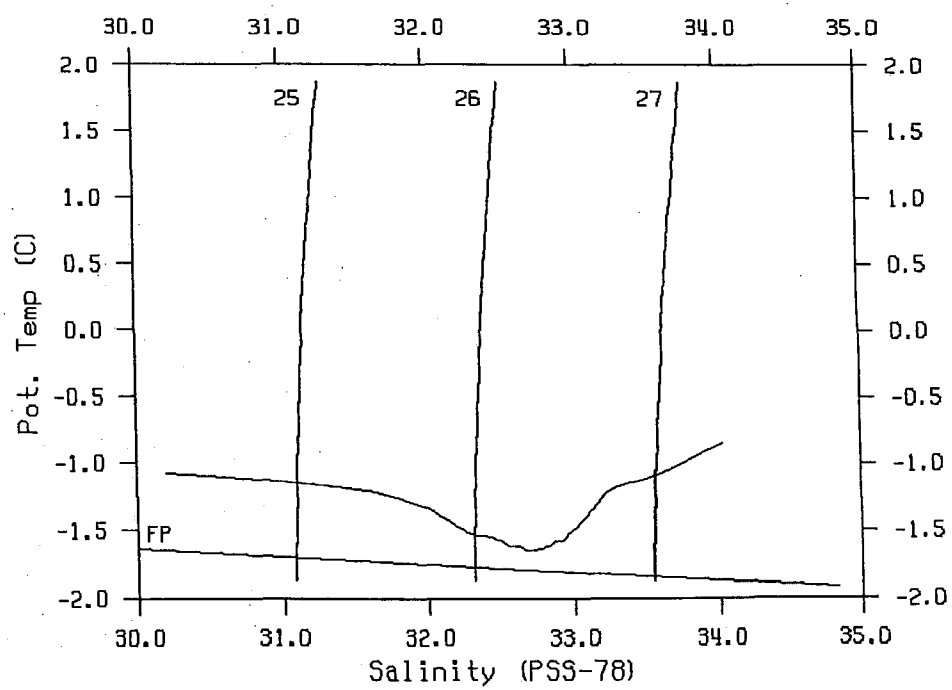


PLOTTED:29/NOV/1994 13:58:59

NOGAP 1993
Henry Larsen
STATION : F08
REFERENCE NO.: 93-24-092
DATE/TIME : 22/09/93 08:02 UTC
POSITION : 73-34.9N 166-29.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-1.0594	-1.0594	29.213	1	23.466	.00	97.04		
10	-1.0175	-1.0177	29.263	10	23.506	.40	97.07		
20	-1.0625	-1.0628	29.917	20	24.037	.81	97.16		
30	-1.3966	-1.3972	32.103	30	25.816	1.11	97.07		
50	-1.6025	-1.6034	32.545	50	26.181	1.51	97.64		
75	-1.5707	-1.5721	32.895	74	26.464	1.93	97.04		
97	-.8465	-.8492	34.031	96	27.362	2.18	89.42		

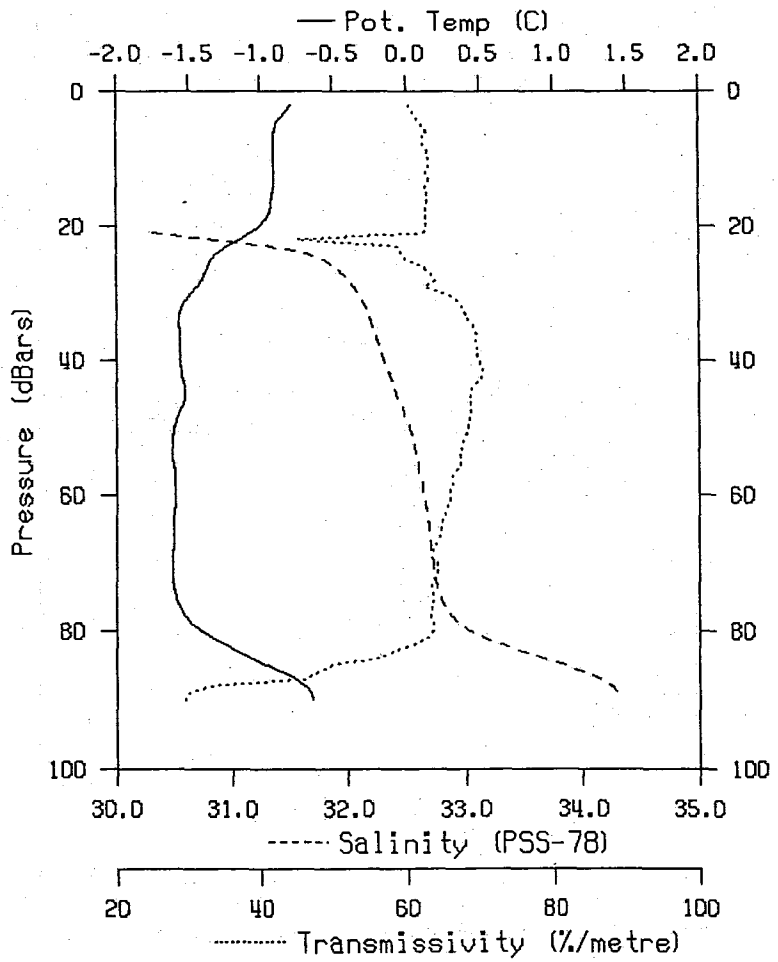


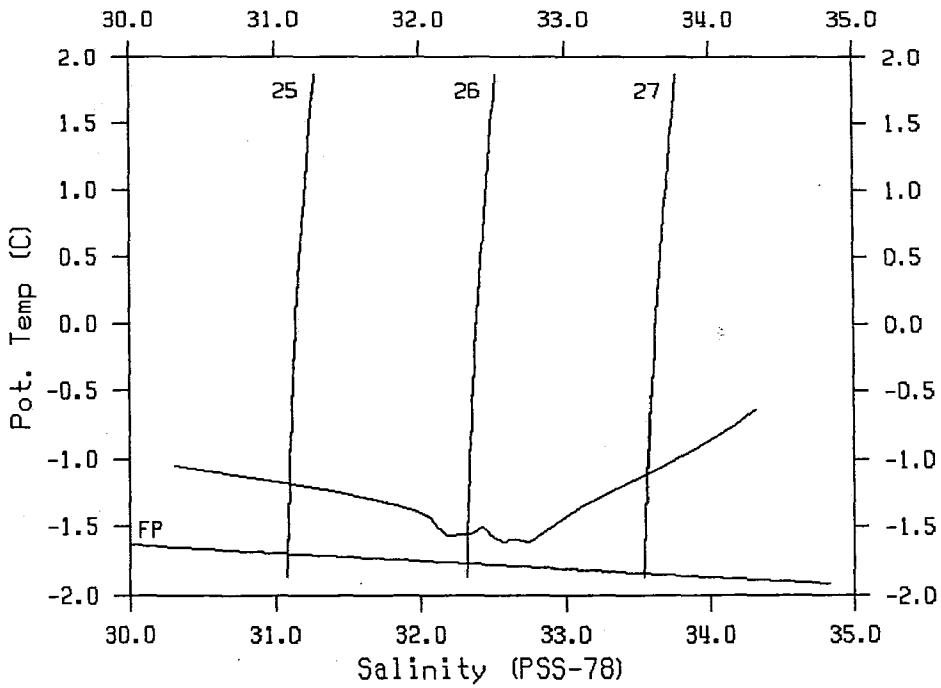


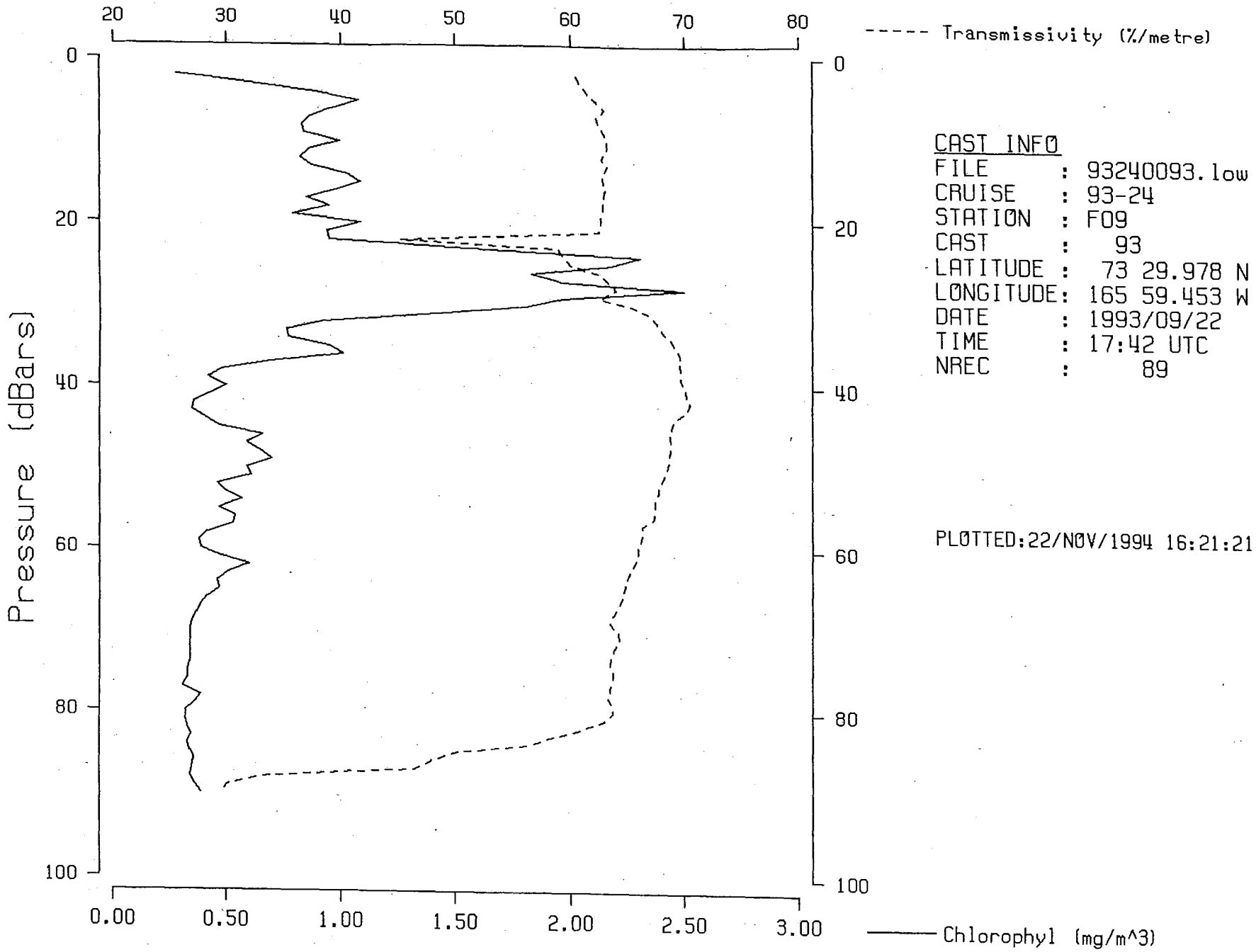
PLOTTED:22/NOV/1994 16:01:47

NOGAP 1993
Henry Larsen
STATION : F09
REFERENCE NO.: 93-24-093
DATE/TIME : 22/09/93 17:42 UTC
POSITION : 73-30.0N 165-59.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-.788	-.788	21.764	2	17.438	.00	60.5	.28	
10	-.903	-.903	29.208	10	23.459	.58	63.2	1.00	
20	-.996	-.996	29.947	20	24.059	1.00	62.7	1.09	
30	-1.476	-1.476	32.098	30	25.814	1.30	65.4	1.81	
50	-1.597	-1.598	32.530	50	26.168	1.70	68.4	.59	
75	-1.585	-1.586	32.795	74	26.383	2.13	63.7	.33	
90	-.632	-.635	34.325	89	27.592	2.29	29.5	.39	



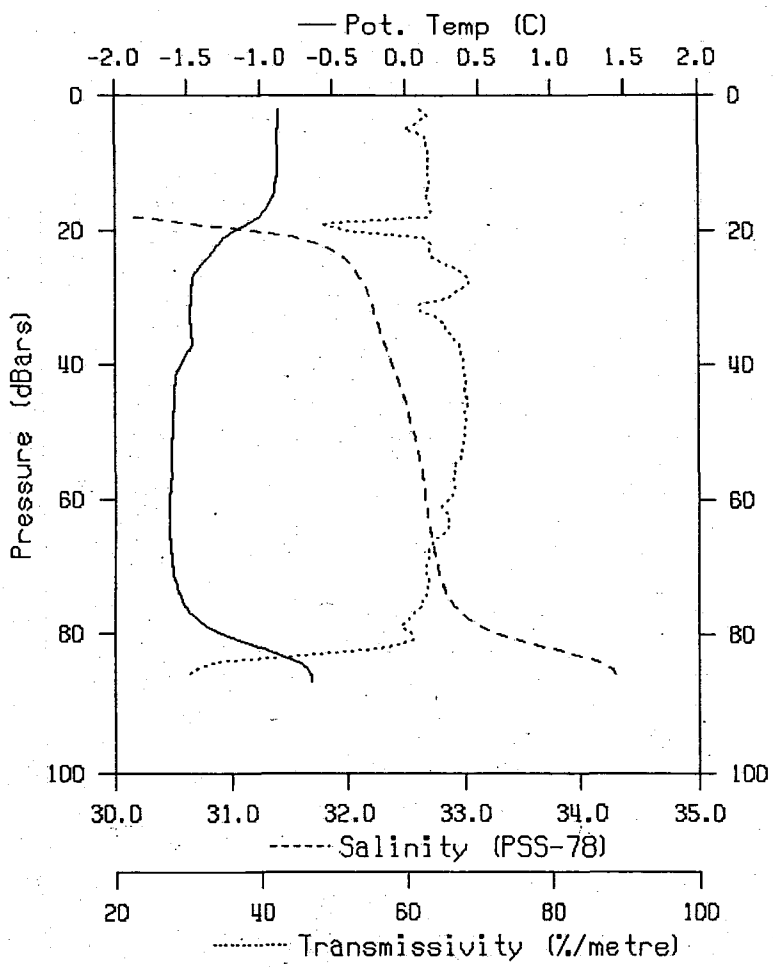


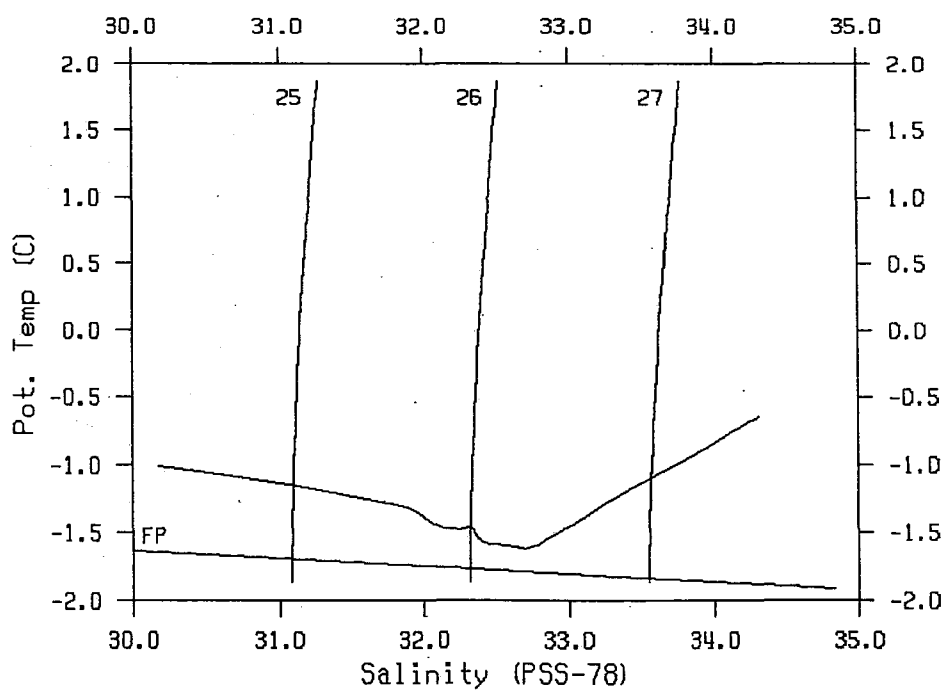

20
30
40
50
60
70
80
----- Transmissivity (%/metre)
0
20
40
60
80
100
Pressure (dBars)
0.00
0.50
1.00
1.50
2.00
2.50
3.00
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240093.low
CRUISE : 93-24
STATION : F09
CAST : 93
LATITUDE : 73 29.978 N
LONGITUDE: 165 59.453 W
DATE : 1993/09/22
TIME : 17:42 UTC
NREC : 89
PLOTTED:22/NOV/1994 16:21:21

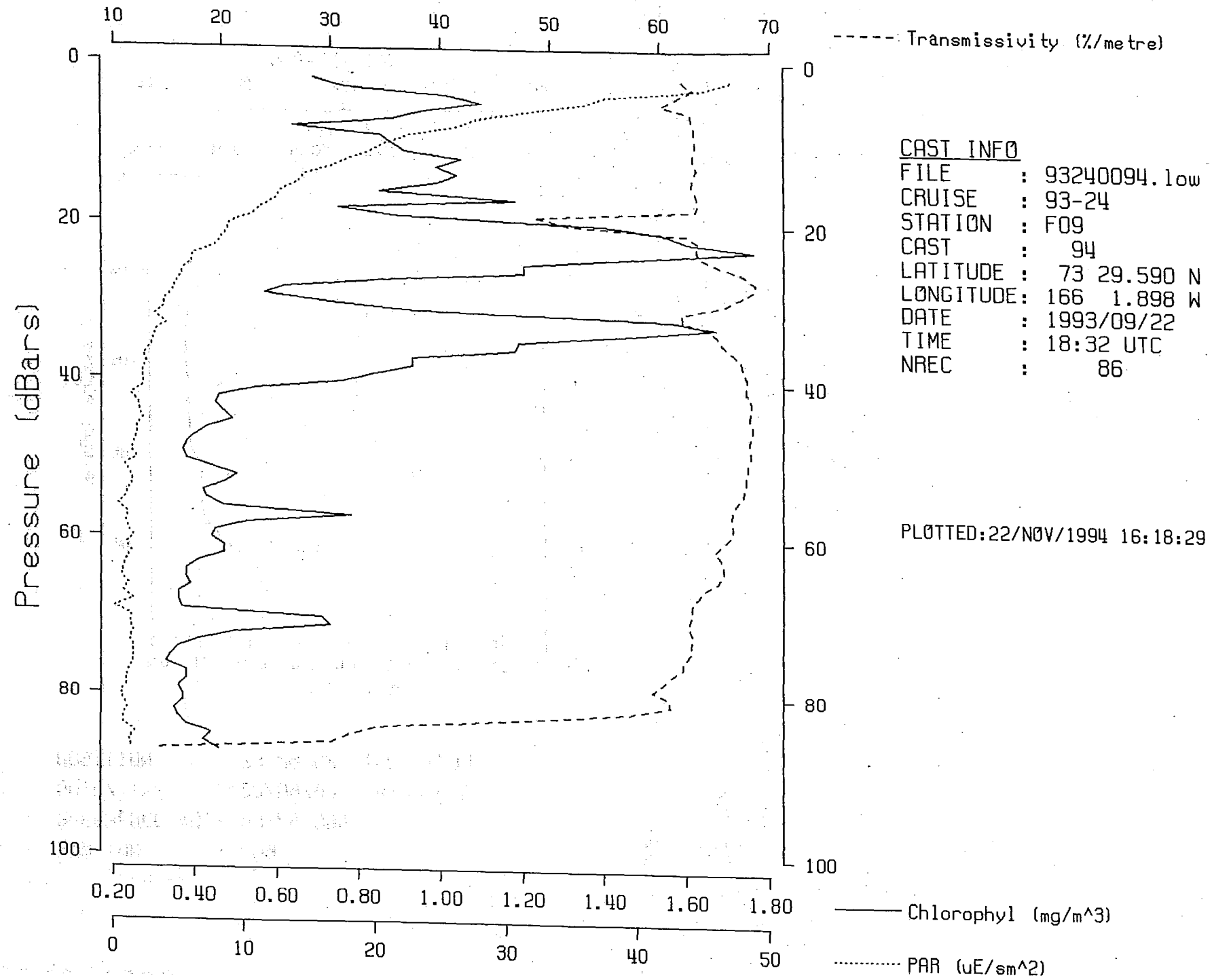
PLOTTED:22/NOV/1994 16:02:10

NOGAP 1993
Henry Larsen
STATION : F09
REFERENCE NO.: 93-24-094
DATE/TIME : 22/09/93 18:32 UTC
POSITION : 73-29.6N 166- 1.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-.875	-.875	29.218	2	23.466	.00	62.1	.69	47.0
10	-.882	-.882	29.259	10	23.500	.35	63.2	.88	20.8
20	-1.173	-1.173	31.182	20	25.064	.71	51.9	1.40	8.9
30	-1.469	-1.470	32.195	30	25.893	.96	65.8	.73	4.0
50	-1.593	-1.594	32.565	50	26.197	1.35	68.0	.38	1.8
75	-1.531	-1.532	32.884	74	26.454	1.77	62.2	.34	1.5
87	-.642	-.645	34.316	86	27.584	1.90	14.1	.46	1.5



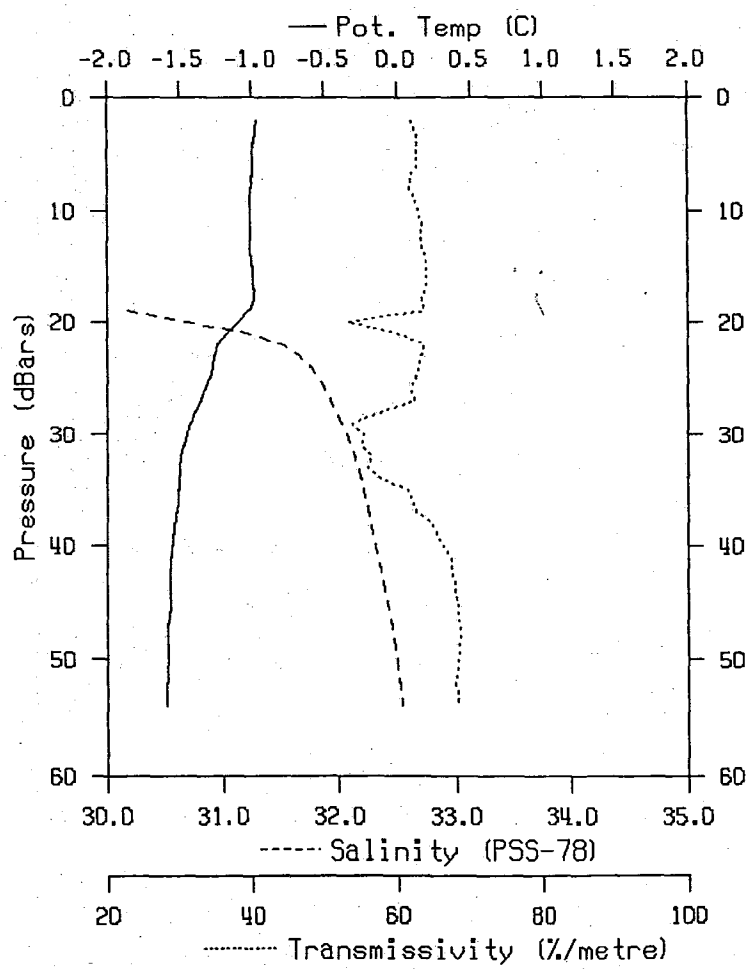


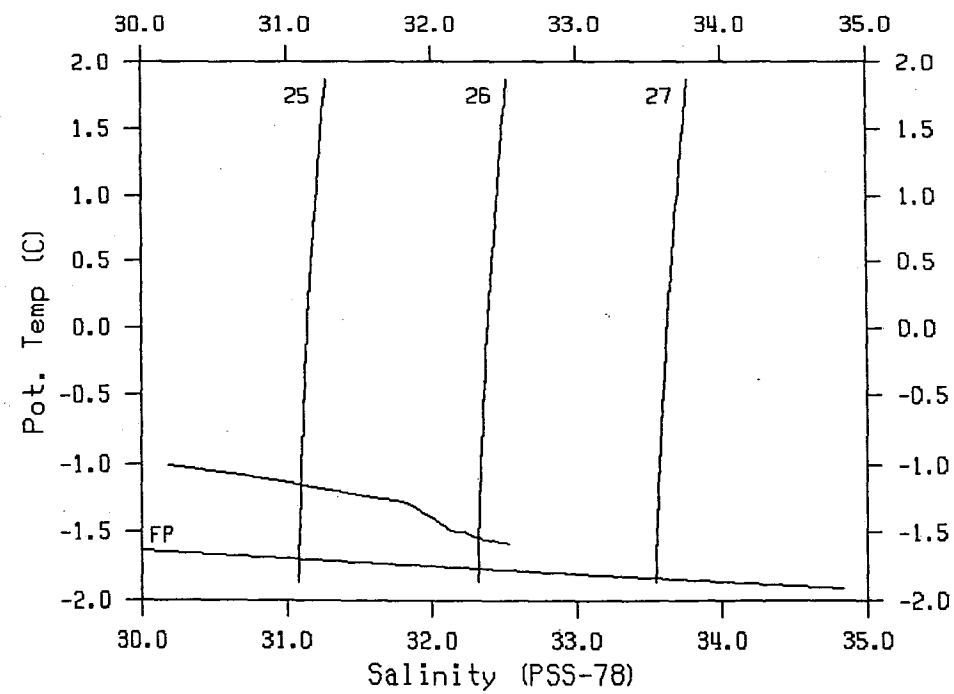

Transmissivity (%/metre)
Pressure (dBars)
Chlorophyl (mg/m^3)
PAR (uE/sm^2)
CAST INFO
FILE : 93240094.low
CRUISE : 93-24
STATION : F09
CAST : 94
LATITUDE : 73 29.590 N
LONGITUDE: 166 1.898 W
DATE : 1993/09/22
TIME : 18:32 UTC
NREC : 86
PLOTTED:22/NOV/1994 16:18:29

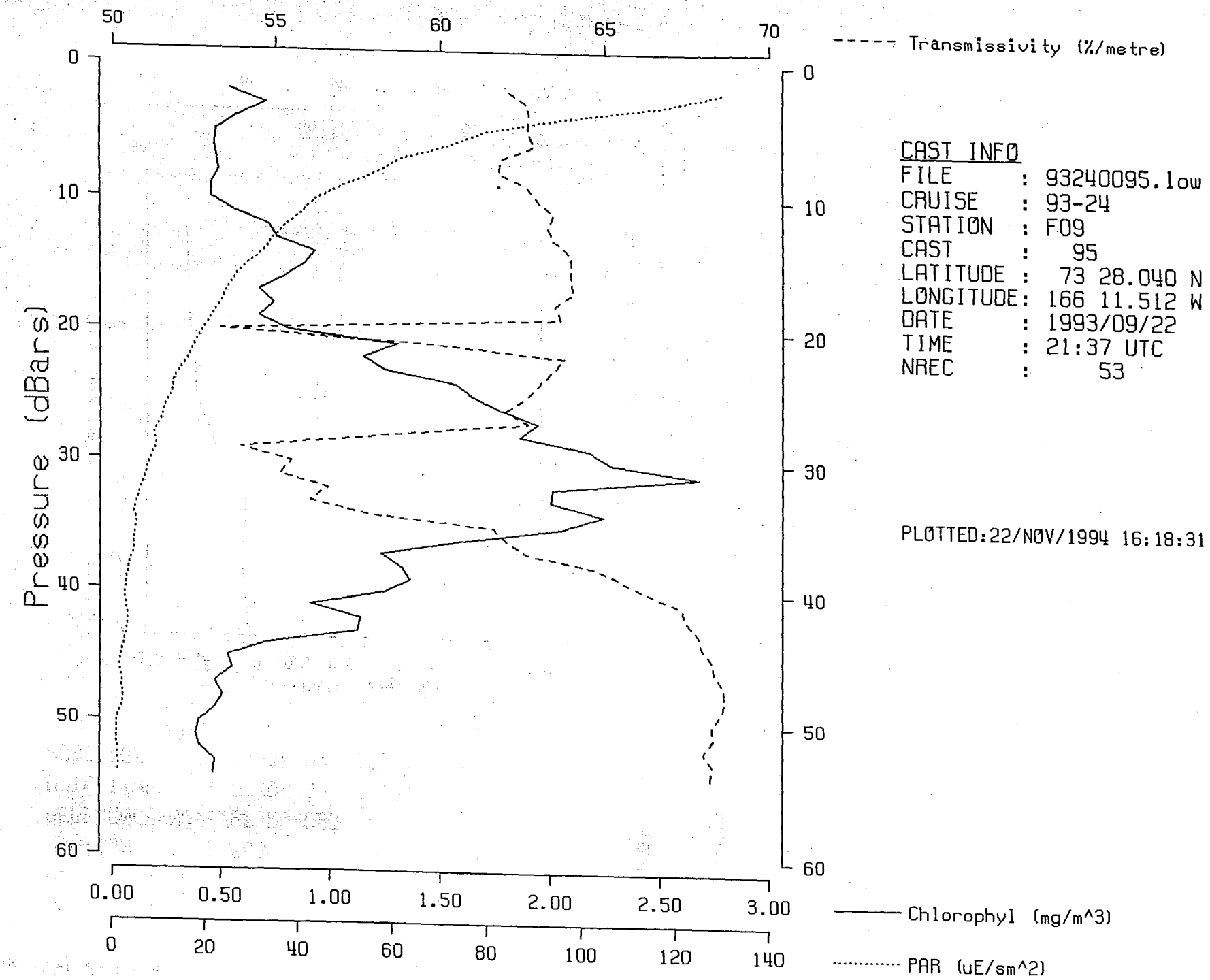
PLOTTED:22/NOV/1994 16:02:32

NOGAP 1993
Henry Larsen
STATION : F09
REFERENCE NO.: 93-24-095
DATE/TIME : 22/09/93 21:37 UTC
POSITION : 73-28.0N 166-11.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-.961	-.961	29.084	2	23.360	.00	62.1	.54	129.9
10	-1.010	-1.010	29.117	10	23.388	.36	62.9	.45	43.6
20	-1.084	-1.084	30.684	20	24.659	.75	53.3	.81	19.6
30	-1.442	-1.442	32.070	30	25.791	1.02	55.5	2.27	7.8
50	-1.574	-1.575	32.503	50	26.146	1.42	68.2	.40	.8
54	-1.584	-1.585	32.537	54	26.174	1.50	68.2	.46	1.1



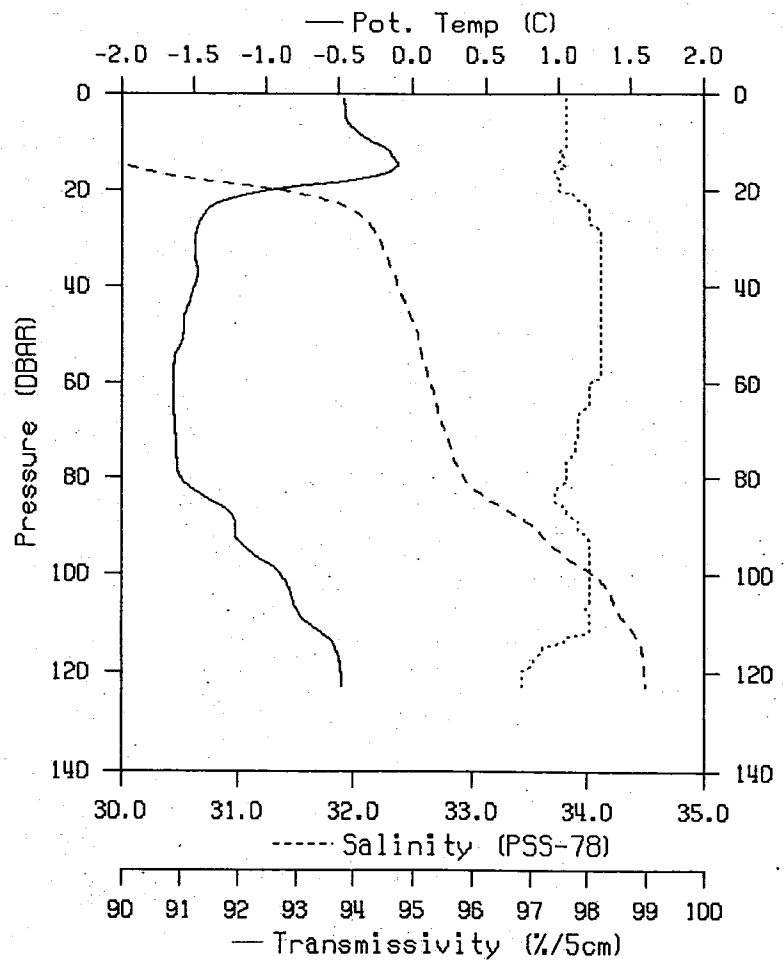


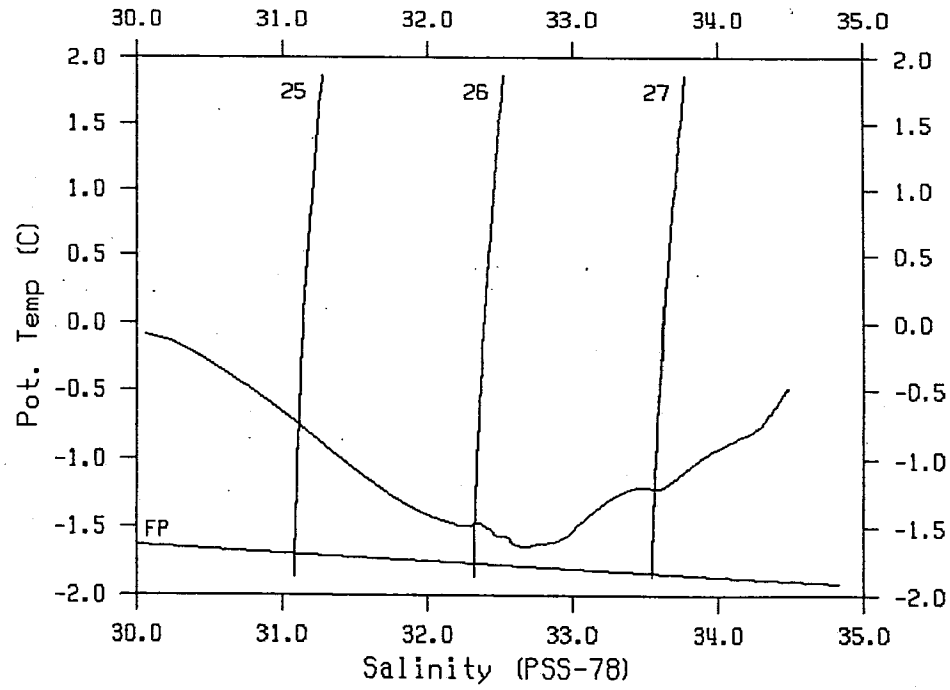

50
55
60
65
70
Transmissivity (%/metre)
Pressure (dBars)
0
10
20
30
40
50
60
CAST INFO
FILE : 93240095.low
CRUISE : 93-24
STATION : F09
CAST : 95
LATITUDE : 73 28.040 N
LONGITUDE: 166 11.512 W
DATE : 1993/09/22
TIME : 21:37 UTC
NREC : 53
PLOTTED:22/NOV/1994 16:18:31
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Chlorophyl (mg/m^3)
0
20
40
60
80
100
120
140
PAR (uE/sm^2)

PLOTTED:29/NOV/1994 13:59:06

NOGAP 1993
Henry Larsen
STATION : F10
REFERENCE NO.: 93-24-096
DATE/TIME : 23/09/93 03:03 UTC
POSITION : 73-41.8N 165-33.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-.4625	-.4625	29.527	1	23.705	.00	97.64		
10	-.2535	-.2537	29.654	10	23.801	.37	97.64		
20	-.9796	-.9800	31.388	20	25.226	.71	97.49		
30	-1.4852	-1.4857	32.213	30	25.908	.95	98.23		
50	-1.5655	-1.5664	32.546	50	26.181	1.34	98.23		
75	-1.6178	-1.6192	32.838	74	26.419	1.77	97.77		
100	-.9000	-.9027	34.042	99	27.374	2.06	98.03		
123	-.4820	-.4859	34.489	122	27.718	2.18	96.85		

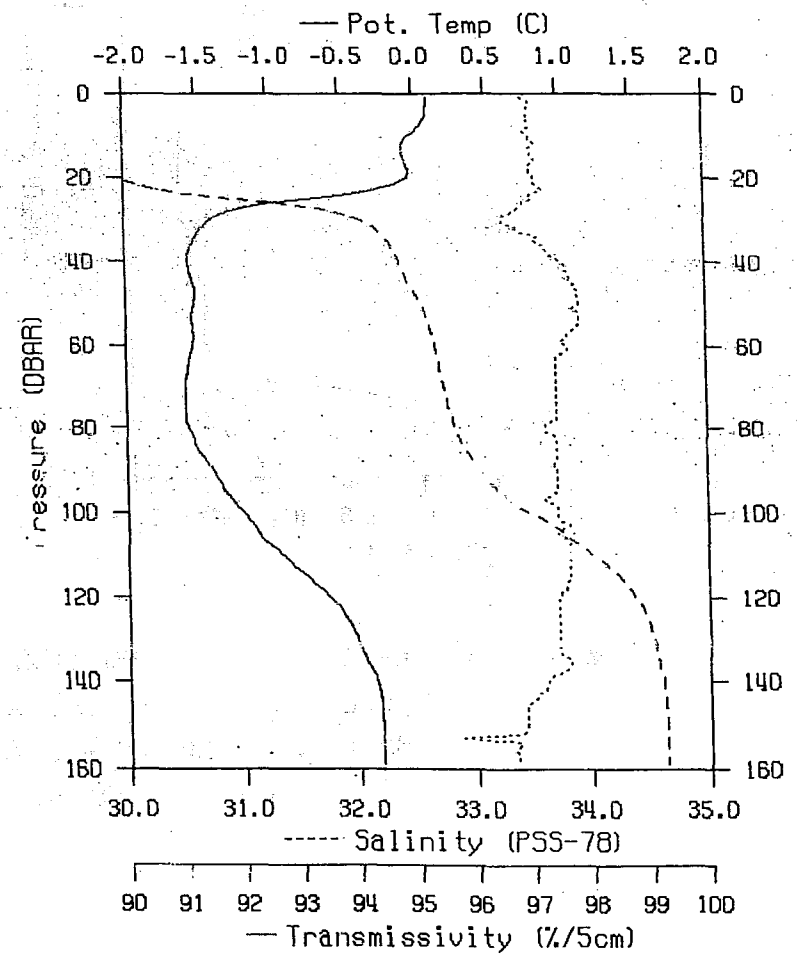


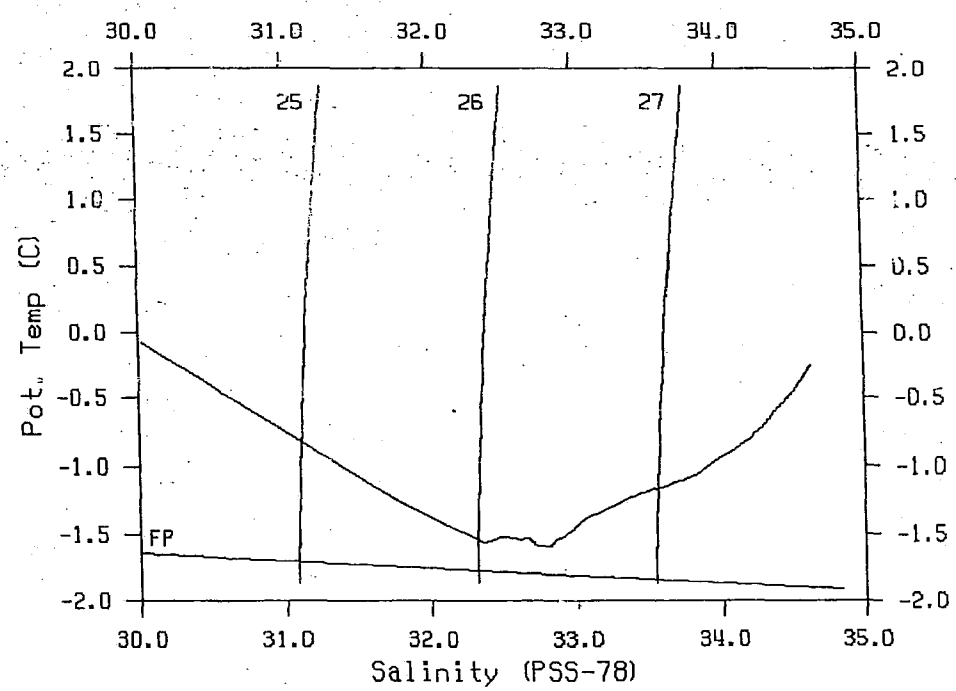


PLOTTED:29/NOV/1994 13:59:13

NOGAP 1993
Henry Larsen
STATION : F11
REFERENCE NO.: 93-24-097
DATE/TIME : 23/09/93 05:01 UTC
POSITION : 73-51.4N 165- 7.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	.1128	.1128	29.373	1	23.562	.00	96.91		
10	-.0144	-.0147	29.718	10	23.845	.38	97.04		
20	-.0336	-.0341	29.949	20	24.032	.77	97.11		
30	-1.3892	-1.3898	32.034	30	25.760	1.08	96.52		
50	-1.5235	-1.5244	32.555	50	26.186	1.48	97.84		
75	-1.5883	-1.5897	32.787	74	26.376	1.91	97.44		
100	-1.1924	-1.1948	33.465	99	26.916	2.26	97.44		
150	-.2511	-.2563	34.625	149	27.817	2.61	96.85		
159	-.2500	-.2555	34.626	158	27.818	2.63	96.65		

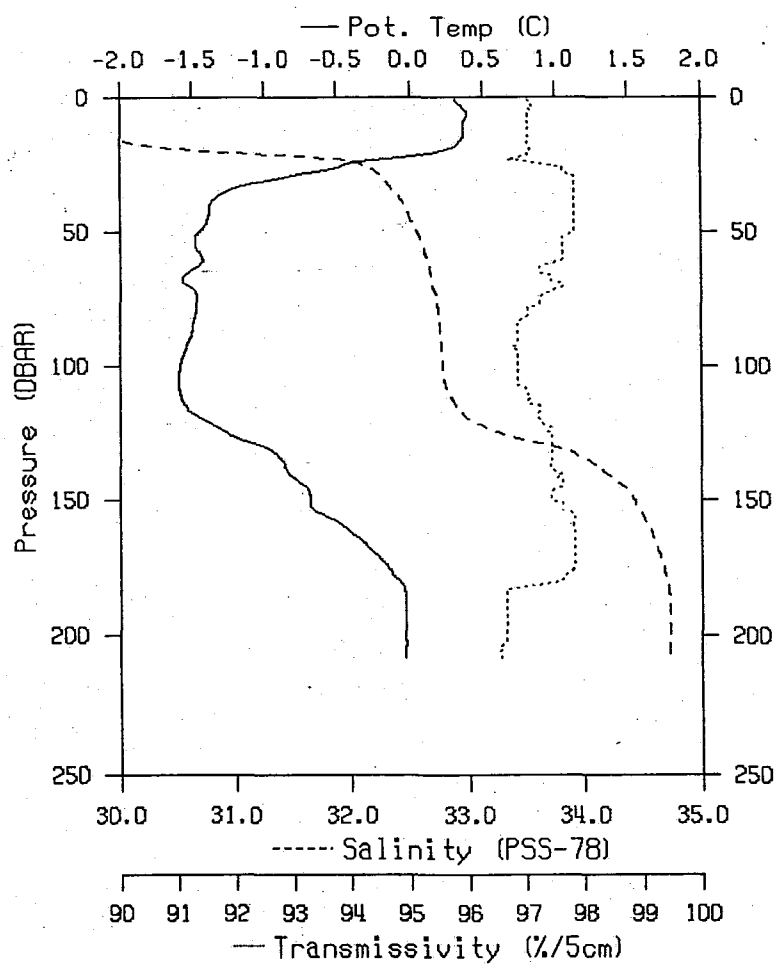


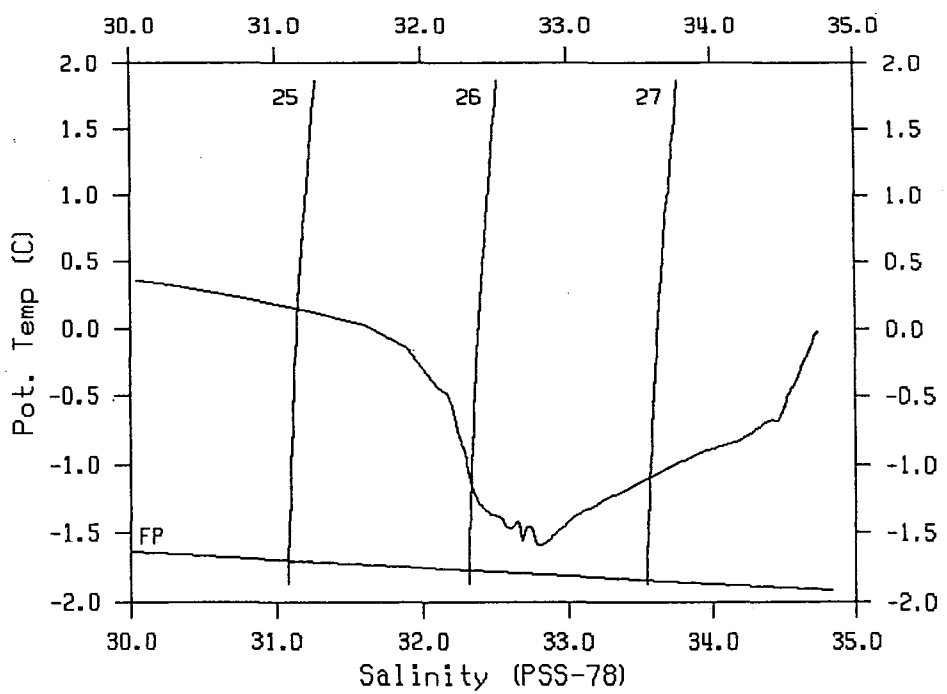


PLOTTED:29/NOV/1994 13:59:20

NOGAP 1993
Henry Larsen
STATION : F12
REFERENCE NO.: 93-24-098
DATE/TIME : 23/09/93 07:01 UTC
POSITION : 74- .8N 164-43.4W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	.3132	.3132	29.571	1	23.713	.00	97.04		
10	.3719	.3716	29.832	10	23.921	.37	97.04		
20	.2303	.2297	30.783	20	24.694	.73	97.11		
30	-.8730	-.8737	32.284	30	25.948	.99	97.84		
50	-1.4388	-1.4398	32.572	50	26.199	1.38	97.84		
75	-1.4595	-1.4610	32.733	74	26.330	1.81	97.24		
100	-1.5719	-1.5738	32.785	99	26.374	2.23	96.85		
150	-.6751	-.6797	34.434	149	27.682	2.73	97.44		
200	-.0194	-.0268	34.726	198	27.887	2.88	96.65		
208	-.0192	-.0269	34.727	206	27.887	2.90	96.57		

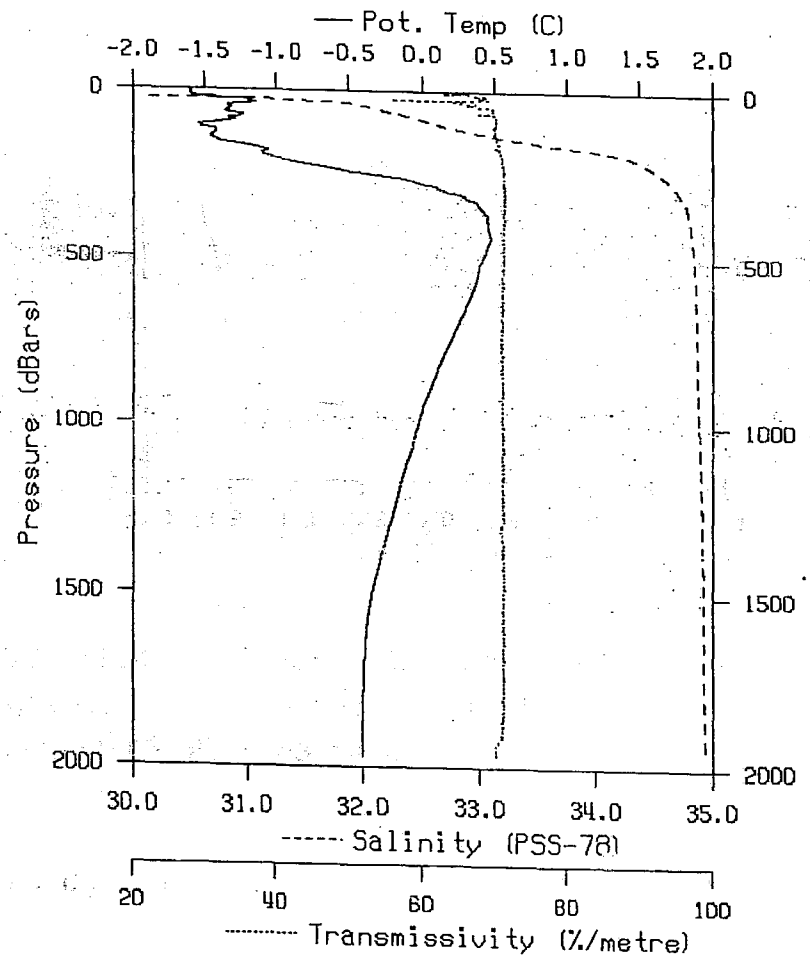


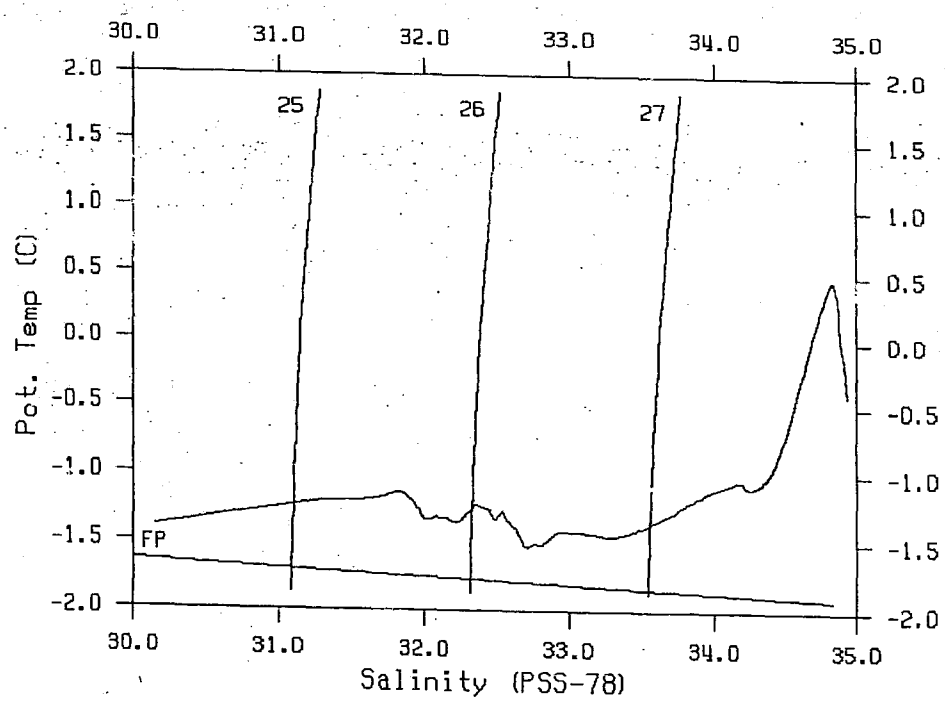


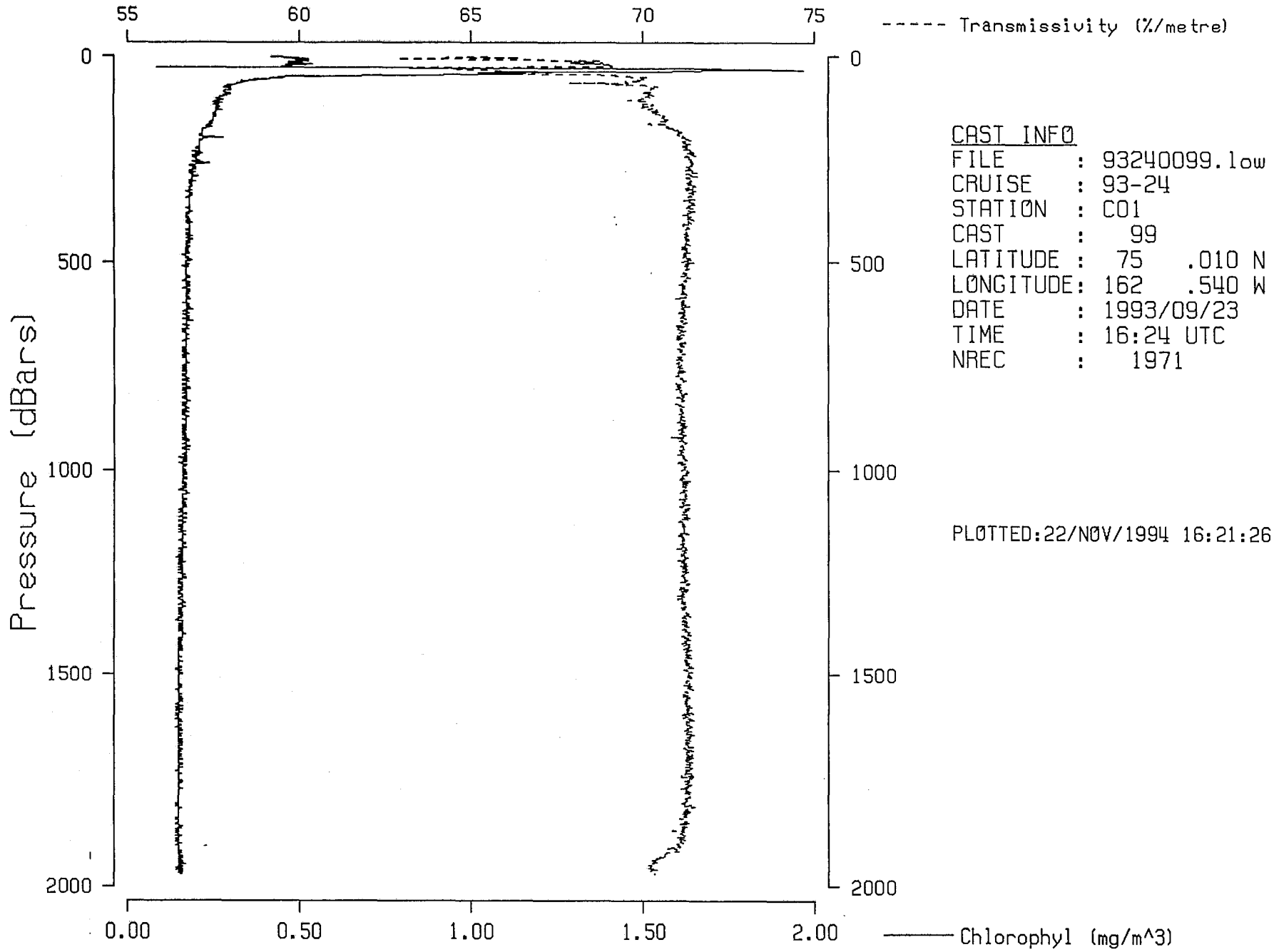
PLOTTED:22/NOV/1994 16:02:54

NOGAP 1993
Henry Larsen
STATION : C01
REFERENCE NO.: 93-24-099
DATE/TIME : 23/09/93 16:24 UTC
POSITION : 75- .0N 162- .5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.603	-1.603	27.228	2	21.864	.00	64.9	.42	
10	-1.593	-1.594	29.039	10	23.334	.42	68.1	.53	
20	-1.558	-1.558	29.232	20	23.490	.87	69.0	.48	
30	-1.197	-1.197	31.403	30	25.244	1.22	64.5	1.82	
50	-1.322	-1.323	32.067	50	25.786	1.71	69.7	.44	
75	-1.226	-1.227	32.368	74	26.027	2.23	70.3	.29	
100	-1.417	-1.419	32.647	99	26.258	2.69	70.2	.27	
150	-1.408	-1.411	33.446	149	26.907	3.41	70.6	.25	
200	-1.029	-1.035	34.354	198	27.631	3.80	71.2	.24	
250	-.333	-.342	34.590	248	27.793	3.99	71.4	.20	
300	.206	.194	34.728	297	27.876	4.12	71.4	.19	
400	.479	.462	34.819	396	27.934	4.31	71.4	.18	
500	.433	.411	34.845	495	27.958	4.47	71.2	.17	
750	.223	.190	34.872	741	27.993	4.79	71.1	.17	
1000	.015	-.029	34.888	988	28.017	5.04	71.2	.16	
1250	-.134	-.191	34.912	1234	28.045	5.21	71.1	.16	
1500	-.270	-.341	34.927	1480	28.065	5.32	71.4	.16	
1750	-.312	-.397	34.933	1725	28.072	5.38	71.3	.15	
1972	-.305	-.405	34.935	1943	28.074	5.42	70.4	.16	



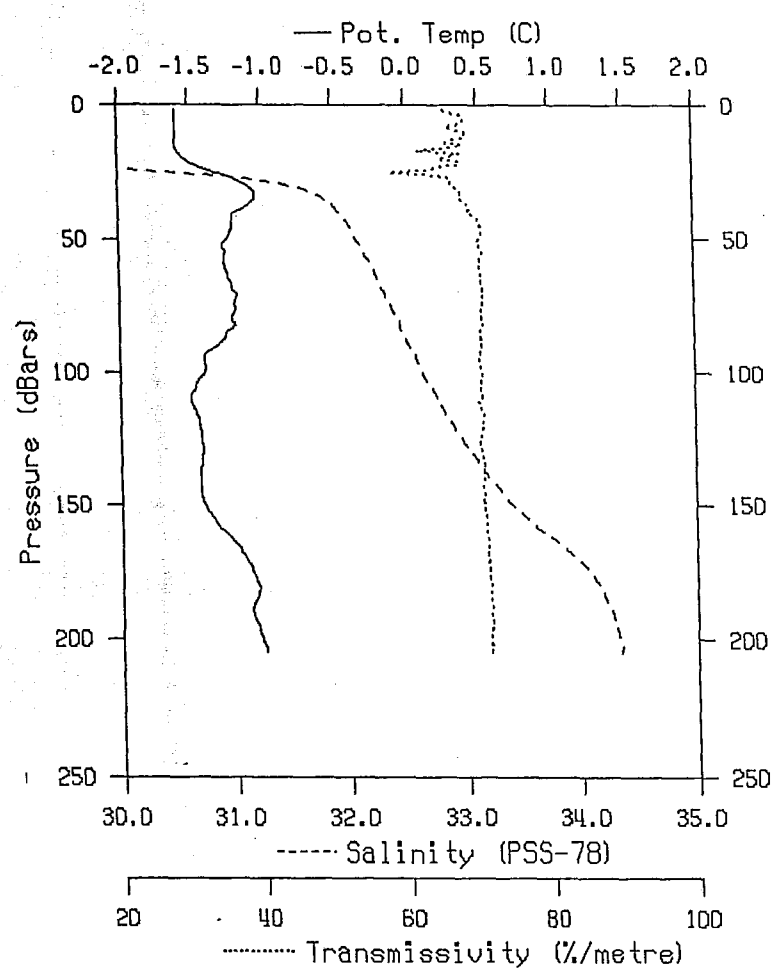


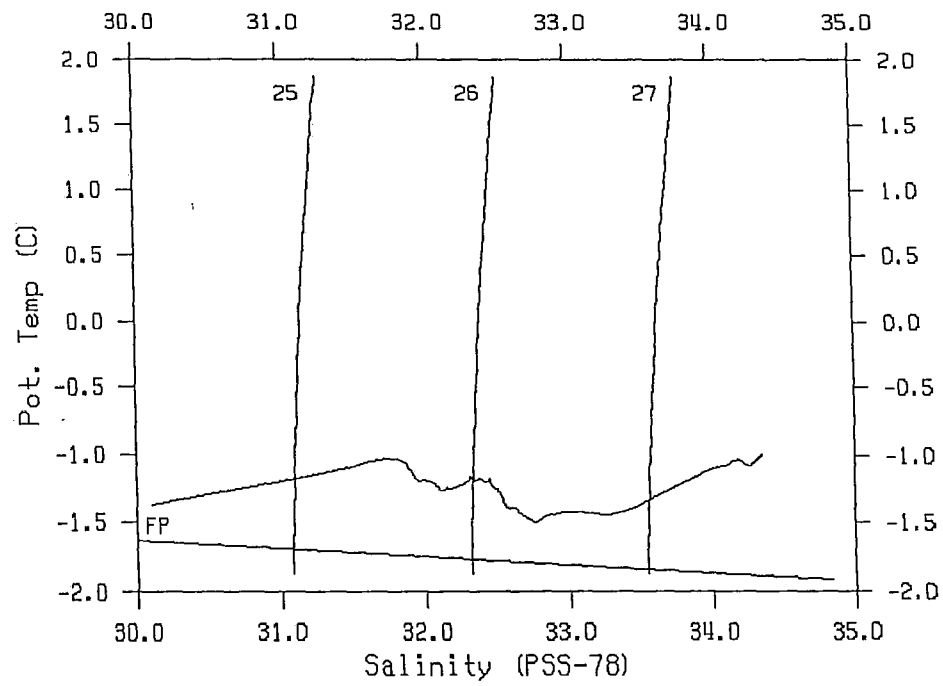

55
60
65
70
75
----- Transmissivity (%/metre)
0
500
1000
1500
2000
Pressure (dBars)
0.00
0.50
1.00
1.50
2.00
——— Chlorophyl (mg/m^3)
CAST INFO
FILE : 93240099.low
CRUISE : 93-24
STATION : C01
CAST : 99
LATITUDE : 75 .010 N
LONGITUDE: 162 .540 W
DATE : 1993/09/23
TIME : 16:24 UTC
NREC : 1971
PLOTTED:22/NOV/1994 16:21:26

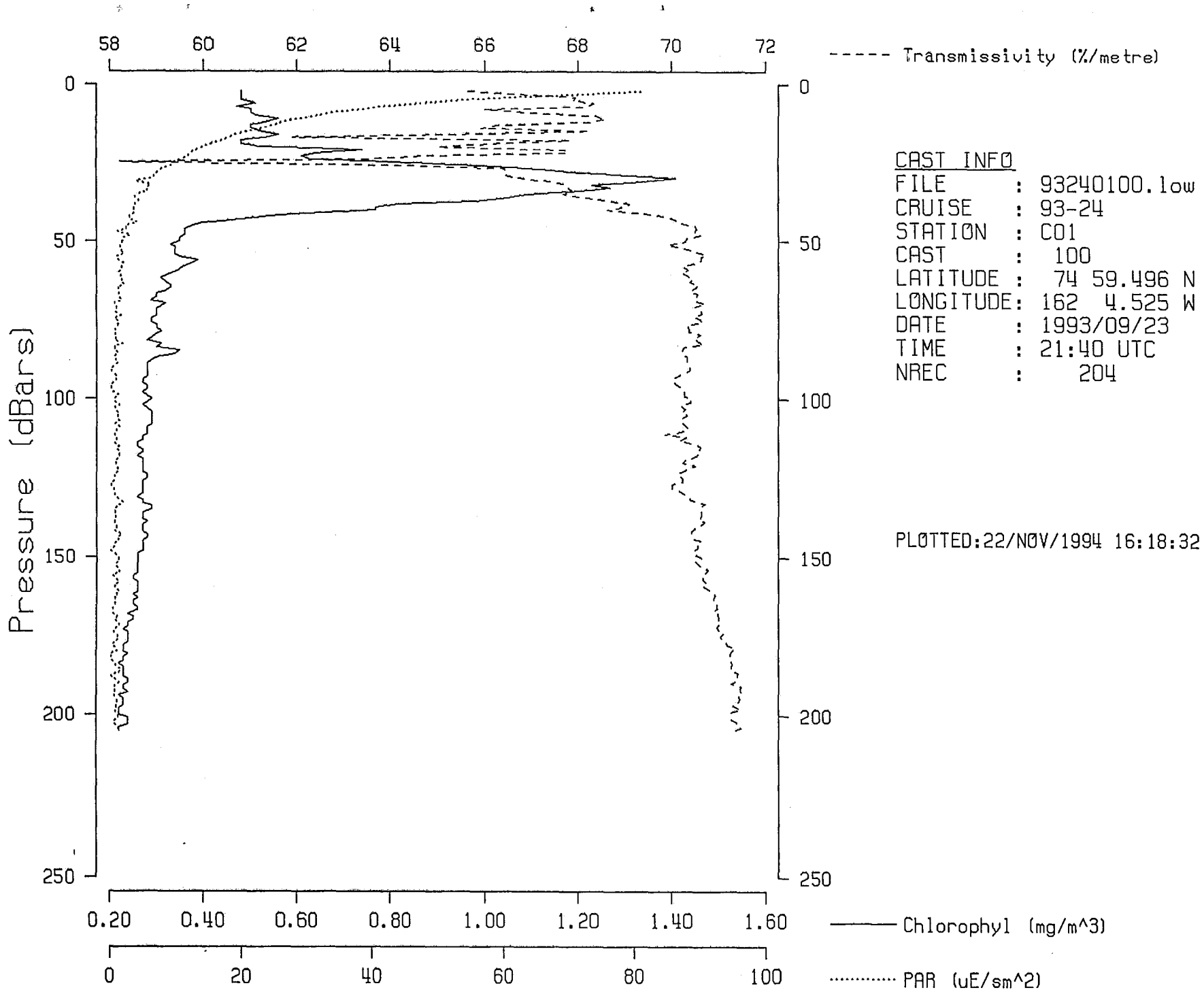
PLOTTED:22/NOV/1994 16:05:25

NOGAP 1993
Henry Larsen
STATION : C01
REFERENCE NO.: 93-24-100
DATE/TIME : 23/09/93 21:40 UTC
POSITION : 74-59.5N 162- 4.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	% Tr	Chl	PAR
2	-1.585	-1.585	28.951	2	23.262	.00	65.7	.48	81.2
10	-1.589	-1.589	28.979	10	23.285	.37	68.4	.51	31.8
20	-1.519	-1.519	29.337	20	23.574	.81	65.0	.52	14.2
30	-1.079	-1.080	31.537	30	25.350	1.16	66.7	1.41	6.7
50	-1.233	-1.234	32.086	50	25.799	1.64	70.3	.35	2.0
75	-1.174	-1.176	32.381	74	26.036	2.15	70.6	.29	.8
100	-1.397	-1.399	32.643	99	26.255	2.62	70.4	.29	.8
150	-1.408	-1.412	33.402	149	26.872	3.35	70.6	.26	1.2
200	-1.009	-1.015	34.333	198	27.614	3.75	71.3	.22	1.3
204	-.986	-.992	34.347	202	27.624	3.77	71.5	.22	1.4



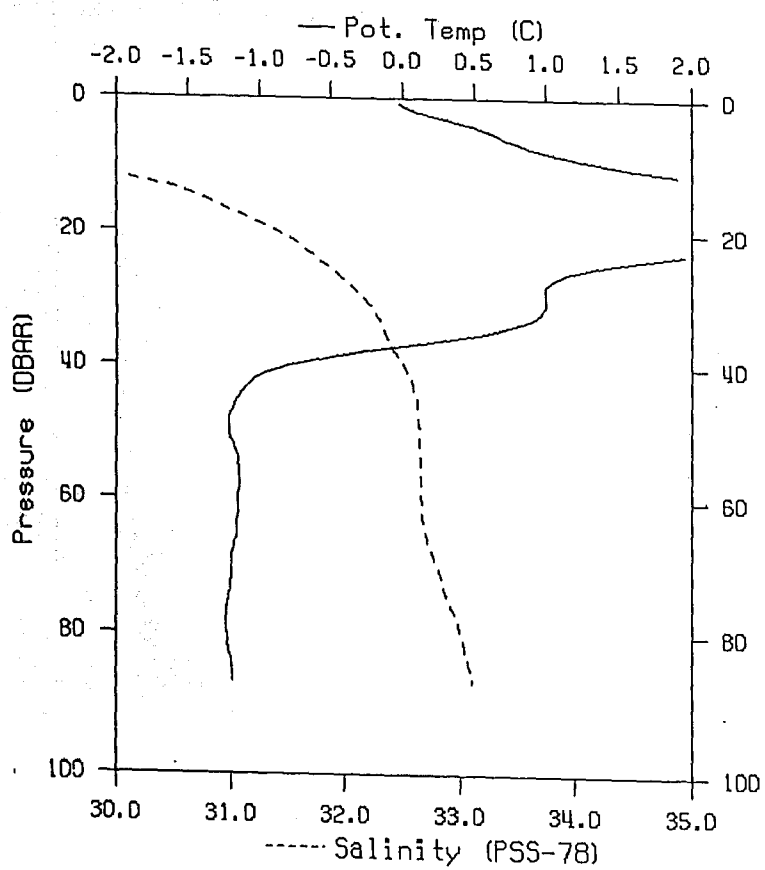


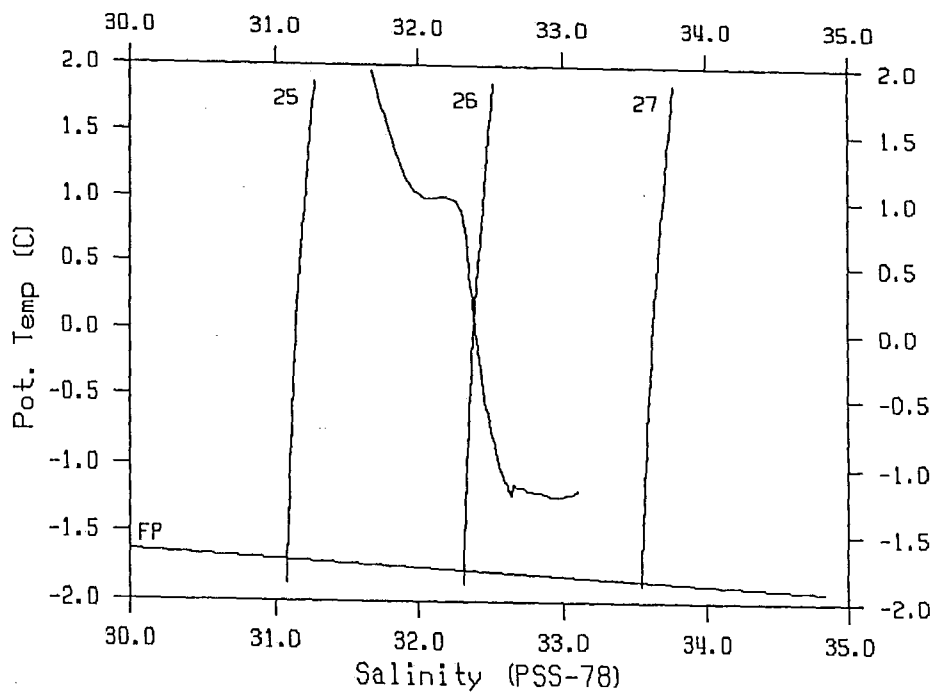

58 60 62 64 66 68 70 72
----- Transmissivity (%/metre)
0 50 100 150 200 250
Pressure (dBars)
CAST INFO
FILE : 93240100.low
CRUISE : 93-24
STATION : C01
CAST : 100
LATITUDE : 74 59.496 N
LONGITUDE: 162 4.525 W
DATE : 1993/09/23
TIME : 21:40 UTC
NREC : 204
PLOTTED:22/NOV/1994 16:18:32
0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Chlorophyl (mg/m^3)
0 20 40 60 80 100
PAR (uE/sm^2)

PLOTTED:29/NOV/1994 13:59:29

NOGAP 1993
Henry Larsen
STATION : 0H01
REFERENCE NO.: 93-24-101
DATE/TIME : 24/09/93 19:58 UTC
POSITION : 71-54.5N 155-56.8W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	-.0234	-.0234	28.187	1	22.611	.00			
10	1.5451	1.5447	29.516	10	23.609	.43			
20	2.6413	2.6403	31.414	20	25.052	.79			
30	1.0077	1.0065	32.166	30	25.767	1.04			
50	-1.2101	-1.2112	32.649	50	26.255	1.44			
75	-1.2137	-1.2154	32.901	74	26.459	1.85			
87	-1.1801	-1.1821	33.109	86	26.626	2.03			

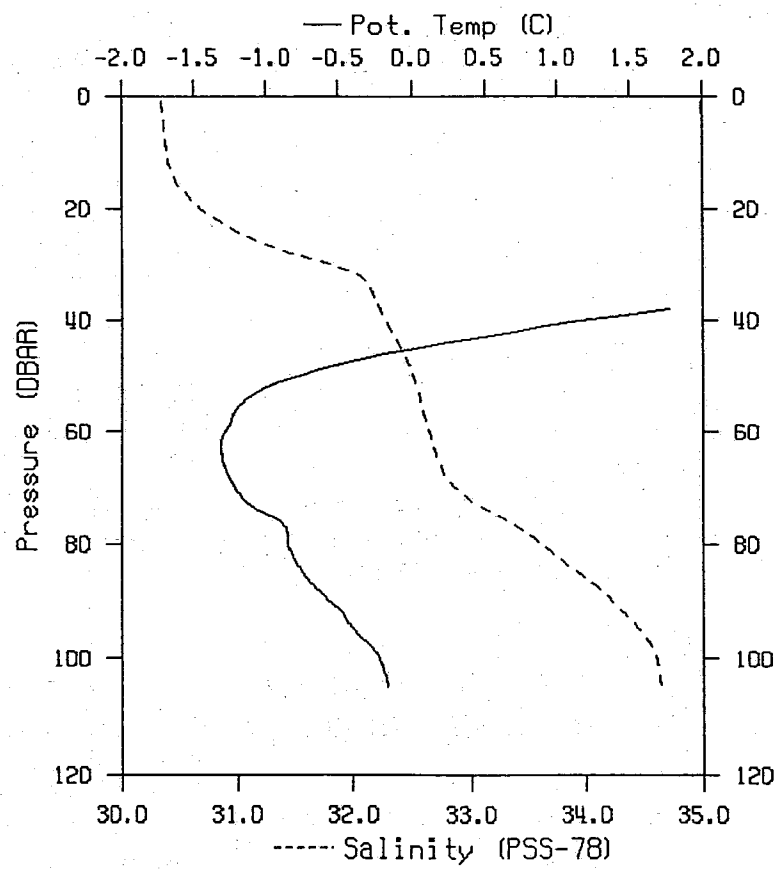


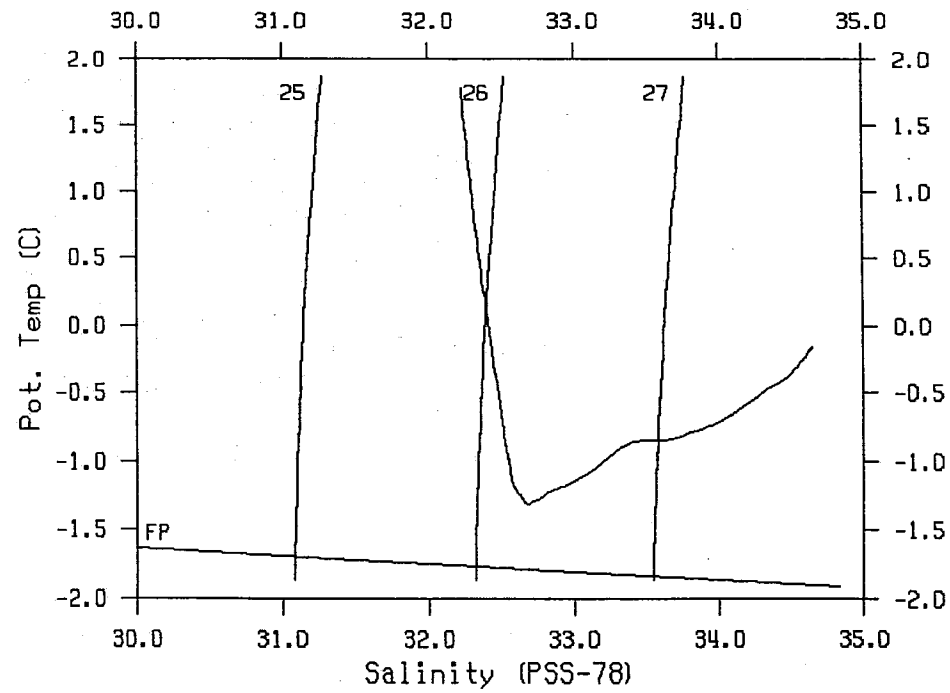


PLOTTED:29/NOV/1994 13:59:35

NOGAP 1993
Henry Larsen
STATION : 0H02
REFERENCE NO.: 93-24-102
DATE/TIME : 24/09/93 21:02 UTC
POSITION : 71-50.9N 155-44.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	1.9921	1.9921	30.353	1	24.251	.00			
10	2.0490	2.0486	30.396	10	24.281	.33			
20	2.6518	2.6508	30.685	20	24.470	.68			
30	2.7849	2.7833	31.808	30	25.356	.99			
50	-.7788	-.7800	32.515	50	26.132	1.43			
75	-.9725	-.9744	33.236	74	26.723	1.83			
100	-.2105	-.2139	34.607	99	27.800	2.03			
105	-.1603	-.1639	34.640	104	27.824	2.04			

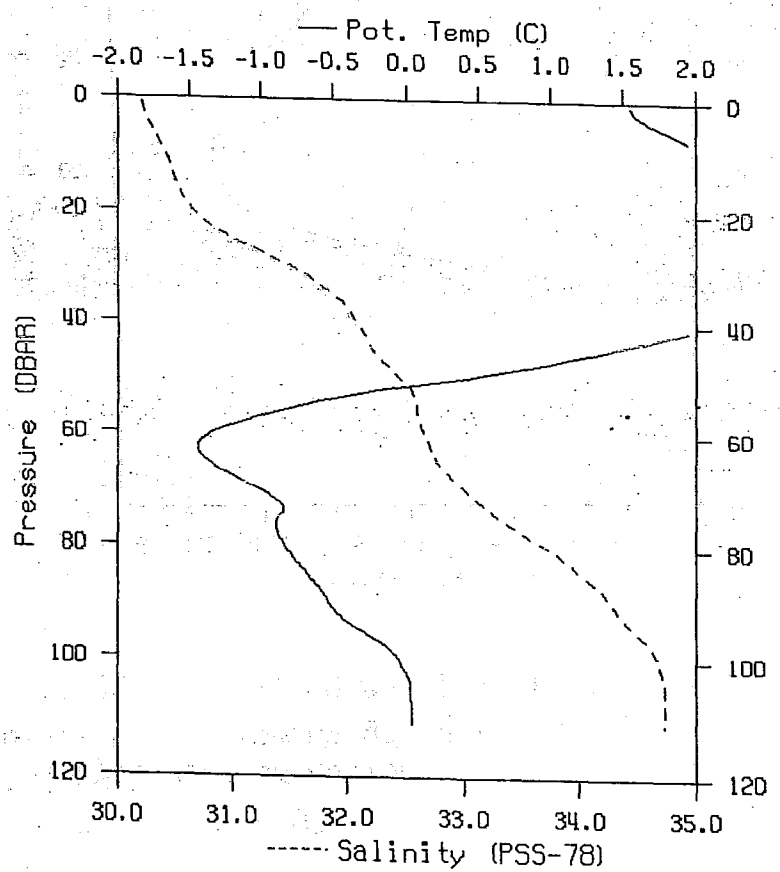


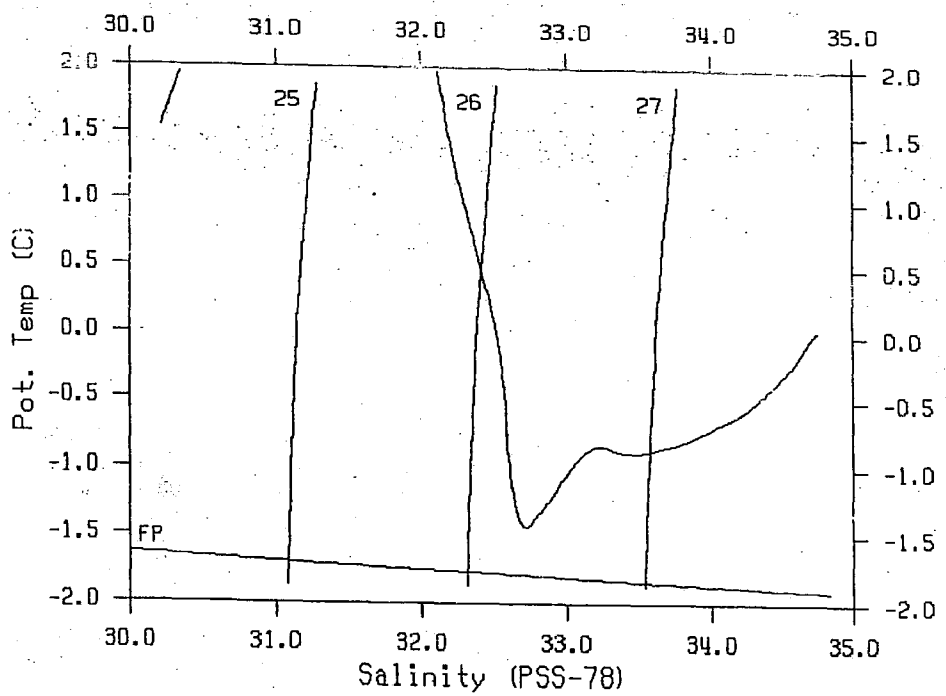


PLOTTED:29/NOV/1994 13:59:41

NOGAP 1993
Henry Larsen
STATION : 0H03
REFERENCE NO.: 93-24-103
DATE/TIME : 24/09/93 21:41 UTC
POSITION : 71-49.0N 155-37.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	1.5488	1.5488	30.211	1	24.166	.00			
10	2.1367	2.1362	30.425	10	24.299	.33			
20	2.5573	2.5563	30.656	20	24.454	.69			
30	2.7939	2.7923	31.519	30	25.124	1.00			
50	.3250	.3233	32.461	50	26.042	1.48			
75	-.8702	-.8721	33.336	74	26.800	1.88			
100	-.0429	-.0465	34.688	99	27.857	2.06			
111	.0411	.0370	34.743	110	27.897	2.09			

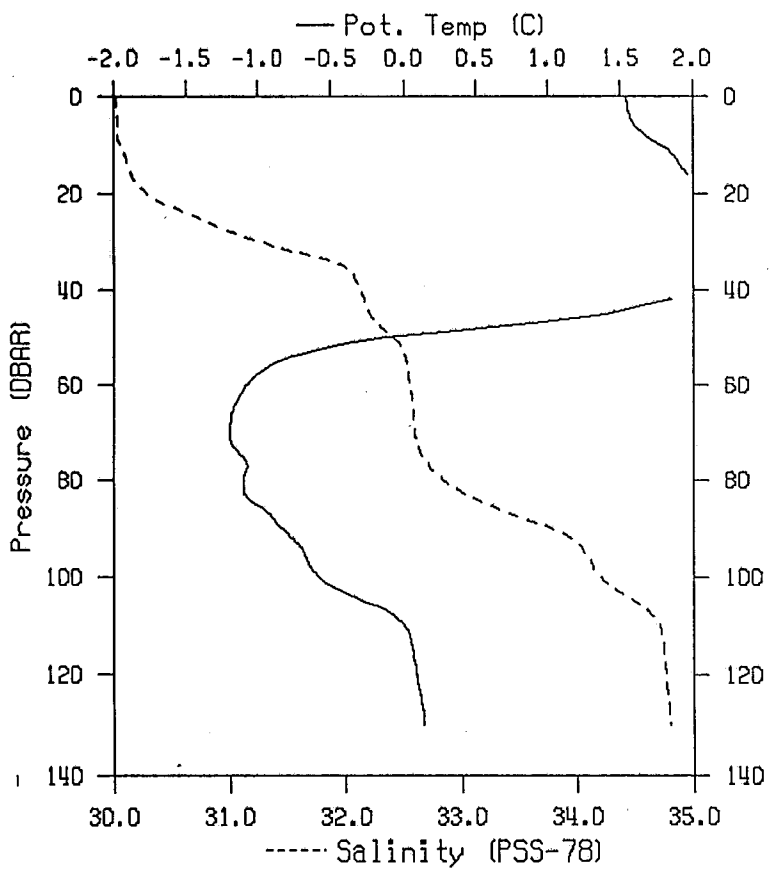


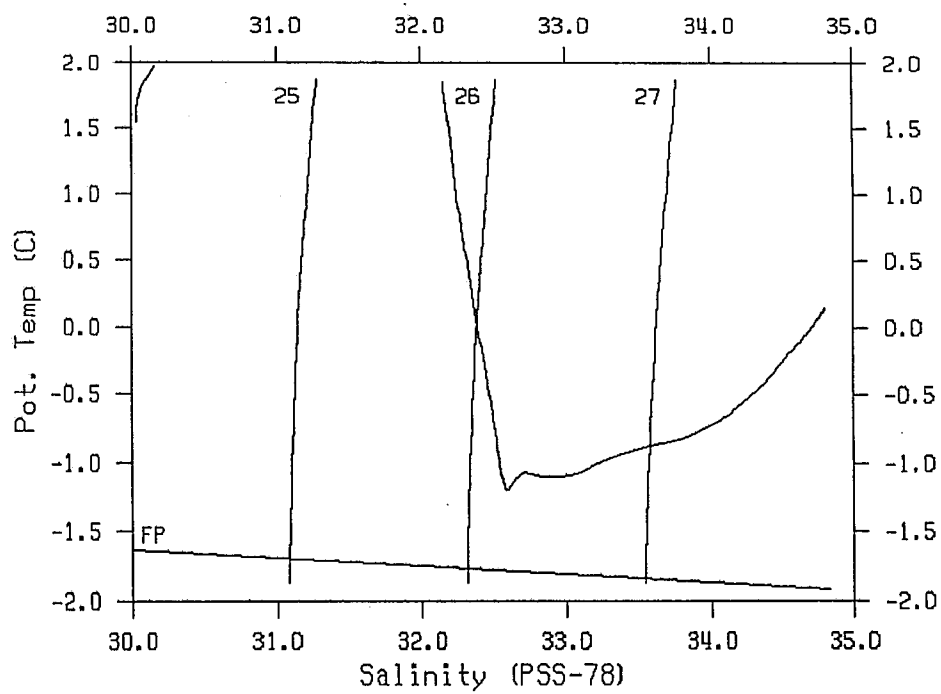


PLOTTED:29/NOV/1994 13:59:47

NOGAP 1993
Henry Larsen
STATION : 0H04
REFERENCE NO.: 93-24-104
DATE/TIME : 24/09/93 22:19 UTC
POSITION : 71-47.0N 155-31.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
0	1.5465	1.5465	30.032	0	24.021	.00			
10	1.7872	1.7868	30.061	10	24.031	.39			
20	2.2618	2.2609	30.295	20	24.186	.77			
30	2.9253	2.9237	31.265	30	24.911	1.11			
50	-.1186	-.1201	32.419	50	26.028	1.61			
75	-1.1056	-1.1073	32.667	74	26.266	2.07			
100	-.5786	-.5816	34.202	99	27.490	2.36			
130	.1481	.1432	34.801	129	27.938	2.47			

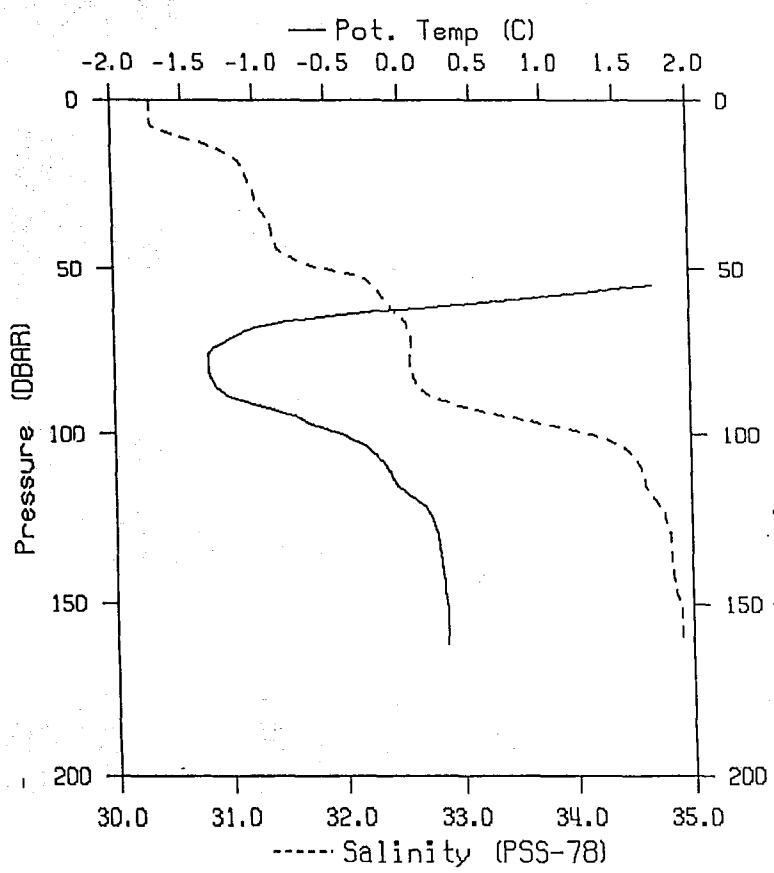


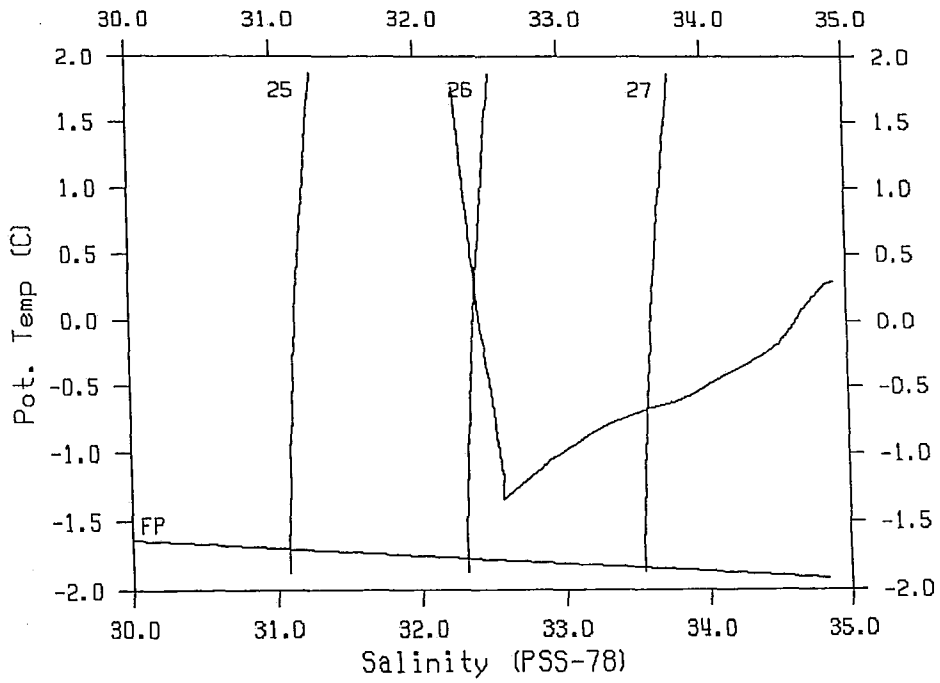


PLOTTED:29/NOV/1994 13:59:54

NOGAP 1993
Henry Larsen
STATION : 0H05
REFERENCE NO.: 93-24-105
DATE/TIME : 24/09/93 23:01 UTC
POSITION : 71-44.6N 155-23.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
0	2.1771	2.1771	30.348	0	24.234	.00			
10	3.6078	3.6072	30.533	10	24.270	.37			
20	4.7568	4.7554	31.149	20	24.649	.71			
30	5.0268	5.0247	31.257	30	24.706	1.04			
50	3.5579	3.5549	31.851	50	25.324	1.63			
75	-1.3223	-1.3238	32.576	74	26.198	2.18			
100	-.4100	-.4132	34.150	99	27.440	2.48			
150	.3014	.2955	34.894	149	28.004	2.67			
162	.3036	.2972	34.911	161	28.018	2.68			

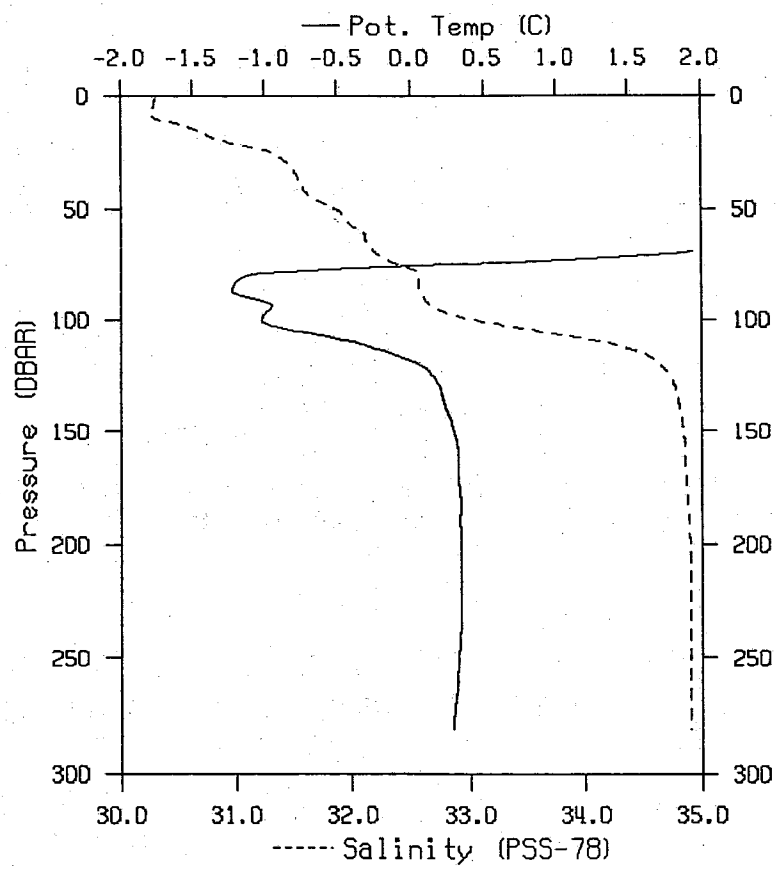


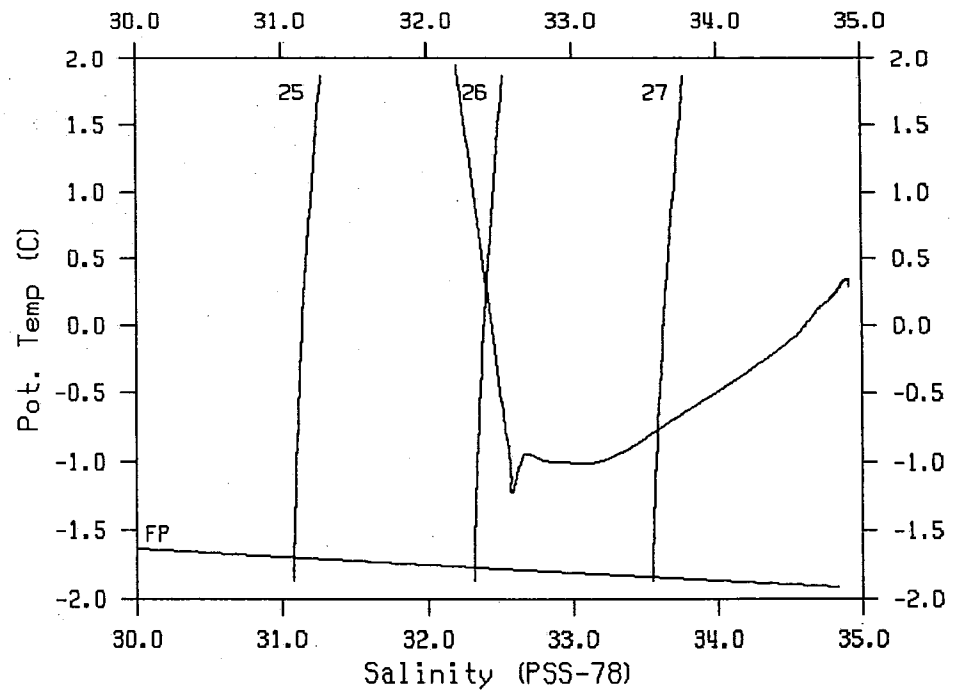


PLOTTED:29/NOV/1994 14:00:00

NOGAP 1993
Henry Larsen
STATION : OH06
REFERENCE NO.: 93-24-106
DATE/TIME : 24/09/93 23:41 UTC
POSITION : 71-42.6N 155-17.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.0513	2.0513	30.305	1	24.209	.00			
10	2.8373	2.8368	30.308	10	24.154	.34			
20	4.4792	4.4779	30.897	20	24.478	.69			
30	4.9280	4.9259	31.456	30	24.875	1.02			
50	4.2941	4.2908	31.860	50	25.261	1.60			
75	.2798	.2772	32.411	74	26.003	2.18			
100	-1.0126	-1.0150	33.024	99	26.553	2.62			
150	.3020	.2961	34.850	149	27.969	3.02			
200	.3495	.3414	34.904	198	28.009	3.07			
250	.3357	.3255	34.907	248	28.013	3.12			
281	.2964	.2850	34.906	278	28.014	3.15			

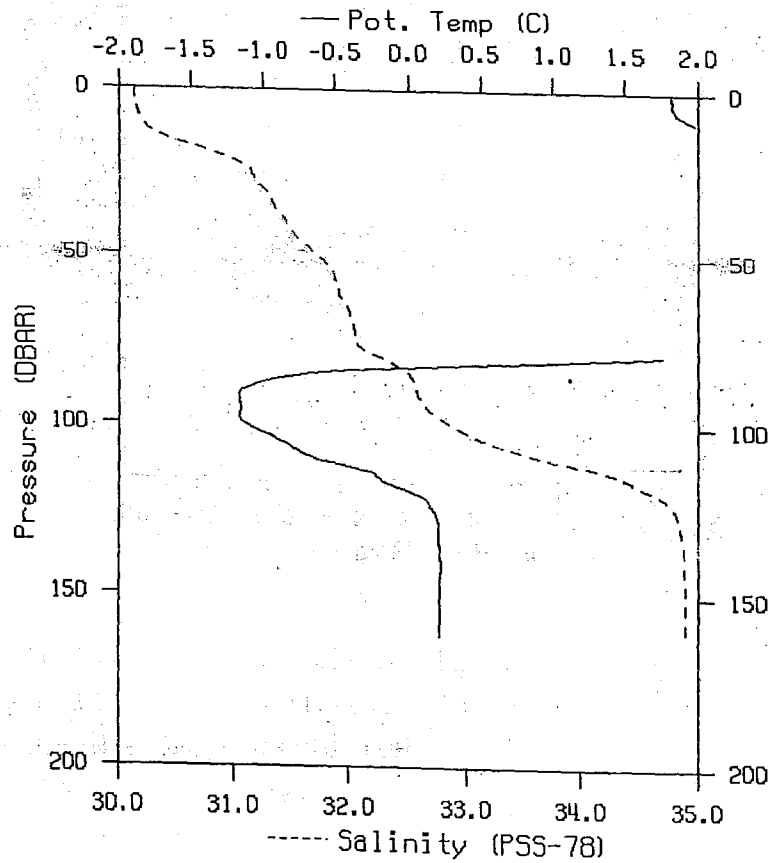


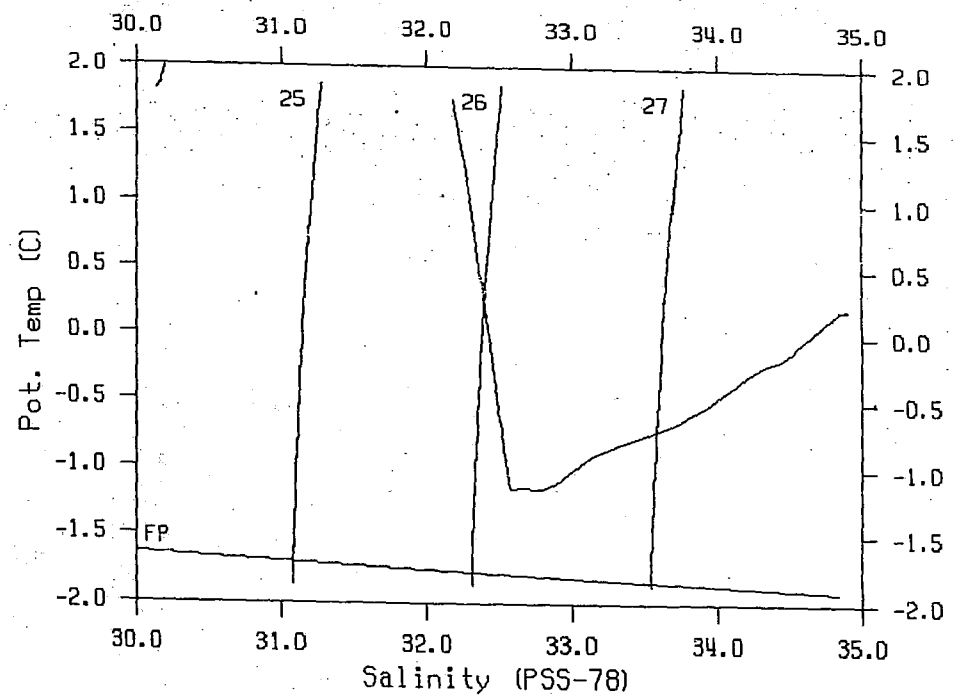


PLOTTED:29/NOV/1994 14:00:06

NOGAP 1993
Henry Larsen
STATION : 0H07
REFERENCE NO.: 93-24-107
DATE/TIME : 25/09/93 00:29 UTC
POSITION : 71-40.4N 155-10.5W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
0	1.8185	1.8185	30.140	0	24.091	.00			
10	2.0714	2.0710	30.210	10	24.131	.38			
20	4.5610	4.5597	30.893	20	24.466	.74			
30	5.3181	5.3159	31.264	30	24.681	1.08			
50	4.6586	4.6552	31.734	50	25.124	1.68			
75	2.6183	2.6143	32.057	74	25.568	2.34			
100	-1.1154	-1.1177	32.891	99	26.448	2.84			
150	.2267	.2209	34.891	149	28.006	3.25			
162	.2199	.2136	34.894	161	28.009	3.26			

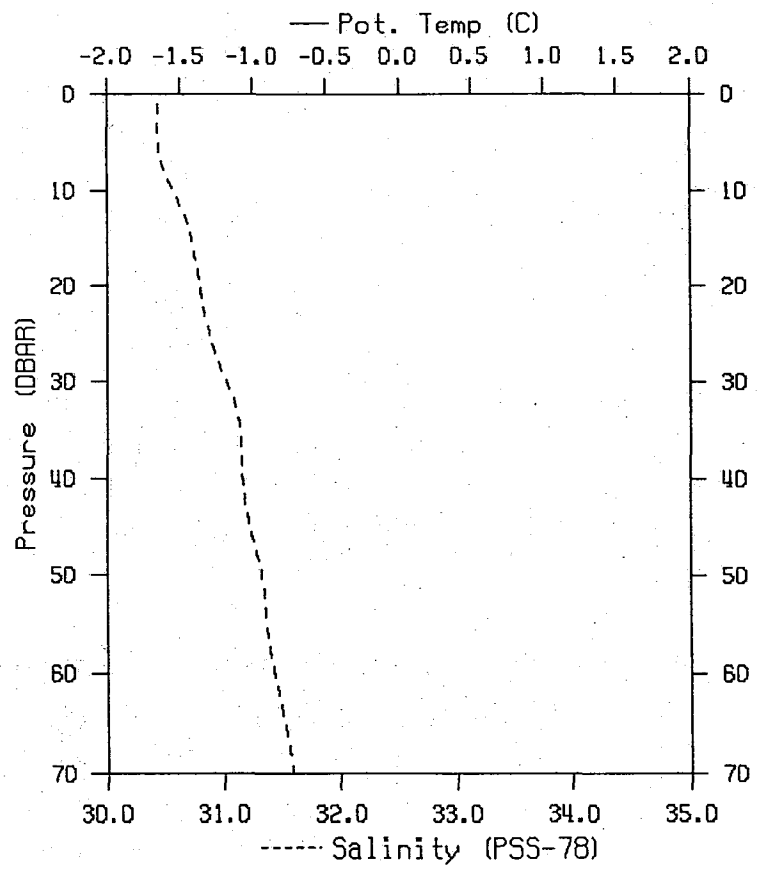


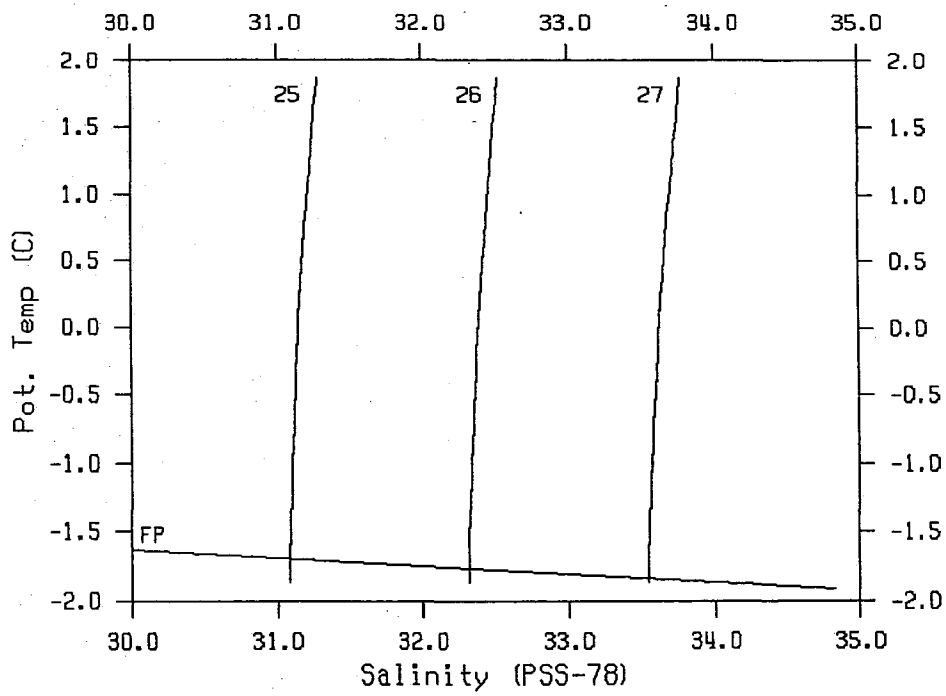


PLOTTED:29/NOV/1994 14:00:14

NOGAP 1993
Henry Larsen
STATION : 0H08
REFERENCE NO.: 93-24-108
DATE/TIME : 25/09/93 01:08 UTC
POSITION : 71-38.0N 155- 3.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.6447	2.6447	30.445	1	24.278	.00			
10	3.3034	3.3028	30.577	10	24.331	.32			
20	3.8475	3.8463	30.804	20	24.464	.68			
30	4.5655	4.5635	31.033	30	24.577	1.02			
50	4.8011	4.7976	31.332	50	24.790	1.67			
70	4.4084	4.4037	31.583	70	25.029	2.28			





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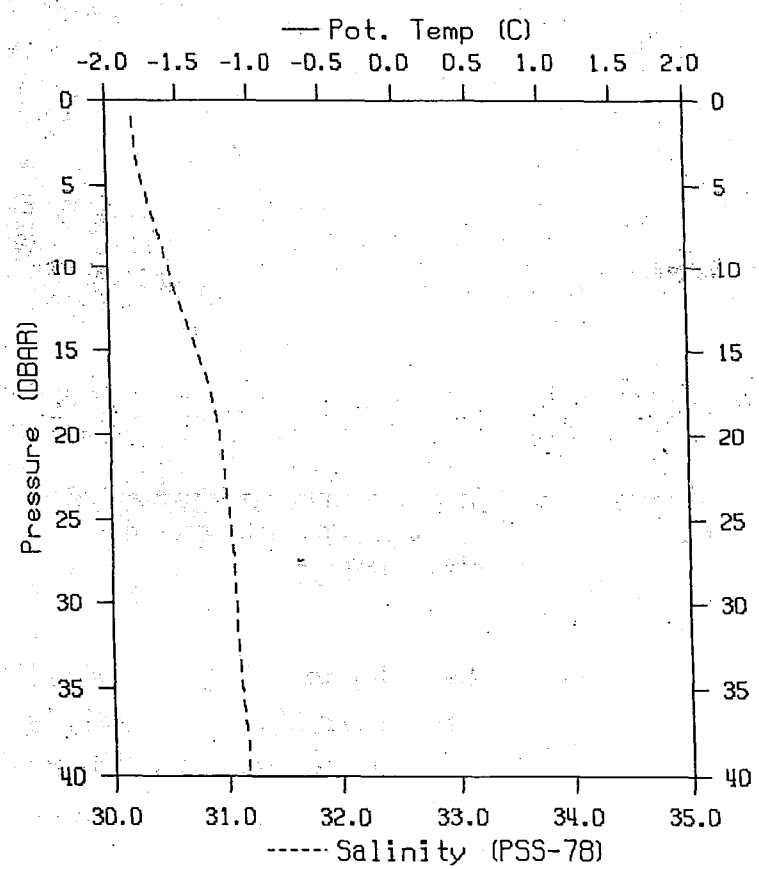
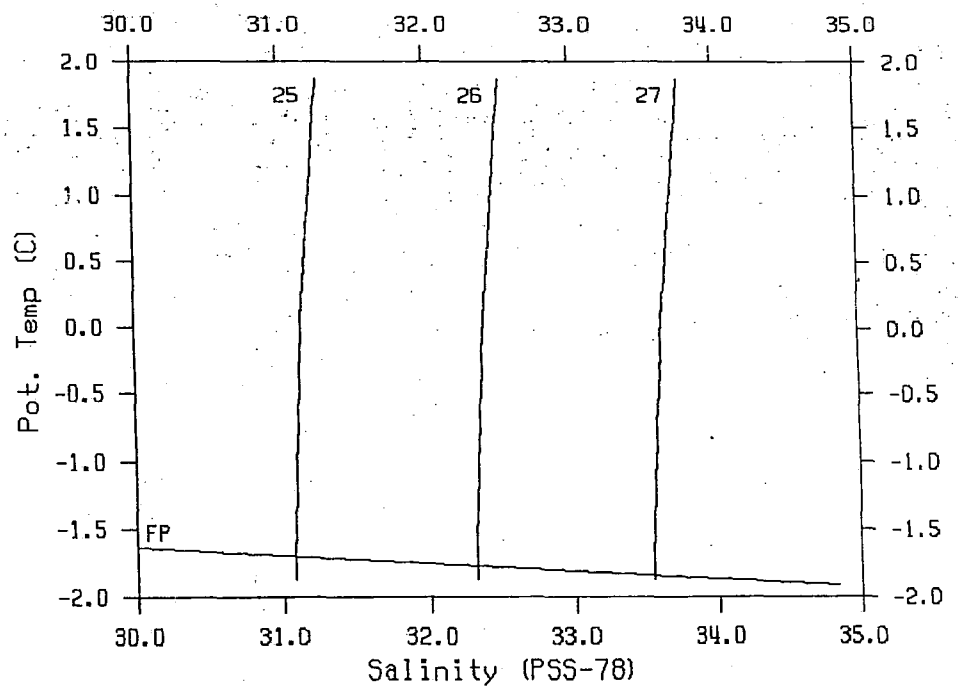
NØGAP 1993
Henry Larsen
STATION : ØD01
REFERENCE NØ.: 93-24-109
DATE/TIME : 25/09/93 01:49 UTC
POSITION : 71-35.9N 154-54.7W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.5595	2.5595	30.244	1	24.124	.00			
10	3.2717	3.2711	30.539	10	24.304	.33			
20	4.2271	4.2258	30.964	20	24.556	.68			
30	4.4504	4.4484	31.089	30	24.633	1.01			
40	4.1908	4.1882	31.173	40	24.725	1.34			





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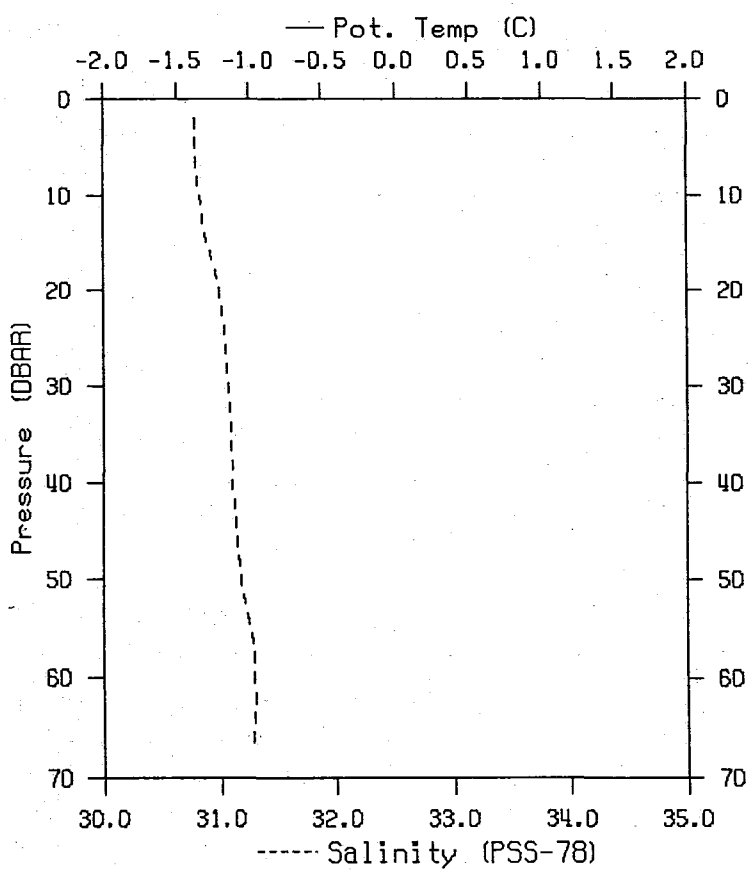
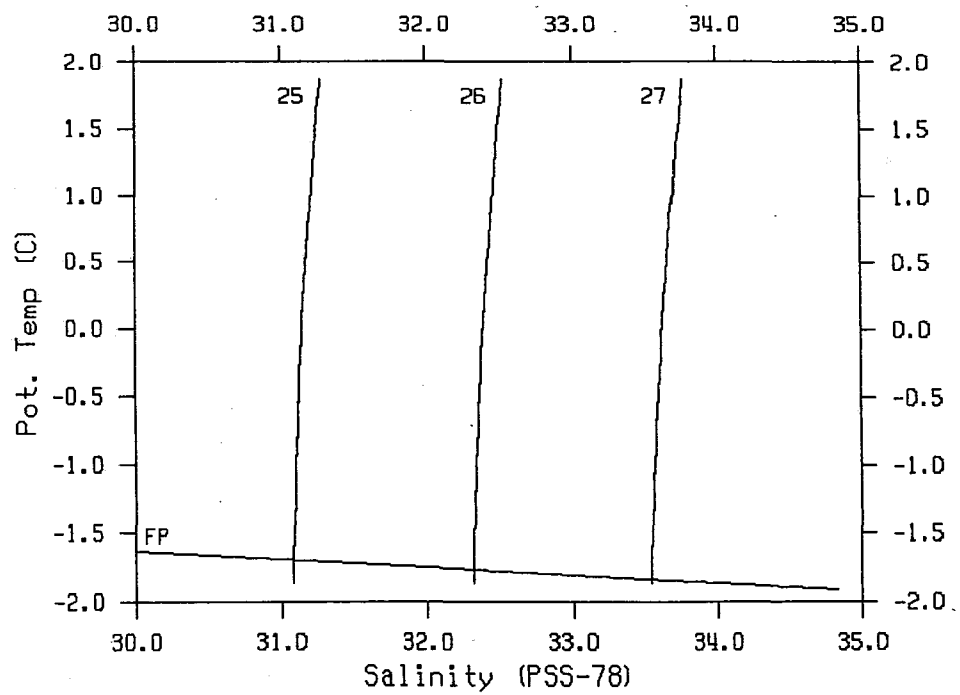
NOGAP 1993
Henry Larsen
STATION : 0E01
REFERENCE NO.: 93-24-110
DATE/TIME : 25/09/93 03:24 UTC
POSITION : 71-34.0N 155-24.9W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
2	3.4868	3.4867	30.780	2	24.477	.00			
10	3.7603	3.7597	30.827	10	24.490	.28			
20	4.3421	4.3408	30.997	20	24.570	.62			
30	4.5419	4.5399	31.077	30	24.614	.95			
50	4.9577	4.9542	31.187	50	24.659	1.61			
67	4.7782	4.7736	31.286	67	24.756	2.16			





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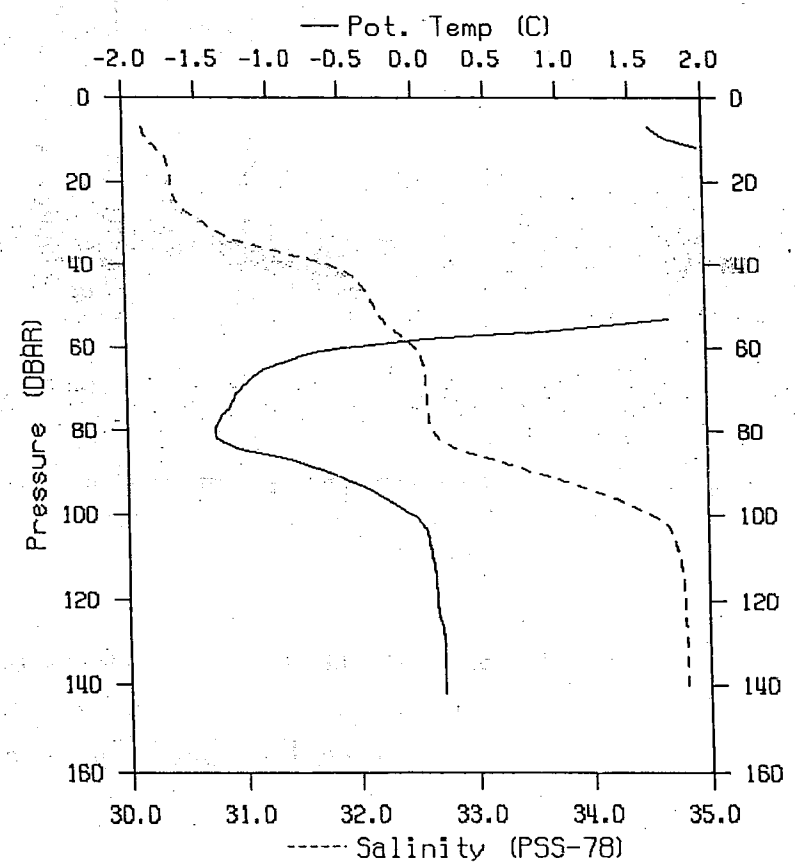
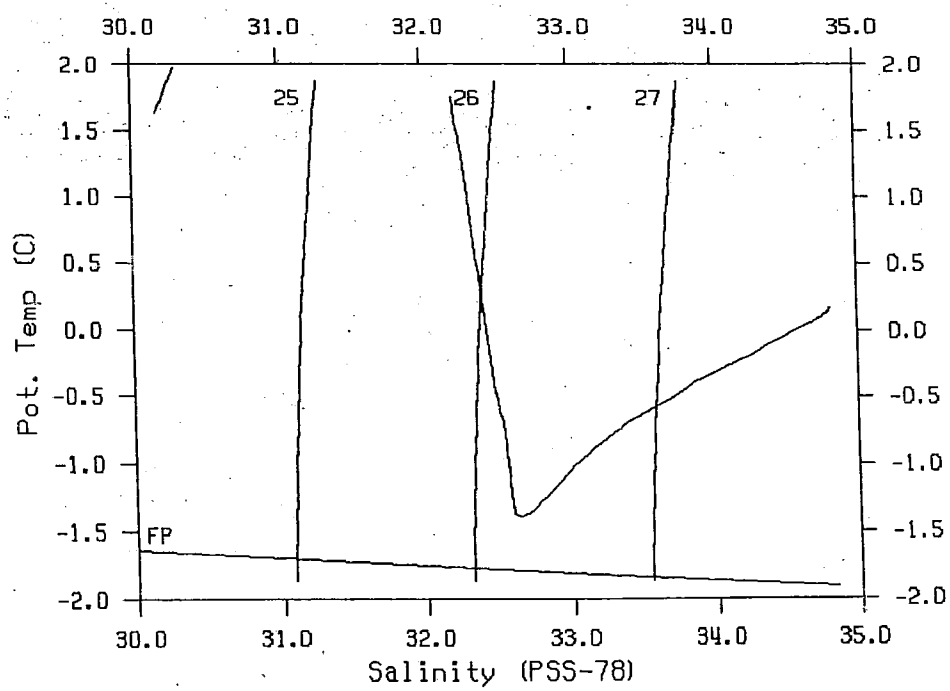
NOGAP 1993
Henry Larsen
STATION : 0F01
REFERENCE NO.: 93-24-111
DATE/TIME : 25/09/93 05:11 UTC
POSITION : 71-39.0N 155-57.1W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
10	1.7768	1.7764	30.226	10	24.163	.00			
20	2.2622	2.2613	30.419	20	24.285	.37			
30	2.5494	2.5479	30.700	30	24.489	.72			
50	2.5973	2.5947	32.157	50	25.649	1.30			
75	-1.3012	-1.3027	32.598	74	26.215	1.81			
100	-.0307	-.0343	34.514	99	27.715	2.08			
142	.1768	.1714	34.808	141	27.942	2.19			





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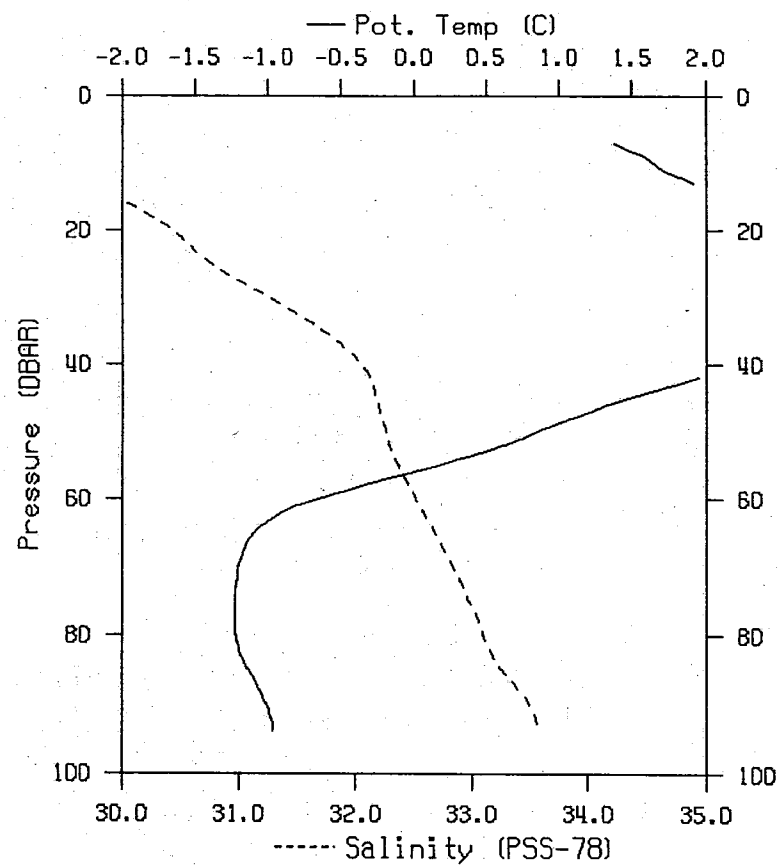
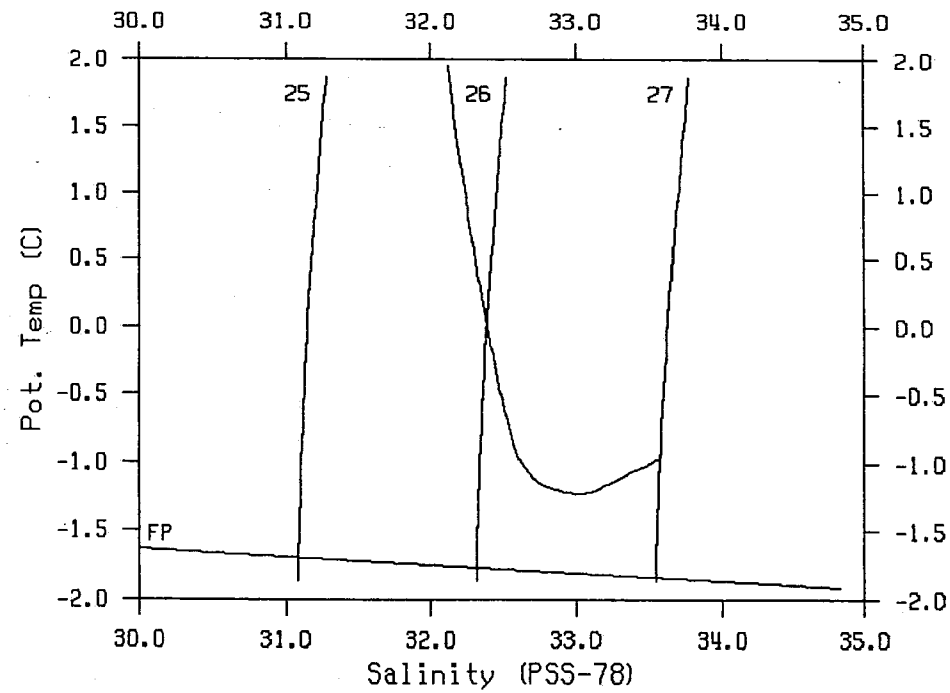
NOGAP 1993
Henry Larsen
STATION : 0G01
REFERENCE NO.: 93-24-112
DATE/TIME : 25/09/93 06:23 UTC
POSITION : 71-45.1N 156- 5.2W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
9	1.5883	1.5879	29.491	9	23.586	.00			
20	2.3433	2.3424	30.437	20	24.294	.44			
30	2.8500	2.8484	31.256	30	24.910	.77			
50	.8515	.8496	32.262	50	25.853	1.28			
75	-1.2214	-1.2231	32.985	74	26.528	1.74			
94	-.9563	-.9587	33.585	93	27.005	1.98			





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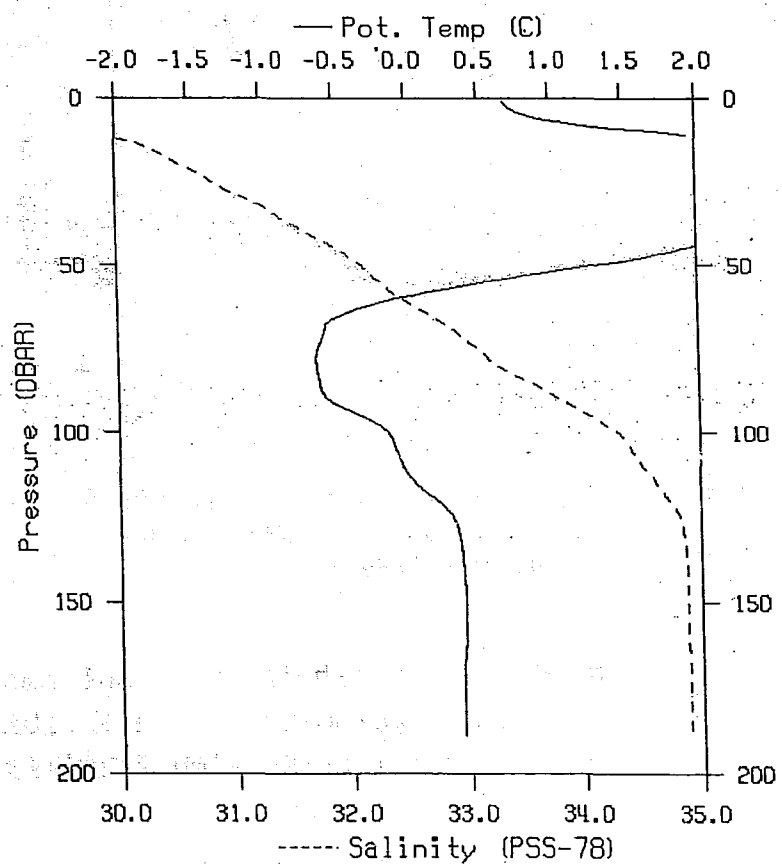
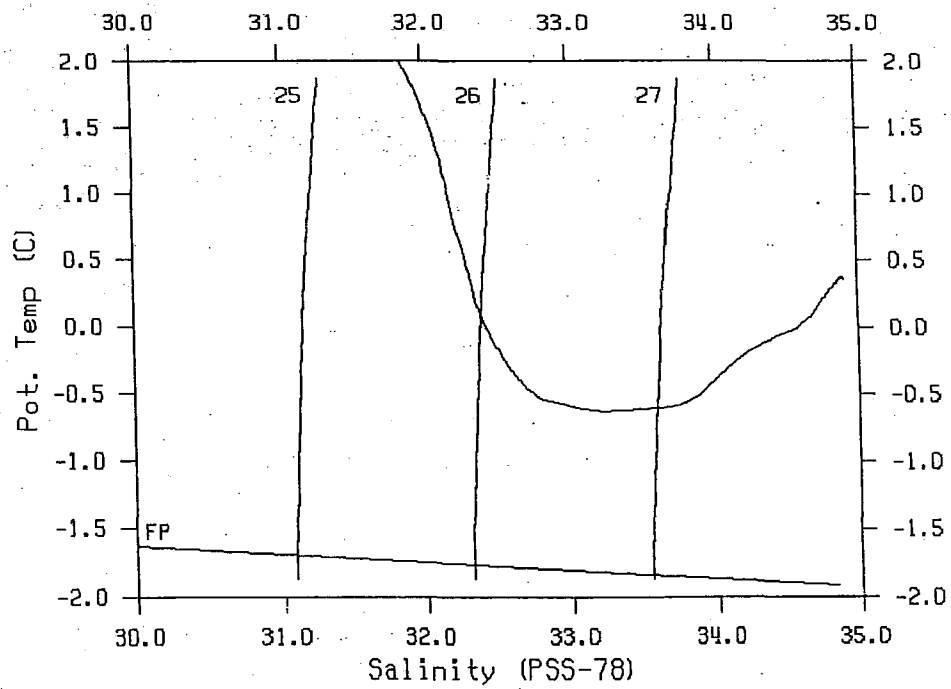
NOGAP 1993
Henry Larsen .
STATION : 0A01
REFERENCE NO.: 93-24-113
DATE/TIME : 25/09/93 08:57 UTC
POSITION : 71-56.9N 155-25.3W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	.6905	.6905	29.221	1	23.416	.00			
10	1.7221	1.7217	29.732	10	23.771	.39			
20	2.5620	2.5610	30.591	20	24.401	.77			
30	2.9591	2.9575	31.139	30	24.808	1.10			
50	1.2933	1.2912	32.118	50	25.711	1.64			
75	-.6172	-.6193	33.116	74	26.612	2.10			
100	-.1336	-.1370	34.319	99	27.564	2.34			
150	.3819	.3759	34.881	149	27.989	2.50			
189	.3661	.3585	34.895	187	28.001	2.54			





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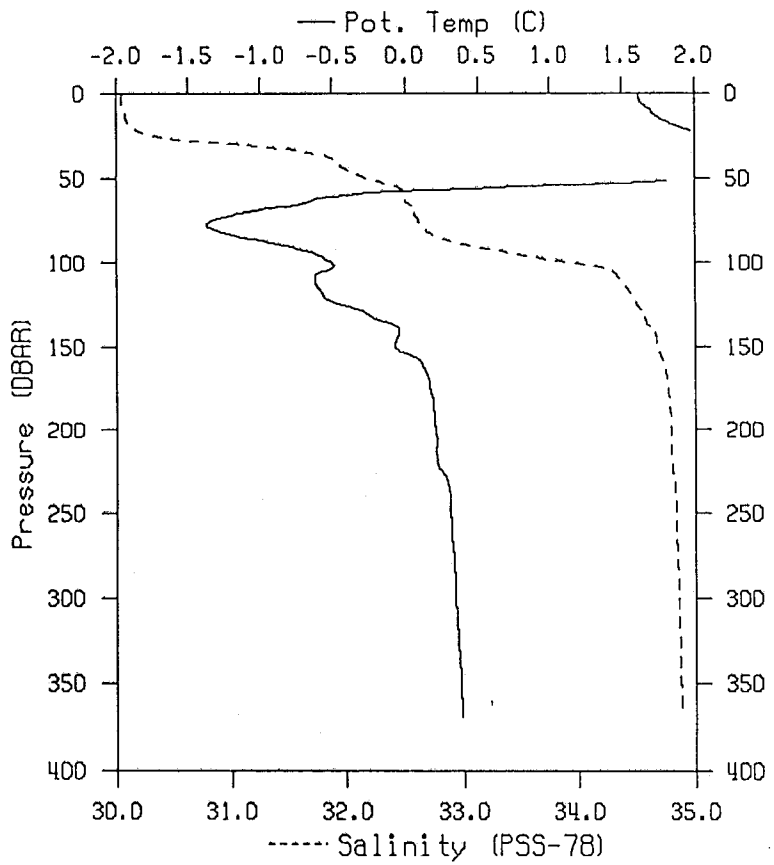
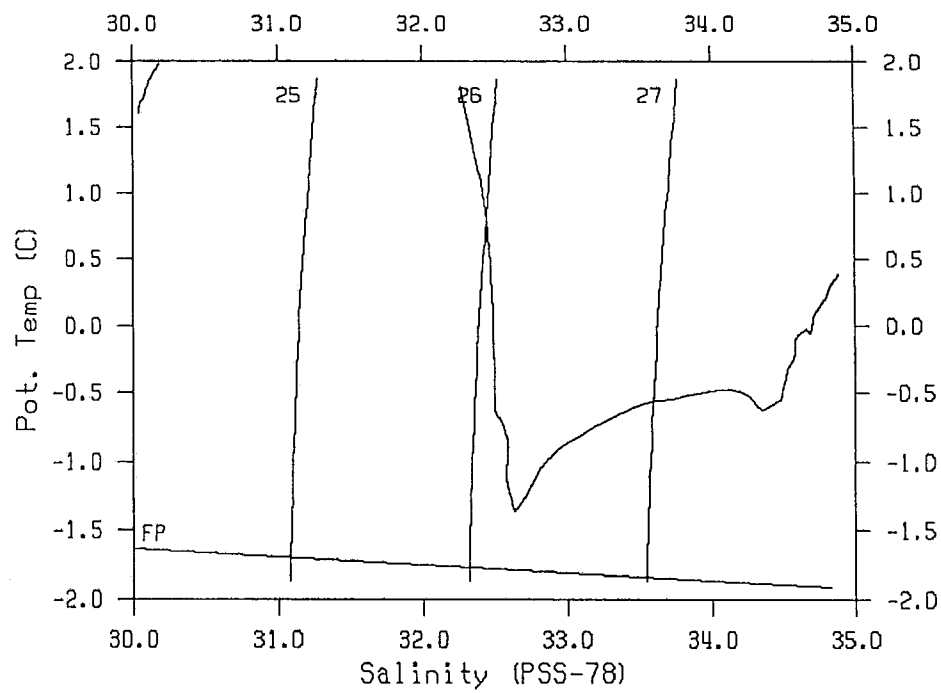
NOGAP 1993
Henry Larsen
STATION : 0B01
REFERENCE NO.: 93-24-114
DATE/TIME : 25/09/93 10:42 UTC
POSITION : 71-52.9N 154-54.6W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	1.6113	1.6113	30.045	1	24.029	.00			
10	1.7037	1.7033	30.072	10	24.045	.35			
20	1.9038	1.9029	30.146	20	24.091	.73			
30	2.9305	2.9289	31.046	30	24.736	1.08			
50	2.3096	2.3071	32.173	50	25.685	1.63			
75	-1.3149	-1.3164	32.621	74	26.235	2.14			
100	-.4961	-.4991	33.946	99	27.279	2.46			
150	-.0602	-.0656	34.682	149	27.853	2.71			
200	.2157	.2079	34.794	198	27.929	2.82			
250	.3207	.3106	34.838	248	27.958	2.89			
300	.3557	.3433	34.859	297	27.973	2.96			
369	.4000	.3844	34.881	365	27.989	3.05			





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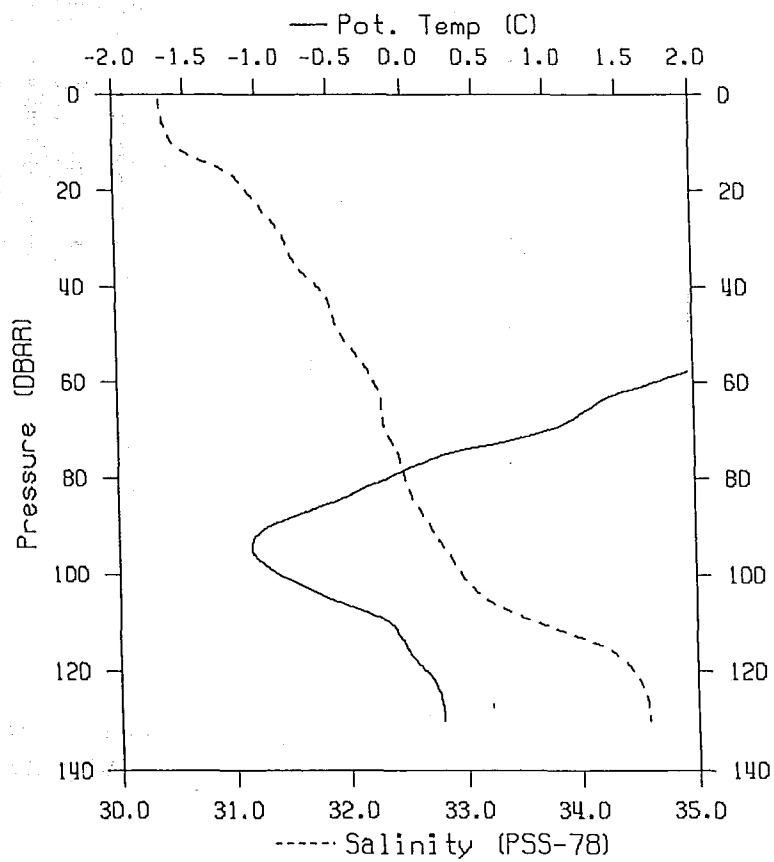
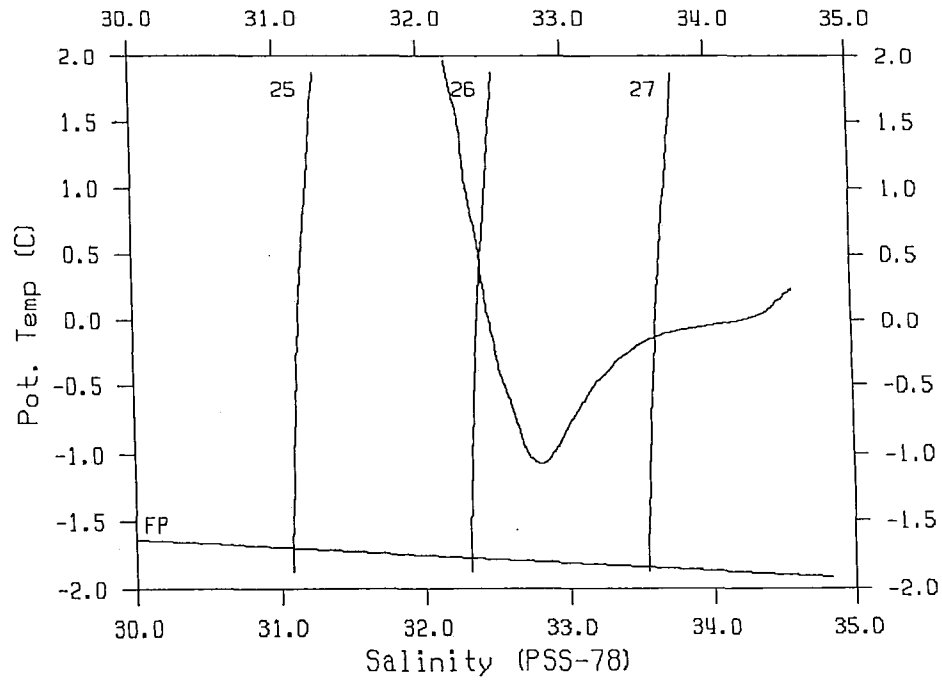
NOGAP 1993
Henry Larsen
STATION : 0C01
REFERENCE NO.: 93-24-115
DATE/TIME : 25/09/93 12:22 UTC
POSITION : 71-44.8N 154-45.0W

Pres	Temp	Theta	Sal	Dept	Gam-th	GPA	%/5cm	Chl	PAR
1	2.6862	2.6861	30.417	1	24.253	.00			
10	3.0470	3.0465	30.532	10	24.317	.33			
20	4.2233	4.2220	31.166	20	24.716	.67			
30	4.0656	4.0637	31.478	30	24.979	.98			
50	3.1596	3.1567	31.964	50	25.449	1.53			
75	.2914	.2888	32.434	74	26.021	2.09			
100	-.8814	-.8839	32.972	99	26.506	2.52			
130	.2447	.2397	34.580	129	27.754	2.80			





6.2 Chemistry Data Tables

The following appendix contains chemical data from water samples collected on the 9324 cruise. The tables include the station name, cast number, date and time of cast, the latitude (LAT) and longitude (LONG) recorded at the beginning of the cast, and a record of the instrumentation on the rosette at the time of sampling. The records from this instrumentation (CTD, Transmissometer, Fluorometer, and PAR Sensors), that coincide with the time of bottle trip are included in the tables.

STATION : A01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
7	8/29/93	15:18	72.534	143.898	3300	182	FSI	1329
8	8/30/93	15:21	72.544	143.821	3300	1601	FSI	1329
9	8/31/93	15:33	72.545	143.842	3300	3361	FSI	1329
11	9/2/93	23:11	72.548	143.851	3300	27	Guild	53501

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118501		7	0	2.0	2.0	25.910	351.8	0.52	6.9	0.1	2.9464	2.9463	25.987	20.728	66.88	0.59	85.26
118502		7	10	12.9	13.0	29.382		0.74	5.1	0.0	1.2254	1.2250	27.503	22.036	67.20	0.60	20.34
118503		7	20	22.8	22.9	30.638	401.4				-0.1961	-0.1967	30.636	24.618	69.87	0.50	9.44
118503	A	7	20	22.8	22.9	30.612		0.82	4.6	0.0	-0.1961	-0.1967	30.636	24.618	69.87	0.50	9.44
118504		7	30	32.7	32.9	30.882	404.8	0.84	5.3	0.0	-0.1861	-0.1870	30.922	24.848	70.50	0.49	4.81
118505		7	40	42.6	42.9	31.449	397.6	1.00	8.8	1.5	-1.1970	-1.1978	31.355	25.230	67.99	0.88	2.53
118506		7	50	52.6	52.9	31.955	360.8	1.30	13.3	5.6	-1.2258	-1.2269	31.959	25.721	71.47	0.41	2.40
118507		7	60	62.5	62.9	32.220	332.3	1.53	19.2	9.1	-1.2903	-1.2915	32.187	25.908	71.81	0.37	1.12
118508		7	70	72.4	72.9	32.387	317.3	1.66	23.6	10.9	-1.3474	-1.3488	32.353	26.044	72.06	0.27	1.47
118509		7	80	82.3	82.9	32.531	309.5	1.75	26.7	12.4	-1.4041	-1.4057	32.518	26.179	72.03	0.23	1.56
118510		7	100	102.1	102.9	32.717	300.9	1.85	32.4	14.0	-1.4777	-1.4797	32.734	26.357	71.89	0.23	1.04
118511		7	120	121.9	122.9	32.900	298.7	1.87	33.0	14.6	-1.5052	-1.5077	32.925	26.512	71.81	0.23	0.67
118512		7	140	141.6	142.8	33.140	295.5	1.92	35.1	15.4	-1.4924	-1.4954	33.118	26.669	71.80	0.26	0.28
118513		7	150	151.6	152.8	33.240	292.5	1.93	34.6	15.7	-1.4751	-1.4783	33.217	26.749	71.81	0.24	0.92
118514		7	160	161.5	162.8	33.400	287.0	1.93	34.3	16.2	-1.4492	-1.4527	33.359	26.863	71.74	0.27	1.30
118515		7	170	171.4	172.8	33.444	289.0	1.86	33.0	15.7	-1.3769	-1.3808	33.506	26.980	71.55	0.23	0.75
118516		7	180	180.3	181.8	33.653	287.7	1.82	34.1	15.9	-1.3019	-1.3062	33.673	27.114	71.43	0.27	0.97
118517		8	190	190.2	191.8	33.962	278.8	1.69	28.4	15.2	-1.2088	-1.2135	33.812	27.224	71.04	0.22	
118518		8	200	200.1	201.8	34.187	270.0	1.49	24.6	14.8	-1.0006	-1.0061	34.052	27.411	70.56	0.21	
118519		8	210	210.0	211.8	34.330	268.4	1.37	22.2	14.4	-0.7957	-0.8020	34.239	27.555	70.81	0.20	
118520		8	225	224.8	226.8	34.454	281.6	1.17	16.6	13.0	-0.5864	-0.5936	34.426	27.697	70.97	0.20	
118521		8	230	229.7	231.8	34.490	280.2	1.12	15.7	12.9	-0.5596	-0.5671	34.461	27.724	70.66	0.20	
118522		8	250	249.5	251.8	34.599	284.4	1.03	12.9	12.6	-0.3414	-0.3501	34.567	27.800	70.50	0.19	
118523		8	275	274.1	276.7	34.666	286.7	1.00	11.9	12.7	-0.1327	-0.1428	34.643	27.850	70.35	0.18	
118524		8	300	298.9	301.7	34.717	292.9	0.97	9.8	12.4	0.0631	0.0515	34.700	27.886	70.54	0.18	
118525		8	325	323.6	326.7	34.751	297.7	0.93	8.6	12.3	0.2177	0.2046	34.746	27.915	70.75	0.18	

STATION : A01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
7	8/29/93	15:18	72.534	143.898	3300	182	FSI	1329
8	8/30/93	15:21	72.544	143.821	3300	1601	FSI	1329
9	8/31/93	15:33	72.545	143.842	3300	3361	FSI	1329
11	9/2/93	23:11	72.548	143.851	3300	27	Guild	53501

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118526		8	350	348.3	351.7	34.778	299.9	0.92	7.9	12.3	0.3206	0.3061	34.775	27.932	69.79	0.17	
118527		8	375	373.0	376.7	34.797	301.1	0.91	7.8	12.3	0.3793	0.3634	34.793	27.944	70.28	0.17	
118528		8	400	398.1	402.1	34.810	299.9	0.92	7.6	12.4	0.4177	0.4006	34.808	27.953	70.37	0.17	
118529		8	450	447.0	451.6	34.827	299.7	0.92	7.3	12.5	0.4280	0.4085	34.827	27.968	70.41	0.17	
118530		8	500	496.4	501.6	34.841	301.8	0.91	7.3	12.6	0.4181	0.3963	34.840	27.979	70.45	0.16	
118531		8	550	545.6	551.5	34.855	301.8	0.93	7.2	12.6	0.3956	0.3715	34.851	27.989	70.53	0.16	
118532		8	600	595.5	602.0	34.860	303.4	0.92	8.2	12.6	0.3699	0.3434	34.859	27.998	70.63	0.16	
118533		8	700	693.6	701.4	34.874	303.0	0.94	7.2	12.7	0.2956	0.2644	34.870	28.011	70.88	0.16	
118534		8	800	792.1	801.3	34.882	304.3	0.95	7.5	12.7	0.2392	0.2033	34.885	28.026	71.44	0.17	
118535		8	900	890.6	901.2	34.888	305.6	0.95	8.1	12.7	0.1094	0.0692	34.888	28.035	71.30	0.16	
118536		8	1000	989.0	1001.1	34.896	305.6	0.95	7.7	12.8	0.0212	-0.0237	34.895	28.046	71.44	0.16	
118537		8	1250	1235.4	1251.4	34.906	307.6	0.97	8.5	13.0	-0.1853	-0.2421	34.906	28.066	71.13	0.16	
118538		8	1500	1480.6	1500.7	34.917		1.00	8.8	13.4	-0.3086	-0.3785	34.919	28.083	71.49	0.15	
118540		9	1500	1480.6	1500.7	34.920	305.3	1.00	8.8	13.1	-0.3073	-0.3772	34.920	28.083			
118541		9	1600	1578.8	1600.7	34.932	305.1	1.02	9.4	13.3	-0.3442	-0.4197	34.925	28.089			
118542		9	1700	1676.9	1700.6	34.927	303.6	1.03	10.1	13.6	-0.3710	-0.4524	34.929	28.094			
118543		9	1800	1775.0	1800.5	34.930	302.1	1.06	10.6	13.8	-0.3909	-0.4782	34.934	28.099			
118544		9	1900	1873.0	1900.4	34.936	301.0	1.04	10.8	13.9	-0.4014	-0.4951	34.938	28.103			
118545		9	2000	1970.9	2000.3		299.0	1.10	11.4	14.1	-0.4063	-0.5067	34.941	28.105			
118546		9	2250	2215.7	2250.1	34.946	295.8	1.07	12.1	14.2	-0.3997	-0.5175	34.948	28.110			
118547		9	2500	2460.2	2499.9	34.950	293.8	1.10	12.8	14.5	-0.3832	-0.5197	34.952	28.113			
118548		9	3000	2948.9	3000.1		289.5	1.09	13.6	14.3	-0.3319	-0.5093	34.957	28.114			
118549		9	3360	3299.1	3359.2	34.958	290.0	1.11	13.7	14.6	-0.2998	-0.5090	34.957	28.113			

Note : Salinities from 2000m (34.994) and 3000m (34.718) were removed from the table due to non-agreement with the CTD salinities.

STATION : B01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
16	9/9/93	15:16	72.537	152.452	3300	178	FSI	1329
15	9/8/93	21:47	72.568	152.359	3300	3486	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118572		16	0	2.0	2.0	27.285	381.2	0.61	6.8	0.0	-0.8025	-0.8025	27.073	21.756	65.79	0.53	13.85
118573		16	10	12.2	12.3	27.807	377.5	0.61	8.6	0.0	-0.4514	-0.4516	27.497	22.091	62.41	0.79	4.44
118574		16	20	22.3	22.4	29.411	376.2	0.60	9.3	0.0	1.8007	1.7997	28.927	23.147	58.17	1.19	1.99
118575		16	30	31.8	32.0	30.425	389.7				2.7042	2.7026	30.104	24.027	61.11	1.41	0.91
118575	B	16	30	31.8	32.0	30.408		0.66	11.0	0.0	2.7042	2.7026	30.104	24.027	61.11	1.41	0.91
118576		16	40	42.3	42.5	31.500	390.6	0.88	15.1	0.6	1.6121	1.6102	31.241	25.013	62.12	1.03	1.26
118577		16	50	52.0	52.3	31.960	358.2	1.21	19.1	2.5	-0.1666	-0.1681	31.956	25.682	63.30	0.54	0.77
118578		16	60	61.6	62.0	32.153		1.40	21.9	4.4	-0.4722	-0.4739	32.117	25.824	62.91	0.45	1.17
118579		16	70	72.0	72.5	32.283	336.7	1.53	23.3	5.7	-1.1001	-1.1017	32.285	25.982	60.72	0.66	1.25
118580		16	80	81.5	82.1	32.433	319.3				-1.2853	-1.2870	32.408	26.087	59.18	0.44	1.52
118580	A	16	80	81.5	82.1	32.428		1.69	26.9	7.8	-1.2853	-1.2870	32.408	26.087	59.18	0.44	1.52
118581		16	100	101.8	102.6	32.574	317.7	1.81	32.8	10.4	-1.3684	-1.3705	32.583	26.231	60.43	0.37	1.63
118582		16	125	127.1	128.1	32.775	306.5	1.77	32.9	10.7	-1.3831	-1.3857	32.685	26.314	59.83	0.44	1.83
118583		16	150	152.2	153.4	33.521	292.2				-1.2368	-1.2404	33.415	26.902	64.04	0.32	0.43
118583	B	16	150	152.2	153.4	33.510		1.72	29.3	14.0	-1.2368	-1.2404	33.415	26.902	64.04	0.32	0.43
118584		16	175	178.0	179.5	34.000	275.4	1.59	27.6	15.3	-1.0459	-1.0506	33.986	27.359	68.78	0.25	1.36
118585		15	200	203.4	205.1	34.229	273.1	1.35	19.8	13.6	-1.0972	-1.1026	33.926	27.312			
118586		15	225	227.5	229.5	34.445	280.2	1.08	14.3	12.7	-0.6902	-0.6973	34.358	27.646			
118587		15	250	252.1	254.4		283.7				-0.4673	-0.4757	34.504	27.755			
118587	B	15	250	252.1	254.4	34.579		1.03	12.1	12.6	-0.4673	-0.4757	34.504	27.755			
118588		15	275	276.6	279.1	34.659	286.8	0.98	10.5	12.6	-0.1180	-0.1283	34.624	27.834			
118589		15	300	302.1	304.9	34.718	291.4	0.94	9.5	12.6	0.0930	0.0812	34.689	27.876			
118590		15	350	351.3	354.7	34.789	296.3	0.93	7.5	12.4	0.3528	0.3380	34.767	27.925			
118559		15	400	402.1	406.1	34.814	300.9	0.91	7.4	12.5	0.4171	0.3998	34.798	27.945			
118560		15	450	452.2	456.8	34.836	302.3	0.92	7.0	12.5	0.4348	0.4151	34.817	27.960			
118561		15	500	502.4	507.7	34.853	300.8	0.92	7.3	12.6	0.4297	0.4075	34.829	27.970			
118562		15	600	595.2	601.7	34.866	304.7	0.90	7.1	12.6	0.3932	0.3666	34.847	27.986			
118563		15	700	696.6	704.4	34.875	306.4	0.91	7.0	12.7	0.2620	0.2309	34.856	28.001			
118564		15	800	798.6	807.8	34.882	309.3	0.91	6.9	12.5	0.1305	0.0950	34.861	28.012			

STATION : B01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
16	9/9/93	15:16	72.537	152.452	3300	178	FSI	1329
15	9/8/93	21:47	72.568	152.359	3300	3486	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118566		15	1000	1001.9	1014.1	34.893	310.7	0.94	7.1	12.6	-0.0611	-0.1059	34.876	28.035			
118567		15	1250	1250.7	1266.9	34.908	309.4	0.95	7.9	13.0	-0.2490	-0.3059	34.888	28.055			
118568		15	1500	1502.2	1522.7	34.923	308.9	1.00	9.0	13.4	-0.3580	-0.4286	34.902	28.071			
118569		15	2000	1999.4	2029.3	34.943	300.5	1.04	11.4	14.4	-0.4116	-0.5137	34.925	28.092			
118570		15	2500	2497.4	2537.9		308.5				-0.3758	-0.5152	34.934	28.098			
118571		15	3423	3418.9	3482.1	34.956	293.2	1.08	13.3	14.6	-0.2896	-0.5100	34.936	28.095			

STATION : TA
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
28	9/11/93	16:54	75.027	173.025	347	204	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118591		28	0	2.0	2.0	29.739	389.9	0.95	4.0	0.0	-1.2931	-1.2931	29.731	23.916	64.65	0.44	9.49
118592		28	10	11.3	11.4	29.858	395.1	0.91	4.3	0.0	-1.2951	-1.2953	29.735	23.919	64.86	0.91	4.19
118593		28	20	21.8	21.9	31.886	353.1	1.35	5.5	0.0	-1.3393	-1.3396	30.007	24.141	62.10	0.71	2.26
118594		28	30	31.7	31.9	32.070	334.1	1.67	14.1	8.0	-1.6155	-1.6160	32.030	25.788	60.55	1.03	1.55
118595		28	40	42.0	42.3	32.203	323.7	1.72	22.2	9.4	-1.5667	-1.5674	32.171	25.902	68.36	0.69	1.50
118596		28	50	53.1	53.5	32.445	288.0	2.02	33.5	12.8	-1.2207	-1.2218	32.445	26.115	66.09	0.97	0.15
118597		28	60	62.3	62.8	32.727	285.8	2.08	37.3	15.0	-1.1645	-1.1659	32.709	26.327	65.56	0.78	1.36
118598		28	70	71.1	71.7	32.856		2.18	43.9	16.6	-1.3666	-1.3681	32.850	26.447	67.11	0.81	0.90
118599		28	80	81.9	82.6	33.002	282.3	2.28	47.5	17.9	-1.6219	-1.6234	32.994	26.571	68.72	0.40	1.18
118600		28	100	103.0	103.9	33.386	248.9	2.34	47.6	18.1	-1.3987	-1.4010	33.440	26.927	70.42	0.35	0.92

STATION : TC
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
52	9/13/93	15:21	75.323	174.001	650	642	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118603		52	75	76.2	76.8	33.052	265.3	2.26	42.8	15.7	-1.3686	-1.3702	32.867	26.461	70.09	0.31	
118604		52	100	101.6	102.5	33.888	307.0	1.12	13.0	9.5	-1.5628	-1.5649	33.717	27.157	71.16	0.26	
118605		52	125	127.0	128.1	34.189	318.1	0.85	6.4	8.9	-1.4882	-1.4911	34.135	27.494	71.25	0.24	
118606		52	150	151.6	153.0	34.369	317.4	0.85	5.8	9.3	-1.2010	-1.2049	34.317	27.633	71.17	0.23	
118607		52	175	177.1	178.8	34.491	317.5	0.85	5.5	9.7	-0.6371	-0.6427	34.457	27.724	71.27	0.21	
118608		52	200	202.2	204.1	34.593	315.7	0.89	5.3	10.3	-0.0402	-0.0476	34.569	27.786	71.29	0.20	
118609		52	225	227.4	229.6	34.719	313.8	0.92	5.6	11.0	0.5057	0.4962	34.674	27.841	71.33	0.20	
118610		52	275	276.9	279.7	34.777	313.4	0.92	5.2	11.3	0.9367	0.9239	34.780	27.898	71.37	0.18	
118611		52	310	311.9	315.1	34.804	314.2	0.93	5.3	11.3	0.7599	0.7458	34.783	27.913	70.82	0.19	
118612		52	350	352.3	356.0	34.819	315.2	0.95	5.6	11.4	0.8159	0.7997	34.816	27.935	71.38	0.18	
118613		52	400	402.2	406.5	34.822	314.1	0.94	5.9	11.6	0.6672	0.6490	34.820	27.948	71.57	0.19	
118614		52	500	502.3	507.8	34.845	315.1	0.99	6.0	11.7	0.5436	0.5210	34.845	27.976	71.48	0.18	
118615		52	630	632.1	639.4	34.861	315.0	0.99	6.4	11.8	0.3891	0.3606	34.854	27.993	65.52	0.18	

STATION : D01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
67	9/15/93	2:27	76.588	174.049	2187	500	FSI	1329
65	9/14/93	18:26	76.505	173.922	2187	2186	FSI	1329

SAMPLE # A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118641	67	0	2.0	2.0	30.187	401.1	0.83	3.1	0.1	-1.5724	-1.5724	30.171	24.278	89.69	0.78	
118642	67	20	21.8	22.0	31.625	373.3	1.16	12.7	4.9	-1.5556	-1.5559	30.760	24.756	89.52	0.97	
118643	67	40	41.0	41.3	31.873	360.2	1.35	15.7	6.7	-1.6589	-1.6595	31.790	25.594	91.25	0.73	
118644	67	60	61.6	62.1	32.358	330.8	1.69	25.4	10.5	-1.6507	-1.6517	32.170	25.903	91.37	0.47	
118645	67	80	81.1	81.8	32.776	291.0	2.10	37.3	15.2	-1.2906	-1.2923	32.732	26.350	91.62	0.33	
118646	67	100	101.9	102.8	33.146	269.7	2.28	45.0	17.1	-1.5294	-1.5315	33.150	26.696	91.69	0.32	
118620	65	125	127.1	128.2	33.908	286.4	1.21	18.6	11.5	-1.4219	-1.4248	33.898	27.300		0.27	
118621	65	150	150.6	152.0	34.251	305.6	0.93	9.2	10.4	-1.3591	-1.3628	34.218	27.558		0.25	
118622	65	175	175.9	177.5	34.393	305.3	0.89	7.9	10.6	-0.9686	-0.9735	34.394	27.687		0.22	
118623	65	200	202.3	204.2	34.532	306.6	0.87	7.0	11.0	-0.4763	-0.4830	34.527	27.774		0.22	
118624	65	225	226.5	228.7	34.620	306.6	0.88	6.8	11.4	-0.1725	-0.1806	34.613	27.829		0.22	
118625	65	250	252.4	254.9	34.701	307.8	0.88	6.3	11.6	0.1448	0.1349	34.706	27.886		0.20	
118626	65	275	276.7	279.5	34.747	309.8	0.89	6.1	11.8	0.2877	0.2764	34.748	27.913		0.20	
118627	65	300	303.4	306.5	34.789	310.1	0.91	6.1	11.9	0.4126	0.3999	34.783	27.934		0.20	
118628	65	325	326.9	330.3	34.803	311.3	0.89	5.9	11.9	0.4553	0.4414	34.802	27.946		0.19	
118629	65	350	351.5	355.2	34.823	310.5	0.90	5.8	12.2	0.4625	0.4474	34.808	27.951		0.18	
118630	65	400	402.7	407.0	34.832	312.3	0.90	6.0	12.1	0.5158	0.4981	34.832	27.967		0.20	
118631	65	450	453.3	458.2	34.841	311.9	0.91	6.0	12.3	0.4664	0.4464	34.843	27.979		0.19	
118632	65	500	503.2	508.8	34.855	313.1	0.91	6.0	12.3	0.4164	0.3942	34.849	27.987		0.17	
118633	65	600	604.5	611.4	34.885	310.6	0.93	7.1	12.5	0.2844	0.2578	34.861	28.004		0.17	
118634	65	800	809.5	819.3	34.872	309.7	0.92	6.6	12.6	0.0280	-0.0074	34.874	28.029		0.17	
118635	65	1000	1006.4	1019.1	34.890	312.9	0.96	7.1	12.9	-0.1627	-0.2070	34.887	28.050		0.17	
118636	65	1250	1253.2	1269.9	34.906	313.4	0.98	8.2	13.2	-0.3135	-0.3700	34.906	28.073		0.17	
118637	65	1500	1501.2	1522.1	34.920	311.1	1.01	9.1	13.6	-0.4235	-0.4933	34.921	28.090		0.16	
118638	65	1750	1749.8	1775.3	34.937	305.1	1.05	10.6	14.2	-0.4546	-0.5395	34.936	28.103		0.15	
118639	65	2000	1999.3	2029.8	34.949	298.2	1.07	12.3	14.6	-0.4202	-0.5223	34.949	28.112		0.15	
118640	65	2150	2137.8	2171.1	34.956	294.7	1.11	14.2	15.0	-0.3932	-0.5055	34.954	28.115		0.14	

STATION : E01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
74	9/17/93	16:19	78.782	176.050	2067	200	FSI	1329
79	9/18/93	3:35	78.799	176.099	2067	400	FSI	1329
81	9/18/93	17:06	78.781	176.014	2055	2030	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118652		74	0	2.0	2.0	30.526	382.8	0.62	8.3	0.3	-1.5797	-1.5797	30.621	24.644	60.25	1.13	
118653		74	10	10.9	11.0		378.3				-1.6542	-1.6543	30.528	24.569	59.86	1.14	
118668		79	10	11.5	11.6	30.728		0.68	9.1	0.6	-1.6468	-1.6470	30.531	24.572	63.13	0.97	
118654		74	20	20.8	21.0	31.013	372.5	0.67	9.3	1.0	-1.6282	-1.6285	30.608	24.634	62.01	1.02	
118655		74	30	31.1	31.3	32.805	336.3	0.88	10.9	6.2	-1.6597	-1.6602	32.272	25.985	66.37	0.49	
118656		74	40	41.3	41.6	33.434	344.1	0.68	6.1	6.3	-1.7323	-1.7331	33.305	26.827	68.62	0.33	
118657		74	50	51.1	51.5	33.632	344.6	0.65	5.1	6.4	-1.7931	-1.7940	33.554	27.030	69.39	0.30	
118658		74	60	61.8	62.3	33.753	338.1	0.67	5.4	6.9	-1.7909	-1.7920	33.694	27.144	69.42	0.31	
118659		74	70	71.8	72.4	33.858	336.0	0.68	5.3	7.2	-1.7794	-1.7808	33.802	27.232	69.67	0.27	
118660		74	80	81.6	82.3	33.937	333.3	0.70	5.2	7.5	-1.7706	-1.7722	33.892	27.305	69.94	0.25	
118661		74	100	102.4	103.4	34.121	323.1	0.74	4.8	8.4	-1.5237	-1.5260	34.108	27.474	70.11	0.24	
118662		74	125	126.1	127.3	34.305	318.3	0.78	4.9	9.2	-1.1815	-1.1847	34.286	27.607	70.03	0.21	
118663		74	150	152.4	153.9	34.469	315.1	0.82	4.8	10.0	-0.4976	-0.5025	34.470	27.728	70.33	0.20	
118664		74	175	176.2	178.0	34.595	313.5	0.84	5.4	10.3	0.1815	0.1747	34.586	27.788	70.32	0.19	
118665		74	200	202.7	204.8	34.731	310.1	0.89	5.1	11.3	0.8761	0.8669	34.732	27.864	70.26	0.19	
118676		79	210	212.1	214.3	34.786	310.2	0.90	5.2	11.4	1.0602	1.0503	34.763	27.877	69.77	0.19	
118677		79	235	237.1	239.5	34.799	304.0	0.90	5.2	11.6	1.2467	1.2352	34.807	27.899	69.76	0.20	
118678		79	250	252.2	254.8	34.848	309.0	0.91	5.3	11.7	1.1103	1.0983	34.799	27.902	69.78	0.20	
118679		79	275	277.1	280.0	34.823	309.7	0.91	5.2	11.8	1.1156	1.1023	34.830	27.926	69.86	0.18	
118680		79	300	302.1	305.3	34.893	311.0	0.92	5.4	12.0	1.0387	1.0244	34.837	27.937	69.79	0.19	
118683		81	315	316.5	319.9	34.837	310.8	0.95	5.5	11.7	1.0566	1.0415	34.841	27.940	69.40	0.19	
118684		81	350	351.9	355.7	34.830	310.4	0.96	5.6	11.9	0.8170	0.8008	34.832	27.948	69.46	0.19	
118685		81	400	402.4	406.8	34.848	311.8	0.96	5.5	12.0	0.7957	0.7771	34.851	27.965	69.42	0.18	
118686		81	450	451.5	456.6	34.848	312.4	0.97	5.7	12.0	0.6519	0.6313	34.851	27.974	69.38	0.19	
118687		81	500	502.1	507.8	34.852	313.4	0.95	5.8	12.0	0.4905	0.4680	34.848	27.981	69.35	0.18	
118688		81	550	553.0	559.4	34.852	314.8	0.96	5.7	12.1	0.4306	0.4059	34.855	27.991	69.26	0.19	
118689		81	600	601.6	608.6	34.857	313.0	0.96	5.8	12.1	0.3379	0.3112	34.858	27.999	69.32	0.19	
118690		81	700	702.7	711.1	34.860	314.9	0.97	6.0	12.2	0.1687	0.1378	34.860	28.010	69.13	0.18	

STATION : E01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
74	9/17/93	16:19	78.782	176.050	2067	200	FSI	1329
79	9/18/93	3:35	78.799	176.099	2067	400	FSI	1329
81	9/18/93	17:06	78.781	176.014	2055	2030	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118691		81	800	801.2	811.0	34.865	313.5	0.97	6.4	12.2	0.0392	0.0041	34.866	28.021	69.25	0.18	
118692		81	900	902.2	913.5	34.873	313.3	0.97	7.1	12.4	-0.0613	-0.1009	34.872	28.032	69.21	0.19	
118693		81	1000	1001.5	1014.3	34.880	312.9	0.98	6.7	12.5	-0.1542	-0.1983	34.879	28.043	69.16	0.19	
118694		81	1100	1101.5	1115.9	34.886	312.4	1.02	7.0	12.7	-0.2412	-0.2899	34.886	28.052	69.15	0.18	
118695		81	1200	1201.1	1217.1	34.893	311.9	1.00	7.1	12.6	-0.3106	-0.3642	34.892	28.061	69.01	0.18	
118696		81	1300	1301.5	1319.2	34.901	311.2	1.01	7.5	12.9	-0.3621	-0.4209	34.901	28.071	69.05	0.18	
118697		81	1400	1400.7	1420.1	34.907	309.0	1.03	8.1	13.1	-0.4099	-0.4738	34.908	28.078	68.82	0.19	
118698		81	1500	1499.8	1521.0	34.920	307.7	1.05	8.7	13.5	-0.4566	-0.5259	34.915	28.087	68.87	0.18	
118699		81	1600	1600.5	1623.5	34.930	306.1	1.08	9.5	13.8	-0.4953	-0.5702	34.919	28.092	68.49	0.17	
118700		81	1725	1723.1	1748.4	34.934	300.9	1.11	10.6	14.1	-0.4689	-0.5519	34.934	28.103	68.67	0.16	
118701		81	1830	1827.3	1854.6	34.944	296.7	1.14	11.7	14.6	-0.4460	-0.5362	34.944	28.110	68.60	0.15	
118702		81	1900	1897.1	1925.8	34.949	294.7	1.15	12.2	14.6	-0.4419	-0.5368	34.948	28.112	68.41	0.15	
118703		81	1960	1958.1	1988.0	34.952	294.0	1.16	13.2	14.9	-0.4197	-0.5190	34.952	28.115	68.27	0.14	
118704		81	2000	1997.1	2027.8	34.954	290.3	1.18	13.5	14.9	-0.4060	-0.5083	34.955	28.116	66.54	0.15	
118705		81	2035	2033.9	2065.4	34.953	292.8	1.17	13.6	15.0	-0.4030	-0.5078	34.955	28.117	65.79	0.15	

STATION : E04
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
84	9/19/93	14:57	76.959	174.147	870	852	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
123102		84	0	2.0	2.0	29.305	378.3	1.27	13.6	0.0	-1.5561	-1.5561	29.291	23.563	58.60	0.56	
123103		84	10	11.8	11.9	29.295	379.0	1.24	13.4	0.0	-1.5749	-1.5750	29.285	23.559	63.68	0.48	
123104		84	20	22.0	22.1	29.502	376.9	1.24	13.5	0.2	-1.5737	-1.5739	29.287	23.561	64.27	0.51	
123105		84	30	31.6	31.8	31.510	327.4	1.46	19.0	5.3	-1.5098	-1.5102	30.163	24.270	63.87	0.53	
123106		84	50	51.7	52.1	33.569	299.0	1.08	14.6	9.5	-1.5470	-1.5480	33.274	26.797	67.33	0.32	
123107		84	60	61.4	61.9	33.790	316.1	0.86	9.1	8.5	-1.6663	-1.6675	33.764	27.198	68.01	0.27	
123108		84	70	71.3	71.9	33.990	320.7	0.80	6.4	8.5	-1.6048	-1.6063	33.942	27.341	68.12	0.25	
123109		84	100	102.2	103.1		316.6	0.81	5.5	9.2	-1.3048	-1.3073	34.262	27.592	68.09	0.24	
123110		84	125	126.8	128.0	34.448	315.7	0.82	5.1	9.7	-0.8145	-0.8182	34.393	27.680	68.07	0.21	
123111		84	150	151.7	153.1	34.588	313.4	0.86	5.0	10.6	0.1389	0.1332	34.561	27.770	68.25	0.22	
123112		84	175	176.9	178.6	34.714	309.9	0.88	5.1	11.2	0.7556	0.7479	34.686	27.834	68.30	0.18	
123113		84	200	202.4	204.4	34.780	309.7	0.90	5.1	11.6	1.2046	1.1949	34.778	27.879	68.27	0.18	
123114		84	250	251.4	254.0	34.828	311.1	0.92	5.4	11.8	1.4127	1.4001	34.832	27.908	68.28	0.18	
123115		84	300	302.1	305.2	34.842	311.4	0.92	5.4	11.8	1.2948	1.2798	34.846	27.927	68.52	0.17	
123116		84	350	352.2	355.9	34.843	311.6	0.92	5.5	11.9	1.0748	1.0578	34.846	27.942	68.21	0.18	
123117		84	400	401.9	406.3	34.845	312.0	0.93	5.3	12.0	0.9374	0.9183	34.849	27.954	68.30	0.18	
123118		84	450	452.3	457.3	34.848	312.7	0.93	5.5	12.0	0.8103	0.7890	34.852	27.964	68.12	0.18	
123119		84	500	502.0	507.6	34.843	313.0	0.93	5.7	12.0	0.6553	0.6322	34.846	27.970	68.16	0.20	
123120		84	600	602.1	609.0	34.844	314.1	0.93	5.8	12.0	0.4418	0.4146	34.847	27.983	68.01	0.18	
123121		84	700	702.4	710.7	34.880	313.9	0.94	6.0	12.1	0.3524	0.3205	34.856	27.996	67.98	0.19	
123122		84	800	802.0	811.7		314.0	0.95	6.2	12.3	0.1932	0.1571	34.863	28.011	68.02	0.18	
123123		84	850	852.6	863.0	34.871	312.4	0.98	6.8	12.5	-0.0548	-0.0918	34.872	28.032	66.79	0.19	

Note : Salinities at 100m (32.299) and 800m (34.967) were rejected.

STATION : F09
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
94	9/22/93	18:32	73.493	166.032	89	86	FSI	1329

SAMPLE # A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
123127	94	0	2.0	2.0	29.222	404.2	0.81	10.3	0.0	-0.8716	-0.8716	29.213	23.488	62.10	0.69	47.04
123128	94	10	12.1	12.2	29.234	378.9	0.79	10.5	0.0	-0.8789	-0.8791	29.223	23.496	63.15	1.04	17.67
123129	94	20	22.2	22.3	31.882	379.2	1.35	14.2	3.5	-1.2462	-1.2466	31.805	25.597	63.48	1.65	8.10
123130	94	30	32.3	32.5	32.243	324.8	1.85	28.8	9.2	-1.4853	-1.4859	32.223	25.942	63.26	1.62	3.60
123131	94	40	42.7	43.0	32.444	308.7	2.03	37.7	12.3	-1.5866	-1.5874	32.430	26.112	68.32	0.45	1.83
123132	94	50	52.5	52.9	32.608		2.10	42.5	13.6	-1.6099	-1.6108	32.599	26.250	67.75	0.47	1.48
123133	94	60	60.4	60.9	32.676	297.4	2.16	45.5	14.6	-1.6102	-1.6113	32.669	26.307	65.06	0.47	1.01
123134	94	70	74.2	74.8	32.803	296.2	2.12	44.6	15.1	-1.5727	-1.5741	32.818	26.427	62.37	0.34	1.50
123135	94	85	85.4	86.1	34.167	244.2	1.84	33.6	14.4	-0.6311	-0.6337	34.333	27.624	28.36	0.42	1.20

STATION : C01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
99	9/23/93	16:24	75.000	162.009	1965	1940		

SAMPLE # A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
123136	99	0	2.0	2.0	29.052	386.5	0.81	3.2	0.0	-1.6210	-1.6210	25.611	20.577	64.90	0.42	
123137	99	10	12.4	12.5	29.080	387.4	0.76	2.9	0.0	-1.5954	-1.5955	29.035	23.356	68.35	0.49	
123138	99	20	21.8	21.9	31.176	377.0	1.01	6.7	1.8	-1.5776	-1.5778	29.106	23.413	69.06	0.48	
123139	99	30	31.8	32.0	31.727	362.5	1.14	9.0	4.1	-1.2114	-1.2120	31.513	25.359	64.91	1.97	
123140	99	50	51.5	51.9	32.064	325.7	1.57	21.4	8.5	-1.3010	-1.3020	32.071	25.814	70.15	0.45	
123141	99	75	76.8	77.4	32.414	313.5	1.79	29.2	11.7	-1.2561	-1.2577	32.384	26.066	70.30	0.30	
123142	99	100	102.0	102.8	32.717	308.0	1.87	36.4	13.3	-1.4445	-1.4465	32.658	26.294	69.91	0.27	
123143	99	125	126.5	127.5	33.094	291.0	1.99	34.7	15.6	-1.4175	-1.4202	33.025	26.591	70.16	0.26	
123144	99	150	152.1	153.4	33.557		2.10	40.3	18.1	-1.3946	-1.3980	33.483	26.962	70.60	0.25	
123145	99	200	202.2	204.0	34.391	292.8	1.03	12.0	11.3	-0.9956	-1.0013	34.376	27.673	71.26	0.22	
123146	99	250	252.9	255.3	34.598	300.5	0.94	8.1	11.3	-0.2601	-0.2691	34.610	27.831	71.50	0.21	
123147	99	300	302.3	305.3	34.760		0.92	6.9	11.7	0.2622	0.2499	34.741	27.909	71.38	0.20	
123148	99	350	352.4	356.0	34.798	307.2	0.92	6.5	11.9	0.4443	0.4292	34.799	27.945	71.37	0.18	
123149	99	400	403.1	407.3	34.819	307.9	0.93	6.7	12.0	0.4738	0.4562	34.819	27.959	71.37	0.17	
123150	99	500	502.7	508.1	34.845	307.9	0.94	6.7	12.2	0.4266	0.4044	34.846	27.984	71.29	0.17	
123151	99	900	902.0	913.0	34.877	308.5	0.97	7.0	12.5	0.0733	0.0327	34.881	28.032	71.11	0.17	
123152	99	1250	1250.9	1267.3	34.911	303.4	1.03	9.4	13.2	-0.1427	-0.2008	34.913	28.069	71.19	0.16	
123153	99	1500	1500.8	1521.5	34.924	299.5	1.08	11.6	13.9	-0.2763	-0.3479	34.927	28.087	71.26	0.15	
123154	99	1600	1600.2	1622.7	34.929	297.7	1.10	12.6	13.9	-0.3021	-0.3795	34.931	28.092	71.32	0.16	
123155	99	1750	1750.9	1776.2	34.931	297.7	1.12	11.9	14.0	-0.3123	-0.3992	34.933	28.094	71.25	0.16	
123156	99	1900	1901.1	1929.4	34.932	295.4	1.11	12.7	14.1	-0.3081	-0.4051	34.934	28.095	70.62	0.15	
123157	99	1940	1942.0	1971.1	34.931	296.0	1.13	13.1	14.2	-0.3049	-0.4048	34.935	28.096	70.34	0.16	

STATION : AM10
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
5	8/28/93	2:43	70.474	136.904	657	545	FSI	1329

SAMPLE # A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118000	5	100	100.3	101.0	32.241					-0.6898	-0.6924	32.352	26.023	69.54	0.33	
118001	5	200	198.3	200.0	34.042					-0.9694	-0.9749	33.985	27.356	69.47	0.27	
118002	5	300	296.3	299.0	34.712					0.0907	0.0791	34.698	27.883	70.69	0.22	
118003	5	400	393.1	397.0	34.797					0.3887	0.3719	34.802	27.950	70.01	0.20	
118004	5	500	491.9	497.0	34.833					0.4016	0.3800	34.832	27.974	68.76	0.20	
118005	5	550	541.3	547.0	34.844					0.3944	0.3705	34.841	27.982	68.80	0.20	

STATION : FM01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
6	8/28/93	14:39	71.389	139.905	2500	1699	FSI	1329

SAMPLE #	A,B or C	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	SALINITY (psu)	OXYGEN (uM)	PHOSPHATE (uM)	SILICATE (uM)	NITRATE (uM)	CTD TEMPERATURE (deg C)	THETA (deg C)	CTD SALINITY (psu)	SIGMA-T	TRANSMISS. (%)	NOMINAL CHL a (mg/m^3)	PAR (uE/sm^2)
118006		6	100	101.2	102.0	32.758					-1.4169	-1.4190	32.716	26.340	71.09	0.27	
118007		6	300	303.1	306.0	34.672					0.0067	-0.0049	34.667	27.863	69.53	0.21	
118008		6	500	496.8	502.0	34.830					0.4281	0.4062	34.828	27.969	69.79	0.20	
118009		6	1000	992.9	1005.0	34.887					0.0689	0.0235	34.888	28.038	70.23	0.17	
118010		6	1500	1480.0	1500.0	34.916					-0.2929	-0.3629	34.916	28.079	69.72	0.18	
118011		6	1700	1675.5	1699.0	34.931					-0.3657	-0.4470	34.927	28.091	69.92	0.17	

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6.3 Chemistry Profile Plots

The following Appendix contains profile plots for the following parameters :

- Bottle salinity
- Bottle salinity vs CTD salinity
- Dissolved oxygen
- Temperature
- Silicate
- Orthophosphate
- Nitrate
- Nominal chlorophyll a (Fluorometer)
- Photosynthetically active radiation (PAR sensor)
- Percent transmission

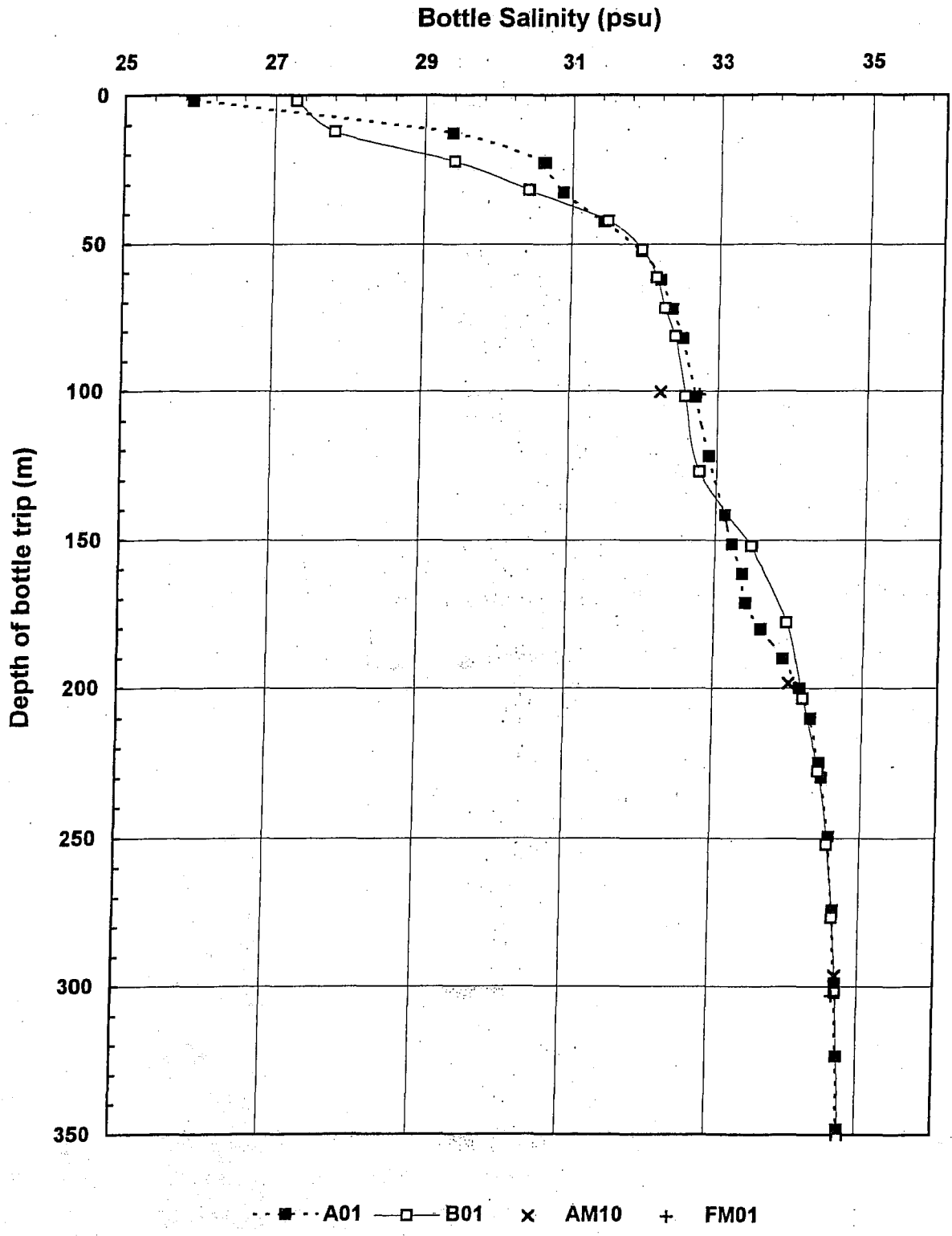
The profiles are plotted in groups of stations as follows :

- A01, B01, AM10, FM01
- TA, TC, D01, F09, C01
- E01, E04

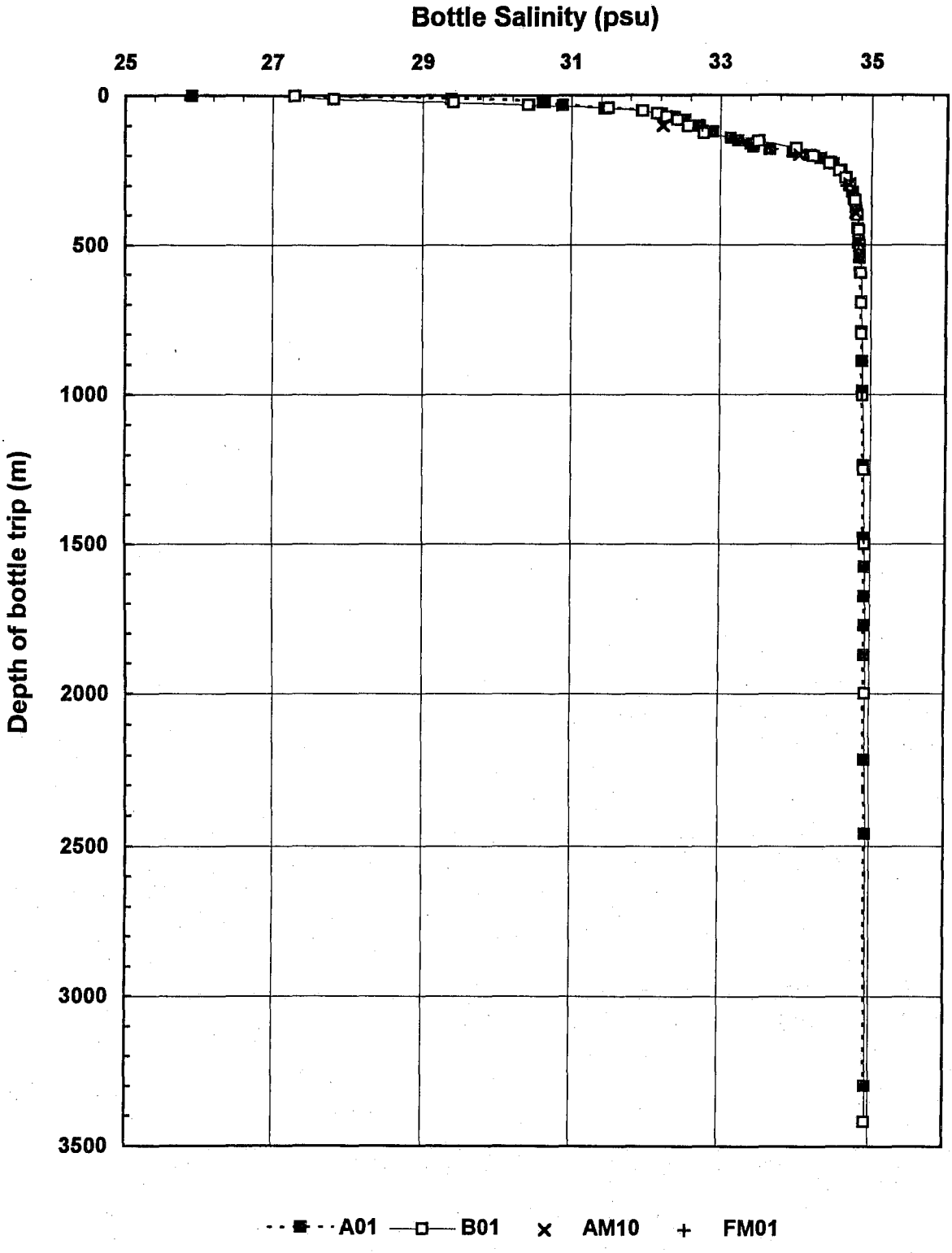
Each group of stations is plotted twice as follows :

- Surface to 200 or 350 metres to show surface detail
- Complete profile

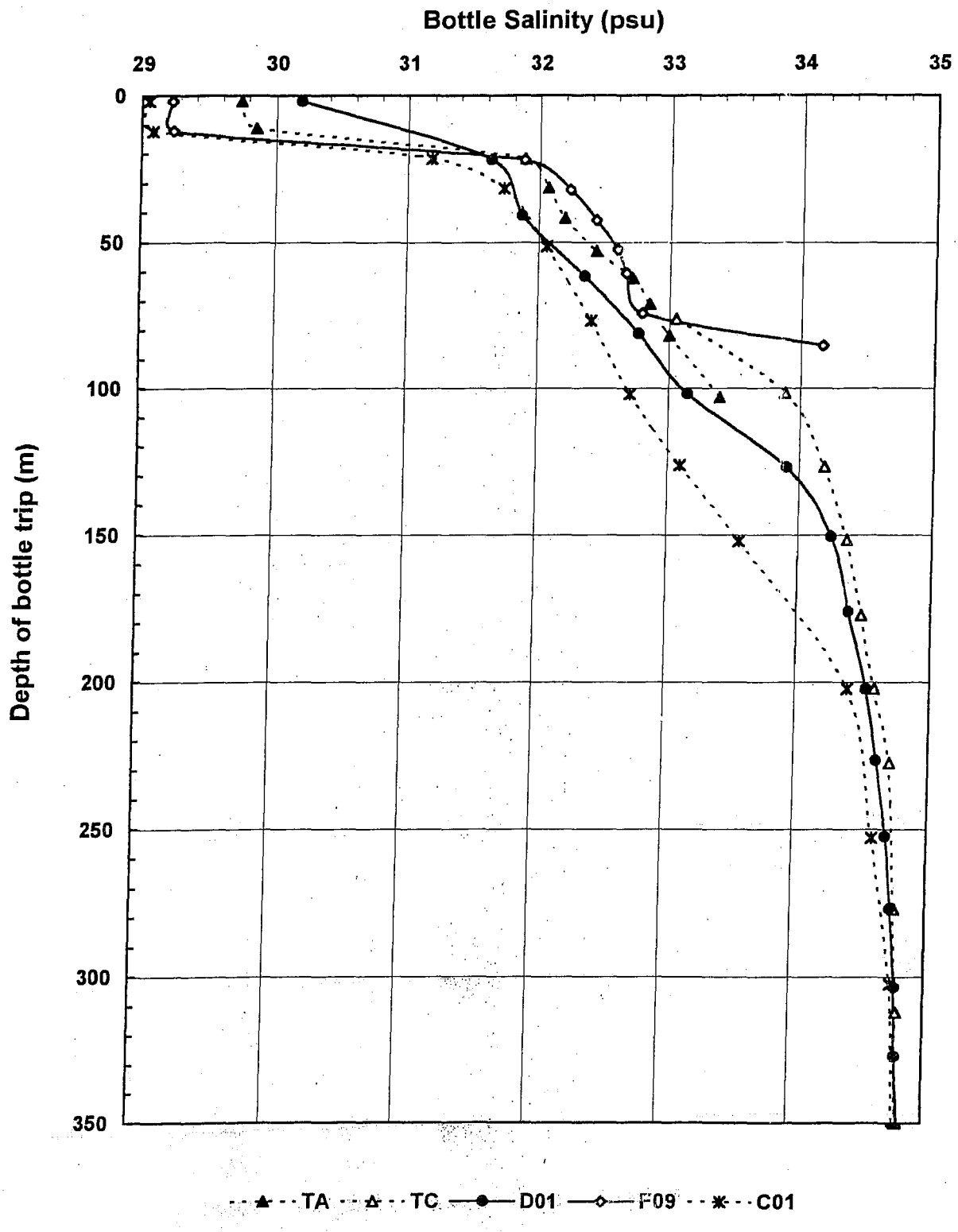
Cruise 9324 - Salinity Data



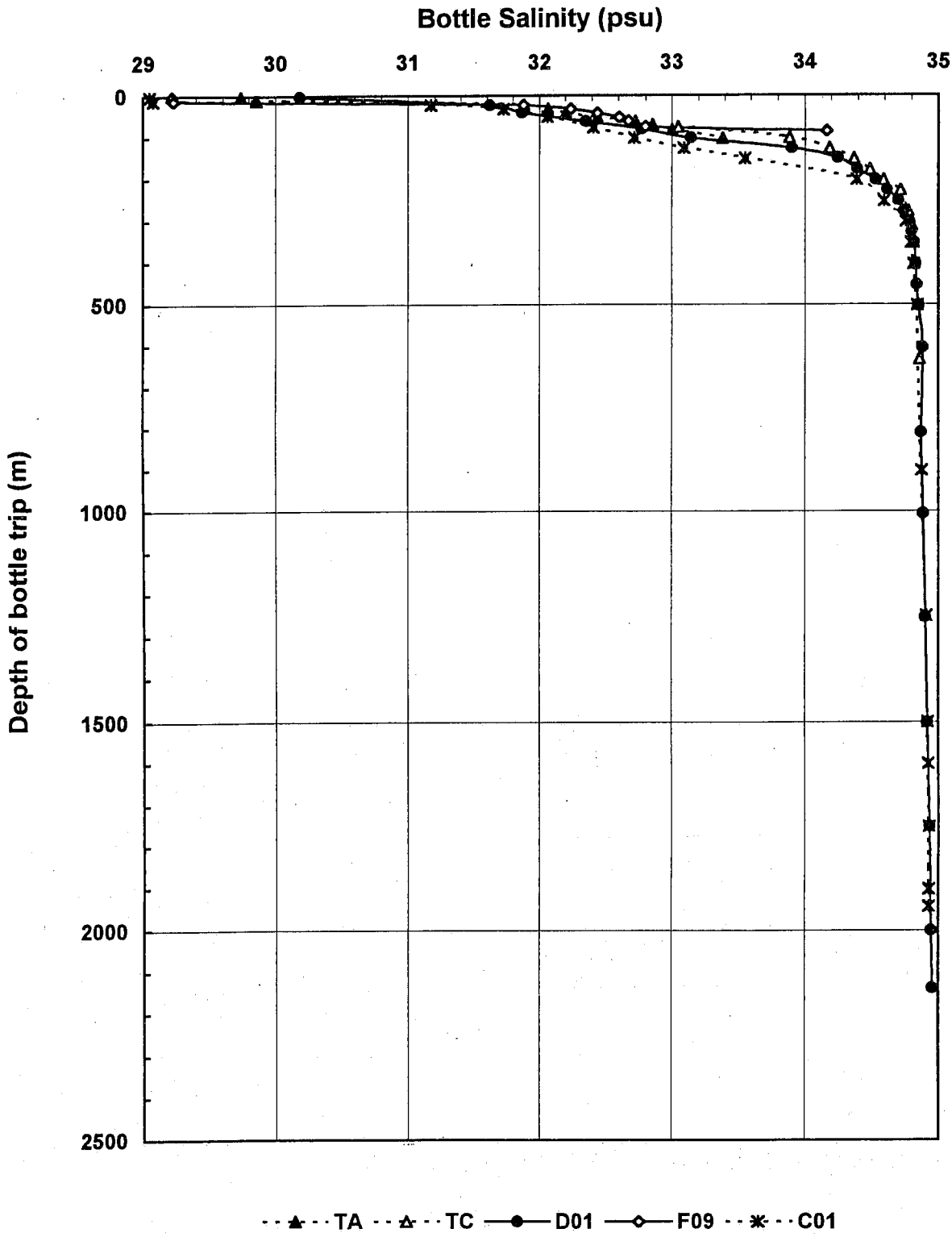
Cruise 9324 : Salinity Data



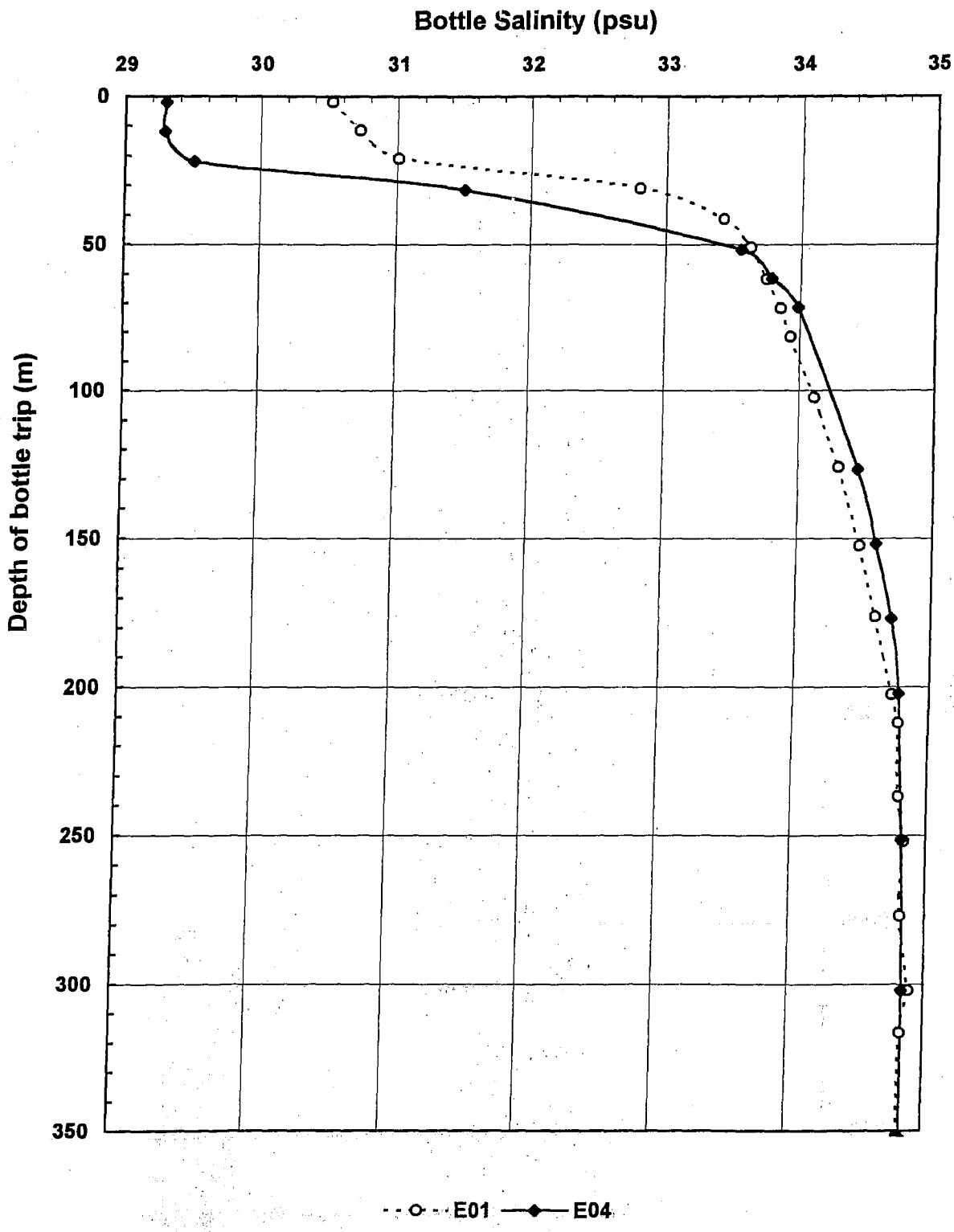
Cruise 9324- Salinity Data



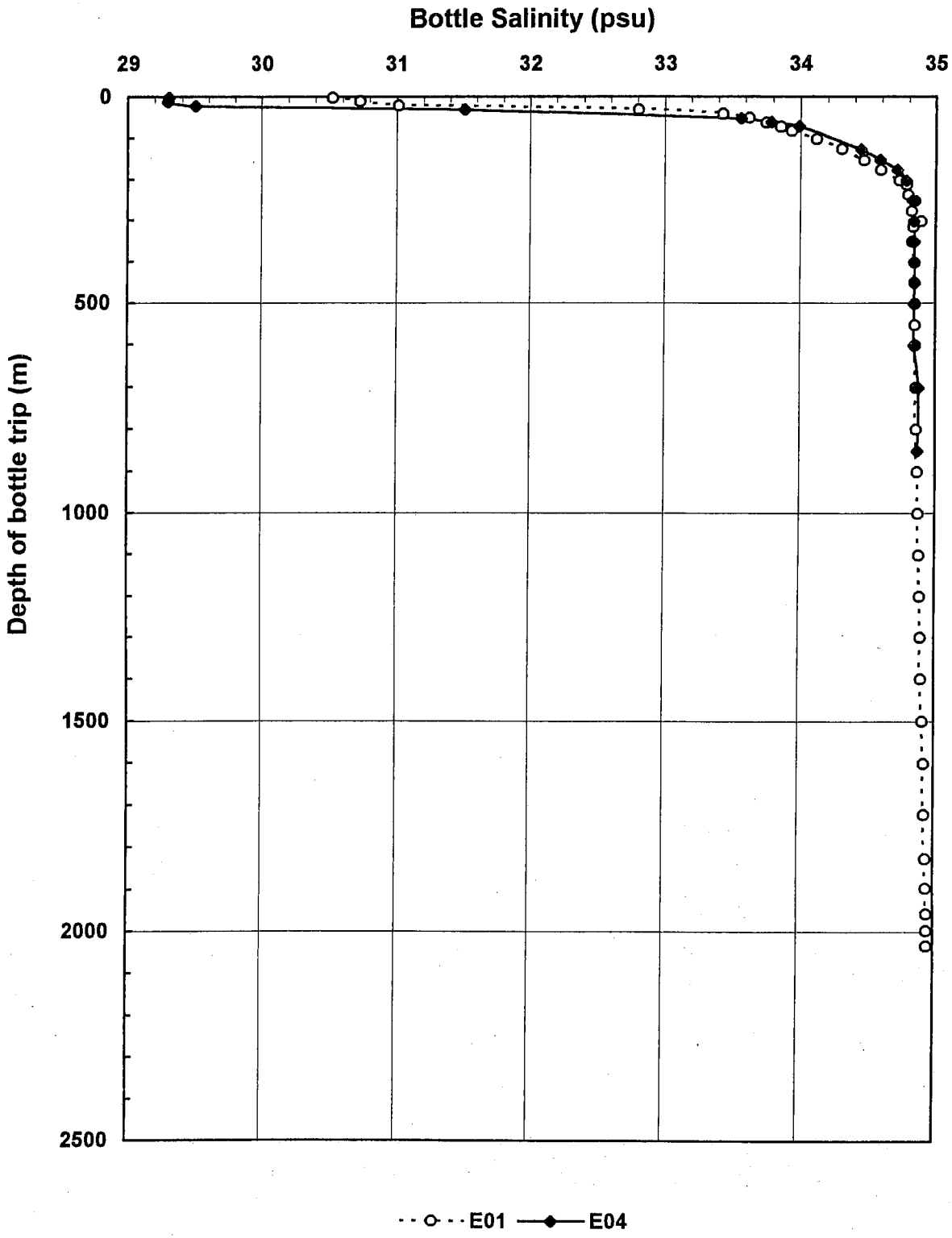
Cruise 9324- Salinity Data



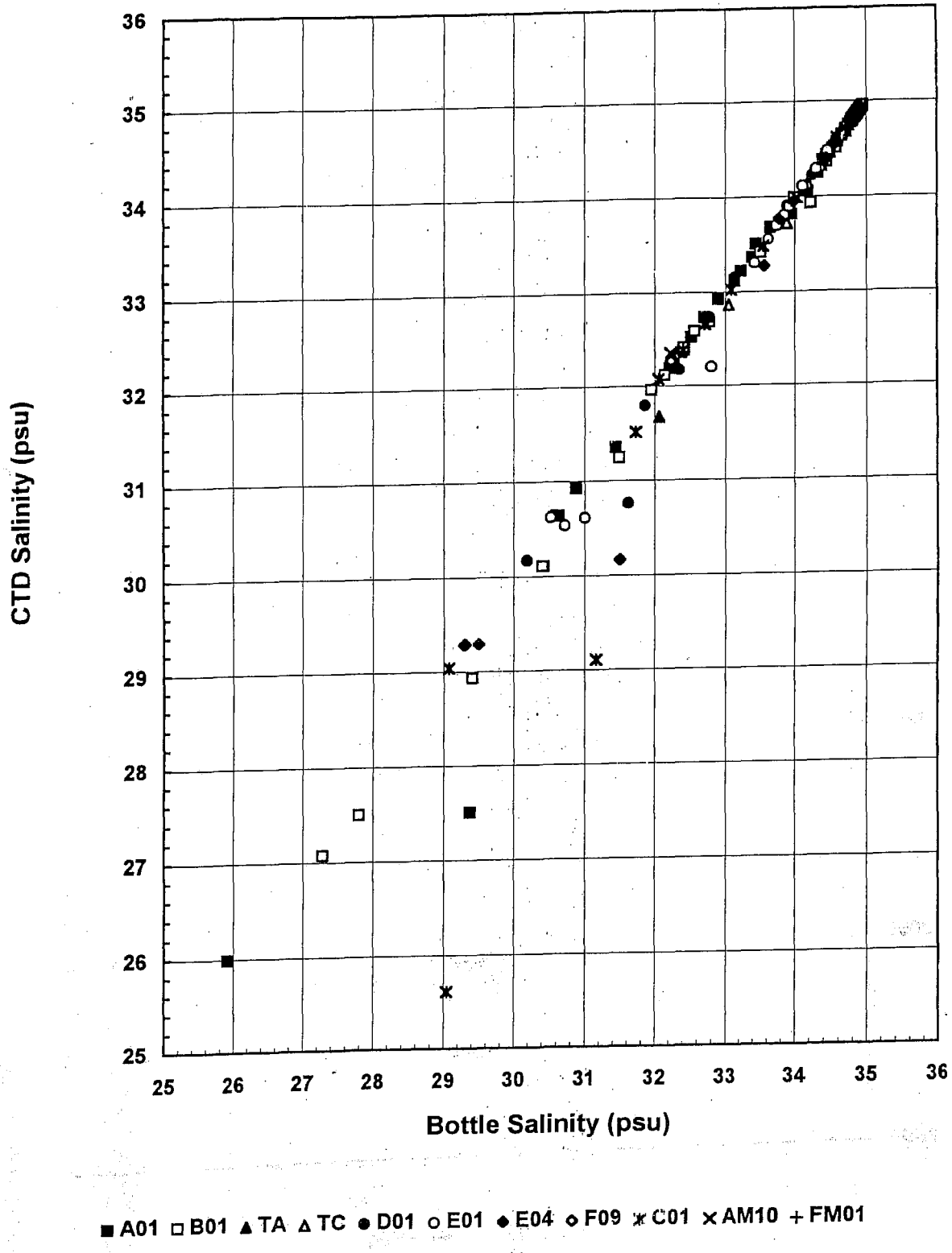
Cruise 9324 : Salinity Data



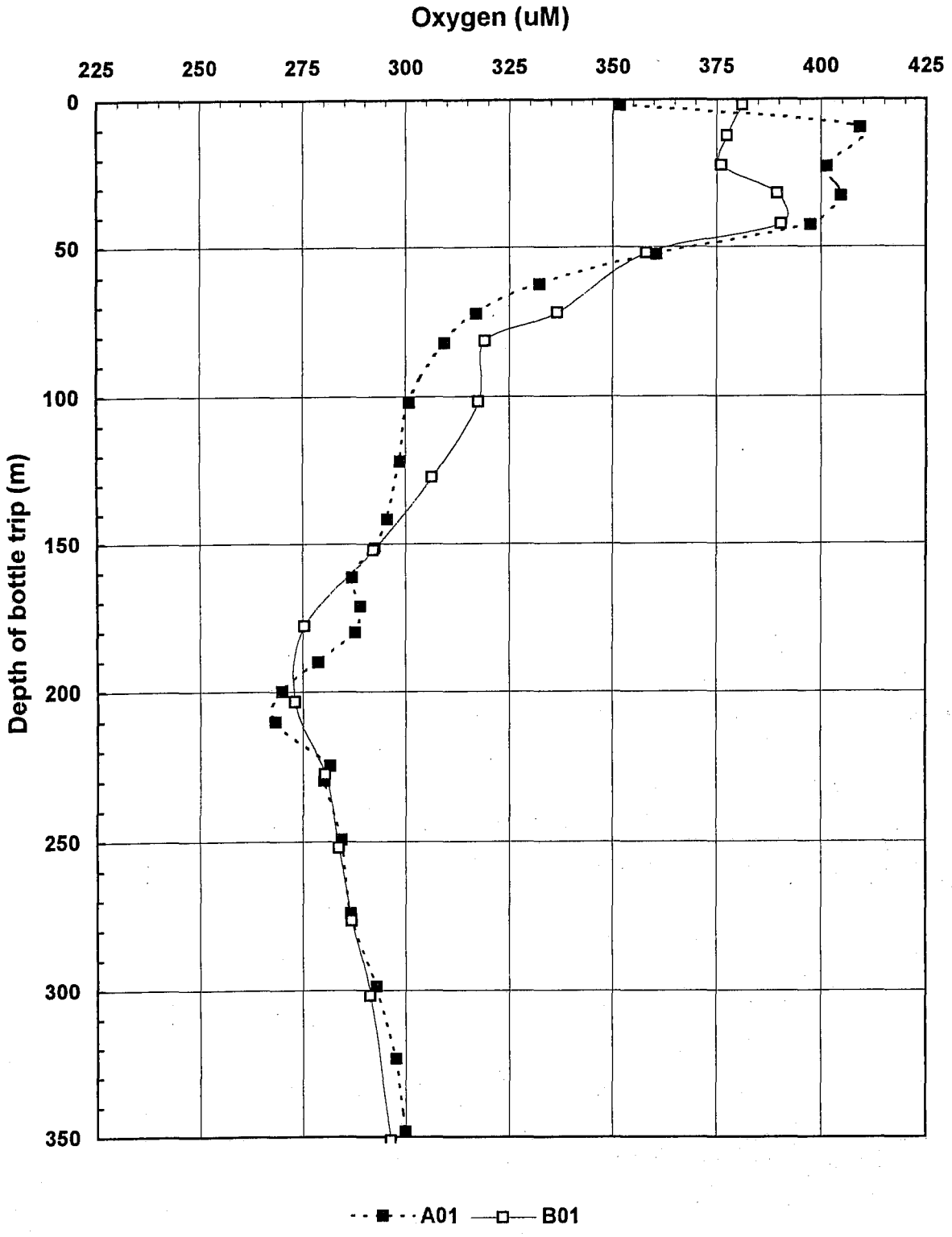
Cruise 9324- Salinity Data



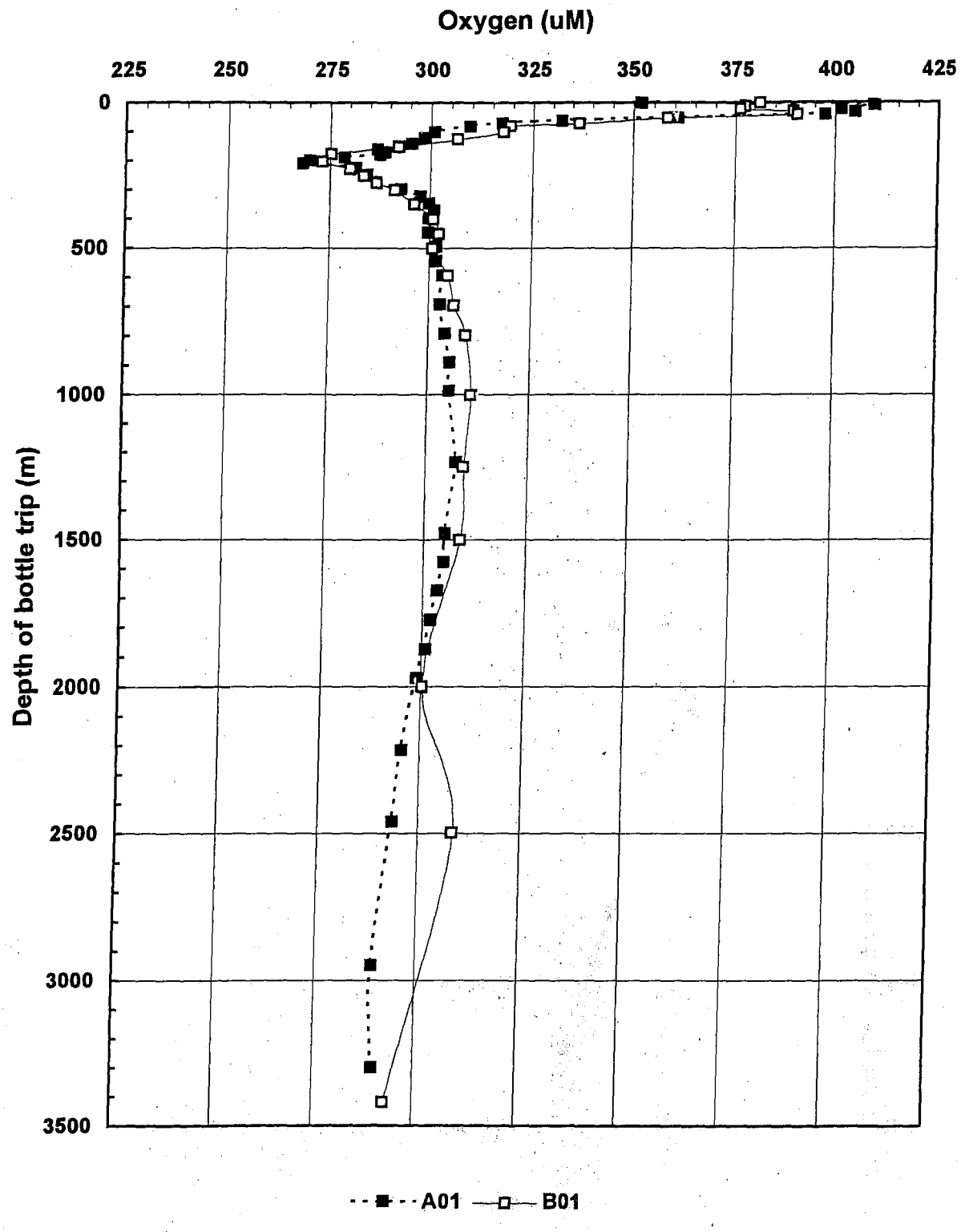
Cruise 9324 : Salinity Data - All Stations



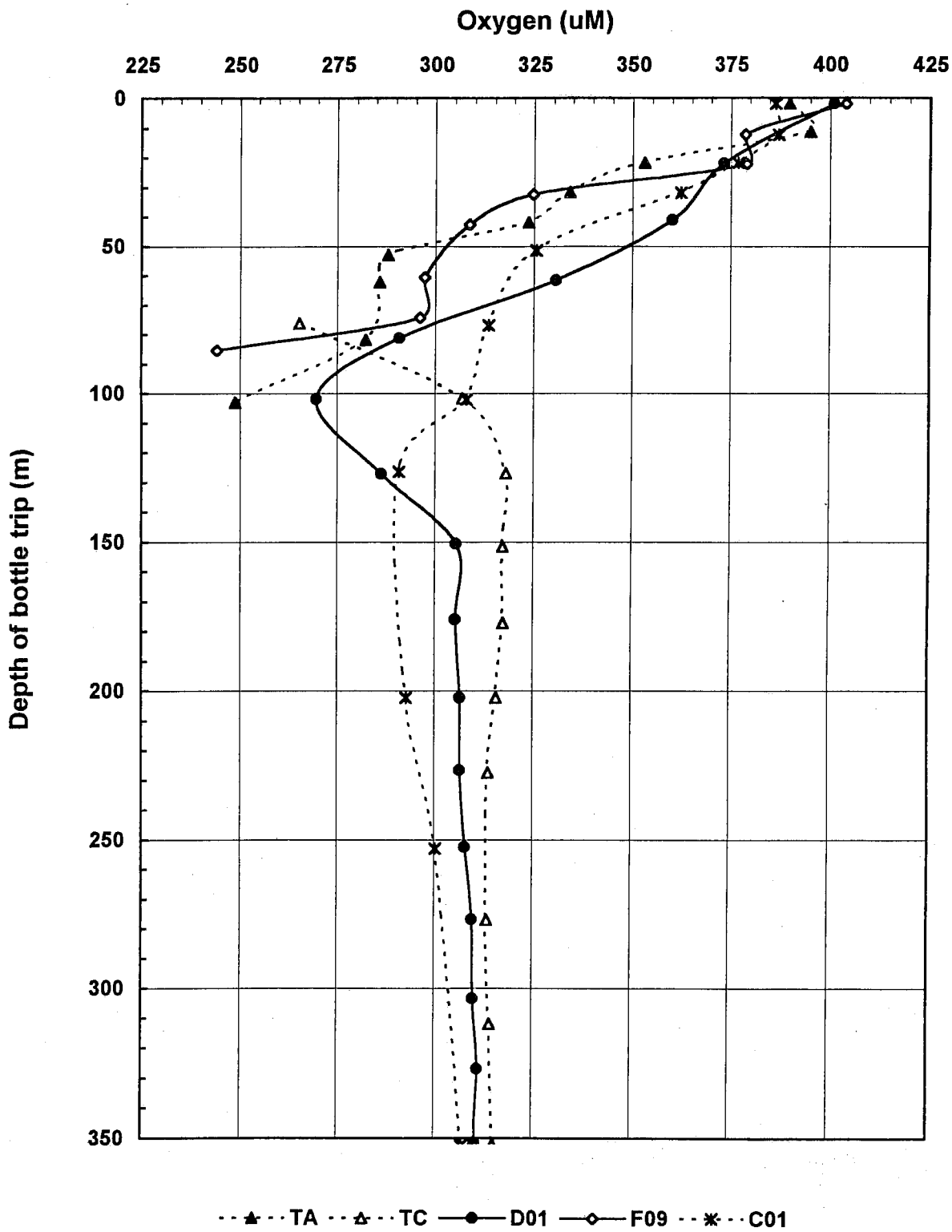
Cruise 9324 - Oxygen Profiles



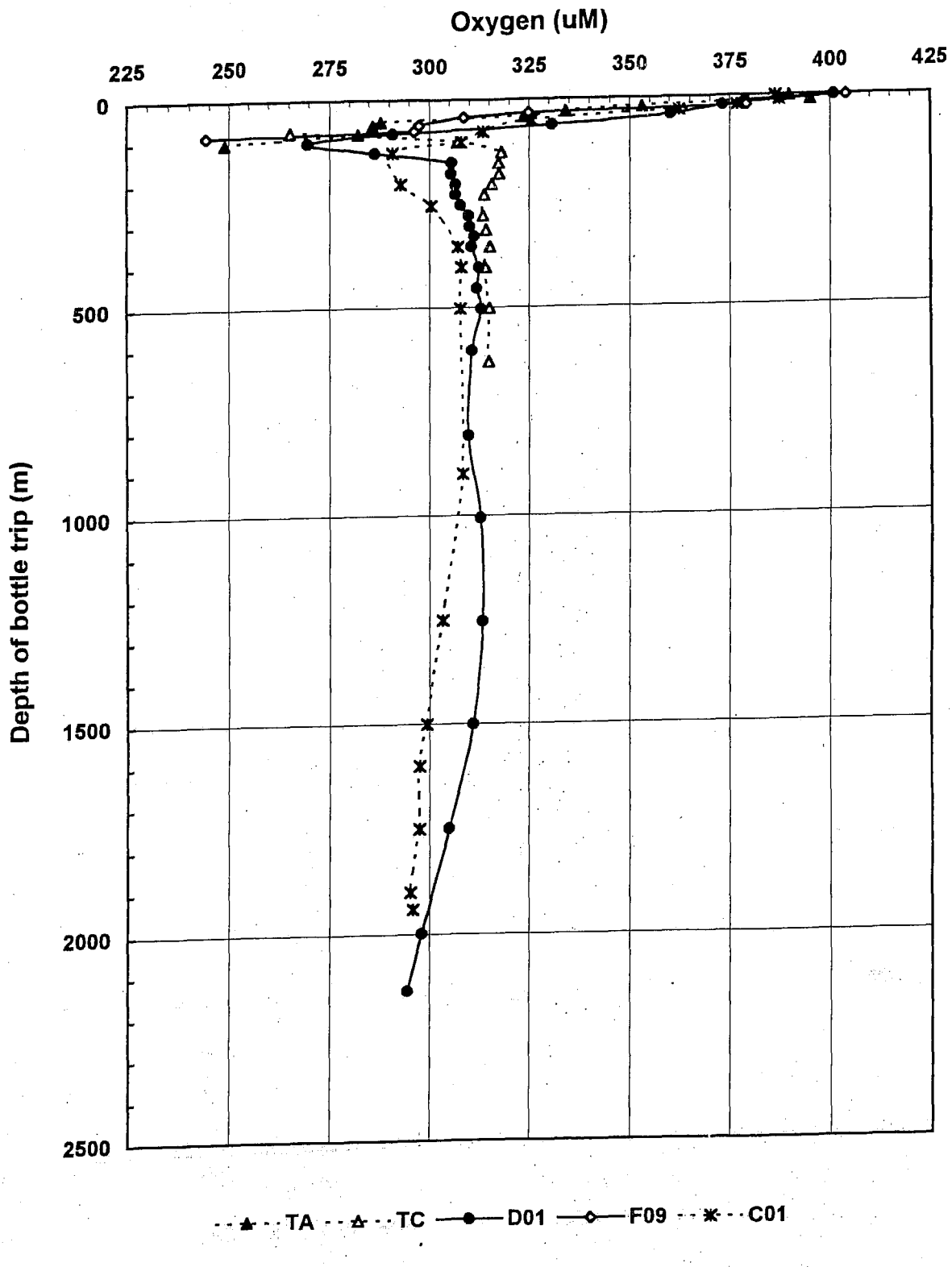
Cruise 9324 : Oxygen Profiles



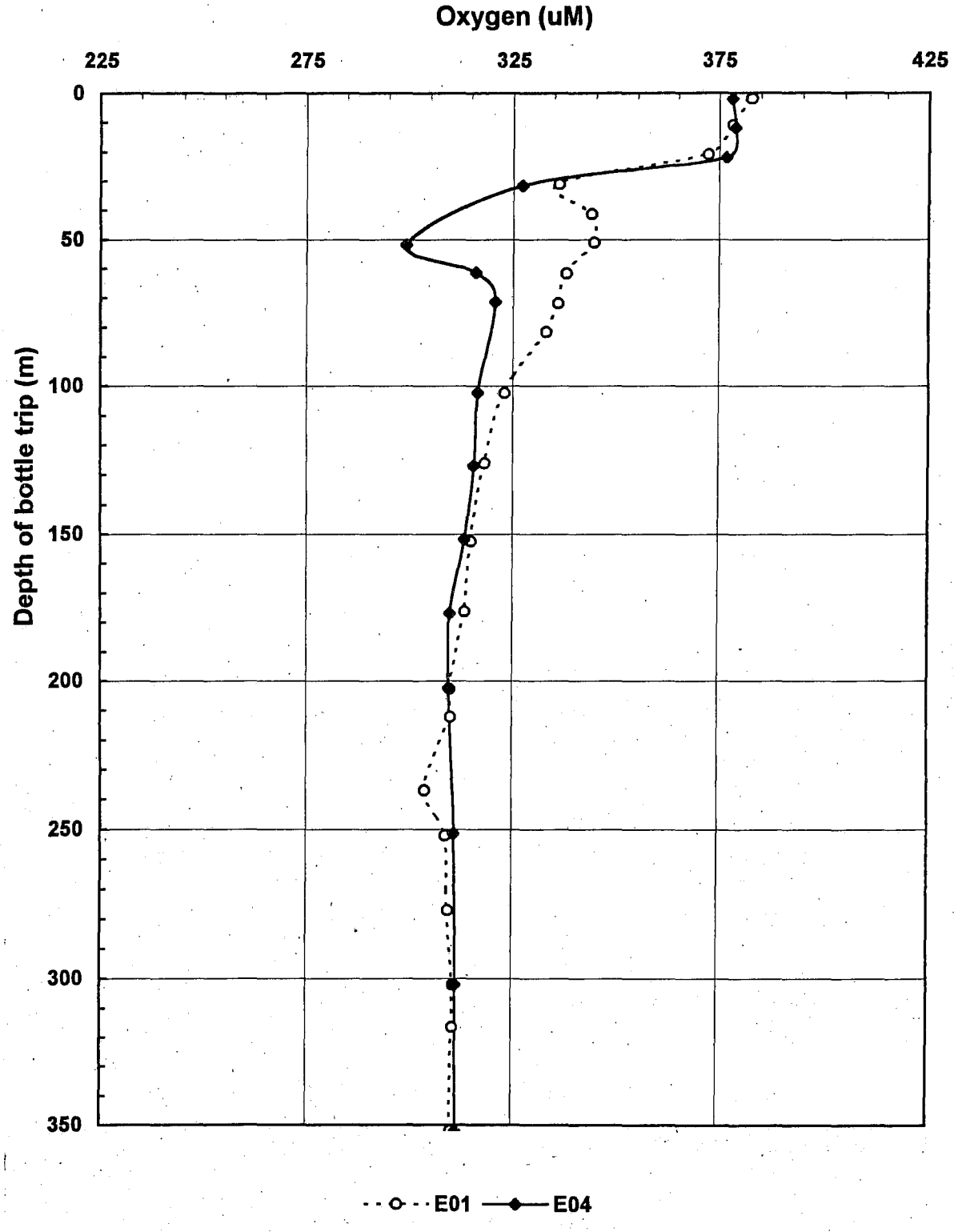
Cruise 9324- Oxygen Profiles



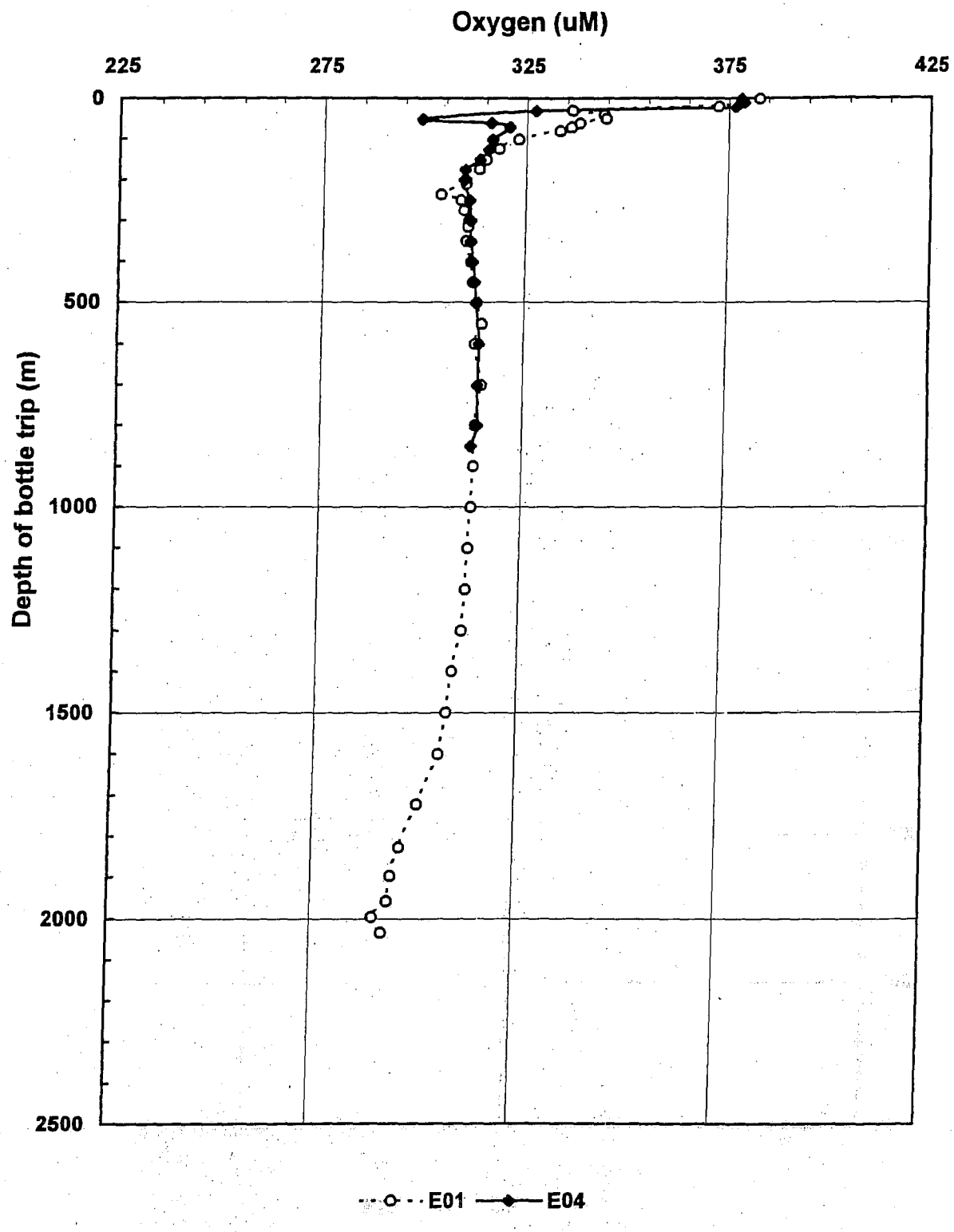
Cruise 9324- Oxygen Profiles



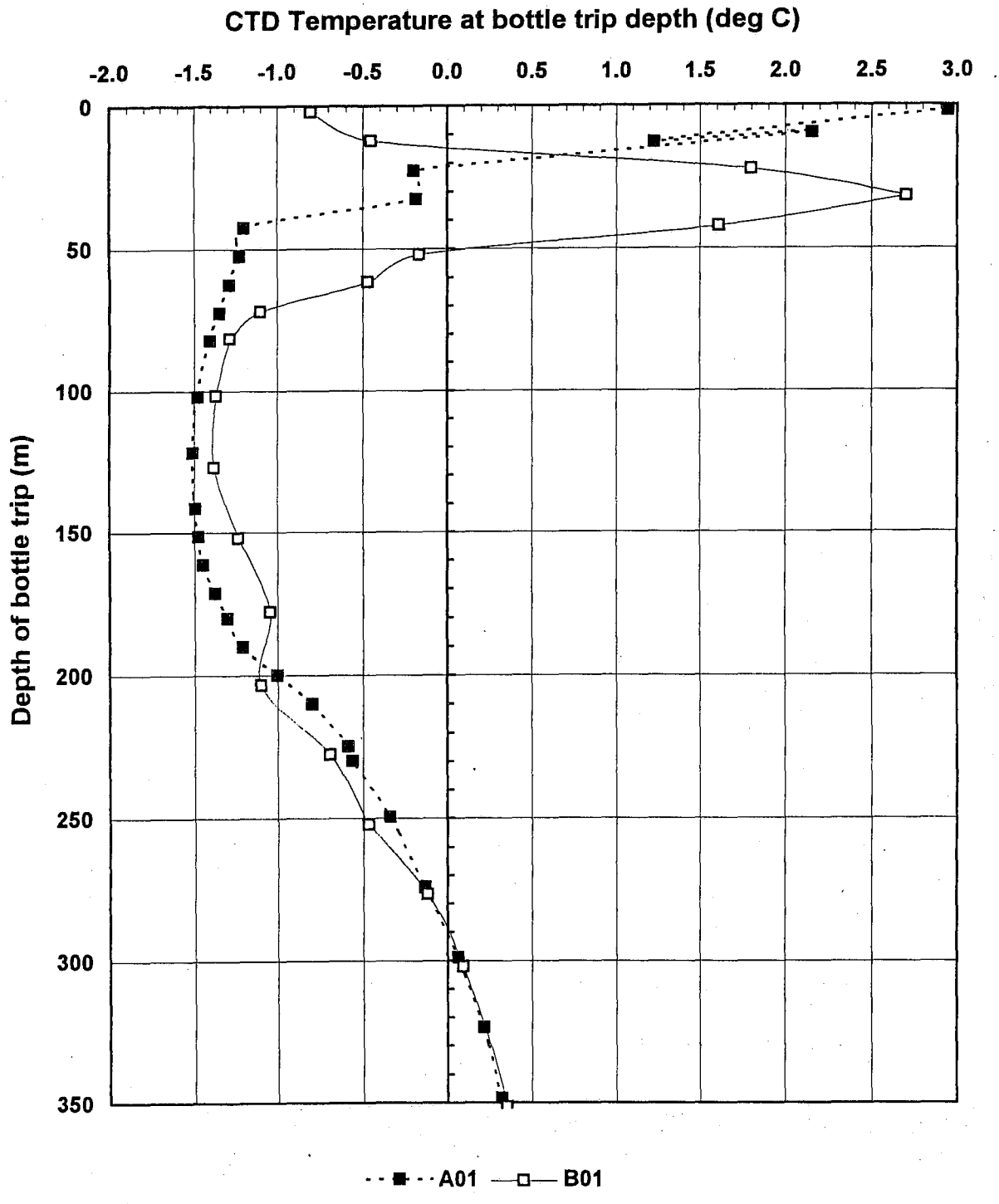
Cruise 9324 : Oxygen Profiles



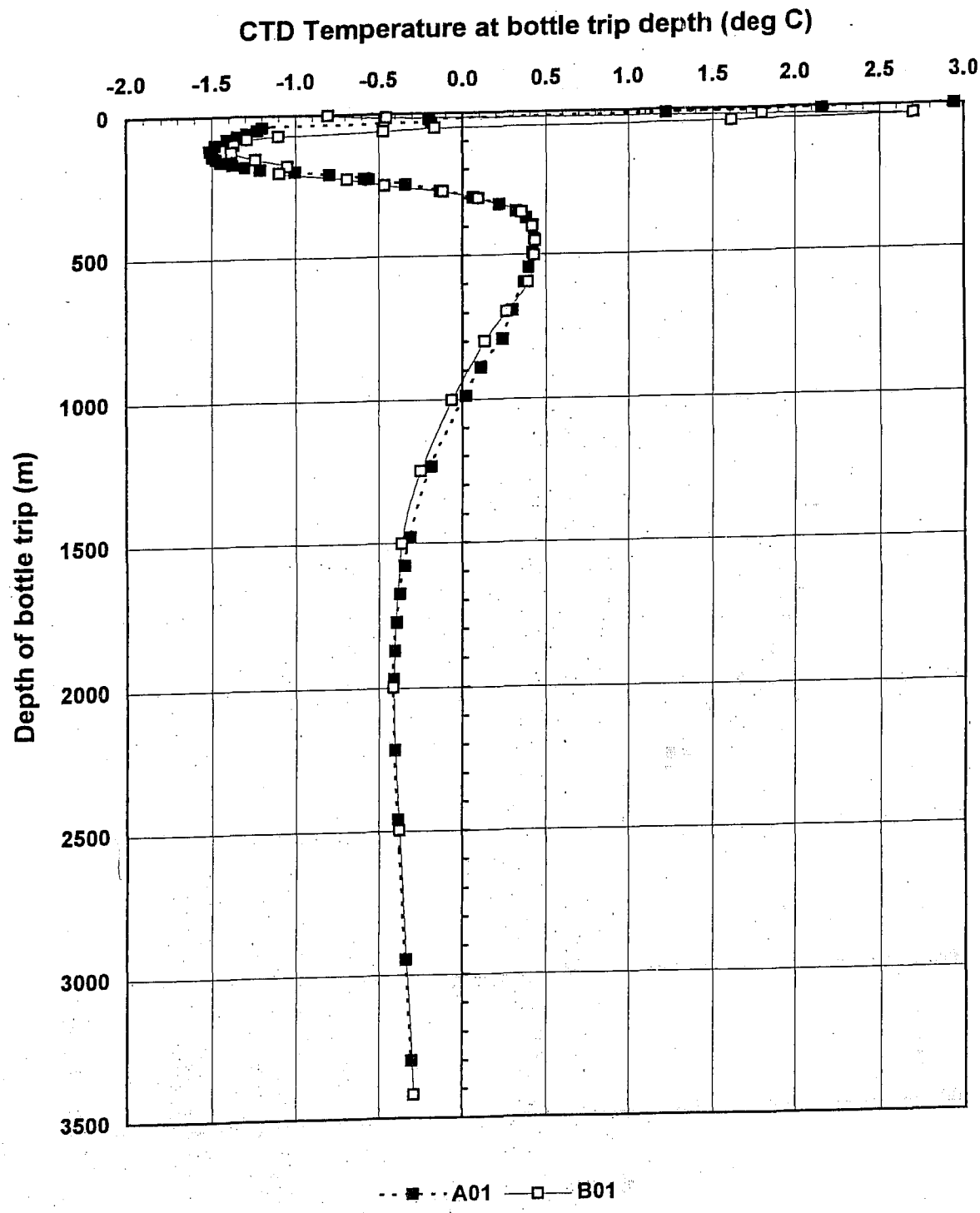
Cruise 9324 : Oxygen Profiles



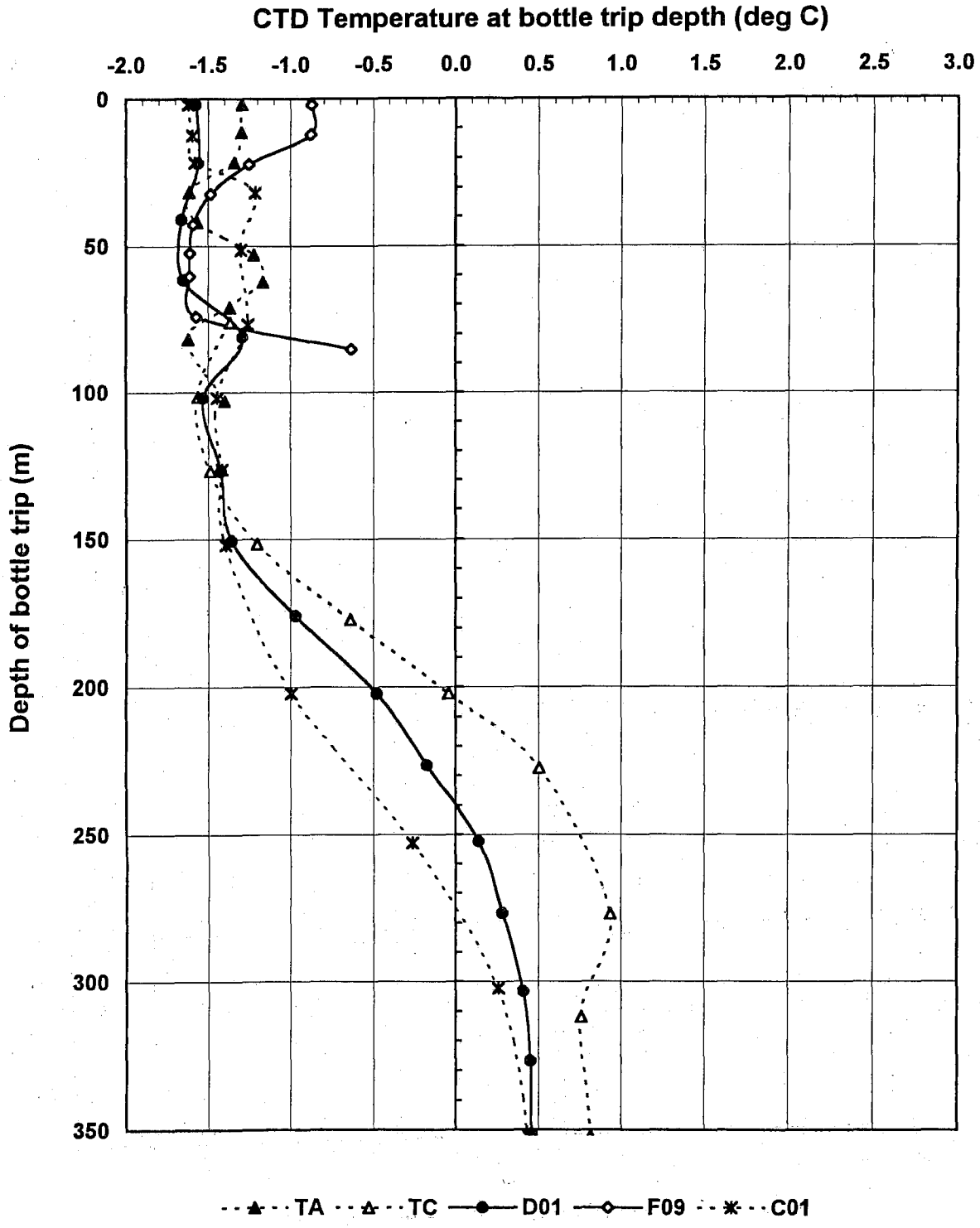
Cruise 9324 - Temperature Profiles



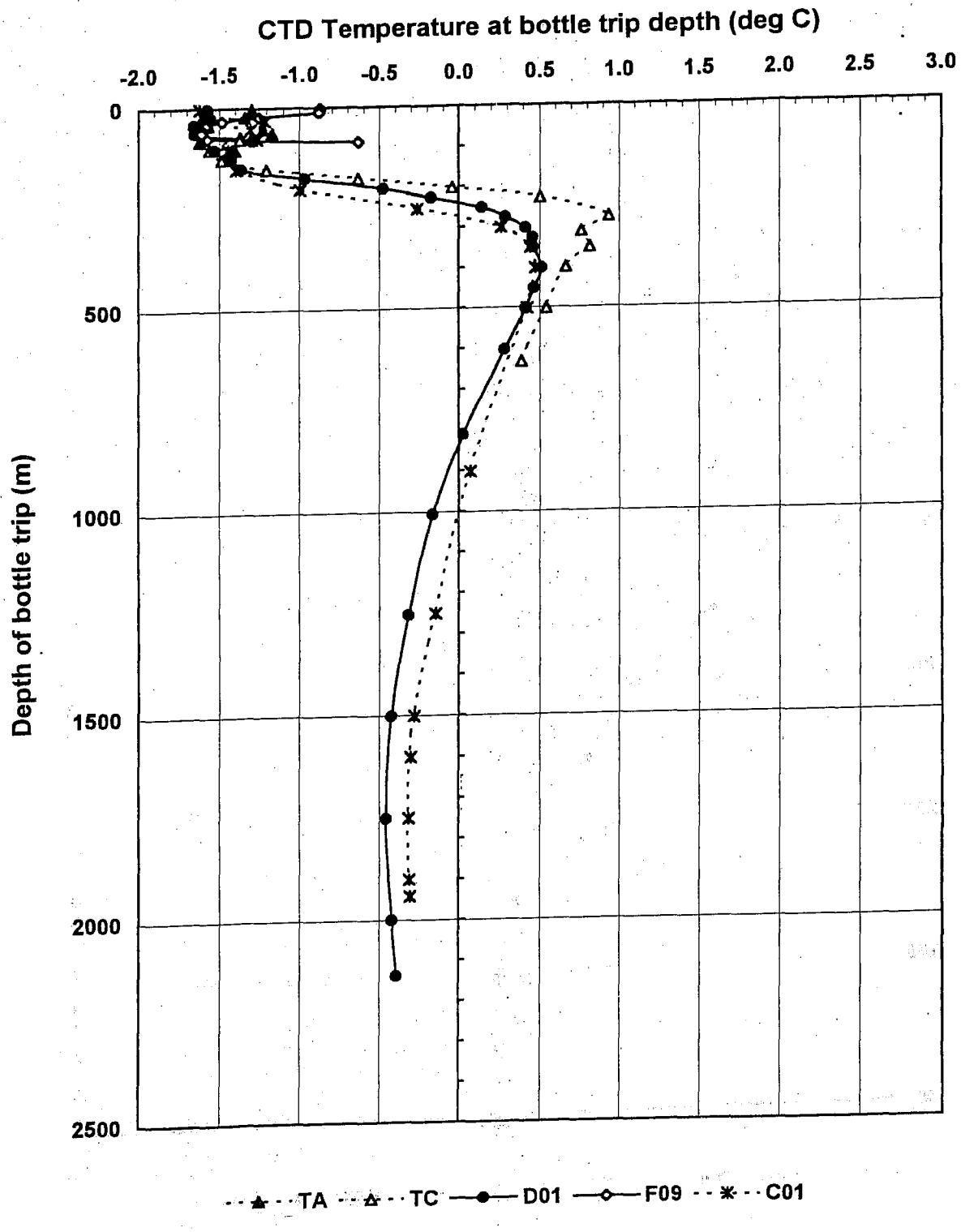
Cruise 9324 - Temperature Profiles



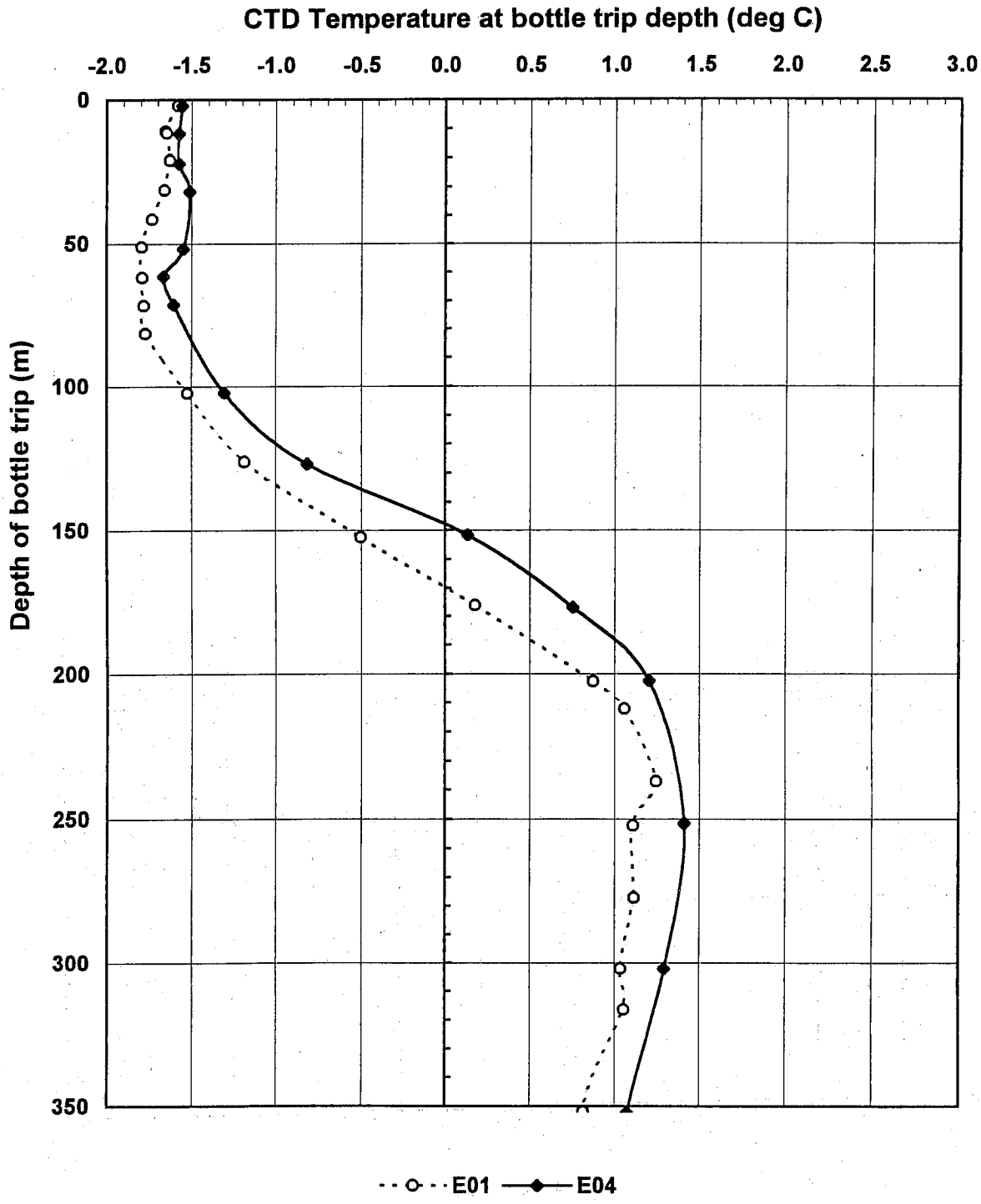
Cruise 9324- Temperature Profiles



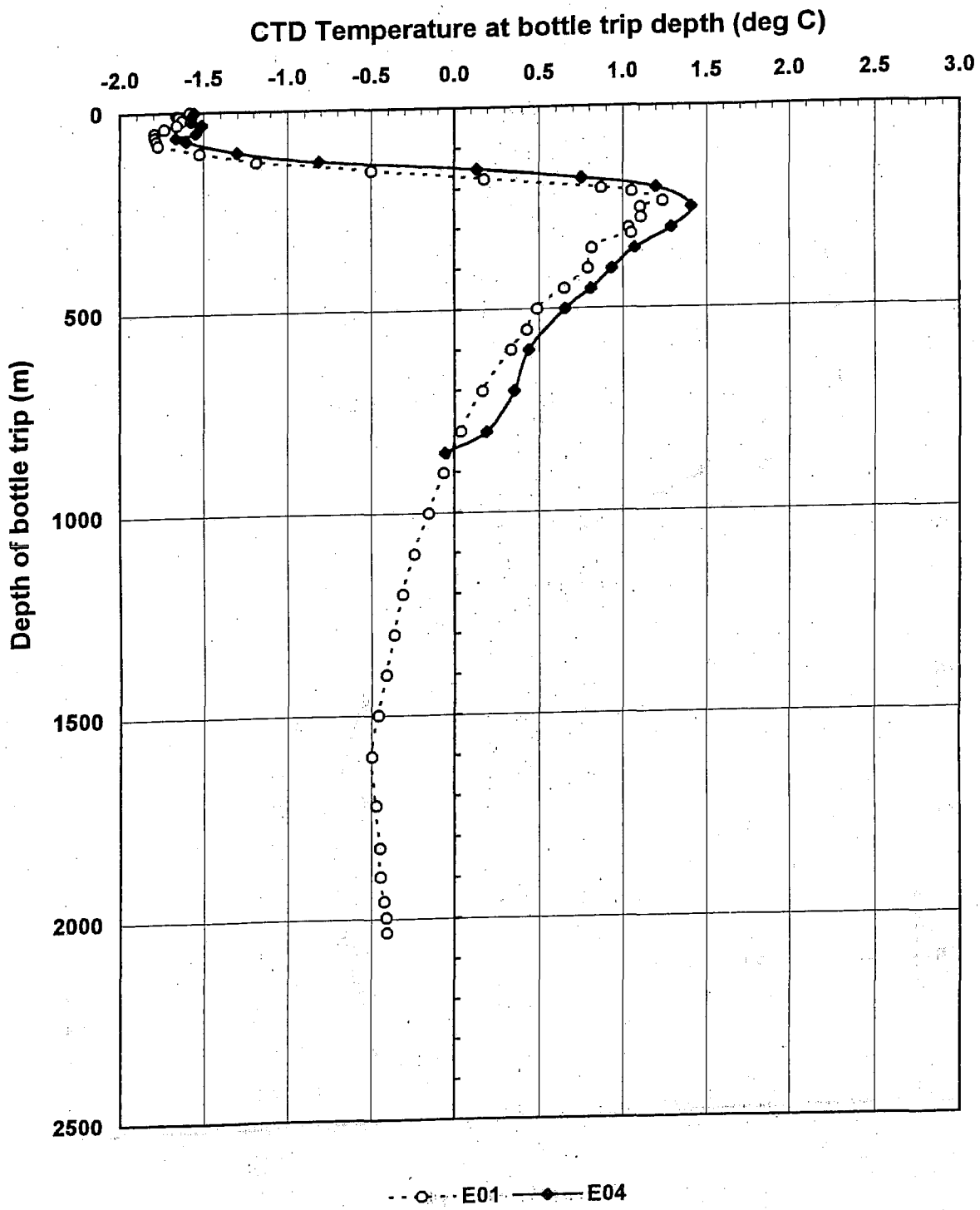
Cruise 9324- Temperature Profiles



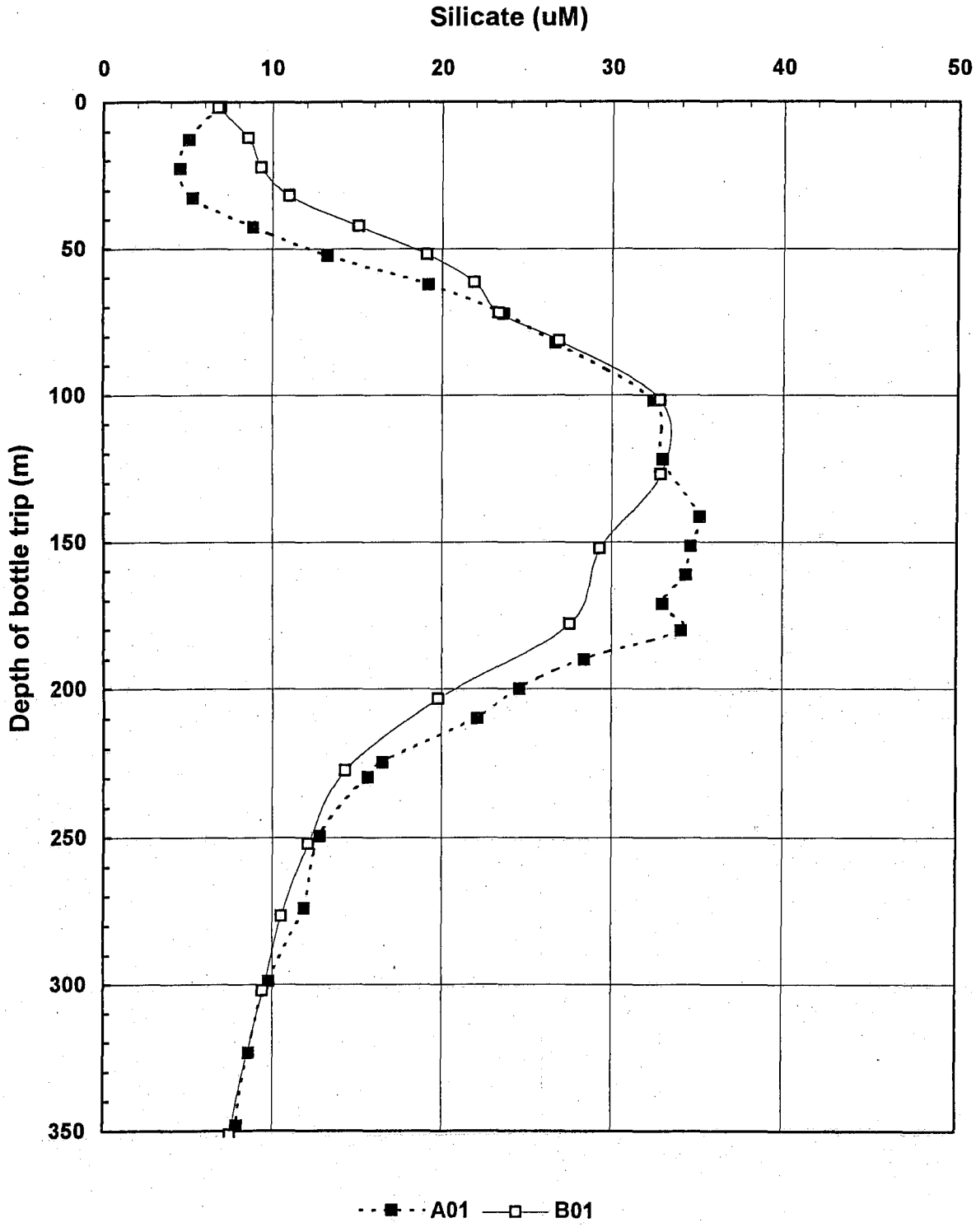
Cruise 9324- Temperature Profiles



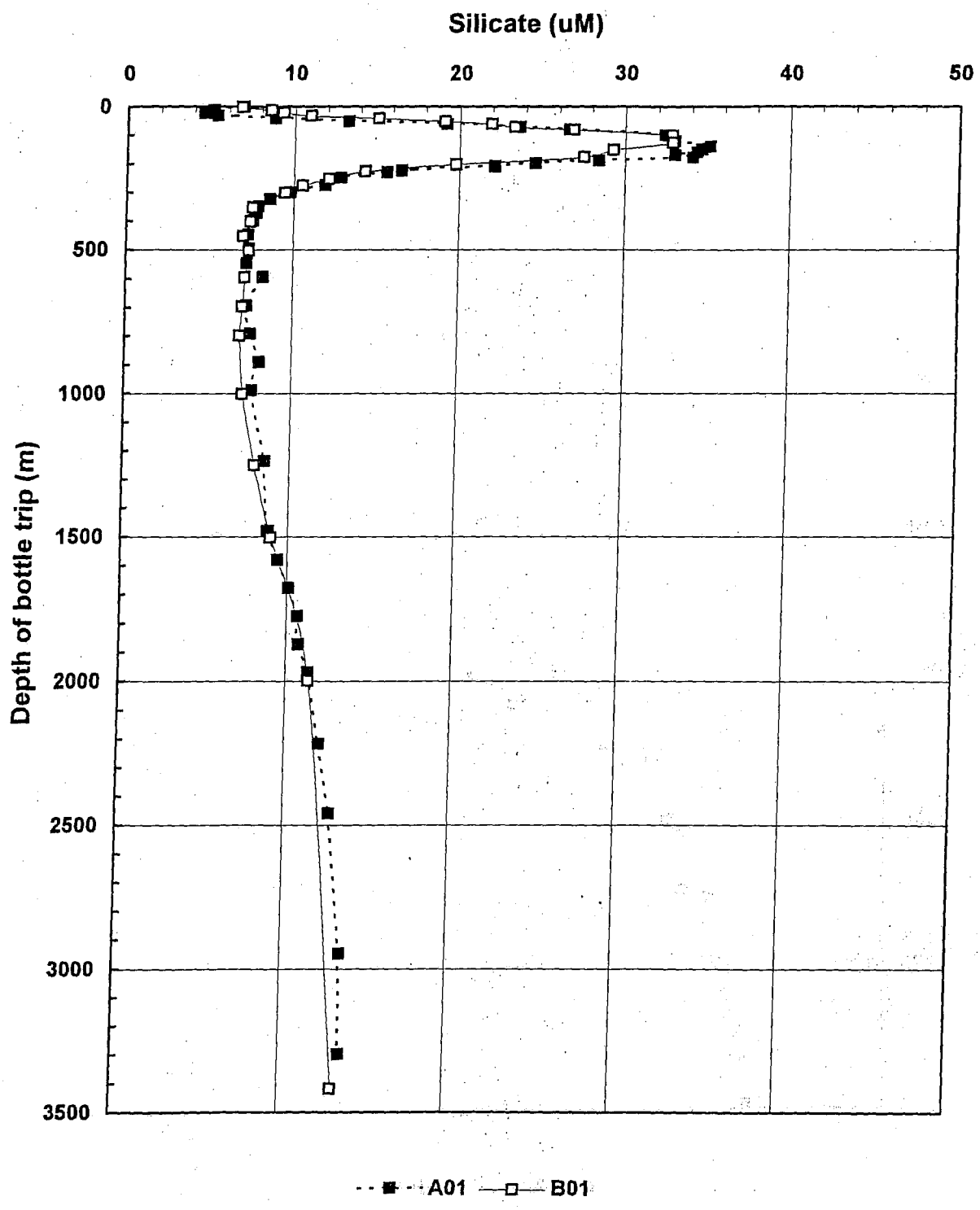
Cruise 9324- Temperature Profiles



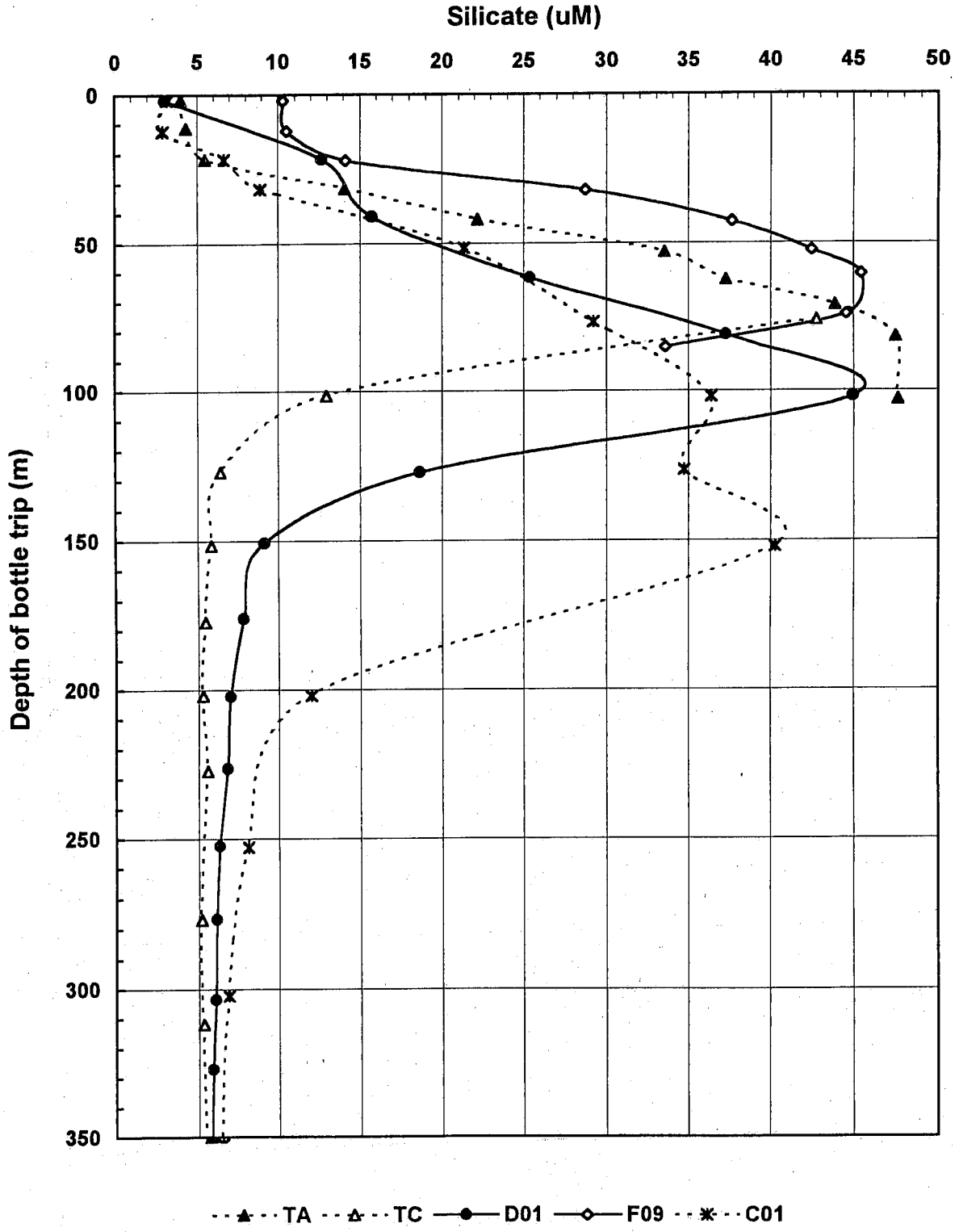
Cruise 9324 - Silicate Profiles

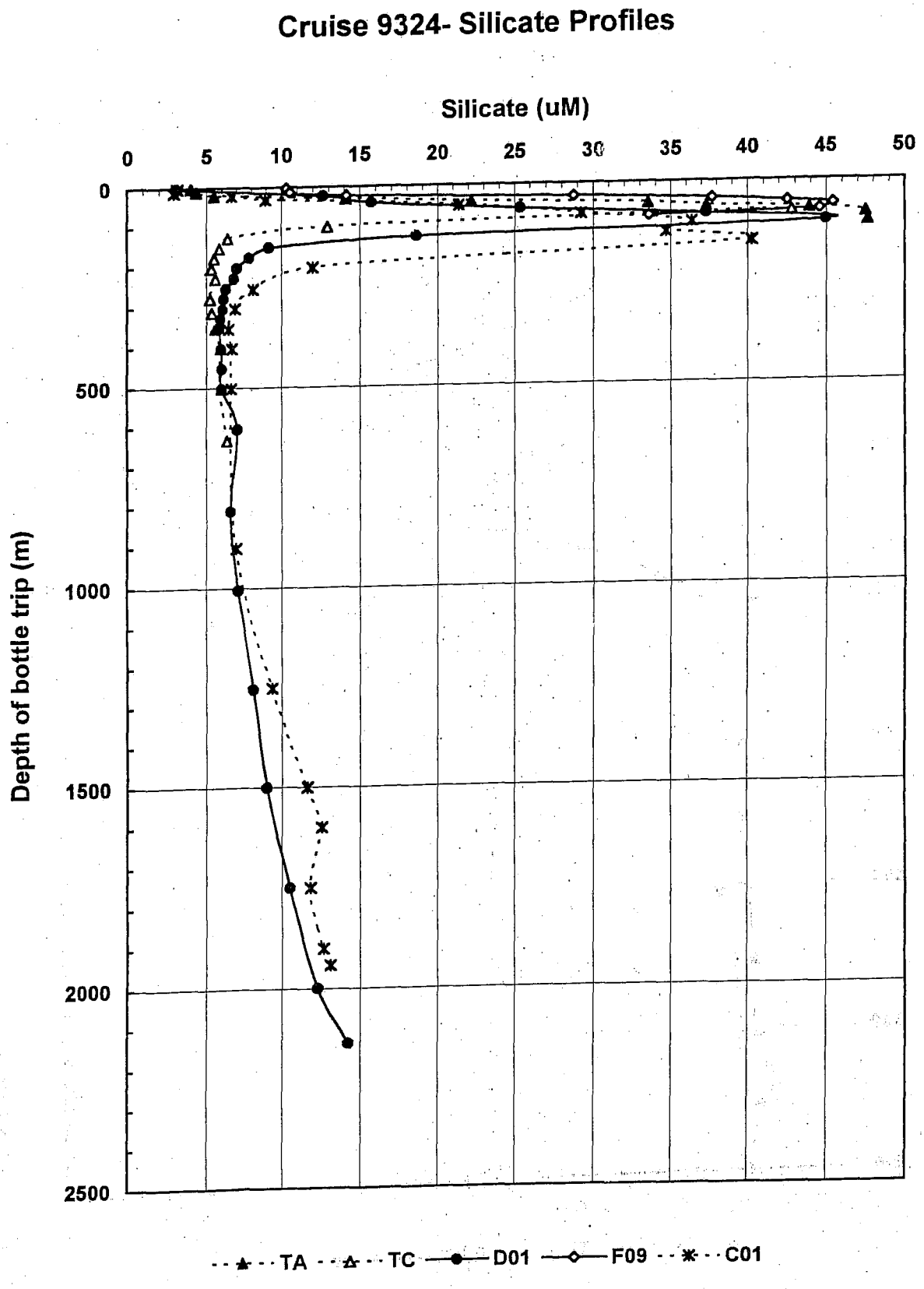


Cruise 9324 - Silicate Profiles

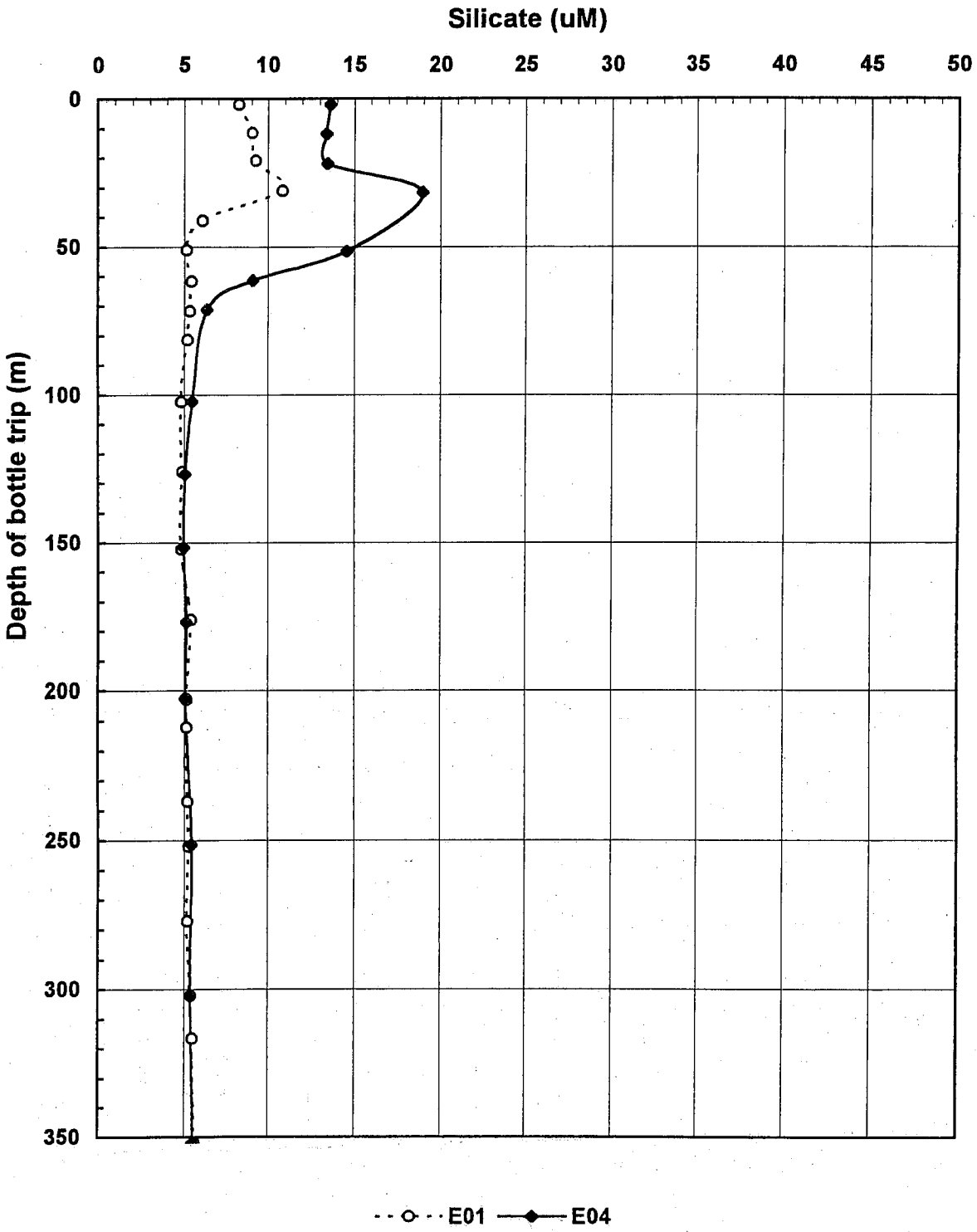


Cruise 9324- Silicate Profiles

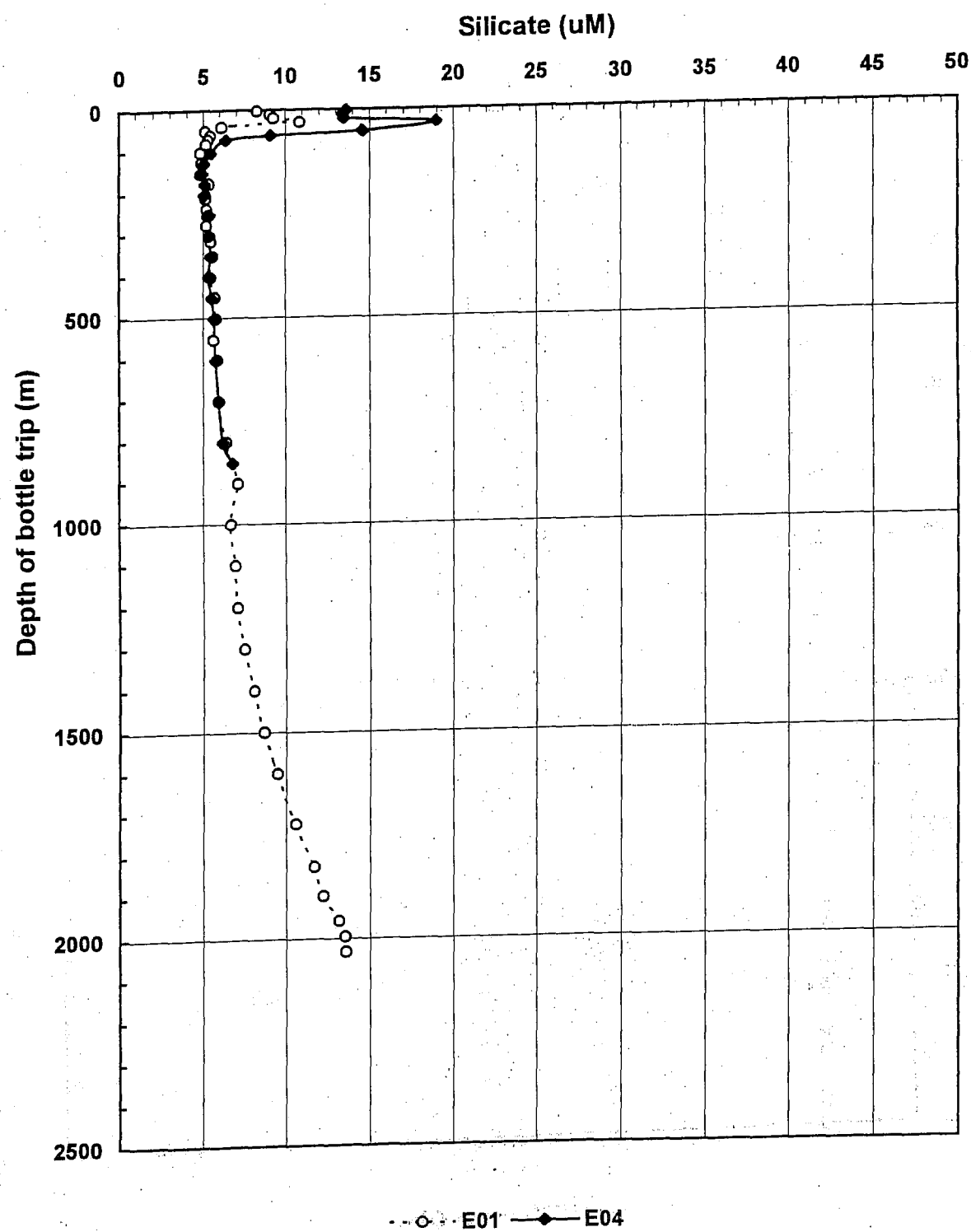



Cruise 9324- Silicate Profiles
Silicate (uM)
0
5
10
15
20
25
30
35
40
45
50
Depth of bottle trip (m)
0
500
1000
1500
2000
2500
TA
TC
D01
F09
C01

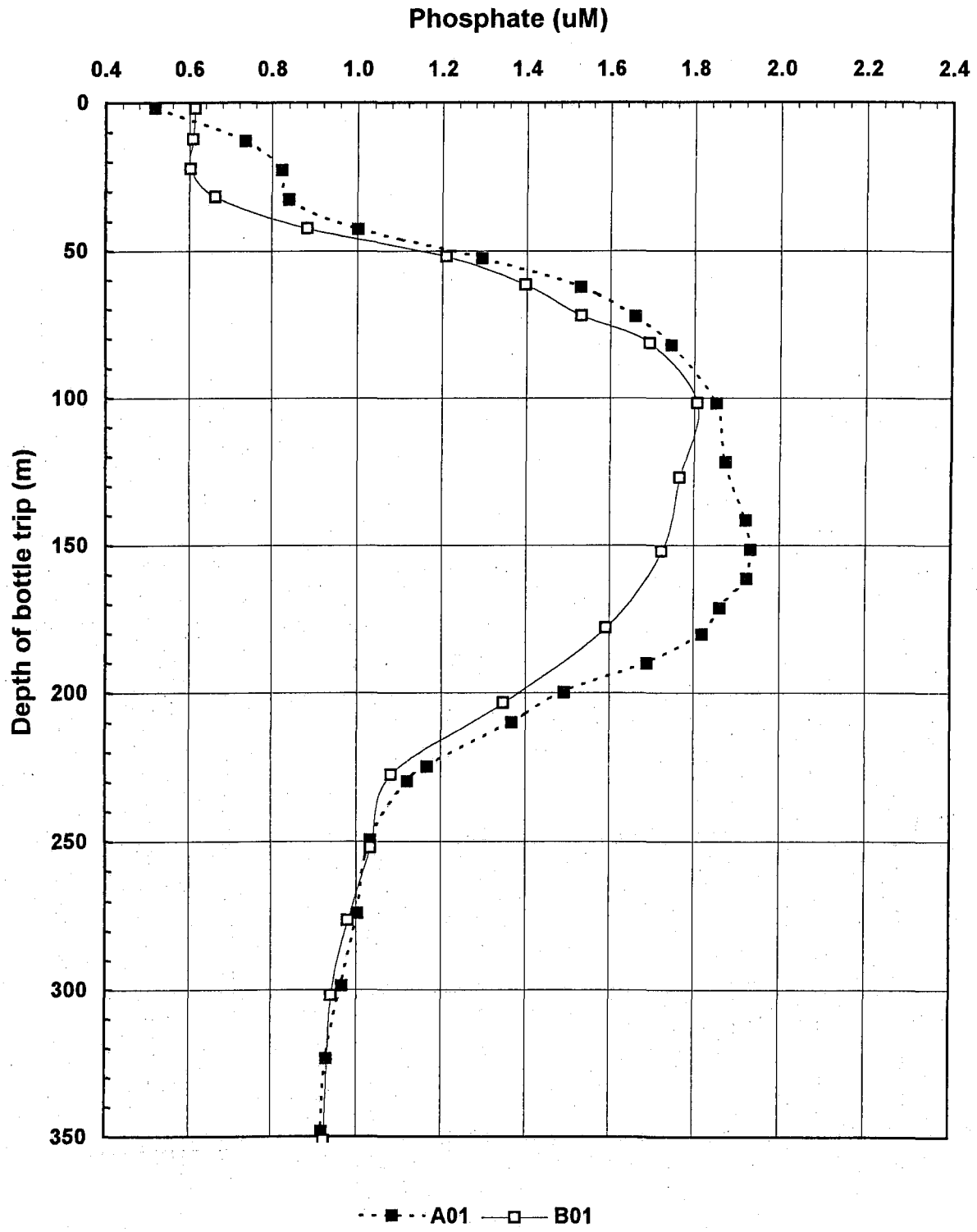
Cruise 9324- Silicate Profiles



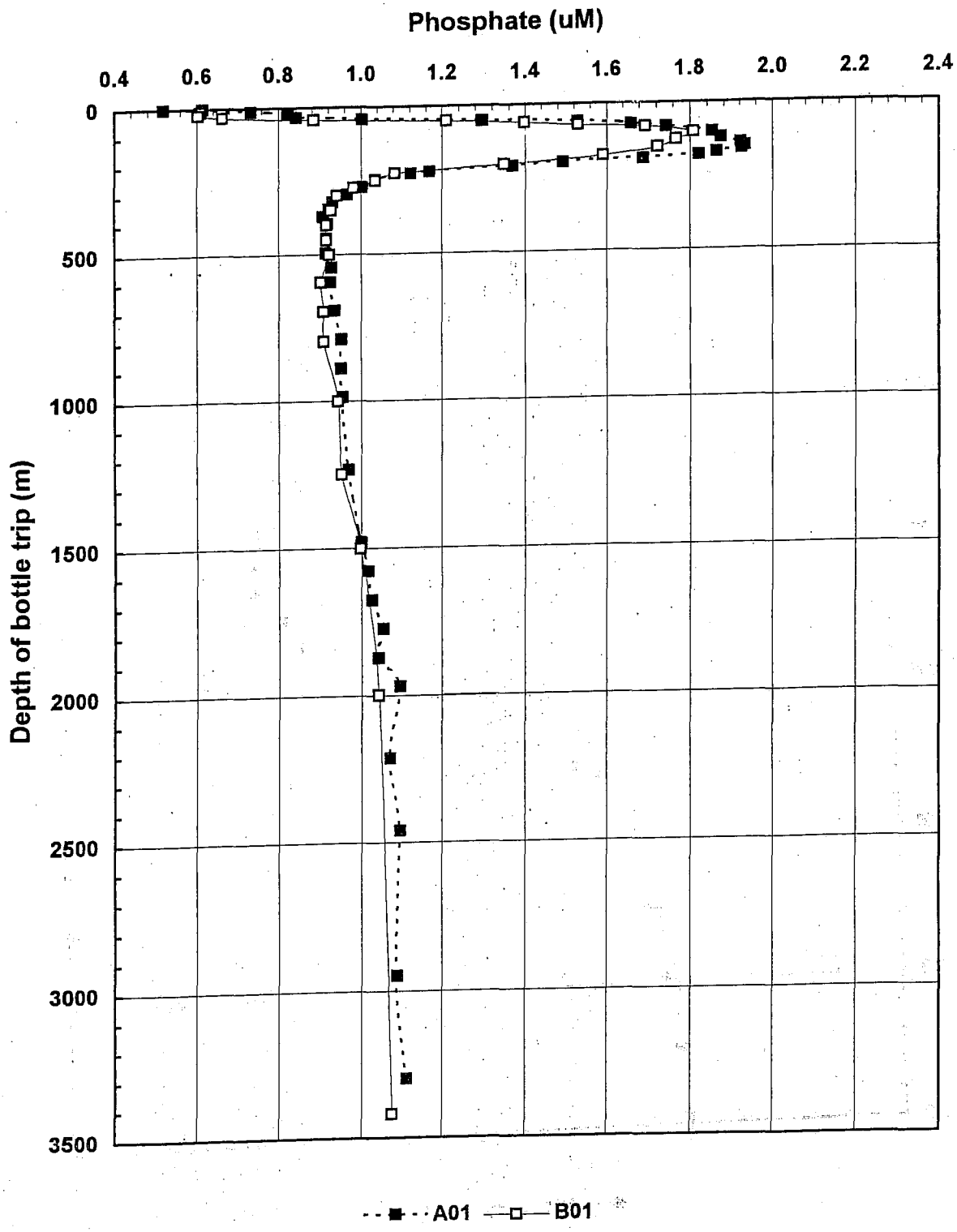
Cruise 9324- Silicate Profiles



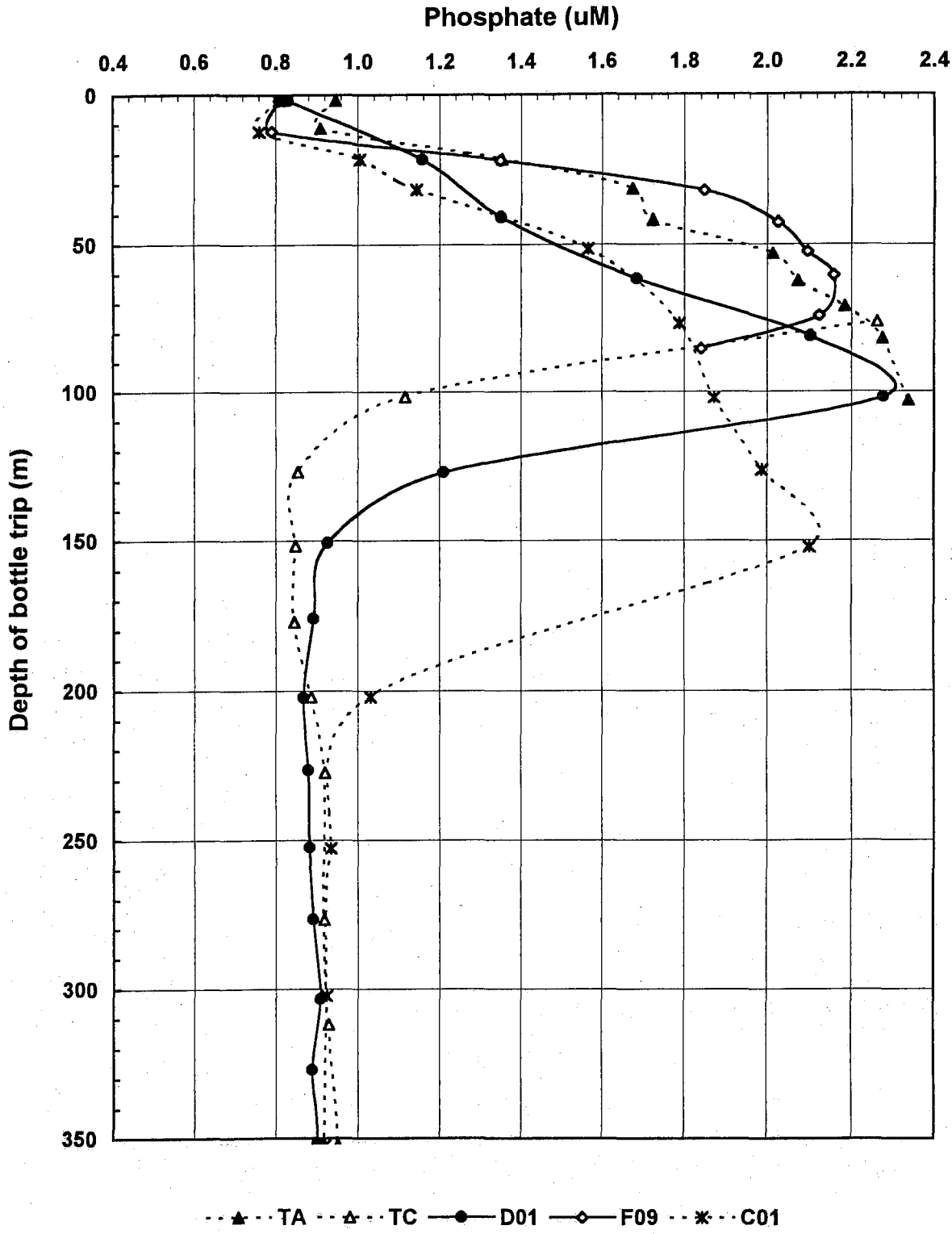
Cruise 9324 - Phosphate Profiles



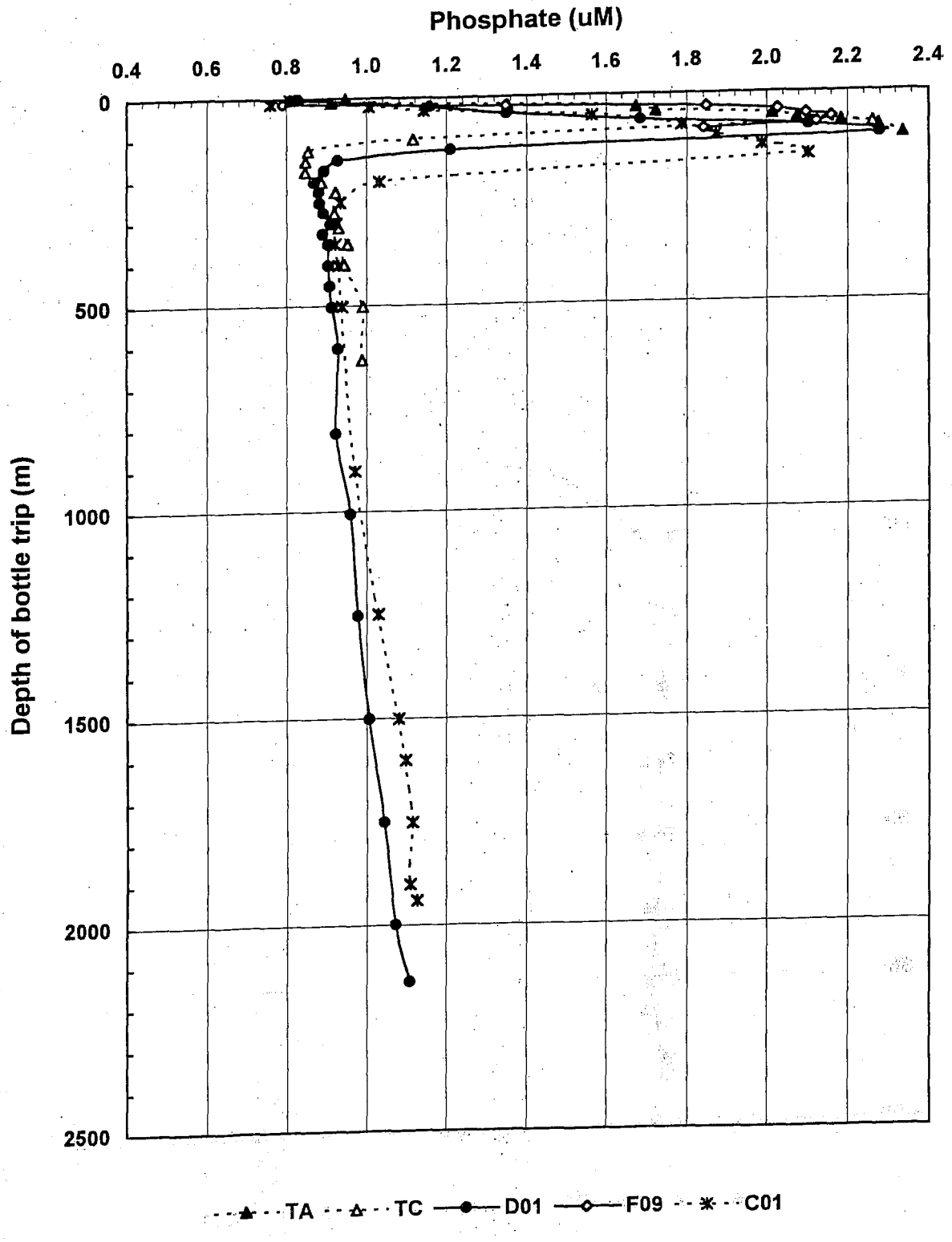
Cruise 9324 - Phosphate Profiles



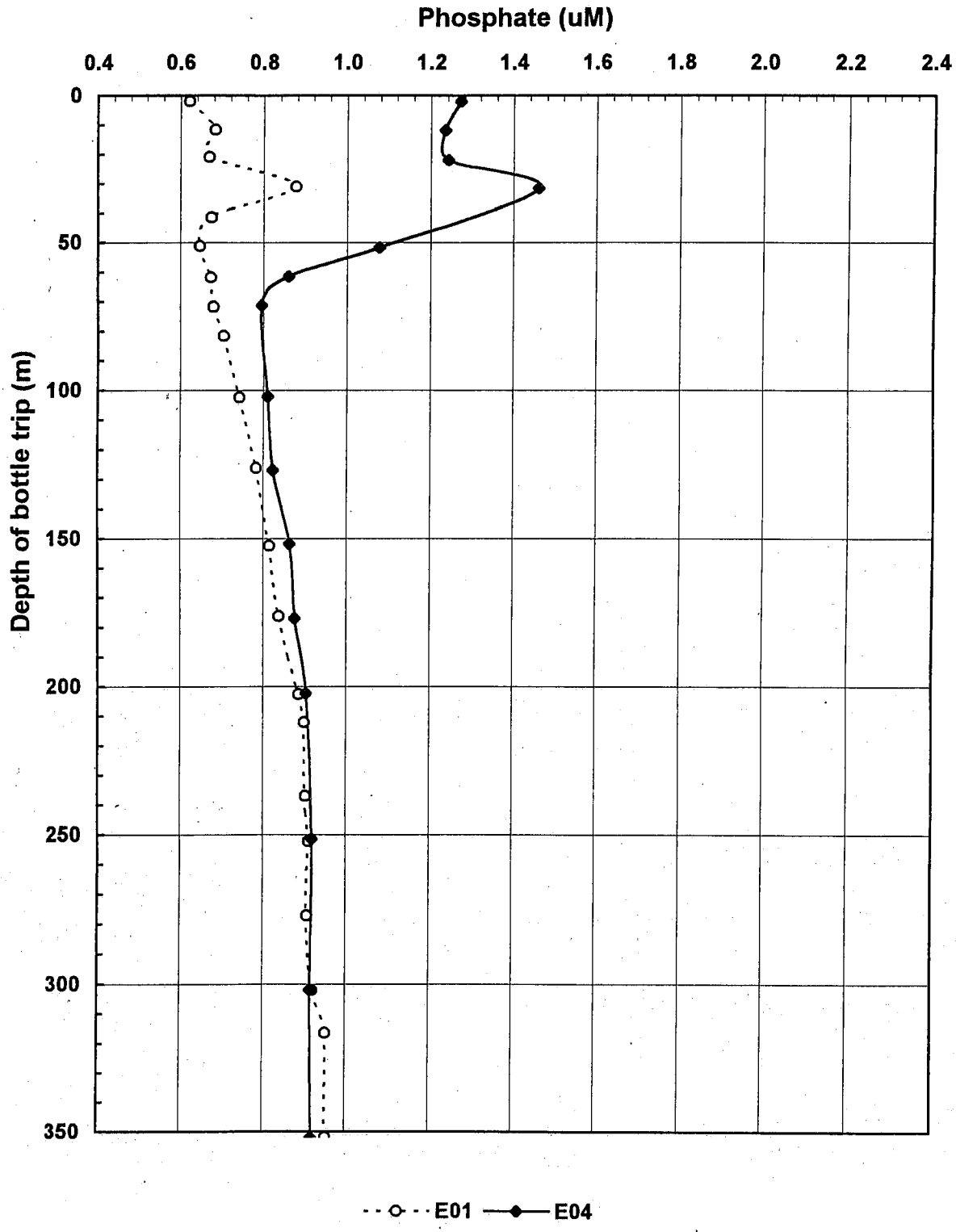
Cruise 9324- Phosphate Profiles



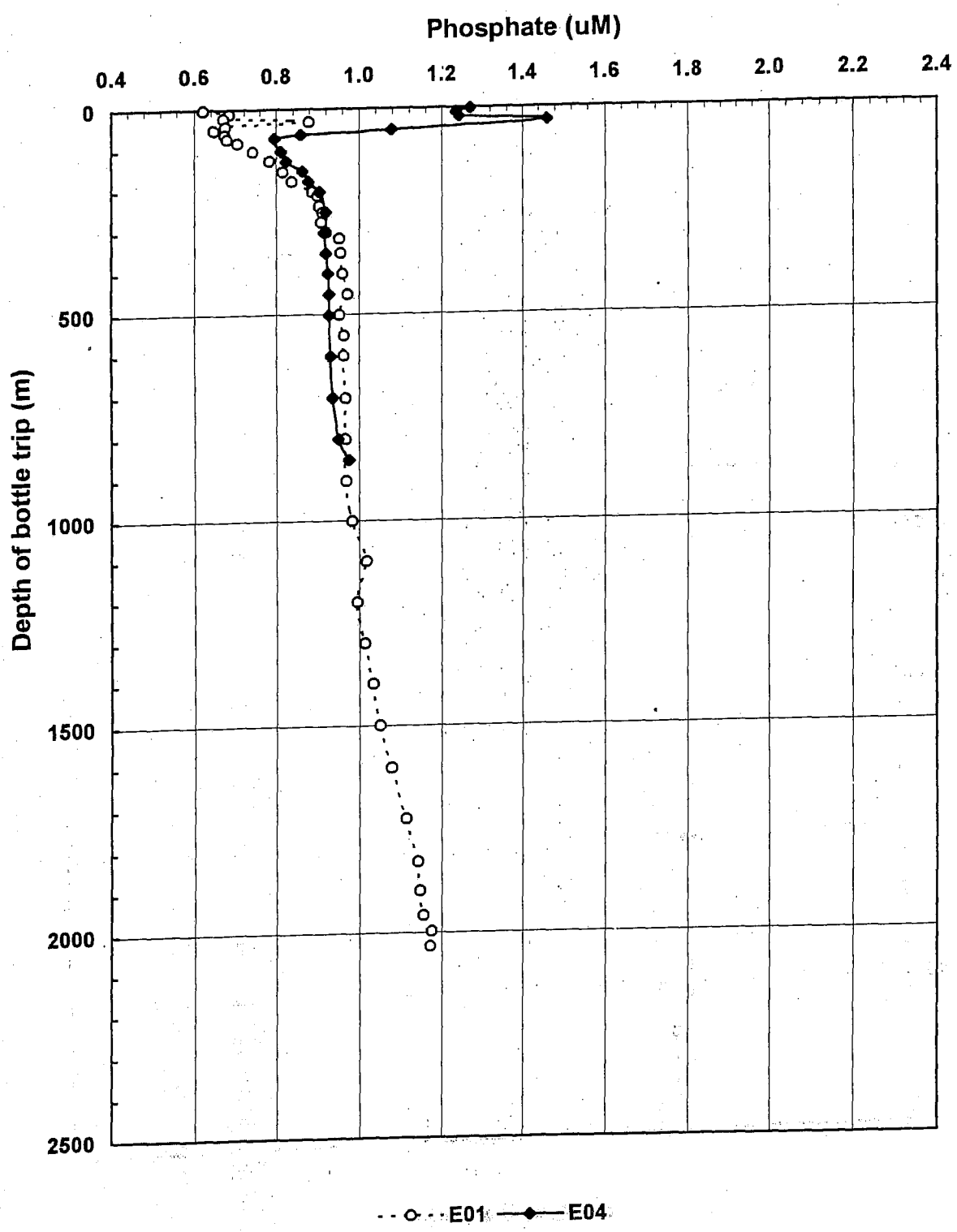
Cruise 9324- Phosphate Profiles



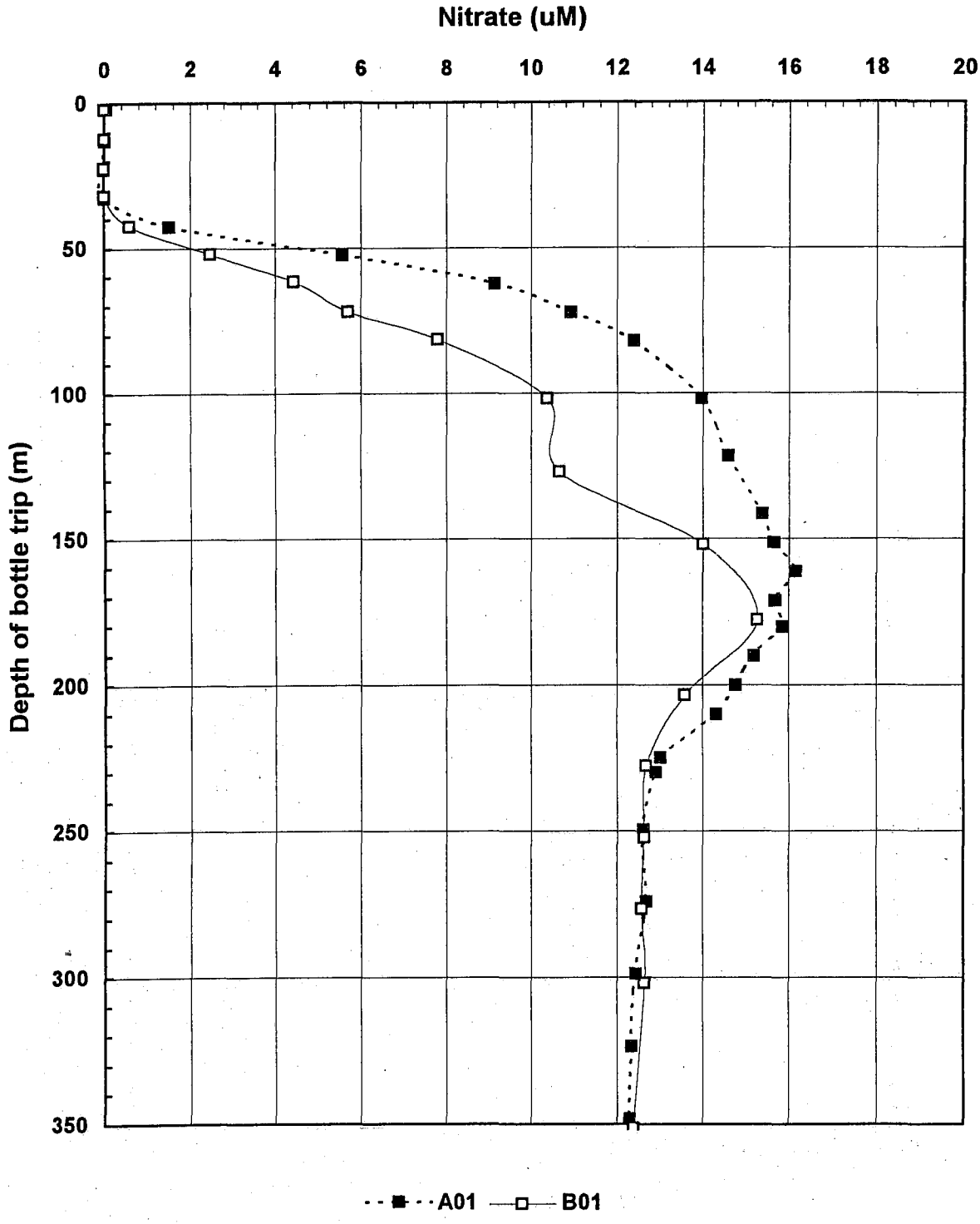
Cruise 9324- Phosphate Profiles



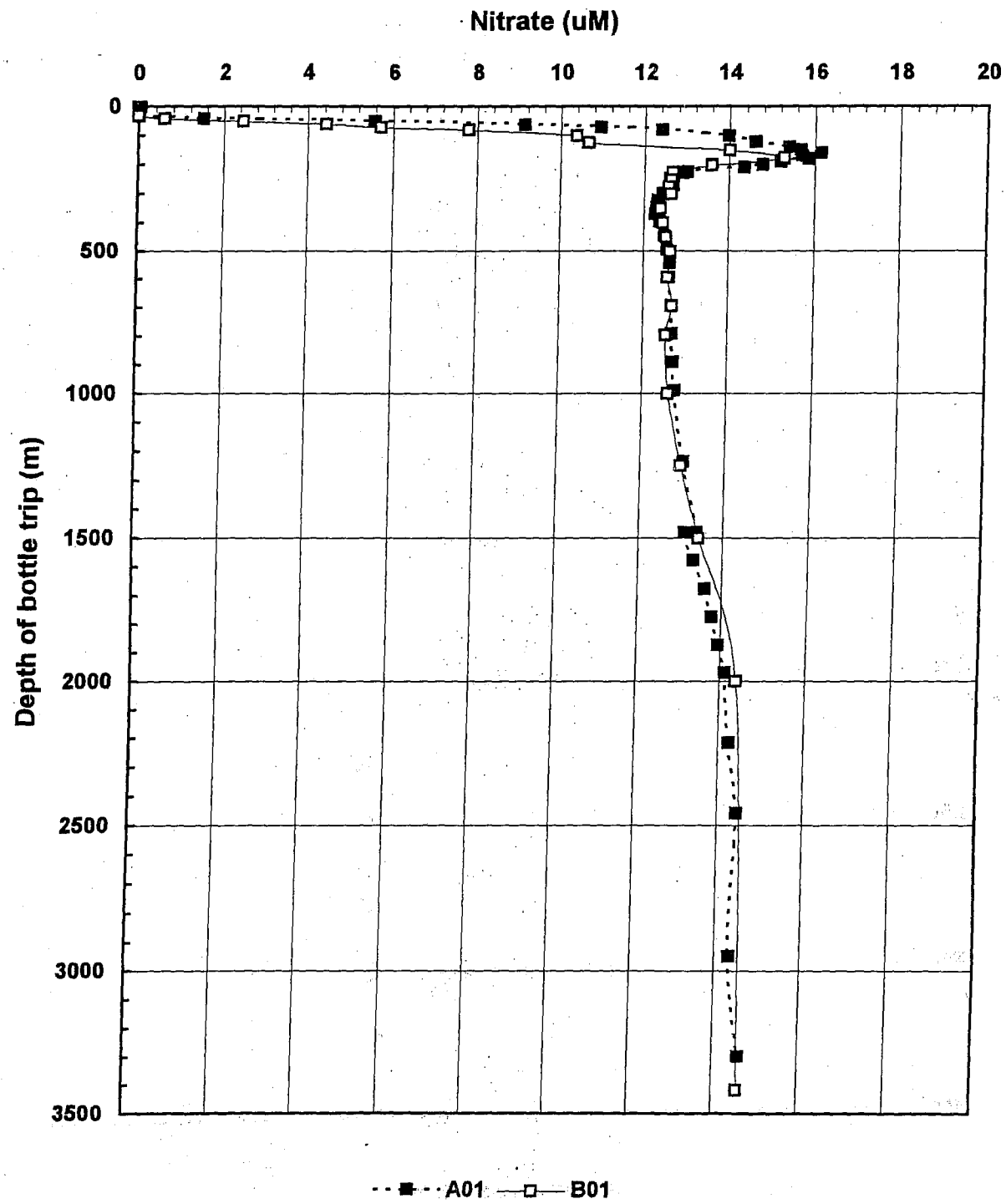
Cruise 9324- Phosphate Profiles



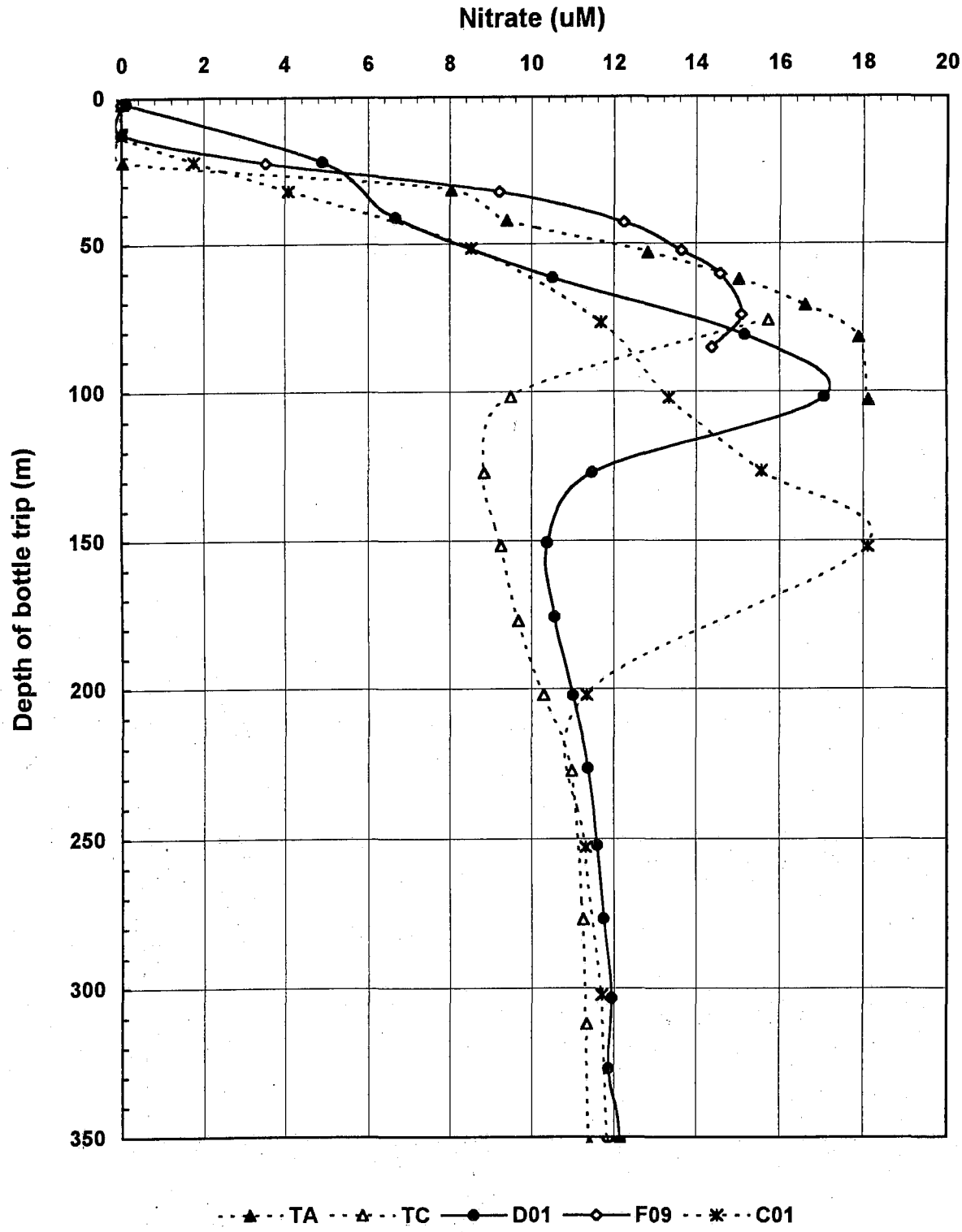
Cruise 9324 - Nitrate Profiles



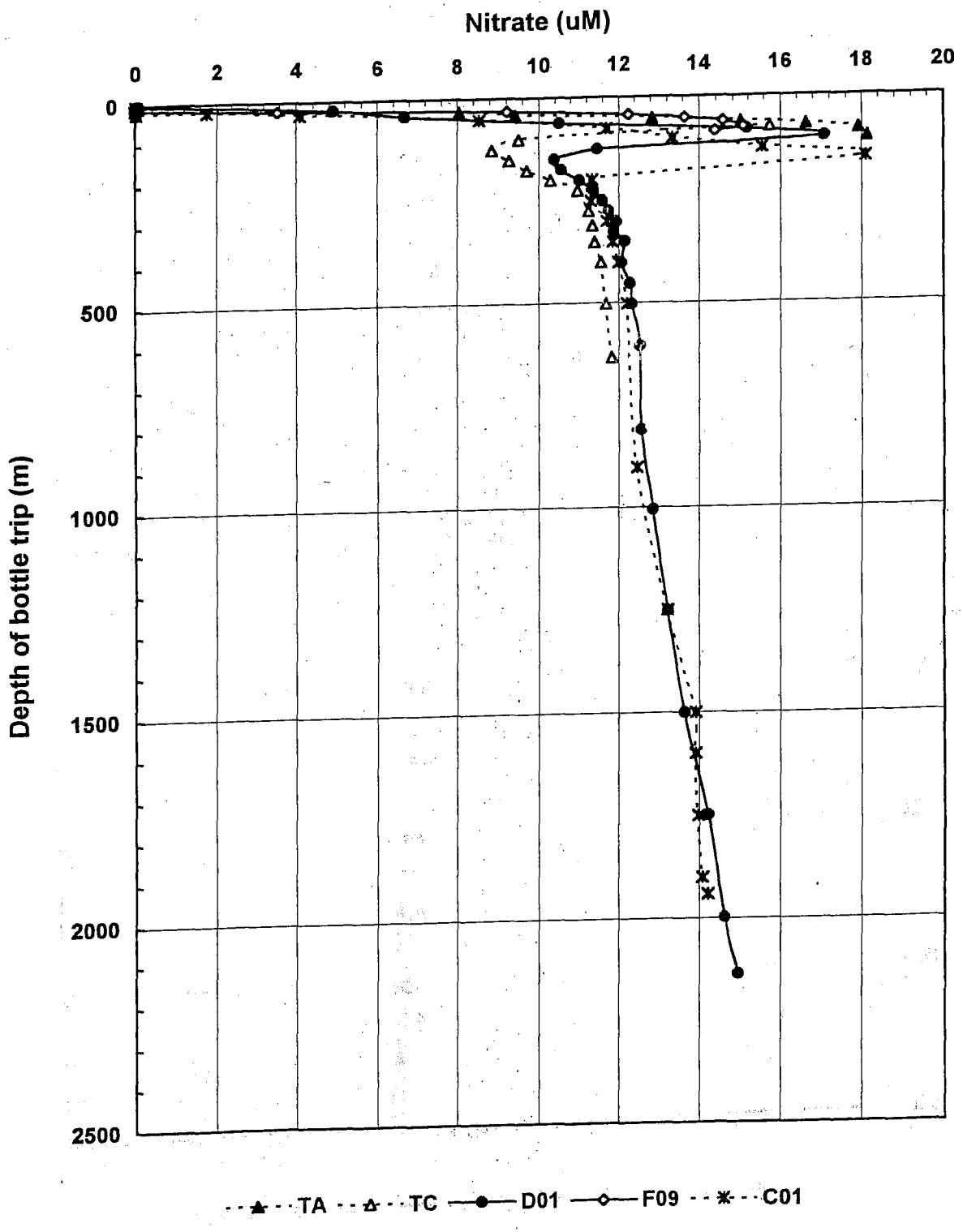
Cruise 9324 : Nitrate Profiles



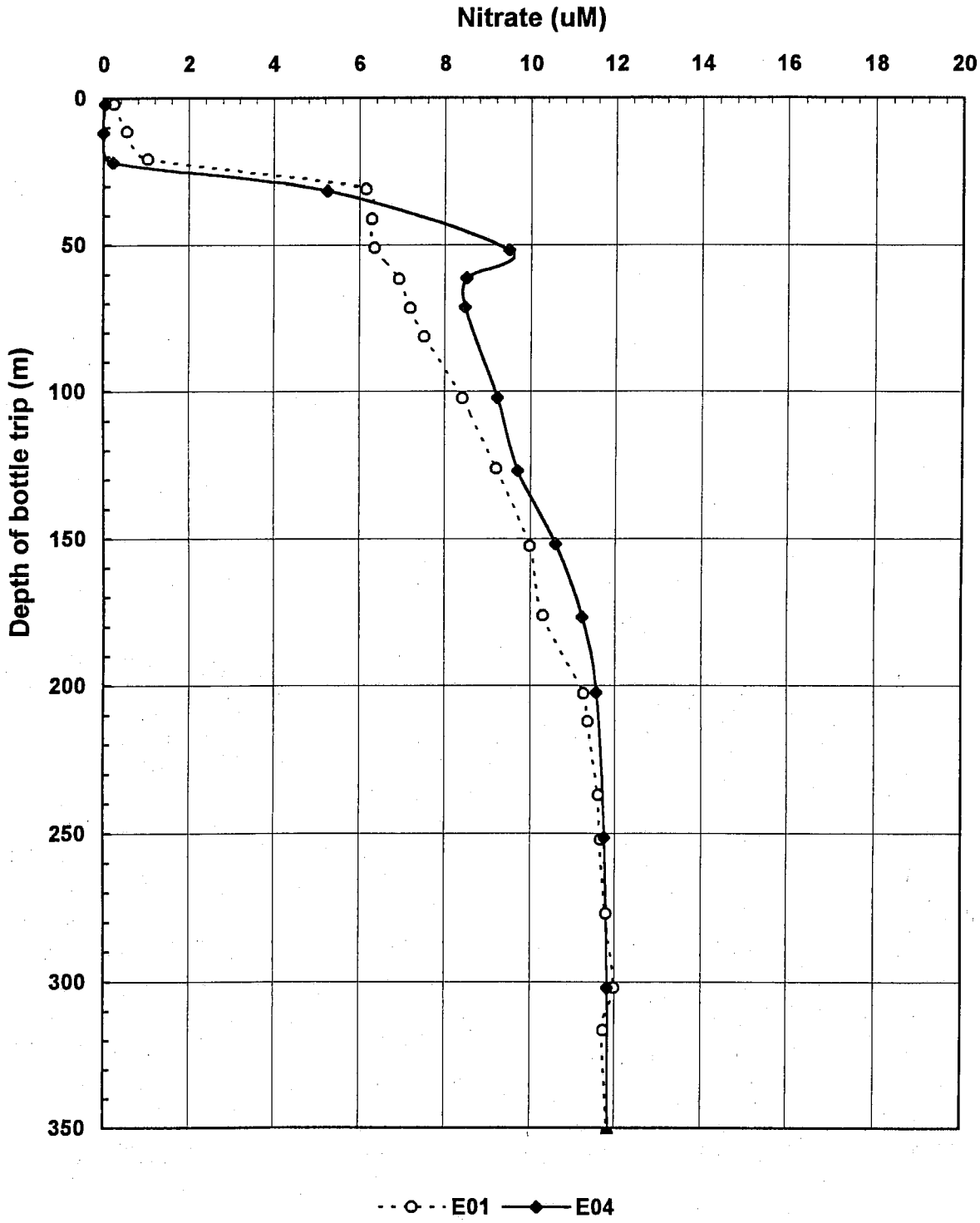
Cruise 9324- Nitrate Profiles



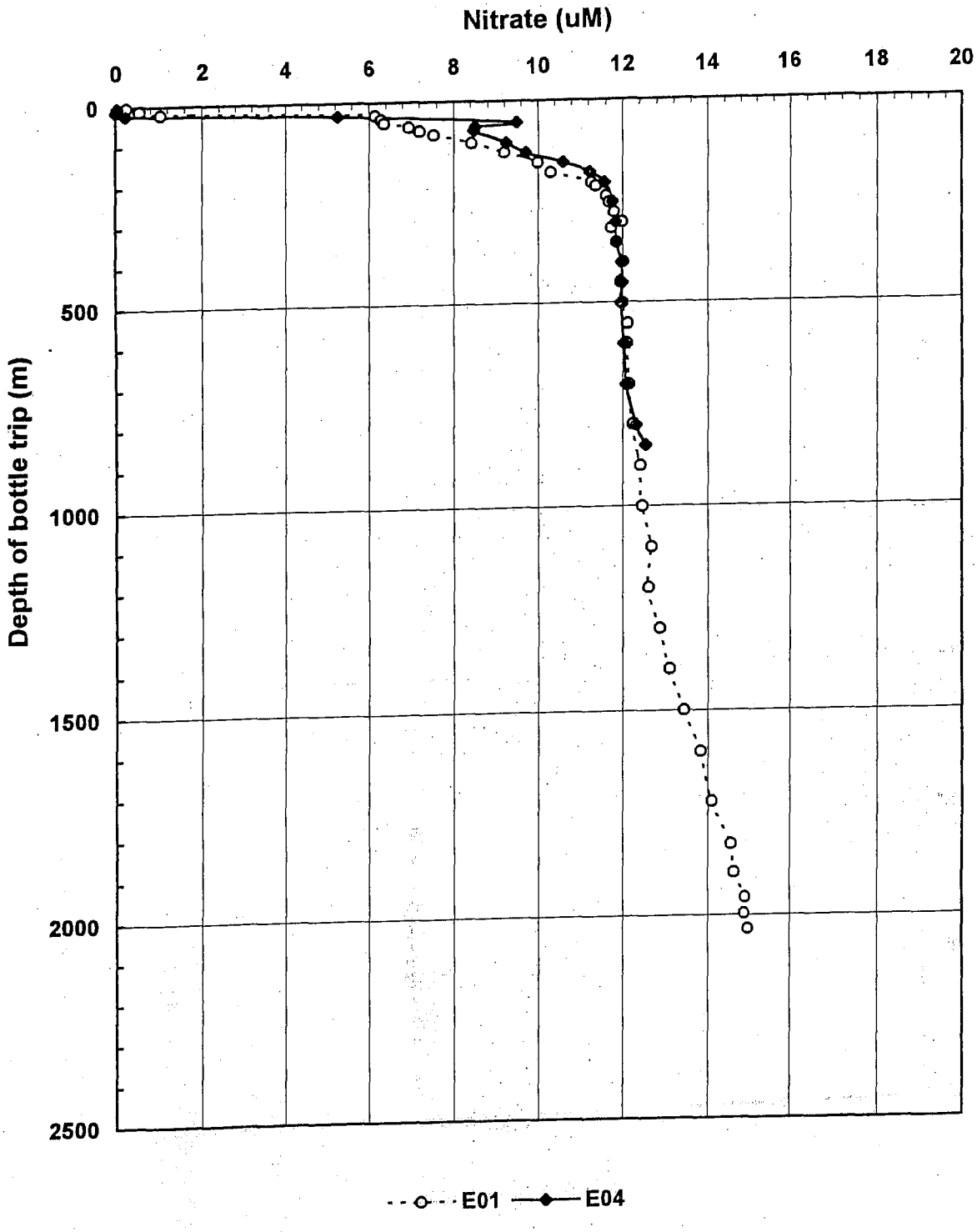
Cruise 9324- Nitrate Profiles



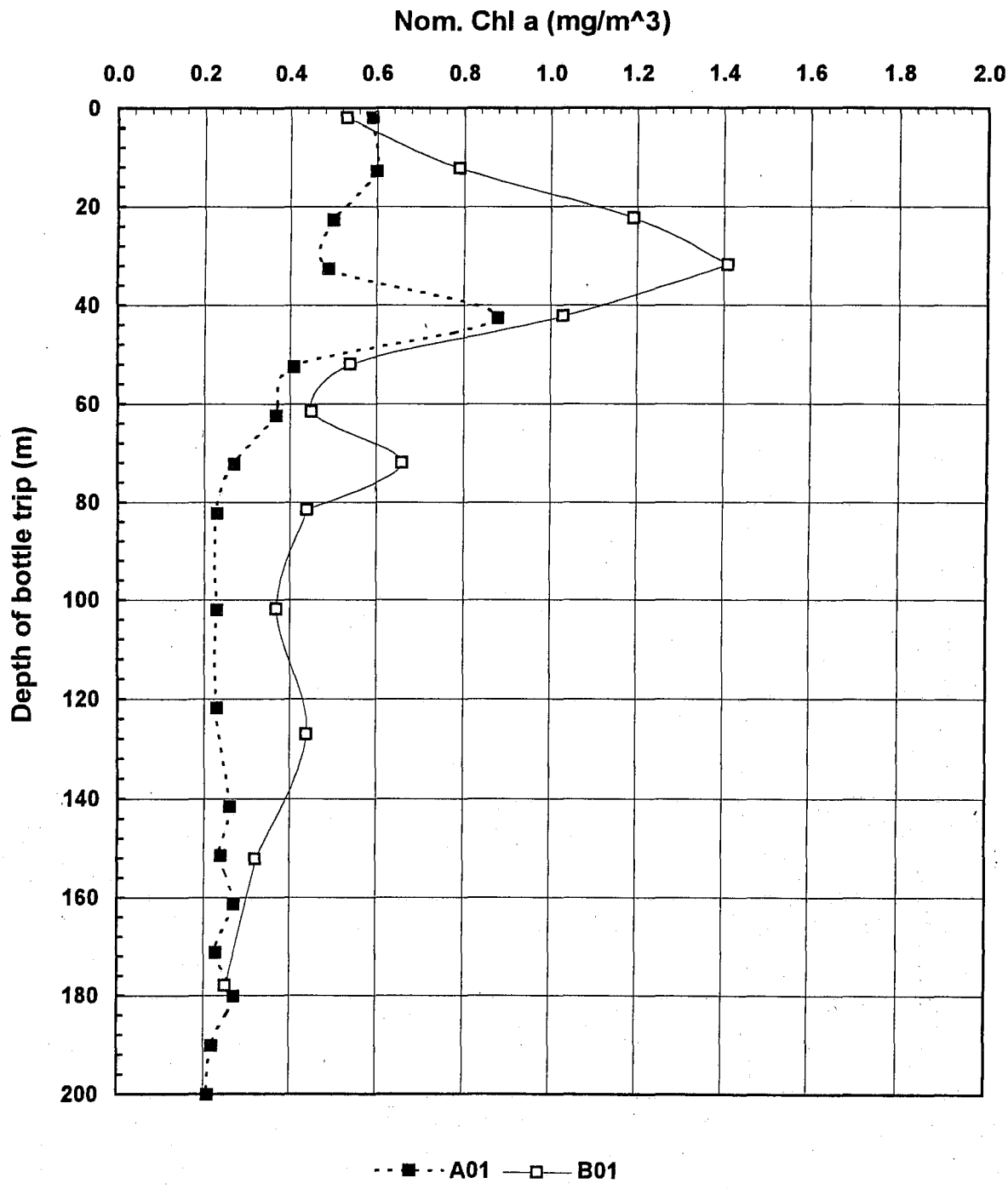
Cruise 9324- Nitrate Profiles



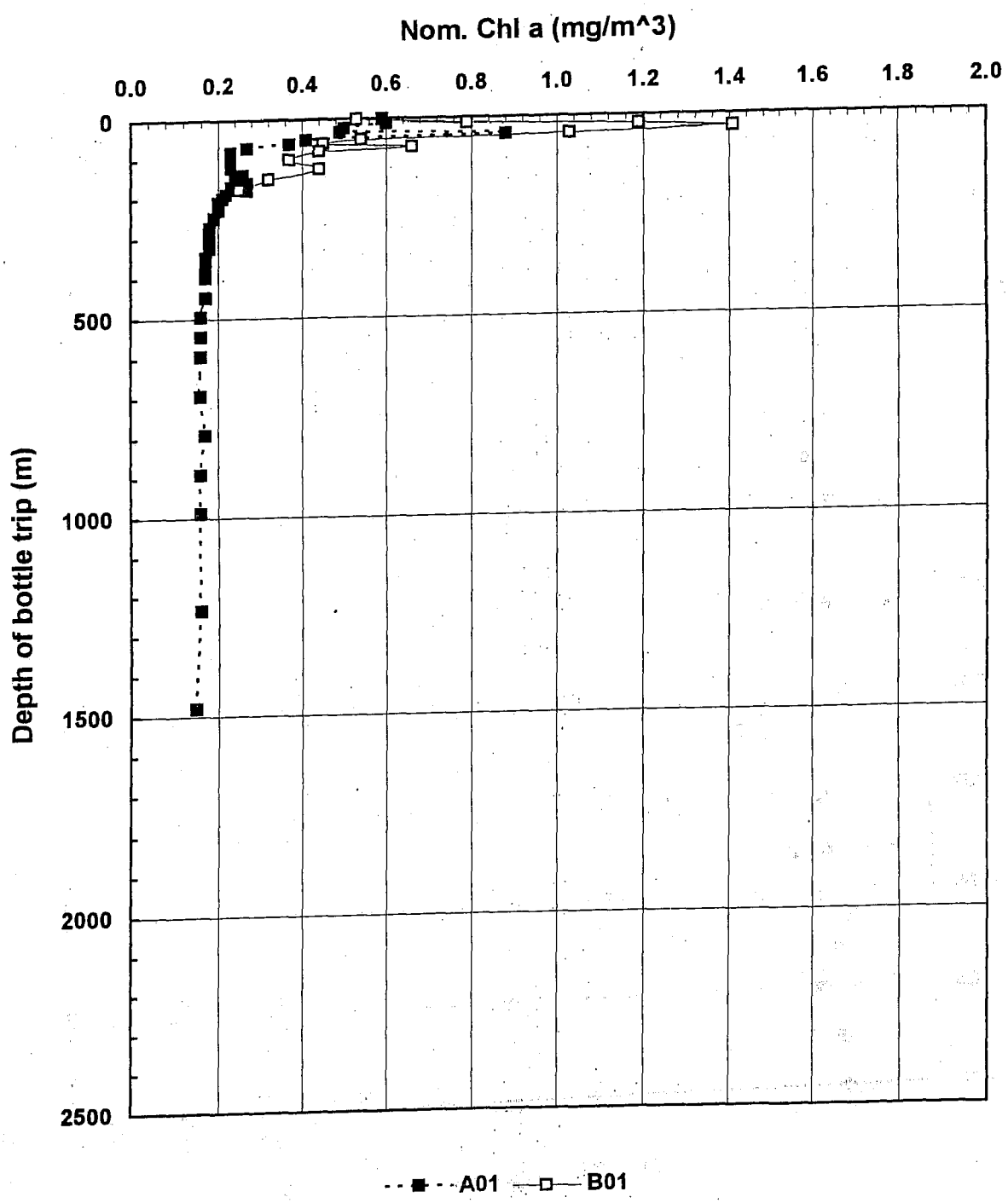
Cruise 9324- Nitrate Profiles



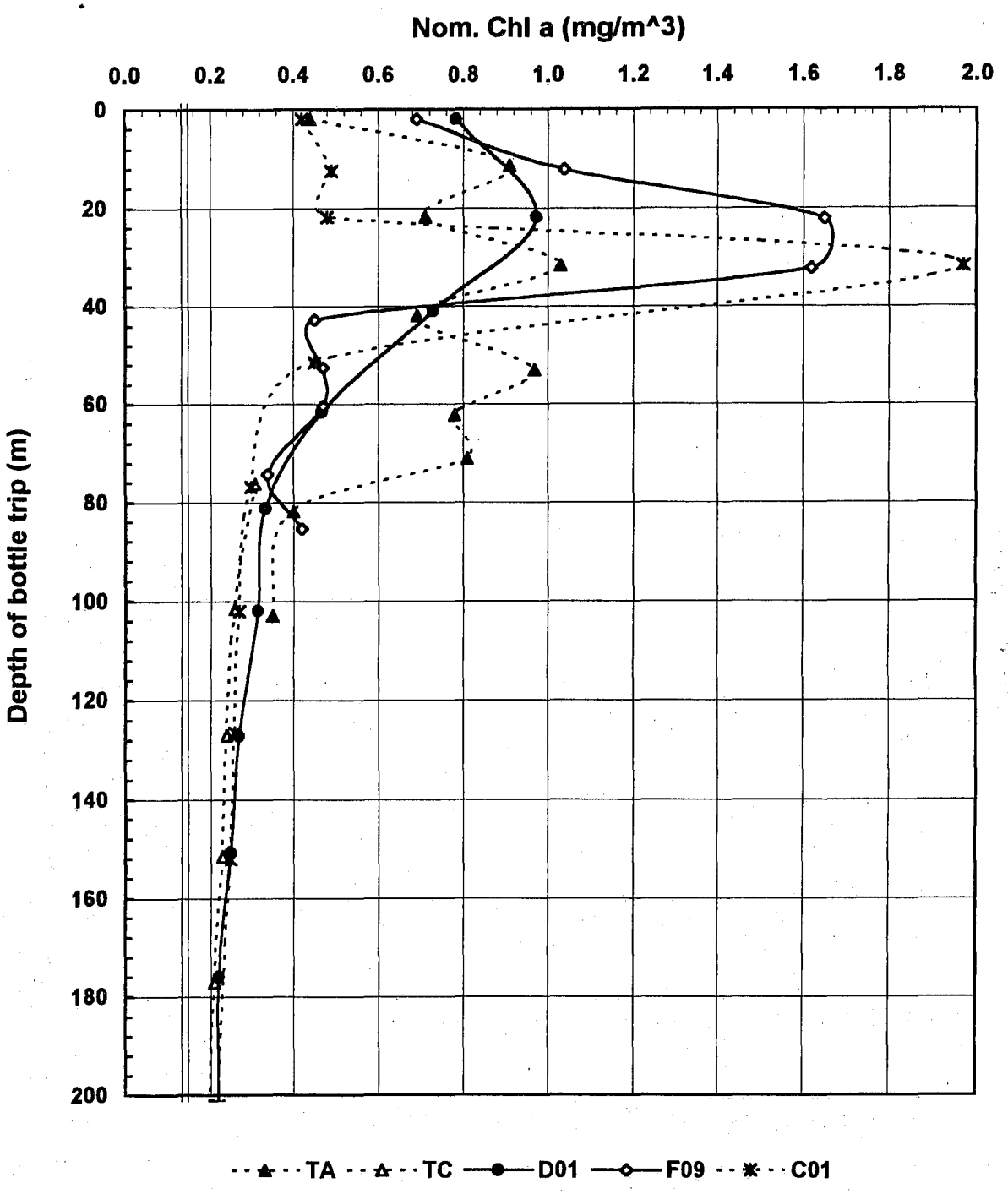
Cruise 9324 - Nominal Chlorophyll a - Fluorometer



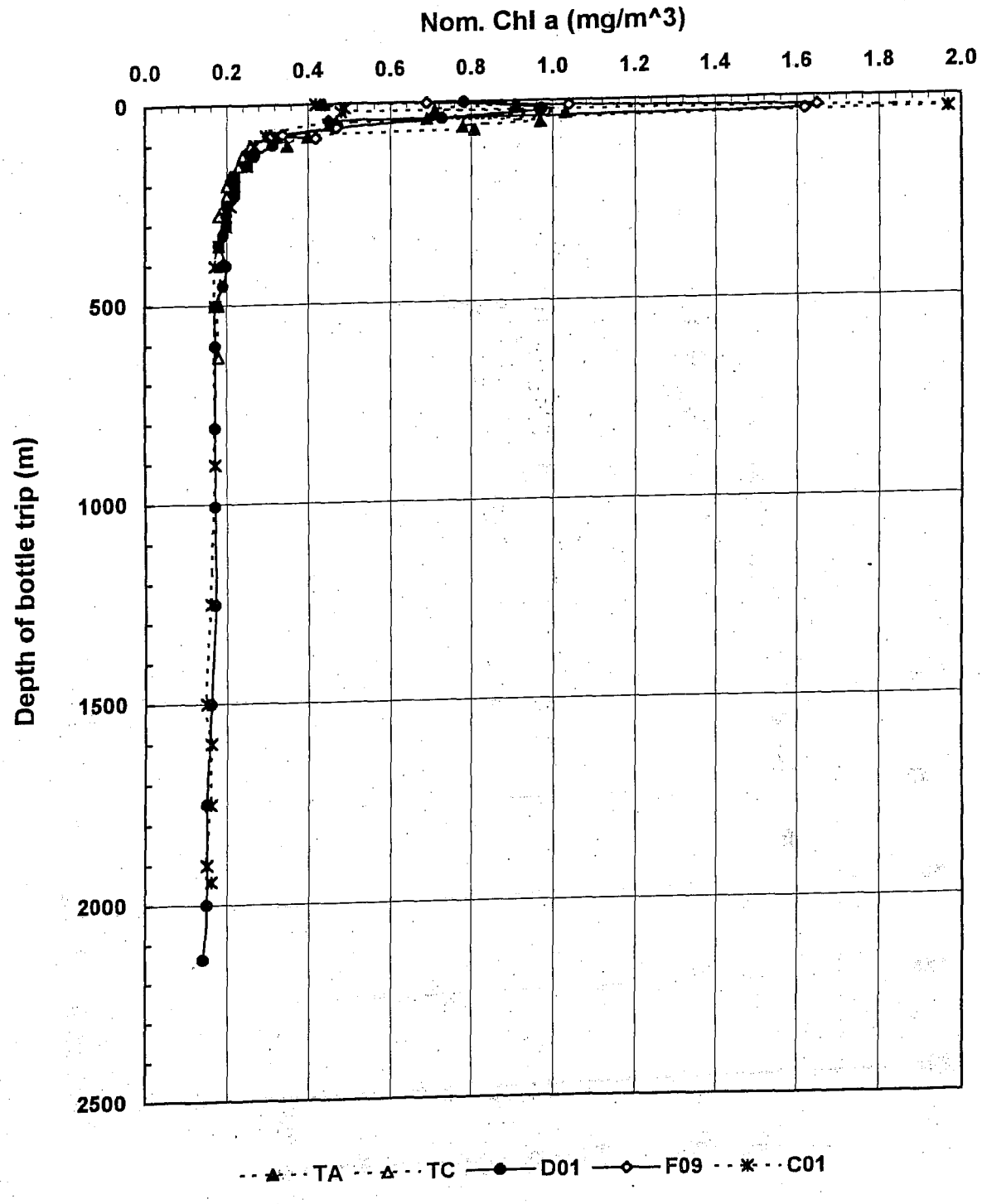
Cruise 9324 - Nominal Chlorophyll a - Fluorometer



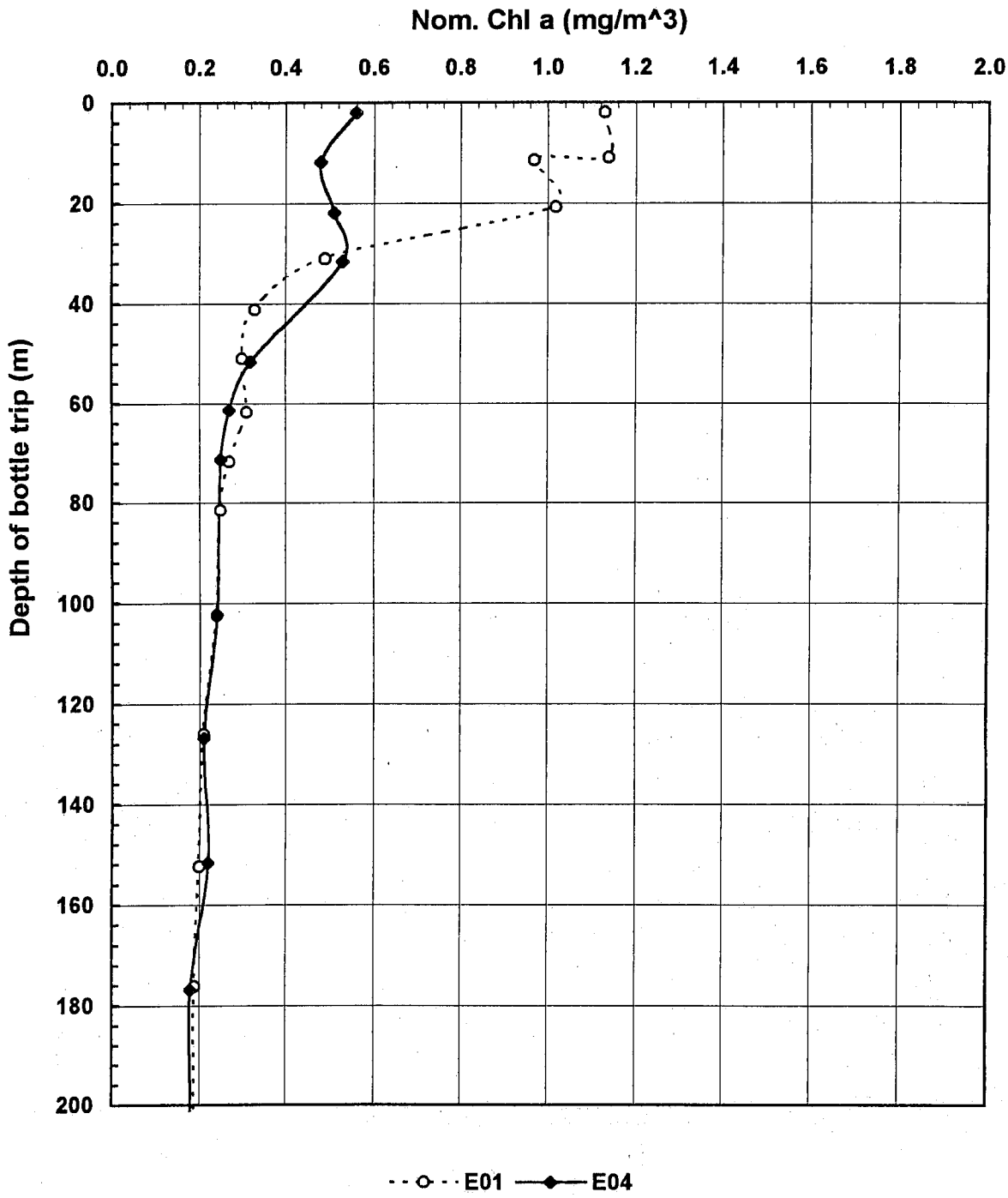
Cruise 9324 : Nominal Chlorophyll a - Fluorometer



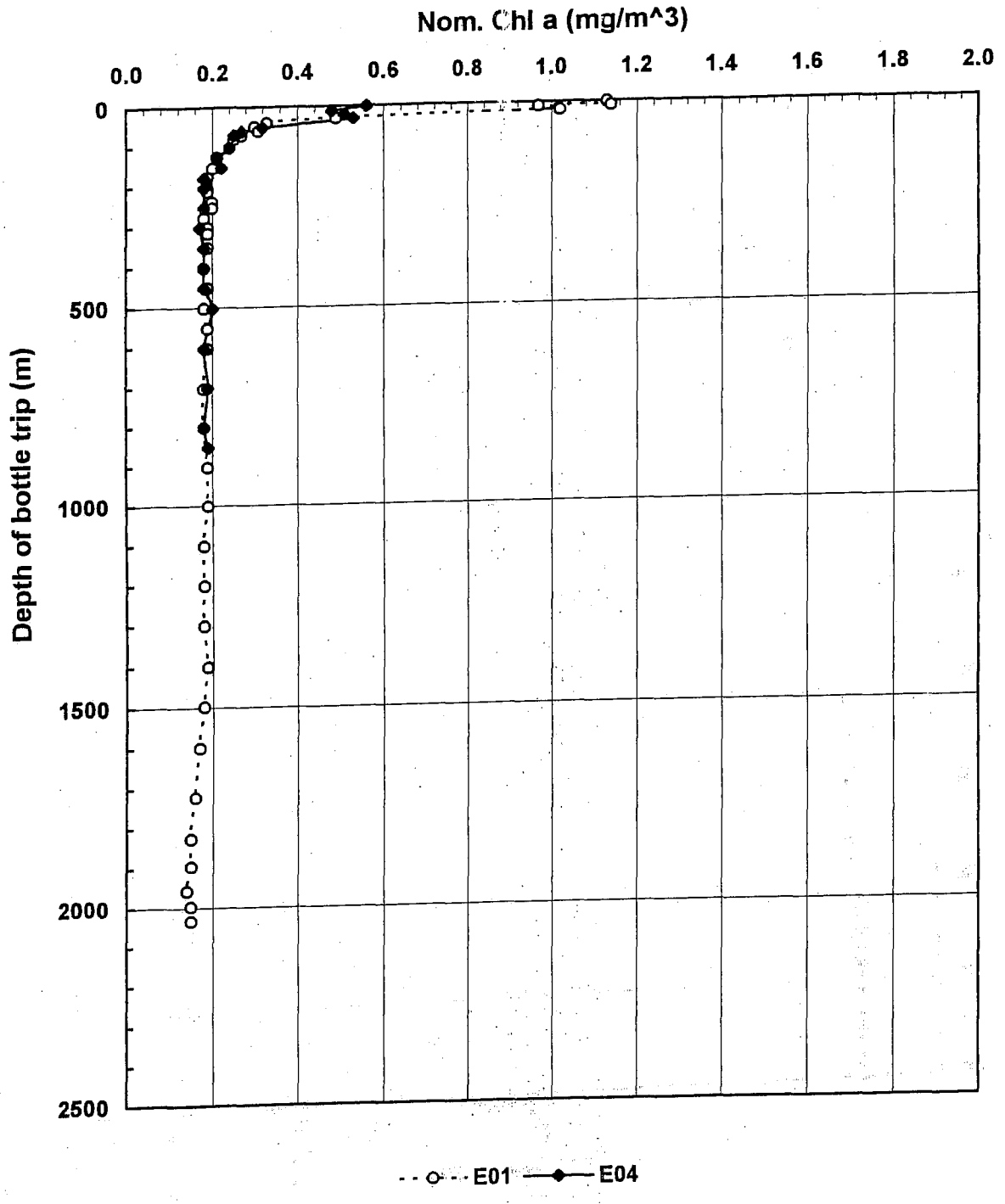
Cruise 9324- Nominal Chlorophyll a - Fluorometer



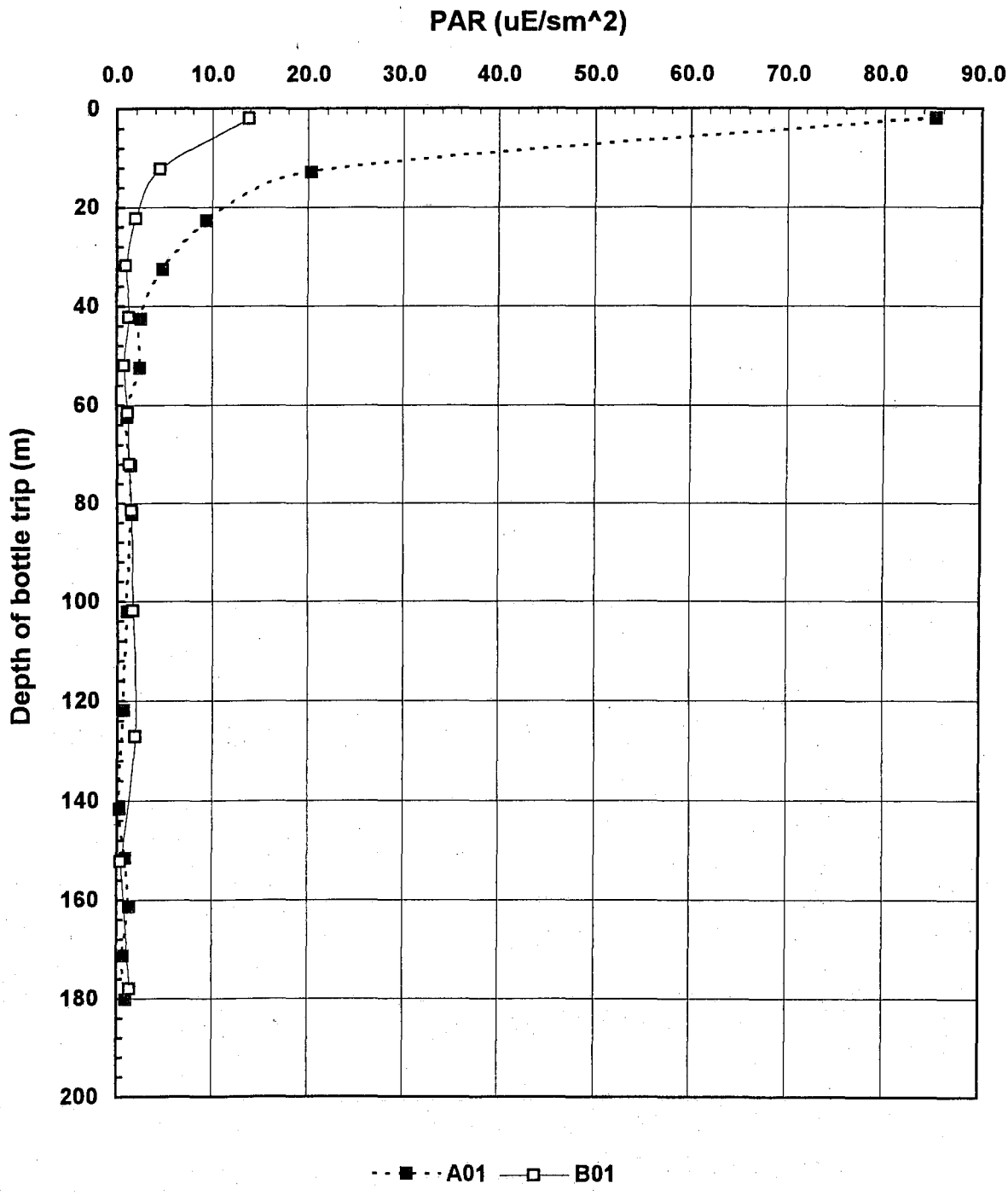
Cruise 9324- Nominal Chlotophyll a - Fluorometer



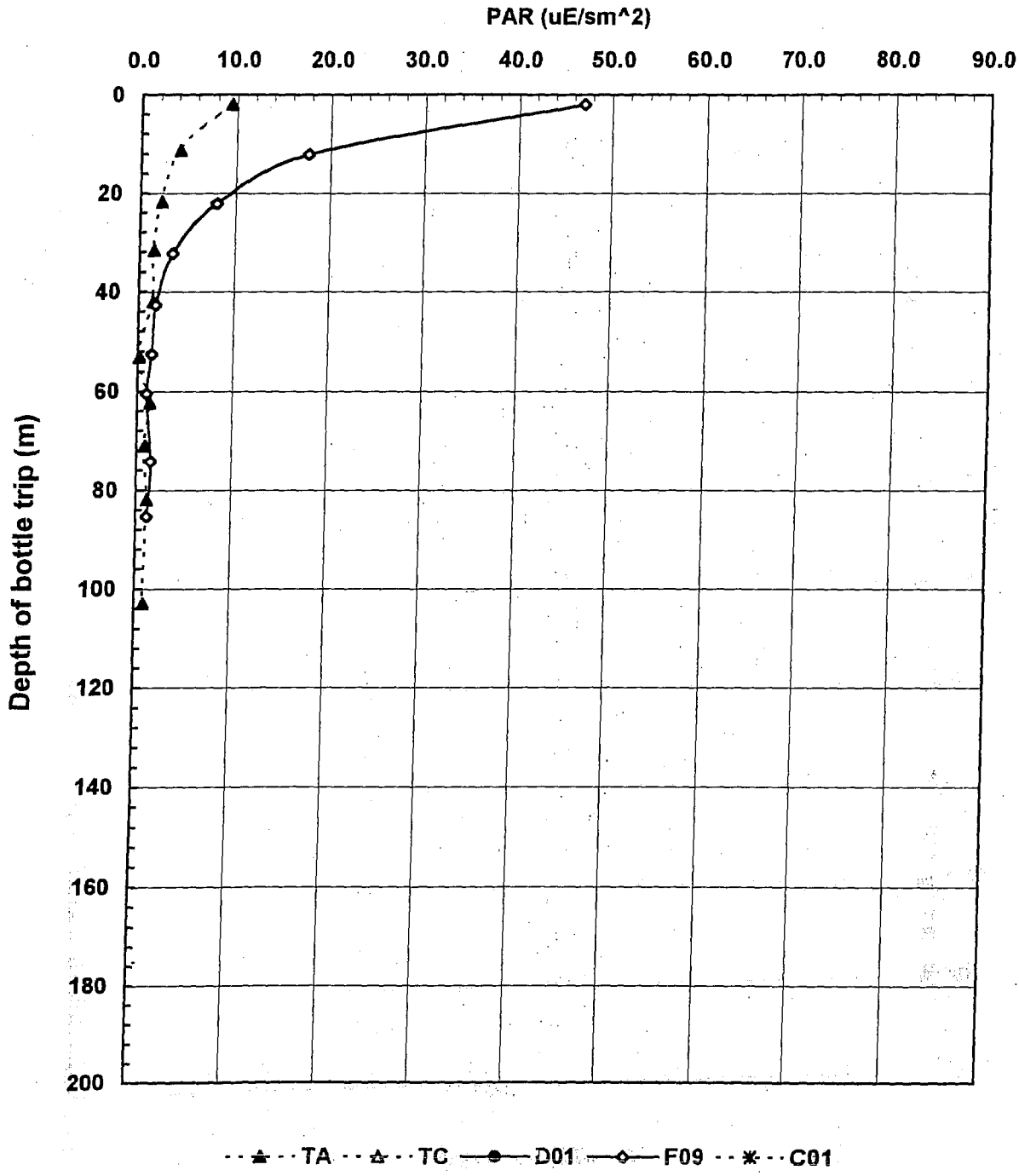
Cruise 9324- Nominal Chlotophyll a - Fluorometer



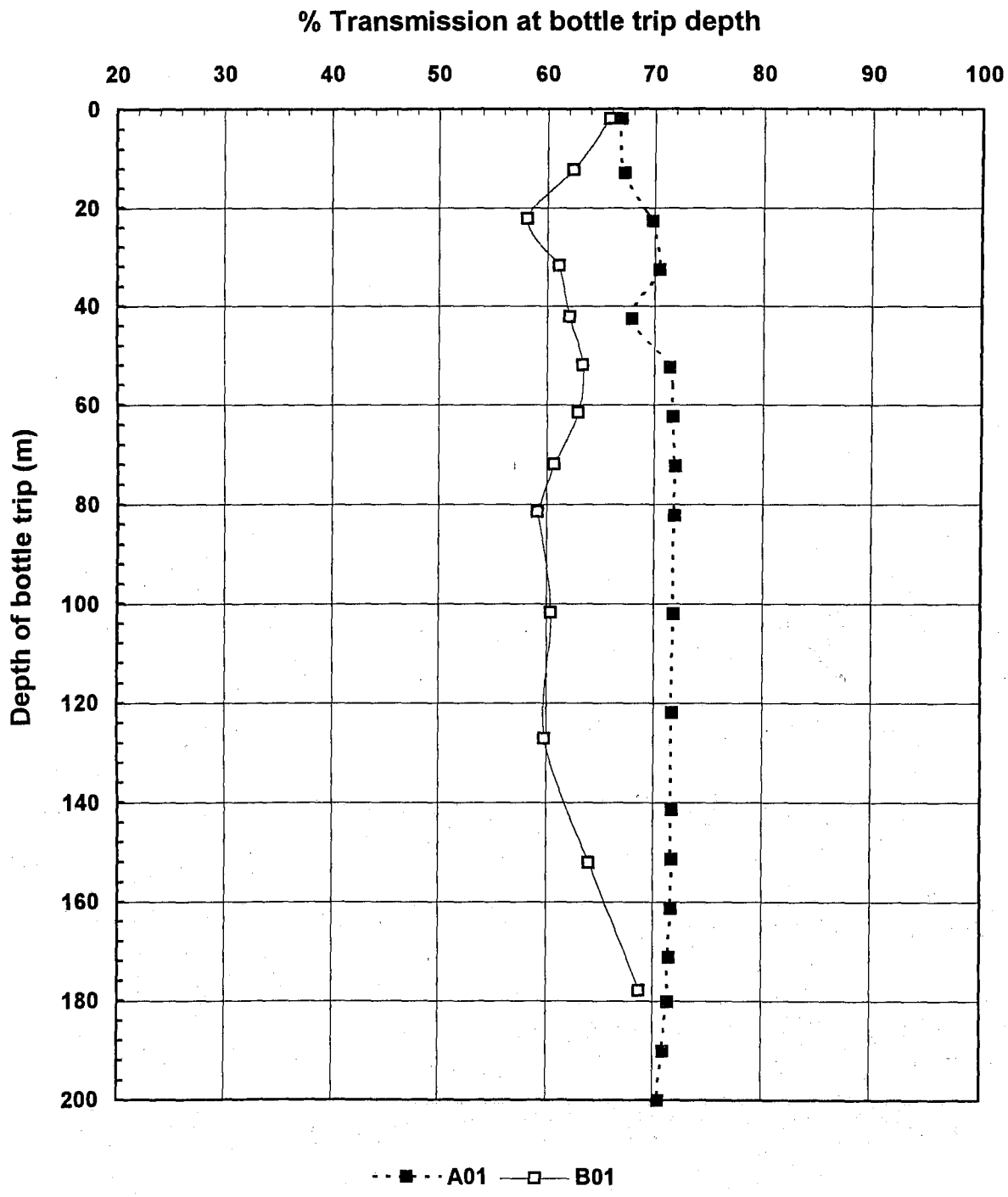
Cruise 9324 - Photosynthetically Active Radiation



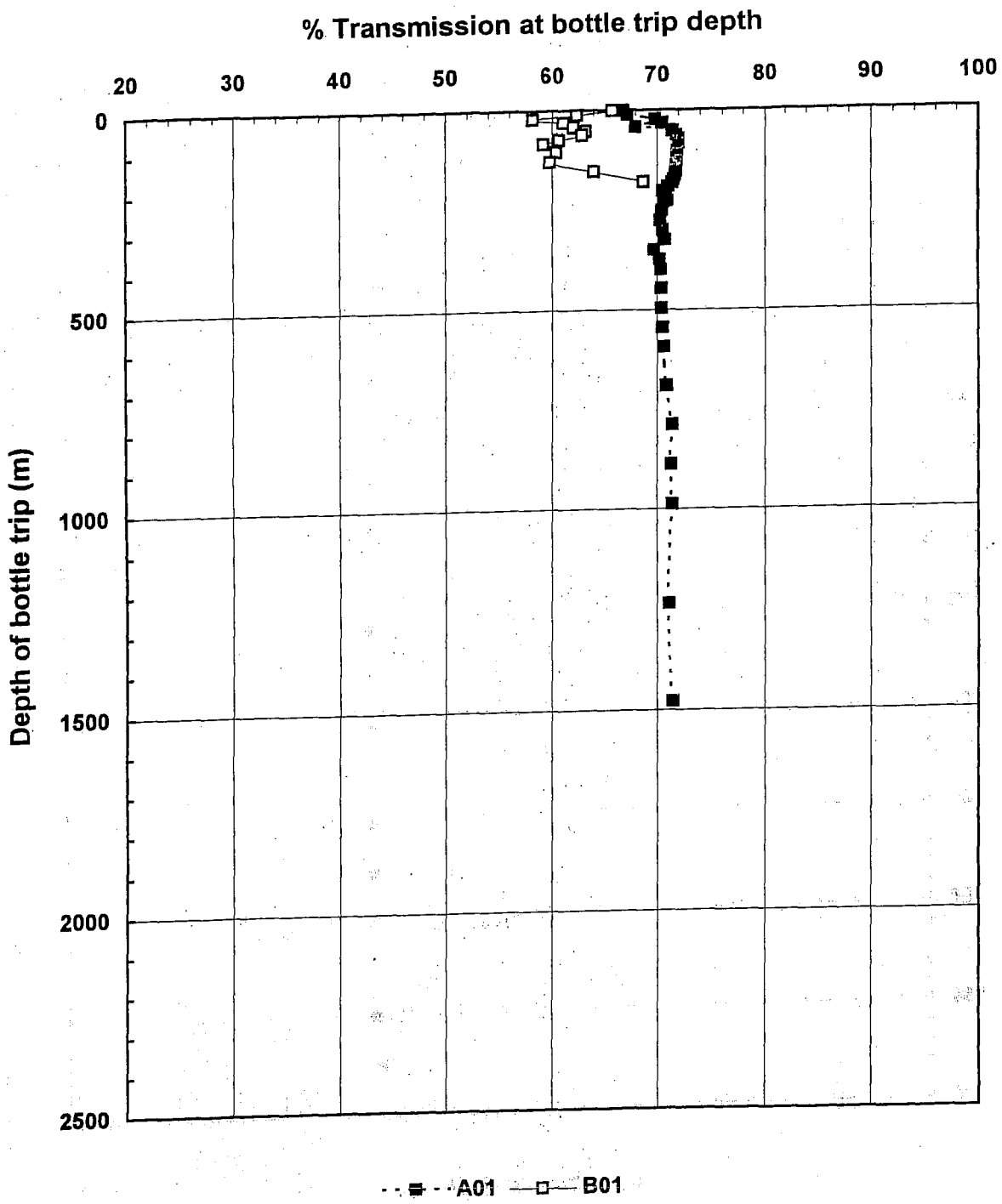
Cruise 9324- Photosynthetically Active Radiation



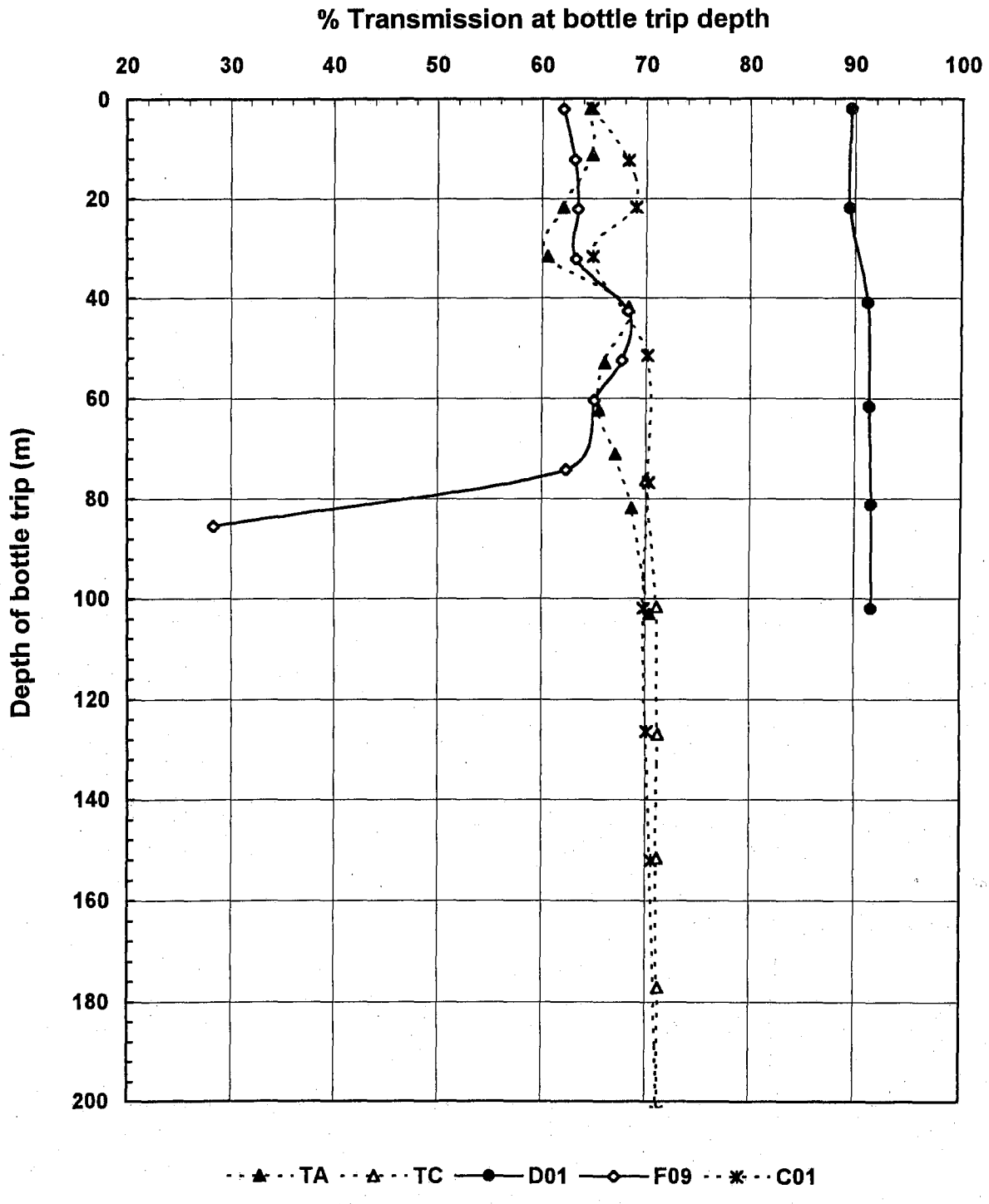
Cruise 9324 - Percent Transmission



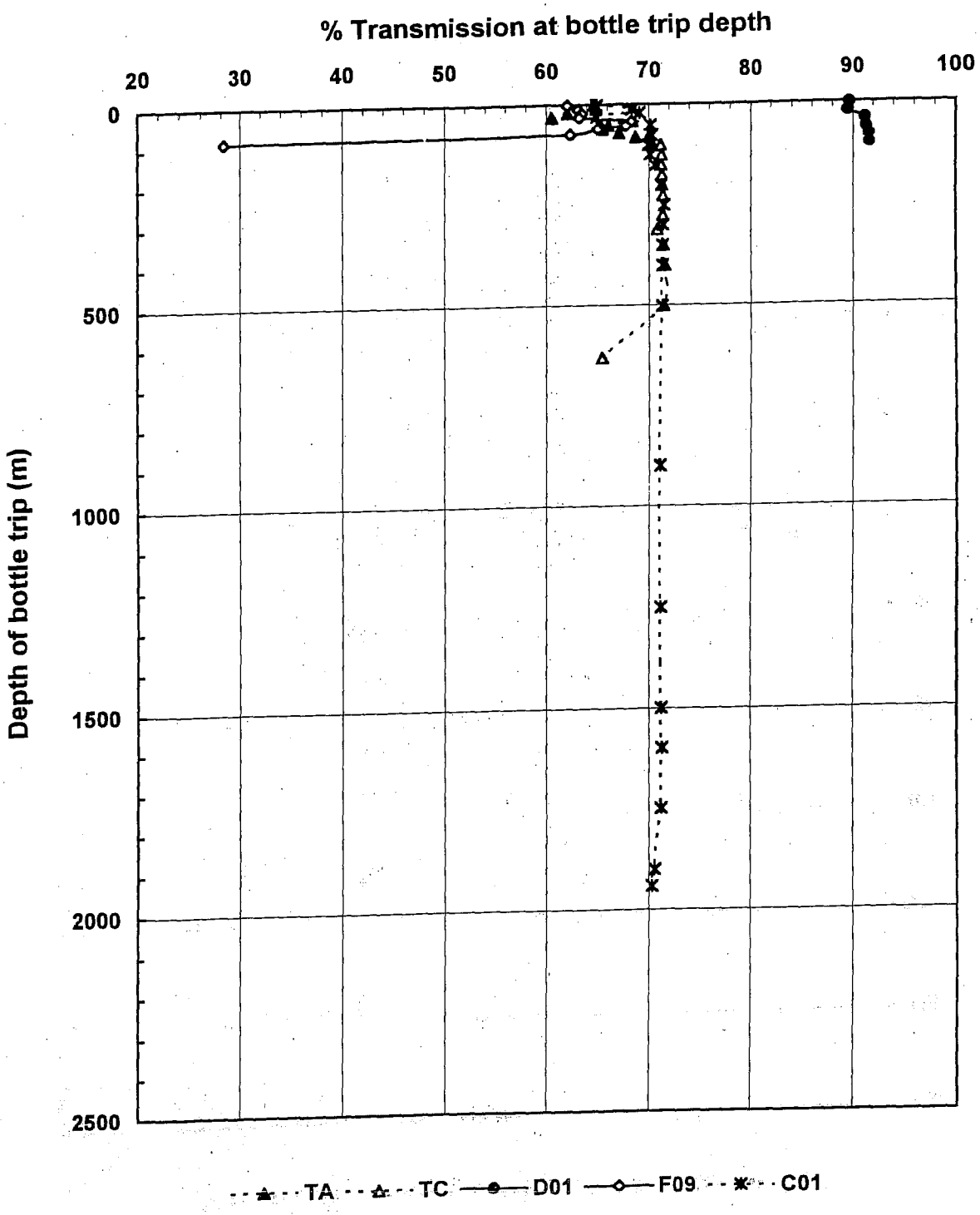
Cruise 9324 - Percent Transmission



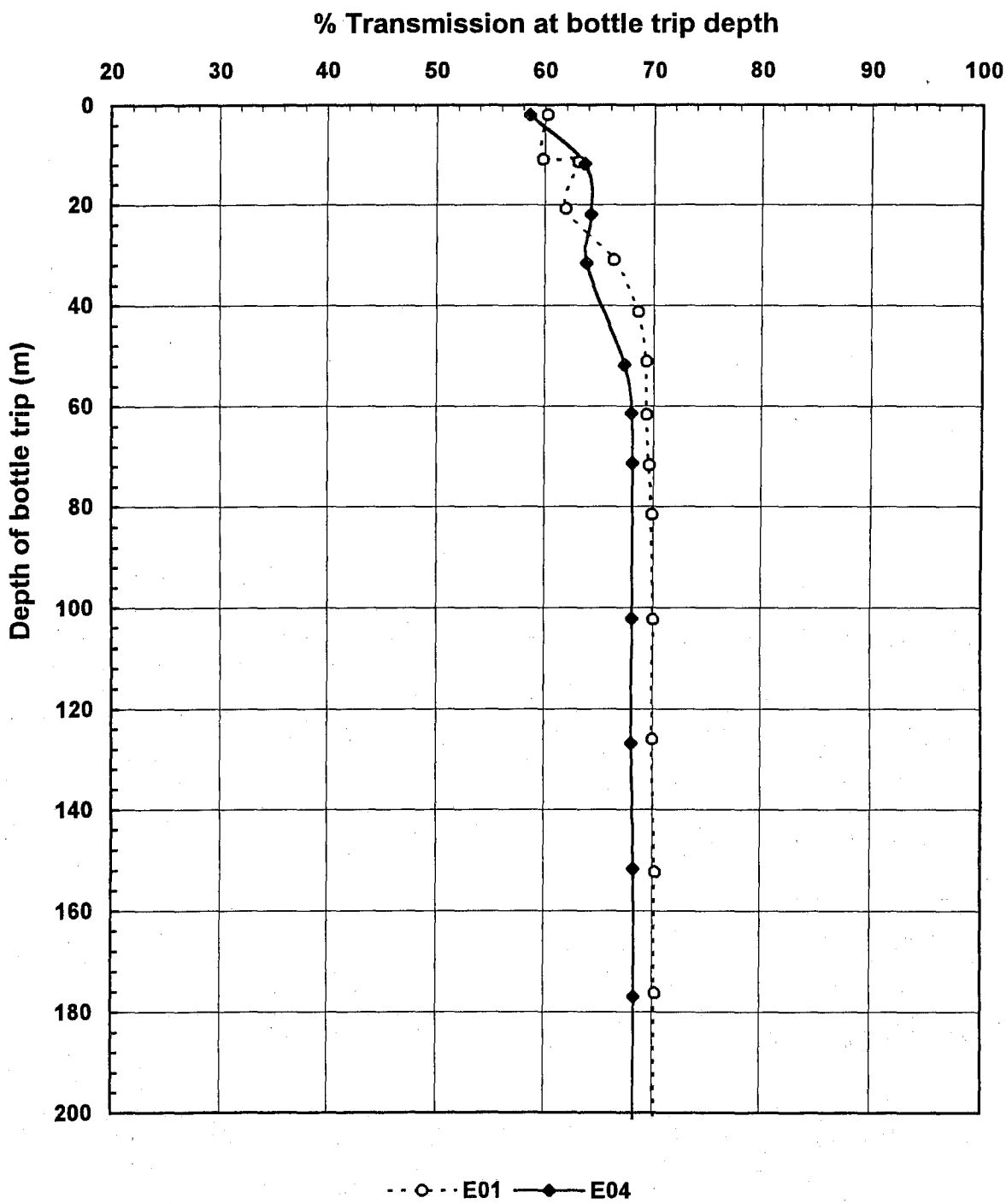
Cruise 9324- Percent Transmission



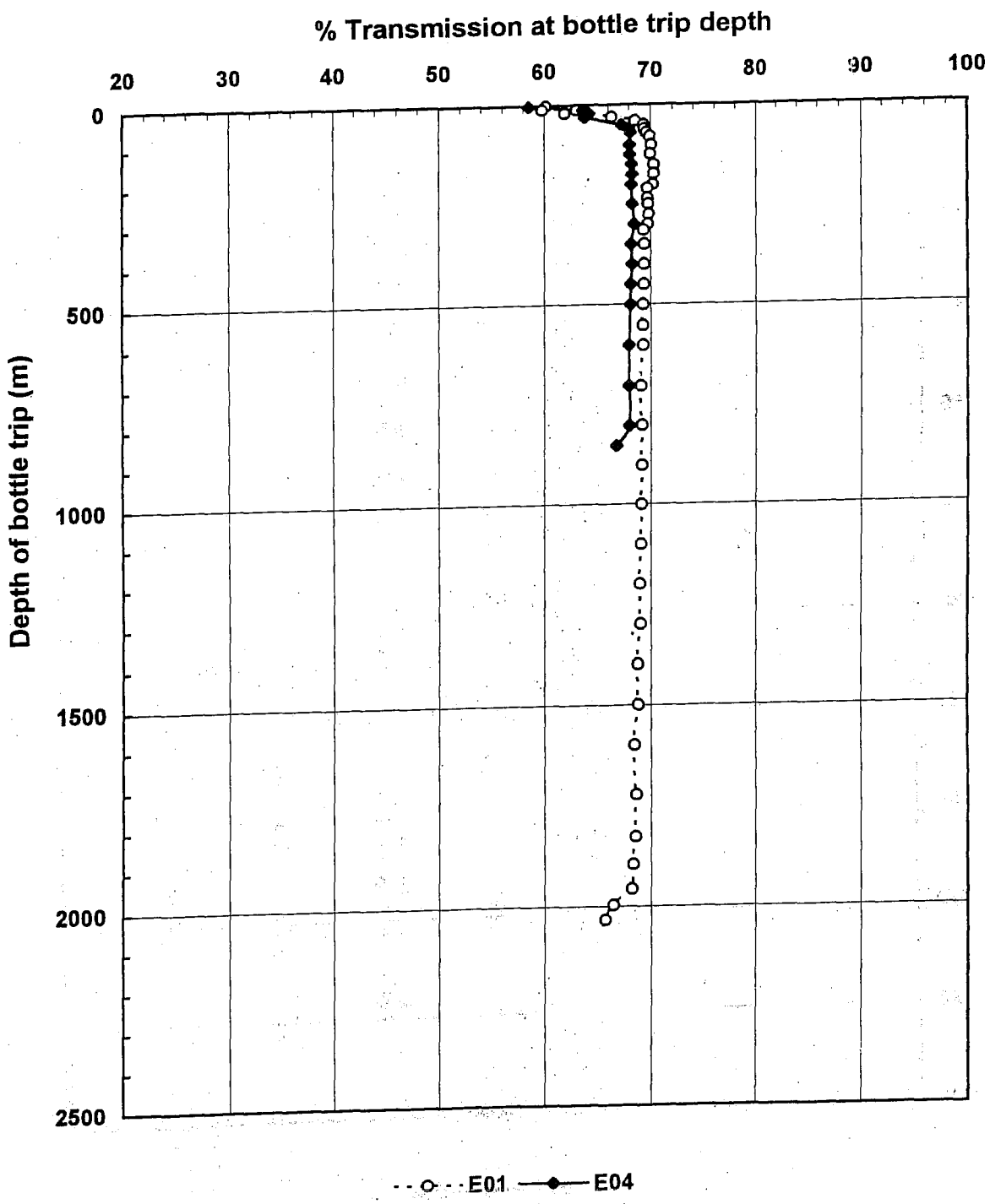
Cruise 9324- Percent Transmission



Cruise 9324- Percent Transmission



Cruise 9324- Percent Transmission

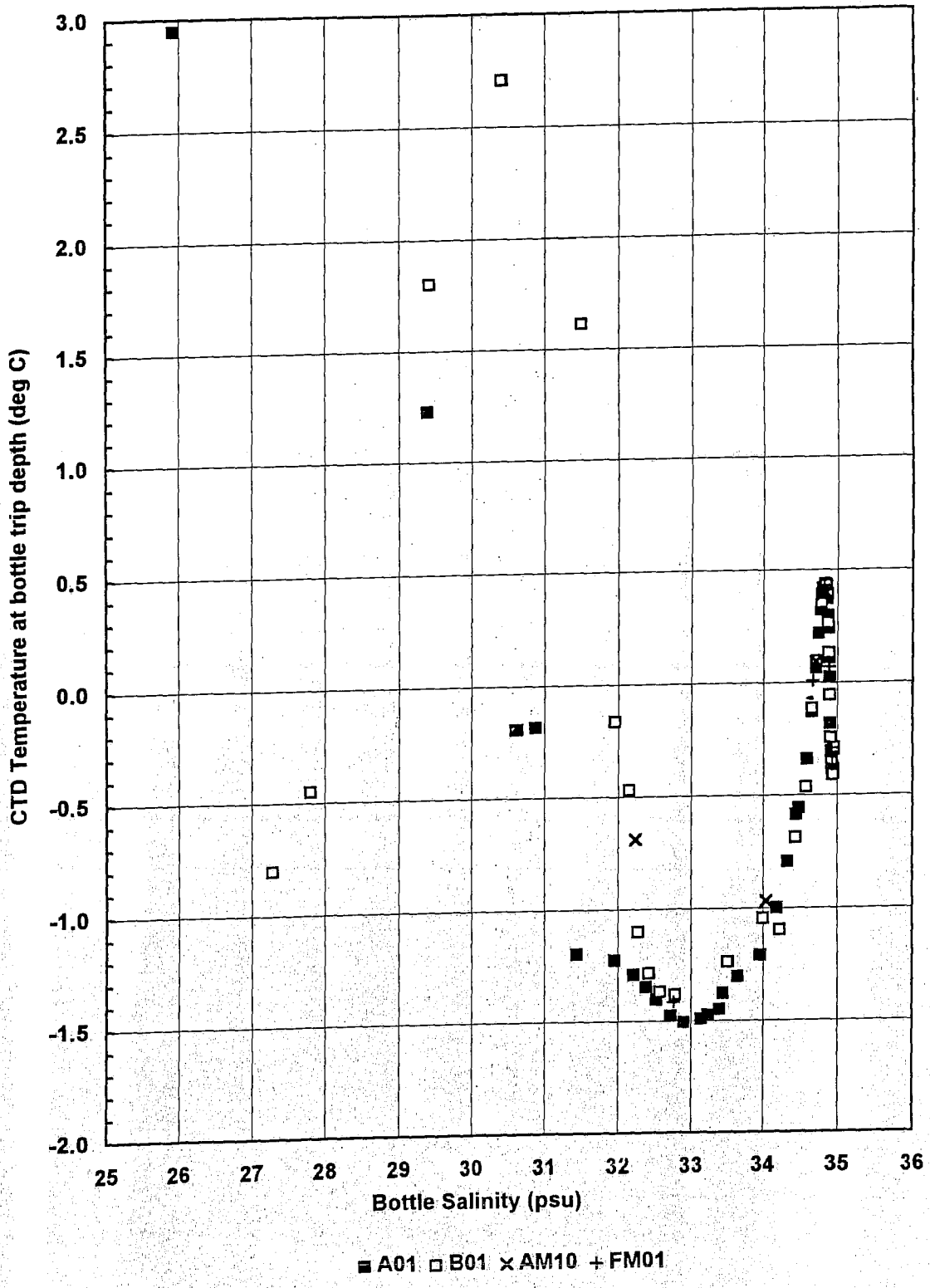


6.4 Chemistry Property / Property Plots

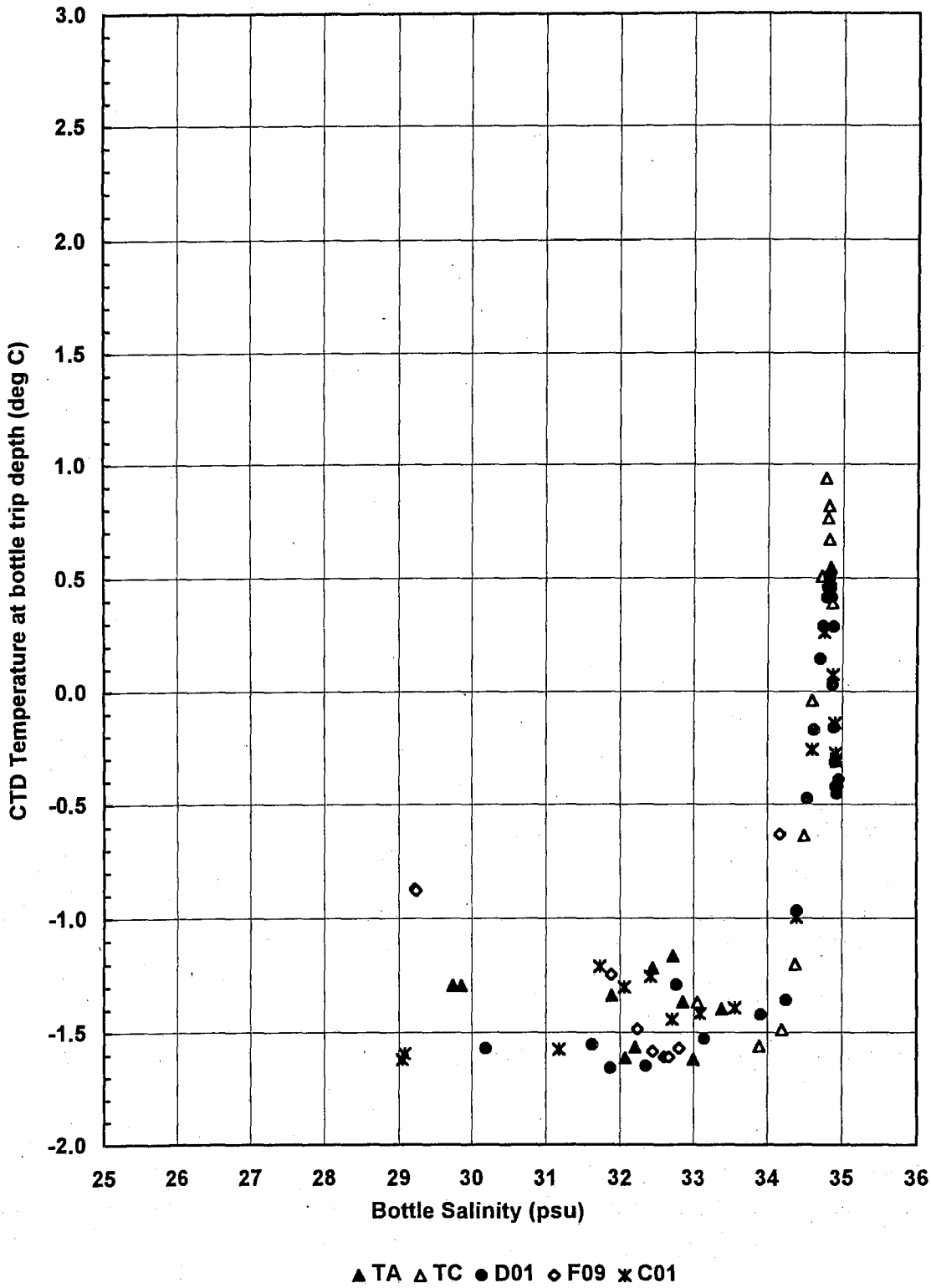
The following Appendix contains property / property plots as follows :

- Temperature - Salinity (TS plots)
- Oxygen - Salinity
- Silicate - Salinity
- Nitrate - Salinity
- Phosphate - Salinity
- Temperature - Oxygen

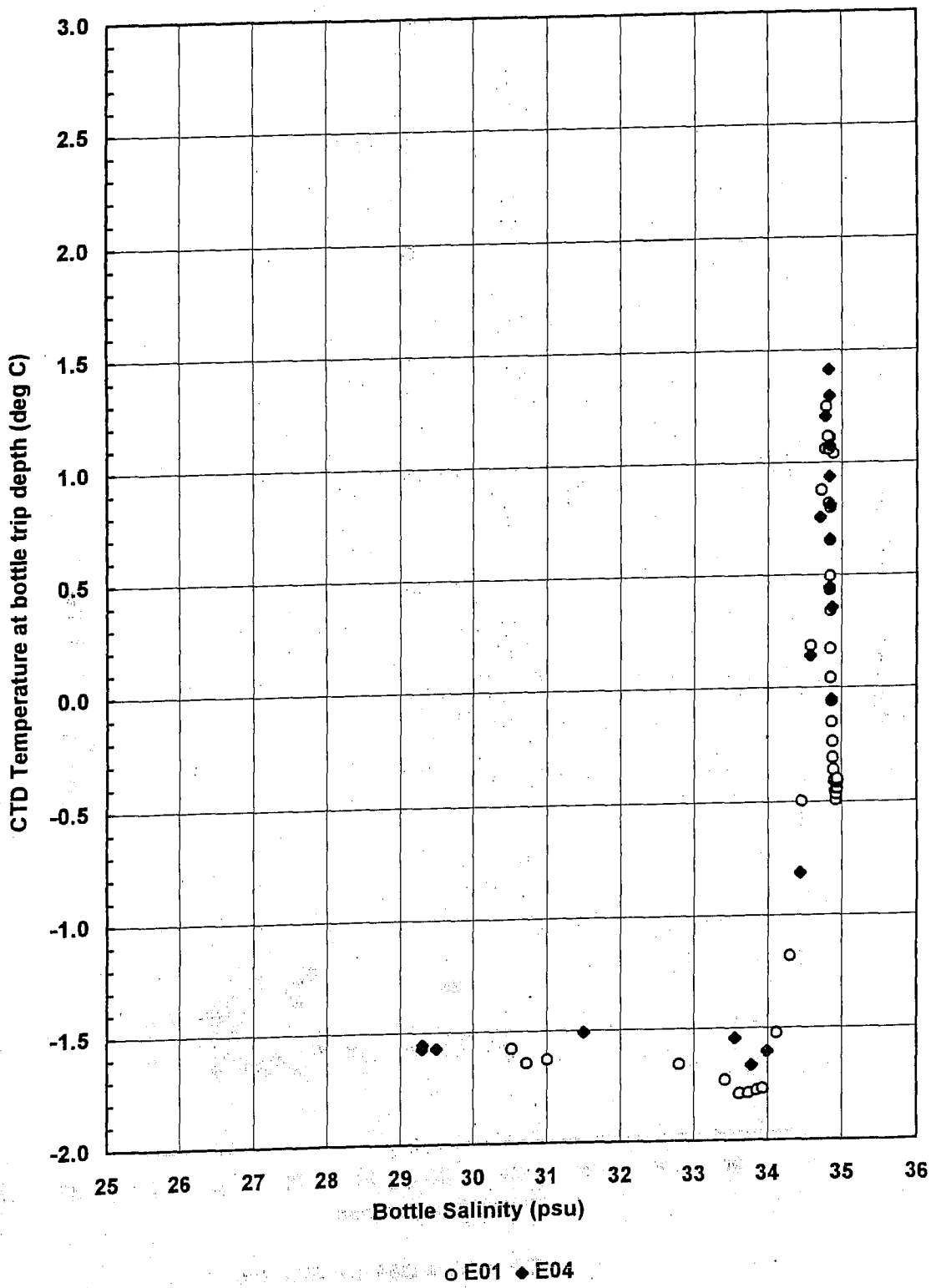
Cruise 9324- TS Plot



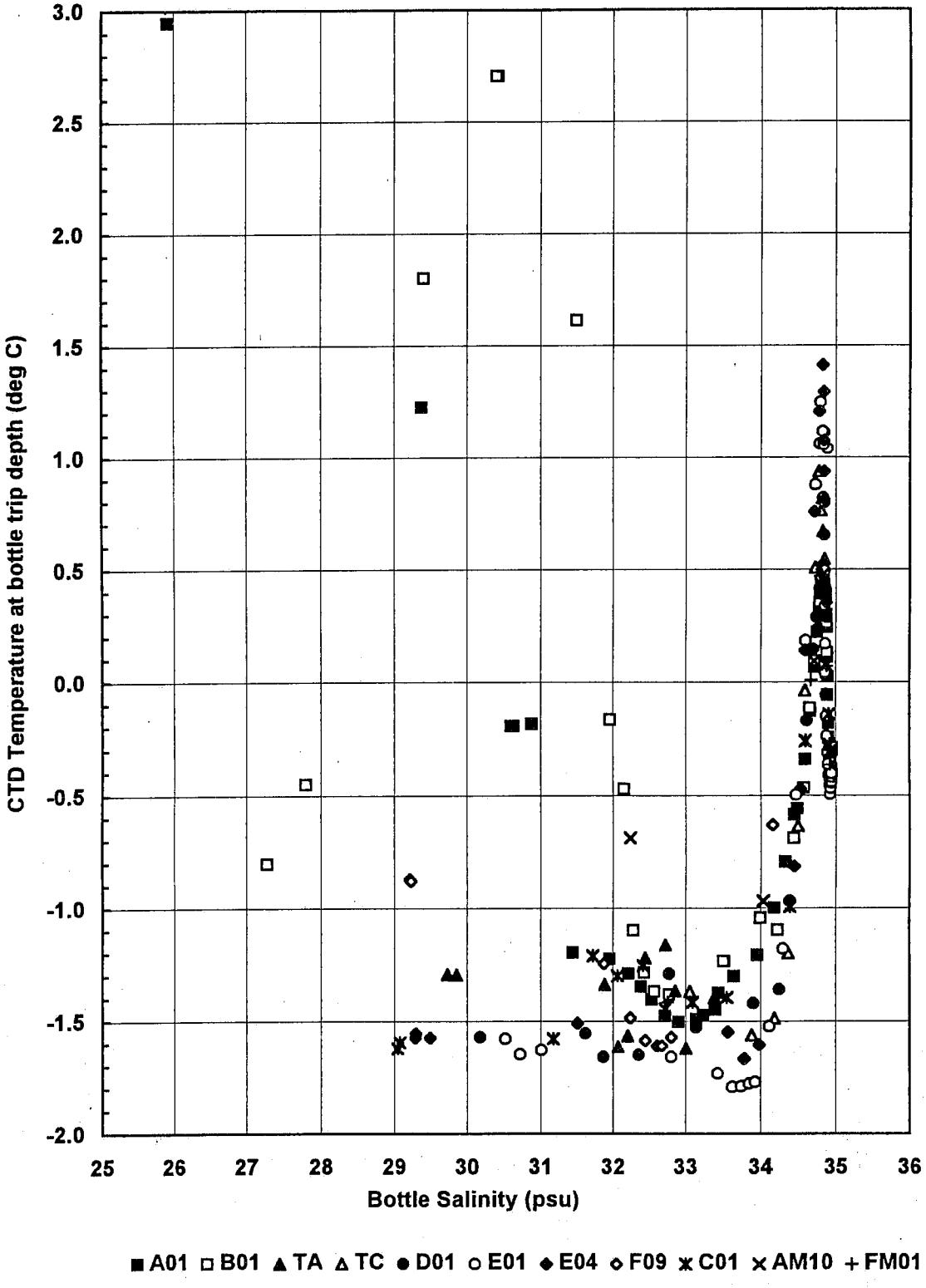
Cruise 9324- TS Plot



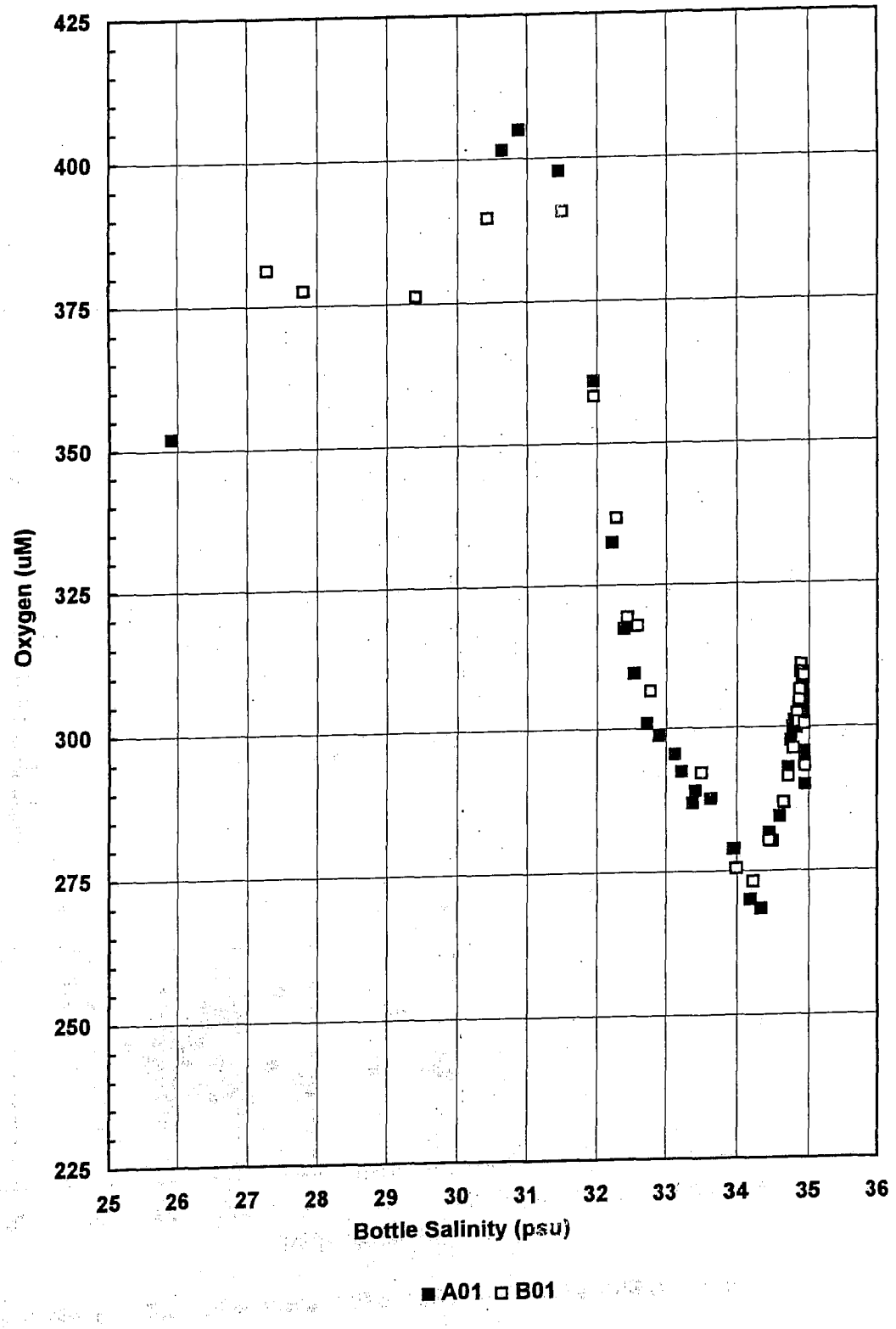
Cruise 9324- TS Plot



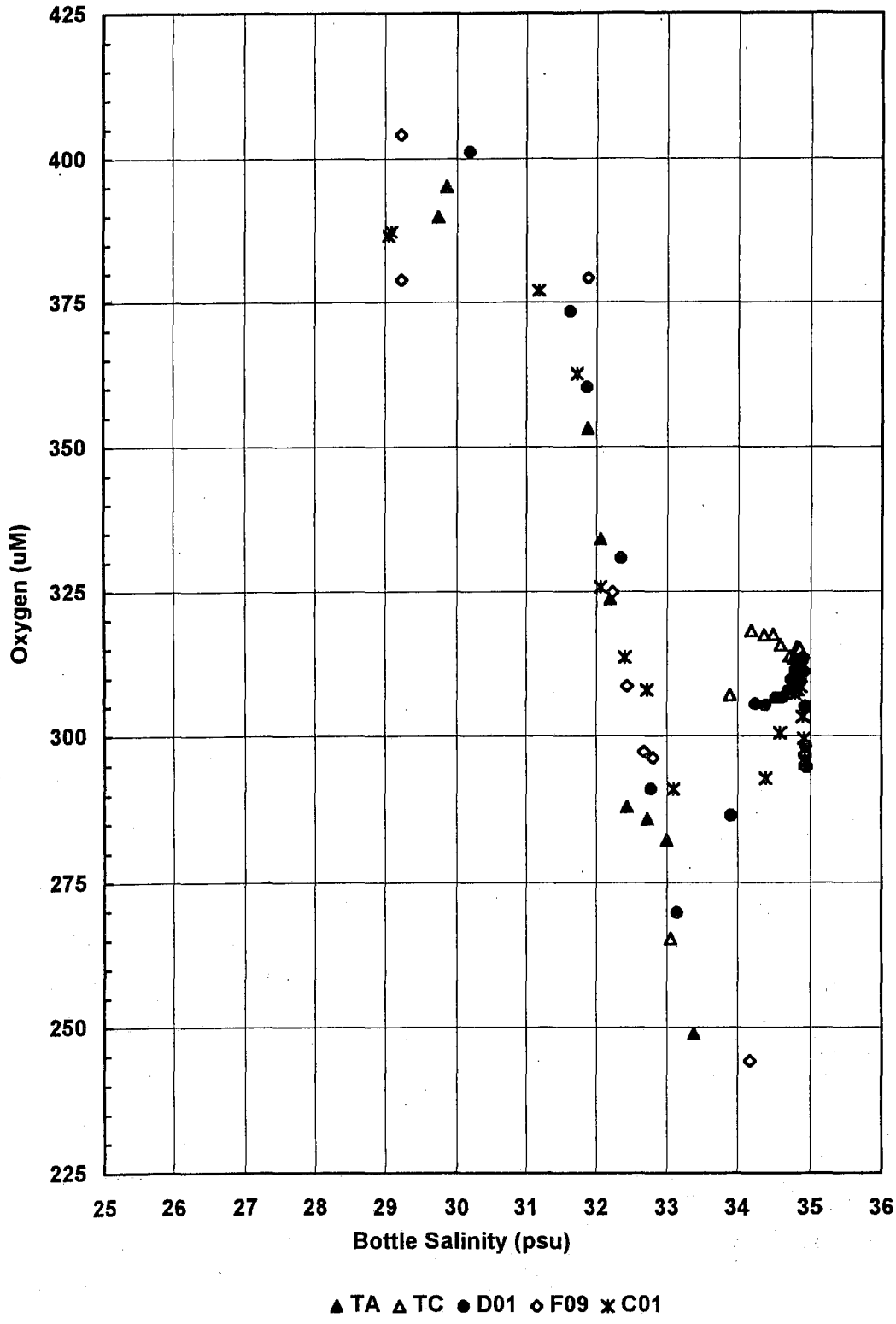
Cruise 9324- TS Plot - All Stations



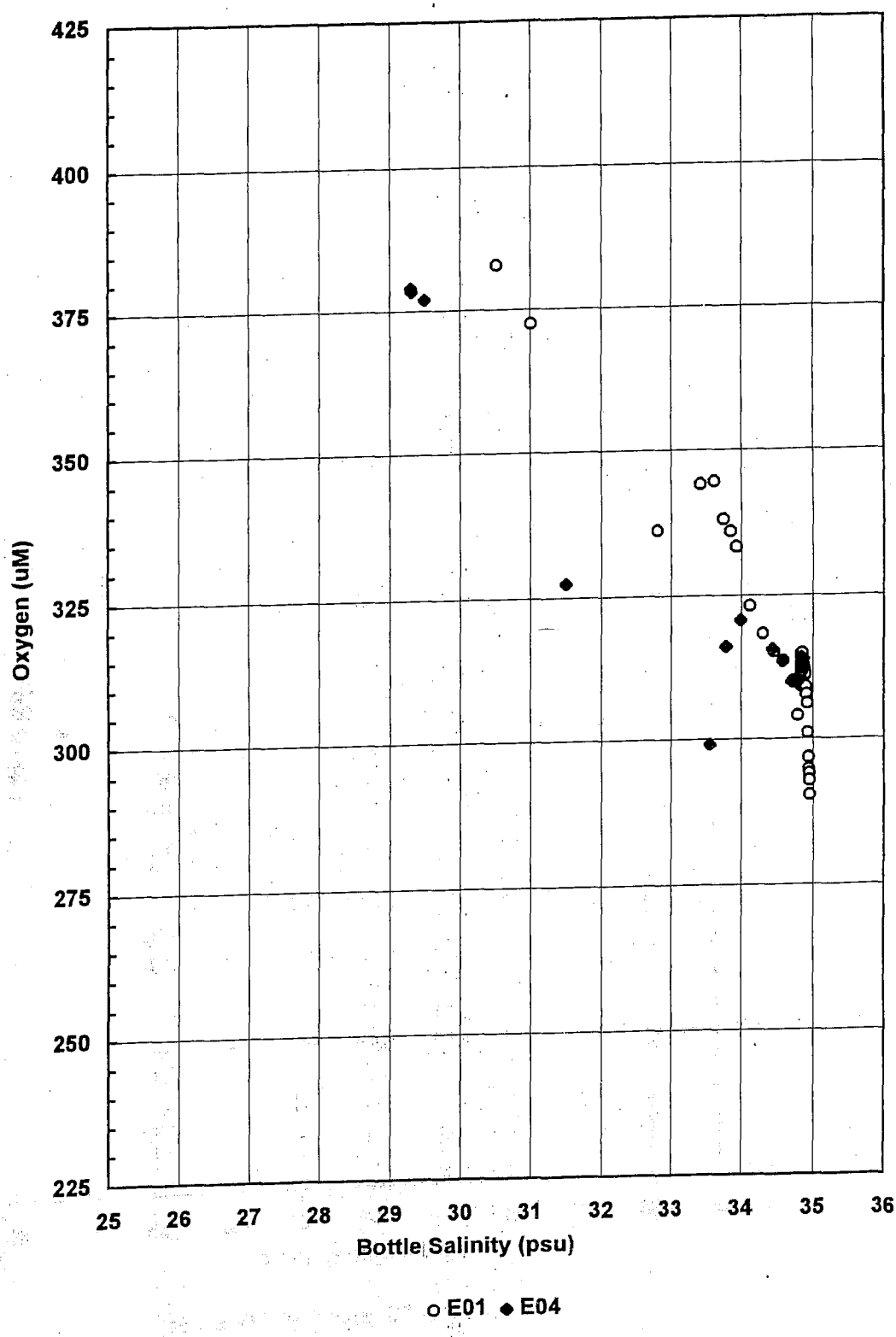
Cruise 9324 : Oxygen - Salinity Plot



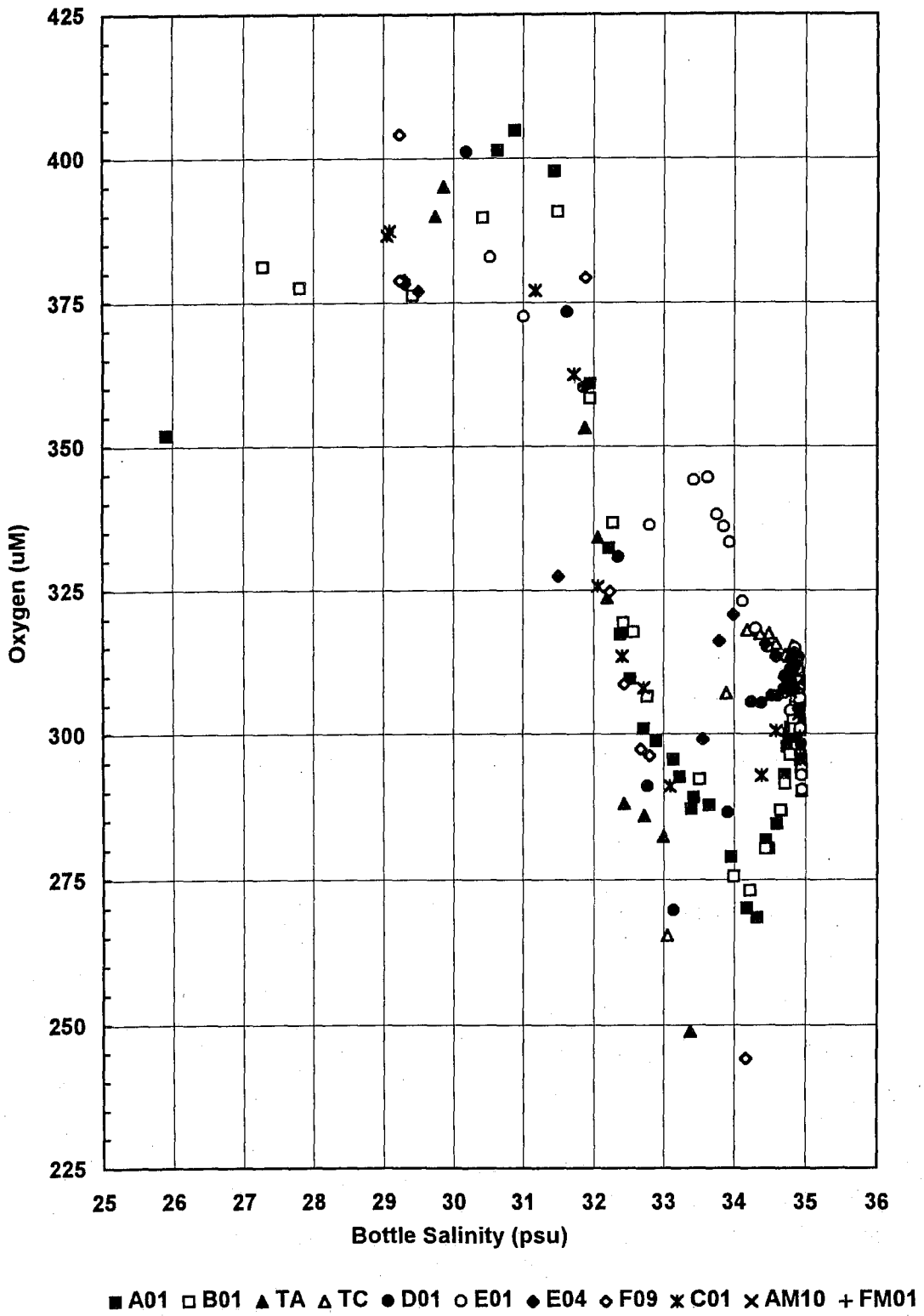
Cruise 9324 : Oxygen - Salinity Plot



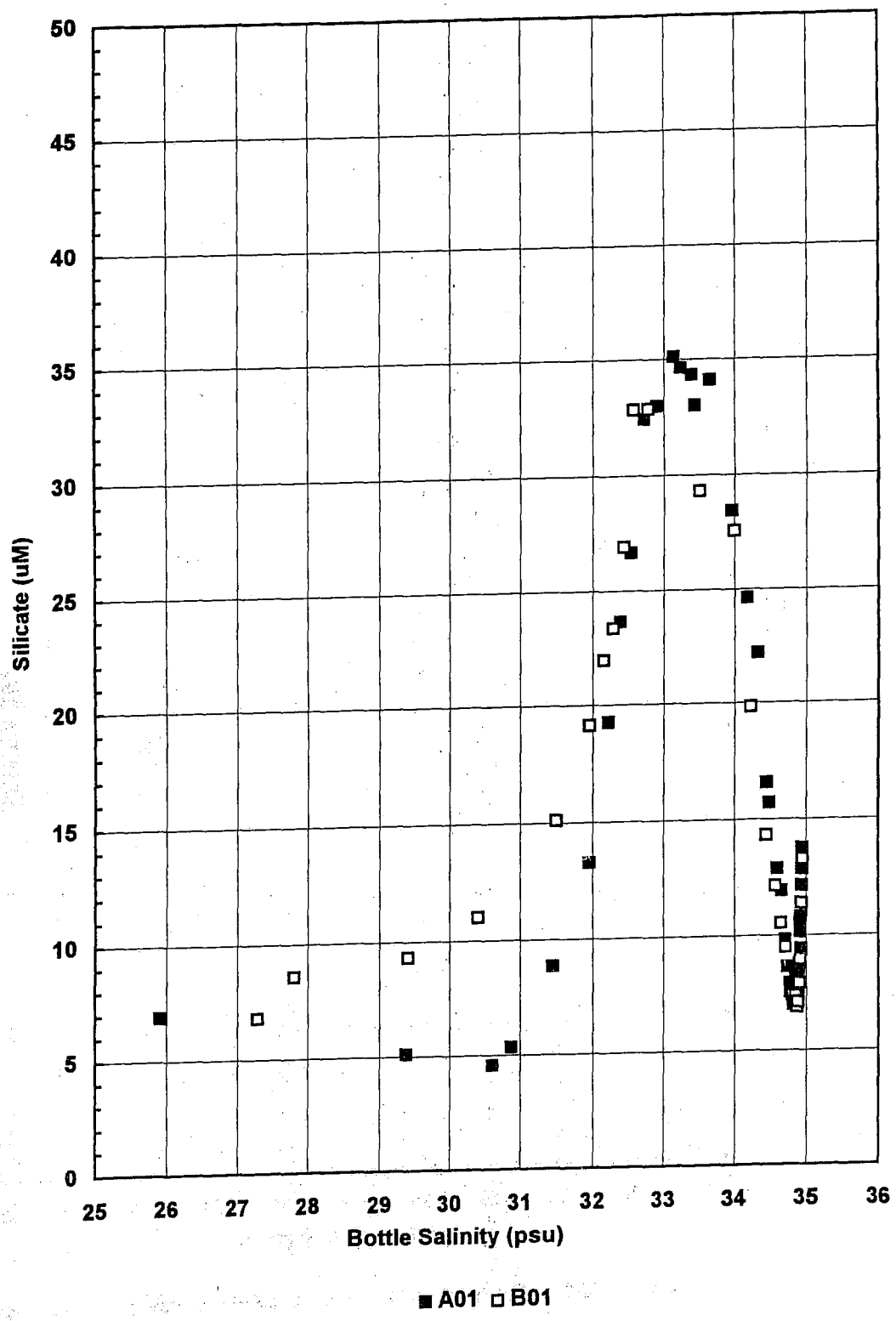
Cruise 9324 : Oxygen - Salinity Plot



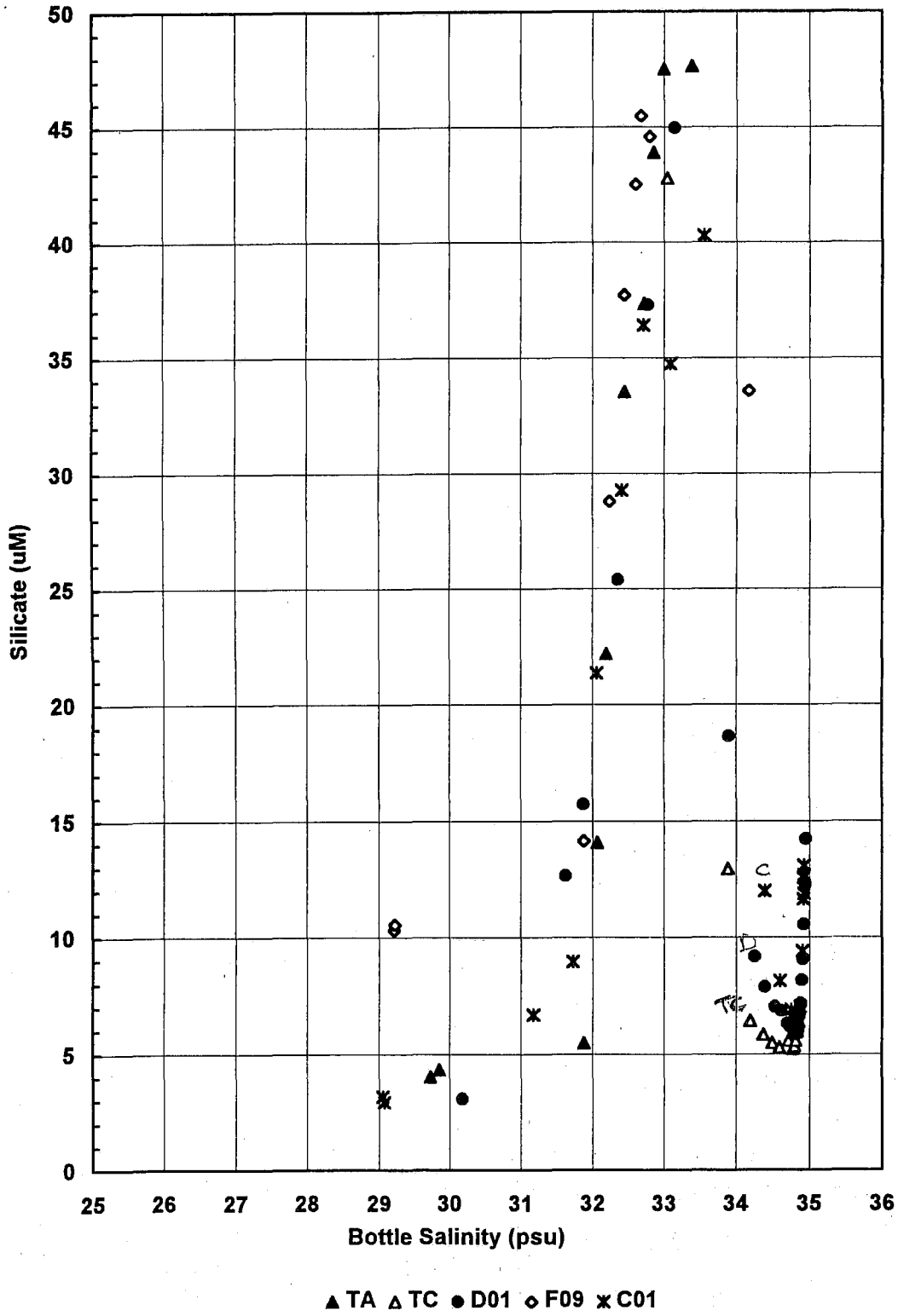
Cruise 9324- Oxygen - Salinity Plot (All Stations)



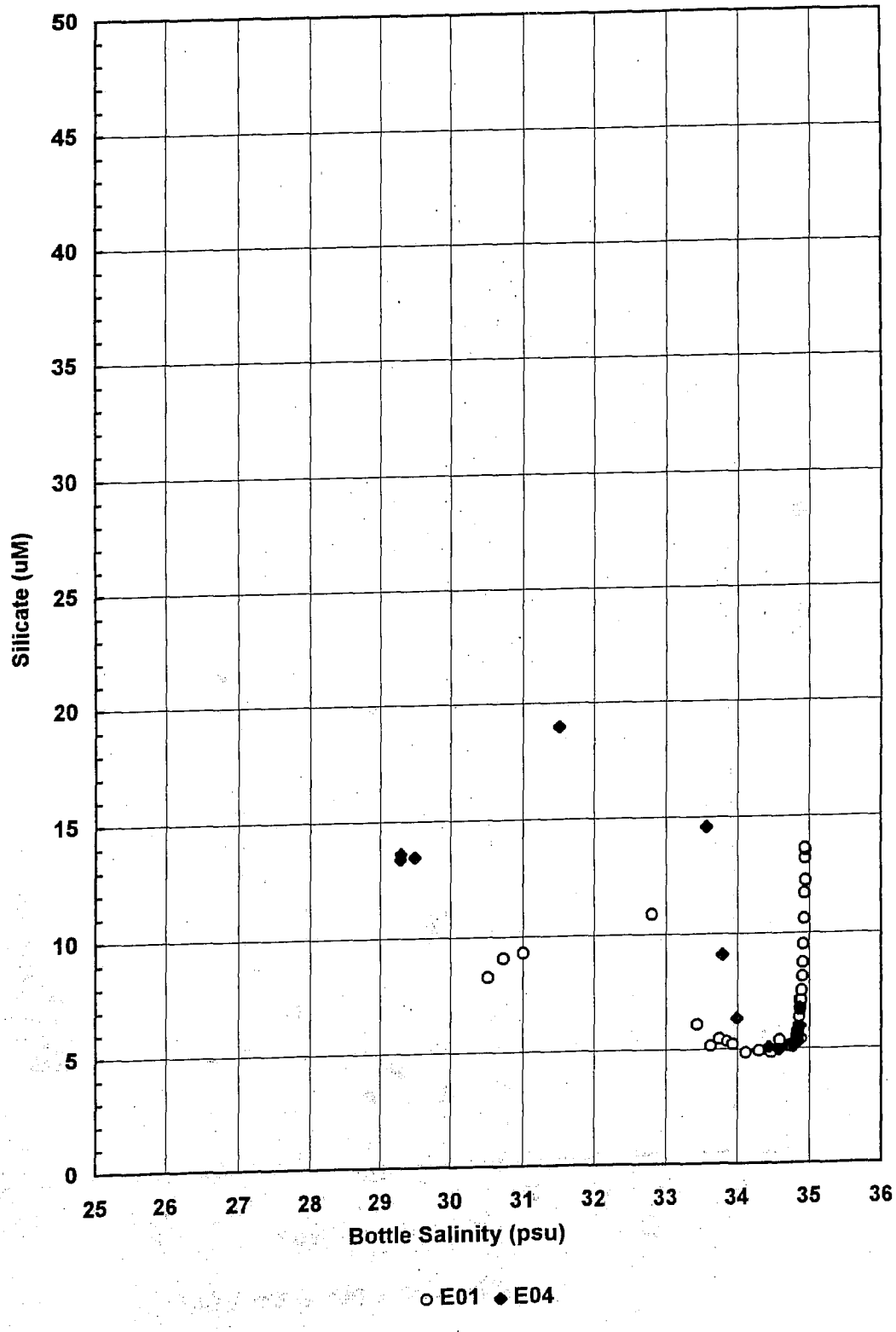
Cruise 9324 : Silicate - Salinity Plot



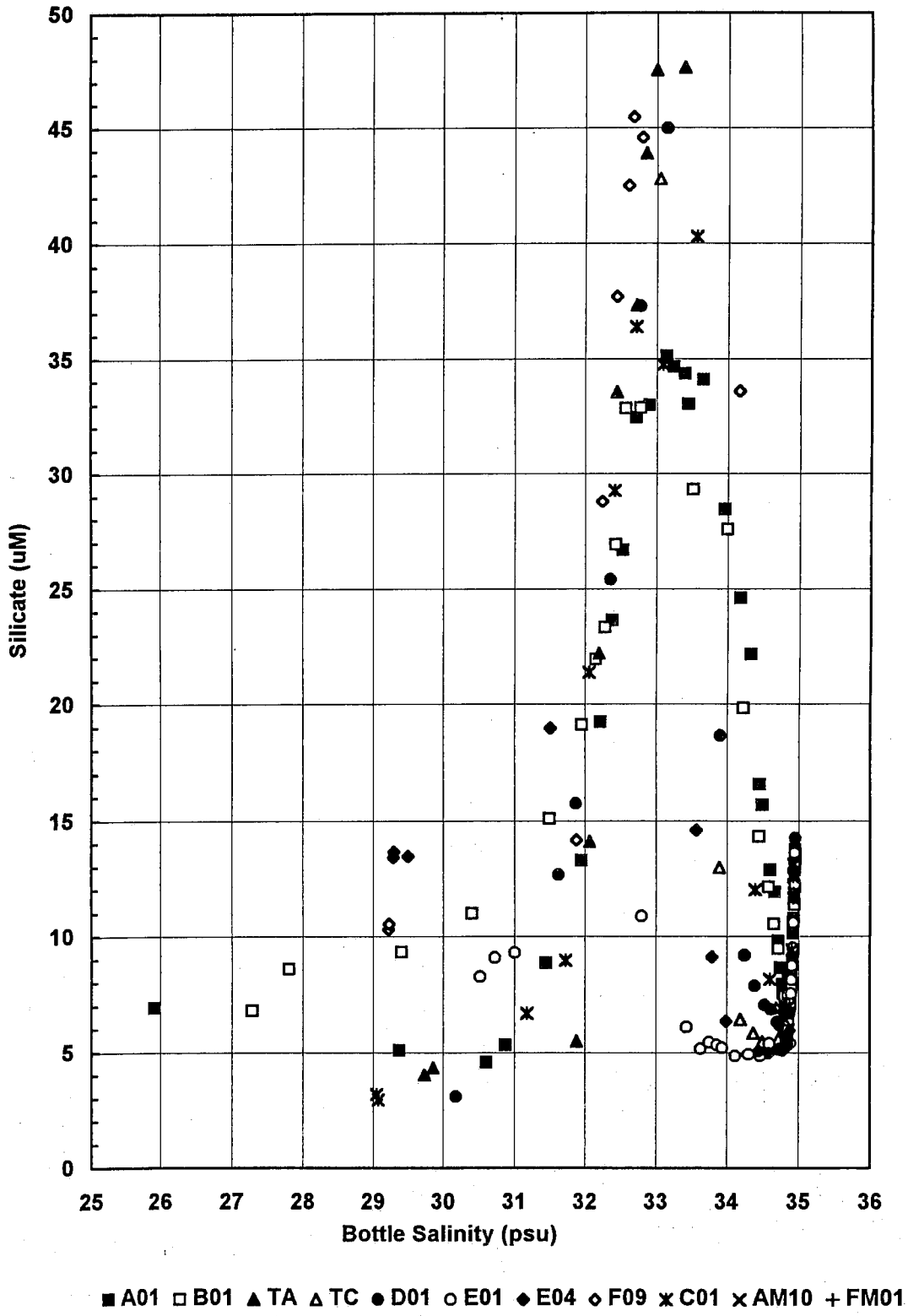
Cruise 9324 : Silicate - Salinity Plot



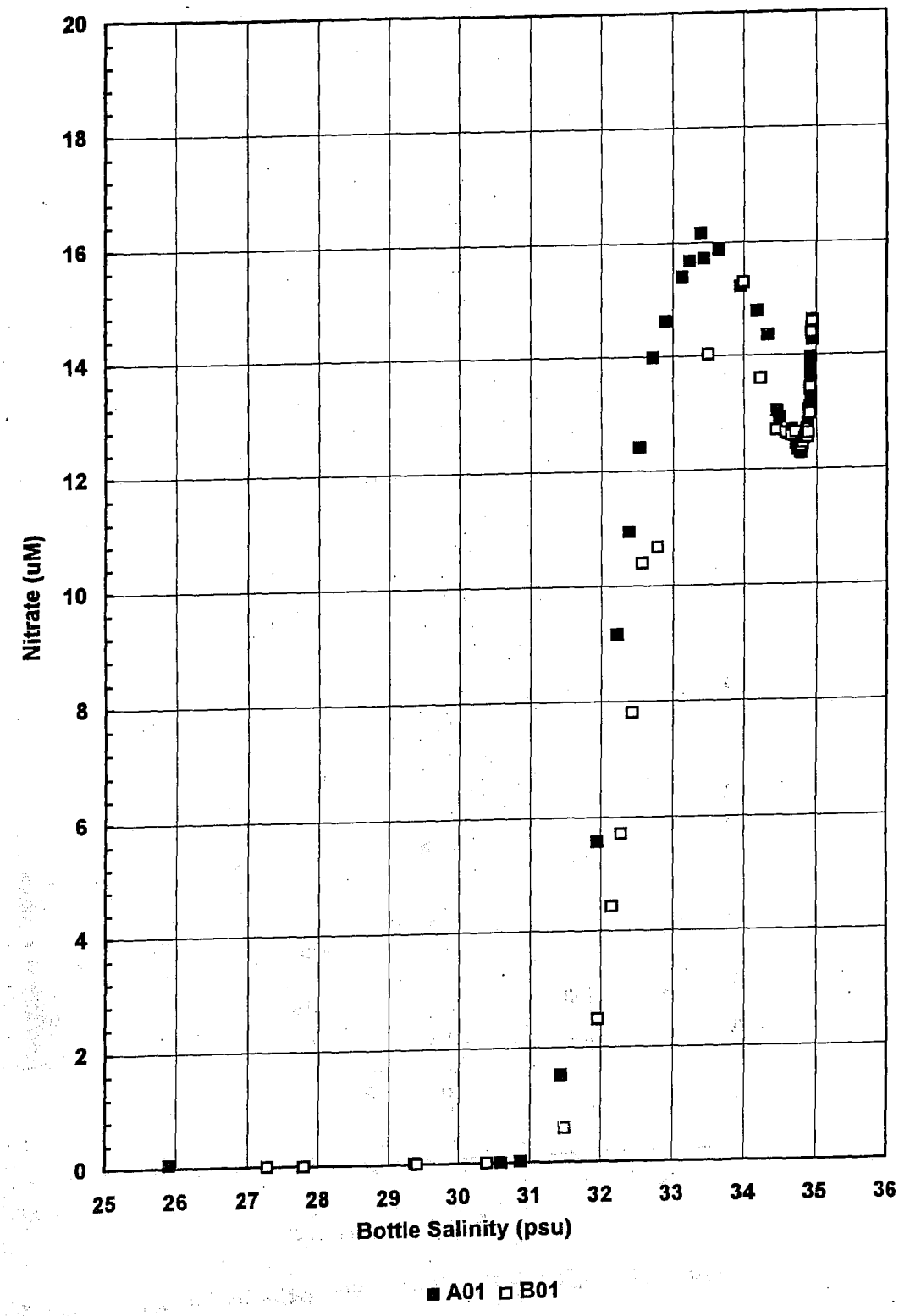
Cruise 9324 : Silicate - Salinity Plot



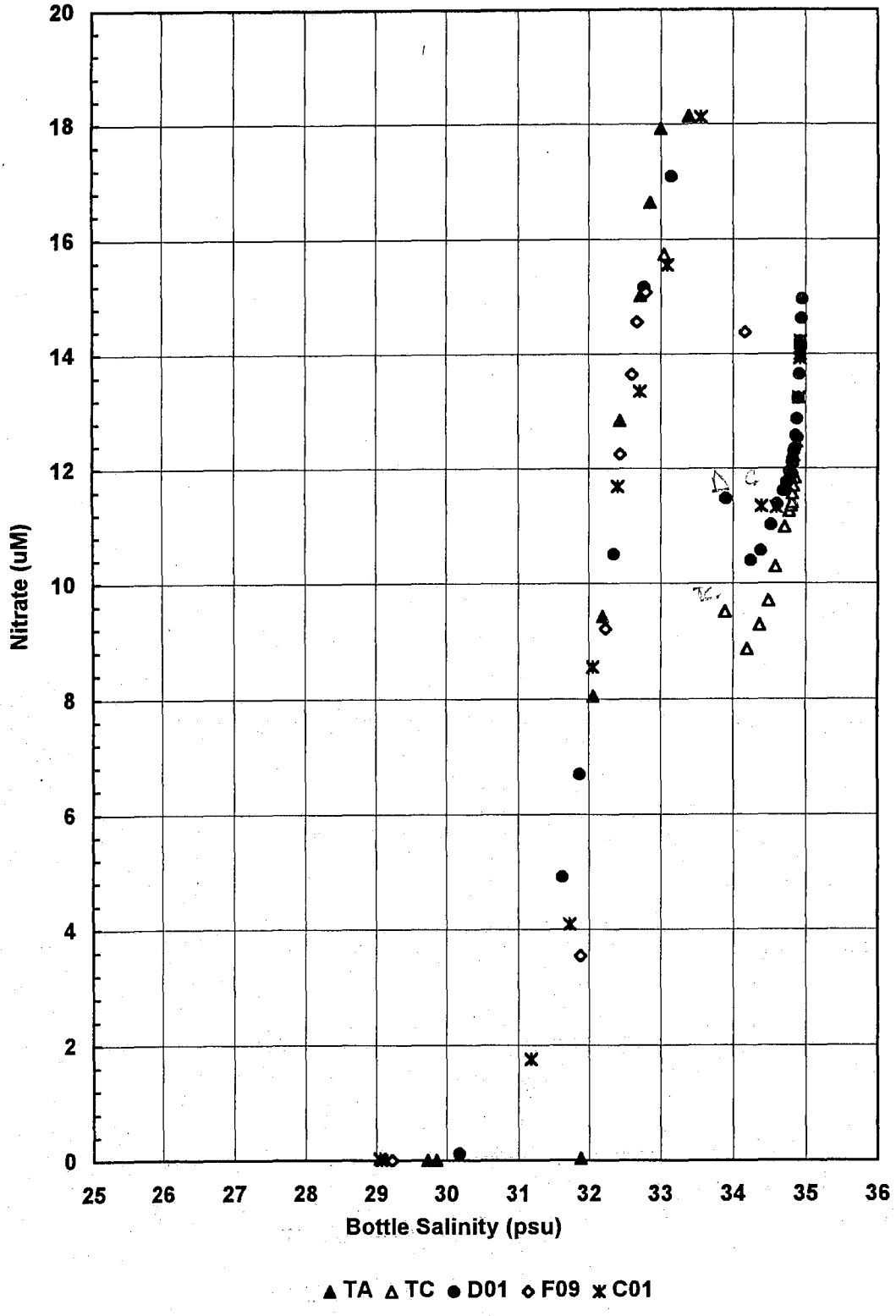
Cruise 9324- Silicate - Salinity Plot (All Stations)



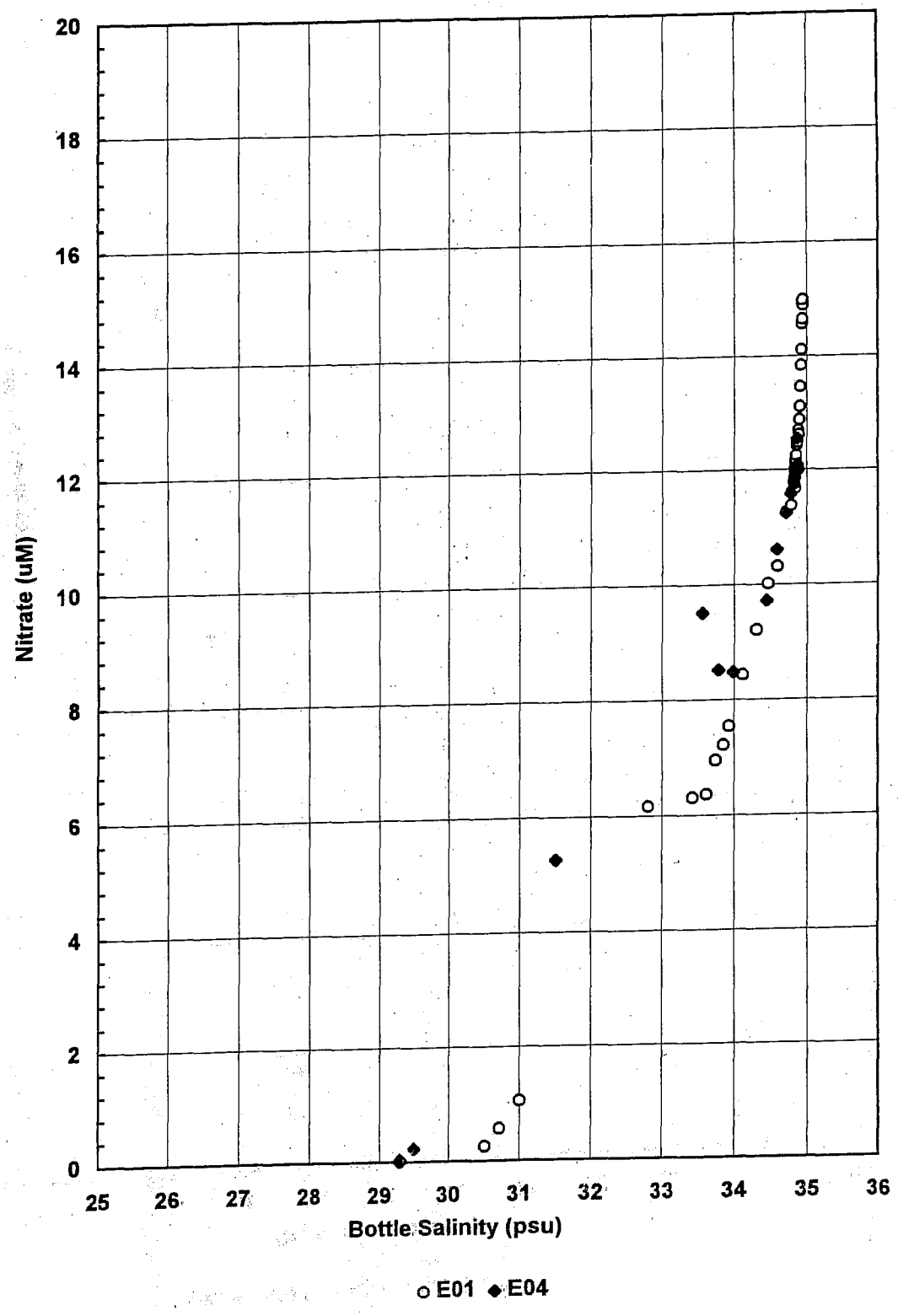
Cruise 9324 : Nitrate - Salinity Plot



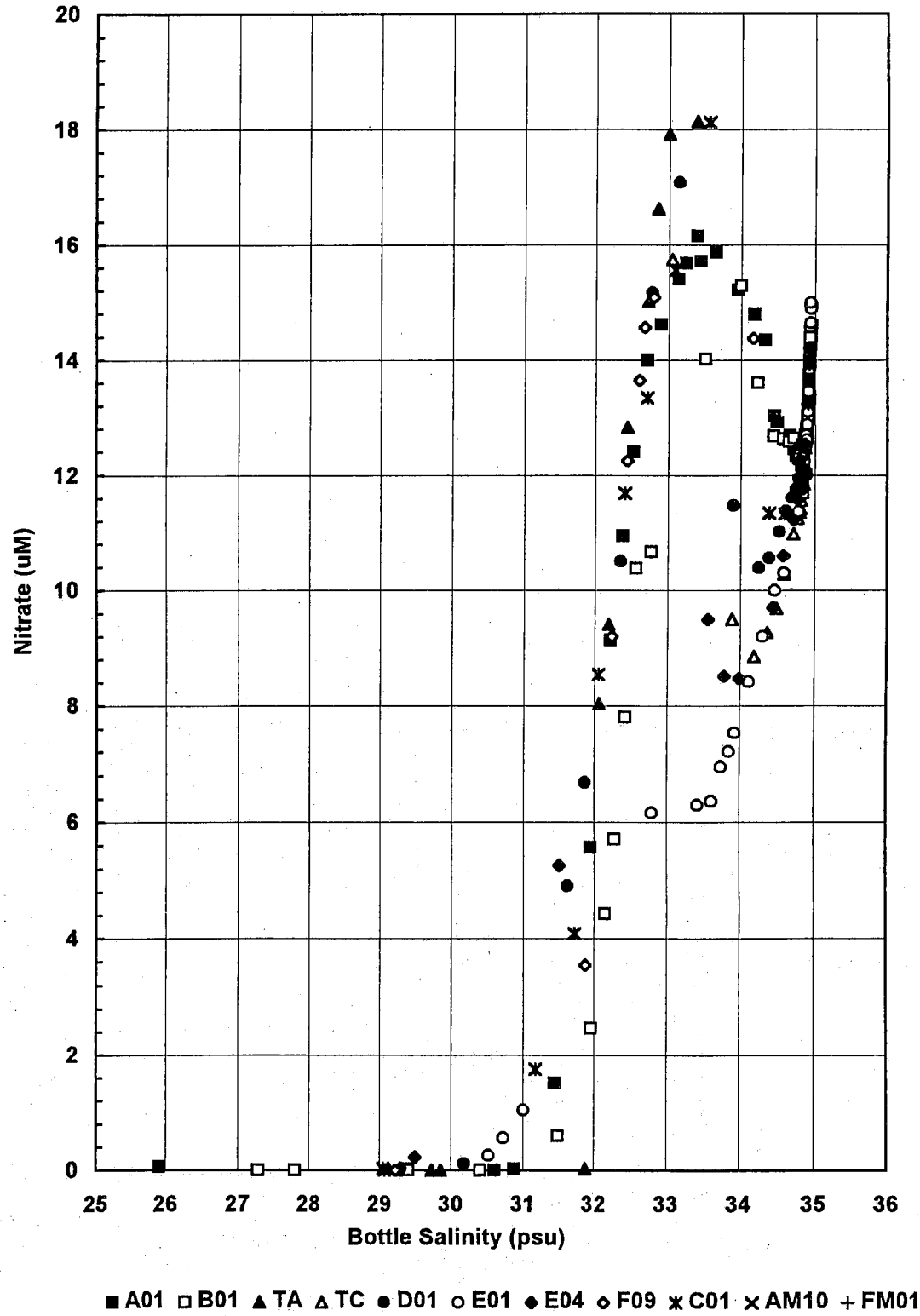
Cruise 9324 : Nitrate - Salinity Plot



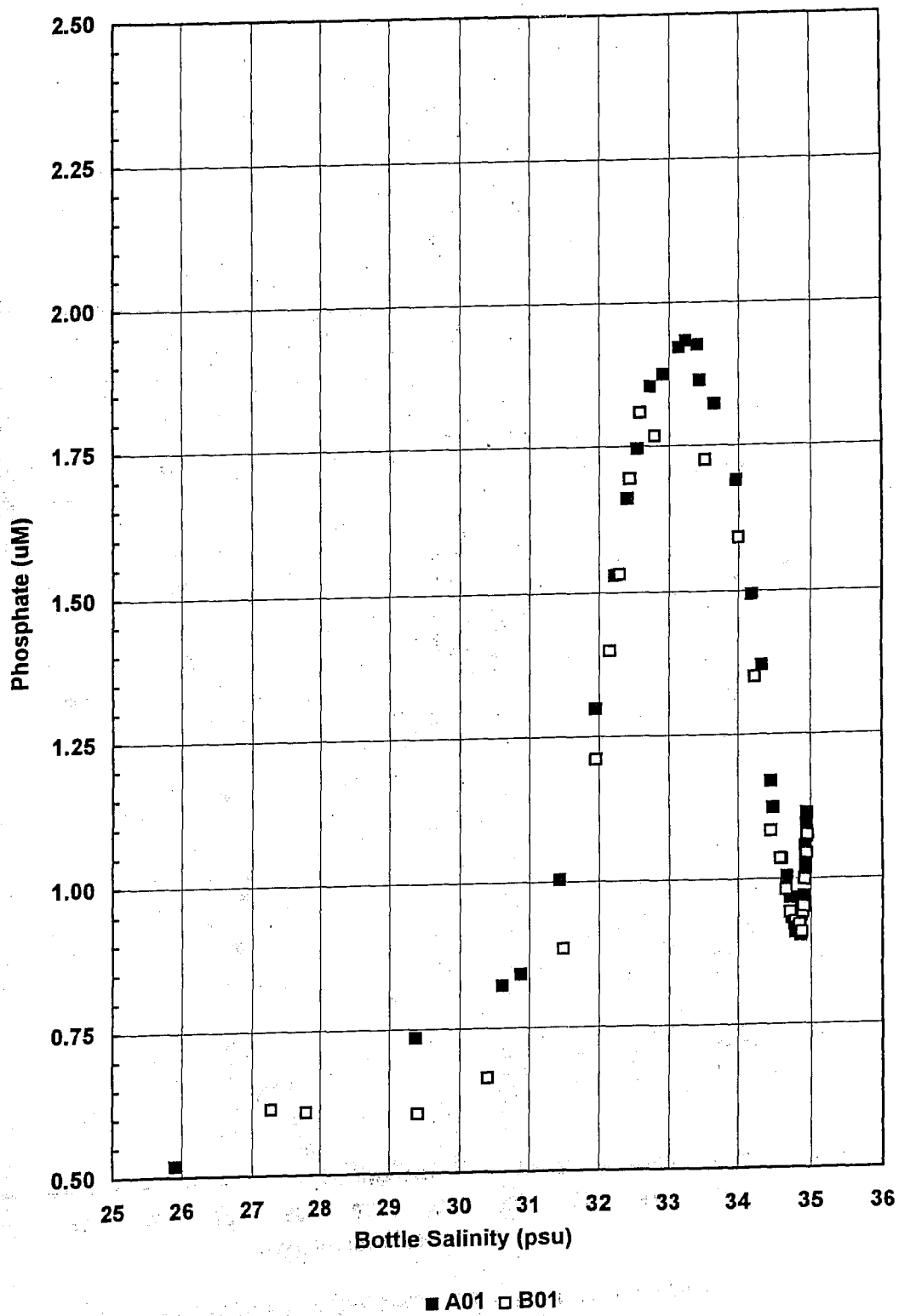
Cruise 9324 : Nitrate - Salinity Plot



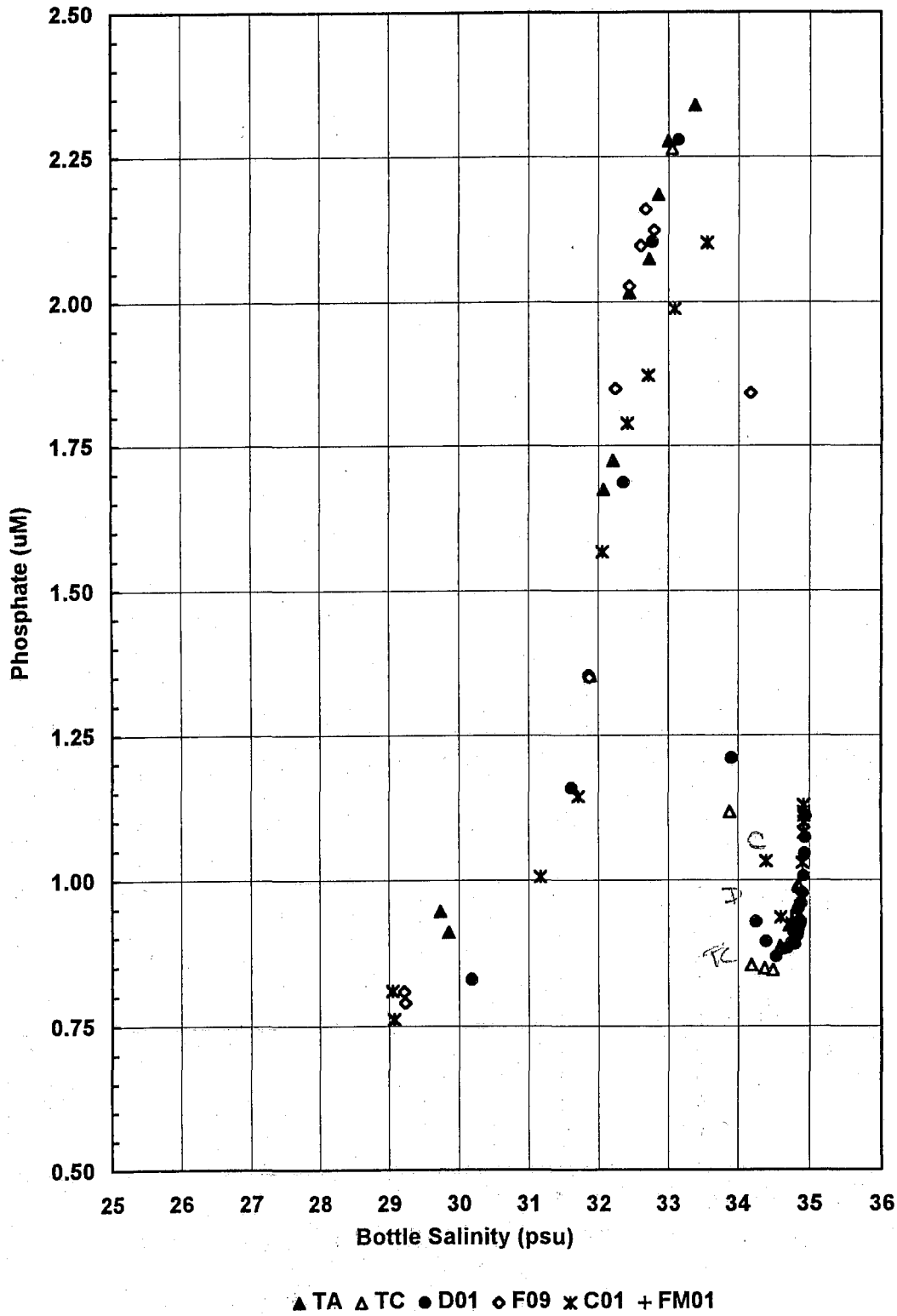
Cruise 9324 - Nitrate - Salinity Plot (All Stations)



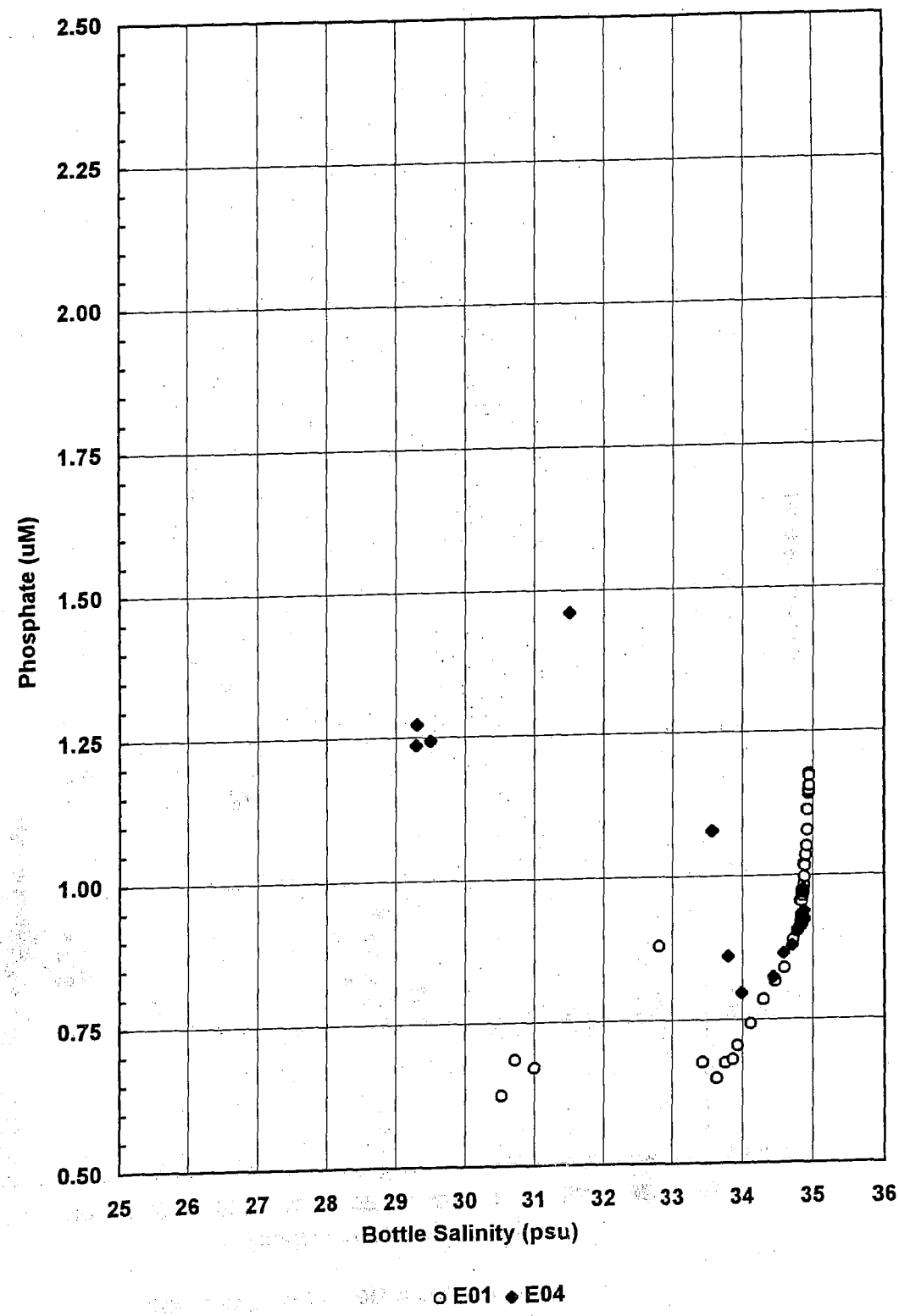
Cruise 9324 : Phosphate- Salinity Plot



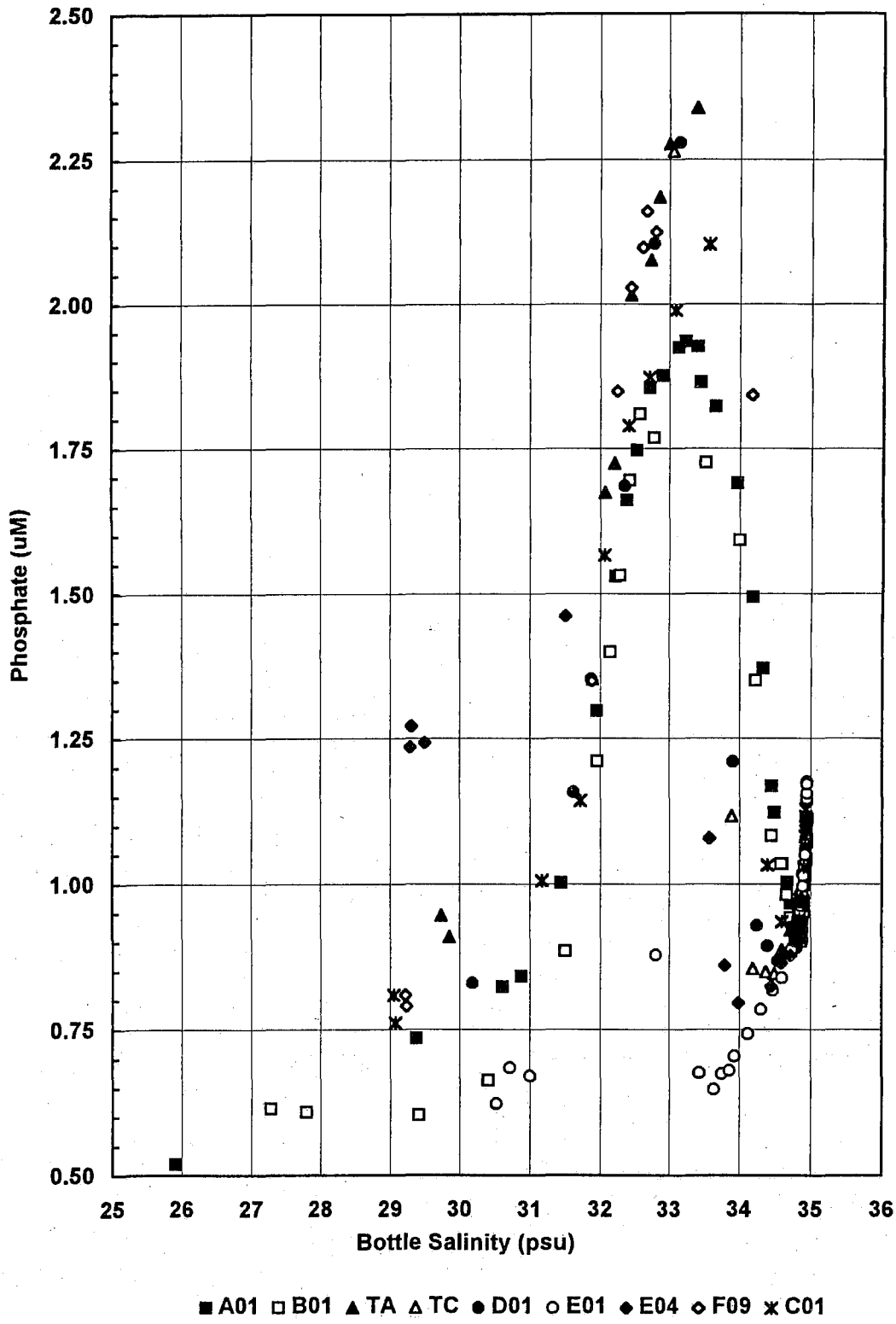
Cruise 9324 : Phosphate- Salinity Plot



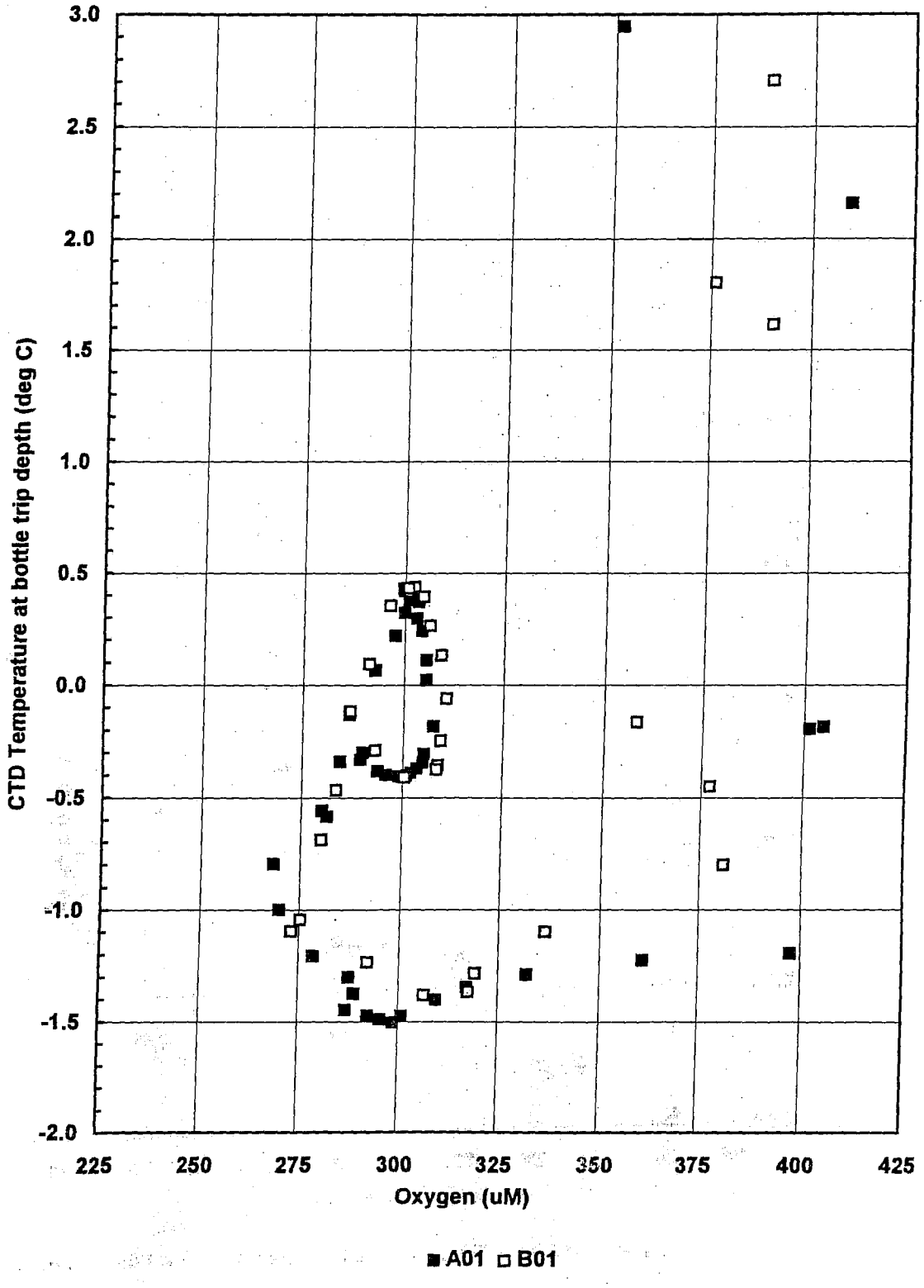
Cruise 9324 : Phosphate- Salinity Plot



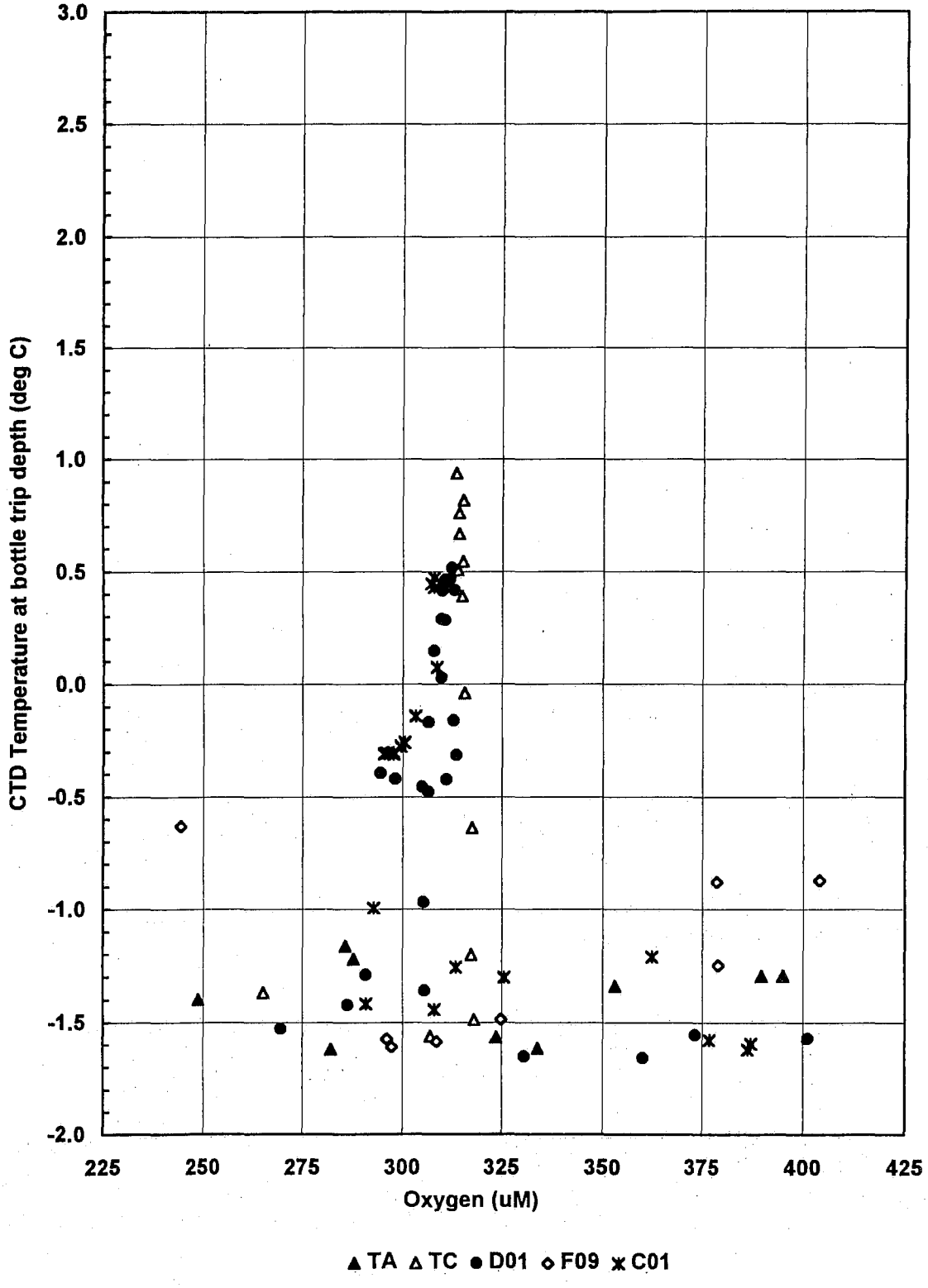
Cruise 9324 - Phosphate- Salinity Plot (All Stations)



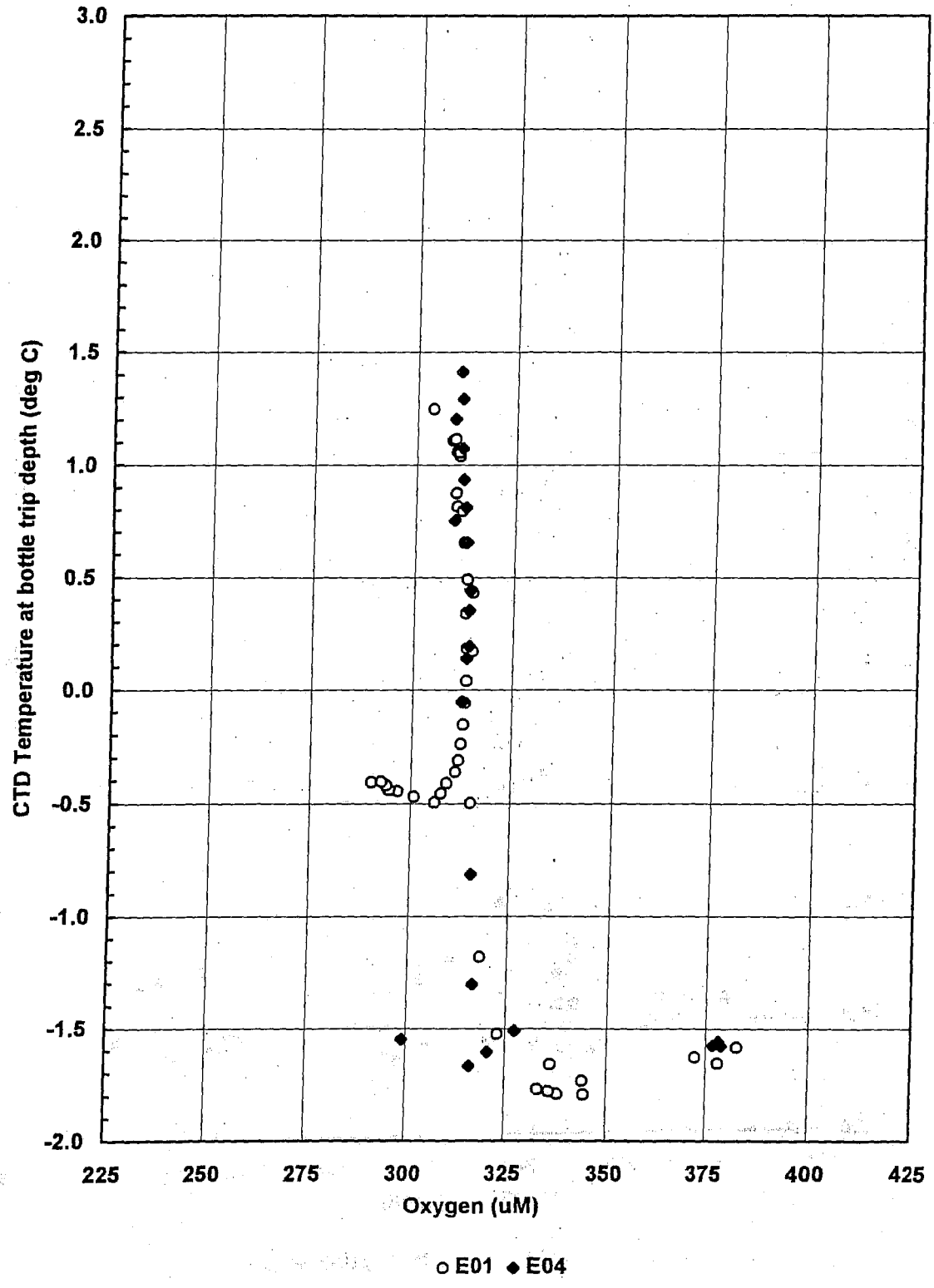
Cruise 9324 : Temperature - Oxygen Plot



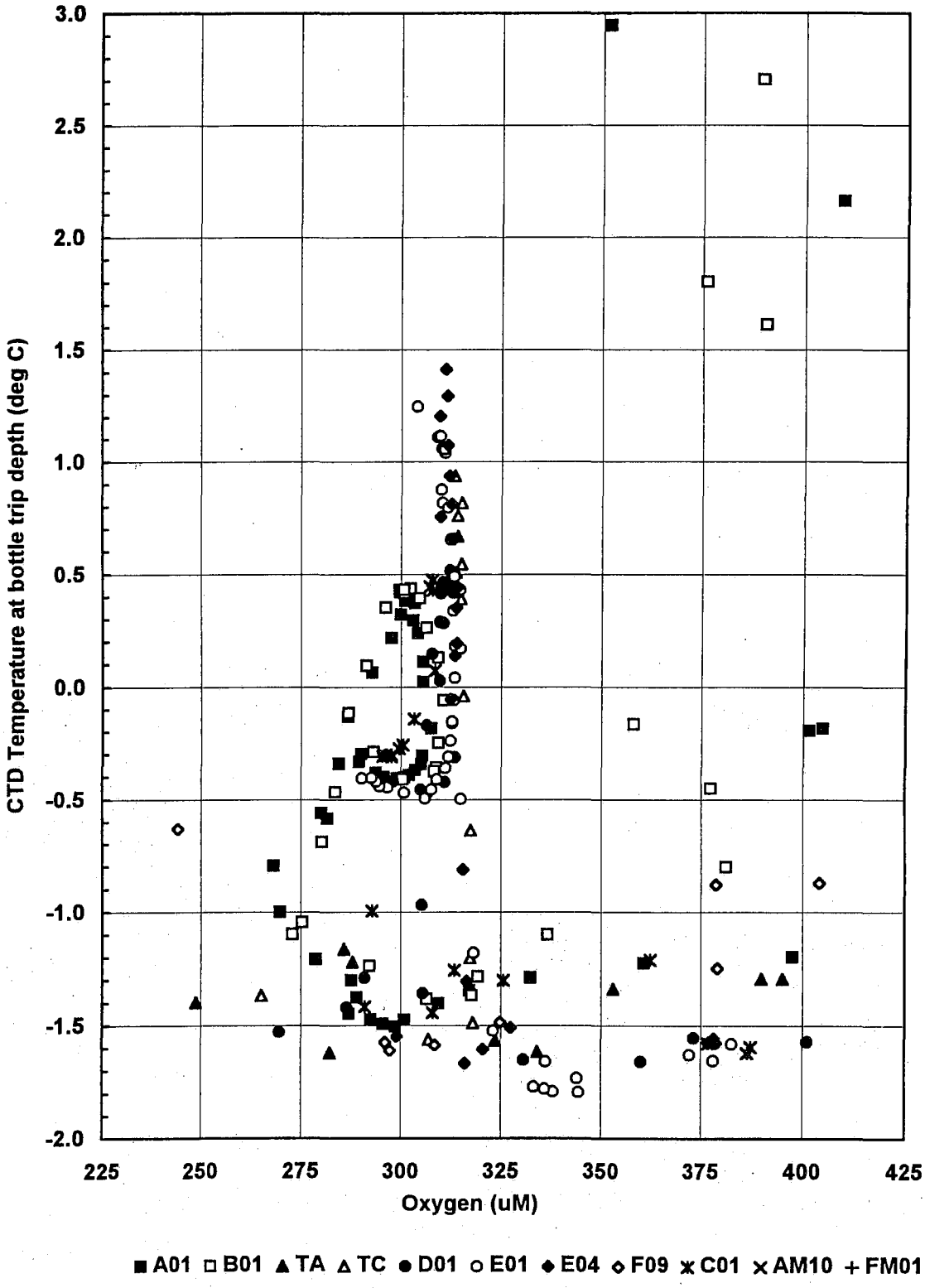
Cruise 9324 : Temperature - Oxygen Plot



Cruise 9324 : Temperature - Oxygen Plot



Cruise 9324 : Temperature - Oxygen Plot (All Stations)



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6.5 Chemistry Tables - Filtration Samples

The following Appendix contains the data tables for the following filtered samples:

- Particulate organic carbon
- Particulate organic nitrogen
- CN ratios
- Total suspended solids
- Extracted chlorophyll a
- Extracted Phaeo-pigments

Also included in the tables is instrument data collected at the bottle trip depth :

- CTD temperature
- Percent transmission (Transmissometer data)
- Nominal chlorophyll a (Fluorometer data)
- Photosynthetically active radiation (PAR sensor)

The letters in the last three columns indicate which bottle the sample was drawn from (see section 2.3).

STATION : A01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
7	8/29/93	15:18	72.534	143.898	3300	182	FSI	1329
8	8/30/93	15:21	72.544	143.821	3300	1601	FSI	1329
9	8/31/93	15:33	72.545	143.842	3300	3361	FSI	1329
10	9/2/93	14:32	72.561	143.805	3300	557	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
118501	7	0	2.0	2.0	41.09	4.93	8.33	191.7	0.125	0.061	2.9464	25.9874	66.88	0.59	85.26	A	A	A
118502	7	10	12.9	13.0	36.64	4.93	7.43	232.6	0.192	0.101	1.2254	27.5026	67.20	0.60	20.34	A	A	A
118504	7	30	32.7	32.9	14.48	1.51	9.61	94.6	0.130	0.075	-0.1861	30.9222	70.50	0.49	4.81	A	A	A
118505	7	40	42.6	42.9	11.42	1.42	8.03	150.1	0.099	0.070	-1.1970	31.3545	67.99	0.88	2.53	A	A	A
118506	7	50	52.6	52.9	66.95	9.38	7.13	51.0	0.046	0.060	-1.2258	31.9586	71.47	0.41	2.40	A	A	A
118508	7	70	72.4	72.9	10.50	0.50	21.11	73.0	0.017	0.014	-1.3474	32.3532	72.06	0.27	1.47	A	A	A
118517	8	190	190.2	191.8					0.002	0.009	-1.2088	33.8121	71.04	0.22		A		A
118521	8	230	229.7	231.8					0.002	0.013	-0.5596	34.4608	70.66	0.20		A		A
118525	8	325	323.6	326.7					0.002	0.019	0.2177	34.7460	70.75	0.18				
118550	9	400	397.6	401.6	6.45	0.36	18.01	63.2			0.4136	34.8057						
118551	9	500	496.4	501.6	7.00	0.30	22.94	158.0			0.4195	34.8397						
118556	9	1000	989.0	1001.1	4.62	0.23	20.29	141.3			0.0181	34.8955				A		
118549	9	3360	3299.1	3359.2	4.22	0.00	43.52	100.2			-0.2998	34.9572				A	A	
F1	10	0	2.0		11.17	1.27	8.80	48.3	0.055	0.024						A	A	
F2	10	10	12.2	12.2	19.79	2.61	7.58	75.1	0.121	0.064	0.3693	26.7572	67.10	0.25		A	A	
F3	10	30	31.7	31.9	17.64	1.35	13.07	72.1	0.078	0.045	-1.2822	30.6167	71.28	0.29		A	A	
F6	10	100	102.4	103.2	8.97	0.78	11.55	42.5	0.010	0.019	-1.4281	32.7017	71.63	0.21				A
F12	10	250	253.1	255.4	5.33	0.44	12.25	77.9	0.005	0.025	-0.3789	34.5574	70.66	0.19		A	A	A

STATION : B01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
15	9/8/93	21:47	72.568	152.359	3300	3486	FSI	1329
16	9/9/93	15:16	72.537	152.452	3300	178	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
118572	16	0	2.0	2.0	41.51	7.26	5.71	142.8	0.185	0.094	-0.8025	27.0732	65.79	0.53	13.85	B*	A	A
118573	16	10	12.2	12.3					0.403	0.113	-0.4514	27.4974	62.41	0.79	4.44			
118574	16	20	22.3	22.4	57.68	9.54	6.05	265.6	0.391	0.156	1.8007	28.9266	58.17	1.19	1.99	A*	B	B
118575	16	30	31.8	32.0	61.28	10.07	6.08	377.1	0.563	0.211	2.7042	30.1041	61.11	1.41	0.91	B+A*	A	A
118576	16	40	42.3	42.5					0.432	0.156	1.6121	31.2411	62.12	1.03	1.26			
118577	16	50	52.0	52.3					0.162	0.101	-0.1666	31.9561	63.30	0.54	0.77			
118578	16	60	61.6	62.0					0.101	0.094	-0.4722	32.1169	62.91	0.45	1.17			
118579	16	70	72.0	72.5					0.078	0.104	-1.1001	32.2852	60.72	0.66	1.25			
118580	16	80	81.5	82.1	28.40	5.11	5.55	159.2	0.094	0.128	-1.2853	32.4084	59.18	0.44	1.52	+A*	B	A
118581	16	100	101.8	102.6					0.051	0.097	-1.3684	32.5826	60.43	0.37	1.63			
118582	16	125	127.1	128.1					0.047	0.107	-1.3831	32.6851	59.83	0.44	1.83			
118583	16	150	152.2	153.4	19.14	3.00	6.37	165.1	0.028	0.068	-1.2368	33.4146	64.04	0.32	0.43	A+B*	B	B
118584	16	175	178.0	179.5					0.014	0.028	-1.0459	33.9860	68.78	0.25	1.36			
118587	15	250	252.1	254.4	3.99	0.73	5.44	48.5	0.005	0.020	-0.4673	34.5039					A	A
118569	15	2000	1999.4	2029.3	2.90	0.38	7.56	21.4			-0.4116	34.9249				A	A	
118571	15	3423	3418.9	3482.1	5.33	0.50	10.75	27.2			-0.2896	34.9360				A+B	B	

STATION : C01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
99	9/23/93	16:24	75.000	162.009	1965	1940		

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
123136	99	0	2.0	2.0					0.183	0.150	-1.6210	25.6106	64.90	0.42				
123137	99	10	12.4	12.5					0.111	0.108	-1.5954	29.0347	68.35	0.49				
123138	99	20	21.8	21.9					0.403	0.402	-1.5776	29.1057	69.06	0.48				
123139	99	30	31.8	32.0					0.701	0.155	-1.2114	31.5134	64.91	1.97				
123140	99	50	51.5	51.9					0.111	0.085	-1.3010	32.0706	70.15	0.45				
123141	99	75	76.8	77.4					0.025	0.041	-1.2561	32.3836	70.30	0.30				
123142	99	100	102.0	102.8					0.012	0.026	-1.4445	32.6582	69.91	0.27				
123144	99	150	152.1	153.4					0.009	0.028	-1.3946	33.4825	70.60	0.25				
123145	99	200	202.2	204.0					0.009	0.033	-0.9956	34.3758	71.26	0.22				

STATION : D01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
65	9/14/93	18:26	76.505	173.922	2187	2186	FSI	1329
67	9/15/93	2:27	76.588	174.049	2187	500	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
118641	67	0	2.0	2.0					0.265	0.220	-1.5724	30.1710	89.69	0.78				
118642	67	20	21.8	22.0					0.241	0.113	-1.5556	30.7600	89.52	0.97				
118643	67	40	41.0	41.3					0.170	0.052	-1.6589	31.7900	91.25	0.73				
118644	67	60	61.6	62.1					0.101	0.041	-1.6507	32.1700	91.37	0.47				
118645	67	80	81.1	81.8					0.047	0.031	-1.2906	32.7320	91.62	0.33				
118646	67	100	101.9	102.8					0.024	0.036	-1.5294	33.1500	91.69	0.32				
118621	65	150	150.6	152.0					0.011	0.021	-1.3591	34.2176		0.25				
118623	65	200	202.3	204.2					0.019	0.033	-0.4763	34.5270		0.22				
118625	65	250	252.4	254.9					0.006	0.021	0.1448	34.7055		0.20				
118627	65	300	303.4	306.5					0.009	0.018	0.4126	34.7833		0.20				

STATION : E01
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
74	9/17/93	16:19	78.782	176.050	2067	200	FSI	1329
79	9/18/93	3:35	78.799	176.099	2067	400	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
118652	74	0	2.0	2.0	43.62	7.32	5.96	187.2	0.447	0.164	-1.5797	30.6213	60.25	1.13				
118668	79	10	11.5	11.6					0.338	0.161	-1.6468	30.5312	63.13	0.97				
118654	74	20	20.8	21.0	32.30	5.72	5.65	126.9	0.351	0.186	-1.6282	30.6082	62.01	1.02				
118655	74	30	31.1	31.3	18.89	2.77	6.82	61.3	0.107	0.073	-1.6597	32.2715	66.37	0.49				
118669	79	30	31.6	31.8					0.078	0.060	-1.6690	32.4044	66.50	0.54				
118656	74	40	41.3	41.6	10.45	1.83	5.72	39.7			-1.7323	33.3051	68.62	0.33				
118657	74	50	51.1	51.5					0.037	0.051	-1.7931	33.5535	69.39	0.30				
118670	79	50	51.7	52.1					0.032	0.039	-1.7765	33.5474	68.96	0.30				
118659	74	70	71.8	72.4					0.020	0.020	-1.7794	33.8021	69.67	0.27				
118671	79	70	71.9	72.5	9.35	1.46	6.39	26.6			-1.7782	33.8011	69.09	0.28			B	
118663	74	150	152.4	153.9					0.004	0.011	-0.4976	34.4697	70.33	0.20				
118674	79	150	152.0	153.5					0.007	0.019	-0.6359	34.4126	69.53	0.22				
118665	74	200	202.7	204.8					0.008	0.012	0.8761	34.7316	70.26	0.19				
118678	79	250	252.2	254.8	5.63	0.70	8.01	76.9			1.1103	34.7987	69.78	0.20			C	
118651	73	500			14.44	0.87	16.56	138.0										
118667	77	1000			24.93	1.99	12.50	20.3										
118666	75	1500			6.78	0.32	20.92	12.5										
118650	71	2000			5.65	0.52	10.93	122.0										

STATION : E04
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
84	9/19/93	14:57	76.959	174.147	870	852	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
123102	84	0	2.0	2.0					0.127	0.097	-1.5561	29.2910	58.60	0.56				
123103	84	10	11.8	11.9					0.128	0.093	-1.5749	29.2851	63.68	0.48				
123104	84	20	22.0	22.1					0.132	0.086	-1.5737	29.2873	64.27	0.51				
123105	84	30	31.6	31.8					0.100	0.090	-1.5098	30.1626	63.87	0.53				
123106	84	50	51.7	52.1					0.032	0.026	-1.5470	33.2738	67.33	0.32				
123108	84	70	71.3	71.9					0.017	0.015	-1.6048	33.9415	68.12	0.25				
123109	84	100	102.2	103.1					0.002	0.003	-1.3048	34.2622	68.09	0.24				
123111	84	150	151.7	153.1					0.003	0.006	0.1389	34.5614	68.25	0.22				
123114	84	250	251.4	254.0					0.002	0.003	1.4127	34.8323	68.28	0.18				

STATION : F09
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
93	9/22/93	17:42	73.500	165.991	91	89	FSI	1329
94	9/22/93	18:32	73.493	166.032	89	86	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
123127	94	0	2.0	2.0	68.80	10.19	6.75	248.0	0.283	0.115	-0.8716	29.2128	62.10	0.69	47.04	A*		
123128	94	10	12.1	12.2	70.45	10.89	6.47	169.5	0.266	0.116	-0.8789	29.2230	63.15	1.04	17.67	A*		
123129	94	20	22.2	22.3					1.152	0.525	-1.2462	31.8050	63.48	1.65	8.10			
123130	94	30	32.3	32.5	35.69	6.18	5.77	247.5	0.606	0.300	-1.4853	32.2231	63.26	1.62	3.60	A*		
123131	94	40	42.7	43.0					0.160	0.114	-1.5866	32.4297	68.32	0.45	1.83			
123132	94	50	52.5	52.9	22.94	3.79	6.06	132.3	0.073	0.102	-1.6099	32.5986	67.75	0.47	1.48	*		
123133	94	60	60.4	60.9					0.047	0.099	-1.6102	32.6691	65.06	0.47	1.01			
123134	94	70	74.2	74.8	19.70	3.16	6.24	202.8	0.043	0.109	-1.5727	32.8182	62.37	0.34	1.50	A		
123135	94	85	85.4	86.1					0.108	0.274	-0.6311	34.3331	28.36	0.42	1.20			
123124	93	87	88.2	88.9	67.05	10.03	6.69	1198.1	0.117	0.282	-0.6138	34.3503	30.39	0.36		*		

STATION : TA
CRUISE : 9324

CAST	DATE	TIME UTC	LAT	LONG	BOT. DEPTH	CAST DEPTH	CTD TYPE	S/N
28	9/11/93	16:54	75.027	173.025	347	204	FSI	1329

SAMPLE #	CAST #	NOMINAL DEPTH (m)	CTD DEPTH (m)	CTD PRESSURE (dbar)	POC (ug C/l)	PON (ug N/l)	CN RATIO	TOTAL SUSPENDED SOLIDS (ug/l)	EXTRACTED CHLOROPHYLL a (ug/l)	EXTRACTED PHAEO-PIGMENT (ug/l)	CTD TEMPERATURE (deg C)	CTD SALINITY (psu)	TRANSMISS. (%)	NOMINAL CHL a (ug/l)	PAR (uE/sm^2)	POC BOT (A,B or C)	TSS BOT (A,B or C)	CHL BOT (A,B or C)
118591	28	0	2.0	2.0	43.29	7.38	5.87	215.3	0.087	0.019	-1.2931	29.7306	64.65	0.44	9.49	A*	B	
118592	28	10	11.3	11.4					0.188	0.050	-1.2951	29.7350	64.86	0.91	4.19			
118593	28	20	21.8	21.9	106.02	13.69	7.74	212.7	0.542	0.133	-1.3393	30.0072	62.10	0.71	2.26	A*	B	
118594	28	30	31.7	31.9	183.26	29.75	6.16	1123.4	4.852	0.444	-1.6155	32.0299	60.55	1.03	1.55	A+B*	B	B
118595	28	40	42.0	42.3					0.854	0.189	-1.5667	32.1714	68.36	0.69	1.50			
118596	28	50	53.1	53.5	37.82	5.95	6.36	226.5	0.643	0.177	-1.2207	32.4446	66.09	0.97	0.15	A*	B	
118597	28	60	62.3	62.8					0.395	0.095	-1.1645	32.7086	65.56	0.78	1.36			
118600	28	100	103.0	103.9	18.56	2.49	7.45	117.1	0.086	0.087	-1.3987	33.4396	70.42	0.35	0.92	A*	B	
123304	28	200	202.9	204.8	14.48	2.27	6.39	116.1	0.061	0.045	-0.1616	34.6170	70.38	0.29	0.92	*		

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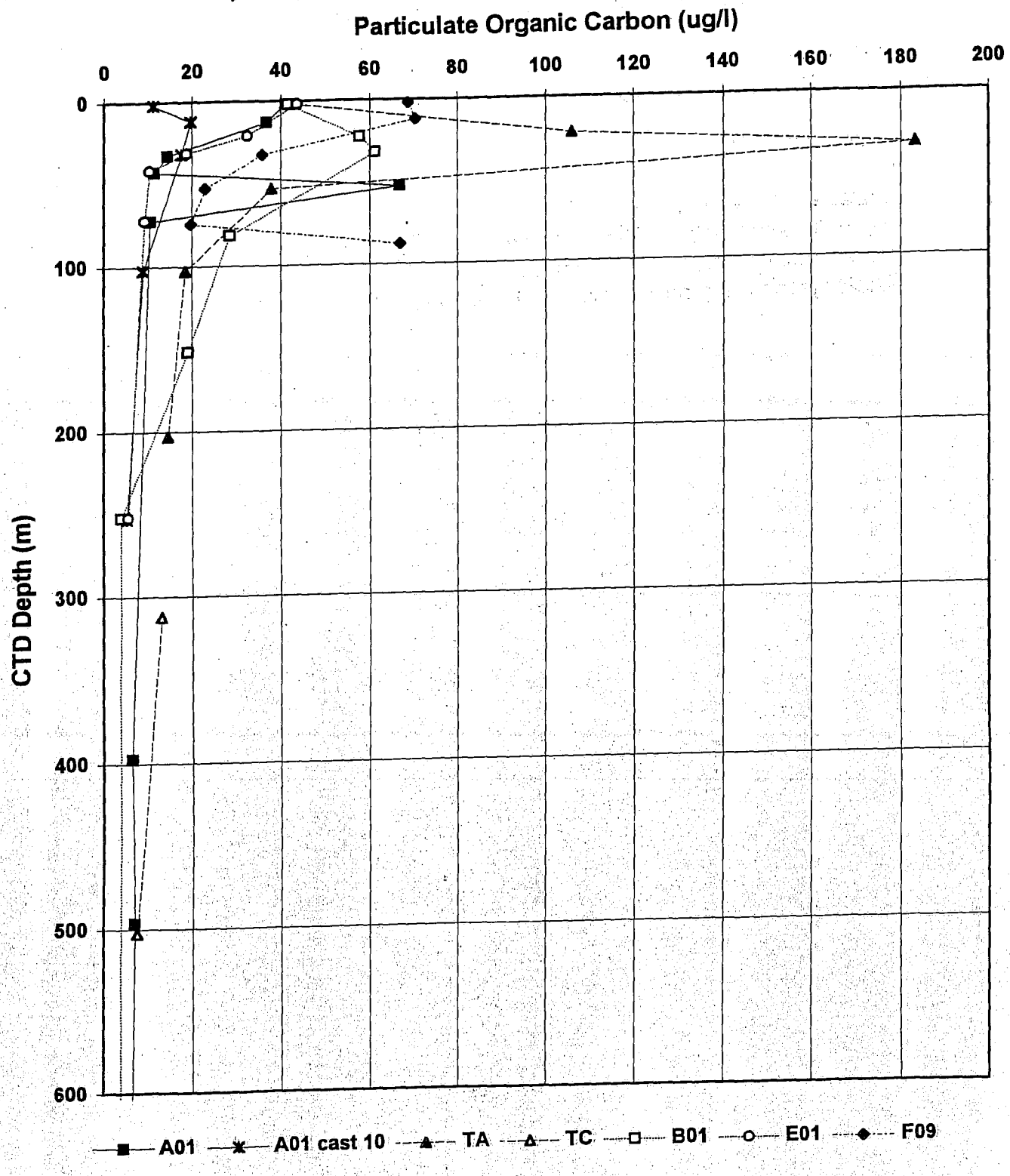
6.6 Profile Plots - Filtration Samples

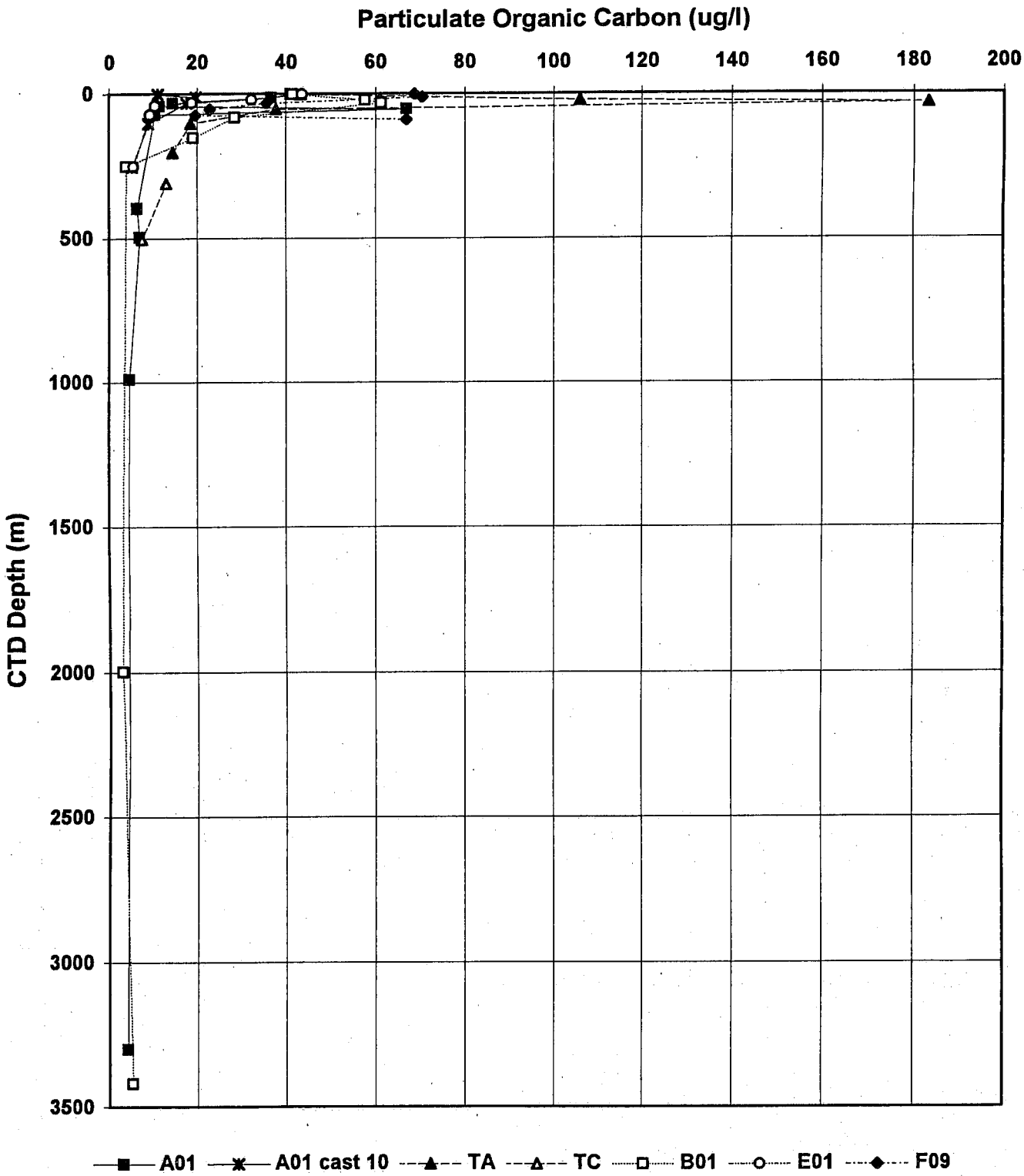
The following Appendix contains profile plots of the following data :

- Particulate organic carbon
- Particulate organic nitrogen
- CN ratios
- Total suspended solids
- Extracted chlorophyll a
- Extracted Phaeo-pigments
- Percent transmission (Transmissometer data)
- Nominal chlorophyll a (Fluorometer data)
- Photosynthetically active radiation (PAR sensor)

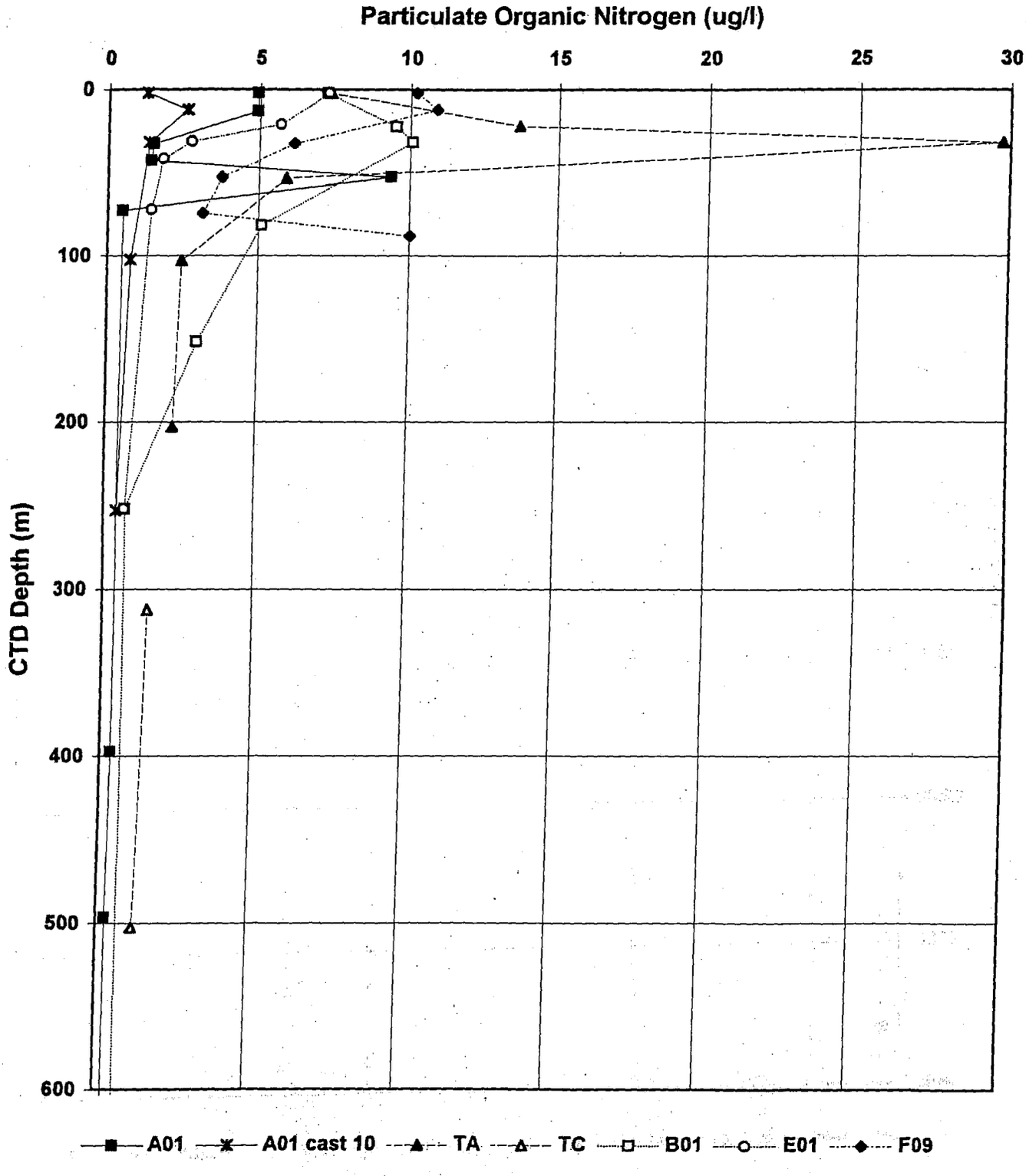
Cruise 9324


Particulate Organic Carbon (ug/l)
0
20
40
60
80
100
120
140
160
180
200
CTD Depth (m)
0
100
200
300
400
500
600
A01
A01 cast 10
TA
TC
B01
E01
F09

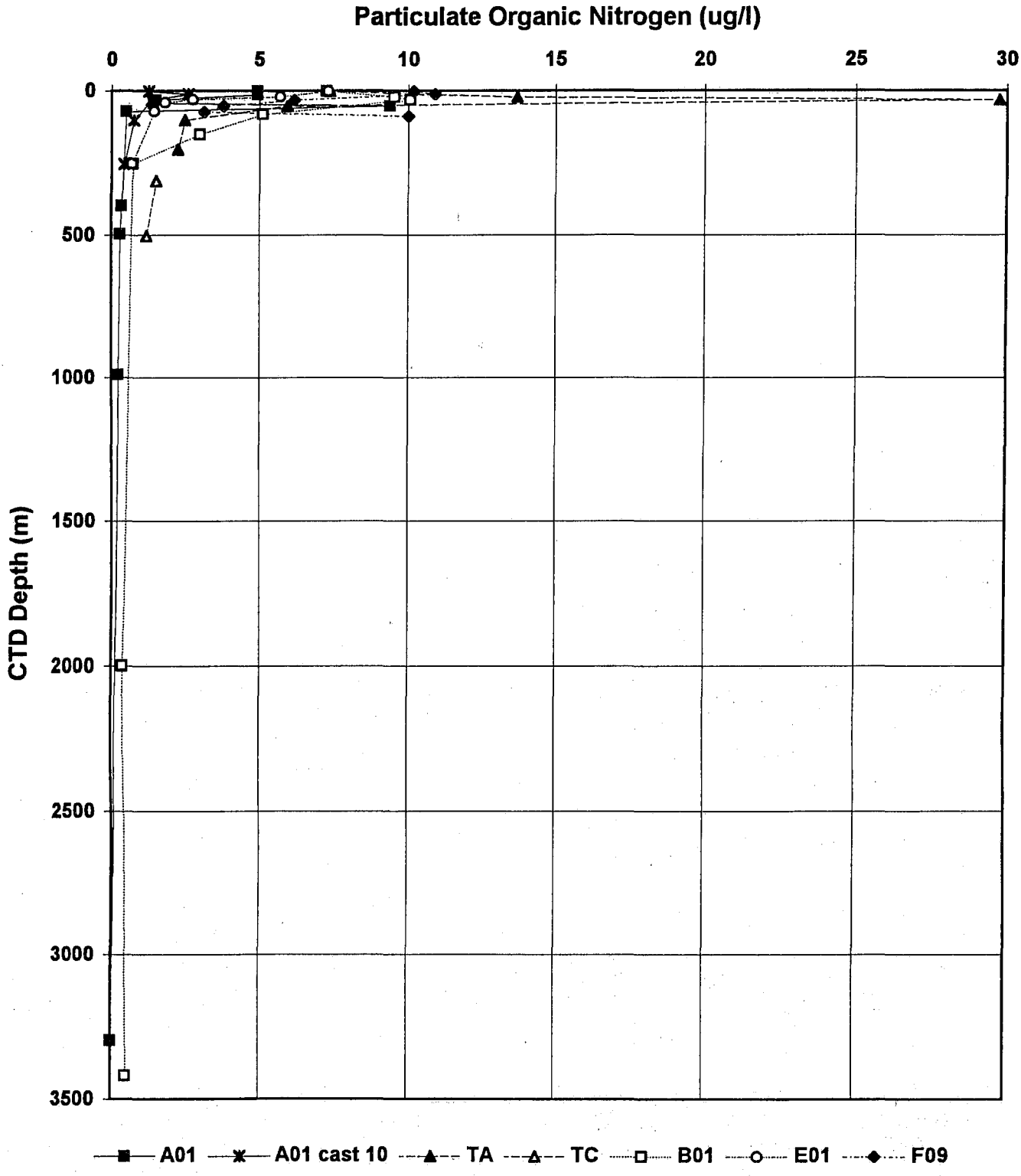
Cruise 9324


Particulate Organic Carbon (ug/l)
0
20
40
60
80
100
120
140
160
180
200
CTD Depth (m)
0
500
1000
1500
2000
2500
3000
3500
A01
A01 cast 10
TA
TC
B01
E01
F09

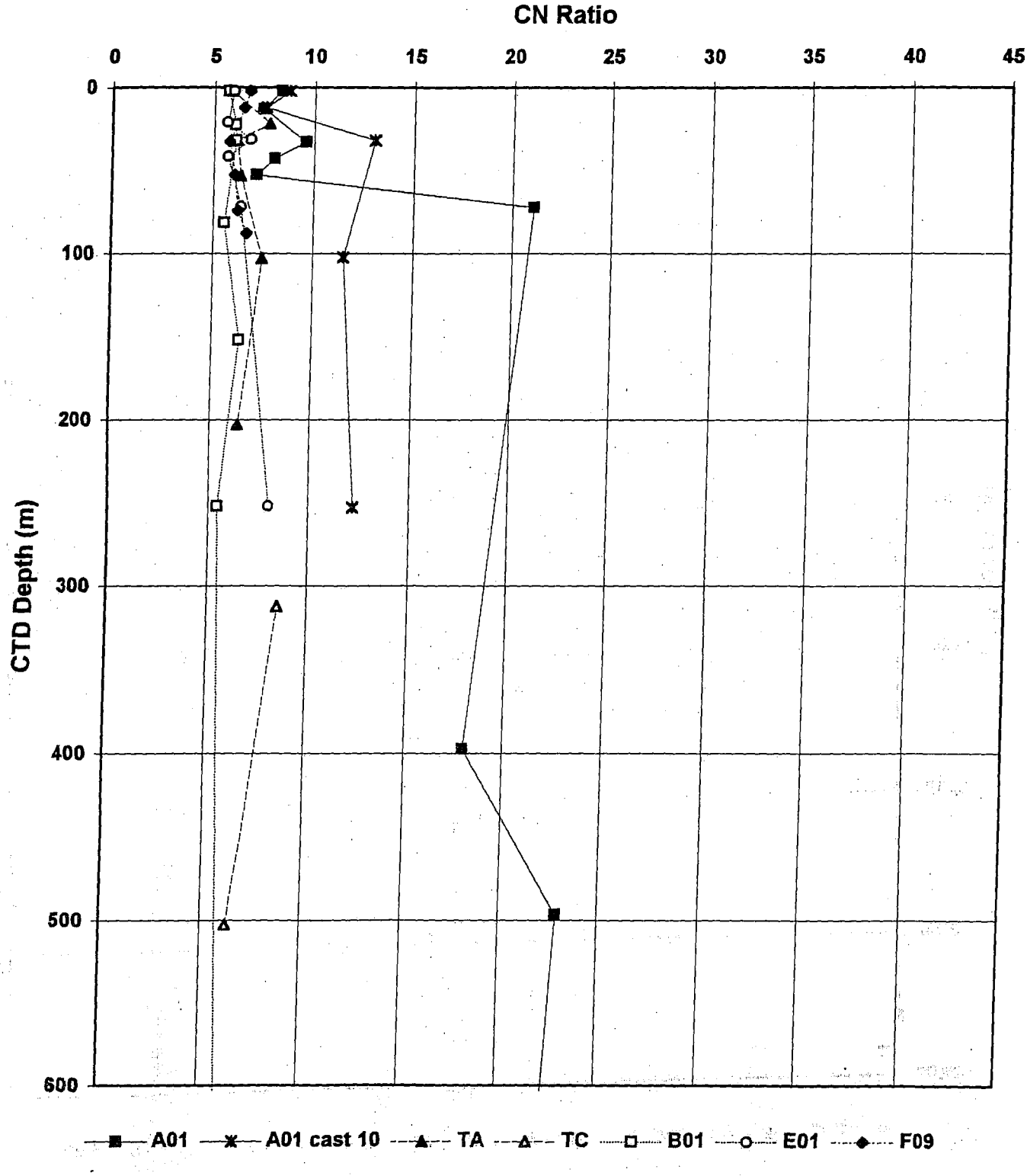
Cruise 9324


Particulate Organic Nitrogen (ug/l)
0
5
10
15
20
25
30
CTD Depth (m)
0
100
200
300
400
500
600
A01
A01 cast 10
TA
TC
B01
E01
F09

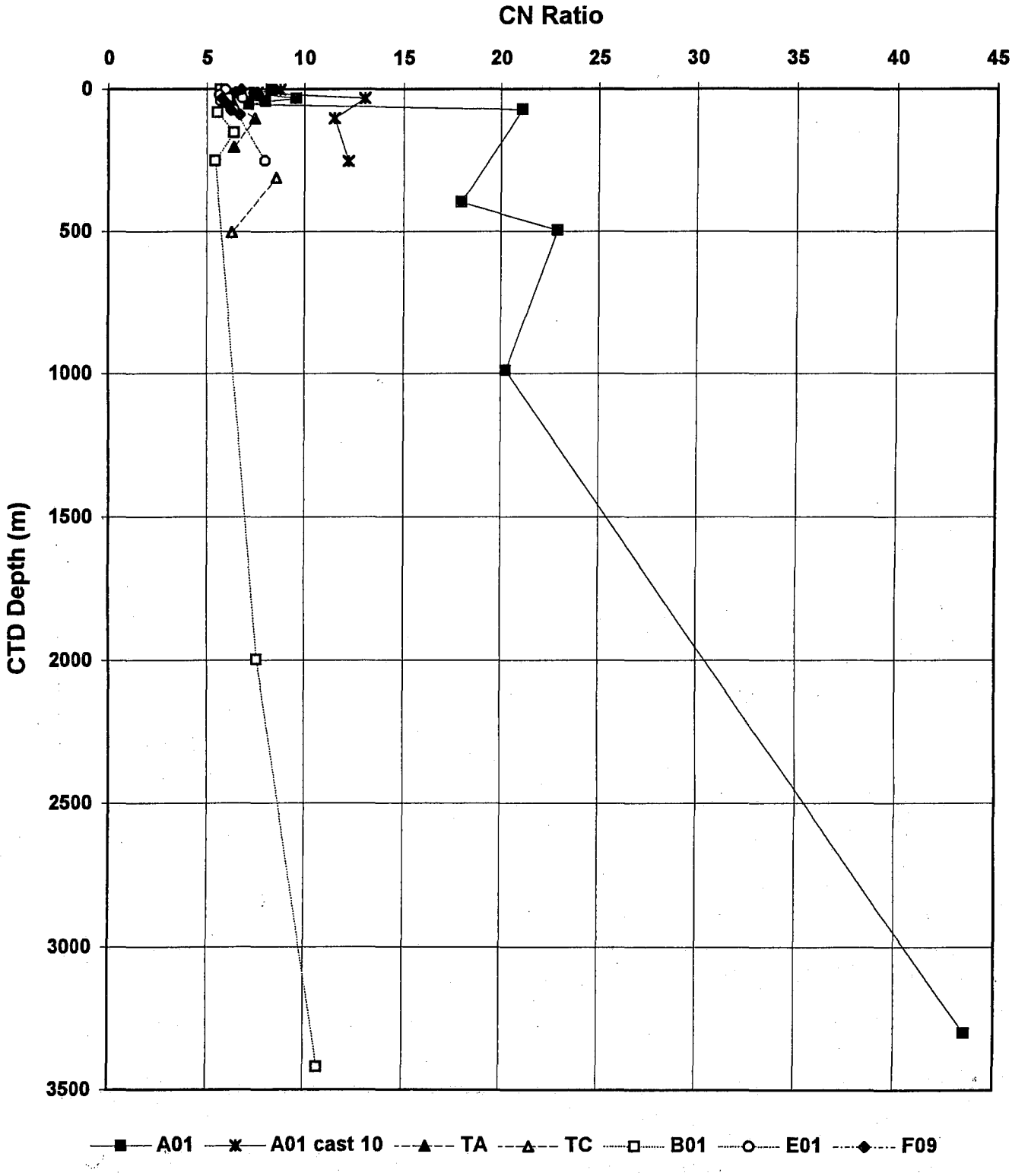
Cruise 9324


Particulate Organic Nitrogen (ug/l)
0
5
10
15
20
25
30
CTD Depth (m)
0
500
1000
1500
2000
2500
3000
3500
A01
A01 cast 10
TA
TC
B01
E01
F09

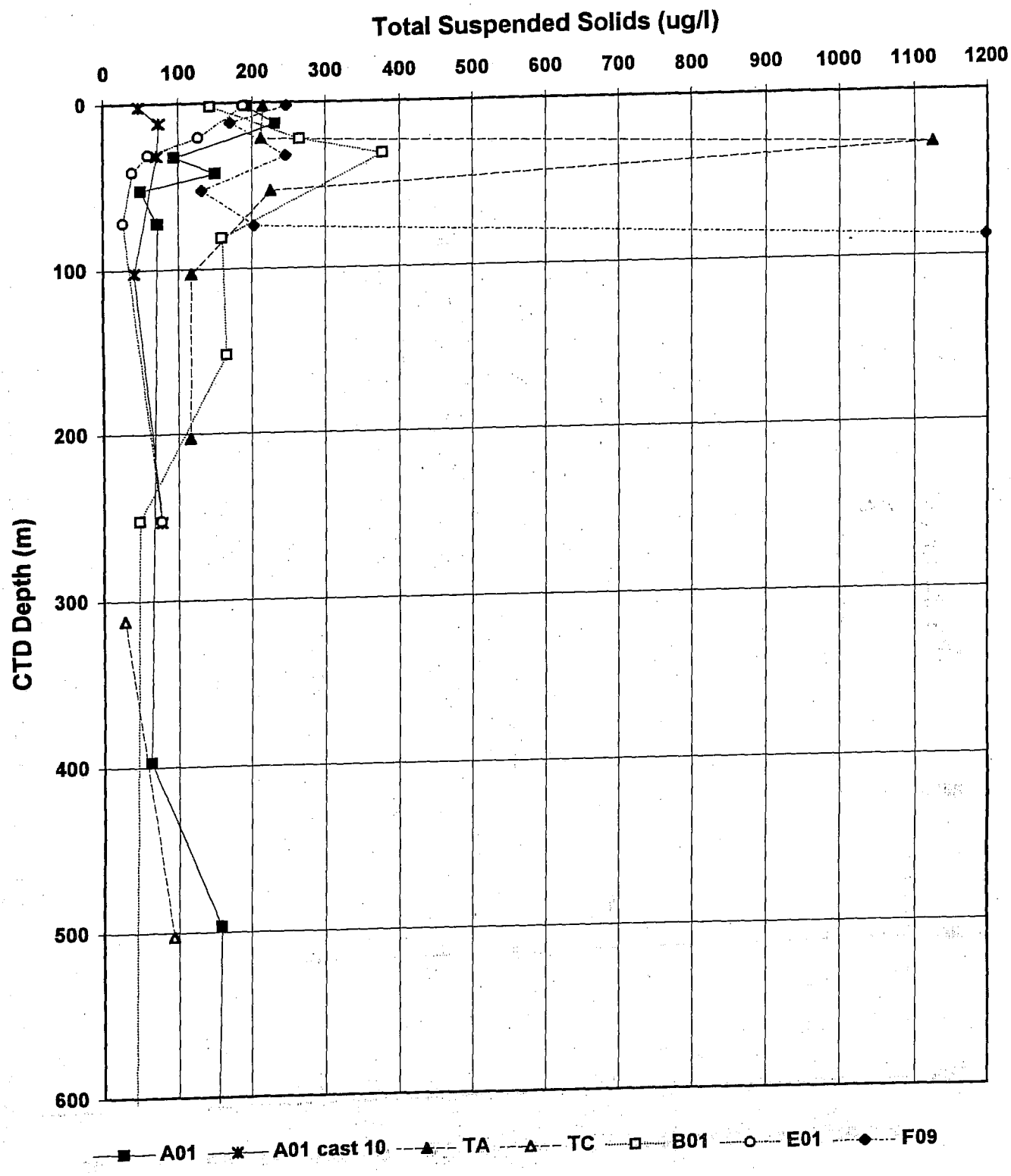
Cruise 9324


CN Ratio
0
5
10
15
20
25
30
35
40
45
CTD Depth (m)
0
100
200
300
400
500
600
A01
A01 cast 10
TA
TC
B01
E01
F09

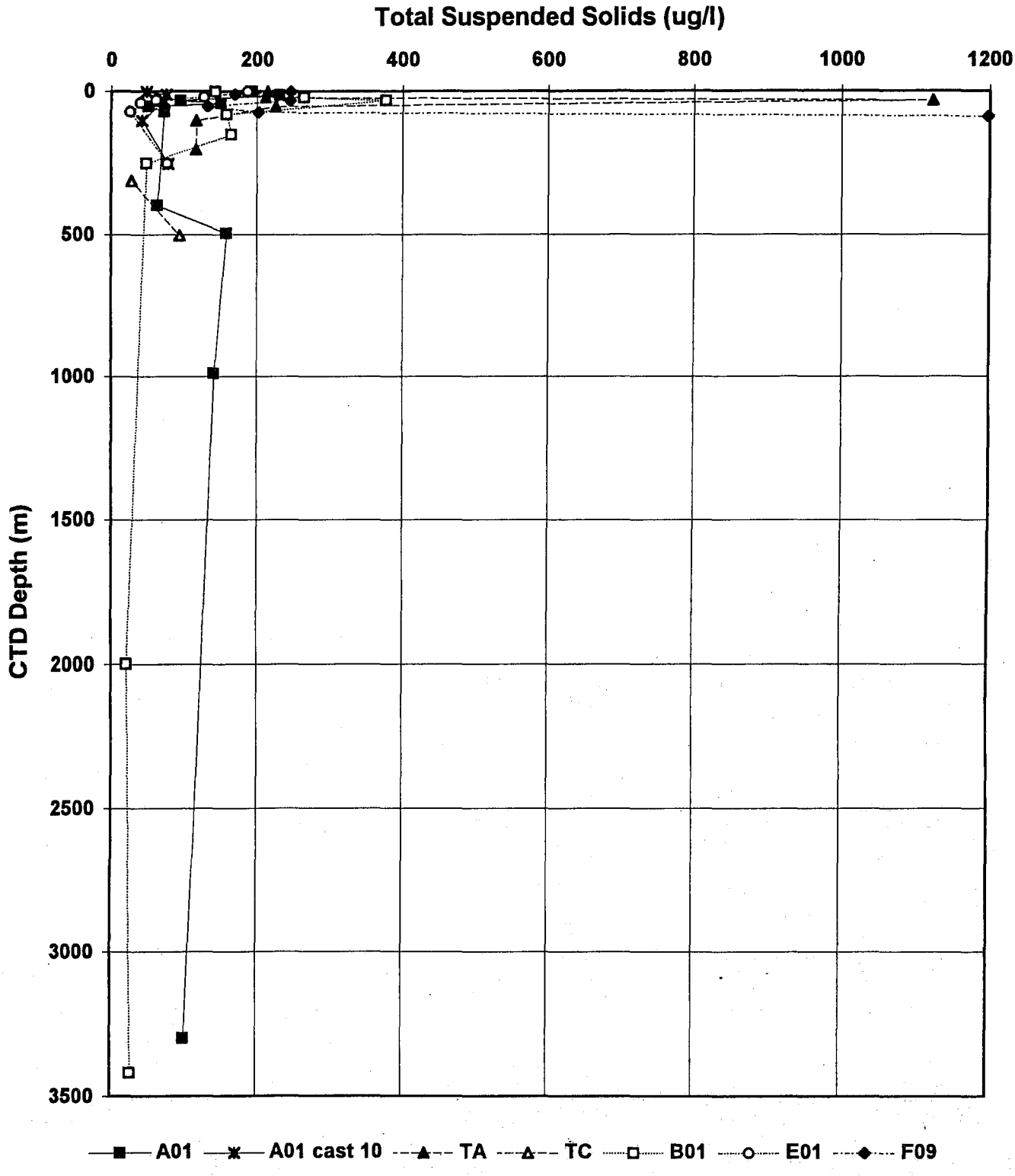
Cruise 9324


CN Ratio
0
5
10
15
20
25
30
35
40
45
CTD Depth (m)
0
500
1000
1500
2000
2500
3000
3500
A01
A01 cast 10
TA
TC
B01
E01
F09

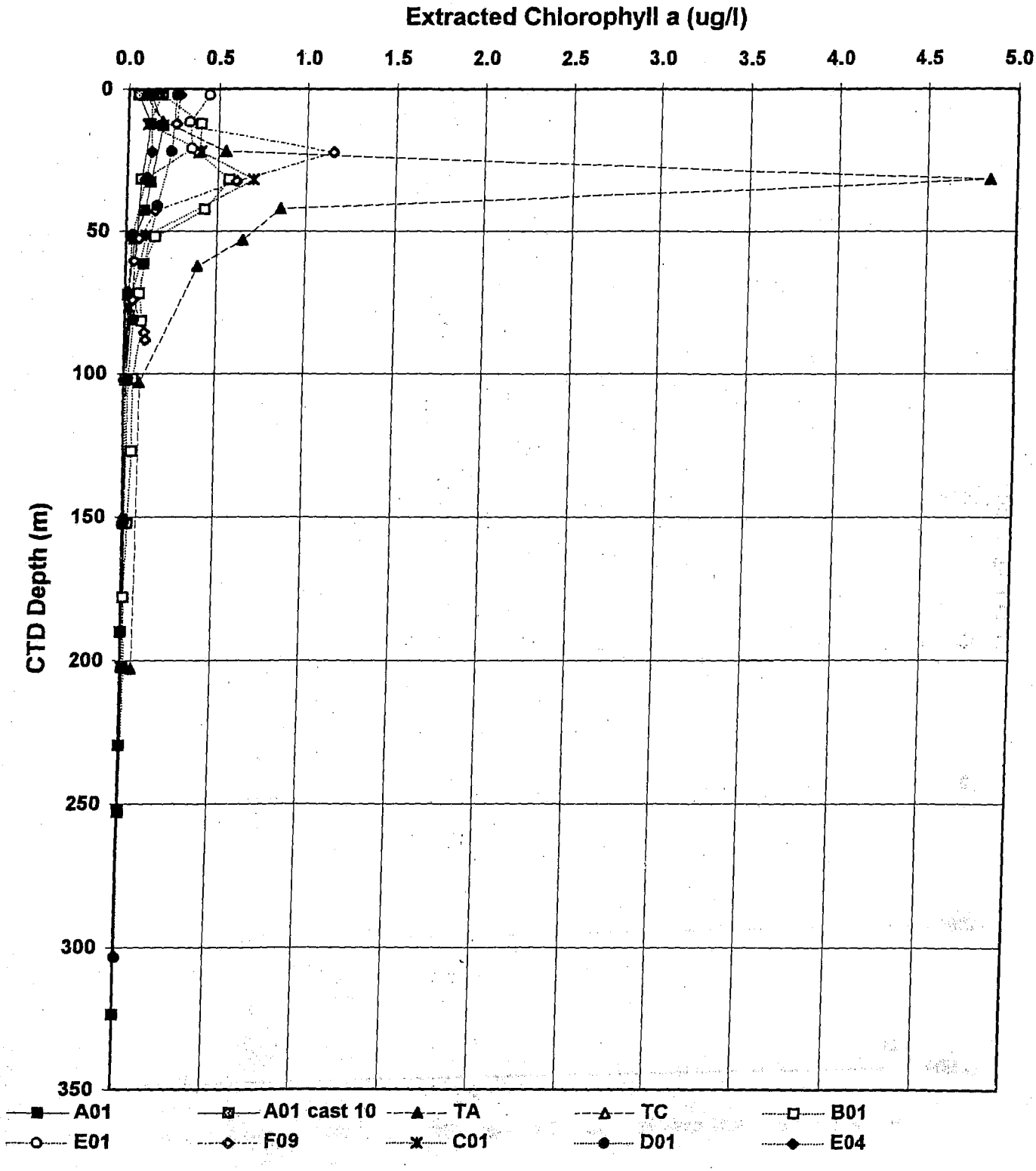
Cruise 9324


Total Suspended Solids (ug/l)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
CTD Depth (m)
0
100
200
300
400
500
600
A01
A01 cast 10
TA
TC
B01
E01
F09

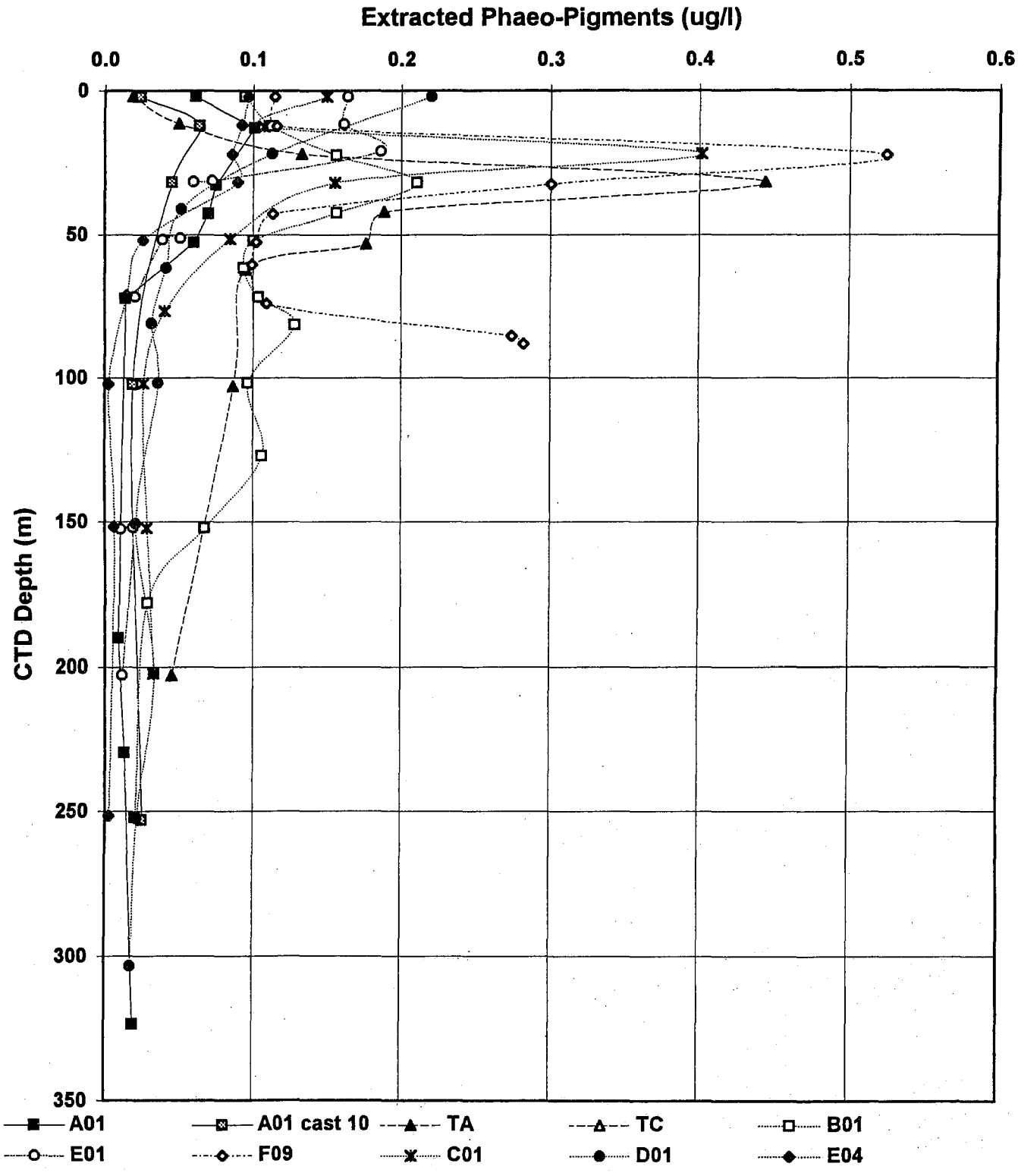
Cruise 9324


Total Suspended Solids (ug/l)
0
200
400
600
800
1000
1200
CTD Depth (m)
0
500
1000
1500
2000
2500
3000
3500
A01
A01 cast 10
TA
TC
B01
E01
F09

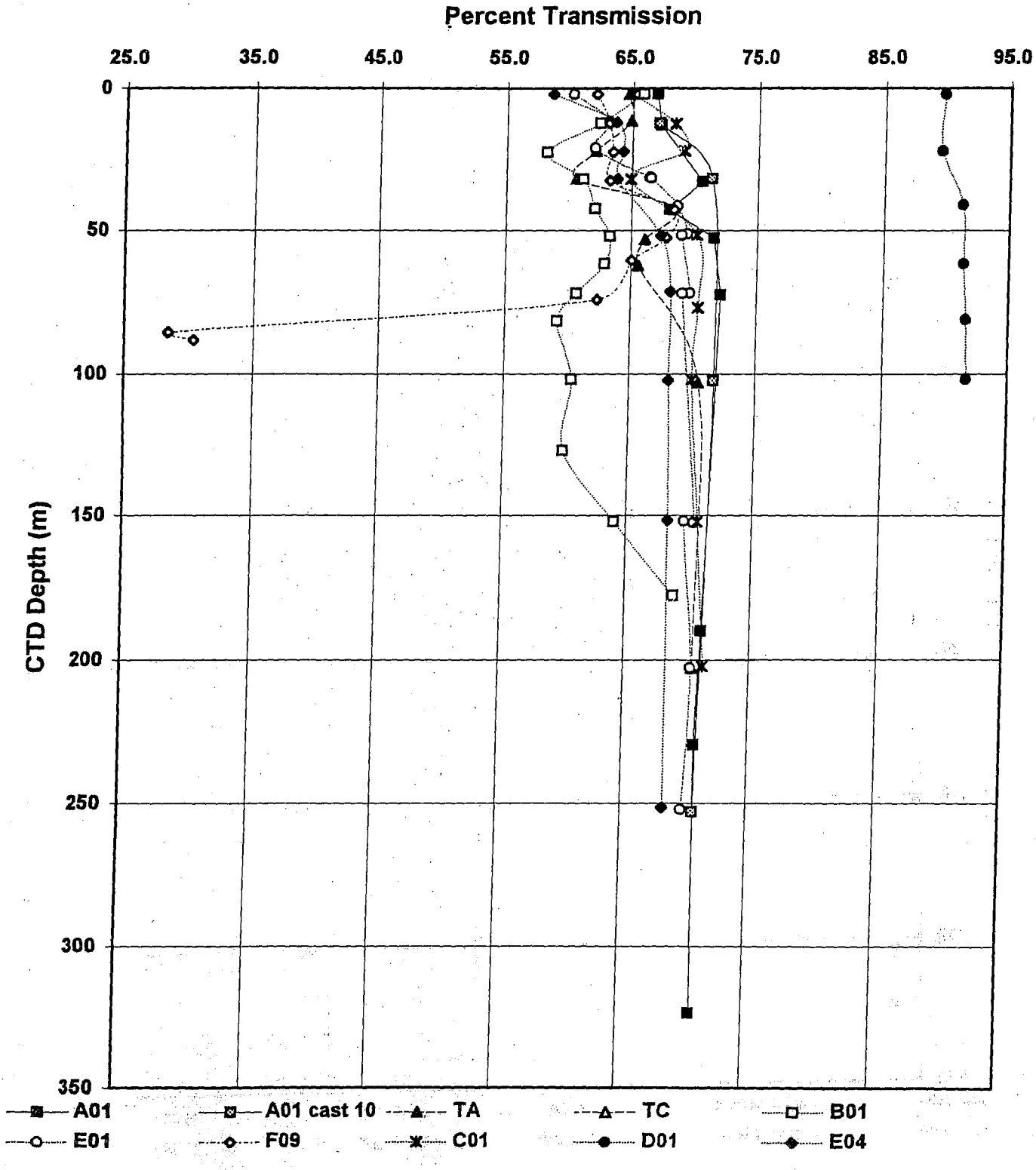
Cruise 9324


Extracted Chlorophyll a (ug/l)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
CTD Depth (m)
0
50
100
150
200
250
300
350
A01
A01 cast 10
TA
TC
B01
E01
F09
C01
D01
E04

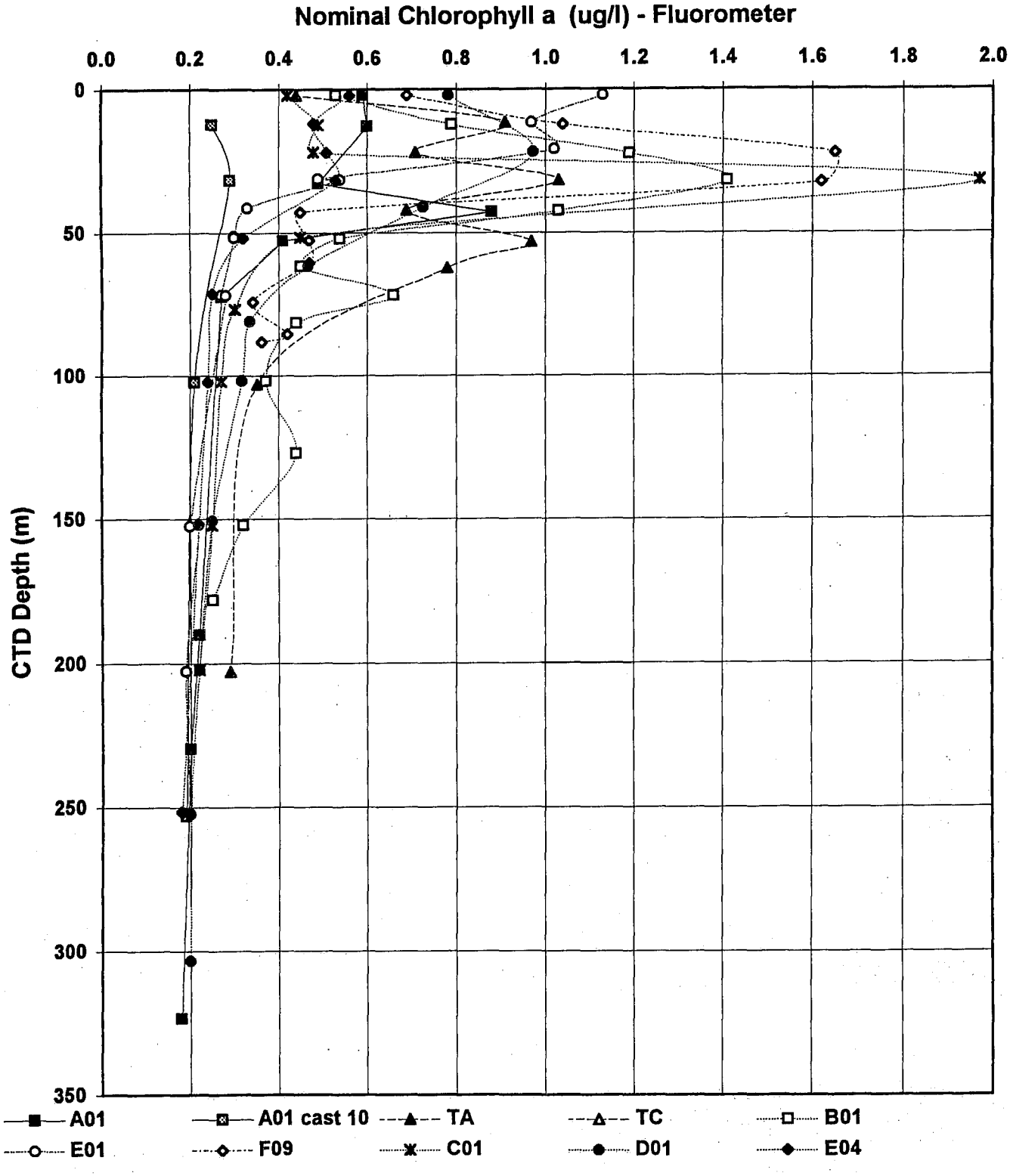
Cruise 9324


Extracted Phaeo-Pigments (ug/l)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
CTD Depth (m)
0
50
100
150
200
250
300
350
A01
A01 cast 10
TA
TC
B01
E01
F09
C01
D01
E04

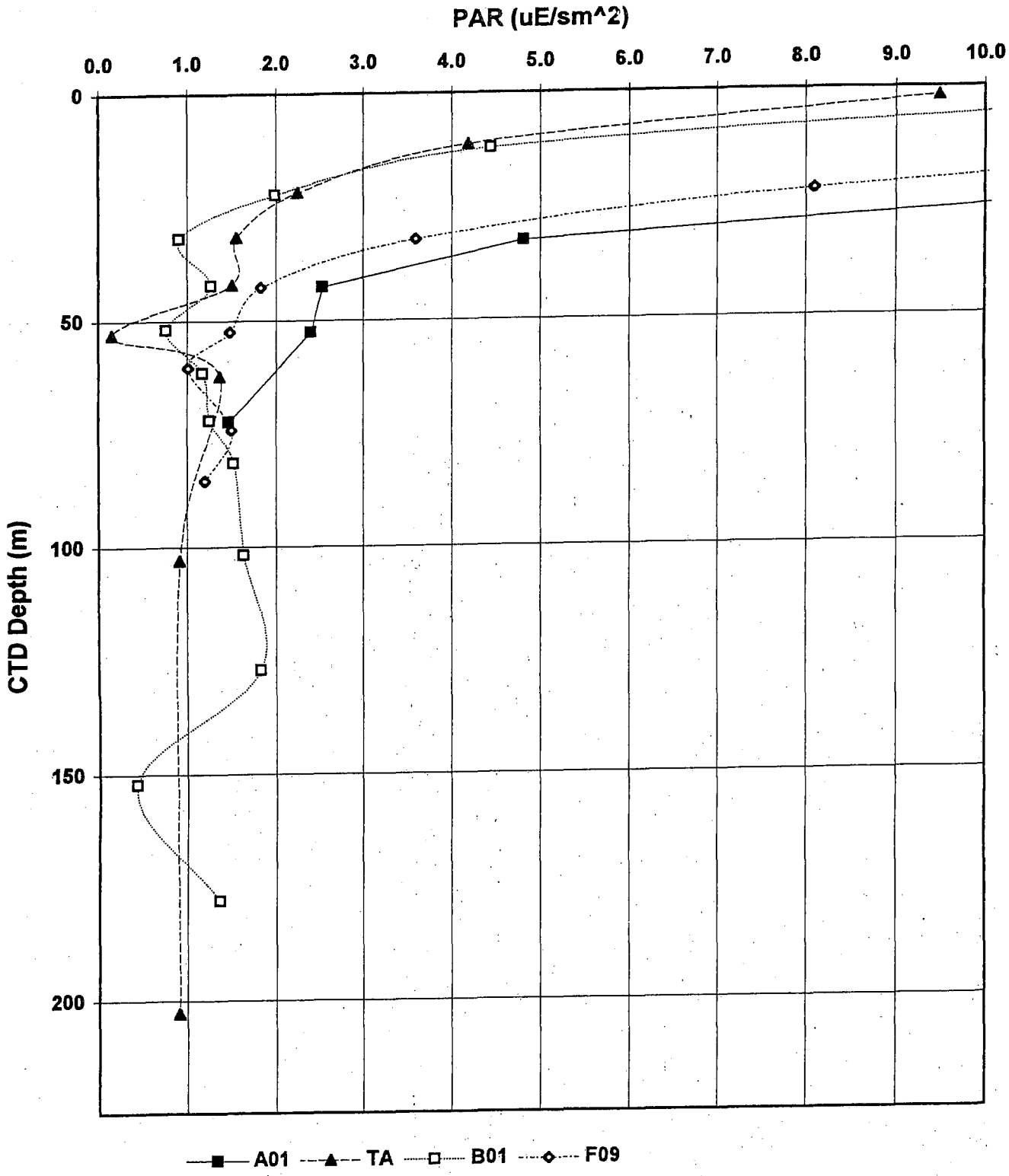
Cruise 9324


Percent Transmission
25.0
35.0
45.0
55.0
65.0
75.0
85.0
95.0
CTD Depth (m)
0
50
100
150
200
250
300
350
A01
A01 cast 10
TA
TC
B01
E01
F09
C01
D01
E04

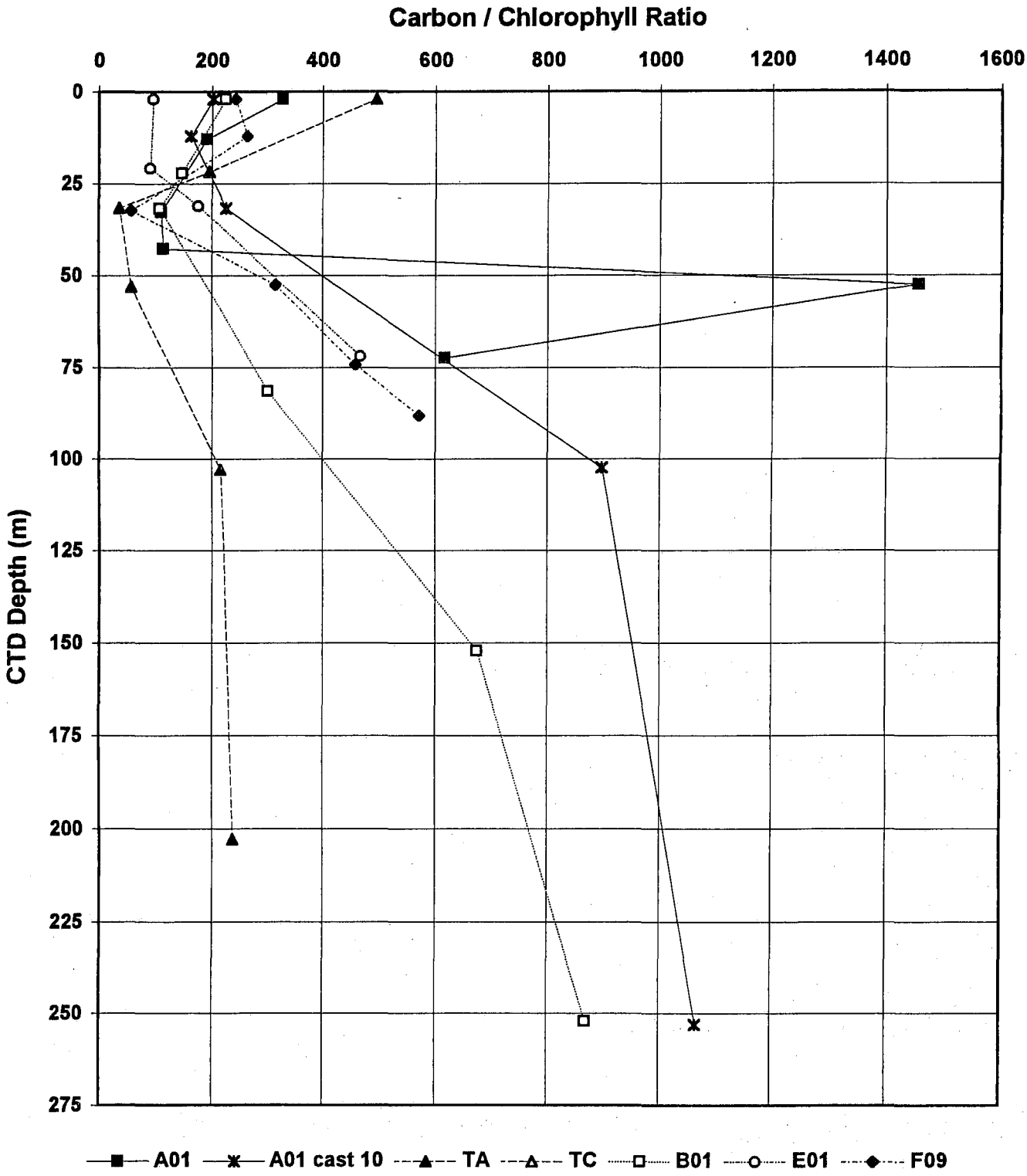
Cruise 9324


Nominal Chlorophyll a (ug/l) - Fluorometer
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
CTD Depth (m)
0
50
100
150
200
250
300
350
A01
A01 cast 10
TA
TC
B01
E01
F09
C01
D01
E04

Cruise 9324


PAR (uE/sm^2)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
CTD Depth (m)
0
50
100
150
200
A01
TA
B01
F09

Cruise 9324


Carbon / Chlorophyll Ratio
0
200
400
600
800
1000
1200
1400
1600
CTD Depth (m)
0
25
50
75
100
125
150
175
200
225
250
275
A01
A01 cast 10
TA
TC
B01
E01
F09