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SOFAR Float Mediterranean Outflow Experiment
Data from the first year, 1984–1985

by

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ABSTRACT

In October, 1984, the Woods Hole Oceanographic Institution SOFAR float group began a three-year long field program to observe the low frequency currents in the Canary Basin. The principal scientific goal was to learn how advection and diffusion by these currents determine the shape and amplitude of the Mediterranean salt tongue. Fourteen floats were launched at a depth of 1100 m in a cluster centered on 32N, 24W, and seven other floats were launched incoherently along a north/south line from 24N to 37N. At the same time investigators from Scripps Institution of Oceanography and the University of Rhode Island used four other SOFAR floats to tag a submesoscale lens of Mediterranean water. Slightly over twenty years of float trajectories were produced during the first year of the experiment.

In this report we briefly describe the 1984 field operations and show the first year's SOFAR float data. Perhaps the most striking result is that westward flow within the Mediterranean salt tongue was found to be confined to a rather narrow jet (roughly 150 km in meridional extent) which had a mean speed of roughly 2 cm s^{-1}. To the north or south of this jet the mean flow was much weaker and eastward. This suggests that currents associated with the salt tongue itself (rather than the gyre scale circulation) may be most important for determining the salt distribution.

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I. Introduction

The large-scale salinity distribution at thermocline depths of the North Atlantic is dominated by a tongue of salty water projecting westward from Gibraltar toward Bermuda (Worthington, 1976). This salinity anomaly originates in the Mediterranean Sea where there is an excess of evaporation over precipitation and outflows through the Strait of Gibraltar. The bulk of the salt tongue extends westward across the Mid-Atlantic Ridge. However, some highly saline water can be traced into the Norwegian-Greenland Sea (Reid, 1979), where wintertime cooling and the relatively high salinity produce a dense water mass which is a major component of the North Atlantic Deep Water and can be traced into the South Atlantic, Pacific, and Indian Oceans (Reid and Lynn, 1971). The Mediterranean outflow is thus a prominent feature of the North Atlantic, and any circulation scheme must be consistent with its existence. Worthington (1976) assumes that advection dominates tracer distributions (in essence that a Peclet number, $Pe = VL/K$, is large, where V is the mean velocity, L is the characteristic length scale of the tracer field, and K is the effective diffusivity) and thus concludes that a basin-wide anticyclonic gyre cannot co-exist with the Mediterranean salt tongue. Worthington's subtropical gyre is thereby confined exclusively to the west of the Mid-Atlantic Ridge. Reid (1978, 1979) also implicitly assumes a very large Pe in his interpretation of tracer fields. Based upon the mean geostrophic shear, he infers a relatively complex circulation pattern which advects the outflow northward along the European coast to about 42N and then westward with the return flow of the North Atlantic Current.

A central problem in physical oceanography is to understand the circulation and mixing that produce such large scale tracer distributions. In 1984 we began a field experiment to observe the long-term displacement of Mediterranean water by tracking neutrally buoyant SOFAR floats which were set within the tongue. Our working hypothesis was that the salt anomaly could be viewed as a passive tracer imposed as a boundary condition on the eastern side of the basin (implicit also in the classical interpretations noted above). However, as we will see below, the trajectories suggest that westward advection occurs within a comparatively narrow jet which may have its origin in the outflow itself, rather than in the subtropical gyre.

II. 1984 Field Experiment

The purpose of our program was to answer the following specific questions on the general circulation and eddy field of the North Atlantic eastern basin:

(a) What is the thermocline-depth mean flow in the vicinity of the Mediterranean salt tongue? How does this observed mean flow fit with contemporary circulation schemes?

(b) What is the magnitude and isotropy of horizontal eddy diffusion in the eastern basin? What is the advective/diffusive balance of the salt tongue?

(c) What are the horizontal and temporal scales of the mesoscale eddy field? Is there a regional (1000 km scale) variation of first order eddy properties?

The field program which intended to answer these questions was made up of four elements: (a) deployment of a coherent float cluster, (b) deployment of additional floats over a wider geographical area, (c) deployment of a single current meter mooring, and (d) hydrographic stations.

(a) Float Deployments

A cluster of fourteen floats was launched near 32N, 24W with nearest neighbors at about 20 km initial spacing (Figure 1, Table 1). While this cluster remains partially intact, it will provide estimates of horizontal eddy scales and dynamic balances. The rate of breakup of this coherent cluster will provide two particle diffusion estimates. During the second and third years, this cluster will be spread over a region of order 300 km diameter, and its data used to estimate regional variations of first order properties (mean velocity, eddy kinetic energy, spectra, etc.).

Seven floats were deployed along a line extending from 37N, 21W, to 24N, 27W in order to explore some circulation features in the eastern basin such as the Azores front and the North Equatorial Current. An additional four floats were launched by L. Armi and T. Rossby within a Meddy (submesoscale eddies of Mediterranean water discussed further below).

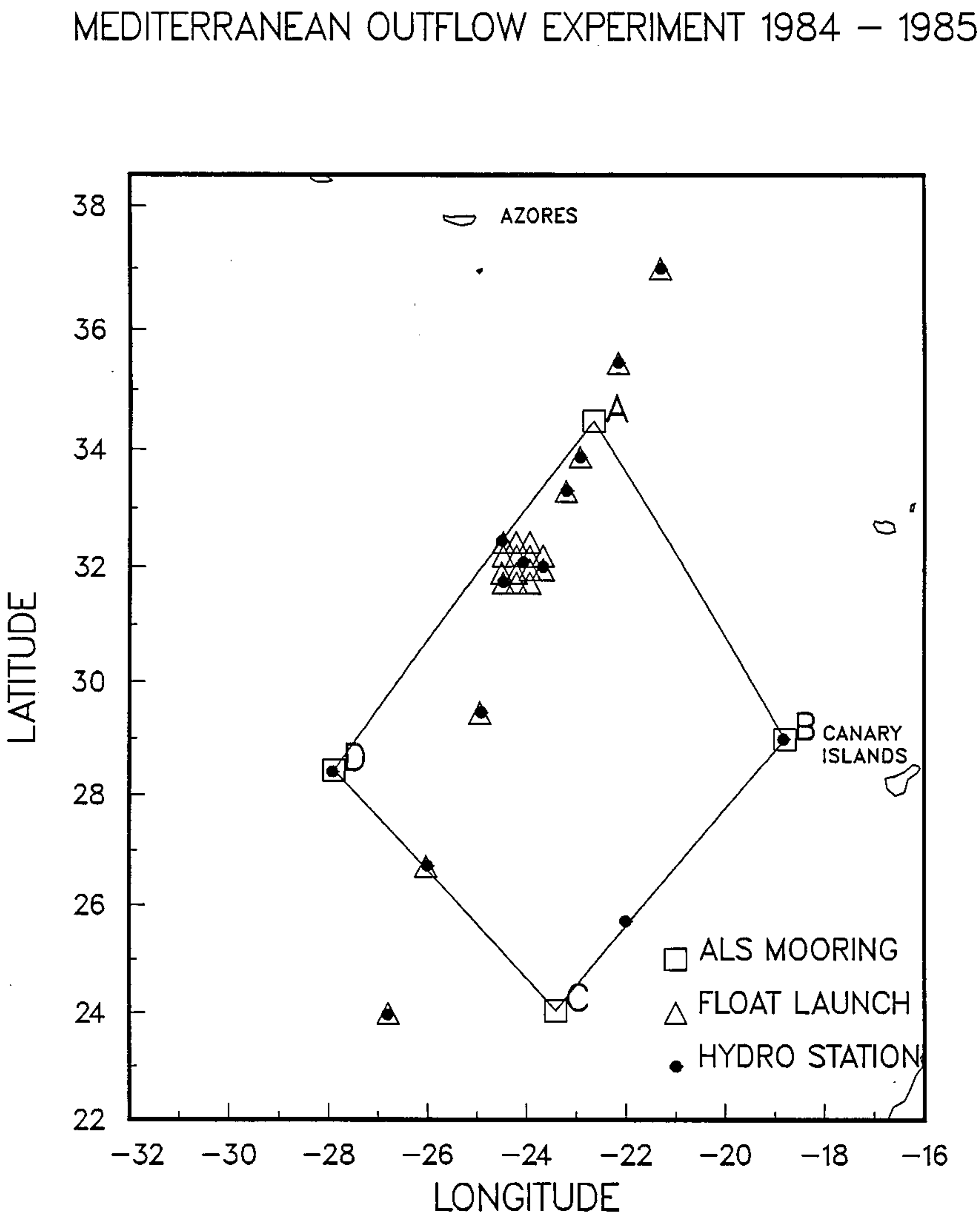

Figure 1: Autonomous listening station, float launch, and hydrographic station positions from the October, 1984, field experiment.

TABLE 1

LAUNCH INFORMATION AND
DIFFERENCES BETWEEN LAUNCH POSITION
AND FIRST TRACKED POSITION

FLOAT	LAUNCH DATE yymmddhh	LAUNCH LAT deg N	LAUNCH LON deg W	DATE OF FIRST POS yymmddhh	FIRST LAT deg N	FIRST LON deg W	POS. DIFF km	LAT DIFF deg	LON DIFF deg	TIME DIFF hr	INITIAL CLOCK ERROR sec
119	84101915	31.97	24.20	84102000	31.98	24.23	3	−0.01	0.03	9	−0.6
120	84102017	33.30	23.20	84102105	33.26	23.22	5	0.04	0.02	12	0.4
121	84101721	29.46	24.94	84101805	29.52	24.98	8	−0.06	0.04	8	0.2
122	84102004	32.20	24.20	84102015	32.19	24.25	5	0.01	0.05	11	−0.1
123	84102005	32.20	24.47	84102018	32.21	24.54	7	−0.01	0.07	13	−0.3
124	84101914	31.96	24.49	84101917	31.99	24.50	3	−0.03	0.01	3	−0.2
125	84101910	31.73	24.20	84101916	31.74	24.23	3	−0.01	0.03	6	−0.2
126	84101518	23.99	26.78	84101716	23.91	26.83	10	0.08	0.05	46	−0.7
127	84102902	31.96	23.93	84102012	31.95	23.97	4	0.01	0.04	10	0.3
129	84102908	32.43	24.47	84102016	32.43	24.52	5	0.00	0.05	8	−0.4
130	84101911	31.73	24.46	84101914	31.77	24.51	6	−0.04	0.05	3	−0.2
131	84102010	32.43	24.21	84102018	32.43	24.23	2	0.00	0.02	8	−0.3
132	84101611	26.70	26.03	84101707	26.69	26.03	1	0.01	0.00	20	0.4
133	84101907	31.97	23.66	84101912	31.91	23.71	8	0.06	0.05	5	0.6
134	84102206	35.46	22.16	84102207	35.33	22.16	14	0.13	0.00	1	9.0
135	84101902	32.20	23.66	84101906	32.21	23.69	3	−0.01	0.03	4	−0.0
136	84101908	31.74	23.93	84101920	31.75	23.97	4	−0.01	0.04	12	−0.4
137	84102002	32.20	23.94	84102014	32.20	23.97	3	0.00	0.03	12	0.1
138	84102217	37.00	21.31	84102219	36.82	21.31	20	0.18	0.00	2	12.1
139	84102111	33.88	22.92	84102113	33.89	22.93	1	−0.01	0.01	2	0.0
142	84102012	32.43	23.93	84102013	32.43	23.97	4	0.00	0.04	1	−0.3
Average differences..........							5.6	0.02	0.03		

All floats were ballasted for 1100 m, which is near the salinity maximum, and within the sound channel. Most of the floats actually settled slightly deeper than this -- typically about 1200 m, Table 2, -- which is well within the Mediterranean layer. In addition to float position, we obtained temperature and pressure at two-day intervals. From these data we can determine the statistics of isotherm fluctuation, and for the coherent cluster, the horizontal scales of the fluctuations.

These floats proved to be reasonably reliable, showing no early deaths, but six of the twenty-five floats did fail before the end of the first year (Table 3). Of the roughly 8,270 possible float days that could have been realized in the first year, we actually acquired 7,363 float days or about 88%. Note, though, that some floats which worked normally otherwise did not give temperature or pressure telemetry (marked by asterisks in Table 2).

The floats were tracked acoustically by signals received at a net of four Autonomous Listening Stations (ALSs) (Figure 1). The ALSs worked normally, except for a tape drive failure at ALS C, which caused the loss of data from every second day at that ALS. Aside from that fairly minor problem, the tracking of these floats proceeded very smoothly. The tracking procedures are described in Section III, and plots of each float are in Appendix A. Composite trajectories will be discussed in Section IV below.

(b) Current Meter Mooring

A single current meter mooring was set in the center of the cluster near 32N, 24W. The current meters were at depths of 500 m, 1000 m, 1100 m, (for some redundancy), and at 3000 m. The 1100 m current meter is measuring conductivity as well as temperature and pressure. This will give an independent estimate of the horizontal Reynolds salt flux, $\underline{V}'S'$, which together with an estimate of $\nabla^2 S$ (historical plus that from Armi and Rossby) may be used to infer K. The current meter data will provide the only long-term measure of vertical structure in the experiment and will be an important complement to the float measurements which show only the horizontal structure. The mooring and instruments were designed for a two-year-long deployment, one of the first attempted by the Woods Hole Buoy Group, and will be recovered in October, 1986.

TABLE 2

VALUES OF TEMPERATURE, PRESSURE, SALINITY, AND DENSITY CORRESPONDING TO INITIAL FLOAT POSITIONS

FLOAT	INIT. TEMP. deg C	AVG. TEMP. deg C	INIT. PRES. dbar	AVG. PRES. dbar	NEAREST STATION	SALINITY ppt	POTENTIAL DENSITY ANOMALY kg/m	IN SITU DENSITY ANOMALY kg/m
119	7.50	7.8	1207	1134	9	35.510	27.766	33.198
120	8.40	8.2	1112*	----	11	35.549	27.663	32.648
121	7.40	8.0	1240	1140	6	35.388	27.686	33.268
122	7.63	7.5	1262*	----	9	35.526	27.760	33.433
123	7.70	8.2	1251	1142	9-10	35.521	27.746	33.123
124	8.40	7.7	1116*	----	8-9	35.750	27.683	32.683
125	8.25	8.5	1128*	----	8	35.542	27.681	32.741
126	6.07*	---	1284	1187	3	35.172	27.699	33.514
127	8.46	8.3	1159	1104	9	35.599	27.692	32.885
129	8.44	8.5	1171	1106	10	35.559	27.664	32.911
130	7.59	8.1	1263	1189	8	35.485	27.734	33.413
131	7.96	8.1	1200	1114	10	35.532	27.717	33.105
132	6.75	6.9	1242	1167	4	35.244	27.666	33.273
133	8.61	8.6	1114	1101	7	35.628	27.691	32.681
134	7.98	7.4	1209*	----	13	35.572	27.744	33.172
135	7.87	7.7	1234	1220	7	35.570	27.757	33.301
136	8.26	8.4	1168	1112	8-9	35.573	27.697	32.941
137	8.28	8.6	1226	1147	9	35.591	27.714	33.209
138	9.96	9.8	1225	1166	14	35.826	27.643	33.072
139	7.88	8.6	1244	1157	12	35.543	27.738	33.323
142	7.96	8.3	1205*	----	9	35.566	27.743	33.153

Salinity and density were interpolated to the float initial depth using measurements from nearest hydrographic stations.

* These values were interpolated using temperature or pressure from the float and measurements from the nearest hydrographic station.

TABLE 3

FLOAT FILE STATISTICS

FLOAT	START DATE yymmdd	START POSITION LAT deg N	LON deg W	STOP DATE yymmdd	STOP POSITION LAT deg N	LON deg W	NO. DAYS	COMMENT
119	841022	31.98	24.28	850902	31.02	28.10	316	died 9/2
120A	841022	33.22	23.21	850823	31.56	28.90	306	
120B	850906	31.68	29.33	850919	31.63	29.63	14	
121	841020	29.52	24.98	850915	29.55	24.37	331	
122	841022	32.19	24.30	850221	32.13	26.84	123	died 2/2
123	841022	32.21	24.58	850919	32.12	25.83	333	
124	841021	31.97	24.54	850918	30.45	24.20	333	
125	841021	31.74	24.26	850513	31.37	26.96	205	died 5/1
126	841018	23.91	26.83	850919	24.67	25.45	337	
127	841022	31.94	24.01	850919	32.55	28.19	333	
129	841022	32.43	24.56	850915	29.20	26.40	329	
130	841021	31.76	24.53	850918	31.97	26.03	333	
131	841022	32.42	24.27	850915	29.93	23.76	329	
132	841019	26.69	26.05	850915	26.22	24.15	332	
133A	841021	31.90	23.73	850724	32.65	29.78	277	
133B	850809	32.55	29.87	850914	31.68	30.90	37	
134	841024	35.28	22.20	850323	35.75	20.51	151	died 3/2
135	841021	32.17	23.72	850918	30.88	24.67	333	
136	841021	31.73	23.97	850915	30.60	24.38	330	
137	841022	32.20	24.00	850916	31.17	31.26	330	
138	841024	36.82	21.31	850914	37.31	21.27	326	
139	841023	33.85	22.91	850919	31.72	20.96	332	
142	841022	32.40	24.00	850410	31.59	26.37	171	died 4/1
Meddy Floats								
128	841016	32.03	22.13	850919	26.87	24.05	339	
140	841018	32.01	21.94	850211	30.09	22.13	117	died 2/1
141	841018	31.93	22.15	850915	28.66	22.95	333	
143	841018	31.90	22.20	850915	26.92	24.01	333	

(c) Hydrographic Section

Nansen bottle casts with twelve bottles per cast were made along the north/south line where the single floats were launched (Table 4). Parameters measured were temperature, salinity, dissolved oxygen, and silica concentration (Figure 2). The Salinometer was standardized using standard water batch number P-92. XBTs and other hydrographic data also collected during this cruise have been described previously by Kase et al., (1986).

(d) Meddy Program

L. Armi and T. Rossby began a field study of Meddies during the cruise preceding our deployment cruise. They carried out a CTD survey of the central Canary Basin and then launched four SOFAR floats within a single Meddy located near 32N, 21W. One of these floats failed after about four months; two stayed with the Meddy for over seven months; and the fourth float stayed with the Meddy for the full length of the experiment. These floats gave information that allowed Armi and Rossby to return to the Meddy for a second intensive CTD survey in fall 1985. We include plots of the Meddy floats within this report as Appendix B but defer all discussion and interpretation of these data to Armi and Rossby.

(e) French and U.K. Programs

There were two other SOFAR float experiments underway in the region during late 1984 and 1985. A group from Centre Oceanologique Brest, France (A. Colin de Verdiere) was studying flow across the Mid-Atlantic Ridge, and a group from Institution of Oceanographic Sciences, Wormley, England (J. Gould) was observing dispersion by deep currents in the Canary Basin. The C.O.B. and I.O.S. experiments included ALS deployments that complemented our own. We have sent them our ALS data and have recently acquired some of theirs. These additional ALS data will be used in the future for filling in the gaps that arise when floats go behind seamounts to the west of our ALS net.

TABLE 4

ALS MOORING POSITIONS

ALS	LAUNCH DATE yymmdd	LATITUDE deg N	LONGITUDE deg W
A	841021	34.490	22.642
B	841013	29.000	18.787
C	841014	24.038	23.406
D	841017	28.434	27.889

HYDROGRAPHIC STATION POSITIONS

STATION	DATE yymmdd	LATITUDE deg N	LONGITUDE deg W
1	841013	29.002	18.825
2	841014	25.702	22.007
3	841015	23.965	26.810
4	841016	26.717	26.002
5	841017	28.413	27.922
6	841017	29.467	24.917
7	841019	32.088	23.666
8	841019	31.747	24.470
9	841019	32.087	24.064
10	841020	32.455	24.500
11	841020	33.308	23.195
12	841021	33.879	22.925
13	841022	35.463	22.157
14	841022	37.000	21.305

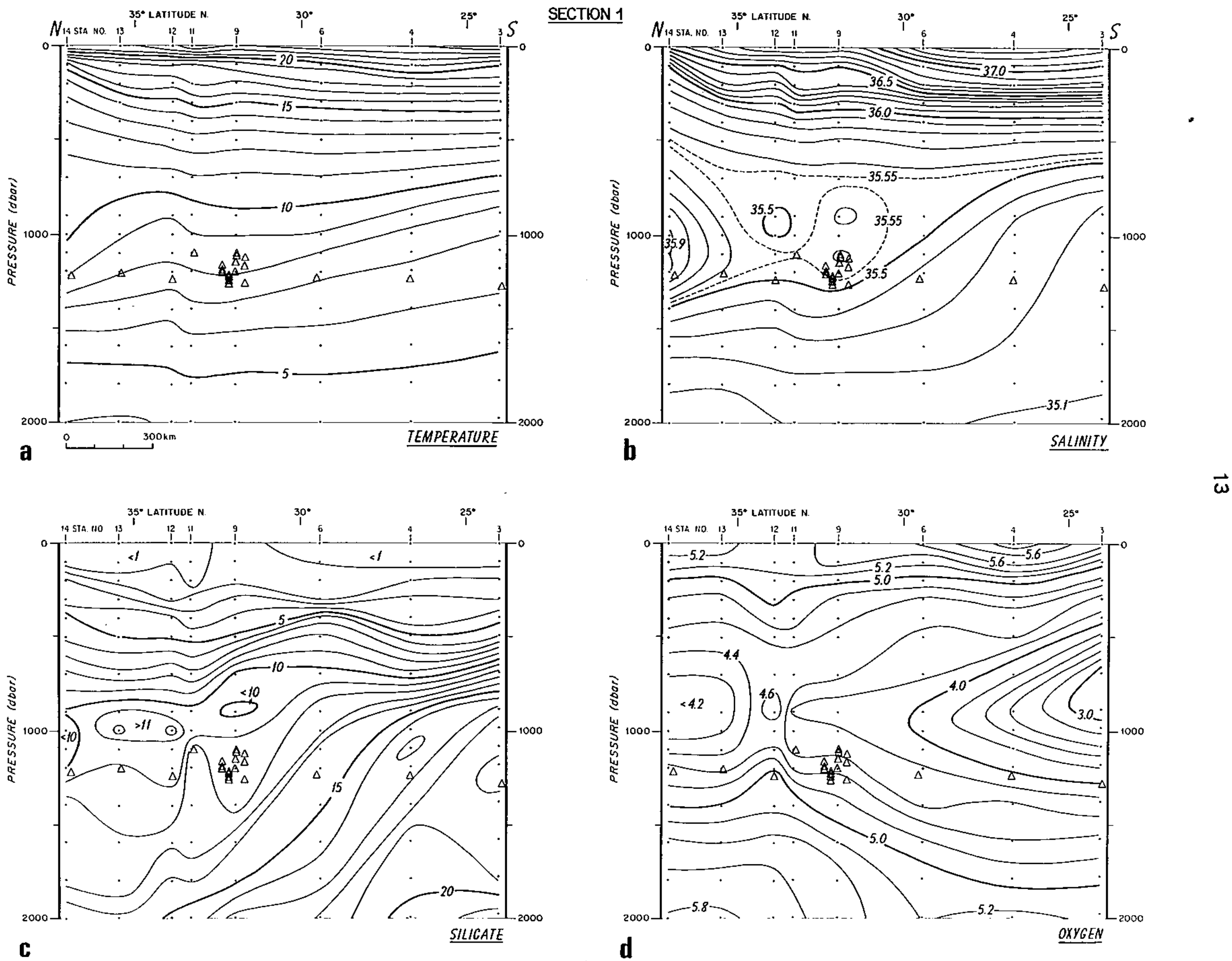

Figure 2: Vertical sections of Nansen bottle data with float launch positions and depths shown as triangles.

III. Data Processing and Float Tracking

A report in preparation by W. B. Owens will describe the float tracking process in detail. Some elements of the final processing phase are described briefly here.

The ALS cassette tapes recovered in October, 1985, containing times of arrivals and telemetry for each of the twenty-five floats, were processed at Woods Hole Oceanographic Institution in three phases: The first phase converts the raw data into a time series of possible time of arrivals and amplitudes of their correlations for each ten minute interval that the ALSs were in the water. The second phase (float tracking) brings the data through three steps: (1) identification and extraction of the float signals for each ALS; (2) tracking the floats (including estimates of the drift of the SOFAR float clock); and (3) creation of a FLOATER format (McKee, 1986) file for each float containing raw (unsmoothed) positions and telemetry (pressure and temperature). The third phase includes editing, interpolating, filtering, and smoothing the data to produce final float trajectories complete with velocities, temperature, and pressure.

Trajectory and time series plots were inspected for outliers, and the preliminary FLOATER format files were edited where necessary to eliminate bad positions and temperature and pressure values. Listings of direction and speed derived from consecutive positions were used to detect unusually high speeds that might indicate a bad position. First differences between consecutive temperature and pressure values were calculated. Radical changes in temperature that were not accompanied by a similar change in pressure (or vice versa) were presumed to indicate an erroneous value. Temperature and pressure that drifted outside the range of the sensors were also removed from the data and flagged as erroneous. Temperature and pressure values that were not associated with a position were deleted.

Trajectories having gaps of greater than ten days were broken into subfiles and labeled A, B, C, etc. This occurred only in the cases of floats 120 and 133 which moved west of the Cruiser Seamounts and were thus blocked from reception by the ALS net in the Canary Basin (French ALSs then in place on the Mid-Atlantic Ridge may help fill these gaps).

Gaps of less than ten days duration in position, temperature, and pressure were linearly interpolated, producing daily values of temperature and pressure from the bi-daily values recorded.

These interpolated series were then filtered using a five point one-day half-width Gaussian filter. Finally, a cubic spline was fitted to the filtered positions and east and north components of velocity were calculated to coincide with the positions at twenty-four hour intervals.

A float file name is up to six characters long and is made up of three parts:

1. A two letter code to indicate the experiment, in this case, EB (for "Eastern Basin").
2. A one to three digit identifier assigned to the float before its launch.
3. A single letter suffix (A, B, C, ...Z) that was added to the file name if the float record was broken into sections due to gaps in the data. An example is float name EB120B -- Experiment Code EB, Float 120, Section B.

As we noted earlier, the tracking of these floats proceeded very smoothly since the ALS records were nearly error free and because the floats were generally heard well by at least three ALSs. The accuracy of the tracking may be judged by comparing the known launch position with the first position calculated by tracking. The difference between these two positions as well as the time difference between launch and the first position are listed in Table 1. The position difference is generally small, typically 5 km, which is more than adequate accuracy for most purposes. The two exceptions are floats 134 and 137 which were the two northern-most floats on the line. These floats were within a very strong Mediterranean water anomaly which would be expected to decrease the effective sound speed at which signals traveled from the floats to the ALSs. During the tracking done here we used a constant (for all floats) sound speed, which may need to be adjusted in the future.

IV. Discussion

A composite of trajectories from the twenty-one floats launched to investigate the large scale flow (not the Meddy floats) is shown in Figure 3, and the underlying topography is shown in Figure 4. The topography near the launch site in the Canary Basin was quite smooth and probably not an important factor for most of the data set. However, some of the floats which went farthest west do appear to have looped around the Cruiser Seamounts at around 32N, 29W, and there are gaps in the trajectories on account of acoustic shadowing by these features.

The trajectories show two kinds of displacement -- a low frequency "sloshing" or eddy motion, as well as an annual mean.

(a) Eddy Motion

The trajectories show a strongly polarized low frequency "eddy" motion which is almost entirely zonal. The amplitude in velocity is roughly 5 cm s^{-1} at the northern end of the line (37N), and somewhat less, roughly 2 cm s^{-1}, at the southern end of the line (24N). The dominant period is roughly four months, and the total range of displacement is about 300 km in the north and 150 km in the south (nearly all zonal).

(b) Annual Mean Velocity

The annual mean velocities are also almost entirely zonal and are shown in Figure 5. These data show a striking and unexpected result. The westward mean flow within the Mediterranean water appears to have been confined to a rather narrow jet centered on 32N which happens to coincide with the cluster of floats. The largest mean flow was about 2.5 cm s^{-1}, but a typical mean velocity within the cluster was about 1.5 cm s^{-1}. At all other float locations outside the cluster, the mean flow was eastward and very weak, typically 0.5 cm s^{-1} if distinguishable from zero. These first year data thus suggest a narrow (roughly 150 km wide) westward flowing jet of Mediterranean water with a broad and weak return flow to the north and south.

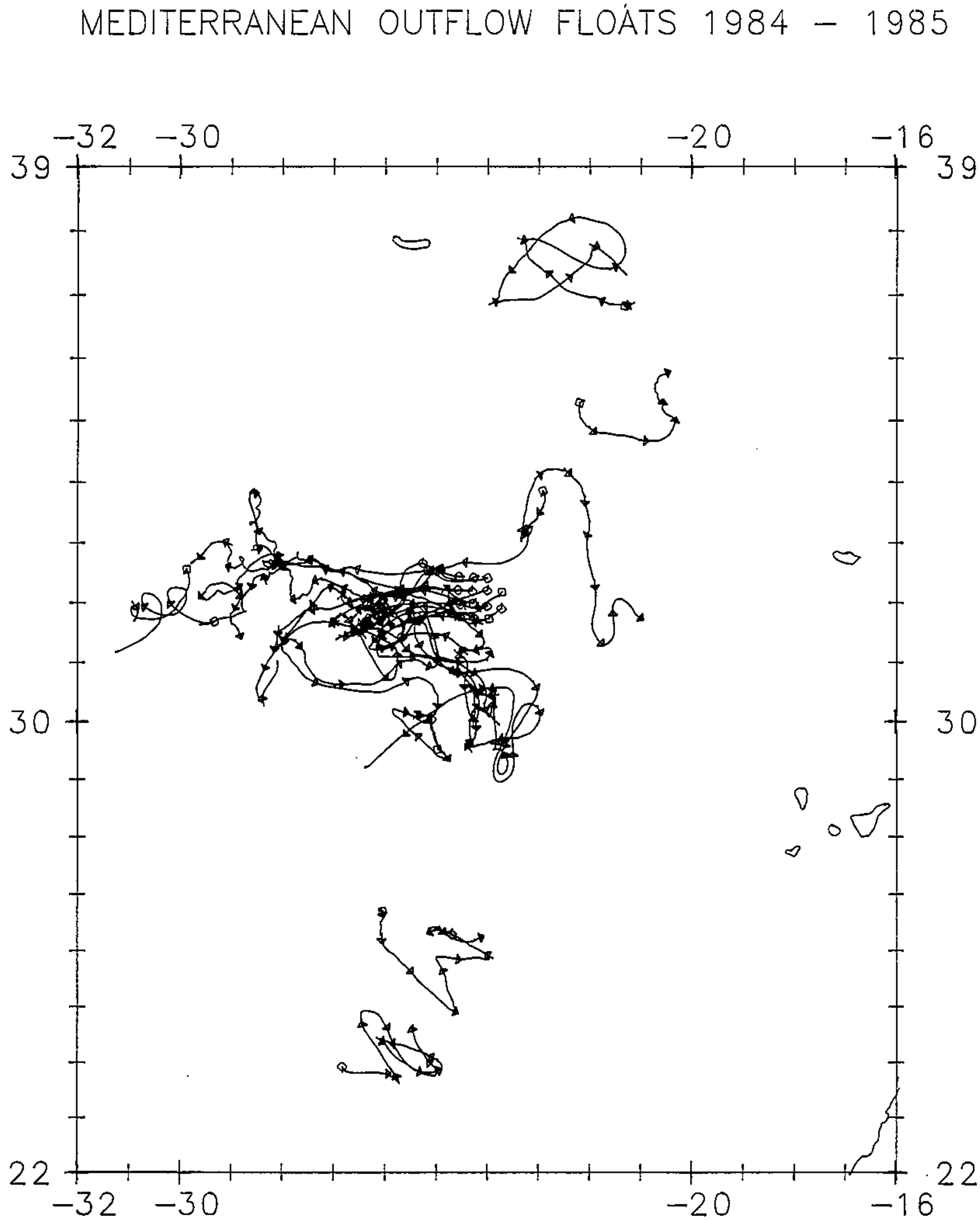

Figure 3: A composite of the trajectories of the twenty-one floats launched to examine the large scale circulation and eddy field. Arrow heads appear at thirty-day intervals along the trajectories. Note the near zonal, low frequency sloshing suggestive of a wavelike eddy motion and especially the westward displacement of floats launched near 32N.

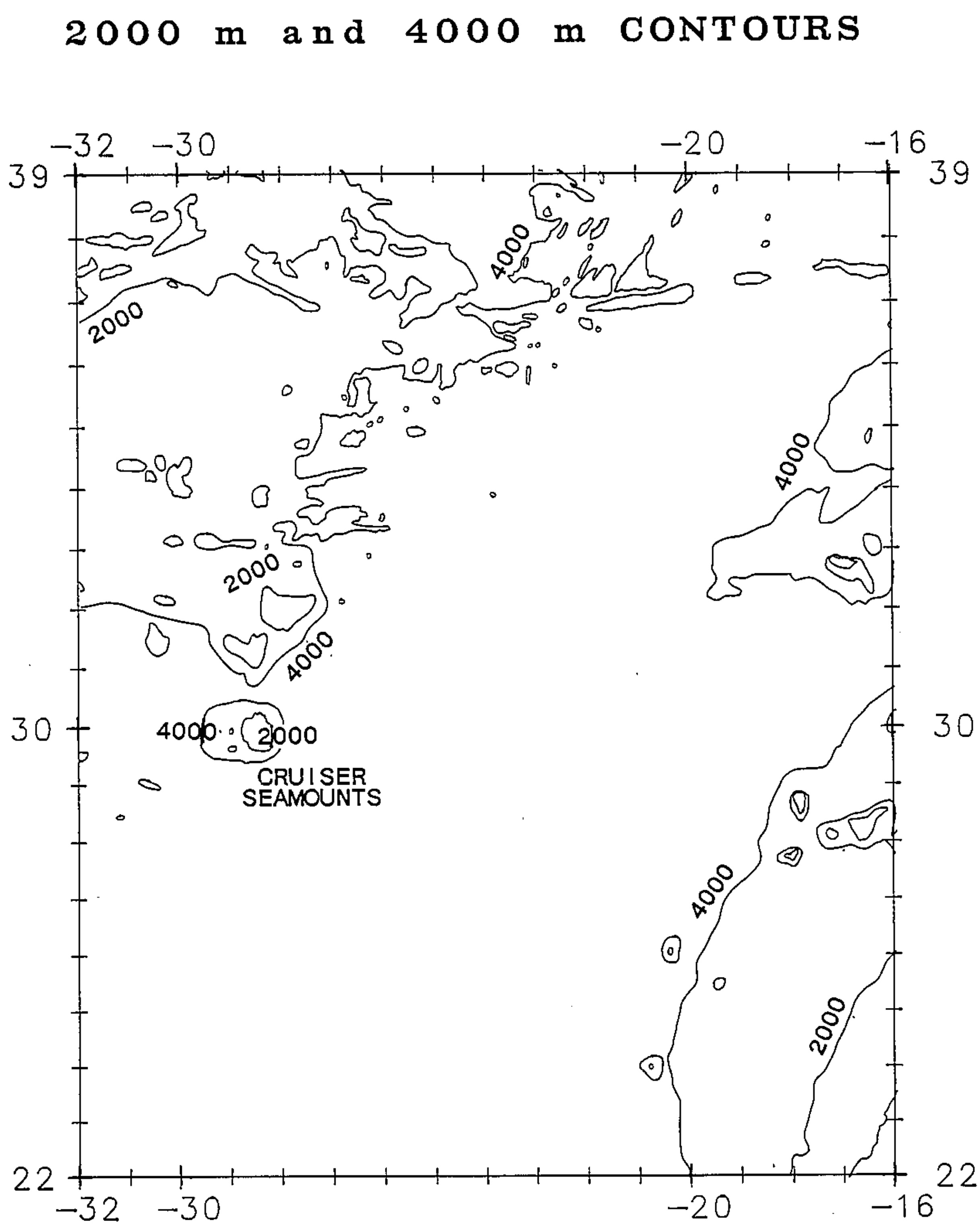

Figure 4: Bathymetry in the experimental area.

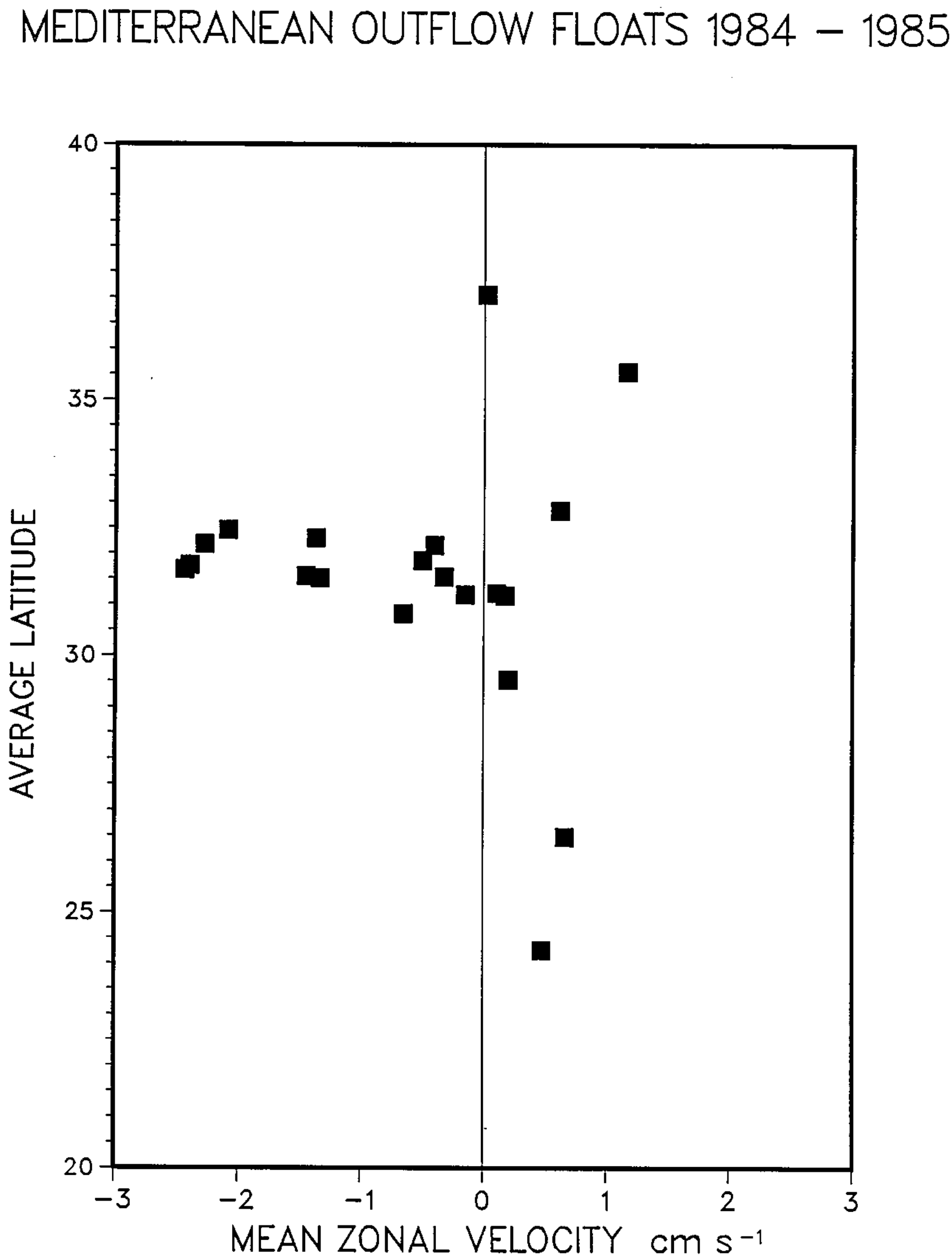

Figure 5: Annual mean zonal velocity from October, 1984, to October, 1985.

The hydrographic data (Figure 6) show that the jet is coincident with a comparatively weak positive salinity anomaly. The salinity anomaly is the difference in salinity at a given potential temperature between the average observed salinity and the standard potential temperature salinity relation for the western North Atlantic given by Iselin (1936) for temperature .4-18°C, and by Fuglister (personal communication) for temperatures warmer than 18°C. This same anomaly was found with much the same amplitude and scale farther to the west during a CTD survey by German investigators aboard Meteor (Kase et al., 1986). Note that there was a much stronger anomaly present at the northern end of the line, but the floats that were launched in that region showed no evidence of westward mean flow, and in fact one of them moved eastward. It appears that the weaker salinity anomaly at 32N was the main core of westward flowing Mediterranean water during this year. The small meridional scale of this flow suggests that the jet may be a product of the outflow itself, rather than a feature of the gyre scale general circulation of the eastern North Atlantic. Thus our working hypothesis - that the Mediterranean salt tongue is a passive tracer - appears to be inappropriate. Instead, it seems that the salt tongue may have important internal dynamics, and that a source, like the Mediterranean outflow, may produce its own circulation well within the Atlantic basin.

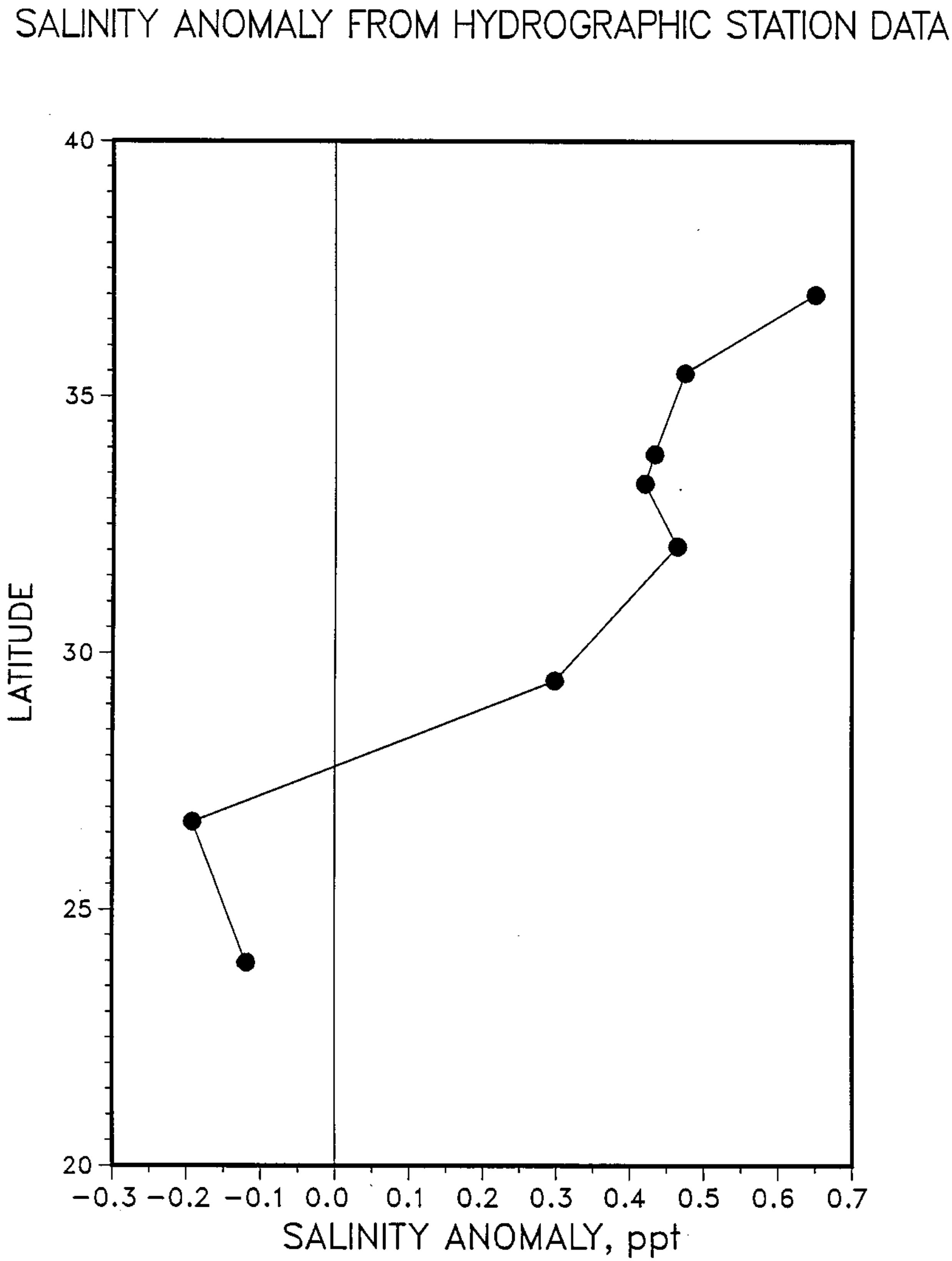

Figure 6: Salinity anomaly at the depth of the floats along the line. Westward advection appears to be active only within the comparatively small anomaly at 32N. The stronger anomaly north of 35N does not appear to be spreading west at this time.

Acknowledgments

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The floats were tracked by M. E. Zemanovic at Woods Hole Oceanographic Institution using a system developed by W. B. Owens. Technical support was performed by R. D. Tavares and B. J. Guest. E. E. Deary typed the manuscript.

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Reid, J. L., and R. J. Lynn, 1971. On the influence of the Norwegian-Greenland and Weddell Seas upon the bottom waters of the Indian and Pacific Oceans, Deep-Sea Research, 18, 1063-1088.

Worthington, L. V., 1976. On the North Atlantic circulation. The Johns Hopkins Oceanographic Studies, 6, 110 pp.

APPENDIX A

Plots of Individual Floats

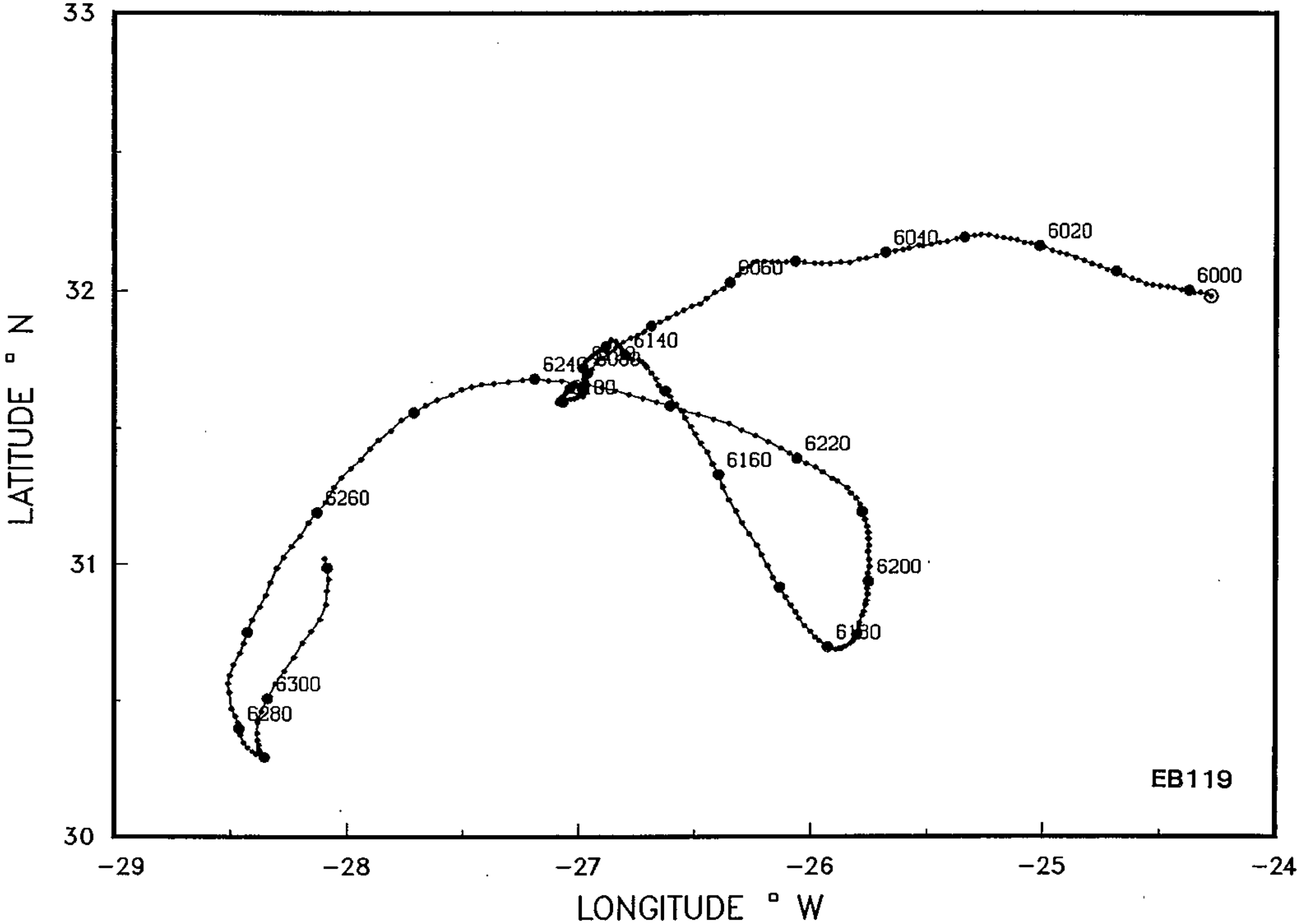
A trajectory plot and a group of time series plots are presented for each float. The order of the time series plots is stick diagram, u and v velocity component overplot, and temperature and pressure overplot (where data are available). Plots were created for this section with the objective of best presenting the data for a particular float; thus the scales vary. For the time series plots, a common scale has been used for the time axis, but the y axis varies for each float according to the minima and maxima of the variable plotted. Two hundred days of data were plotted on each page. Float files of lengths greater than 200 days were continued on subsequent pages. The time axis is annotated with the last four digits of the Julian day and with the calendar months. Refer to the conversion chart (Appendix C) to convert Julian day to calendar day. Data points are marked daily.

A trajectory for each float is plotted on a mercator projection. For the longitude axis, negative numbers indicate longitudes west of the Greenwich Meridian. Along the trajectories, open circles denote the first float position, small dots mark the daily positions, large dots the tenth day, and every twentieth day is annotated with the last four digits of the Julian date.

Stick plots show velocity for every day of data. The stick length indicates the speed in cm s^{-1}, and the angle the stick makes with the horizontal axis represents the direction. North is toward the top of the page. The east and north components of velocity can be seen separately in overplots plotted to the same scale as the stick plots.

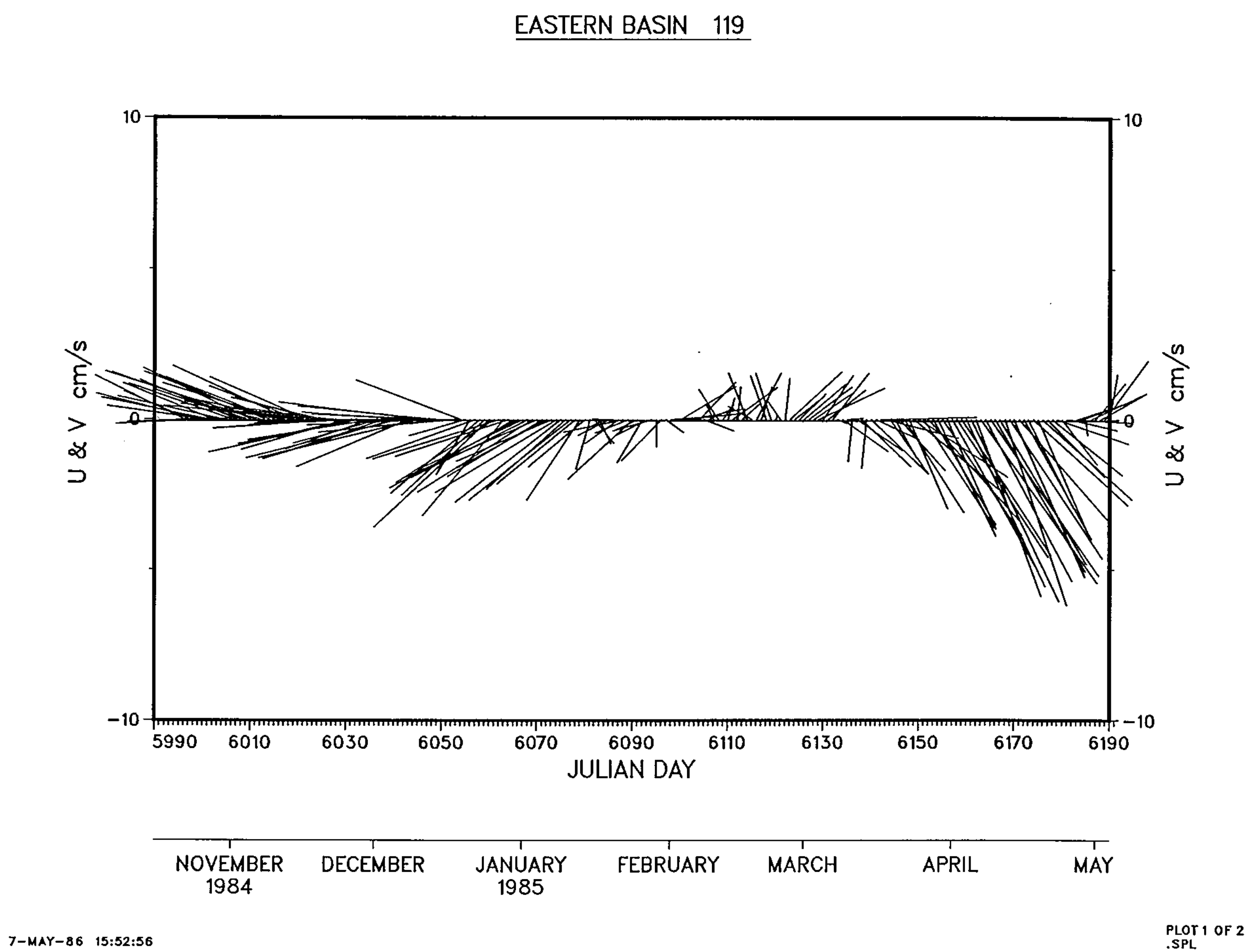
Temperature and pressure are overplotted, temperature on a centigrade scale marked on the left y axis, pressure in decibars marked on the right y axis. Pressure is plotted with deeper values at the bottom of the scale.

EASTERN BASIN 119

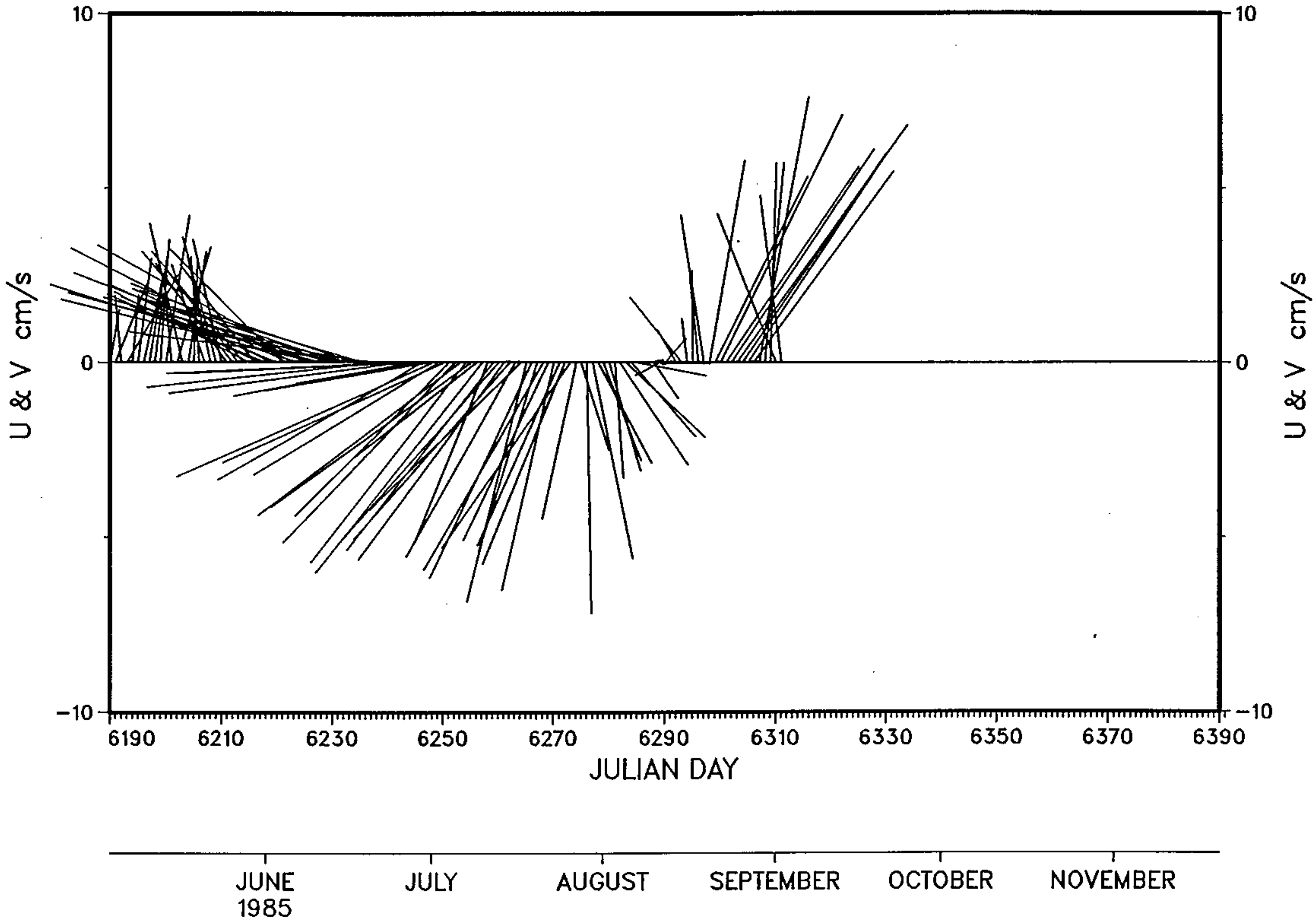


18-JUN-86 10:18:45

PLOT 1 OF 1
.FIN


EASTERN BASIN 119
10
0
-10
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
7-MAY-86 15:52:56
PLOT 1 OF 2
.SPL

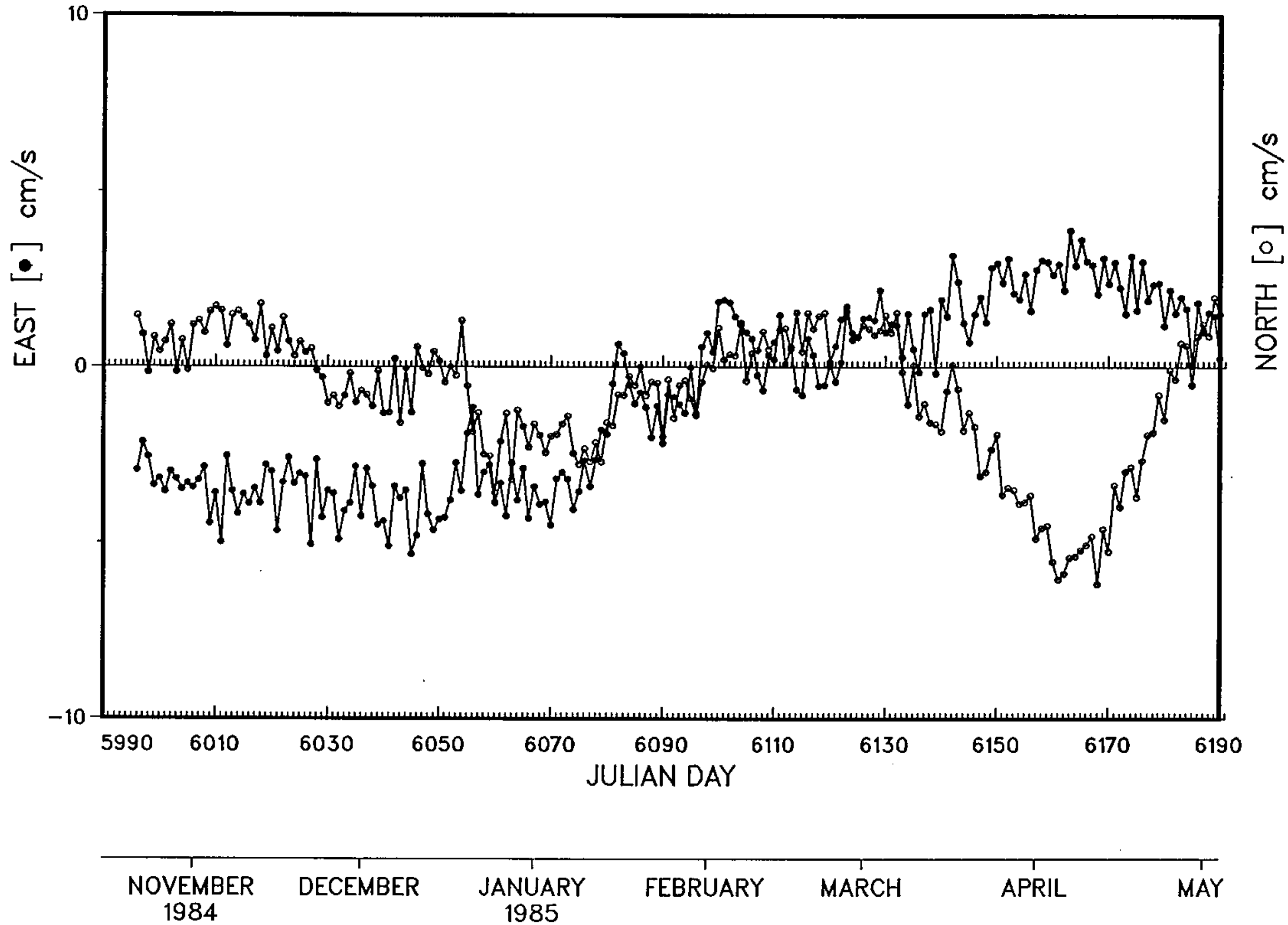
EASTERN BASIN 119



7-MAY-86 15:53:07

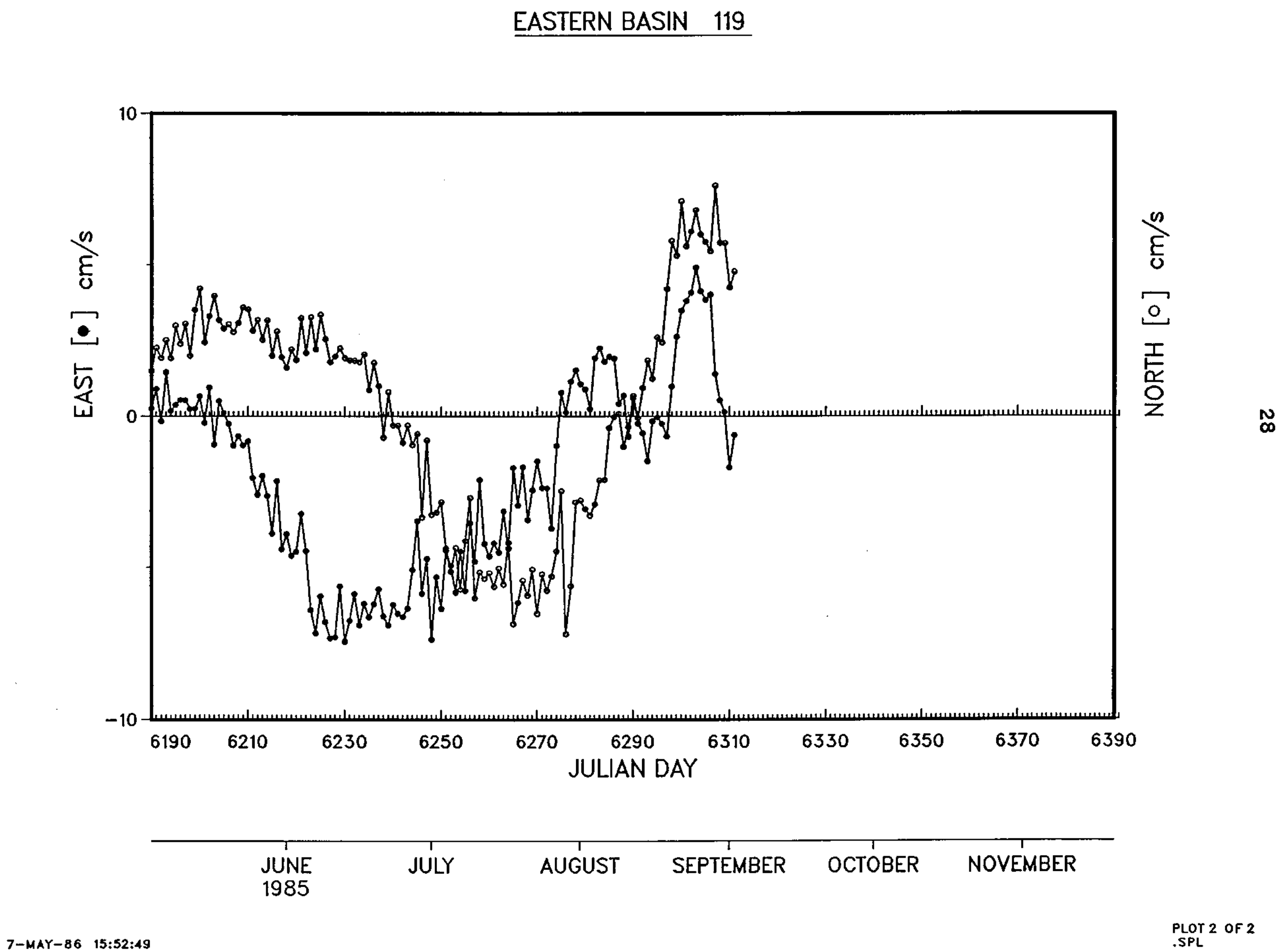
PLOT 2 OF 2
.SPL

EASTERN BASIN 119

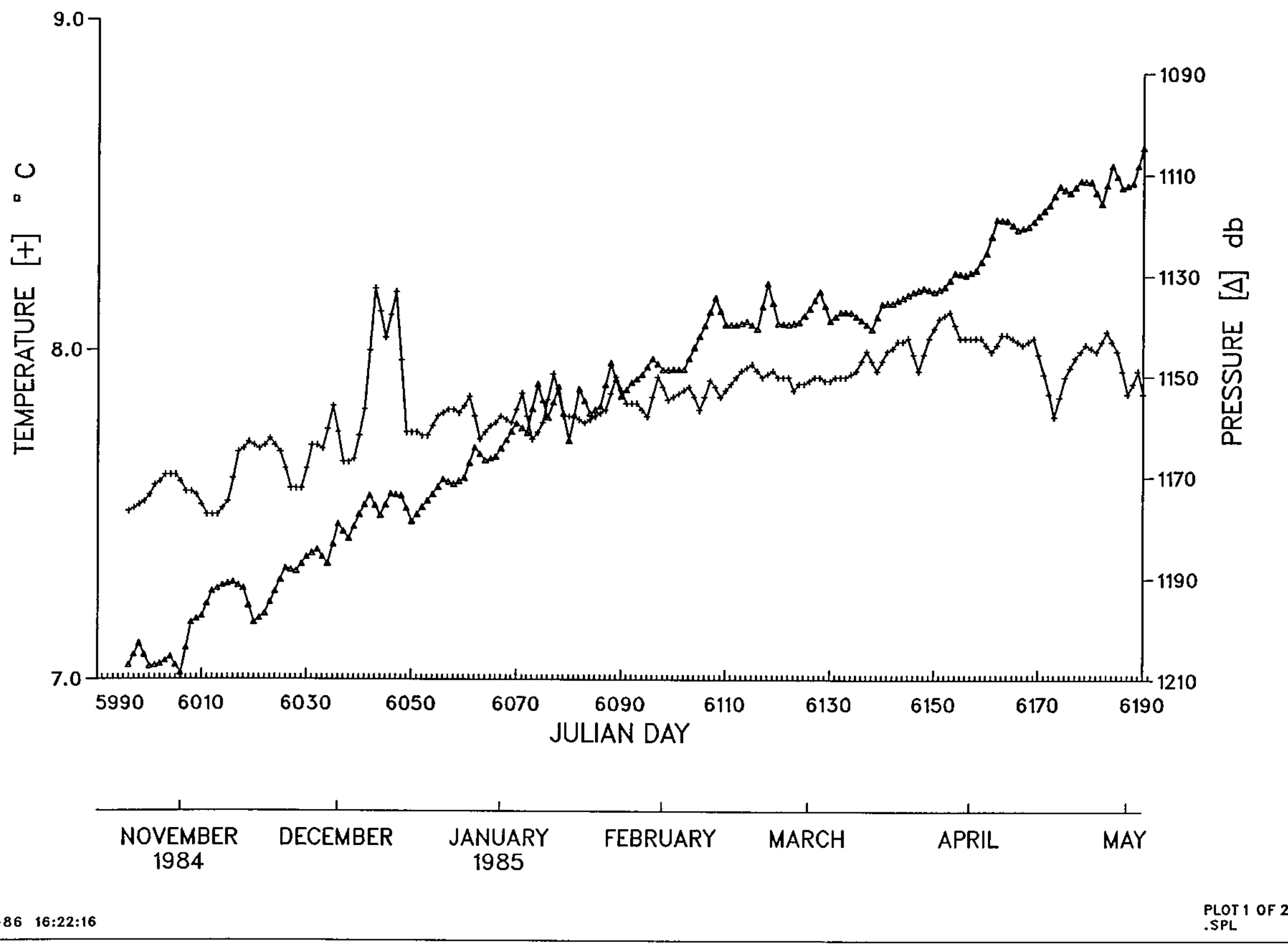


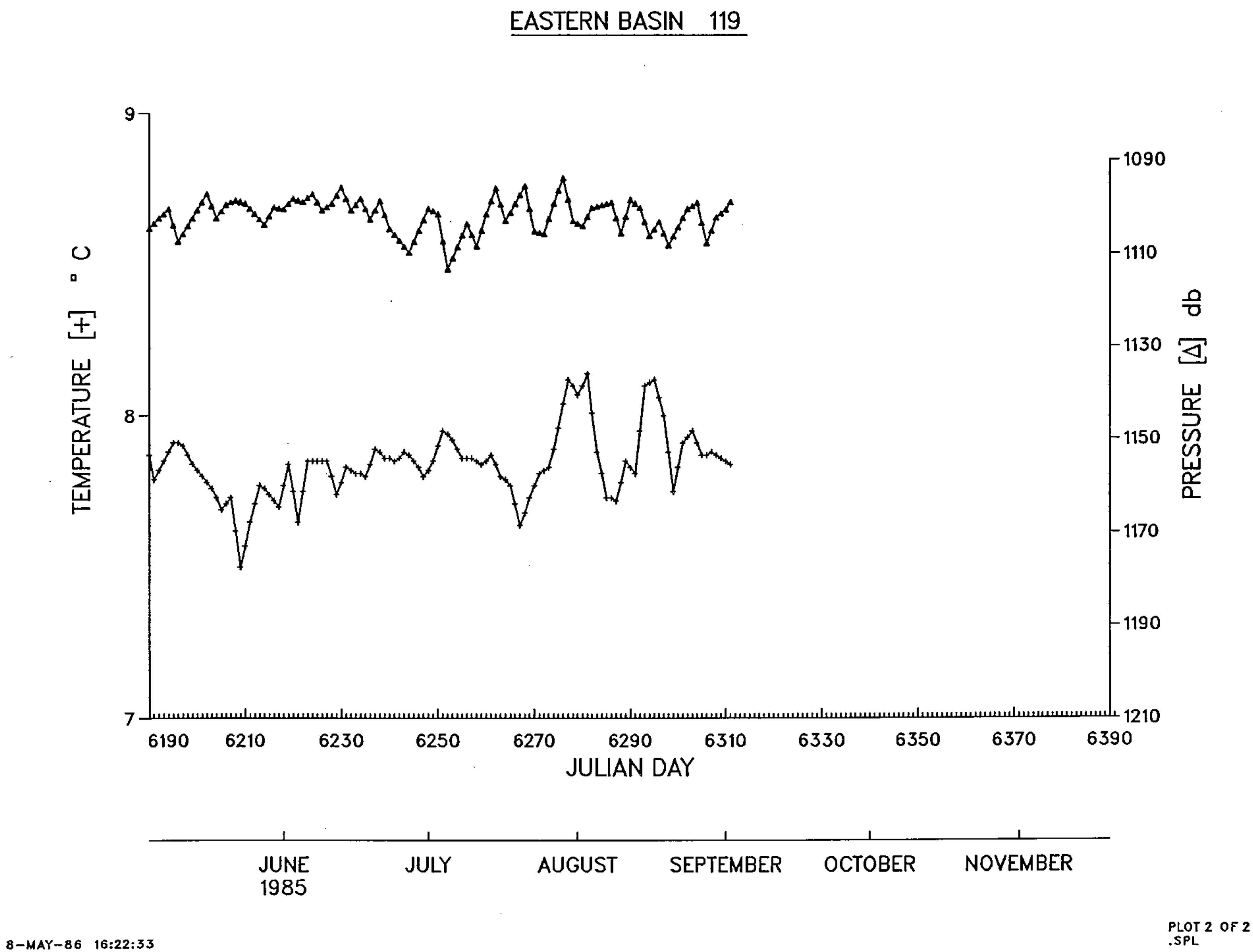
7-MAY-86 15:52:35

PLOT 1 OF 2
.SPL

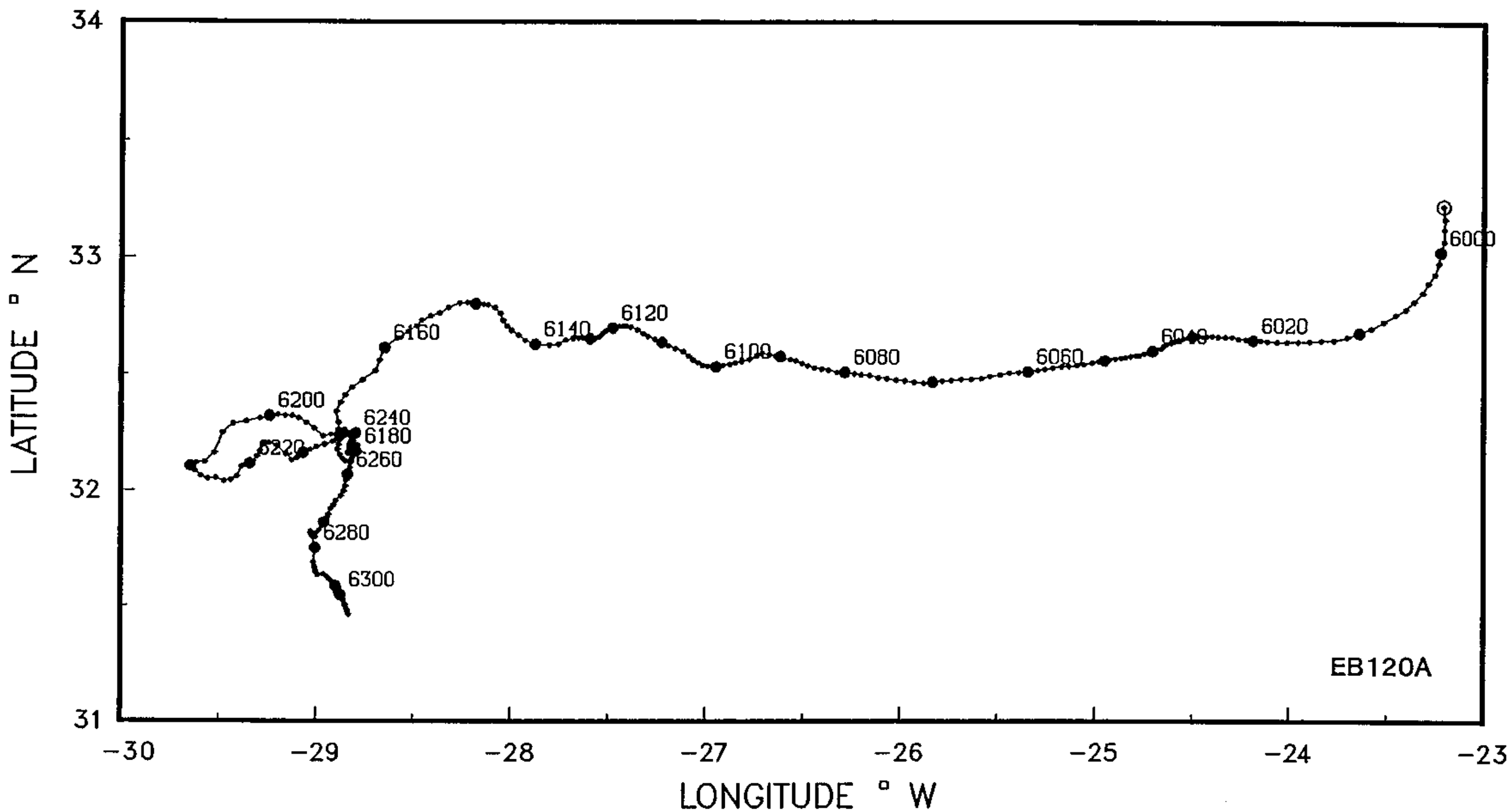

EASTERN BASIN 119
EAST [●] cm/s
NORTH [○] cm/s
10
0
−10
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
7-MAY-86 15:52:49
PLOT 2 OF 2
.SPL

EASTERN BASIN 119

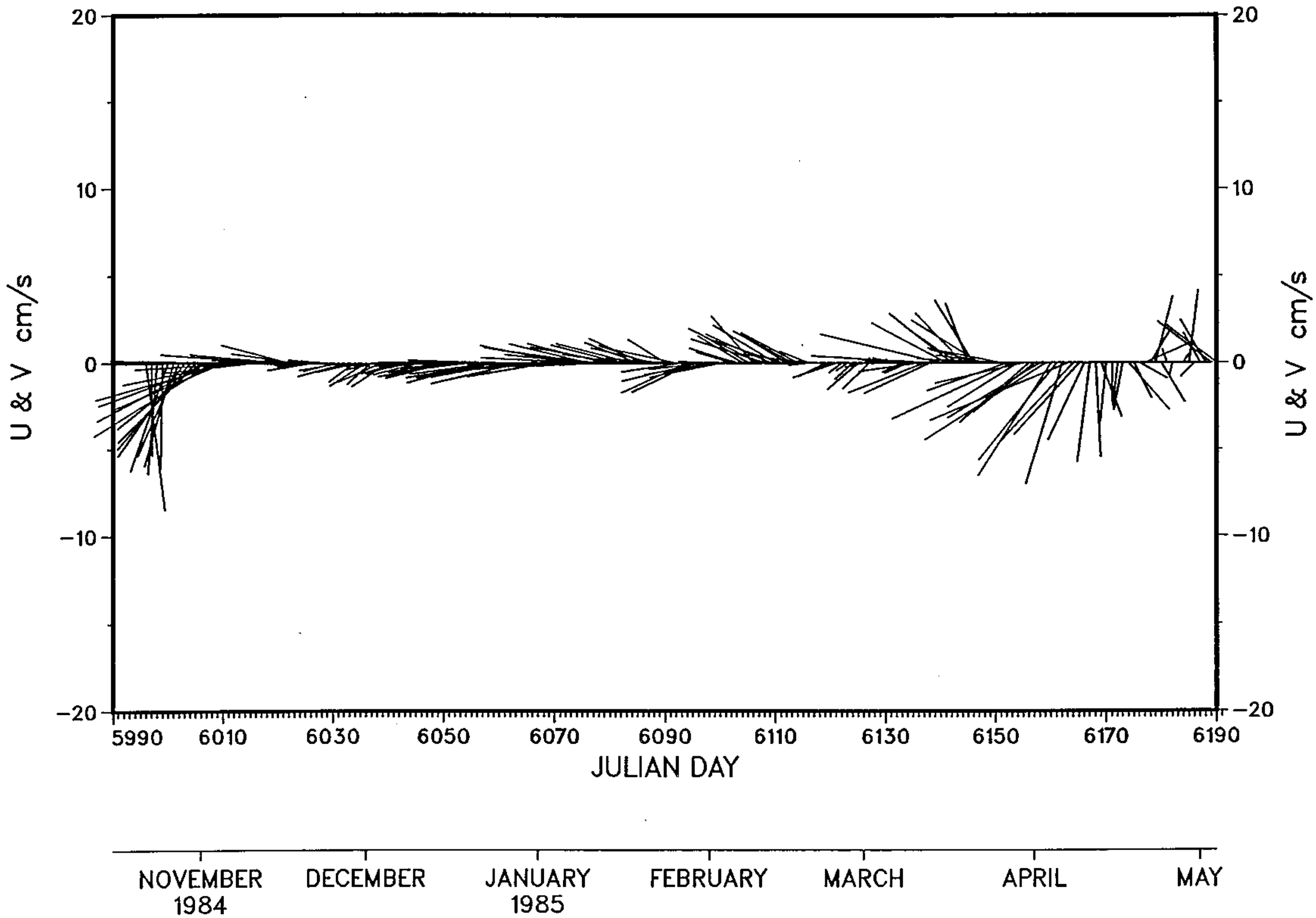



EASTERN BASIN 119
TEMPERATURE [+] °C
9
8
7
PRESSURE [Δ] db
1090
1110
1130
1150
1170
1190
1210
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
8-MAY-86 16:22:33
PLOT 2 OF 2
.SPL

EASTERN BASIN 120A



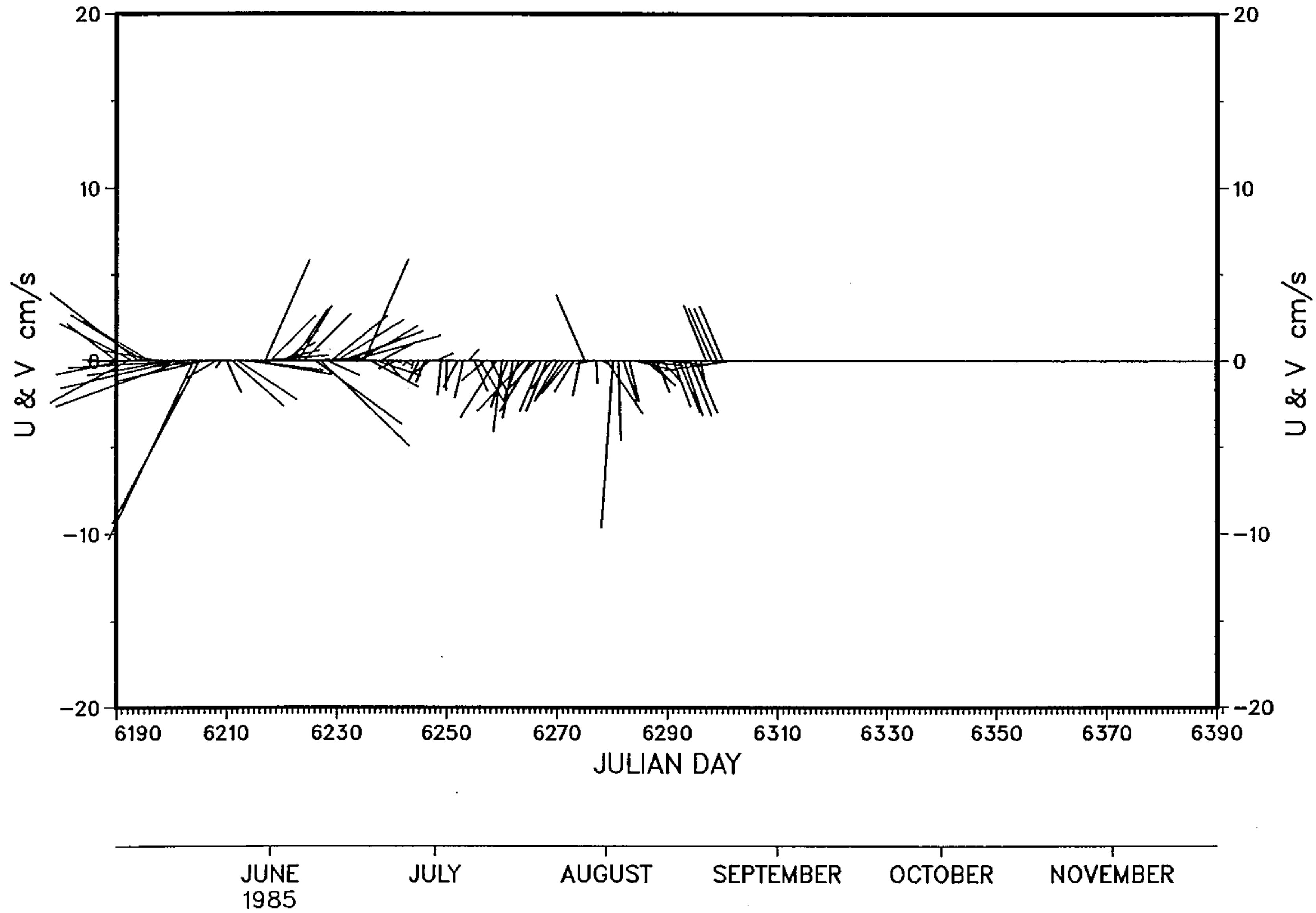
EASTERN BASIN 120A



7-MAY-86 16:03:16

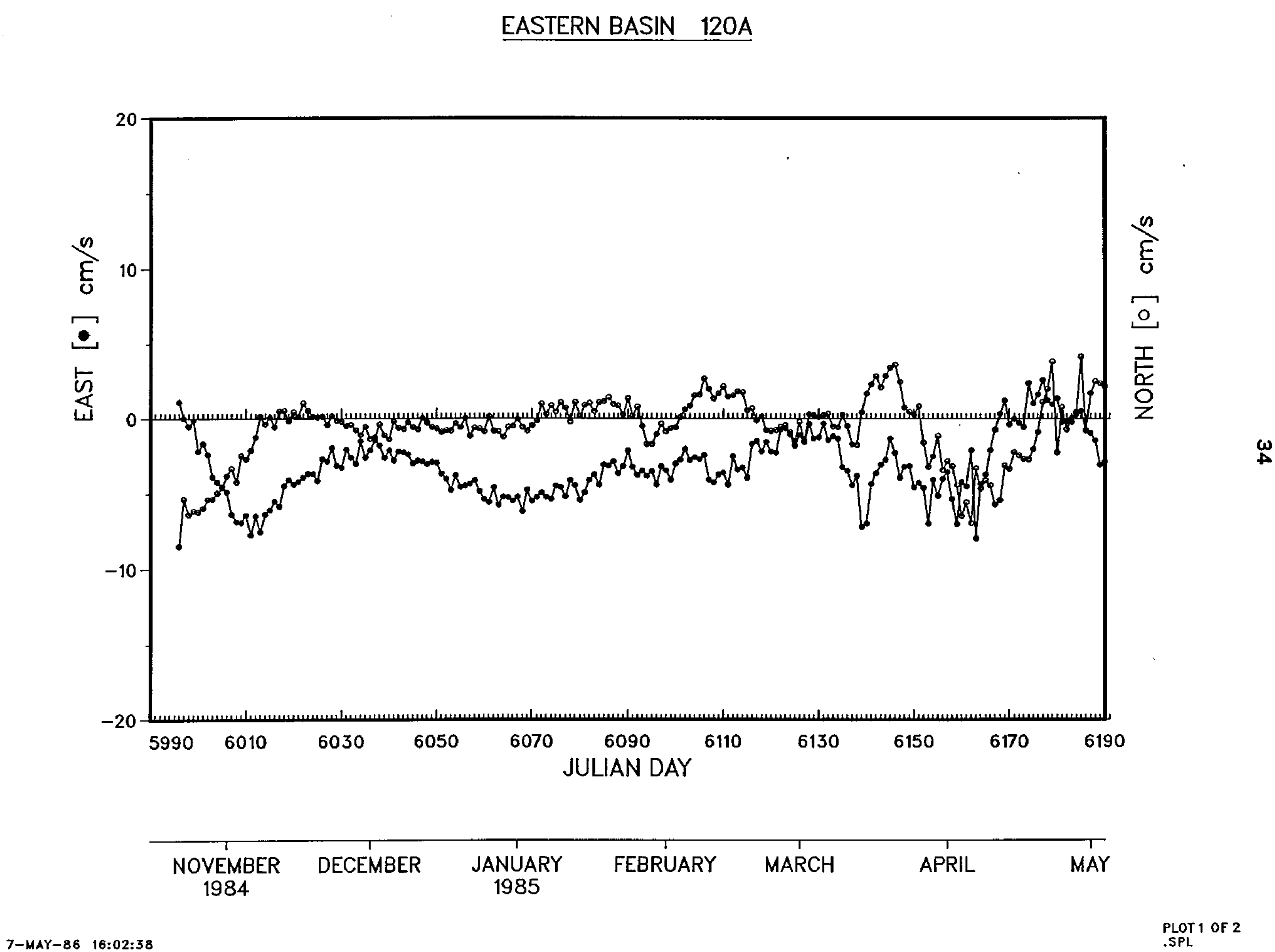
PLOT 1 OF 2
.SPL

EASTERN BASIN 120A

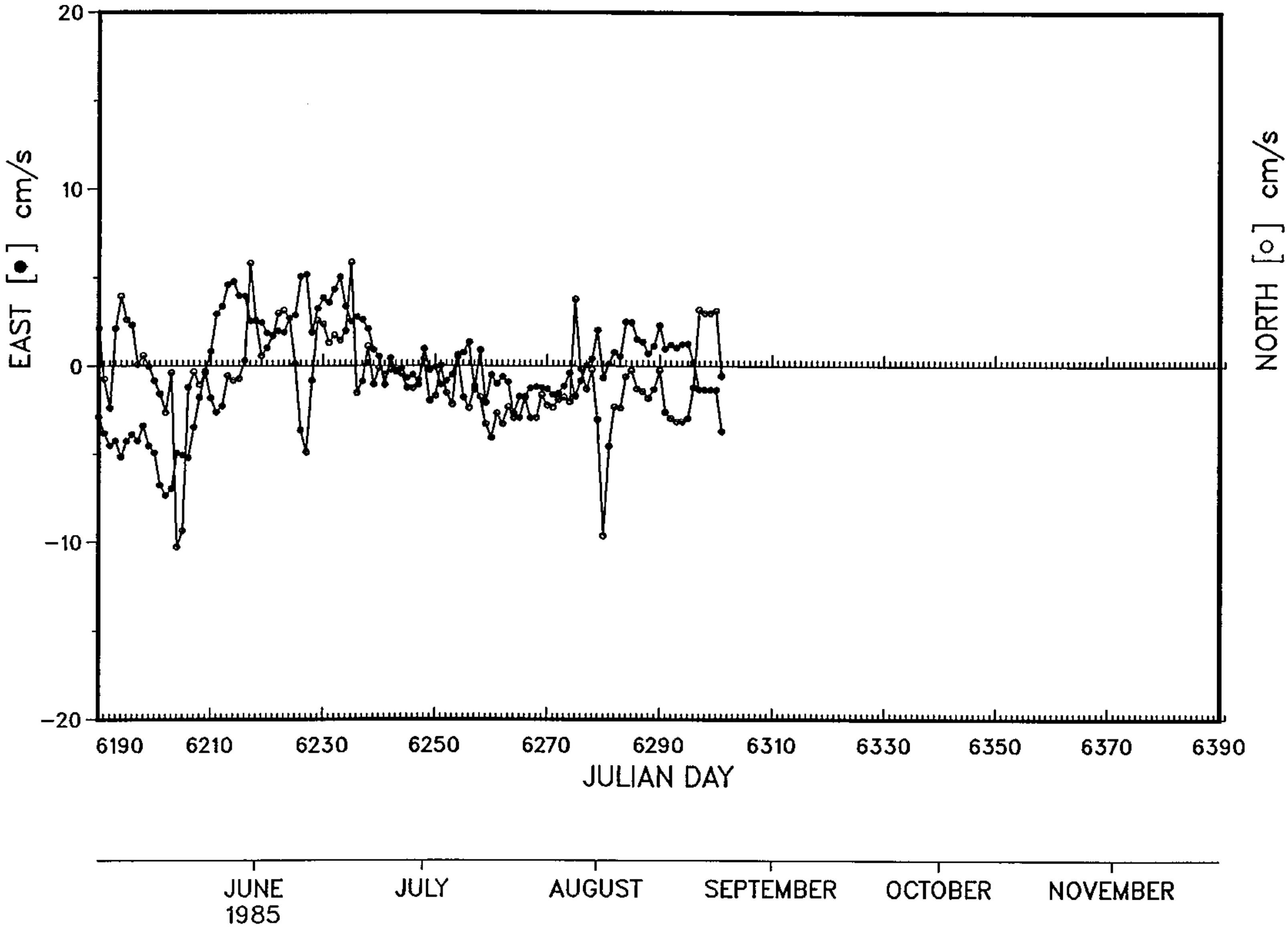


7−MAY−86 16:03:39

PLOT 2 OF 2
.SPL

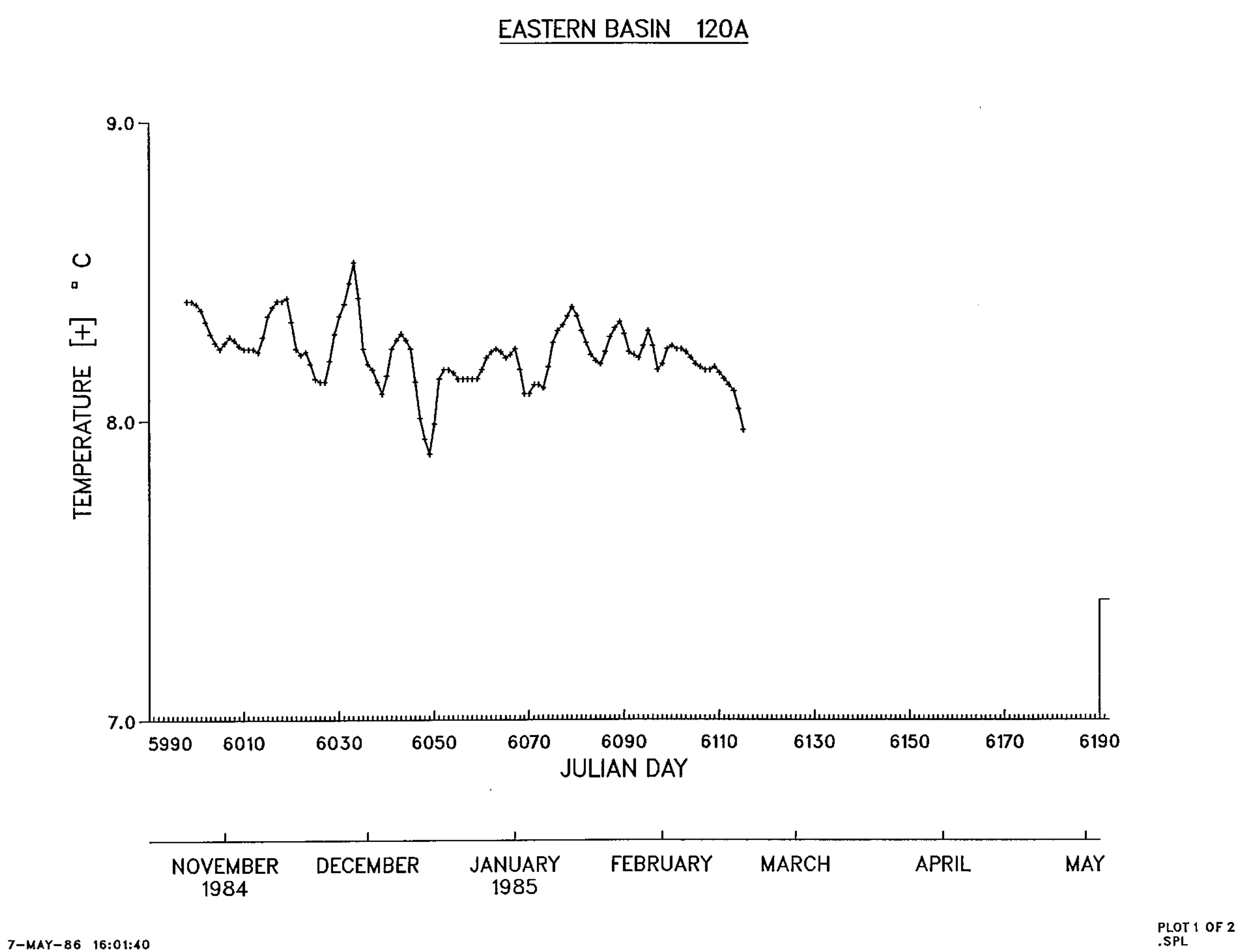

EASTERN BASIN 120A
EAST [●] cm/s
NORTH [○] cm/s
20
10
0
−10
−20
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
7-MAY-86 16:02:38
PLOT 1 OF 2
.SPL

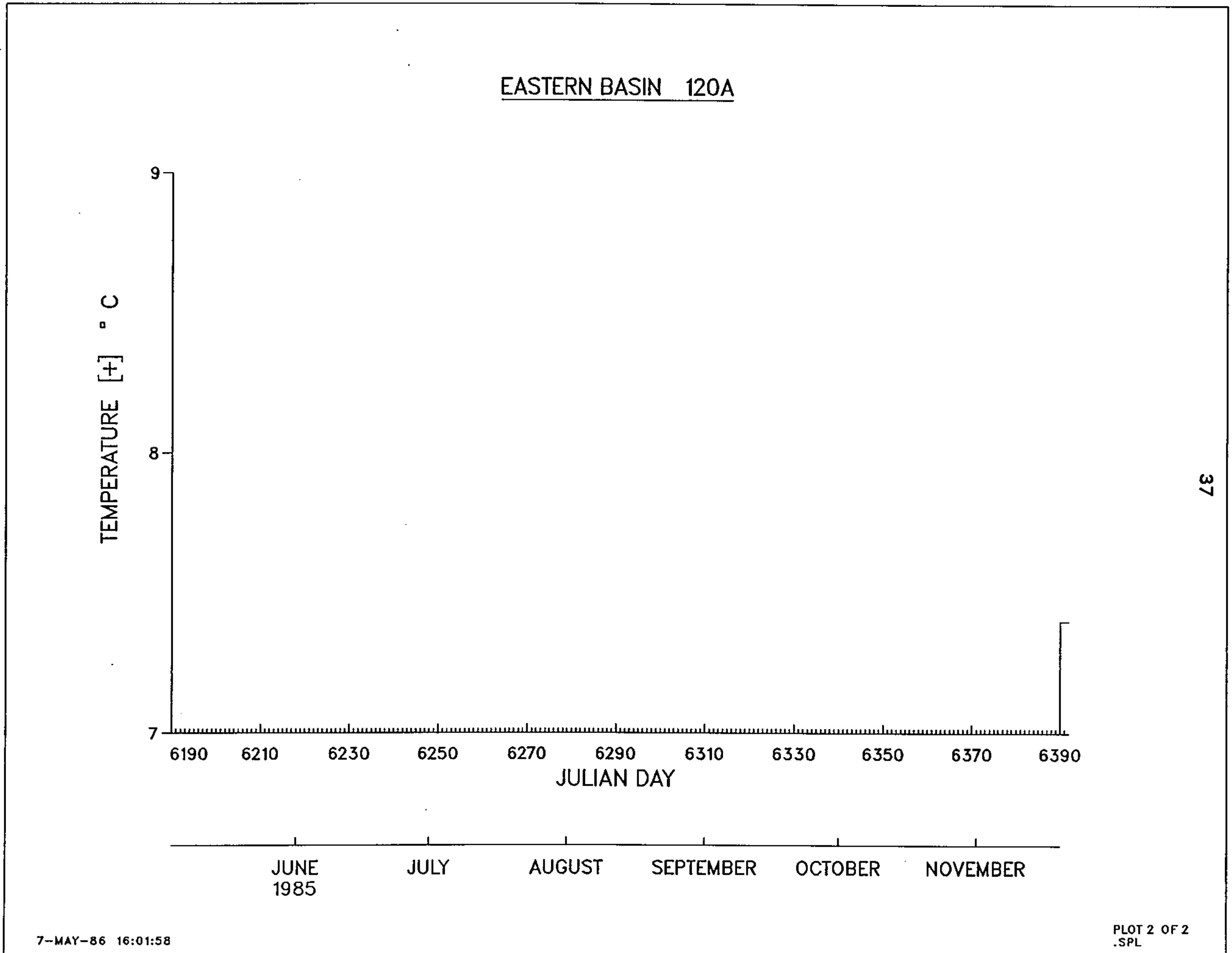
EASTERN BASIN 120A



7-MAY-86 16:03:01

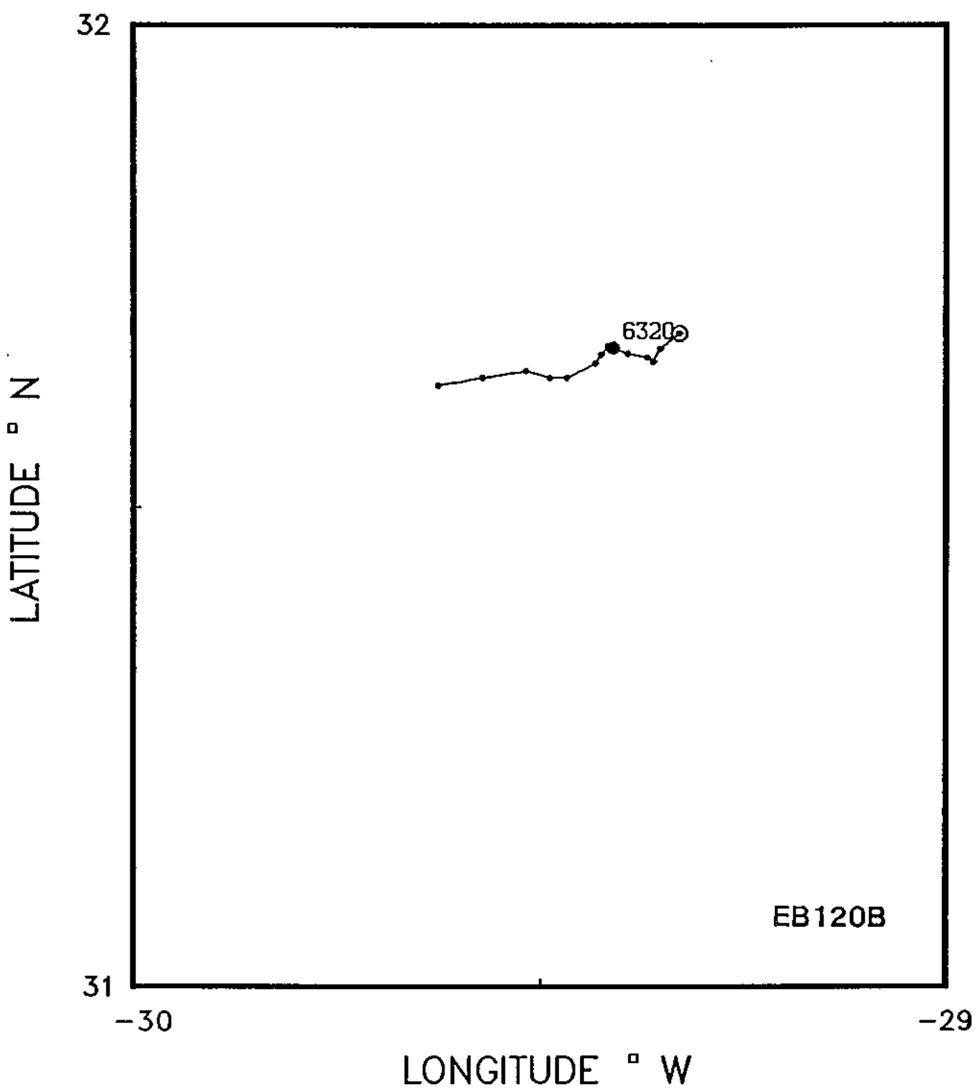
PLOT 2 OF 2
.SPL


EASTERN BASIN 120A
TEMPERATURE [+] ° C
9.0
8.0
7.0
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
7-MAY-86 16:01:40
PLOT 1 OF 2 .SPL



EASTERN BASIN 120A
TEMPERATURE [+] ° C
9
8
7
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
7-MAY-86 16:01:58
PLOT 2 OF 2
.SPL

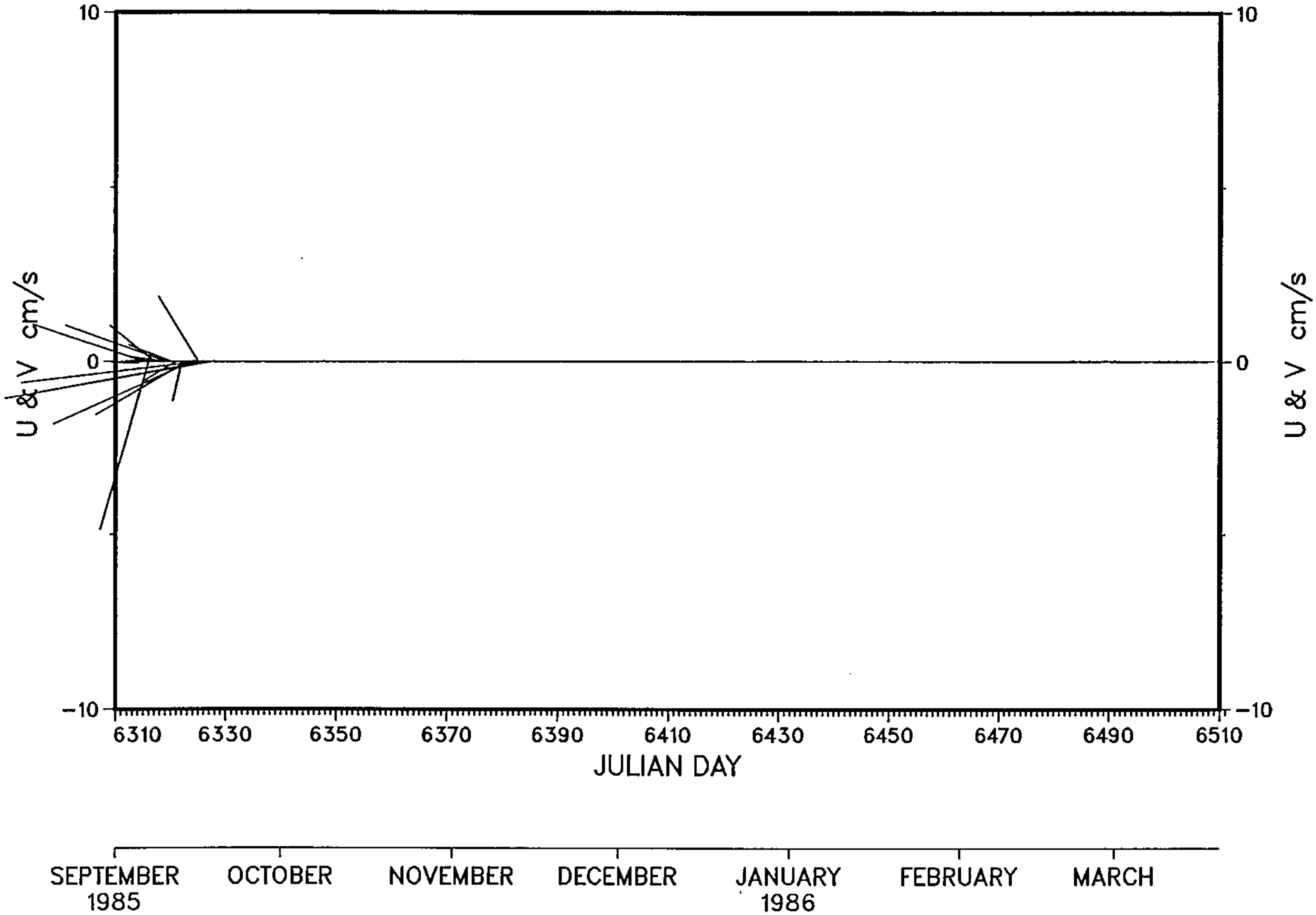
<u>EASTERN BASIN   120B</u>



18-JUN-86 10:21:30

PLOT 1 OF 1
.FIN

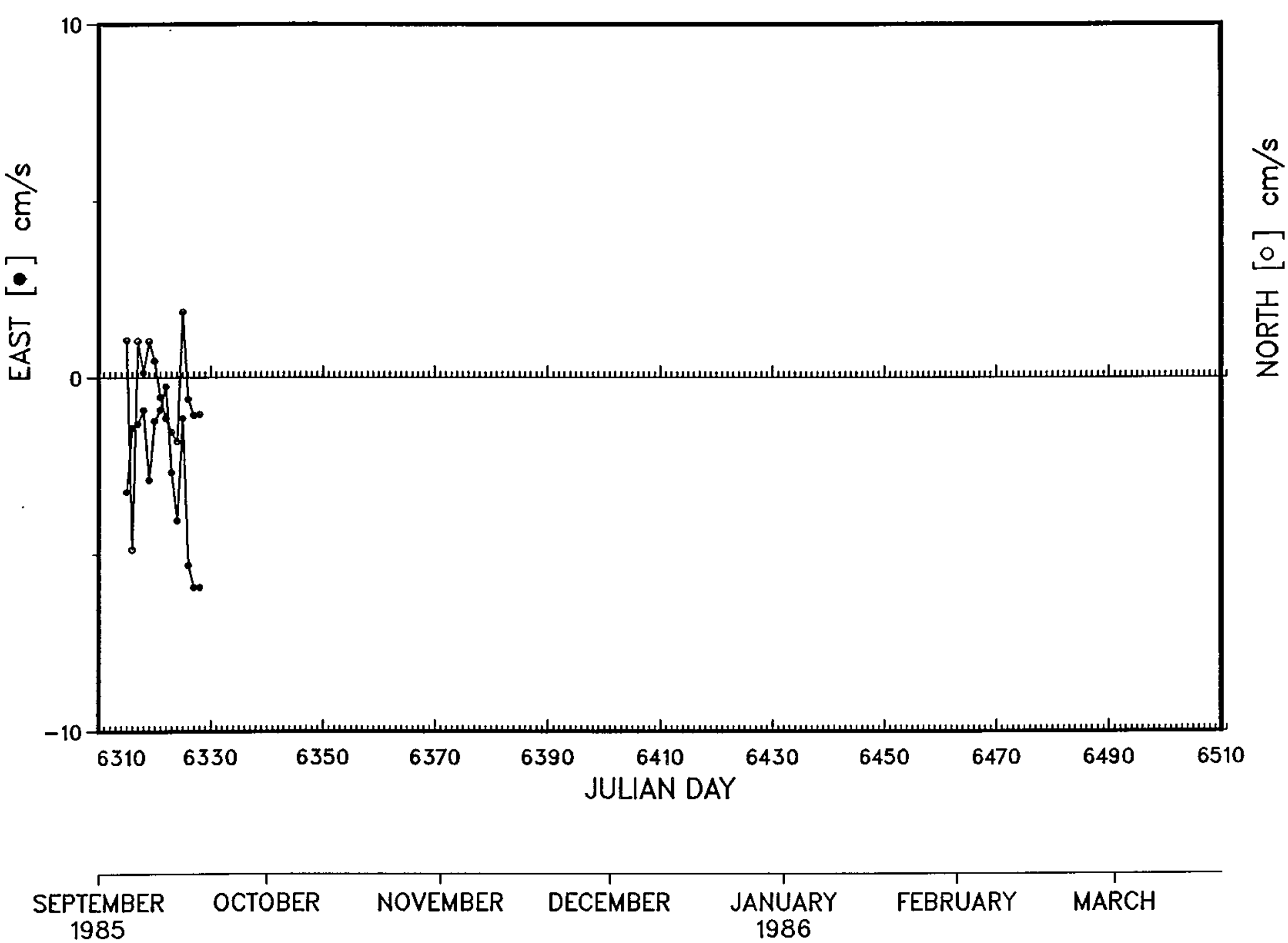
EASTERN BASIN 120B



8-MAY-86 01:01:56

PLOT 1 OF 1
.SPL

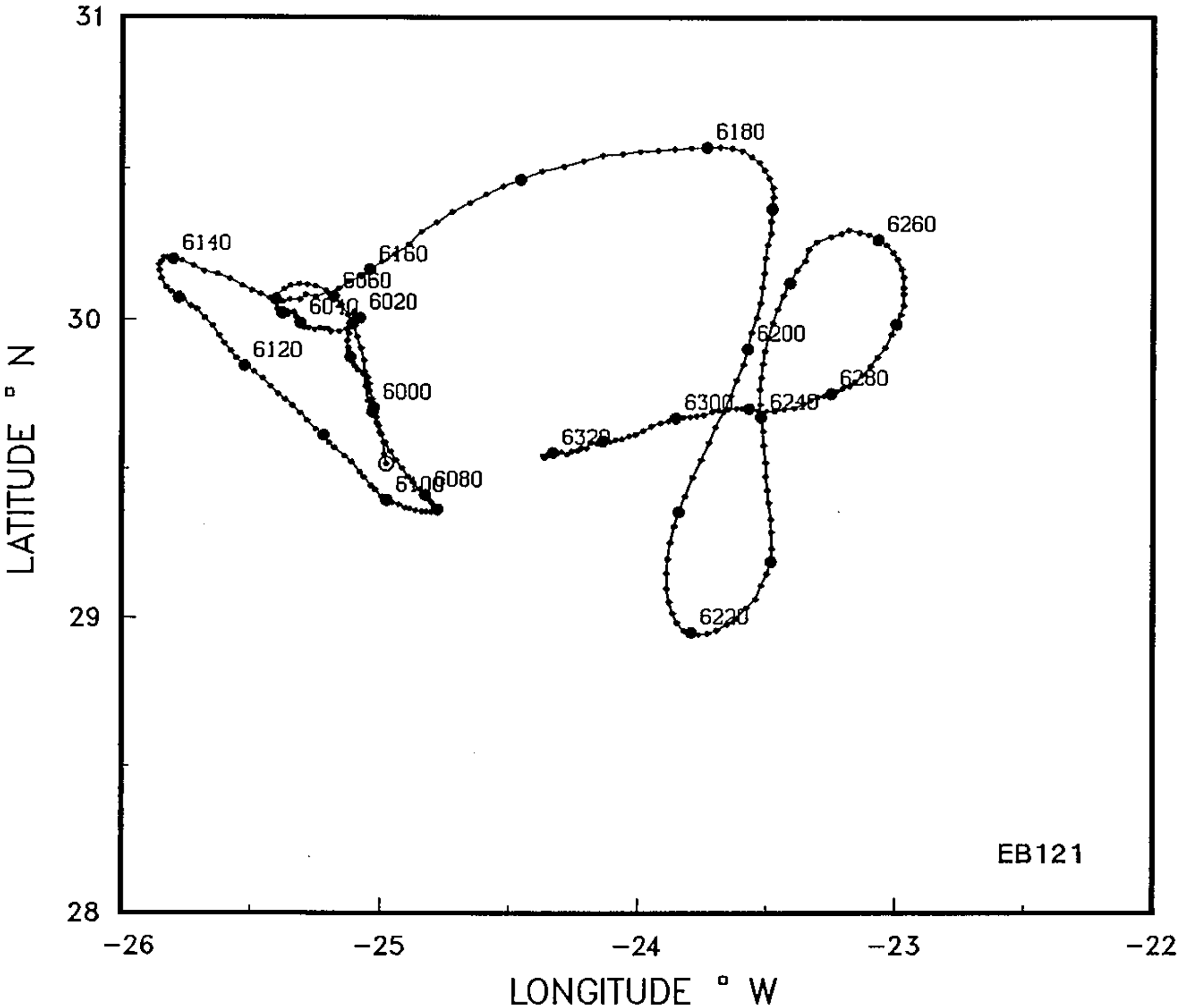
EASTERN BASIN 120B



8-MAY-86 01:01:49

PLOT 1 OF 1
.SPL

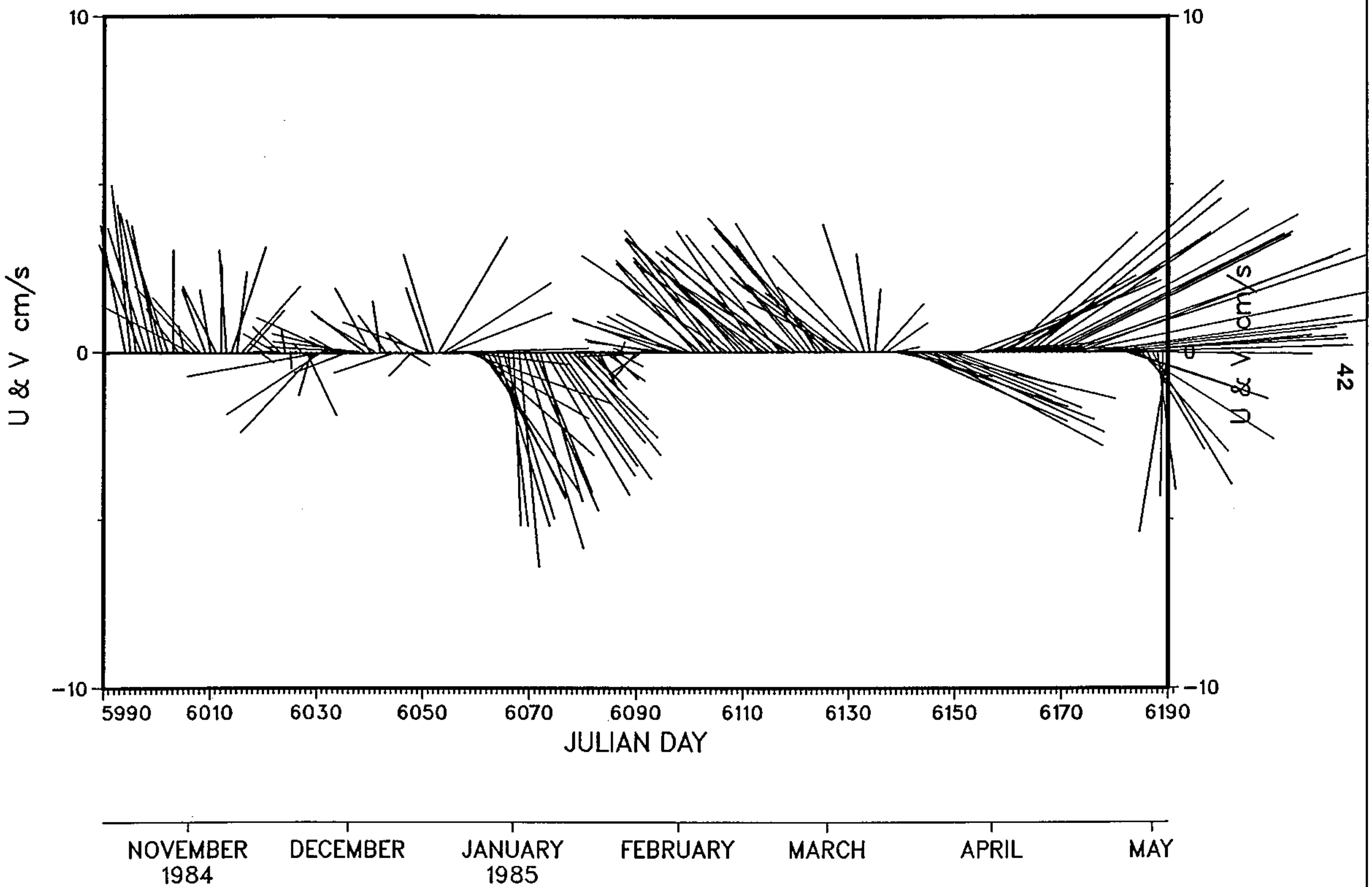
EASTERN BASIN 121



18-JUN-86 10:23:11

PLOT 1 OF 1
.FIN

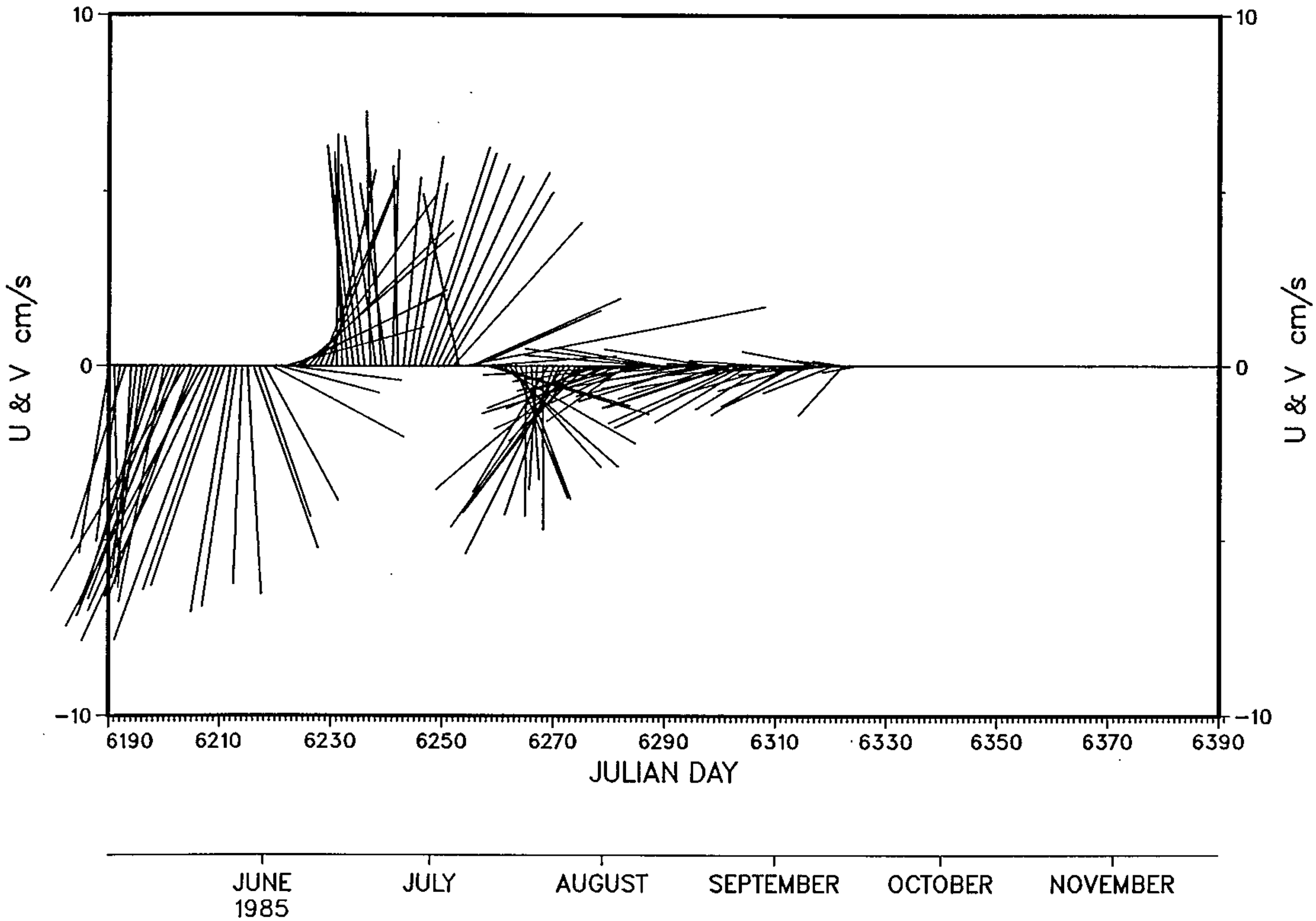
EASTERN BASIN 121



8-MAY-86 08:39:56

PLOT 1 OF 2
.SPL

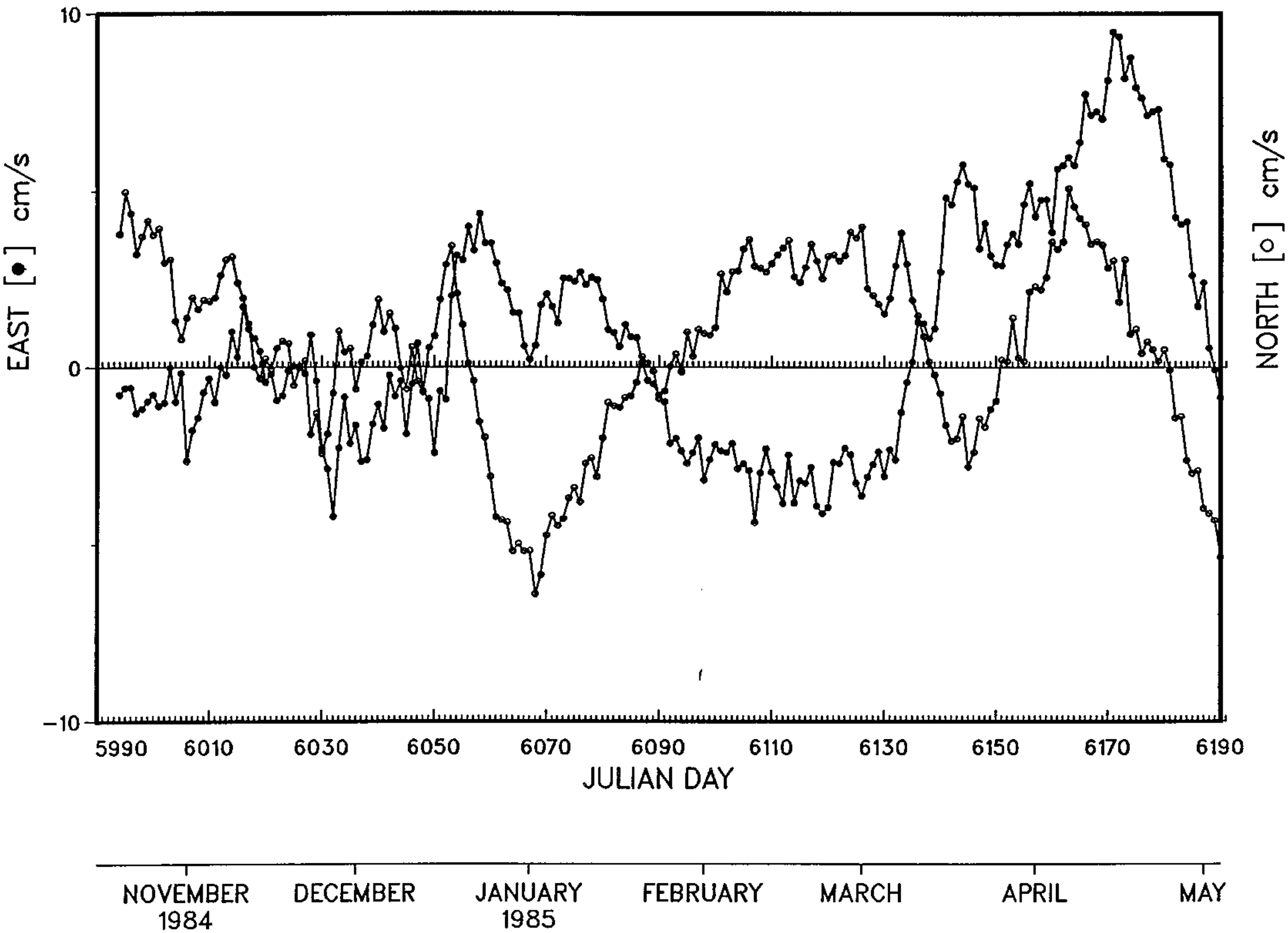
EASTERN BASIN 121



8−MAY−86 08:40:17

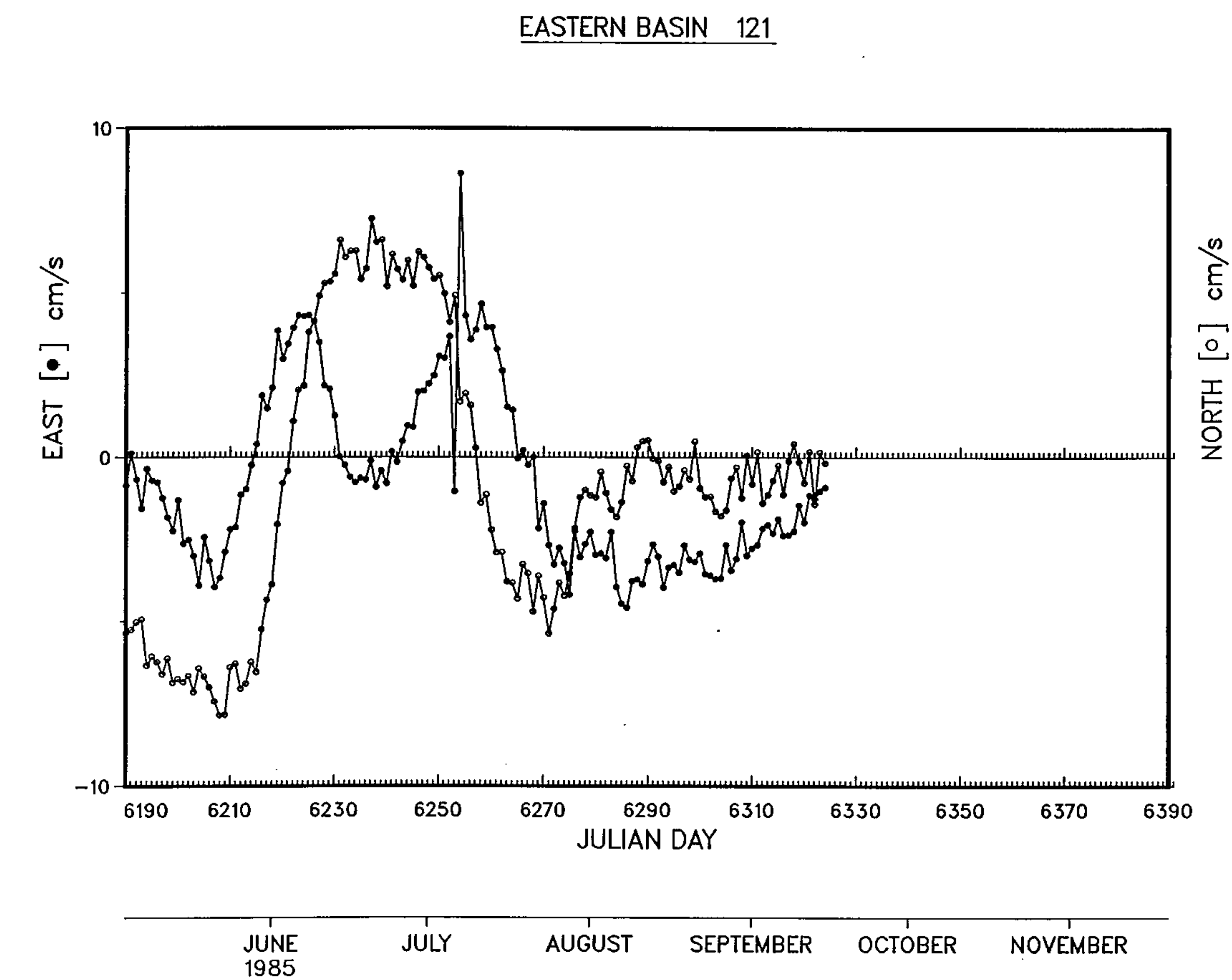
PLOT 2 OF 2
.SPL

EASTERN BASIN 121



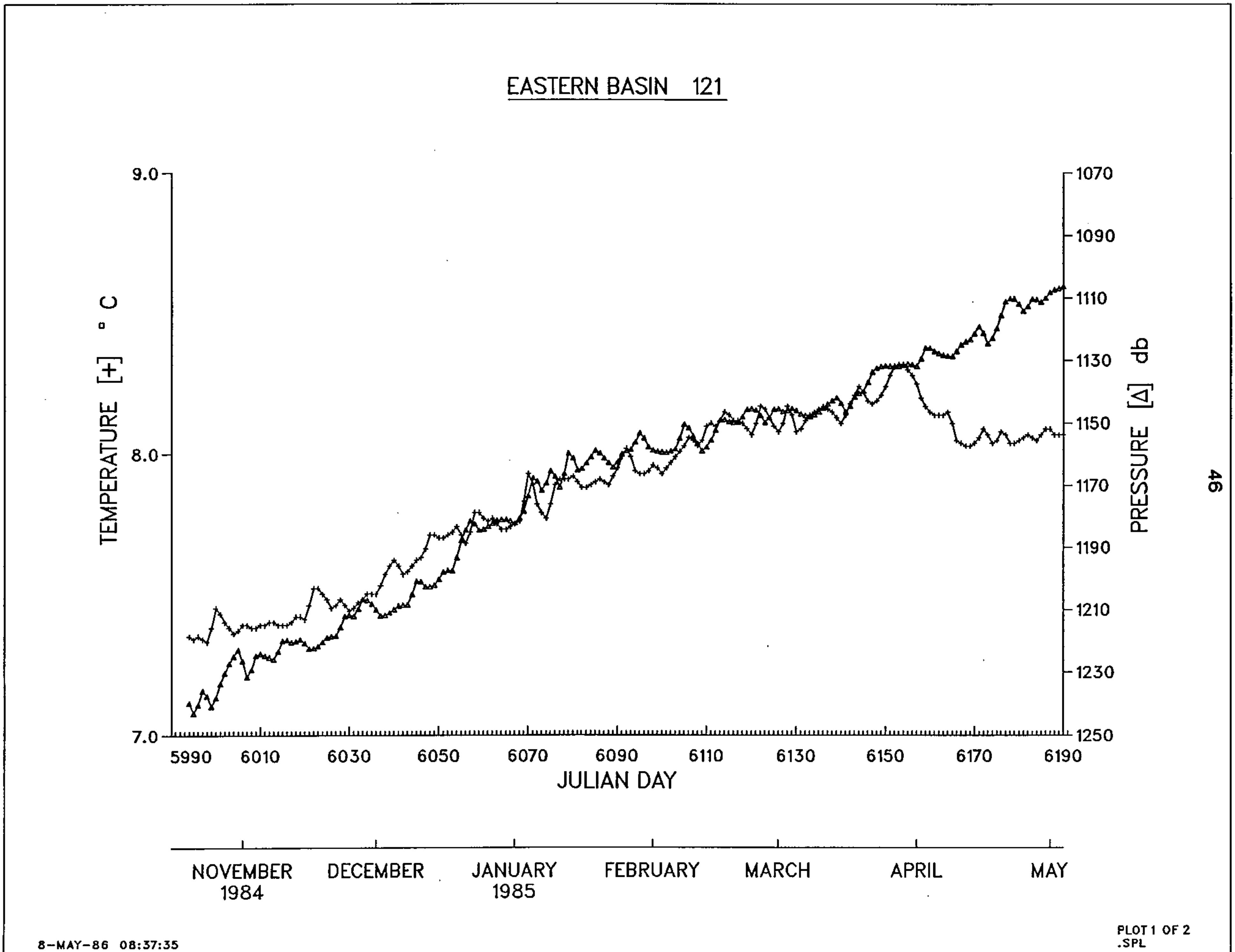
8-MAY-86 08:38:54

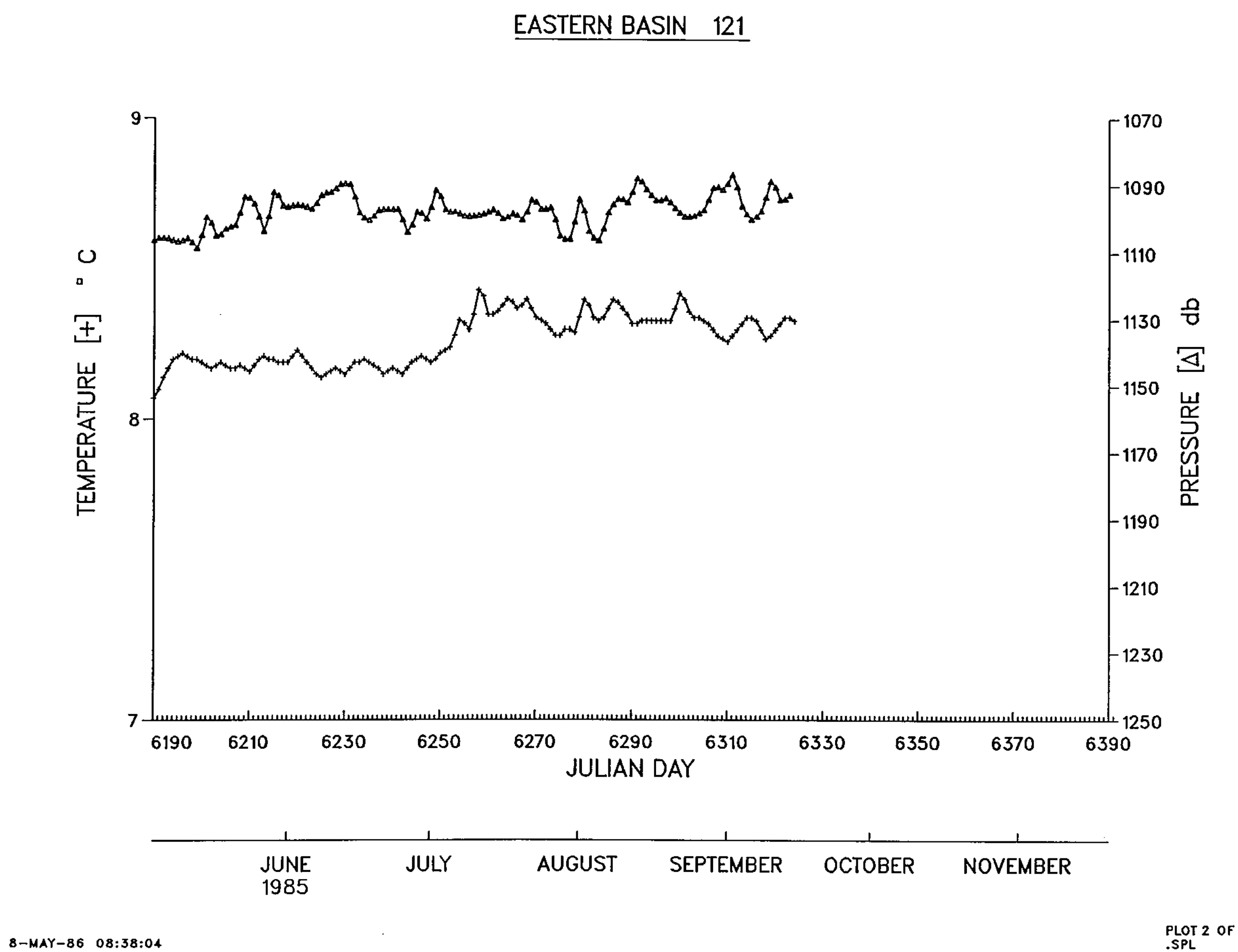
PLOT 1 OF 2
.SPL



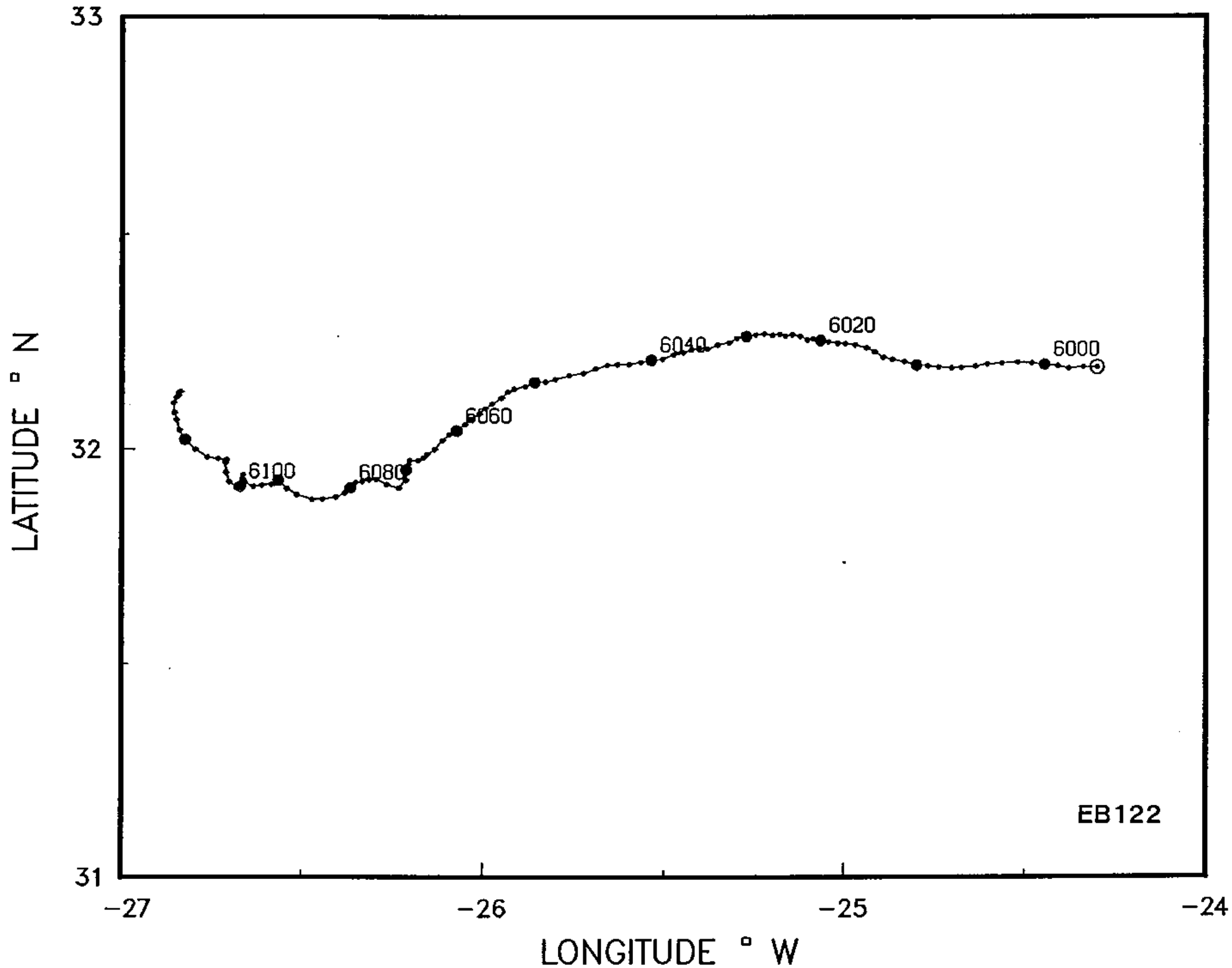
8-MAY-86 08:39:37

PLOT 2 OF 2
.SPL


EASTERN BASIN 121
TEMPERATURE [+] ° C
9.0
8.0
7.0
PRESSURE [Δ] db
1070
1090
1110
1130
1150
1170
1190
1210
1230
1250
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
8-MAY-86 08:37:35
PLOT 1 OF 2
.SPL

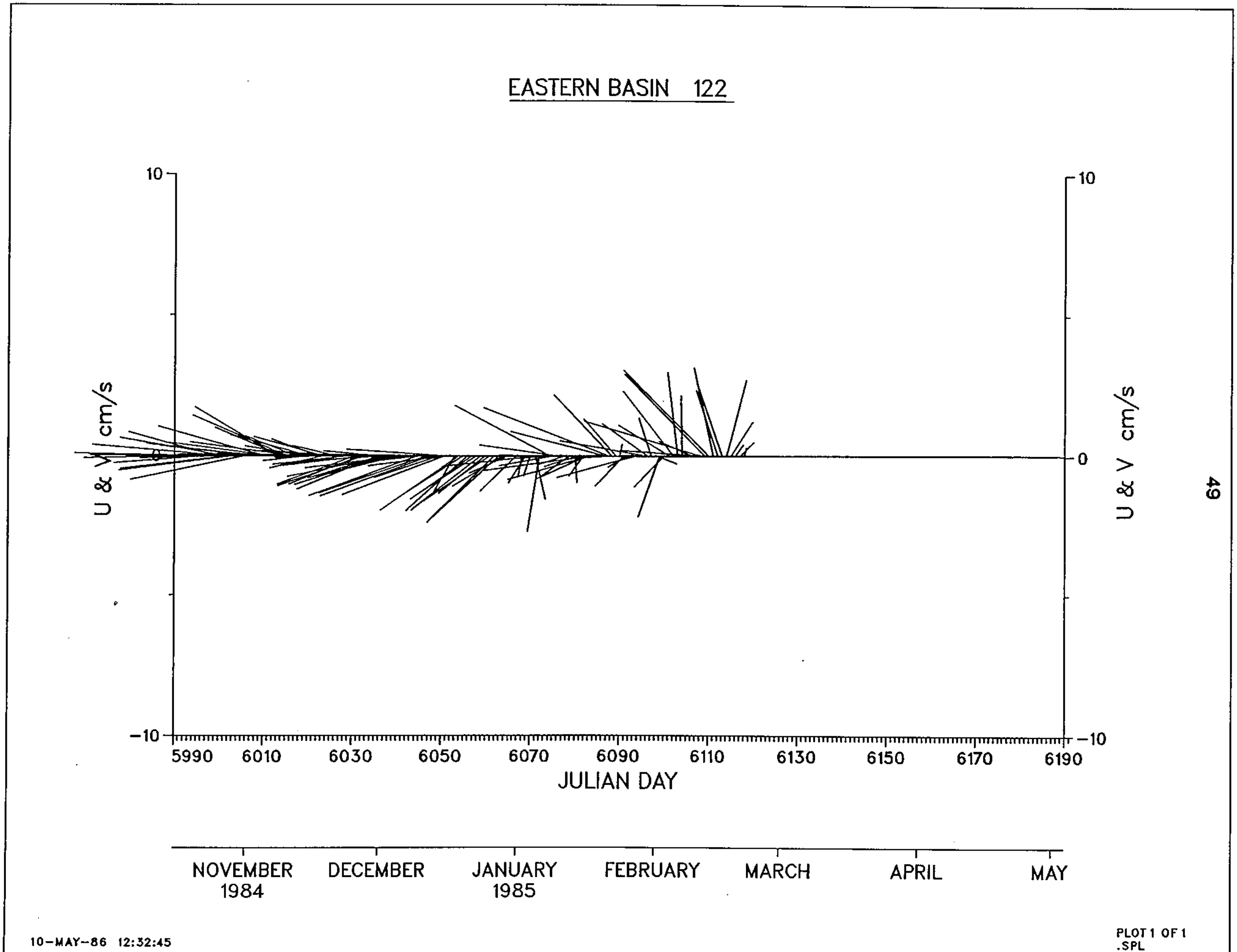

EASTERN BASIN 121
TEMPERATURE [+] °C
9
8
7
PRESSURE [Δ] db
1070
1090
1110
1130
1150
1170
1190
1210
1230
1250
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
8-MAY-86 08:38:04
PLOT 2 OF 2
.SPL

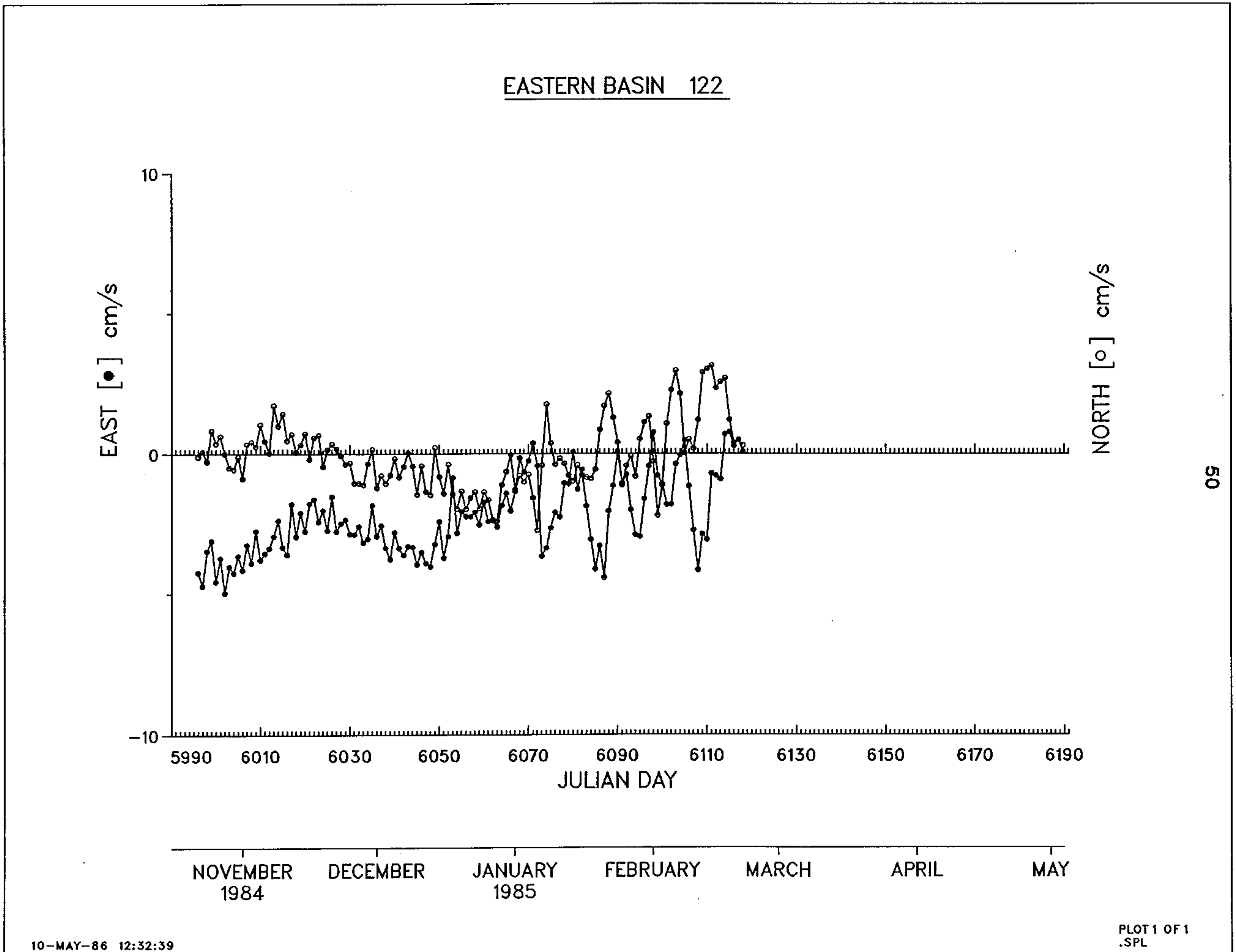
EASTERN BASIN 122

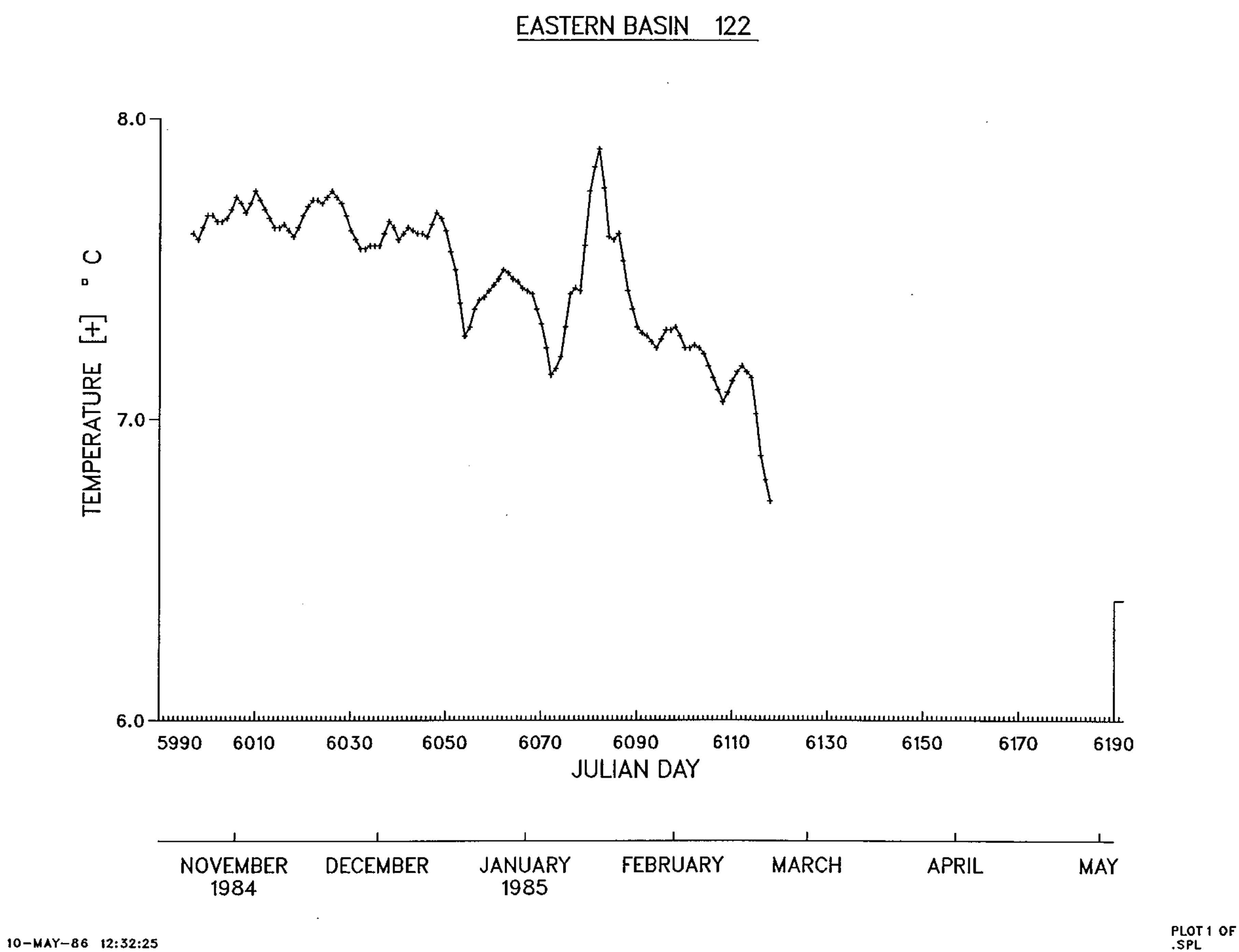


18-JUN-86 10:23:53

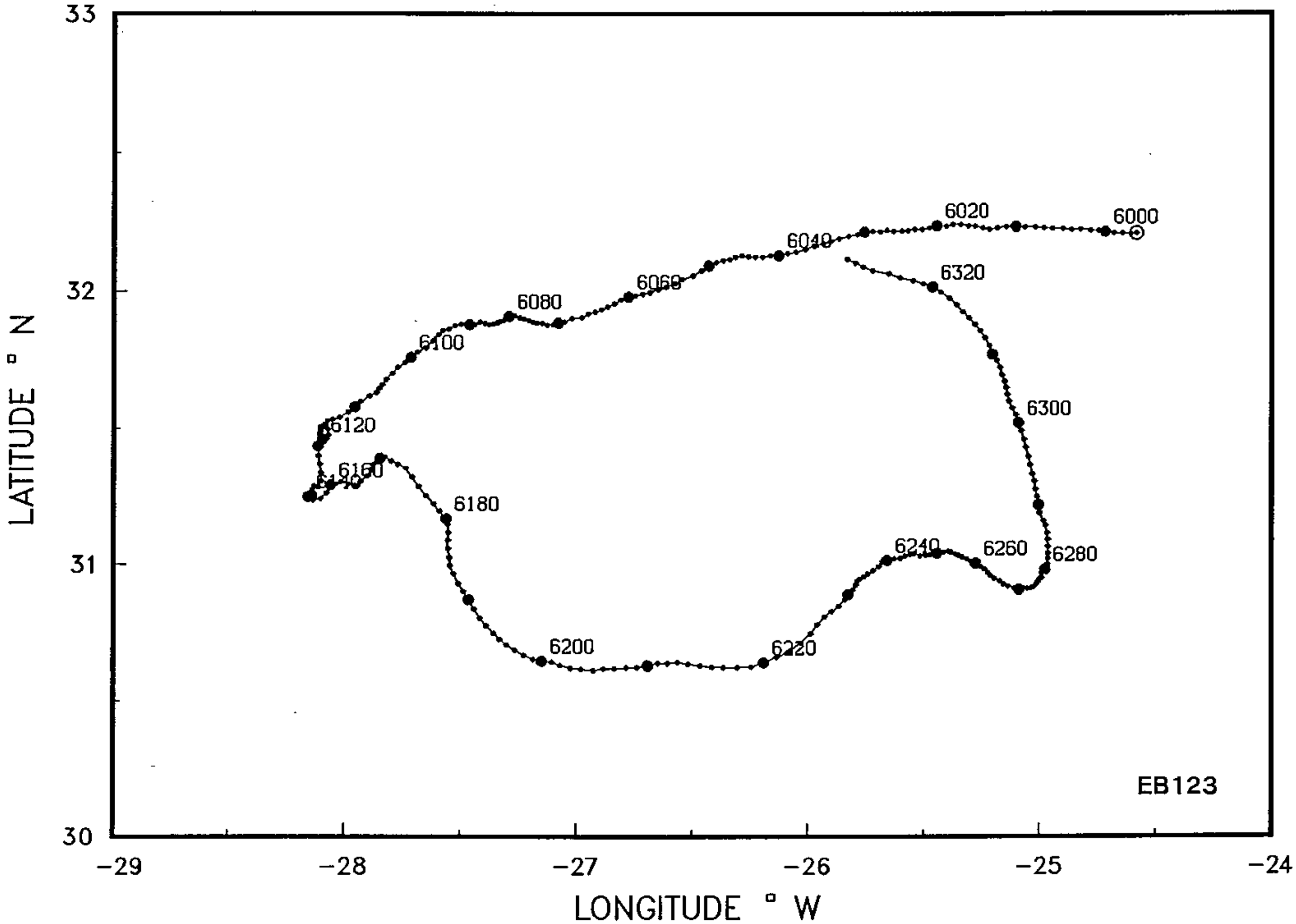
PLOT 1 OF 1
.FIN


EASTERN BASIN 122
U & V cm/s
10
0
−10
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:32:45
PLOT 1 OF 1
.SPL


EASTERN BASIN 122
10
0
-10
EAST [●] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:32:39
PLOT 1 OF 1
.SPL


EASTERN BASIN 122
TEMPERATURE [+] ° C
8.0
7.0
6.0
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:32:25
PLOT 1 OF 1 .SPL

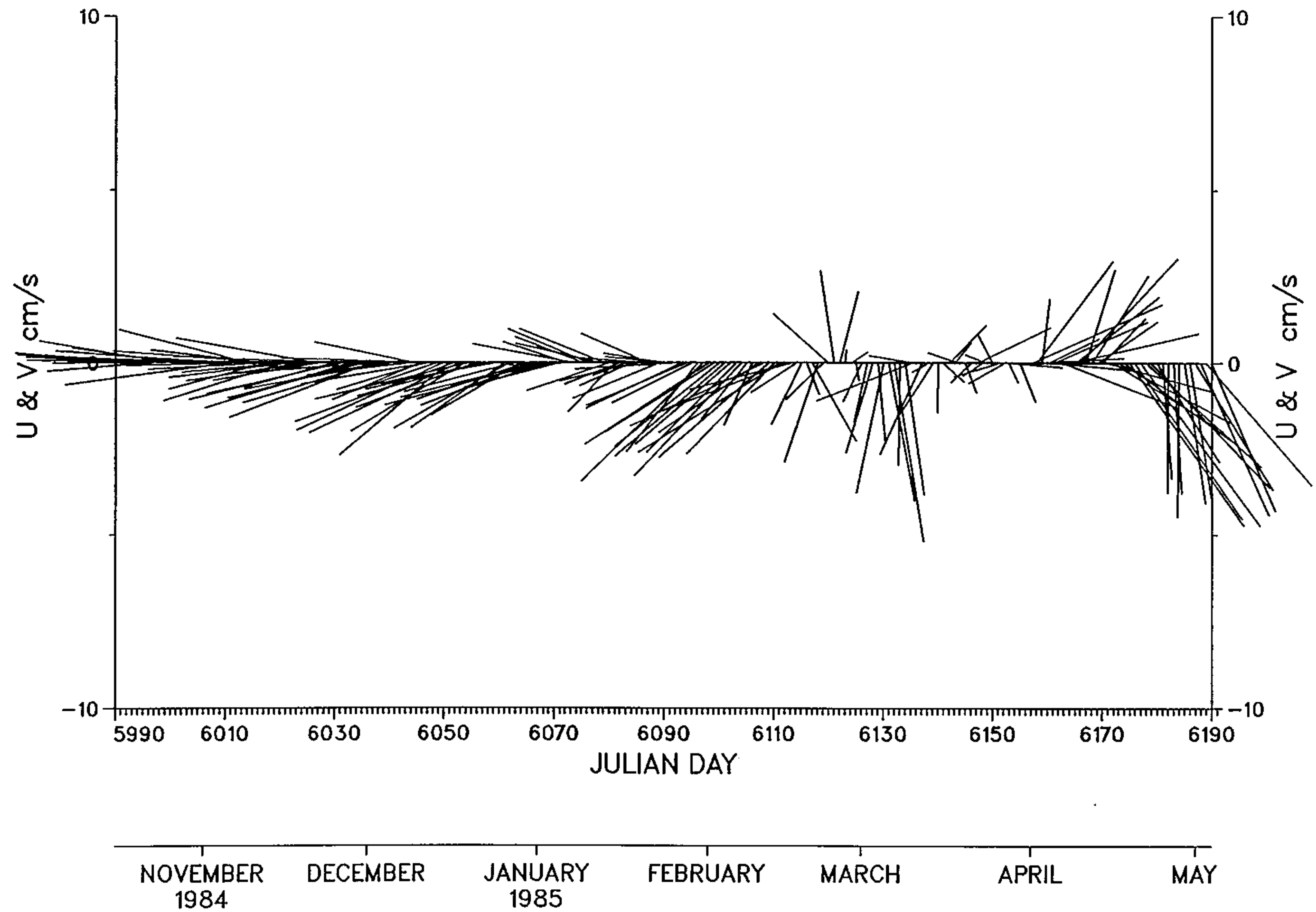
EASTERN BASIN 123



18-JUN-86 10:24:50

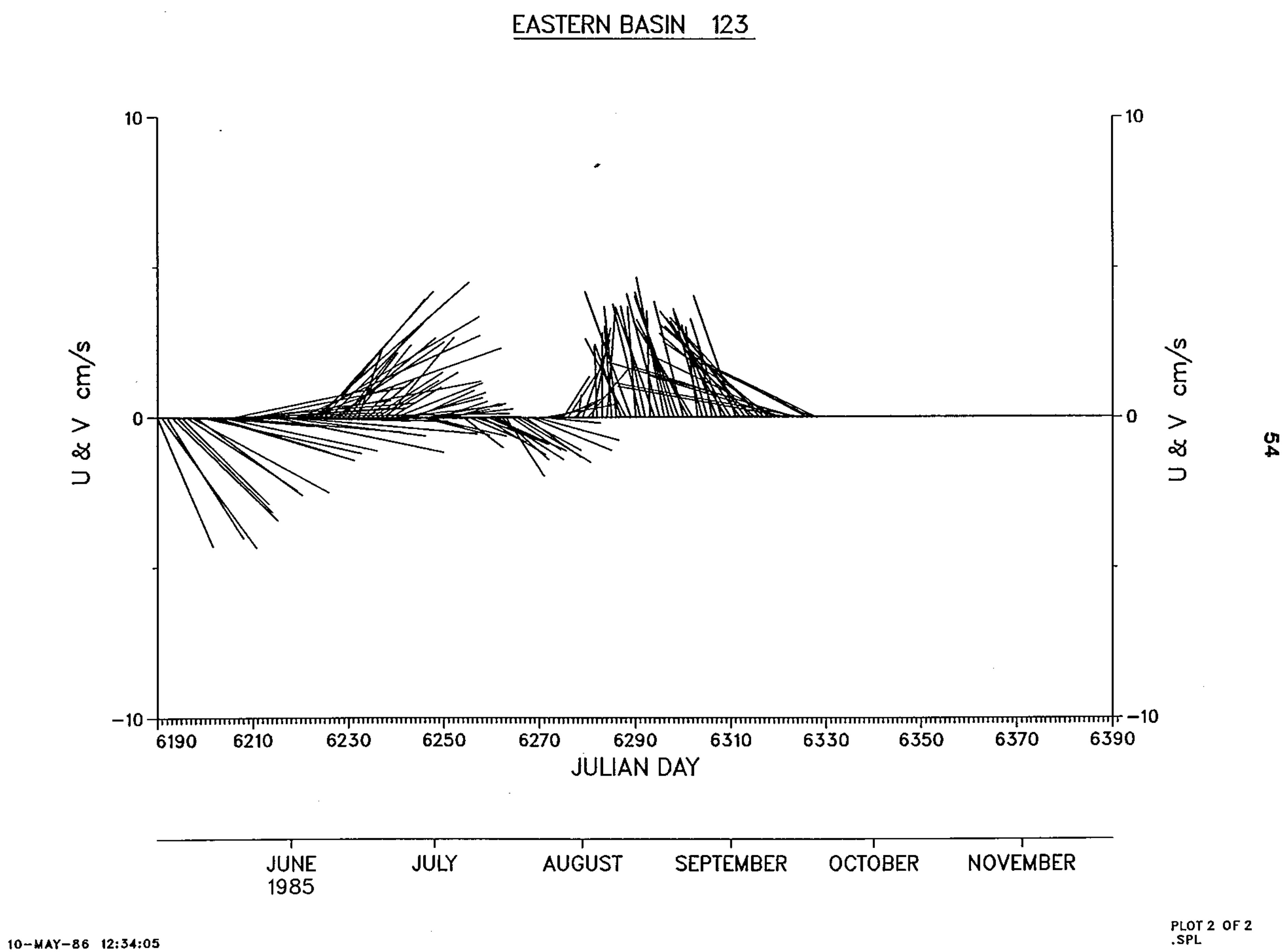
PLOT 1 OF 1
.FIN

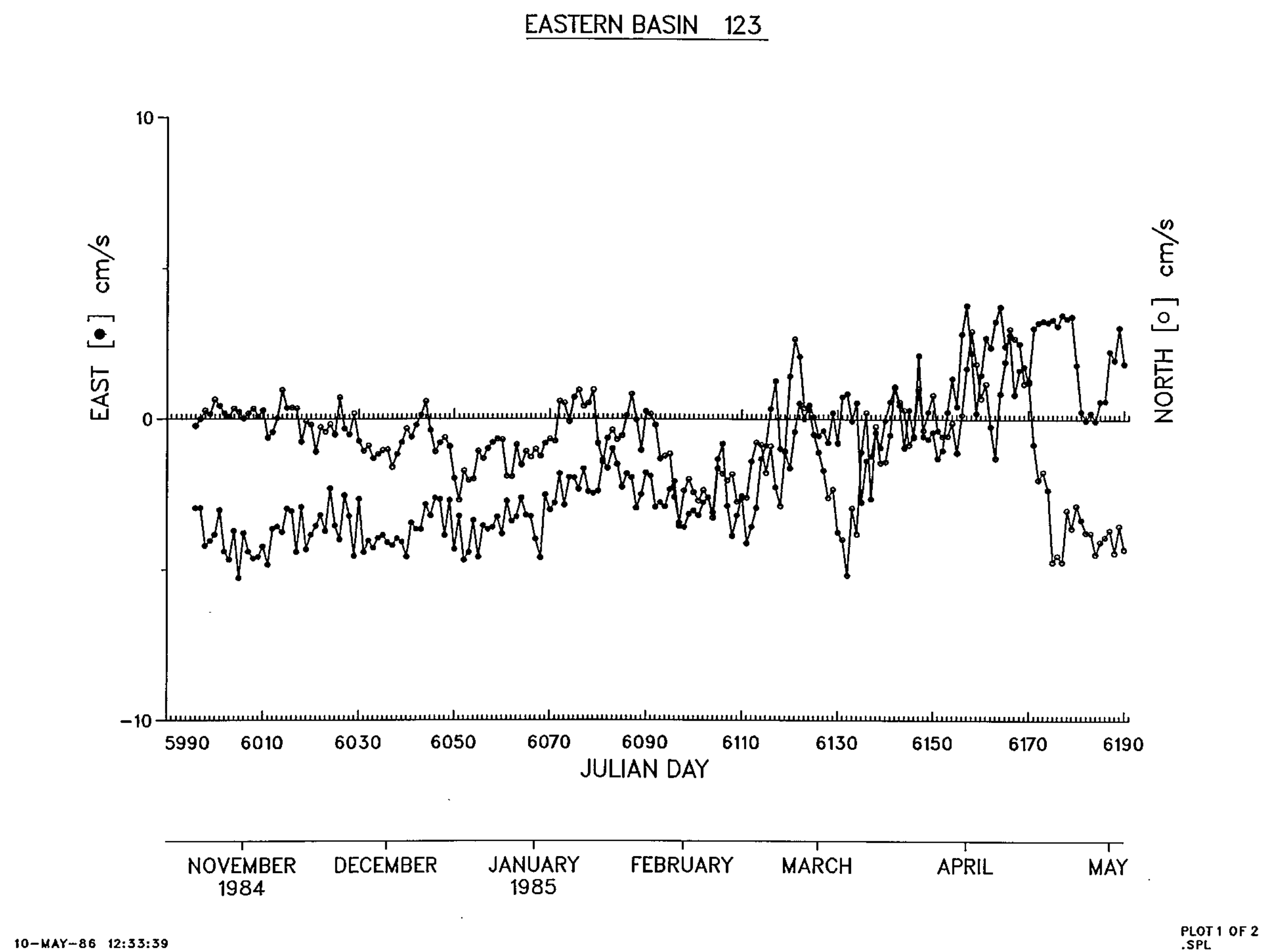
EASTERN BASIN 123



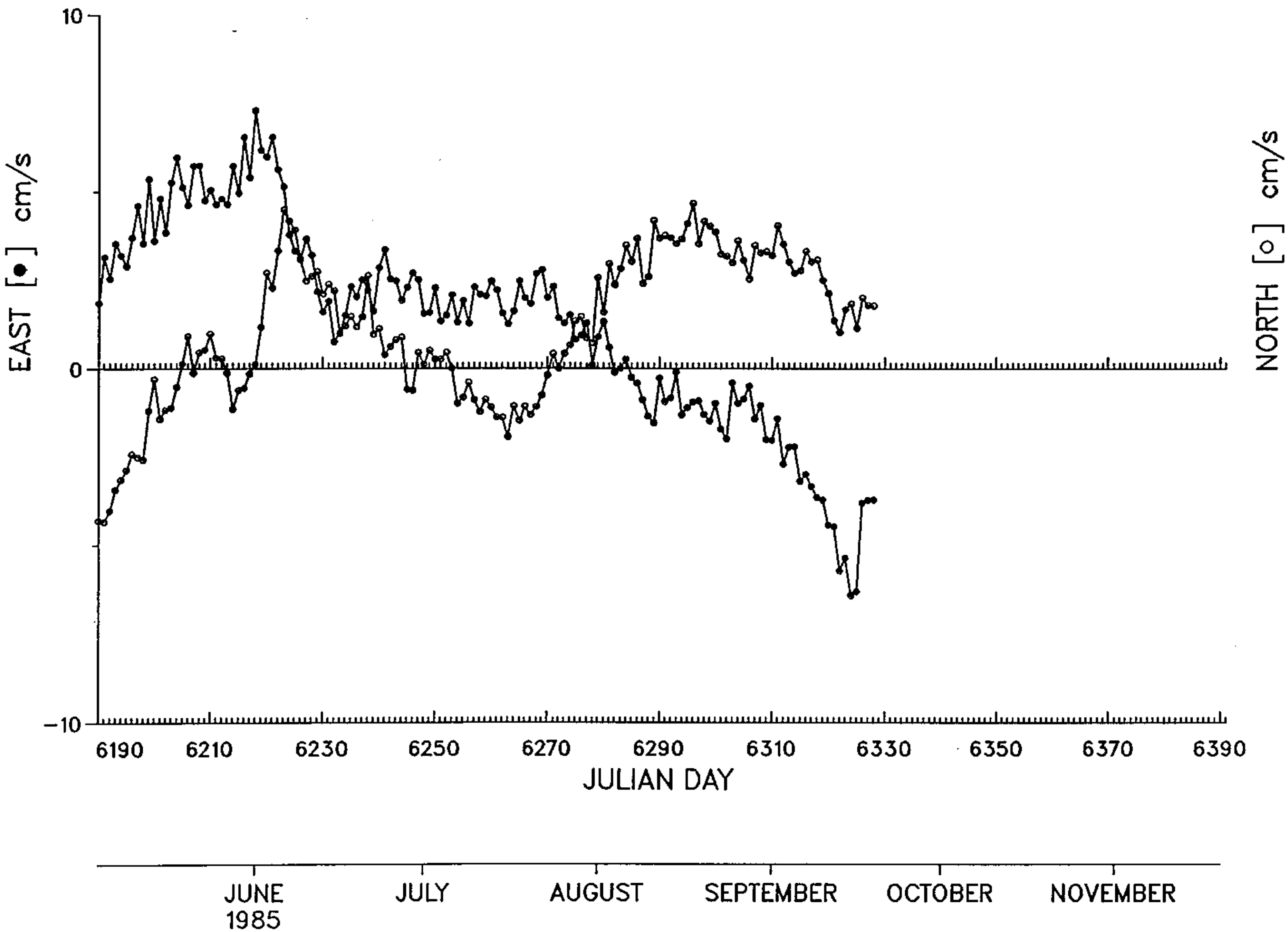
10-MAY-86 12:33:59

PLOT 1 OF 2
.SPL


EASTERN BASIN 123
10
0
-10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:34:05
PLOT 2 OF 2
.SPL


EASTERN BASIN 123
10
0
−10
EAST [●] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:33:39
PLOT 1 OF 2
.SPL

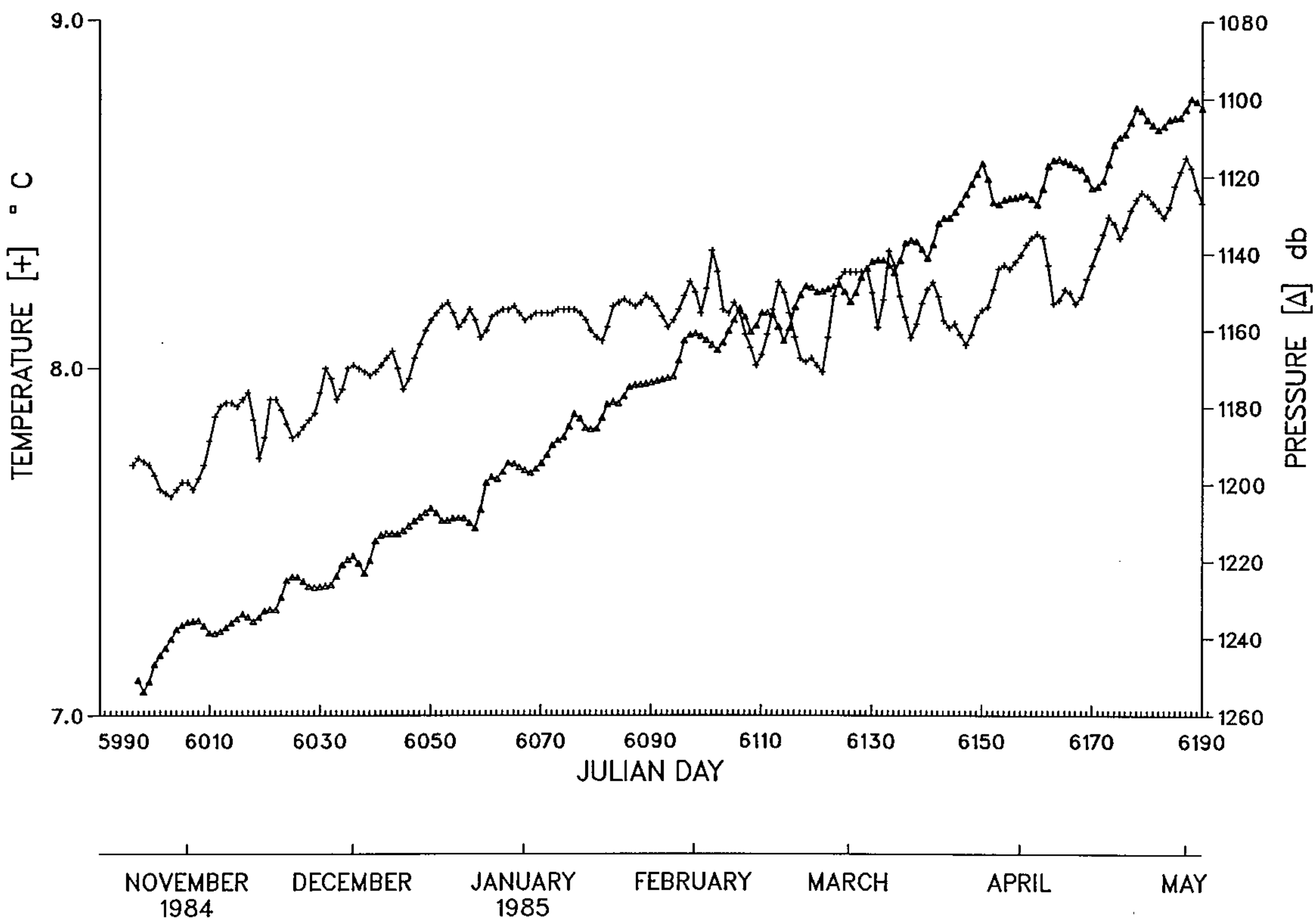
EASTERN BASIN 123



10-MAY-86 12:33:52

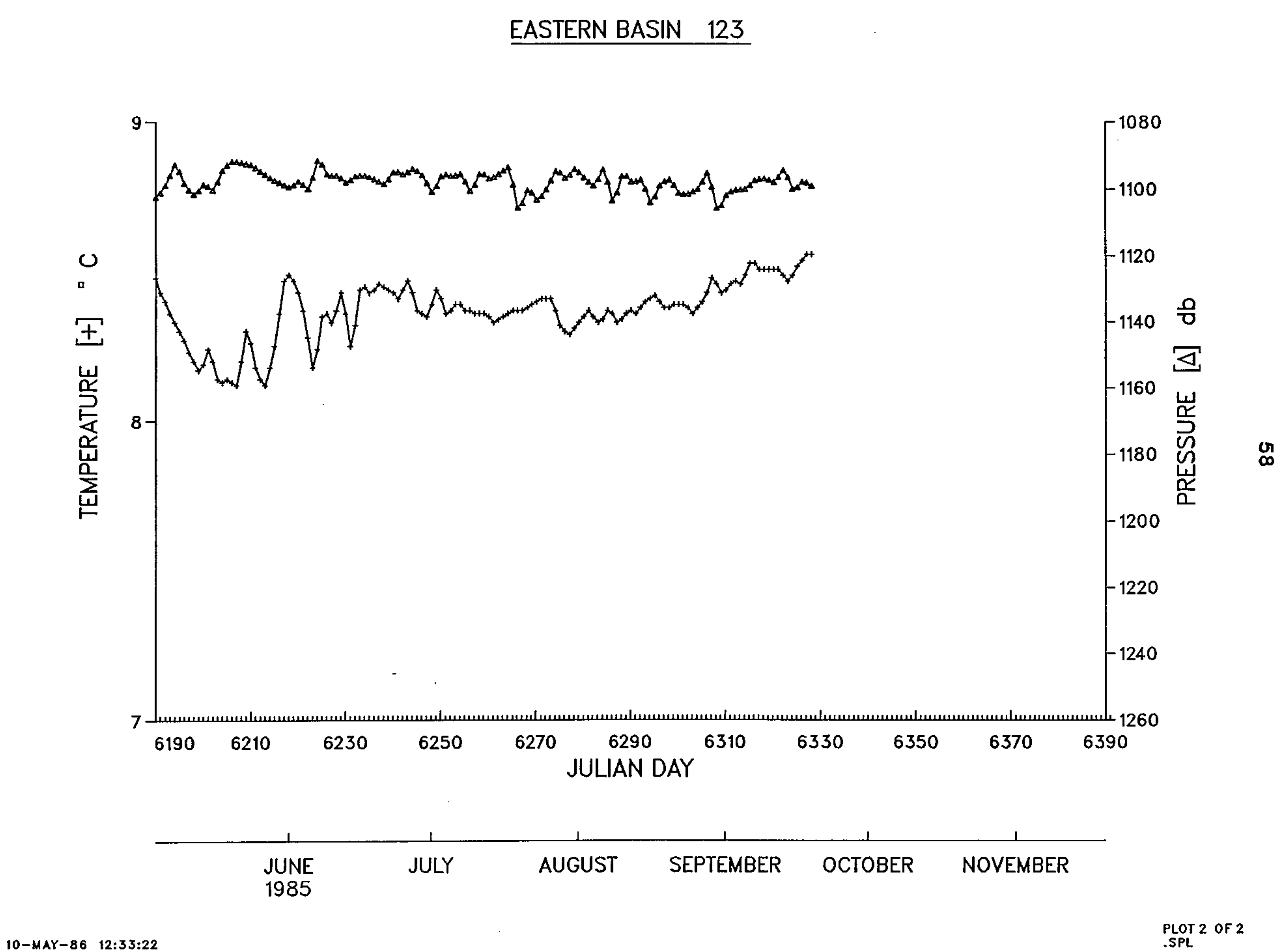
PLOT 2 OF 2
.SPL

EASTERN BASIN 123

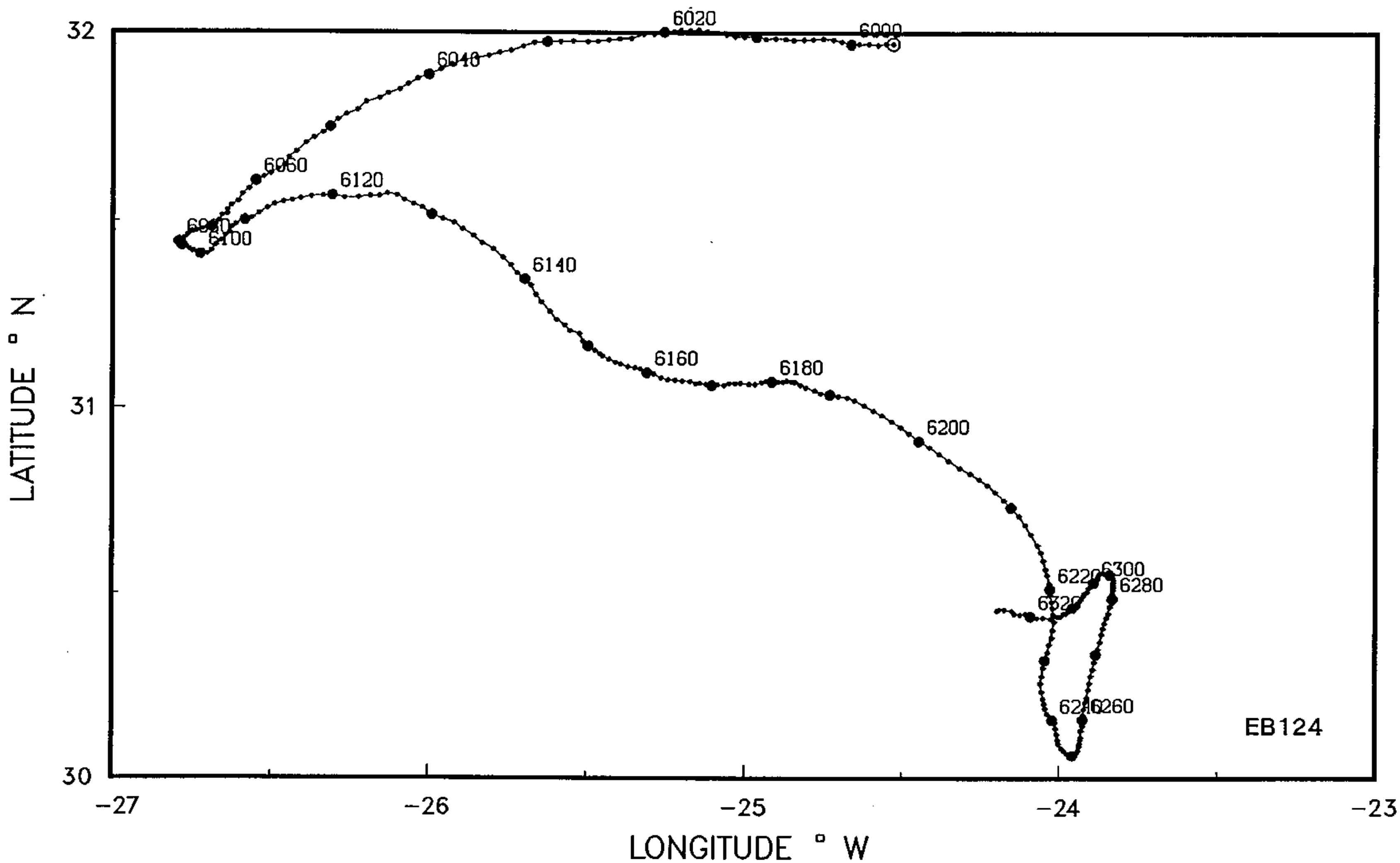


10-MAY-86 12:33:13

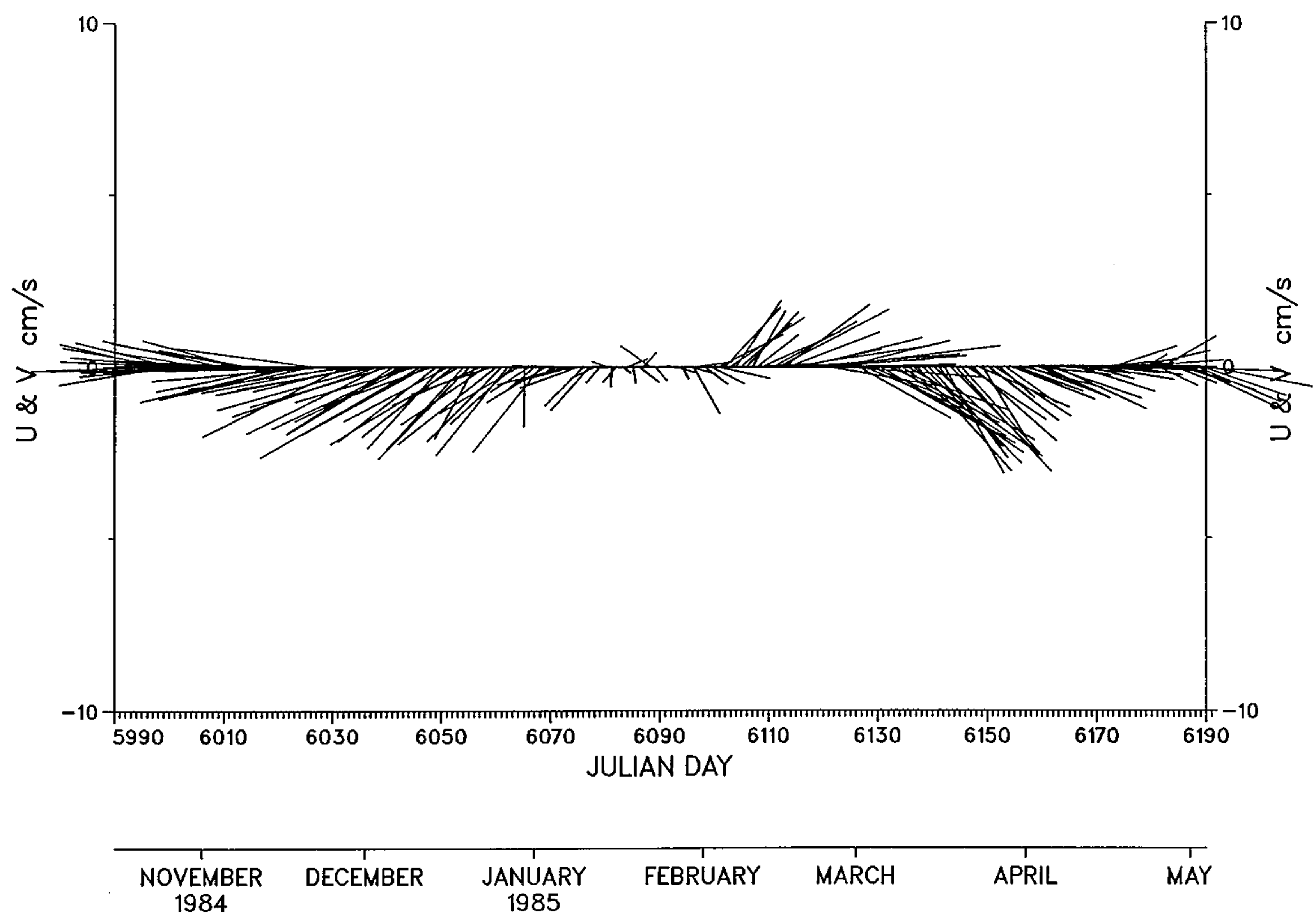
PLOT 1 OF 2
.SPL


EASTERN BASIN 123
TEMPERATURE [+] °C
9
8
7
PRESSURE [Δ] db
1080
1100
1120
1140
1160
1180
1200
1220
1240
1260
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:33:22
PLOT 2 OF 2
.SPL

EASTERN BASIN 124



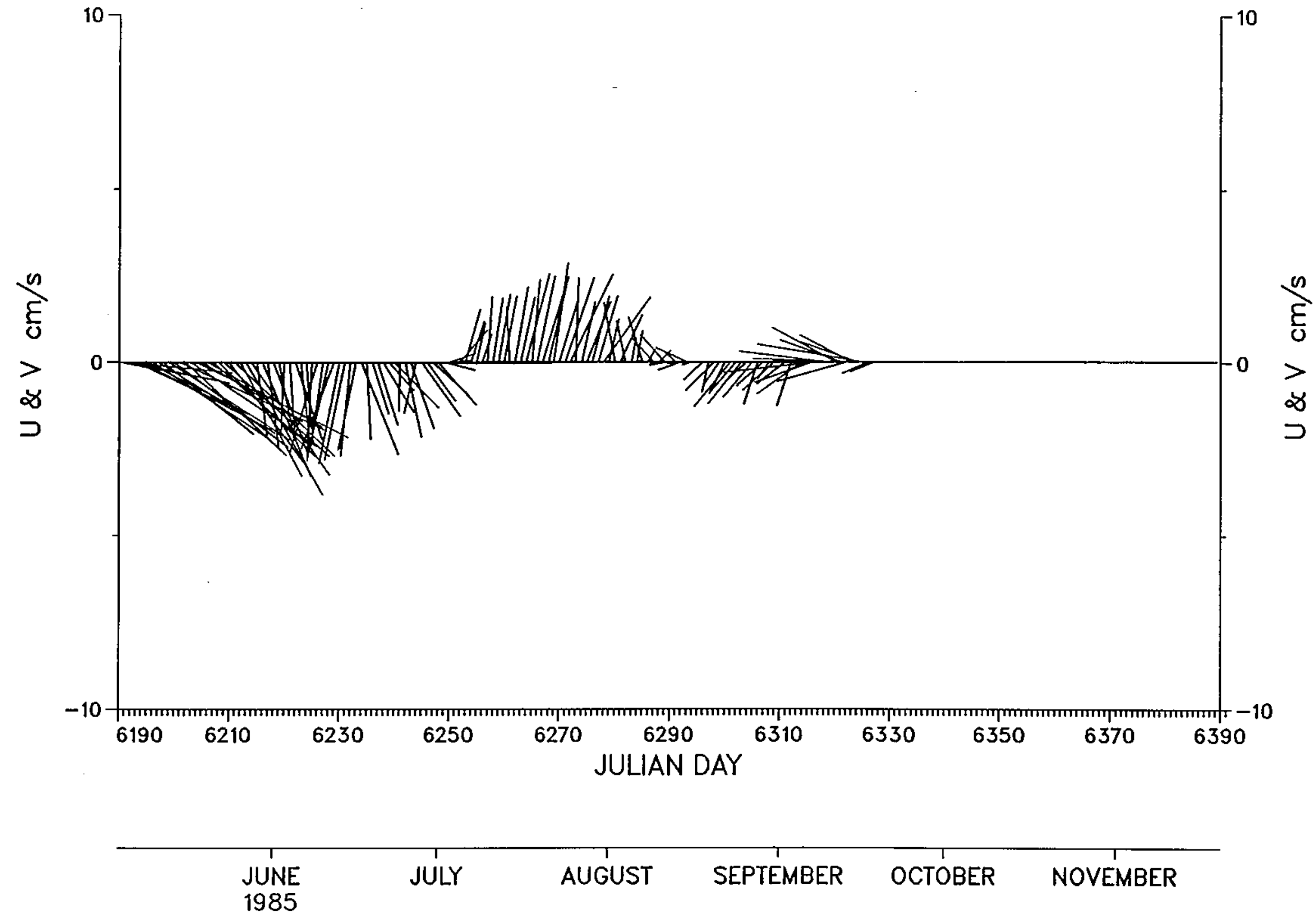
EASTERN BASIN 124



10-MAY-86 12:35:22

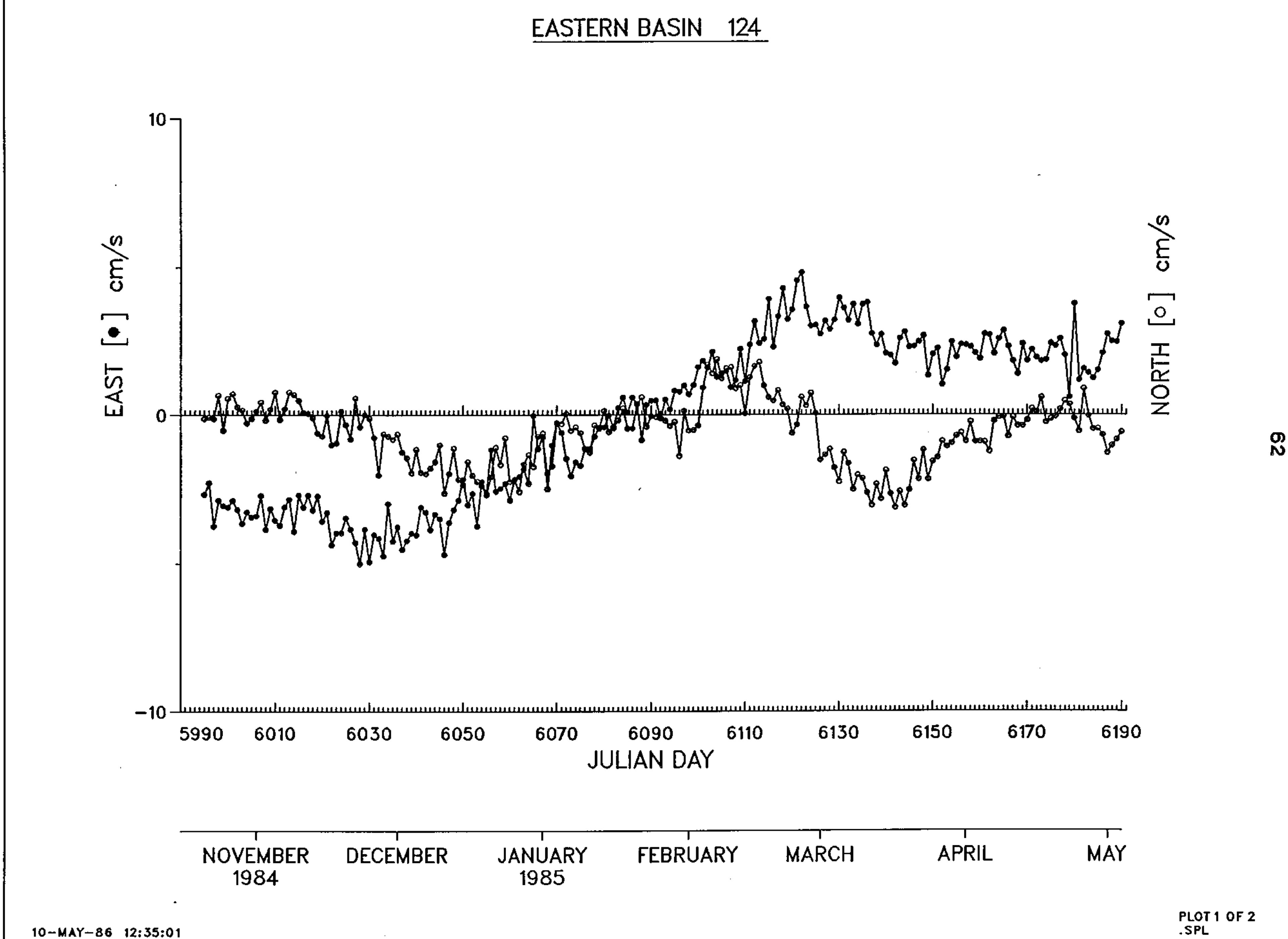
PLOT 1 OF 2
.SPL

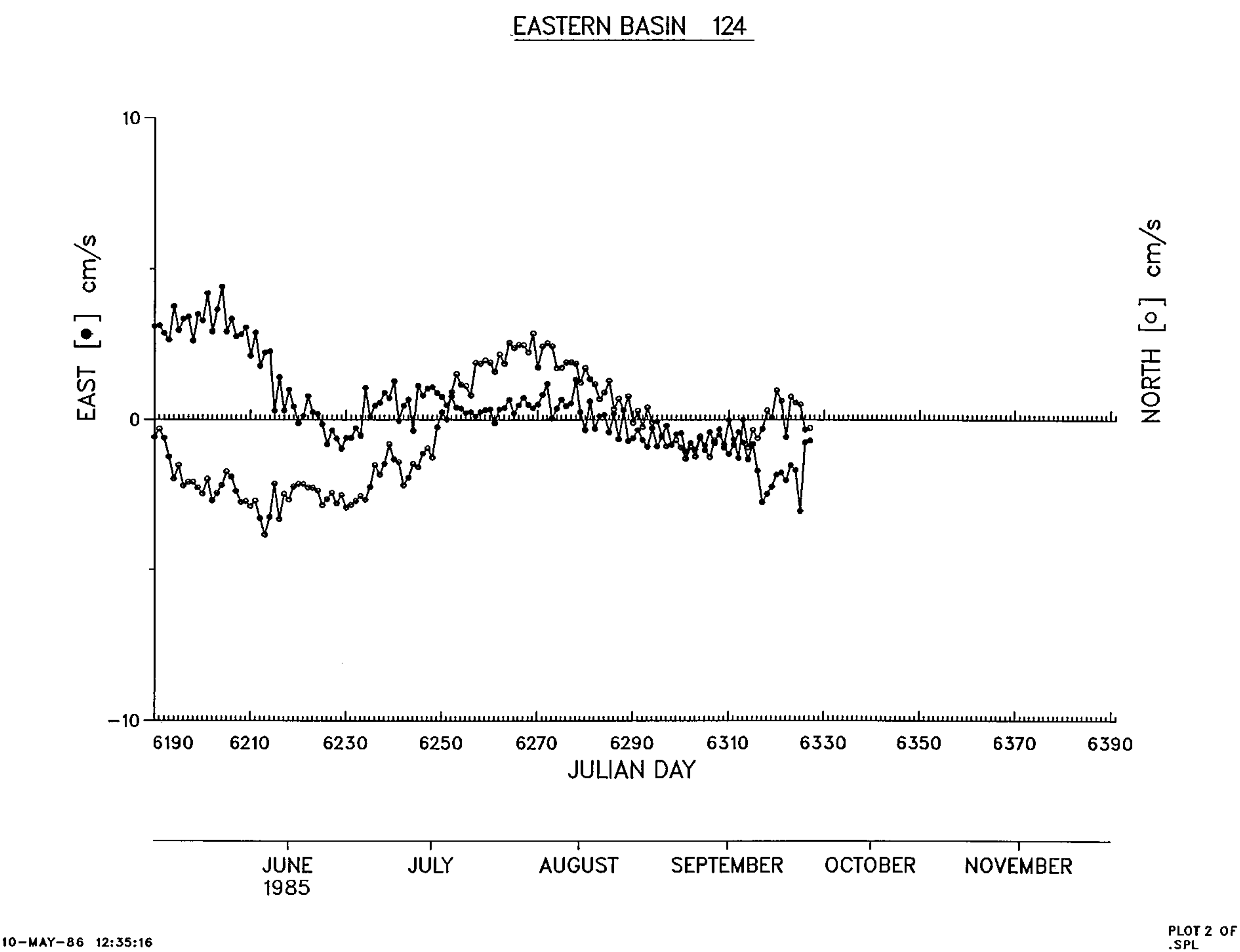
EASTERN BASIN 124

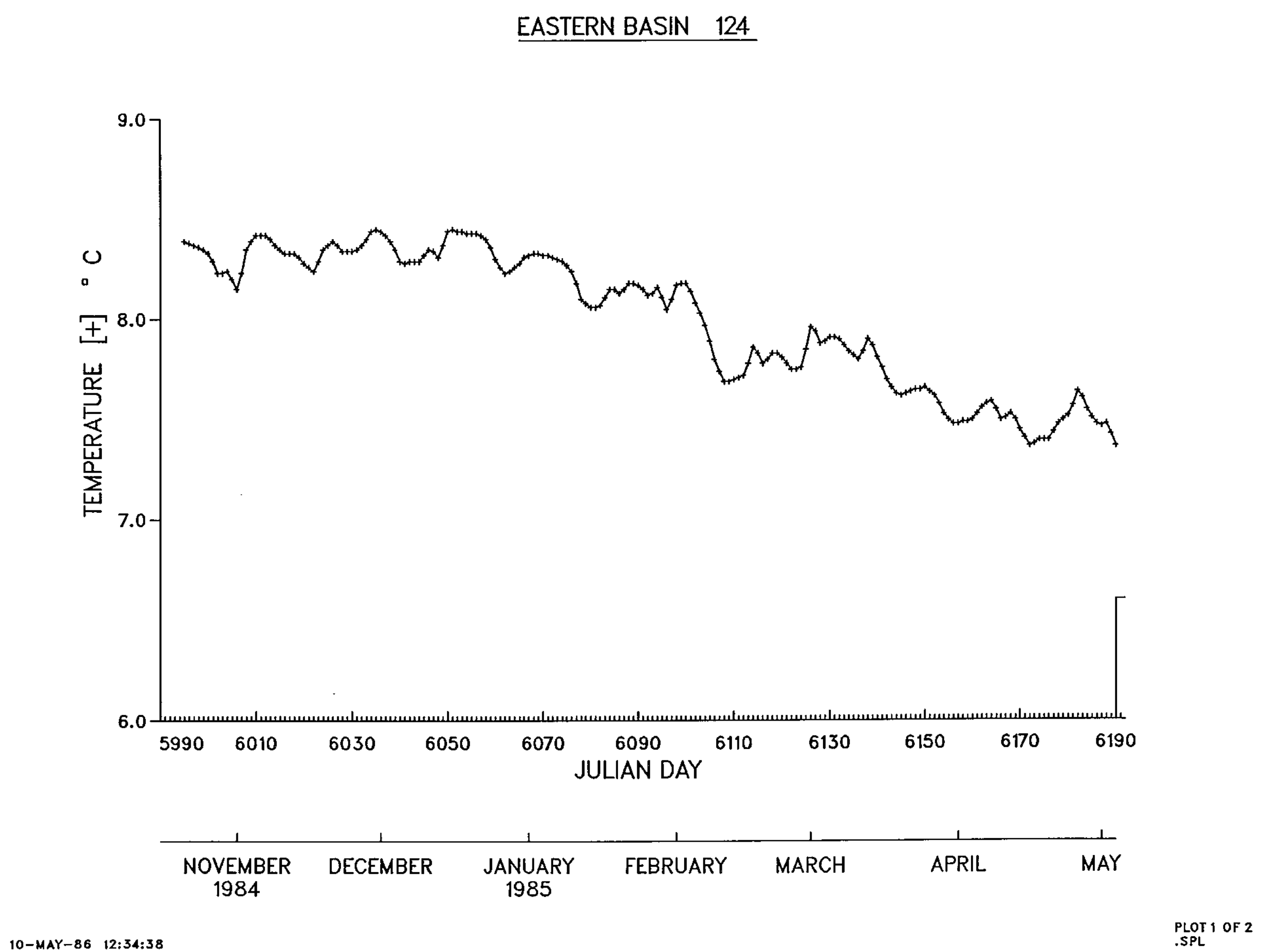


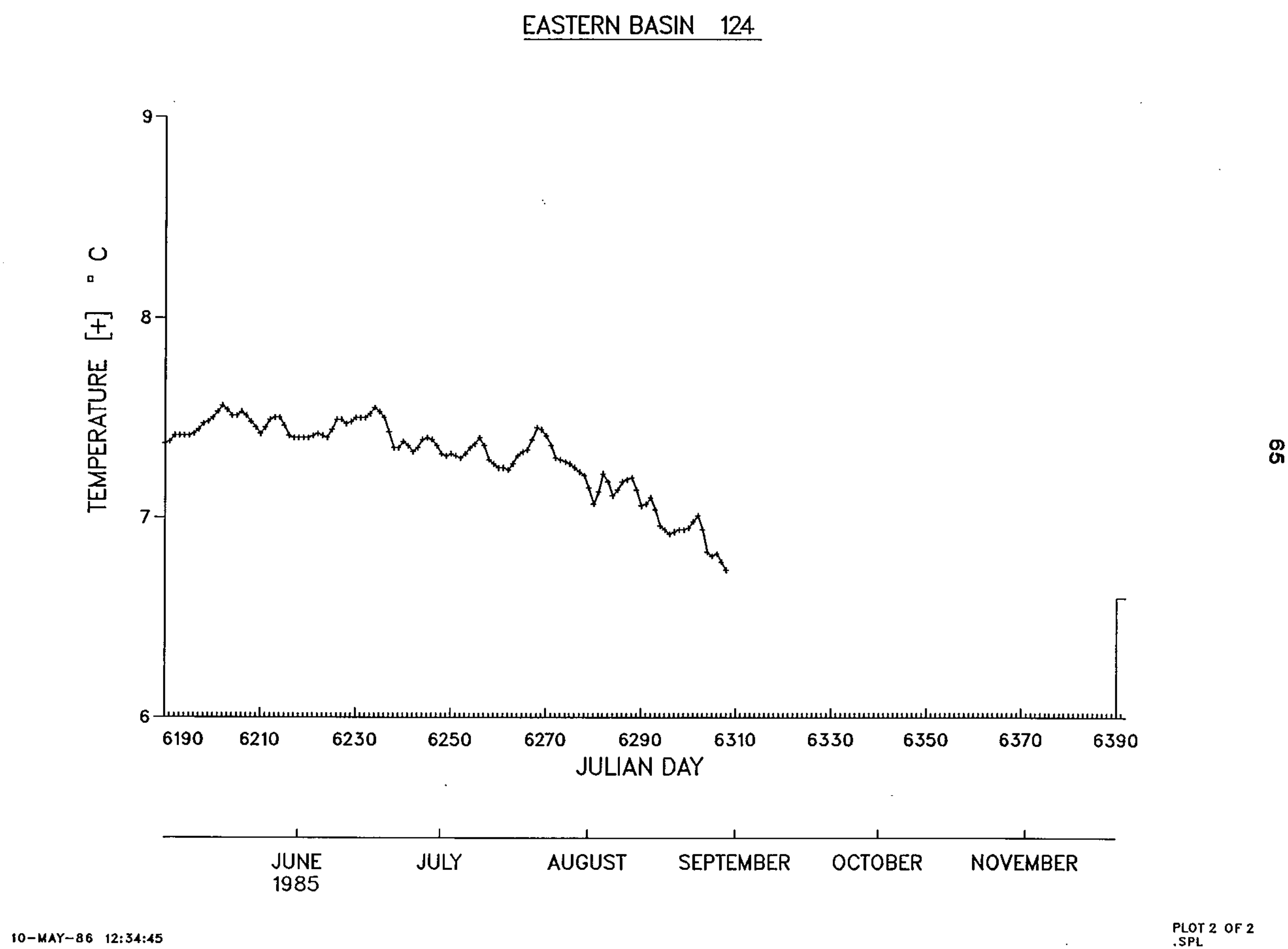
10-MAY-86 12:35:30

PLOT 2 OF 2
.SPL


EASTERN BASIN 124
EAST [●] cm/s
NORTH [○] cm/s
10
0
−10
5990 6010 6030 6050 6070 6090 6110 6130 6150 6170 6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10−MAY−86 12:35:01
PLOT 1 OF 2
.SPL

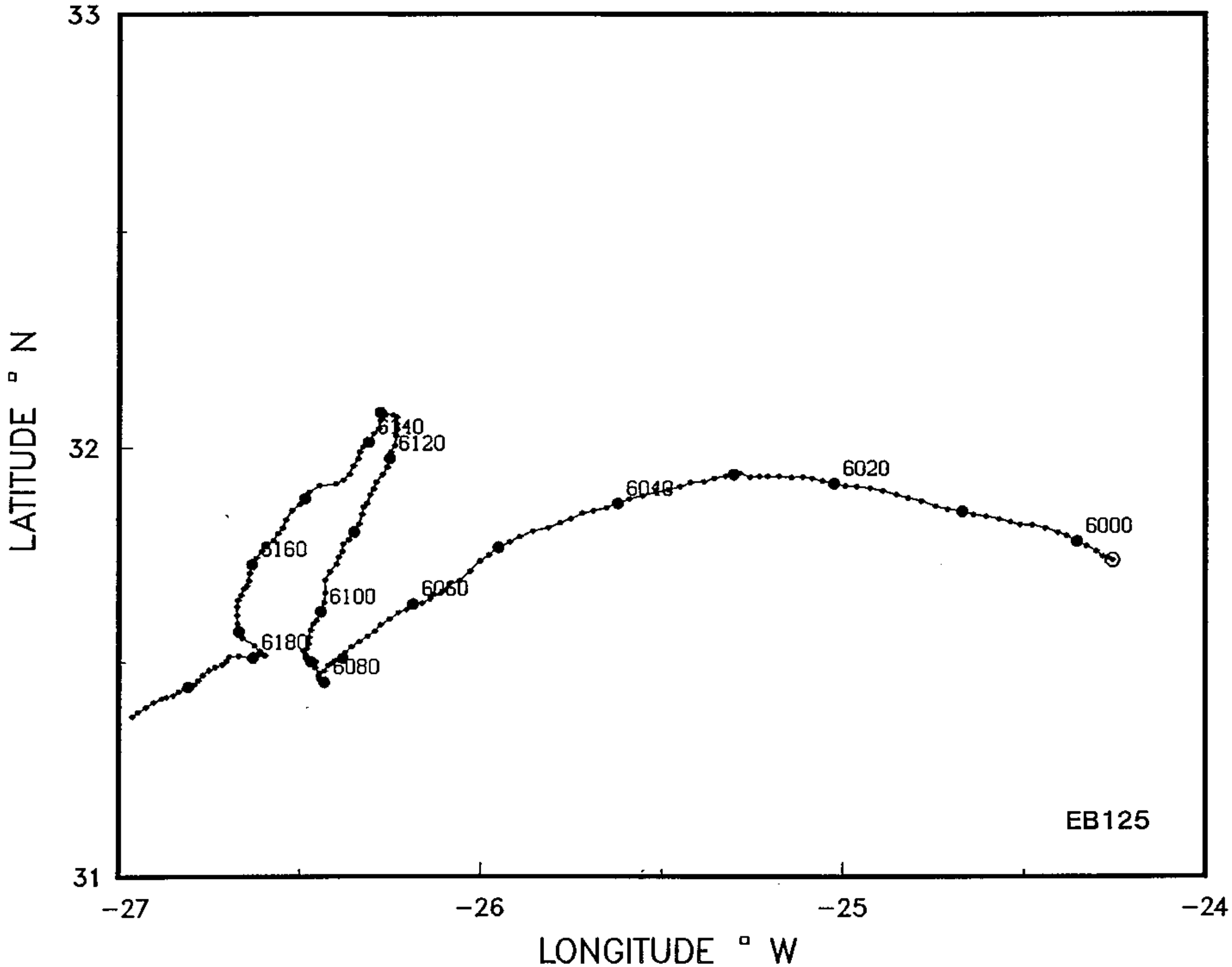

EASTERN BASIN 124
10
0
−10
EAST [•] cm/s
NORTH [o] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:35:16
PLOT 2 OF 2
.SPL


EASTERN BASIN 124
TEMPERATURE [+] ° C
9.0
8.0
7.0
6.0
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:34:38
PLOT 1 OF 2 .SPL



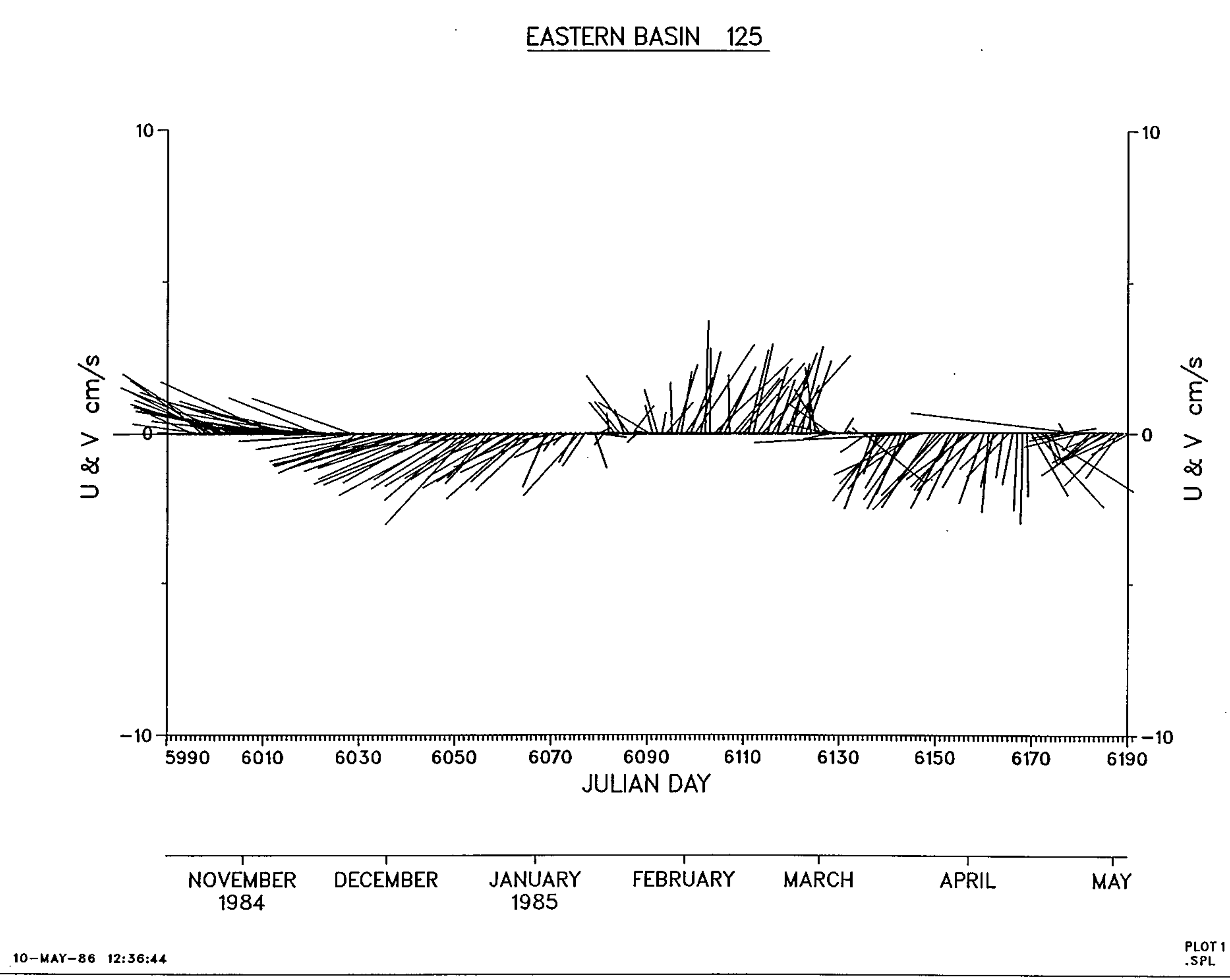
EASTERN BASIN 124
TEMPERATURE [+] °C
9
8
7
6
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:34:45
PLOT 2 OF 2
.SPL

EASTERN BASIN 125

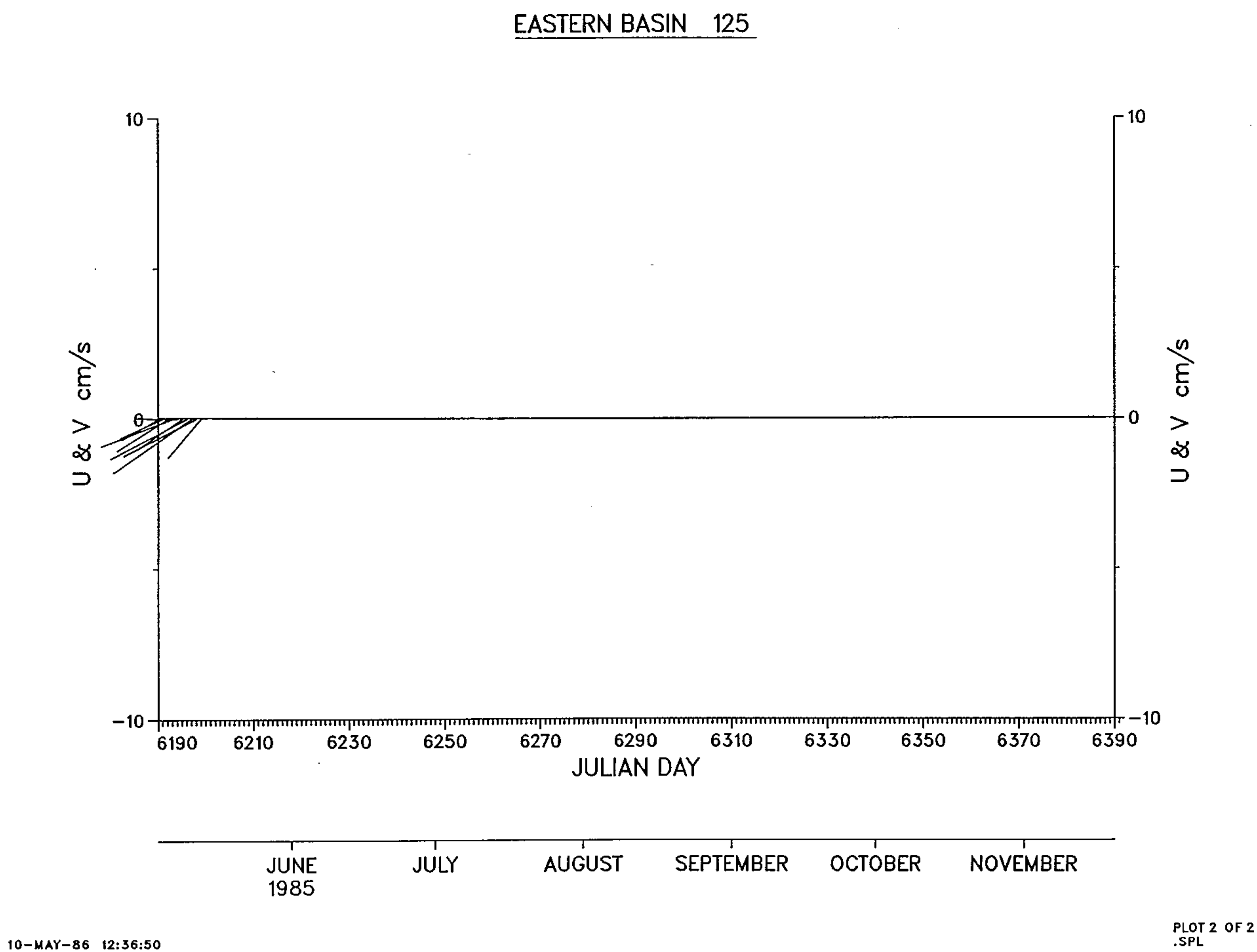


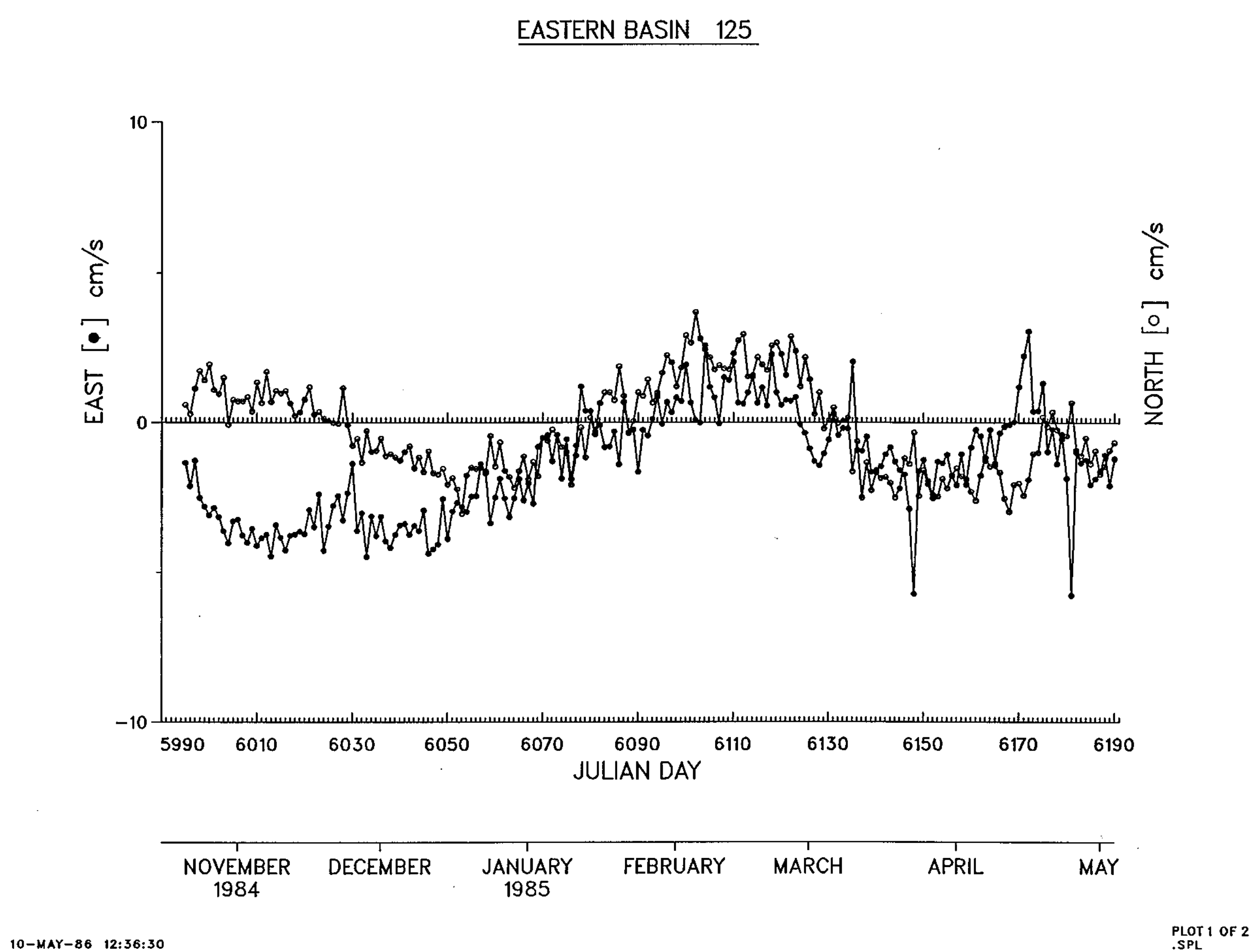
18-JUN-86 10:26:38

PLOT 1 OF 1
.FIN

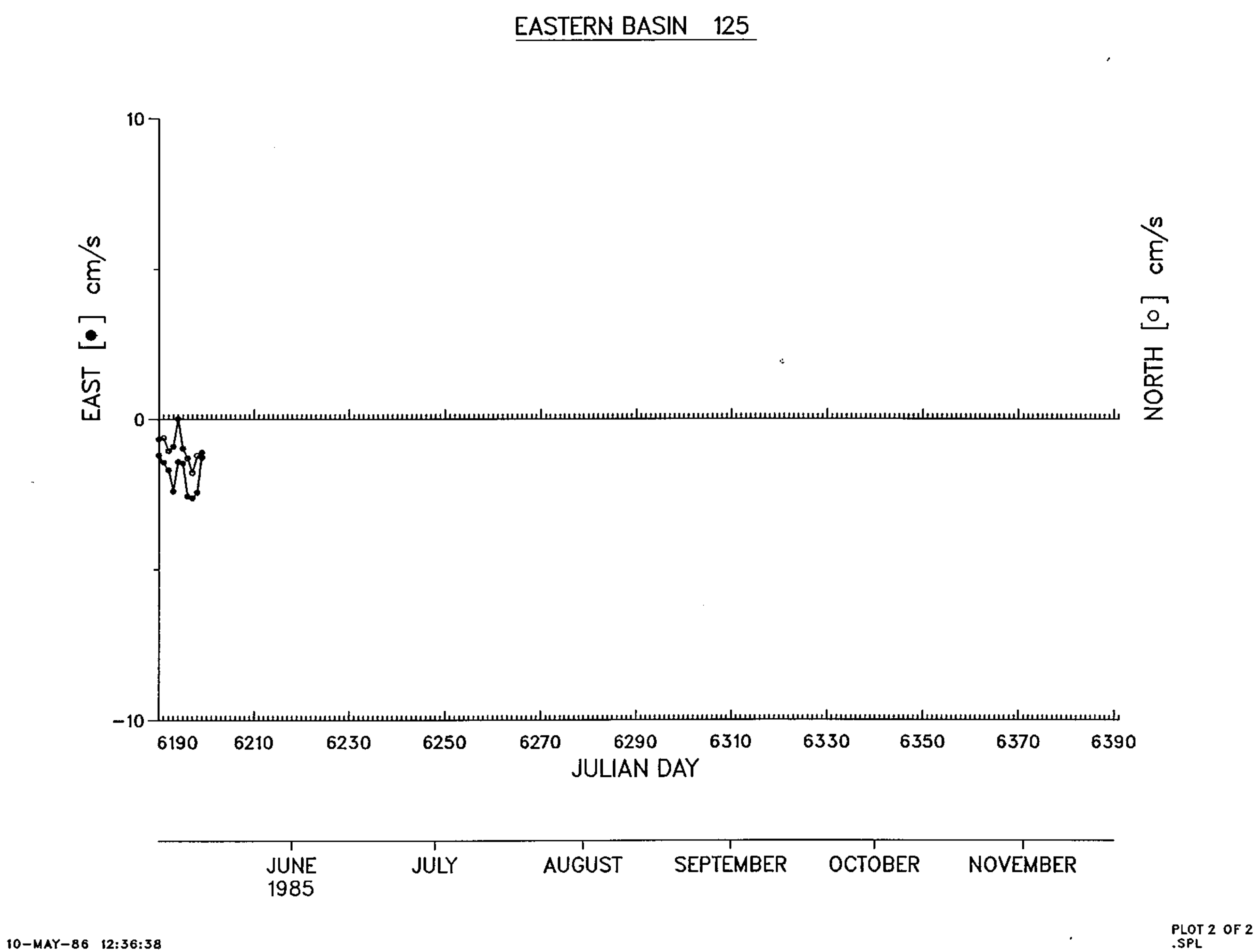


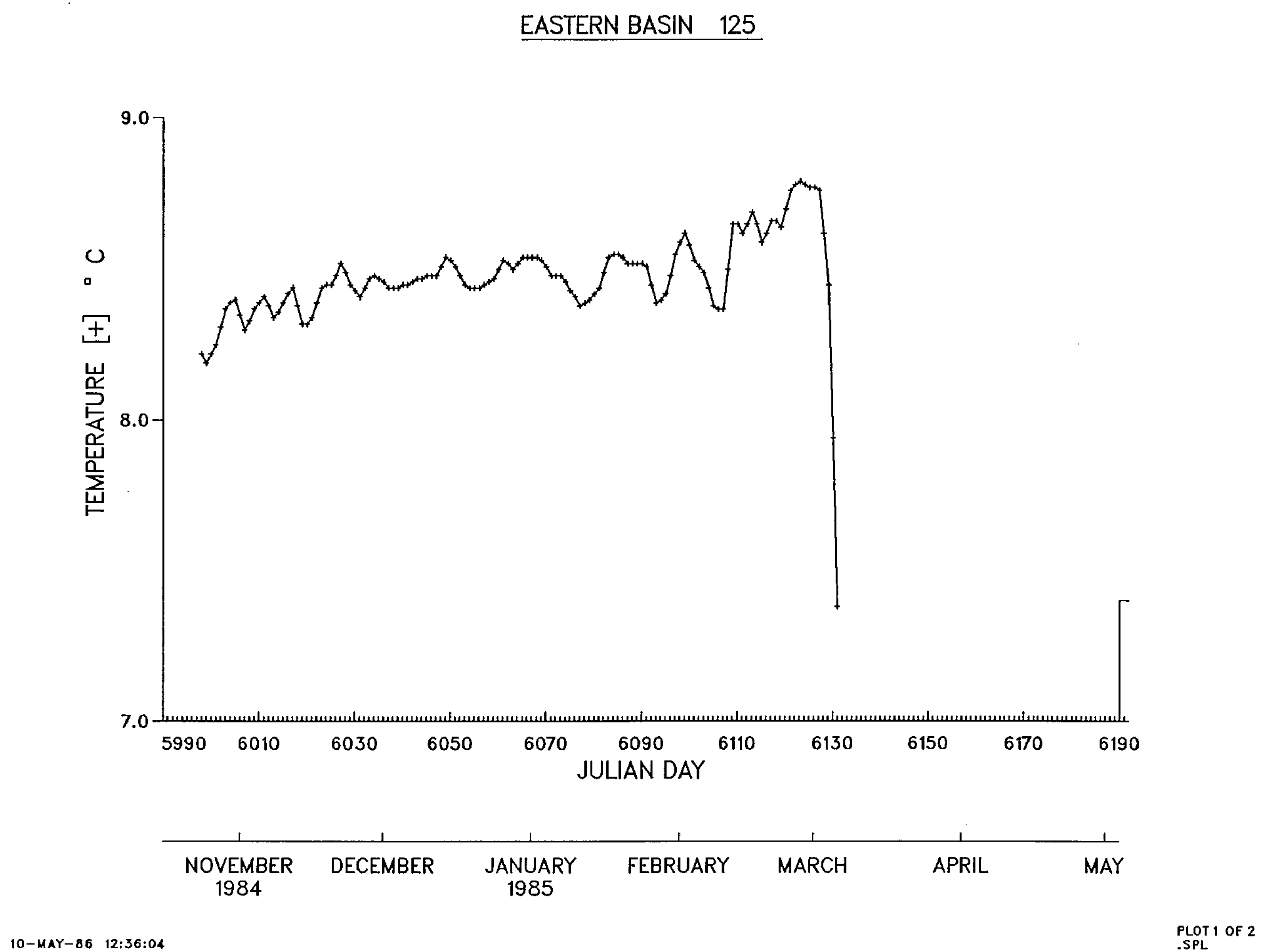
EASTERN BASIN 125
10
0
−10
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10−MAY−86 12:36:44
PLOT 1 OF 2
.SPL


EASTERN BASIN 125
10
0
-10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:36:50
PLOT 2 OF 2
.SPL

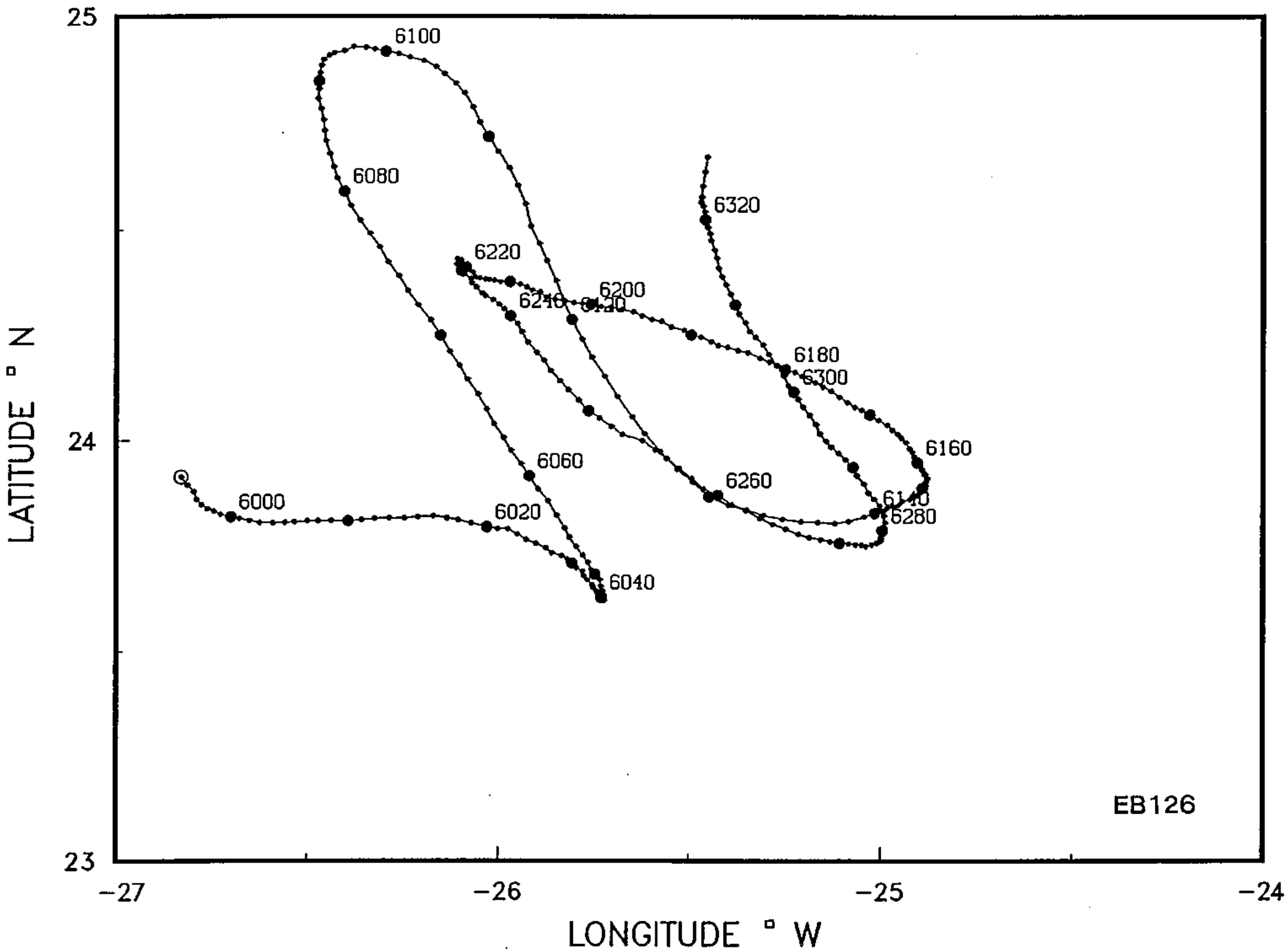


EASTERN BASIN 125
10
0
−10
EAST [•] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:36:30
PLOT 1 OF 2
.SPL


EASTERN BASIN 125
10
0
−10
EAST [•] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:36:38
PLOT 2 OF 2
.SPL


EASTERN BASIN 125
9.0
8.0
7.0
TEMPERATURE [+] ° C
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:36:04
PLOT 1 OF 2
.SPL

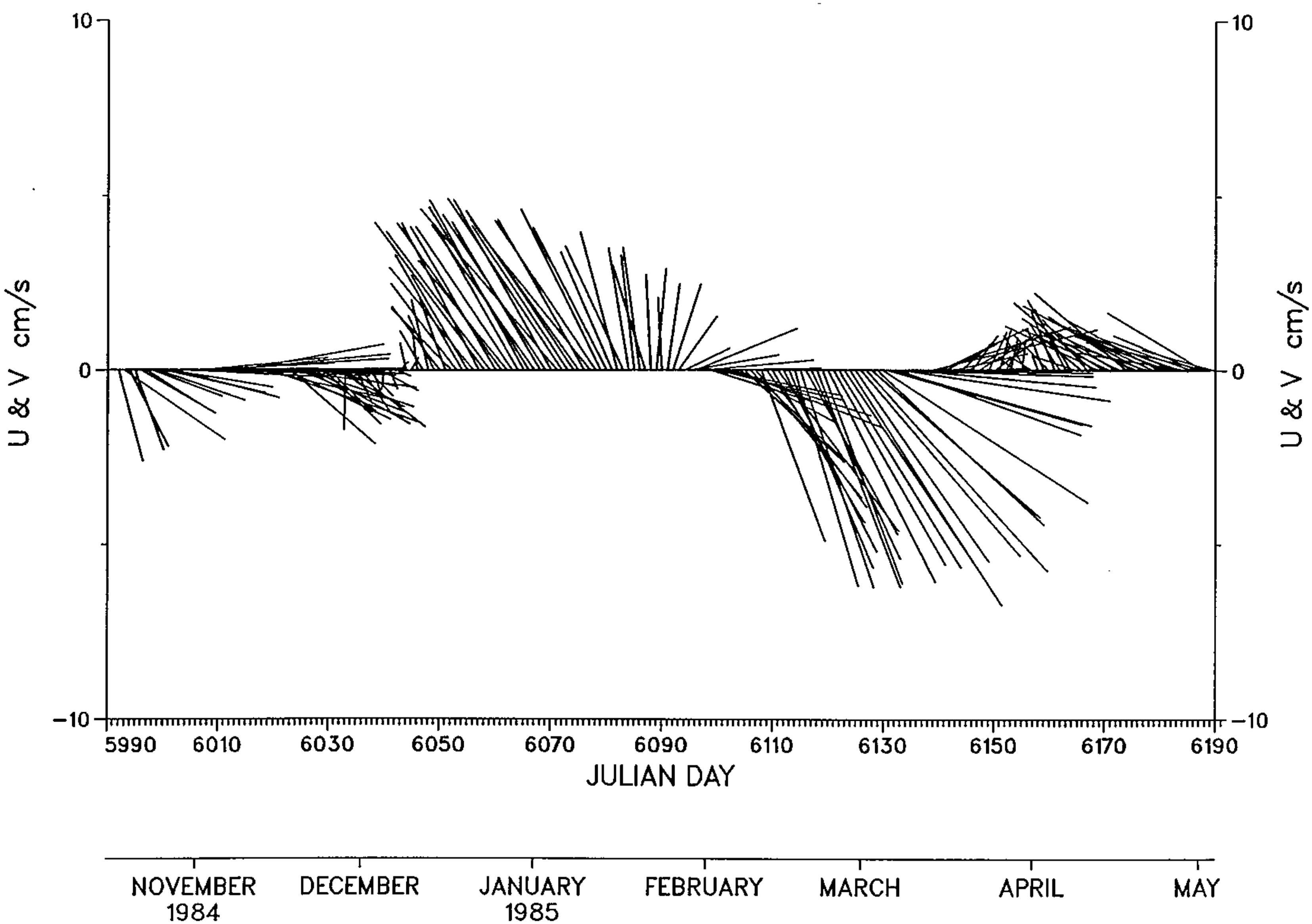
EASTERN BASIN 126



18-JUN-86 10:28:04

PLOT 1 OF 1
.FIN

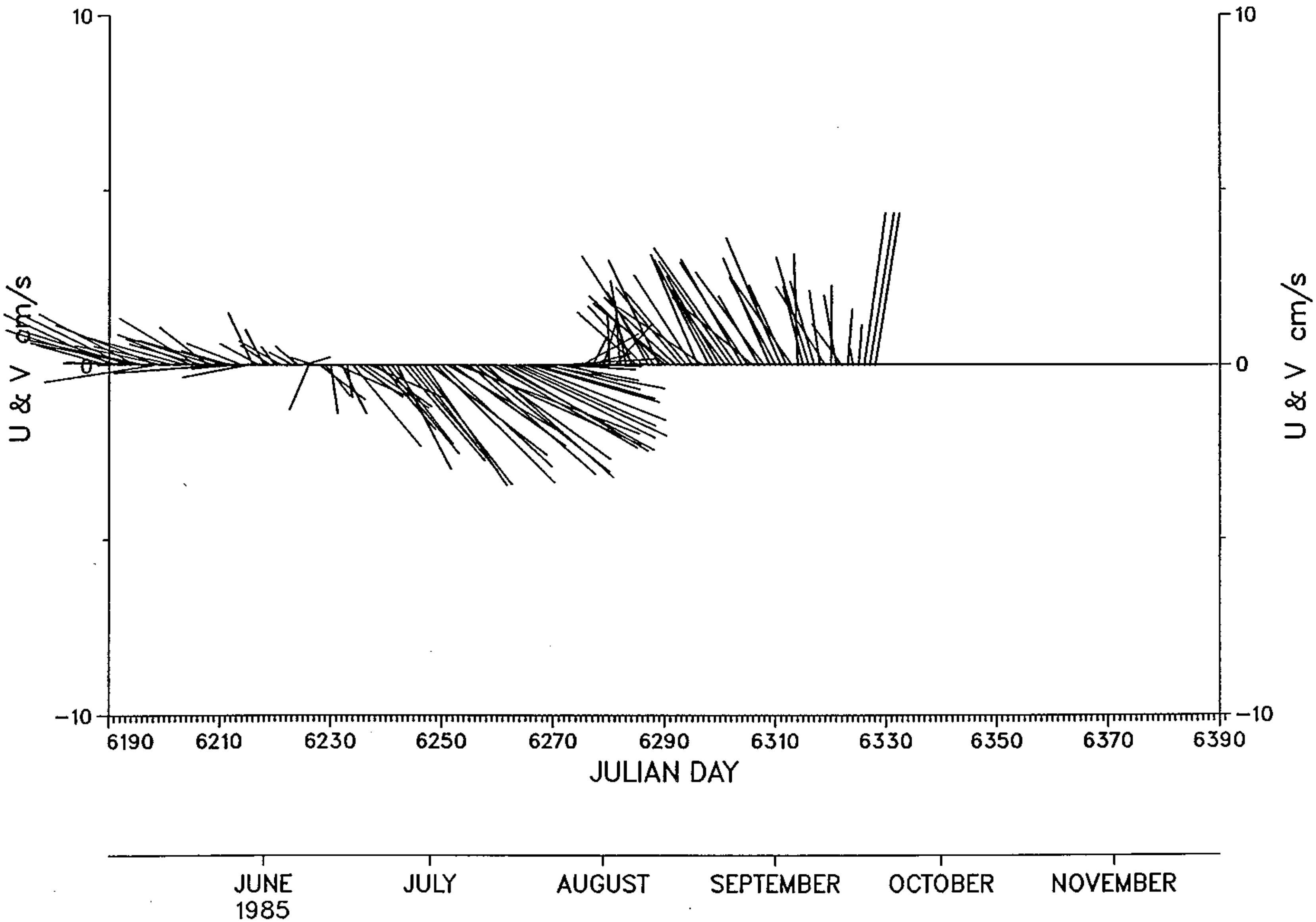
EASTERN BASIN 126



10-MAY-86 12:38:01

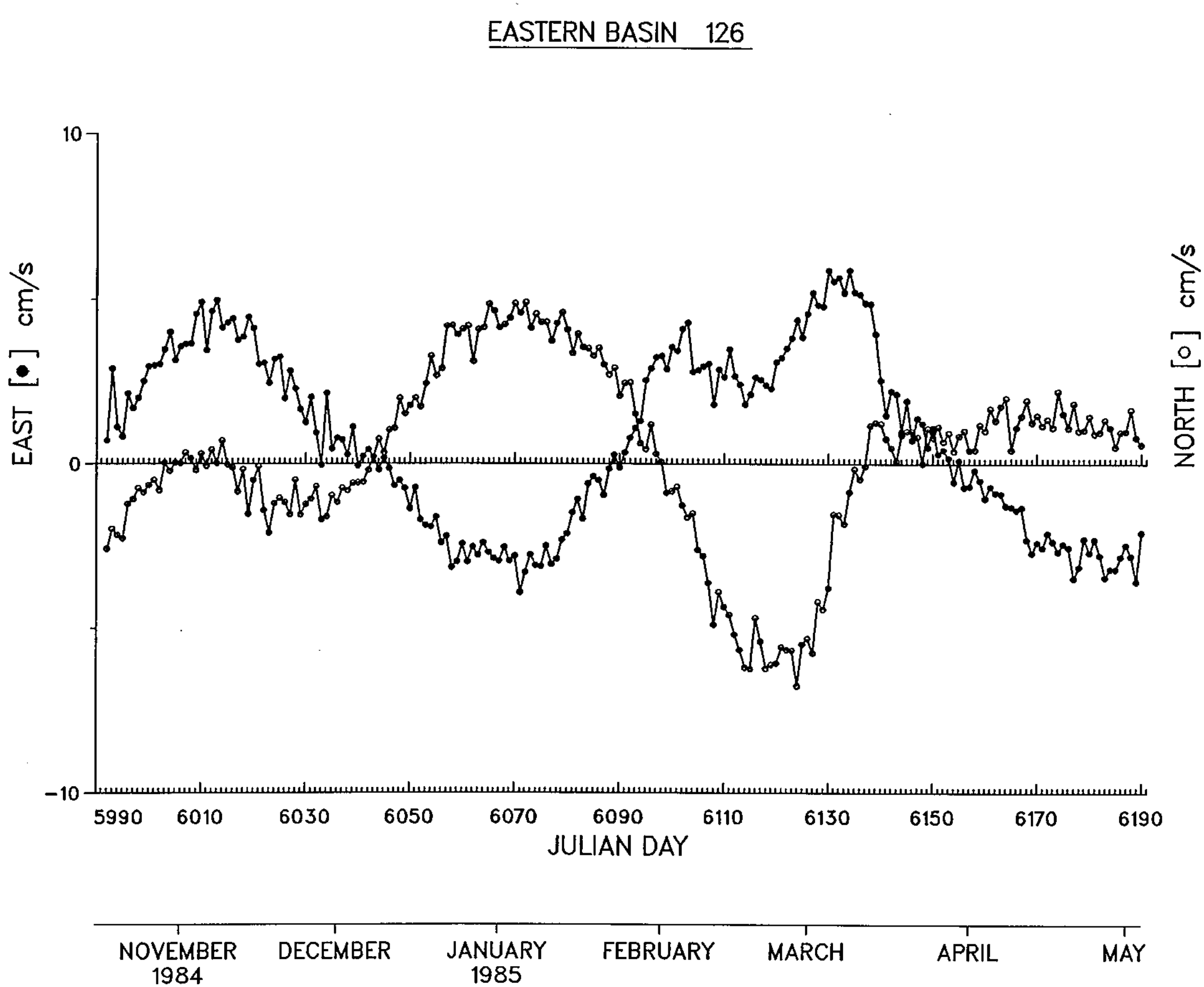
PLOT 1 OF 2
.SPL

EASTERN BASIN 126



10-MAY-86 12:38:07

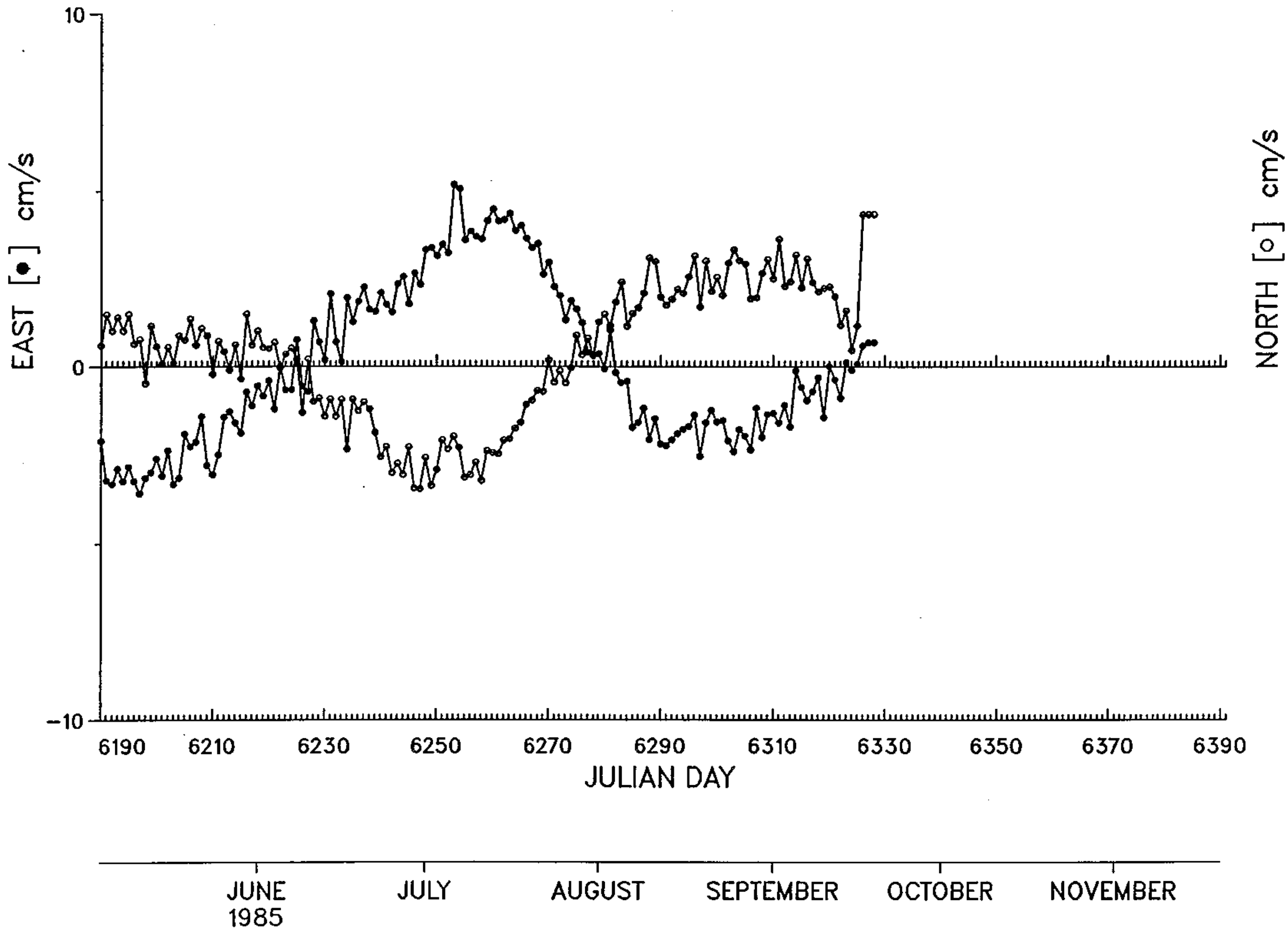
PLOT 2 OF 2
.SPL



10-MAY-86 12:37:41

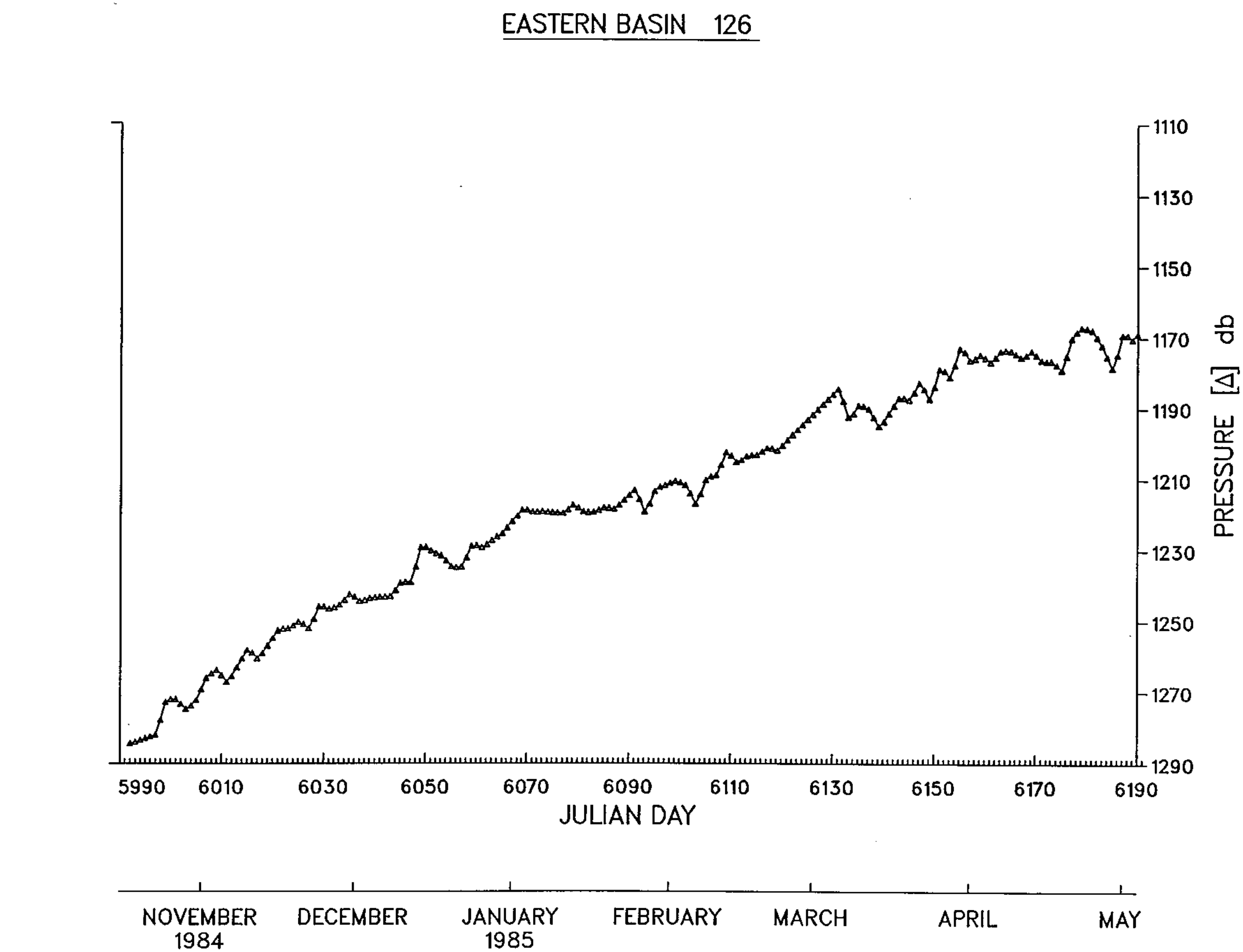
PLOT 1 OF 2
.SPL

EASTERN BASIN 126



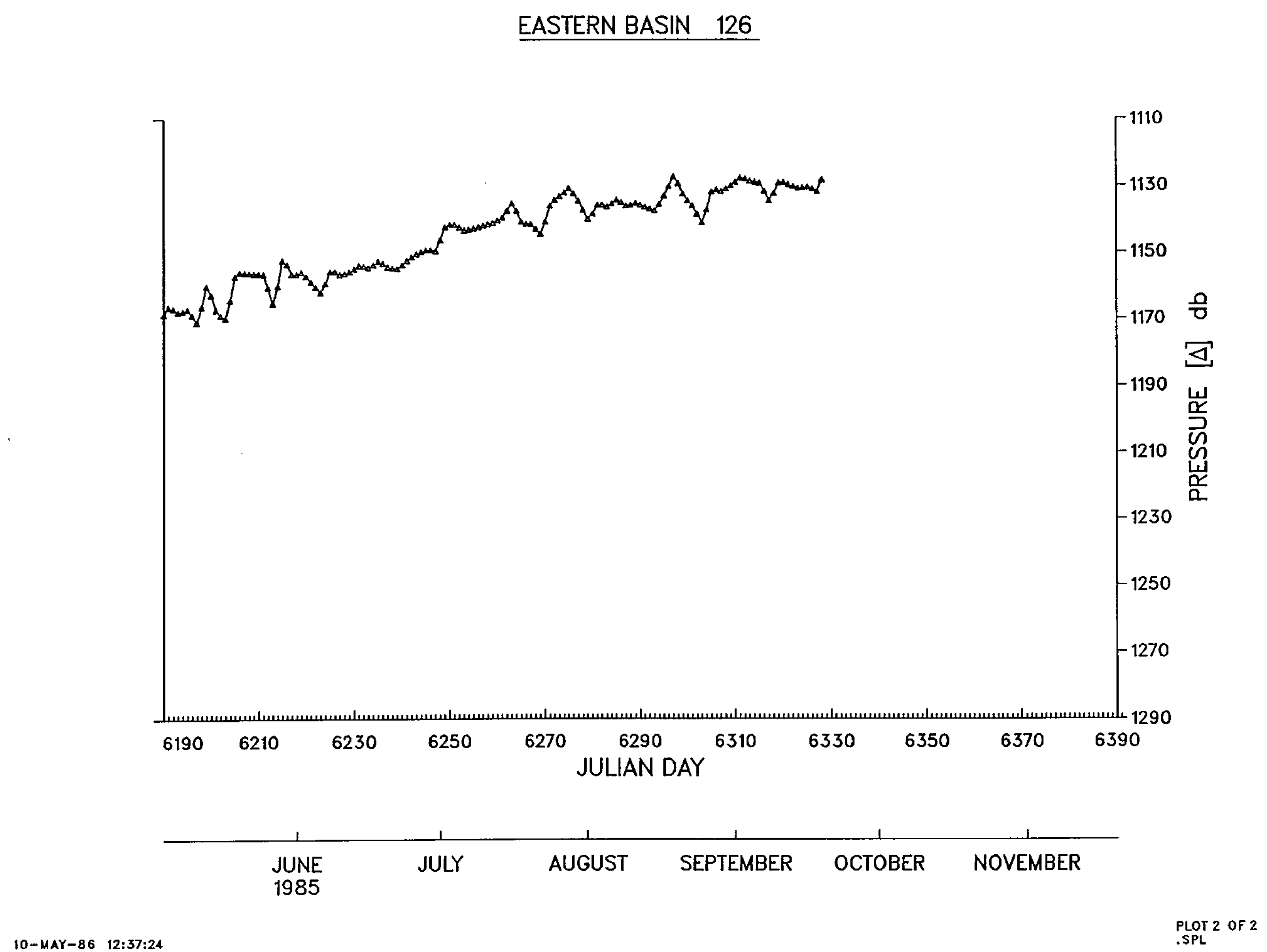
10−MAY−86 12:37:55

PLOT 2 OF 2
.SPL

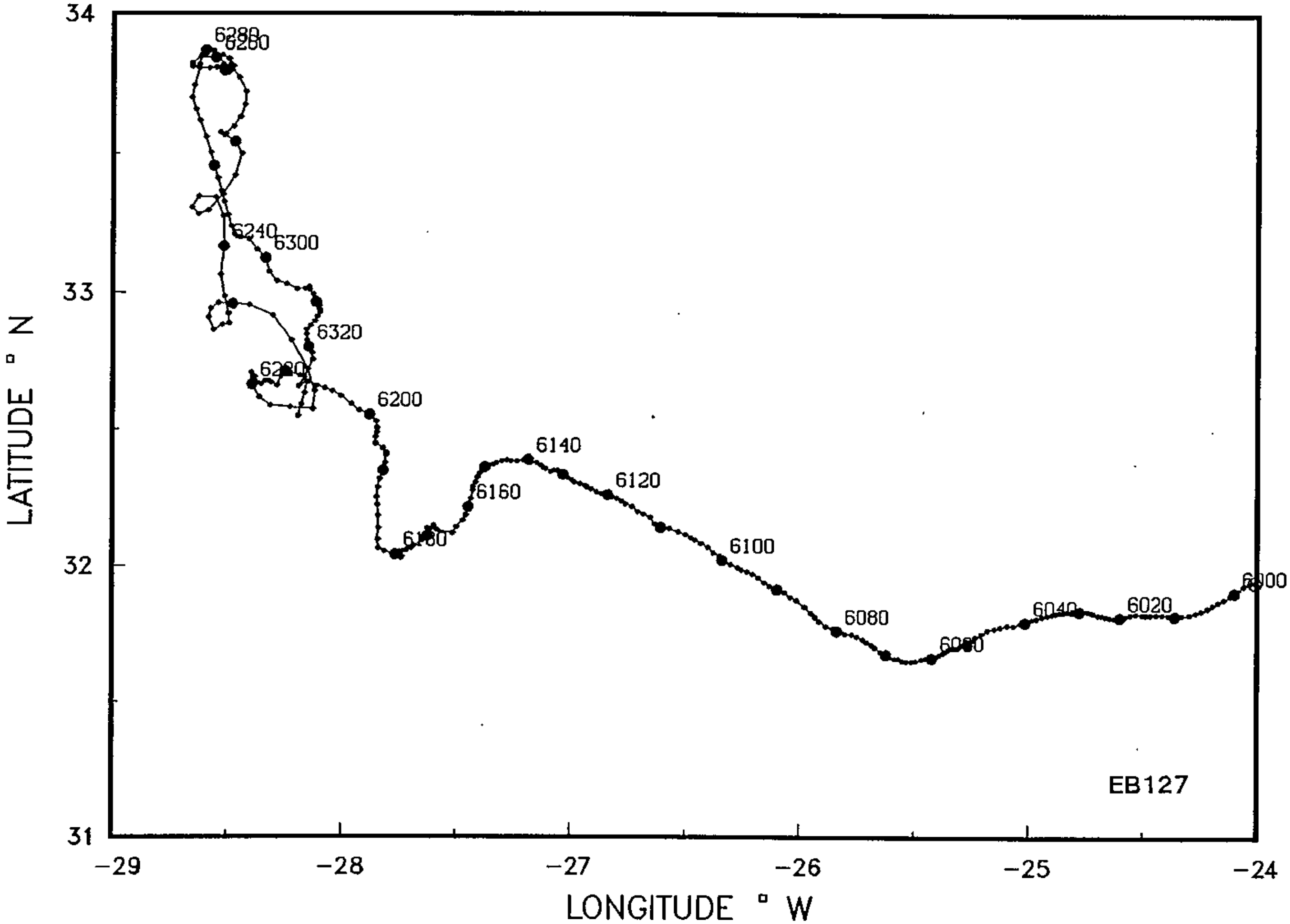


10-MAY-86 12:37:17

PLOT 1 OF 2
.SPL


EASTERN BASIN 126
1110
1130
1150
1170
1190
1210
1230
1250
1270
1290
PRESSURE [Δ] db
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:37:24
PLOT 2 OF 2
.SPL

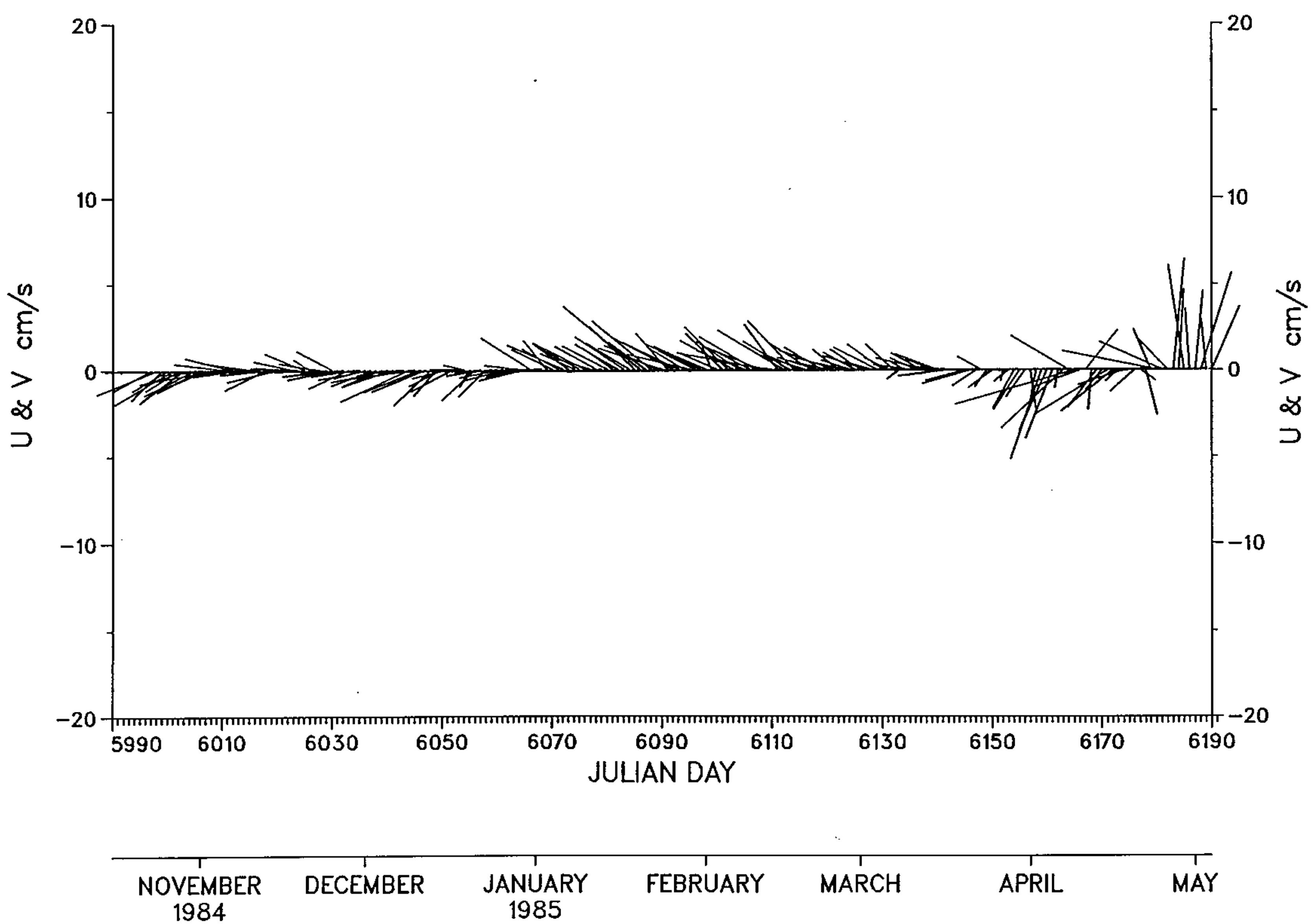
EASTERN BASIN 127



18-JUN-86 10:29:35

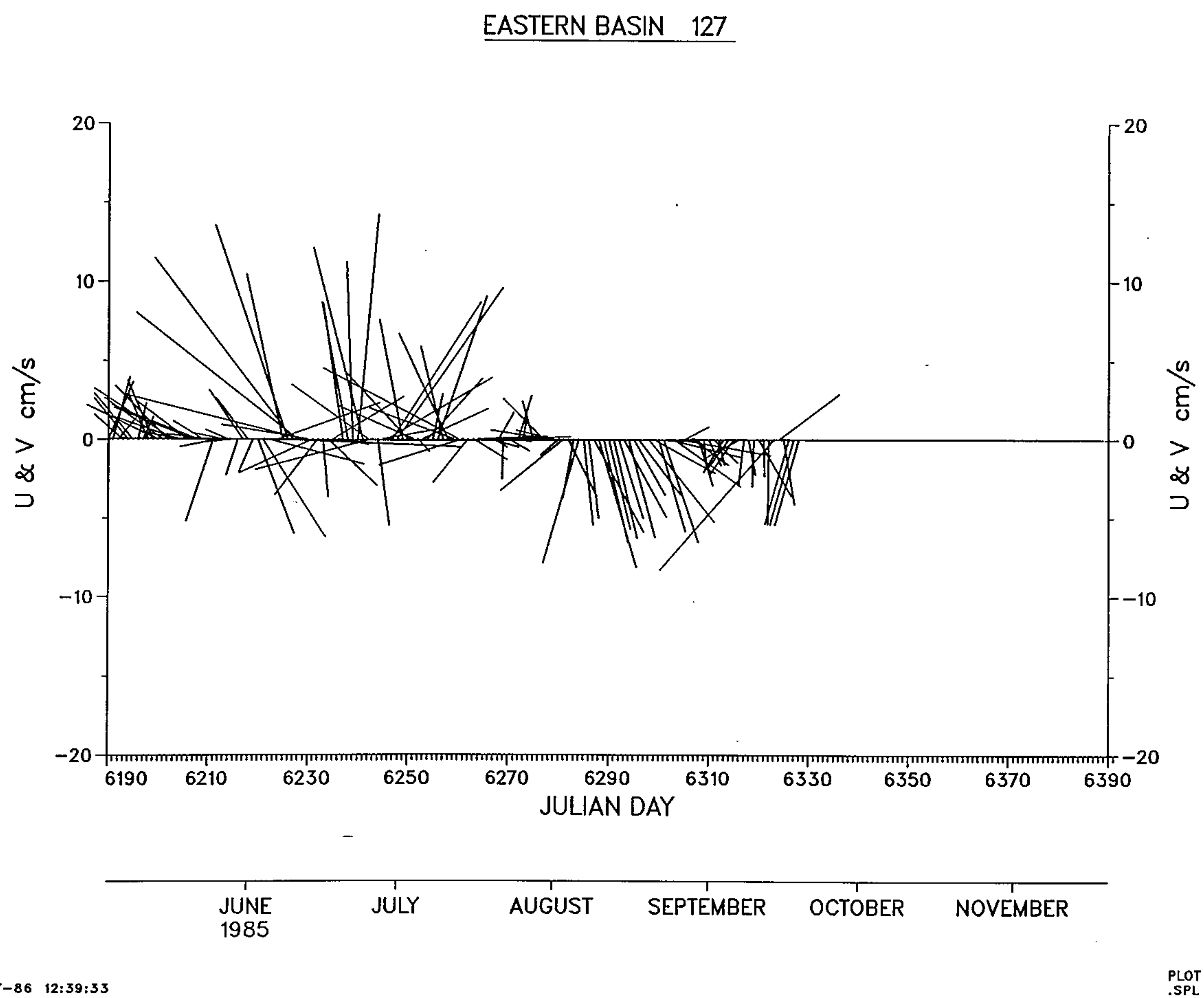
PLOT 1 OF 1
.FIN

EASTERN BASIN 127

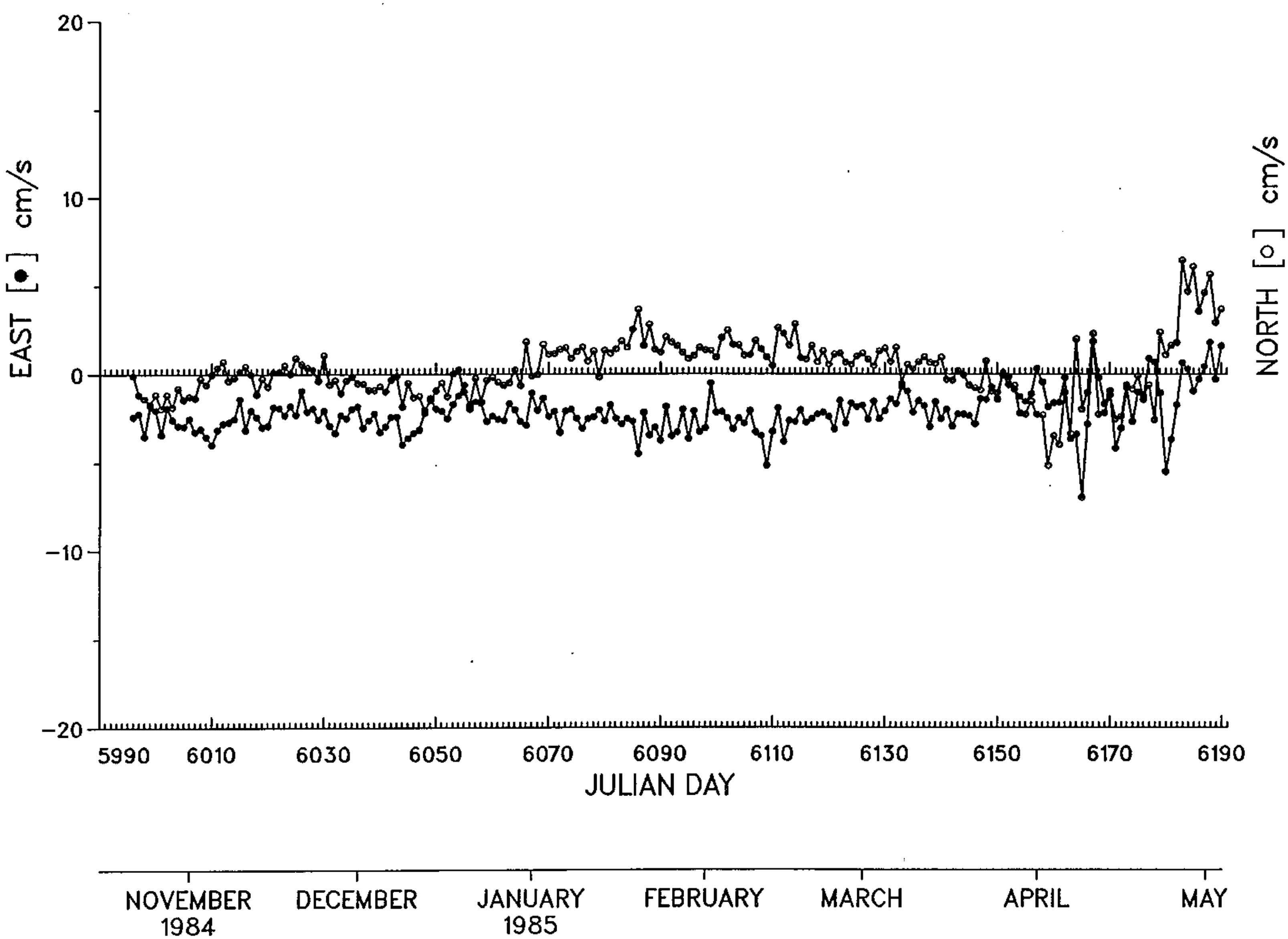


10−MAY−86 12:39:26

PLOT 1 OF 2
.SPL

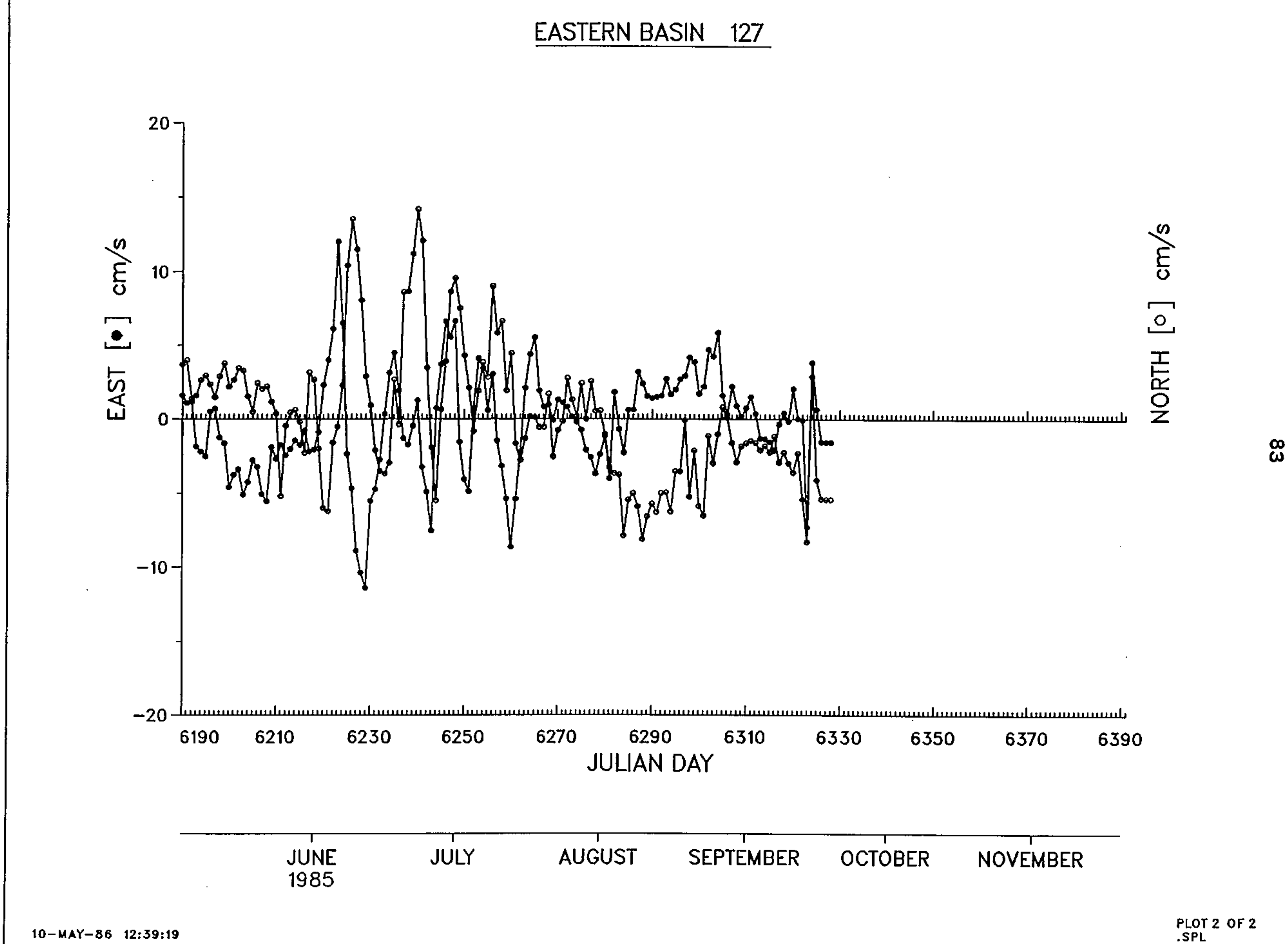

EASTERN BASIN 127
20
10
0
−10
−20
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:39:33
PLOT 2 OF 2
.SPL

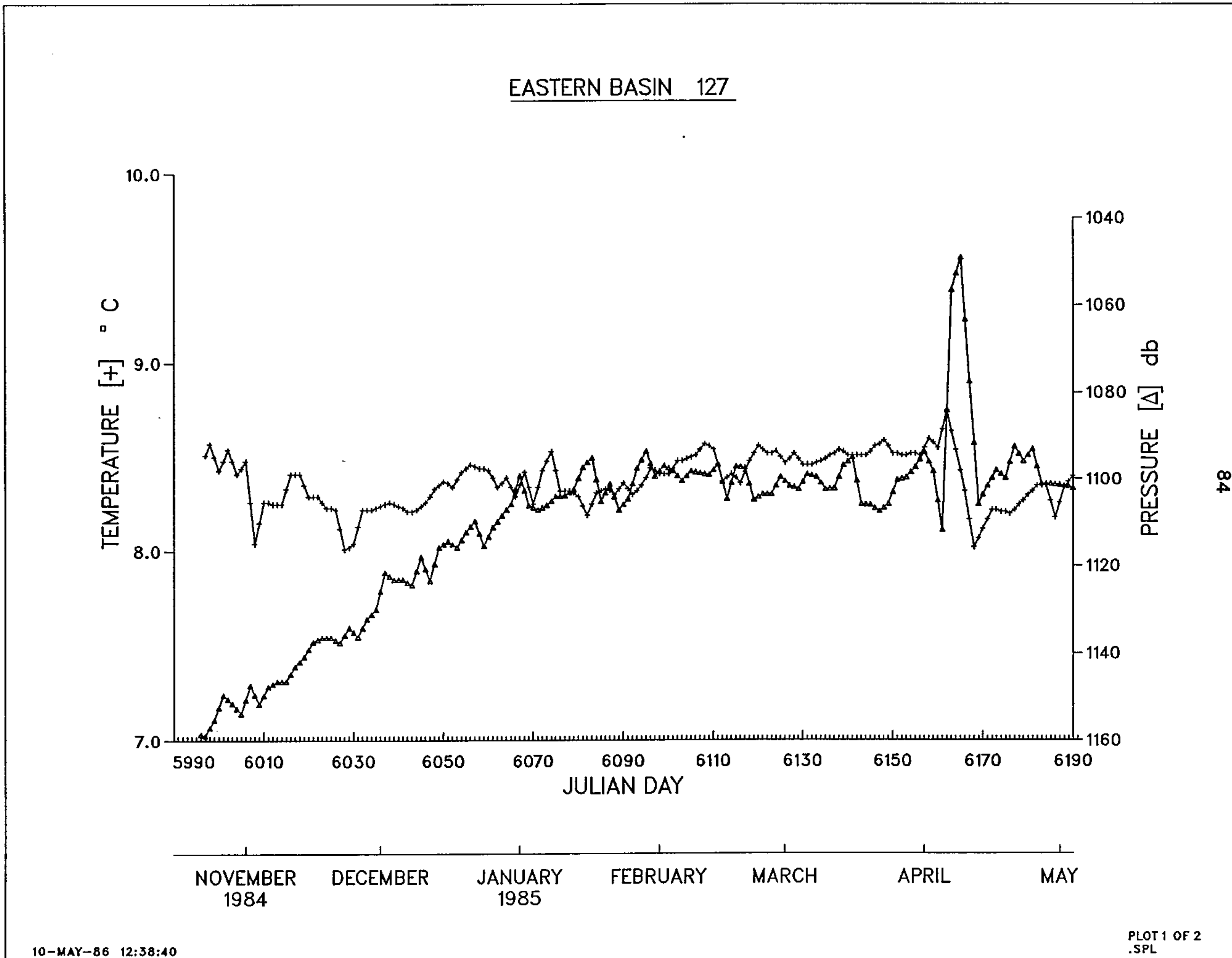
EASTERN BASIN 127



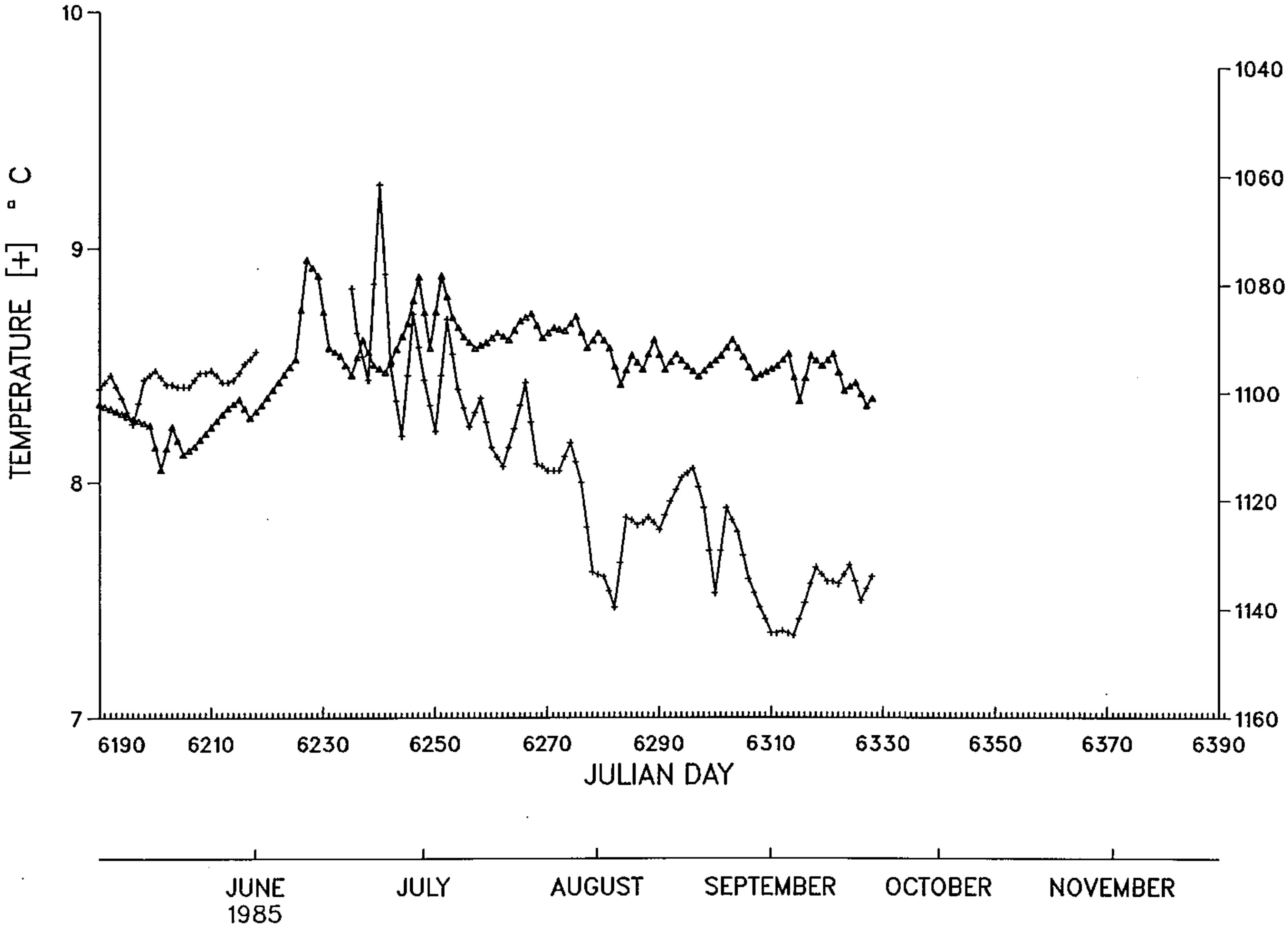
10-MAY-86 12:39:06

PLOT 1 OF 2
.SPL


EASTERN BASIN 127
20
10
0
−10
−20
EAST [●] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:39:19
PLOT 2 OF 2
.SPL


EASTERN BASIN 127
TEMPERATURE [+] °C
10.0
9.0
8.0
7.0
PRESSURE [Δ] db
1040
1060
1080
1100
1120
1140
1160
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:38:40
PLOT 1 OF 2
.SPL

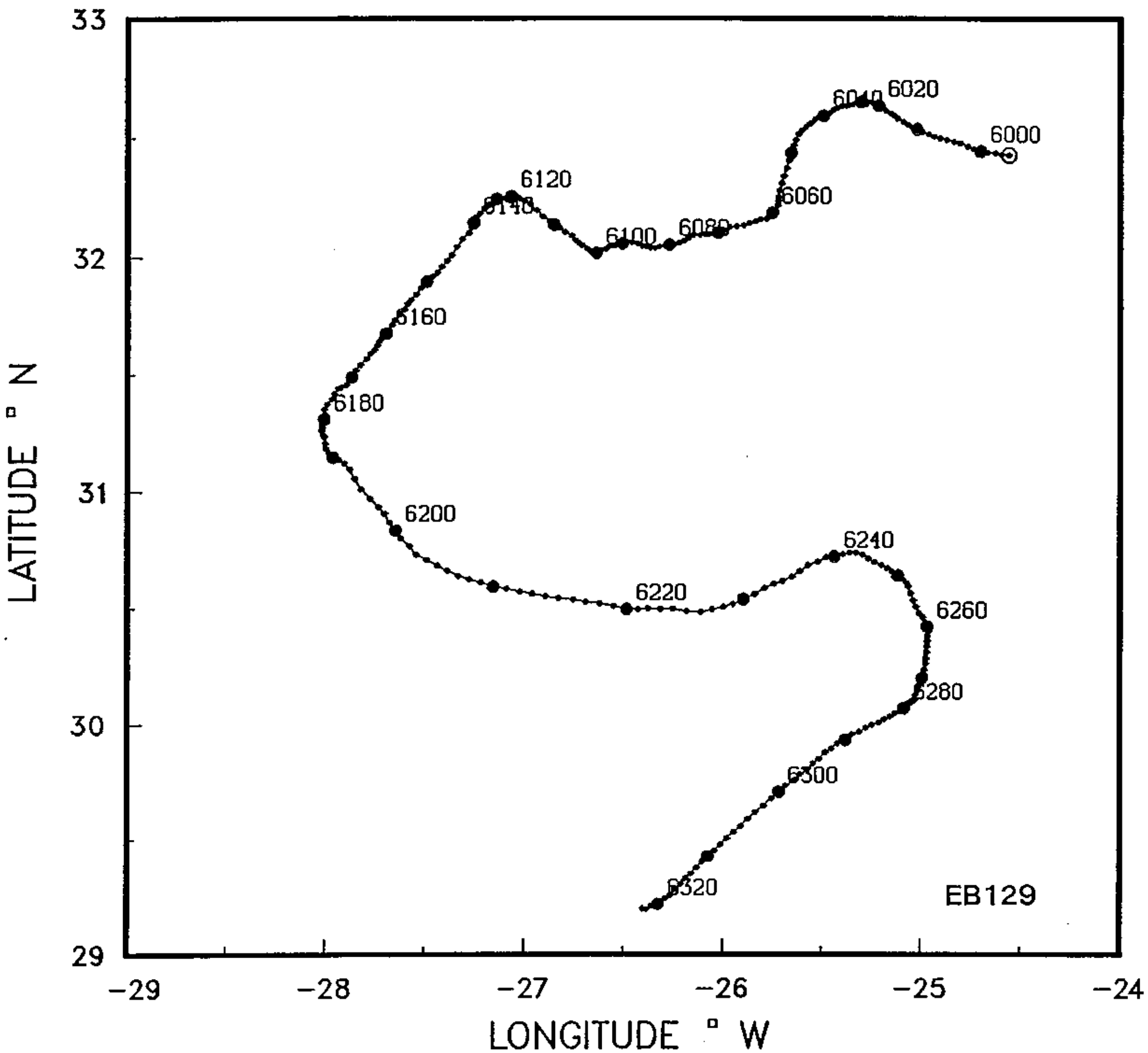
EASTERN BASIN 127



10-MAY-86 12:38:48

PLOT 2 OF 2
.SPL

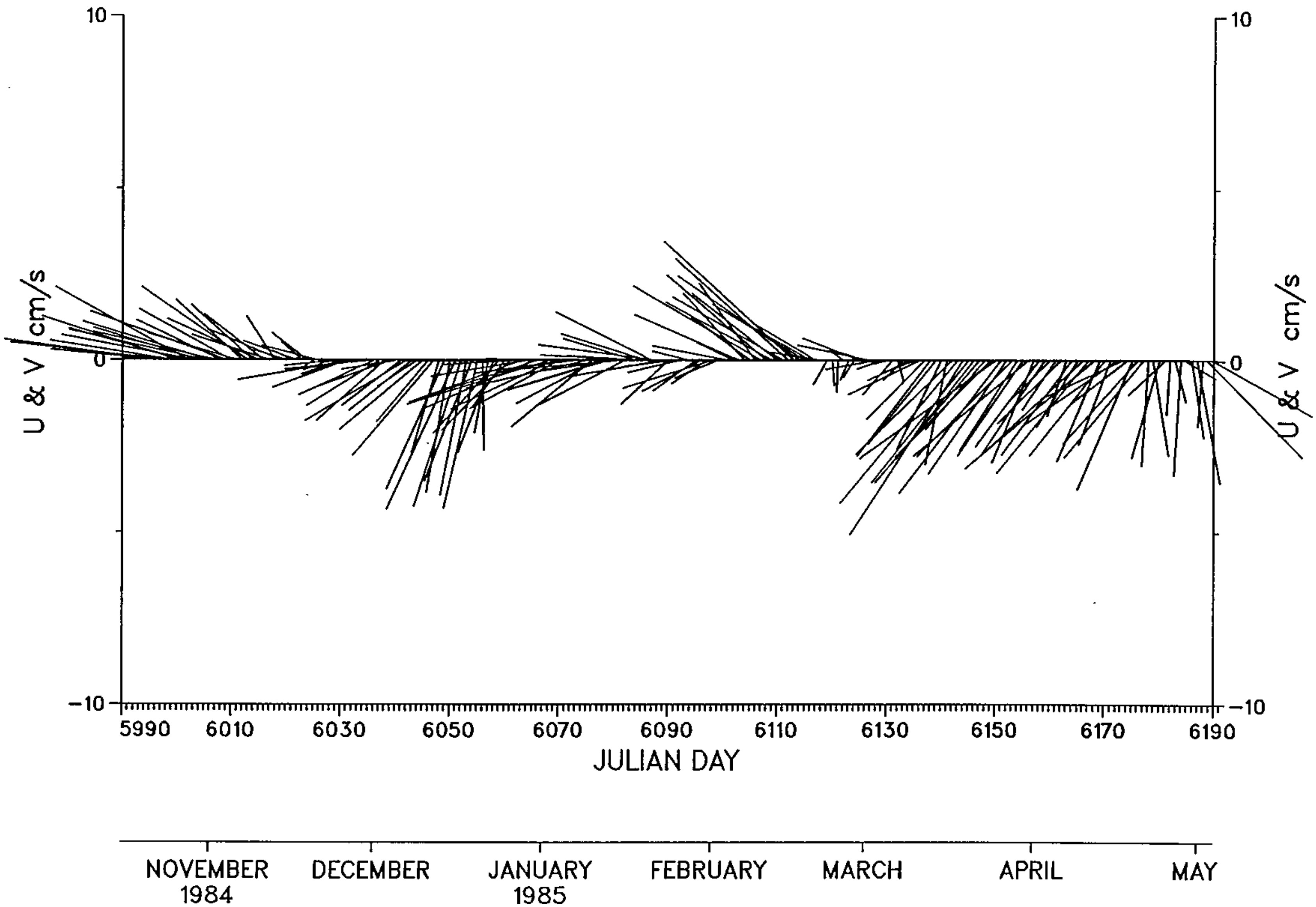
EASTERN BASIN 129



18-JUN-86 10:30:19

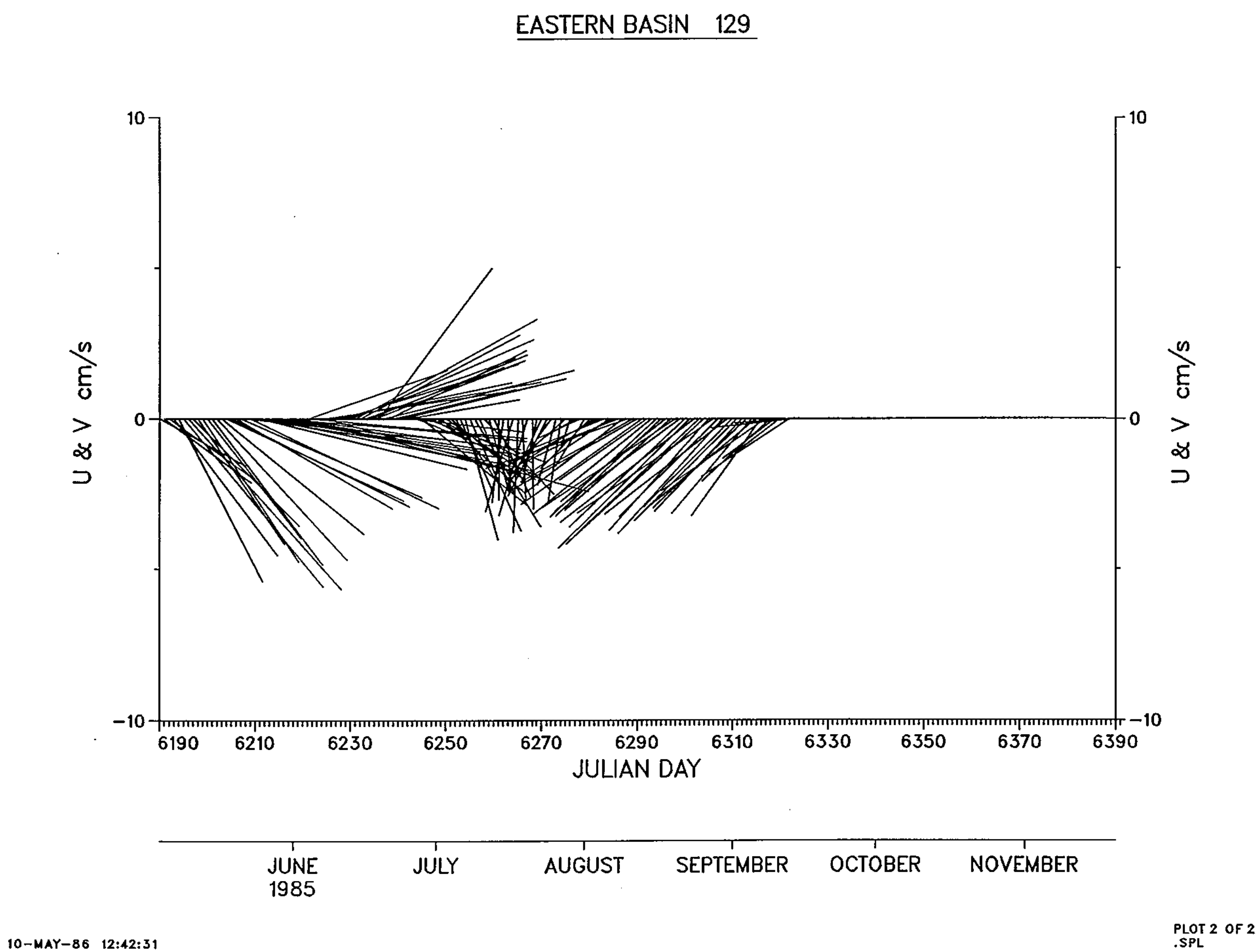
PLOT 1 OF 1
.FIN

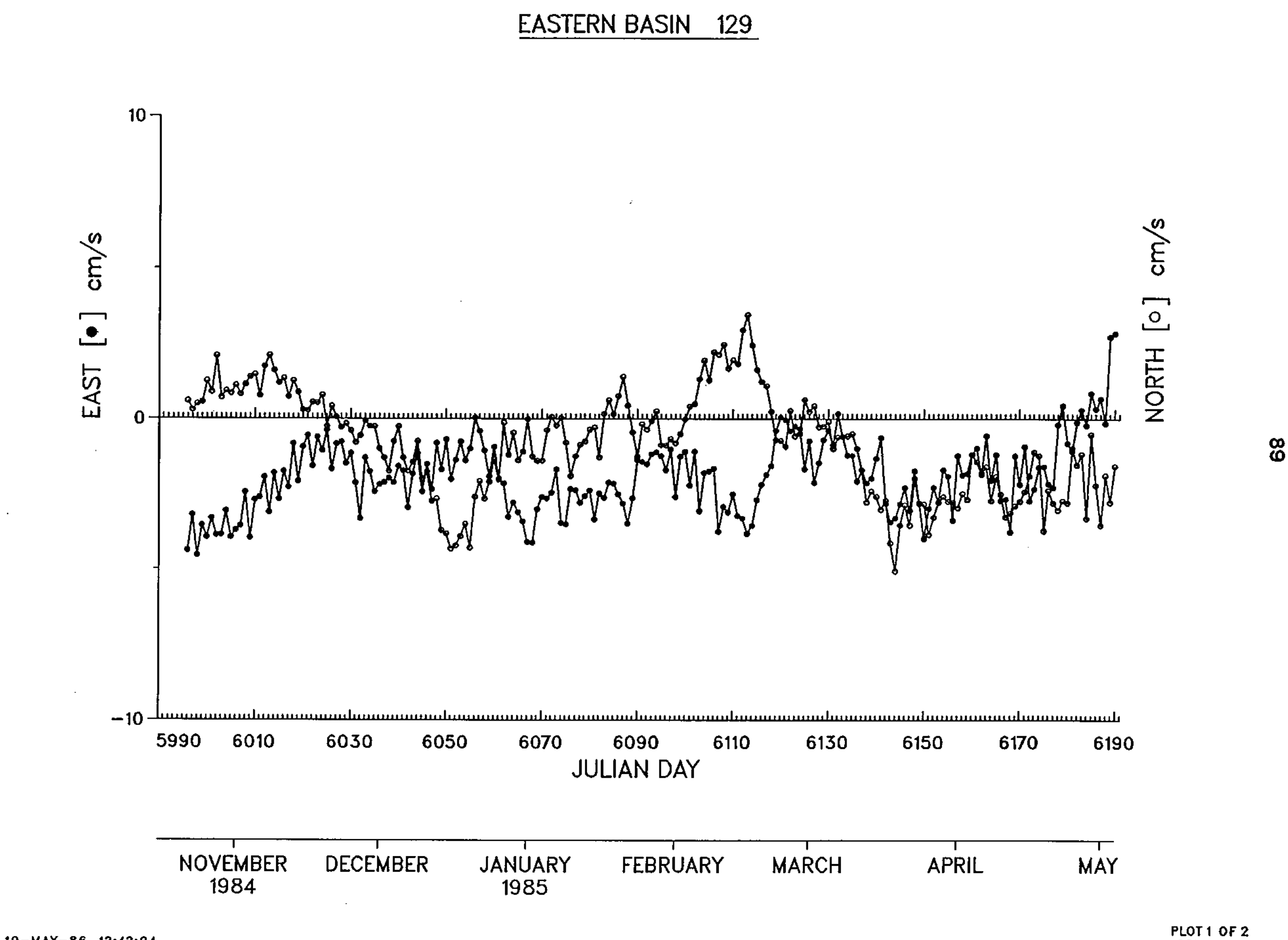
EASTERN BASIN 129

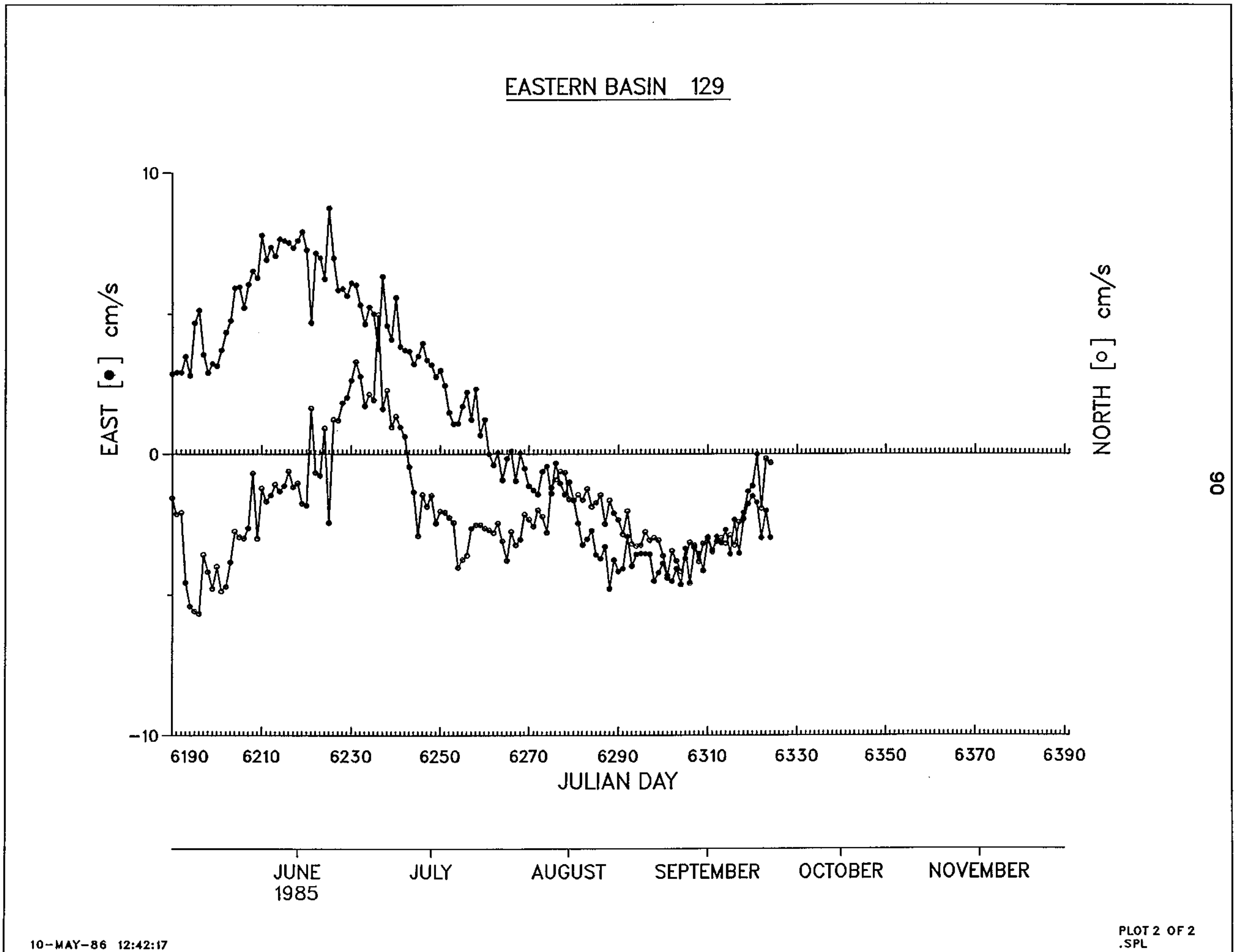


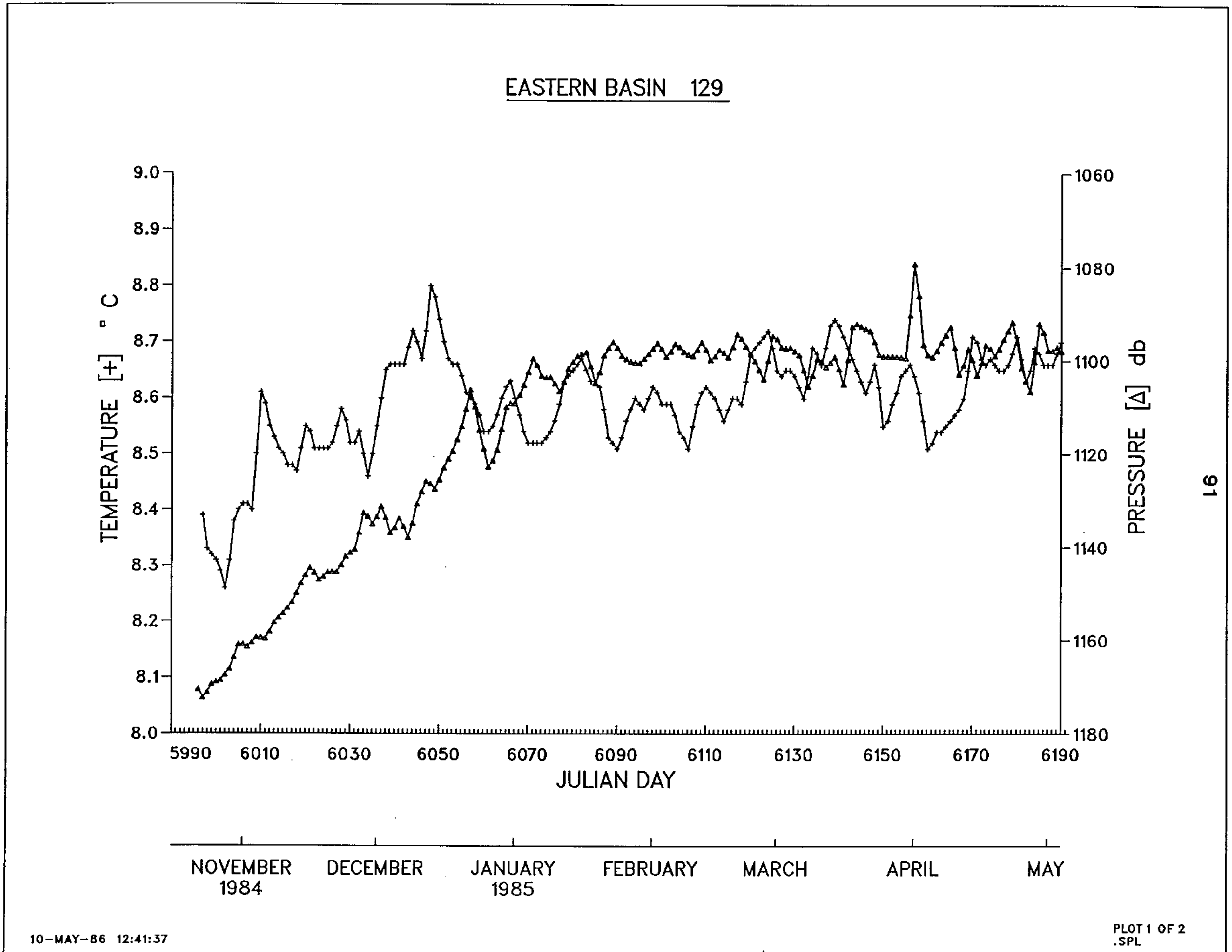
10-MAY-86 12:42:24

PLOT 1 OF 2
.SPL

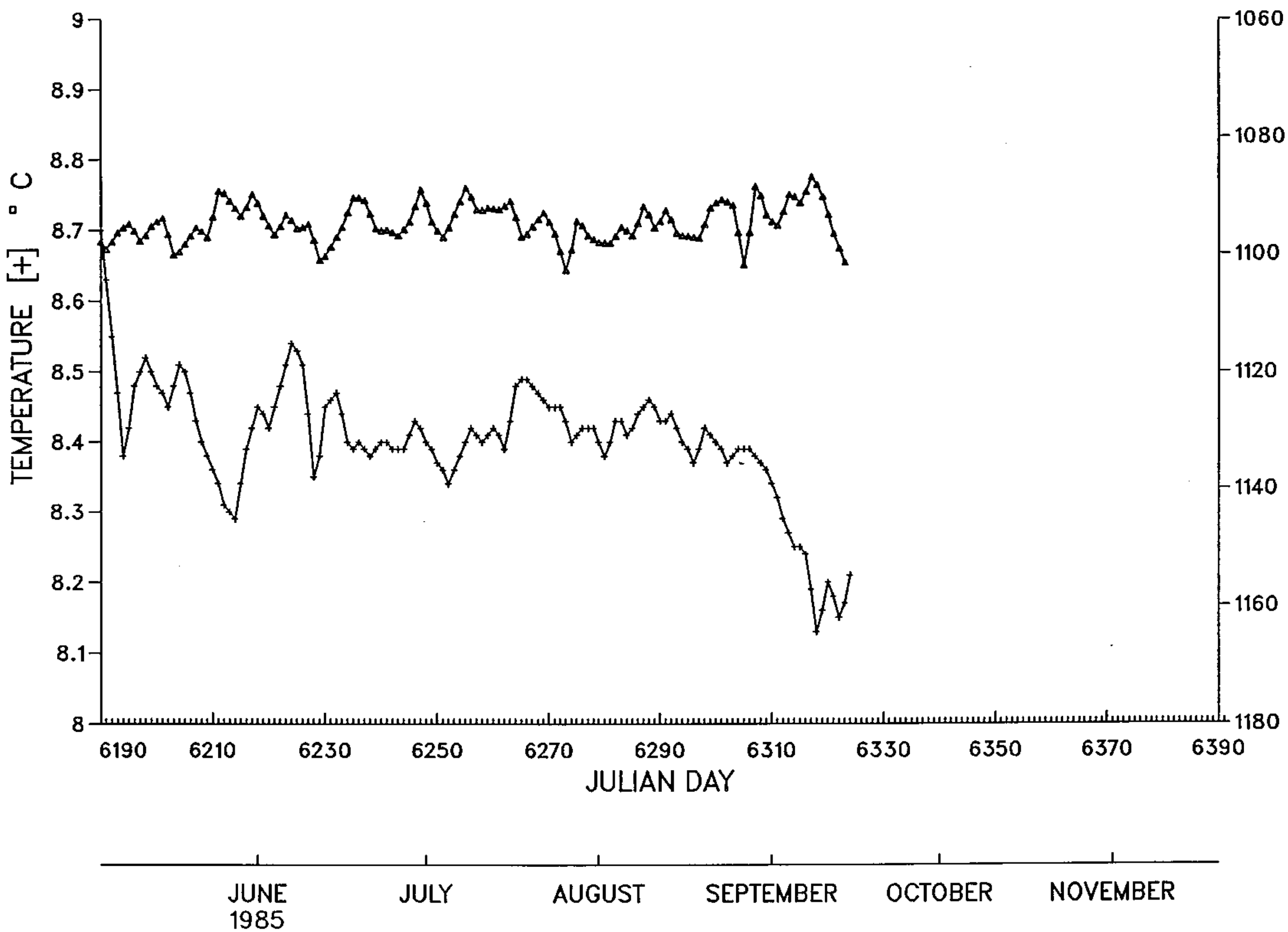

EASTERN BASIN 129
10
0
−10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:42:31
PLOT 2 OF 2
.SPL


EASTERN BASIN 129
10
0
-10
EAST [•] cm/s
NORTH [o] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:42:04
PLOT 1 OF 2
.SPL


EASTERN BASIN 129
10
0
-10
EAST [●] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:42:17
PLOT 2 OF 2
.SPL


EASTERN BASIN 129
TEMPERATURE [+] °C
9.0
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8.0
PRESSURE [Δ] db
1060
1080
1100
1120
1140
1160
1180
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:41:37
PLOT 1 OF 2
.SPL

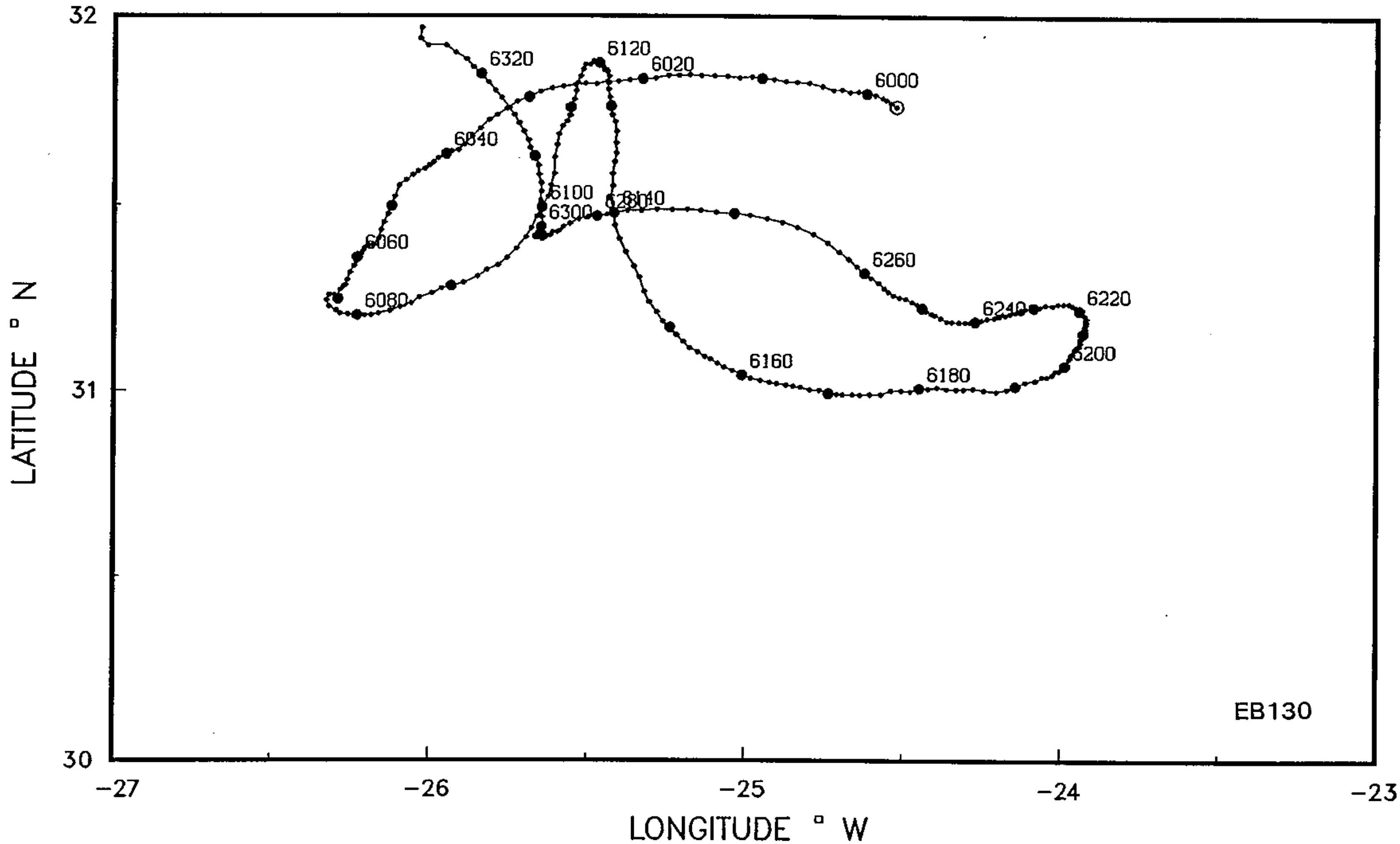
EASTERN BASIN 129



10-MAY-86 12:41:47

PLOT 2 OF 2
.SPL

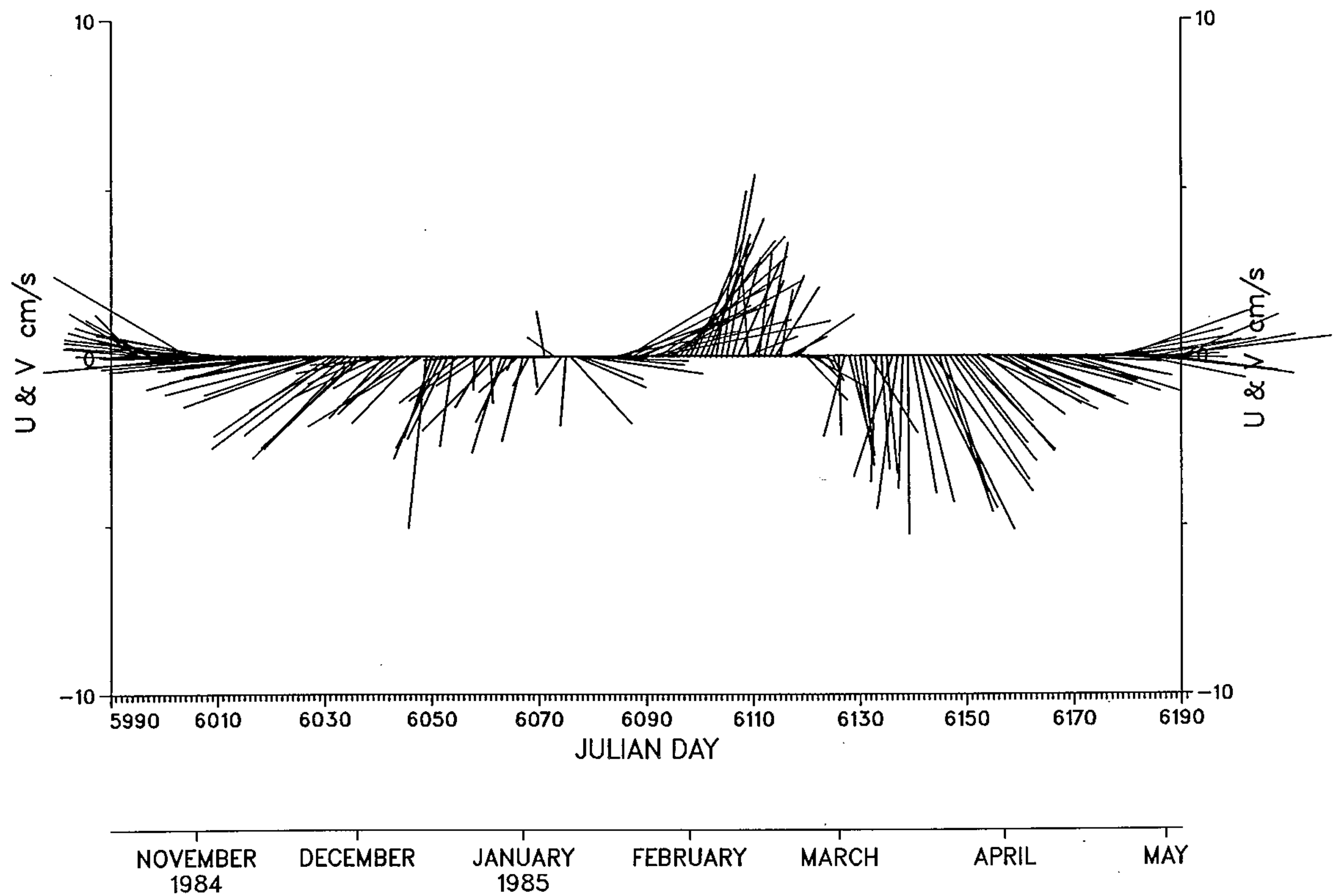
EASTERN BASIN 130



18-JUN-86 10:31:06

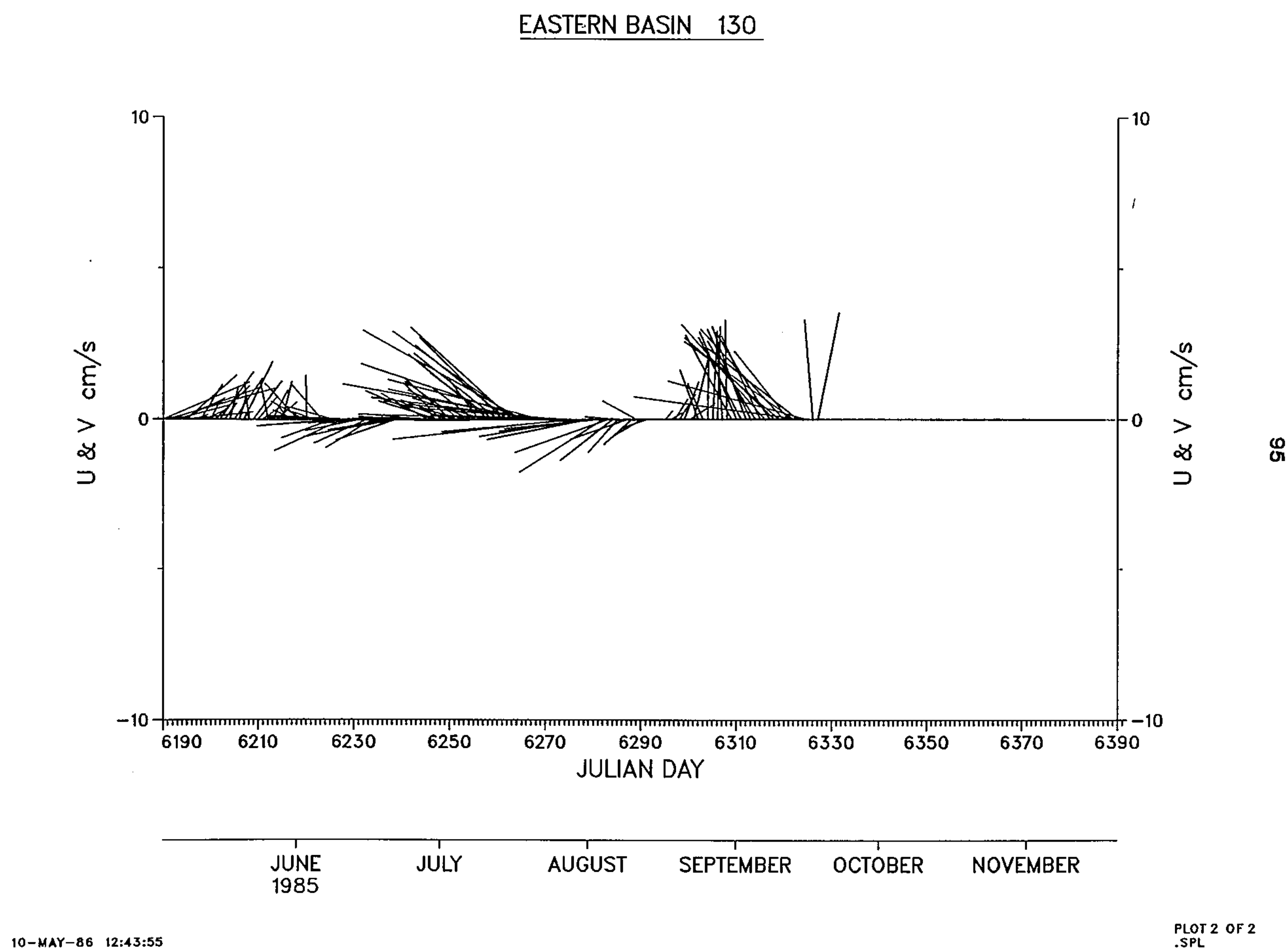
PLOT 1 OF 1
.FIN

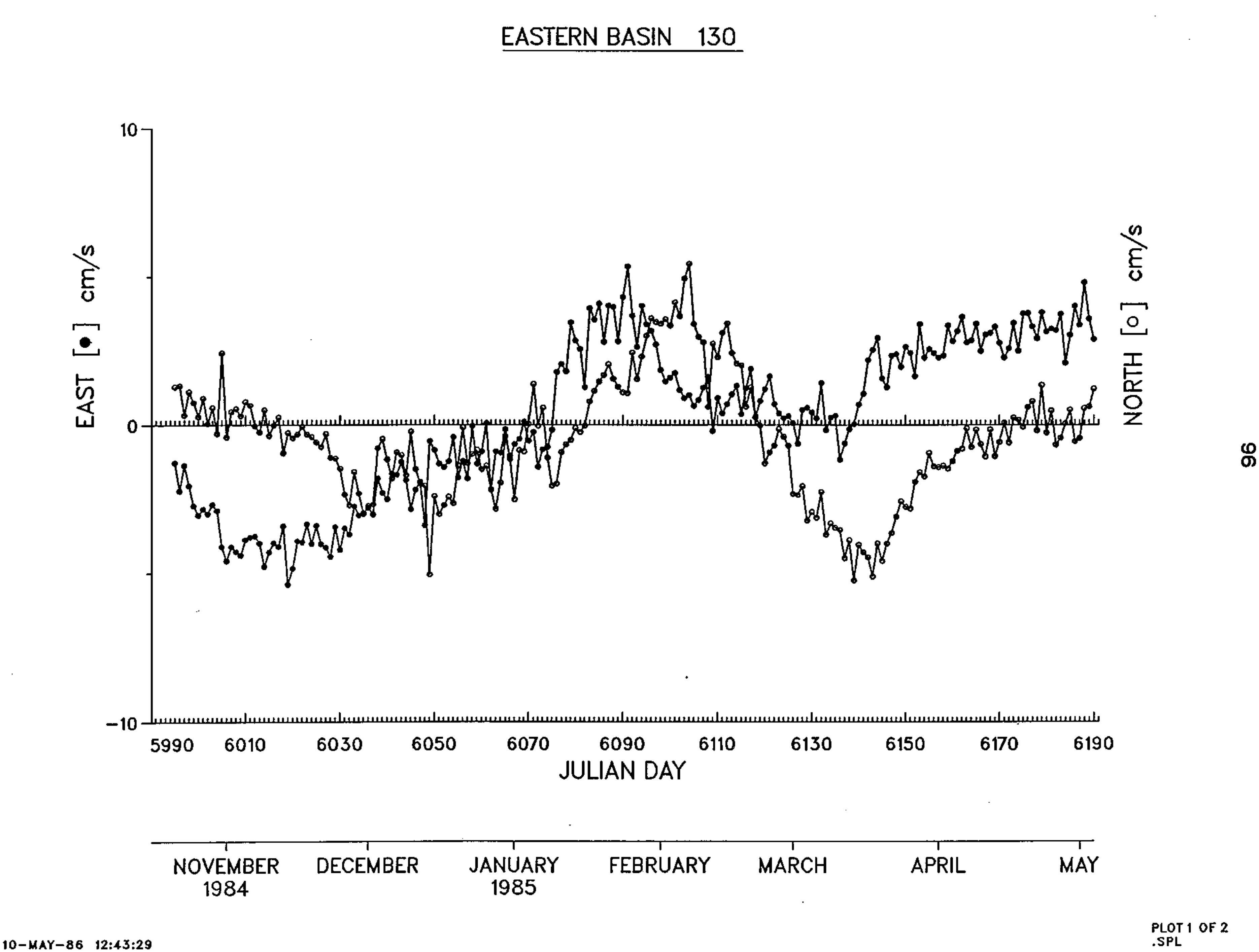
EASTERN BASIN 130



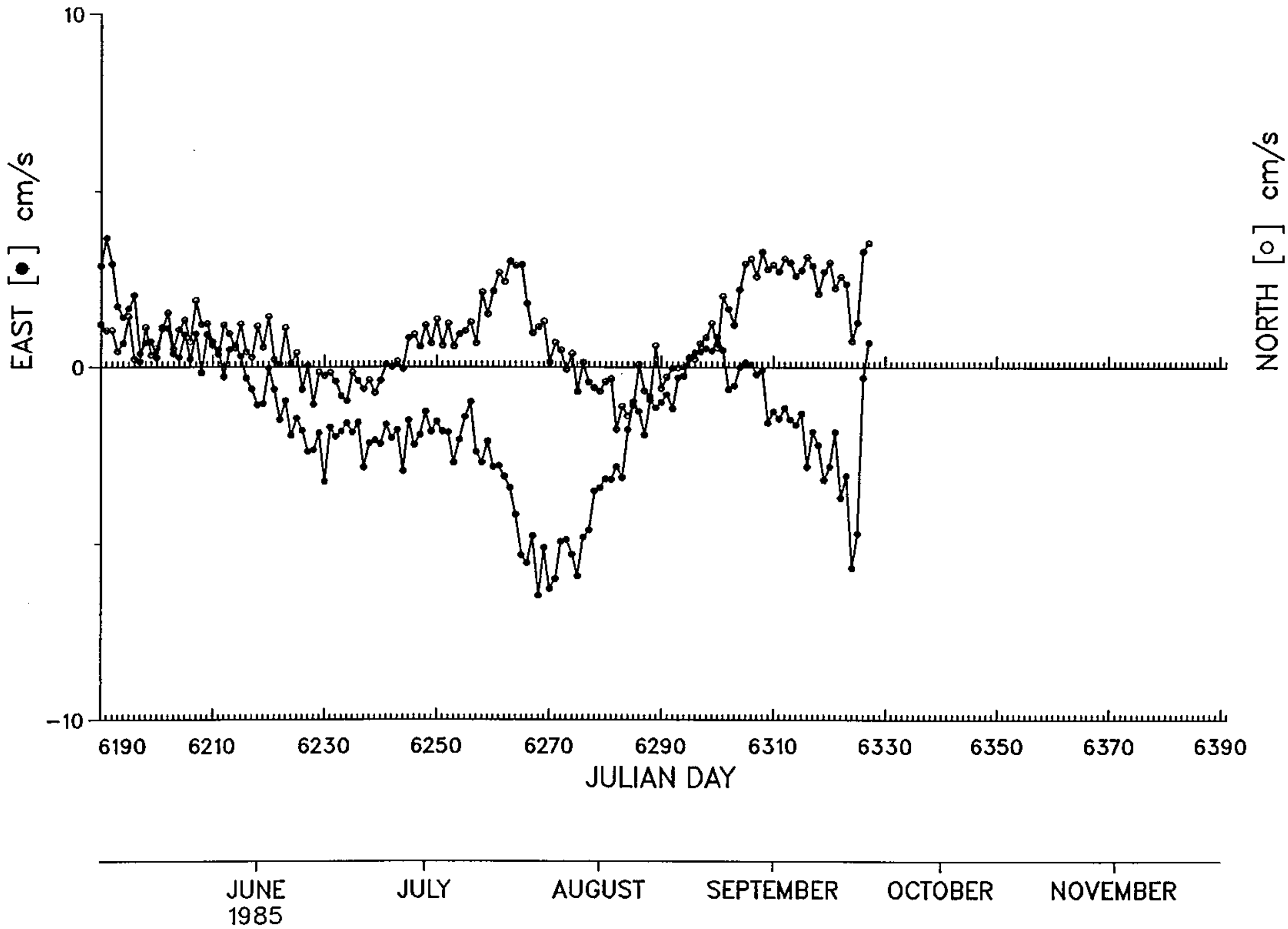
10-MAY-86 12:43:49

PLOT 1 OF 2
.SPL


EASTERN BASIN 130
10
0
-10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:43:55
PLOT 2 OF 2
.SPL

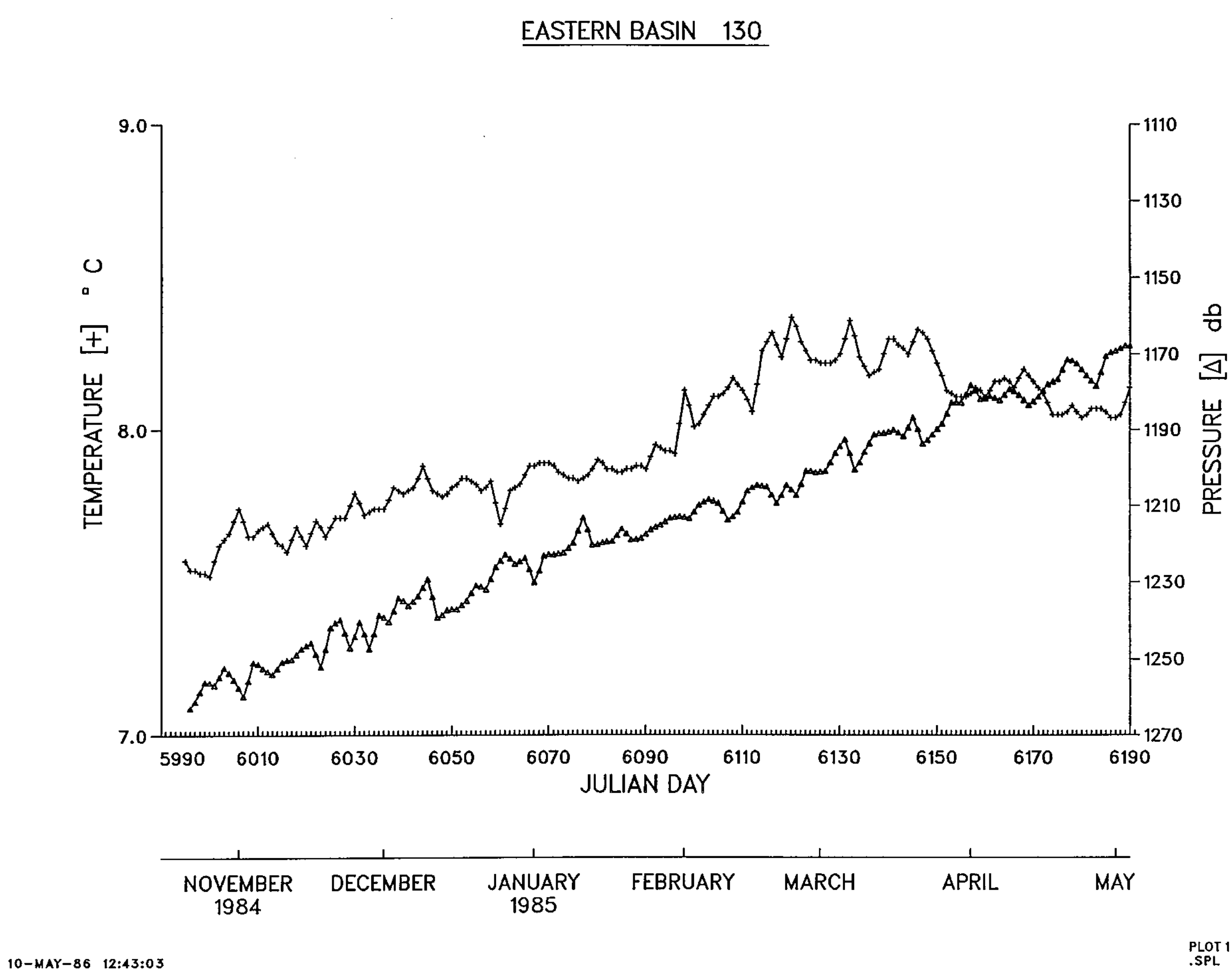

EASTERN BASIN 130
EAST [●] cm/s
NORTH [o] cm/s
10
0
−10
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:43:29
PLOT 1 OF 2
.SPL

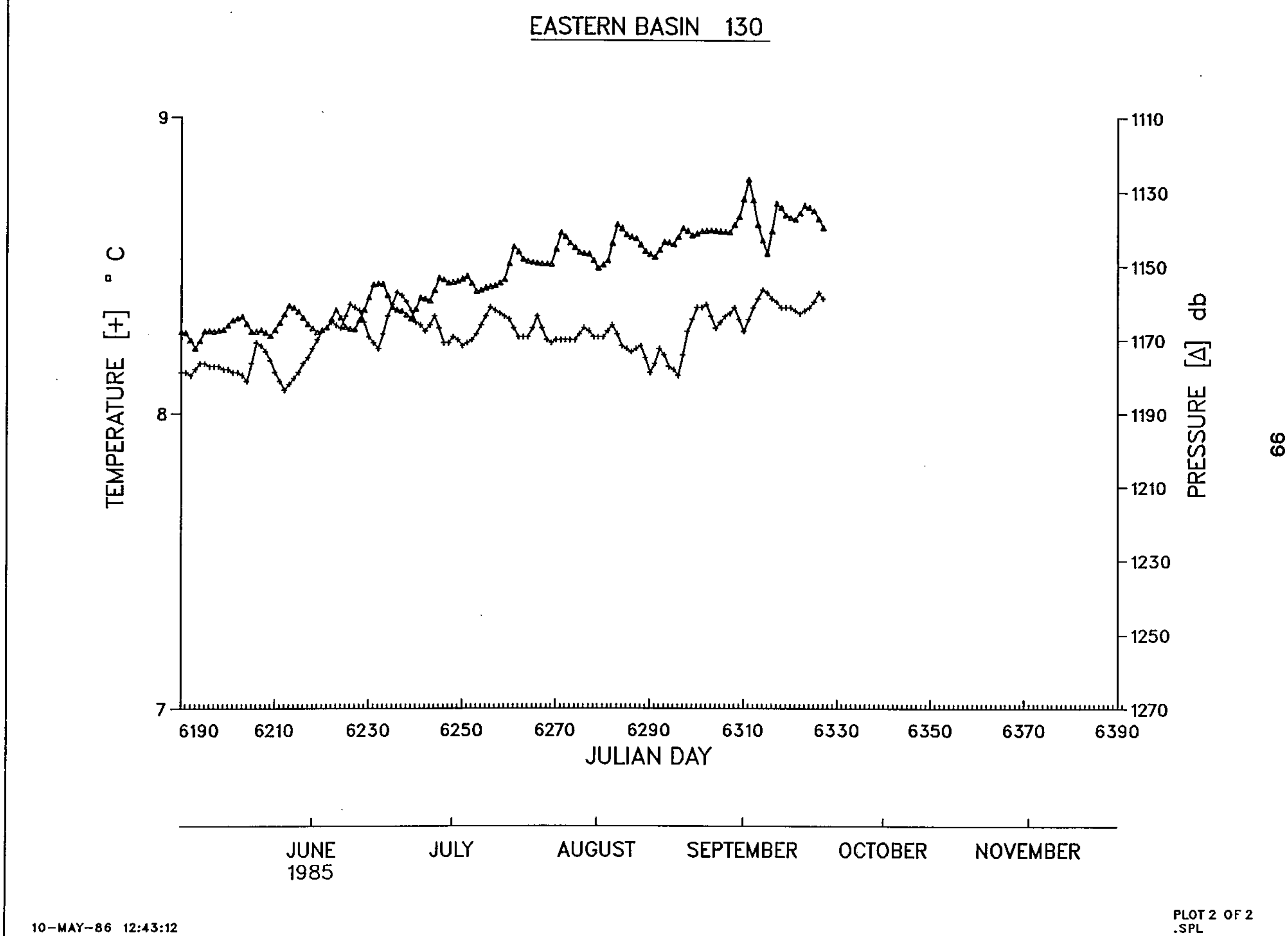
EASTERN BASIN 130



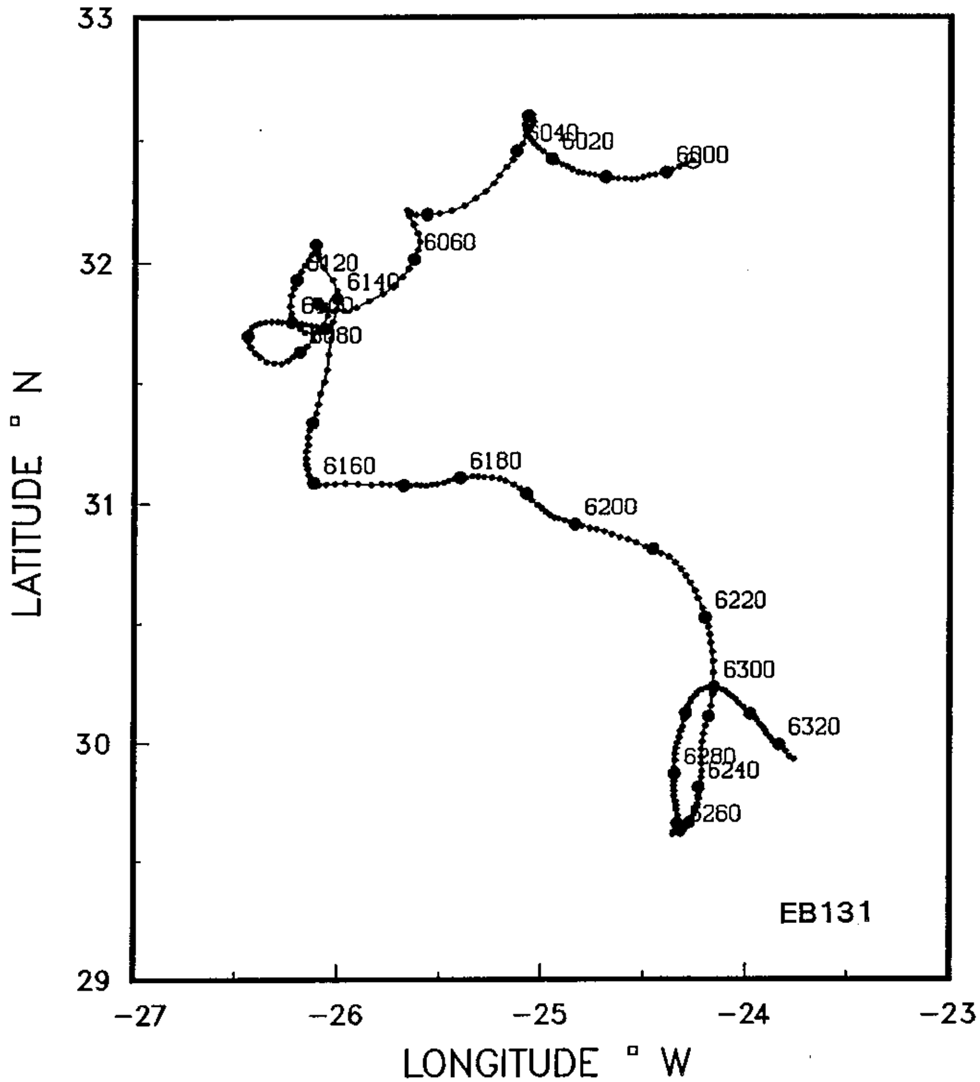
10−MAY−86 12:43:43

PLOT 2 OF 2
.SPL


EASTERN BASIN 130
9.0
8.0
7.0
TEMPERATURE [+] °C
1110
1130
1150
1170
1190
1210
1230
1250
1270
PRESSURE [Δ] db
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:43:03
PLOT 1 OF 2 .SPL


EASTERN BASIN 130
TEMPERATURE [+] °C
9
8
7
PRESSURE [Δ] db
1110
1130
1150
1170
1190
1210
1230
1250
1270
6190 6210 6230 6250 6270 6290 6310 6330 6350 6370 6390
JULIAN DAY
JUNE 1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:43:12
PLOT 2 OF 2
.SPL

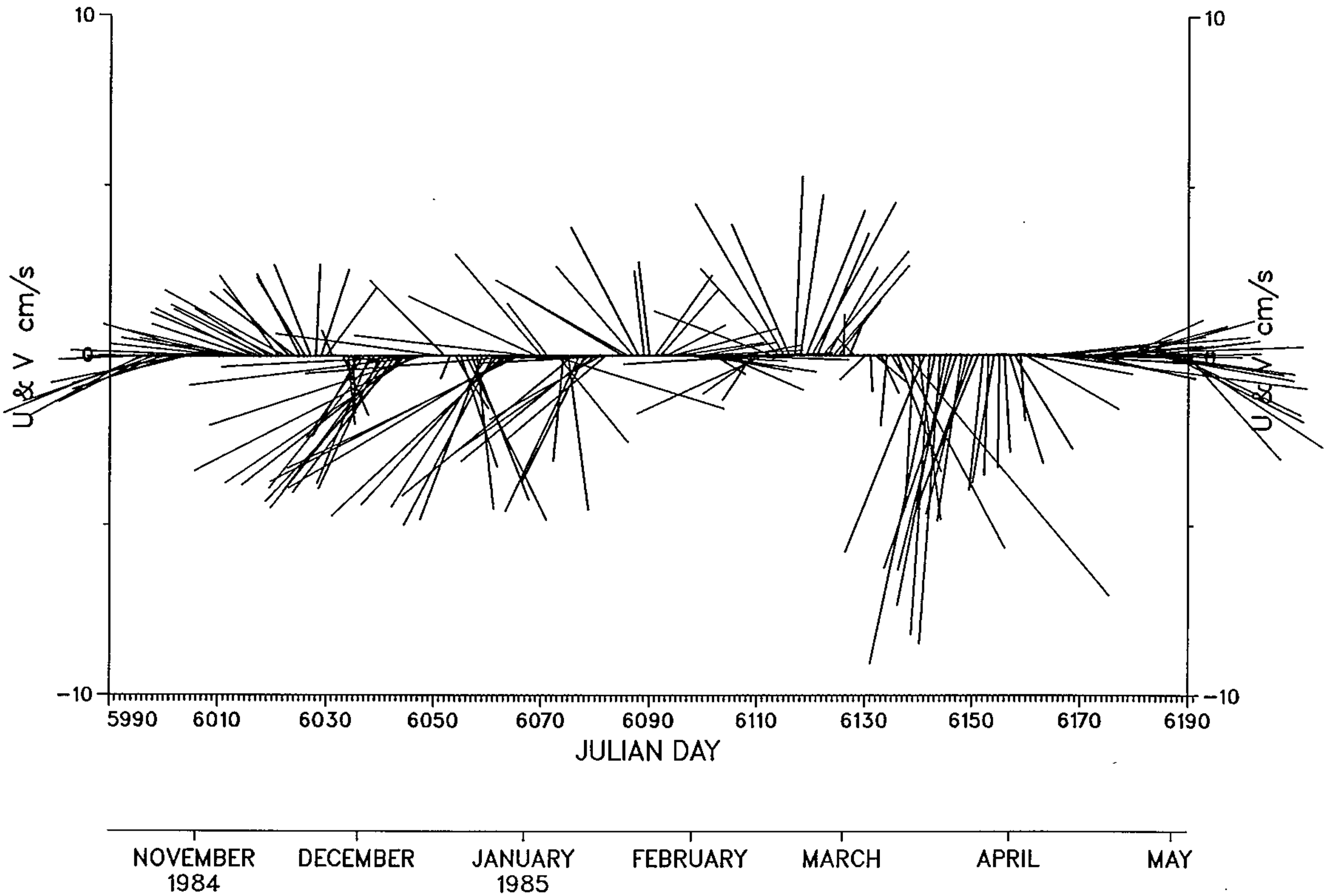
EASTERN BASIN 131



18-JUN-86 10:31:52

PLOT 1 OF 1
.FIN

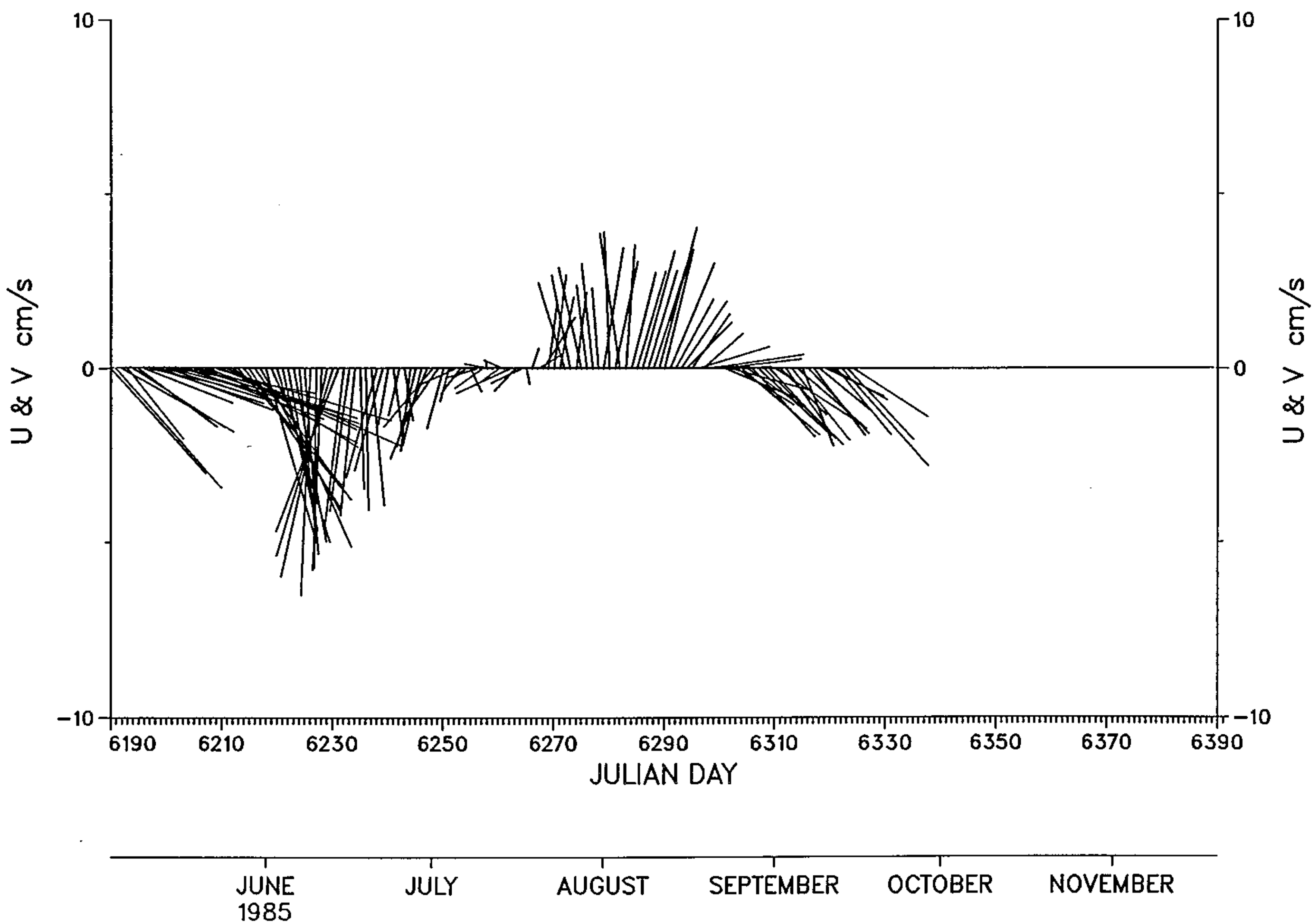
EASTERN BASIN 131



10-MAY-86 12:45:13

PLOT 1 OF 2
.SPL

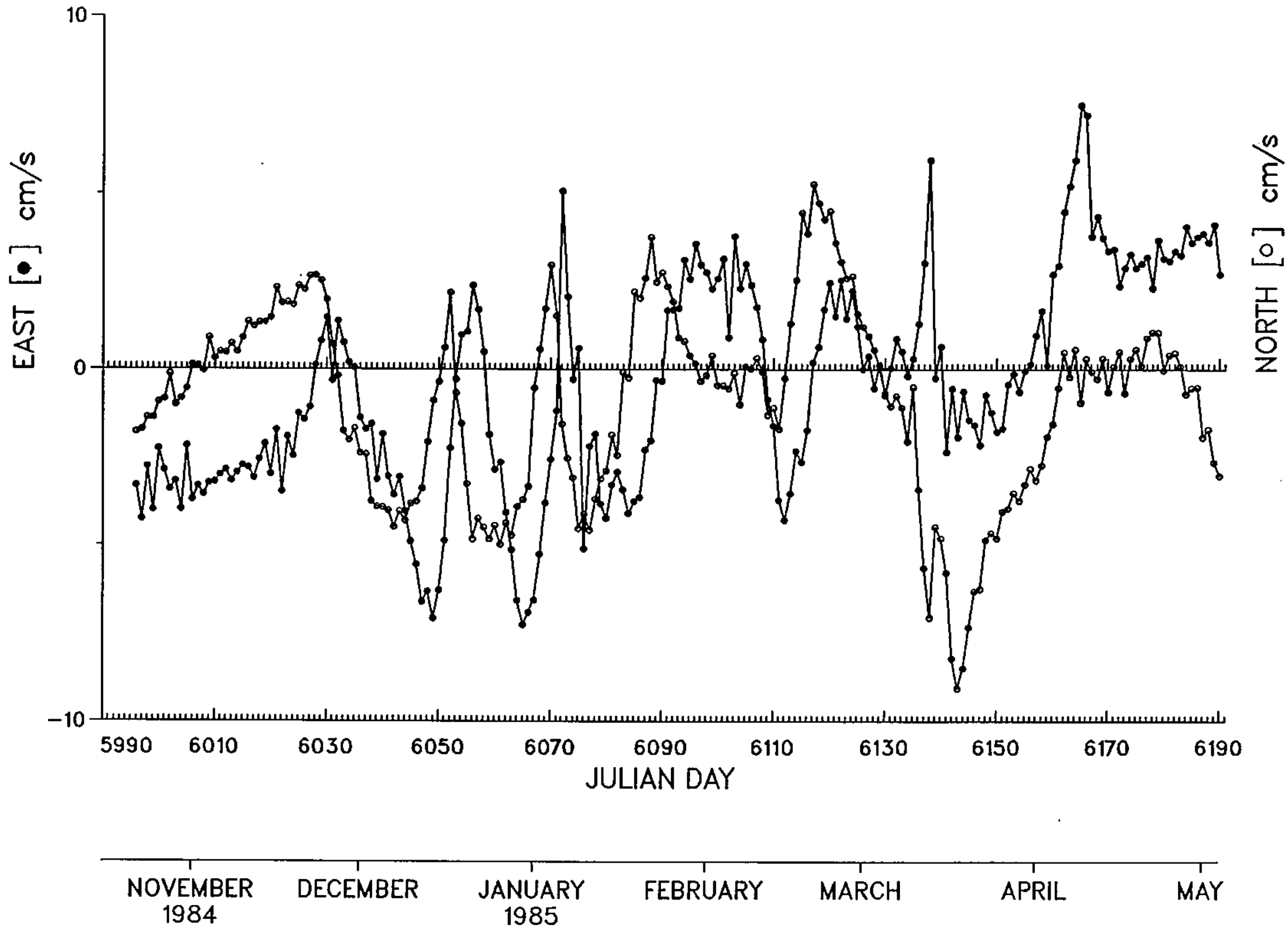
EASTERN BASIN 131



10-MAY-86 12:45:19

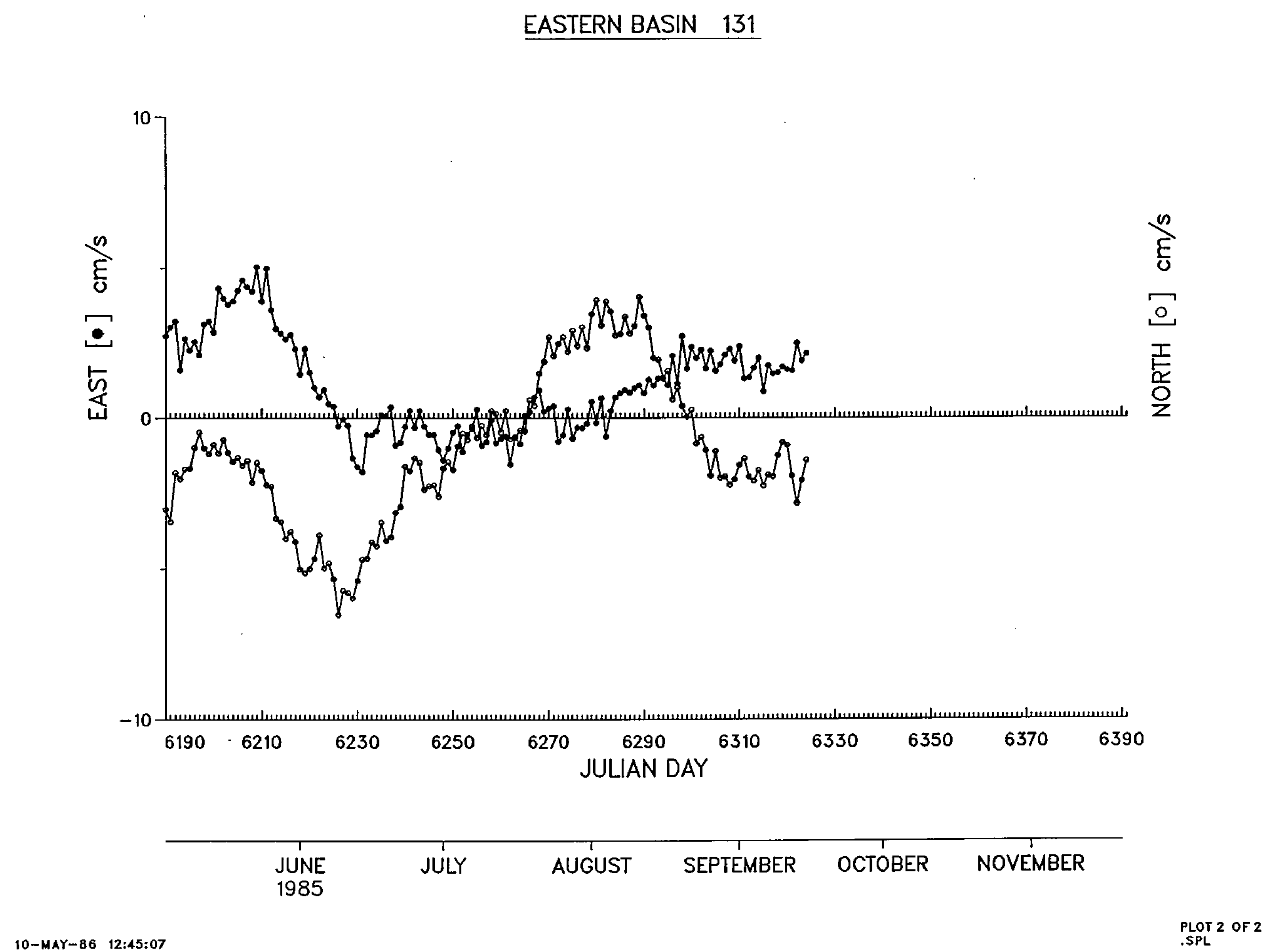
PLOT 2 OF 2
.SPL

EASTERN BASIN 131

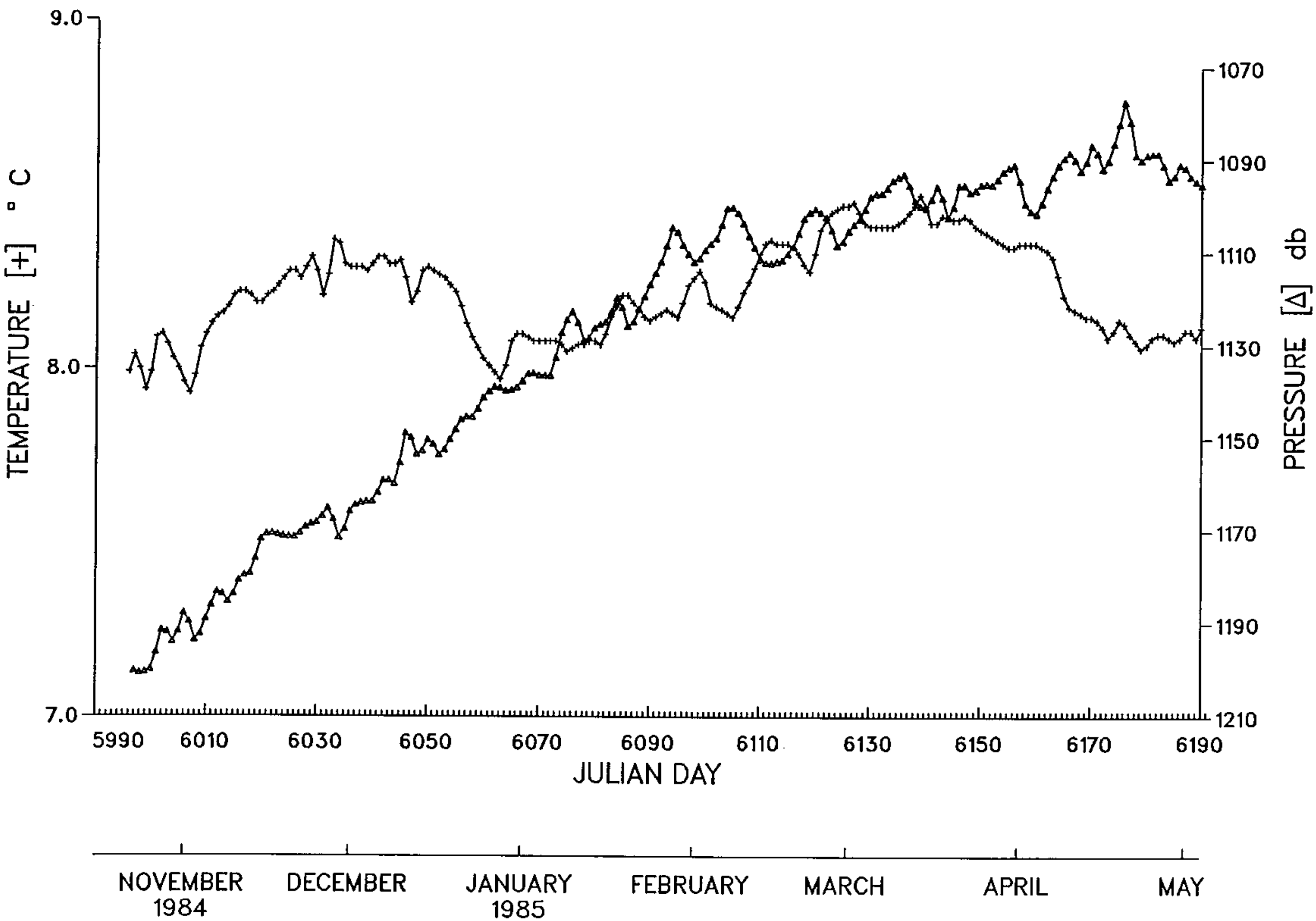


10-MAY-86 12:44:53

PLOT 1 OF 2
.SPL

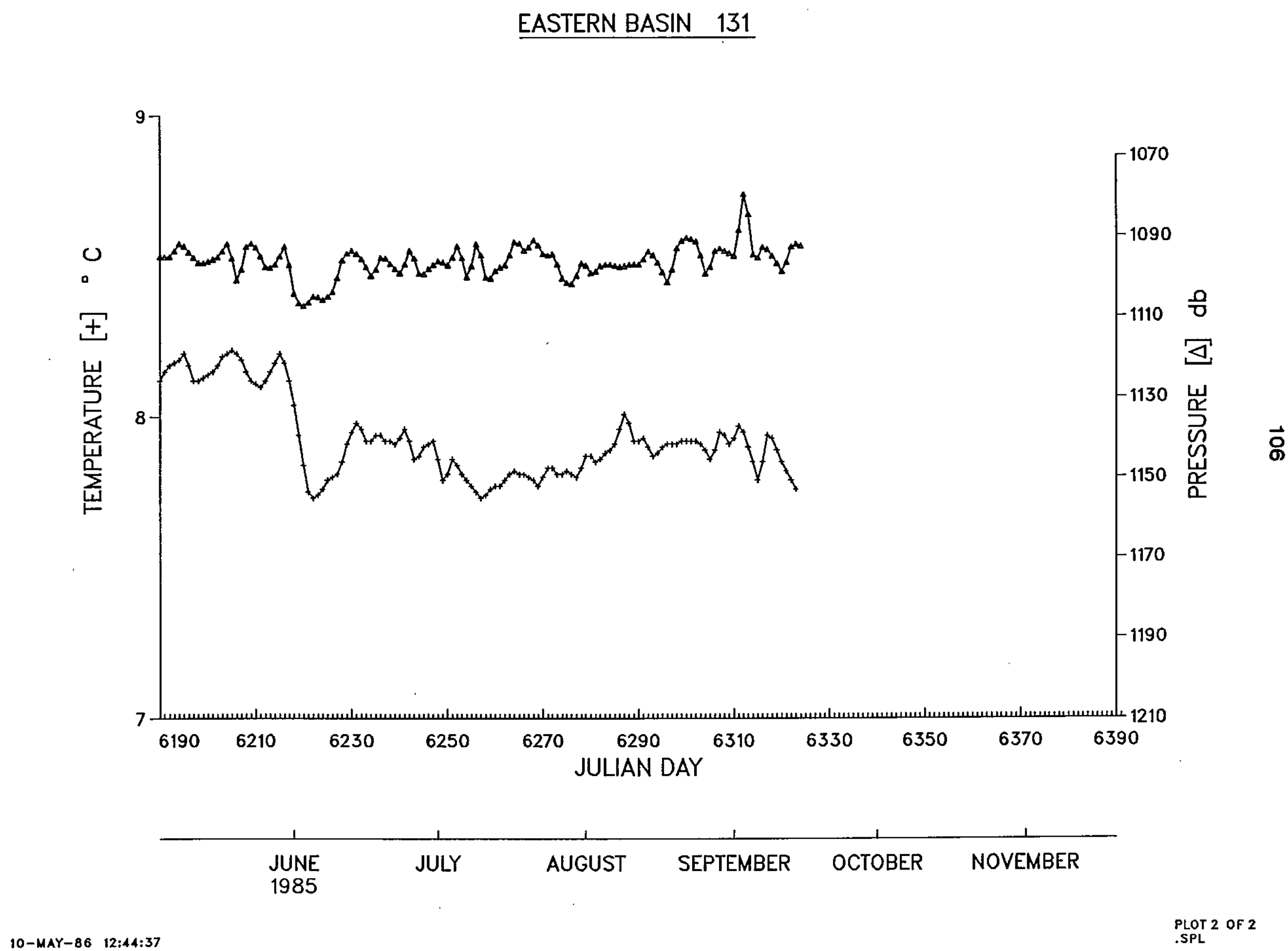

EASTERN BASIN 131
10
0
−10
EAST [●] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:45:07
PLOT 2 OF 2
.SPL

EASTERN BASIN 131

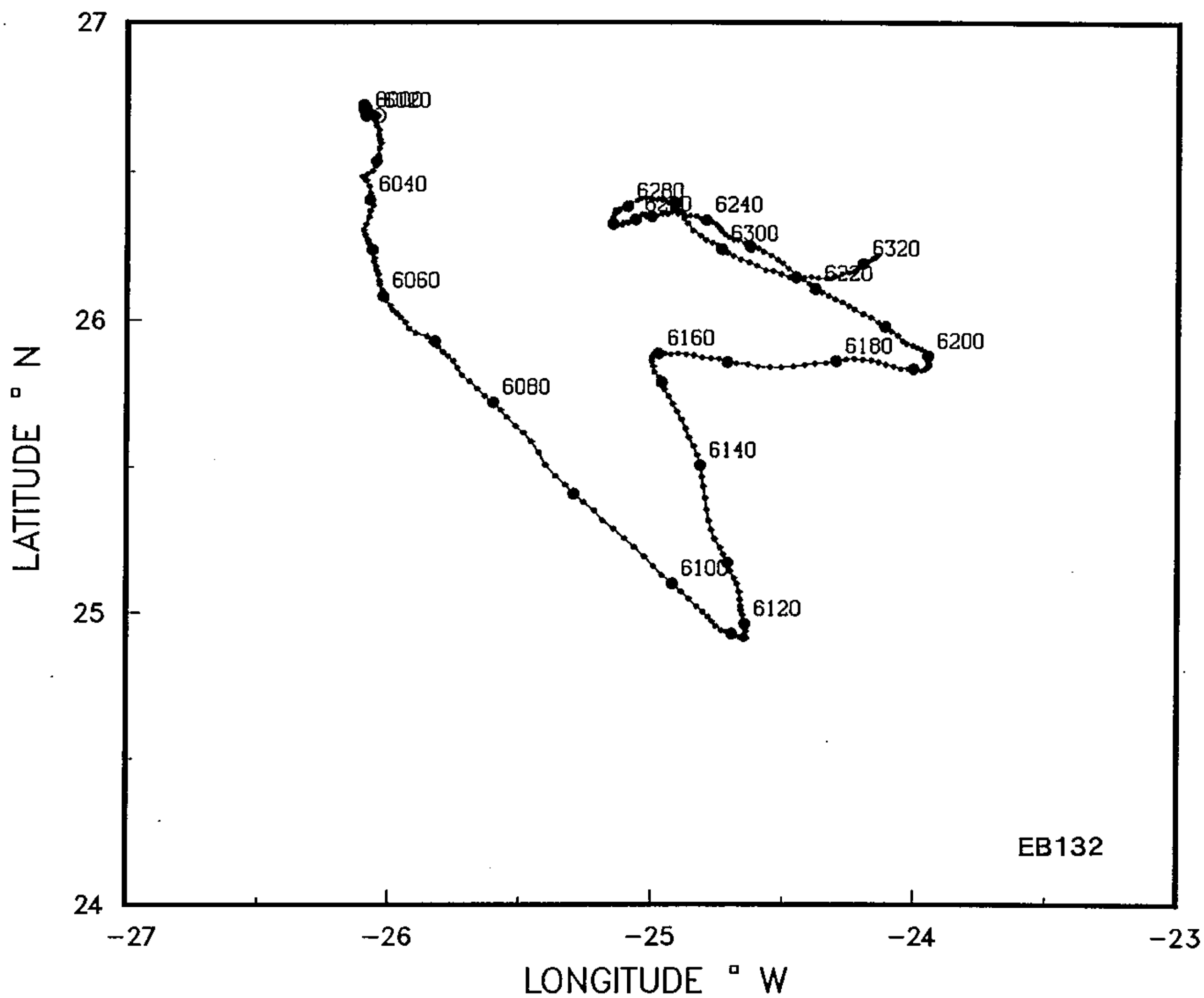


10-MAY-86 12:44:29

PLOT 1 OF 2
.SPL


EASTERN BASIN 131
TEMPERATURE [+] ° C
9
8
7
PRESSURE [Δ] db
1070
1090
1110
1130
1150
1170
1190
1210
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:44:37
PLOT 2 OF 2
.SPL

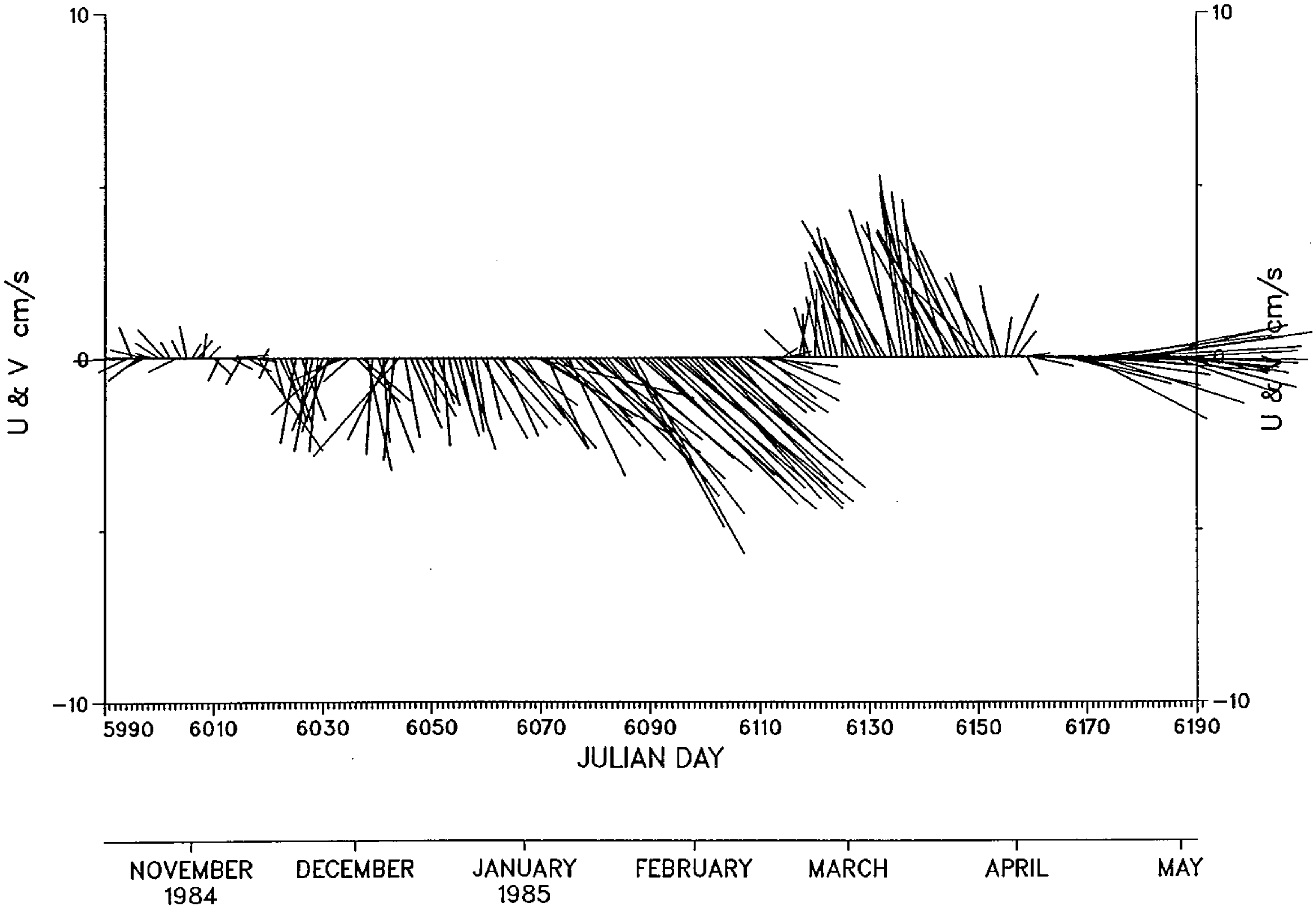
EASTERN BASIN 132



18-JUN-86 10:33:25

PLOT 1 OF 1
.FIN

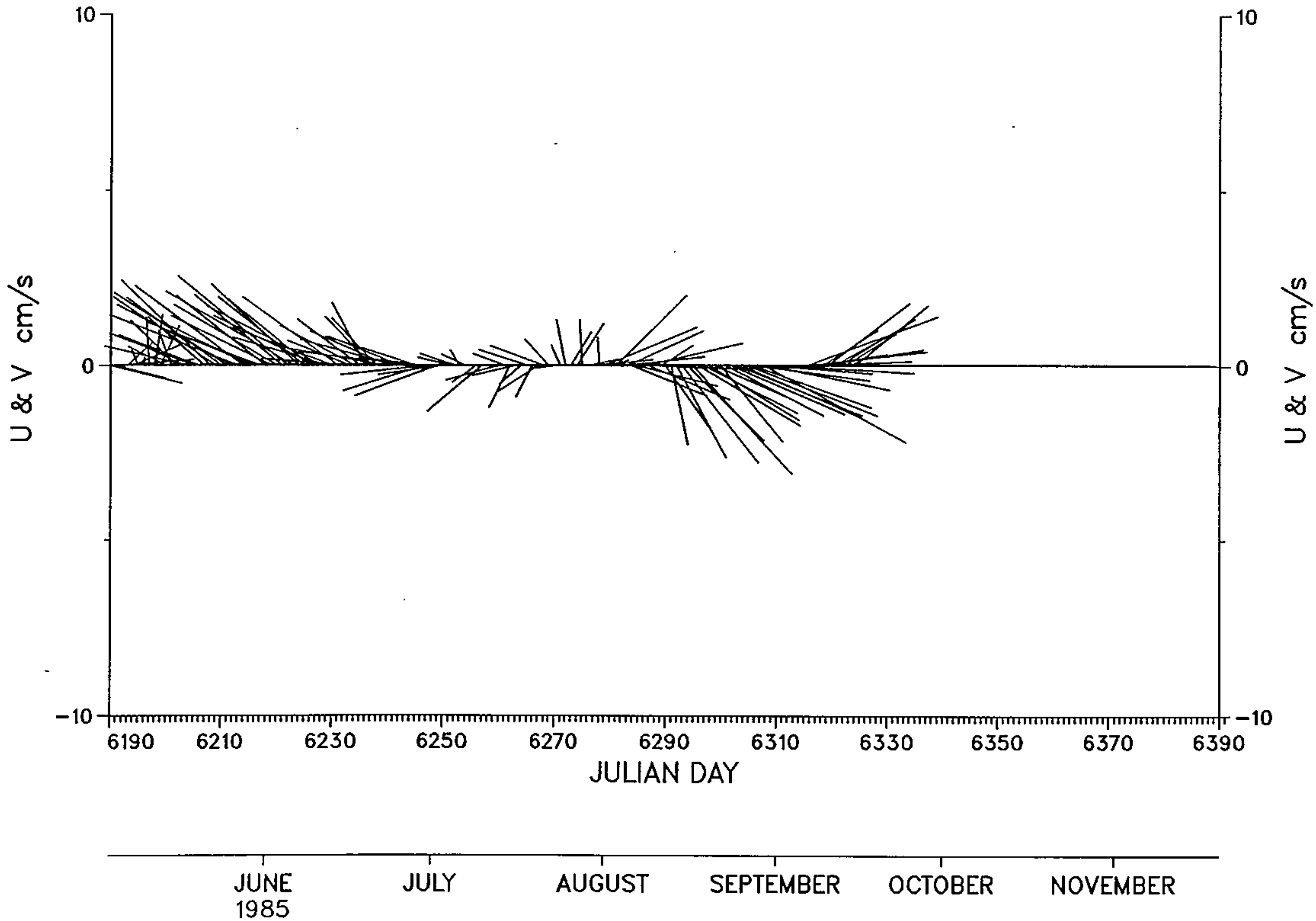
EASTERN BASIN 132



10-MAY-86 12:46:36

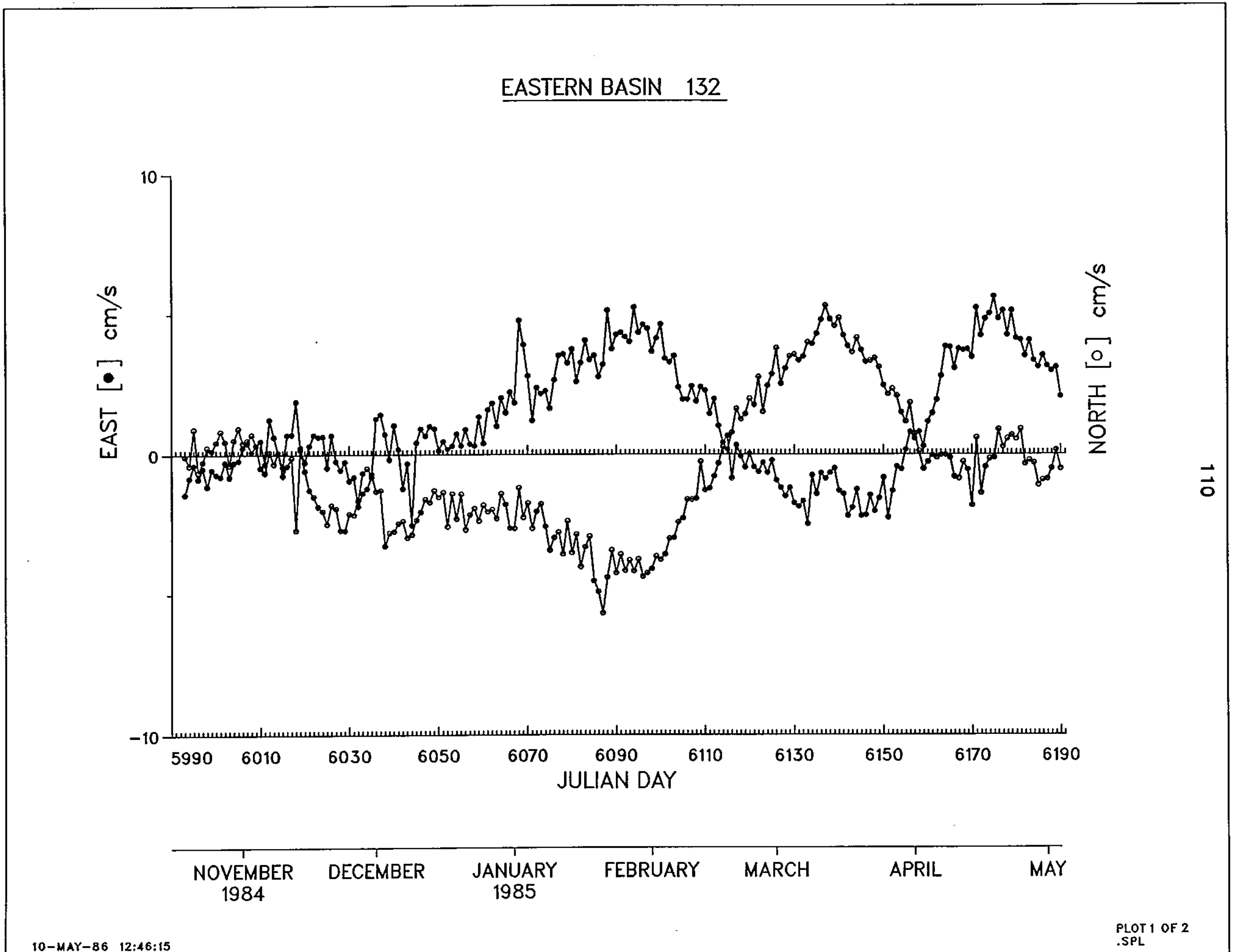
PLOT 1 OF 2
.SPL

EASTERN BASIN 132

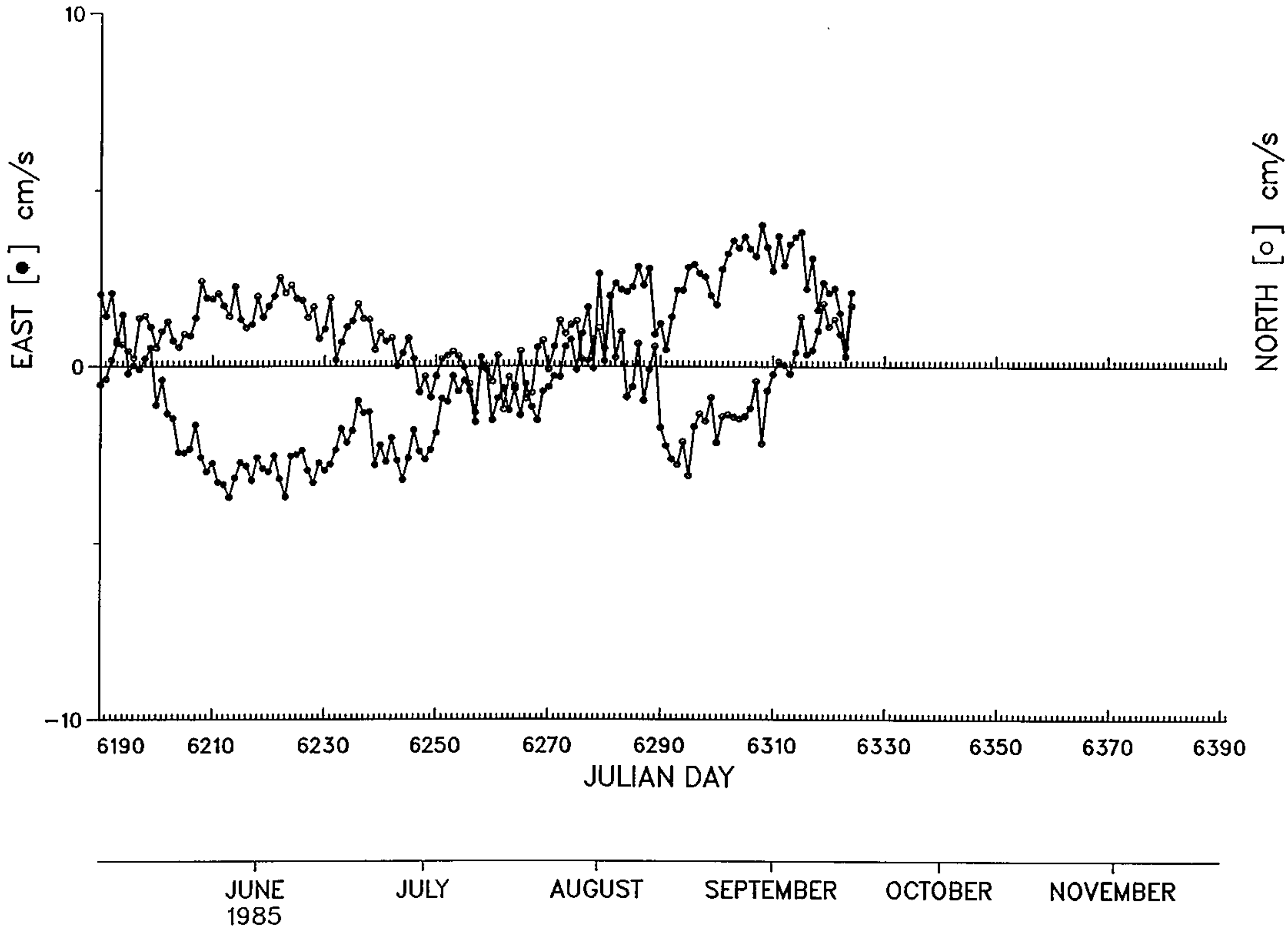


10-MAY-86 12:46:43

PLOT 2 OF 2
.SPL


EASTERN BASIN 132
10
0
−10
EAST [●] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:46:15
PLOT 1 OF 2 .SPL

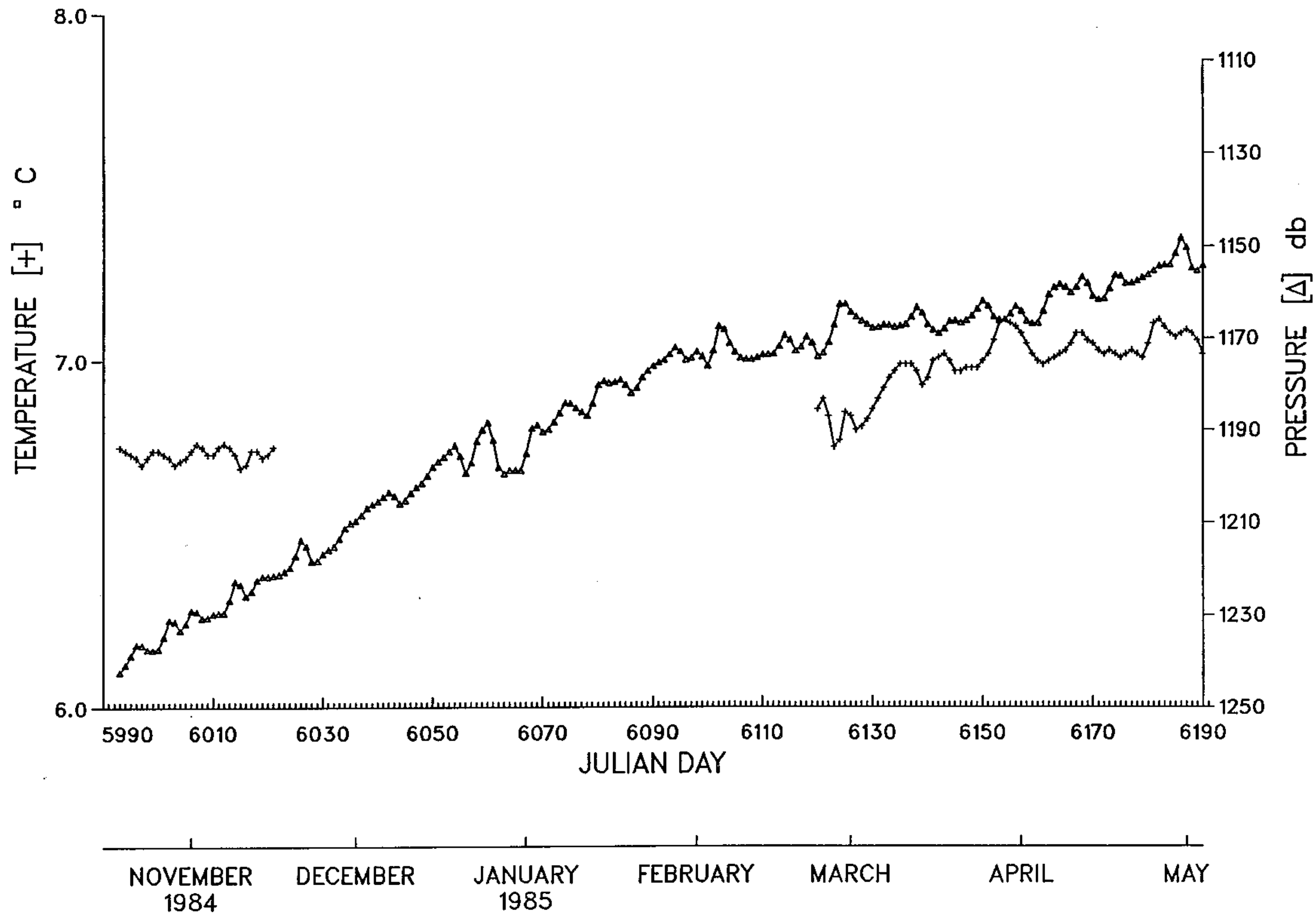
EASTERN BASIN 132



10-MAY-86 12:46:30

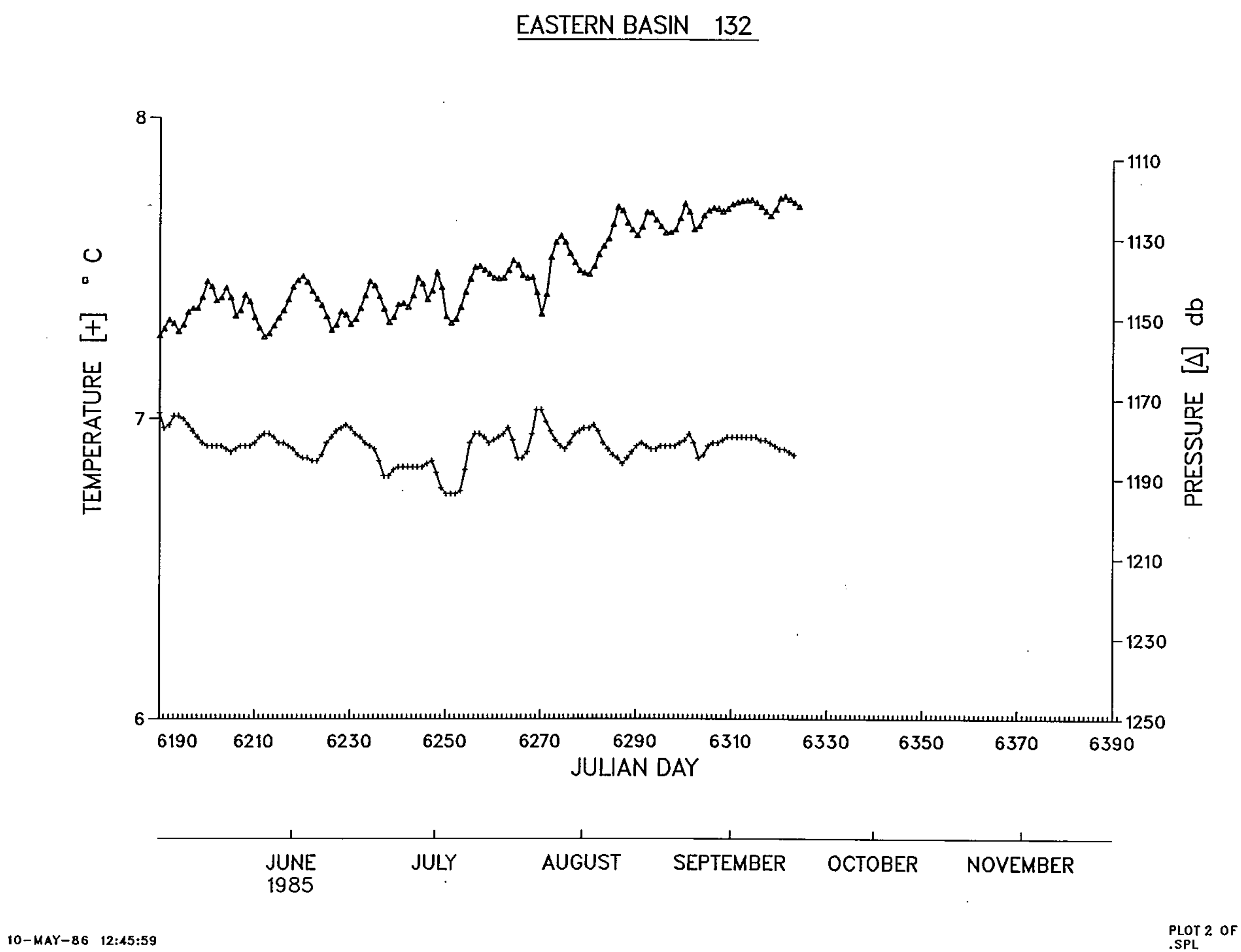
PLOT 2 OF 2
.SPL

EASTERN BASIN 132

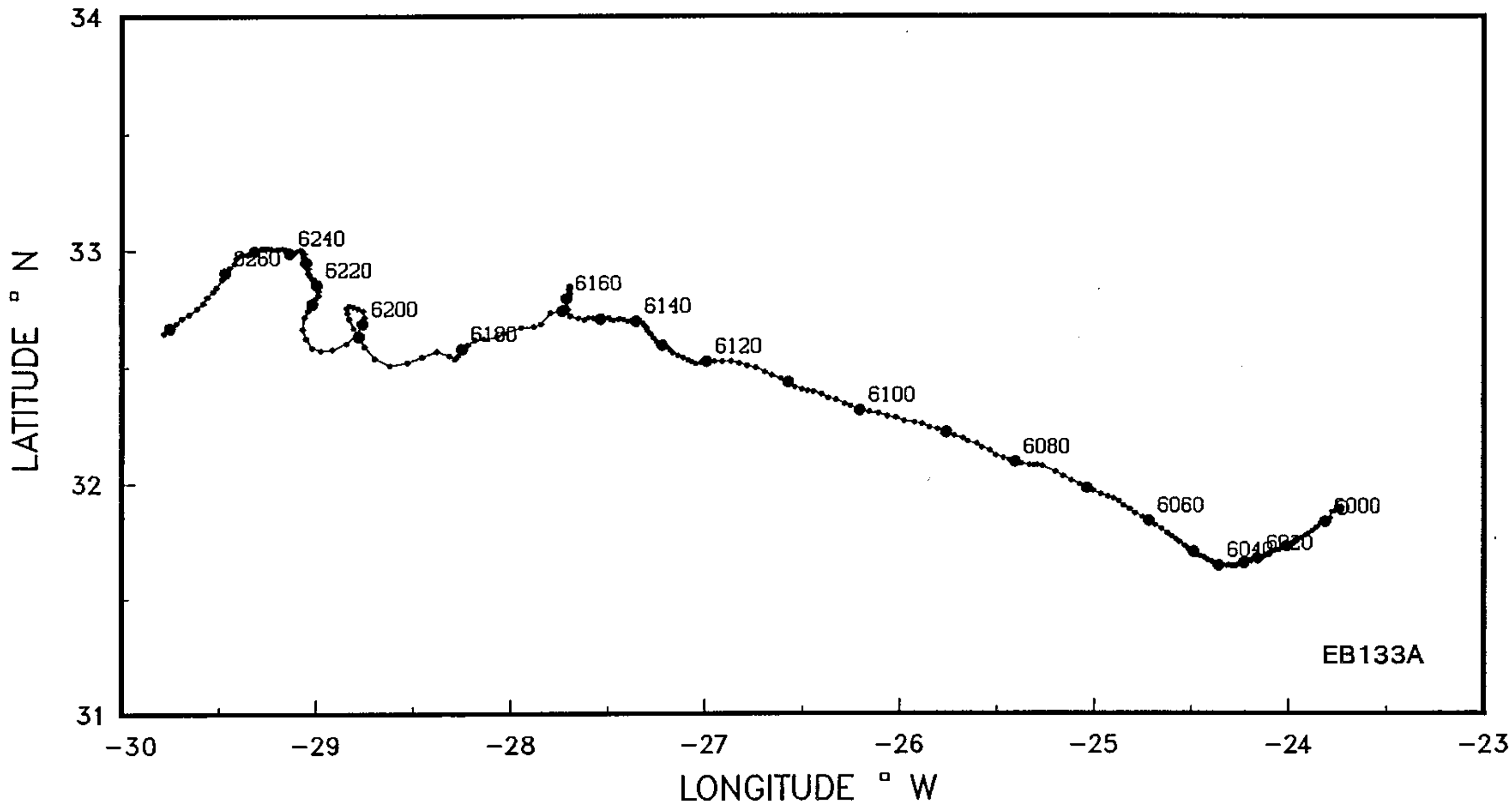


10-MAY-86 12:45:50

PLOT 1 OF 2
.SPL

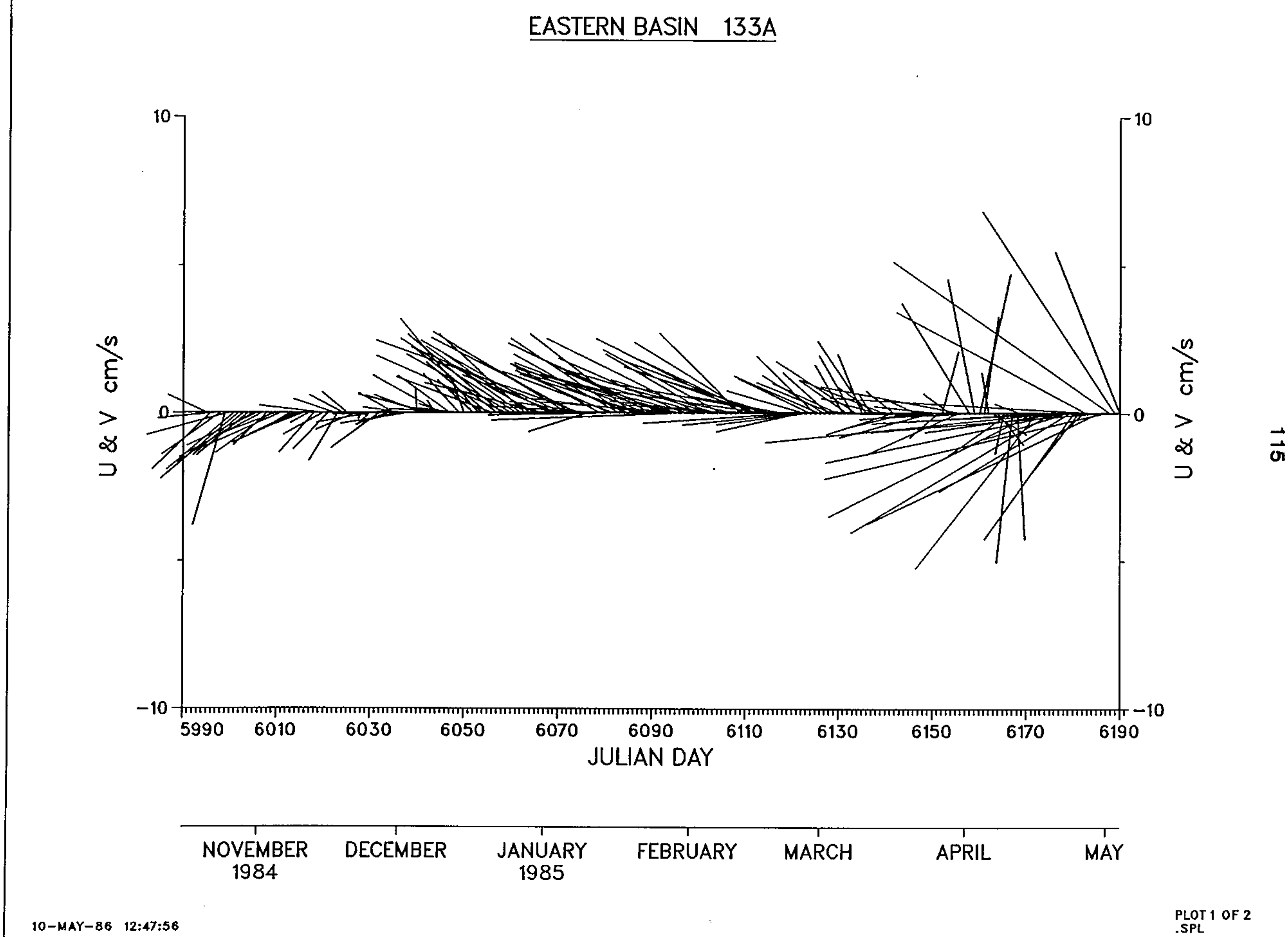

EASTERN BASIN 132
8
7
6
TEMPERATURE [+] °C
1110
1130
1150
1170
1190
1210
1230
1250
PRESSURE [Δ] db
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:45:59
PLOT 2 OF 2
.SPL

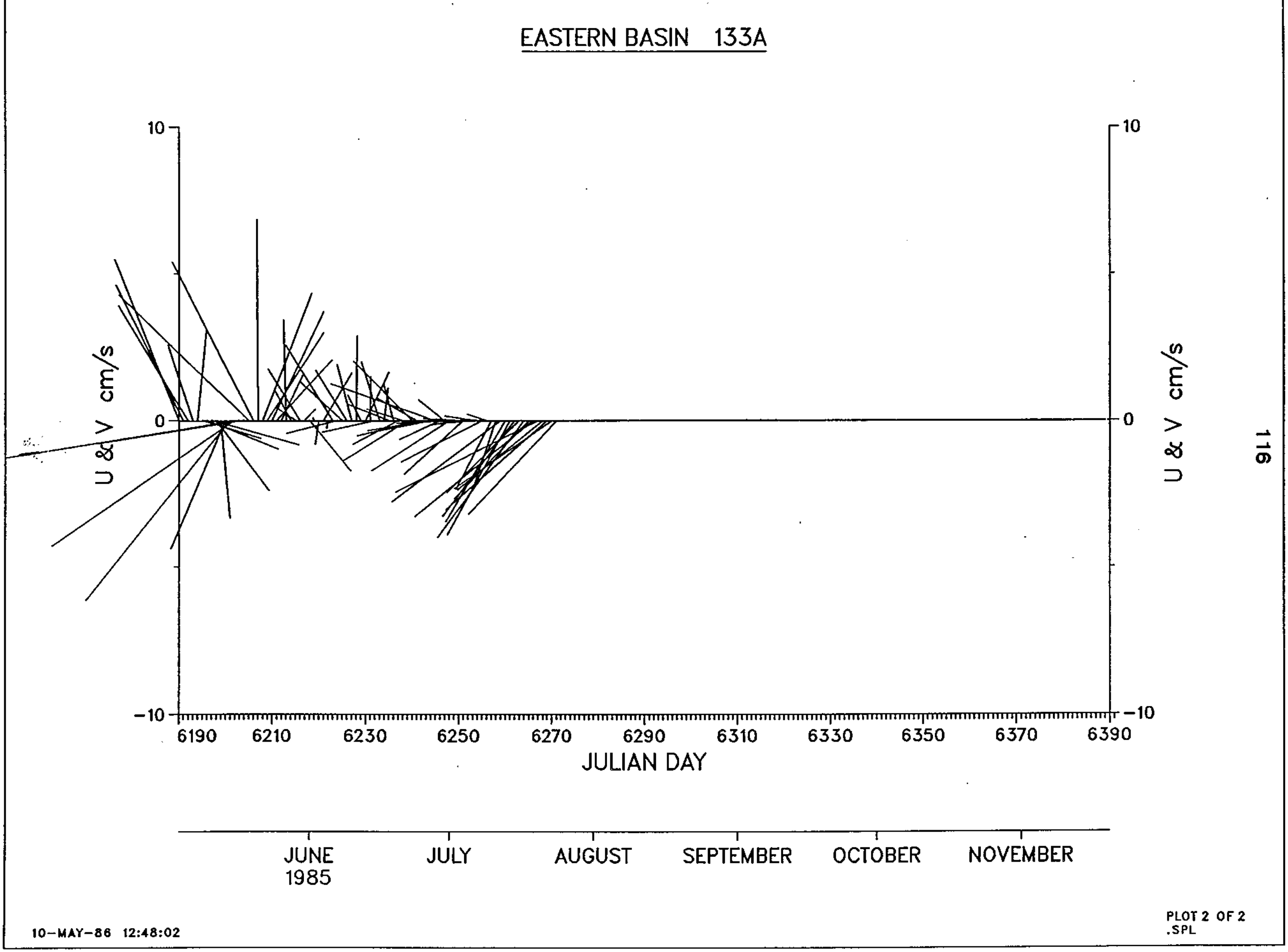
EASTERN BASIN 133A

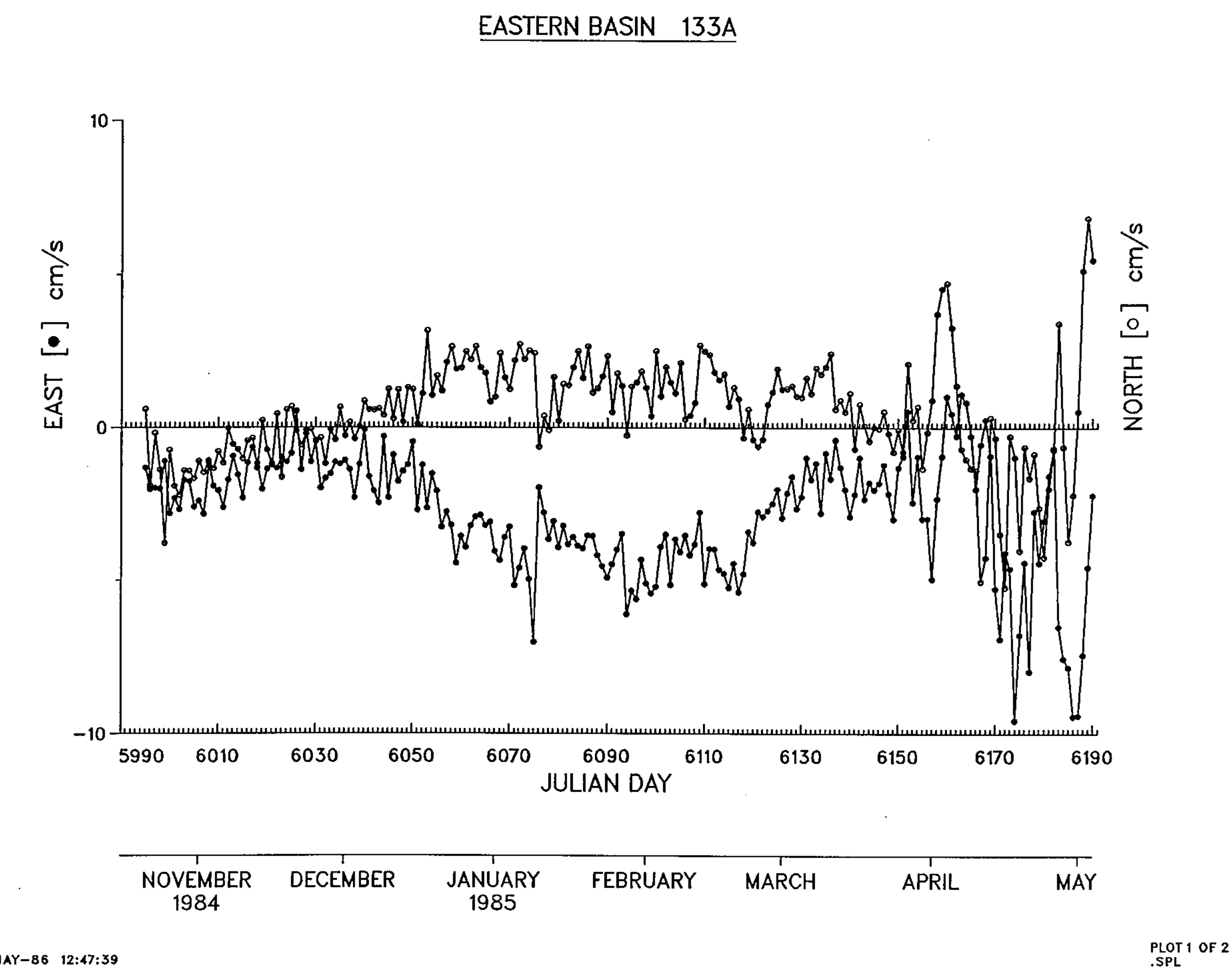


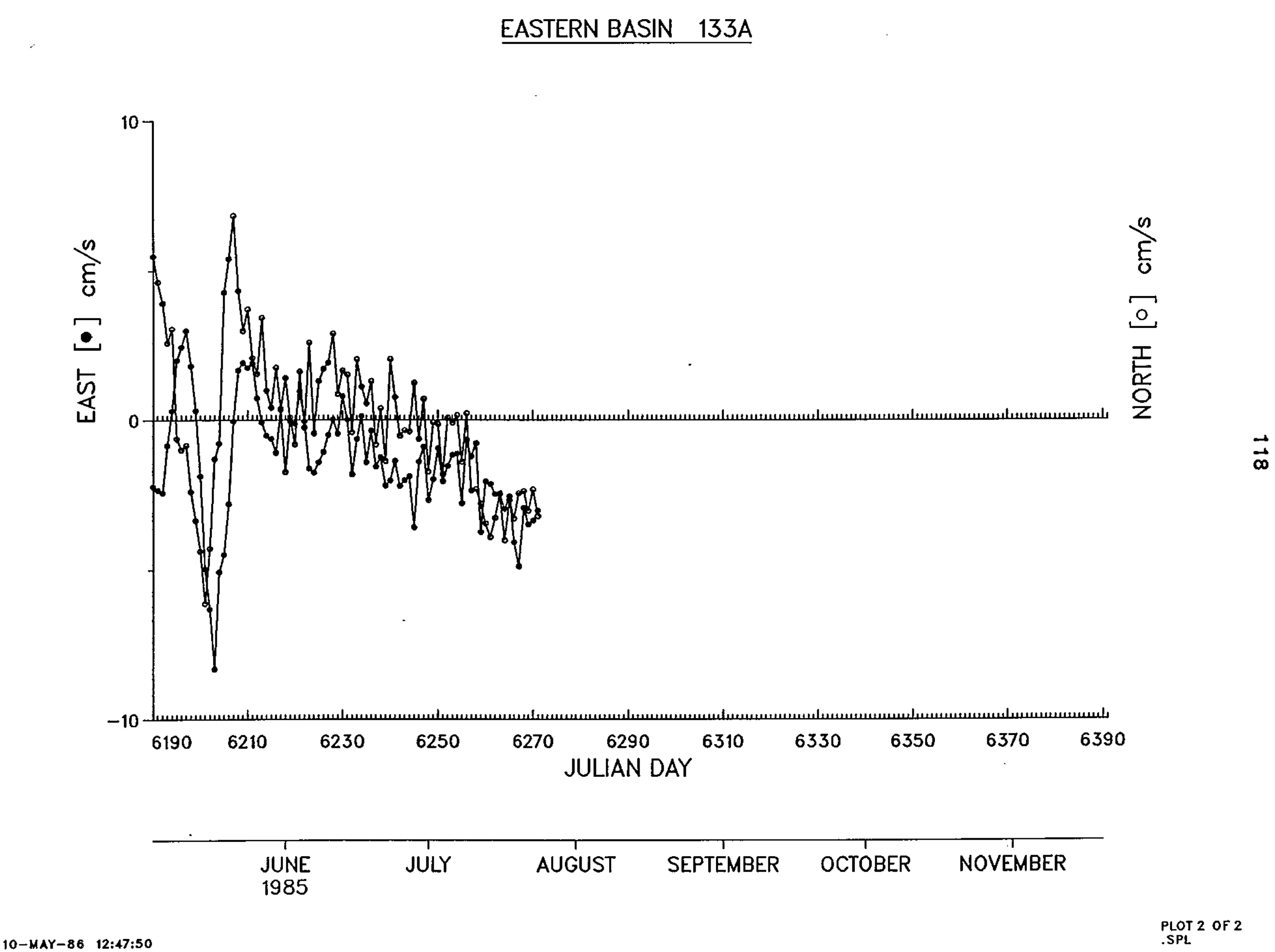
18-JUN-86 10:34:03

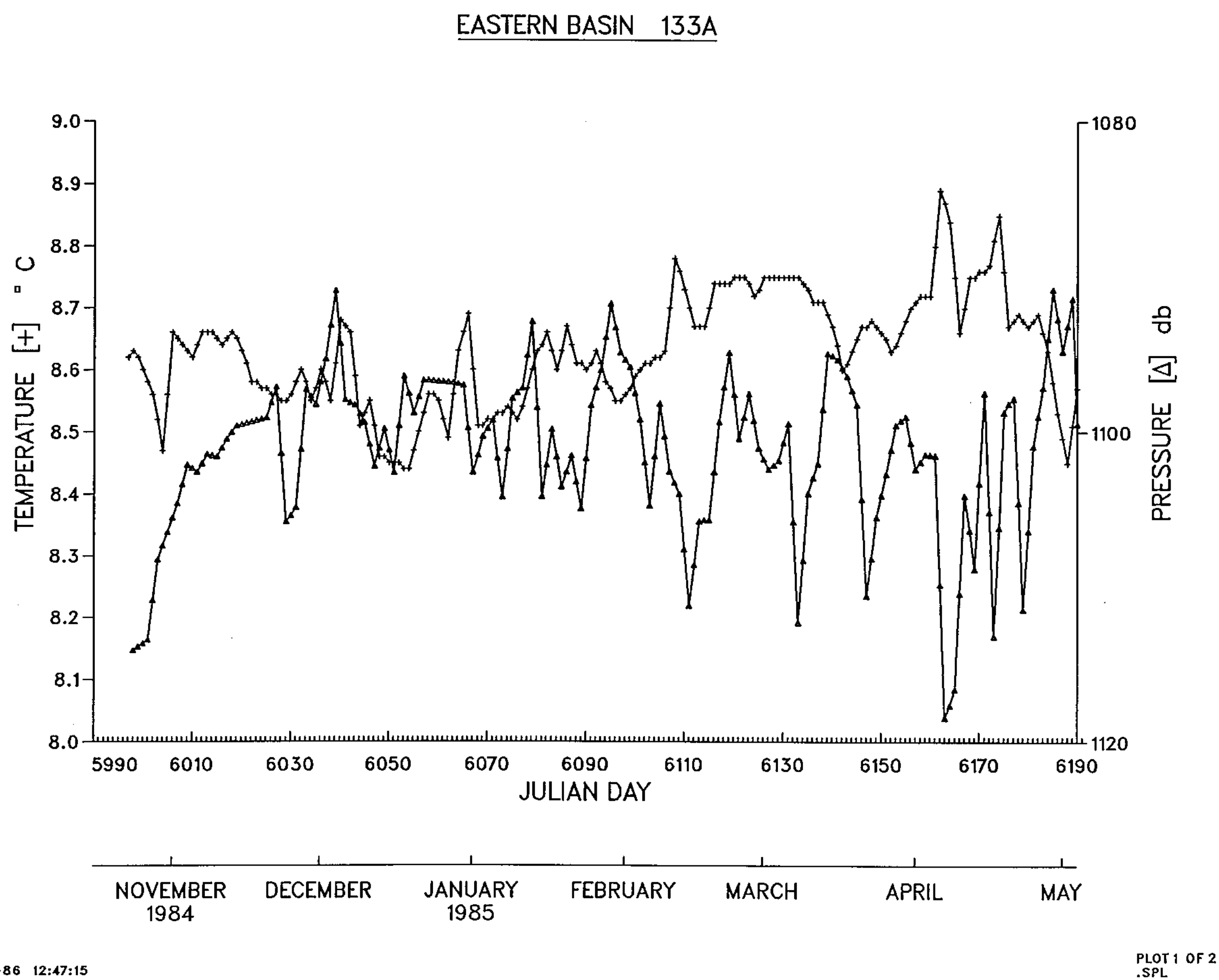
PLOT 1 OF 1
.FIN


EASTERN BASIN 133A
10
0
-10
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:47:56
PLOT 1 OF 2
.SPL

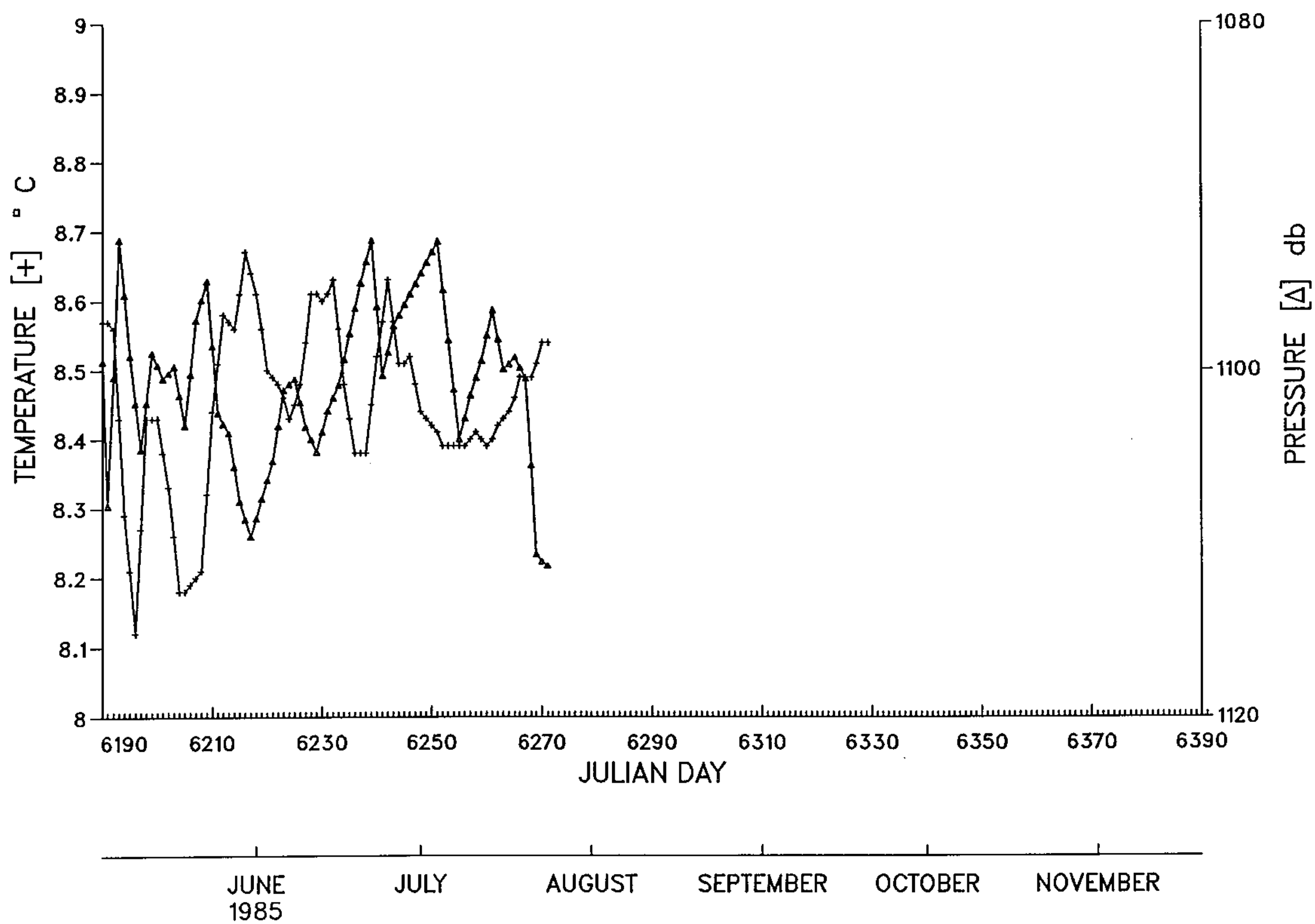

EASTERN BASIN 133A
10
0
-10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:48:02
PLOT 2 OF 2
.SPL


EASTERN BASIN 133A
EAST [●] cm/s
NORTH [○] cm/s
10
0
−10
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:47:39
PLOT 1 OF 2
.SPL


EASTERN BASIN 133A
10
0
−10
EAST [•] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:47:50
PLOT 2 OF 2
.SPL


EASTERN BASIN 133A
TEMPERATURE [+] °C
9.0
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8.0
PRESSURE [Δ] db
1080
1100
1120
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:47:15
PLOT 1 OF 2
.SPL

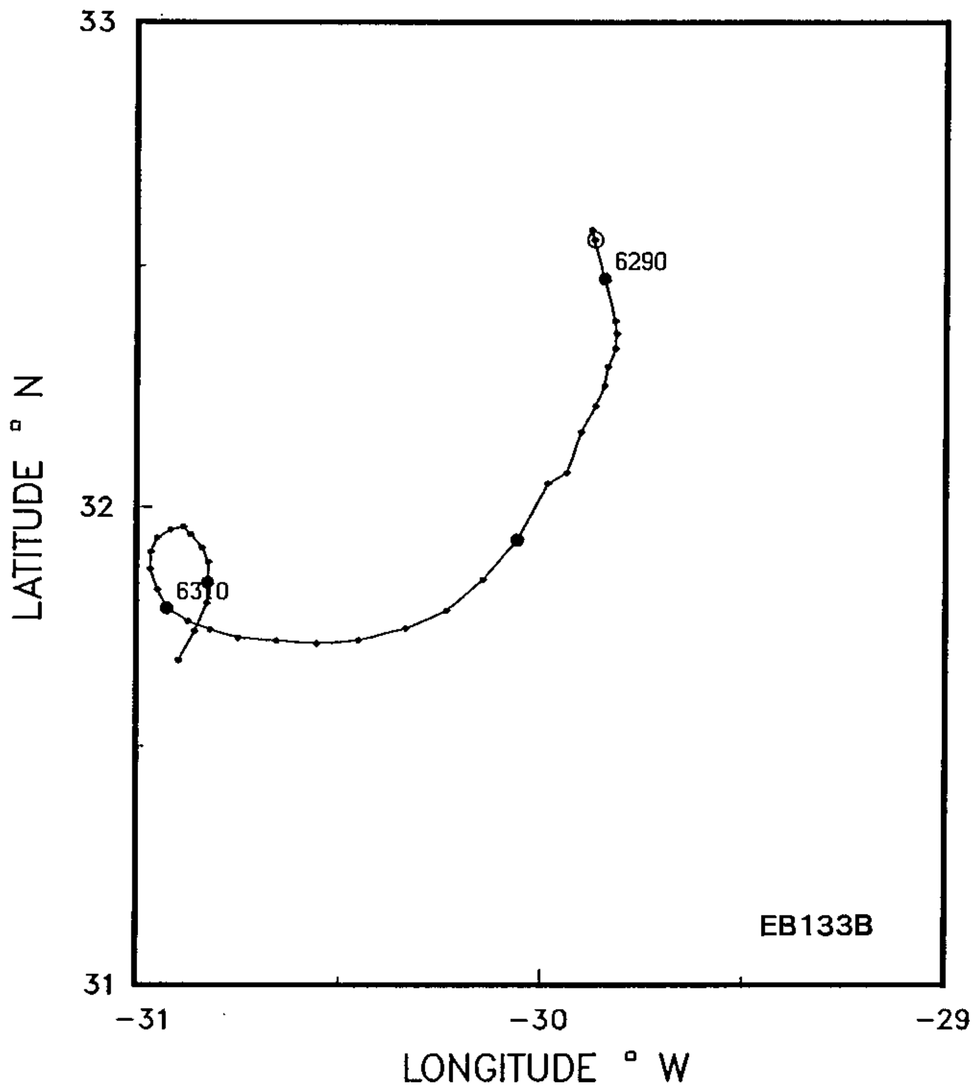
EASTERN BASIN 133A



10-MAY-86 12:47:23

PLOT 2 OF 2
.SPL

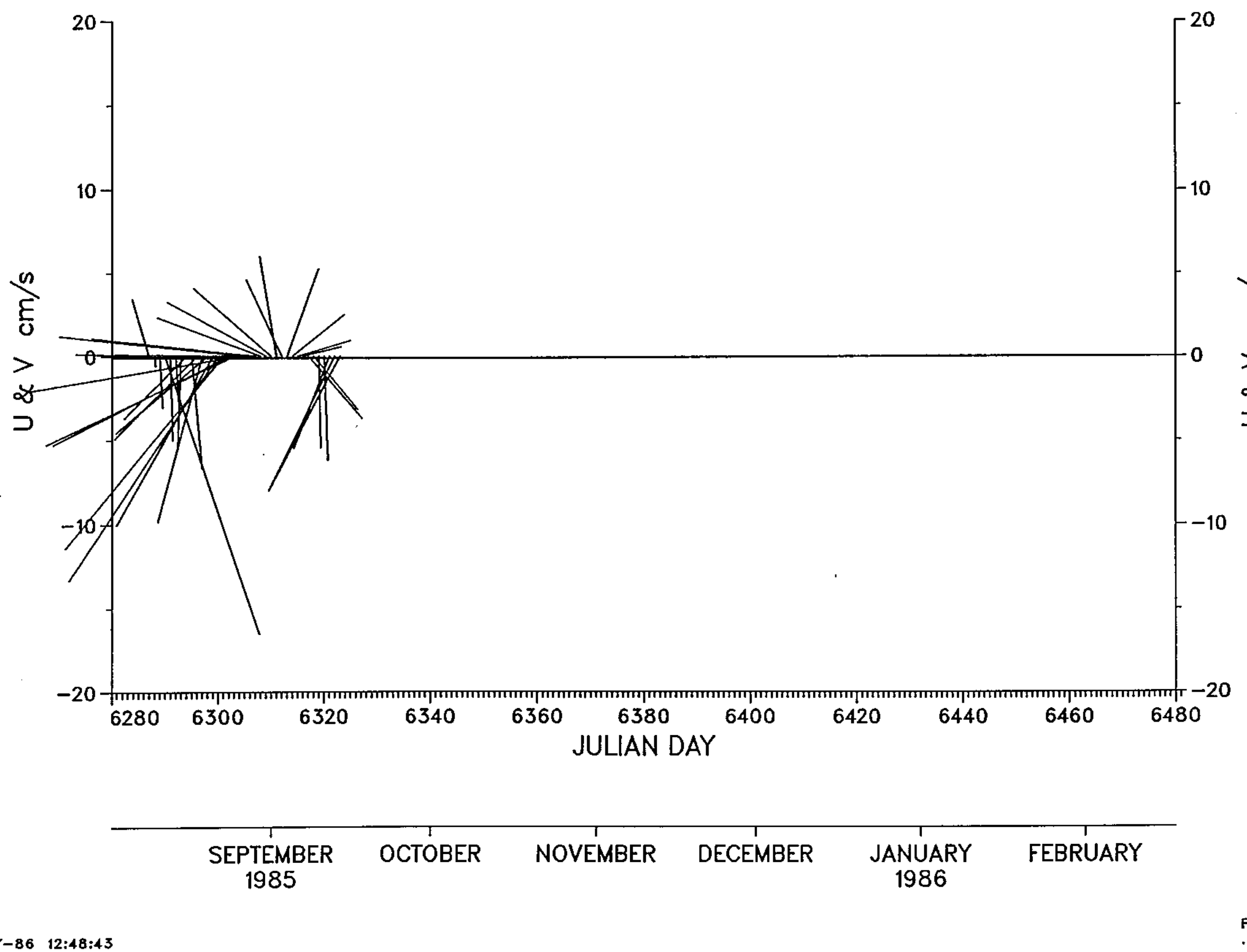
EASTERN BASIN 133B

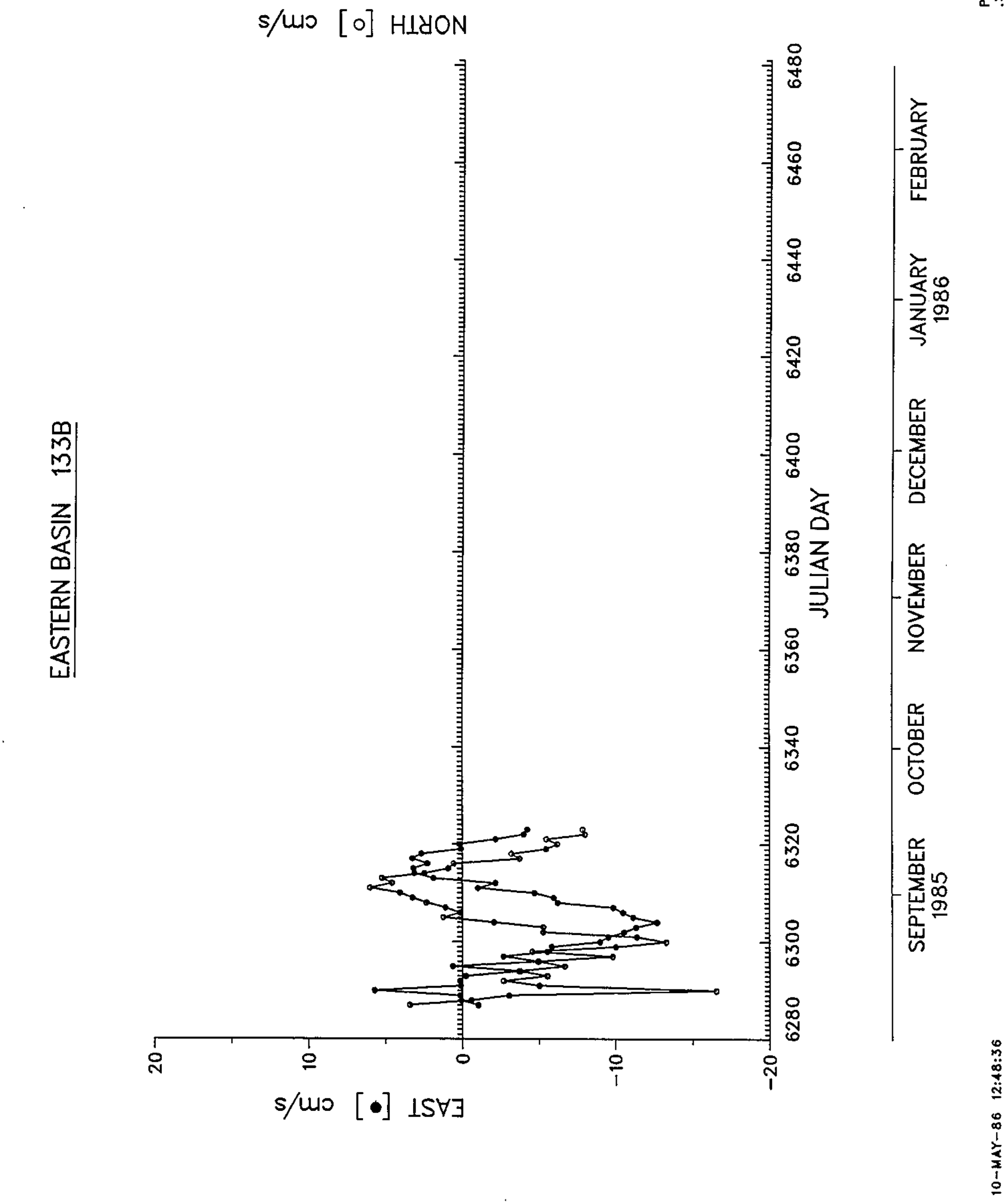


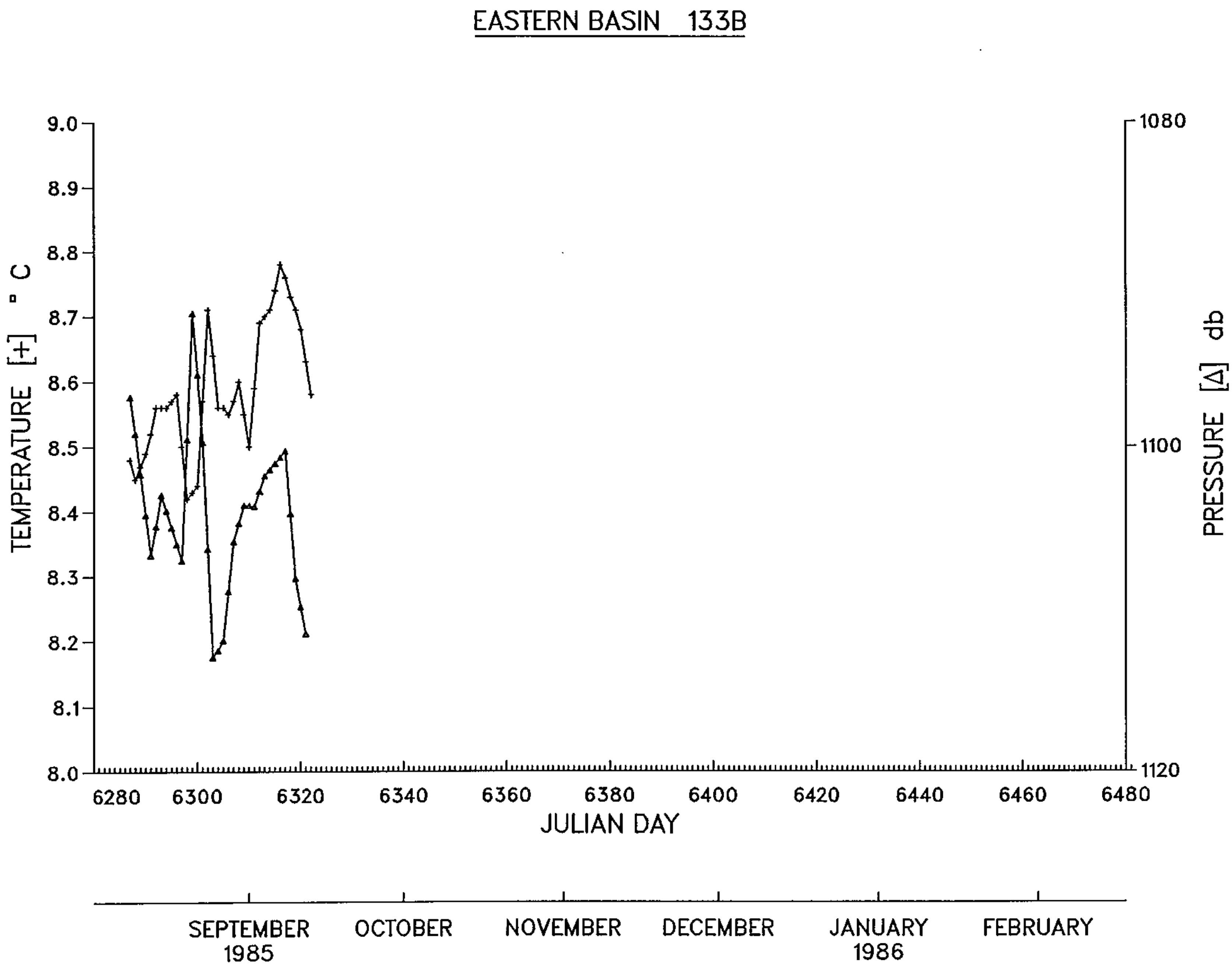
18-JUN-86 10:34:20

PLOT 1 OF 1
.FIN

EASTERN BASIN 133B



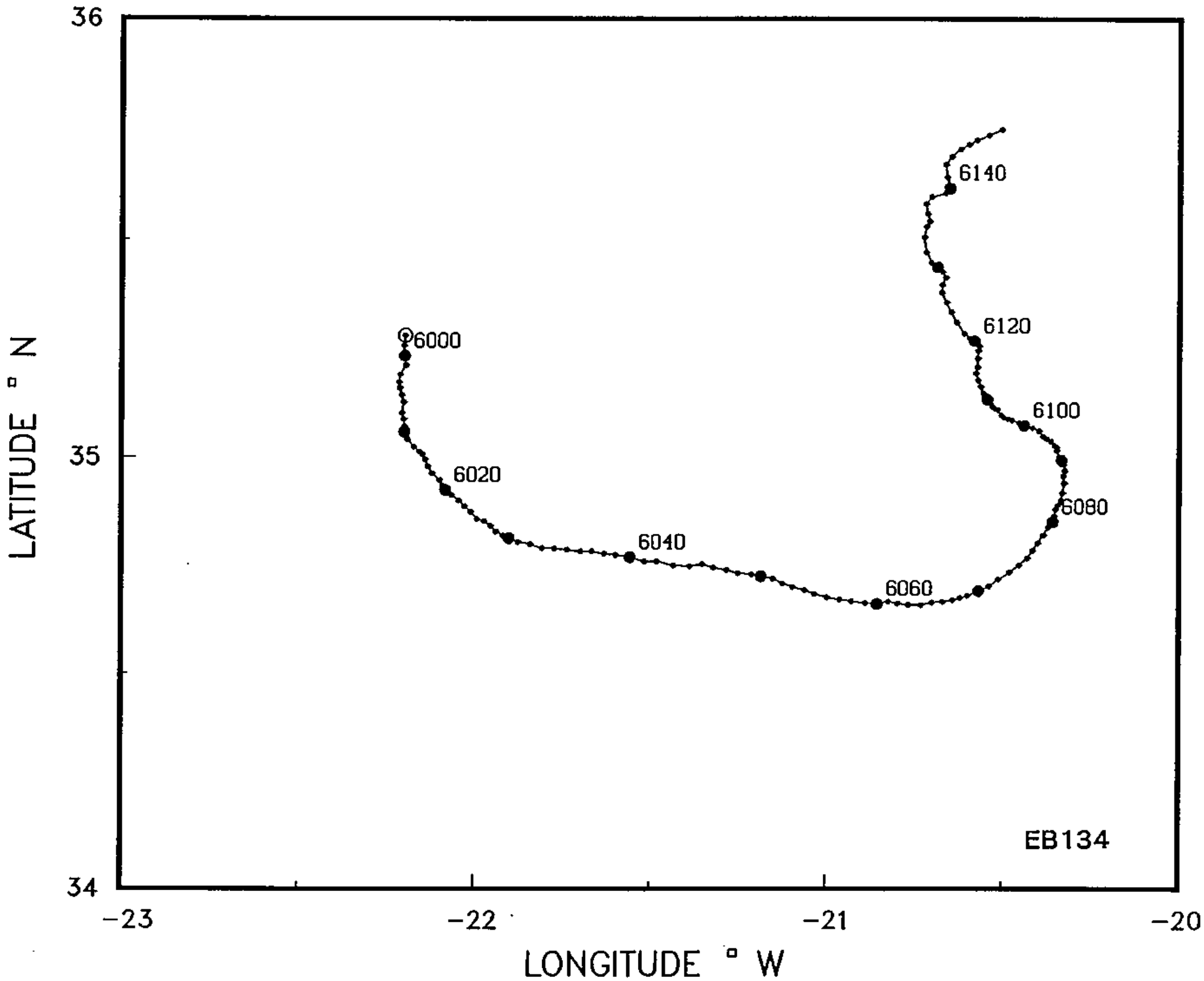

EASTERN BASIN 133B
NORTH [o] cm/s
EAST [•] cm/s
20
10
0
-10
-20
6280
6300
6320
6340
6360
6380
6400
6420
6440
6460
6480
JULIAN DAY
SEPTEMBER 1985
OCTOBER
NOVEMBER
DECEMBER
JANUARY 1986
FEBRUARY
PLOT1 OF 1 .SPL
10-MAY-86 12:48:36



10-MAY-86 12:48:28

PLOT 1 OF 1
.SPL

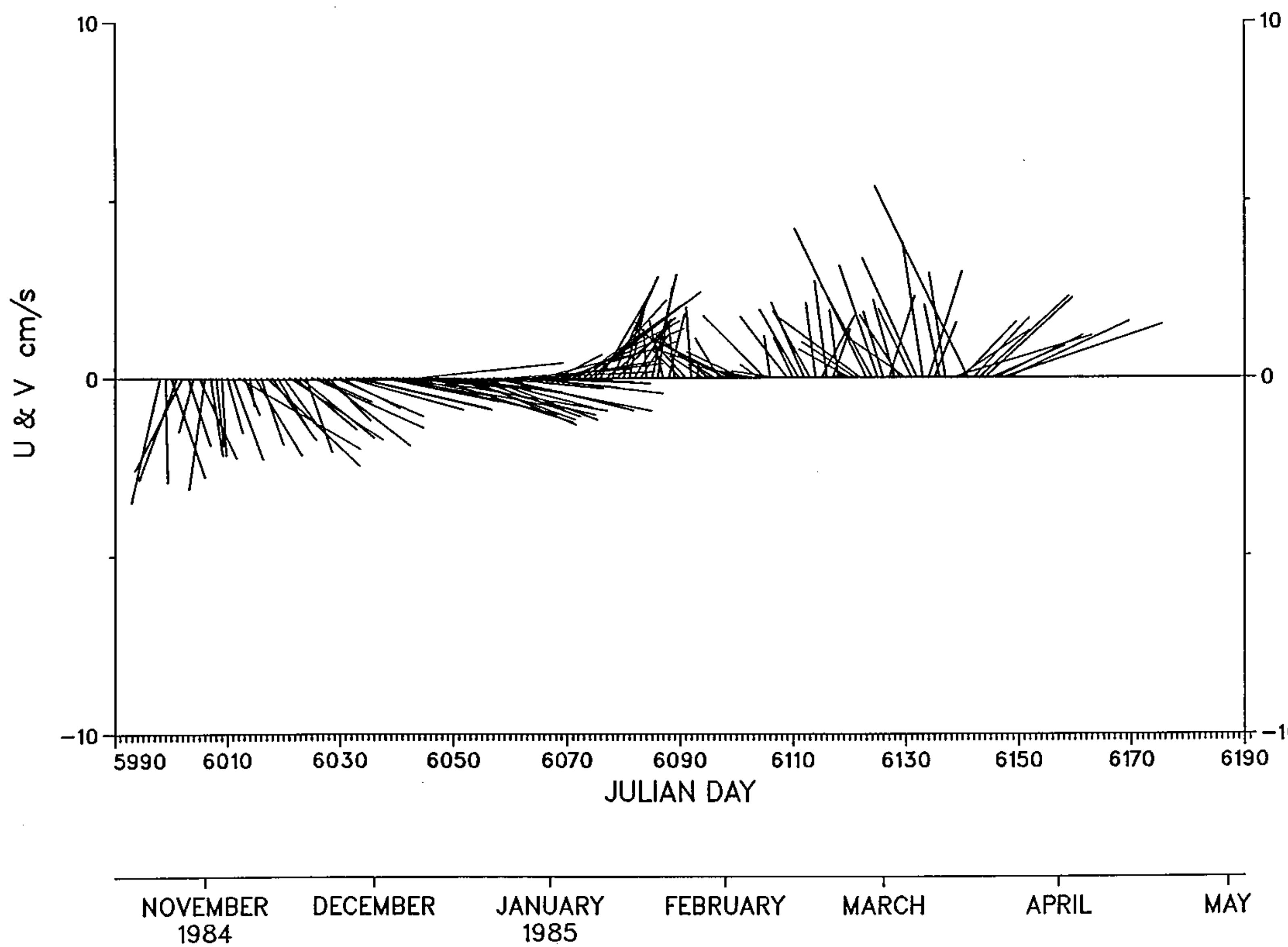
EASTERN BASIN 134



18-JUN-86 10:34:42

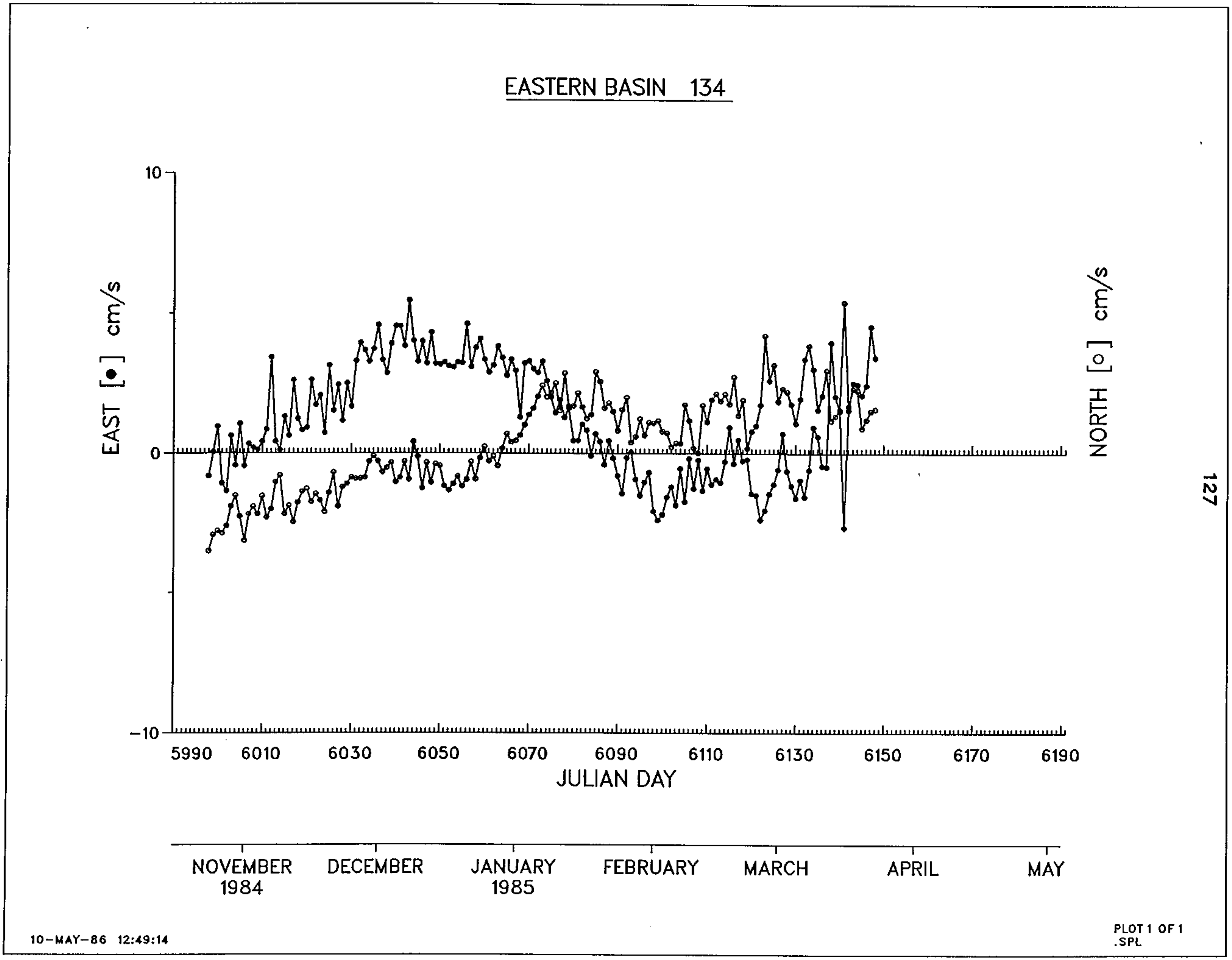
PLOT 1 OF 1
.FIN

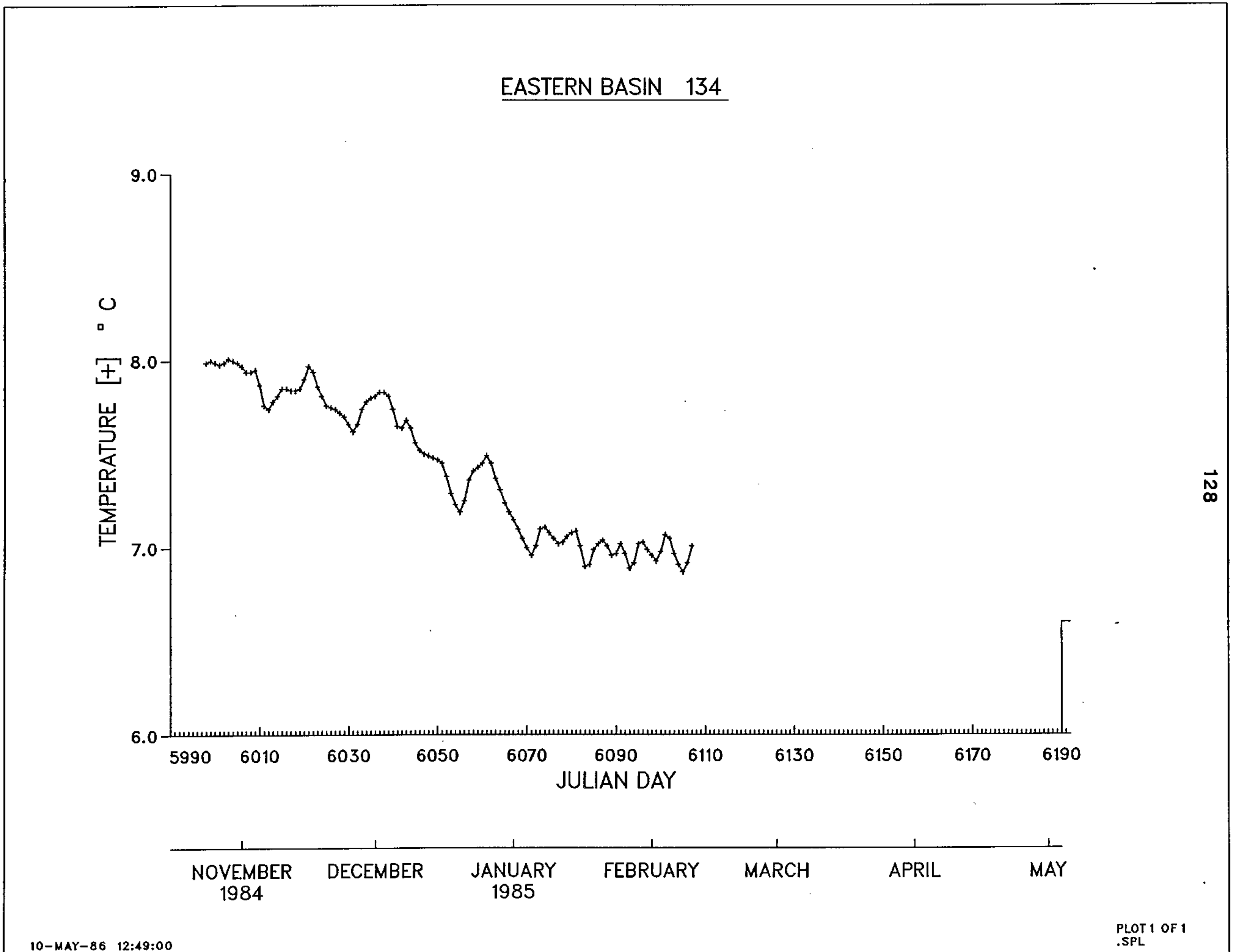
EASTERN BASIN 134



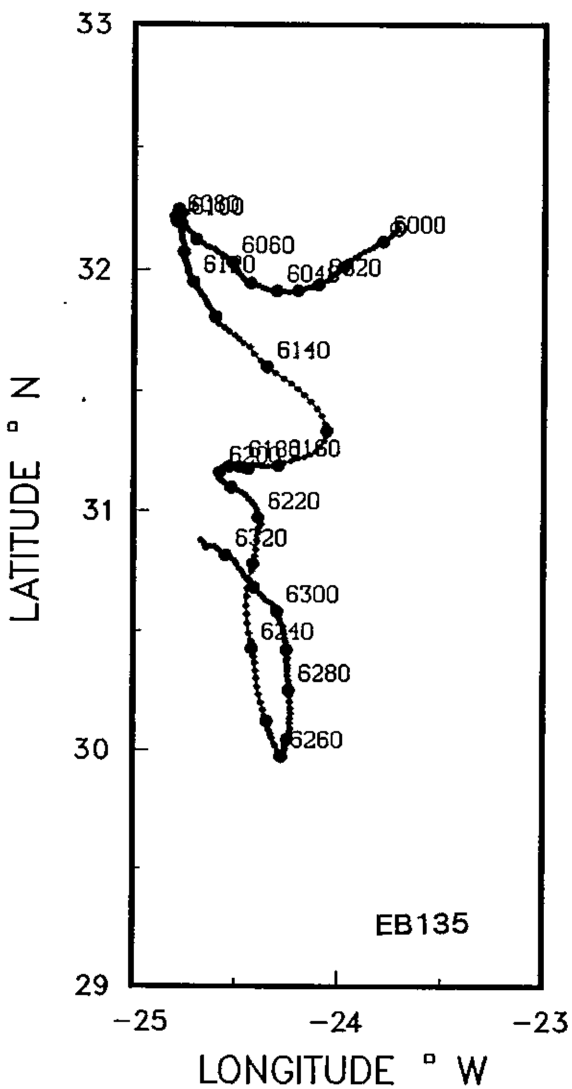
10-MAY-86 12:49:20

PLOT 1 OF 1
.SPL


EASTERN BASIN 134
10
0
-10
EAST [●] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:49:14
PLOT 1 OF 1
.SPL


EASTERN BASIN 134
TEMPERATURE [+] ° C
9.0
8.0
7.0
6.0
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:49:00
PLOT 1 OF 1
.SPL

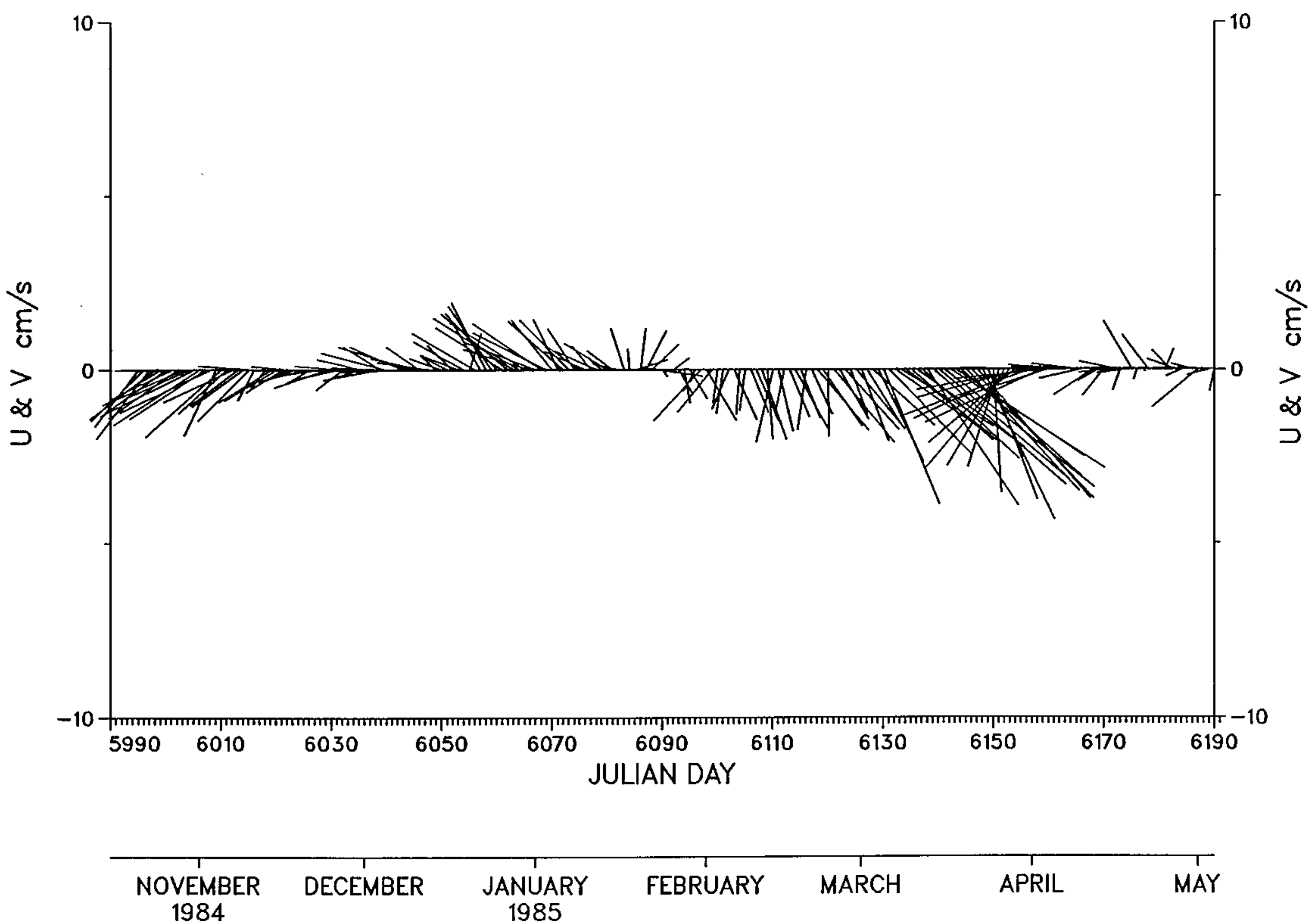
EASTERN BASIN 135



18-JUN-86 10:35:24

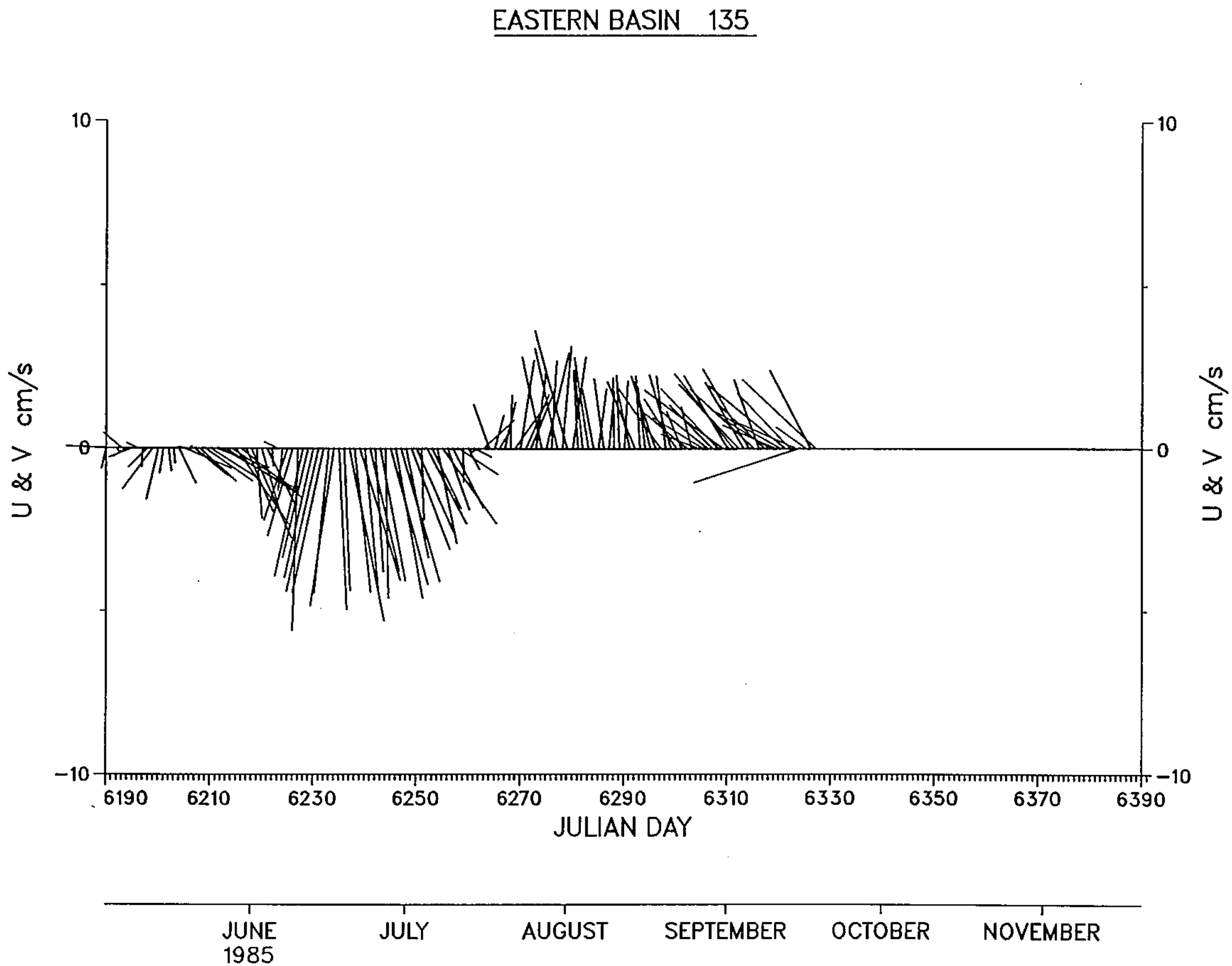
PLOT 1 OF 1
.FIN

EASTERN BASIN 135



10-MAY-86 12:50:28

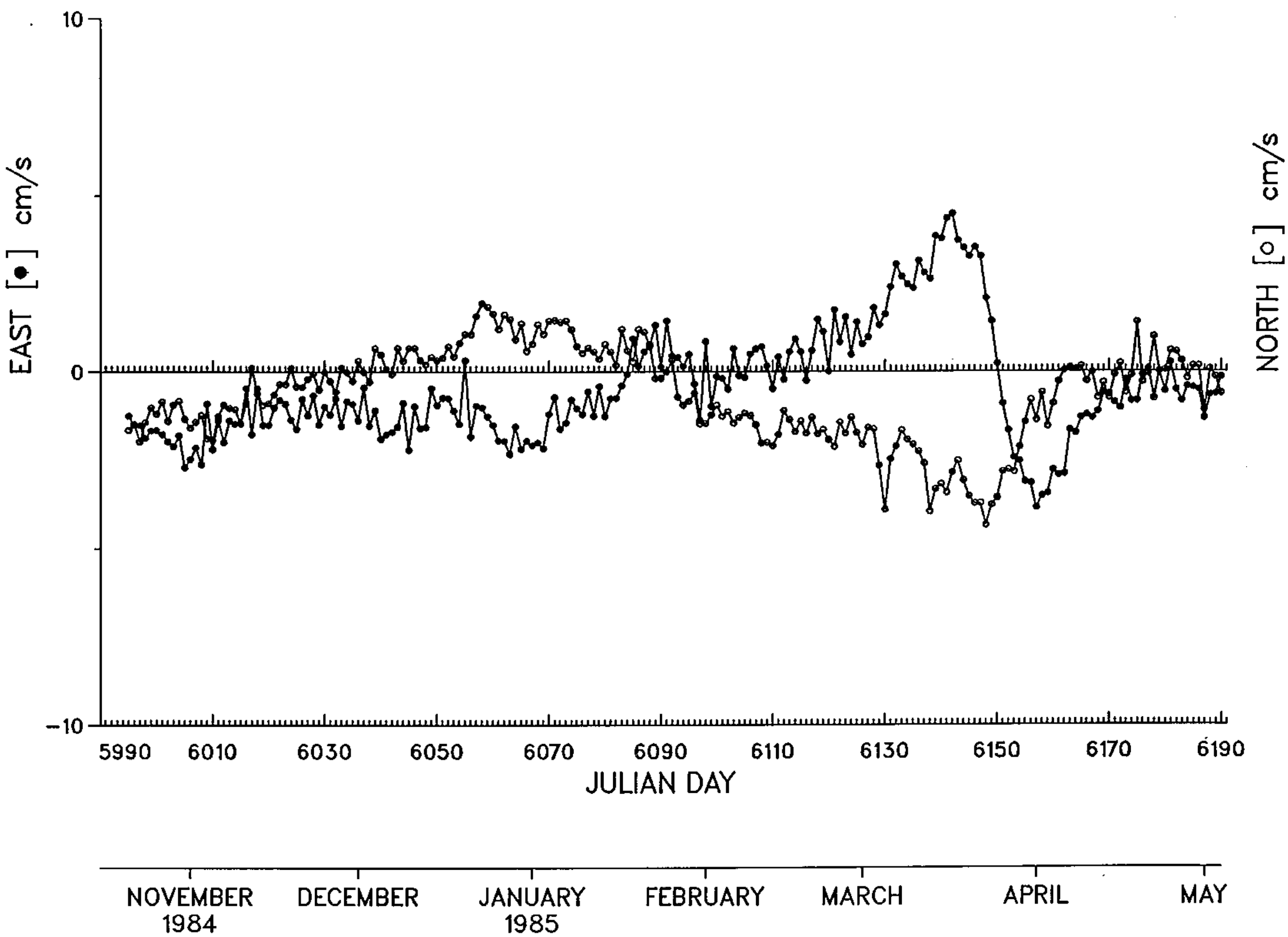
PLOT 1 OF 2
.SPL



10-MAY-86 12:50:35

PLOT 2 OF 2
.SPL

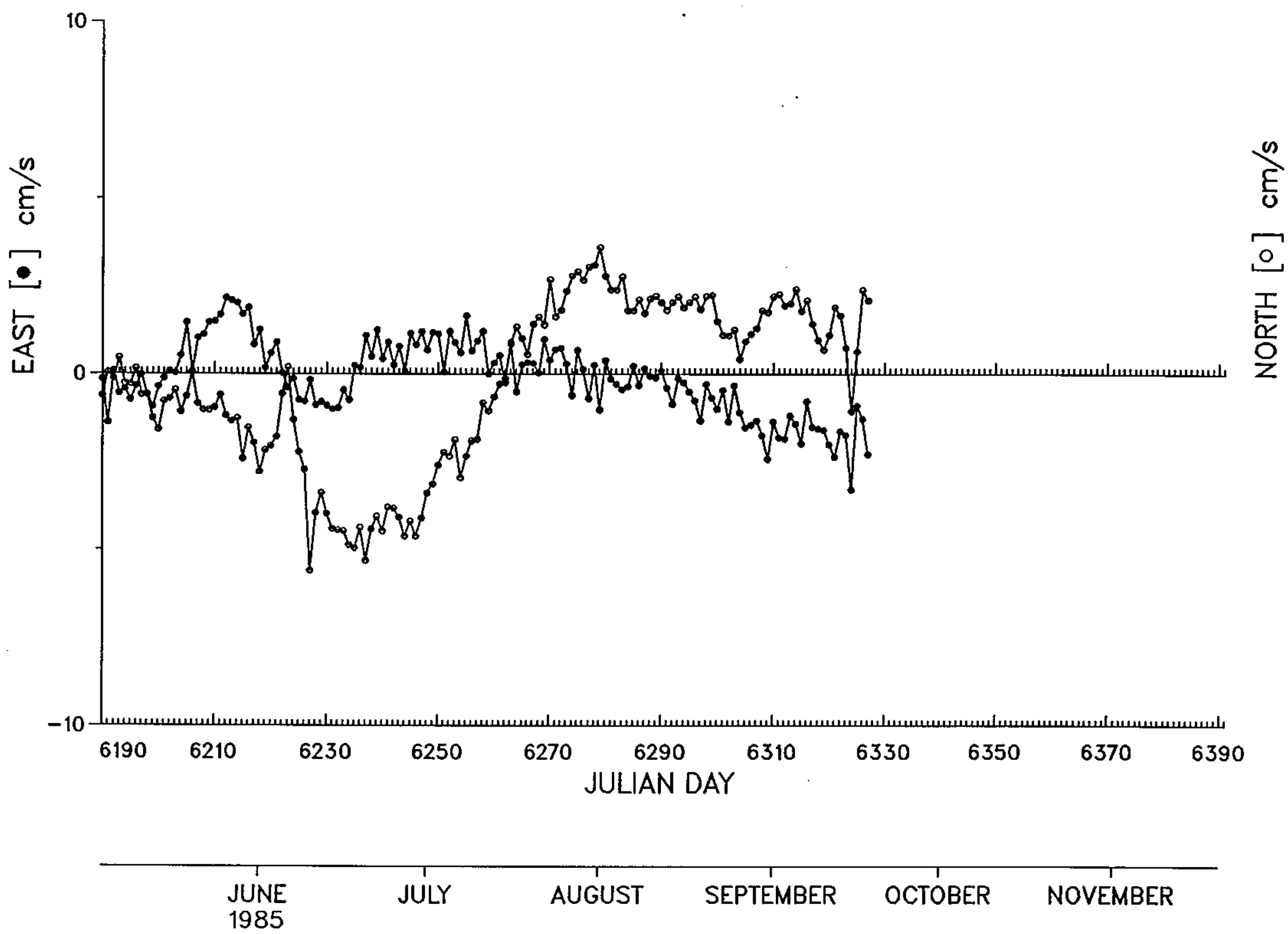
EASTERN BASIN 135



10-MAY-86 12:50:09

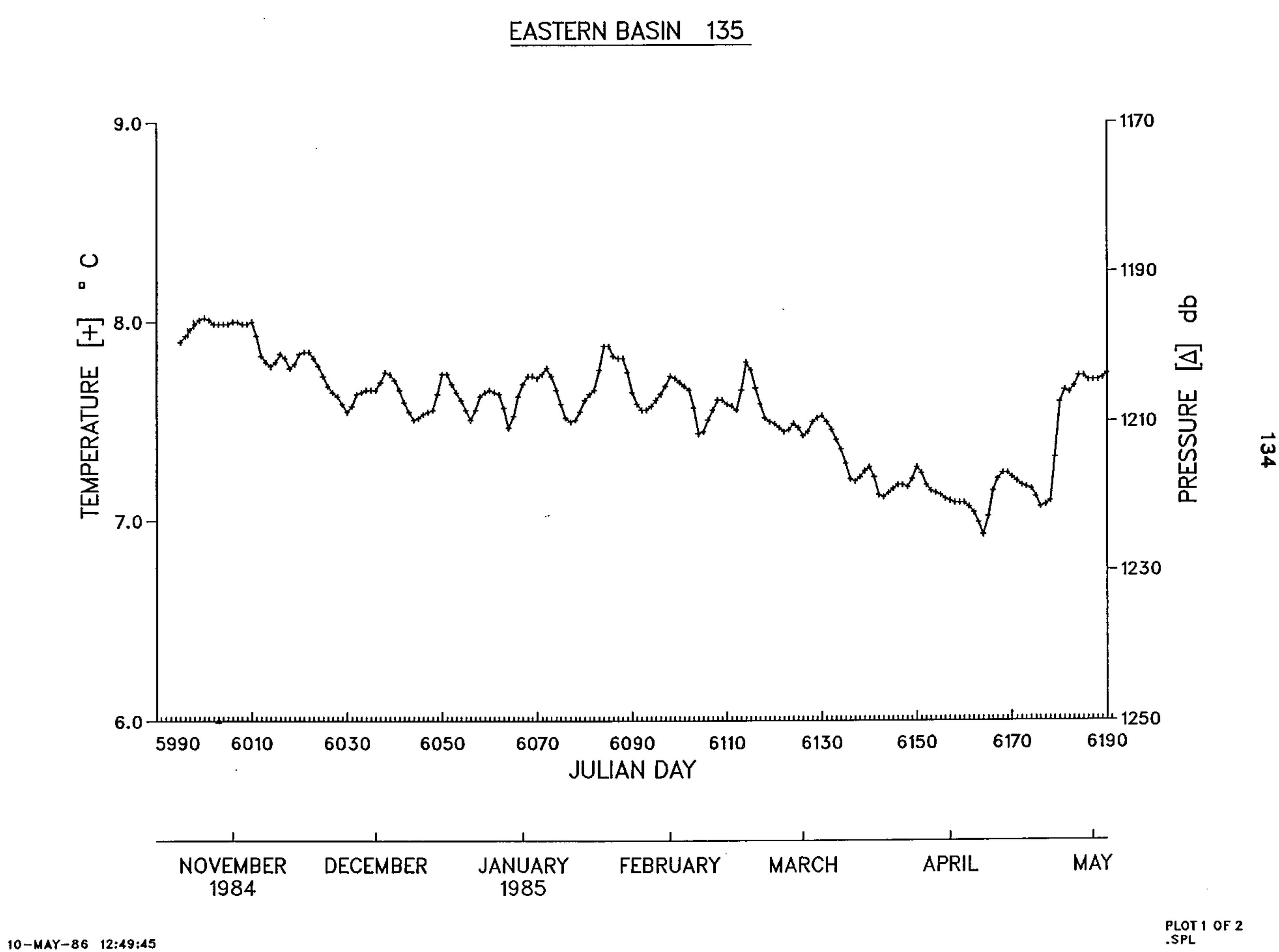
PLOT 1 OF 2
.SPL

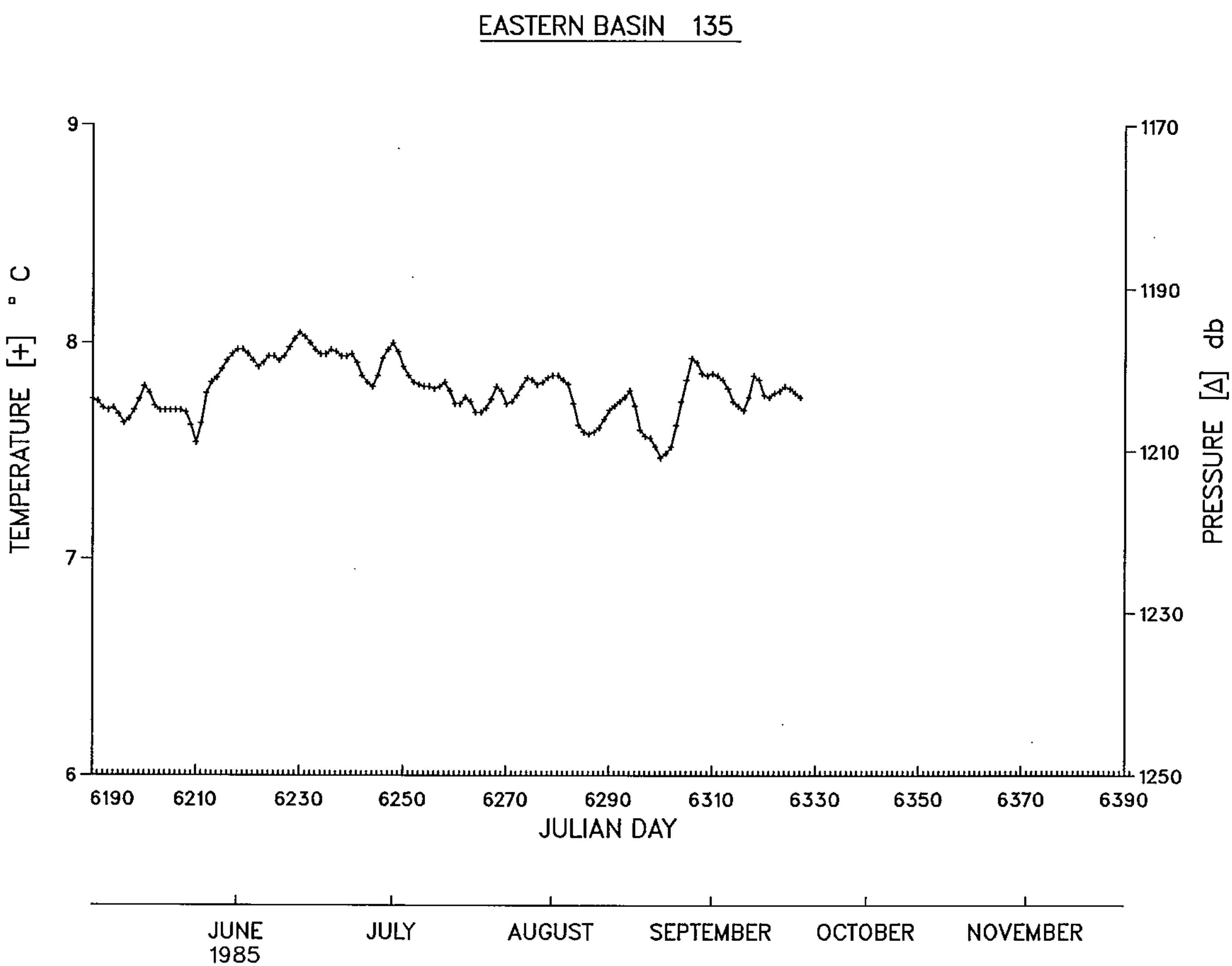
EASTERN BASIN 135



10-MAY-86 12:50:22

PLOT 2 OF 2
.SPL

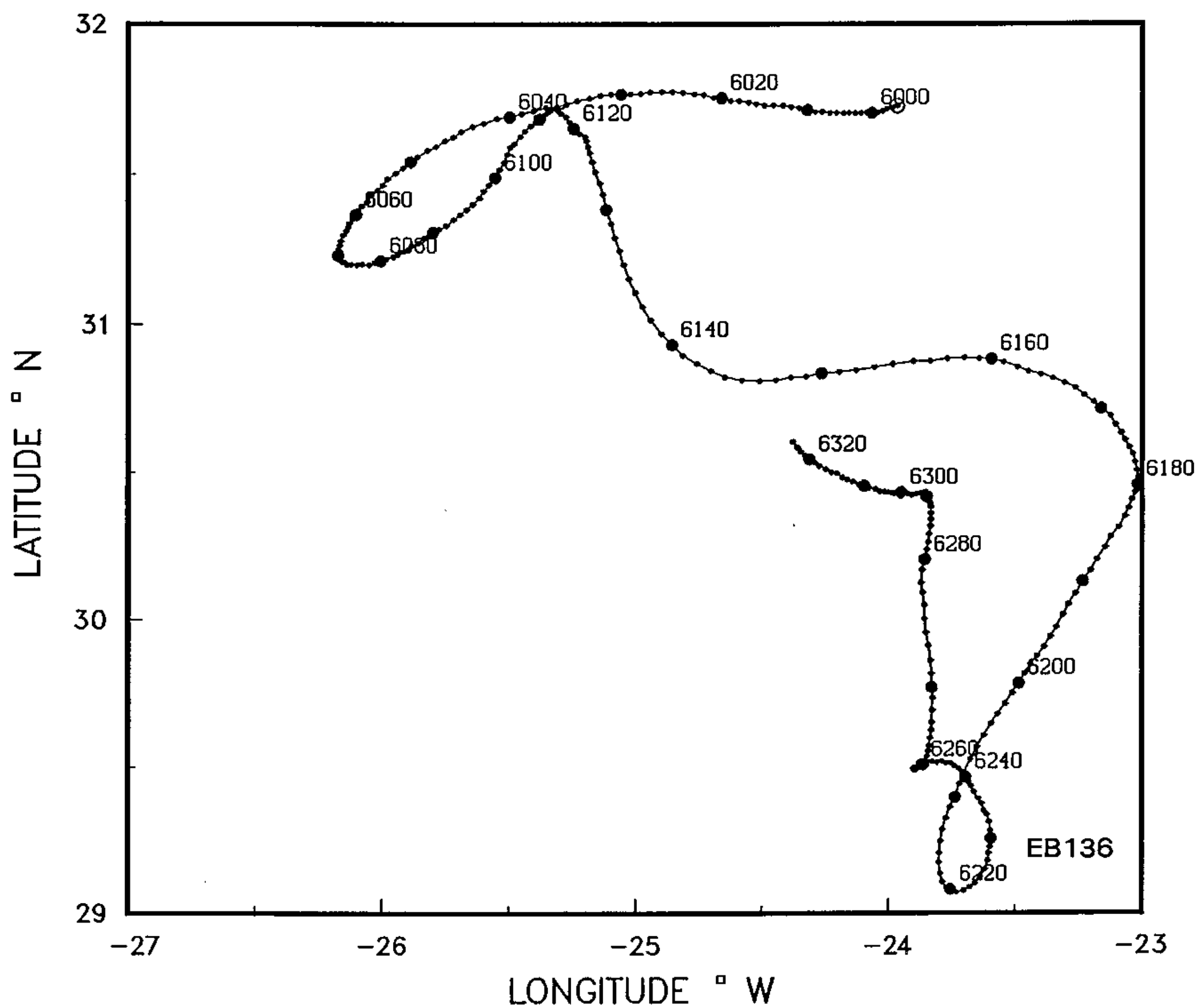

EASTERN BASIN 135
TEMPERATURE [+] °C
9.0
8.0
7.0
6.0
PRESSURE [Δ] db
1170
1190
1210
1230
1250
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:49:45
PLOT 1 OF 2
.SPL

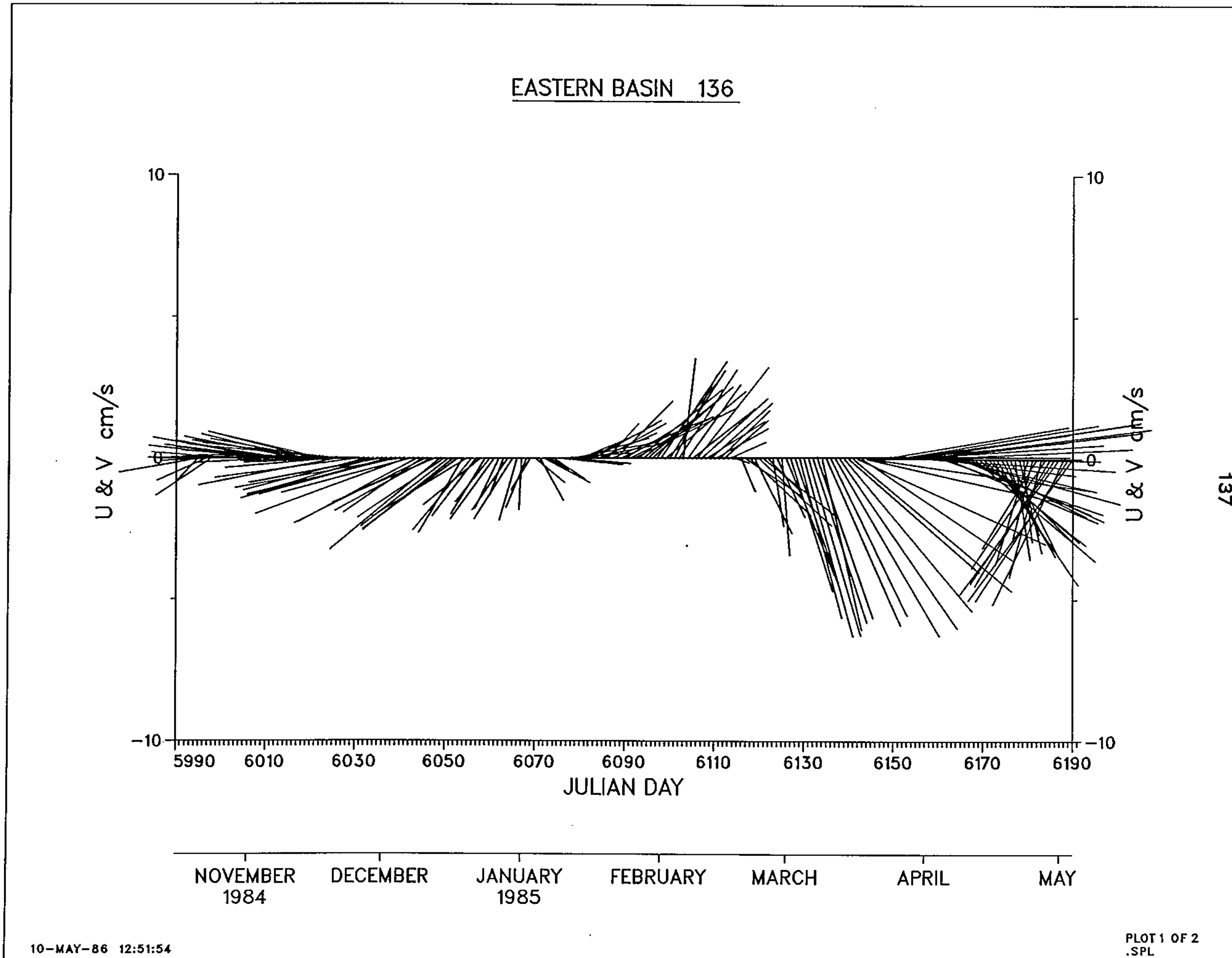


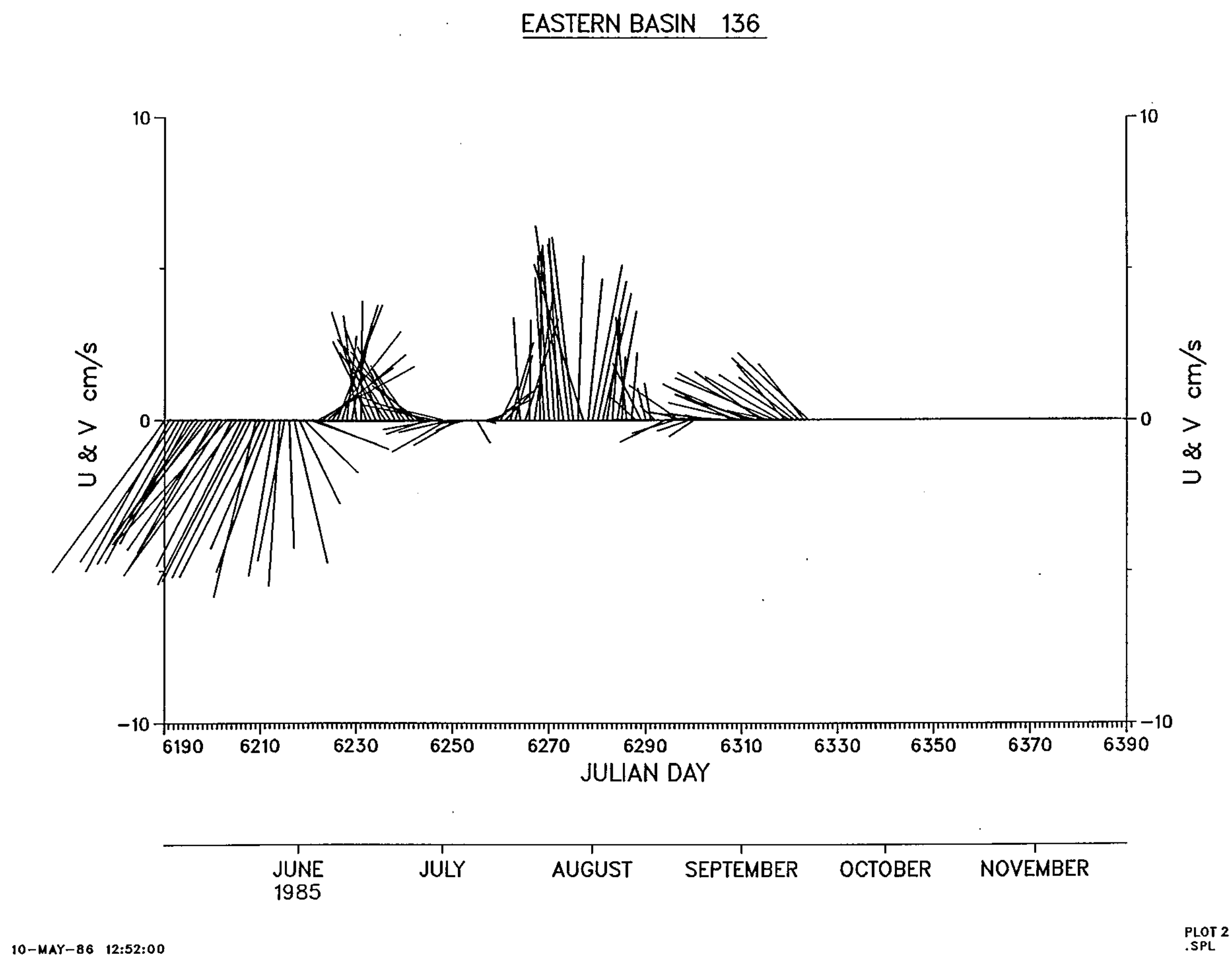
10-MAY-86 12:49:52

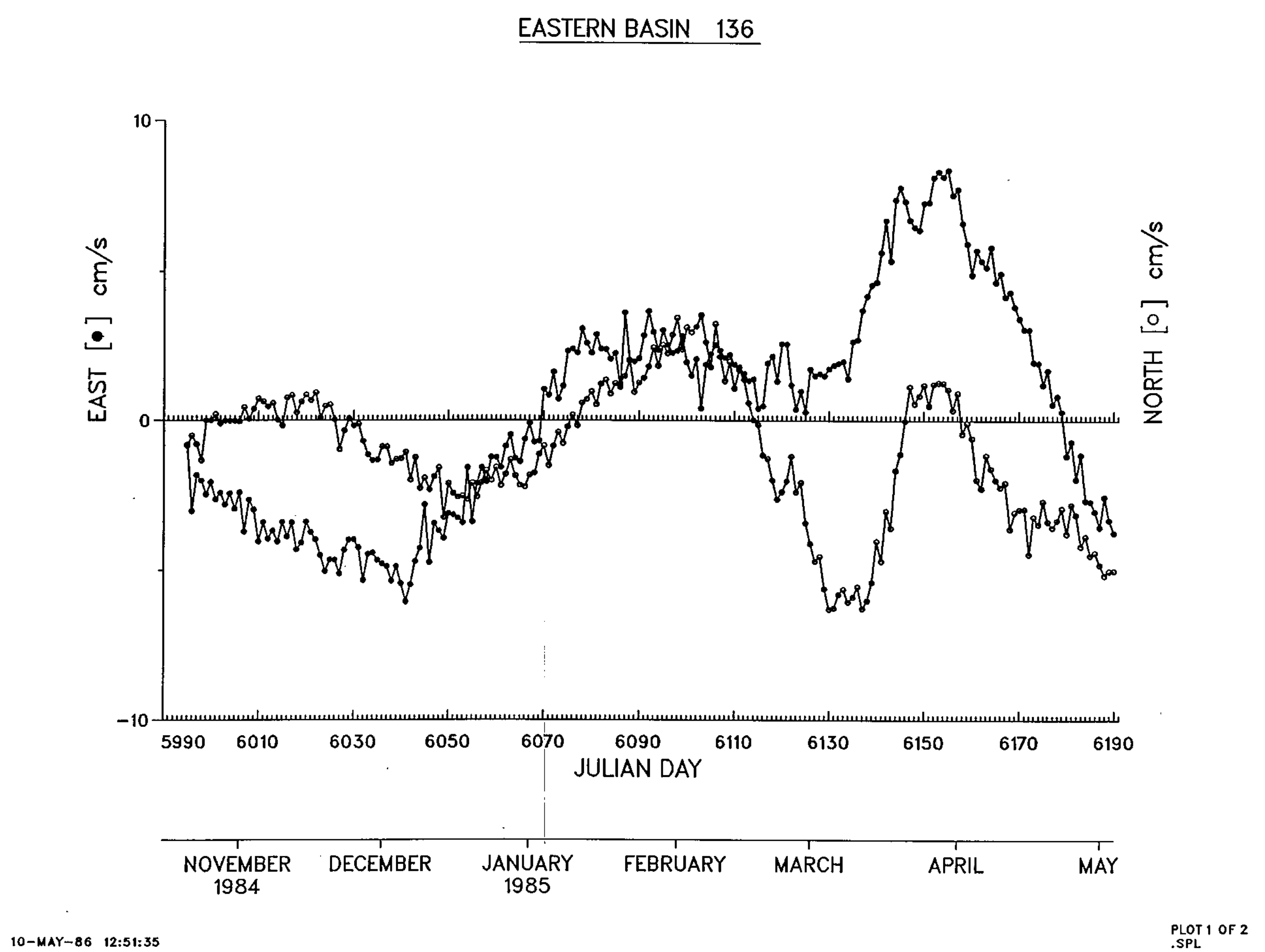
PLOT 2 OF 2
.SPL

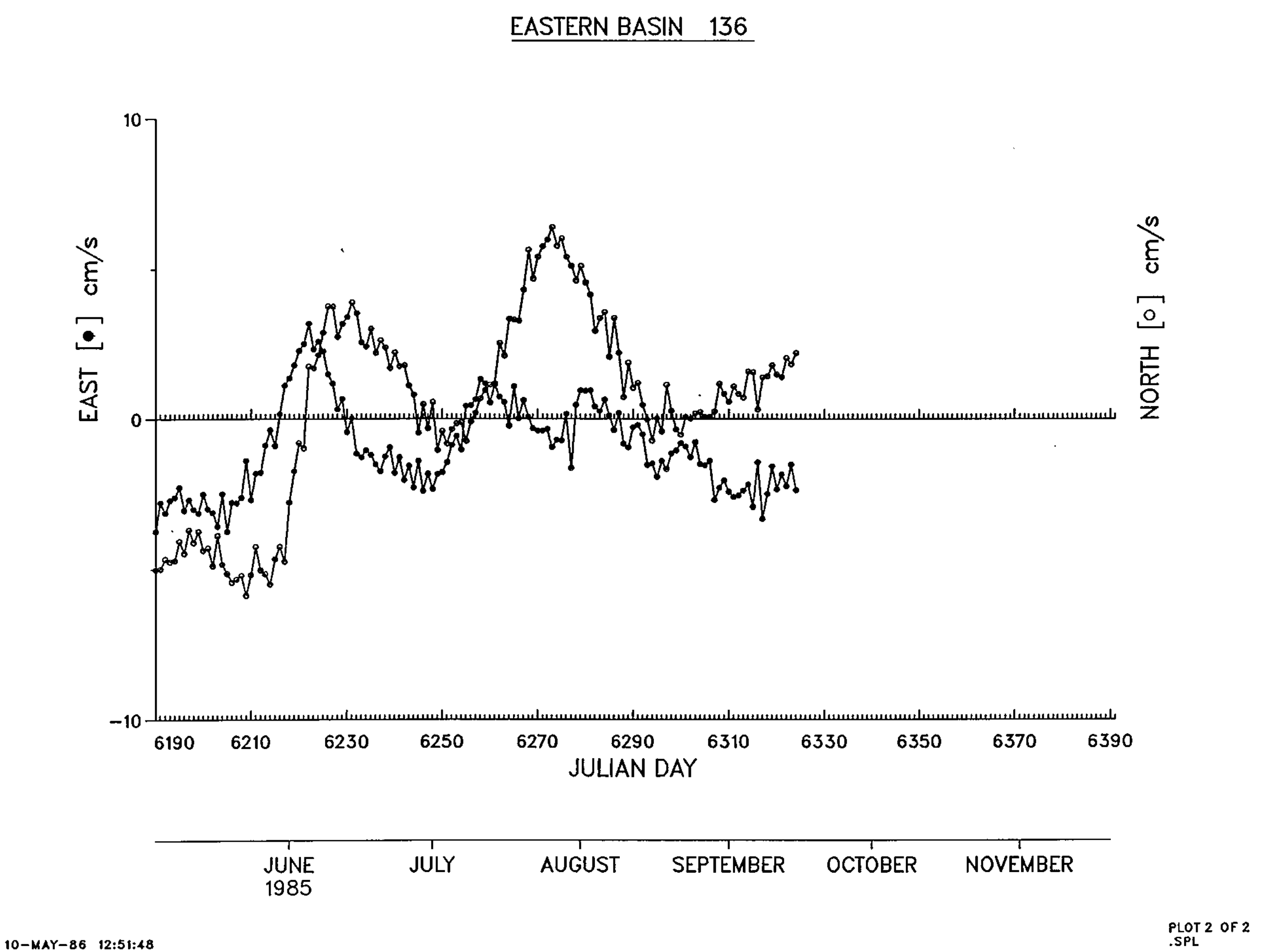
EASTERN BASIN 136

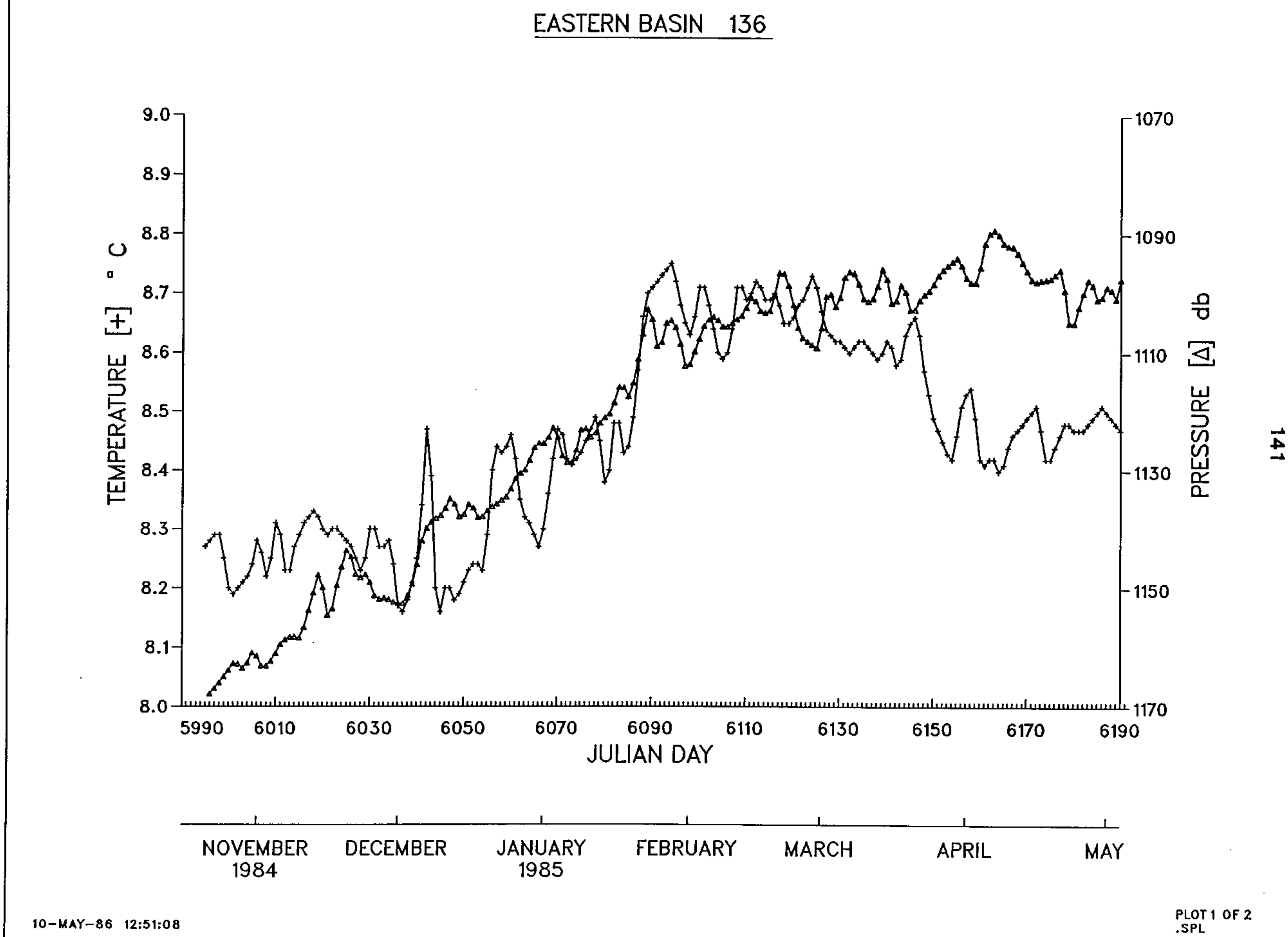


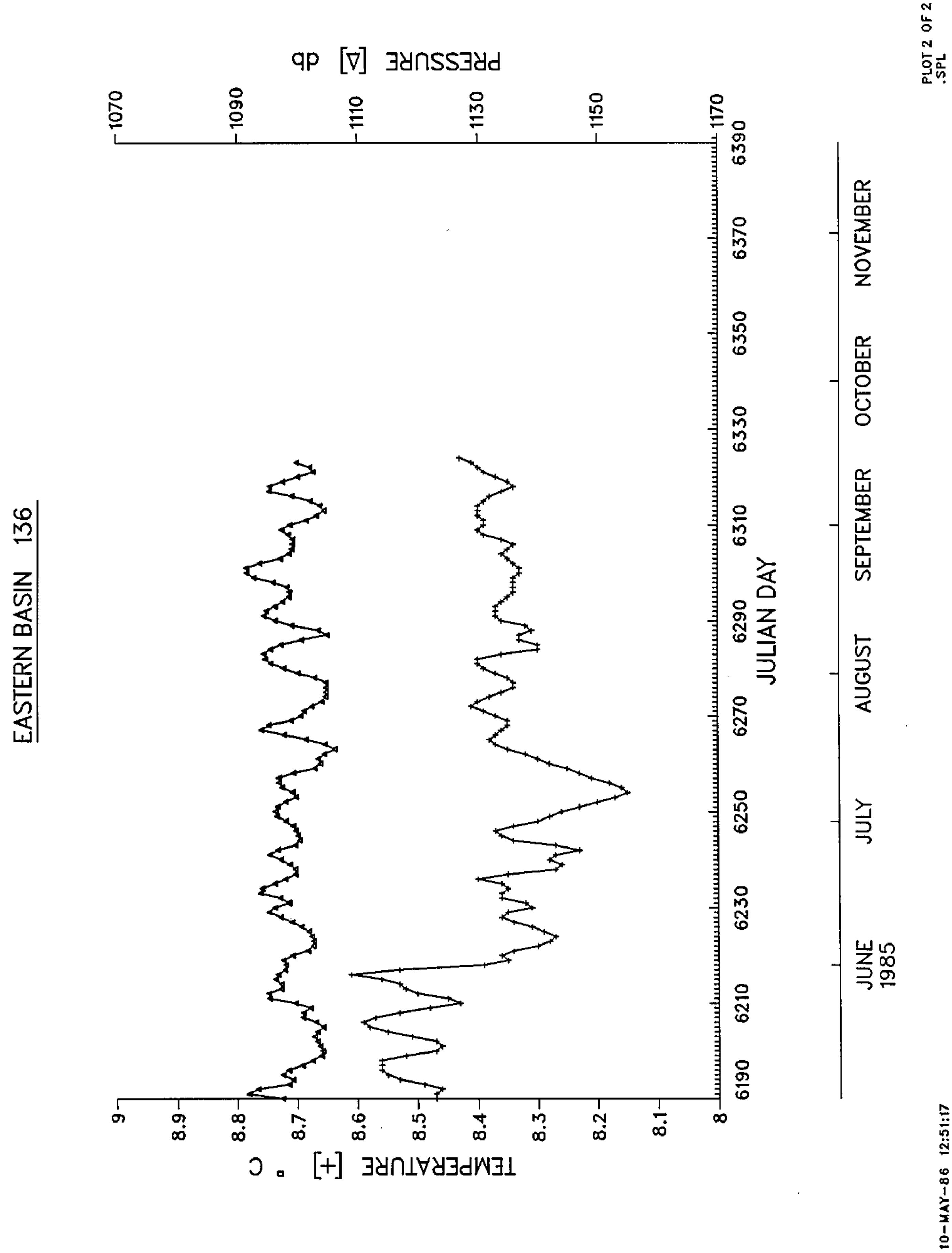

EASTERN BASIN 136
10
0
-10
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:51:54
PLOT 1 OF 2
.SPL


EASTERN BASIN 136
10
0
-10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:52:00
PLOT 2 OF 2
.SPL

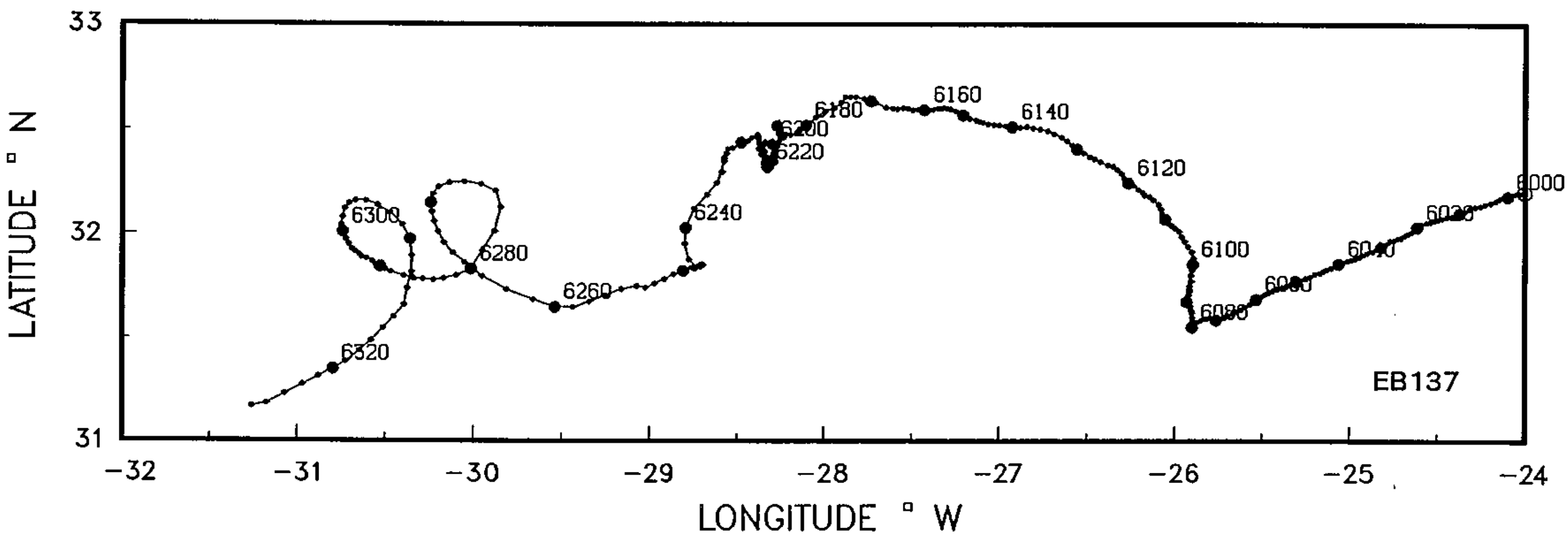

EASTERN BASIN 136
10
0
−10
EAST [•] cm/s
NORTH [o] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:51:35
PLOT 1 OF 2
.SPL


EASTERN BASIN 136
10
0
−10
EAST [●] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:51:48
PLOT 2 OF 2
.SPL

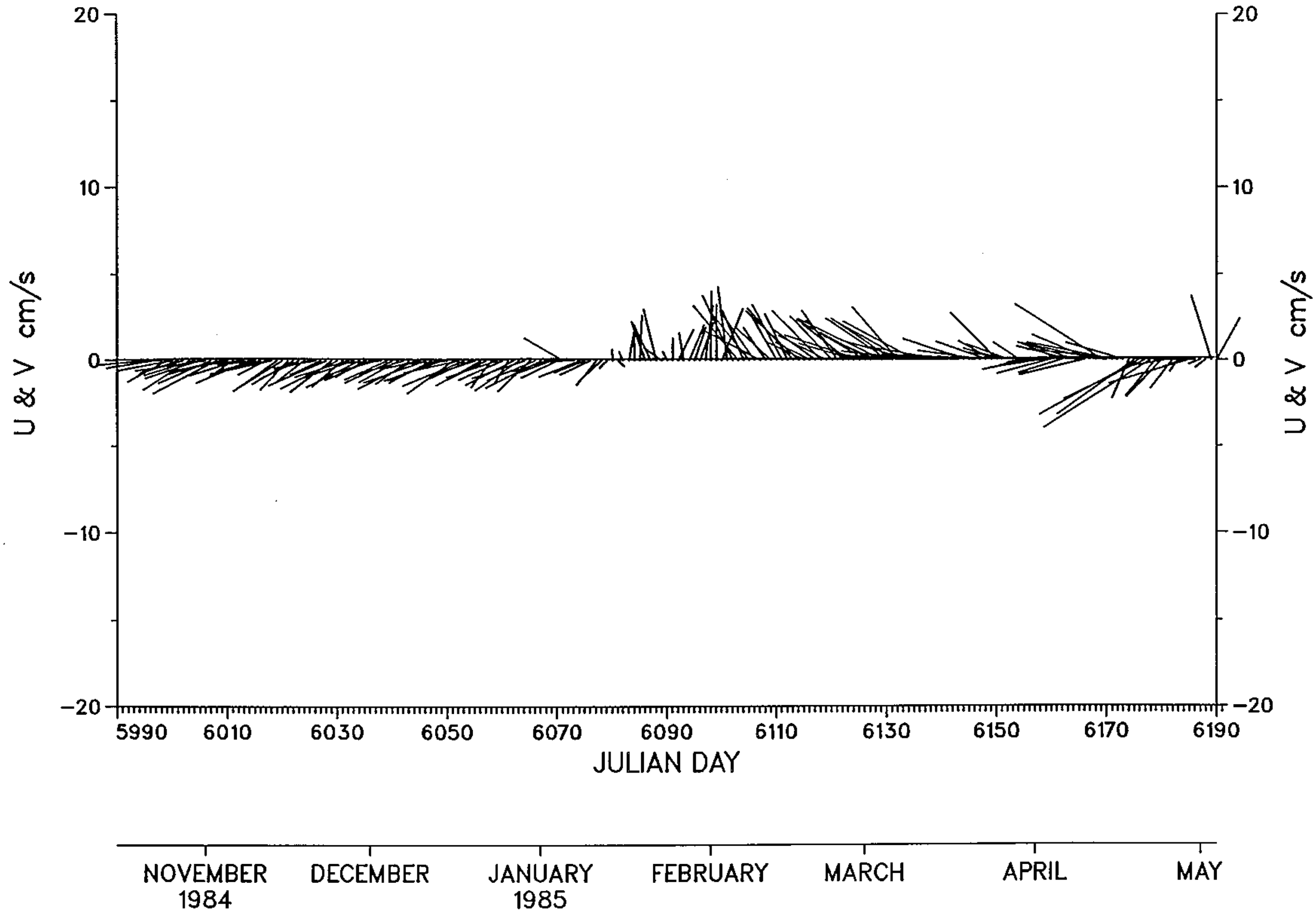

EASTERN BASIN 136
9.0
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8.0
TEMPERATURE [+] ° C
1070
1090
1110
1130
1150
1170
PRESSURE [Δ] db
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:51:08
PLOT 1 OF 2 .SPL


EASTERN BASIN 136
PRESSURE [Δ] db
1070
1090
1110
1130
1150
1170
TEMPERATURE [+] ° C
9
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
PLOT 2 OF 2
.SPL
10-MAY-86 12:51:17

EASTERN BASIN 137



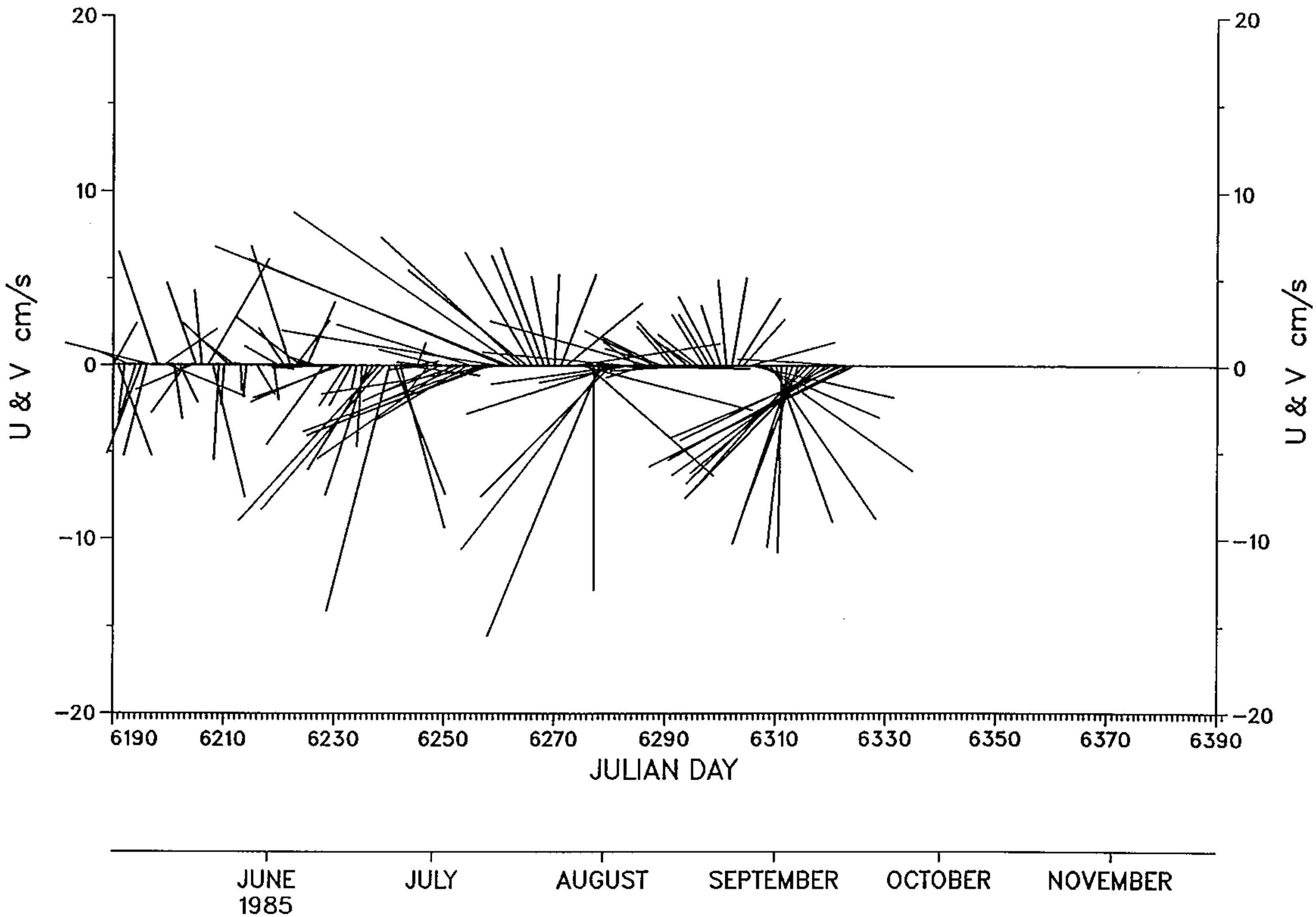
EASTERN BASIN 137



10-MAY-86 12:53:24

PLOT 1 OF 2
.SPL

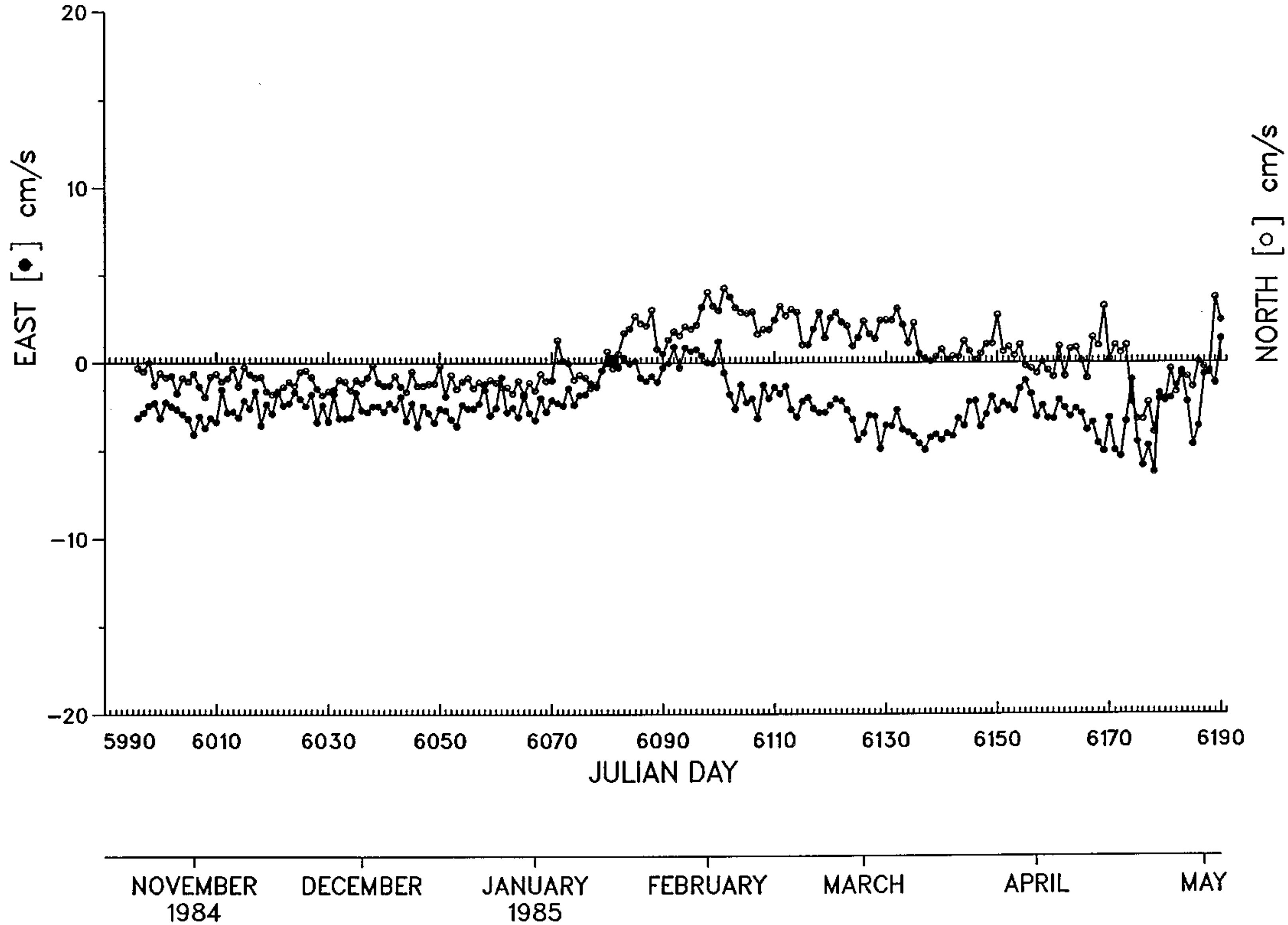
EASTERN BASIN 137



10-MAY-86 12:53:31

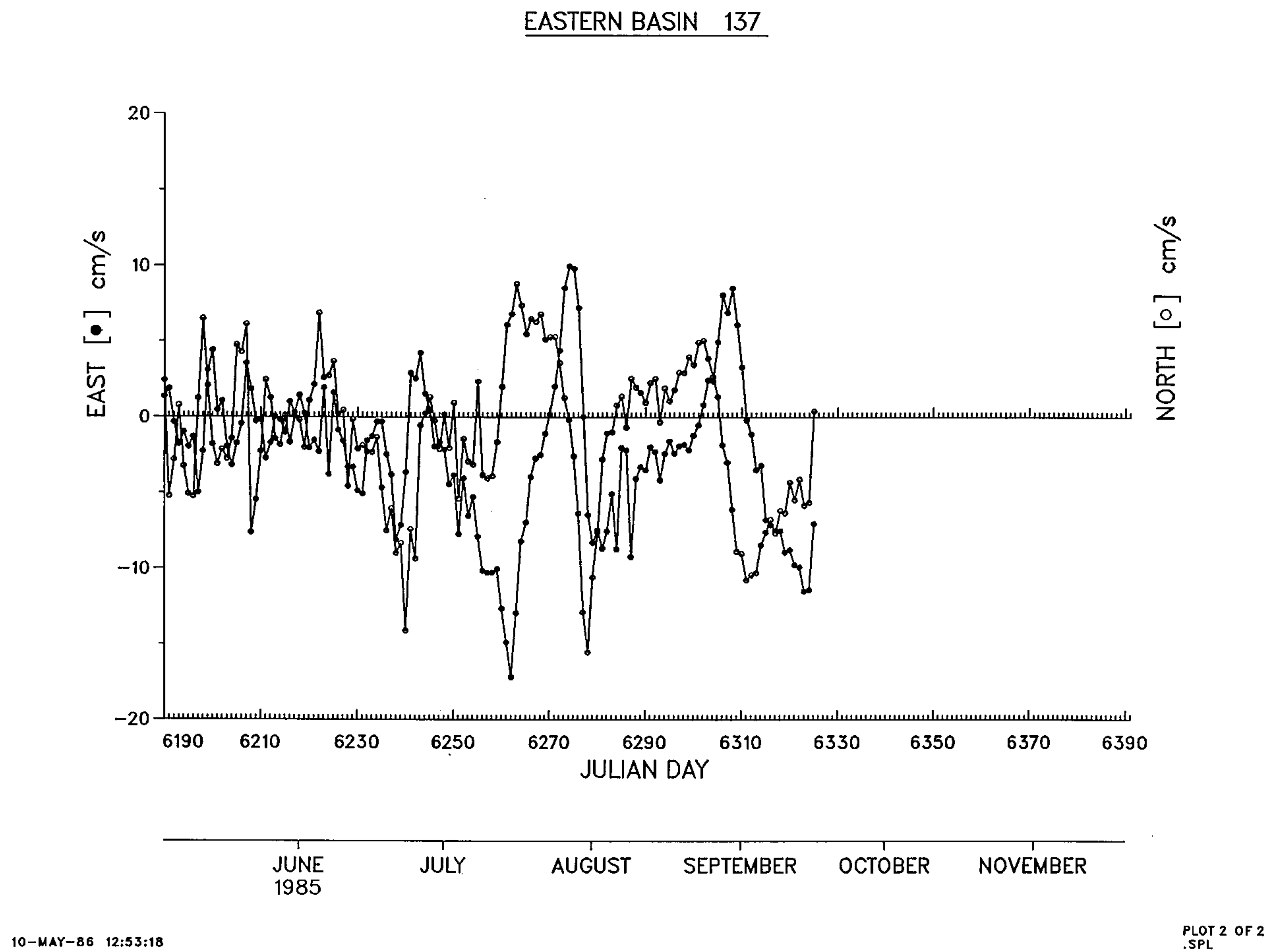
PLOT 2 OF 2
.SPL

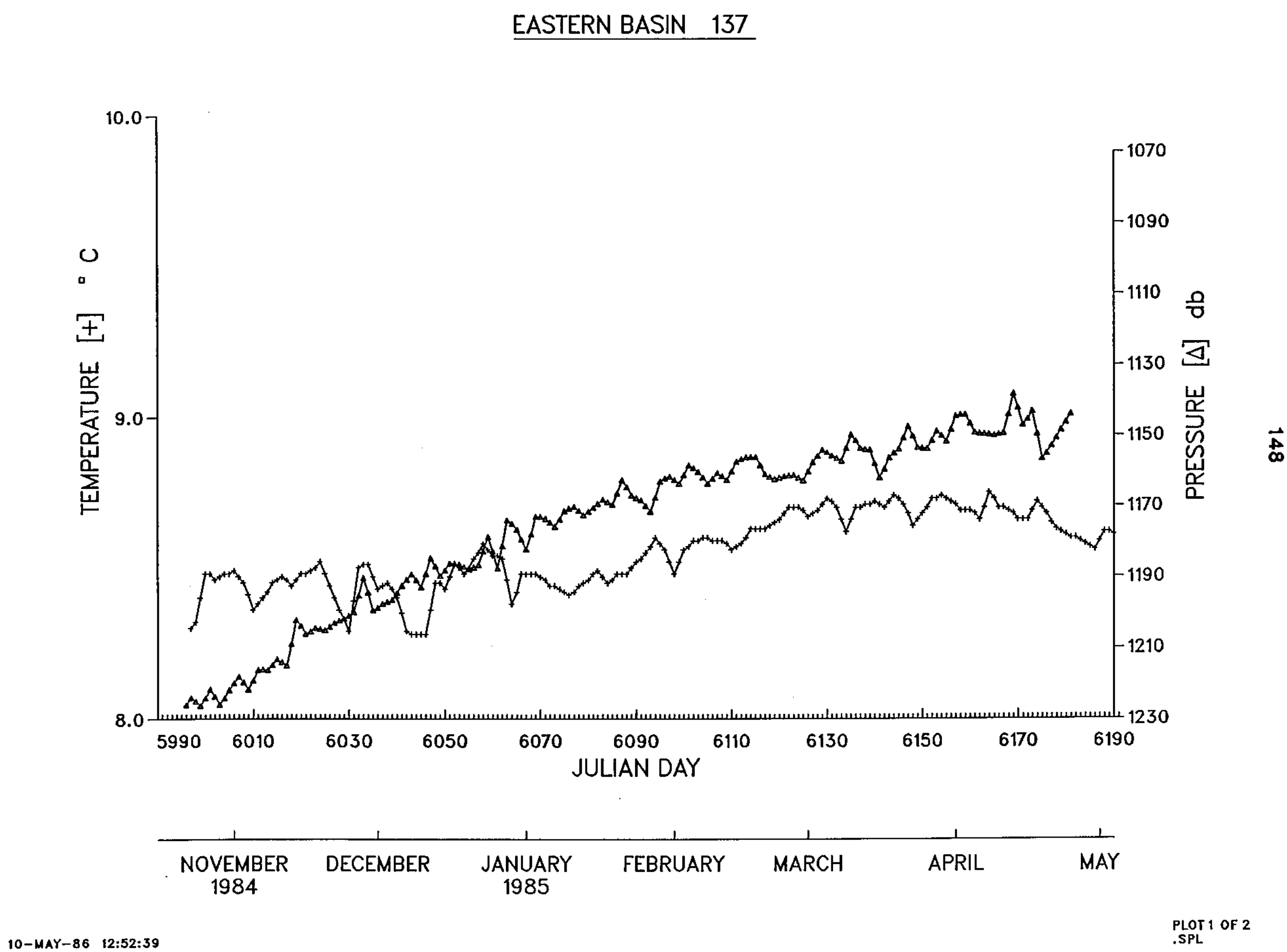
EASTERN BASIN 137

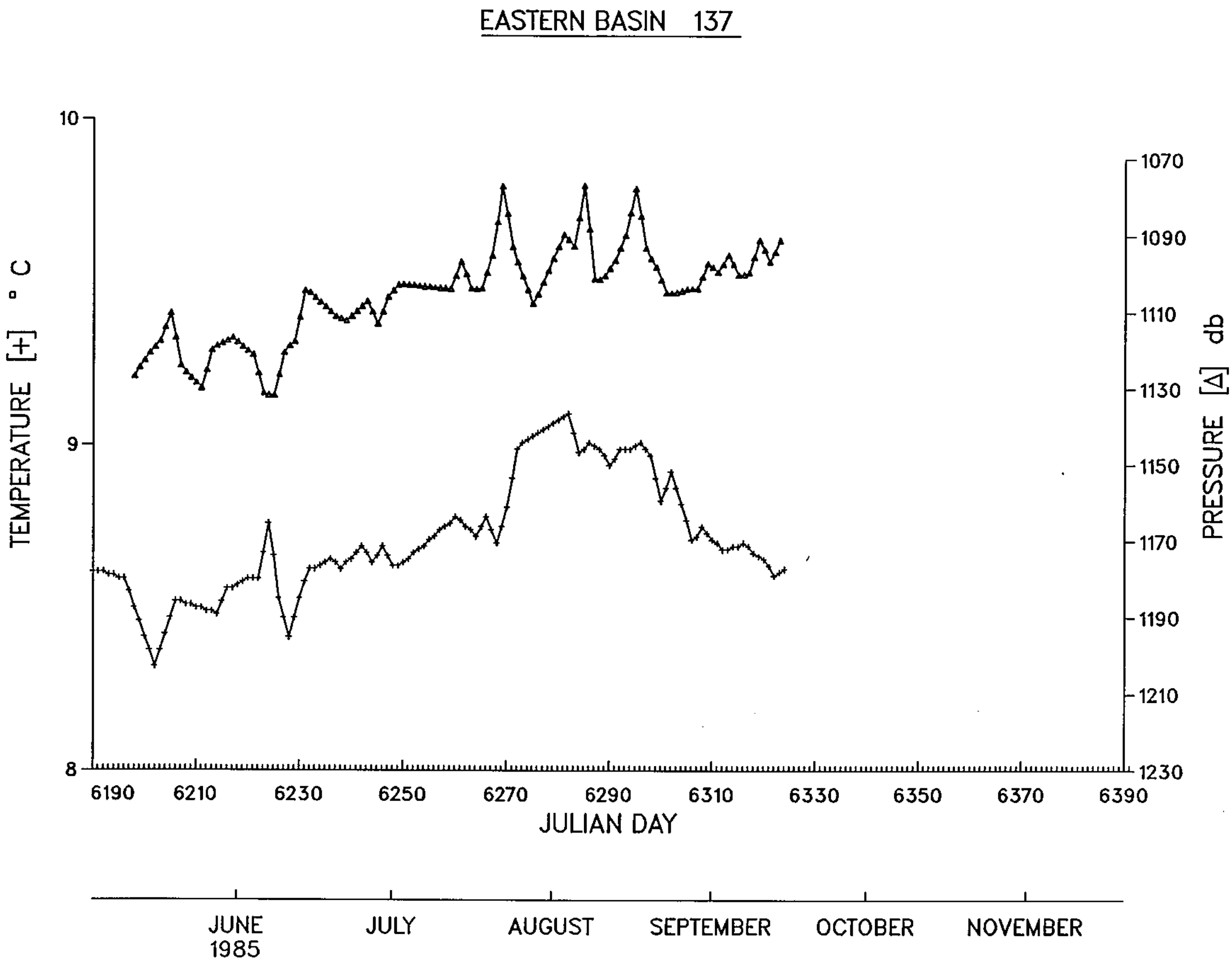


10-MAY-86 12:53:04

PLOT 1 OF 2
.SPL


EASTERN BASIN 137
20
10
0
−10
−20
EAST [●] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:53:18
PLOT 2 OF 2
.SPL

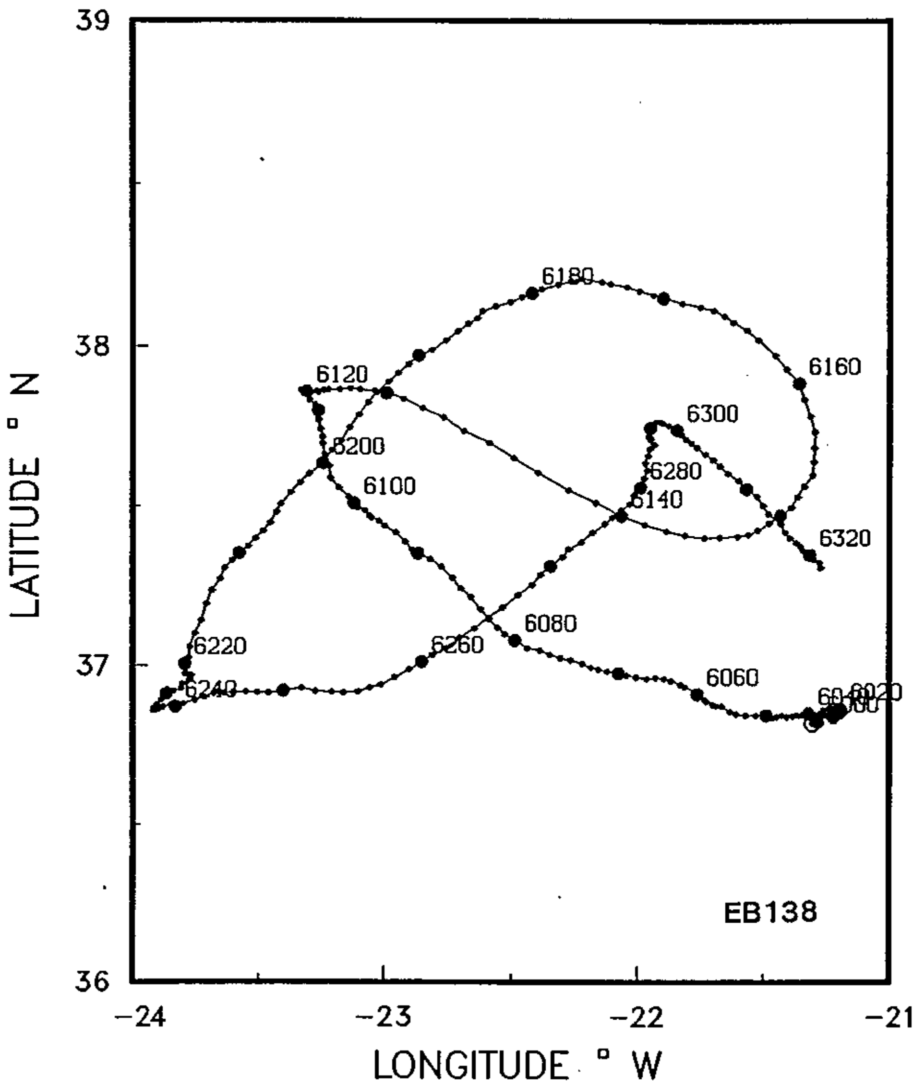

EASTERN BASIN 137
TEMPERATURE [+] ° C
10.0
9.0
8.0
PRESSURE [Δ] db
1070
1090
1110
1130
1150
1170
1190
1210
1230
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:52:39
PLOT 1 OF 2
.SPL

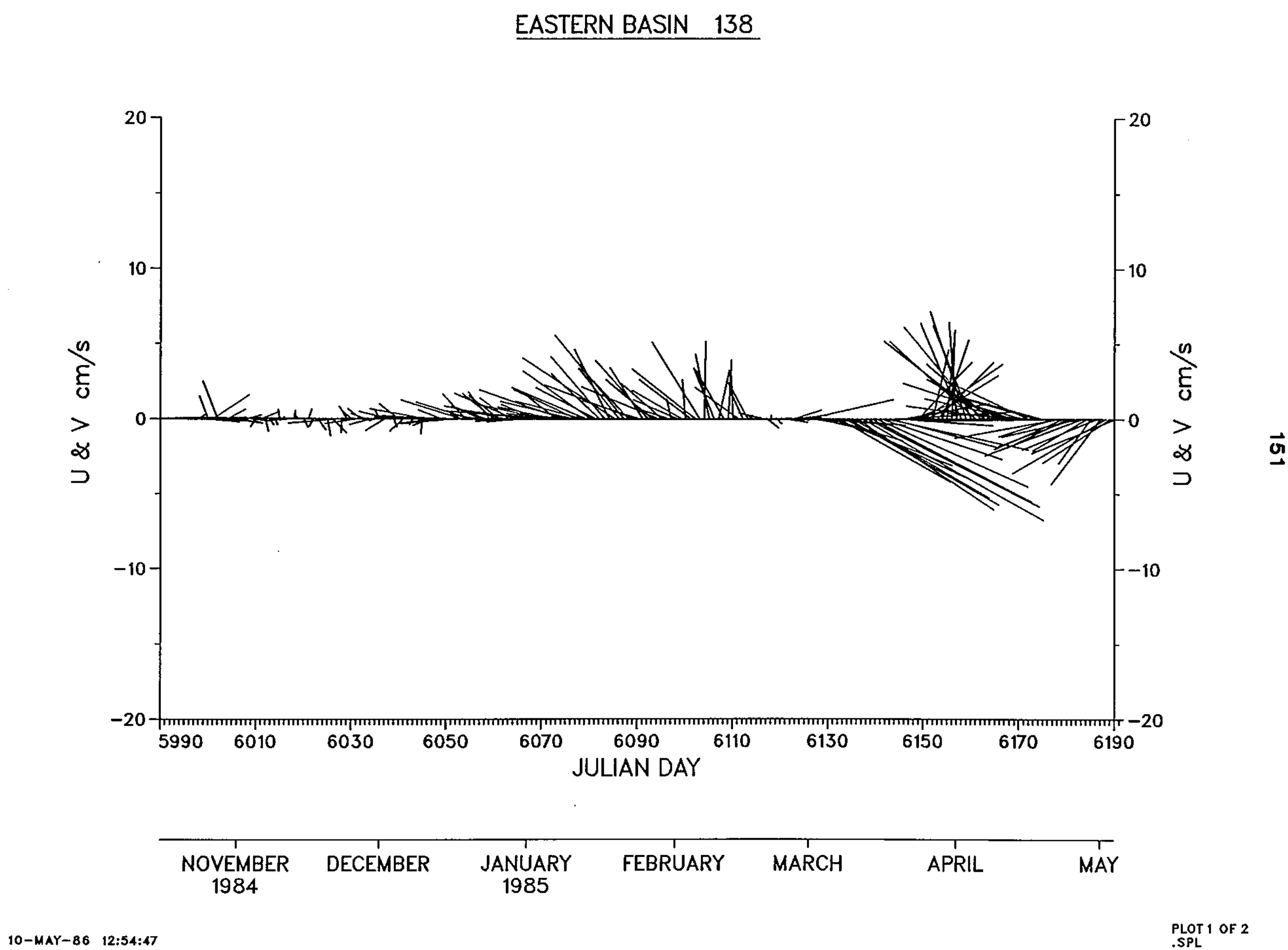


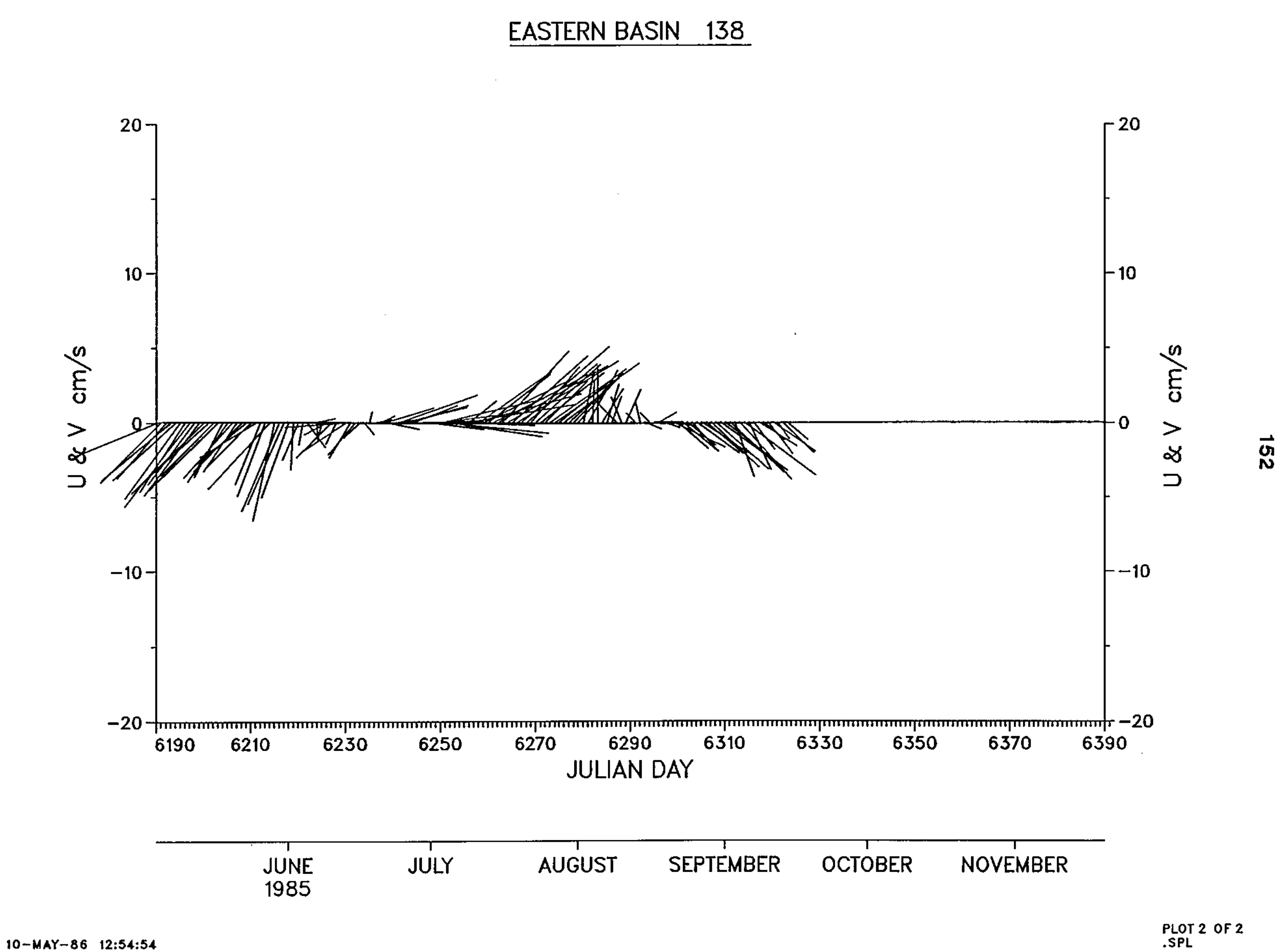
10-MAY-86 12:52:48

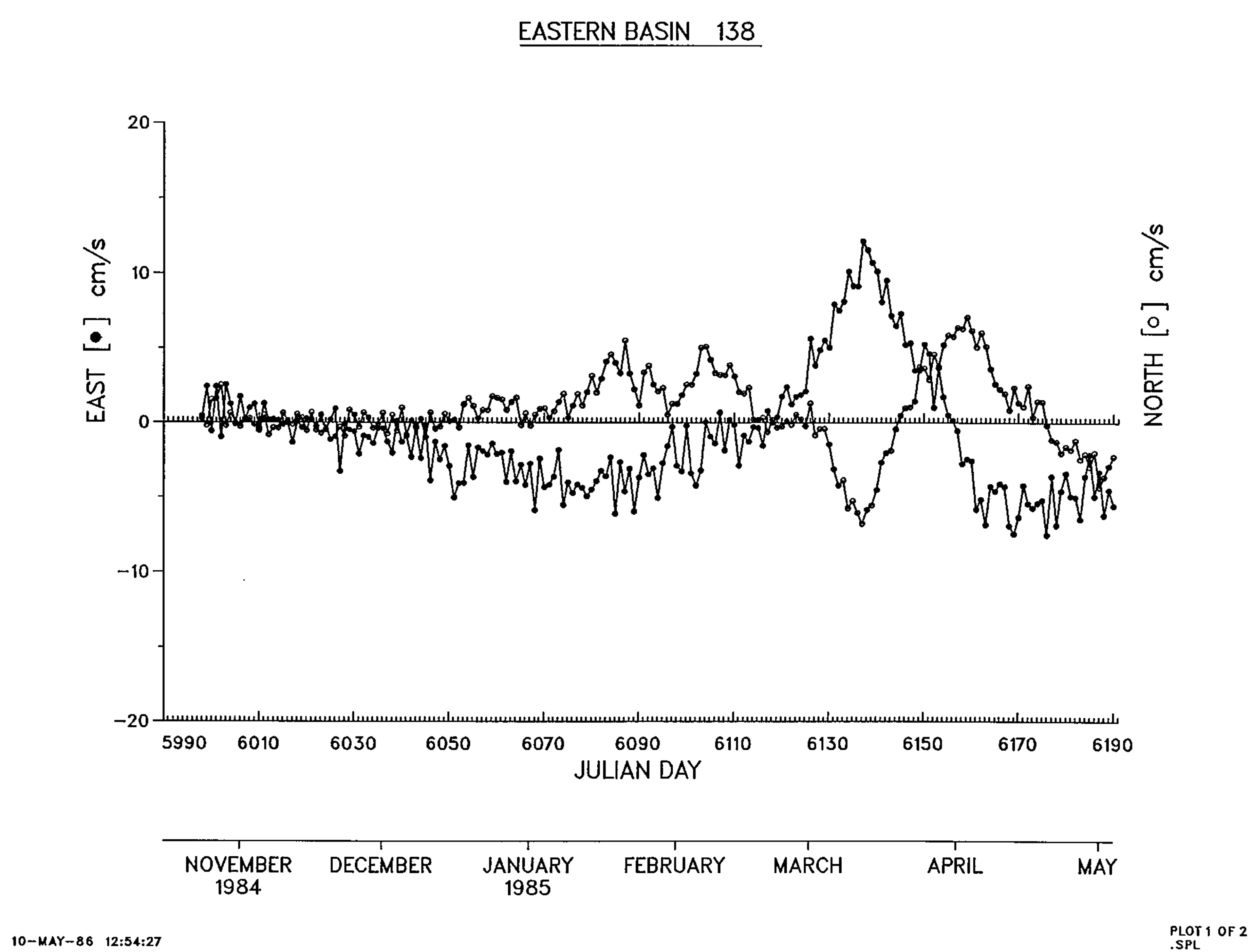
PLOT 2 OF 2
.SPL

EASTERN BASIN 138

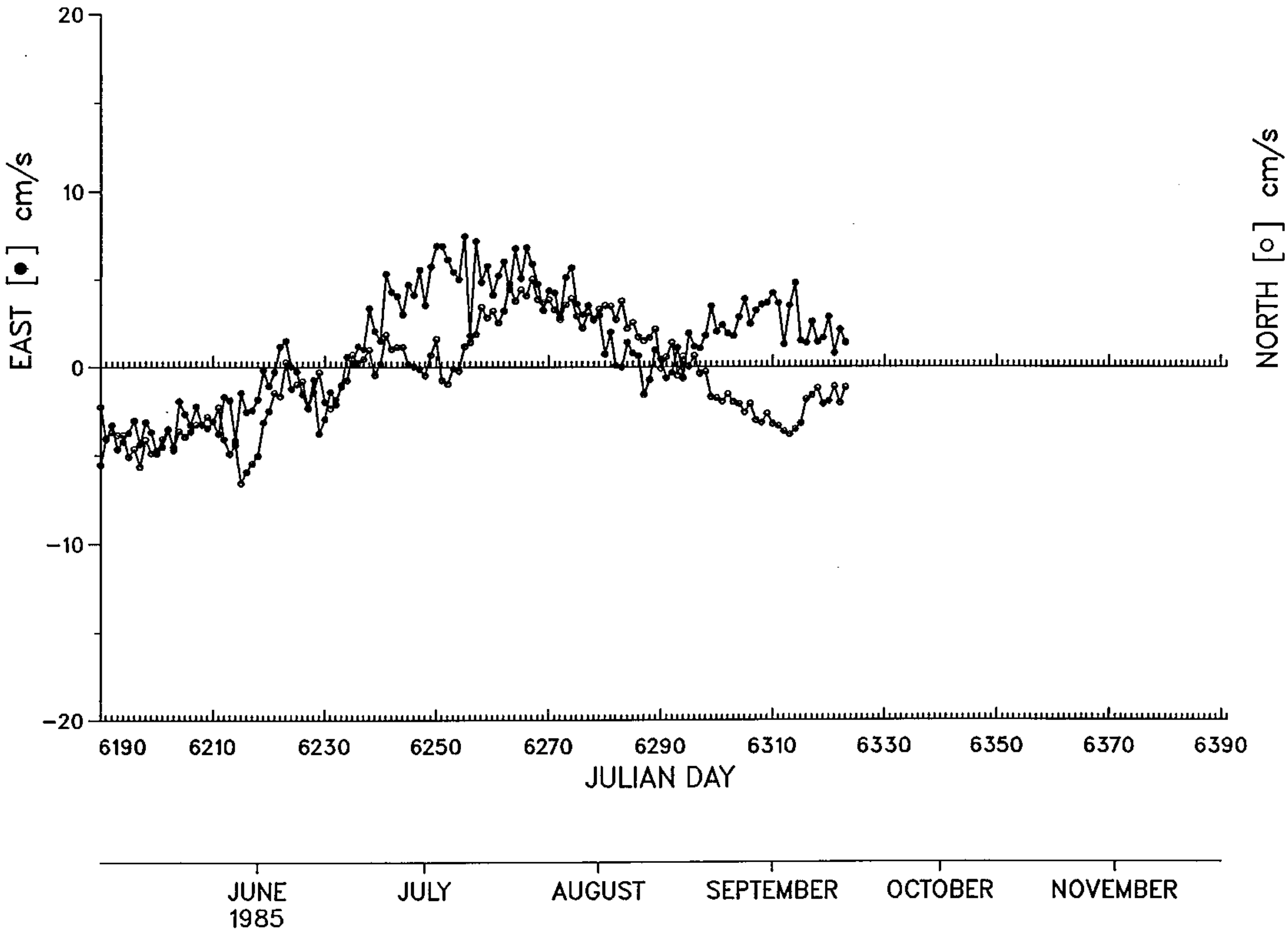



EASTERN BASIN 138
U & V cm/s
20
10
0
−10
−20
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:54:47
PLOT 1 OF 2
.SPL


EASTERN BASIN 138
20
10
0
−10
−20
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:54:54
PLOT 2 OF 2
.SPL

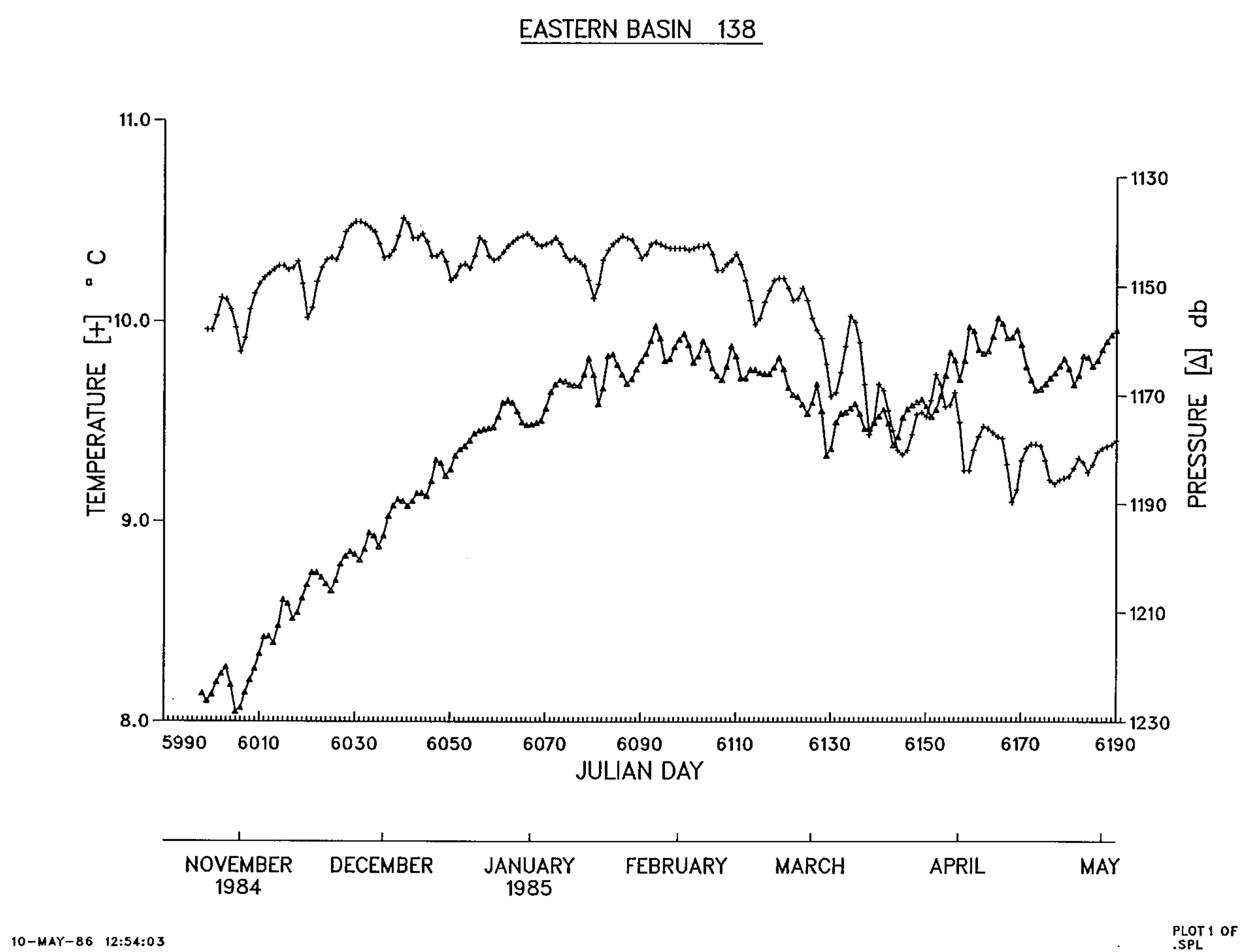

EASTERN BASIN 138
20
10
0
−10
−20
EAST [●] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:54:27
PLOT 1 OF 2
.SPL

EASTERN BASIN 138

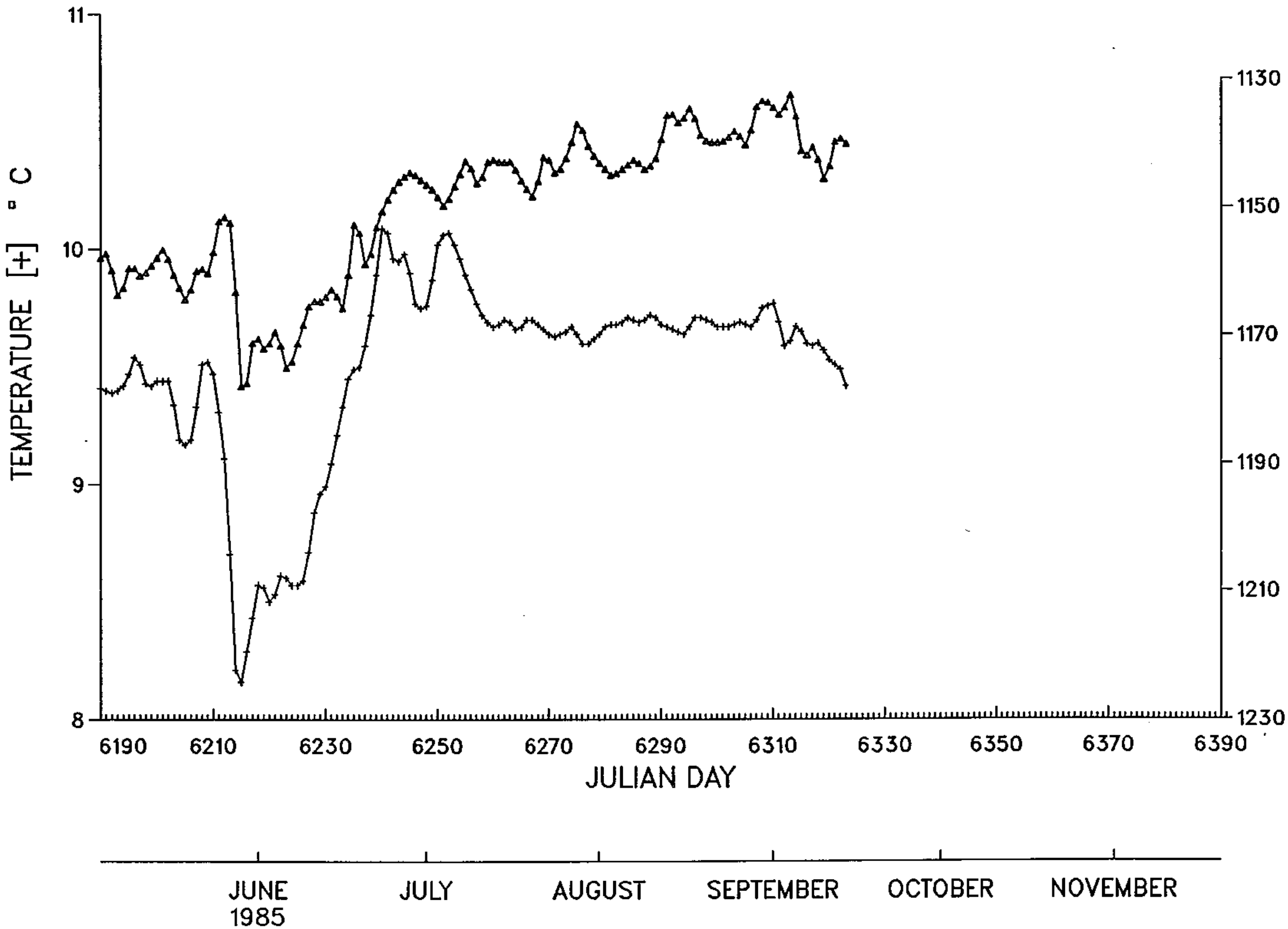


10-MAY-86 12:54:41

PLOT 2 OF 2
.SPL


EASTERN BASIN 138
11.0
10.0
9.0
8.0
TEMPERATURE [+] °C
1130
1150
1170
1190
1210
1230
PRESSURE [Δ] db
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:54:03
PLOT 1 OF 2
.SPL

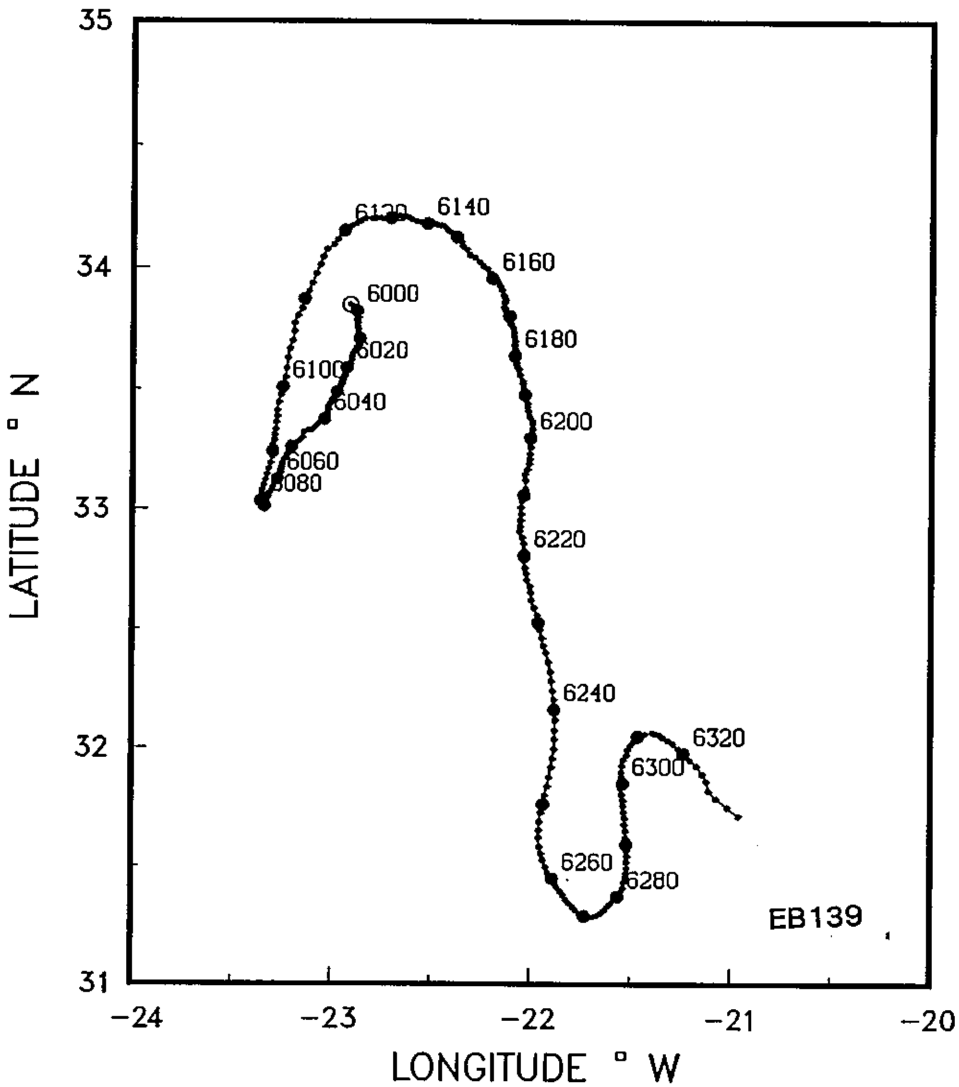
EASTERN BASIN 138



10-MAY-86 12:54:11

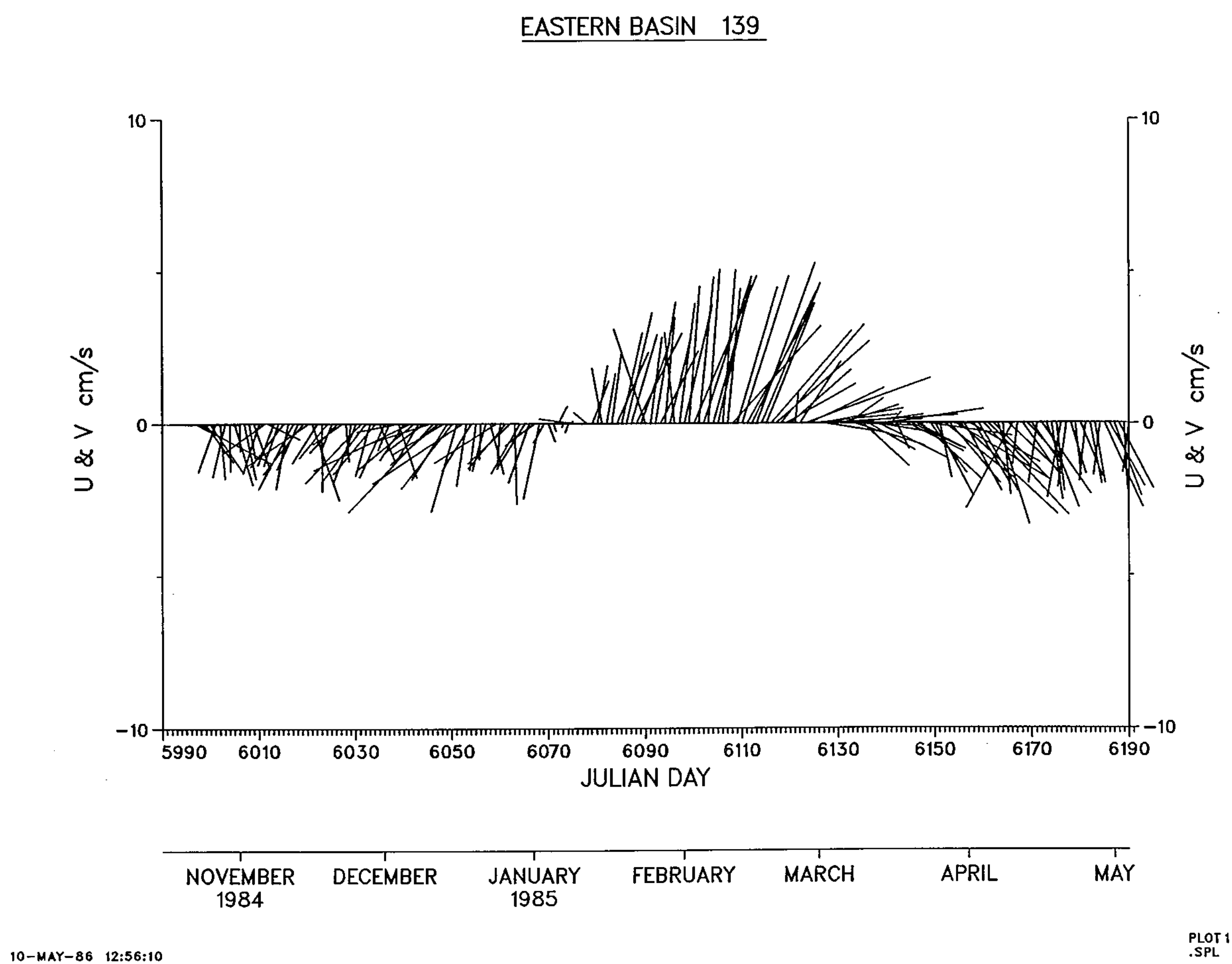
PLOT 2 OF 2
.SPL

EASTERN BASIN 139

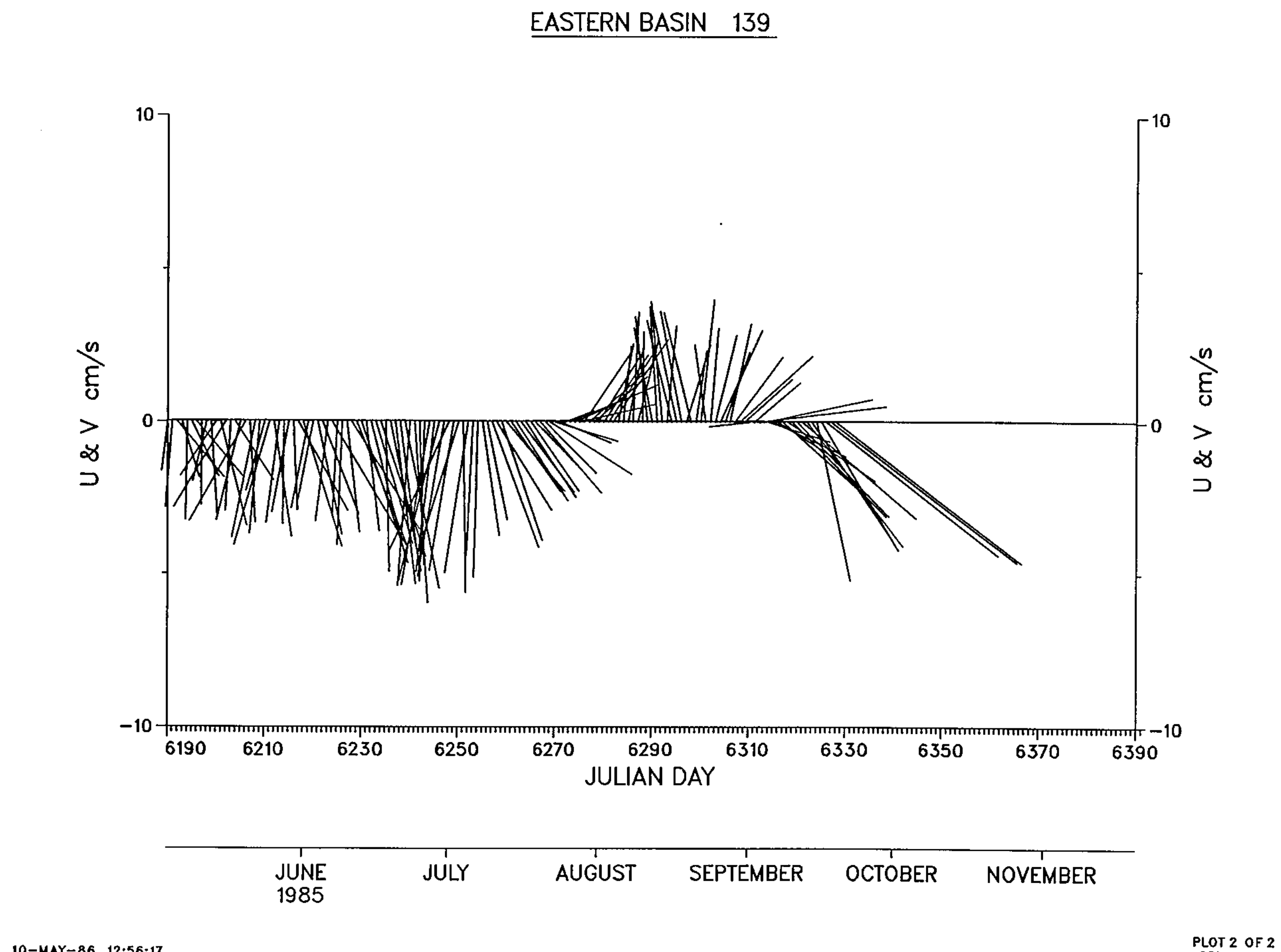


18-JUN-86 10:40:00

PLOT 1 OF 1
.FIN

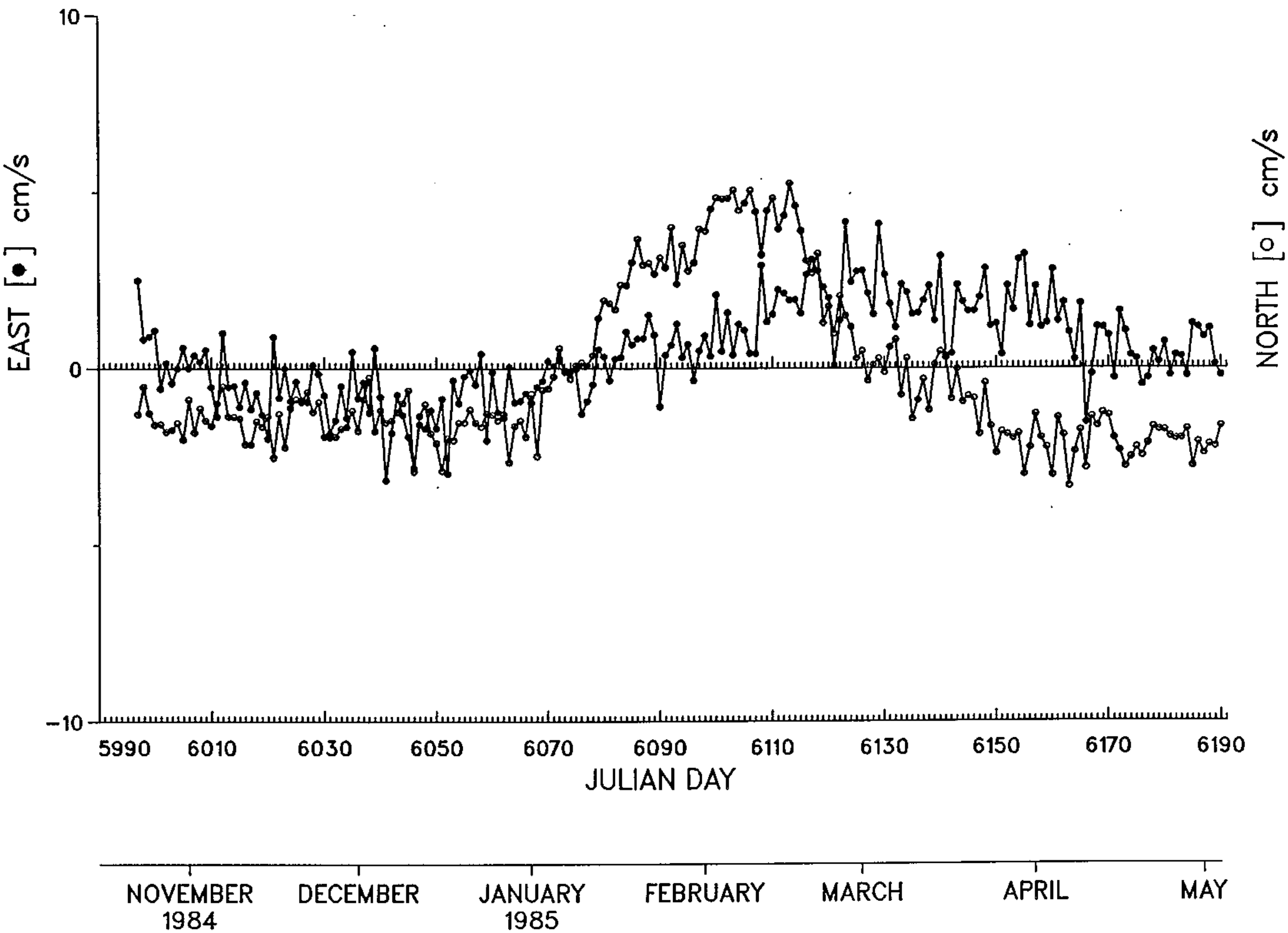


EASTERN BASIN 139
10
0
-10
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:56:10
PLOT 1 OF 2 .SPL



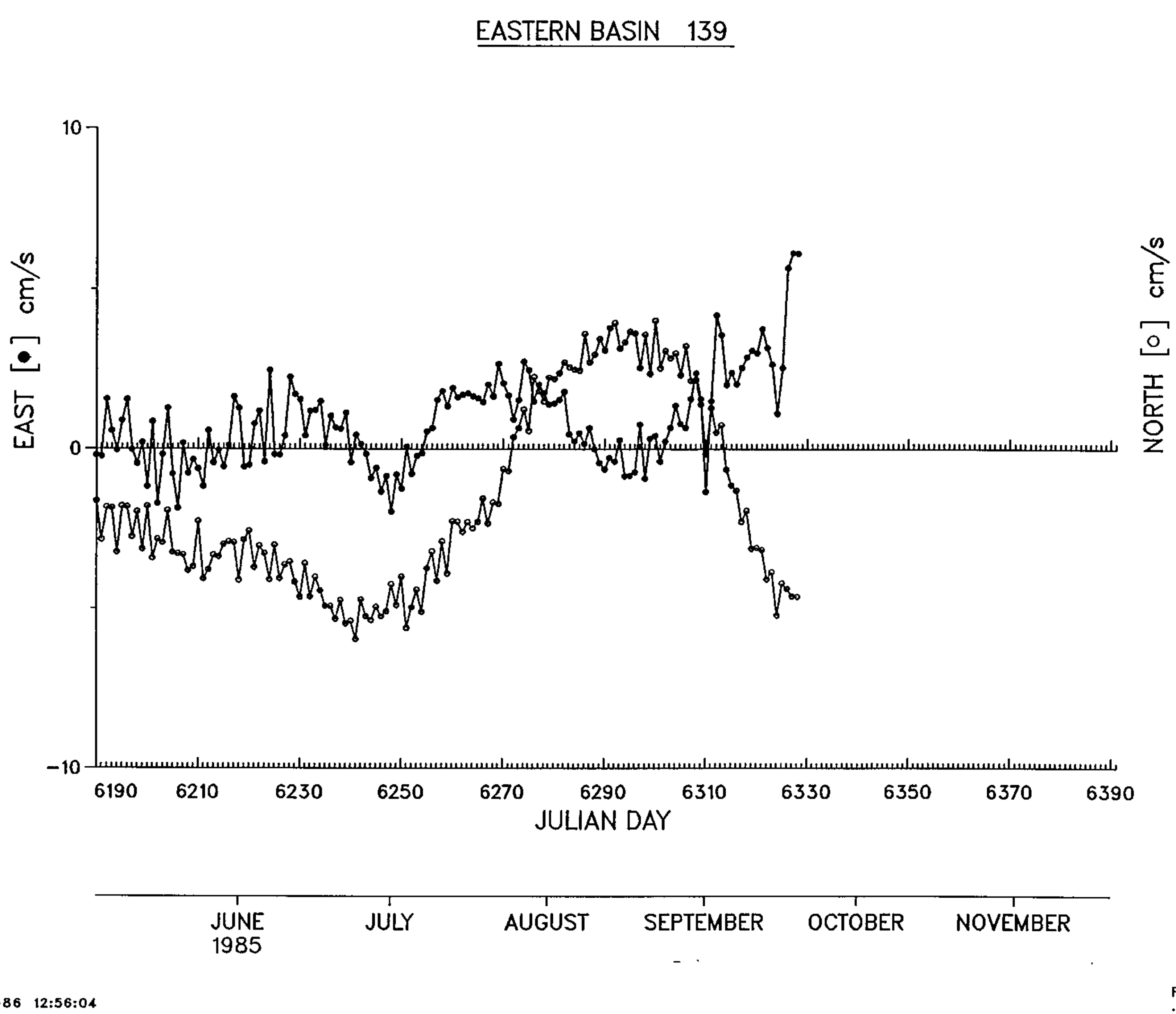
EASTERN BASIN 139
10
0
−10
U & V cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10−MAY−86 12:56:17
PLOT 2 OF 2
.SPL

EASTERN BASIN 139

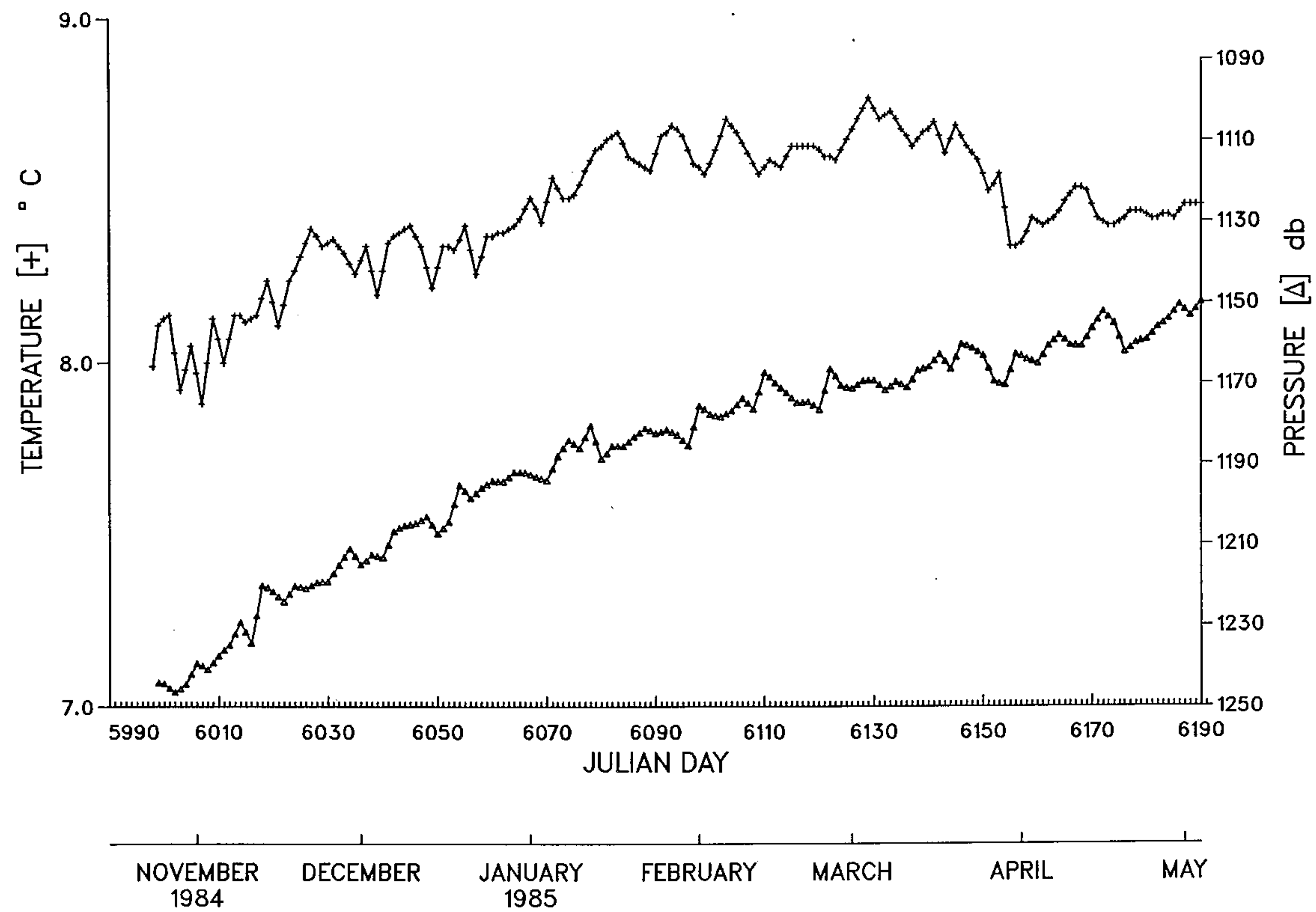


10-MAY-86 12:55:51

PLOT 1 OF 2
.SPL

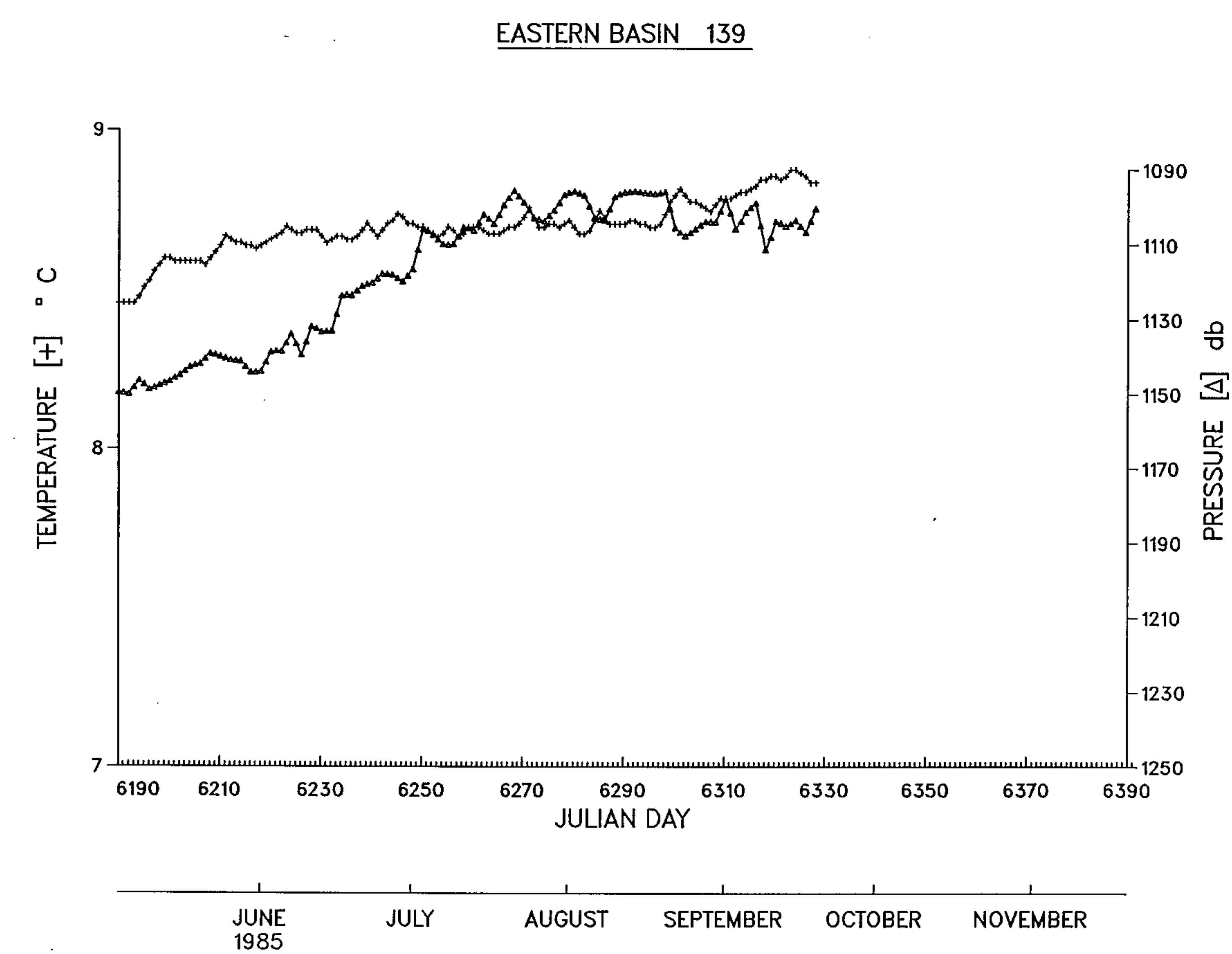

EASTERN BASIN 139
10
0
-10
EAST [●] cm/s
NORTH [○] cm/s
6190
6210
6230
6250
6270
6290
6310
6330
6350
6370
6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
10-MAY-86 12:56:04
PLOT 2 OF 2
.SPL

EASTERN BASIN 139



10-MAY-86 12:55:26

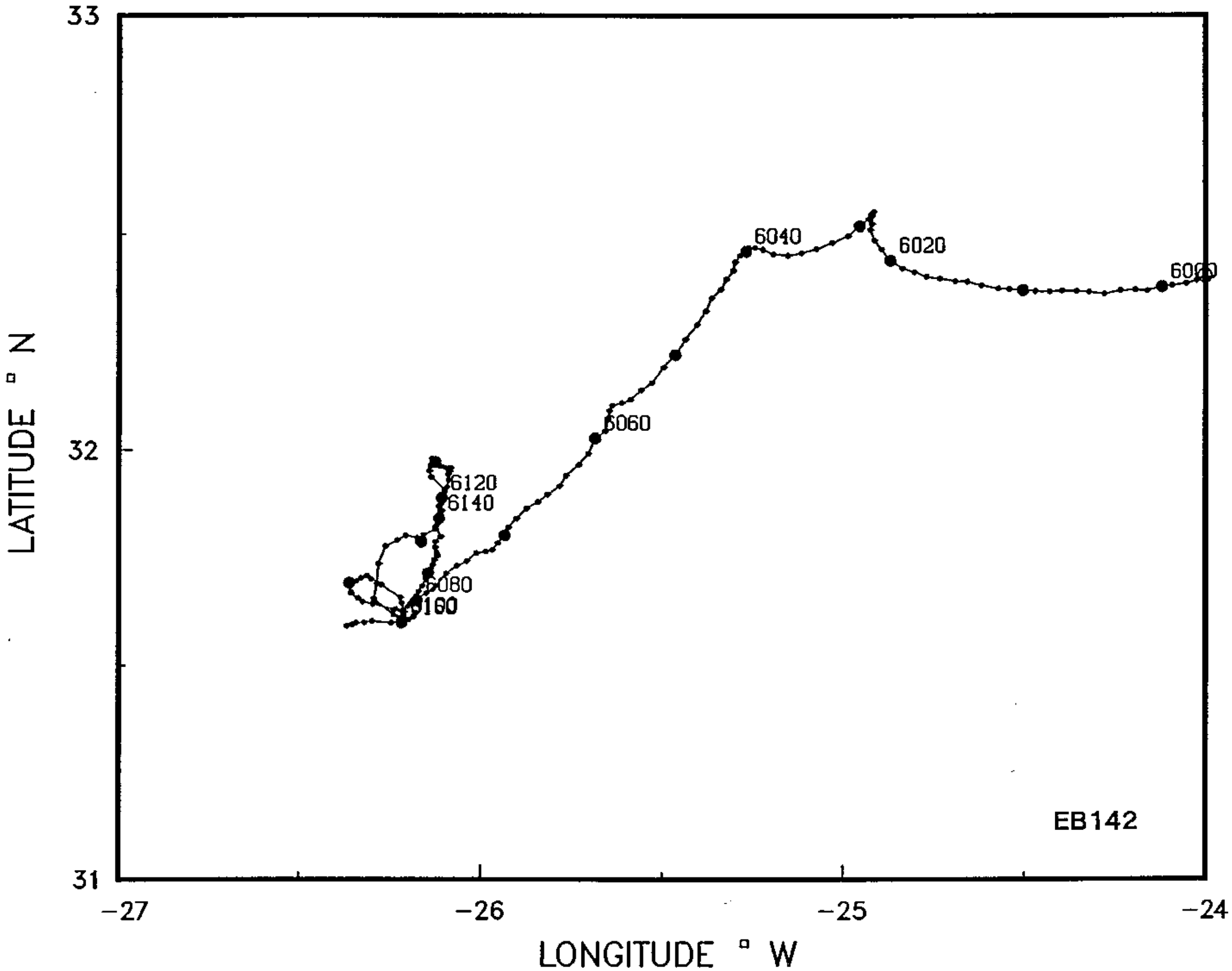
PLOT 1 OF 2
.SPL



10-MAY-86 12:55:34

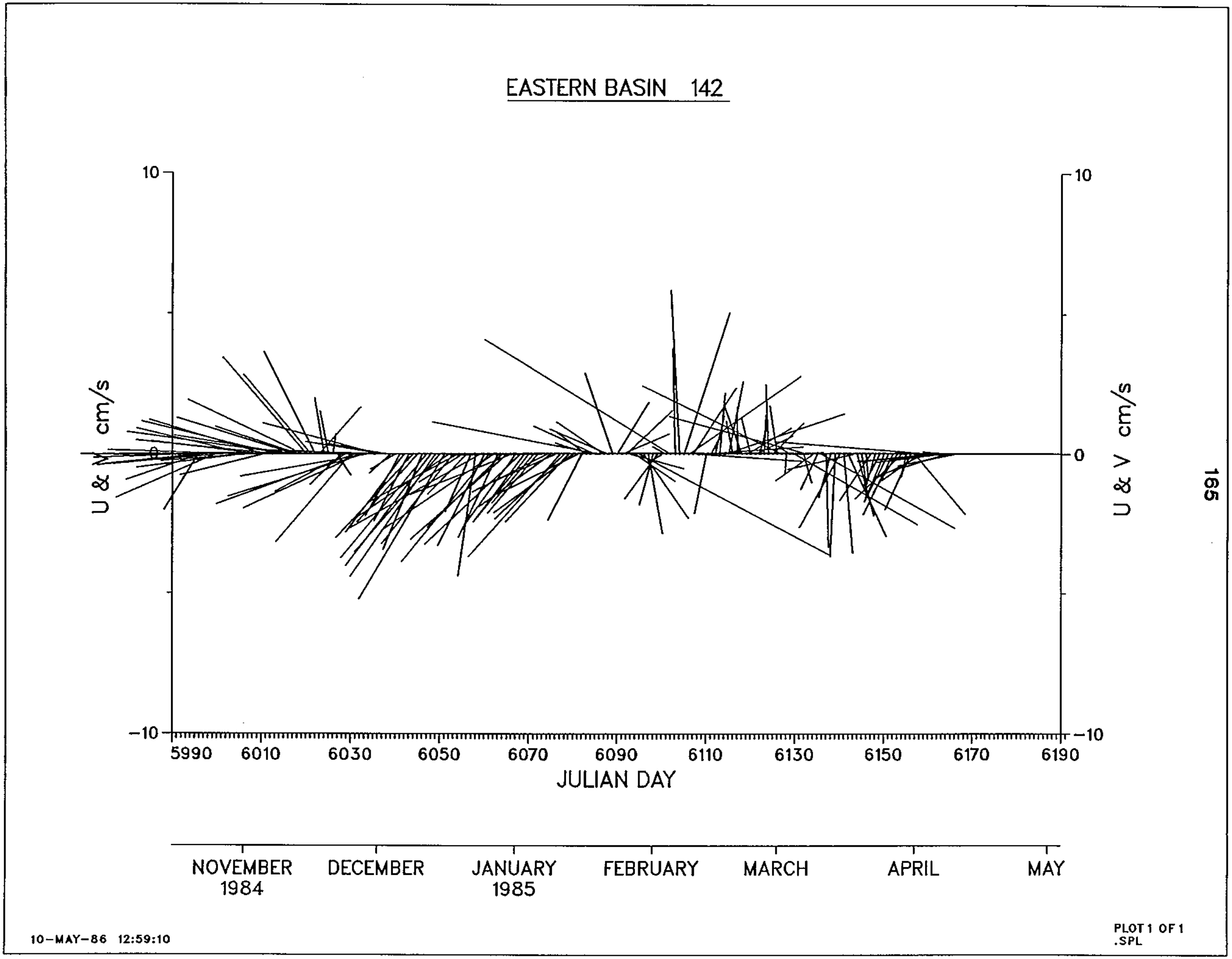
PLOT 2 OF 2
.SPL

EASTERN BASIN 142

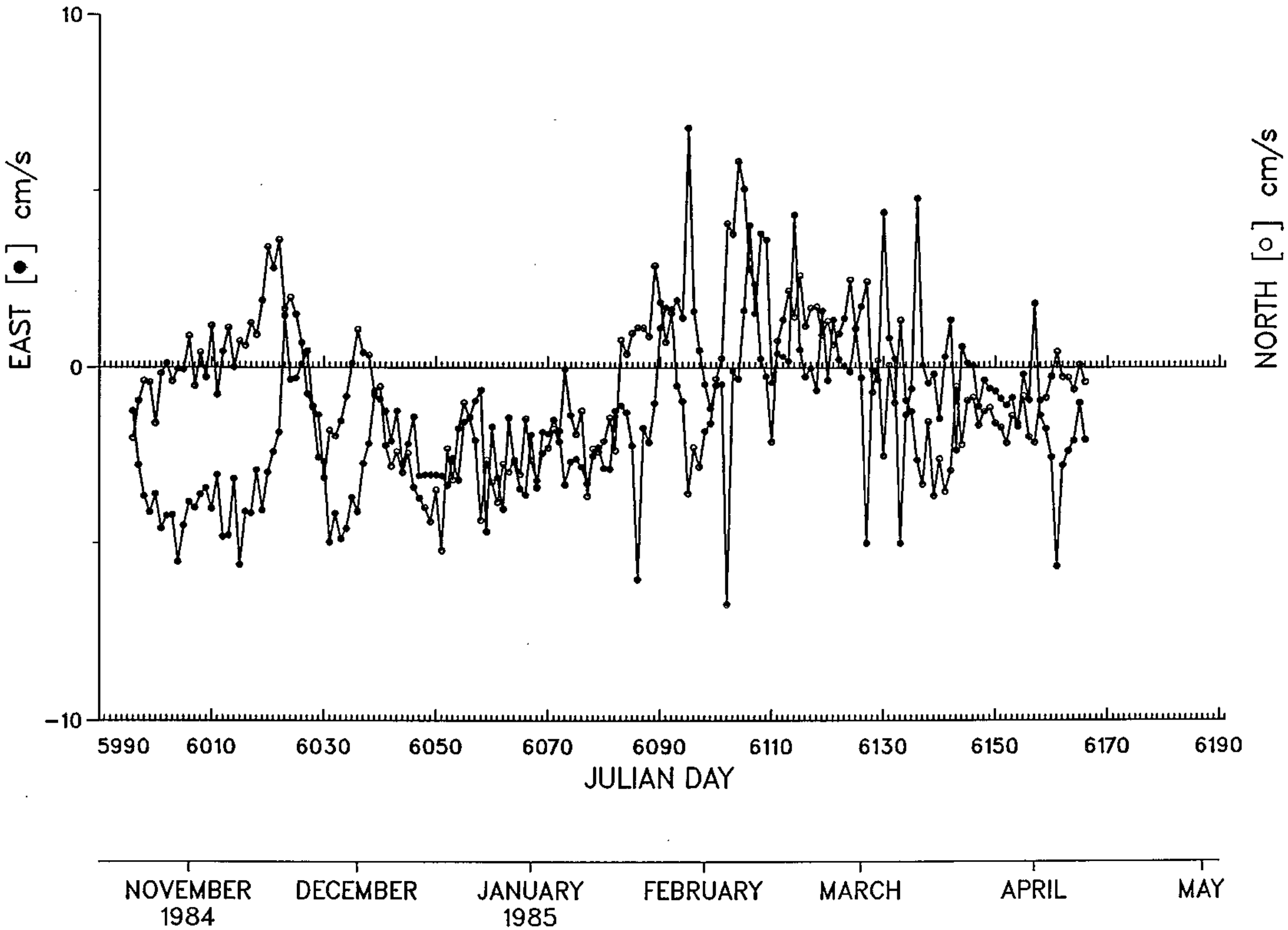


18-JUN-86 10:40:32

PLOT 1 OF 1
.FIN

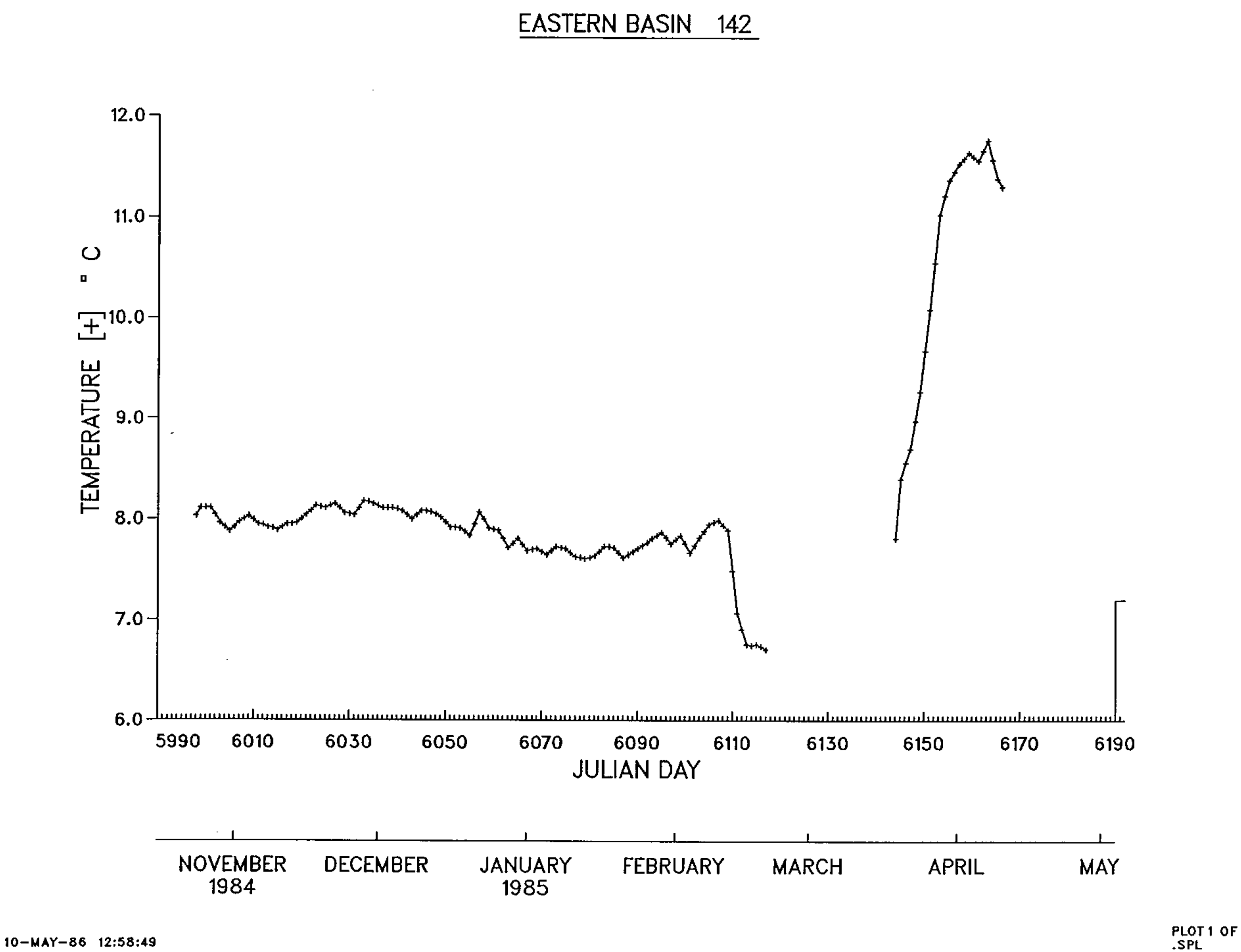

EASTERN BASIN 142
10
0
−10
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
10−MAY−86 12:59:10
PLOT 1 OF 1
.SPL

EASTERN BASIN 142



10-MAY-86 12:59:04

PLOT 1 OF 1
.SPL


EASTERN BASIN 142
TEMPERATURE [+] ° C
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER 1984
DECEMBER
JANUARY 1985
FEBRUARY
MARCH
APRIL
MAY
10-MAY-86 12:58:49
PLOT 1 OF 1 .SPL

APPENDIX B

Meddy Floats

In this report we also include a composite plot and individual float trajectory plots of the four Meddy floats launched by L. Armi. These data were processed in parallel with our own data but omitting all editing and smoothing. Speeds were calculated from consecutive positions and subsampled to one per day before plotting.

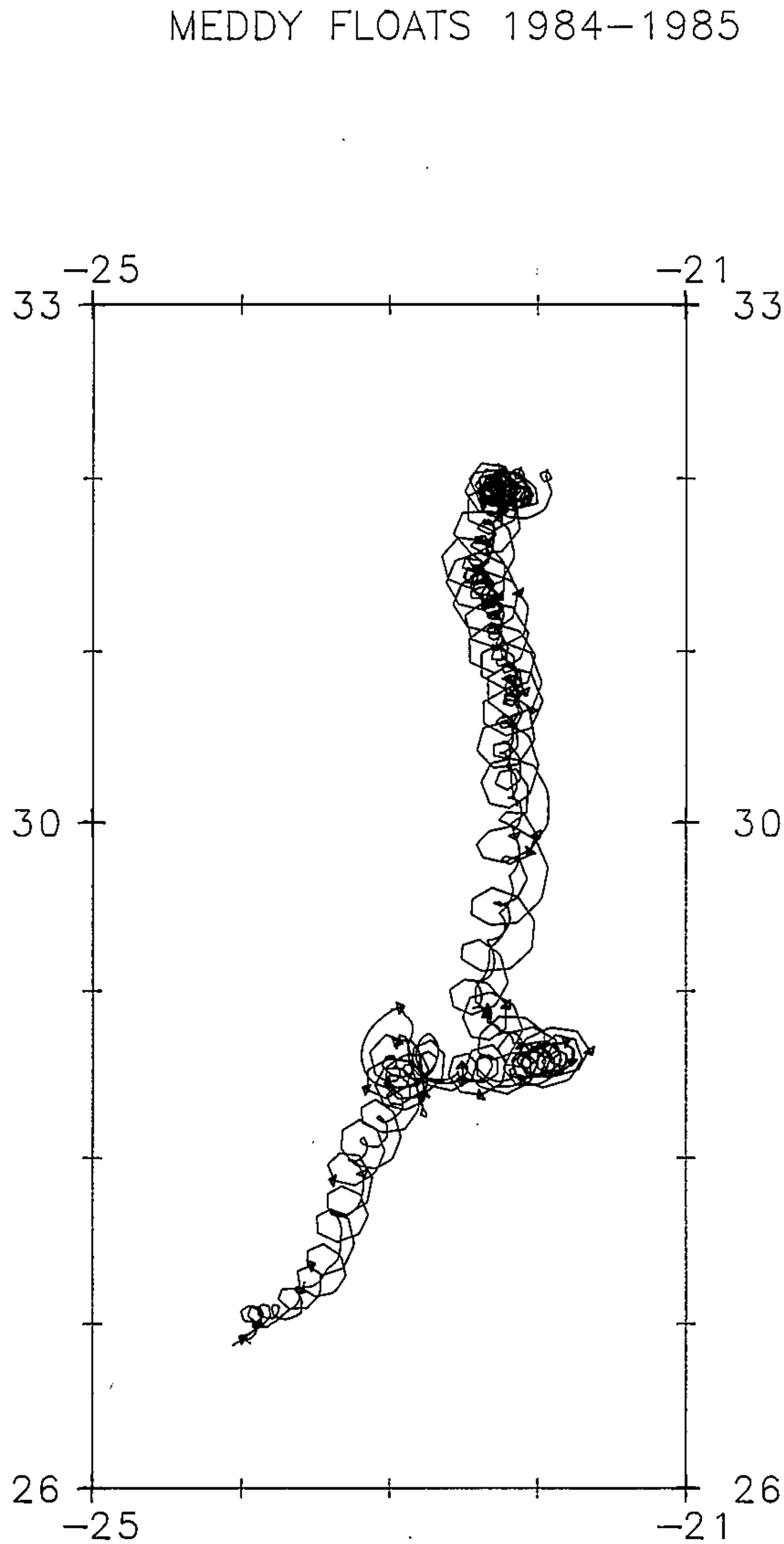
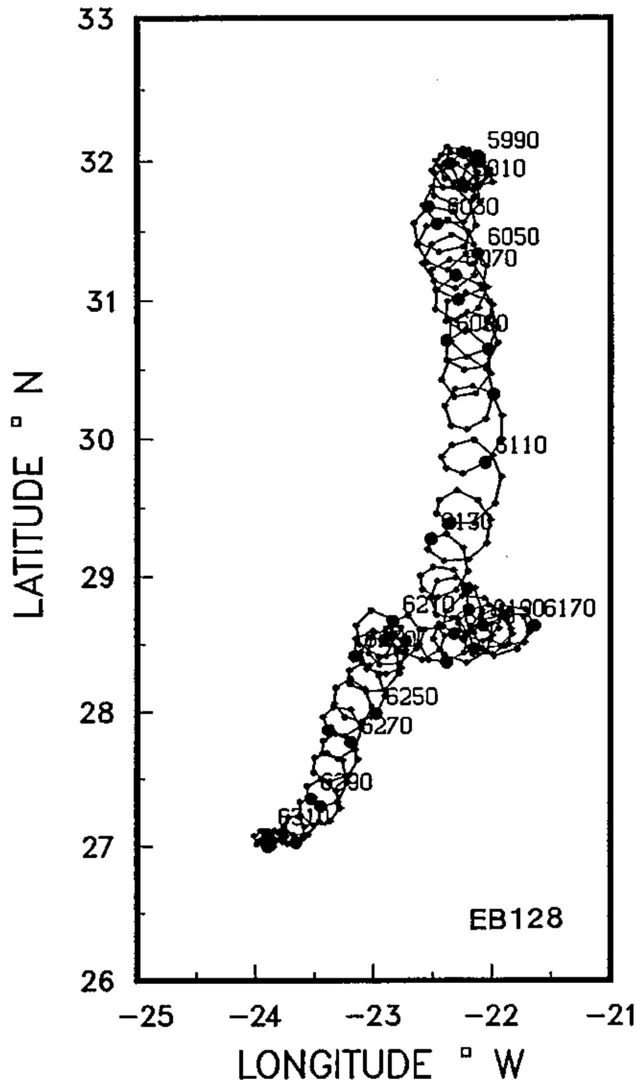


Figure 7: A composite of trajectories from four floats launched within a Meddy by L. Armi and T. Rossby.

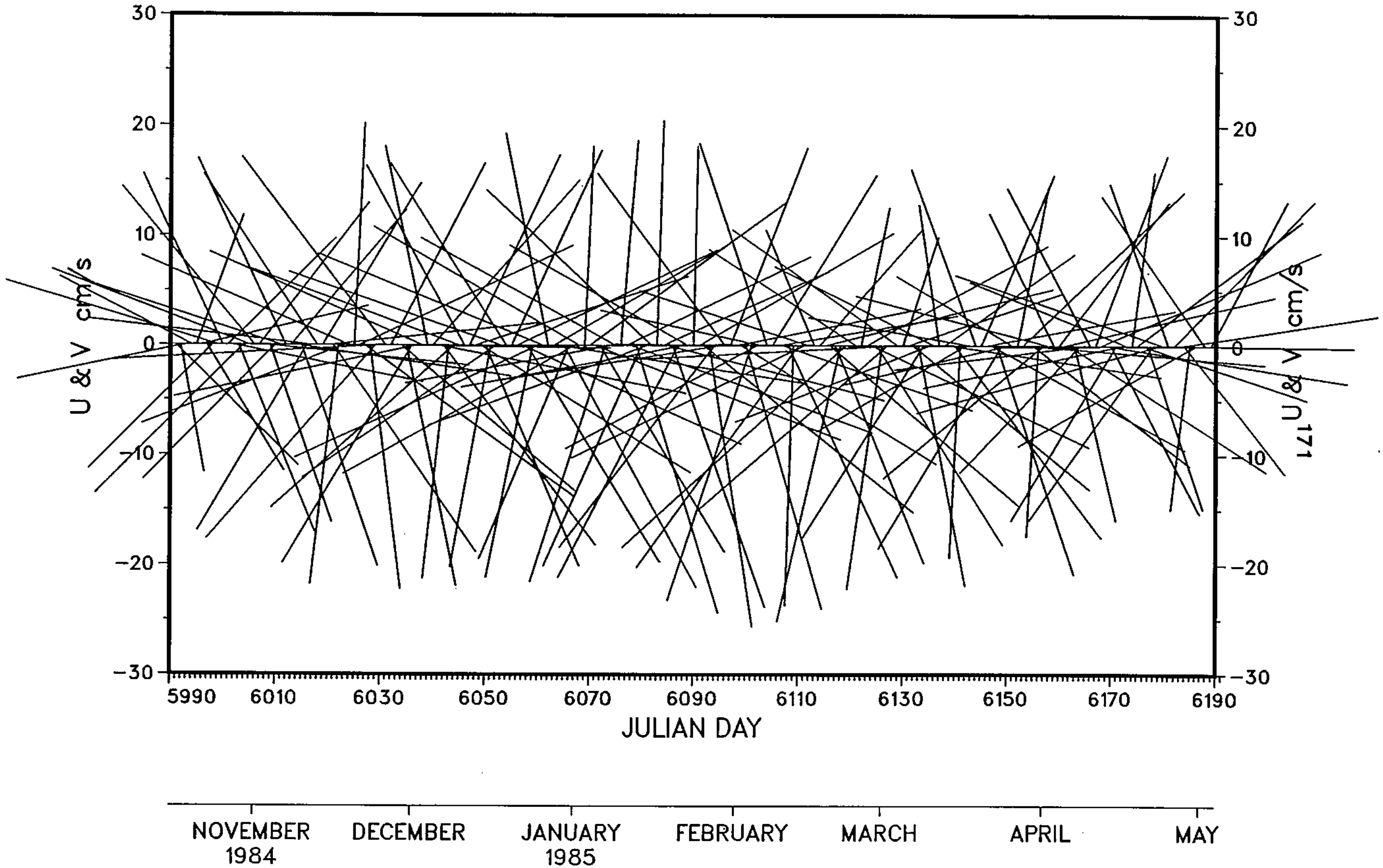
EASTERN BASIN 128



25-AUG-86 15:32:49

PLOT 1 OF 1
.SSF

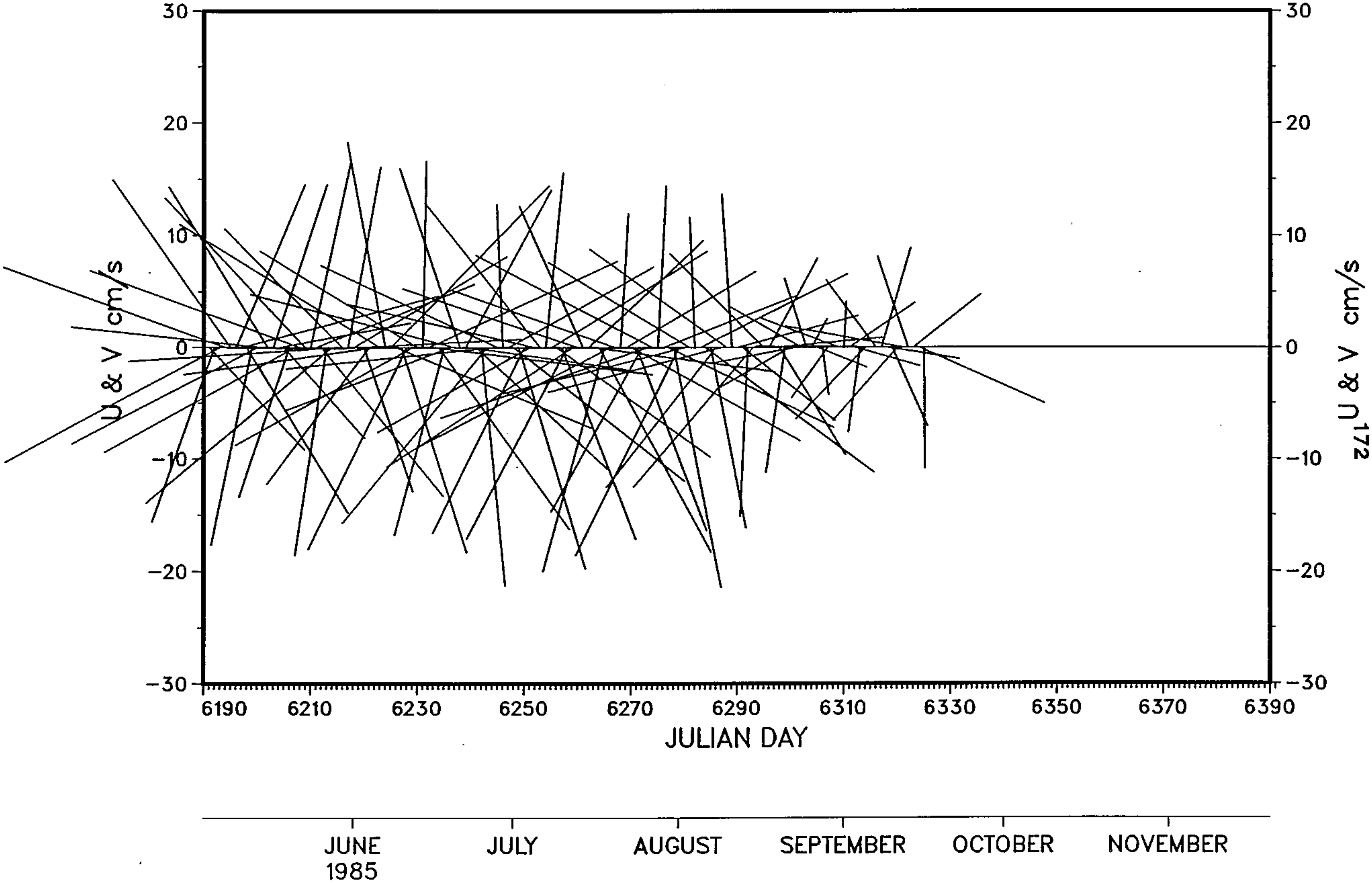
EASTERN BASIN 128



25-AUG-86 13:56:24

PLOT 1 OF 2
.SSF

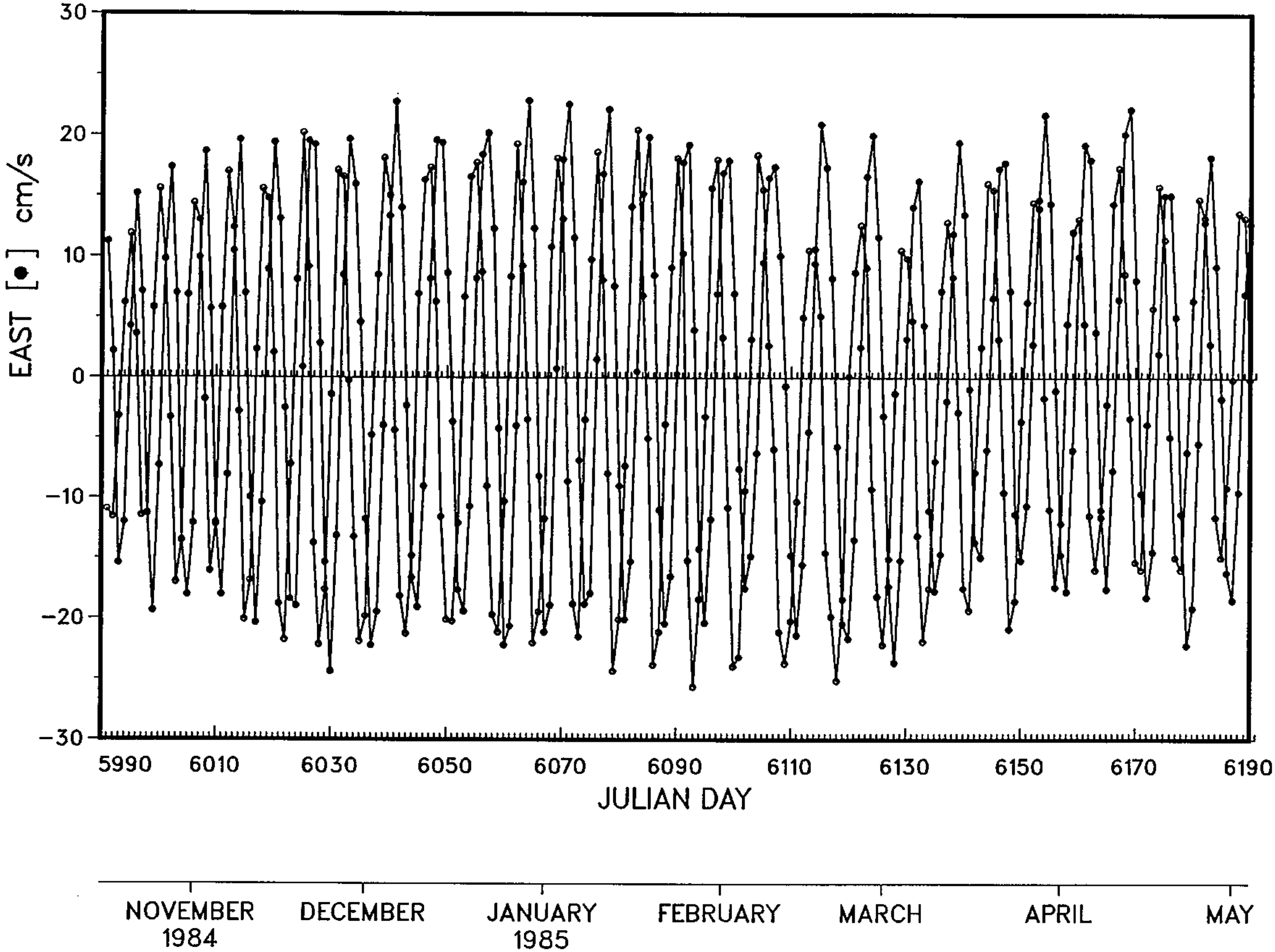
EASTERN BASIN 128



25-AUG-86 13:56:33

PLOT 2 OF 2
.SSF

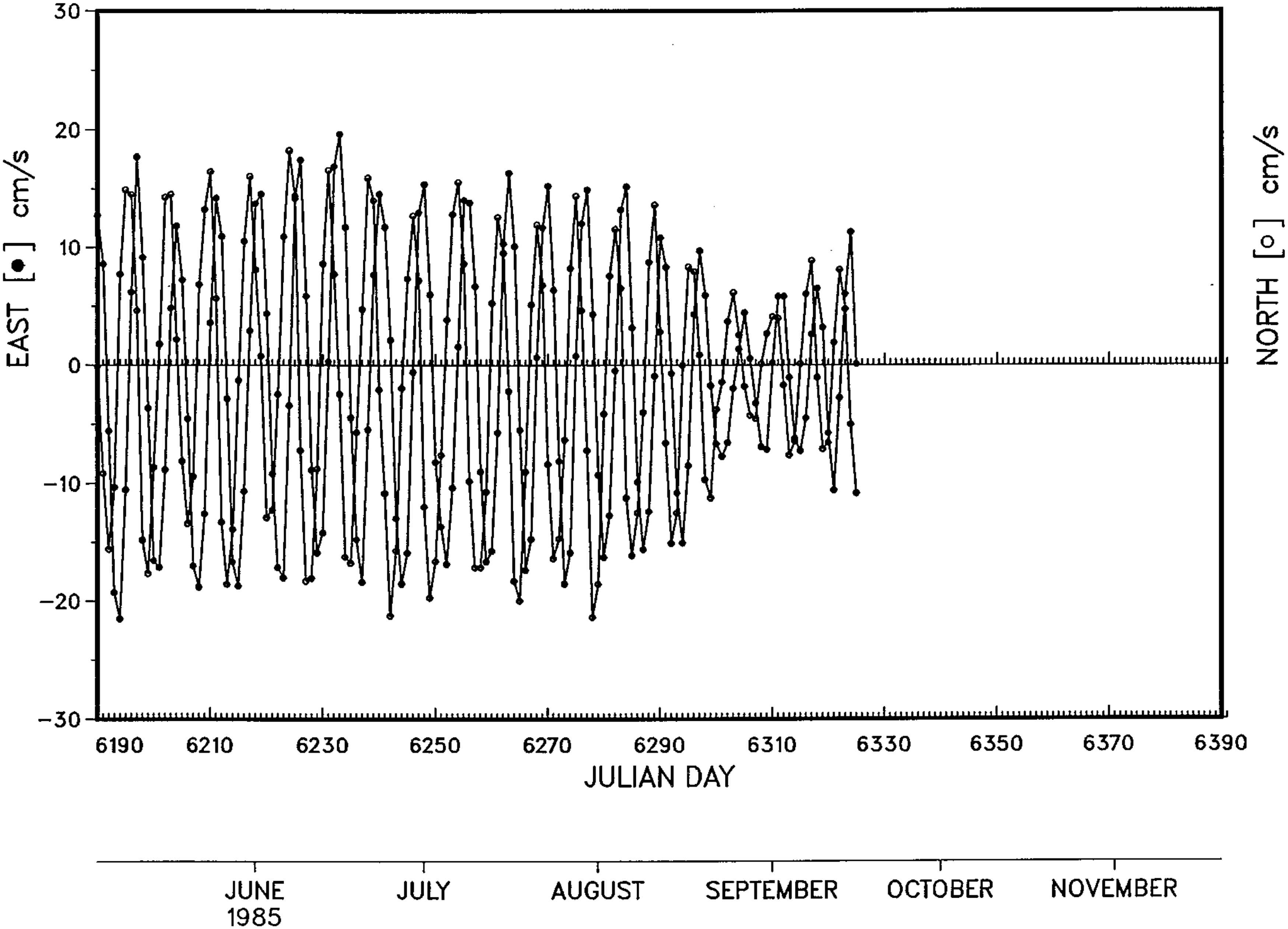
EASTERN BASIN 128



25-AUG-86 13:55:48

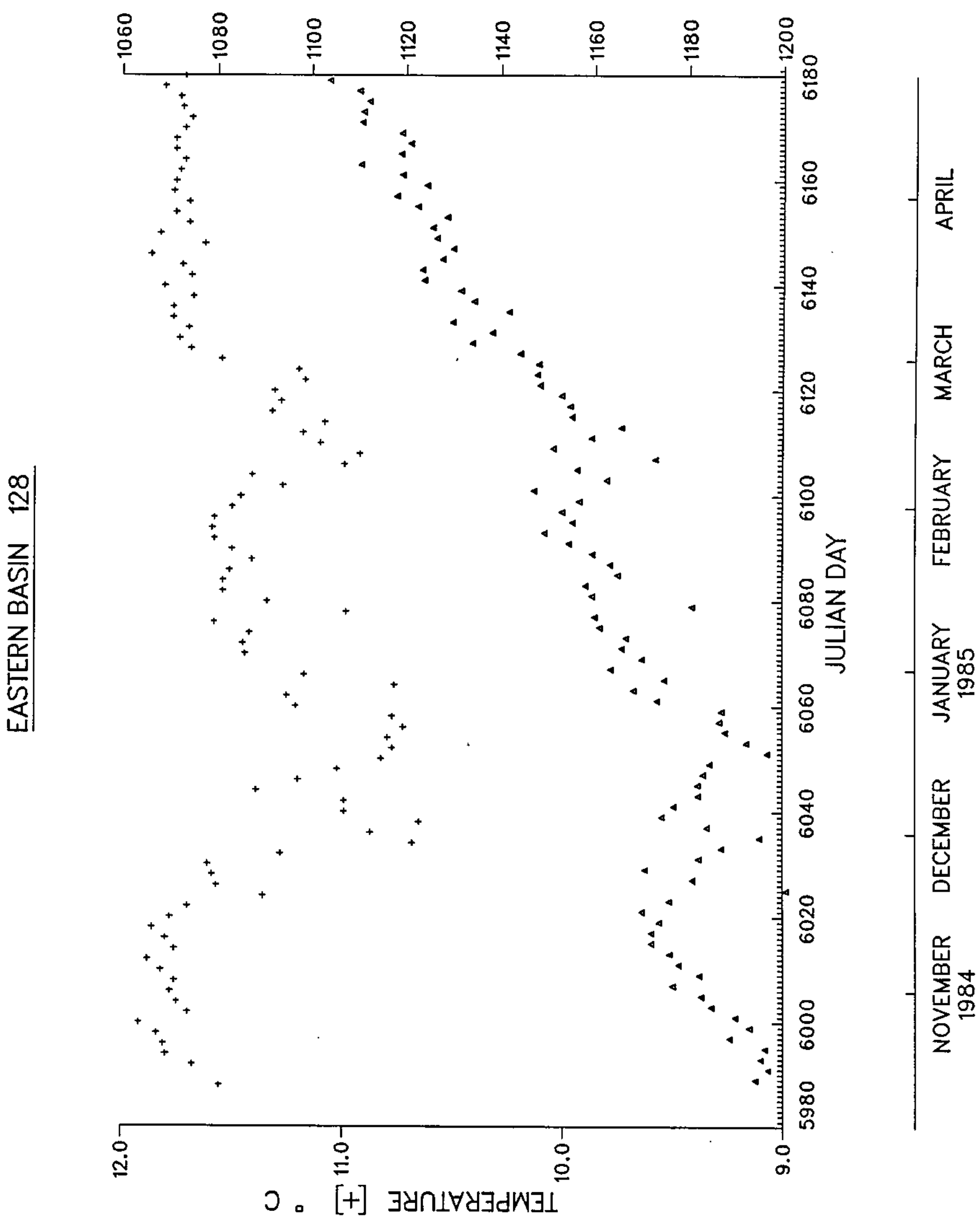
PLOT 1 OF 2
.SSF

EASTERN BASIN 128



25-AUG-86 13:56:08

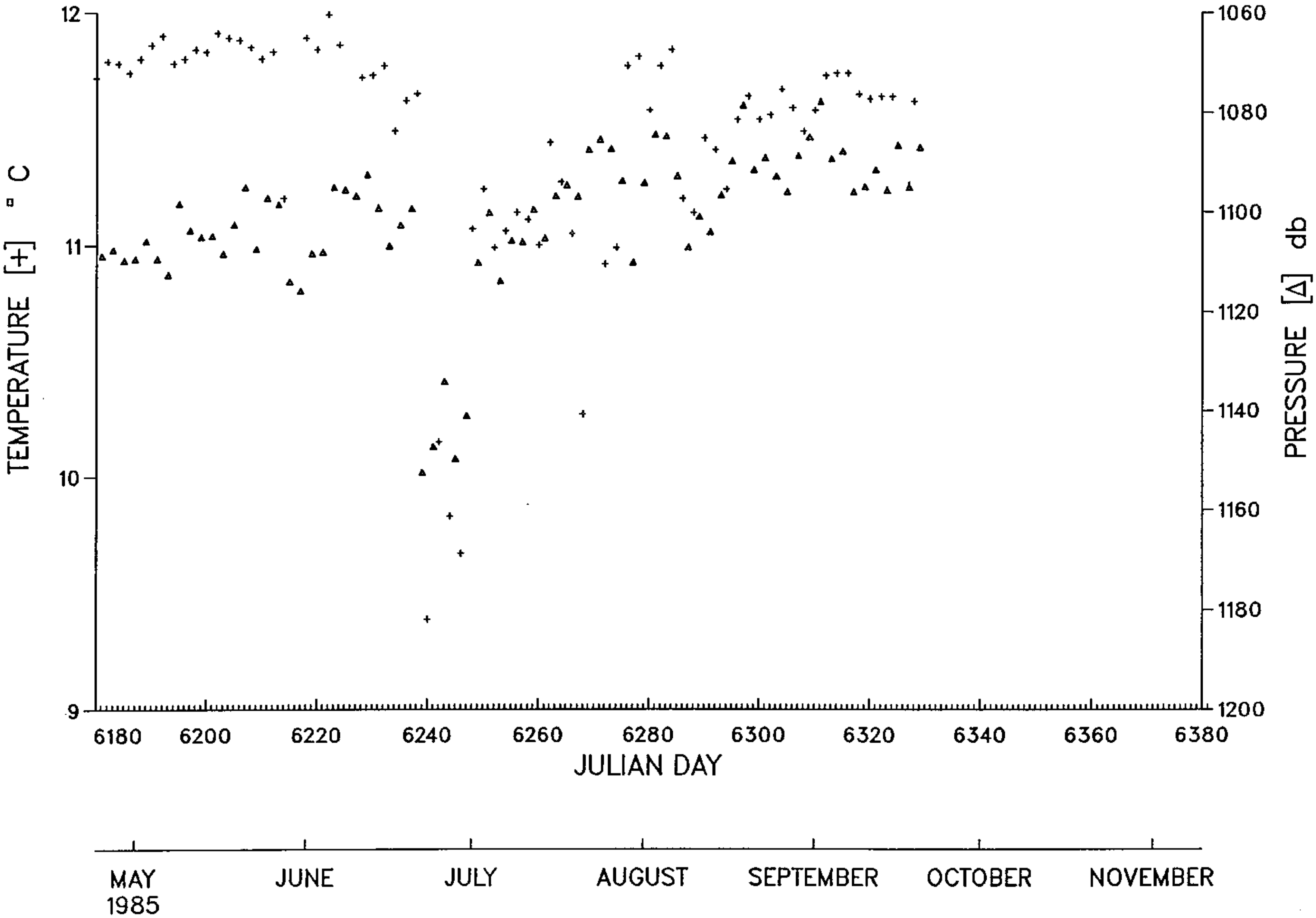
PLOT 2 OF 2
.SSF



PLOT 1 OF 2
.ARM

18-JUN-86 16:06:24

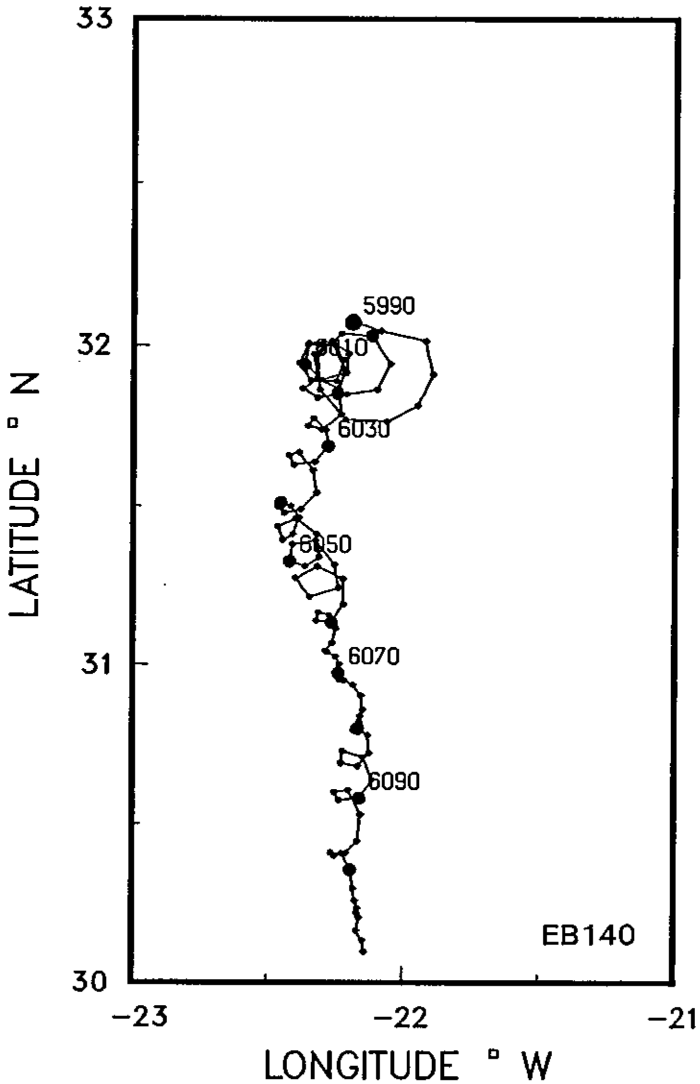
EASTERN BASIN 128



18-JUN-86 16:07:08

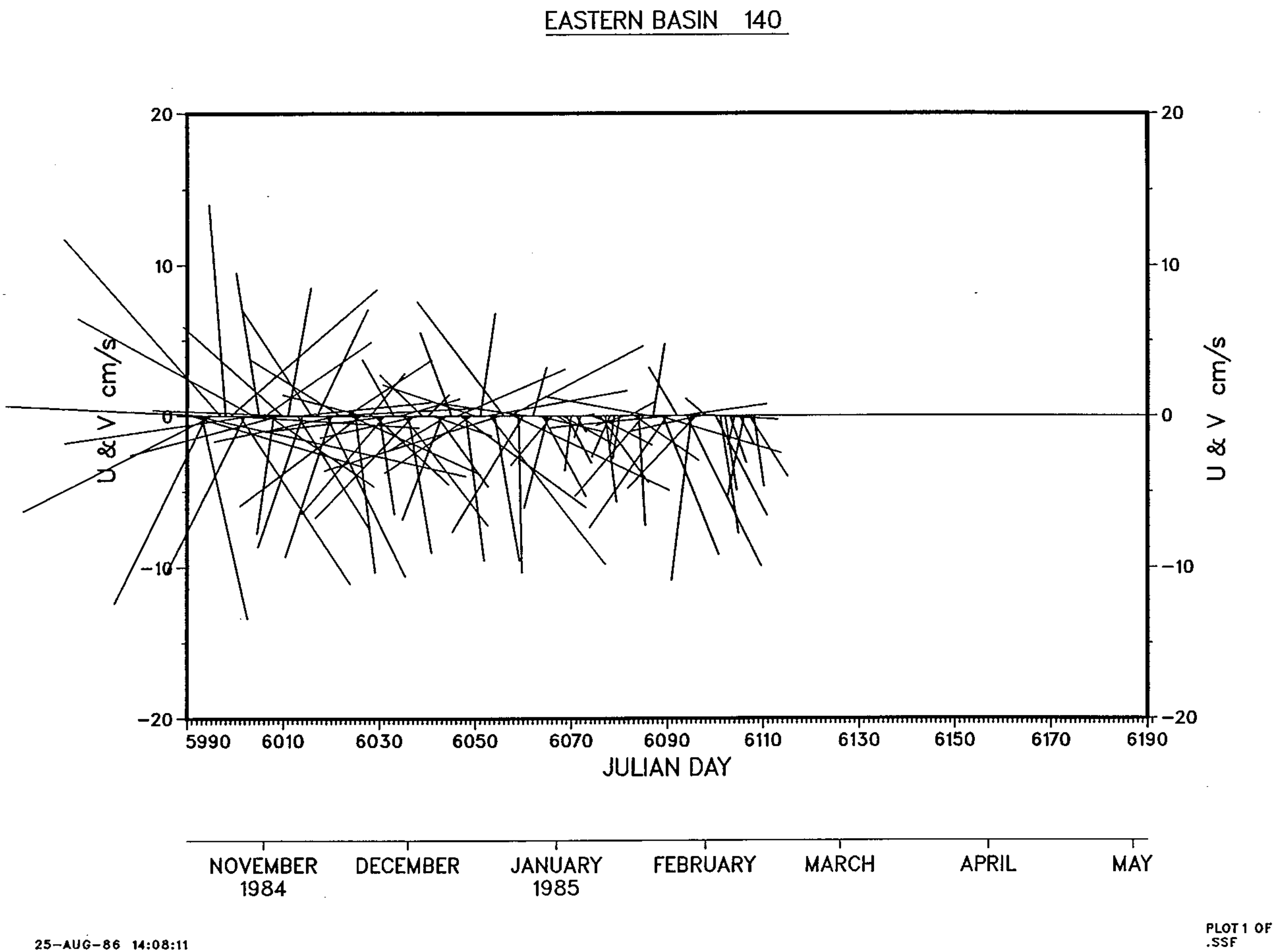
PLOT 2 OF 2
.ARM

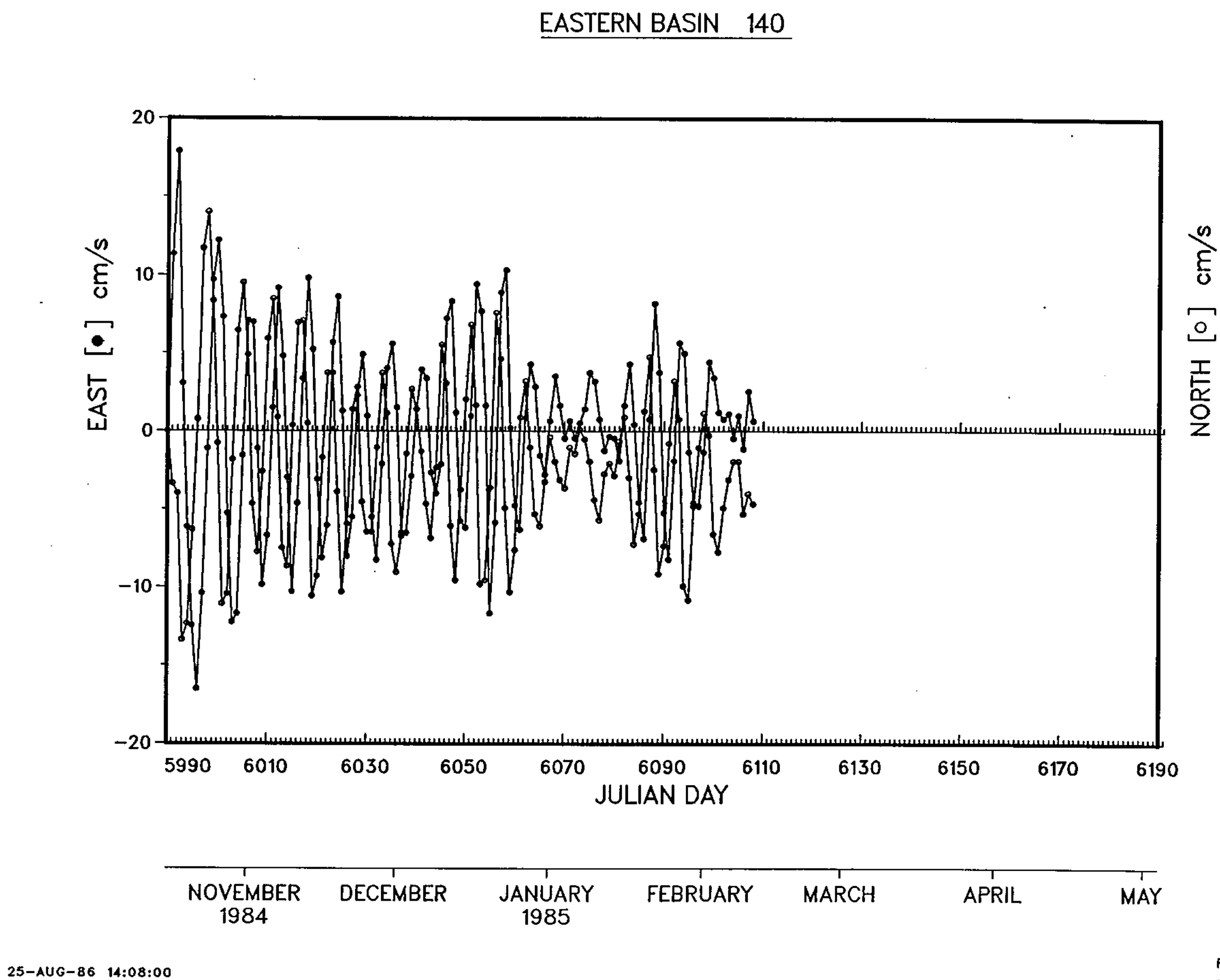
EASTERN BASIN 140



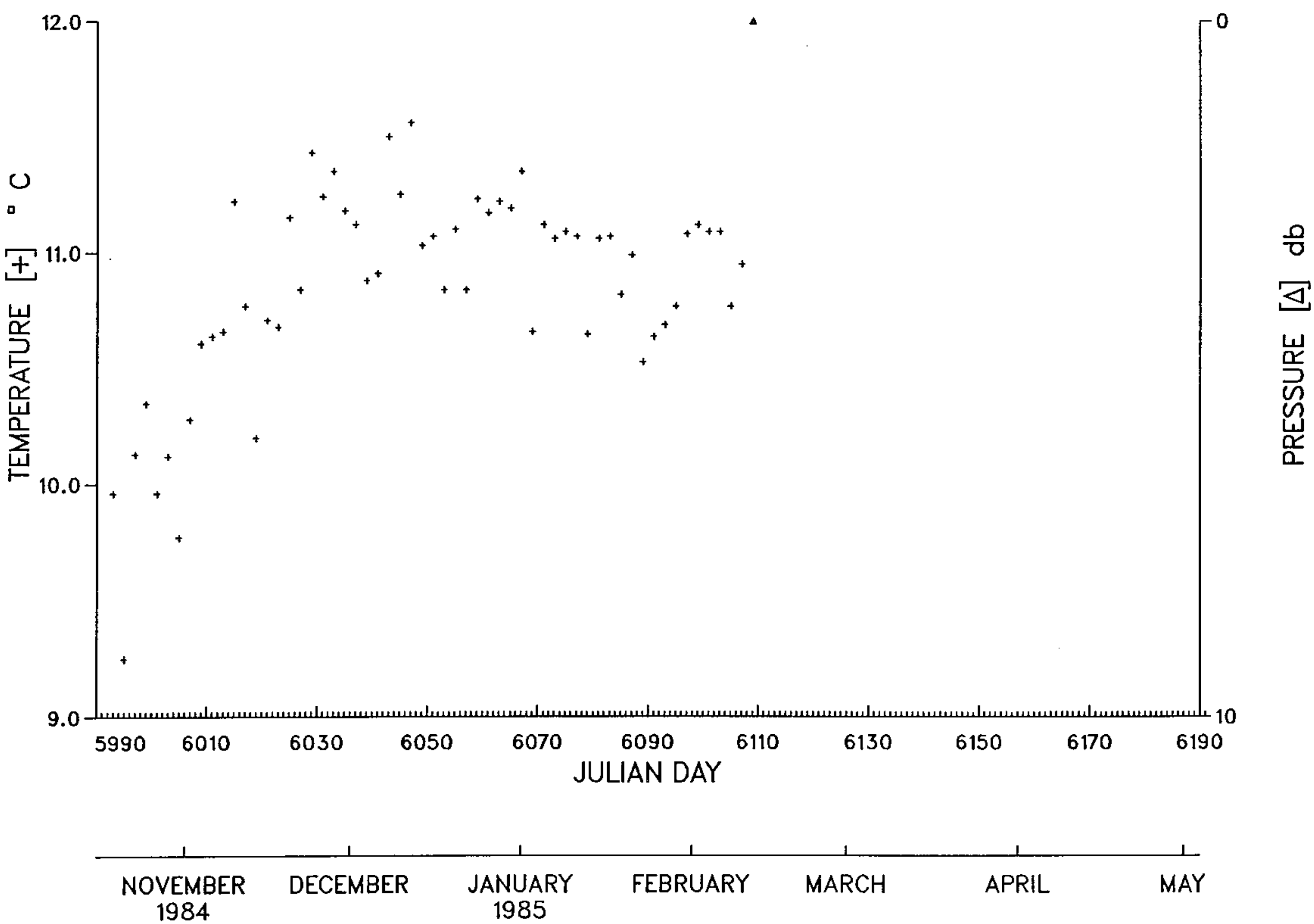
25-AUG-86 15:33:12

PLOT 1 OF 1
.SSF


EASTERN BASIN 140
20
10
0
-10
-20
U & V cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
25-AUG-86 14:08:11
PLOT 1 OF 1
.SSF


EASTERN BASIN 140
20
10
0
-10
-20
EAST [●] cm/s
NORTH [○] cm/s
5990
6010
6030
6050
6070
6090
6110
6130
6150
6170
6190
JULIAN DAY
NOVEMBER
1984
DECEMBER
JANUARY
1985
FEBRUARY
MARCH
APRIL
MAY
25-AUG-86 14:08:00
PLOT 1 OF 1
.SSF

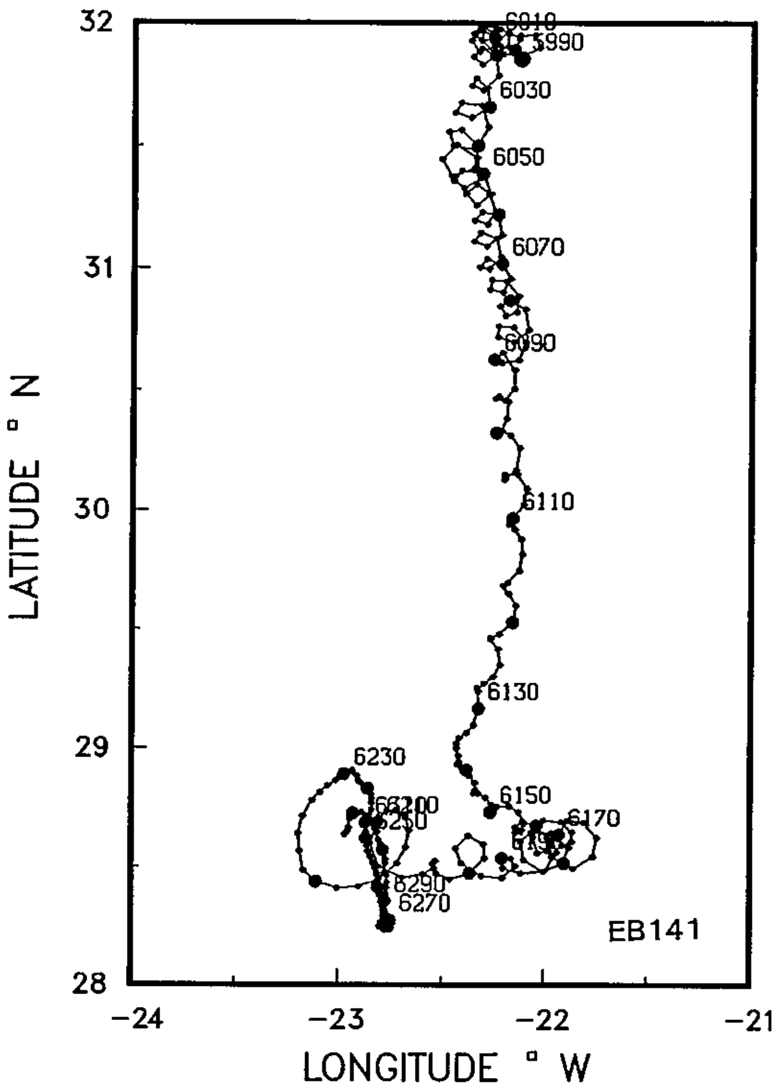
EASTERN BASIN 140



18-JUN-86 16:26:36

PLOT 1 OF 1
.ARM

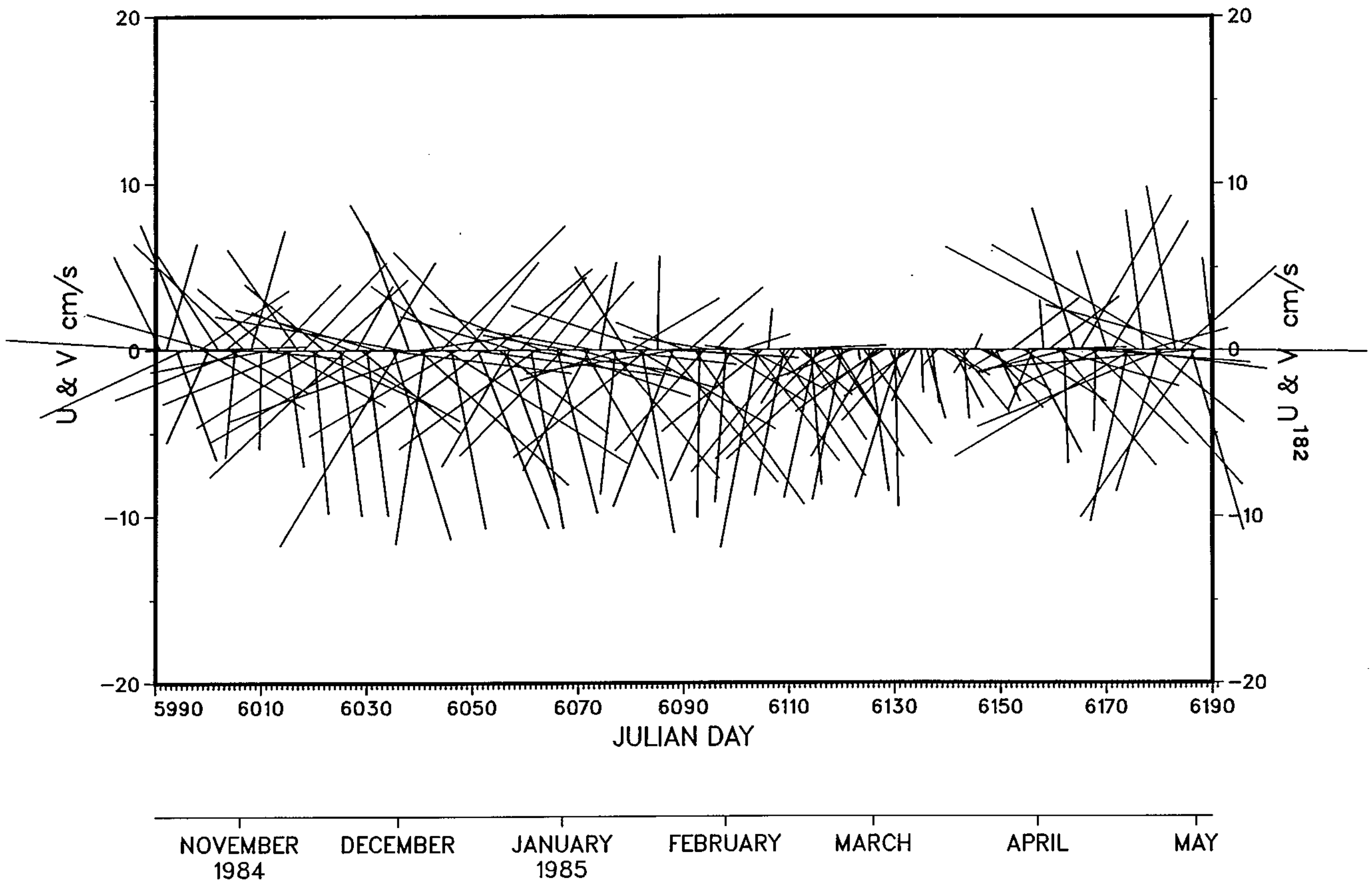
EASTERN BASIN 141



25-AUG-86 15:33:44

PLOT 1 OF 1
.SSF

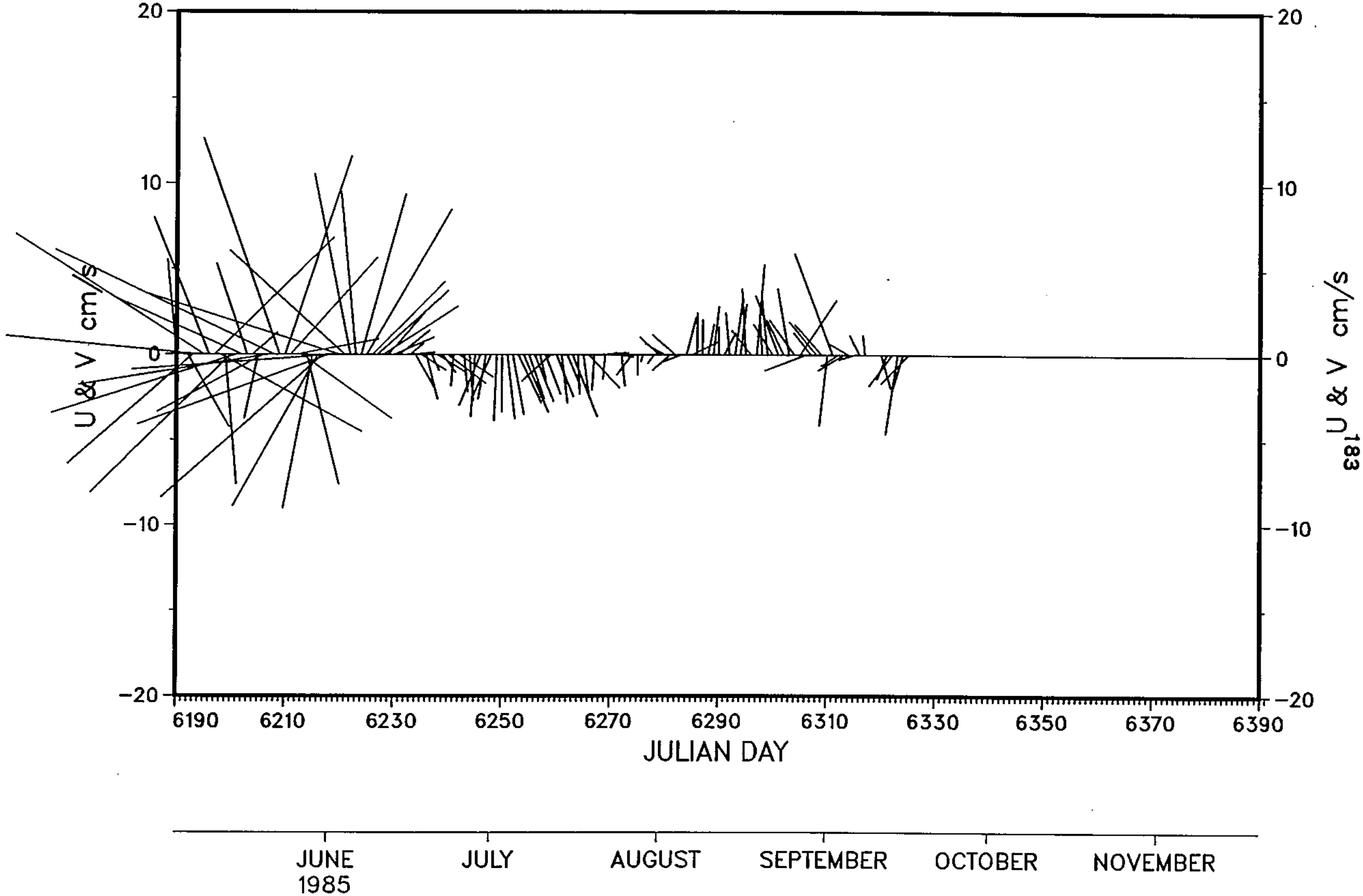
EASTERN BASIN 141



25-AUG-86 14:06:16

PLOT 1 OF 2
.SSF

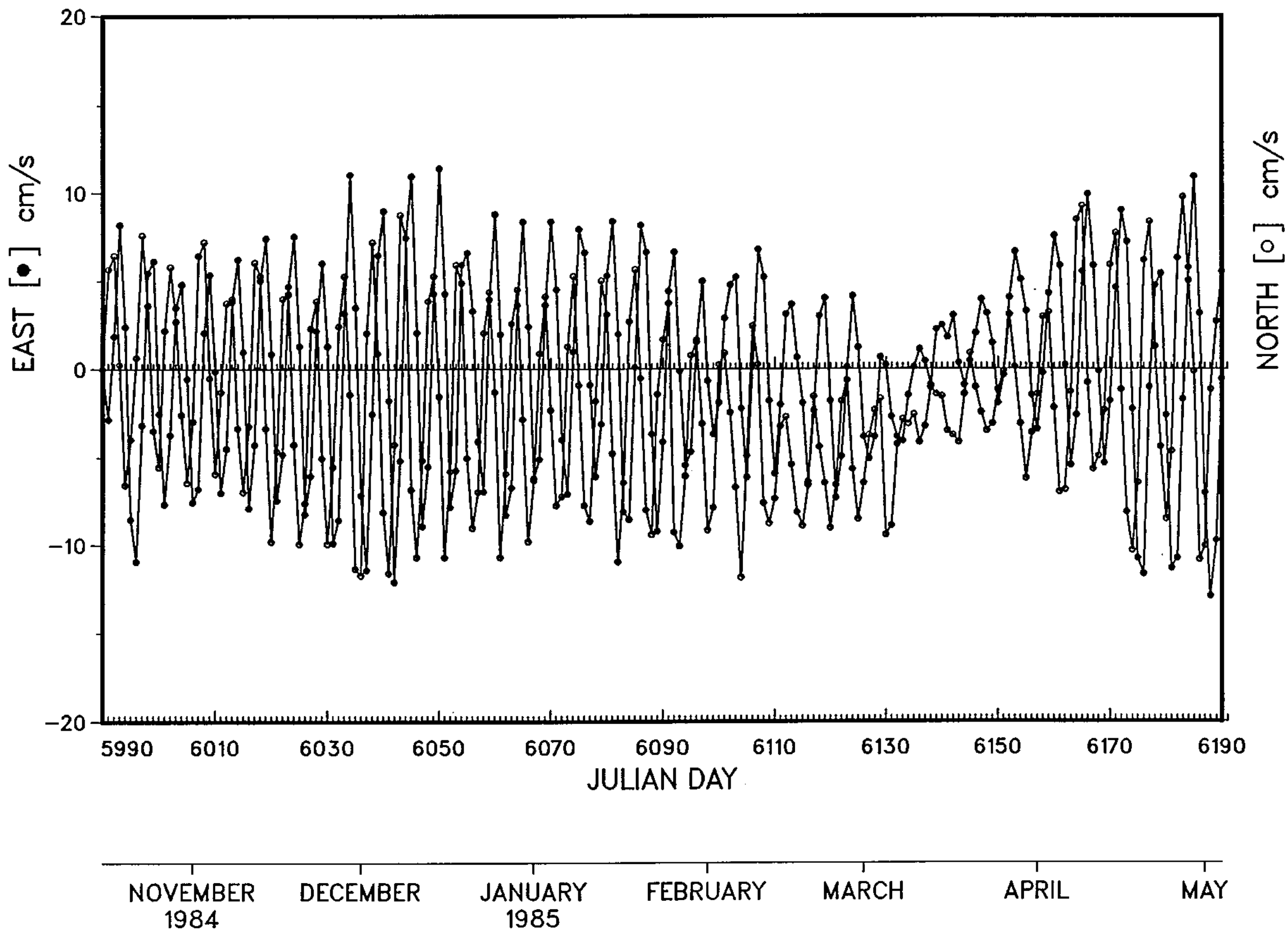
EASTERN BASIN 141



25–AUG–86 14:06:28

PLOT 2 OF 2
.SSF

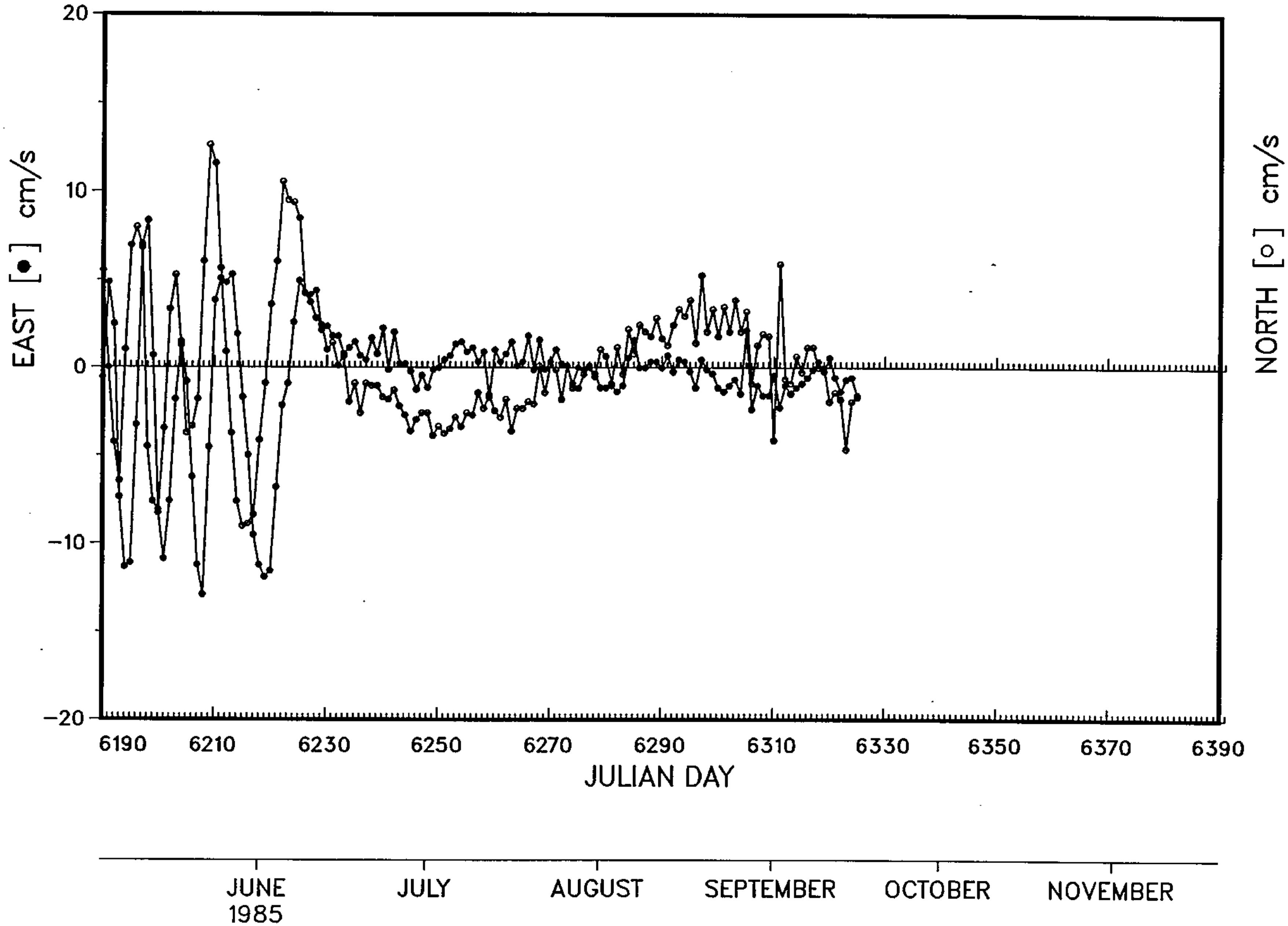
EASTERN BASIN 141



25-AUG-86 14:05:38

PLOT 1 OF 2
.SSF

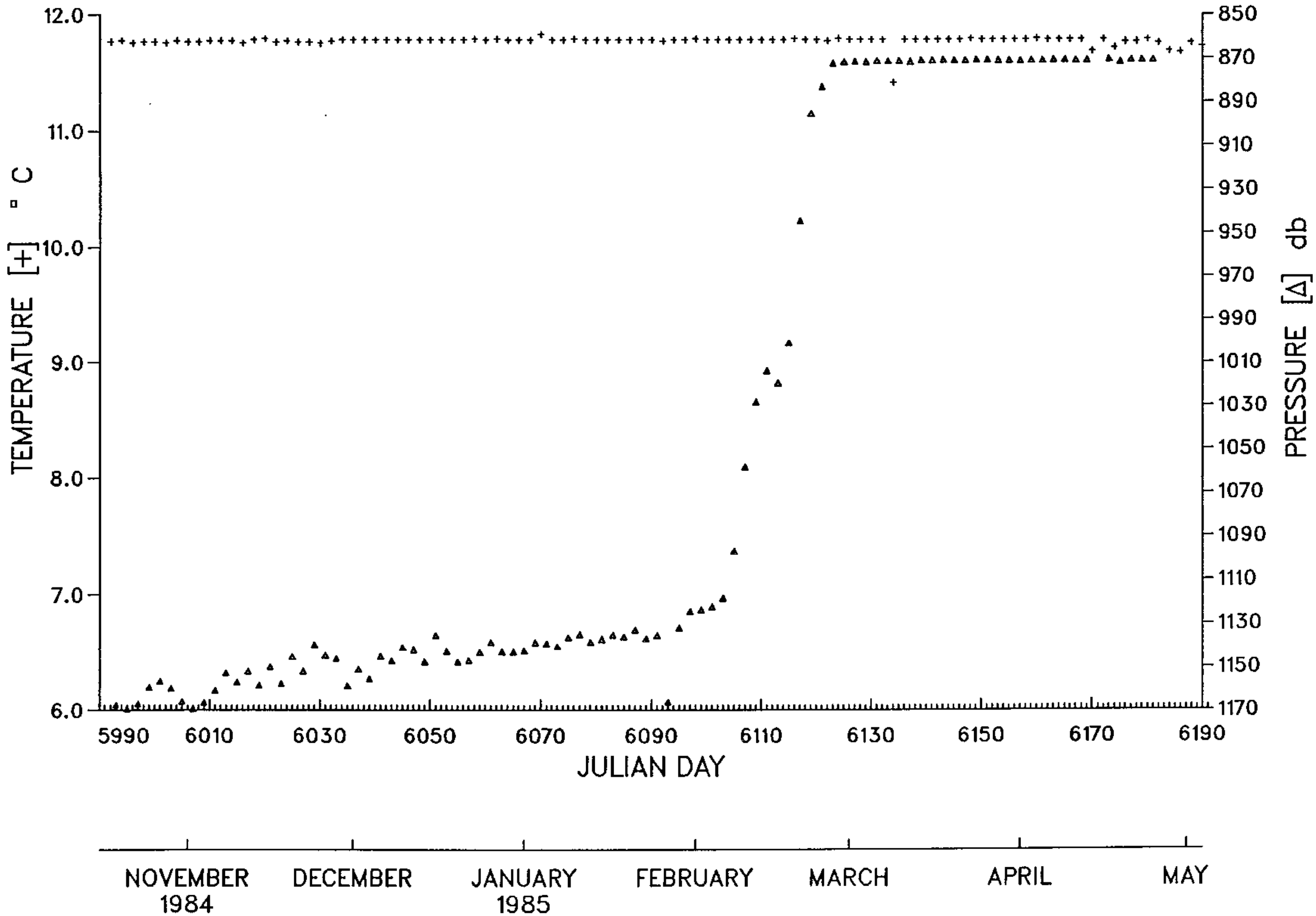
EASTERN BASIN 141



25-AUG-86 14:06:05

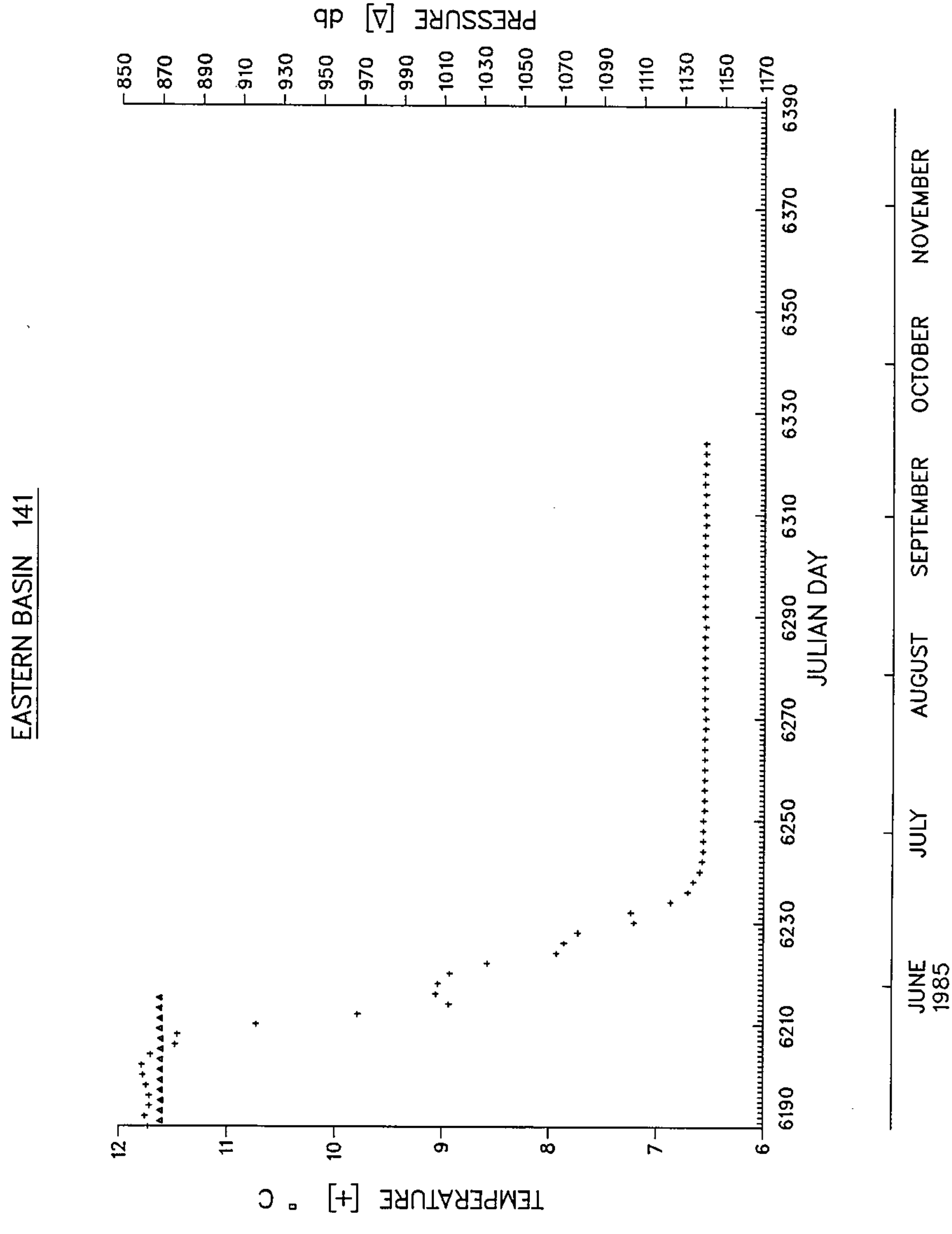
PLOT 2 OF 2
.SSF

EASTERN BASIN 141



19-JUN-86 09:56:42

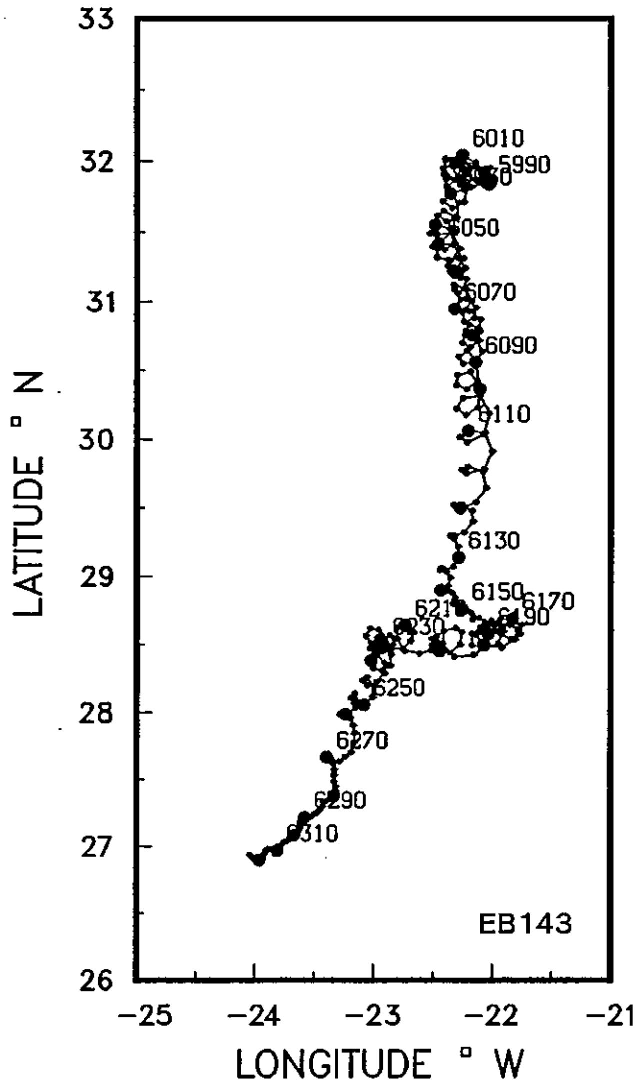
PLOT 1 OF 2
.ARM



PLOT 2 OF 2
.ARM

19-JUN-86 09:56:57

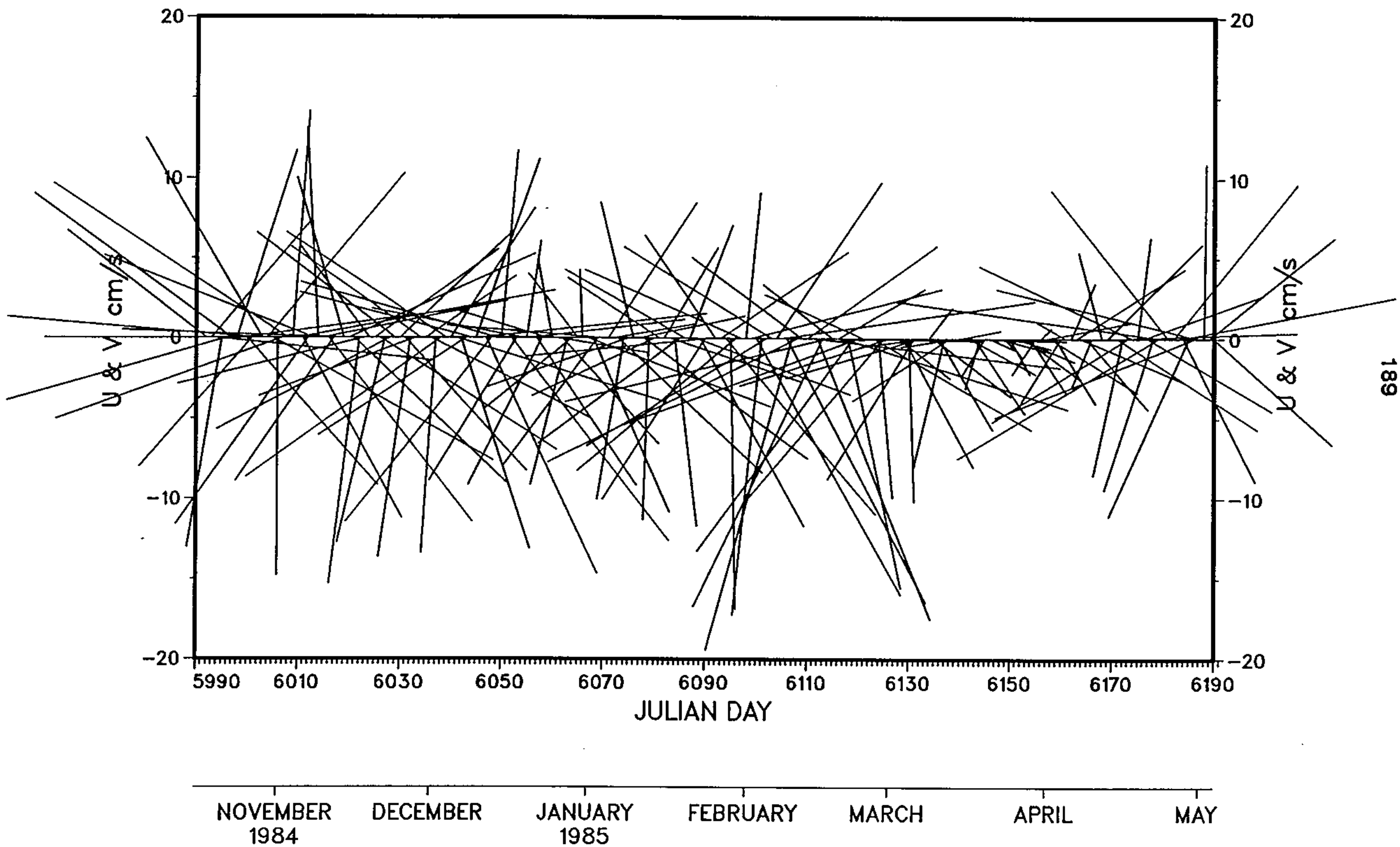
EASTERN BASIN 143



25-AUG-86 15:34:17

PLOT 1 OF 1
.SSF

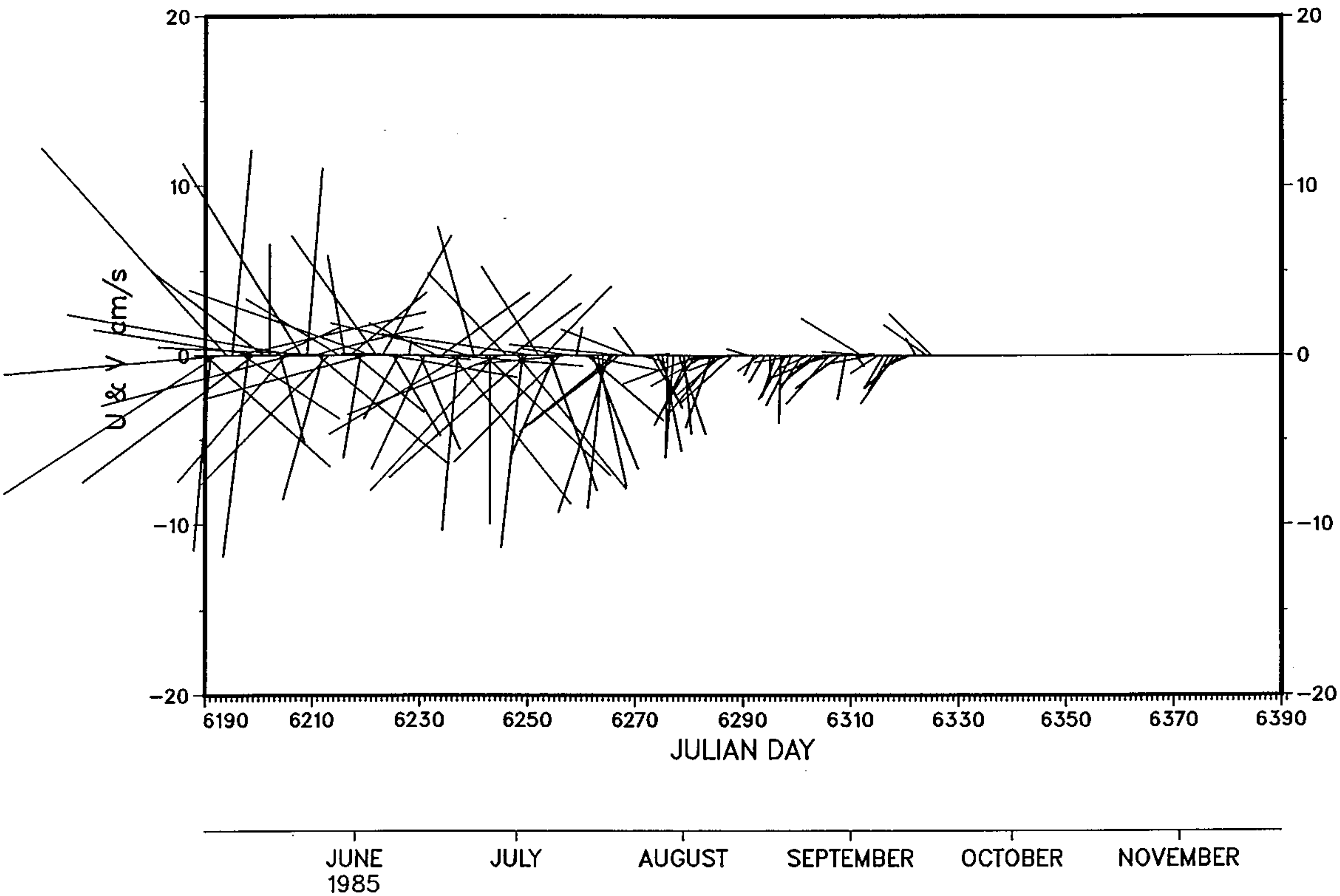
EASTERN BASIN 143



25-AUG-86 14:10:39

PLOT 1 OF 2
.SSF

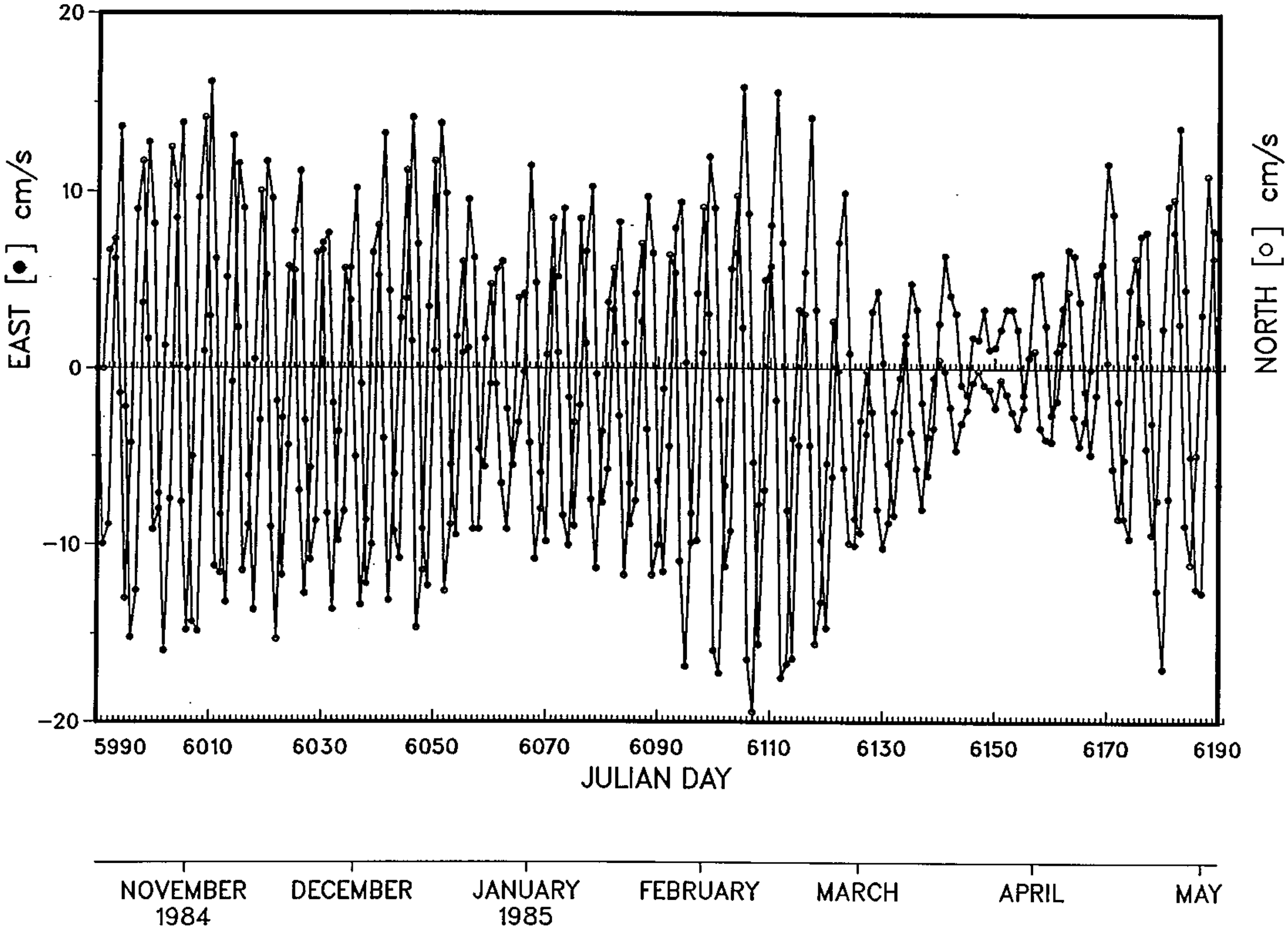
EASTERN BASIN 143



25−AUG−86 14:11:14

PLOT 2 OF 2
.SSF

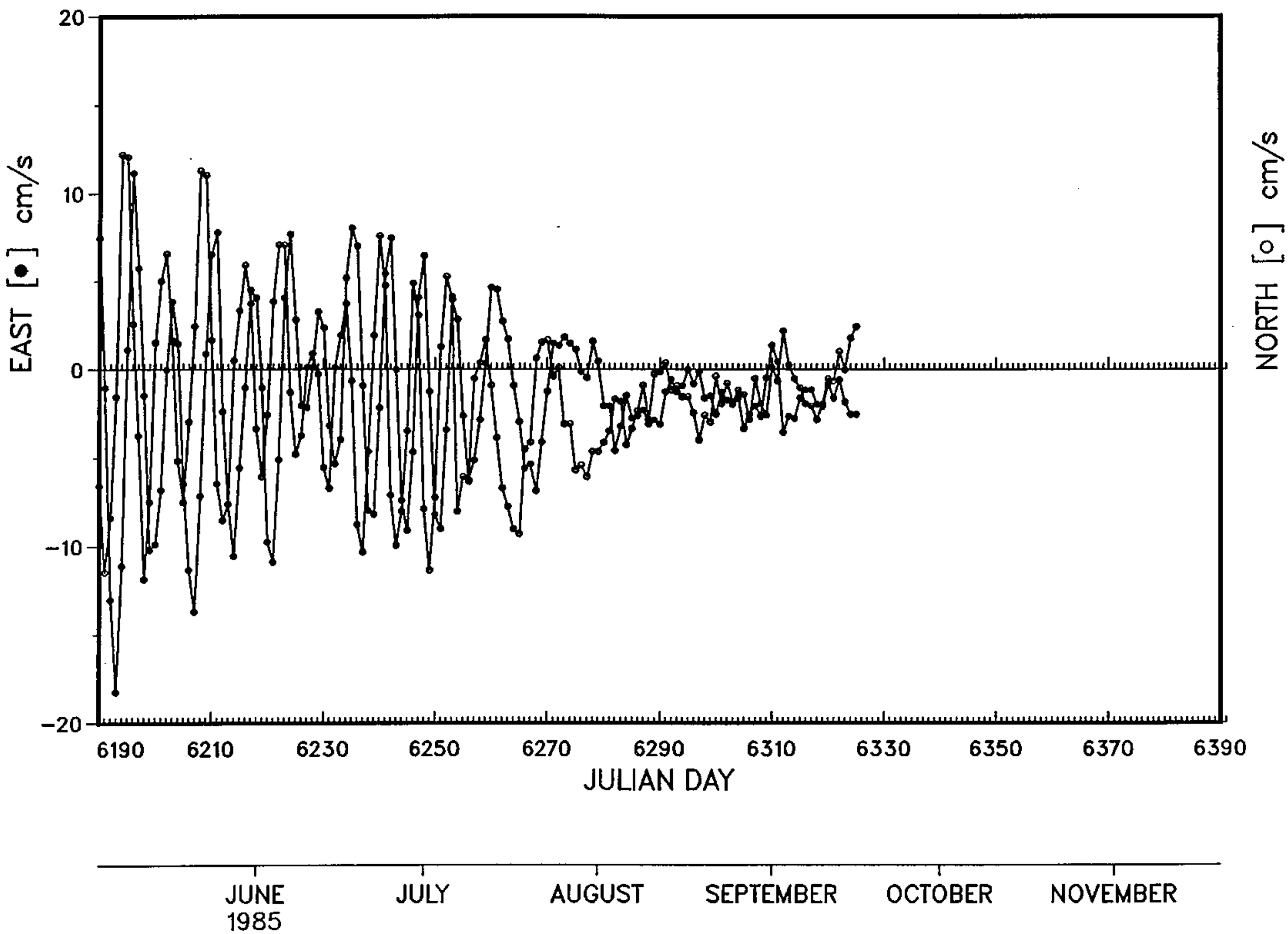
EASTERN BASIN 143



25-AUG-86 14:09:34

PLOT 1 OF 2
.SSF

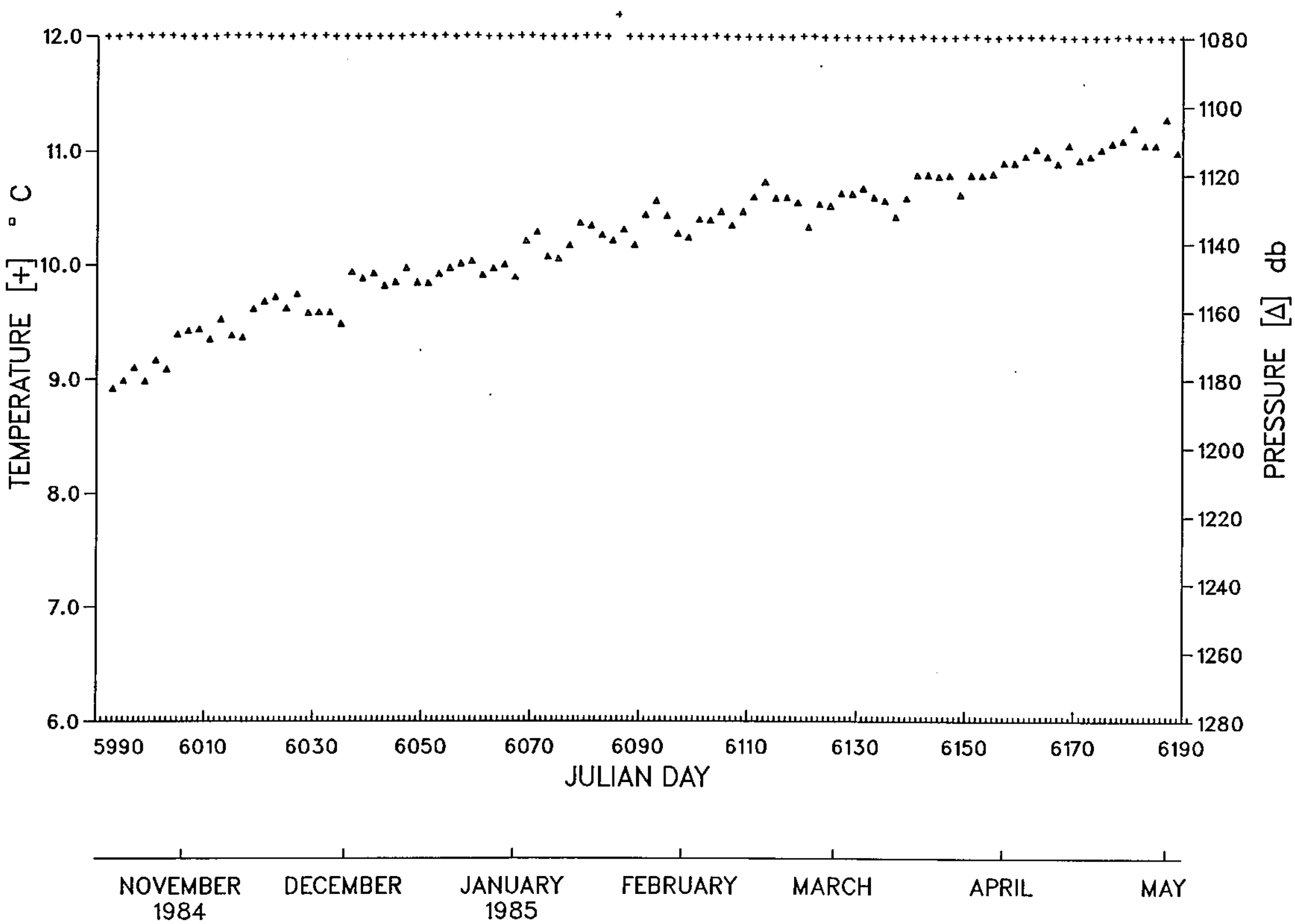
EASTERN BASIN 143



25-AUG-86 14:10:21

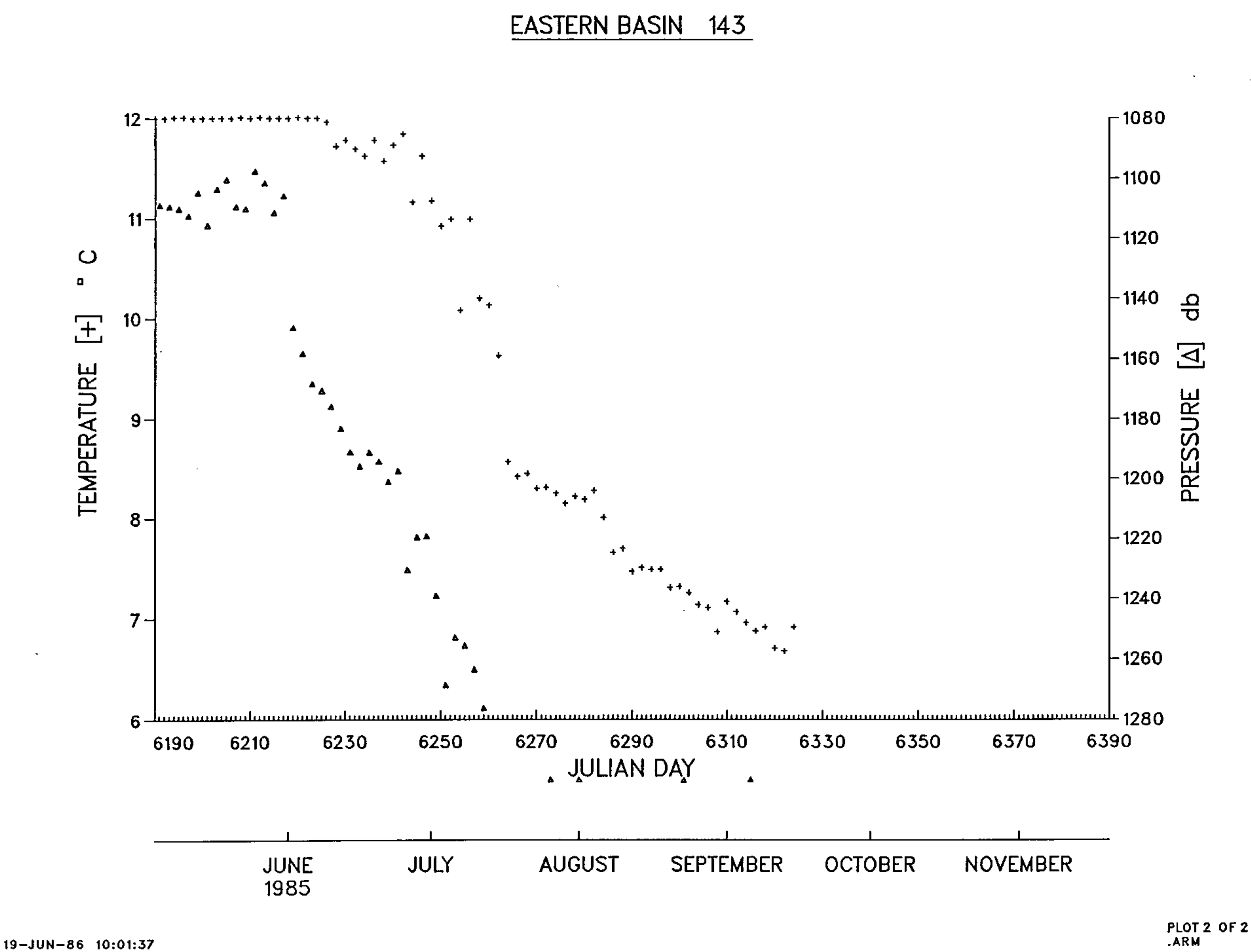
PLOT 2 OF 2
.SSF

EASTERN BASIN 143



19-JUN-86 10:01:20

PLOT 1 OF 2
.ARM


EASTERN BASIN 143
TEMPERATURE [+] °C
12
11
10
9
8
7
6
PRESSURE [Δ] db
1080
1100
1120
1140
1160
1180
1200
1220
1240
1260
1280
6190 6210 6230 6250 6270 6290 6310 6330 6350 6370 6390
JULIAN DAY
JUNE
1985
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
19-JUN-86 10:01:37
PLOT 2 OF 2
.ARM

APPENDIX C

Julian Day Calendars for 1984, 1985

These tables give the year day and truncated Julian year day for each calendar date for the years 1984 and 1985. The truncated Julian year days range from 5883 through 6431. To convert to true Julian date, add 2440000.5 to these numbers.

1984

JAN

SUN	MON	TUE	WED	THU	FRI	SAT
1 1 5701	2 2 5702	3 3 5703	4 4 5704	5 5 5705	6 6 5706	7 7 5707
8 8 5708	9 9 5709	10 10 5710	11 11 5711	12 12 5712	13 13 5713	14 14 5714
15 15 5715	16 16 5716	17 17 5717	18 18 5718	19 19 5719	20 20 5720	21 21 5721
22 22 5722	23 23 5723	24 24 5724	25 25 5725	26 26 5726	27 27 5727	28 28 5728
29 29 5729	30 30 5730	31 31 5731				

FEB

SUN	MON	TUE	WED	THU	FRI	SAT
			1 32 5732	2 33 5733	3 34 5734	4 35 5735
5 36 5736	6 37 5737	7 38 5738	8 39 5739	9 40 5740	10 41 5741	11 42 5742
12 43 5743	13 44 5744	14 45 5745	15 46 5746	16 47 5747	17 48 5748	18 49 5749
19 50 5750	20 51 5751	21 52 5752	22 53 5753	23 54 5754	24 55 5755	25 56 5756
26 57 5757	27 58 5758	28 59 5759	29 60 5760			

MAR

SUN	MON	TUE	WED	THU	FRI	SAT
				1 61 5761	2 62 5762	3 63 5763
4 64 5764	5 65 5765	6 66 5766	7 67 5767	8 68 5768	9 69 5769	10 70 5770
11 71 5771	12 72 5772	13 73 5773	14 74 5774	15 75 5775	16 76 5776	17 77 5777
18 78 5778	19 79 5779	20 80 5780	21 81 5781	22 82 5782	23 83 5783	24 84 5784
25 85 5785	26 86 5786	27 87 5787	28 88 5788	29 89 5789	30 90 5790	31 91 5791

APR

SUN	MON	TUE	WED	THU	FRI	SAT
1 92 5792	2 93 5793	3 94 5794	4 95 5795	5 96 5796	6 97 5797	7 98 5798
8 99 5799	9 100 5800	10 101 5801	11 102 5802	12 103 5803	13 104 5804	14 105 5805
15 106 5806	16 107 5807	17 108 5808	18 109 5809	19 110 5810	20 111 5811	21 112 5812
22 113 5813	23 114 5814	24 115 5815	25 116 5816	26 117 5817	27 118 5818	28 119 5819
29 120 5820	30 121 5821					

MAY

SUN	MON	TUE	WED	THU	FRI	SAT
		1 122 5822	2 123 5823	3 124 5824	4 125 5825	5 126 5826
6 127 5827	7 128 5828	8 129 5829	9 130 5830	10 131 5831	11 132 5832	12 133 5833
13 134 5834	14 135 5835	15 136 5836	16 137 5837	17 138 5838	18 139 5839	19 140 5840
20 141 5841	21 142 5842	22 143 5843	23 144 5844	24 145 5845	25 146 5846	26 147 5847
27 148 5848	28 149 5849	29 150 5850	30 151 5851	31 152 5852		

JUN

SUN	MON	TUE	WED	THU	FRI	SAT
					1 153 5853	2 154 5854
3 155 5855	4 156 5856	5 157 5857	6 158 5858	7 159 5859	8 160 5860	9 161 5861
10 162 5862	11 163 5863	12 164 5864	13 165 5865	14 166 5866	15 167 5867	16 168 5868
17 169 5869	18 170 5870	19 171 5871	20 172 5872	21 173 5873	22 174 5874	23 175 5875
24 176 5876	25 177 5877	26 178 5878	27 179 5879	28 180 5880	29 181 5881	30 182 5882

JUL

SUN	MON	TUE	WED	THU	FRI	SAT
1 183 5883	2 184 5884	3 185 5885	4 186 5886	5 187 5887	6 188 5888	7 189 5889
8 190 5890	9 191 5891	10 192 5892	11 193 5893	12 194 5894	13 195 5895	14 196 5896
15 197 5897	16 198 5898	17 199 5899	18 200 5900	19 201 5901	20 202 5902	21 203 5903
22 204 5904	23 205 5905	24 206 5906	25 207 5907	26 208 5908	27 209 5909	28 210 5910
29 211 5911	30 212 5912	31 213 5913				

AUG

SUN	MON	TUE	WED	THU	FRI	SAT
			1 214 5914	2 215 5915	3 216 5916	4 217 5917
5 218 5918	6 219 5919	7 220 5920	8 221 5921	9 222 5922	10 223 5923	11 224 5924
12 225 5925	13 226 5926	14 227 5927	15 228 5928	16 229 5929	17 230 5930	18 231 5931
19 232 5932	20 233 5933	21 234 5934	22 235 5935	23 236 5936	24 237 5937	25 238 5938
26 239 5939	27 240 5940	28 241 5941	29 242 5942	30 243 5943	31 244 5944	

SEP

SUN	MON	TUE	WED	THU	FRI	SAT
						1 245 5945
2 246 5946	3 247 5947	4 248 5948	5 249 5949	6 250 5950	7 251 5951	8 252 5952
9 253 5953	10 254 5954	11 255 5955	12 256 5956	13 257 5957	14 258 5958	15 259 5959
16 260 5960	17 261 5961	18 262 5962	19 263 5963	20 264 5964	21 265 5965	22 266 5966
23 267 5967	24 268 5968	25 269 5969	26 270 5970	27 271 5971	28 272 5972	29 273 5973
30 274 5974						

OCT

SUN	MON	TUE	WED	THU	FRI	SAT
	1 275 5975	2 276 5976	3 277 5977	4 278 5978	5 279 5979	6 280 5980
7 281 5981	8 282 5982	9 283 5983	10 284 5984	11 285 5985	12 286 5986	13 287 5987
14 288 5988	15 289 5989	16 290 5990	17 291 5991	18 292 5992	19 293 5993	20 294 5994
21 295 5995	22 296 5996	23 297 5997	24 298 5998	25 299 5999	26 300 6000	27 301 6001
28 302 6002	29 303 6003	30 304 6004	31 305 6005			

NOV

SUN	MON	TUE	WED	THU	FRI	SAT
				1 306 6006	2 307 6007	3 308 6008
4 309 6009	5 310 6010	6 311 6011	7 312 6012	8 313 6013	9 314 6014	10 315 6015
11 316 6016	12 317 6017	13 318 6018	14 319 6019	15 320 6020	16 321 6021	17 322 6022
18 323 6023	19 324 6024	20 325 6025	21 326 6026	22 327 6027	23 328 6028	24 329 6029
25 330 6030	26 331 6031	27 332 6032	28 333 6033	29 334 6034	30 335 6035	

DEC

SUN	MON	TUE	WED	THU	FRI	SAT
						1 336 6036
2 337 6037	3 338 6038	4 339 6039	5 340 6040	6 341 6041	7 342 6042	8 343 6043
9 344 6044	10 345 6045	11 346 6046	12 347 6047	13 348 6048	14 349 6049	15 350 6050
16 351 6051	17 352 6052	18 353 6053	19 354 6054	20 355 6055	21 356 6056	22 357 6057
23 358 6058	24 359 6059	25 360 6060	26 361 6061	27 362 6062	28 363 6063	29 364 6064
30 365 6065	31 366 6066					

1985

JAN

SUN	MON	TUE	WED	THU	FRI	SAT
		1 1 6067	2 2 6068	3 3 6069	4 4 6070	5 5 6071
6 6 6072	7 7 6073	8 8 6074	9 9 6075	10 10 6076	11 11 6077	12 12 6078
13 13 6079	14 14 6080	15 15 6081	16 16 6082	17 17 6083	18 18 6084	19 19 6085
20 20 6086	21 21 6087	22 22 6088	23 23 6089	24 24 6090	25 25 6091	26 26 6092
27 27 6093	28 28 6094	29 29 6095	30 30 6096	31 31 6097		

FEB

SUN	MON	TUE	WED	THU	FRI	SAT
					1 32 6098	2 33 6099
3 34 6100	4 35 6101	5 36 6102	6 37 6103	7 38 6104	8 39 6105	9 40 6106
10 41 6107	11 42 6108	12 43 6109	13 44 6110	14 45 6111	15 46 6112	16 47 6113
17 48 6114	18 49 6115	19 50 6116	20 51 6117	21 52 6118	22 53 6119	23 54 6120
24 55 6121	25 56 6122	26 57 6123	27 58 6124	28 59 6125	29 60 6126	

MAR

SUN	MON	TUE	WED	THU	FRI	SAT
					1 60 6126	2 61 6127
3 62 6128	4 63 6129	5 64 6130	6 65 6131	7 66 6132	8 67 6133	9 68 6134
10 69 6135	11 70 6136	12 71 6137	13 72 6138	14 73 6139	15 74 6140	16 75 6141
17 76 6142	18 77 6143	19 78 6144	20 79 6145	21 80 6146	22 81 6147	23 82 6148
24 83 6149	25 84 6150	26 85 6151	27 86 6152	28 87 6153	29 88 6154	30 89 6155
31 90 6156						

APR

SUN	MON	TUE	WED	THU	FRI	SAT
	1 91 6157	2 92 6158	3 93 6159	4 94 6160	5 95 6161	6 96 6162
7 97 6163	8 98 6164	9 99 6165	10 100 6166	11 101 6167	12 102 6168	13 103 6169
14 104 6170	15 105 6171	16 106 6172	17 107 6173	18 108 6174	19 109 6175	20 110 6176
21 111 6177	22 112 6178	23 113 6179	24 114 6180	25 115 6181	26 116 6182	27 117 6183
28 118 6184	29 119 6185	30 120 6186				

MAY

SUN	MON	TUE	WED	THU	FRI	SAT
			1 121 6187	2 122 6188	3 123 6189	4 124 6190
5 125 6191	6 126 6192	7 127 6193	8 128 6194	9 129 6195	10 130 6196	11 131 6197
12 132 6198	13 133 6199	14 134 6200	15 135 6201	16 136 6202	17 137 6203	18 138 6204
19 139 6205	20 140 6206	21 141 6207	22 142 6208	23 143 6209	24 144 6210	25 145 6211
26 146 6212	27 147 6213	28 148 6214	29 149 6215	30 150 6216	31 151 6217	

JUN

SUN	MON	TUE	WED	THU	FRI	SAT
						1 152 6218
2 153 6219	3 154 6220	4 155 6221	5 156 6222	6 157 6223	7 158 6224	8 159 6225
9 160 6226	10 161 6227	11 162 6228	12 163 6229	13 164 6230	14 165 6231	15 166 6232
16 167 6233	17 168 6234	18 169 6235	19 170 6236	20 171 6237	21 172 6238	22 173 6239
23 174 6240	24 175 6241	25 176 6242	26 177 6243	27 178 6244	28 179 6245	29 180 6246
30 181 6247						

JUL

SUN	MON	TUE	WED	THU	FRI	SAT
	1 182 6248	2 183 6249	3 184 6250	4 185 6251	5 186 6252	6 187 6253
7 188 6254	8 189 6255	9 190 6256	10 191 6257	11 192 6258	12 193 6259	13 194 6260
14 195 6261	15 196 6262	16 197 6263	17 198 6264	18 199 6265	19 200 6266	20 201 6267
21 202 6268	22 203 6269	23 204 6270	24 205 6271	25 206 6272	26 207 6273	27 208 6274
28 209 6275	29 210 6276	30 211 6277	31 212 6278			

AUG

SUN	MON	TUE	WED	THU	FRI	SAT
				1 213 6279	2 214 6280	3 215 6281
4 216 6282	5 217 6283	6 218 6284	7 219 6285	8 220 6286	9 221 6287	10 222 6288
11 223 6289	12 224 6290	13 225 6291	14 226 6292	15 227 6293	16 228 6294	17 229 6295
18 230 6296	19 231 6297	20 232 6298	21 233 6299	22 234 6300	23 235 6301	24 236 6302
25 237 6303	26 238 6304	27 239 6305	28 240 6306	29 241 6307	30 242 6308	31 243 6309

SEP

SUN	MON	TUE	WED	THU	FRI	SAT
1 244 6310	2 245 6311	3 246 6312	4 247 6313	5 248 6314	6 249 6315	7 250 6316
8 251 6317	9 252 6318	10 253 6319	11 254 6320	12 255 6321	13 256 6322	14 257 6323
15 258 6324	16 259 6325	17 260 6326	18 261 6327	19 262 6328	20 263 6329	21 264 6330
22 265 6331	23 266 6332	24 267 6333	25 268 6334	26 269 6335	27 270 6336	28 271 6337
29 272 6338	30 273 6339					

OCT

SUN	MON	TUE	WED	THU	FRI	SAT
		1 274 6340	2 275 6341	3 276 6342	4 277 6343	5 278 6344
6 279 6345	7 280 6346	8 281 6347	9 282 6348	10 283 6349	11 284 6350	12 285 6351
13 286 6352	14 287 6353	15 288 6354	16 289 6355	17 290 6356	18 291 6357	19 292 6358
20 293 6359	21 294 6360	22 295 6361	23 296 6362	24 297 6363	25 298 6364	26 299 6365
27 300 6366	28 301 6367	29 302 6368	30 303 6369	31 304 6370		

NOV

SUN	MON	TUE	WED	THU	FRI	SAT
					1 305 6371	2 306 6372
3 307 6373	4 308 6374	5 309 6375	6 310 6376	7 311 6377	8 312 6378	9 313 6379
10 314 6380	11 315 6381	12 316 6382	13 317 6383	14 318 6384	15 319 6385	16 320 6386
17 321 6387	18 322 6388	19 323 6389	20 324 6390	21 325 6391	22 326 6392	23 327 6393
24 328 6394	25 329 6395	26 330 6396	27 331 6397	28 332 6398	29 333 6399	30 334 6400

DEC

SUN	MON	TUE	WED	THU	FRI	SAT
1 335 6401	2 336 6402	3 337 6403	4 338 6404	5 339 6405	6 340 6406	7 341 6407
8 342 6408	9 343 6409	10 344 6410	11 345 6411	12 346 6412	13 347 6413	14 348 6414
15 349 6415	16 350 6416	17 351 6417	18 352 6418	19 353 6419	20 354 6420	21 355 6421
22 356 6422	23 357 6423	24 358 6424	25 359 6425	26 360 6426	27 361 6427	28 362 6428
29 363 6429	30 364 6430	31 365 6431				

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16. Abstract (Limit: 200 words)

In October, 1984, the Woods Hole Oceanographic Institution SOFAR float group began a three-year long field program to observe the low frequency currents in the Canary Basin. The principal scientific goal was to learn how advection and diffusion by these currents determine the shape and amplitude of the Mediterranean salt tongue. Fourteen floats were launched at a depth of 1100 m in a cluster centered on 32N, 24W, and seven other floats were launched incoherently along a north/south line from 24N to 37N. At the same time investigators from Scripps Institution of Oceanography and the University of Rhode Island used four other SOFAR floats to tag a submesoscale lens of Mediterranean water. Slightly over twenty years of float trajectories were produced during the first year of the experiment.

In this report we briefly describe the 1984 field operations and show the first year's SOFAR float data. Perhaps the most striking result is that westward flow within the Mediterranean salt tongue was found to be confined to a rather narrow jet (roughly 150 km in meridional extent) which had a mean speed of roughly 2 cm s^{-1}. To the north or south of this jet the mean flow was much weaker and eastward. This suggests that currents associated with the salt tongue itself (rather than the gyre scale circulation) may be most important for determining the salt distribution.

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3. Mediterranean Outflow

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