I.O.S.

# SEASOAR CTD SURVEYS DURING FASINEX

BY

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&

J.SMITHERS

REPORT NO. 230

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INSTITUTE OF OCEANOGRAPHIC SCIENCES

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WORMLEY

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*FASINEX Contribution No. 11*

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# 1. INTRODUCTION

During February/March 1986, a team from the Institute of Oceanographic Sciences and Research Vessel Services of the U.K. Natural Environment Research Council took part in FASINEX (Frontal Air-Sea Interaction Experiment, Stage and Weller, 1985, 1986) aboard R.V. Oceanus. Surveys were carried out with the IOS developed SeaSoar (Collins, Pollard and Pu, 1983) carrying a Neil Brown CTD. The data were fully processed within a day of collection using two containerised PDP11/34 computers so that the plots presented here were available for decision making at sea.

Five runs were carried out, including a creeping line ahead survey of a 120 km x 160 km box spanning the main FASINEX front, a single box 30 km x 90 km circumnavigated four times in 3.75 days, and several circuits of the FASINEX mooring array.

Track plots using a mixture of Loran and GPS were also constructed in near-real-time, and are described here.

# 2. INSTRUMENTATION AND DATA REDUCTION

## 2.1 SeaSoar

The SeaSoar (Fig. 1a), developed at IOS from the original Batfish (Dessureault, 1976), is towed behind the ship at around 8 knots (4 m/s) on a 600 m long faired cable. The main wings are driven hydraulically by the propeller and are servocontrolled by the difference between a sawtooth function simulating the desired pressure/time path and the observed pressure measured at the SeaSoar. A typical Track (Fig. 1b) shows the SeaSoar profiling between 25 m and 275 m with a full down/up profile every 3 km. The minimum depth is normally set at or very close to the surface, but the danger of fouling by floating sargassum in the FASINEX area (28°N, 70°W) made it advisable to turn well below the surface. The turning depth was rather variable, as the SeaSoar proved sensitive to the strong cross currents as it passed through the frontal jets of 50 cm/s or more. The maximum depth can be set as deep as 375 m with a fully faired cable. In FASINEX, only about 325 m could be attained, probably because about 30 m of cable at the SeaSoar end had remained unfaired when the fairing was transferred to a new cable. In the event, most of the frontal structure lay above 300 m, so the reduced maximum depth shown in Fig. 1b was used to increase along-track resolution.

The SeaSoar CTD data are thus equivalent to a shallow CTD section, with over 60 casts per 100 km, covered at 350 km (over 200 casts) per day.

To launch the SeaSoar, the faired cable was run through a large diameter purpose built shieve hung from the centre of the stern A-frame. To allow adjustment of the shieve height, it was hung on a wire which was led through a small block on the crossbar of the A-frame and down to the air-winch attached to the A-frame starboard side. It proved straight forward to lift the SeaSoar well off the deck from its cradle strapped beneath the A-frame, using the main faired cable winch. The A-frame and cable were then paid out simultaneously until the SeaSoar was outboard, and it could then be fully paid out with Oceanus underway at 4-5 knots. The procedure was reversed on recovery except that ship speed had to be reduced to one knot or less to lessen the drag.

Once fully deployed, the faired cable drum was stopped off through a strain gauge between a bollard and the drum rim. This allowed the wire tension to be continuously monitored. A cable clamp was also attached to the cable through a loosely stopped rope to provide backup should the strain gauge fail.

## 2.2 Navigation

Prior to presenting details of SeaSoar runs and tracks, it is necessary to describe the navigation data.

The primary navigational aid in use was Loran, but GPS, transit satellite fixes, and Oceanus Doppler log and gyro readings were also logged on a PDP11/34 and used to fill gaps or improve the navigation on occasion.

The Loran Internav 408 crosschain receiver provided by Bob Weller output latitude, longitude and time delays once a minute. We read the positional data but did not make use of the time delays. An example of a Loran track plot from unedited, unsmoothed one-minute data is shown in Fig. 2a.

All satellite fixes from a Magnavox 1105 integrated Transit/Omega system were logged. These fixes were then listed and duplicate fixes, fixes with more than 2 or 3 iterations, and fixes with high (greater than 70°) or low (less than 15°) elevation were deleted.

Fixes from a Magnovox GPS T-set were recorded every 30 sec, along with details of the satellites from which they were calculated and GPS times. After examination of four days of GPS data at the start of the cruise, it was concluded that

(a) when three or four satellites were visible, no discontinuities could be detected in track plots (about 100 m resolution) when the constellation changed

(b) when only two satellites were visible, and the T-set was using its atomic clock to navigate, fixes could not be relied upon. Small drifts (e.g. off a straight line track) became apparent within minutes, and usually increased to catastrophic offsets within an hour.

We therefore retained only fixes with 3 or more satellites. Possibly, the clock or set was imperfect. Certainly, later in the cruise the GPS set gradually became harder to lock on, and eventually became unoperable. However, up to day 63, GPS fixes with 3 or more satellites frequently provided better navigation than Loran, and were patched in as described below.

Early in the cruise (between day 47 at 0615 GMT and 48/1840), but after arriving in the working area, the smoothed Loran, edited transit, and edited GPS fixes were intercompared. Only a small sample of 12 transit fixes was good enough to retain in the 36 hour period, but 15.5 hours of GPS data were available, providing a sample of 1856 30-second values spanning 27°30'N to 28°30'N and 69°40'W to 70°20'W in the centre of the working area. Loran and GPS data were interpolated to transit satellite times, and Loran data were interpolated to GPS times. The latitudes and longitudes were then differenced and the differences plotted as histograms. The means and standard deviations of the differences (Table 1) show no significant difference between GPS and transit satellite fixes. Taking GPS fixes as correct, therefore, the Loran fixes require offsets of 1850 m to the north and 5380 m to the west, which we identify as the Loran algorithm absolute offset for the FASINEX area. This was consistent with the corrections built into the Bridge Loran set. Throughout the cruise, therefore, all computer logged Loran fixes were corrected to absolute latitude and longitude by adding 0.017°(N) and -0.055°(E).

Standard deviations of (Loran-Transit) differences show only the large errors of order 600 m in transit fixes. The (Loran-GPS) differences have standard deviations of 230 and 370 m, so our navigation data may be up to a few hundred metres off in absolute accuracy.

GPS data were only available for part of this time, so could not be used as the prime navaid. However, the major period of good GPS data ran from around 0500-1200 GMT, or 0000-0700 local time. This period spanned local sunrise, during which Loran was weakest, so GPS was used on several occasions (e.g. Fig. 2b) to patch in data during periods when Loran data wandered or spiked badly, jumped lanes, or were entirely lost through loss of lock. Table 2 lists all such periods for the entire cruise. The pairs of values shown in the correction and comments field are explained as follows. When GPS and Loran values at the start and end of a period to be patched in were compared an offset was often noted. This indicates that the overall correction of .017°N,-.055°E applied to all Loran data was too crude, as it did not allow for spatial variations in the Loran algorithm. Further corrections were therefore applied to minimise these jumps, and the difference between the jumps at start and end of a patched period is shown by the ± values in the comments field.

In general, the aim was to minimise relative errors (alongtrack jumps), and not to worry about absolute errors of order 1 km.

The sequence of navigation correction was thus

(a) plot 1-minute Loran values

(b) delete spikes, or correct lane jumps, or patch in GPS where possible, using Table 2 corrections

(c) interpolate any missing one-minute values

(d) apply 11-point running mean (i.e. 10 minute average) filter to smooth both Loran jitter and minor jumps where navigation type changes. A smoothed plot is shown in Fig. 2c.

(e) integrate the smoothed data to derive distance run alongtrack (DISTRUN), which is used as the x-variable in all contour plots in this report

(f) produce final track plots, annotated with time and DISTRUN (Figs. 3-13).

## 2.3 CTD sampling and calibration

CTD logging has been described in previous data reports (Collins et al., 1983, Pollard et al., 1986), so need only be briefly summarized here.

(a) Program CTDSAMP obtains raw data cycles from the deck unit to computer interface, and writes them to a file

(b) CTDAVG reduces the full data set (8 samples/sec in FASINEX) to one value per second. Outliers are first deleted as described by Pollard et al. (1986), and the rate of change of temperature is added as an extra variable (Collins et al., 1983), but the data are still in raw units.

(c) CTDCAL speeds up the temperature values to match the conductivity and temperature time constants. A time constant of 0.20 seconds was found to minimize hysteresis between down and up T/S traces in FASINEX. Calibrated values were then calculated from the equations

$$P(dbar) = 0.01*P(raw)$$

(default calibration)

$$T(°C) = 0.000499968*T(raw) + 0.083$$

(from laboratory calibrations)

$$C(mmho/cm) = 0.001*C(raw)$$

(default calibration)

and salinity and density were then derived using the 1983 equations of state.

Oxygens were derived (following Pollard, 1985) using

$$O(ml/l) = 0.00148*O(raw)*\exp(-0.036*T_L -0.000155*P(dbar))*O_{saturated}(T,S)$$

Where $T_L$ is $T_{CAL}$ lagged with a 300 second time constant.

(d) At this point all CTD and navigation data were archived and transferred to the second PDP11/34 for further processing with PSTAR applications programs (Pollard and Read, 1986)

(e) Salinity calibration data were minimal. Calibrated values of salinity at a temperature of 18.5°C were extracted from listings of CTD casts 16-22 on the first Knorr FASINEX cruise (kindly supplied by R. Weller and N. Pennington), and yielded S = 36.516 psu with a standard deviation of 0.004 psu. A short set of 15 salinities at the same temperature from SeaSoar down- and up-casts in the same geographical area yielded S = 36.518±0.003 psu. Fortuitously, therefore, the default conductivity calibration appeared to be correct.

At the end of the cruise there was an opportunity to compare T/S curves from the SeaSoar with those from CTD casts. Poor calibration data from six bottles indicated bottle values higher than SeaSoar values by 0.010 ± 0.007 psu (see Appendix A). We conclude that SeaSoar salinities are no more than 0.01 psu in error.

(f) Oxygen values were clearly far too large, but no calibration data were available on Oceanus or Endeavor. Oxygens have therefore been scaled by an arbitrary value of 0.63 to produce values plausibly related to saturation values expected for the range of temperatures encountered.

(g) To allow for the fact that the SeaSoar sampling position is 500-600 m behind the ship, SeaSoar times were reduced by 150 seconds. This corrects for the fact that the ship (at which navigation and acoustic doppler profiler are sampled) passes a point about 150 seconds before the SeaSoar.

(h) T/S plots were then examined for salinity errors or signs of conductivity cell fouling. A few such errors were found, none lasting more than a few minutes. Errors were either deleted, or corrected by adding a constant offset to the salinity and density values.

(i) The CTD and navigation data were then merged on time, so that DISTRUN (section 2.2e) replaces time as the alongtrack variable.

(j) Prior to producing contour plots, data were gridded with DISTRUN as the x-coordinate and pressure or potential density as the y-coordinate. Each grid point is a straight average of all 1-second data values in a rectangular box centred on the grid point. The x-dimension of the box is 10 km (±5 km from grid points 4 km apart), which smooths or eliminates internal waves and noise with horizontal scales less than 10 km. The columns of data 4 km apart are therefore not independent, but the smoothed data allow meaningful geostrophic calculations to be made on adjacent pairs of columns.

The y-dimension of each box was 10 dbar (±5 dbar, roughly ±5 m) for grid points every 10 dbar from 10 dbar to 300 dbar for data gridded on pressure. For data gridded on density, the y-dimension was 0.05 $kg/m^3$ (±0.025 $kg/m^3$) for grid points every 0.05 $kg/m^3$ from 25.0 to 26.5 $kg/m^3$, or, for the most southern latitudes 24.6 to 26.4 $kg/m^3$.

## 2.4 Data presentation

Track plots are shown in Figs. 3-12, with hourly crosses, time annotated every 6 hours and DISTRUN every 2 or 4 hours. The distance run per hour usually lies between 14 and 16 km, so is easily interpolated.

Fig. 13 is a plot of all SeaSoar tracks with daily time annotation. Comparison of Fig. 13 with the preceding figures allows the relative positions of different runs and legs to be assessed.

Contour plots are presented from page 38 on. Wherever possible, sections have been plotted from north to south (with north on the left side of the page) or from west to east. Sections which were run from south to north have thus been plotting with DISTRUN decreasing from left to right. Latitude or longitude scales as appropriate have been added at the bottom of each page. Potential temperature, salinity and potential density are plotted on the left, oxygen, salinity (against density) and sound velocity on the right. Note that the oxygen calibration is only approximate, so oxygen contours should only be used for qualitative comparisons.

Significant events are listed in Table 4, reference to which may explain gaps or anomalies in the contoured data.

# 3. DEPLOYMENTS

The SeaSoar was deployed and recovered seven times during FASINEX. [This excludes a short test deployment on the first leg of the cruise as Oceanus traversed the Gulf Stream. An intermittent switch between the CTD deck unit and the computer unfortunately limited sampling to only about 20 km alongtrack, so the data are not reported here.] These seven deployments are divided into five runs (Table 3), two of which were interrupted to repair cable faults.

The runs are described separately below with track plots, and a summary track plot is shown in Fig. 13. Details of all significant events are listed in Table 4, with further explanation of anomalies given below. The main satellite-visible front, with a temperature change across it of over 1°C lay roughly west-east between 28° and 29°N. The moored array lay further south, around 27°N, 70°W within the square (no-go zone) clearly shown in Fig. 13 (also Figs. 10,11). Survey time was divided between detailed surveys of the main front and circuits of the moored array.

Run 1 (Fig. 3) comprised a long (320 km) roughly north-south line just east of the moored array, returning northwards on the west side of the array. The run was interrupted near the start (45/0400, 547-555 km) to secure the Zodiac on the main deck, with Oceanus hove to, in heavy seas. A south westerly track was followed initially to cross to the cold side of a front (isopycnals and isotherms rise from 520 to 580 km). The track was then gradually adjusted to the south and east to pass down the moored array on its eastern side at a safe distance.

The dominant front was crossed at 715 km (27.8°N) on the southward leg and at 1075 km (28.1°N) on the northward leg just before recovering the SeaSoar. The last 2 hours of data 46/1733 - 46/1933 which include this front) were unaccountably missing from the processed data tapes. They have been recovered from raw data backup tapes written by the CTD deck unit. Oxygen was not recoverable.

Run 2 (Fig. 4) consisted of eight north-south legs about 16 km apart ranging from 90 to 160 km long, with a short near-eastward leg at the start (which is included in leg 1) and a southeastward run at the end (leg 9). Leg 5 was interrupted at 28°N from 49/1600 to 49/2036 (1909-1917 km) to repair the cable termination and consequent discontinuities are apparent in the contour plots. The oxygen contours appear spurious from 1916-1950 km, which is probably caused by the very long time it takes the Beckman oxygen sensor to settle after deployment.

The surface outcrop of the front is clear on all legs between 28° and 28.4°N.

Run 3 (Figs. 5 and 6) began as a set of repeated squares cutting the front, with Oceanus and Endeavour working together. Worsening weather caused that plan to be abandoned after one circuit and course was set at 57/1247 to repeat the circuit of the moored array done on Run 1. After running south along 69°32'W (a near-repeat of Run 1 leg 2) and north along 70°12'W (a repeat of Run 1 leg 3 and Run 2 leg 4) until the main front was crossed, the survey continued east along 28°50'N (Run 3 leg 5) because the strongest part of the front appeared to be moving eastward. Run 3 ended with 3 north-south legs across the front (Fig. 6).

Run 4 (Figs. 7, 8 and 9). A series of RTP (real-time profiler) drops begun after the end of Run 3 had to be abandoned because of rapidly worsening weather. Instead, the SeaSoar was redeployed and three circuits of a box were run which repeated the last two legs of Run 3. Thus four complete circuits were obtained (the excellence of the navigation is apparent from Fig. 13) at about 1-day intervals, crossing the front before during and after a storm in which westerly winds rose to force 7-9 from 60/1600 to 62/0000. Conditions were most unpleasant with the seas beam-on, but the quality of the resulting data set can be seen from the contour plots. The survey was twice broken off. On the first occasion salt spray shorted the motor generator supplying power to the container. From 61/1240-1330 Oceanus slowed to 1 kt during repairs (5406-5407 km). CTD data from 5400-5408 were recovered from backup tapes of the raw data written by the CTD deck unit. On the second occasion, the SeaSoar ceased to respond fully from 62/0005 (5519 km) so was recovered. It was found that the cable near the CTD had chafed through. The SeaSoar was redeployed within 3 hours after repair. Because the failure had occurred just as the front was being crossed, Oceanus ran south before turning north again at 5560 km in order to pick up the survey where it had been left off at 5519 km.

Run 5 (Figs. 10, 11 and 12) consisted of two circuits of the moored array, extended, because of the interesting conditions found, to include a third run down the eastern side (Fig. 12). Fresh (down to 36.4 psu) light (down to 24.65 kg/m$^3$) surface water was found stretching across the moored array from west to east forming a salinity dominated surface front in marked contrast to the temperature dominated front further north. The density change across the surface outcrop of about 0.3 kg/m$^3$ was caused by a 0.2 psu salinity change and a 0.4°C temperature change.

## 4. ACKNOWLEDGEMENTS

Our participation in FASINEX aboard R.V. Oceanus was encouraged by Bob Weller, coordinator of FASINEX and principal scientist on Oceanus. With his cooperation, SeaSoaring was allotted a generous share of the available ship time, which we hope is justified by the resultant data sets. We have already alluded to the excellence of the navigation and the unpleasant sea-states, and are most grateful to Captain Howland and all the crew for their skill and patience. Particular thanks are due to the Chief Engineer, 'Dutch' Wegman and the Marine Department of the Woods Hole Oceanographic Institution, for the speed and efficiency with which major repairs to the steering gear were made at the start of the cruise. We would like to thank all those who helped with preparation and shipping of the container, particularly Arthur Fisher and Roger Clement. The computer system was installed by the Barry Shipboard Computer Group of NERC, without whose skill the system could not have been commissioned in time. Derek Lewis in particular, got the hardware up and running and managed to keep it running against the odds despite salt water damage during shipment and on the cruise.

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TABLE 1

Comparison of navigational fixes

| Navaids differenced | Sample size | Latitude difference (m) mean | Latitude difference (m) S.D. | Longitude difference (m) mean | Longitude difference (m) S.D. |
|---|---|---|---|---|---|
| (Transit - GPS) | 12 | -150 | 290 | -50 | 370 |
| (Transit - Loran) | 12 | 2080 | 640 | -5700 | 620 |
| (GPS - Loran) | 1856 | 1850 (1) | 230 | -5380 (1) | 370 |

Note (1) - Loran converted to absolute by adding
0.017° latitude (N) and -0.055° longitude (E)

TABLE 2

Alterations to Loran navigation

| Period | Navaid | Correction[1] | Comment |
|---|---|---|---|
| 45/0315-0423 | none | | Power fail, ship hove to |
| 47/1023-1106 | GPS | not logged | hove to, met. obs overnight |
| 50/0431-0542 | log/gyro | - | Ship on constant course to N at 4m/s. Assumed mean current of (24.8,-1.8) cm/s between 0430 and 0543 used. Current includes log calibration error. |
| 50/0543-0816 | GPS | (.0072,-.0155) | matched to Loran at 0821 |
| 50/0816-0821 | none | | timegap, expect poor ship velocity |
| 51/1147-1157 | GPS | (.0026,-.0068) | hove to, float work |
| 52/0522-1205 | GPS | (.0030,-.0048) | (±.0004,±.0007) |
| 53/0607-0951 | GPS | (.0004,.0033) | (±.0004,±.0003) |
| 53/1139-1150 | Loran | (.1048,-.3965) | (±.0007,±.0023) Loran lane jump |
| 54/0549-1100 | GPS | (.0007,.0028) | (±.0006,±.0001) |
| 54/1357-1524 | Loran ) | | Crane in use, so Loran computer interface failed. Patched in hand-logged 15 minute values and interpolated |
| 54/1818-1907 | Loran ) | | |
| 55/0543-1138 | GPS | (.0008,.0008) | (±.0003,±.0005) |
| 56/0510-1153 | GPS | (.0000,.0030) | |
| 56/1154-1747 | log/gyro | | Loran set adjusted, causing output to computer to be quantised to 1'. Log/gyro patch poor (ship manouvering) and appeared rotated. Navigation bad. |
| 60/0511-0615 | Loran | (-.0989,.2344) | Loran lane jump |
| 61/0254-0307 | Loran | | Severe spikes deleted and interpolated |
| 61/1213-1337 | none | | lost all power in container |
| 63/0543-1120 | GPS | (.0000,.0126) | (±.0010,.0030) |

Note [1] Correction (in degrees) (.001° latitude is approximately 100 m) added to GPS to match to <u>local</u> Loran value at end times of patched in period. See Text for further explanation.

TABLE 3

SeaSoar Runs

| Run | Time | | | Distance Run | | | Average Speed (km/hr) | Comments |
|---|---|---|---|---|---|---|---|---|
| | Start (day/time) | End (day/time) | Duration* (hours) | Start (km) | End (km) | Length* (km) | | |
| 1 | 45/0116 | 46/1830 | 41.2 | 521 | 1087 | 566 | 13.7 | Long north/south runs, circuit of moored array |
| 2 | 47/1352 | 51/0844 | 86.2 | 1194 | 2432 | 1230 | 14.3 | 8 north-south crossings of front, 16 km apart |
| 3 | 56/2010 | 60/0833 | 84.4 | 3978 | 5144 | 1166 | 13.8 | Circuit of moored array, ending with box across front |
| 4 | 60/1702 | 63/1240 | 62.9 | 5180 | 6002 | 800 | 12.7 | Three further circuits of box across front |
| 5 | 65/2152 | 67/1210 | 38.3 | 6625 | 7145 | 520 | 13.6 | Two circuits of moored array, ending with run down east side. |

Total duration: 313.0 hours = 13d 1h

Total distance run 4282 km

* excluding down time

TABLE 4

Log of significant events

| Run | Leg | Distance Run (km) | Latitude (°N) | Longitude (°W) | Jday | Time (GMT) (HHMM) | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 521 | 29.23 | 69.19 | 45 | 0116 | start of run 235° |
| | | 547 | 29.09 | 69.41 | 45 | 0311 | heave to, secure gear |
| | | 555 | 29.12 | 69.48 | 45 | 0430 | resume course 235° |
| | | 575 | 29.01 | 69.65 | 45 | 0602 | a/c 196° |
| | | 642 | 28.44 | 69.86 | 45 | 1038 | a/c 160° |
| | 2 | 713 | 27.84 | 69.61 | 45 | 1542 | o/c 180° |
| | 3 | 848 | 26.63 | 69.57 | 46 | 0200 | a/c 270° |
| | | 911 | 26.66 | 70.19 | 46 | 0631 | a/c 000° |
| | | 1089 | 28.23 | 70.13 | 46 | 1925 | end of run |
| 2 | 1 | 1194 | 28.09 | 70.14 | 47 | 1352 | start of run |
| | | 1198 | 28.07 | 70.11 | 47 | 1417 | s/c 060° |
| | | 1249 | 28.22 | 69.65 | 47 | 1731 | a/c 180° |
| | 2 | 1338 | 27.42 | 69.66 | 47 | 2351 | a/c 270° |
| | | 1355 | 27.44 | 69.83 | 48 | 0101 | a/c 000° |
| | | 1475 | 28.51 | 69.82 | 48 | 0932 | a/c 270° |
| | 3 | 1492 | 28.51 | 69.98 | 48 | 1043 | a/c 180° |
| | 4 | 1612 | 27.43 | 70.00 | 48 | 1931 | a/c 270° |
| | | 1628 | 27.44 | 70.16 | 48 | 2031 | a/c 000° |
| | | 1792 | 28.92 | 70.16 | 49 | 0730 | a/c 270° |
| | 5 | 1807 | 28.93 | 70.30 | 49 | 0833 | a/c 180° |
| | | 1909 | 28.02 | 70.32 | 49 | 1600 | cable fault, recover SeaSoar |
| | | 1917 | 27.98 | 70.29 | 49 | 2037 | restart sampling |
| | | 1918 | 27.96 | 70.28 | 49 | 2054 | s/c 190° (leg 5 contd) |
| | 6 | 1959 | 27.60 | 70.31 | 50 | 0001 | a/c 270° |
| | | 1977 | 27.62 | 70.49 | 50 | 0115 | a/c 000° |
| | | 2119 | 28.89 | 70.49 | 50 | 1103 | a/c 270° |
| | 7 | 2132 | 28.89 | 70.62 | 50 | 1159 | a/c 180° |
| | 8 | 2232 | 28.00 | 70.64 | 50 | 1901 | a/c 270° |
| | | 2247 | 28.00 | 70.79 | 50 | 2002 | a/c 000° |

TABLE 4 (Contd)

Log of significant events

| Run | Leg | Distance Run (km) | Latitude (°N) | Longitude (°W) | Jday | Time (GMT) (HHMM) | |
|---|---|---|---|---|---|---|---|
| 2 | 9 | 2342 | 28.86 | 70.78 | 51 | 0224 | a/c 118° |
| | | 2430 | 28.49 | 69.98 | 51 | 0817 | slow to recover |
| | | 2432 | 28.47 | 69.99 | 51 | 0844 | end of run |
| 3 | 1 | 3978 | 28.14 | 69.49 | 56 | 2010 | start sampling |
| | | 3980 | 28.16 | 69.49 | 56 | 2026 | start of run 000° |
| | | 4000 | 28.33 | 69.48 | 56 | 2201 | a/c 135° |
| | | 4046 | 28.05 | 69.14 | 57 | 0104 | a/c 044° |
| | | 4092 | 28.34 | 68.82 | 57 | 0403 | a/c 315° |
| | | 4133 | 28.59 | 69.12 | 57 | 0717 | a/c 225° |
| | 2 | 4176 | 28.34 | 69.45 | 57 | 1030 | a/c 135° |
| | | 4210 | 28.12 | 69.23 | 57 | 1247 | a/c 225° |
| | | 4238 | 27.93 | 69.42 | 57 | 1511 | a/c 270° |
| | | 4247 | 27.93 | 65.50 | 57 | 1600 | a/c 180° |
| | 3 | 4397 | 26.59 | 69.55 | 58 | 0331 | a/c 270° |
| | 4 | 4464 | 26.60 | 70.22 | 58 | 0329 | o/c 000° |
| | 5 | 4710 | 28.81 | 70.20 | 59 | 0100 | a/c 090° |
| | 6 | 4879 | 28.83 | 68.47 | 59 | 1152 | a/c 180° |
| | 7 | 4957 | 28.13 | 68.46 | 59 | 1749 | a/c 270° |
| | | 4973 | 28.12 | 68.62 | 59 | 1905 | a/c 000° |
| | 8 | 5043 | 28.74 | 68.64 | 60 | 0004 | a/c 090° |
| | | 5077 | 28.76 | 68.30 | 60 | 0216 | a/c 180° |
| | | 5143 | 28.17 | 68.29 | 60 | 0752 | slow to recover |
| | | 5144 | 28.17 | 68.30 | 60 | 0833 | end of run |

TABLE 4 (Contd)

Log of significant events

| Run | Leg | Distance Run (km) | Latitude (°N) | Longitude (°W) | Jday | Time (GMT) (HHMM) | |
|---|---|---|---|---|---|---|---|
| 4 | 1 | 5180 | 28.25 | 68.44 | 60 | 1702 | start of run |
| | | 5195 | 28.12 | 68.46 | 60 | 1847 | a/c 270° |
| | | 5212 | 28.13 | 68.63 | 60 | 2018 | o/c 000° |
| | 2 | 5309 | 28.99 | 68.63 | 61 | 0438 | a/c 090° |
| | | 5342 | 28.99 | 68.29 | 61 | 0720 | a/c 180° |
| | | 5406 | 28.43 | 68.29 | 61 | 1240 | computer power fail, slow to 1 kt |
| | | 5407 | 28.42 | 68.31 | 61 | 1330 | return to speed |
| | 3 | 5428 | 28.23 | 68.29 | 61 | 1527 | a/c 270° |
| | | 5463 | 28.23 | 68.63 | 61 | 1931 | a/c 000° |
| | | 5519 | 28.73 | 68.63 | 62 | 0005 | SeaSoar failed, stop yoyo |
| | | 5540 | 28.88 | 68.70 | 62 | 0359 | Restart SeaSoar, a/c 160° |
| | | 5560 | 28.72 | 68.65 | 62 | 0523 | a/c 000°, continue survey |
| | 4 | 5592 | 28.99 | 68.63 | 62 | 0744 | a/c 090° |
| | | 5625 | 28.99 | 68.30 | 62 | 0946 | a/c 180° |
| | 5 | 5718 | 28.16 | 68.30 | 62 | 1605 | a/c 270° |
| | | 5750 | 28.16 | 68.62 | 62 | 1823 | a/c 000° |
| | 6 | 5844 | 29.00 | 68.62 | 63 | 0100 | a/c 090° |
| | | 5875 | 28.99 | 68.30 | 63 | 0302 | o/c 180° |
| | | 5968 | 28.16 | 68.30 | 63 | 1001 | o/c 270° |
| | | 6002 | 28.17 | 68.65 | 63 | 1240 | end of run |
| 5 | 1 | 6625 | 27.39 | 69.62 | 65 | 2152 | start of run 180° |
| | | 6676 | 26.93 | 69.62 | 66 | 0205 | a/c 270° |
| | | 6729 | 26.94 | 70.14 | 66 | 0617 | o/c 000° |
| | | 6780 | 27.39 | 70.13 | 66 | 0942 | a/c 090° |
| | 2 | 6831 | 27.38 | 69.62 | 66 | 1316 | o/c 180° |
| | | 6883 | 26.92 | 69.63 | 66 | 1701 | a/c 270° |
| | | 6934 | 26.93 | 70.14 | 66 | 2047 | a/c 000° |
| | | 6986 | 27.39 | 70.13 | 67 | 0008 | a/c 090° |
| | 3 | 7036 | 27.39 | 69.63 | 67 | 0346 | a/c 180° |
| | | 7089 | 26.92 | 69.62 | 67 | 0743 | a/c 209° |
| | | 7145 | 26.49 | 69.91 | 67 | 1210 | end of run |

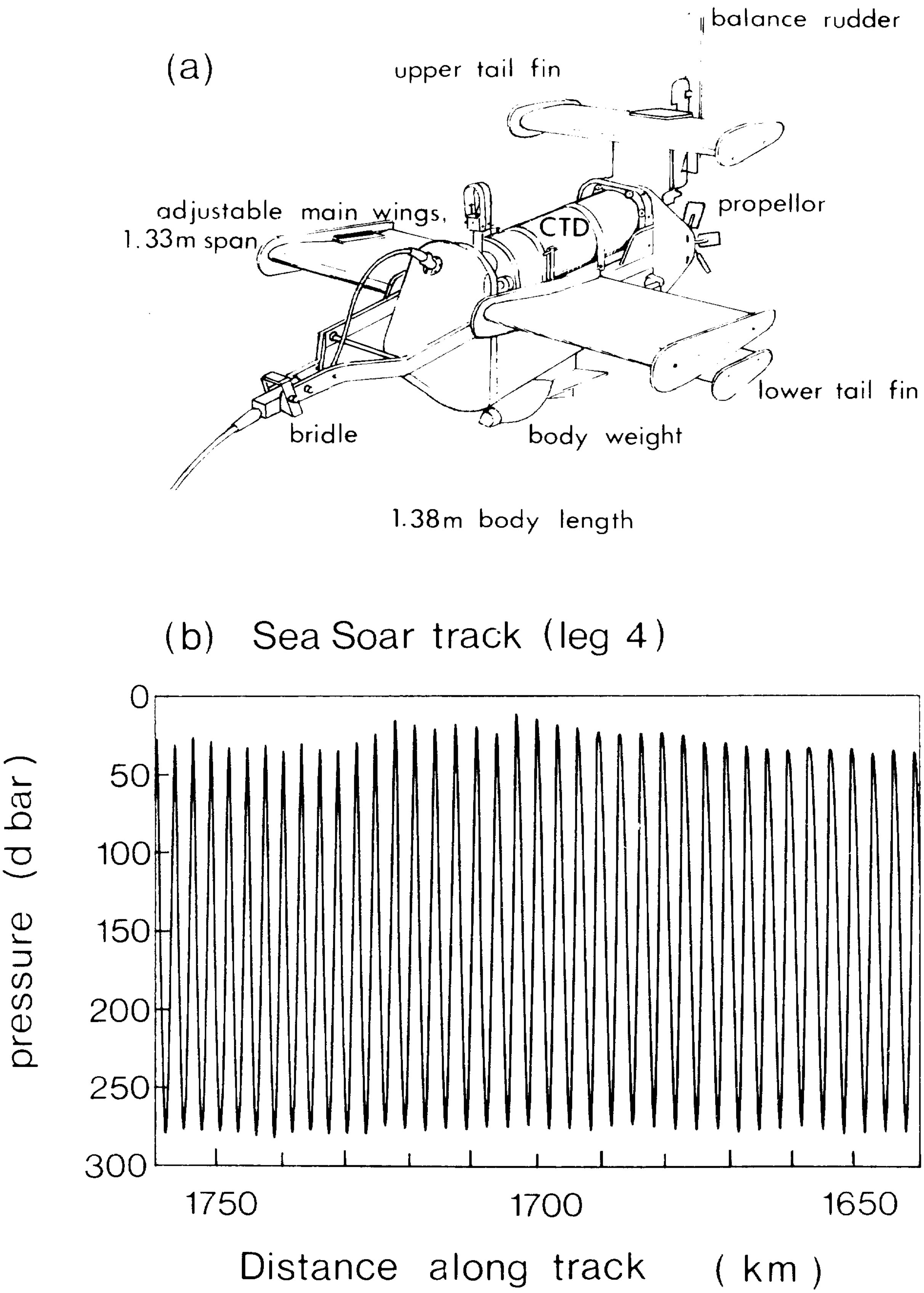



Fig. 1 (a) The SeaSoar, derived from the Canadian Batfish, is a body with hydraulically powered, controllable wings. In FASINEX, it housed a Neil Brown CTD (conductivity, temperature, depth measuring instrument); (b) Towed at 8 knots, the SeaSoar can dive and climb at an angle of about 1:5 to the horizontal, thus completing a sawtooth path to 300 m or more every 3 km. The shallow turn had to be made 10-30 m below the surface to avoid fouling by sargassum. The track shown is leg 4 of Run 2.

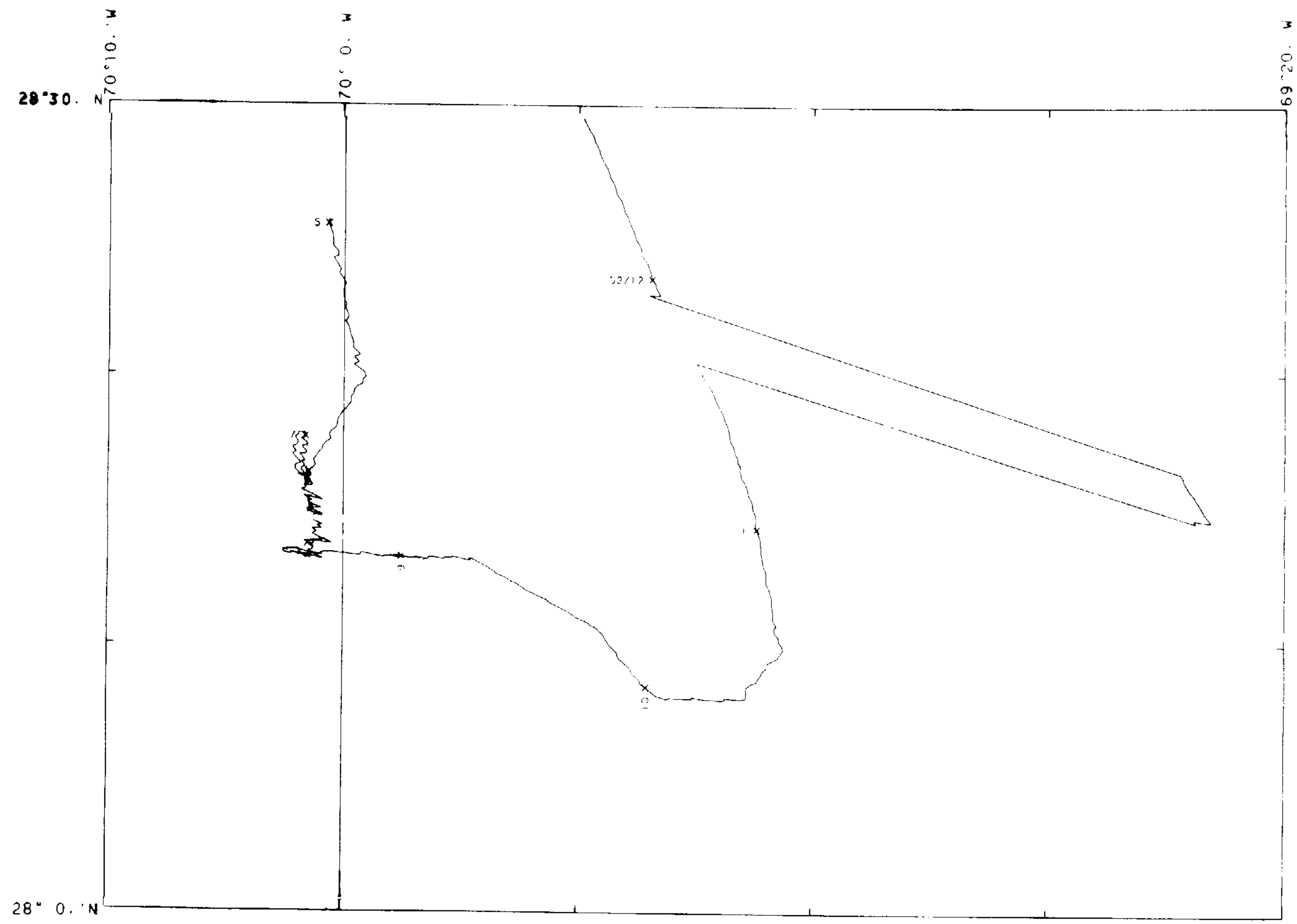



Fig. 2(a) Track plot for the period 52/0500 - 52/1200 using 1-minute Loran values with no smoothing.

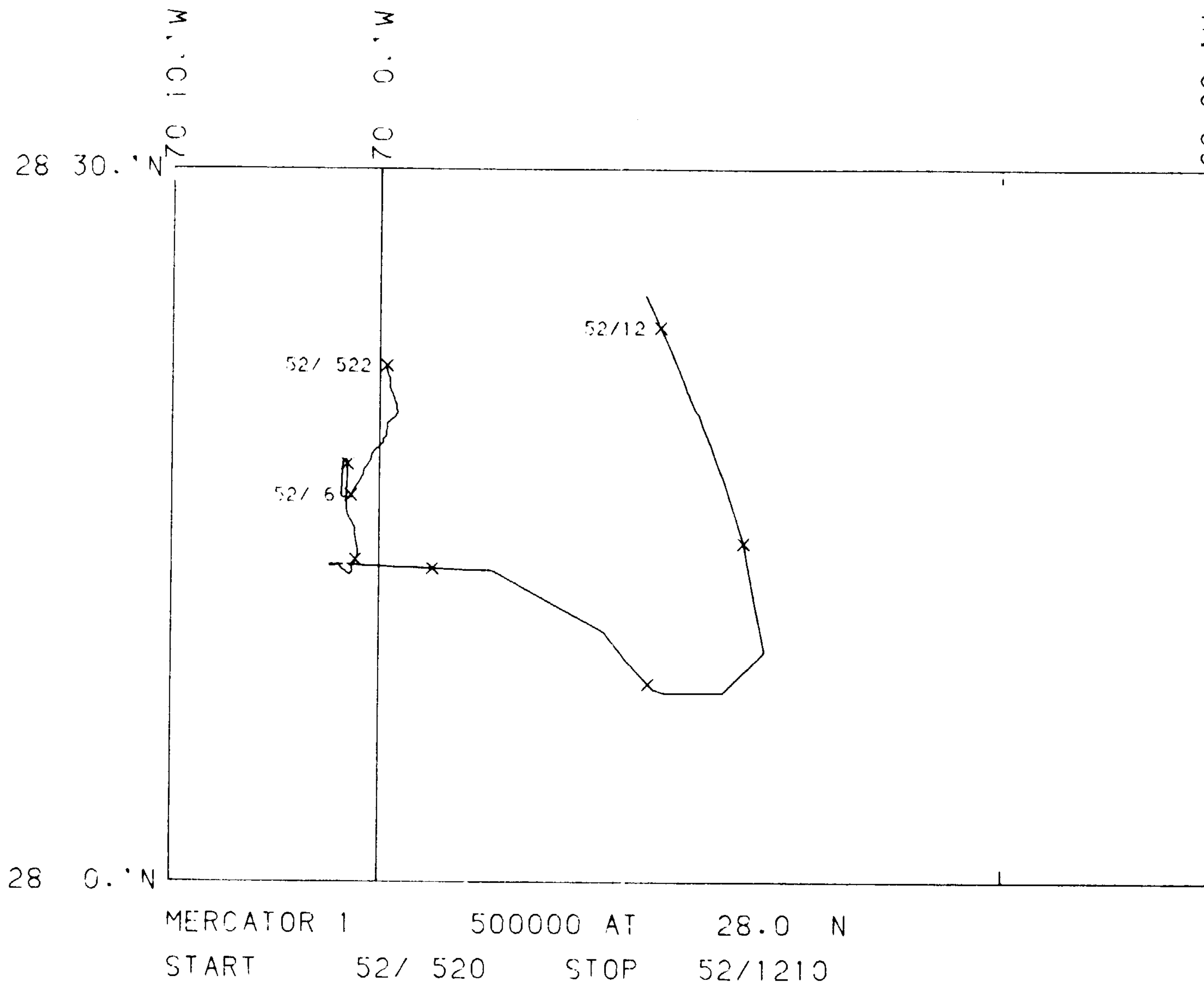



Fig. 2(b) Track plot for the period 52/0500 - 52/1200 as (a) but with GPS patched in at 1 minute intervals for the period 0600 - 1200.

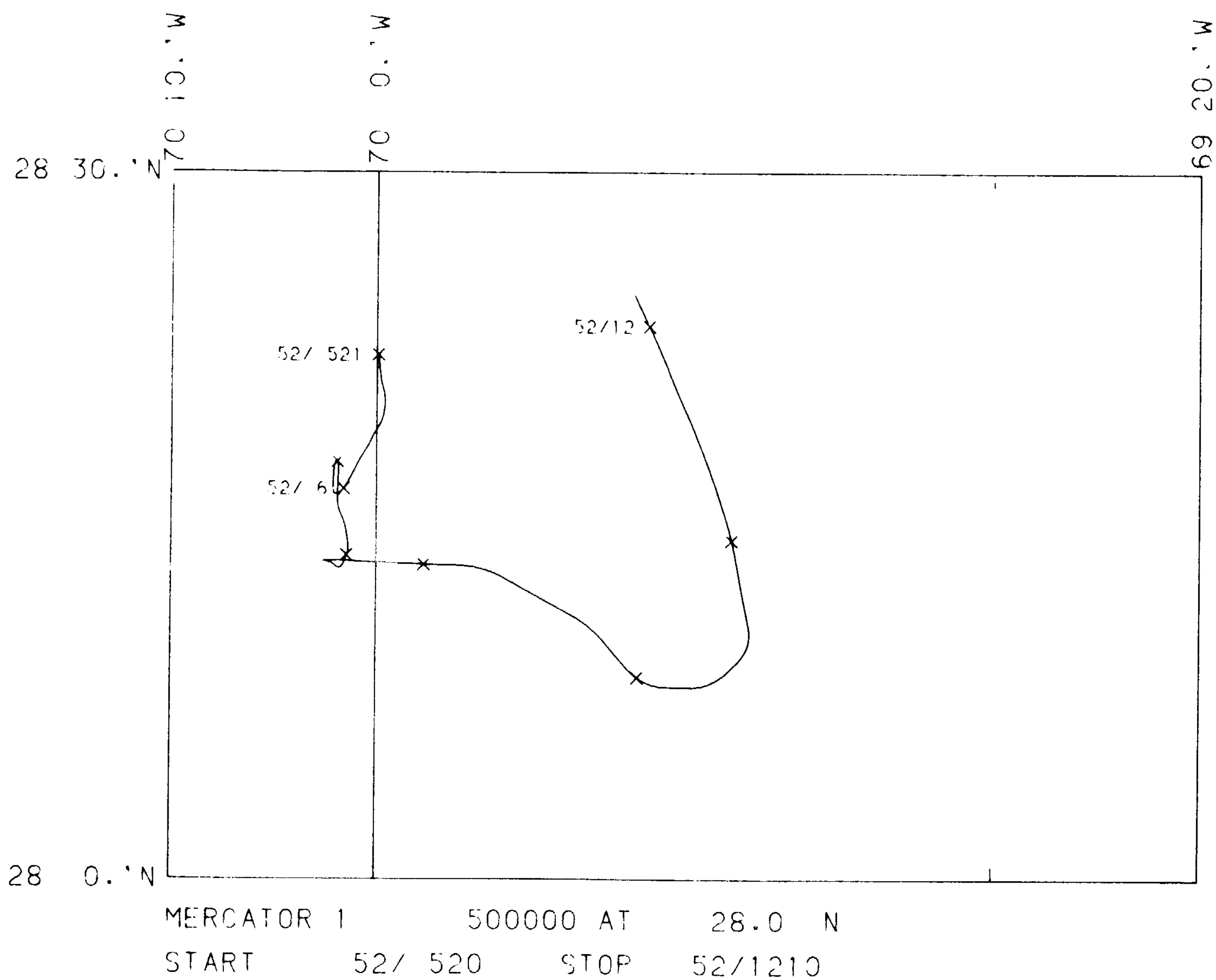



Fig. 2(c) Track plot for the period 52/0500 - 52/1200. The data of (b) further smoothed with an 11 point running mean. The filter smooths the genuinely sharp turning points between 0900 - 1100, but is necessary to smooth Loran data before integrating to calculate distance run.

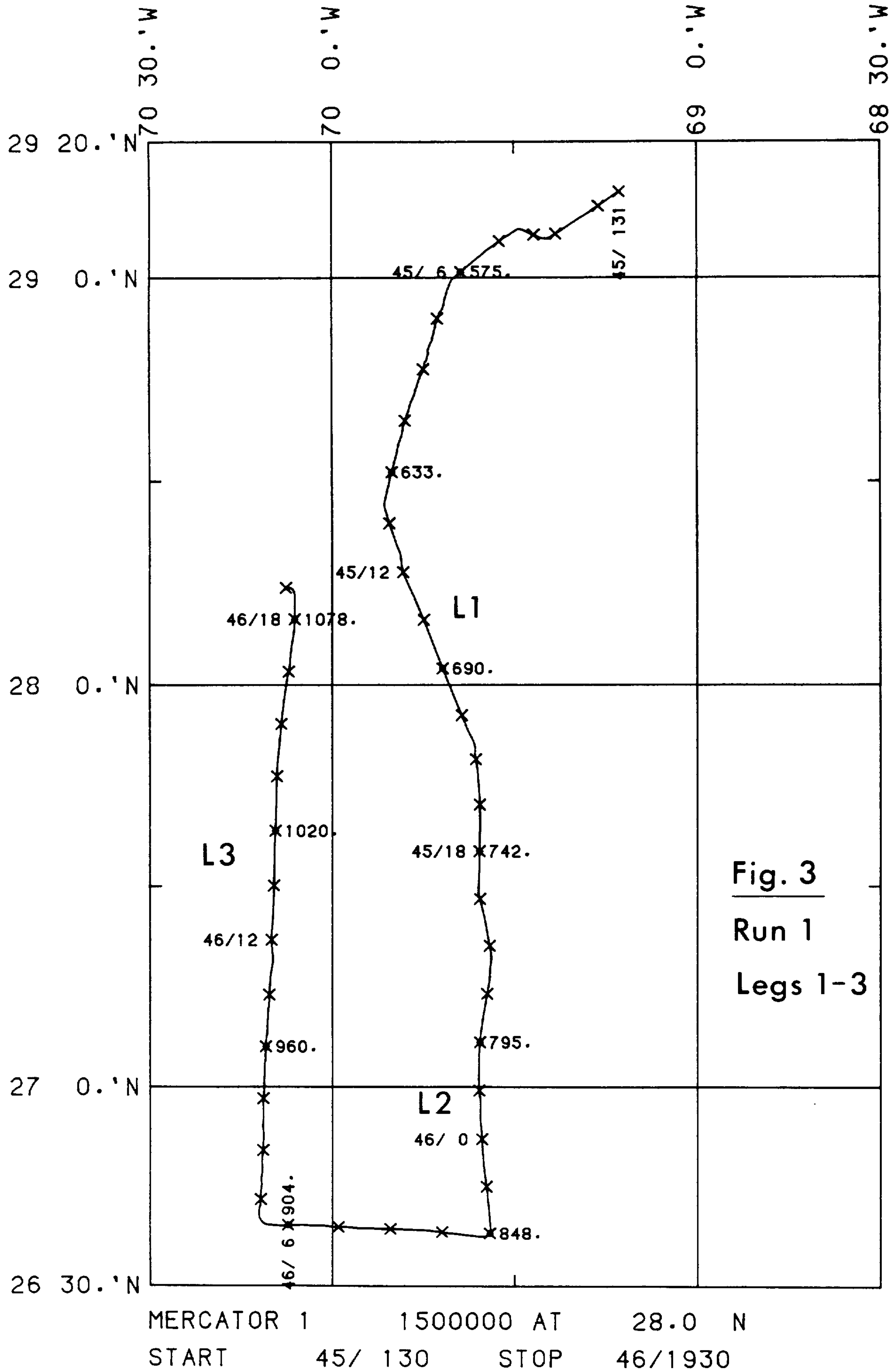



Fig. 3

Run 1

Legs 1-3

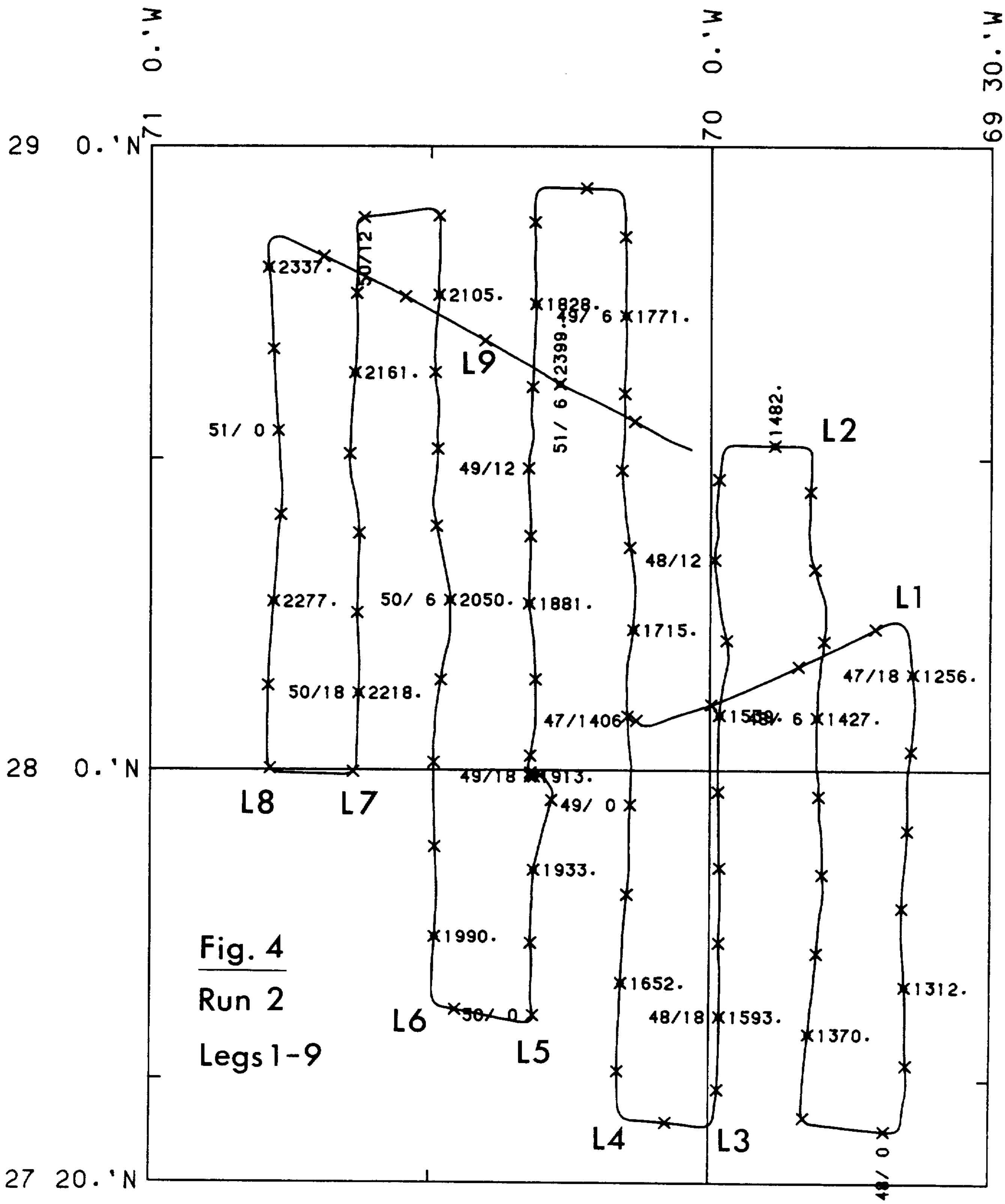



Fig. 4
Run 2
Legs 1-9

MERCATOR 1 1000000 AT 28.0 N
START 47/1405 STOP 51/ 747

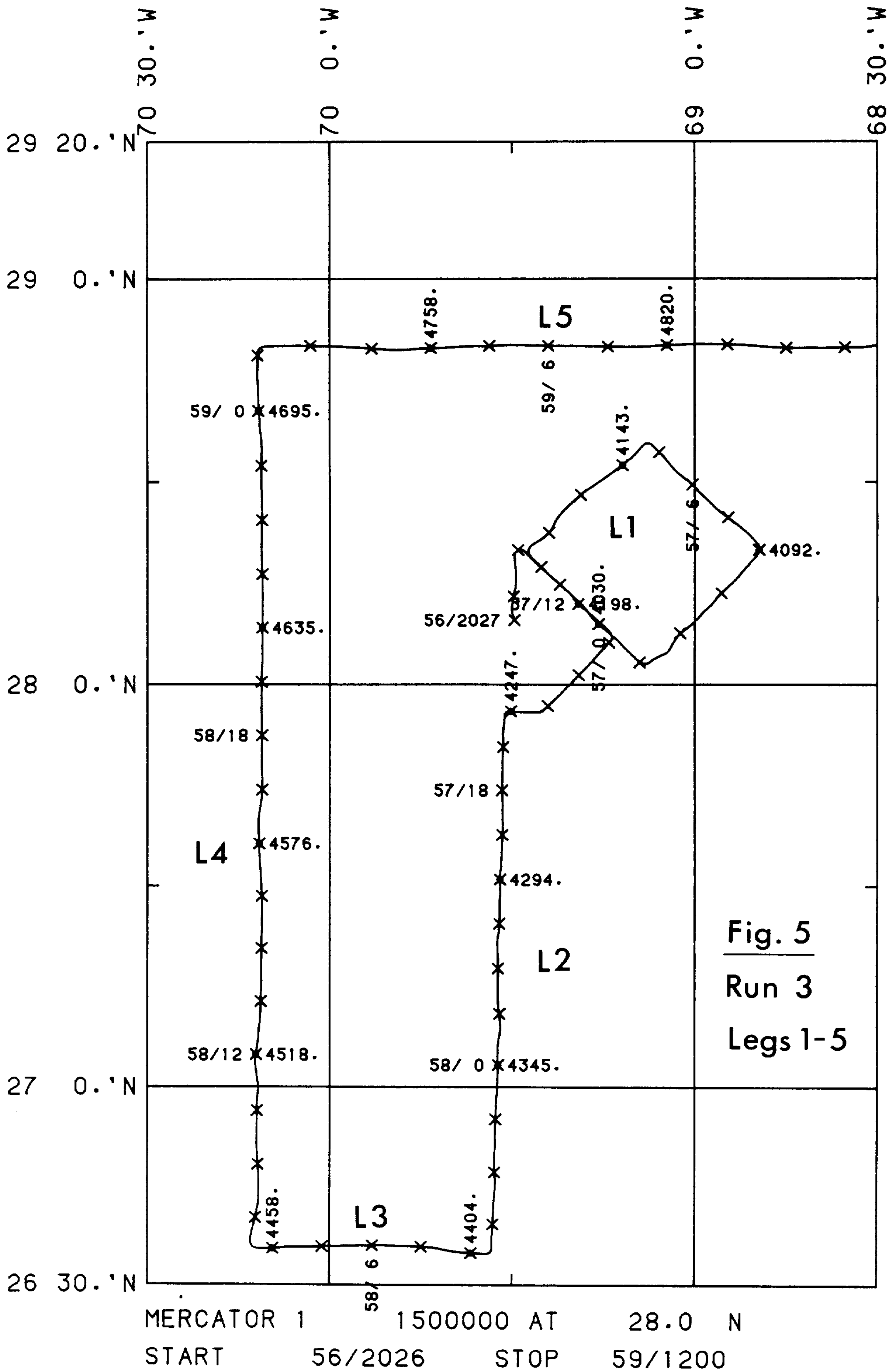
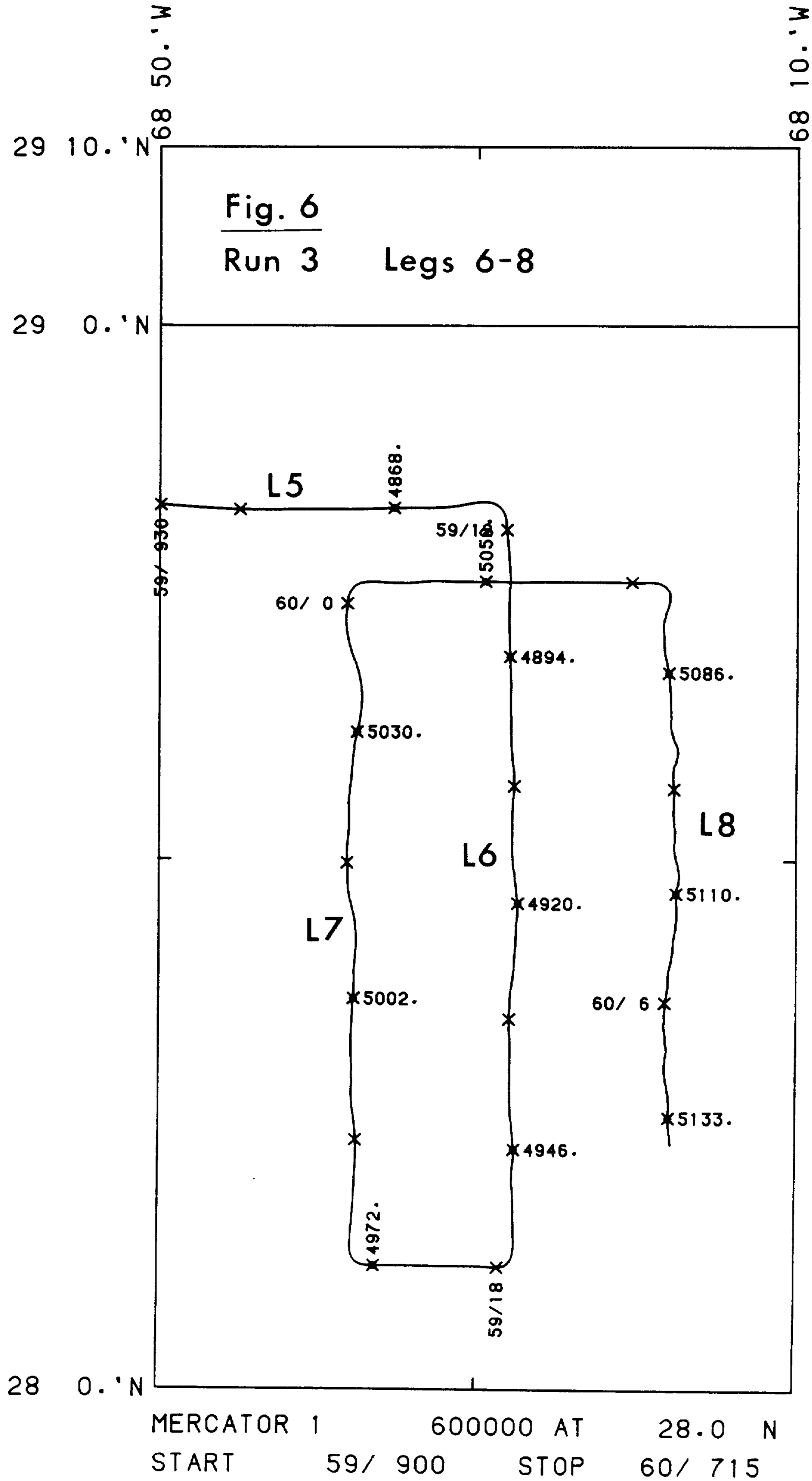


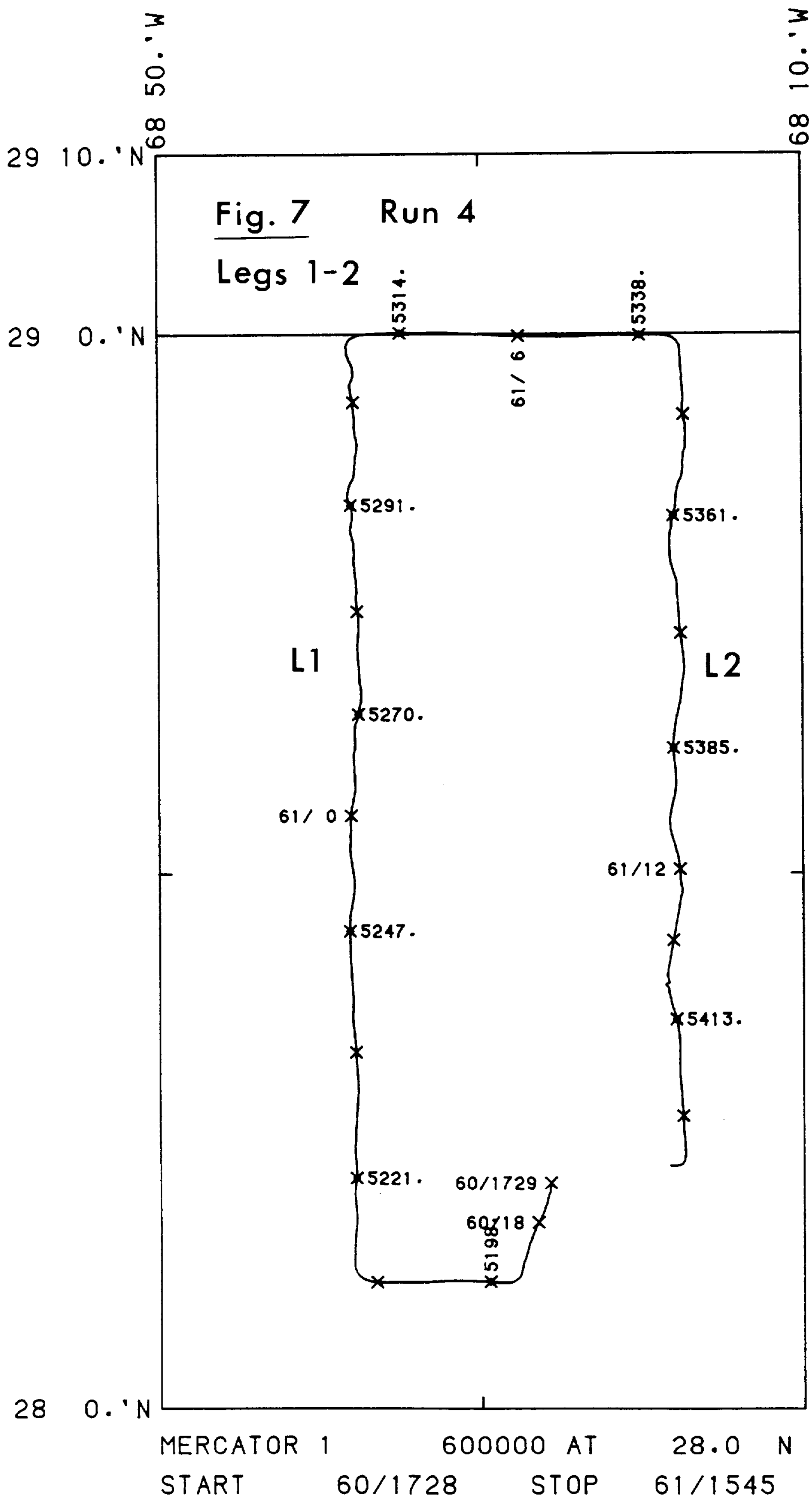

Fig. 5

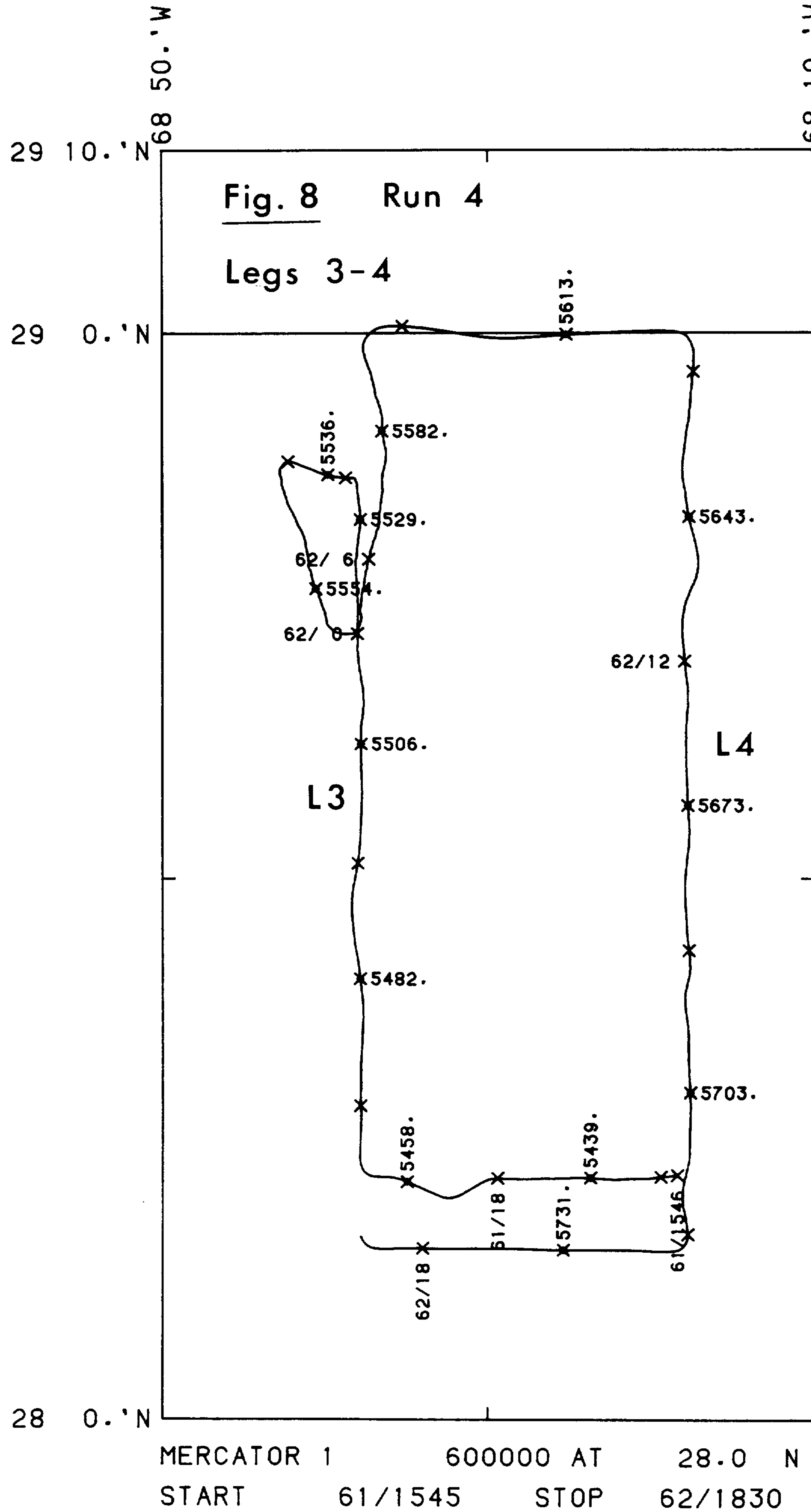
Run 3

Legs 1-5



68 50.'W
68 10.'W
29 10.'N
Fig. 6
Run 3 Legs 6-8
29 0.'N
L5
4868.
59/ 930
59/16
5058
60/ 0
4894.
5086.
5030.
L8
L6
4920.
5110.
L7
5002.
60/ 6
5133.
4946.
4972.
59/18
28 0.'N
MERCATOR 1 600000 AT 28.0 N
START 59/ 900 STOP 60/ 715


68 50.'W
68 10.'W
29 10.'N
29 0.'N
28 0.'N
Fig. 7 Run 4
Legs 1-2
5314.
5338.
61/ 6
5291.
5361.
L1
L2
5270.
5385.
61/ 0
61/12
5247.
5413.
5221.
60/1729
60/18
5198.
MERCATOR 1 600000 AT 28.0 N
START 60/1728 STOP 61/1545


68 50.'W
68 10.'W
29 10.'N
29 0.'N
28 0.'N
Fig. 8 Run 4
Legs 3-4
5613.
5582.
5536.
5529.
62/ 6
5554.
62/ 0
5506.
L3
5482.
5458.
5643.
62/12
L4
5673.
5703.
5439.
61/18
5731.
61/1546
62/18
MERCATOR 1 600000 AT 28.0 N
START 61/1545 STOP 62/1830

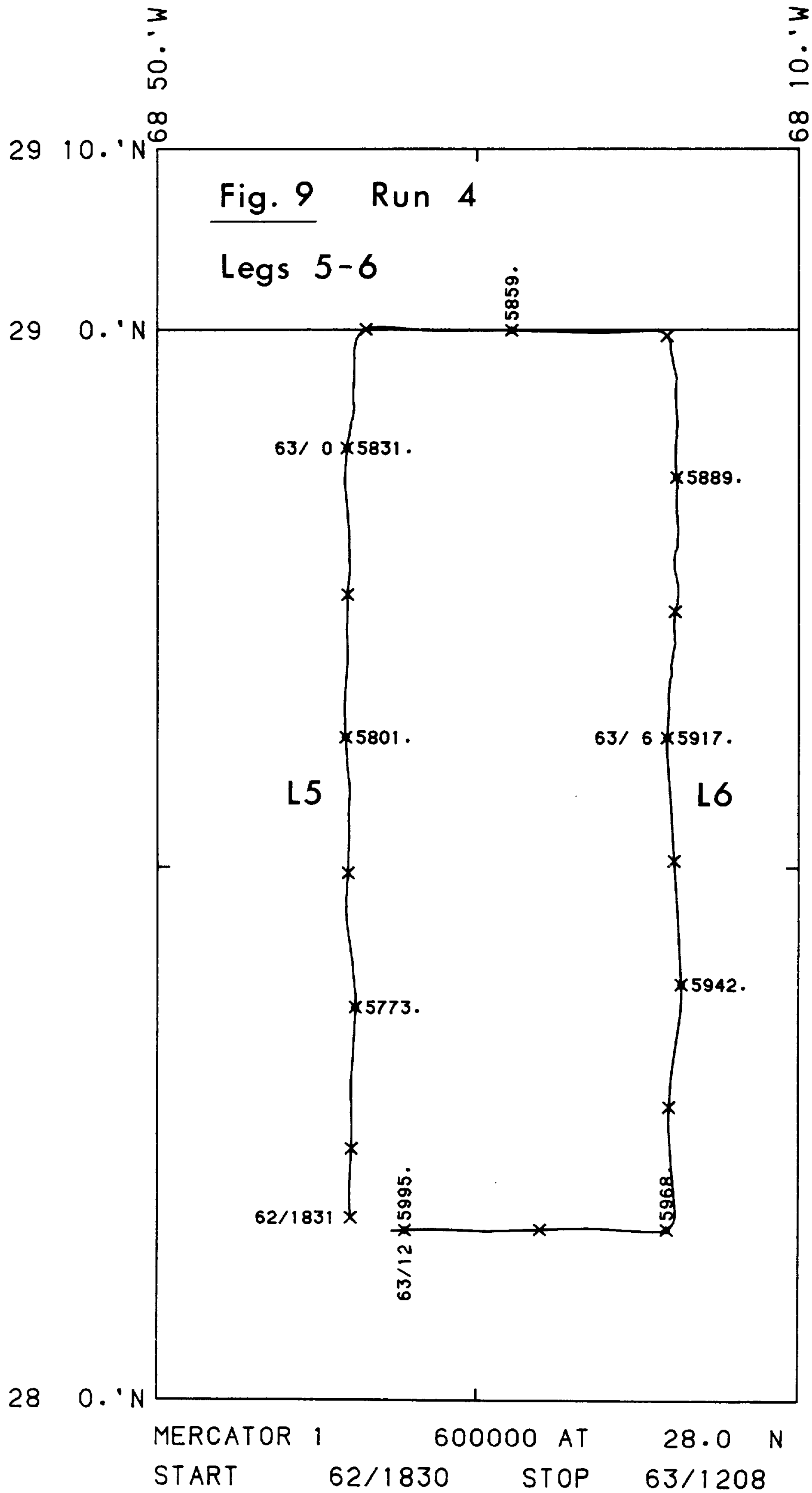


Fig. 9 Run 4
Legs 5-6
68 50.'W
68 10.'W
29 10.'N
29 0.'N
28 0.'N
5859.
63/ 0
5831.
5889.
5801.
63/ 6
5917.
L5
L6
5773.
5942.
62/1831
5995.
63/12
5968.
MERCATOR 1 600000 AT 28.0 N
START 62/1830 STOP 63/1208

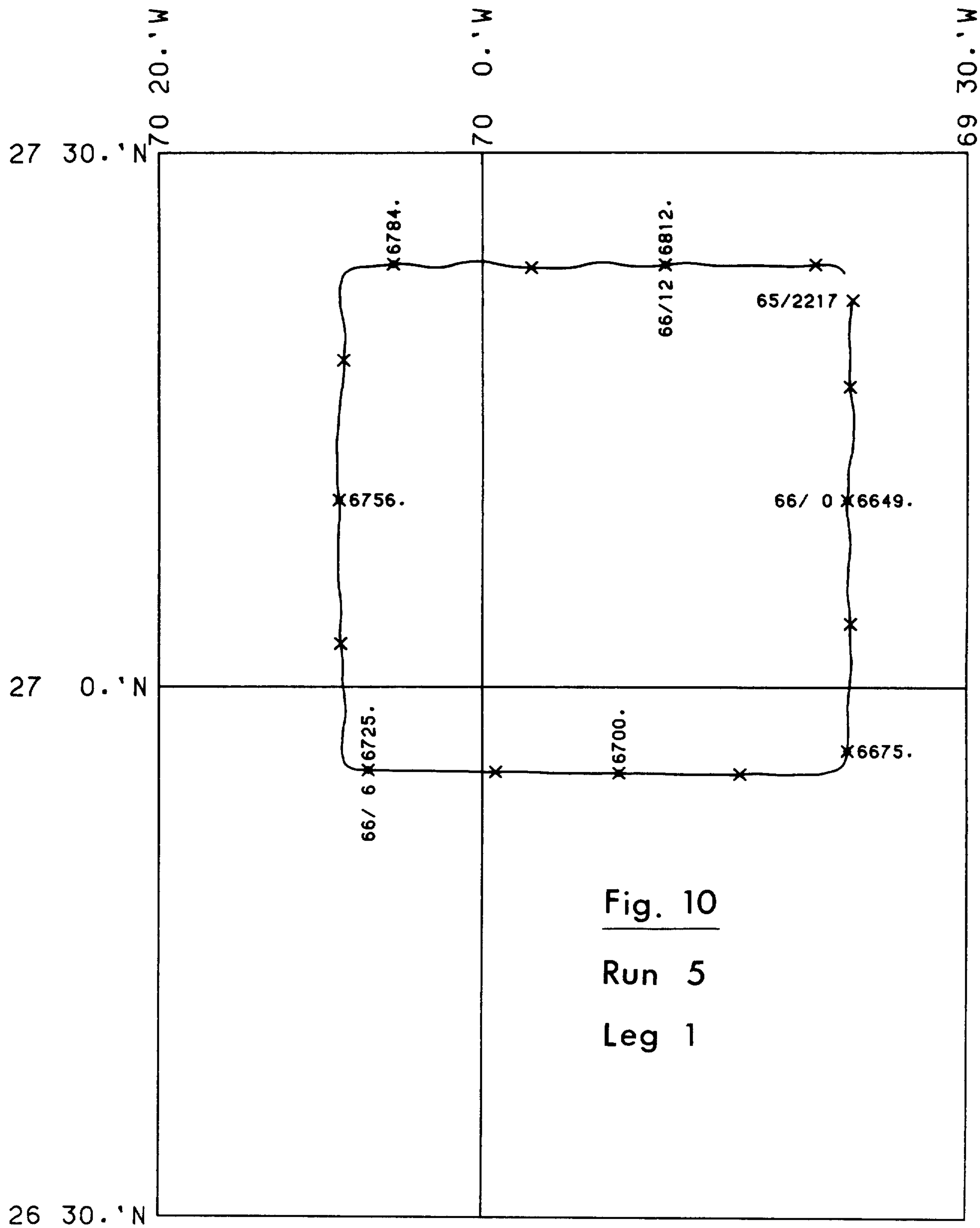



Fig. 10

Run 5

Leg 1

MERCATOR 1 600000 AT 28.0 N
START 65/2216 STOP 66/1315

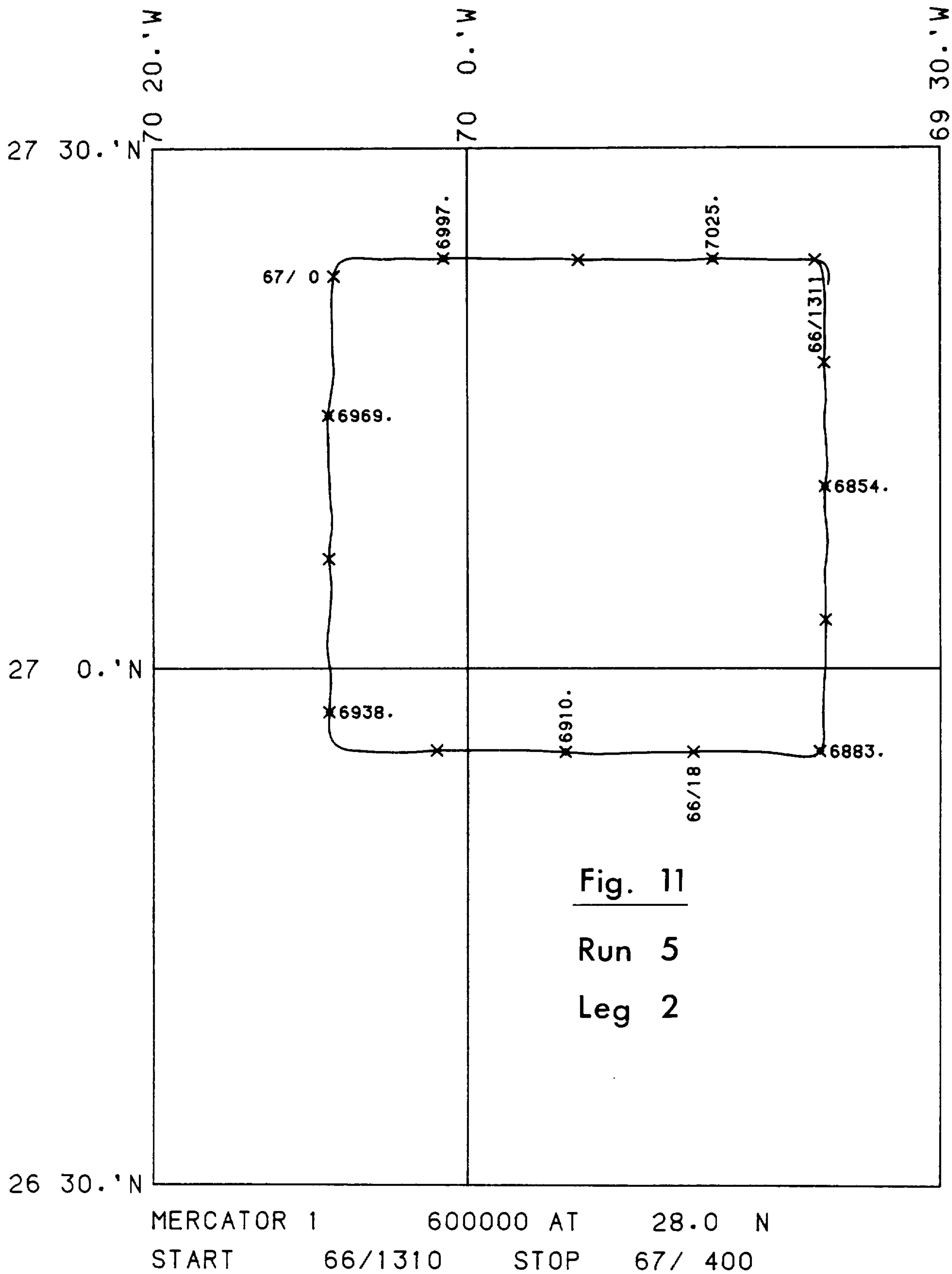
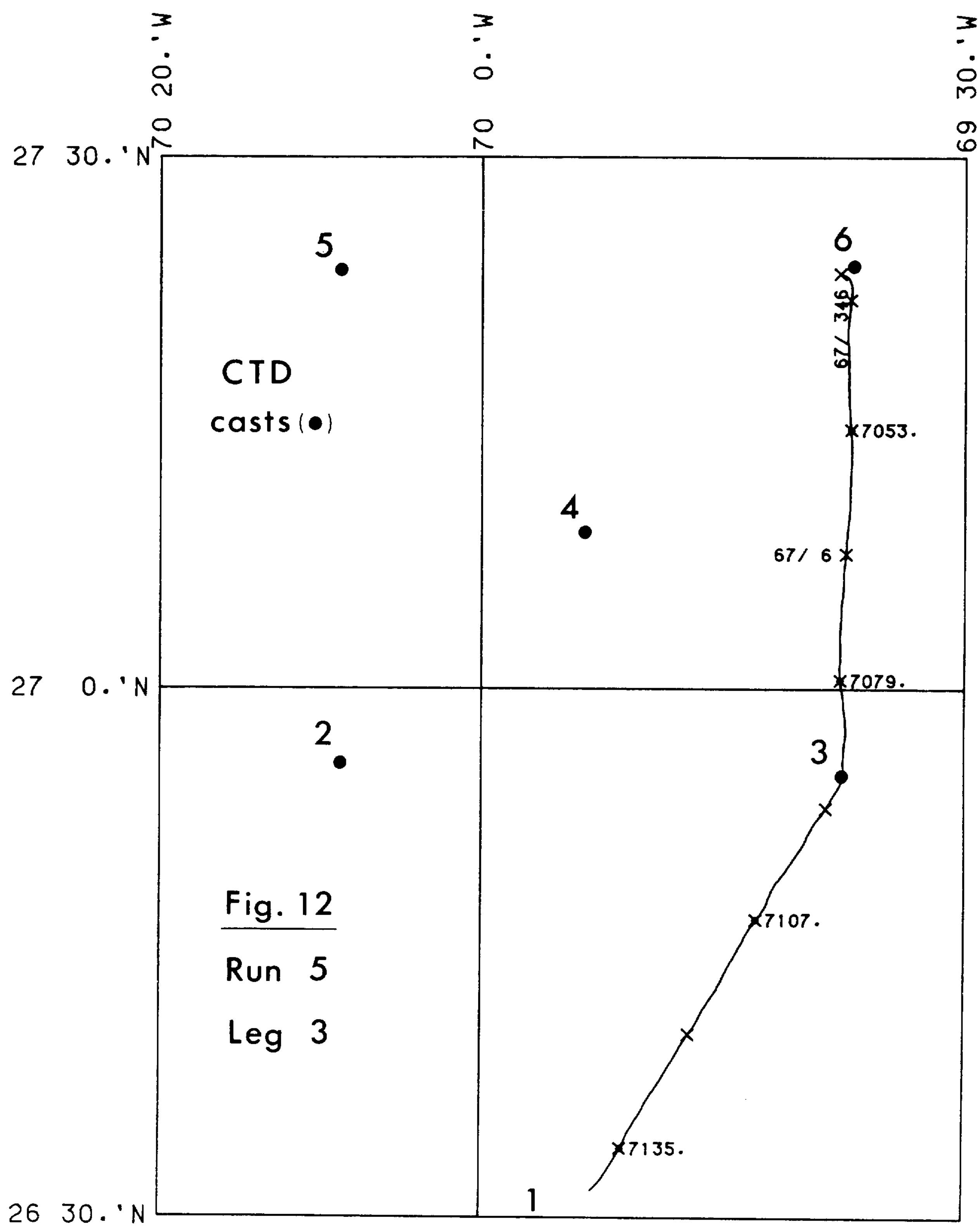



Fig. 11

Run 5

Leg 2




MERCATOR 1 600000 AT 28.0 N

START 67/ 345 STOP 67/1124

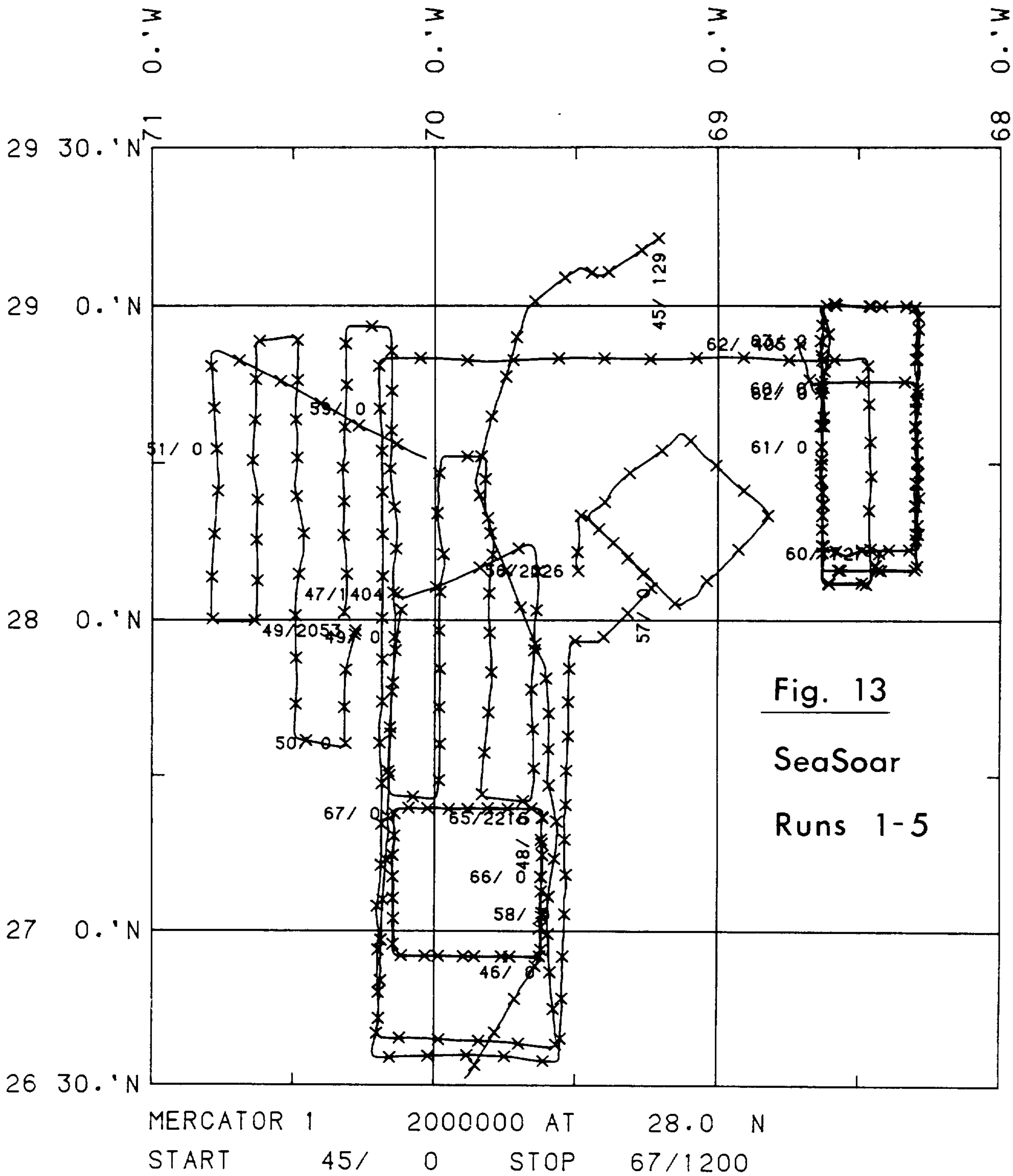
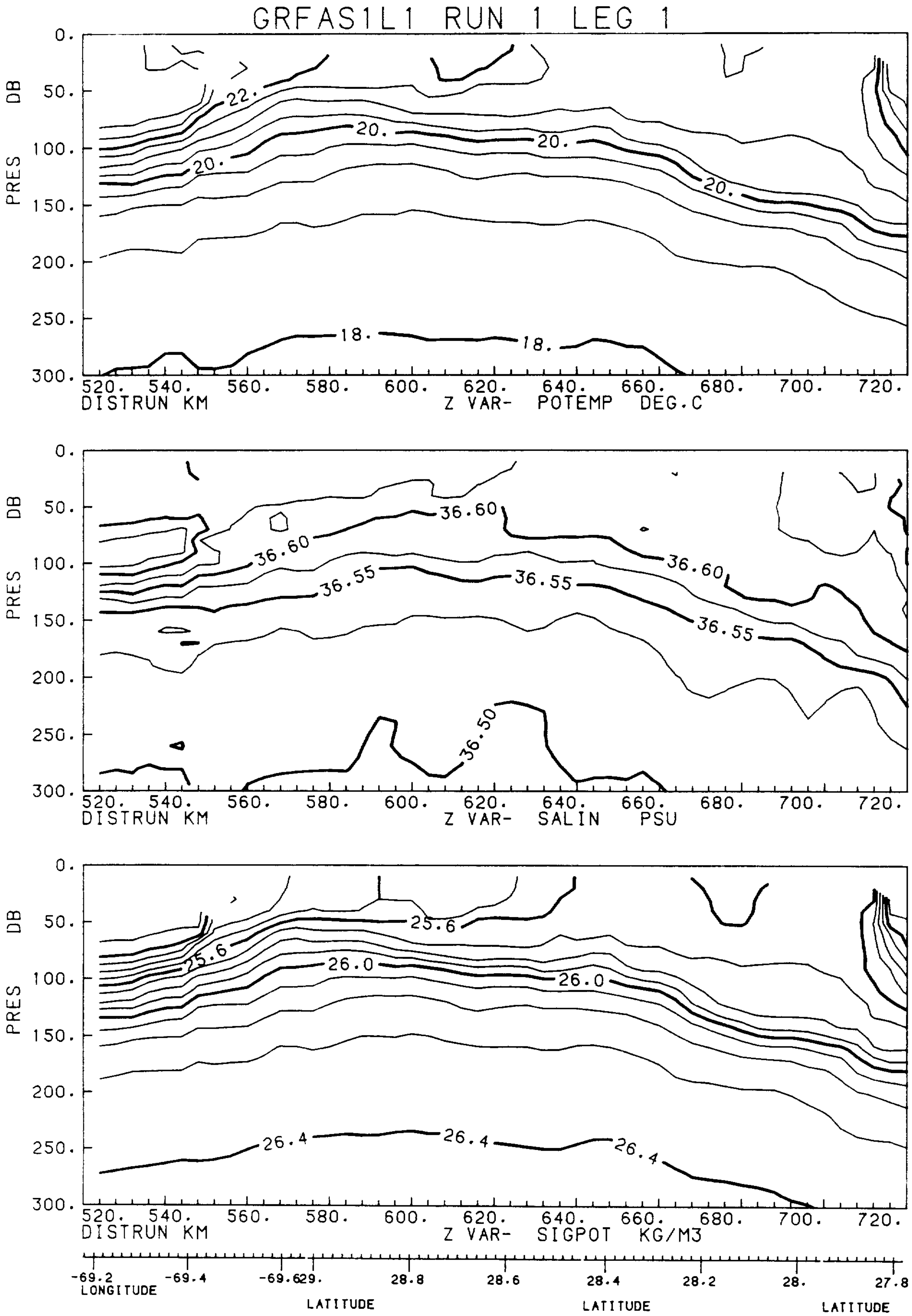


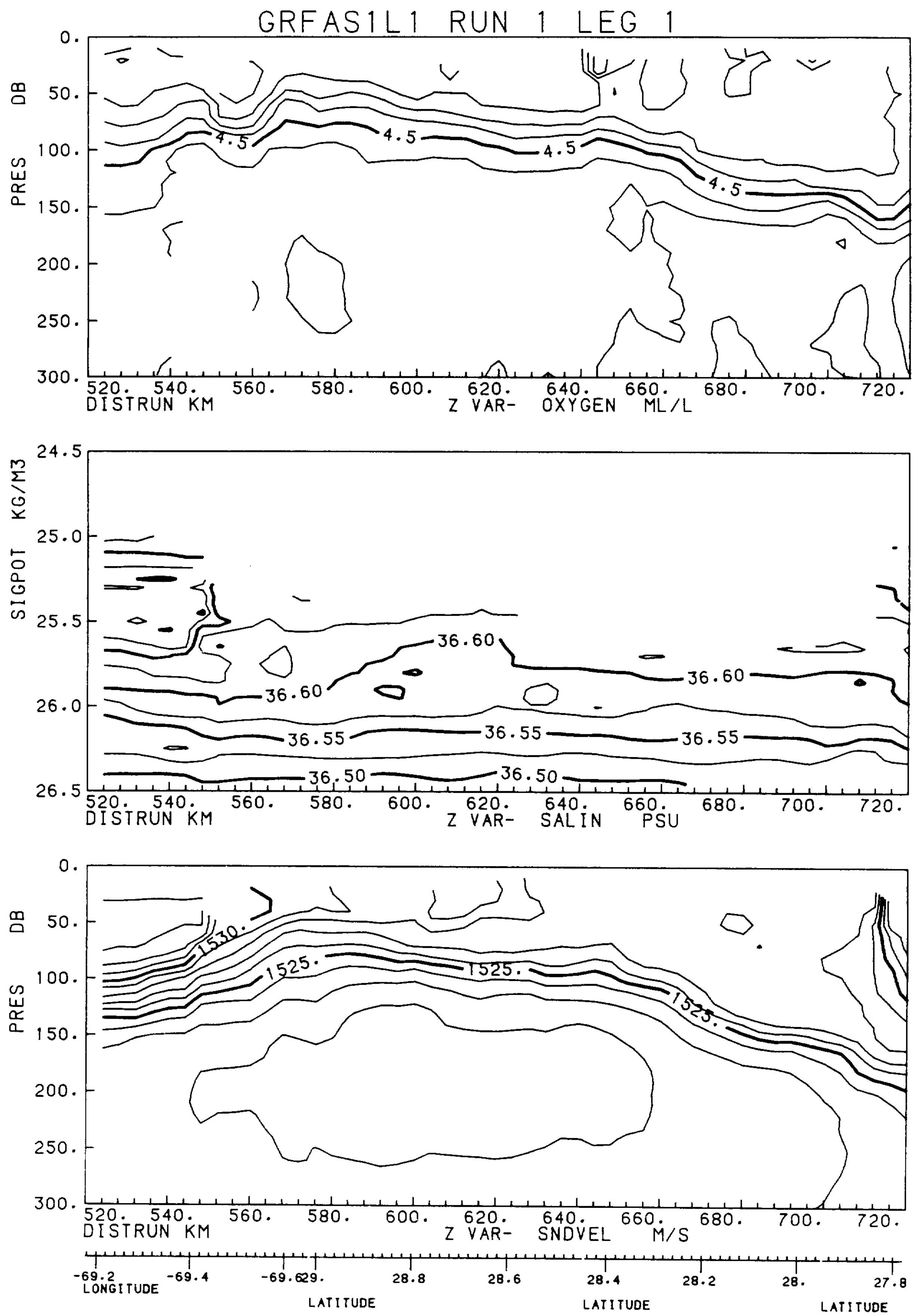

Fig. 13

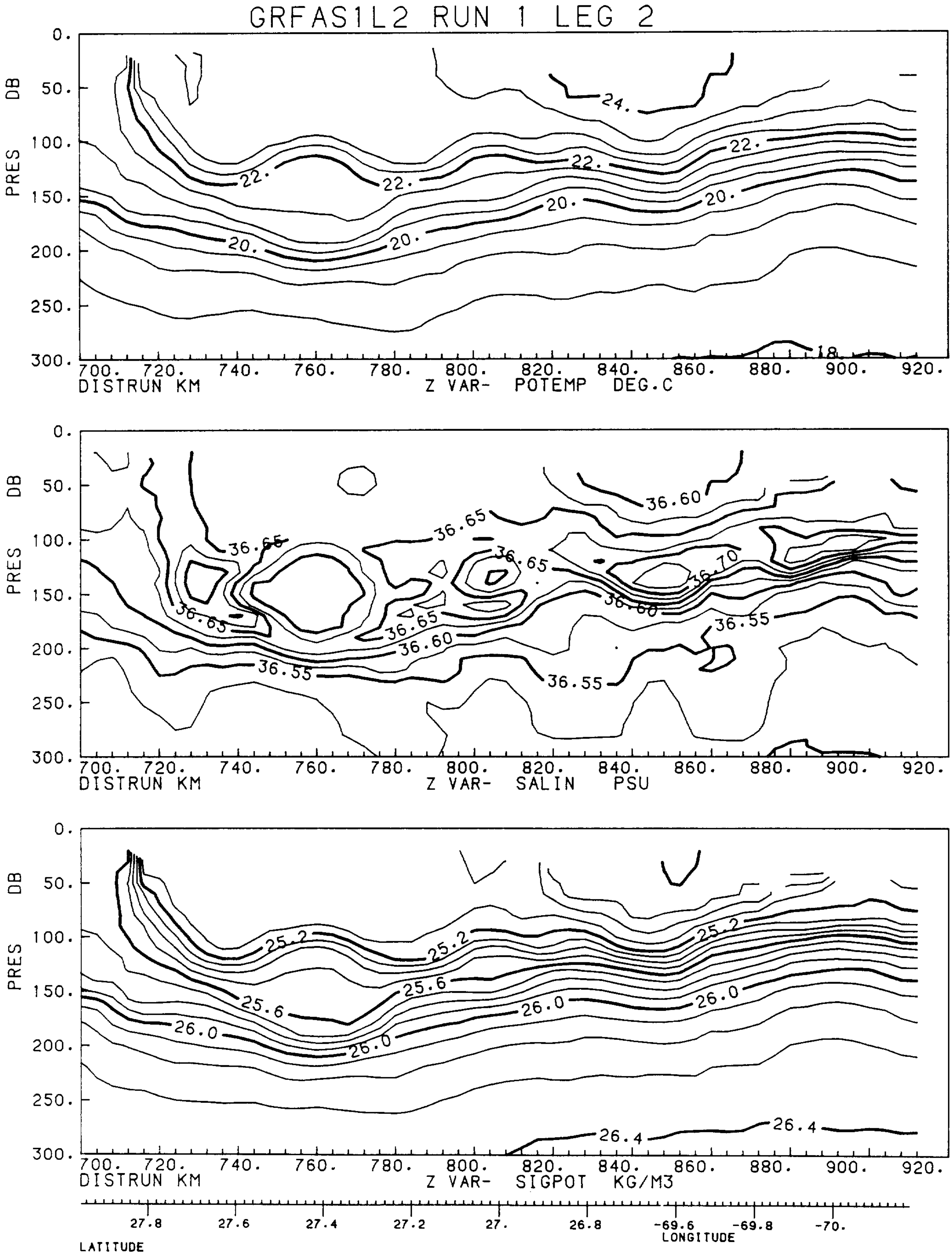
SeaSoar

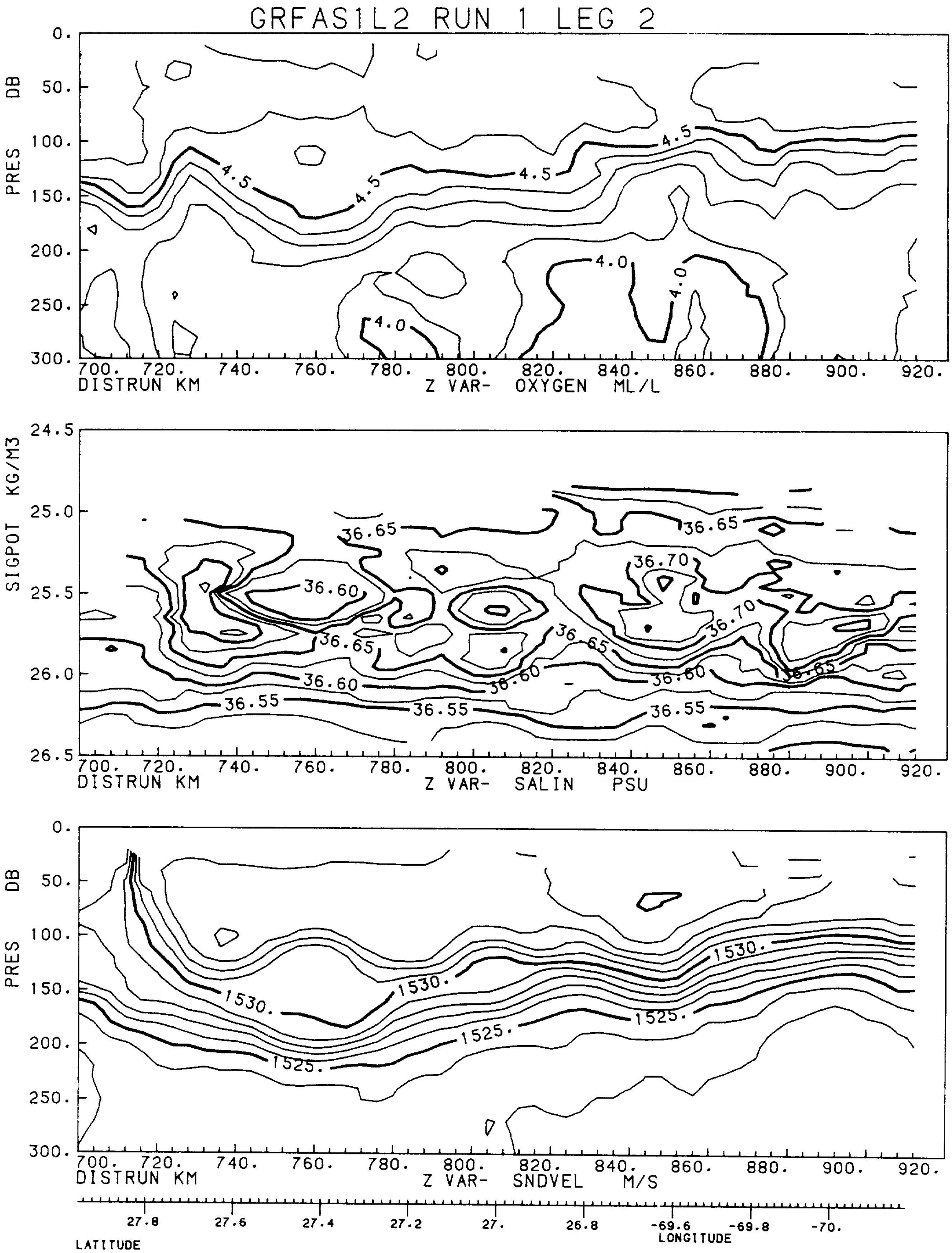
Runs 1-5

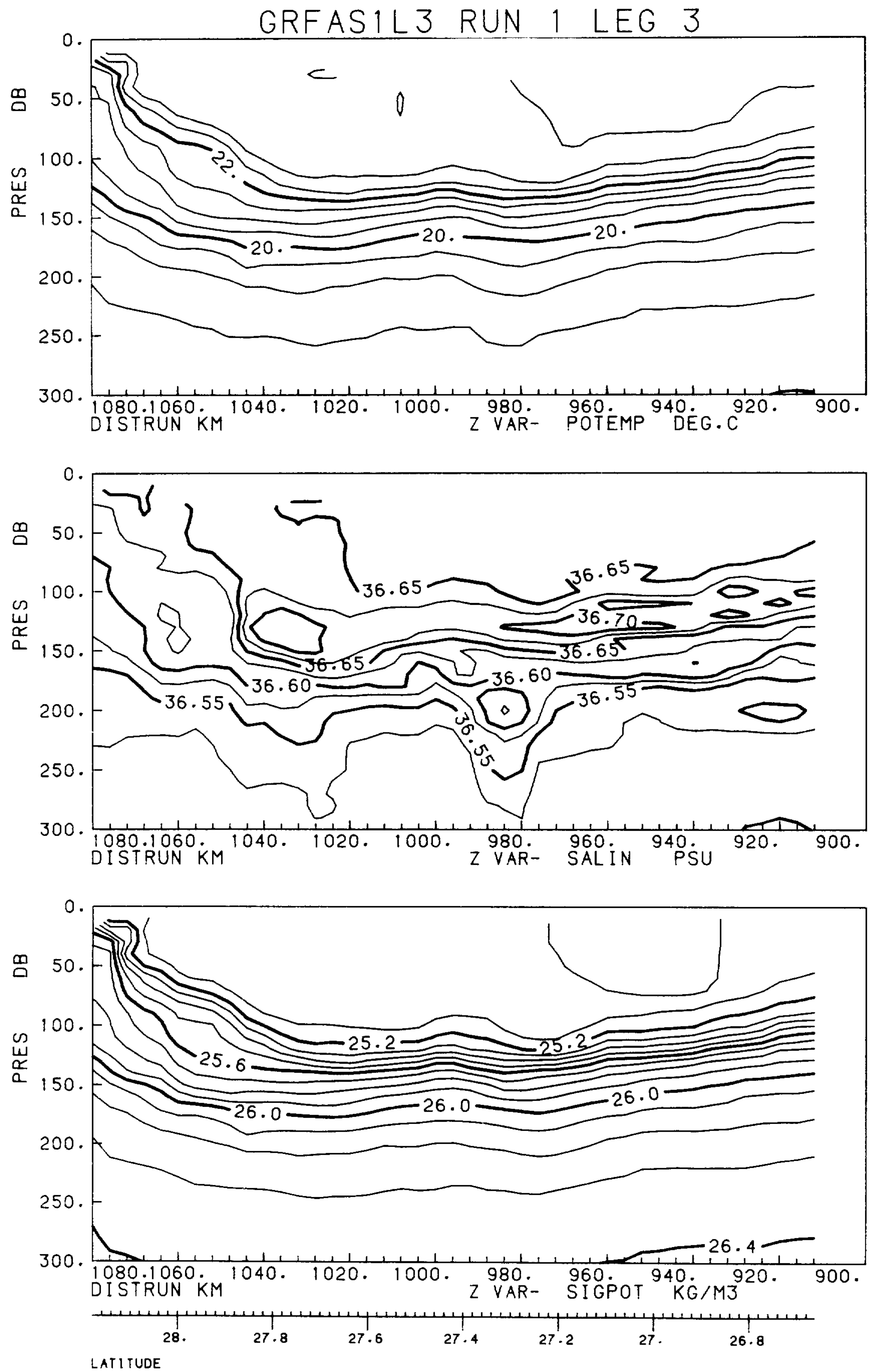


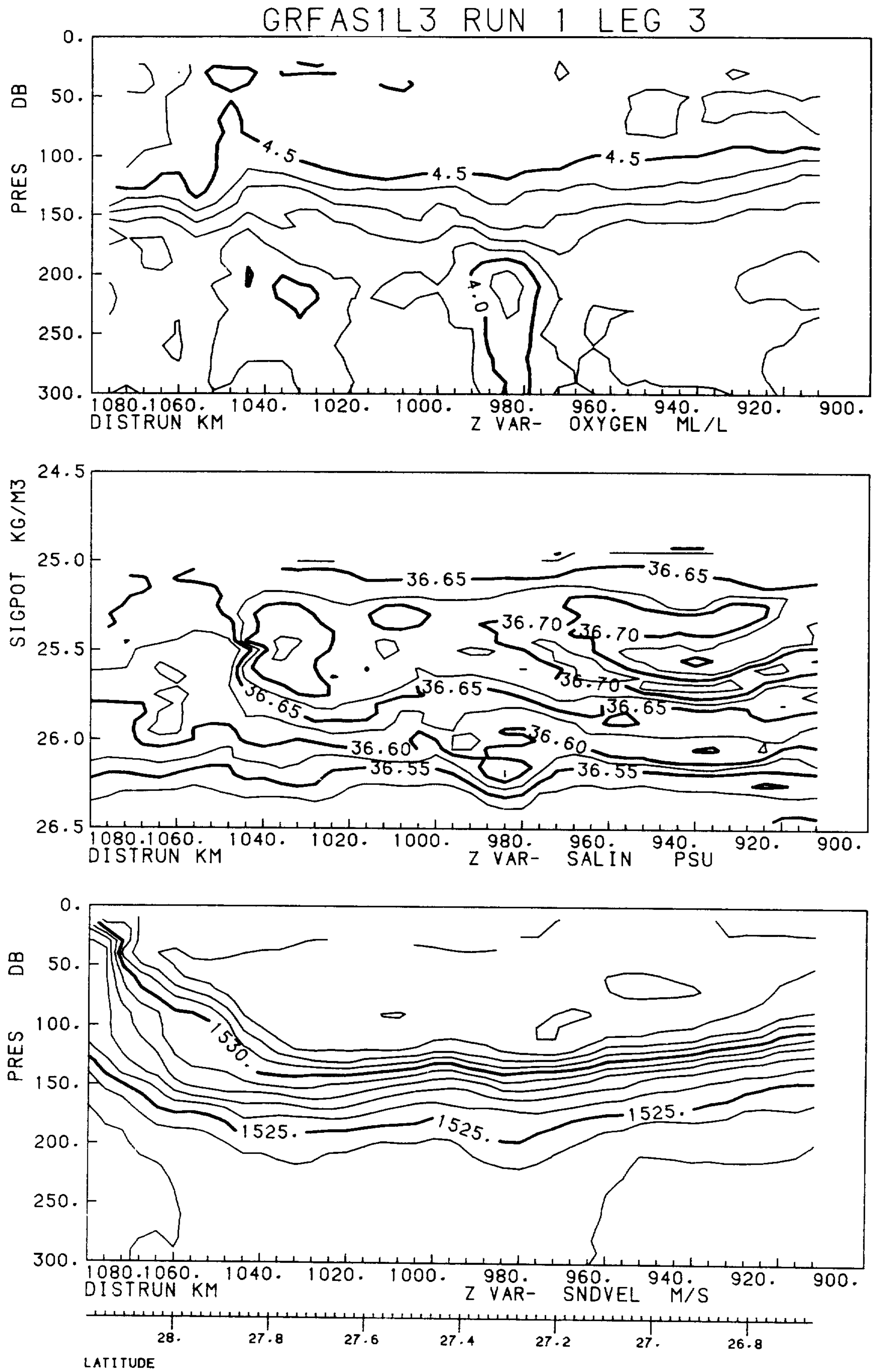
GRFAS1L1 RUN 1 LEG 1
PRES DB
DISTRUN KM
Z VAR- POTEMP DEG.C
22.
20.
18.
Z VAR- SALIN PSU
36.60
36.55
36.50
Z VAR- SIGPOT KG/M3
25.6
26.0
26.4
LONGITUDE
LATITUDE

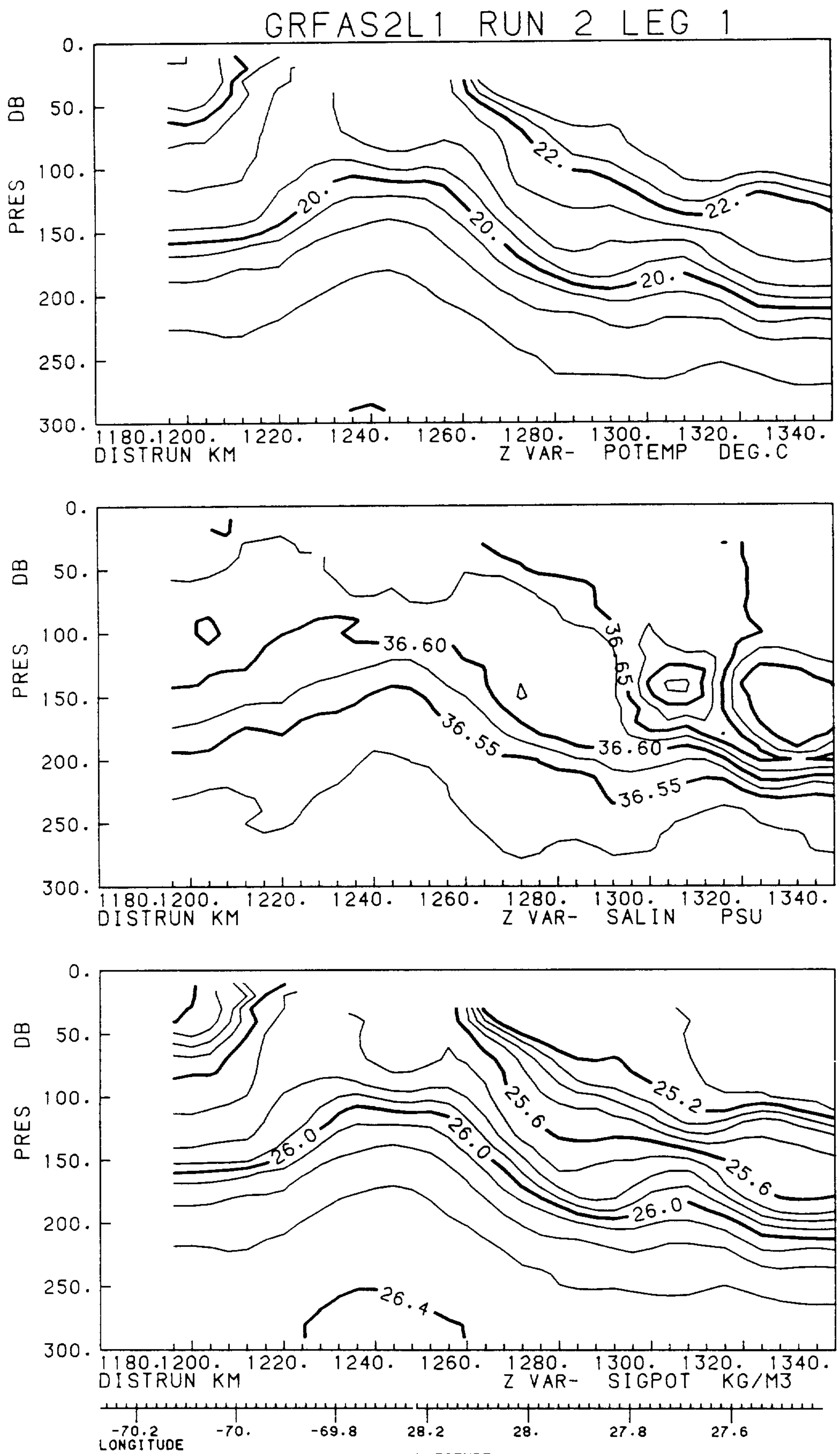

GRFAS1L1 RUN 1 LEG 1
PRES DB
DISTRUN KM
Z VAR- OXYGEN ML/L
4.5
SIGPOT KG/M3
Z VAR- SALIN PSU
36.60
36.55
36.50
Z VAR- SNDVEL M/S
1530.
1525.
LONGITUDE
LATITUDE

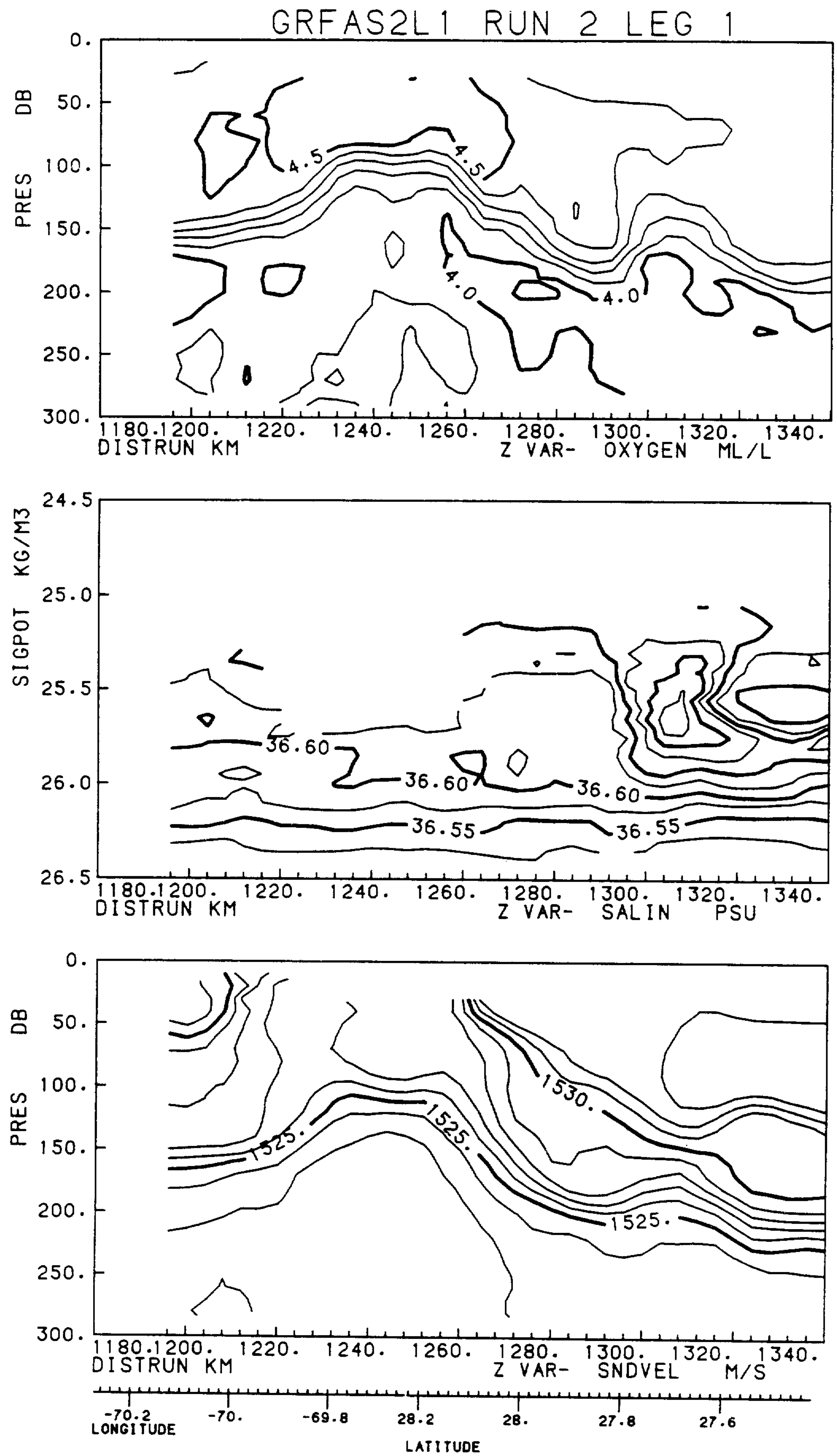

GRFAS1L2 RUN 1 LEG 2
PRES DB
DISTRUN KM
Z VAR- POTEMP DEG.C
Z VAR- SALIN PSU
Z VAR- SIGPOT KG/M3
LATITUDE
LONGITUDE

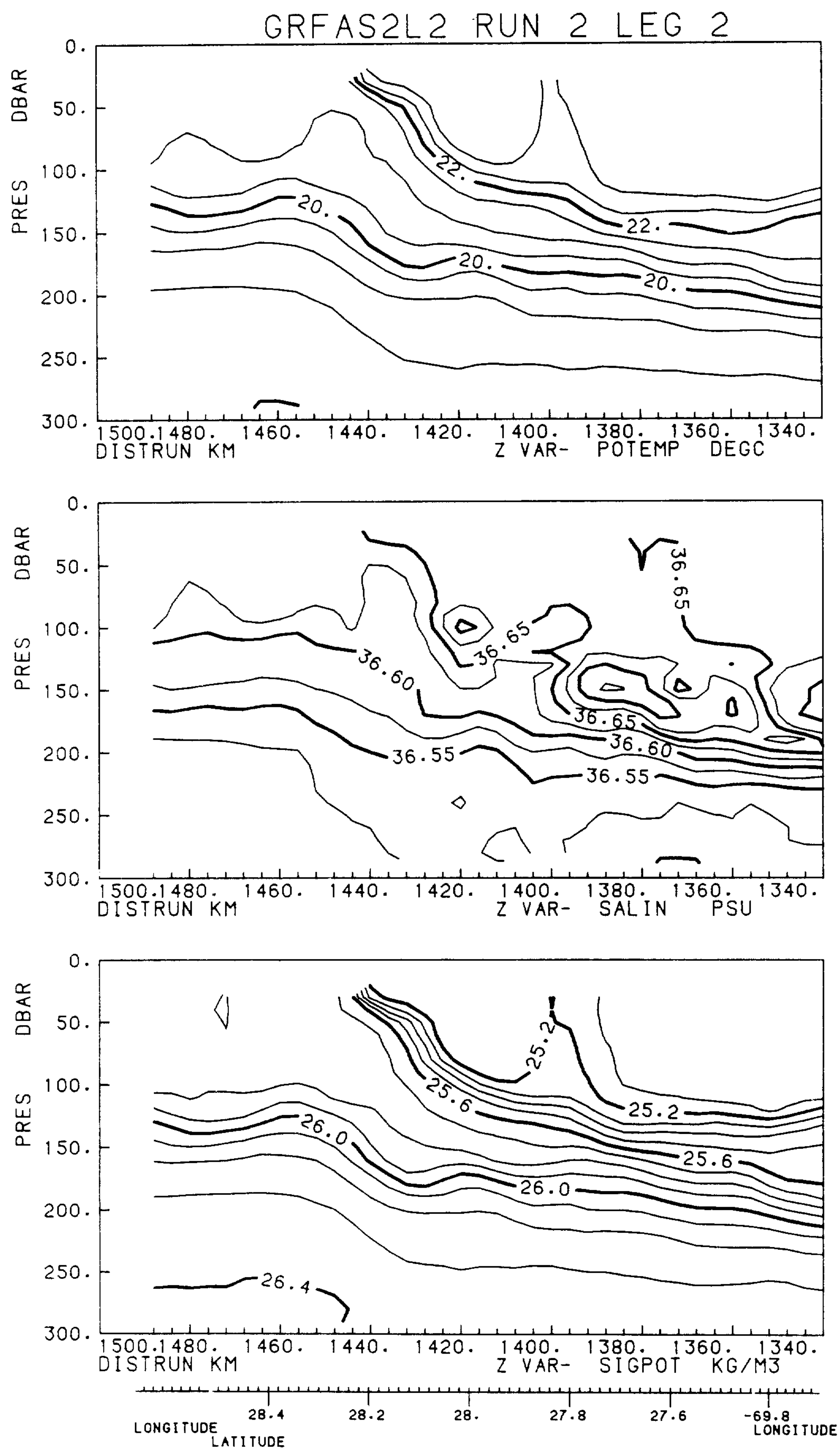

GRFAS1L2 RUN 1 LEG 2
PRES DB
DISTRUN KM
Z VAR- OXYGEN ML/L
4.5
4.0
SIGPOT KG/M3
Z VAR- SALIN PSU
36.55
36.60
36.65
36.70
PRES DB
Z VAR- SNDVEL M/S
1525.
1530.
LATITUDE
LONGITUDE

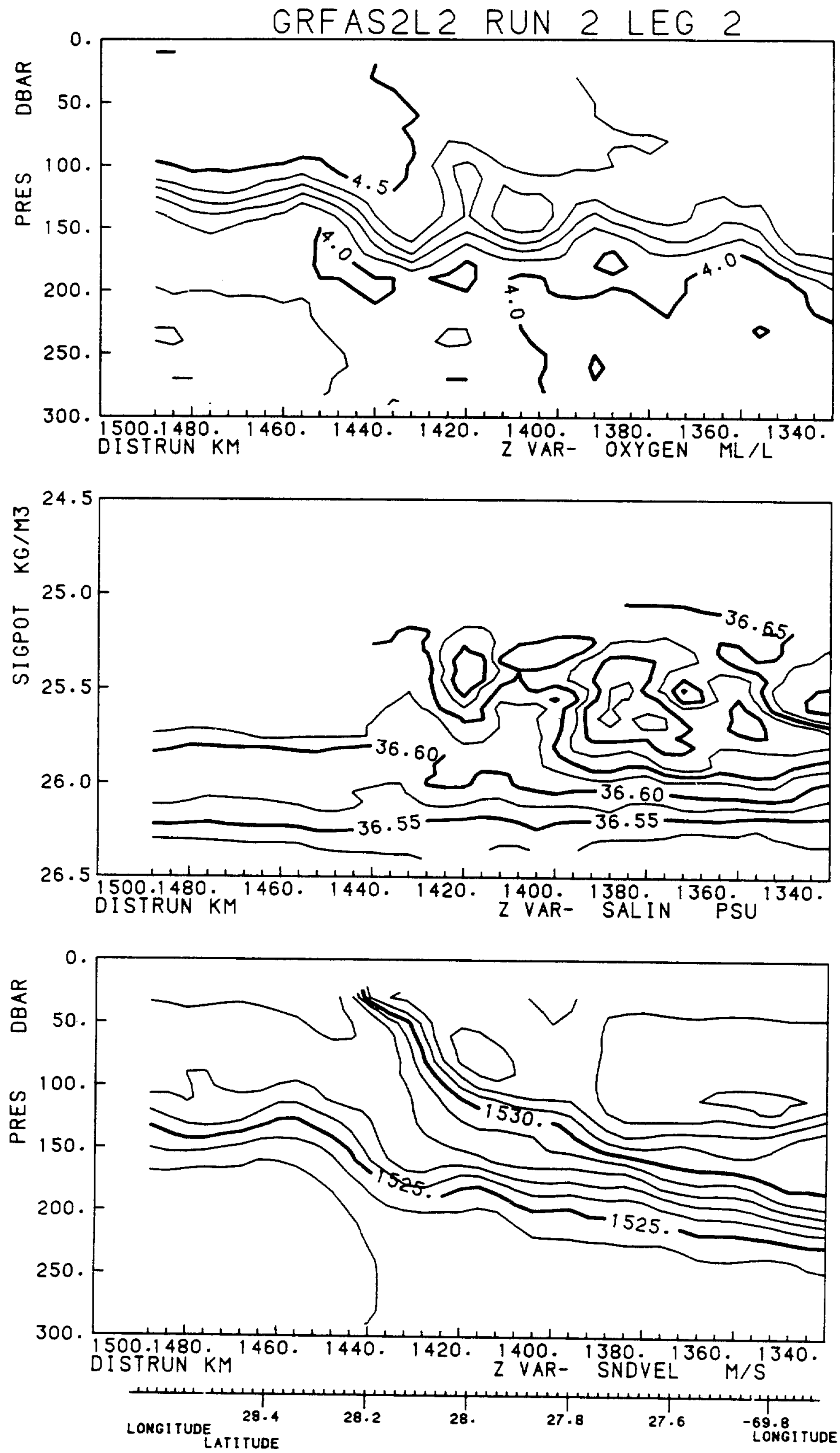

GRFAS1L3 RUN 1 LEG 3
PRES DB
0. 50. 100. 150. 200. 250. 300.
22.
20.
1080. 1060. 1040. 1020. 1000. 980. 960. 940. 920. 900.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65
36.70
36.60
36.55
Z VAR- SALIN PSU
25.2
25.6
26.0
26.4
Z VAR- SIGPOT KG/M3
28. 27.8 27.6 27.4 27.2 27. 26.8
LATITUDE


GRFAS1L3 RUN 1 LEG 3
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.5
4.0
1080.1060. 1040. 1020. 1000. 980. 960. 940. 920. 900.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.70
36.60
36.55
1080.1060. 1040. 1020. 1000. 980. 960. 940. 920. 900.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1530.
1525.
1080.1060. 1040. 1020. 1000. 980. 960. 940. 920. 900.
DISTRUN KM
Z VAR- SNDVEL M/S
28.
27.8
27.6
27.4
27.2
27.
26.8
LATITUDE

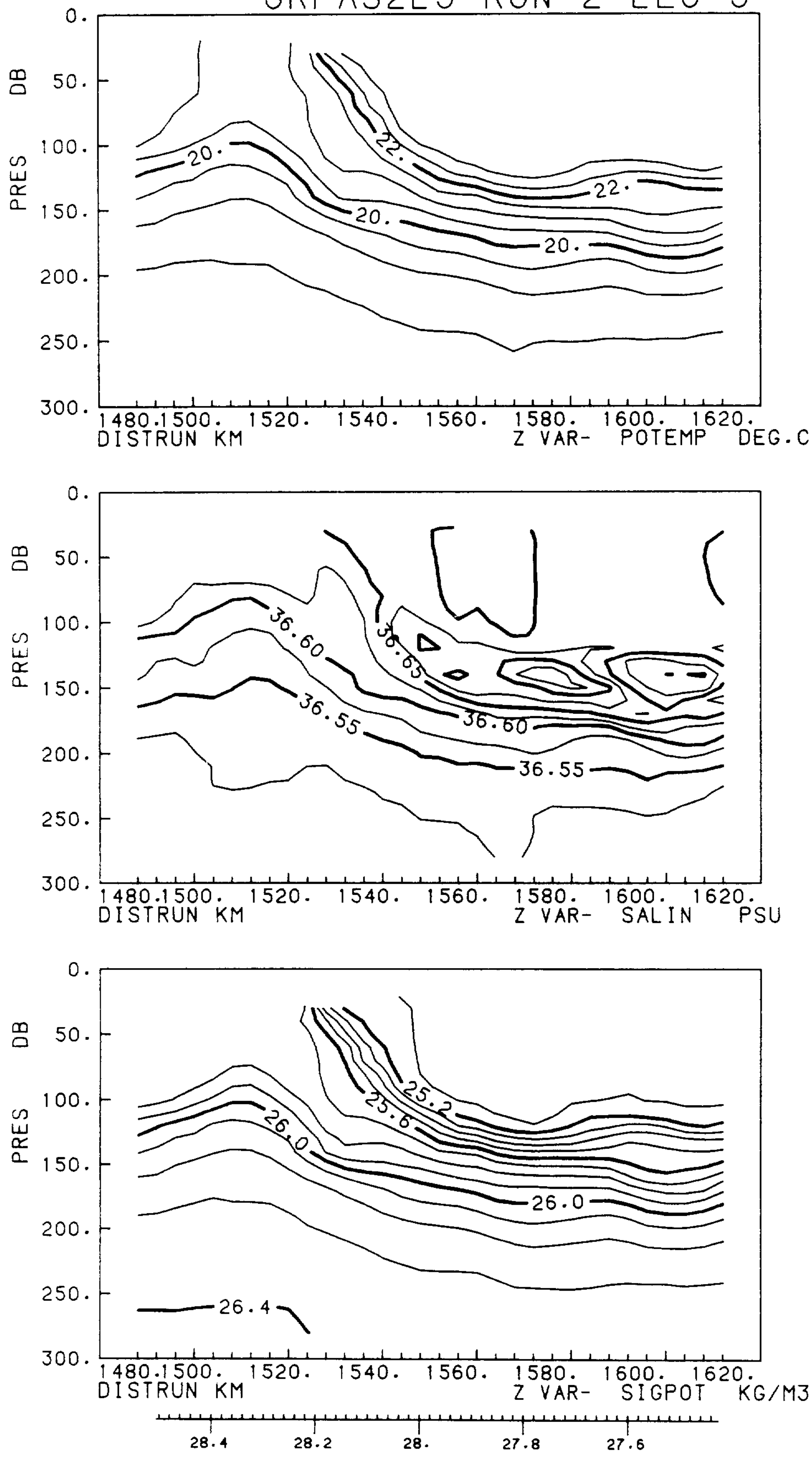

GRFAS2L1 RUN 2 LEG 1
PRES DB
0. 50. 100. 150. 200. 250. 300.
1180. 1200. 1220. 1240. 1260. 1280. 1300. 1320. 1340.
DISTRUN KM
Z VAR- POTEMP DEG.C
22.
20.
Z VAR- SALIN PSU
36.65
36.60
36.55
Z VAR- SIGPOT KG/M3
25.2
25.6
26.0
26.4
-70.2 -70. -69.8 28.2 28. 27.8 27.6
LONGITUDE
LATITUDE

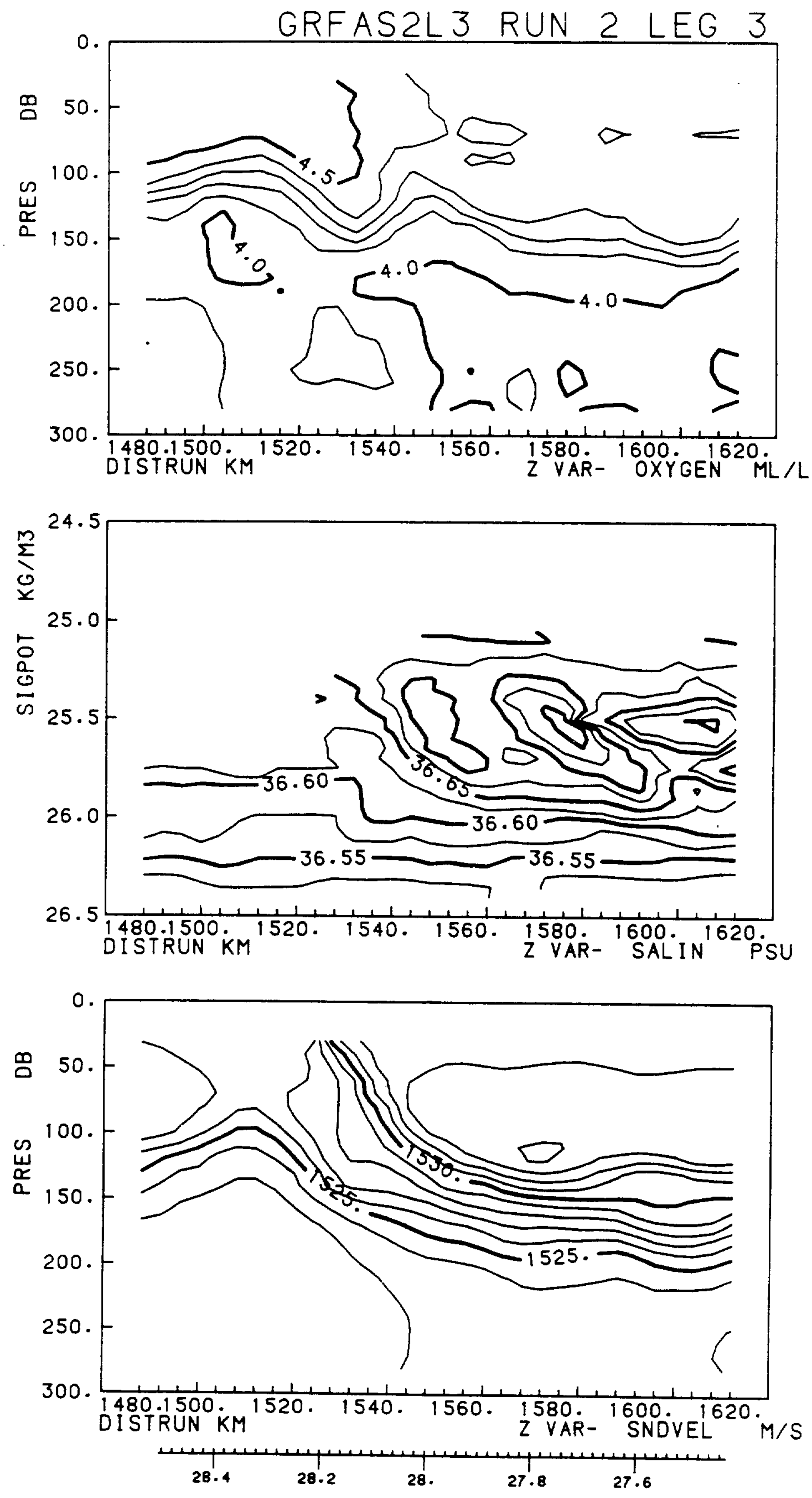

GRFAS2L1 RUN 2 LEG 1
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.5
4.5
4.0
4.0
1180.1200. 1220. 1240. 1260. 1280. 1300. 1320. 1340.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.60
36.60
36.60
36.55
36.55
1180.1200. 1220. 1240. 1260. 1280. 1300. 1320. 1340.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1530.
1525.
1525.
1525.
1180.1200. 1220. 1240. 1260. 1280. 1300. 1320. 1340.
DISTRUN KM
Z VAR- SNDVEL M/S
-70.2
LONGITUDE
-70.
-69.8
28.2
28.
27.8
27.6
LATITUDE

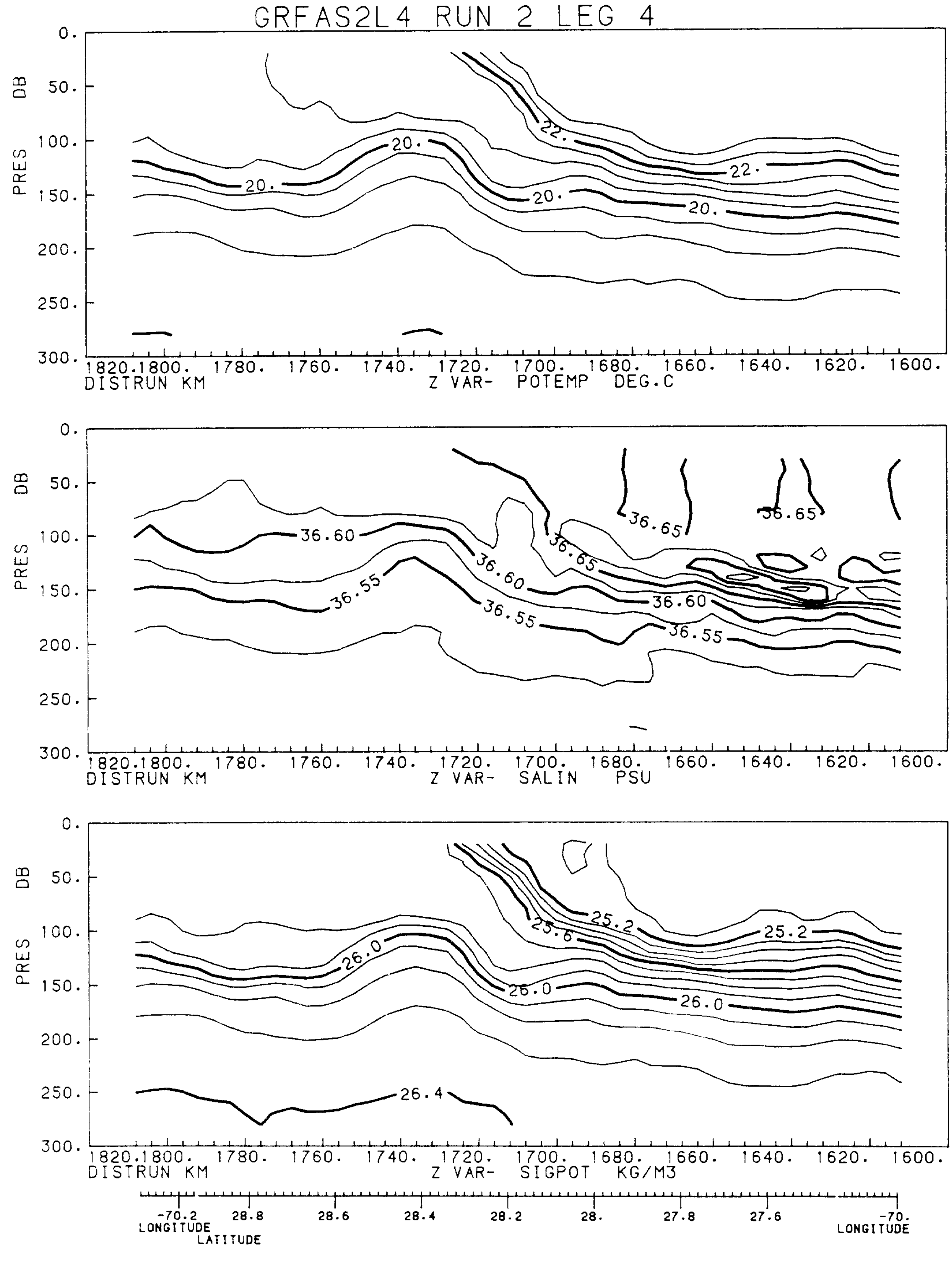

GRFAS2L2 RUN 2 LEG 2
PRES DBAR
0. 50. 100. 150. 200. 250. 300.
22. 20.
1500. 1480. 1460. 1440. 1420. 1400. 1380. 1360. 1340.
DISTRUN KM
Z VAR- POTEMP DEGC
36.65 36.60 36.55
Z VAR- SALIN PSU
25.2 25.6 26.0 26.4
Z VAR- SIGPOT KG/M3
28.4 28.2 28. 27.8 27.6 -69.8
LONGITUDE
LATITUDE
LONGITUDE


GRFAS2L2 RUN 2 LEG 2
PRES DBAR
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
4.0
4.0
1500. 1480. 1460. 1440. 1420. 1400. 1380. 1360. 1340.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.60
36.60
36.55
36.55
1500. 1480. 1460. 1440. 1420. 1400. 1380. 1360. 1340.
DISTRUN KM
Z VAR- SALIN PSU
PRES DBAR
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
1525.
1500. 1480. 1460. 1440. 1420. 1400. 1380. 1360. 1340.
DISTRUN KM
Z VAR- SNDVEL M/S
LONGITUDE
LATITUDE
28.4 28.2 28. 27.8 27.6 -69.8
LONGITUDE

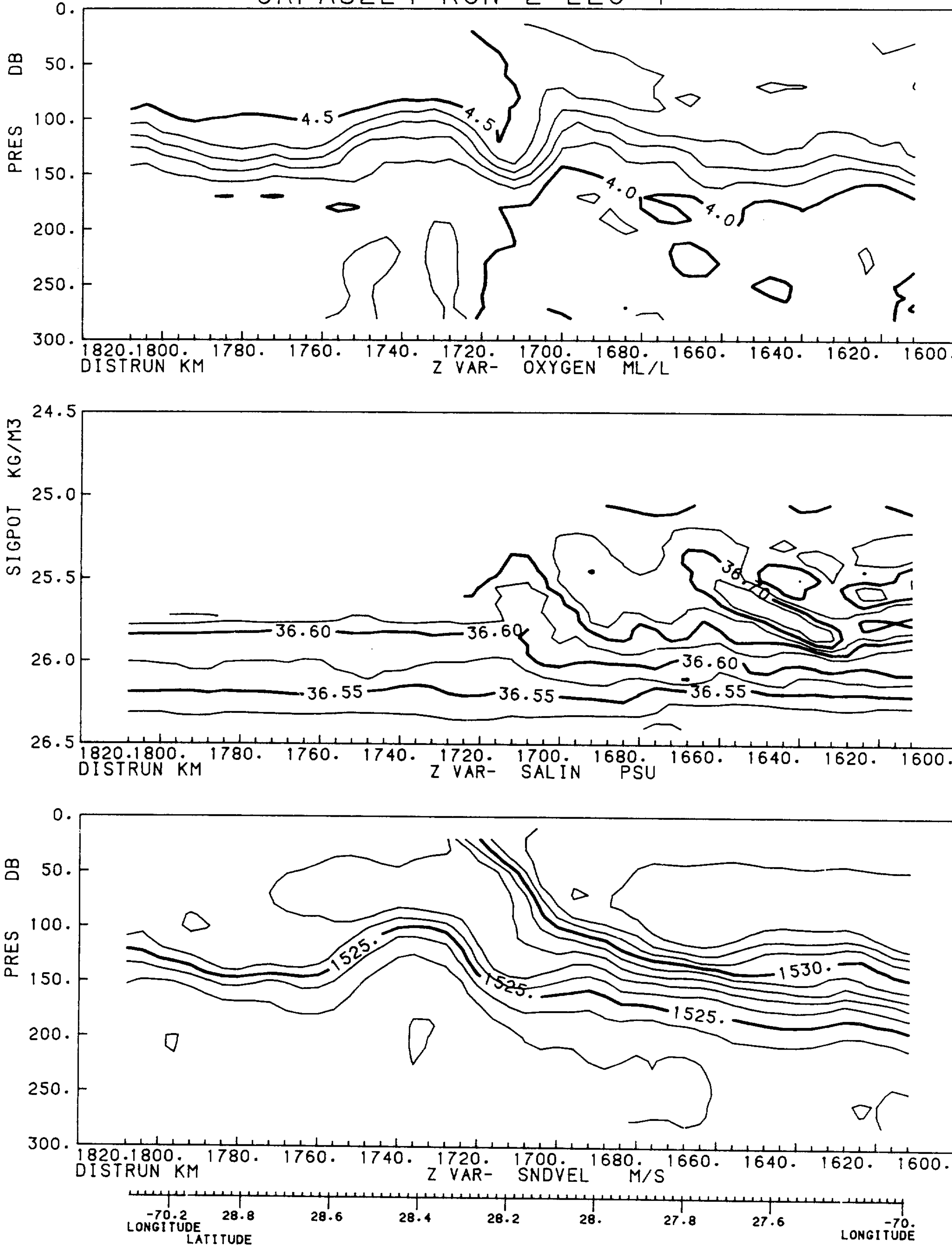
GRFAS2L3 RUN 2 LEG 3

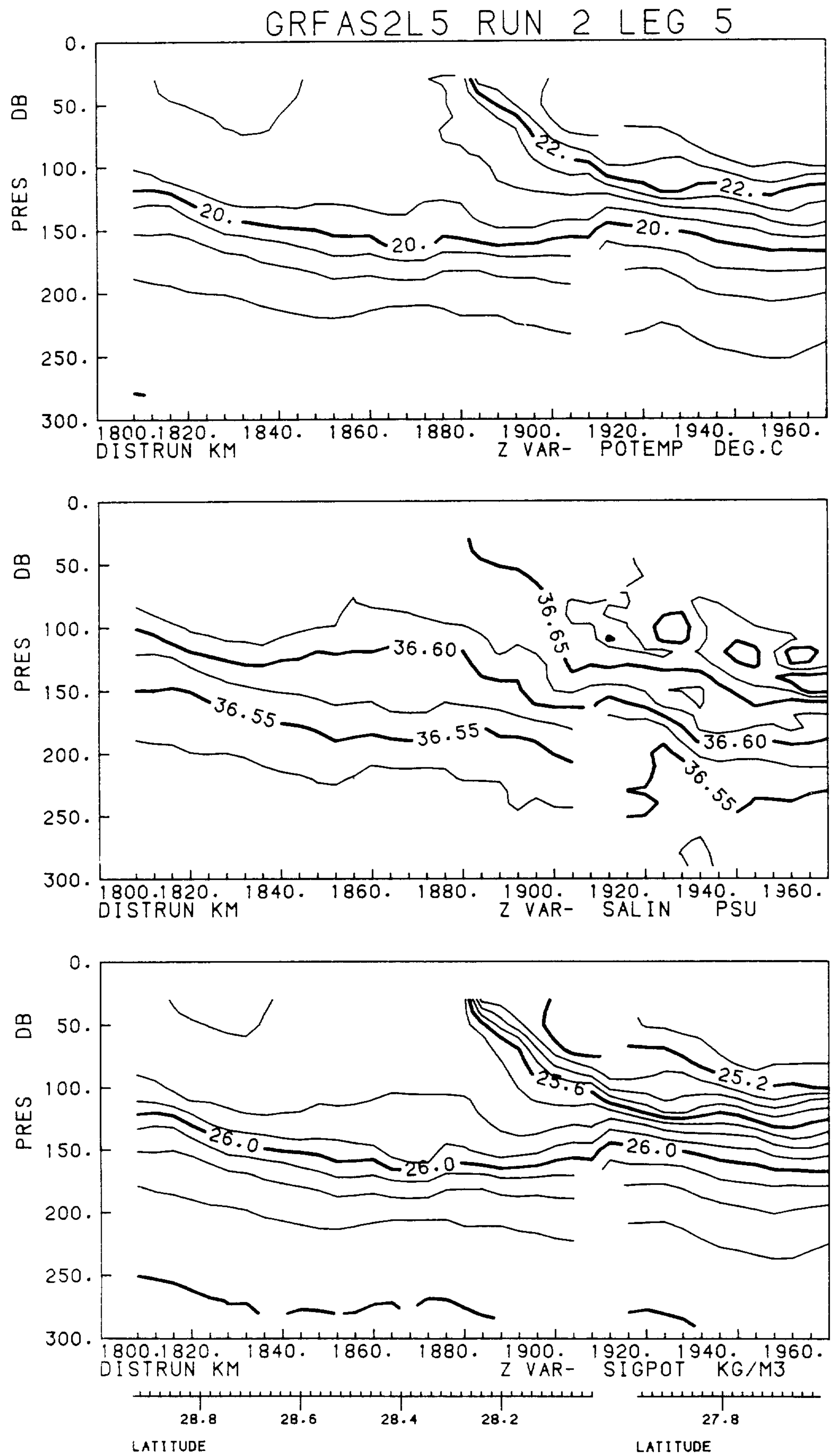


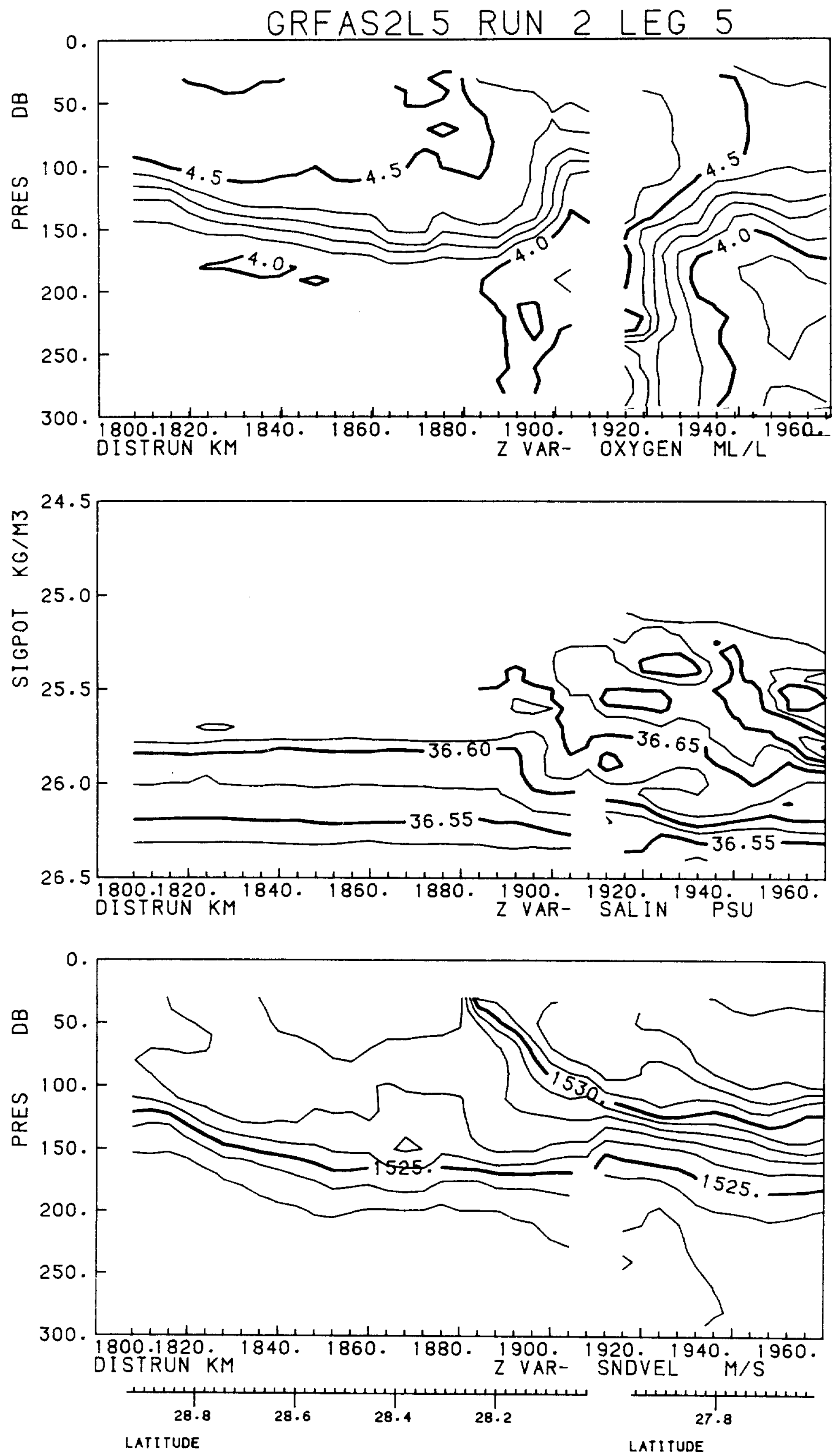

GRFAS2L3 RUN 2 LEG 3
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
4.0
4.0
1480.1500. 1520. 1540. 1560. 1580. 1600. 1620.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.60
36.65
36.60
36.55
36.55
1480.1500. 1520. 1540. 1560. 1580. 1600. 1620.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
1525.
1480.1500. 1520. 1540. 1560. 1580. 1600. 1620.
DISTRUN KM
Z VAR- SNDVEL M/S
28.4 28.2 28. 27.8 27.6
LATITUDE

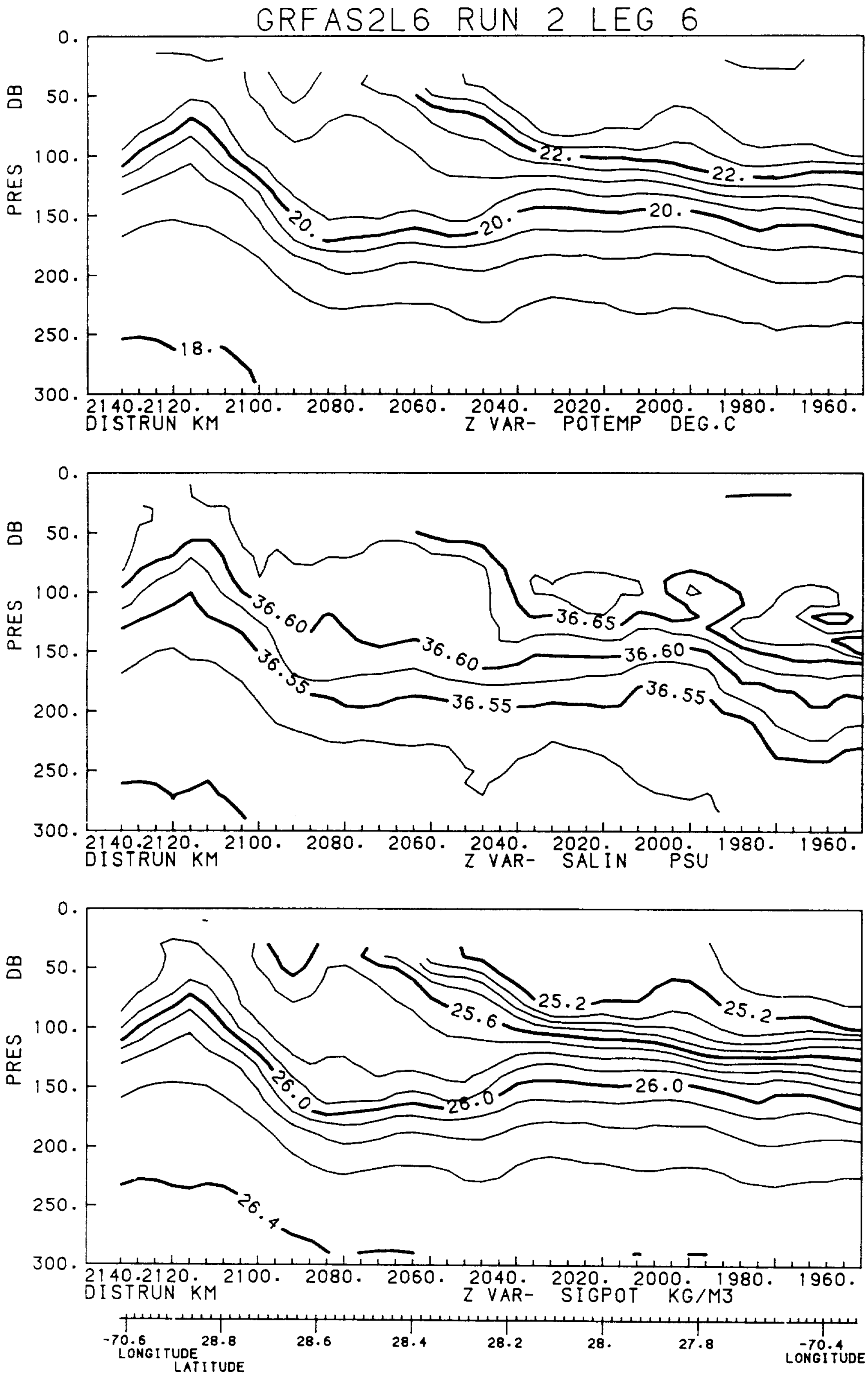

GRFAS2L4 RUN 2 LEG 4
PRES DB
DISTRUN KM
Z VAR- POTEMP DEG.C
Z VAR- SALIN PSU
Z VAR- SIGPOT KG/M3
LONGITUDE
LATITUDE

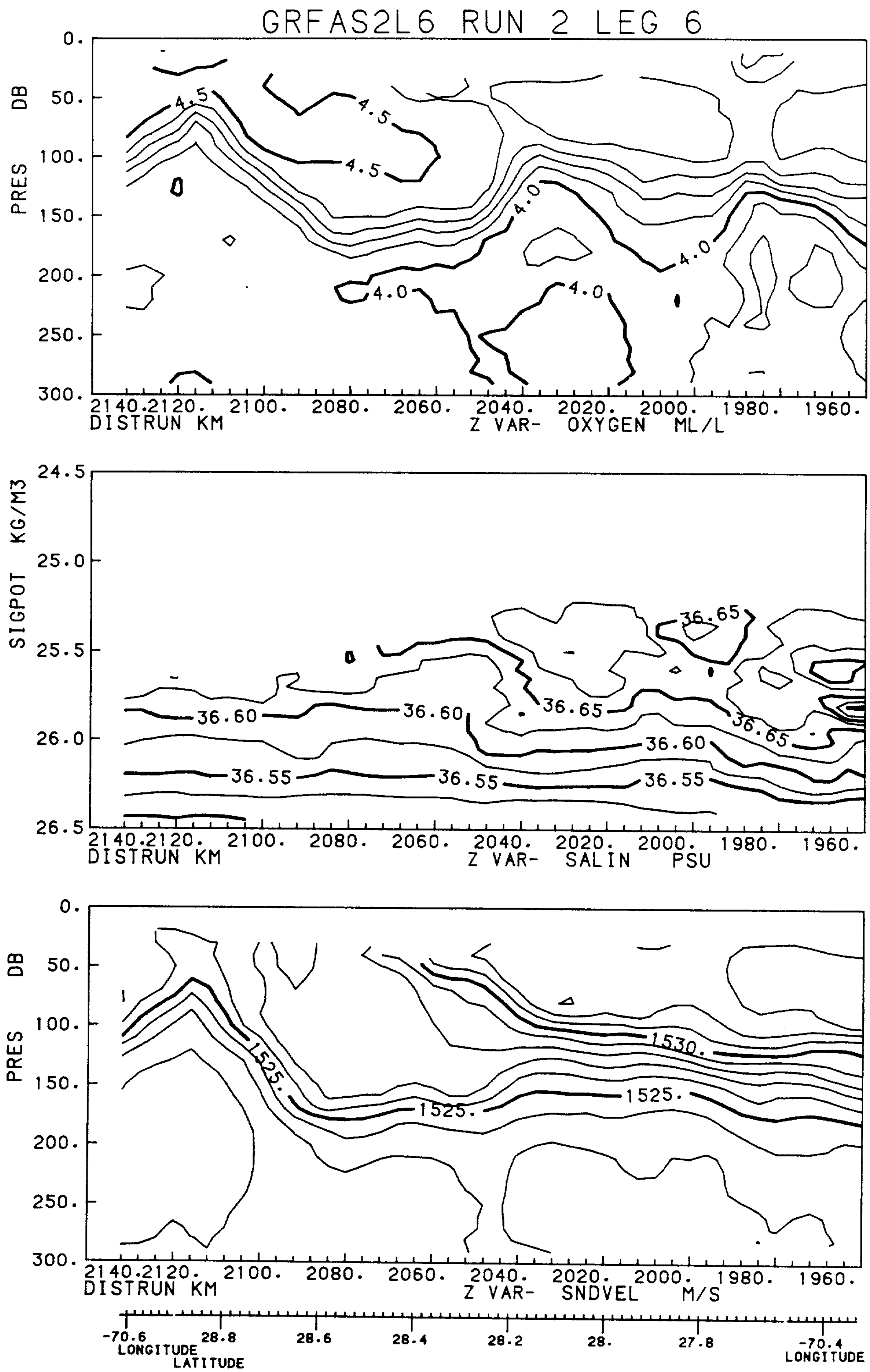
# GRFAS2L4 RUN 2 LEG 4

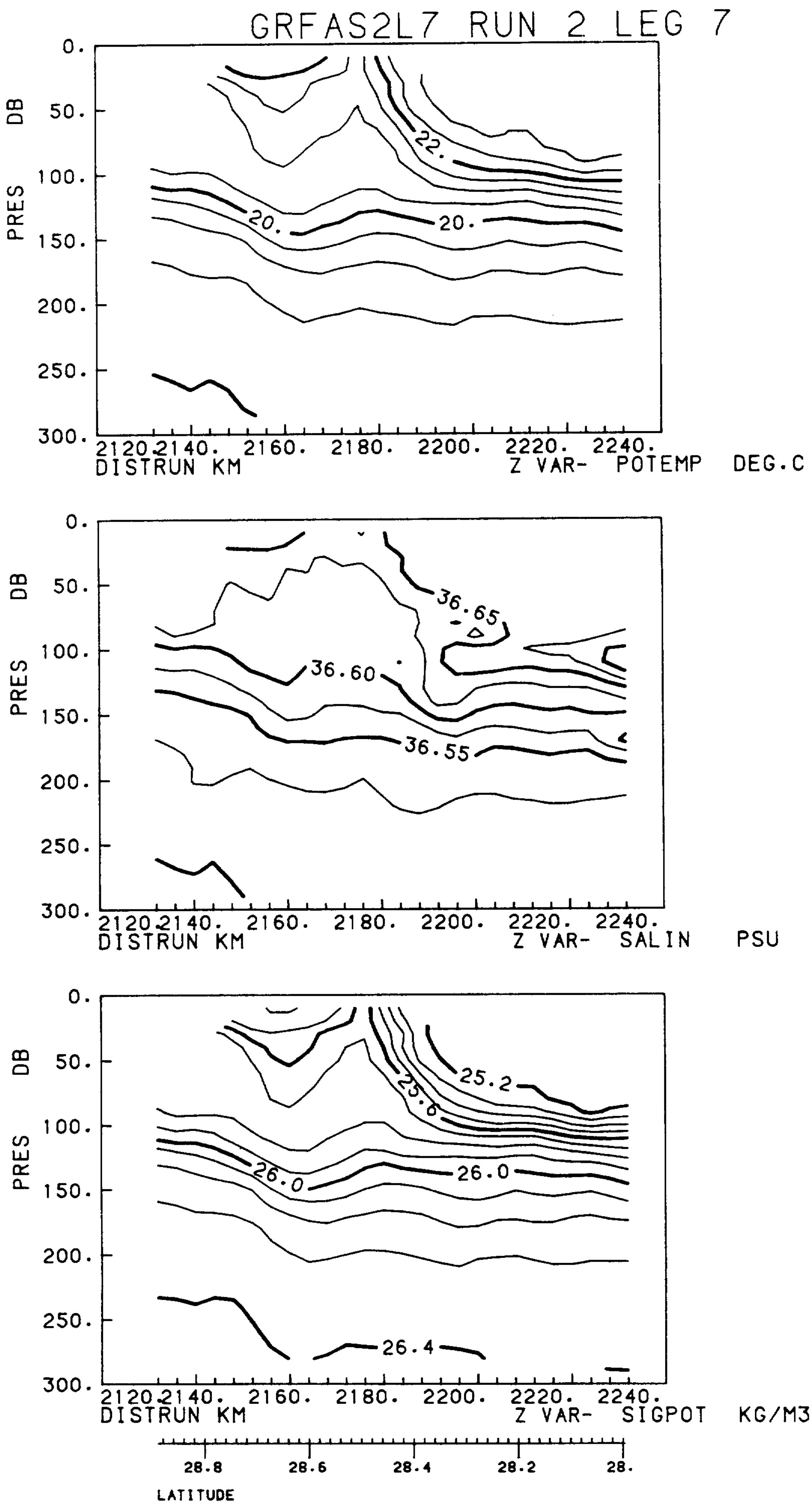


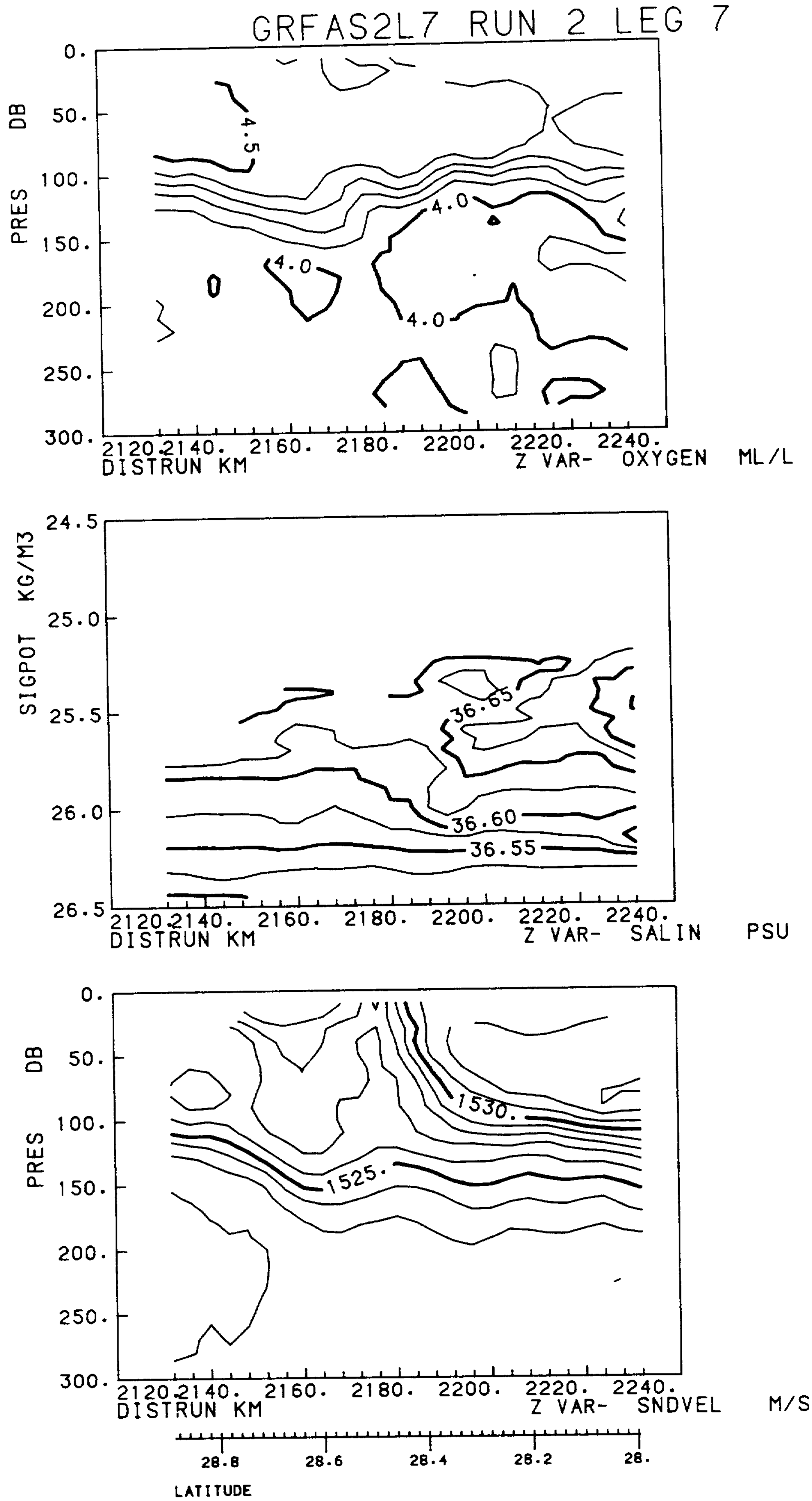

GRFAS2L5 RUN 2 LEG 5
PRES DB
0. 50. 100. 150. 200. 250. 300.
1800. 1820. 1840. 1860. 1880. 1900. 1920. 1940. 1960.
DISTRUN KM
Z VAR- POTEMP DEG.C
22.
20.
Z VAR- SALIN PSU
36.65
36.60
36.55
Z VAR- SIGPOT KG/M3
25.2
25.6
26.0
28.8 28.6 28.4 28.2 27.8
LATITUDE
LATITUDE

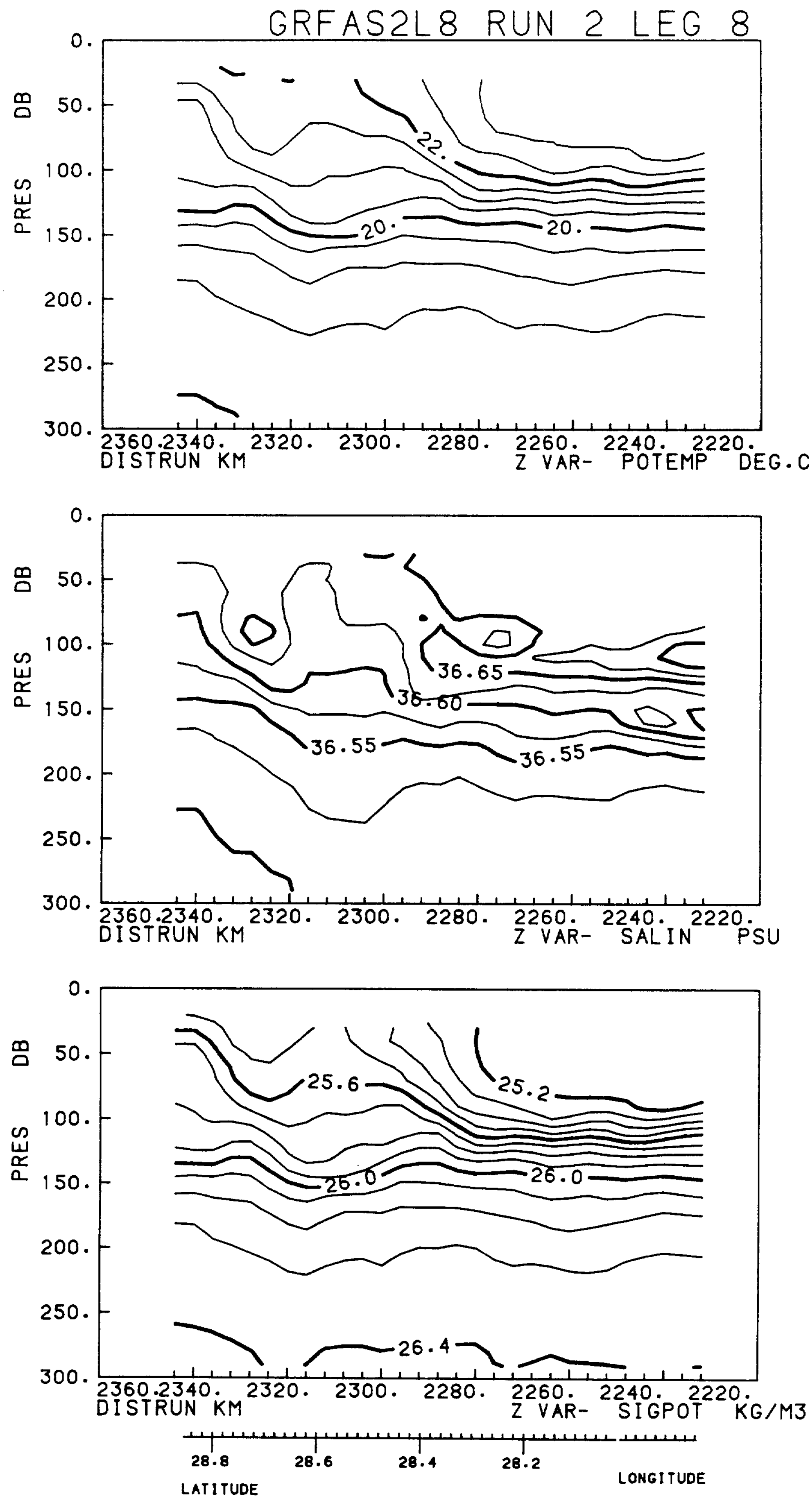

GRFAS2L5 RUN 2 LEG 5
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
1800.1820. 1840. 1860. 1880. 1900. 1920. 1940. 1960.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.60
36.65
36.55
1800.1820. 1840. 1860. 1880. 1900. 1920. 1940. 1960.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
1800.1820. 1840. 1860. 1880. 1900. 1920. 1940. 1960.
DISTRUN KM
Z VAR- SNDVEL M/S
28.8 28.6 28.4 28.2
LATITUDE
27.8
LATITUDE

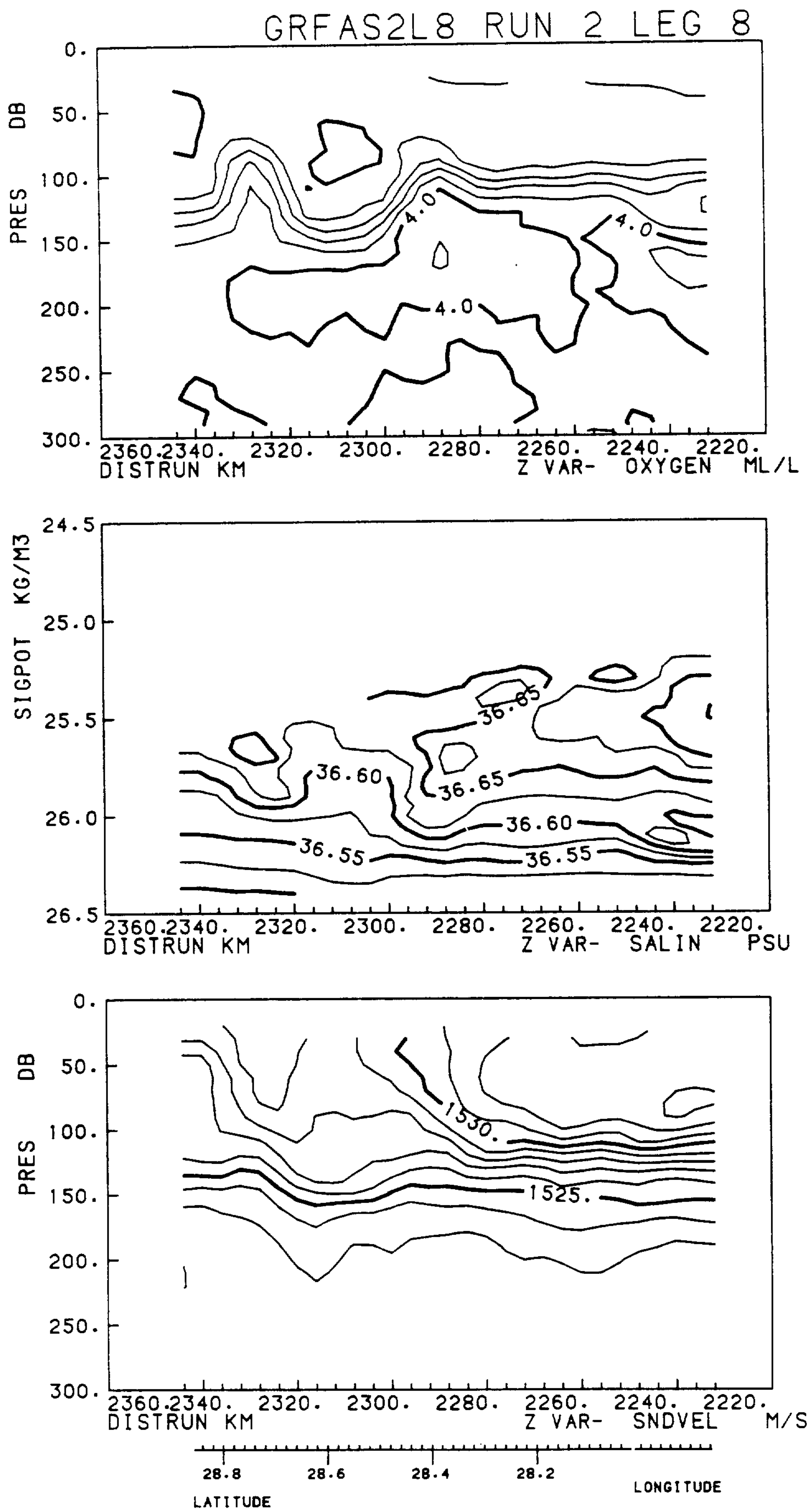

GRFAS2L6 RUN 2 LEG 6
PRES DB
0. 50. 100. 150. 200. 250. 300.
22. 22.
20. 20. 20.
18.
2140.2120. 2100. 2080. 2060. 2040. 2020. 2000. 1980. 1960.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.60 36.65 36.60 36.60
36.55 36.55 36.55
Z VAR- SALIN PSU
25.2 25.6 25.2
26.0 26.0 26.0
26.4
Z VAR- SIGPOT KG/M3
-70.6 28.8 28.6 28.4 28.2 28. 27.8 -70.4
LONGITUDE
LATITUDE
LONGITUDE


GRFAS2L6 RUN 2 LEG 6
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
2140. 2120. 2100. 2080. 2060. 2040. 2020. 2000. 1980. 1960.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.60
36.55
Z VAR- SALIN PSU
1530.
1525.
Z VAR- SNDVEL M/S
-70.6 LONGITUDE
28.8 LATITUDE
28.6 28.4 28.2 28. 27.8
-70.4 LONGITUDE


GRFAS2L7 RUN 2 LEG 7
PRES DB
0.
50.
100.
150.
200.
250.
300.
2120.2140. 2160. 2180. 2200. 2220. 2240.
DISTRUN KM
Z VAR- POTEMP DEG.C
22.
20.
20.
PRES DB
2120.2140. 2160. 2180. 2200. 2220. 2240.
DISTRUN KM
Z VAR- SALIN PSU
36.65
36.60
36.55
PRES DB
2120.2140. 2160. 2180. 2200. 2220. 2240.
DISTRUN KM
Z VAR- SIGPOT KG/M3
25.2
25.6
26.0
26.0
26.4
28.8
28.6
28.4
28.2
28.
LATITUDE


GRFAS2L7 RUN 2 LEG 7
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
4.0
4.0
2120. 2140. 2160. 2180. 2200. 2220. 2240.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.60
36.55
2120. 2140. 2160. 2180. 2200. 2220. 2240.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
2120. 2140. 2160. 2180. 2200. 2220. 2240.
DISTRUN KM
Z VAR- SNDVEL M/S
28.8 28.6 28.4 28.2 28.
LATITUDE


GRFAS2L8 RUN 2 LEG 8
PRES DB
0. 50. 100. 150. 200. 250. 300.
22.
20.
20.
2360. 2340. 2320. 2300. 2280. 2260. 2240. 2220.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65
36.60
36.55
36.55
Z VAR- SALIN PSU
25.6
25.2
26.0
26.0
26.4
Z VAR- SIGPOT KG/M3
28.8
28.6
28.4
28.2
LATITUDE
LONGITUDE


GRFAS2L8 RUN 2 LEG 8
PRES DB
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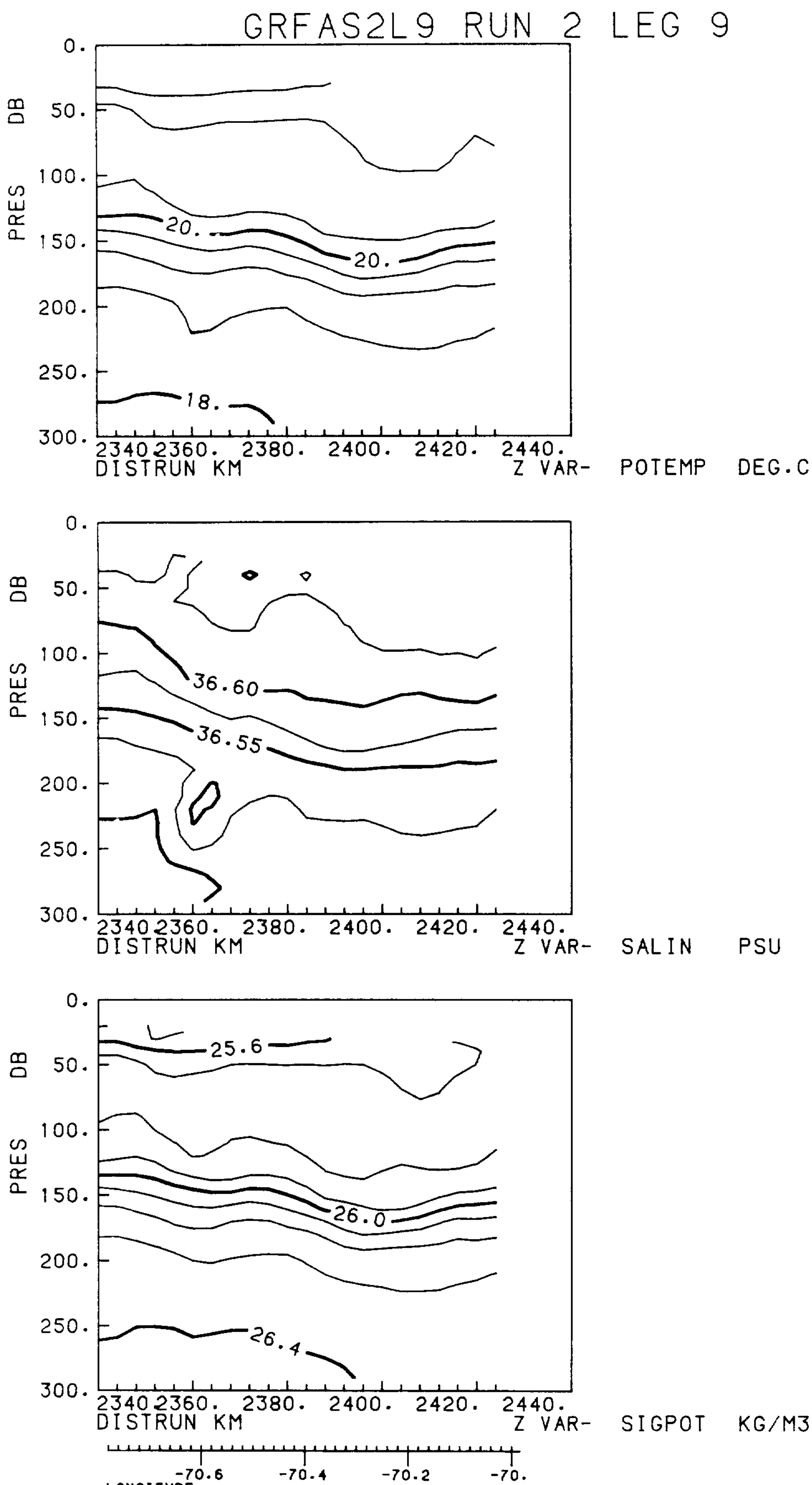
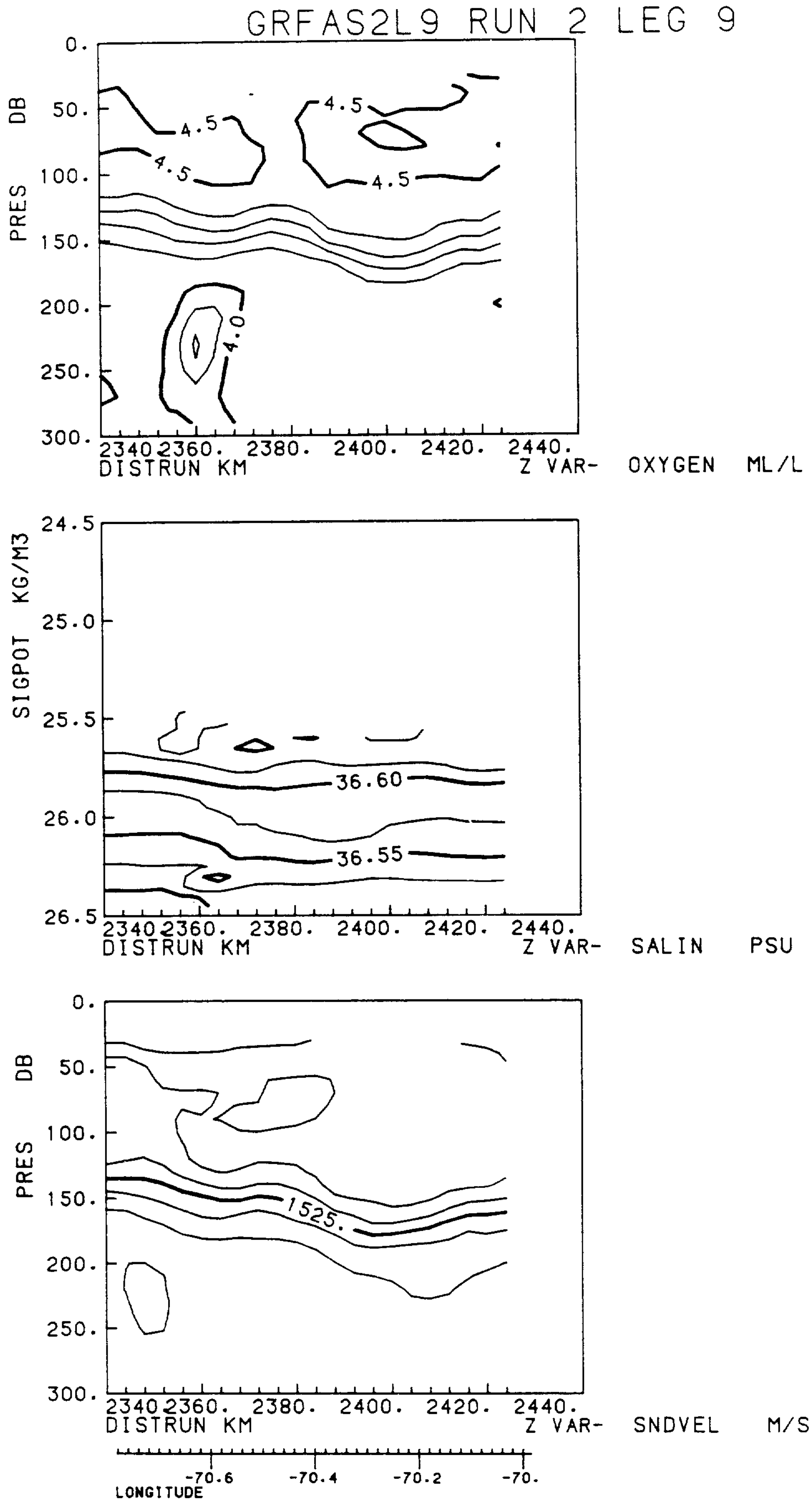
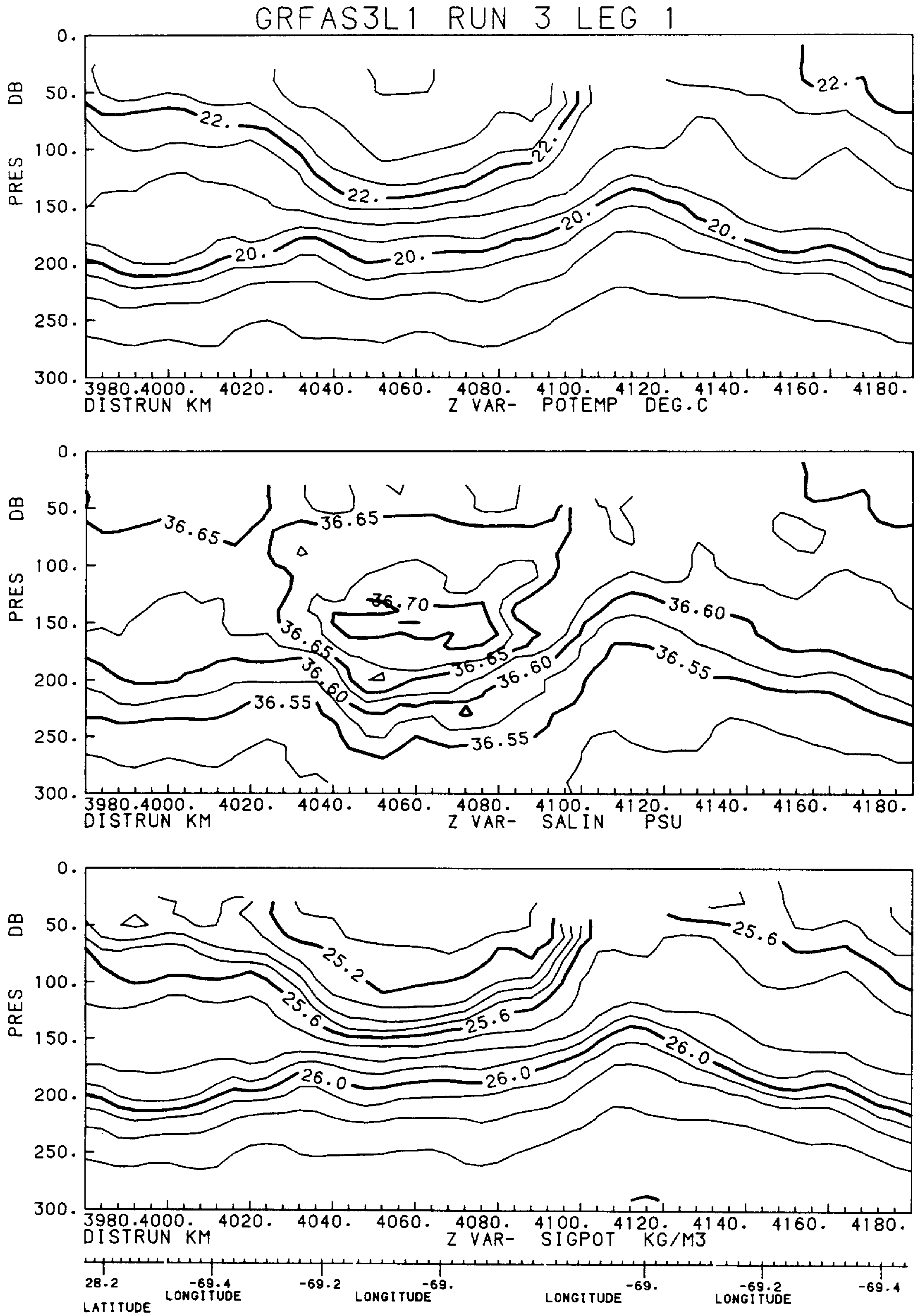
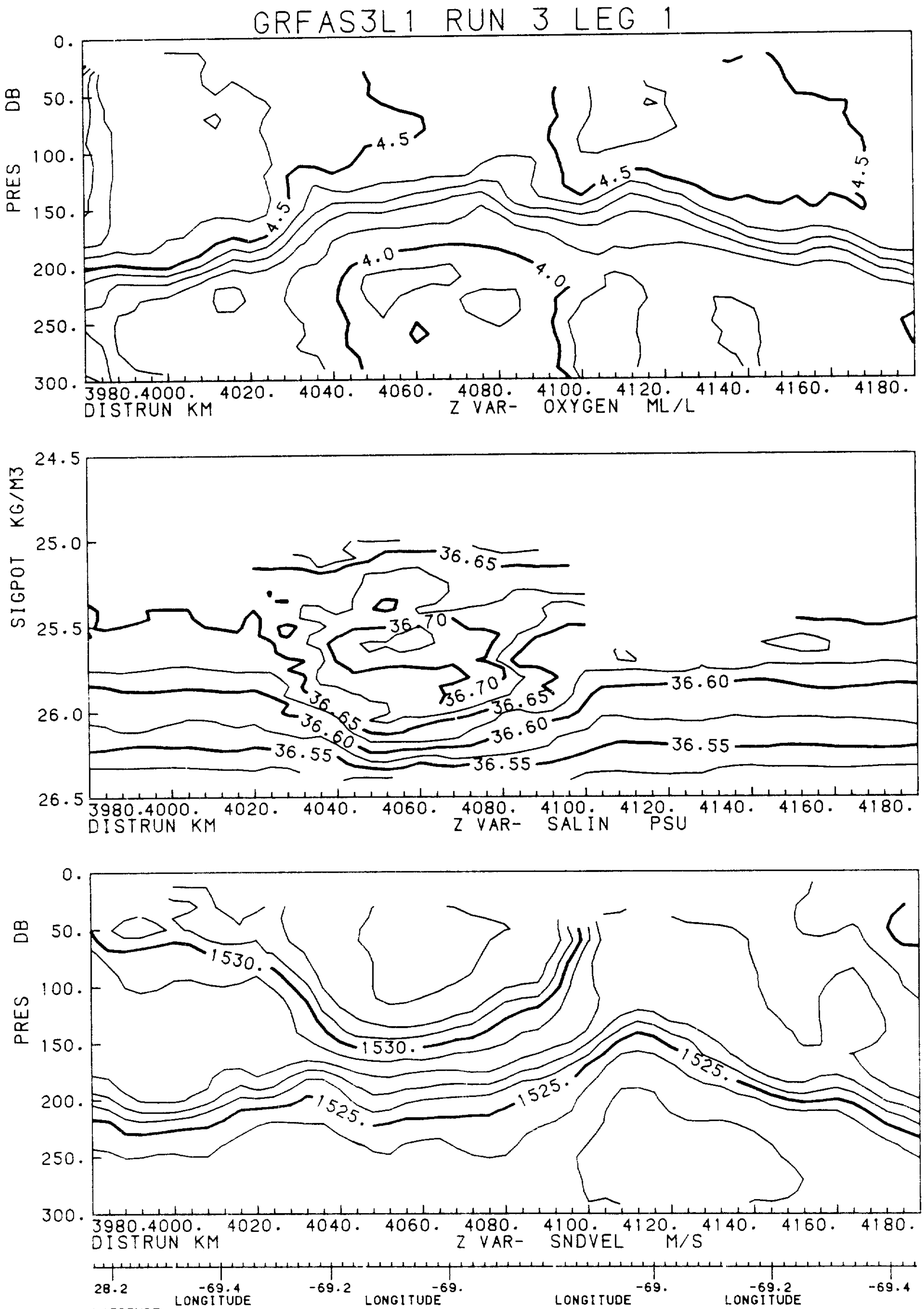
4.0
2360. 2340. 2320. 2300. 2280. 2260. 2240. 2220.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.60
36.55
2360. 2340. 2320. 2300. 2280. 2260. 2240. 2220.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
2360. 2340. 2320. 2300. 2280. 2260. 2240. 2220.
DISTRUN KM
Z VAR- SNDVEL M/S
28.8 28.6 28.4 28.2
LATITUDE
LONGITUDE

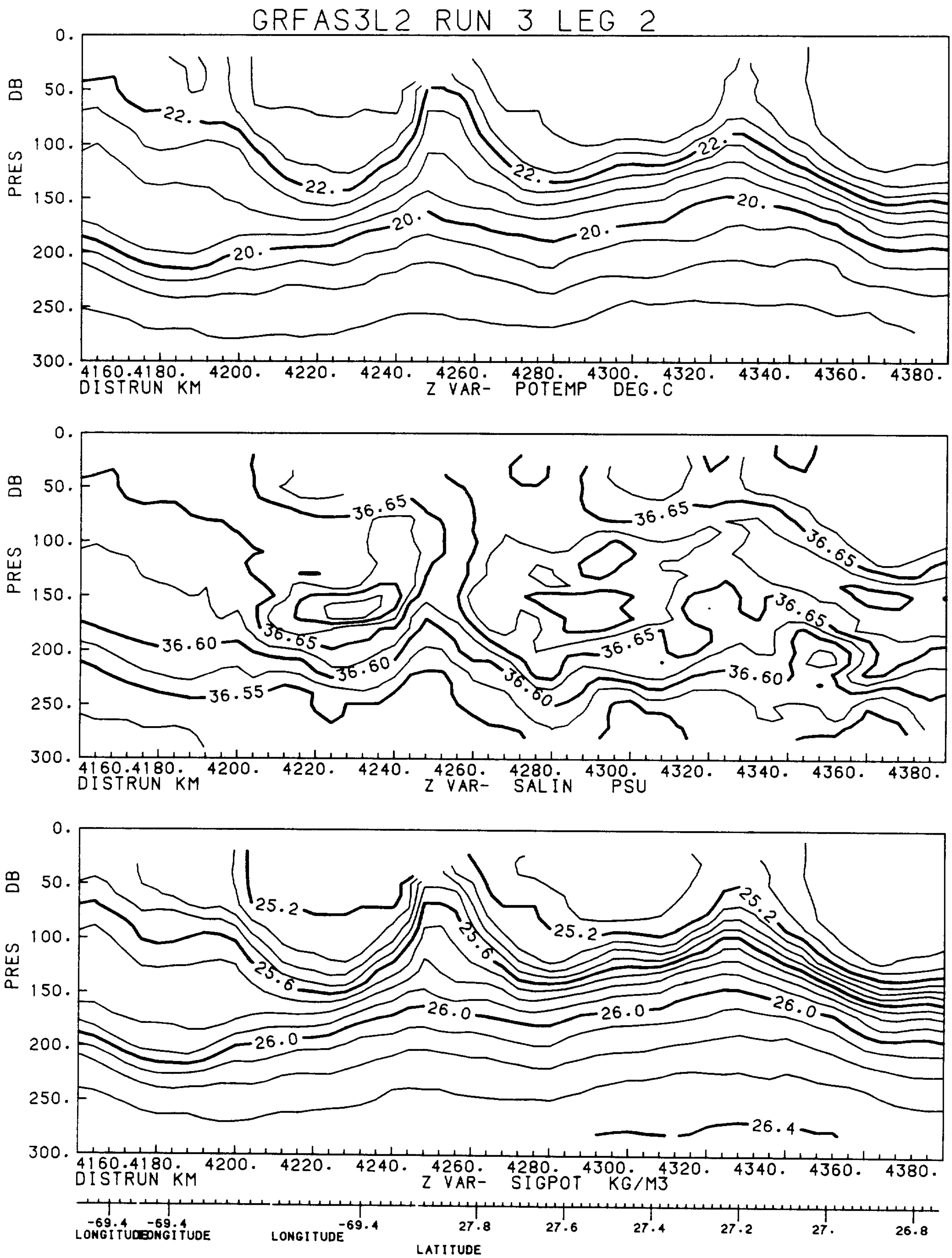

GRFAS2L9 RUN 2 LEG 9
PRES DB
0.
50.
100.
150.
200.
250.
300.
20.
20.
18.
2340 2360. 2380. 2400. 2420. 2440.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.60
36.55
Z VAR- SALIN PSU
25.6
26.0
26.4
Z VAR- SIGPOT KG/M3
-70.6
-70.4
-70.2
-70.
LONGITUDE

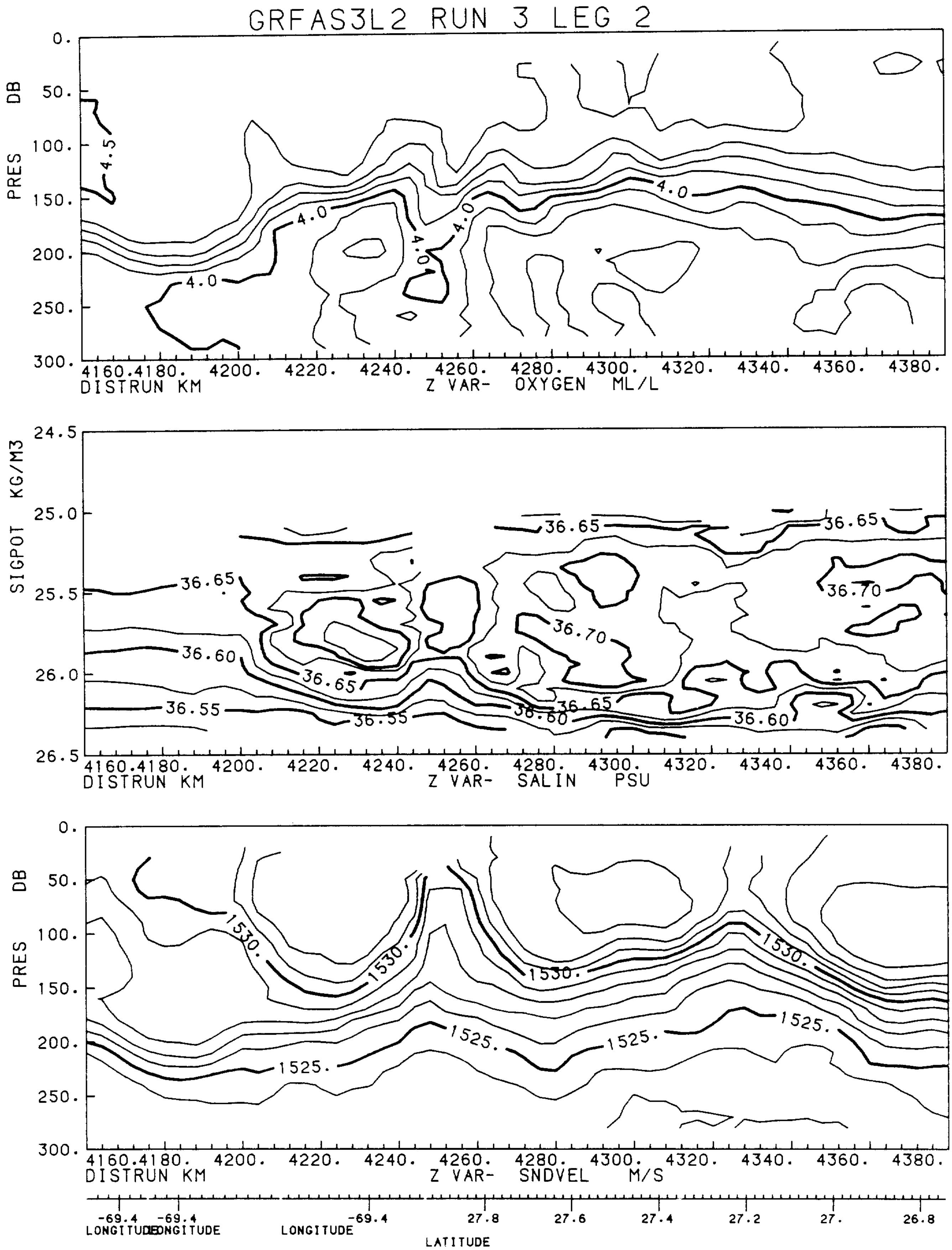

GRFAS2L9 RUN 2 LEG 9
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.5
4.5
4.5
4.5
4.0
2340 2360. 2380. 2400. 2420. 2440.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.60
36.55
2340 2360. 2380. 2400. 2420. 2440.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1525.
2340 2360. 2380. 2400. 2420. 2440.
DISTRUN KM
Z VAR- SNDVEL M/S
-70.6
-70.4
-70.2
-70.
LONGITUDE

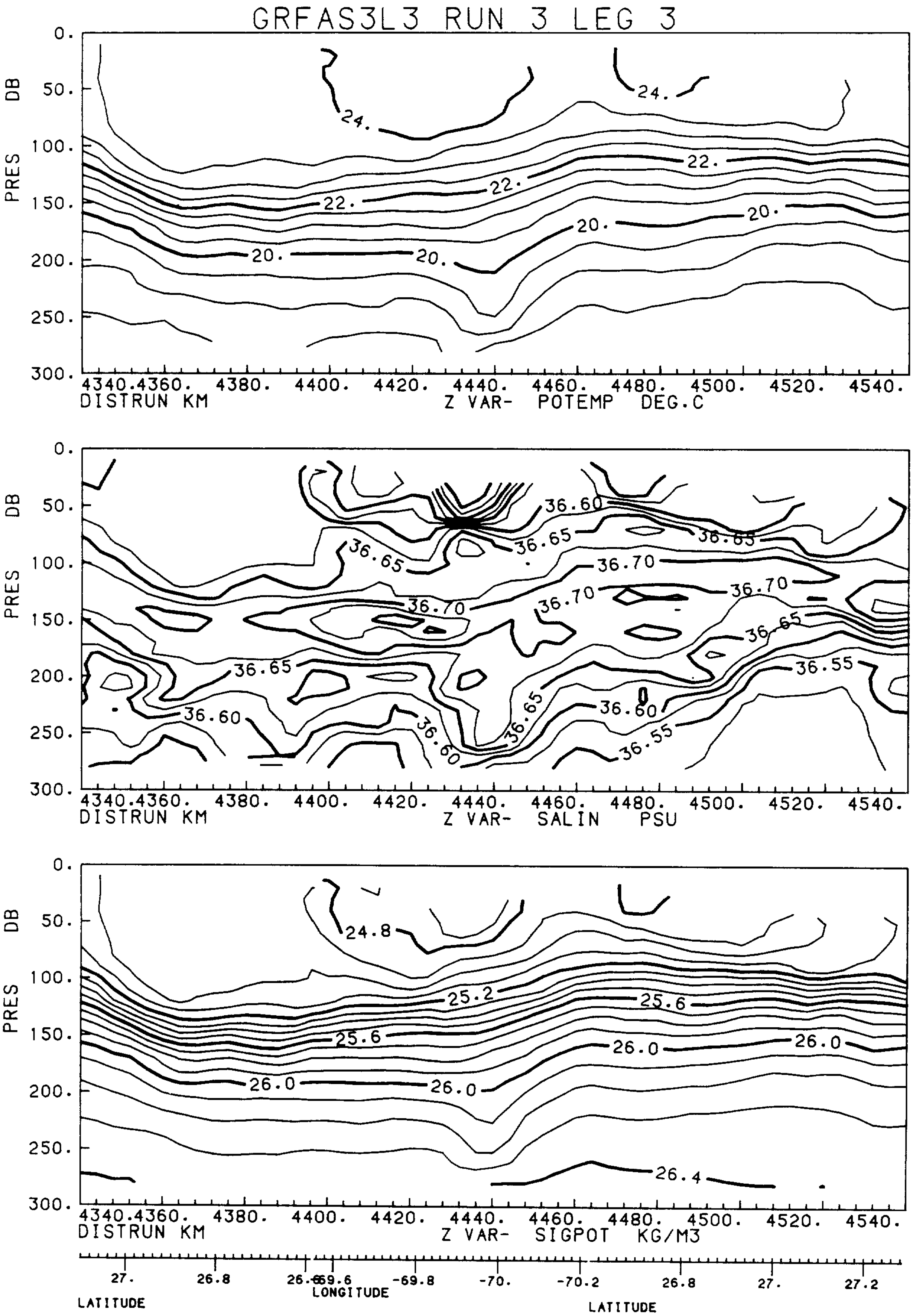


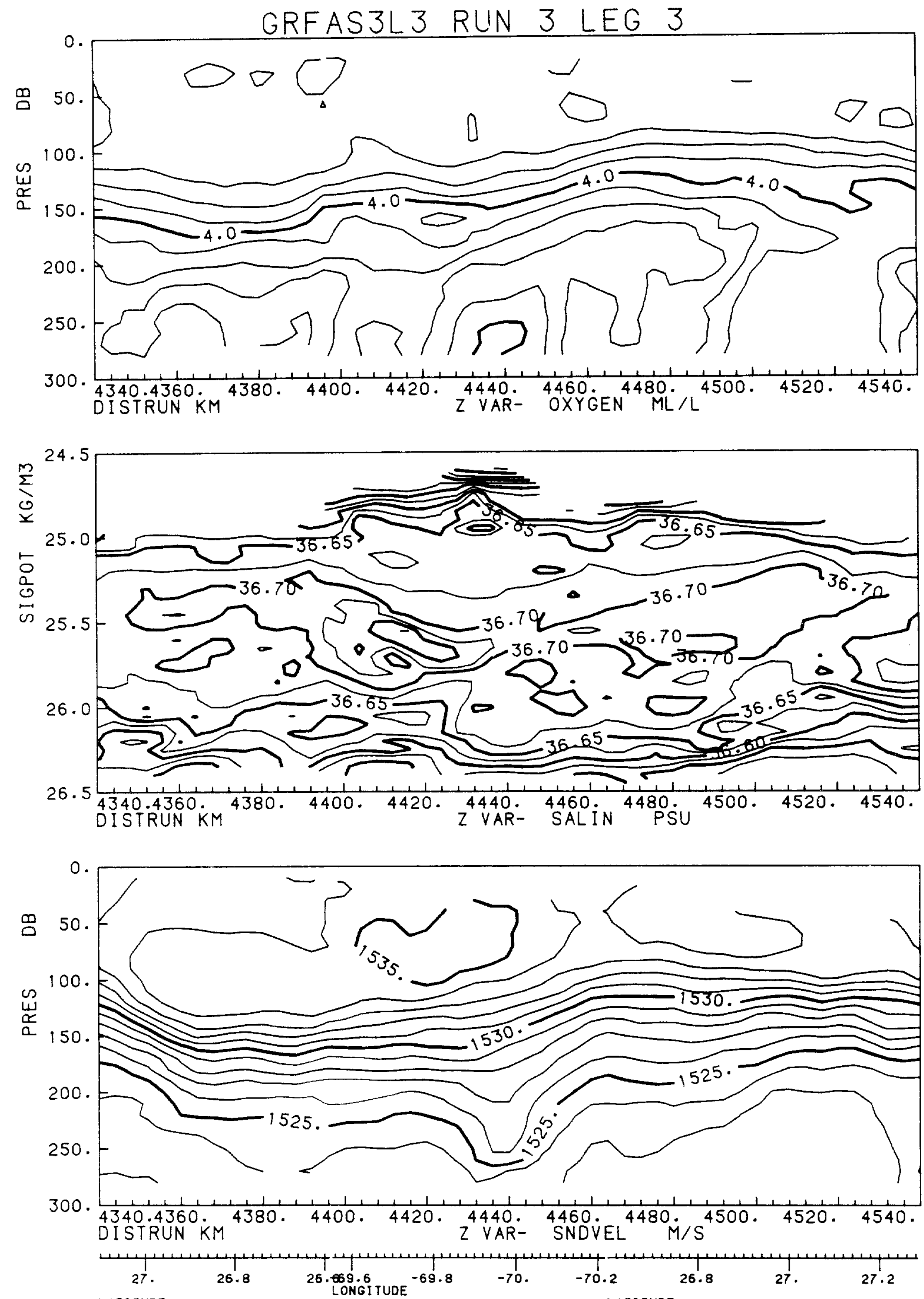
GRFAS3L1 RUN 3 LEG 1
PRES DB
0. 50. 100. 150. 200. 250. 300.
22. 22. 22. 22.
20. 20. 20. 20.
3980. 4000. 4020. 4040. 4060. 4080. 4100. 4120. 4140. 4160. 4180.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65 36.65 36.70 36.65 36.65 36.60 36.60 36.60 36.55 36.55 36.55
Z VAR- SALIN PSU
25.2 25.6 25.6 25.6 26.0 26.0 26.0
Z VAR- SIGPOT KG/M3
28.2 -69.4 -69.2 -69. -69. -69.2 -69.4
LATITUDE
LONGITUDE

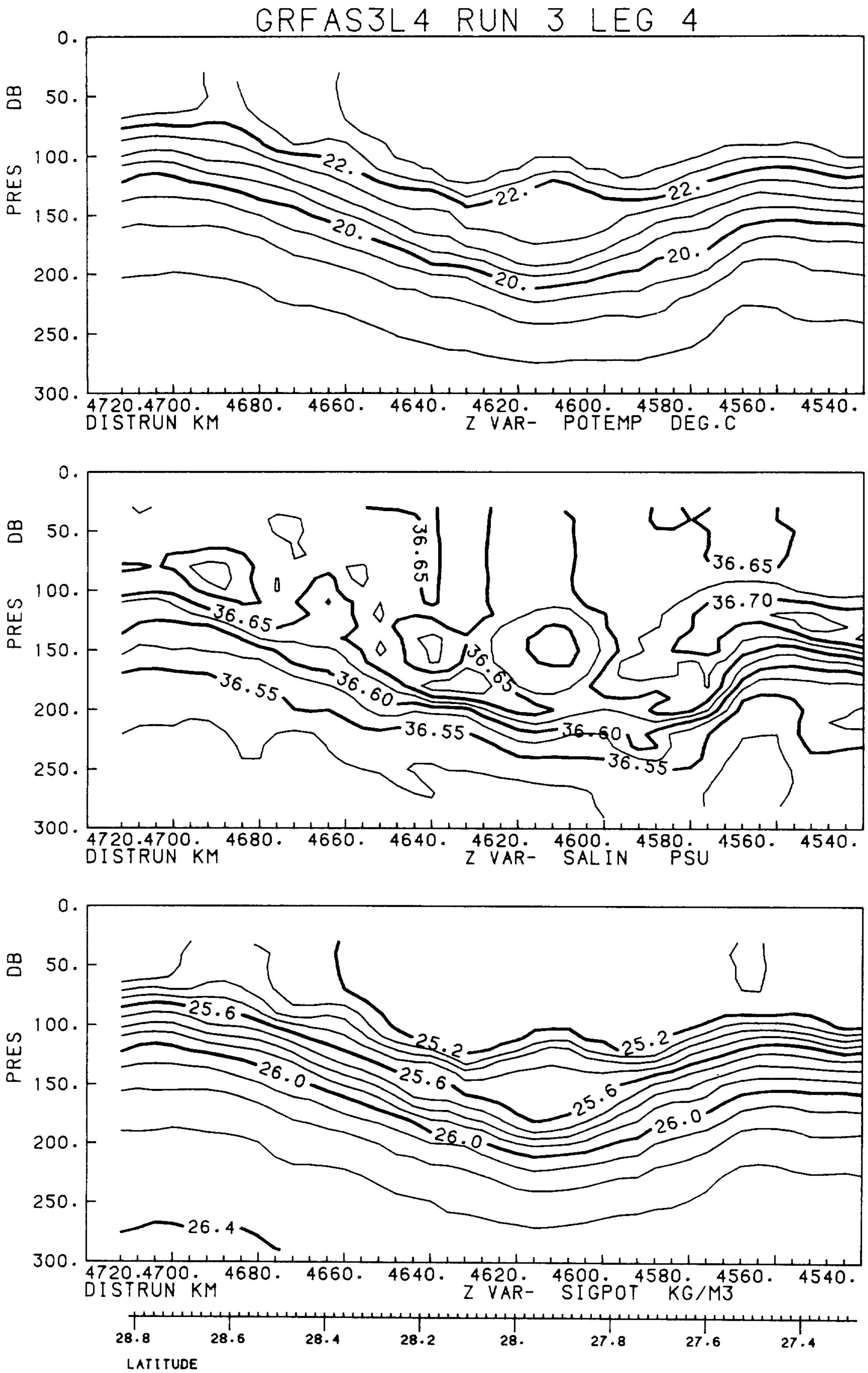

GRFAS3L1 RUN 3 LEG 1
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
3980. 4000. 4020. 4040. 4060. 4080. 4100. 4120. 4140. 4160. 4180.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.70
36.60
36.55
Z VAR- SALIN PSU
1530.
1525.
Z VAR- SNDVEL M/S
28.2
LATITUDE
-69.4 -69.2 -69. -69. -69.2 -69.4
LONGITUDE

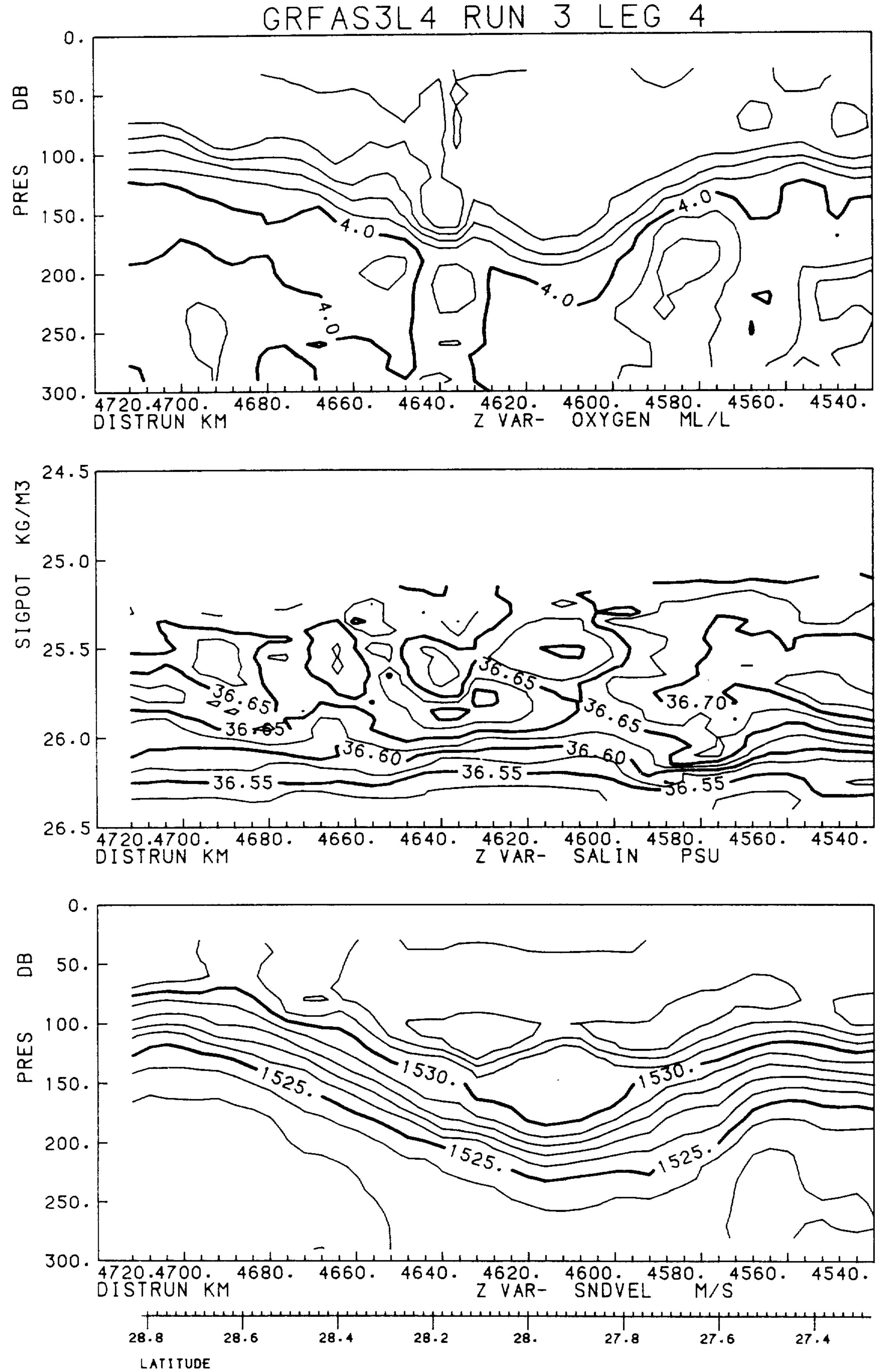

GRFAS3L2 RUN 3 LEG 2
PRES DB
0. 50. 100. 150. 200. 250. 300.
22. 22. 22. 22. 20. 20. 20. 20.
4160. 4180. 4200. 4220. 4240. 4260. 4280. 4300. 4320. 4340. 4360. 4380.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65 36.65 36.65 36.65 36.65 36.65 36.60 36.60 36.60 36.60 36.55
Z VAR- SALIN PSU
25.2 25.2 25.2 25.6 25.6 26.0 26.0 26.0 26.0 26.4
Z VAR- SIGPOT KG/M3
-69.4 -69.4 -69.4
LONGITUDE LONGITUDE LONGITUDE
27.8 27.6 27.4 27.2 27. 26.8
LATITUDE

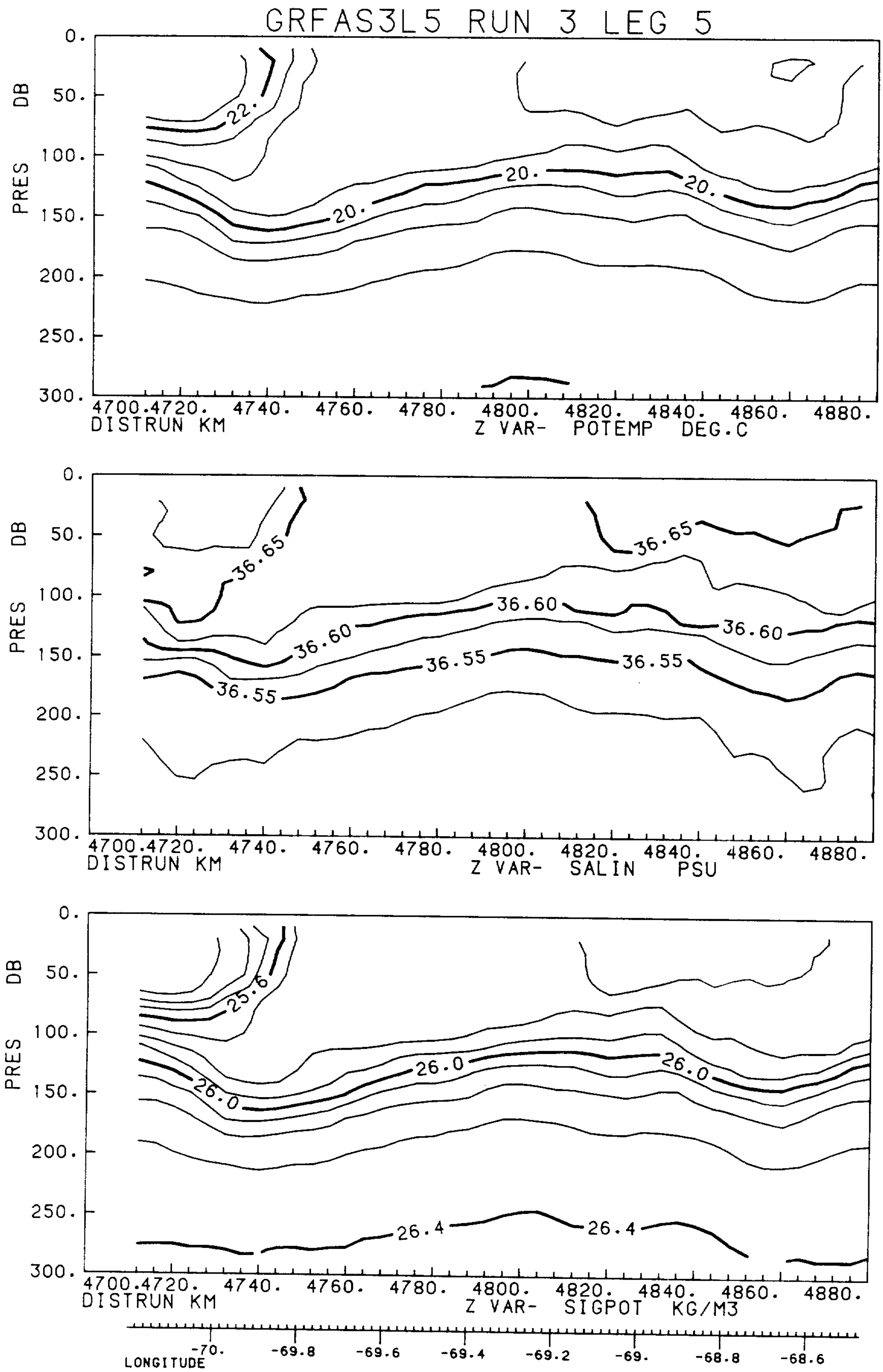

GRFAS3L2 RUN 3 LEG 2
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.5
4.0
4160.4180. 4200. 4220. 4240. 4260. 4280. 4300. 4320. 4340. 4360. 4380.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.70
36.60
36.55
4160.4180. 4200. 4220. 4240. 4260. 4280. 4300. 4320. 4340. 4360. 4380.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1530.
1525.
4160.4180. 4200. 4220. 4240. 4260. 4280. 4300. 4320. 4340. 4360. 4380.
DISTRUN KM
Z VAR- SNDVEL M/S
-69.4 -69.4 -69.4
LONGITUDE LONGITUDE LONGITUDE
27.8 27.6 27.4 27.2 27. 26.8
LATITUDE

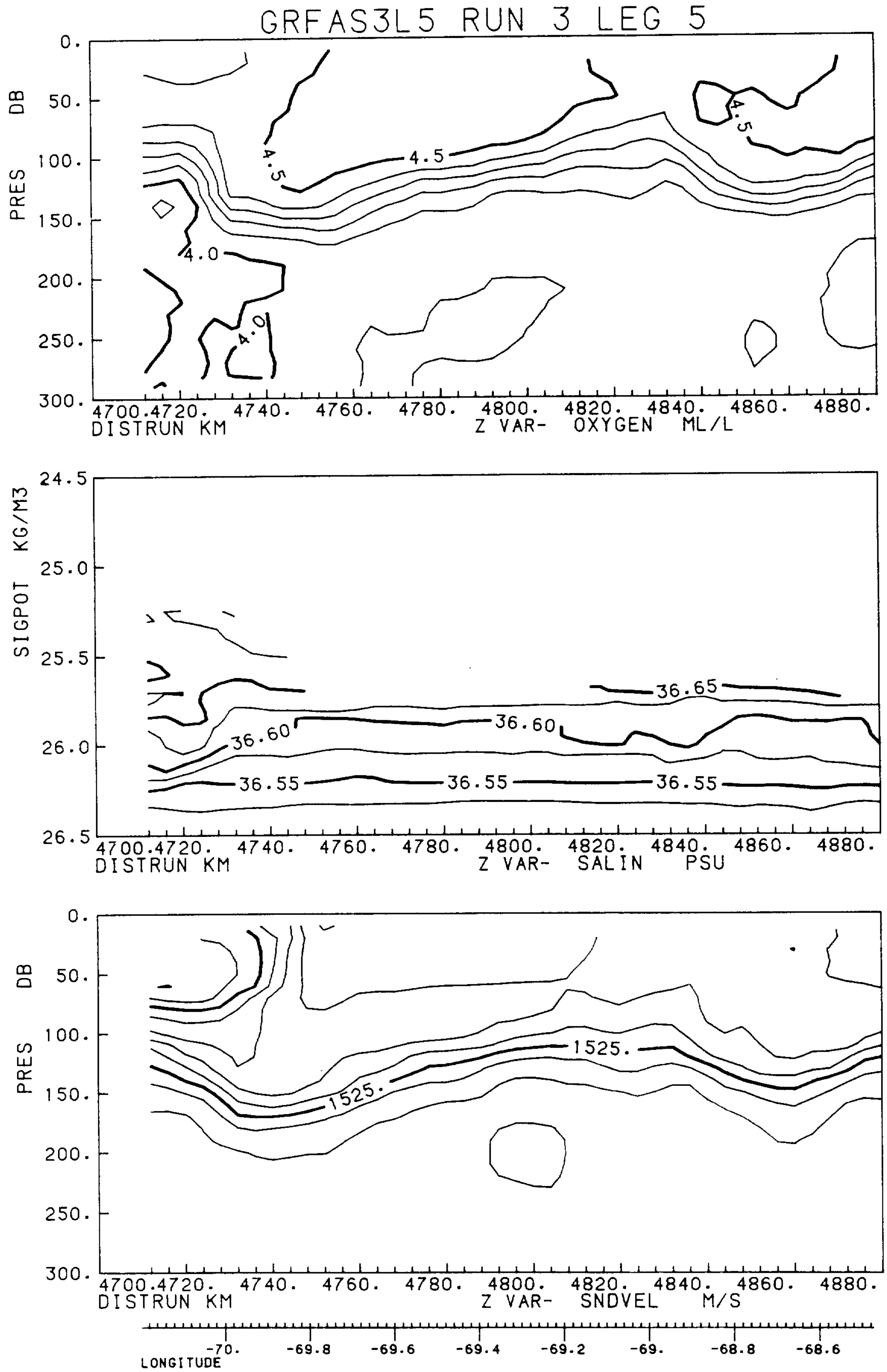

GRFAS3L3 RUN 3 LEG 3
PRES DB
0. 50. 100. 150. 200. 250. 300.
24.
22.
20.
4340. 4360. 4380. 4400. 4420. 4440. 4460. 4480. 4500. 4520. 4540.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.60
36.65
36.70
36.55
Z VAR- SALIN PSU
24.8
25.2
25.6
26.0
26.4
Z VAR- SIGPOT KG/M3
27. 26.8 26.6 -69.6 -69.8 -70. -70.2 26.8 27. 27.2
LATITUDE
LONGITUDE
LATITUDE

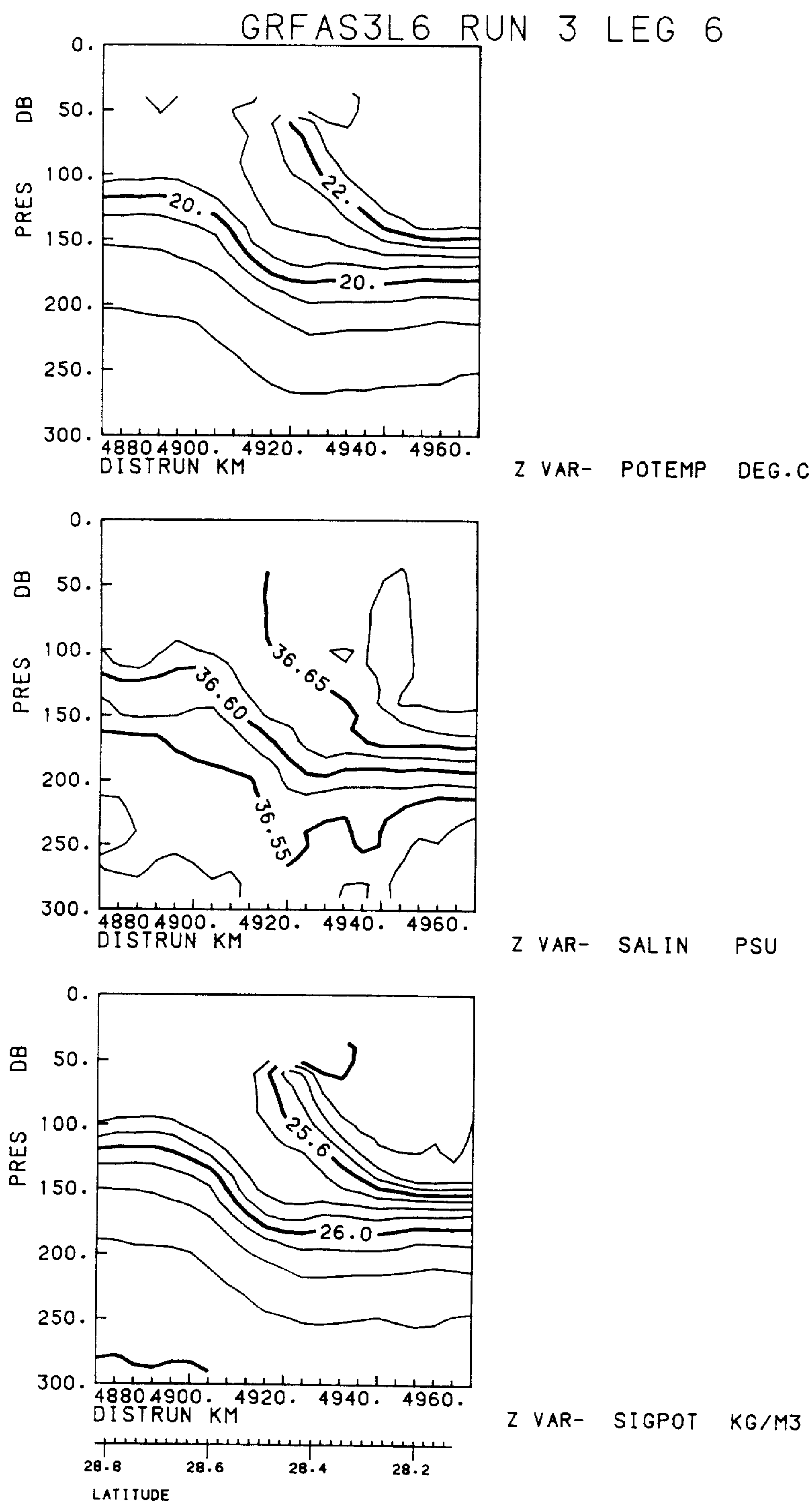

GRFAS3L3 RUN 3 LEG 3
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.0
4340.4360. 4380. 4400. 4420. 4440. 4460. 4480. 4500. 4520. 4540.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.70
36.60
4340.4360. 4380. 4400. 4420. 4440. 4460. 4480. 4500. 4520. 4540.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1535.
1530.
1525.
4340.4360. 4380. 4400. 4420. 4440. 4460. 4480. 4500. 4520. 4540.
DISTRUN KM
Z VAR- SNDVEL M/S
27.
26.8
26.6
-69.6
-69.8
-70.
-70.2
26.8
27.
27.2
LATITUDE
LONGITUDE
LATITUDE


GRFAS3L4 RUN 3 LEG 4
PRES DB
DISTRUN KM
Z VAR- POTEMP DEG.C
22.
20.
Z VAR- SALIN PSU
36.65
36.70
36.60
36.55
Z VAR- SIGPOT KG/M3
25.2
25.6
26.0
26.4
LATITUDE

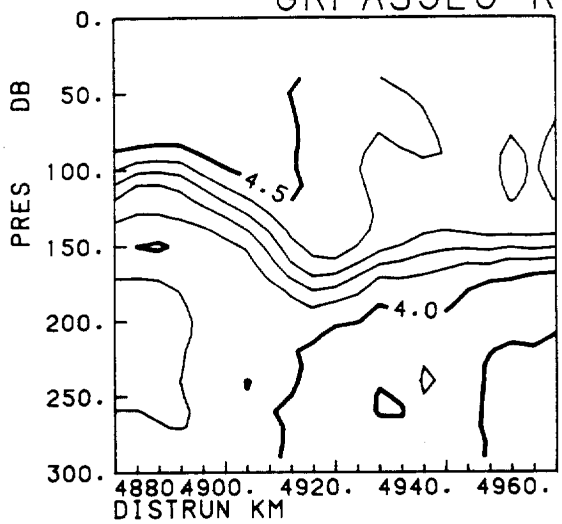

GRFAS3L4 RUN 3 LEG 4
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.0
4720. 4700. 4680. 4660. 4640. 4620. 4600. 4580. 4560. 4540.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.70
36.60
36.55
4720. 4700. 4680. 4660. 4640. 4620. 4600. 4580. 4560. 4540.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
4720. 4700. 4680. 4660. 4640. 4620. 4600. 4580. 4560. 4540.
DISTRUN KM
Z VAR- SNDVEL M/S
28.8 28.6 28.4 28.2 28. 27.8 27.6 27.4
LATITUDE


GRFAS3L5 RUN 3 LEG 5
PRES DB
0. 50. 100. 150. 200. 250. 300.
22.
20.
4700. 4720. 4740. 4760. 4780. 4800. 4820. 4840. 4860. 4880.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65
36.60
36.55
Z VAR- SALIN PSU
25.6
26.0
26.4
Z VAR- SIGPOT KG/M3
LONGITUDE
-70. -69.8 -69.6 -69.4 -69.2 -69. -68.8 -68.6

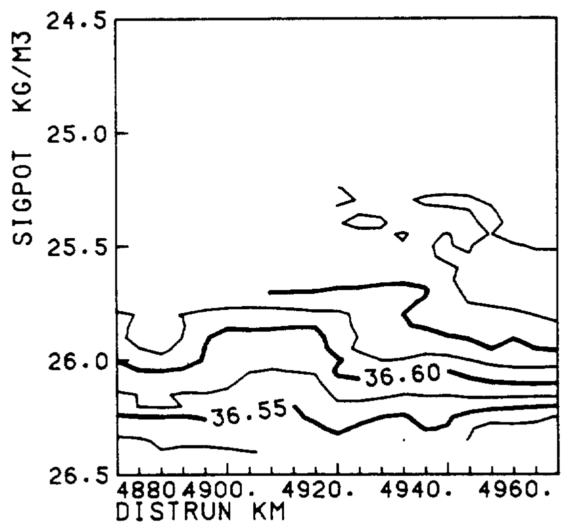

GRFAS3L5 RUN 3 LEG 5
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.5
4.0
4700.4720. 4740. 4760. 4780. 4800. 4820. 4840. 4860. 4880.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.60
36.55
4700.4720. 4740. 4760. 4780. 4800. 4820. 4840. 4860. 4880.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1525.
4700.4720. 4740. 4760. 4780. 4800. 4820. 4840. 4860. 4880.
DISTRUN KM
Z VAR- SNDVEL M/S
-70.
-69.8
-69.6
-69.4
-69.2
-69.
-68.8
-68.6
LONGITUDE


GRFAS3L6 RUN 3 LEG 6
PRES DB
DISTRUN KM
Z VAR- POTEMP DEG.C
20.
22.
Z VAR- SALIN PSU
36.65
36.60
36.55
Z VAR- SIGPOT KG/M3
25.6
26.0
LATITUDE
28.8
28.6
28.4
28.2

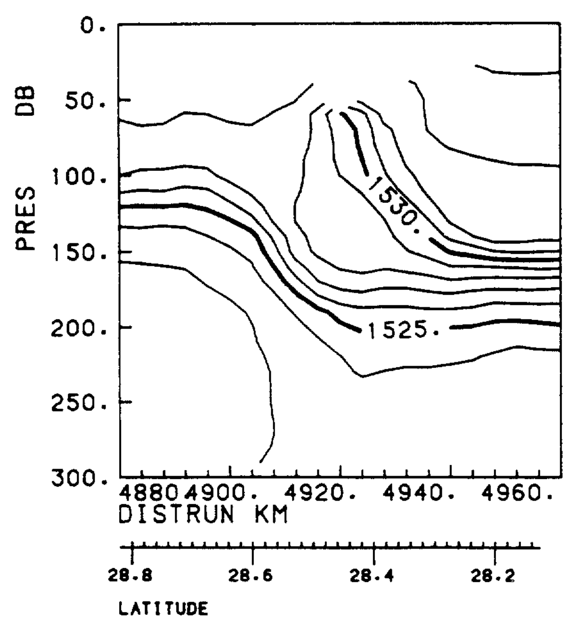
GRFAS3L6 RUN 3 LEG 6



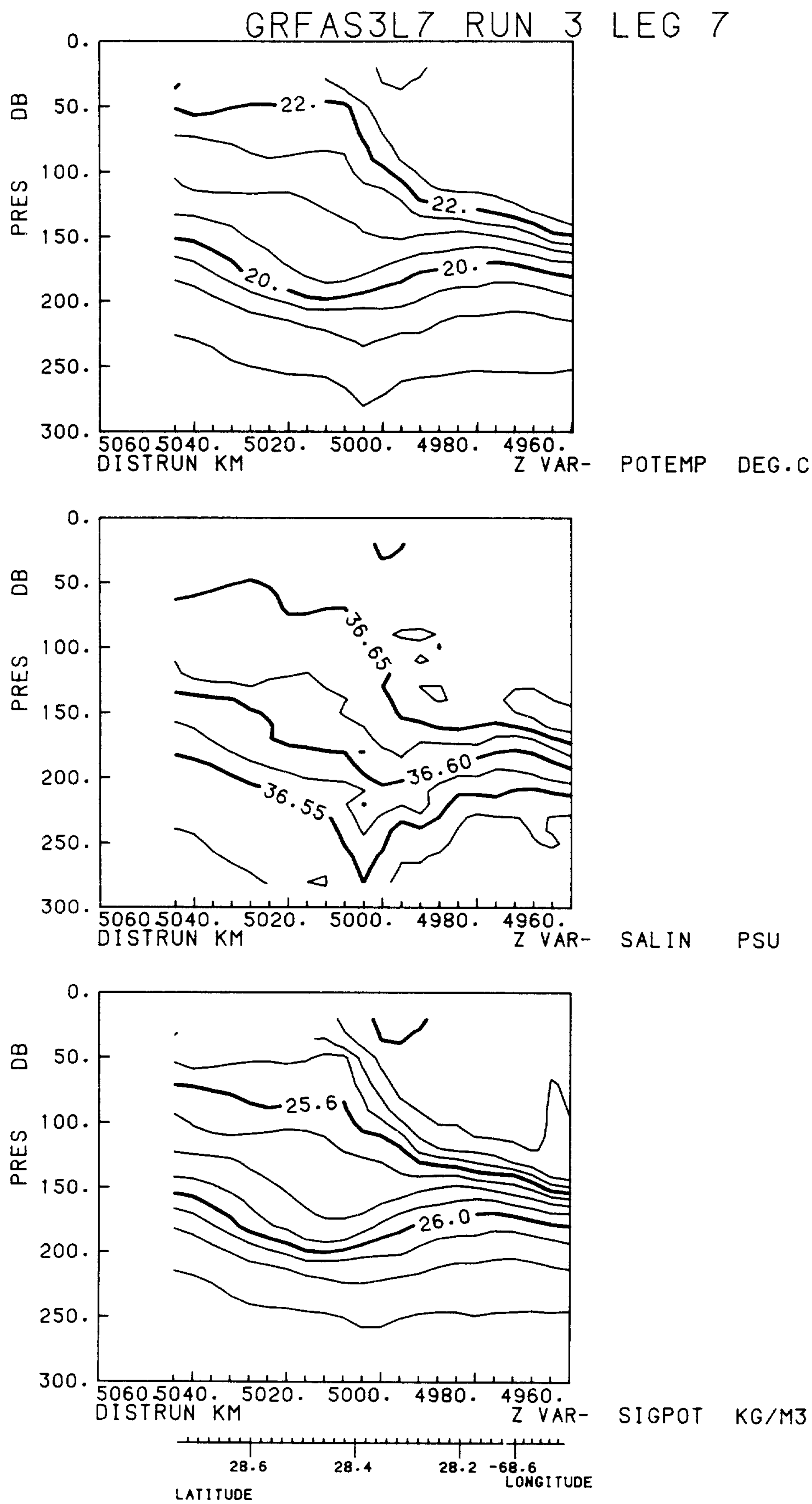

Z VAR- OXYGEN ML/L

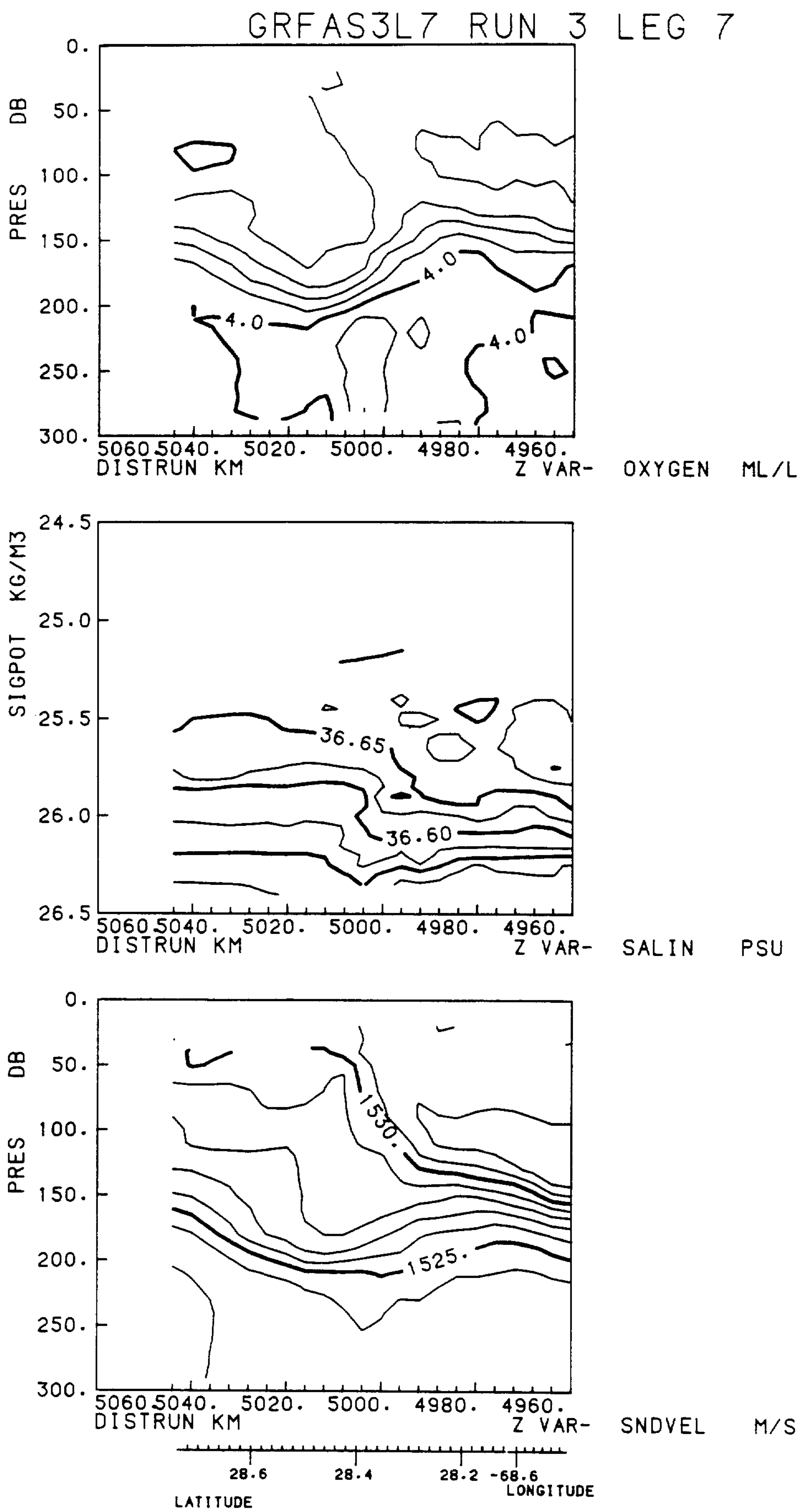


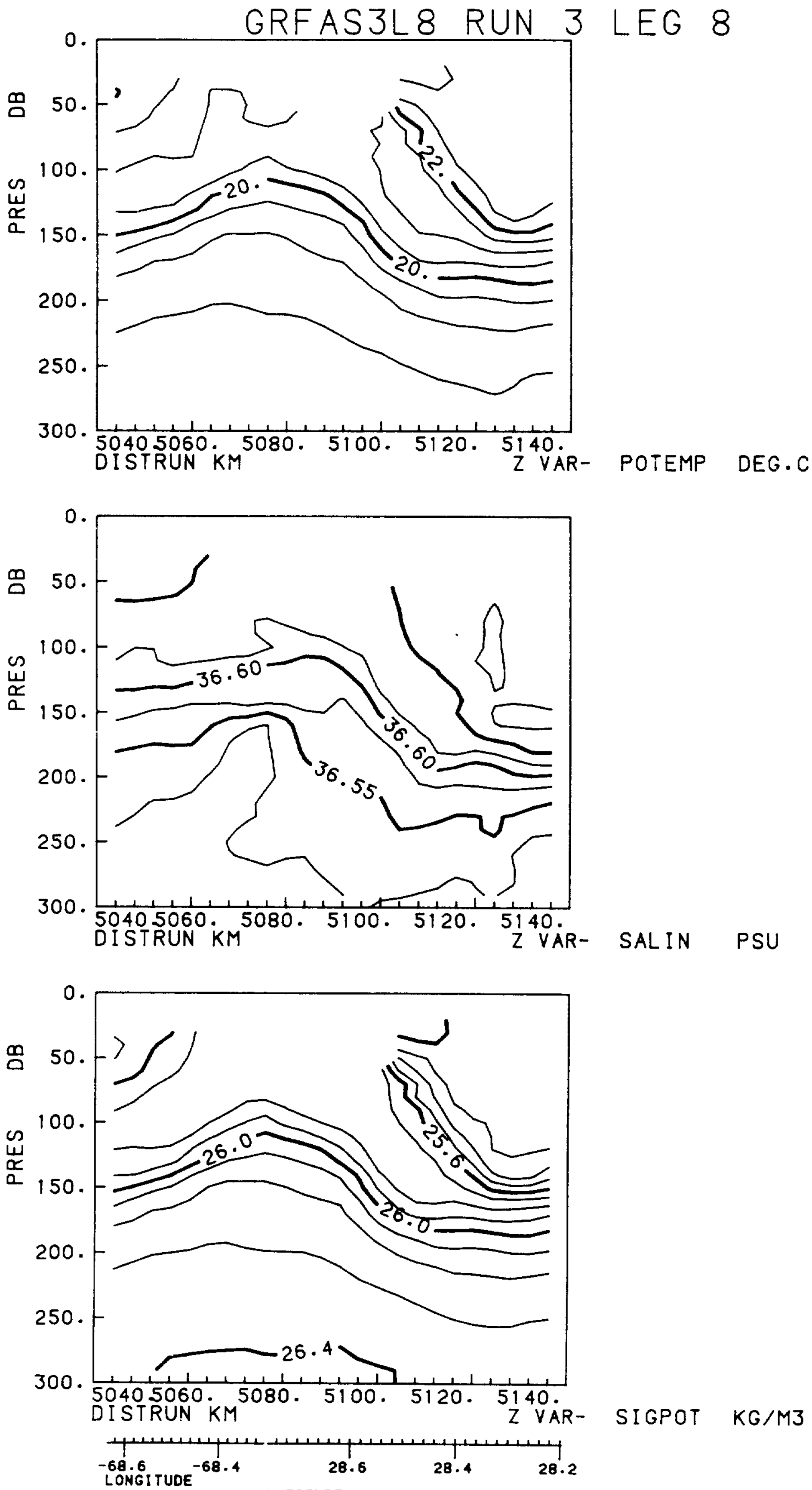

Z VAR- SALIN PSU



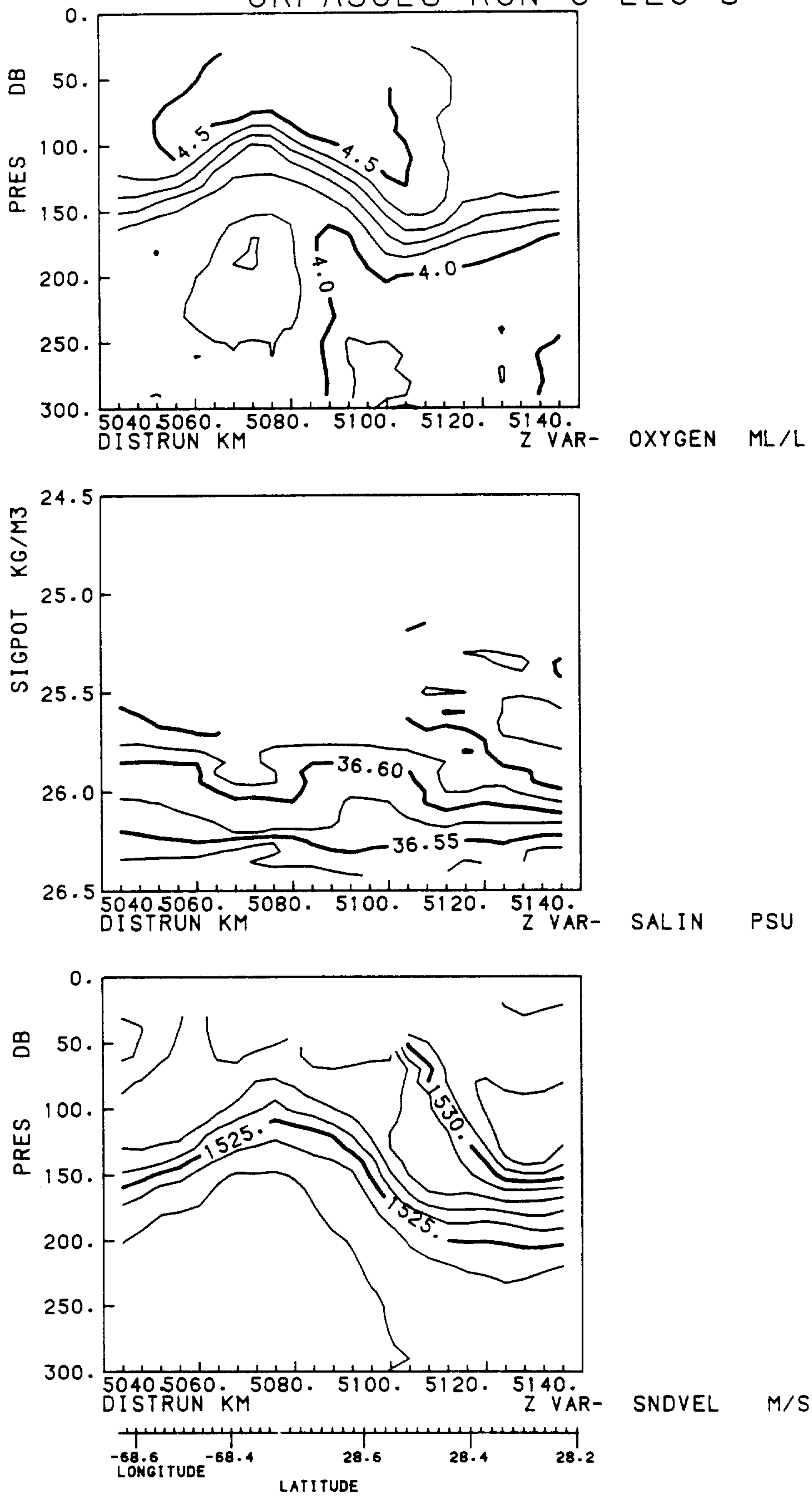

Z VAR- SNDVEL M/S

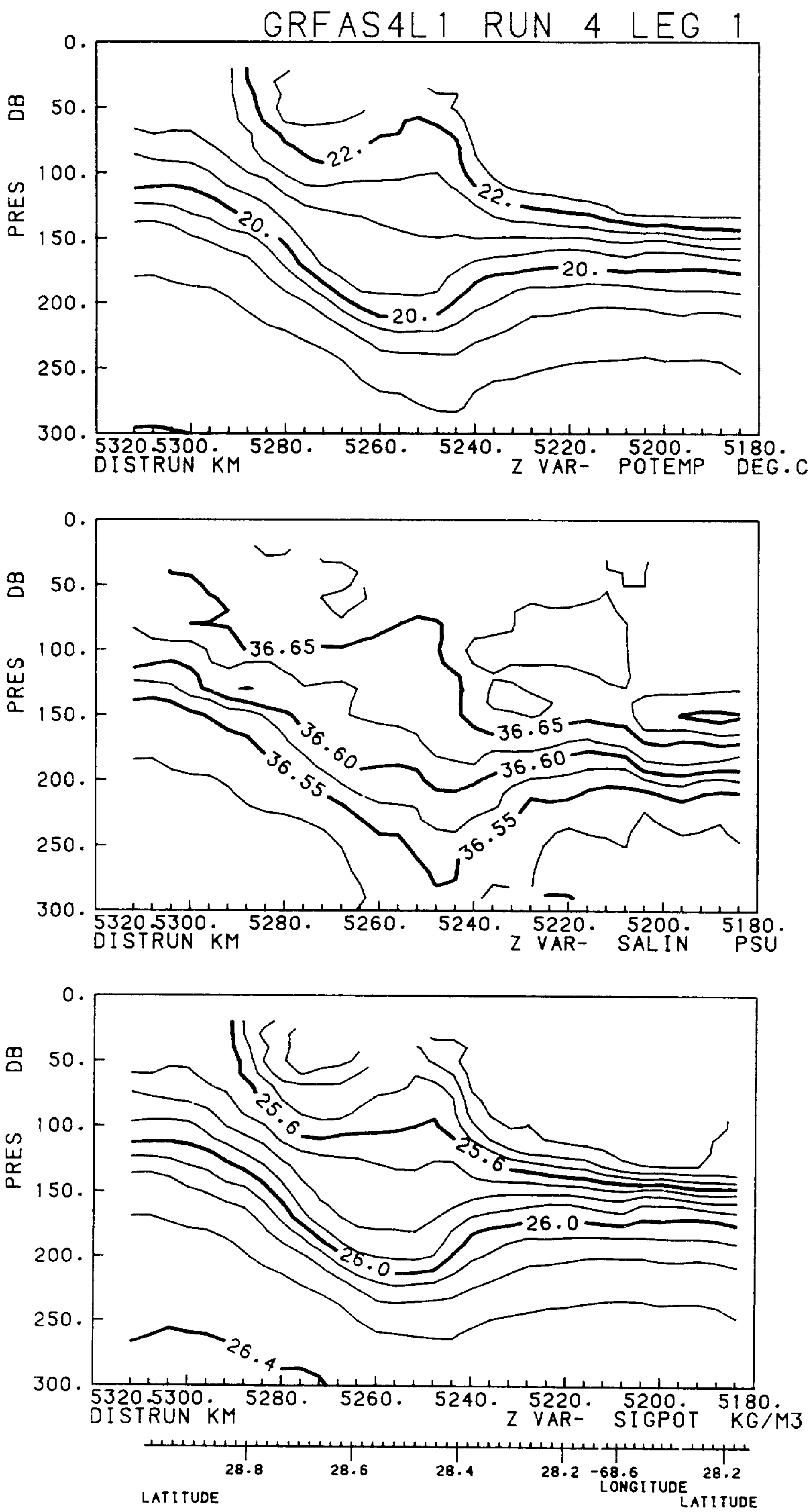

GRFAS3L7 RUN 3 LEG 7
PRES DB
0.
50.
100.
150.
200.
250.
300.
22.
20.
5060 5040. 5020. 5000. 4980. 4960.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65
36.60
36.55
Z VAR- SALIN PSU
25.6
26.0
Z VAR- SIGPOT KG/M3
28.6
28.4
28.2
-68.6
LATITUDE
LONGITUDE

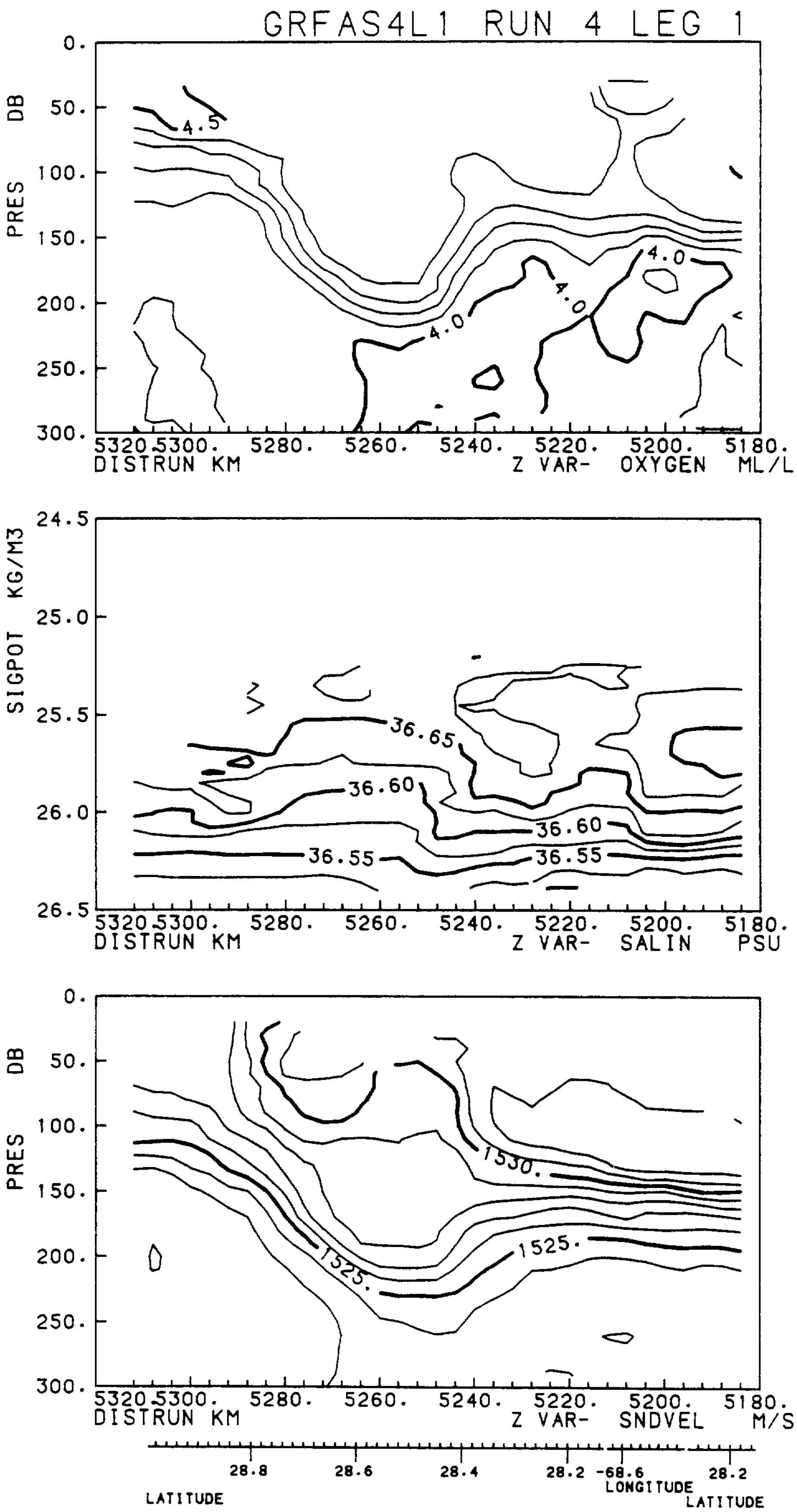

GRFAS3L7 RUN 3 LEG 7
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.0
4.0
4.0
4.0
5060 5040. 5020. 5000. 4980. 4960.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.60
5060 5040. 5020. 5000. 4980. 4960.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1530.
1525.
5060 5040. 5020. 5000. 4980. 4960.
DISTRUN KM
Z VAR- SNDVEL M/S
28.6
28.4
28.2
-68.6
LATITUDE
LONGITUDE

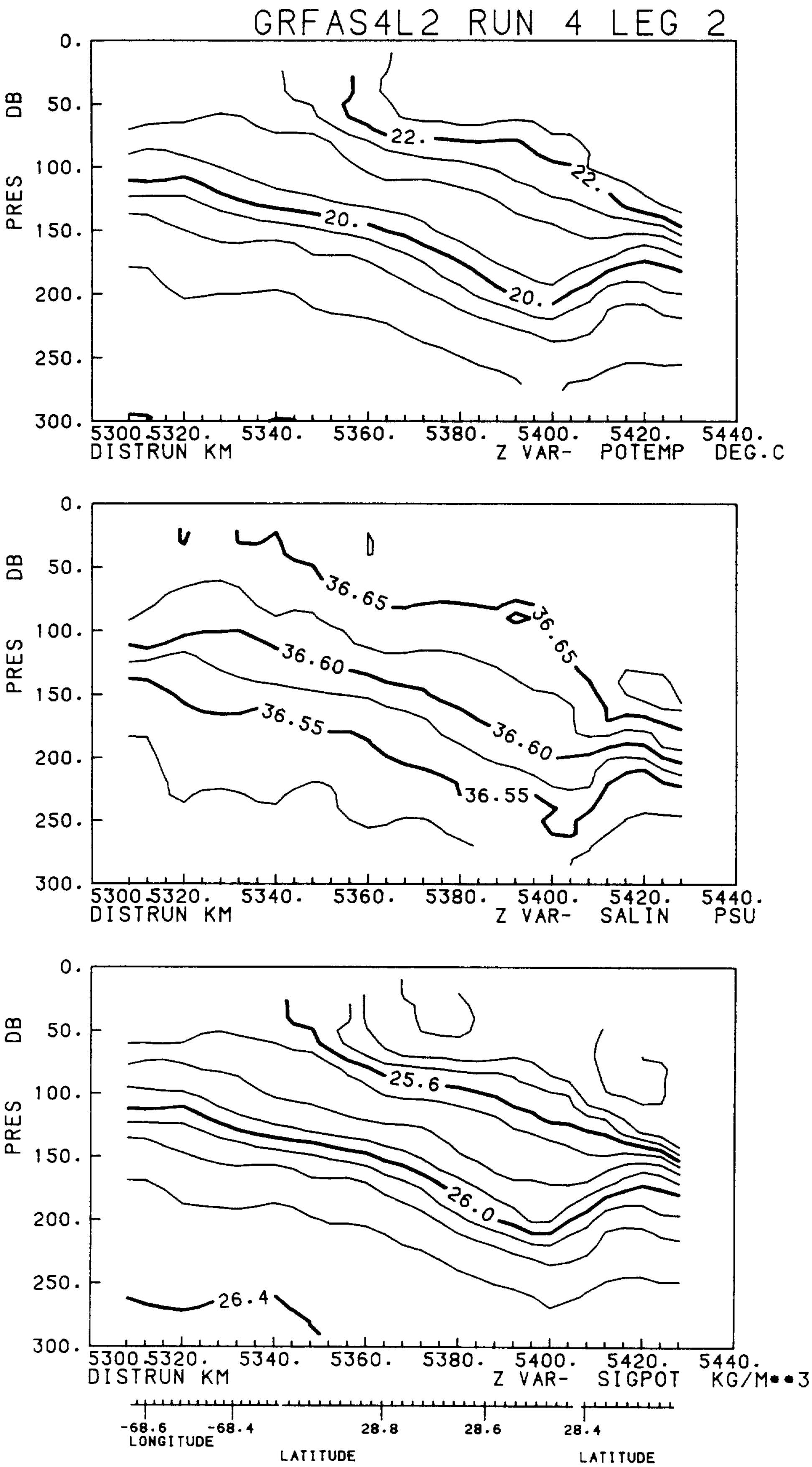

GRFAS3L8 RUN 3 LEG 8
PRES DB
0.
50.
100.
150.
200.
250.
300.
5040 5060. 5080. 5100. 5120. 5140.
DISTRUN KM
Z VAR- POTEMP DEG.C
20.
22.
20.
Z VAR- SALIN PSU
36.60
36.60
36.55
Z VAR- SIGPOT KG/M3
26.0
25.6
26.0
26.4
-68.6 -68.4
LONGITUDE
28.6 28.4 28.2
LATITUDE

GRFAS3L8 RUN 3 LEG 8




GRFAS4L1 RUN 4 LEG 1
PRES DB
0. 50. 100. 150. 200. 250. 300.
22. 22. 20. 20. 20.
5320. 5300. 5280. 5260. 5240. 5220. 5200. 5180.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65 36.65 36.60 36.60 36.55 36.55
Z VAR- SALIN PSU
25.6 25.6 26.0 26.0 26.4
Z VAR- SIGPOT KG/M3
28.8 28.6 28.4 28.2 -68.6 28.2
LATITUDE
LONGITUDE
LATITUDE


GRFAS4L1 RUN 4 LEG 1
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.5
4.0
5320.5300. 5280. 5260. 5240. 5220. 5200. 5180.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.60
36.55
5320.5300. 5280. 5260. 5240. 5220. 5200. 5180.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1530.
1525.
5320.5300. 5280. 5260. 5240. 5220. 5200. 5180.
DISTRUN KM
Z VAR- SNDVEL M/S
28.8
28.6
28.4
28.2
-68.6
28.2
LATITUDE
LONGITUDE
LATITUDE


GRFAS4L2 RUN 4 LEG 2
PRES DB
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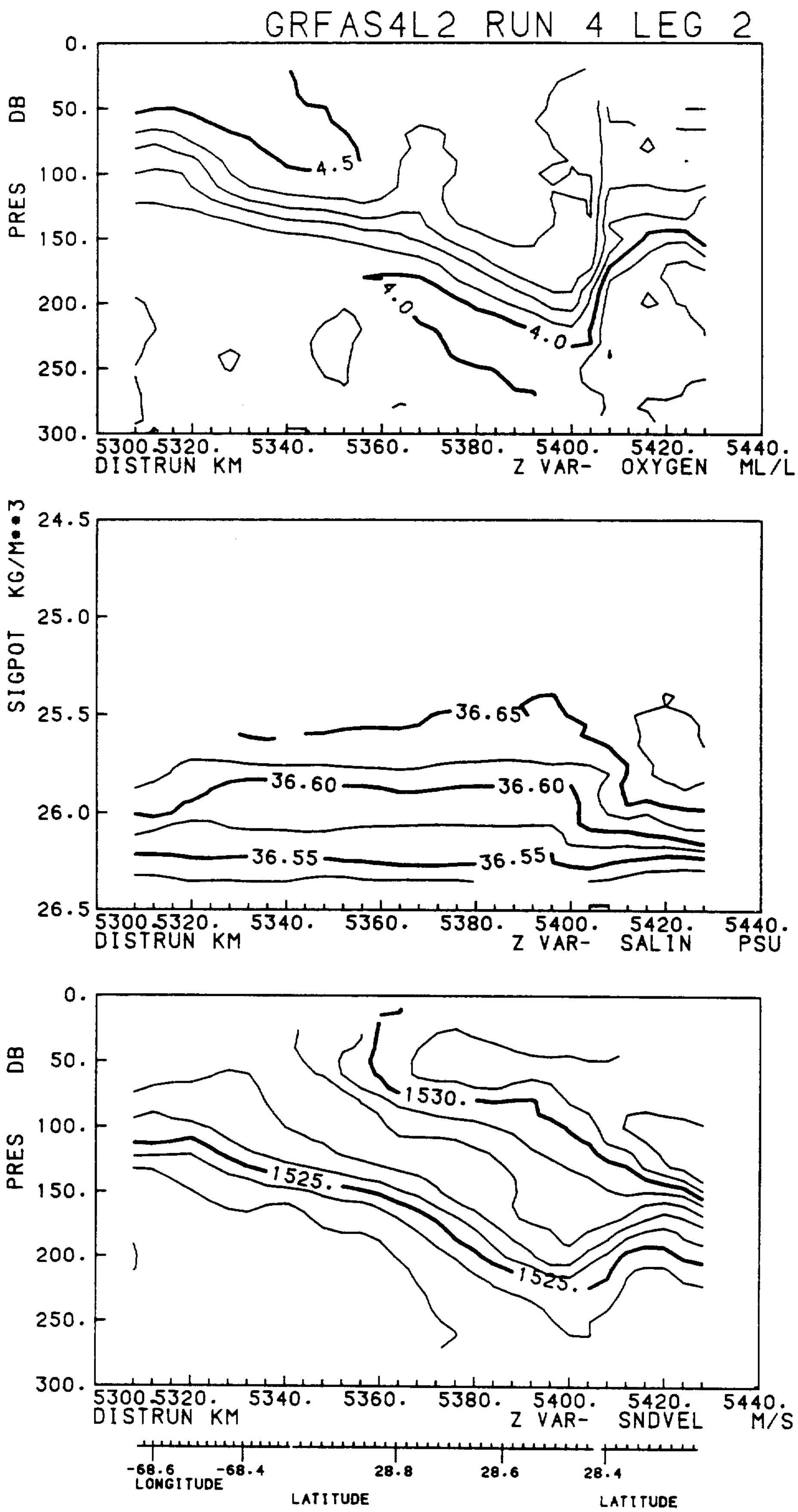
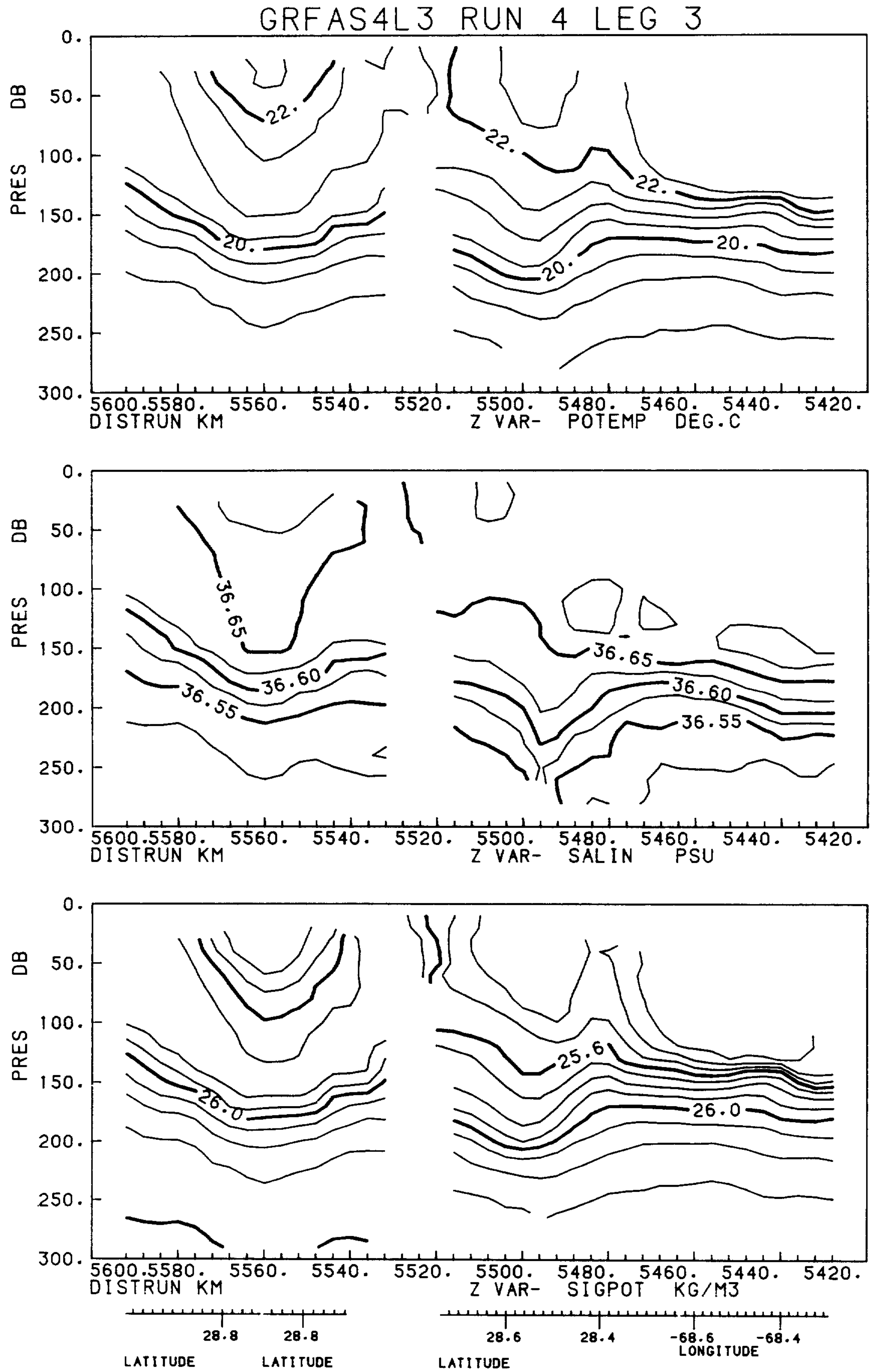
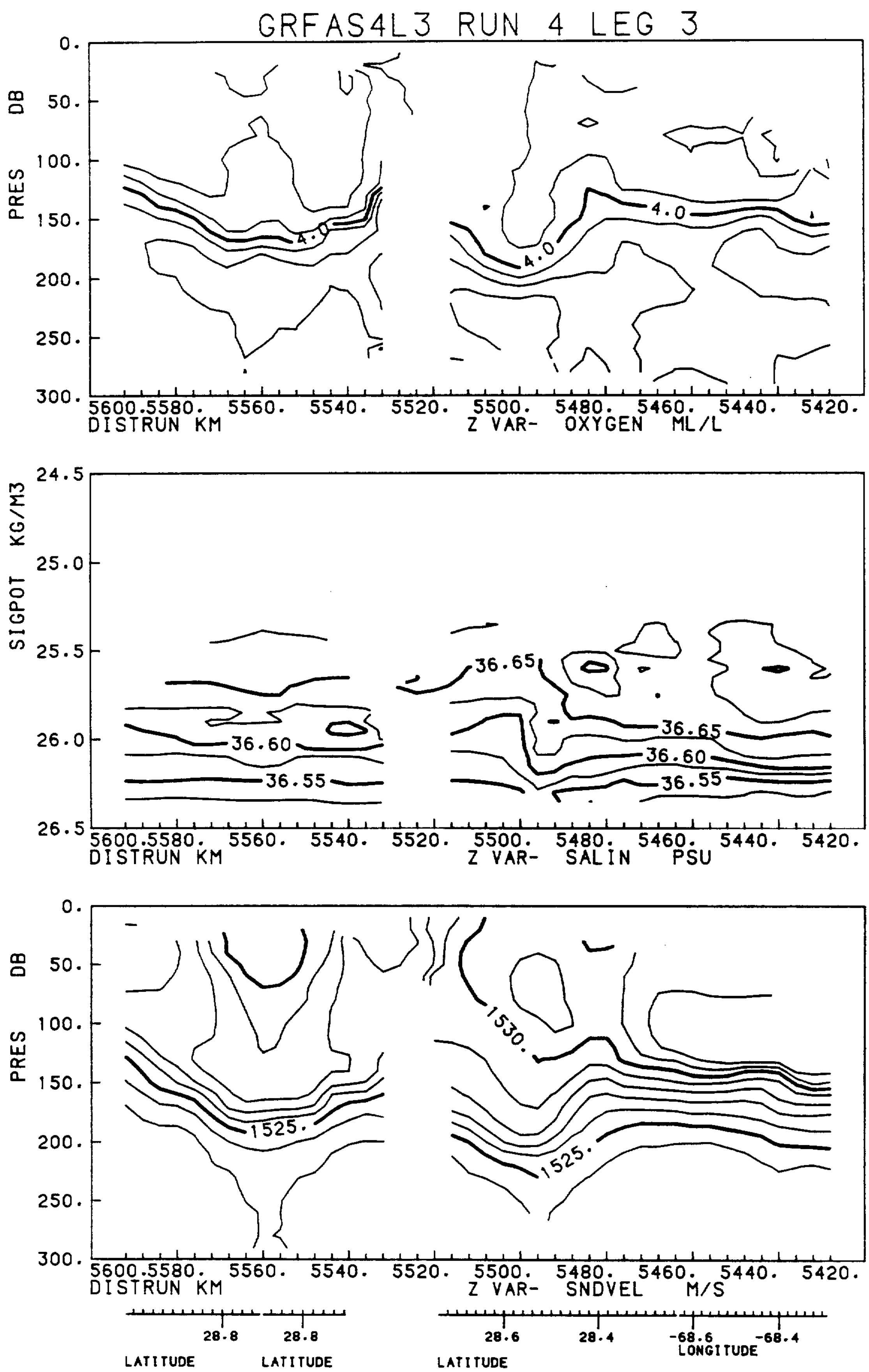
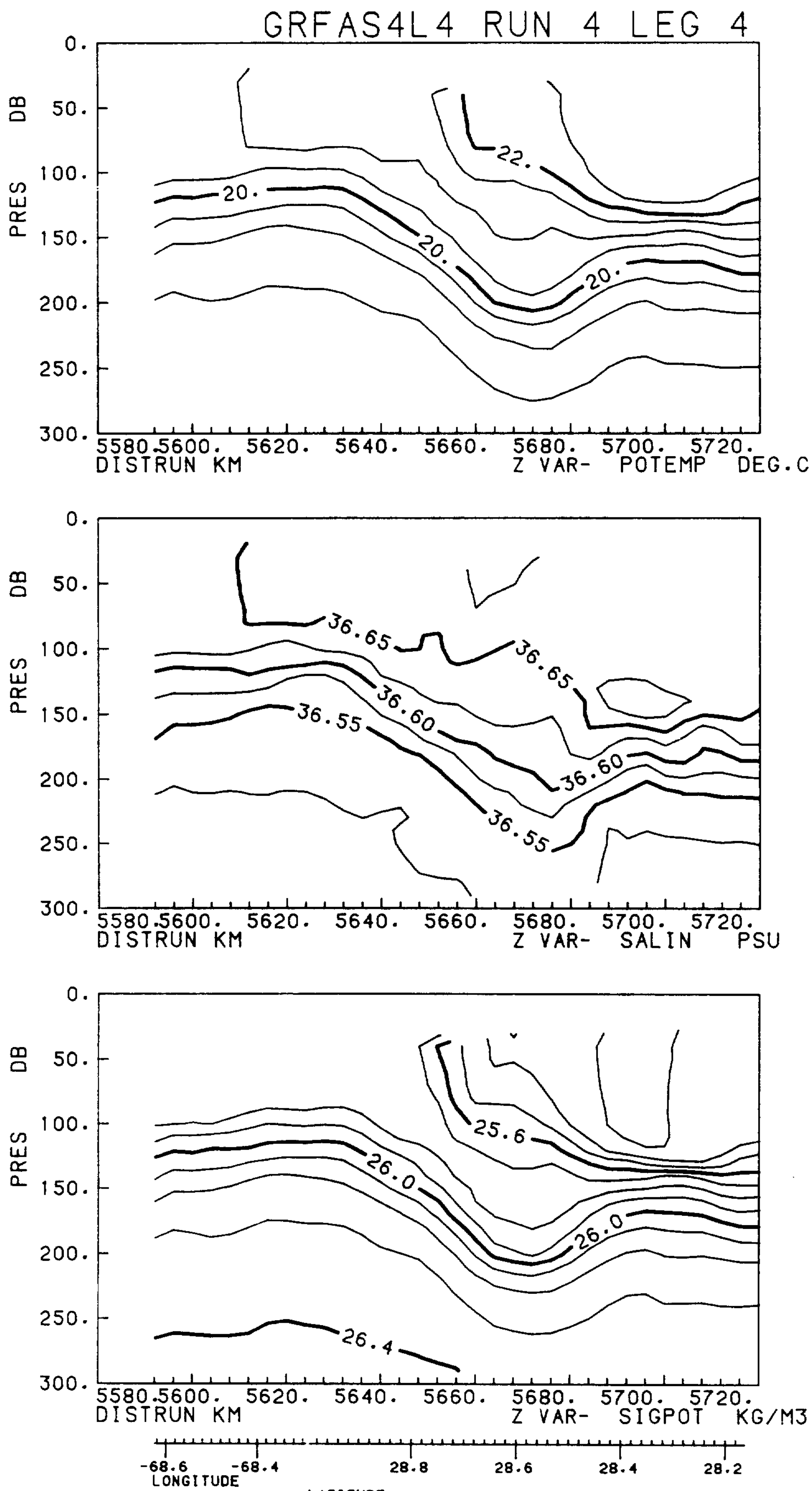
22. 22. 20. 20.
5300.5320. 5340. 5360. 5380. 5400. 5420. 5440.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65 36.65 36.60 36.60 36.55 36.55
Z VAR- SALIN PSU
25.6 26.0 26.4
Z VAR- SIGPOT KG/M**3
-68.6 -68.4
LONGITUDE
28.8 28.6 28.4
LATITUDE
LATITUDE

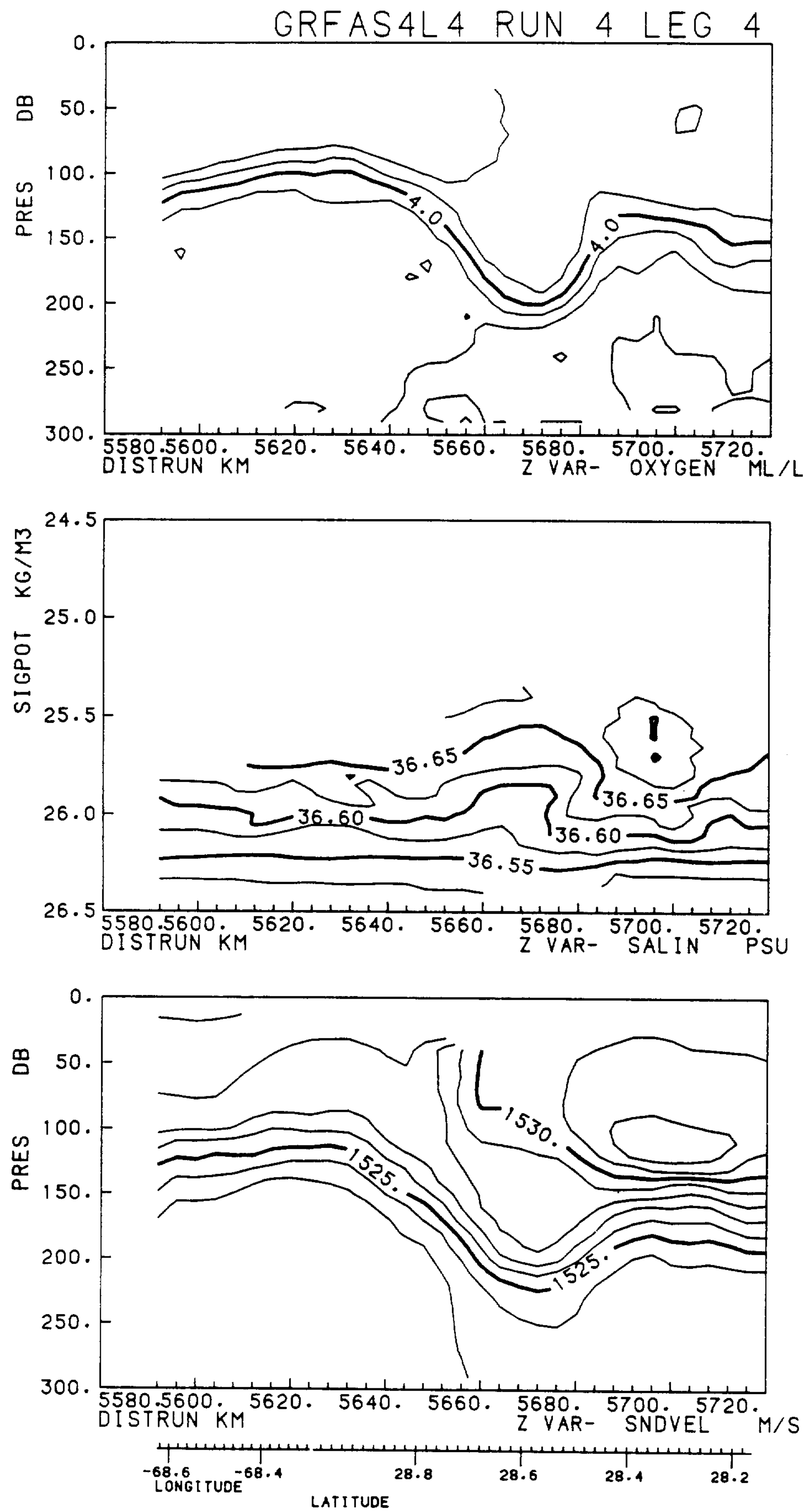

GRFAS4L2 RUN 4 LEG 2
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.5
4.0
4.0
5300 5320. 5340. 5360. 5380. 5400. 5420. 5440.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M**3
24.5 25.0 25.5 26.0 26.5
36.65
36.60
36.60
36.55
36.55
5300 5320. 5340. 5360. 5380. 5400. 5420. 5440.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0. 50. 100. 150. 200. 250. 300.
1530.
1525.
1525.
5300 5320. 5340. 5360. 5380. 5400. 5420. 5440.
DISTRUN KM
Z VAR- SNDVEL M/S
-68.6 -68.4
LONGITUDE
28.8 28.6
LATITUDE
28.4
LATITUDE

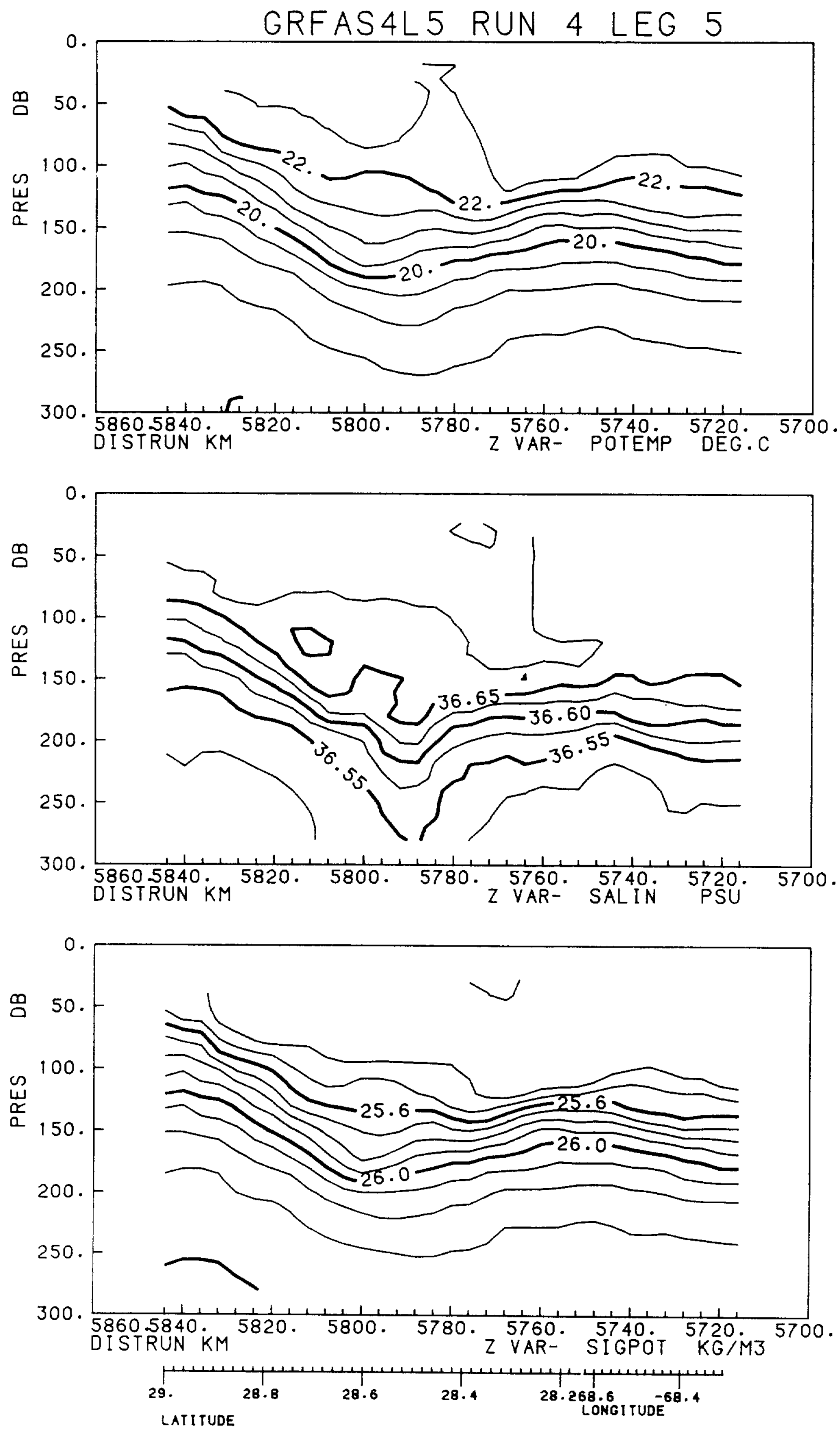

GRFAS4L3 RUN 4 LEG 3
PRES DB
0.
50.
100.
150.
200.
250.
300.
22.
20.
5600.5580. 5560. 5540. 5520. 5500. 5480. 5460. 5440. 5420.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65
36.60
36.55
Z VAR- SALIN PSU
25.6
26.0
Z VAR- SIGPOT KG/M3
28.8
28.8
28.6
28.4
-68.6
-68.4
LATITUDE
LATITUDE
LATITUDE
LONGITUDE


GRFAS4L3 RUN 4 LEG 3
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.0
5600.5580. 5560. 5540. 5520. 5500. 5480. 5460. 5440. 5420.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.60
36.55
Z VAR- SALIN PSU
1530.
1525.
Z VAR- SNDVEL M/S
28.8
28.6
28.4
-68.6
-68.4
LATITUDE
LONGITUDE



GRFAS4L4 RUN 4 LEG 4
PRES DB
0. 50. 100. 150. 200. 250. 300.
22.
20.
20.
20.
5580.5600. 5620. 5640. 5660. 5680. 5700. 5720.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65
36.65
36.60
36.60
36.55
36.55
Z VAR- SALIN PSU
25.6
26.0
26.0
26.4
Z VAR- SIGPOT KG/M3
-68.6 -68.4
LONGITUDE
28.8 28.6 28.4 28.2
LATITUDE


GRFAS4L4 RUN 4 LEG 4
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.0
4.0
5580.5600. 5620. 5640. 5660. 5680. 5700. 5720.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.65
36.65
36.60
36.60
36.55
5580.5600. 5620. 5640. 5660. 5680. 5700. 5720.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1530.
1525.
1525.
5580.5600. 5620. 5640. 5660. 5680. 5700. 5720.
DISTRUN KM
Z VAR- SNDVEL M/S
-68.6 -68.4
LONGITUDE
28.8 28.6 28.4 28.2
LATITUDE


GRFAS4L5 RUN 4 LEG 5
PRES DB
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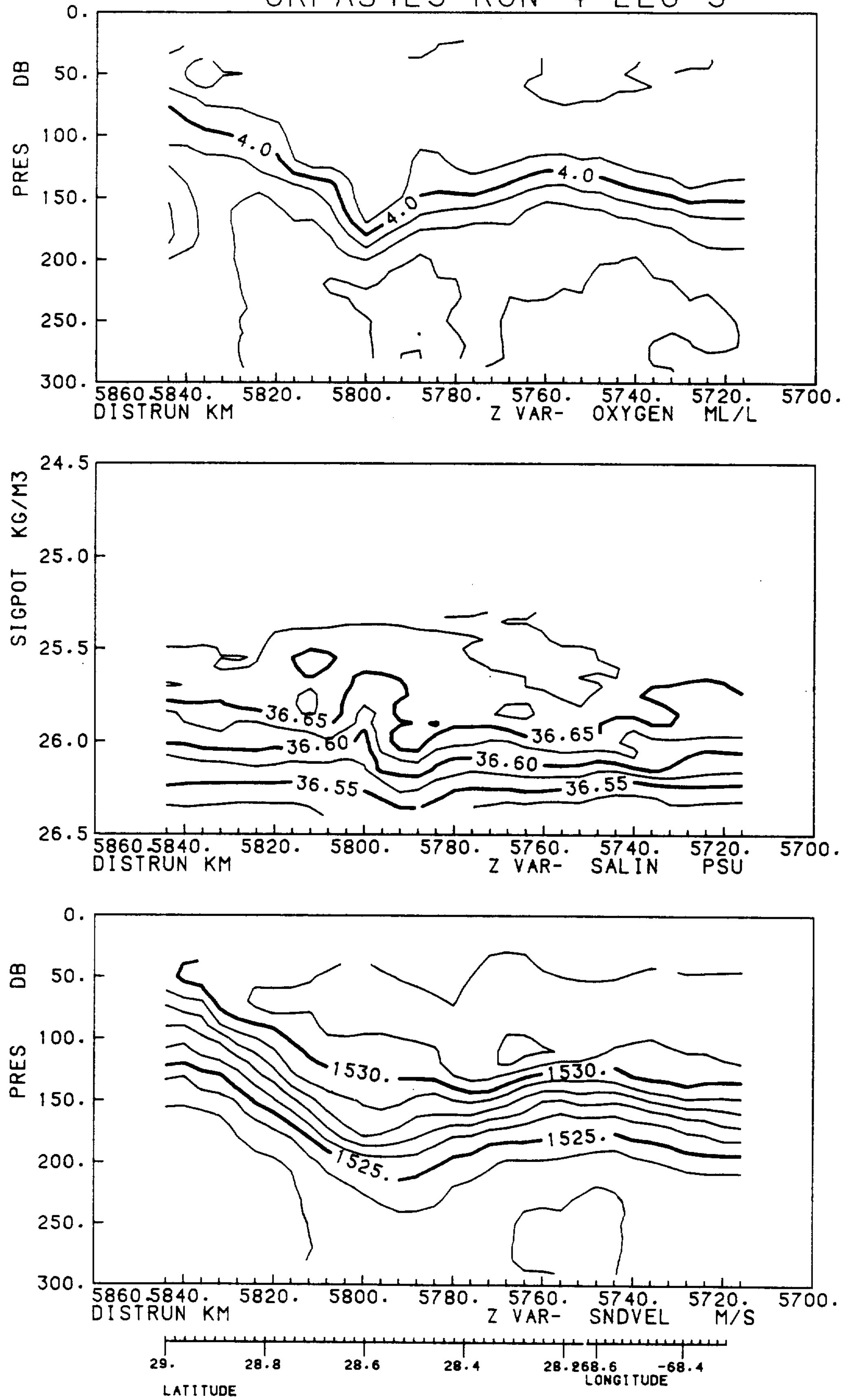
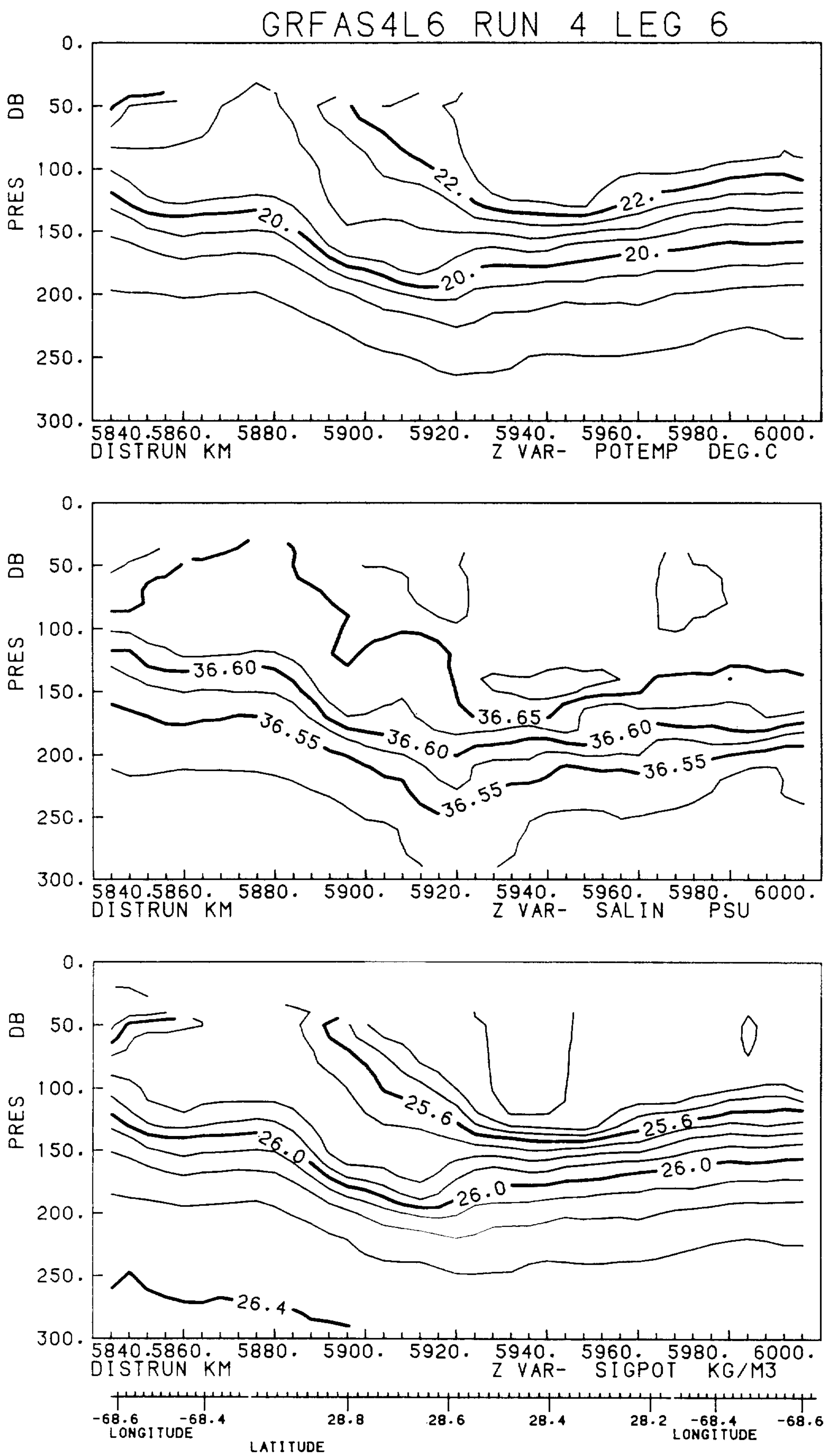
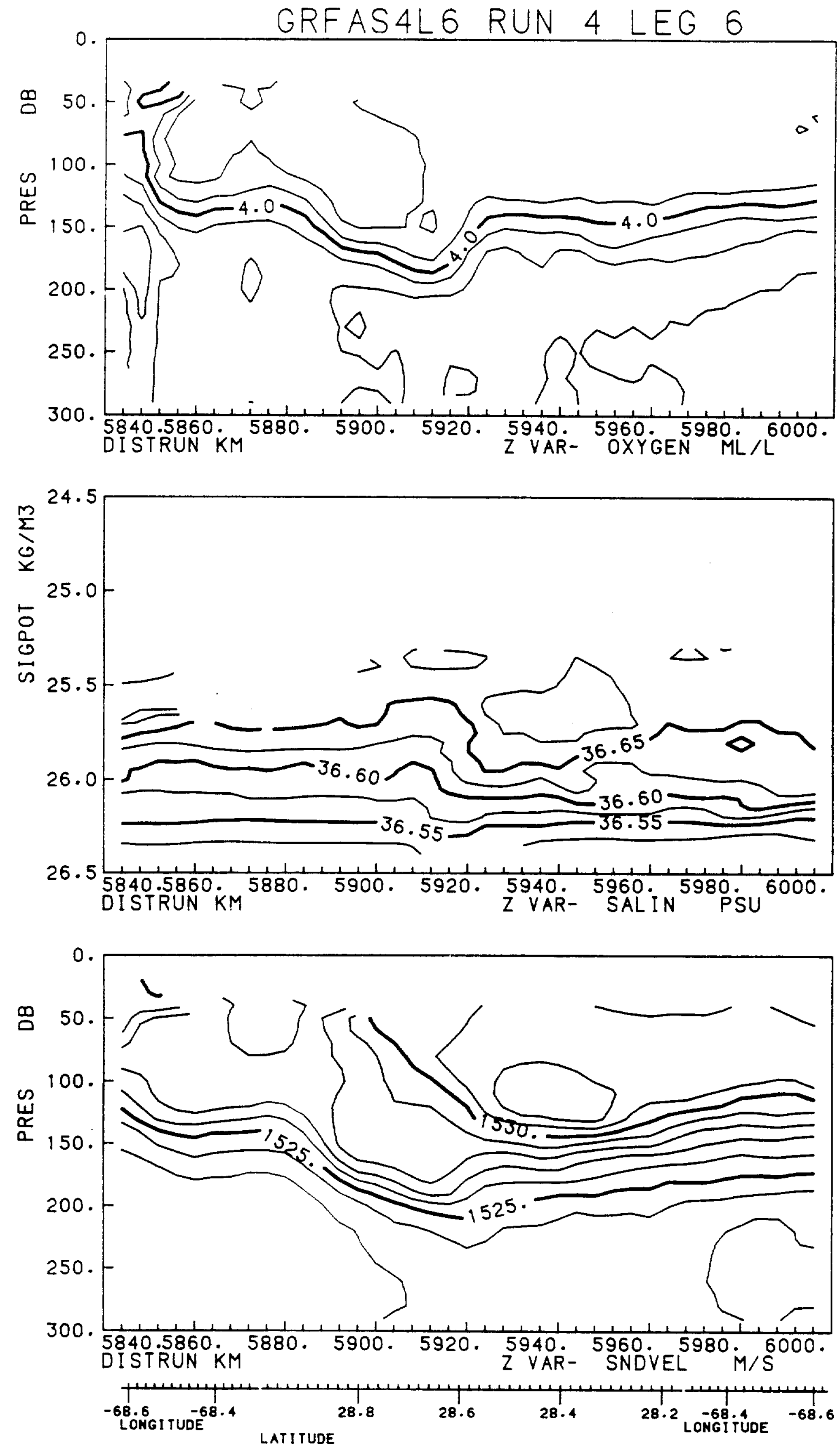
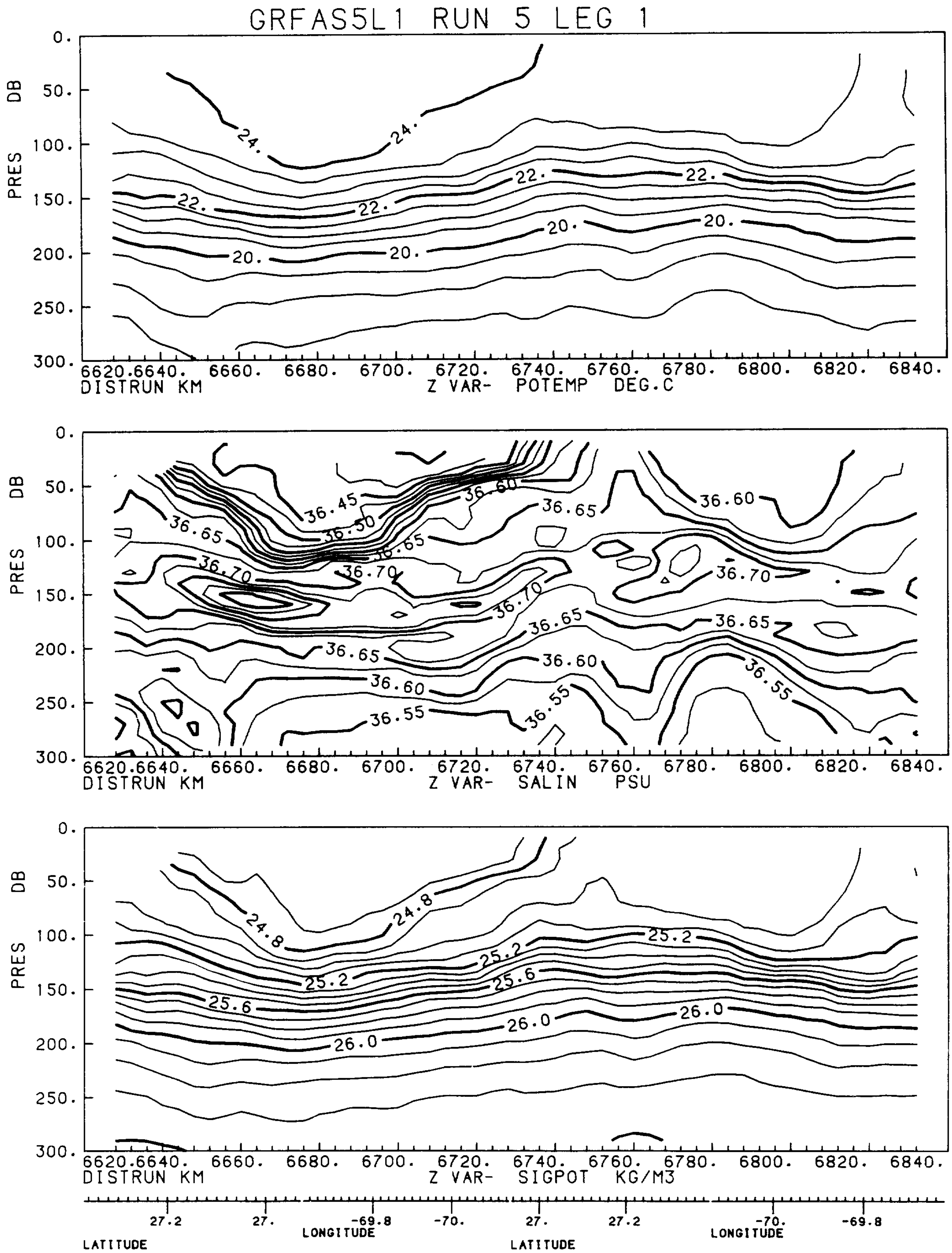
22. 22. 22.
20. 20. 20.
5860 5840. 5820. 5800. 5780. 5760. 5740. 5720. 5700.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.65 36.60 36.55 36.55
Z VAR- SALIN PSU
25.6 25.6 26.0 26.0
Z VAR- SIGPOT KG/M3
29. 28.8 28.6 28.4 28.2 68.6 -68.4
LATITUDE
LONGITUDE

GRFAS4L5 RUN 4 LEG 5




GRFAS4L6 RUN 4 LEG 6
PRES DB
0. 50. 100. 150. 200. 250. 300.
22. 22. 20. 20. 20.
5840.5860. 5880. 5900. 5920. 5940. 5960. 5980. 6000.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.60 36.65 36.60 36.60 36.55 36.55 36.55
Z VAR- SALIN PSU
25.6 25.6 26.0 26.0 26.0 26.4
Z VAR- SIGPOT KG/M3
-68.6 -68.4 28.8 28.6 28.4 28.2 -68.4 -68.6
LONGITUDE
LATITUDE
LONGITUDE


GRFAS4L6 RUN 4 LEG 6
PRES DB
0. 50. 100. 150. 200. 250. 300.
4.0
5840.5860. 5880. 5900. 5920. 5940. 5960. 5980. 6000.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5 25.0 25.5 26.0 26.5
36.65
36.60
36.55
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
1530.
1525.
DISTRUN KM
Z VAR- SNDVEL M/S
-68.6 -68.4 28.8 28.6 28.4 28.2 -68.4 -68.6
LONGITUDE
LATITUDE
LONGITUDE


GRFAS5L1 RUN 5 LEG 1
PRES DB
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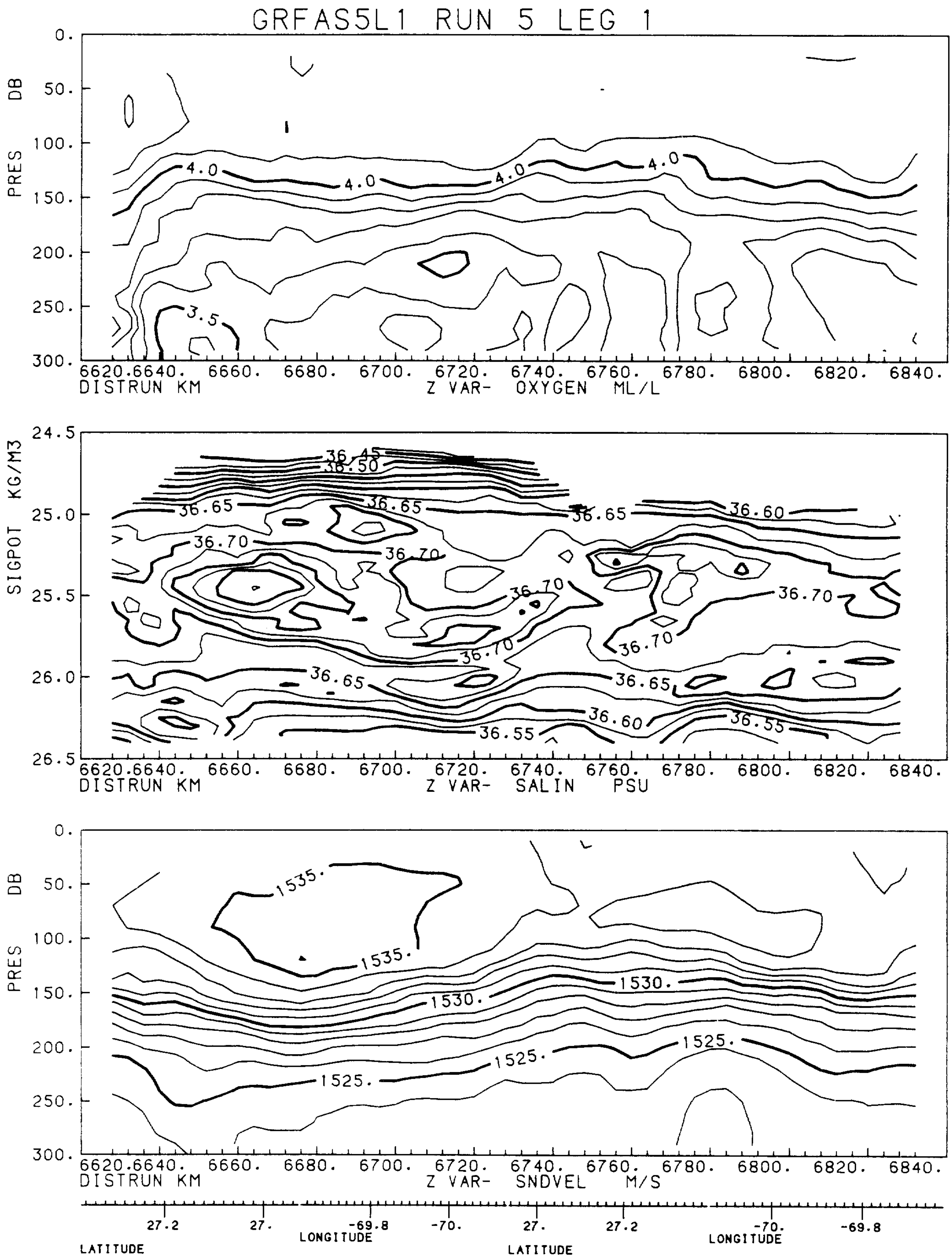
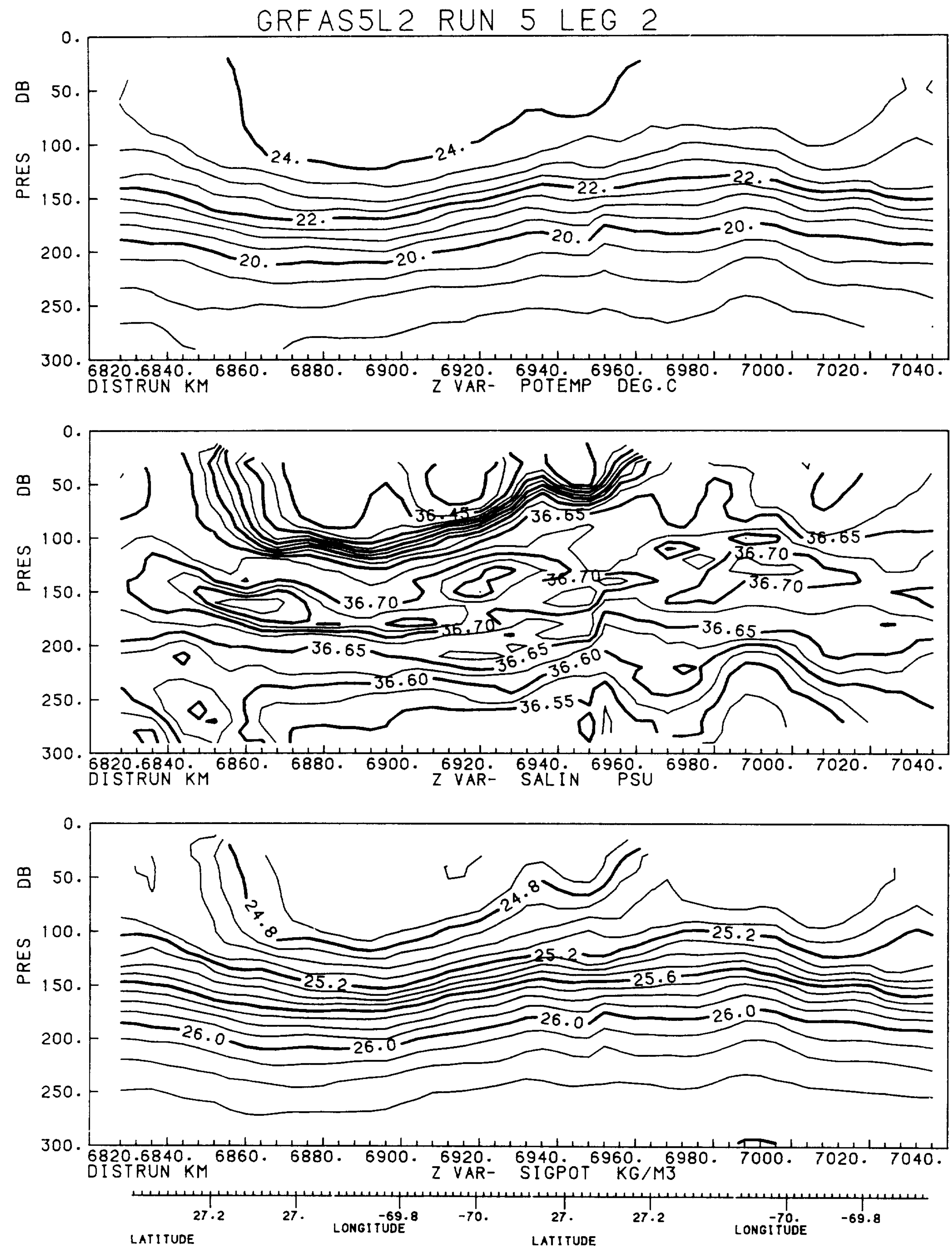
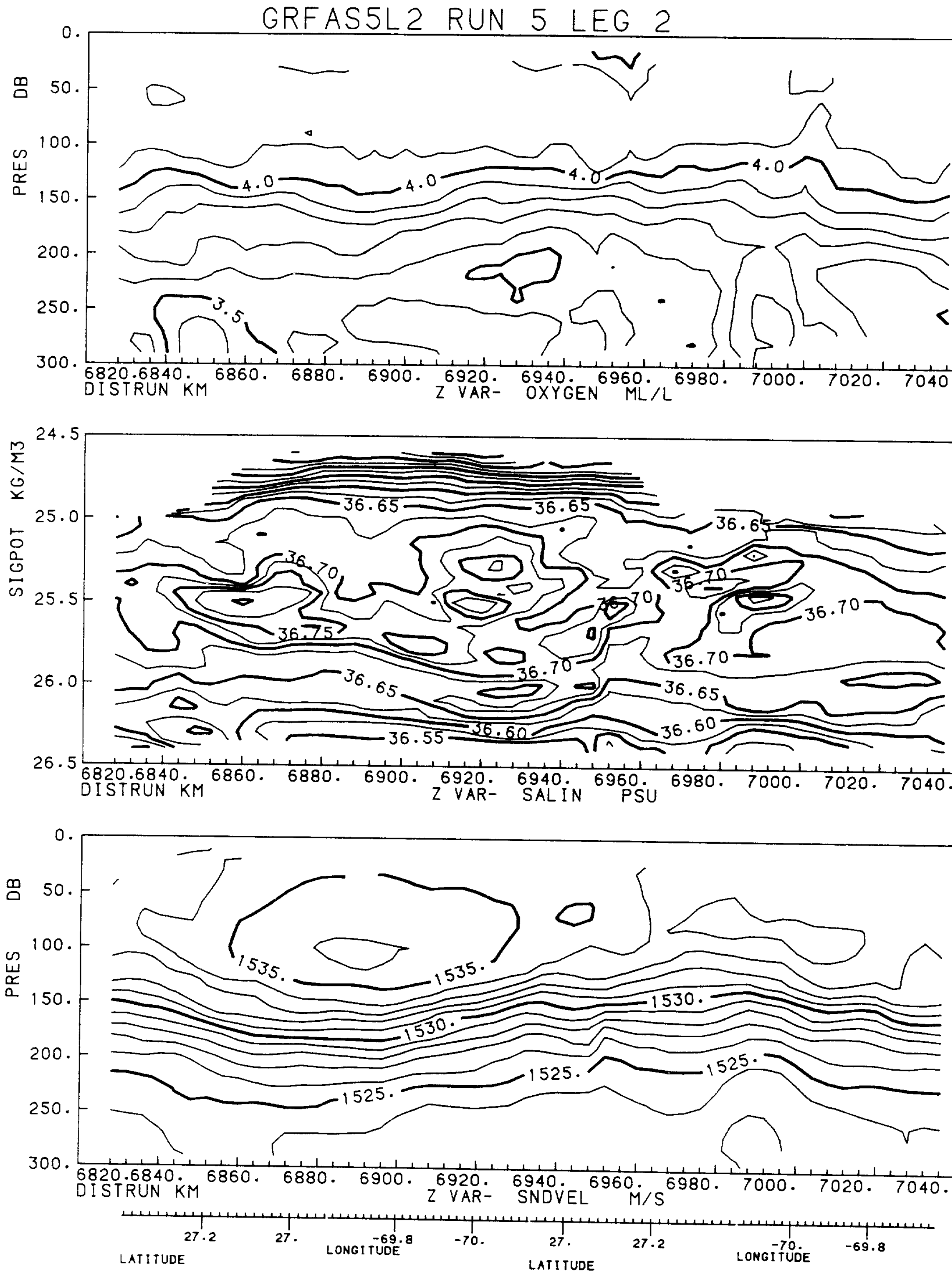
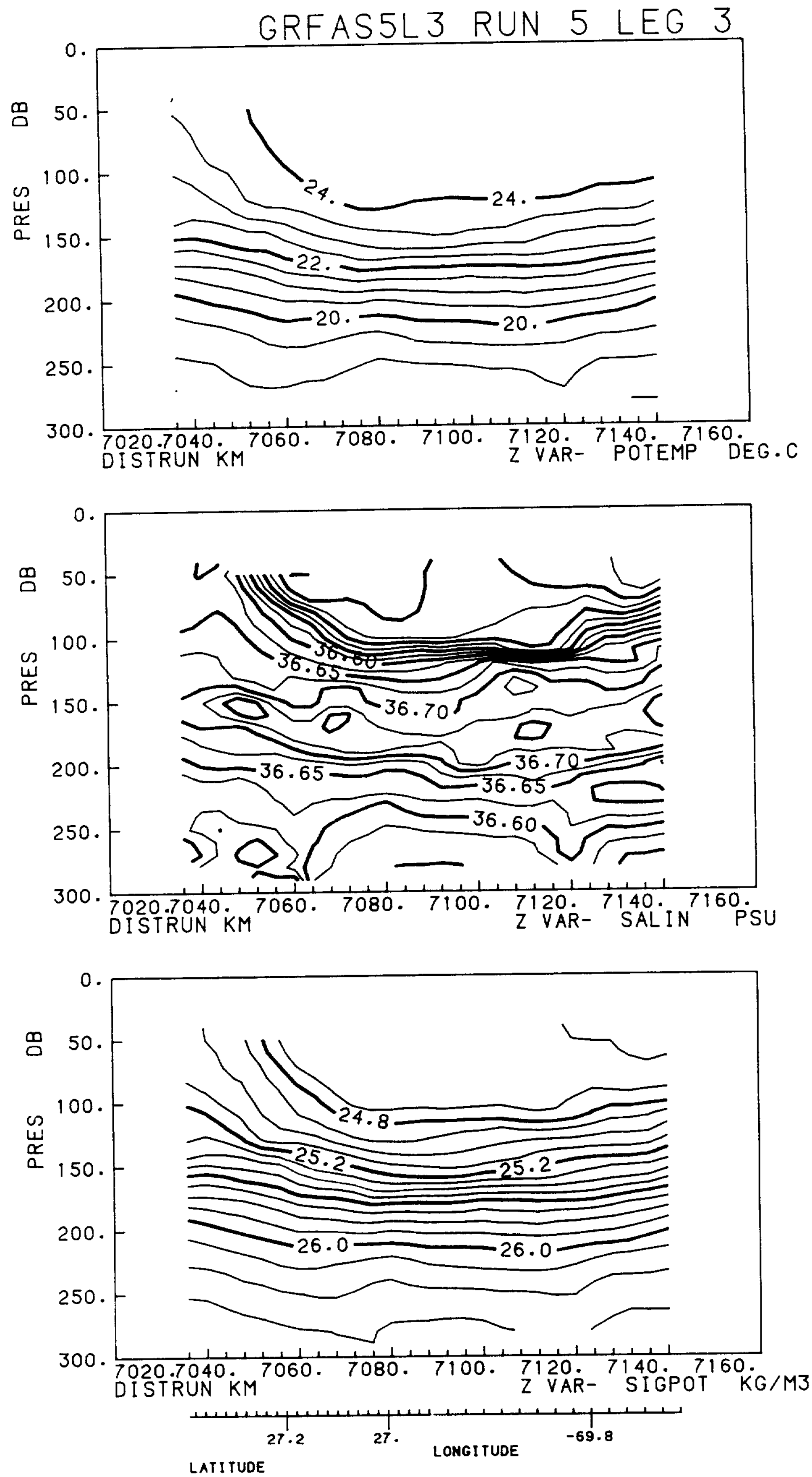
6620. 6640. 6660. 6680. 6700. 6720. 6740. 6760. 6780. 6800. 6820. 6840.
DISTRUN KM
Z VAR- POTEMP DEG.C
24. 22. 20.
Z VAR- SALIN PSU
36.45 36.50 36.55 36.60 36.65 36.70
Z VAR- SIGPOT KG/M3
24.8 25.2 25.6 26.0
27.2 27. -69.8 -70. 27. 27.2 -70. -69.8
LATITUDE
LONGITUDE


GRFAS5L1 RUN 5 LEG 1
PRES DB
0.
50.
100.
150.
200.
250.
300.
4.0
3.5
6620.6640. 6660. 6680. 6700. 6720. 6740. 6760. 6780. 6800. 6820. 6840.
DISTRUN KM
Z VAR- OXYGEN ML/L
SIGPOT KG/M3
24.5
25.0
25.5
26.0
26.5
36.45
36.50
36.55
36.60
36.65
36.70
6620.6640. 6660. 6680. 6700. 6720. 6740. 6760. 6780. 6800. 6820. 6840.
DISTRUN KM
Z VAR- SALIN PSU
PRES DB
0.
50.
100.
150.
200.
250.
300.
1535.
1530.
1525.
6620.6640. 6660. 6680. 6700. 6720. 6740. 6760. 6780. 6800. 6820. 6840.
DISTRUN KM
Z VAR- SNDVEL M/S
27.2
27.
-69.8
-70.
27.
27.2
-70.
-69.8
LATITUDE
LONGITUDE
LATITUDE
LONGITUDE


GRFAS5L2 RUN 5 LEG 2
PRES DB
0. 50. 100. 150. 200. 250. 300.
24. 22. 20.
6820. 6840. 6860. 6880. 6900. 6920. 6940. 6960. 6980. 7000. 7020. 7040.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.45 36.65 36.70 36.60 36.55
Z VAR- SALIN PSU
24.8 25.2 25.6 26.0
Z VAR- SIGPOT KG/M3
27.2 27. -69.8 -70. 27. 27.2 -70. -69.8
LATITUDE
LONGITUDE
LATITUDE
LONGITUDE


GRFAS5L2 RUN 5 LEG 2
PRES DB
DISTRUN KM
Z VAR- OXYGEN ML/L
4.0
3.5
SIGPOT KG/M3
Z VAR- SALIN PSU
36.55
36.60
36.65
36.70
36.75
Z VAR- SNDVEL M/S
1525.
1530.
1535.
LATITUDE
LONGITUDE


GRFAS5L3 RUN 5 LEG 3
PRES DB
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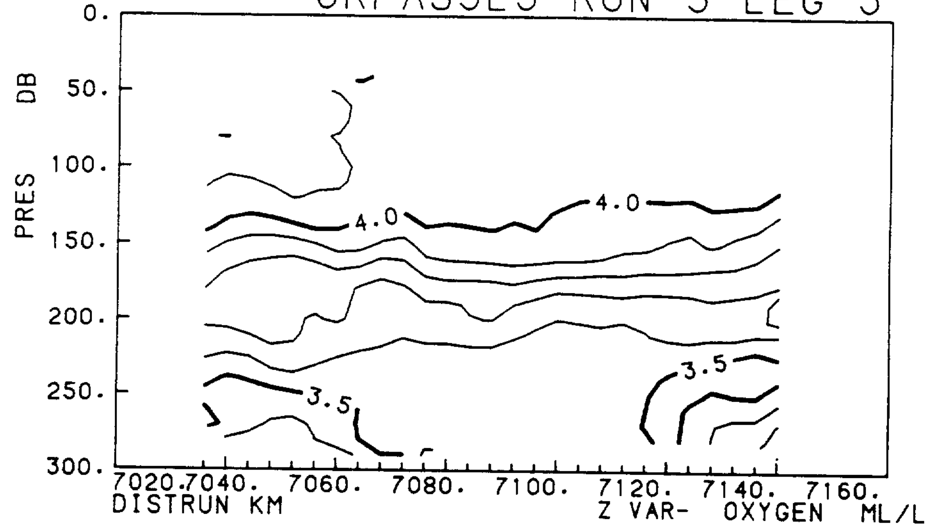
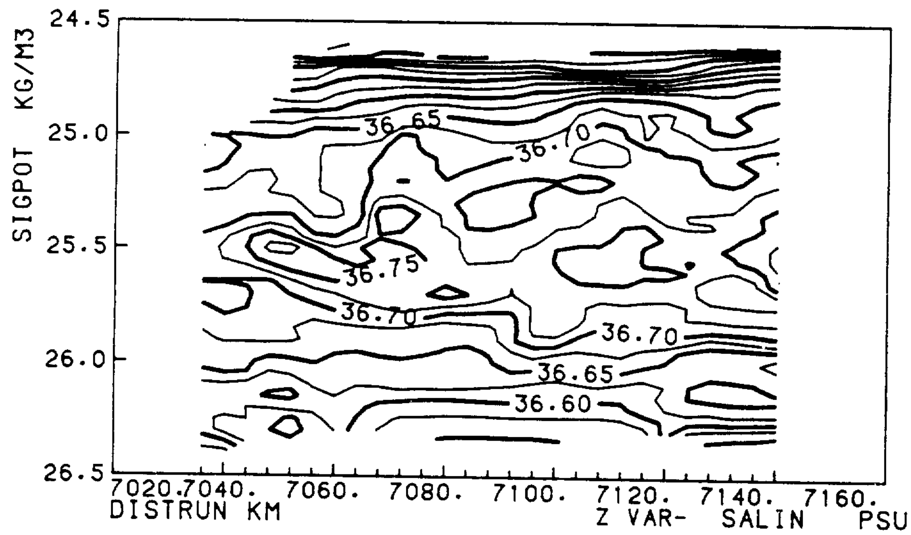
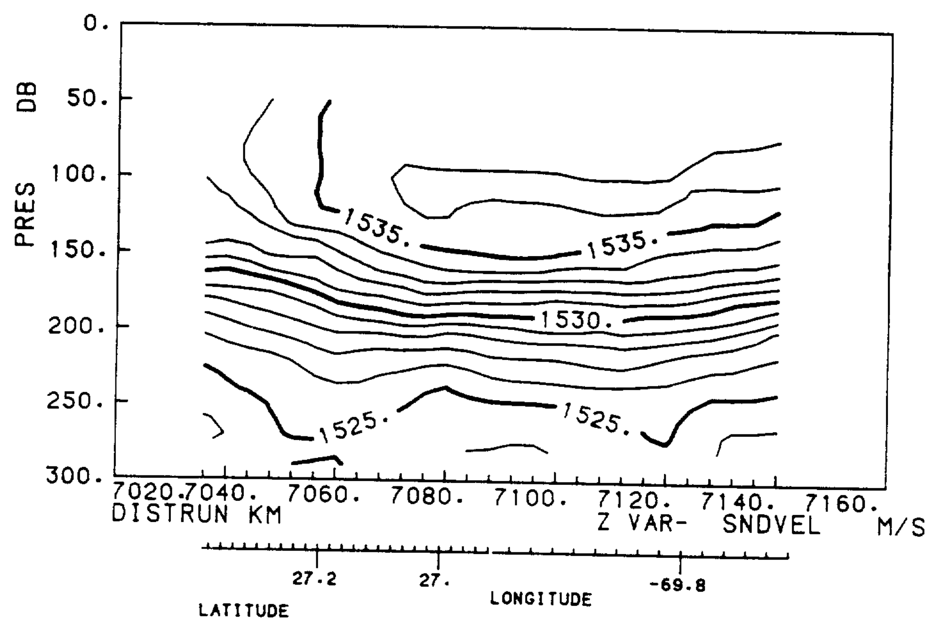
50.
100.
150.
200.
250.
300.
24.
22.
20.
7020.7040. 7060. 7080. 7100. 7120. 7140. 7160.
DISTRUN KM
Z VAR- POTEMP DEG.C
36.60
36.65
36.70
Z VAR- SALIN PSU
24.8
25.2
26.0
Z VAR- SIGPOT KG/M3
27.2
27.
-69.8
LATITUDE
LONGITUDE

# GRFAS5L3 RUN 5 LEG 3



## Appendix A

### CTD casts

At the end of the cruise immediately after the SeaSoar was recovered at the end of Run 5, six CTD casts to 2000 m were made around the moored array (Fig. 12 and Table 5). The data are poor, but are of particular interest because of their proximity to the FASINEX moored array, so are included here, with reservations.

The oxygen sensor came loose, causing jittery worthless data. Oxygen has been deleted from the files. The remaining sensors were calibrated as follows.

P(dbar) = 0.1*P(raw)
(default calibration)

T(°C) = 0.000499516*T(raw) + 0.026
(from laboratory calibrations)

C(mmho/cm) = 0.993465*C(raw)

The conductivity ratio was chosen such that downcast T/S curves from the CTD fitted closely the SeaSoar T/S curves for Run 5. It was then noted that upcast salinities were about 0.016 psu fresher than downcasts. Examination of salinity profiles near the bottom of each cast showed that salinity jumped back and forth between two values, settling on one for down, the other for up. The cell is clearly suspect, but has been calibrated and corrected as far as possible as follows.

Salinity samples were taken on all upcasts at 2000 m, 1500 m and 10 or 50 m. Because upcasts differ from downcasts, and we require calibration of downcast only, the potential temperature was read at the time the bottle was taken, and the downcast salinity at the same potential temperature was compared with the bottle salinity. Calibration statistics are then

S(bottle) - S(downcast)
(ppm = 1000*psu)

| depth m | No. in sample | mean ppm | Standard deviation ppm |
|---|---|---|---|
| 10-50 | 5 | 10.4 | 7.3 |
| 1500 | 6 | -56.5 | 7.9 |
| 2000 | 6 | -48.8 | 11.2 |

Matching CTD to SeaSoar salinities has minimised the calibration offset in the surface layers (the CTD/SeaSoar comparison only extends to 300 m of course), and we conclude (compare section 2.3(e), page 10) that SeaSoar and shallow CTD values are perhaps 0.010 psu too fresh.

The 1500 and 2000 m values are seriously off, confirming that the conductivity cell is bad. Unfortunately, we have only two samples between 50 and 1500 m. CTD and SeaSoar traces overlap within 5 ppm to the SeaSoar maximum depth of 300 m, and the T/S curve has only a few ppm spread at that depth. Also, on the first cast, samples were also taken at 300 m and 1000 m, and give offsets of -18 ppm at 300 m at -59 ppm at 1000 m.

For the purpose of this report, we have made the following, arbitrary corrections to the CTD salinities.

| pressure | correction made to CTD salinities |
|---|---|
| 0-100 dbar | +0.010 psu |
| 100-700 dbar | +0.010 - .0001*(p-100) |
| | (i.e. .010 change per 100 dbar) |
| Below 700 dbar | -.050 |

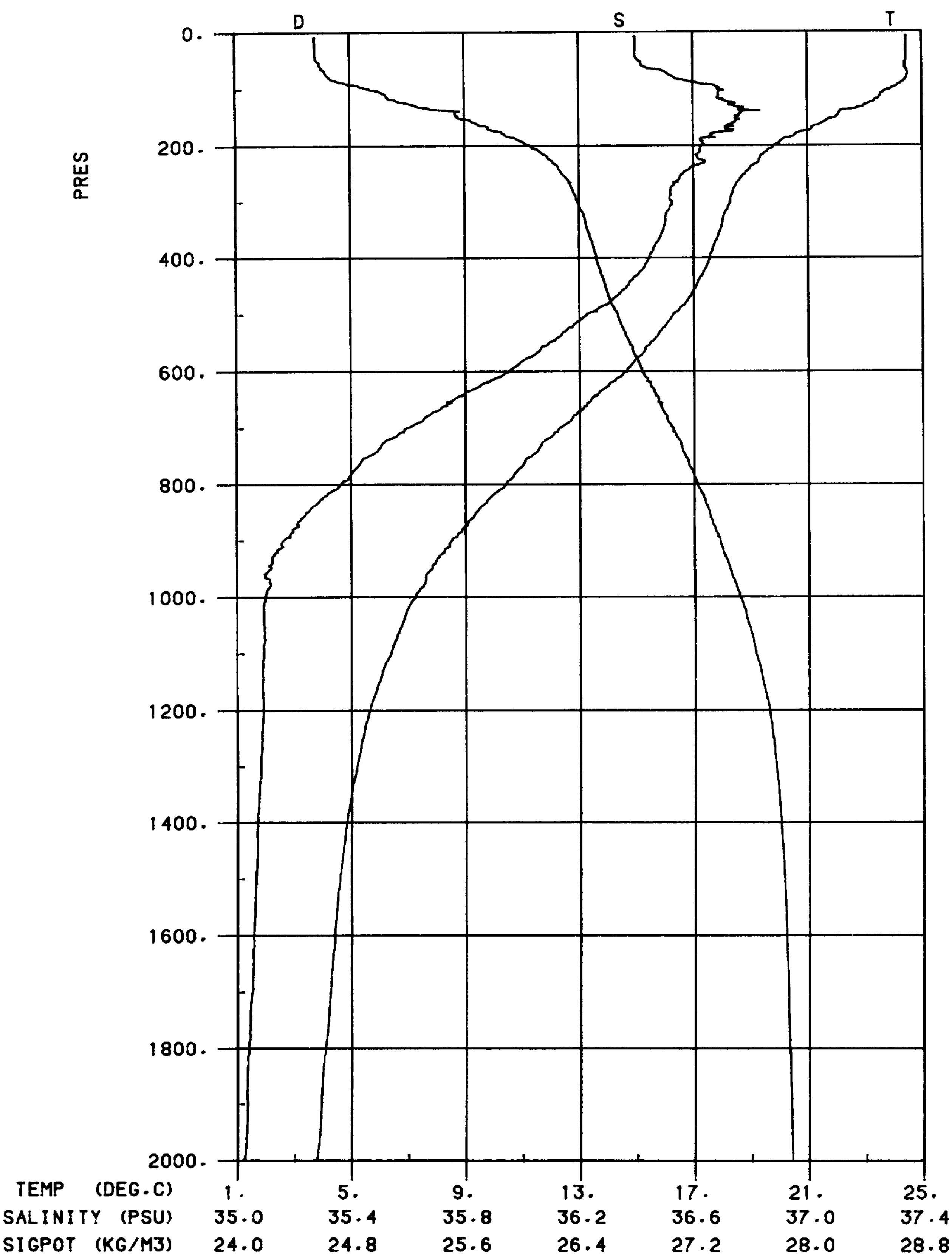
Plots and listings of downcasts incorporating these corrections are given in the following pages.

TABLE 5

CTD casts on Oceanus FASINEX cruise

| cast | start time day/HHMM | end time day/HHMM | latitude (N) | longitude (W) |
|---|---|---|---|---|
| 1 | 67/1312 | 67/1448 | 26°29.0' | 69°56.2' |
| 2 | 67/1657 | 67/1826 | 26°56.0' | 70° 8.8' |
| 3 | 67/2044 | 67/2207 | 26°55.0' | 69°37.6' |
| 4 | 67/2347 | 68/0108 | 27° 8.8' | 69°53.6' |
| 5 | 68/0245 | 68/0408 | 27°23.6' | 70° 8.7' |
| 6 | 68/0622 | 68/0744 | 27°23.5' | 69°37.0' |

# FASCTD01

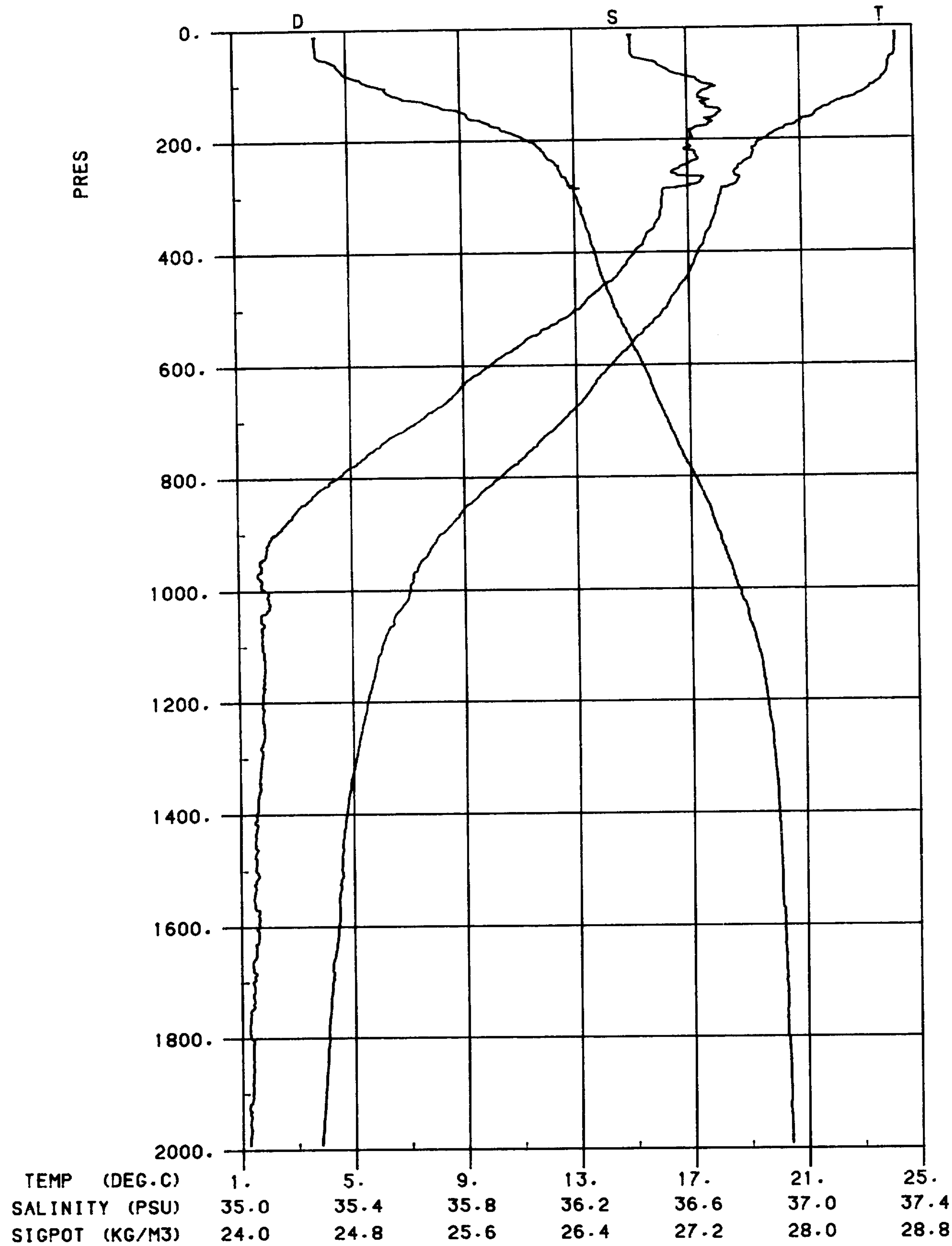



OCEANUS FASINEX FASCTD01 D 1986/36/1319 26 28.99N 69 56.16W

OCEANUS FASINEX STATION 01

| P-DB | T-DEGC | SAL-PSU | POTEMP | SIGMAT | SIG1000 | SIG2000 | DYNHT-M | SNDV-M/S | DEPTH-M | SVANOM | BVFR-CY/HR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. | 24.454 | 36.397 | 24.452 | 24.558 | 28.765 | 32.873 | 0.034 | 1534.7 | 10. | 0.3366E+03 | -999.000 |
| 20. | 24.456 | 36.397 | 24.452 | 24.559 | 28.766 | 32.874 | 0.067 | 1534.9 | 20. | 0.3370E+03 | 0.387 |
| 40. | 24.451 | 36.397 | 24.443 | 24.561 | 28.768 | 32.876 | 0.135 | 1535.2 | 40. | 0.3377E+03 | 0.585 |
| 60. | 24.407 | 36.424 | 24.394 | 24.596 | 28.804 | 32.912 | 0.202 | 1535.5 | 60. | 0.3353E+03 | 2.356 |
| 80. | 24.477 | 36.530 | 24.460 | 24.656 | 28.863 | 32.970 | 0.269 | 1536.1 | 79. | 0.3305E+03 | 3.085 |
| 100. | 24.002 | 36.687 | 23.981 | 24.919 | 29.131 | 33.243 | 0.333 | 1535.5 | 99. | 0.3064E+03 | 6.448 |
| 120. | 23.417 | 36.698 | 23.392 | 25.104 | 29.322 | 33.442 | 0.392 | 1534.4 | 119. | 0.2898E+03 | 5.391 |
| 140. | 22.225 | 36.781 | 22.197 | 25.513 | 29.746 | 33.882 | 0.447 | 1531.7 | 139. | 0.2517E+03 | 8.049 |
| 160. | 21.555 | 36.741 | 21.524 | 25.674 | 29.915 | 34.061 | 0.496 | 1530.3 | 159. | 0.2373E+03 | 5.036 |
| 180. | 20.606 | 36.665 | 20.572 | 25.879 | 30.133 | 34.293 | 0.542 | 1528.0 | 179. | 0.2186E+03 | 5.706 |
| 200. | 19.892 | 36.633 | 19.855 | 26.048 | 30.312 | 34.482 | 0.584 | 1526.3 | 199. | 0.2033E+03 | 5.180 |
| 220. | 19.349 | 36.614 | 19.309 | 26.178 | 30.449 | 34.628 | 0.623 | 1525.1 | 218. | 0.1918E+03 | 4.534 |
| 240. | 18.988 | 36.591 | 18.945 | 26.256 | 30.532 | 34.716 | 0.661 | 1524.4 | 238. | 0.1852E+03 | 3.513 |
| 260. | 18.653 | 36.551 | 18.607 | 26.313 | 30.593 | 34.783 | 0.698 | 1523.7 | 258. | 0.1806E+03 | 3.001 |
| 280. | 18.399 | 36.521 | 18.349 | 26.357 | 30.640 | 34.834 | 0.733 | 1523.3 | 278. | 0.1772E+03 | 2.626 |
| 300. | 18.292 | 36.525 | 18.239 | 26.389 | 30.672 | 34.868 | 0.769 | 1523.3 | 298. | 0.1750E+03 | 2.215 |
| 320. | 18.095 | 36.506 | 18.039 | 26.427 | 30.711 | 34.910 | 0.803 | 1523.1 | 318. | 0.1723E+03 | 2.408 |
| 340. | 17.997 | 36.500 | 17.938 | 26.449 | 30.733 | 34.934 | 0.838 | 1523.1 | 337. | 0.1711E+03 | 1.834 |
| 360. | 17.872 | 36.487 | 17.809 | 26.472 | 30.757 | 34.960 | 0.872 | 1523.1 | 357. | 0.1697E+03 | 1.883 |
| 380. | 17.694 | 36.464 | 17.628 | 26.501 | 30.787 | 34.994 | 0.906 | 1522.9 | 377. | 0.1678E+03 | 2.112 |
| 400. | 17.563 | 36.445 | 17.494 | 26.520 | 30.808 | 35.016 | 0.939 | 1522.8 | 397. | 0.1667E+03 | 1.741 |
| 450. | 17.101 | 36.370 | 17.025 | 26.580 | 30.873 | 35.089 | 1.021 | 1522.2 | 447. | 0.1629E+03 | 1.942 |
| 500. | 16.292 | 36.229 | 16.211 | 26.668 | 30.971 | 35.202 | 1.101 | 1520.4 | 496. | 0.1561E+03 | 2.400 |
| 550. | 15.513 | 36.098 | 15.426 | 26.752 | 31.066 | 35.311 | 1.178 | 1518.7 | 546. | 0.1496E+03 | 2.348 |
| 600. | 14.648 | 35.956 | 14.557 | 26.838 | 31.165 | 35.427 | 1.251 | 1516.6 | 595. | 0.1425E+03 | 2.417 |
| 700. | 12.352 | 35.603 | 12.257 | 27.047 | 31.413 | 35.719 | 1.384 | 1510.3 | 694. | 0.1237E+03 | 2.704 |
| 800. | 10.406 | 35.366 | 10.307 | 27.224 | 31.631 | 35.977 | 1.498 | 1504.9 | 793. | 0.1067E+03 | 2.561 |
| 900. | 8.517 | 35.165 | 8.418 | 27.379 | 31.828 | 36.217 | 1.597 | 1499.5 | 892. | 0.9089E+02 | 2.459 |
| 1000. | 7.245 | 35.100 | 7.144 | 27.517 | 31.996 | 36.413 | 1.681 | 1496.2 | 991. | 0.7715E+02 | 2.292 |
| 1100. | 6.392 | 35.094 | 6.287 | 27.629 | 32.129 | 36.566 | 1.752 | 1494.5 | 1090. | 0.6627E+02 | 2.054 |
| 1200. | 5.645 | 35.091 | 5.537 | 27.723 | 32.240 | 36.695 | 1.814 | 1493.2 | 1189. | 0.5703E+02 | 1.901 |
| 1300. | 5.200 | 35.083 | 5.085 | 27.771 | 32.300 | 36.766 | 1.868 | 1493.1 | 1287. | 0.5257E+02 | 1.400 |
| 1400. | 4.838 | 35.071 | 4.717 | 27.804 | 32.342 | 36.818 | 1.919 | 1493.3 | 1386. | 0.4952E+02 | 1.207 |
| 1500. | 4.598 | 35.066 | 4.471 | 27.828 | 32.372 | 36.854 | 1.968 | 1493.9 | 1485. | 0.4764E+02 | 1.019 |
| 1600. | 4.416 | 35.058 | 4.281 | 27.842 | 32.392 | 36.878 | 2.015 | 1494.9 | 1583. | 0.4675E+02 | 0.830 |
| 1700. | 4.259 | 35.053 | 4.116 | 27.856 | 32.409 | 36.900 | 2.061 | 1495.9 | 1682. | 0.4595E+02 | 0.802 |
| 1800. | 4.097 | 35.042 | 3.947 | 27.865 | 32.423 | 36.918 | 2.107 | 1496.9 | 1781. | 0.4542E+02 | 0.734 |
| 1900. | 3.954 | 35.036 | 3.797 | 27.876 | 32.438 | 36.937 | 2.152 | 1497.9 | 1879. | 0.4473E+02 | 0.762 |
| 2000. | 3.779 | 35.023 | 3.614 | 27.884 | 32.451 | 36.955 | 2.196 | 1498.9 | 1977. | 0.4410E+02 | 0.743 |

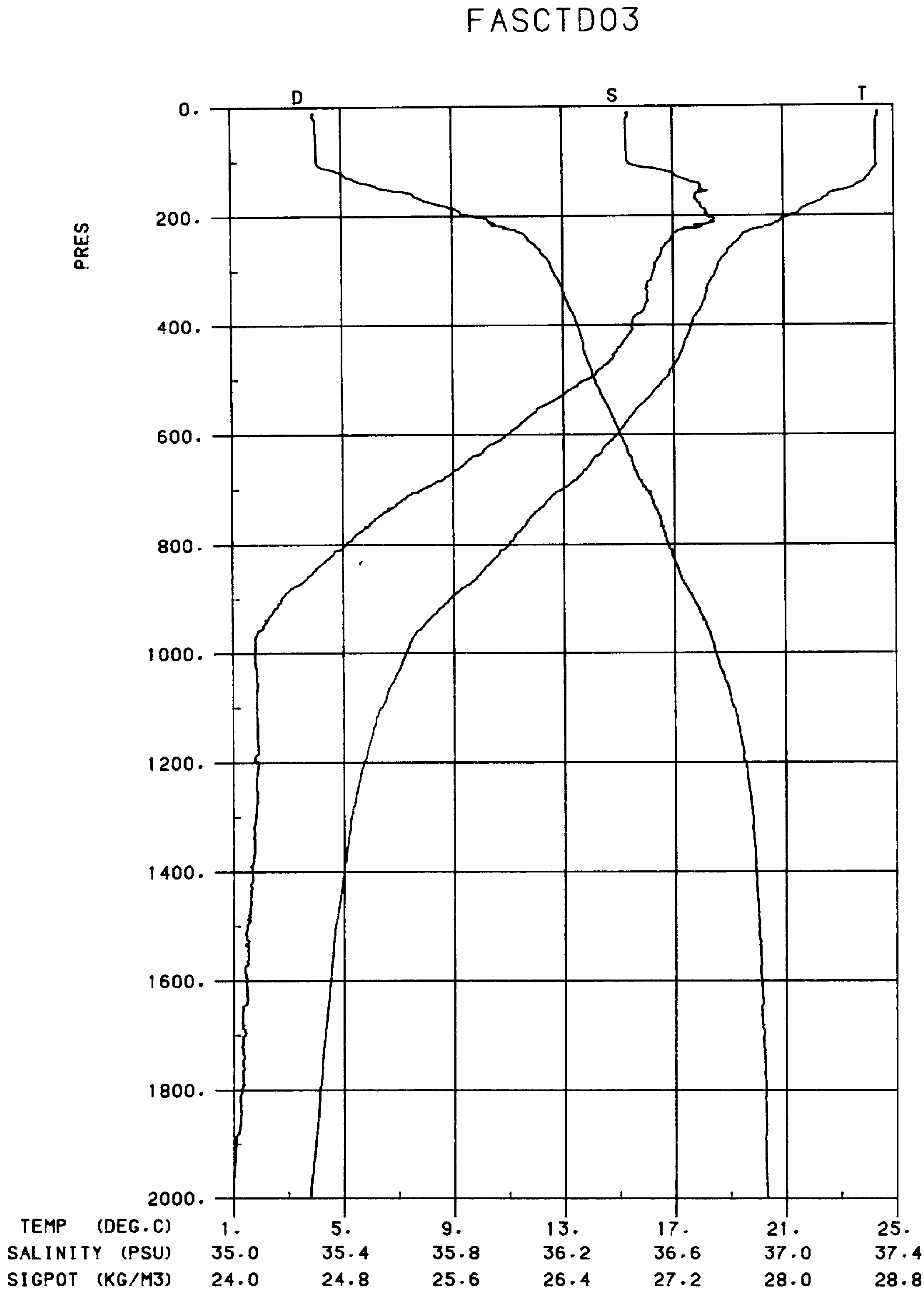
# FASCTD02




OCEANUS FASINEX FASCTD02 A 1986/36/1702 26 55.98N 70 8.83W

OCEANUS FASINEX STATION 02

| P-DB | T-DEGC | SAL-PSU | POTEMP | SIGMAT | SIG1000 | SIG2000 | DYNHT-M | SNDV-M/S | DEPTH-M | SVANOM | BVFR-CY/HR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. | 24.393 | 36.402 | 24.390 | 24.581 | 28.789 | 32.897 | 0.033 | 1534.6 | 10. | 0.3344E+03 | -999.000 |
| 20. | 24.397 | 36.406 | 24.393 | 24.582 | 28.790 | 32.899 | 0.067 | 1534.8 | 20. | 0.3347E+03 | 0.728 |
| 40. | 24.381 | 36.405 | 24.373 | 24.588 | 28.797 | 32.906 | 0.134 | 1535.1 | 40. | 0.3351E+03 | 0.982 |
| 60. | 24.167 | 36.485 | 24.154 | 24.715 | 28.925 | 33.036 | 0.200 | 1535.0 | 60. | 0.3240E+03 | 4.465 |
| 80. | 24.098 | 36.553 | 24.081 | 24.788 | 28.999 | 33.111 | 0.264 | 1535.2 | 79. | 0.3179E+03 | 3.400 |
| 100. | 23.717 | 36.669 | 23.696 | 24.990 | 29.206 | 33.322 | 0.326 | 1534.7 | 99. | 0.2996E+03 | 5.660 |
| 120. | 23.082 | 36.642 | 23.057 | 25.159 | 29.382 | 33.507 | 0.384 | 1533.4 | 119. | 0.2845E+03 | 5.152 |
| 140. | 22.079 | 36.668 | 22.051 | 25.469 | 29.704 | 33.843 | 0.438 | 1531.2 | 139. | 0.2559E+03 | 7.002 |
| 160. | 21.415 | 36.688 | 21.383 | 25.672 | 29.916 | 34.064 | 0.487 | 1529.8 | 159. | 0.2374E+03 | 5.667 |
| 180. | 20.442 | 36.623 | 20.408 | 25.891 | 30.148 | 34.310 | 0.532 | 1527.5 | 179. | 0.2174E+03 | 5.888 |
| 200. | 19.763 | 36.611 | 19.726 | 26.065 | 30.331 | 34.504 | 0.574 | 1525.9 | 199. | 0.2017E+03 | 5.256 |
| 220. | 19.338 | 36.617 | 19.298 | 26.183 | 30.454 | 34.633 | 0.613 | 1525.1 | 218. | 0.1913E+03 | 4.320 |
| 240. | 19.018 | 36.613 | 18.975 | 26.266 | 30.540 | 34.724 | 0.651 | 1524.5 | 238. | 0.1843E+03 | 3.599 |
| 260. | 18.662 | 36.548 | 18.616 | 26.309 | 30.589 | 34.779 | 0.687 | 1523.8 | 258. | 0.1809E+03 | 2.628 |
| 280. | 18.671 | 36.624 | 18.621 | 26.367 | 30.645 | 34.834 | 0.723 | 1524.2 | 278. | 0.1764E+03 | 2.982 |
| 300. | 18.135 | 36.511 | 18.082 | 26.418 | 30.704 | 34.902 | 0.758 | 1522.9 | 298. | 0.1722E+03 | 2.876 |
| 320. | 18.016 | 36.509 | 17.960 | 26.449 | 30.735 | 34.935 | 0.792 | 1522.9 | 318. | 0.1702E+03 | 2.167 |
| 340. | 17.911 | 36.499 | 17.852 | 26.469 | 30.755 | 34.957 | 0.826 | 1522.9 | 337. | 0.1691E+03 | 1.730 |
| 360. | 17.749 | 36.474 | 17.687 | 26.492 | 30.780 | 34.985 | 0.860 | 1522.7 | 357. | 0.1677E+03 | 1.903 |
| 380. | 17.564 | 36.444 | 17.499 | 26.517 | 30.806 | 35.014 | 0.893 | 1522.5 | 377. | 0.1662E+03 | 1.958 |
| 400. | 17.359 | 36.411 | 17.291 | 26.544 | 30.835 | 35.047 | 0.926 | 1522.1 | 397. | 0.1644E+03 | 2.064 |
| 450. | 16.862 | 36.330 | 16.787 | 26.606 | 30.903 | 35.123 | 1.007 | 1521.4 | 447. | 0.1603E+03 | 1.986 |
| 500. | 16.153 | 36.207 | 16.072 | 26.684 | 30.990 | 35.223 | 1.086 | 1519.9 | 496. | 0.1545E+03 | 2.252 |
| 550. | 15.184 | 36.040 | 15.098 | 26.780 | 31.100 | 35.352 | 1.161 | 1517.6 | 546. | 0.1465E+03 | 2.535 |
| 600. | 14.271 | 35.897 | 14.182 | 26.874 | 31.208 | 35.477 | 1.232 | 1515.3 | 595. | 0.1387E+03 | 2.517 |
| 700. | 12.515 | 35.640 | 12.418 | 27.045 | 31.406 | 35.710 | 1.364 | 1510.9 | 694. | 0.1241E+03 | 2.425 |
| 800. | 10.304 | 35.355 | 10.206 | 27.233 | 31.642 | 35.991 | 1.480 | 1504.5 | 793. | 0.1057E+03 | 2.658 |
| 900. | 8.194 | 35.132 | 8.097 | 27.402 | 31.859 | 36.255 | 1.576 | 1498.2 | 892. | 0.8807E+02 | 2.577 |
| 1000. | 7.068 | 35.097 | 6.968 | 27.540 | 32.023 | 36.444 | 1.657 | 1495.5 | 991. | 0.7466E+02 | 2.263 |
| 1100. | 6.057 | 35.083 | 5.955 | 27.664 | 32.171 | 36.617 | 1.726 | 1493.2 | 1090. | 0.6218E+02 | 2.178 |
| 1200. | 5.528 | 35.083 | 5.420 | 27.730 | 32.251 | 36.709 | 1.784 | 1492.8 | 1189. | 0.5598E+02 | 1.604 |
| 1300. | 5.115 | 35.077 | 5.001 | 27.776 | 32.307 | 36.775 | 1.838 | 1492.7 | 1287. | 0.5182E+02 | 1.361 |
| 1400. | 4.765 | 35.057 | 4.645 | 27.801 | 32.341 | 36.818 | 1.888 | 1493.0 | 1386. | 0.4959E+02 | 1.084 |
| 1500. | 4.588 | 35.055 | 4.461 | 27.820 | 32.365 | 36.847 | 1.937 | 1493.9 | 1485. | 0.4831E+02 | 0.911 |
| 1600. | 4.455 | 35.062 | 4.320 | 27.841 | 32.390 | 36.875 | 1.985 | 1495.0 | 1583. | 0.4697E+02 | 0.917 |
| 1700. | 4.232 | 35.042 | 4.090 | 27.850 | 32.405 | 36.896 | 2.031 | 1495.7 | 1682. | 0.4632E+02 | 0.770 |
| 1800. | 4.090 | 35.037 | 3.940 | 27.862 | 32.420 | 36.915 | 2.077 | 1496.8 | 1781. | 0.4570E+02 | 0.755 |
| 1900. | 3.954 | 35.038 | 3.796 | 27.877 | 32.439 | 36.938 | 2.122 | 1497.9 | 1879. | 0.4461E+02 | 0.847 |

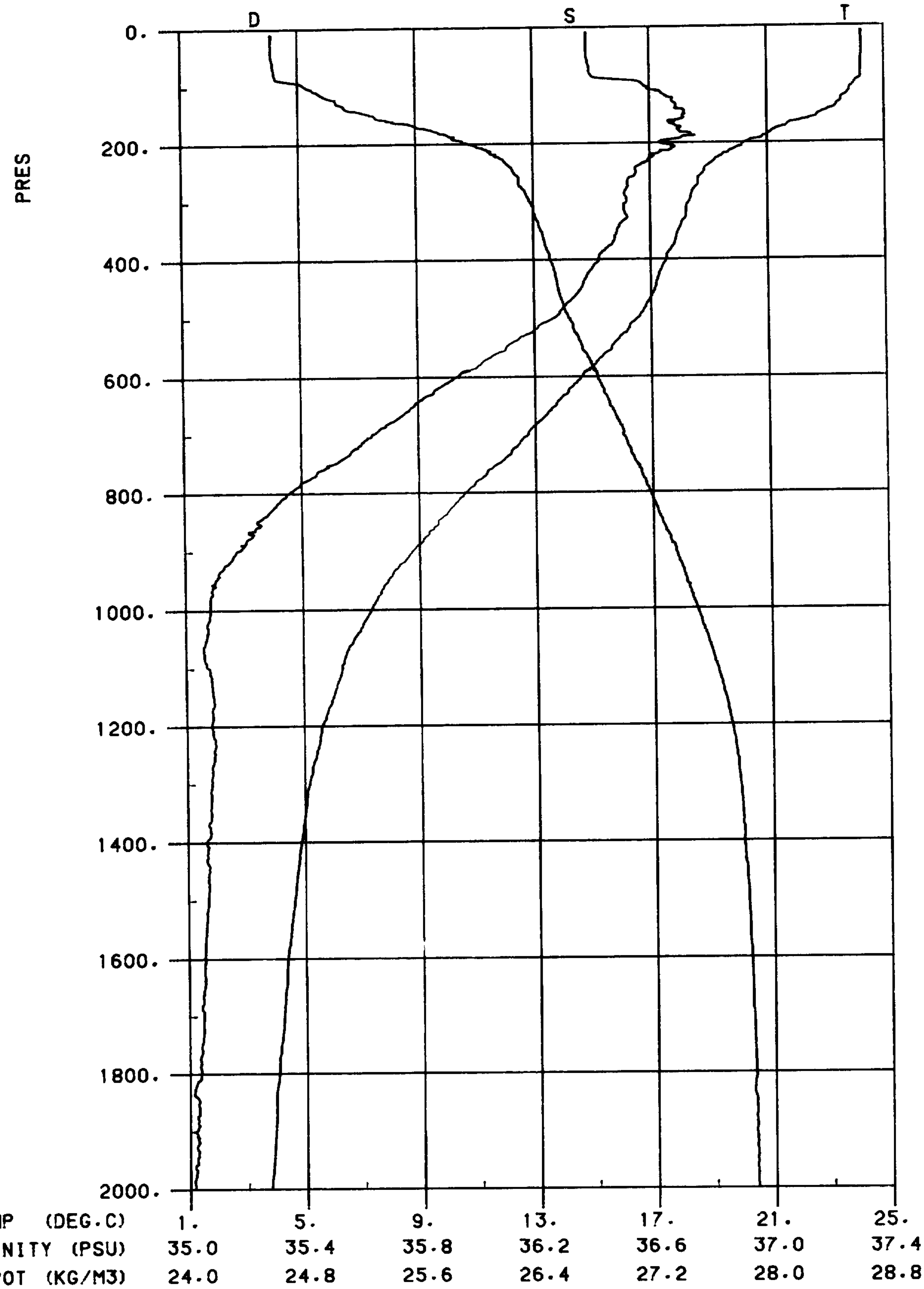



OCEANUS FASINEX FASCTD03 A 1986/36/2048 26 55.04N 69 37.57W

OCEANUS FASINEX STATION 03

| P-DB | T-DEGC | SAL-PSU | POTEMP | SIGMAT | SIG1000 | SIG2000 | DYNHT-M | SNDV-M/S | DEPTH-M | SVANOM | BVFR-CY/HR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20. | 24.414 | 36.435 | 24.410 | 24.599 | 28.807 | 32.915 | 0.067 | 1534.9 | 20. | 0.3331E+03 | -999.000 |
| 40. | 24.355 | 36.430 | 24.346 | 24.615 | 28.823 | 32.933 | 0.133 | 1535.0 | 40. | 0.3326E+03 | 1.575 |
| 60. | 24.353 | 36.431 | 24.340 | 24.618 | 28.826 | 32.935 | 0.200 | 1535.4 | 60. | 0.3332E+03 | 0.642 |
| 80. | 24.354 | 36.432 | 24.337 | 24.620 | 28.828 | 32.937 | 0.266 | 1535.7 | 79. | 0.3340E+03 | 0.560 |
| 100. | 24.357 | 36.436 | 24.336 | 24.623 | 28.831 | 32.941 | 0.333 | 1536.1 | 99. | 0.3346E+03 | 0.722 |
| 120. | 24.204 | 36.587 | 24.178 | 24.786 | 28.994 | 33.104 | 0.399 | 1536.2 | 119. | 0.3201E+03 | 5.050 |
| 140. | 23.841 | 36.683 | 23.811 | 24.970 | 29.181 | 33.295 | 0.462 | 1535.7 | 139. | 0.3036E+03 | 5.378 |
| 160. | 22.679 | 36.685 | 22.646 | 25.313 | 29.538 | 33.669 | 0.520 | 1533.1 | 159. | 0.2718E+03 | 7.373 |
| 180. | 22.024 | 36.699 | 21.988 | 25.513 | 29.746 | 33.886 | 0.573 | 1531.8 | 179. | 0.2537E+03 | 5.625 |
| 200. | 21.269 | 36.727 | 21.230 | 25.747 | 29.990 | 34.140 | 0.621 | 1530.2 | 199. | 0.2323E+03 | 6.087 |
| 220. | 20.307 | 36.689 | 20.265 | 25.983 | 30.239 | 34.403 | 0.665 | 1527.9 | 218. | 0.2106E+03 | 6.123 |
| 240. | 19.431 | 36.593 | 19.387 | 26.143 | 30.412 | 34.590 | 0.706 | 1525.7 | 238. | 0.1960E+03 | 5.064 |
| 260. | 19.022 | 36.561 | 18.976 | 26.227 | 30.500 | 34.685 | 0.744 | 1524.8 | 258. | 0.1889E+03 | 3.631 |
| 280. | 18.720 | 36.543 | 18.670 | 26.293 | 30.570 | 34.759 | 0.782 | 1524.3 | 278. | 0.1834E+03 | 3.230 |
| 300. | 18.536 | 36.528 | 18.483 | 26.331 | 30.609 | 34.801 | 0.818 | 1524.0 | 298. | 0.1807E+03 | 2.424 |
| 320. | 18.318 | 36.510 | 18.261 | 26.374 | 30.655 | 34.850 | 0.854 | 1523.7 | 318. | 0.1774E+03 | 2.597 |
| 340. | 18.192 | 36.507 | 18.133 | 26.405 | 30.687 | 34.884 | 0.889 | 1523.7 | 337. | 0.1753E+03 | 2.199 |
| 360. | 18.056 | 36.501 | 17.993 | 26.437 | 30.719 | 34.919 | 0.924 | 1523.6 | 357. | 0.1731E+03 | 2.220 |
| 380. | 17.832 | 36.471 | 17.767 | 26.472 | 30.757 | 34.961 | 0.958 | 1523.3 | 377. | 0.1706E+03 | 2.352 |
| 400. | 17.639 | 36.448 | 17.570 | 26.504 | 30.791 | 34.998 | 0.992 | 1523.0 | 397. | 0.1683E+03 | 2.248 |
| 450. | 17.282 | 36.391 | 17.206 | 26.553 | 30.842 | 35.055 | 1.075 | 1522.7 | 447. | 0.1656E+03 | 1.733 |
| 500. | 16.672 | 36.288 | 16.589 | 26.625 | 30.921 | 35.145 | 1.157 | 1521.6 | 496. | 0.1605E+03 | 2.154 |
| 550. | 15.711 | 36.117 | 15.623 | 26.721 | 31.032 | 35.273 | 1.235 | 1519.3 | 546. | 0.1526E+03 | 2.539 |
| 600. | 14.936 | 35.998 | 14.843 | 26.808 | 31.129 | 35.385 | 1.310 | 1517.6 | 595. | 0.1457E+03 | 2.400 |
| 700. | 12.963 | 35.689 | 12.865 | 26.994 | 31.346 | 35.641 | 1.448 | 1512.5 | 694. | 0.1295E+03 | 2.536 |
| 800. | 10.997 | 35.412 | 10.895 | 27.155 | 31.550 | 35.884 | 1.568 | 1507.1 | 793. | 0.1141E+03 | 2.468 |
| 900. | 8.848 | 35.178 | 8.747 | 27.338 | 31.779 | 36.161 | 1.674 | 1500.7 | 892. | 0.9542E+02 | 2.653 |
| 1000. | 7.275 | 35.080 | 7.173 | 27.497 | 31.975 | 36.392 | 1.760 | 1496.3 | 991. | 0.7908E+02 | 2.477 |
| 1100. | 6.403 | 35.087 | 6.298 | 27.622 | 32.121 | 36.558 | 1.833 | 1494.6 | 1090. | 0.6695E+02 | 2.155 |
| 1200. | 5.752 | 35.090 | 5.642 | 27.709 | 32.224 | 36.677 | 1.895 | 1493.7 | 1189. | 0.5861E+02 | 1.820 |
| 1300. | 5.276 | 35.082 | 5.161 | 27.761 | 32.288 | 36.752 | 1.951 | 1493.4 | 1287. | 0.5372E+02 | 1.454 |
| 1400. | 5.007 | 35.069 | 4.885 | 27.783 | 32.317 | 36.788 | 2.004 | 1494.0 | 1386. | 0.5206E+02 | 0.997 |
| 1500. | 4.693 | 35.050 | 4.565 | 27.805 | 32.347 | 36.826 | 2.055 | 1494.3 | 1485. | 0.5014E+02 | 1.031 |
| 1600. | 4.513 | 35.049 | 4.377 | 27.824 | 32.371 | 36.855 | 2.105 | 1495.2 | 1583. | 0.4878E+02 | 0.923 |
| 1700. | 4.319 | 35.040 | 4.176 | 27.839 | 32.391 | 36.880 | 2.153 | 1496.1 | 1682. | 0.4770E+02 | 0.862 |
| 1800. | 4.115 | 35.028 | 3.965 | 27.852 | 32.410 | 36.904 | 2.200 | 1496.9 | 1781. | 0.4669E+02 | 0.842 |
| 1900. | 3.976 | 35.008 | 3.818 | 27.851 | 32.413 | 36.911 | 2.247 | 1498.0 | 1879. | 0.4711E+02 | 0.452 |
| 2000. | 3.778 | 34.997 | 3.613 | 27.863 | 32.430 | 36.934 | 2.294 | 1498.8 | 1977. | 0.4601E+02 | 0.843 |

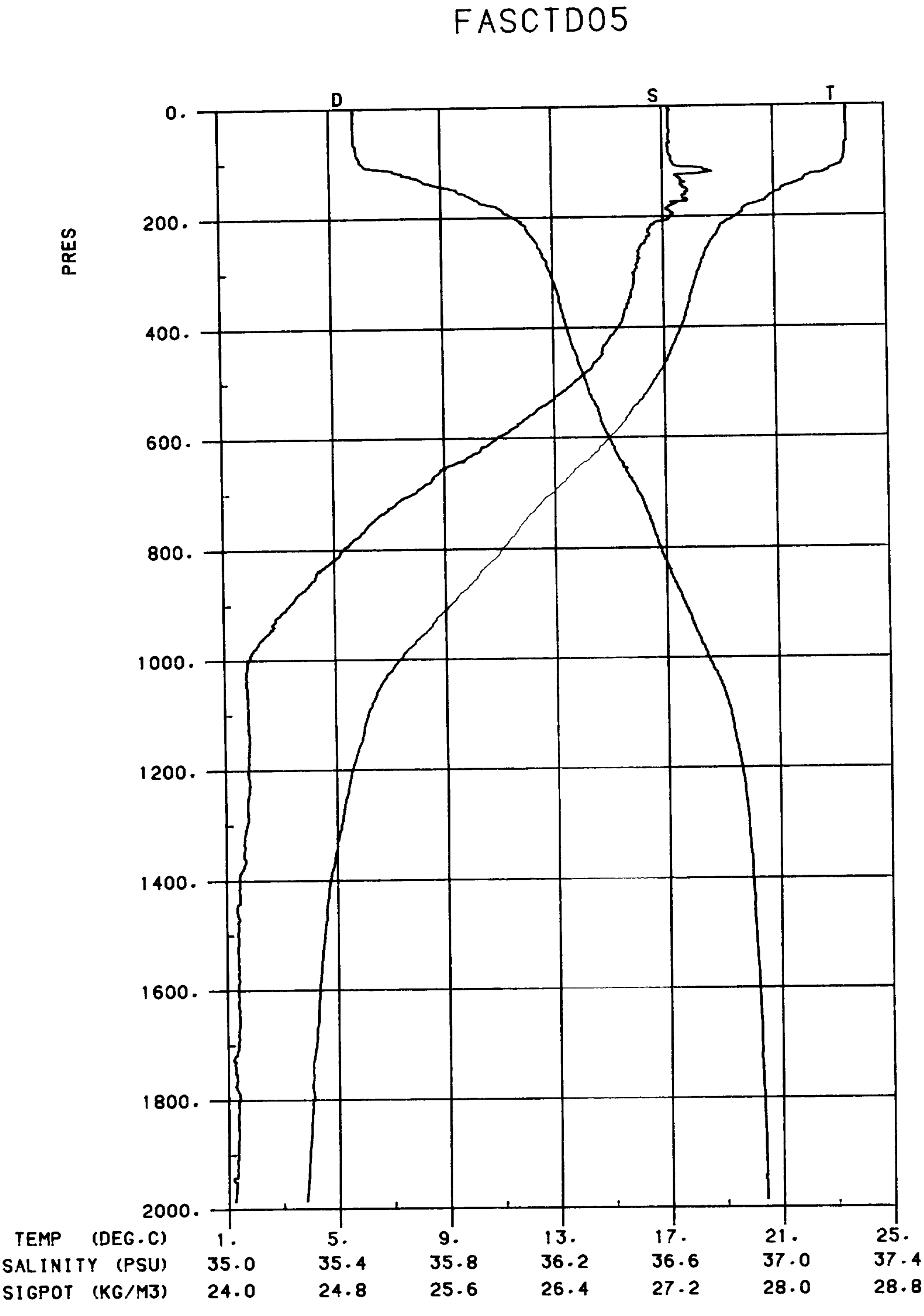
# FASCTD04




OCEANUS FASINEX FASCTD04 A 1986/36/2349 27 8.84N 69 53.59W

OCEANUS FASINEX STATION 04

| P-DB | T-DEGC | SAL-PSU | POTEMP | SIGMAT | SIG1000 | SIG2000 | DYNHT-M | SNDV-M/S | DEPTH-M | SVANOM | BVFR-CY/HR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. | 24.226 | 36.384 | 24.223 | 24.617 | 28.827 | 32.938 | 0.033 | 1534.2 | 10. | 0.3310E+03 | -999.000 |
| 20. | 24.233 | 36.385 | 24.229 | 24.616 | 28.826 | 32.937 | 0.066 | 1534.4 | 20. | 0.3315E+03 | -0.547 |
| 40. | 24.238 | 36.385 | 24.229 | 24.616 | 28.826 | 32.937 | 0.133 | 1534.7 | 40. | 0.3324E+03 | 0.162 |
| 60. | 24.210 | 36.390 | 24.197 | 24.629 | 28.840 | 32.951 | 0.199 | 1535.0 | 60. | 0.3321E+03 | 1.450 |
| 80. | 24.190 | 36.398 | 24.173 | 24.643 | 28.854 | 32.965 | 0.265 | 1535.3 | 79. | 0.3317E+03 | 1.443 |
| 100. | 23.946 | 36.581 | 23.925 | 24.855 | 29.068 | 33.182 | 0.330 | 1535.2 | 99. | 0.3124E+03 | 5.794 |
| 120. | 23.633 | 36.661 | 23.608 | 25.011 | 29.227 | 33.344 | 0.391 | 1534.9 | 119. | 0.2986E+03 | 4.949 |
| 140. | 23.229 | 36.698 | 23.200 | 25.160 | 29.380 | 33.503 | 0.450 | 1534.2 | 139. | 0.2854E+03 | 4.845 |
| 160. | 22.249 | 36.682 | 22.217 | 25.434 | 29.665 | 33.802 | 0.504 | 1532.0 | 159. | 0.2602E+03 | 6.576 |
| 180. | 21.152 | 36.703 | 21.117 | 25.759 | 30.005 | 34.157 | 0.553 | 1529.5 | 179. | 0.2301E+03 | 7.182 |
| 200. | 20.229 | 36.635 | 20.192 | 25.959 | 30.218 | 34.384 | 0.597 | 1527.3 | 199. | 0.2118E+03 | 5.642 |
| 220. | 19.471 | 36.611 | 19.431 | 26.144 | 30.413 | 34.590 | 0.638 | 1525.5 | 218. | 0.1951E+03 | 5.413 |
| 240. | 18.918 | 36.556 | 18.874 | 26.248 | 30.524 | 34.710 | 0.676 | 1524.2 | 238. | 0.1860E+03 | 4.061 |
| 260. | 18.645 | 36.533 | 18.599 | 26.302 | 30.582 | 34.772 | 0.712 | 1523.7 | 258. | 0.1816E+03 | 2.928 |
| 280. | 18.469 | 36.518 | 18.420 | 26.337 | 30.618 | 34.812 | 0.749 | 1523.5 | 278. | 0.1791E+03 | 2.325 |
| 300. | 18.325 | 36.519 | 18.272 | 26.377 | 30.659 | 34.854 | 0.784 | 1523.4 | 298. | 0.1762E+03 | 2.474 |
| 320. | 18.199 | 36.514 | 18.143 | 26.407 | 30.690 | 34.887 | 0.819 | 1523.4 | 318. | 0.1742E+03 | 2.154 |
| 340. | 18.035 | 36.496 | 17.976 | 26.436 | 30.720 | 34.920 | 0.854 | 1523.2 | 337. | 0.1723E+03 | 2.124 |
| 360. | 17.870 | 36.478 | 17.808 | 26.466 | 30.751 | 34.954 | 0.888 | 1523.1 | 357. | 0.1703E+03 | 2.154 |
| 380. | 17.703 | 36.451 | 17.637 | 26.488 | 30.775 | 34.981 | 0.922 | 1522.9 | 377. | 0.1689E+03 | 1.861 |
| 400. | 17.523 | 36.423 | 17.455 | 26.513 | 30.802 | 35.011 | 0.956 | 1522.6 | 397. | 0.1674E+03 | 1.967 |
| 450. | 17.118 | 36.358 | 17.042 | 26.567 | 30.859 | 35.075 | 1.038 | 1522.2 | 447. | 0.1642E+03 | 1.835 |
| 500. | 16.569 | 36.269 | 16.486 | 26.635 | 30.933 | 35.159 | 1.119 | 1521.3 | 496. | 0.1594E+03 | 2.089 |
| 550. | 15.639 | 36.103 | 15.551 | 26.727 | 31.039 | 35.282 | 1.197 | 1519.1 | 546. | 0.1520E+03 | 2.477 |
| 600. | 14.609 | 35.935 | 14.518 | 26.830 | 31.158 | 35.420 | 1.271 | 1516.5 | 595. | 0.1432E+03 | 2.645 |
| 700. | 12.749 | 35.643 | 12.652 | 27.001 | 31.358 | 35.657 | 1.406 | 1511.7 | 694. | 0.1286E+03 | 2.432 |
| 800. | 10.578 | 35.354 | 10.479 | 27.185 | 31.588 | 35.931 | 1.526 | 1505.5 | 793. | 0.1107E+03 | 2.625 |
| 900. | 8.769 | 35.178 | 8.669 | 27.350 | 31.794 | 36.176 | 1.628 | 1500.4 | 892. | 0.9410E+02 | 2.513 |
| 1000. | 7.317 | 35.083 | 7.215 | 27.494 | 31.971 | 36.387 | 1.715 | 1496.5 | 991. | 0.7950E+02 | 2.356 |
| 1100. | 6.318 | 35.077 | 6.214 | 27.625 | 32.126 | 36.566 | 1.788 | 1494.2 | 1090. | 0.6645E+02 | 2.225 |
| 1200. | 5.613 | 35.087 | 5.504 | 27.723 | 32.242 | 36.698 | 1.849 | 1493.1 | 1189. | 0.5689E+02 | 1.928 |
| 1300. | 5.159 | 35.084 | 5.045 | 27.776 | 32.306 | 36.773 | 1.903 | 1492.9 | 1287. | 0.5195E+02 | 1.457 |
| 1400. | 4.858 | 35.065 | 4.737 | 27.797 | 32.334 | 36.809 | 1.954 | 1493.3 | 1386. | 0.5029E+02 | 0.992 |
| 1500. | 4.624 | 35.068 | 4.497 | 27.827 | 32.371 | 36.851 | 2.003 | 1494.1 | 1485. | 0.4785E+02 | 1.109 |
| 1600. | 4.367 | 35.054 | 4.233 | 27.844 | 32.395 | 36.882 | 2.050 | 1494.7 | 1583. | 0.4638E+02 | 0.939 |
| 1700. | 4.231 | 35.050 | 4.089 | 27.856 | 32.411 | 36.902 | 2.096 | 1495.8 | 1682. | 0.4578E+02 | 0.756 |
| 1800. | 4.035 | 35.039 | 3.886 | 27.869 | 32.429 | 36.926 | 2.141 | 1496.6 | 1780. | 0.4473E+02 | 0.844 |
| 1900. | 3.917 | 35.021 | 3.760 | 27.867 | 32.431 | 36.930 | 2.186 | 1497.8 | 1879. | 0.4534E+02 | 0.371 |
| 2000. | 3.758 | 35.015 | 3.593 | 27.880 | 32.447 | 36.951 | 2.231 | 1498.8 | 1977. | 0.4439E+02 | 0.810 |

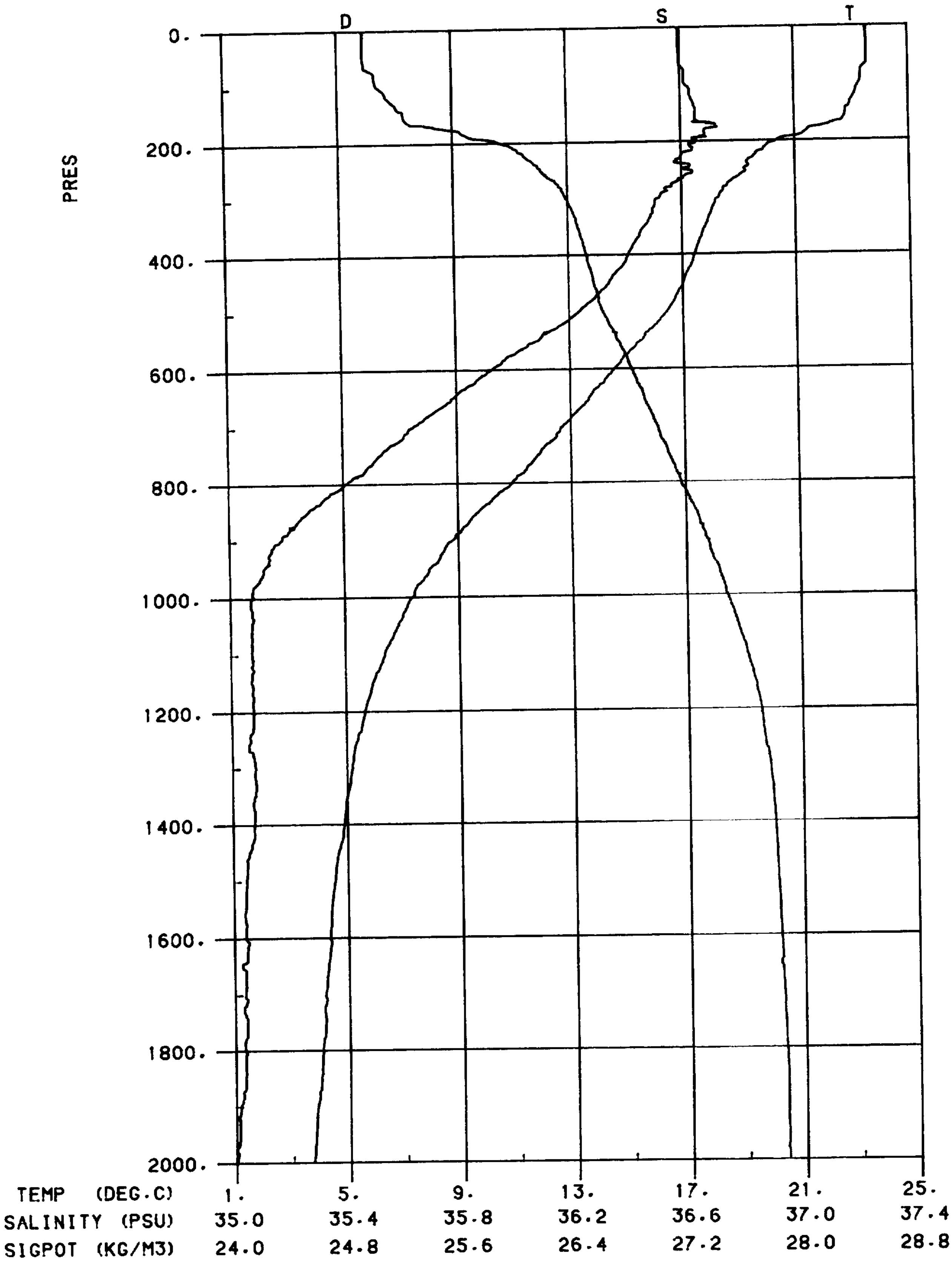



OCEANUS FASINEX FASCTD05 A 1986/37/0248 27 23.63N 70 8.73W

OCEANUS FASINEX STATION 05

| P-DB | T-DEGC | SAL-PSU | POTEMP | SIGMAT | SIG1000 | SIG2000 | DYNHT-M | SNDV-M/S | DEPTH-M | SVANOM | BVFR-CY/HR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. | 23.633 | 36.627 | 23.631 | 24.977 | 29.194 | 33.312 | 0.030 | 1533.0 | 10. | 0.2967E+03 | -999.000 |
| 20. | 23.638 | 36.624 | 23.634 | 24.974 | 29.191 | 33.308 | 0.059 | 1533.1 | 20. | 0.2974E+03 | -1.011 |
| 40. | 23.642 | 36.625 | 23.634 | 24.975 | 29.192 | 33.309 | 0.119 | 1533.5 | 40. | 0.2983E+03 | 0.333 |
| 60. | 23.642 | 36.624 | 23.630 | 24.975 | 29.192 | 33.310 | 0.179 | 1533.8 | 60. | 0.2991E+03 | 0.278 |
| 80. | 23.575 | 36.623 | 23.559 | 24.995 | 29.213 | 33.332 | 0.238 | 1534.0 | 79. | 0.2981E+03 | 1.778 |
| 100. | 23.498 | 36.634 | 23.477 | 25.028 | 29.247 | 33.367 | 0.298 | 1534.2 | 99. | 0.2959E+03 | 2.288 |
| 120. | 22.835 | 36.759 | 22.811 | 25.318 | 29.544 | 33.672 | 0.355 | 1532.9 | 119. | 0.2693E+03 | 6.762 |
| 140. | 21.806 | 36.670 | 21.778 | 25.547 | 29.786 | 33.929 | 0.406 | 1530.5 | 139. | 0.2484E+03 | 6.012 |
| 160. | 20.943 | 36.678 | 20.912 | 25.794 | 30.045 | 34.200 | 0.453 | 1528.6 | 159. | 0.2257E+03 | 6.261 |
| 180. | 20.069 | 36.627 | 20.035 | 25.994 | 30.257 | 34.424 | 0.497 | 1526.5 | 179. | 0.2075E+03 | 5.623 |
| 200. | 19.612 | 36.628 | 19.575 | 26.117 | 30.386 | 34.561 | 0.537 | 1525.5 | 199. | 0.1966E+03 | 4.418 |
| 220. | 19.033 | 36.551 | 18.994 | 26.212 | 30.488 | 34.672 | 0.576 | 1524.2 | 218. | 0.1885E+03 | 3.866 |
| 240. | 18.790 | 36.540 | 18.747 | 26.268 | 30.547 | 34.734 | 0.613 | 1523.8 | 238. | 0.1840E+03 | 2.959 |
| 260. | 18.527 | 36.510 | 18.480 | 26.315 | 30.596 | 34.789 | 0.649 | 1523.3 | 258. | 0.1804E+03 | 2.710 |
| 280. | 18.371 | 36.508 | 18.322 | 26.354 | 30.637 | 34.832 | 0.685 | 1523.2 | 278. | 0.1775E+03 | 2.483 |
| 300. | 18.218 | 36.491 | 18.165 | 26.382 | 30.666 | 34.864 | 0.721 | 1523.1 | 298. | 0.1757E+03 | 2.073 |
| 320. | 18.101 | 36.491 | 18.045 | 26.414 | 30.698 | 34.898 | 0.756 | 1523.1 | 318. | 0.1735E+03 | 2.198 |
| 340. | 17.973 | 36.481 | 17.914 | 26.440 | 30.725 | 34.927 | 0.790 | 1523.0 | 337. | 0.1719E+03 | 2.001 |
| 360. | 17.880 | 36.467 | 17.818 | 26.455 | 30.740 | 34.943 | 0.824 | 1523.1 | 357. | 0.1714E+03 | 1.468 |
| 380. | 17.770 | 36.454 | 17.705 | 26.474 | 30.760 | 34.965 | 0.859 | 1523.1 | 377. | 0.1703E+03 | 1.716 |
| 400. | 17.614 | 36.432 | 17.546 | 26.498 | 30.785 | 34.993 | 0.893 | 1522.9 | 397. | 0.1688E+03 | 1.938 |
| 450. | 17.172 | 36.373 | 17.095 | 26.566 | 30.857 | 35.072 | 0.976 | 1522.4 | 447. | 0.1643E+03 | 2.057 |
| 500. | 16.591 | 36.273 | 16.508 | 26.633 | 30.931 | 35.156 | 1.057 | 1521.3 | 496. | 0.1597E+03 | 2.078 |
| 550. | 15.801 | 36.137 | 15.713 | 26.717 | 31.025 | 35.265 | 1.136 | 1519.6 | 546. | 0.1532E+03 | 2.354 |
| 600. | 14.971 | 35.992 | 14.878 | 26.796 | 31.116 | 35.372 | 1.211 | 1517.7 | 595. | 0.1469E+03 | 2.309 |
| 700. | 12.901 | 35.687 | 12.803 | 27.004 | 31.358 | 35.654 | 1.349 | 1512.2 | 694. | 0.1285E+03 | 2.681 |
| 800. | 11.054 | 35.431 | 10.952 | 27.159 | 31.552 | 35.885 | 1.470 | 1507.3 | 793. | 0.1138E+03 | 2.413 |
| 900. | 9.192 | 35.237 | 9.088 | 27.329 | 31.763 | 36.136 | 1.575 | 1502.0 | 892. | 0.9687E+02 | 2.545 |
| 1000. | 7.309 | 35.087 | 7.207 | 27.498 | 31.975 | 36.391 | 1.663 | 1496.4 | 991. | 0.7909E+02 | 2.576 |
| 1100. | 6.163 | 35.084 | 6.060 | 27.651 | 32.156 | 36.599 | 1.734 | 1493.6 | 1090. | 0.6365E+02 | 2.397 |
| 1200. | 5.568 | 35.083 | 5.460 | 27.726 | 32.246 | 36.703 | 1.794 | 1492.9 | 1189. | 0.5650E+02 | 1.702 |
| 1300. | 5.151 | 35.075 | 5.037 | 27.770 | 32.300 | 36.767 | 1.848 | 1492.9 | 1287. | 0.5249E+02 | 1.343 |
| 1400. | 4.736 | 35.046 | 4.617 | 27.796 | 32.337 | 36.815 | 1.899 | 1492.8 | 1386. | 0.4996E+02 | 1.130 |
| 1500. | 4.523 | 35.040 | 4.396 | 27.815 | 32.362 | 36.845 | 1.948 | 1493.6 | 1485. | 0.4853E+02 | 0.936 |
| 1600. | 4.333 | 35.042 | 4.199 | 27.838 | 32.390 | 36.878 | 1.996 | 1494.5 | 1583. | 0.4681E+02 | 0.980 |
| 1700. | 4.193 | 35.039 | 4.052 | 27.852 | 32.407 | 36.899 | 2.042 | 1495.6 | 1682. | 0.4603E+02 | 0.795 |
| 1800. | 4.081 | 35.041 | 3.931 | 27.866 | 32.424 | 36.920 | 2.088 | 1496.8 | 1780. | 0.4526E+02 | 0.786 |
| 1900. | 3.930 | 35.034 | 3.773 | 27.877 | 32.440 | 36.939 | 2.133 | 1497.8 | 1879. | 0.4453E+02 | 0.772 |

# FASCTD06




OCEANUS FASINEX FASCTD06 A 1986/37/0629 27 23.47N 69 37.03W

OCEANUS FASINEX STATION 06

| P-DB | T-DEGC | SAL-PSU | POTEMP | SIGMAT | SIG1000 | SIG2000 | DYNHT-M | SNDV-M/S | DEPTH-M | SVANOM | BVFR-CY/HR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. | 23.536 | 36.596 | 23.534 | 24.983 | 29.201 | 33.320 | 0.030 | 1532.7 | 10. | 0.2961E+03 | -999.000 |
| 20. | 23.546 | 36.596 | 23.542 | 24.980 | 29.198 | 33.317 | 0.059 | 1532.9 | 20. | 0.2969E+03 | -0.957 |
| 40. | 23.552 | 36.596 | 23.544 | 24.980 | 29.198 | 33.317 | 0.119 | 1533.2 | 40. | 0.2978E+03 | -0.220 |
| 60. | 23.541 | 36.596 | 23.529 | 24.984 | 29.203 | 33.322 | 0.178 | 1533.5 | 60. | 0.2983E+03 | 0.858 |
| 80. | 23.341 | 36.613 | 23.324 | 25.057 | 29.278 | 33.400 | 0.237 | 1533.4 | 79. | 0.2922E+03 | 3.392 |
| 100. | 23.266 | 36.618 | 23.245 | 25.084 | 29.306 | 33.429 | 0.296 | 1533.6 | 99. | 0.2906E+03 | 2.061 |
| 120. | 23.094 | 36.634 | 23.069 | 25.149 | 29.372 | 33.497 | 0.353 | 1533.5 | 119. | 0.2854E+03 | 3.178 |
| 140. | 22.894 | 36.650 | 22.865 | 25.222 | 29.446 | 33.573 | 0.410 | 1533.3 | 139. | 0.2795E+03 | 3.363 |
| 160. | 22.717 | 36.651 | 22.685 | 25.276 | 29.502 | 33.632 | 0.465 | 1533.2 | 159. | 0.2753E+03 | 2.907 |
| 180. | 21.476 | 36.684 | 21.441 | 25.655 | 29.896 | 34.043 | 0.517 | 1530.3 | 179. | 0.2401E+03 | 7.747 |
| 200. | 20.362 | 36.647 | 20.324 | 25.933 | 30.190 | 34.353 | 0.563 | 1527.6 | 199. | 0.2143E+03 | 6.653 |
| 220. | 19.694 | 36.611 | 19.653 | 26.086 | 30.352 | 34.525 | 0.604 | 1526.1 | 218. | 0.2006E+03 | 4.927 |
| 240. | 19.334 | 36.615 | 19.290 | 26.185 | 30.455 | 34.634 | 0.643 | 1525.4 | 238. | 0.1920E+03 | 3.948 |
| 260. | 19.091 | 36.618 | 19.044 | 26.253 | 30.525 | 34.708 | 0.681 | 1525.1 | 258. | 0.1865E+03 | 3.264 |
| 280. | 18.538 | 36.557 | 18.488 | 26.350 | 30.630 | 34.821 | 0.717 | 1523.8 | 278. | 0.1780E+03 | 3.927 |
| 300. | 18.298 | 36.522 | 18.245 | 26.386 | 30.668 | 34.864 | 0.753 | 1523.4 | 298. | 0.1754E+03 | 2.371 |
| 320. | 18.063 | 36.498 | 18.007 | 26.428 | 30.713 | 34.913 | 0.787 | 1523.0 | 318. | 0.1721E+03 | 2.591 |
| 340. | 17.910 | 36.483 | 17.851 | 26.457 | 30.743 | 34.946 | 0.822 | 1522.9 | 337. | 0.1702E+03 | 2.104 |
| 360. | 17.730 | 36.454 | 17.668 | 26.482 | 30.770 | 34.975 | 0.856 | 1522.6 | 357. | 0.1687E+03 | 1.970 |
| 380. | 17.568 | 36.430 | 17.503 | 26.506 | 30.795 | 35.003 | 0.889 | 1522.5 | 377. | 0.1672E+03 | 1.911 |
| 400. | 17.428 | 36.410 | 17.360 | 26.526 | 30.817 | 35.027 | 0.923 | 1522.3 | 397. | 0.1661E+03 | 1.787 |
| 450. | 17.014 | 36.339 | 16.939 | 26.578 | 30.871 | 35.089 | 1.005 | 1521.9 | 447. | 0.1631E+03 | 1.786 |
| 500. | 16.441 | 36.233 | 16.359 | 26.637 | 30.938 | 35.166 | 1.085 | 1520.8 | 496. | 0.1591E+03 | 1.964 |
| 550. | 15.541 | 36.088 | 15.454 | 26.737 | 31.051 | 35.296 | 1.163 | 1518.7 | 546. | 0.1509E+03 | 2.575 |
| 600. | 14.560 | 35.924 | 14.469 | 26.833 | 31.161 | 35.424 | 1.236 | 1516.3 | 595. | 0.1429E+03 | 2.543 |
| 700. | 12.709 | 35.643 | 12.612 | 27.008 | 31.366 | 35.666 | 1.372 | 1511.6 | 694. | 0.1278E+03 | 2.464 |
| 800. | 10.912 | 35.408 | 10.810 | 27.167 | 31.563 | 35.899 | 1.492 | 1506.8 | 793. | 0.1128E+03 | 2.433 |
| 900. | 8.815 | 35.177 | 8.714 | 27.342 | 31.784 | 36.166 | 1.595 | 1500.6 | 892. | 0.9496E+02 | 2.602 |
| 1000. | 7.364 | 35.077 | 7.262 | 27.482 | 31.959 | 36.374 | 1.683 | 1496.6 | 991. | 0.8065E+02 | 2.336 |
| 1100. | 6.380 | 35.073 | 6.275 | 27.614 | 32.114 | 36.552 | 1.757 | 1494.5 | 1090. | 0.6764E+02 | 2.222 |
| 1200. | 5.652 | 35.077 | 5.543 | 27.711 | 32.228 | 36.683 | 1.819 | 1493.2 | 1189. | 0.5817E+02 | 1.922 |
| 1300. | 5.198 | 35.081 | 5.084 | 27.770 | 32.298 | 36.765 | 1.875 | 1493.1 | 1287. | 0.5267E+02 | 1.520 |
| 1400. | 4.891 | 35.075 | 4.770 | 27.801 | 32.338 | 36.812 | 1.926 | 1493.5 | 1386. | 0.4999E+02 | 1.155 |
| 1500. | 4.548 | 35.045 | 4.421 | 27.817 | 32.363 | 36.845 | 1.975 | 1493.7 | 1485. | 0.4850E+02 | 0.952 |
| 1600. | 4.359 | 35.041 | 4.225 | 27.835 | 32.386 | 36.874 | 2.023 | 1494.6 | 1583. | 0.4719E+02 | 0.907 |
| 1700. | 4.181 | 35.036 | 4.040 | 27.851 | 32.406 | 36.899 | 2.069 | 1495.5 | 1682. | 0.4608E+02 | 0.863 |
| 1800. | 4.066 | 35.035 | 3.917 | 27.863 | 32.422 | 36.918 | 2.115 | 1496.7 | 1780. | 0.4546E+02 | 0.752 |
| 1900. | 3.862 | 35.018 | 3.705 | 27.871 | 32.435 | 36.937 | 2.160 | 1497.5 | 1879. | 0.4479E+02 | 0.757 |
| 2000. | 3.720 | 35.004 | 3.556 | 27.874 | 32.443 | 36.948 | 2.205 | 1498.6 | 1977. | 0.4469E+02 | 0.602 |