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Gulf Stream Recirculation Experiment - Part II

by

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Technical Report

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Gulf Stream Recirculation Experiment — Part II

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and
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June 13, 1989

Abstract

This report presents trajectories and time series of velocity, pressure, and temperature for twelve neutrally-buoyant floats launched during the Gulf Stream Recirculation EXperiment (GUSREX) and two from earlier experiments, that continued to operate after May 1982. These float data were obtained from Autonomous Listening Stations (ALSs) deployed from May 1982 to August 1985.

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1 Background

Twelve neutrally-buoyant, SOund Fixing And Ranging (SOFAR) floats launched between April 1980 and August 1981 as part of the Gulf Stream Recirculation EXperiment (GUSREX) continued to work after the first two years of the experiment reported by Kennelly and McKee (1984). In addition, two floats, one launched in October 1976 over the Nares Abyssal Plain as part of POLYMODE and another launched in June 1979 as part of an earlier Gulf Stream experiment also were heard after May 1982. This report presents the trajectories and time series of temperature, pressure, and velocity for these fourteen floats. GUSREX part II coverage of the Northwest Atlantic Ocean lasted for 33 months and then was supplemented by an array of five ALSs deployed to track SOFAR floats launched in the close vicinity of 34°N, 70°W (Site L, Price *et al.*, 1987) (Figure 1).

The GUSREX program, including the Site L coverage, lasted nearly five-and-a-half years. GUSREX was a joint program of Woods Hole Oceanographic Institution and the University of Rhode Island. It focused on the recirculation of the Gulf Stream, addressing such questions as the size and structure of the recirculation south of the Gulf Stream as proposed by Worthington (1976) and the interconnection of the Gulf Stream and the North Atlantic Current at the tail of the Grand Banks (Worthington, 1976; Clarke *et al.*, 1980). As part of GUSREX, a total of forty-three floats was launched along 55°W from 24 to 44°N during two cruises in April–May 1980 and July–August 1981 (Kennelly and McKee, 1984). Except for one case, these floats were launched in pairs with one float ballasted to 700 m and the other to 2000 m (see Figures 2, 3, 4 and 5). Twelve of these floats, five shallow and seven deep, are presented in this report. Table I shows the duration and start and end locations for each float

GUSREX EXPERIMENT AUG 1981 – SEPT 1985

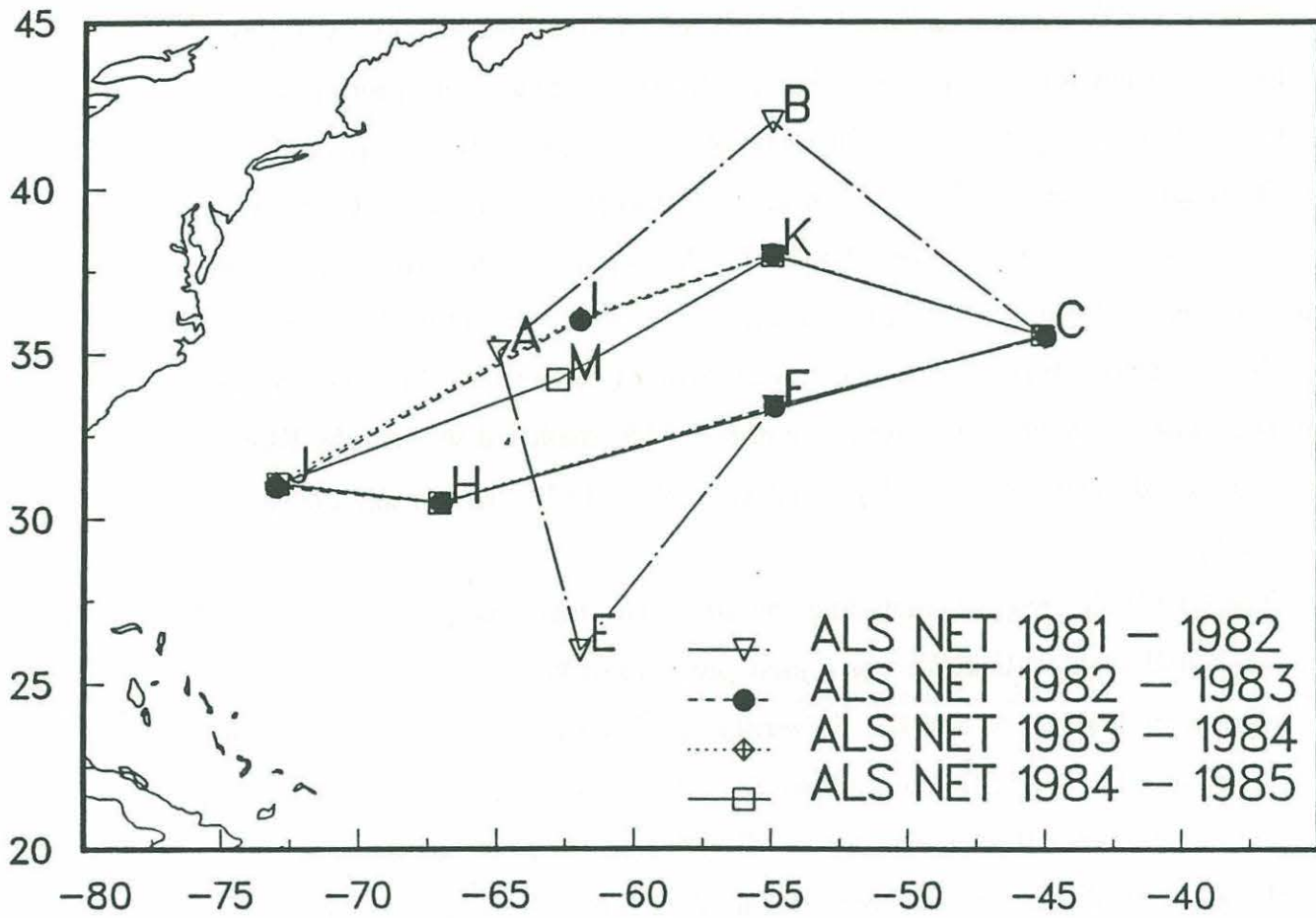


Figure 1: ALS tracking arrays for duration of GUSREX Site L Experiment.

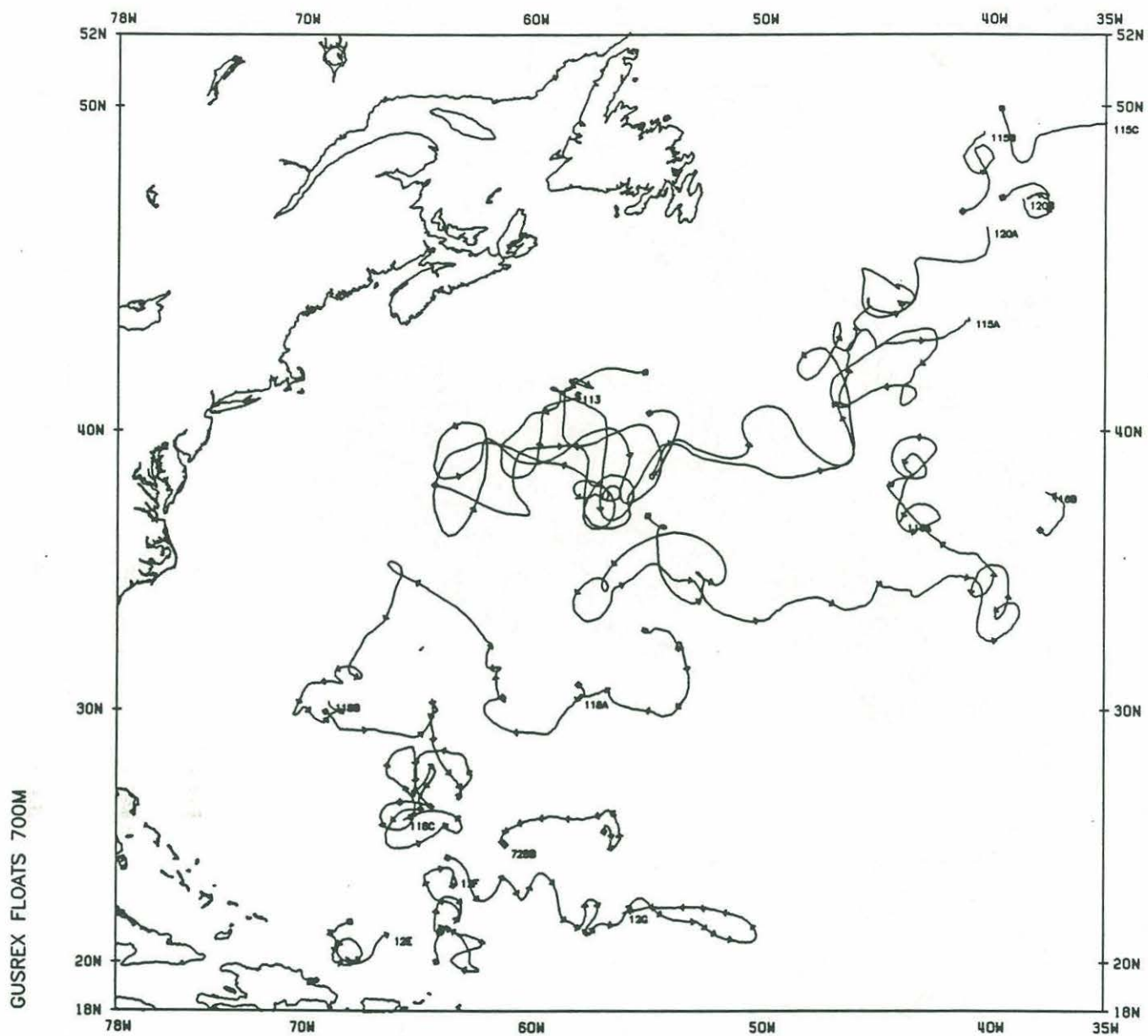


Figure 2: Composite 700-meter trajectories for floats covered in this report. Arrowheads mark every thirtieth day.

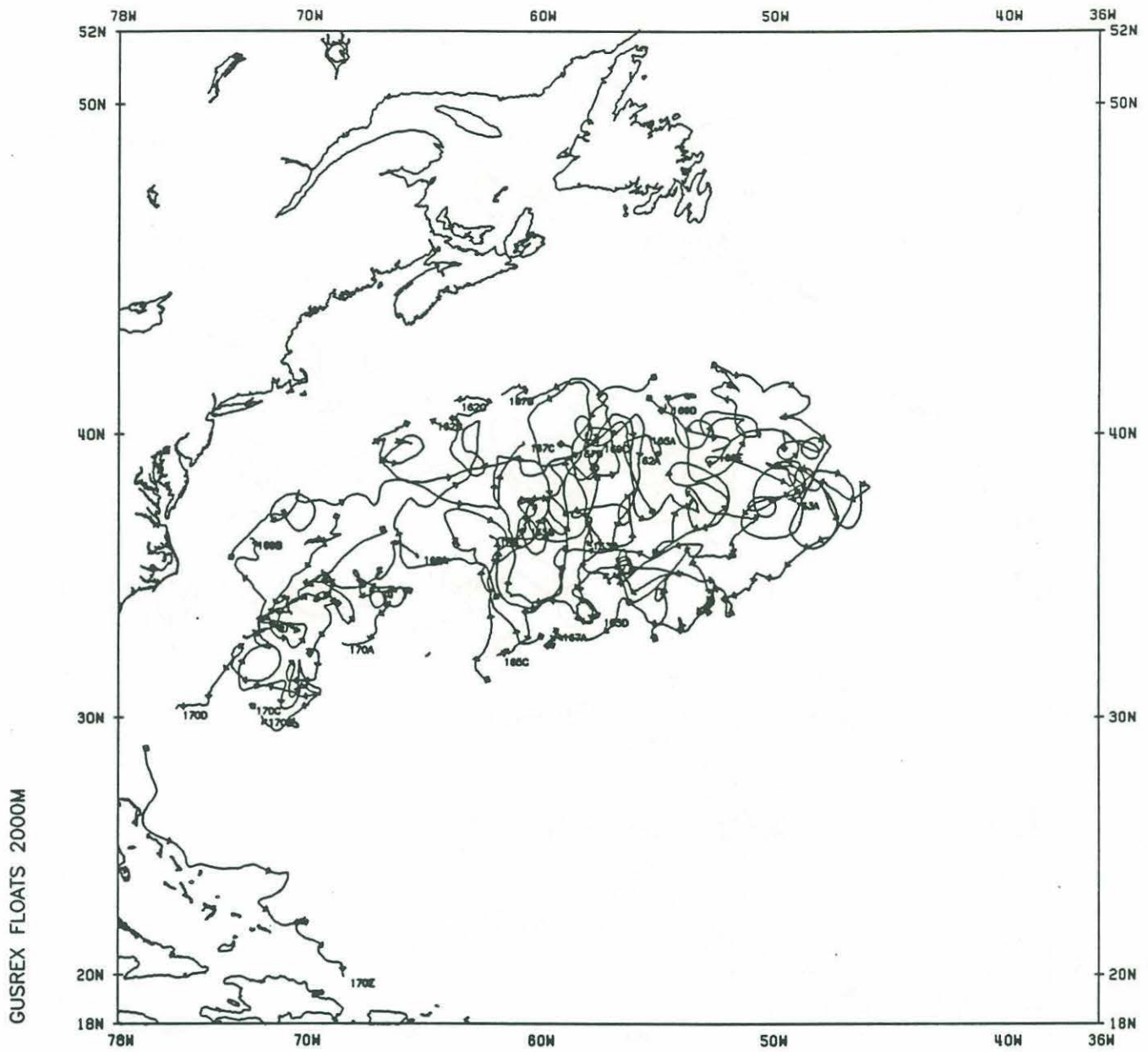


Figure 3: Composite 2000-meter trajectories for floats covered in this report. Arrowheads mark every thirtieth day.

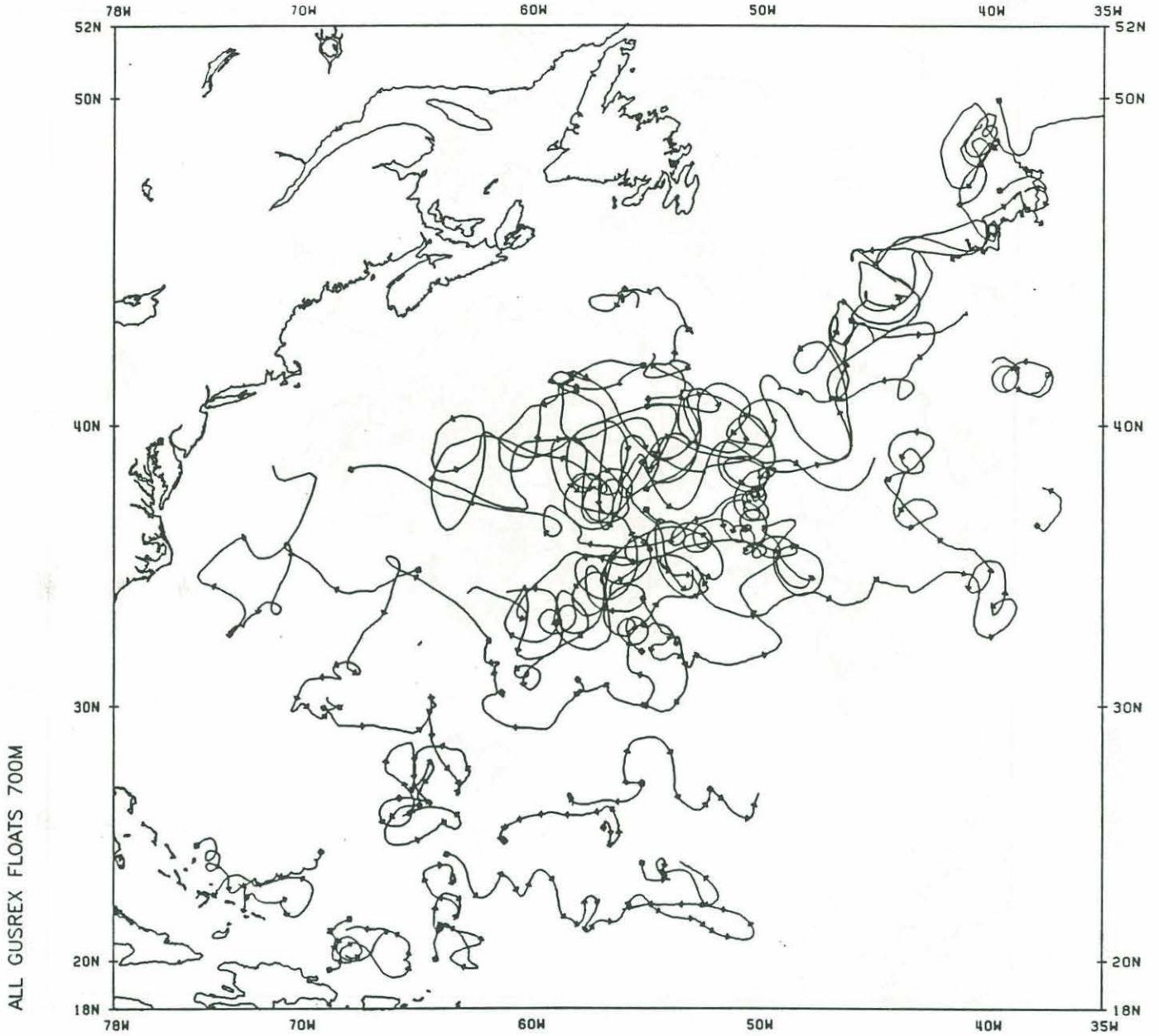


Figure 4: Composite 700-meter trajectories for floats covered in this report and earlier Gulf Stream floats. Arrowheads mark every thirtieth day.

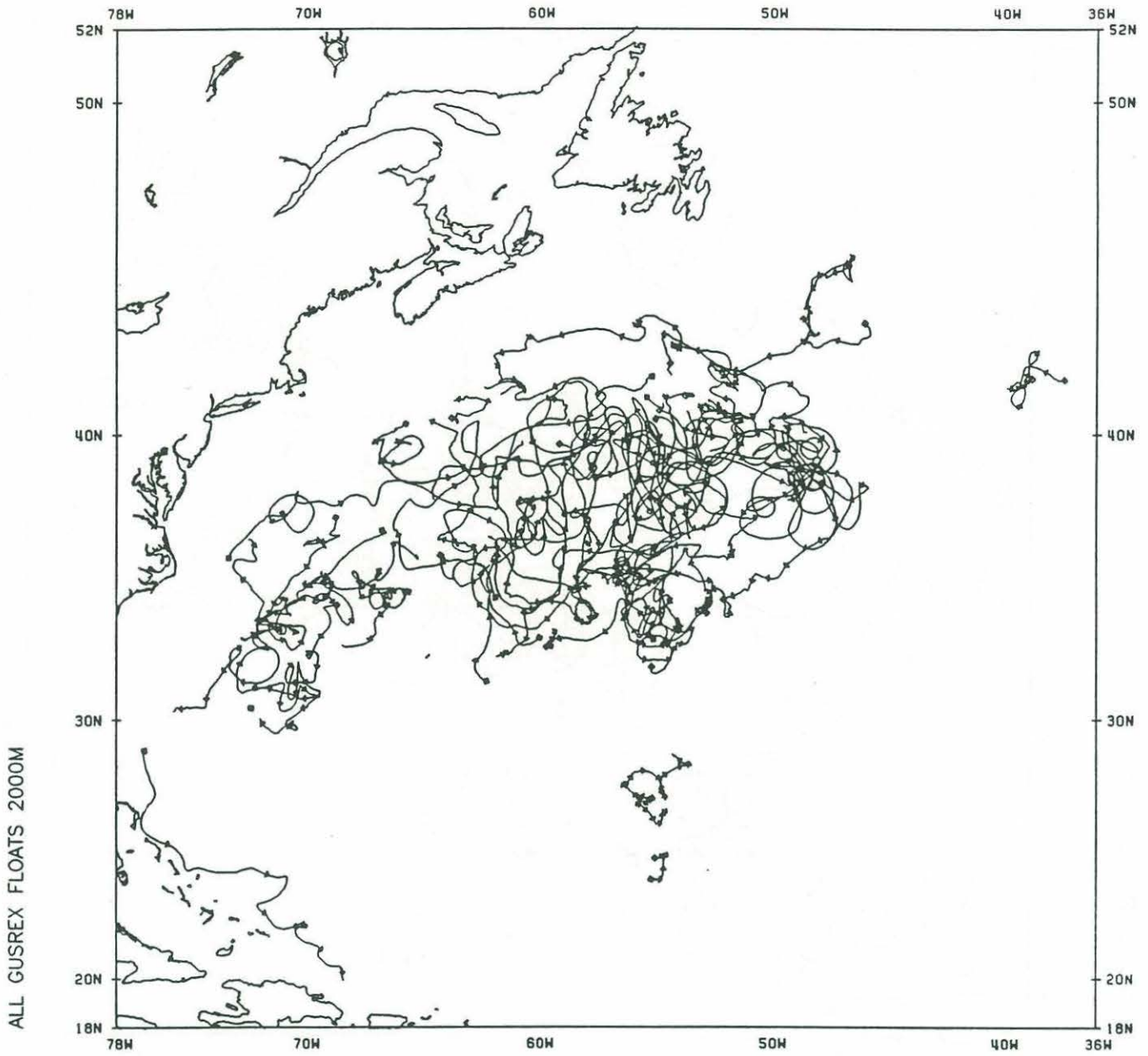


Figure 5: Composite 2000-meter trajectories for floats covered in this report and earlier Gulf Stream floats. Arrowheads mark every thirtieth day.

FLOAT	START	LAT	LONG	STOP	LAT	LONG	NO. DAYS	NOM. DEPTH	INIT. TEMP.	AVE. TEMP.	INIT. PRES.	AVE. PRES.
GS72BB	820530	25.29	-56.76	830504	24.67	-61.10	340	700	14.1	14.5	631.	618.
GU113	810809	41.94	-55.04	821030	41.26	-58.07	448	700	-	-	665.	685.
GU115A	810808	40.60	-54.86	820416	43.67	-40.94	252	700	8.7	9.9	699.	670.
GU115B	820529	46.94	-41.25	820716	49.26	-40.30	49	700	4.8	5.5	640.	684.
GU115C	821007	49.93	-39.54	830110	50.99	-31.99	96	700	4.0	4.8	663.	687.
GU116A	810808	37.10	-54.90	830502	36.89	-43.89	633	700	10.8	10.0	695.	678.
GU116B	830721	36.59	-37.81	830823	37.91	-37.57	34	700	10.0	9.6	690.	684.
GU118A	810806	32.99	-55.02	820202	30.45	-57.93	181	700	11.5	11.8	734.	711.
GU118B	820222	30.96	-57.89	830503	30.32	-68.77	436	700	12.7	12.5	707.	703.
GU118C	830607	29.92	-68.92	850901	25.76	-65.49	818	700	13.2	11.8	705.	698.
GU120A	810719	38.17	-64.21	820402	46.46	-40.15	258	700	11.4	7.8	639.	794.
GU120B	820713	47.34	-39.50	821001	47.30	-38.60	81	700	-	-	-	-
GU162A	810809	41.86	-55.08	820809	39.35	-56.15	366	2000	3.2	3.2	2126.	2163.
GU162B	821123	34.42	-61.83	830425	40.46	-64.66	154	2000	3.2	3.2	-	-
GU162C	830603	40.51	-63.72	830805	41.09	-63.64	64	2000	-	-	-	-
GU163A	810809	40.78	-54.77	830504	37.83	-49.27	634	2000	3.7	3.7	2116.	2115.
GU163B	830605	39.54	-49.46	850829	36.43	-57.99	817	2000	3.7	3.8	2100.	2093.
GU165A	810808	37.42	-55.16	810919	40.01	-55.48	43	2000	3.7	3.5	-	-
GU165B	811005	38.54	-57.51	811223	36.91	-60.69	80	2000	3.6	3.6	-	-
GU165C	820112	36.73	-60.73	830502	32.29	-61.79	476	2000	3.5	3.5	-	-
GU165D	830607	31.40	-62.22	850826	33.73	-57.52	812	2000	3.6	3.6	2199.	2161.
GU166	810807	36.02	-55.02	820717	36.53	-61.98	345	2000	-	-	-	-
GU167A	810809	32.92	-55.02	830505	33.19	-59.26	635	2000	-	-	1972.	1998.
GU167B	830607	32.99	-59.91	840419	41.28	-61.61	318	2000	-	-	1999.	2002.
GU167C	840529	40.34	-65.68	841208	39.75	-60.69	194	2000	-	-	2008.	2011.
GU169A	810721	37.21	-68.66	830505	35.92	-65.23	654	2000	3.5	3.5	2121.	2114.
GU169B	830603	36.78	-66.67	840503	36.44	-72.36	336	2000	3.6	3.6	2079.	2038.
GU169C	840522	35.82	-73.19	850101	39.73	-57.51	225	2000	-	-	-	-
GU169D	850201	41.19	-55.31	850211	41.00	-54.60	11	2000	-	-	-	-
GU169E	850225	41.25	-53.63	850823	39.45	-52.57	180	2000	-	-	-	-
GU170A	810719	34.63	-65.55	820429	32.73	-68.37	285	2000	3.7	3.7	2144.	2136.
GU170B	820604	34.17	-68.59	830503	30.05	-71.86	334	2000	3.6	3.6	2148.	2119.
GU170C	830626	31.17	-72.07	840502	30.33	-75.54	312	2000	3.7	3.7	2065.	2025.
GU170D	840524	28.85	-76.82	841224	19.91	-68.31	215	2000	-	-	-	-
PL12D	810116	19.61	-68.68	810713	21.25	-67.94	179	700	5.4	5.9	-	-
PL12E	810719	21.68	-67.80	820116	21.15	-66.16	182	700	6.2	6.1	-	-
PL12F	820311	20.05	-64.05	830423	23.49	-63.28	409	700	6.2	6.1	-	-
PL12G	830608	24.26	-63.58	850613	22.05	-55.93	737	700	6.2	5.9	-	-

Table 1: Table of float information.

segment. The initial and average values for temperature and pressure are shown (dash indicates absence of data).

Another float still operating in May 1982 was PL12 which was launched on October 4, 1976, at 24.4°N, 69.0°W, as part of a pilot study for POLYMODE called Pre-LDE (Spain *et al.*, 1980; McKee, 1986). This float was launched by Riser and Rossby (1983) in an isolated eddy of warm, saline Mediterranean water in the Nares Abyssal Plain. It was ballasted to approximately 900 m depth in order to track the "meddy". PL12 is the longest operating SOFAR float (Owens *et al.*, 1988). In figures where the floats are divided by depth, PL12 is included with the 700-meter floats.

The other non-GUSREX float covered in this report is GS72B, launched on June 6, 1979, at 38.4°N, 67.9°W, near but south of the axis of the Gulf Stream (Kennelly and McKee, 1984). This float had a nominal depth of 700 m.

Figure 6 is a histogram of total durations. Excluding PL12 because it had such a different history, the average duration for all the Gulf Stream floats is 1.45 years (1.65 if floats with reused batteries aren't included). The average duration of the 13 floats reported here (without PL12) is 2.8 years, which could be lower than the actual value, since five floats (see plus signs on Figure 6) appeared to still be in operation when the last ALS array was retrieved. Of these, four were deep and one shallow, which agrees with earlier observations that the 700-meter floats were more prone to sudden failure (Kennelly and McKee, 1984). In addition, five other floats were fading at the end of their data records. For at least four of these, moving out of range appears to be a sufficient cause of the decreased signal power. GU120, on the other hand, looks like its lithium batteries, reused from an earlier experiment, were giving out. Alkaline-powered floats tend to die abruptly, as GU113 and GU116 did (Kennelly and McKee, 1984).

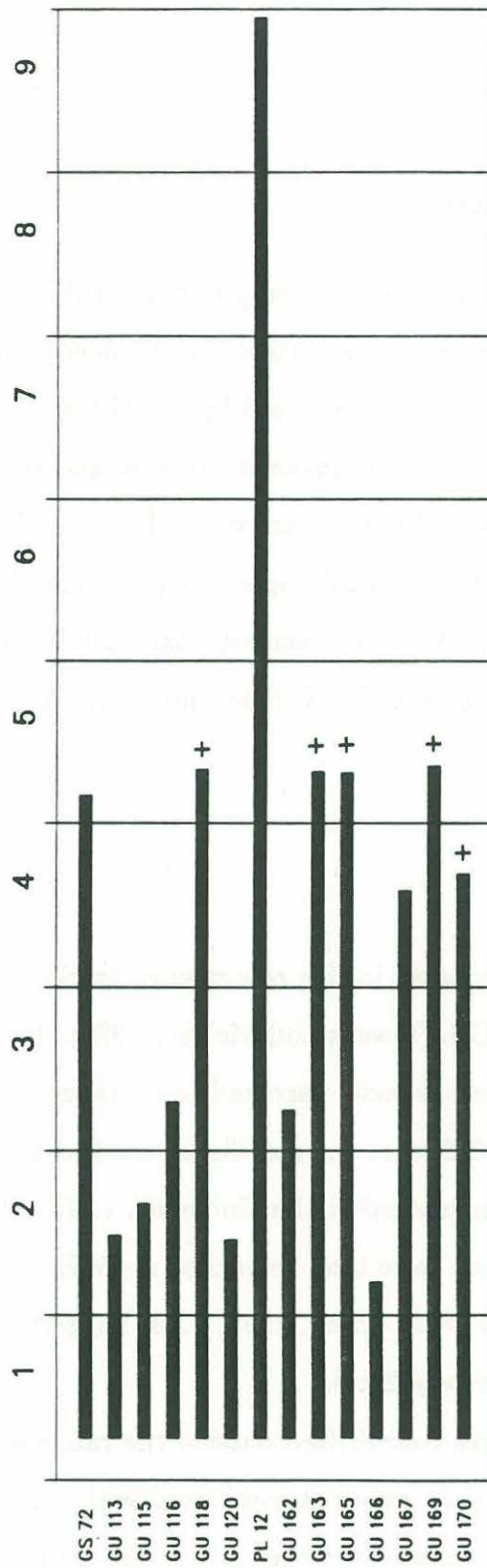


Figure 6: Total duration of floats covered in this report.

2 Instrumentation

SOFAR floats are freely drifting, neutrally-buoyant subsurface instruments. Every eight hours each instrument transmits a low-frequency acoustic signal which, under optimal conditions, can be heard by an ALS at distances on the order of 2500 km. Forty-eight-hour averages of pressure and temperature are transmitted on alternate days. The ALSs are vertical arrays of hydrophones deployed on a subsurface mooring. A microprocessor-controlled detection system records the times of arrival of the four strongest float signals during each ten-minute interval. During the GUSREX experiment, the ALSs were renewed annually.

3 Processing

In general, the floats discussed in this report were tracked using the methods which are standard at W.H.O.I. (Owens and McKee, 1989). Because of the long duration of some of these floats, special care had to be taken in calculating clock drifts. The data after May 1982 were the first floats tracked at W.H.O.I. The earlier data had initially been tracked at the University of Rhode Island (see Spain *et al.*, 1980, for technique), but were later retracked at W.H.O.I. for consistency.

Analysis on Site L floats (Price *et al.*, 1987, p.13) suggests that the precision of float positions is approximately 2 km.

Temperatures or pressures that drifted outside the range of the sensors have been deleted, as have values that were not associated with a position.

Trajectories having gaps greater than ten days were broken into subfiles and labelled A, B, C, etc. This was necessary for all floats being tracked in May 1983, since the first setting ALSs ran out of tape before the next ALSs could be deployed. Gaps of less than ten days in position, temperature, or pressure were

linearly interpolated to the eight-hour interval. See Figures 7 and 8 for times covered by each float. See Figures 9 and 10 for distance traveled by each float, by segment.

These interpolated series were then filtered using a seven point, one-day-half-width Gaussian filter. Finally, a cubic spline was fitted to the filtered positions to produce one location per day, and east and north components of velocity were calculated.

4 General Information for Individual Float Plots

A trajectory plot and a group of time series plots are presented for each float in Appendix A. The order of the time series plots is: "stick diagram" ($u-v$ vectors), u and v velocity component overplot, and temperature and pressure overplot (where data are available). These plots were created with the objective of presenting the data for a particular float; thus the scales vary between floats. The time axis is consistent throughout, with 200 days per page. The time axis is annotated with the last four digits of the Julian day and with the calendar date. Data points are plotted at daily intervals.

The stick plots show a velocity vector for each day, with the stick length proportional to the speed in centimeters per second. North is toward the top of the page. The separate components on the u and v time series are plotted at the same scale.

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

A trajectory for each float is plotted on a Mercator projection. Open circles denote the first float position, small dots mark the daily positions, large dots every

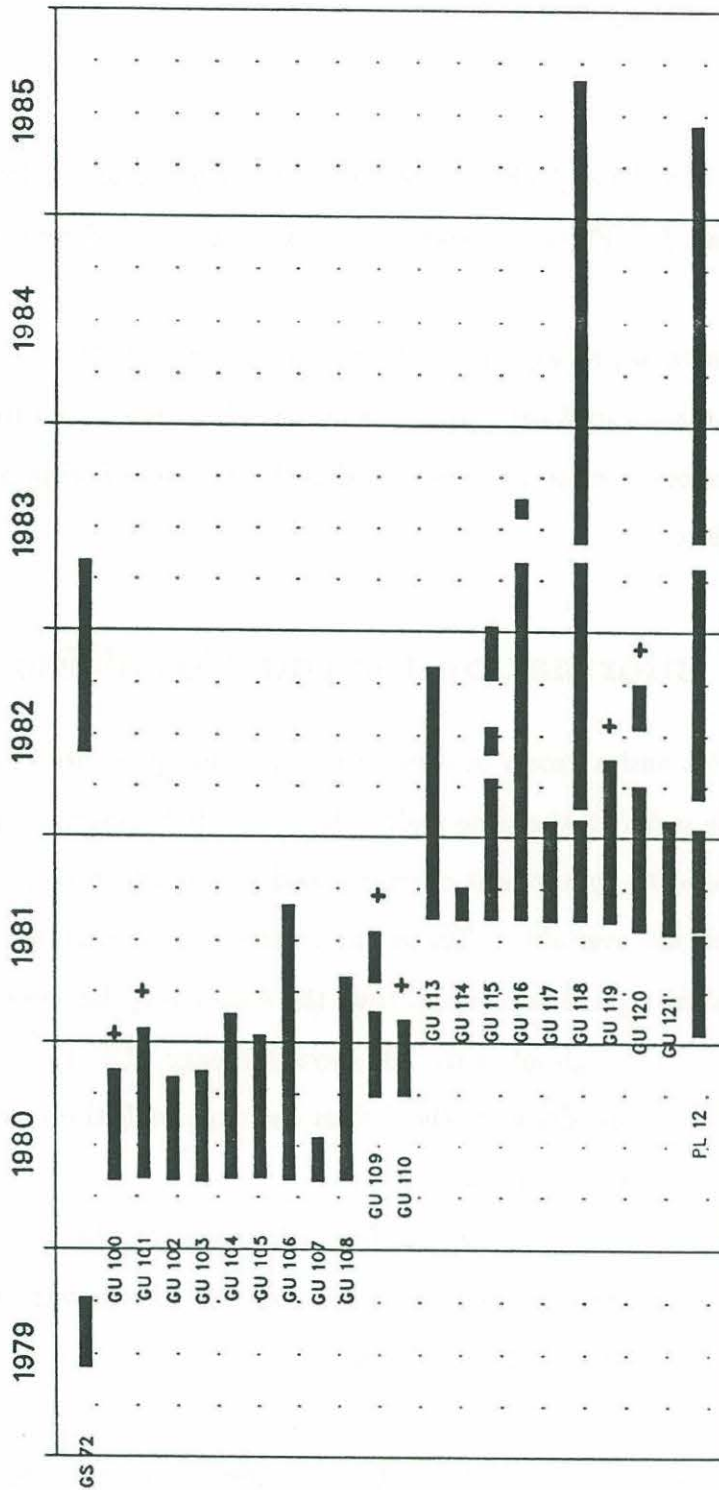


Figure 7: Float duration for all 700-meter GUSREX floats as a time line. + means reused from previous experiment.

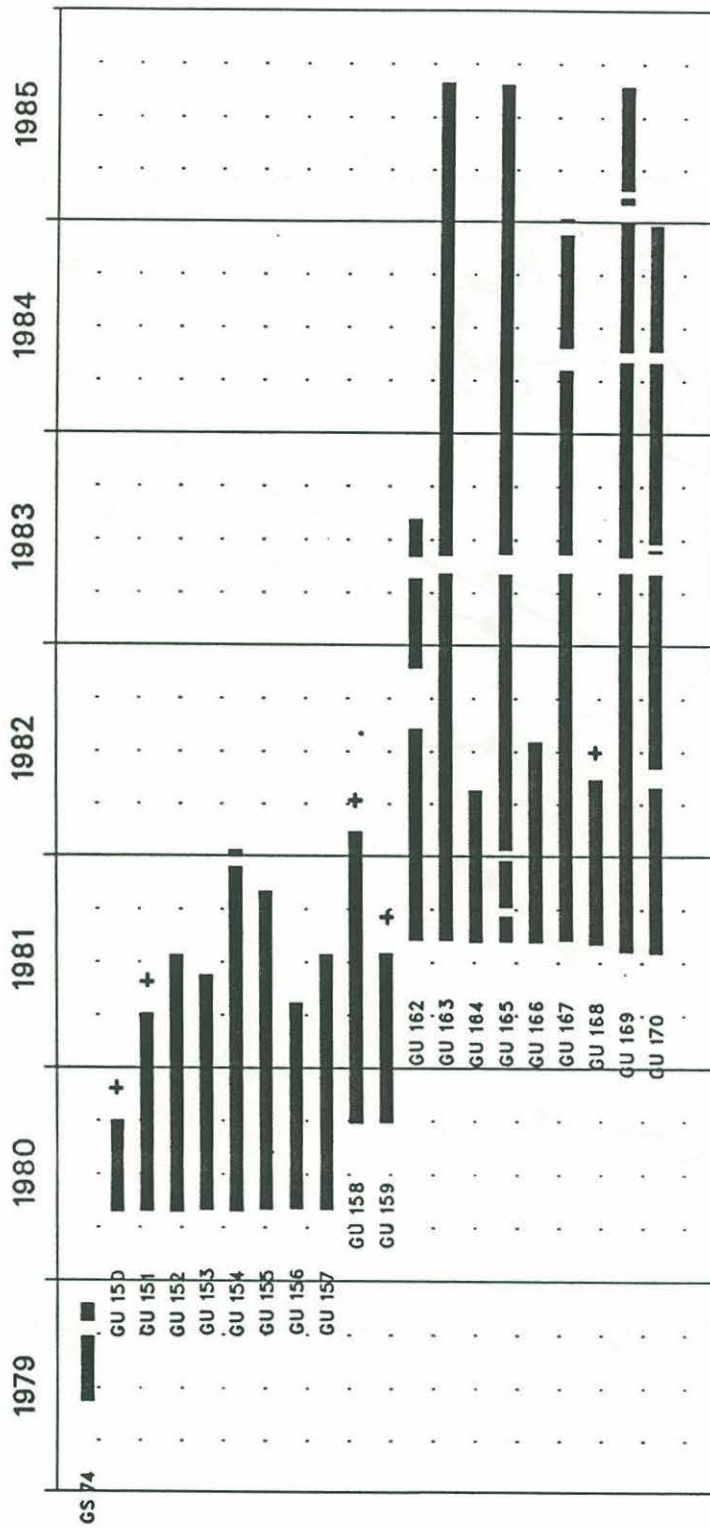


Figure 8: Float duration for all 2000-meter GUSREX floats as a time line. + means reused from previous experiment.

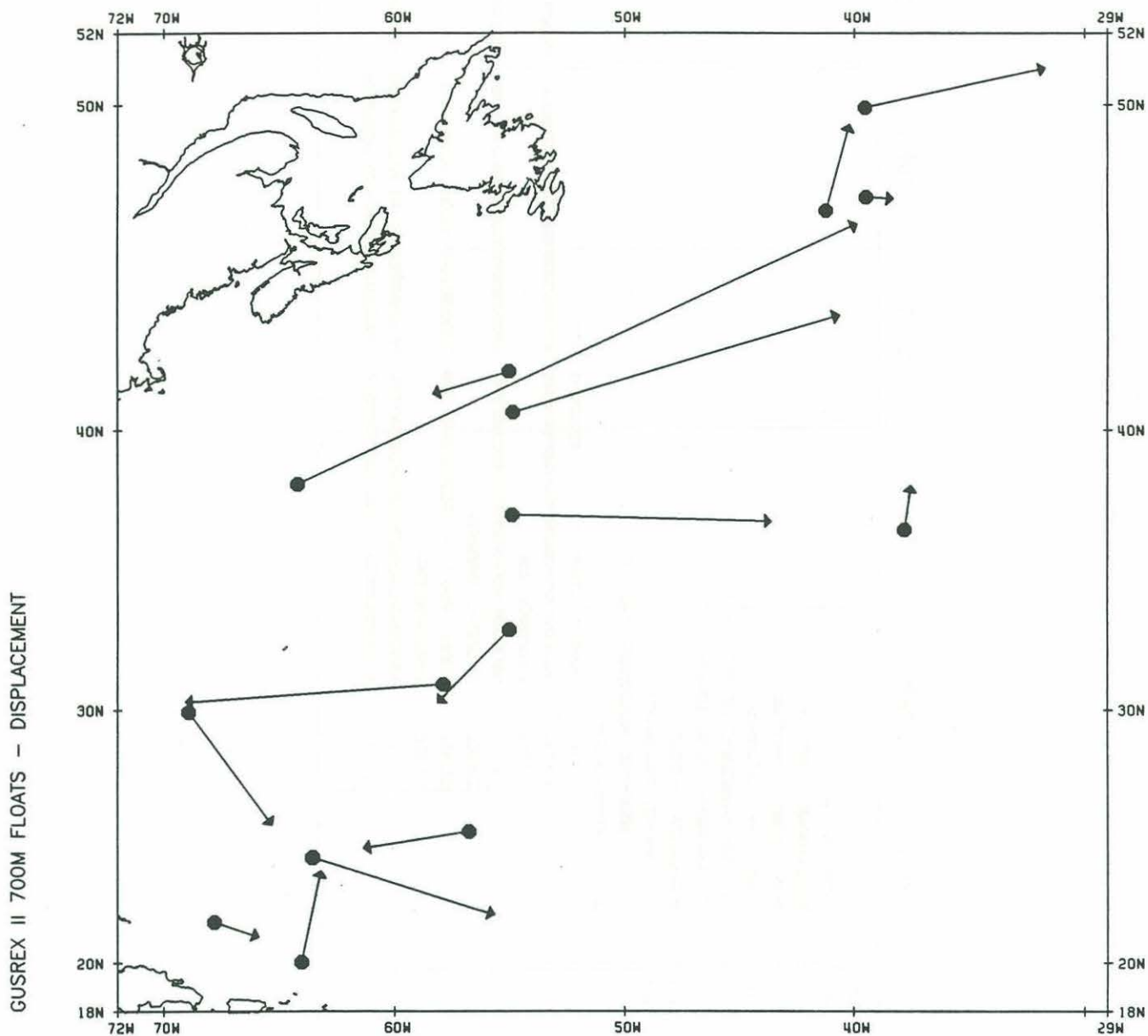


Figure 9: Total displacement of 700-meter floats covered in this report, by segment. Arrows mark final locations.

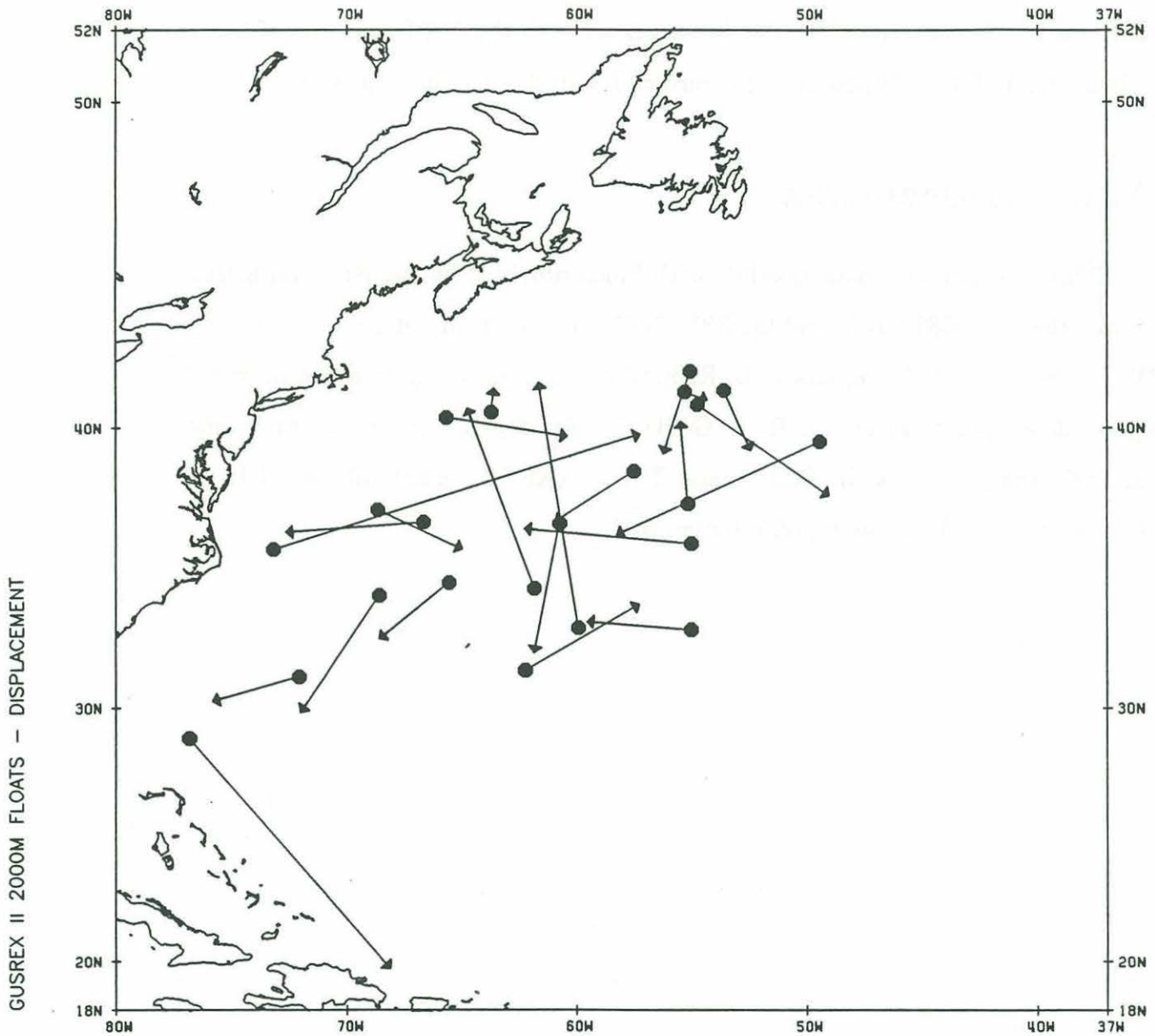


Figure 10: Total displacement of 2000-meter floats covered in this report, by segment. Arrows mark final locations.

tenth day, and every twentieth day is annotated with the last four digits of the Julian day. Refer to Appendix C to convert Julian day to calendar date.

Acknowledgements

This research was made possible with funds provided by the National Science Foundation (OCE81-09145 and OCE81-17467). Principal investigators were W. B. Owens, J. F. Price, and P. L. Richardson. Technical support was provided by the float operations group. R. A. Goldsmith developed many of the programs for analyzing float data. B. Gaffron and T. K. McKee made helpful editorial remarks and M. A. Lucas typed the manuscript.

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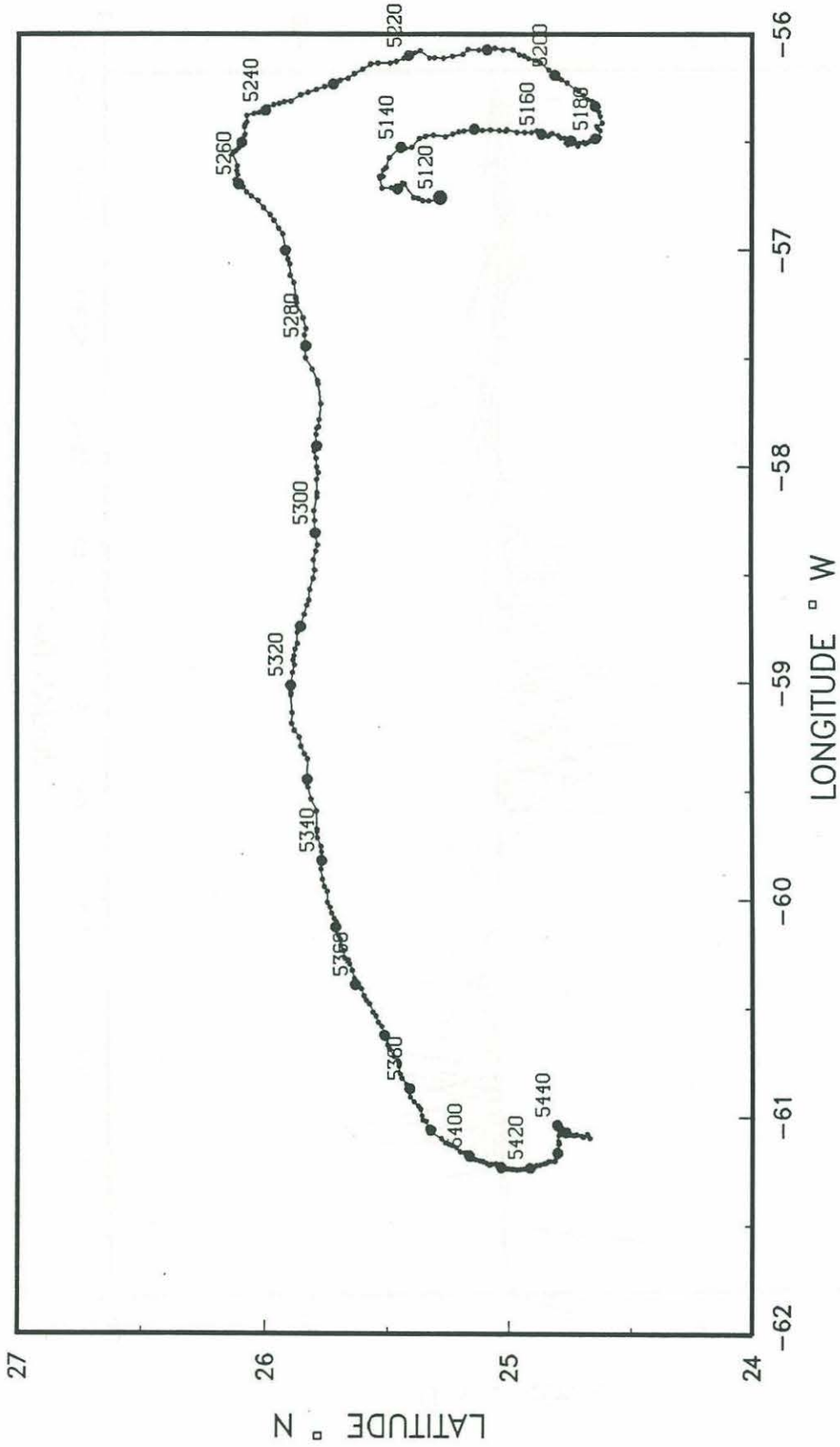
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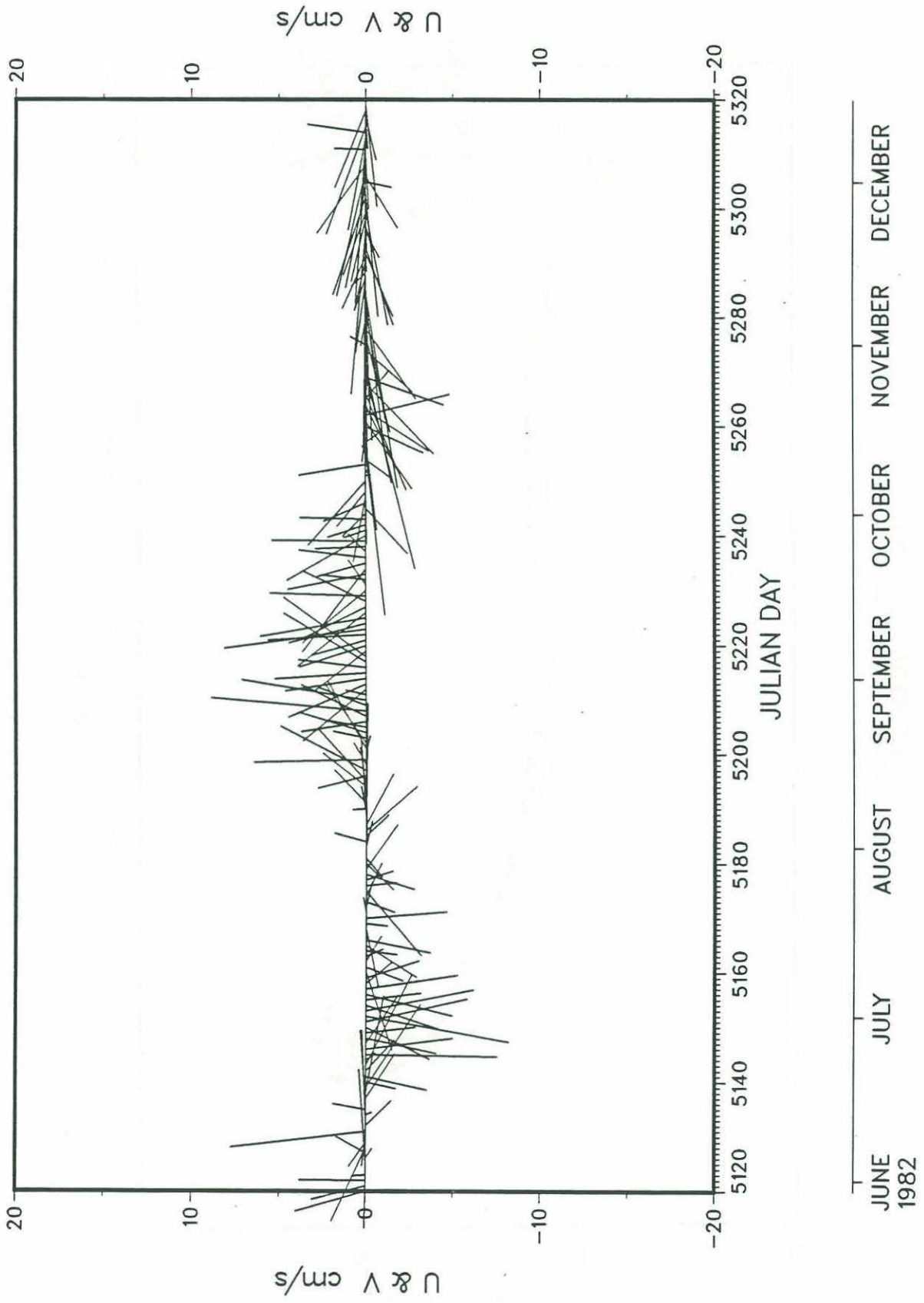
Worthington, L. V., 1976. On the North Atlantic circulation. *The Johns Hopkins Oceanographic Studies*, 6, 110 pp.

APPENDIX A: Individual Float Plots

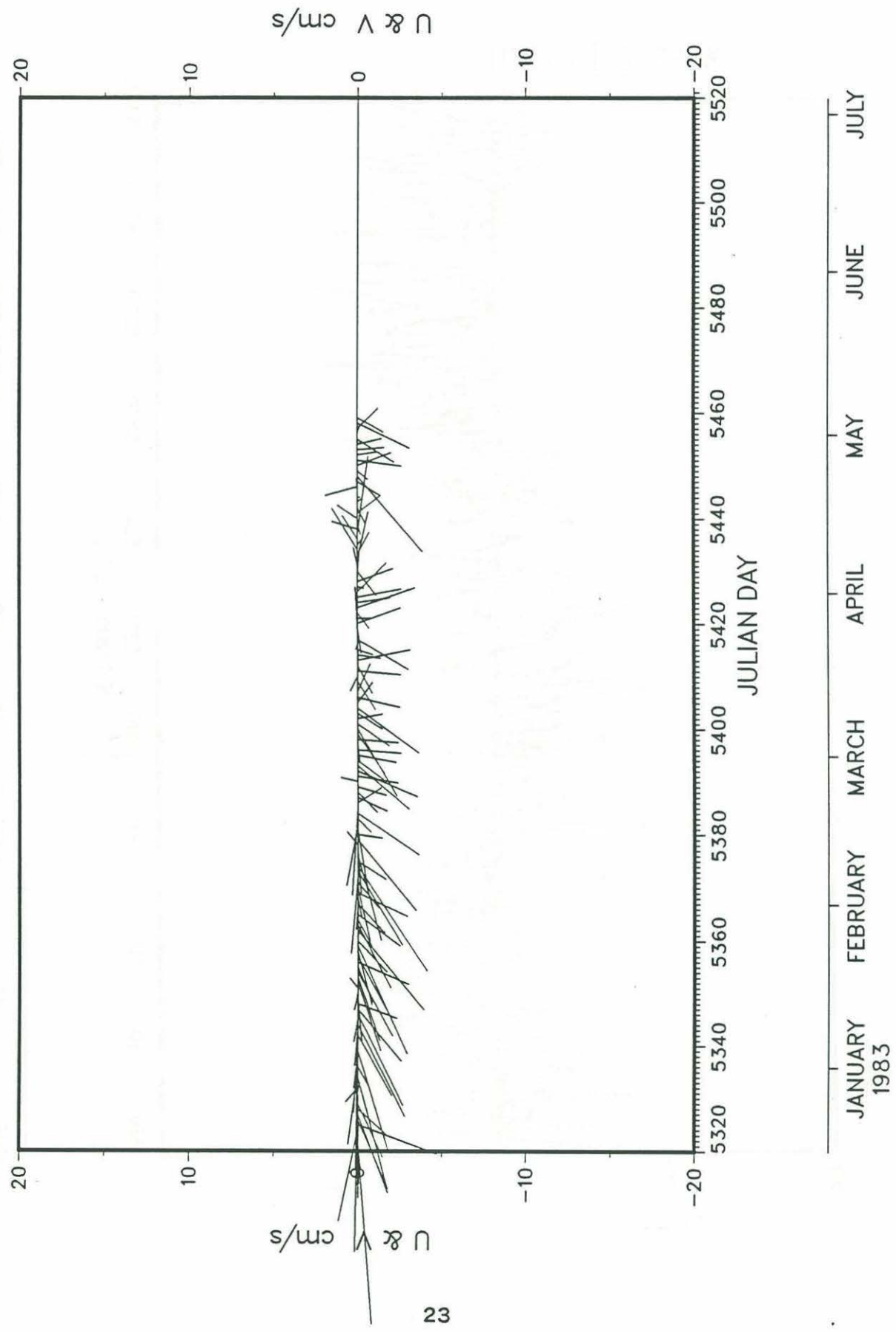
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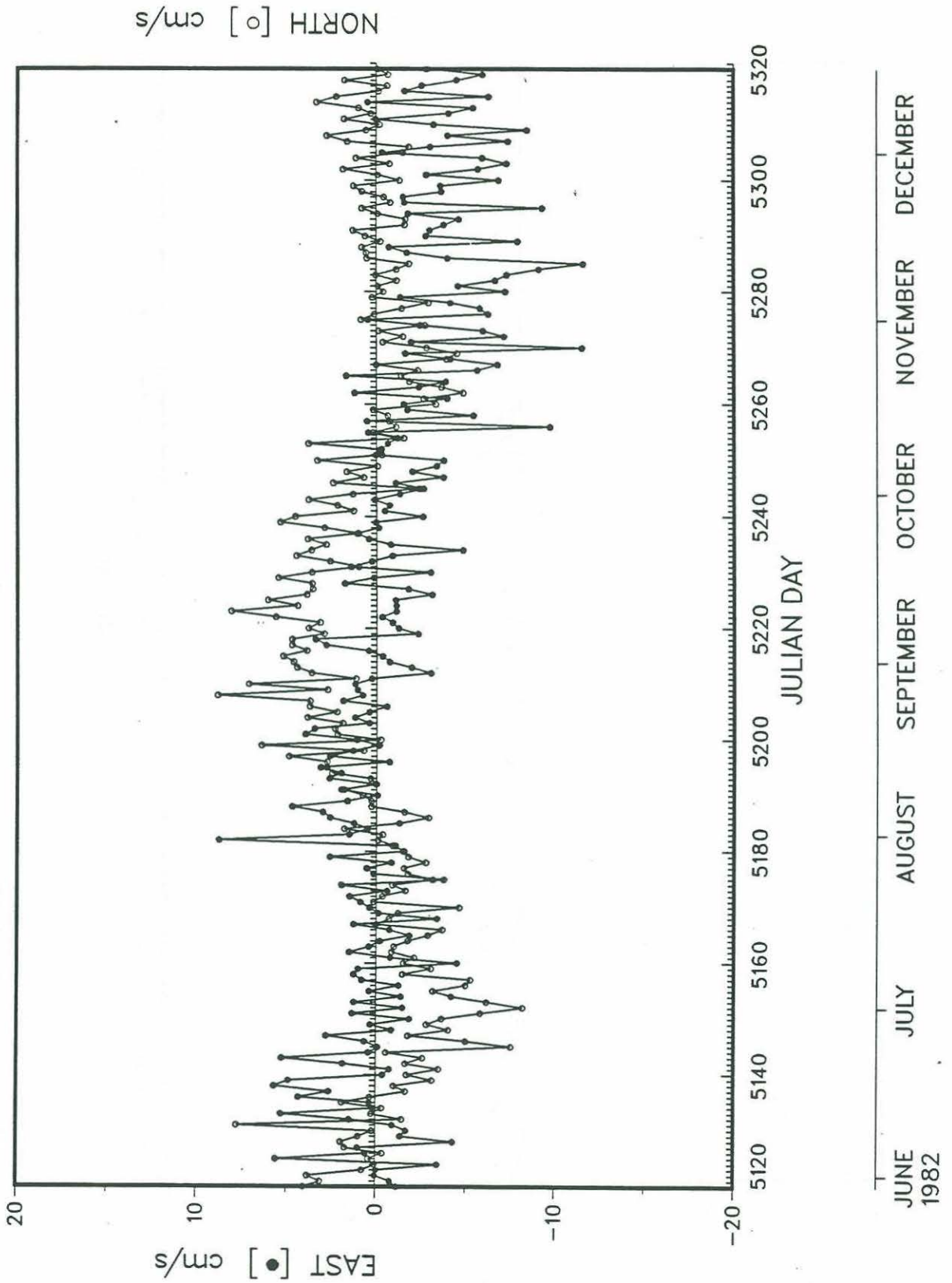
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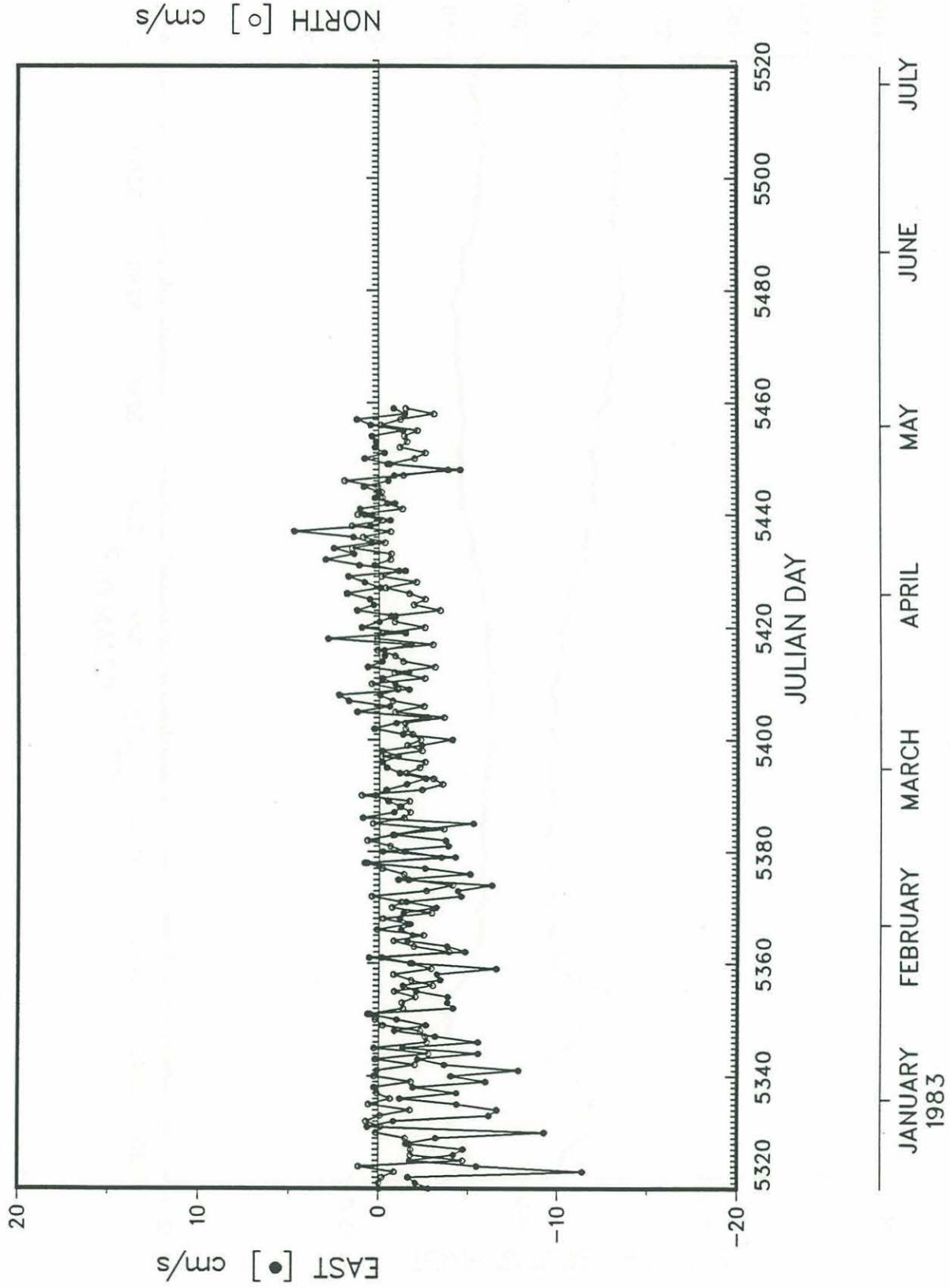
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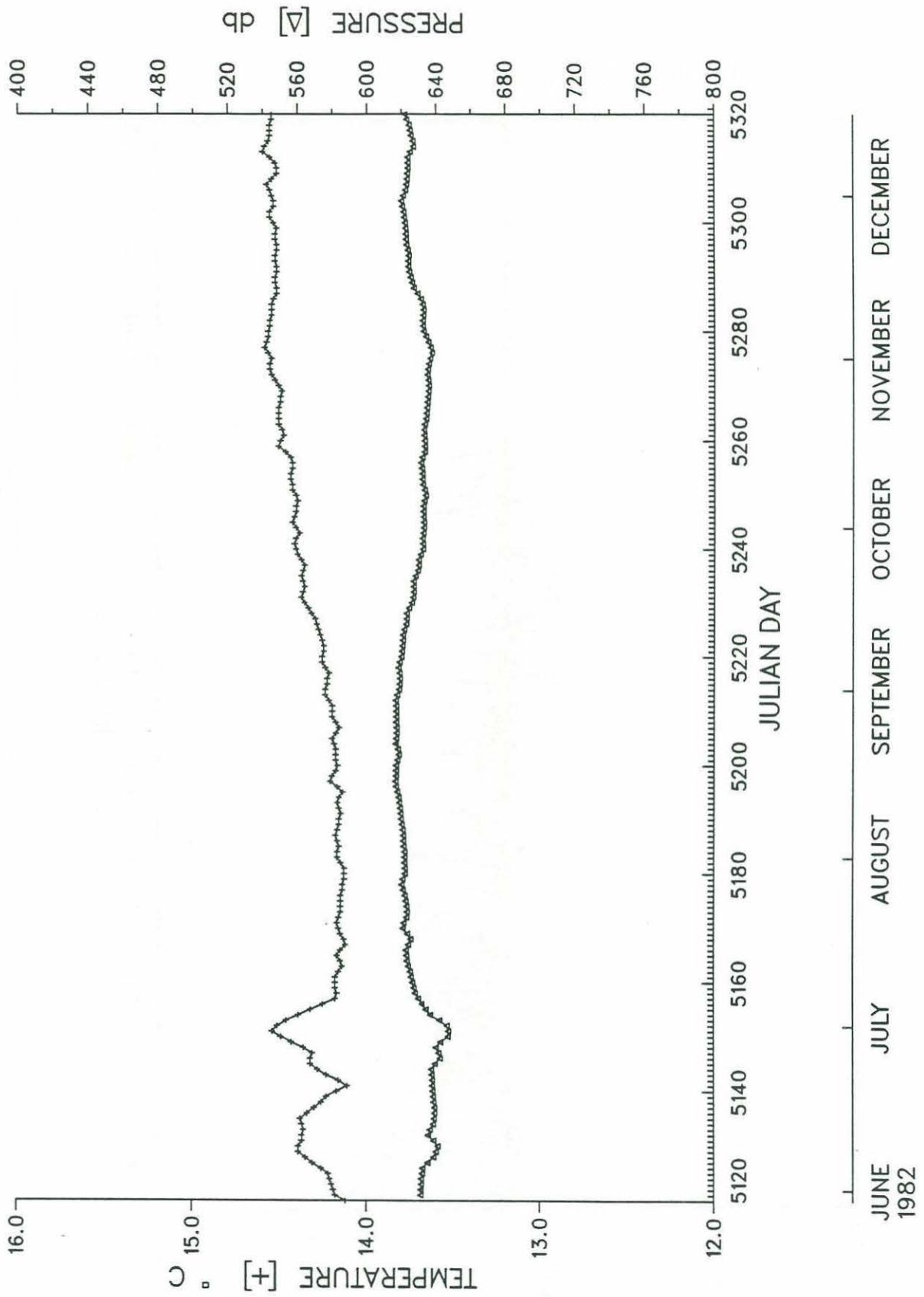
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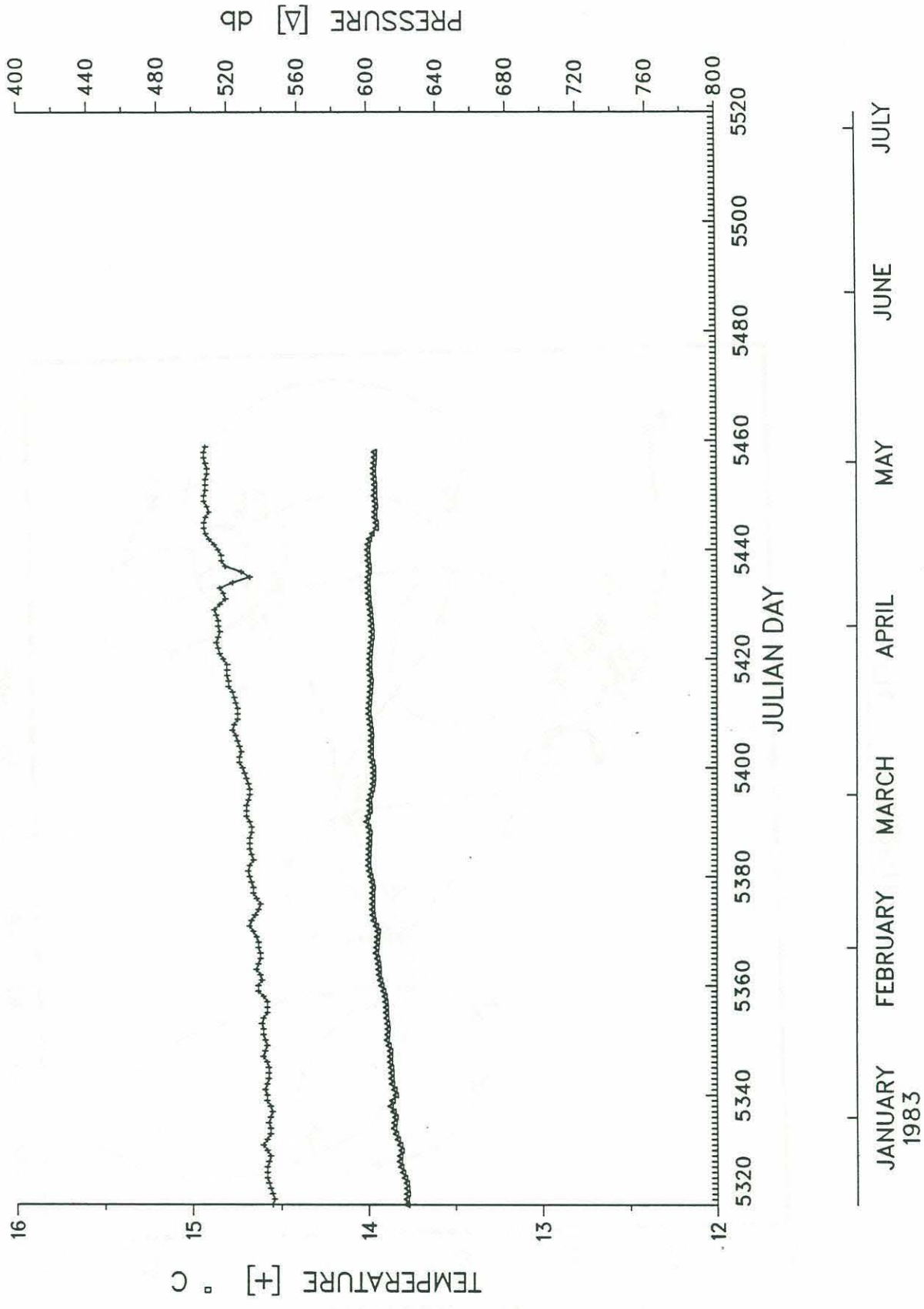
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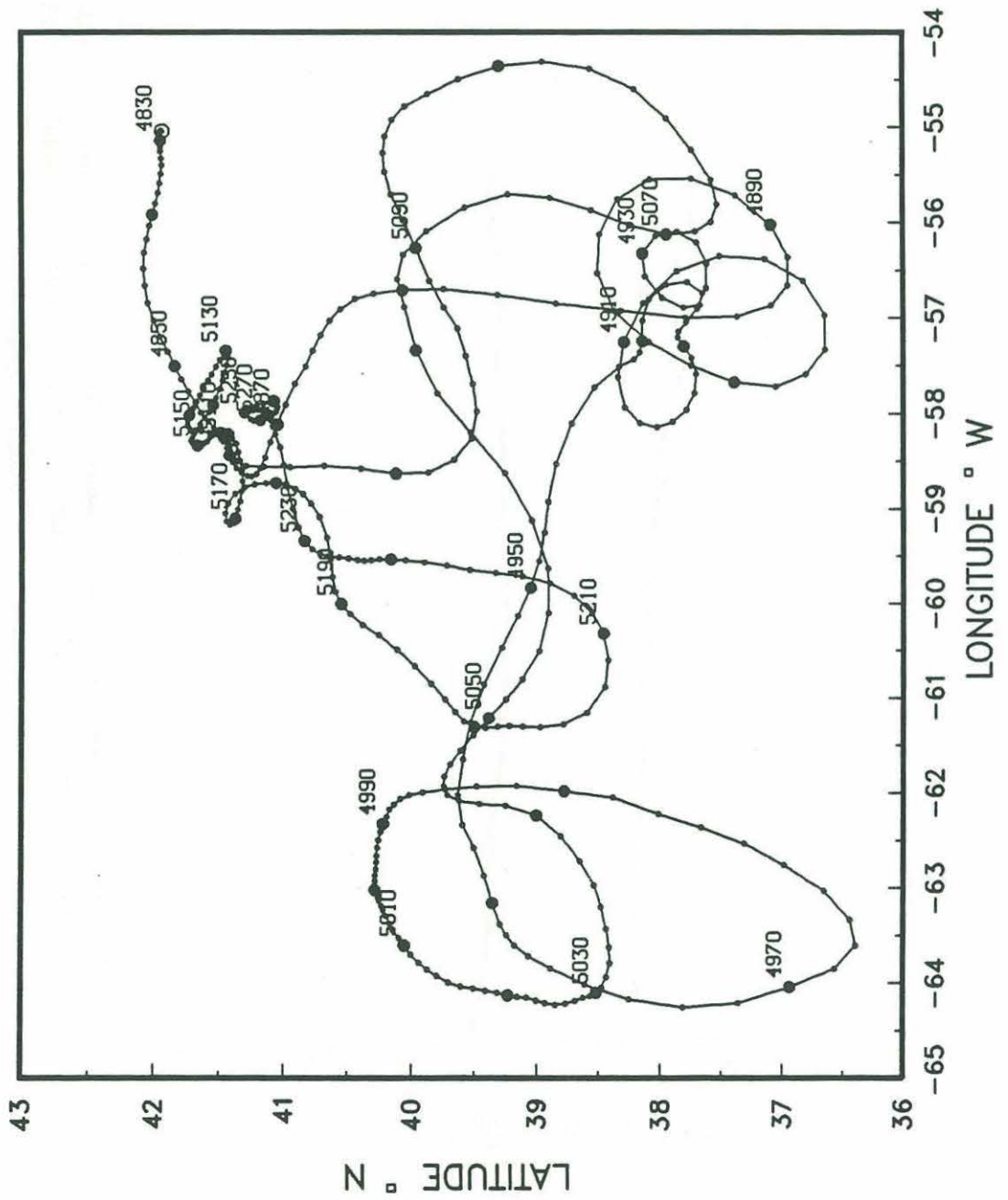


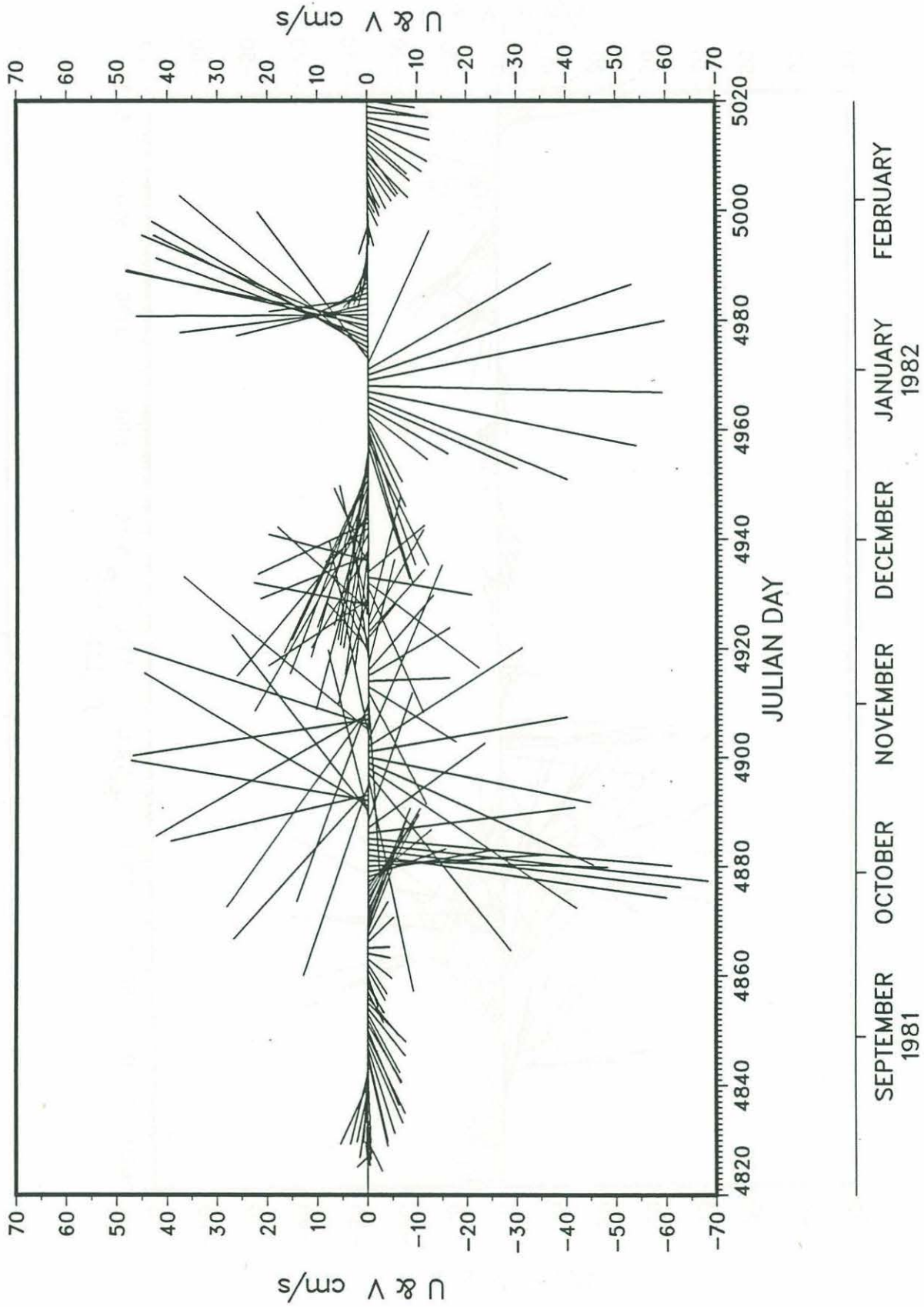
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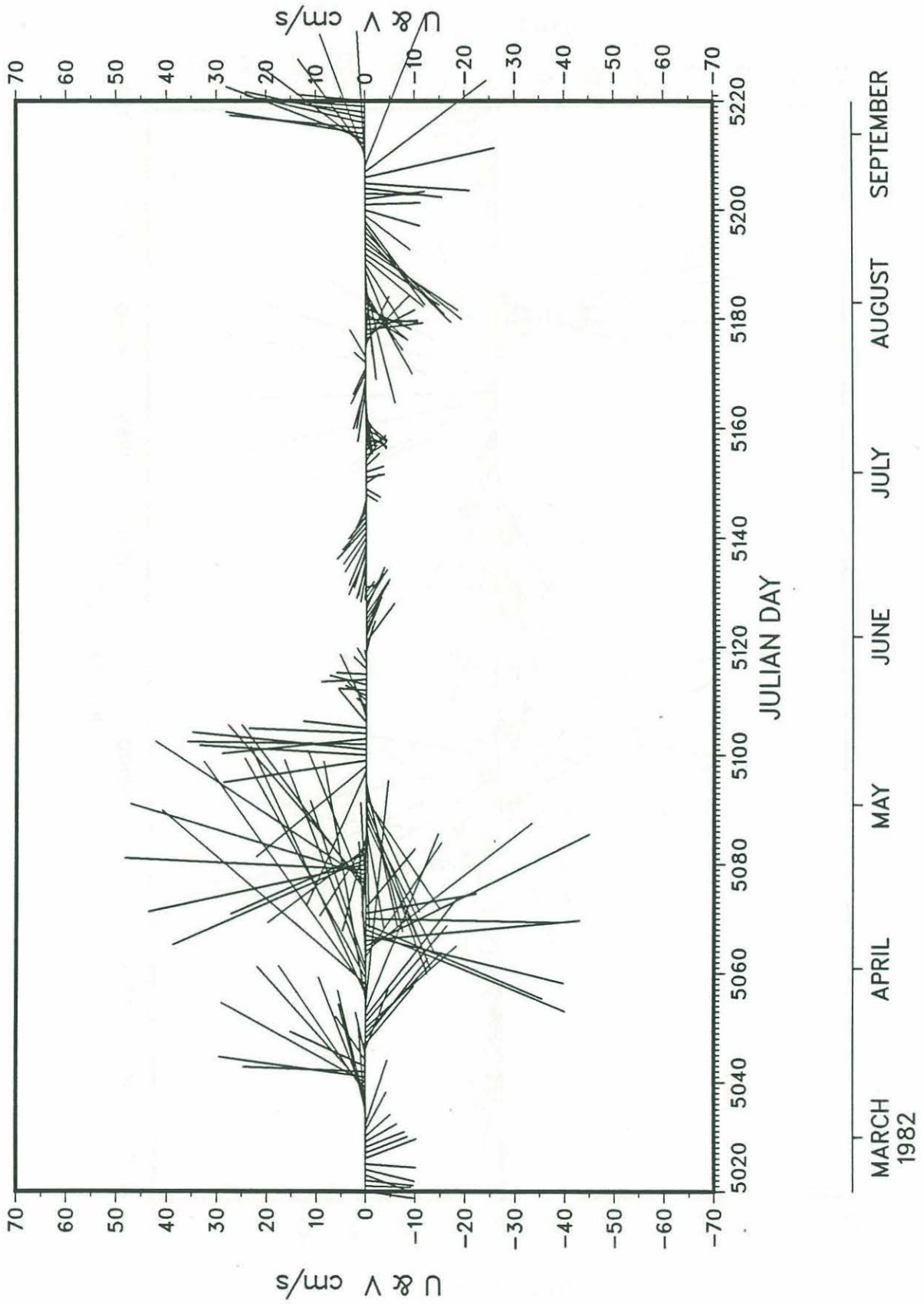


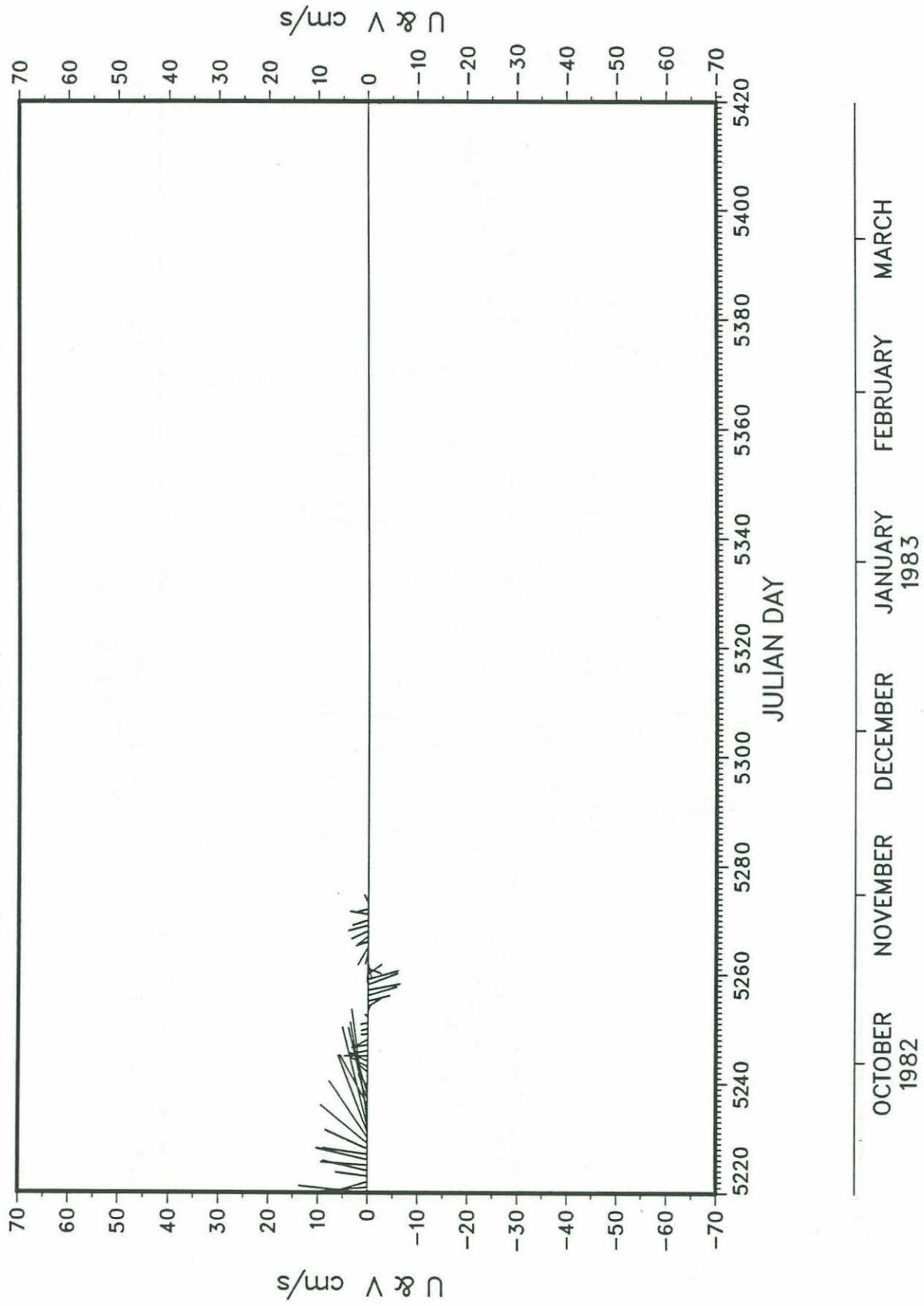
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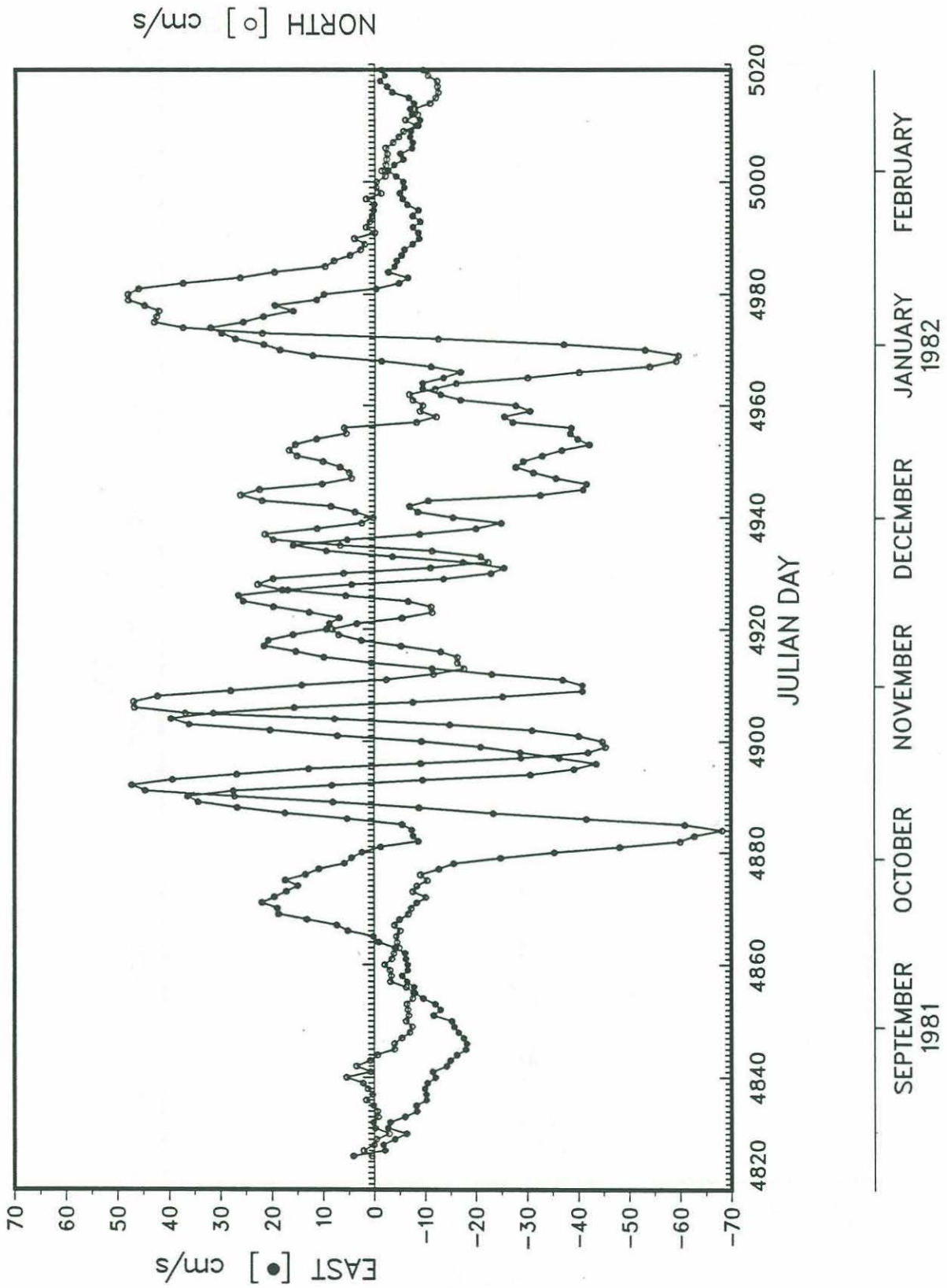


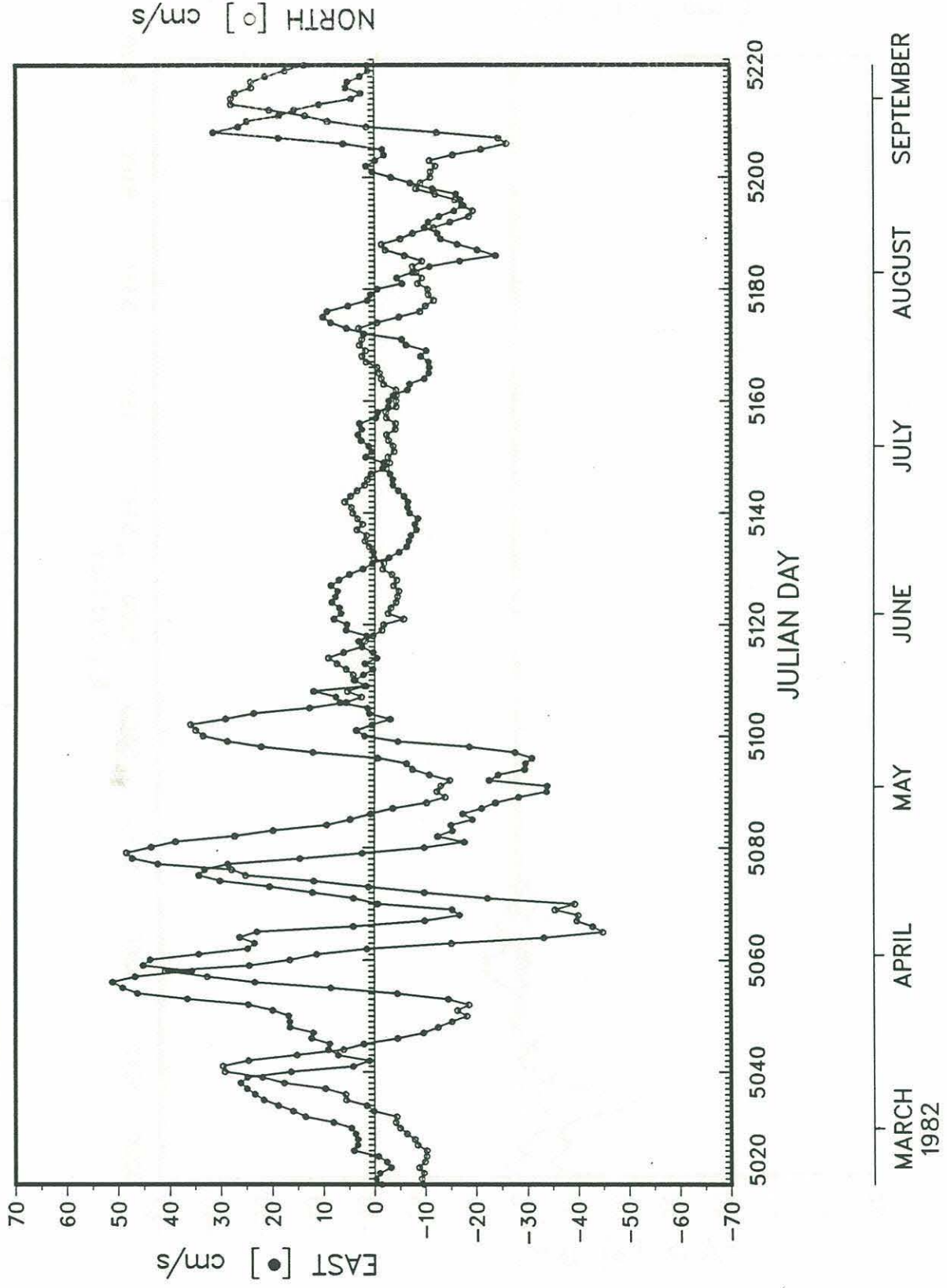


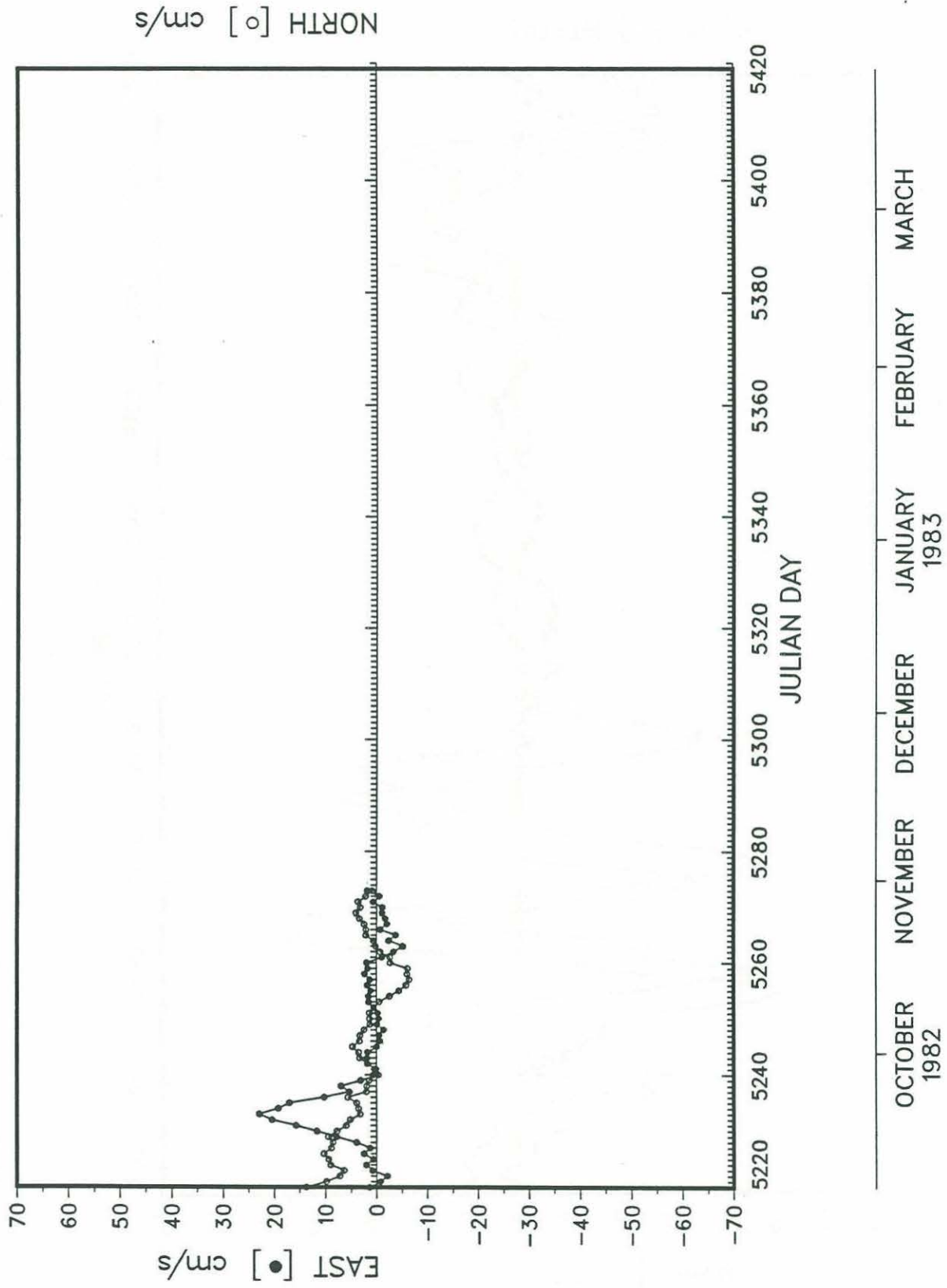


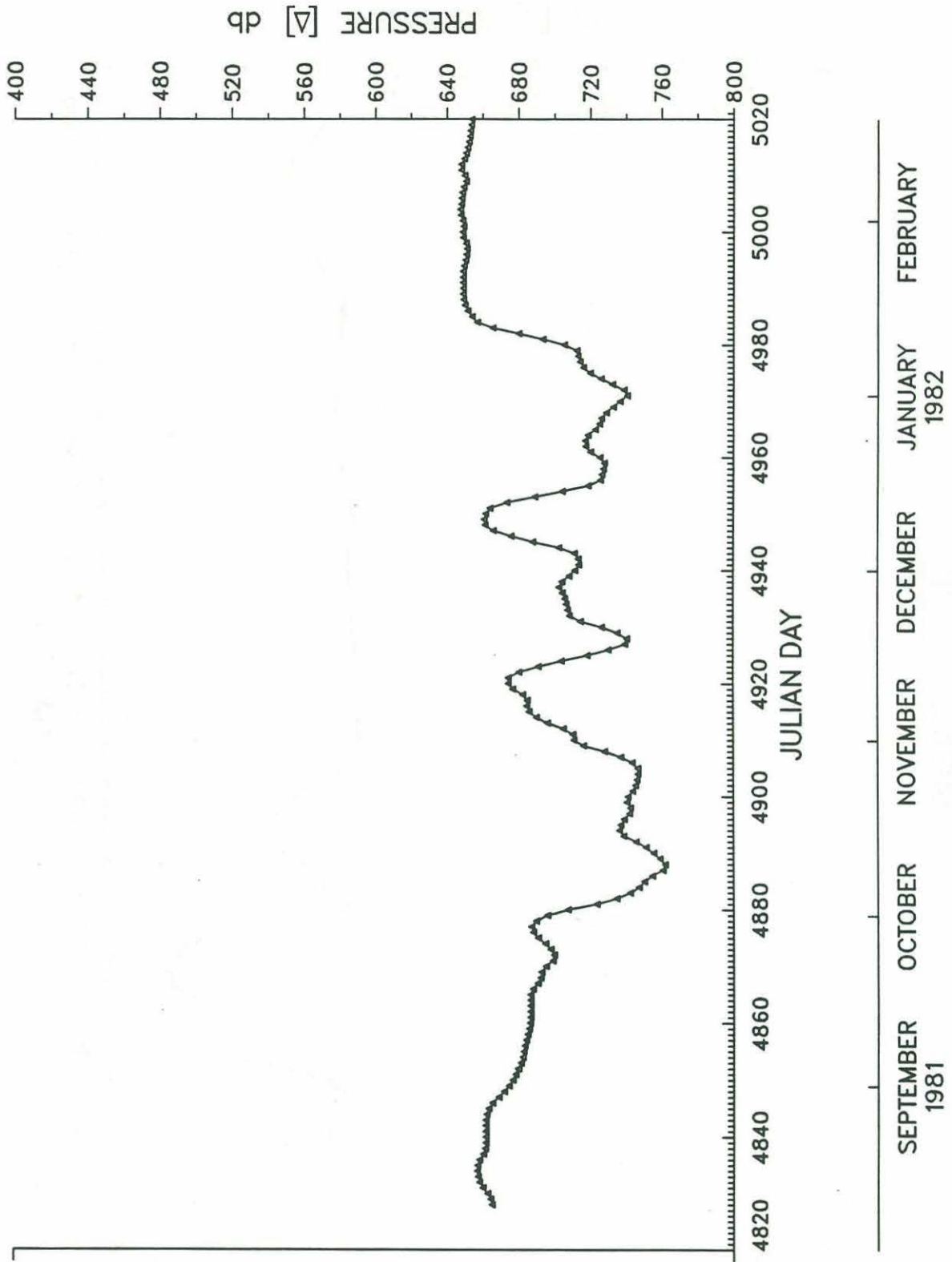


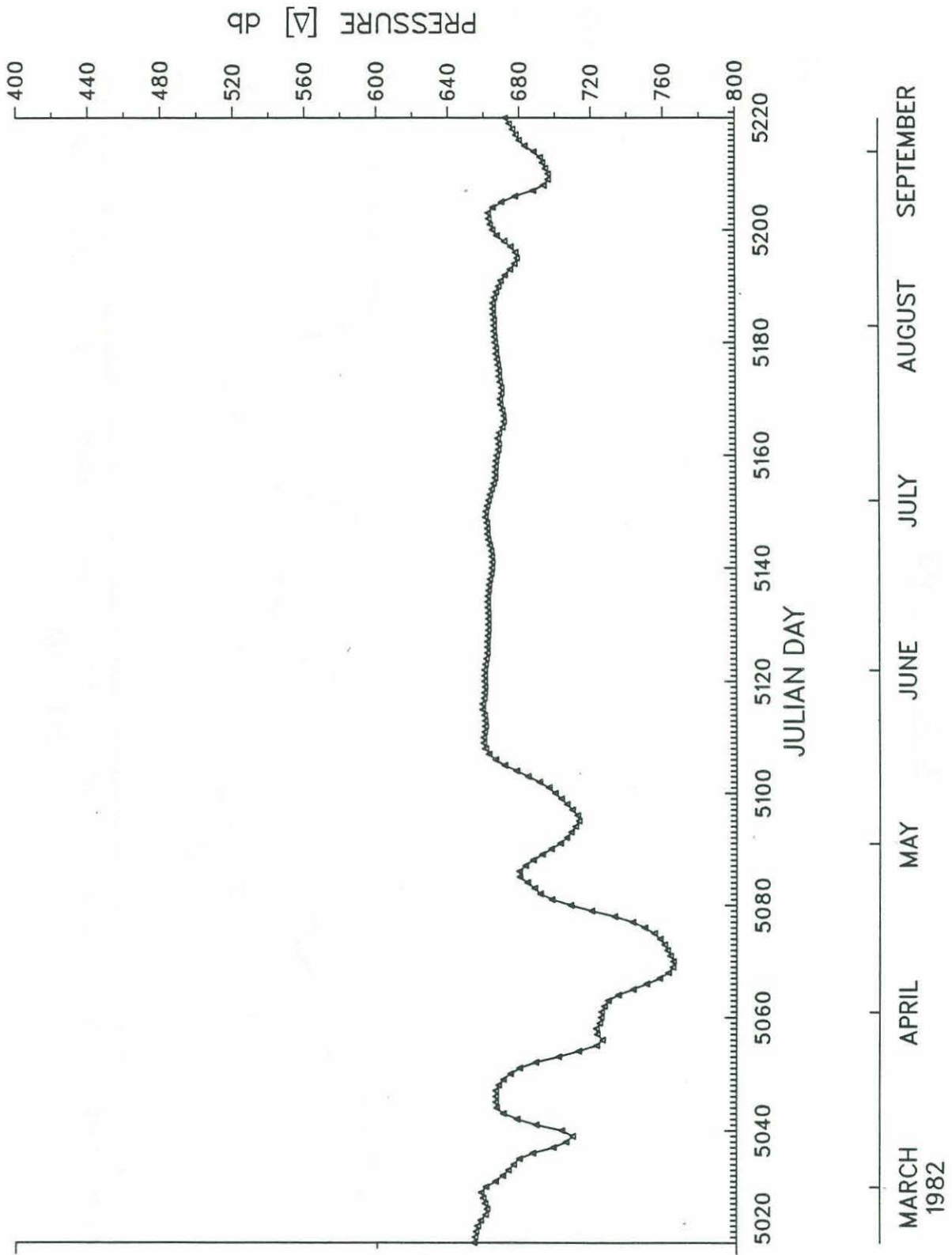


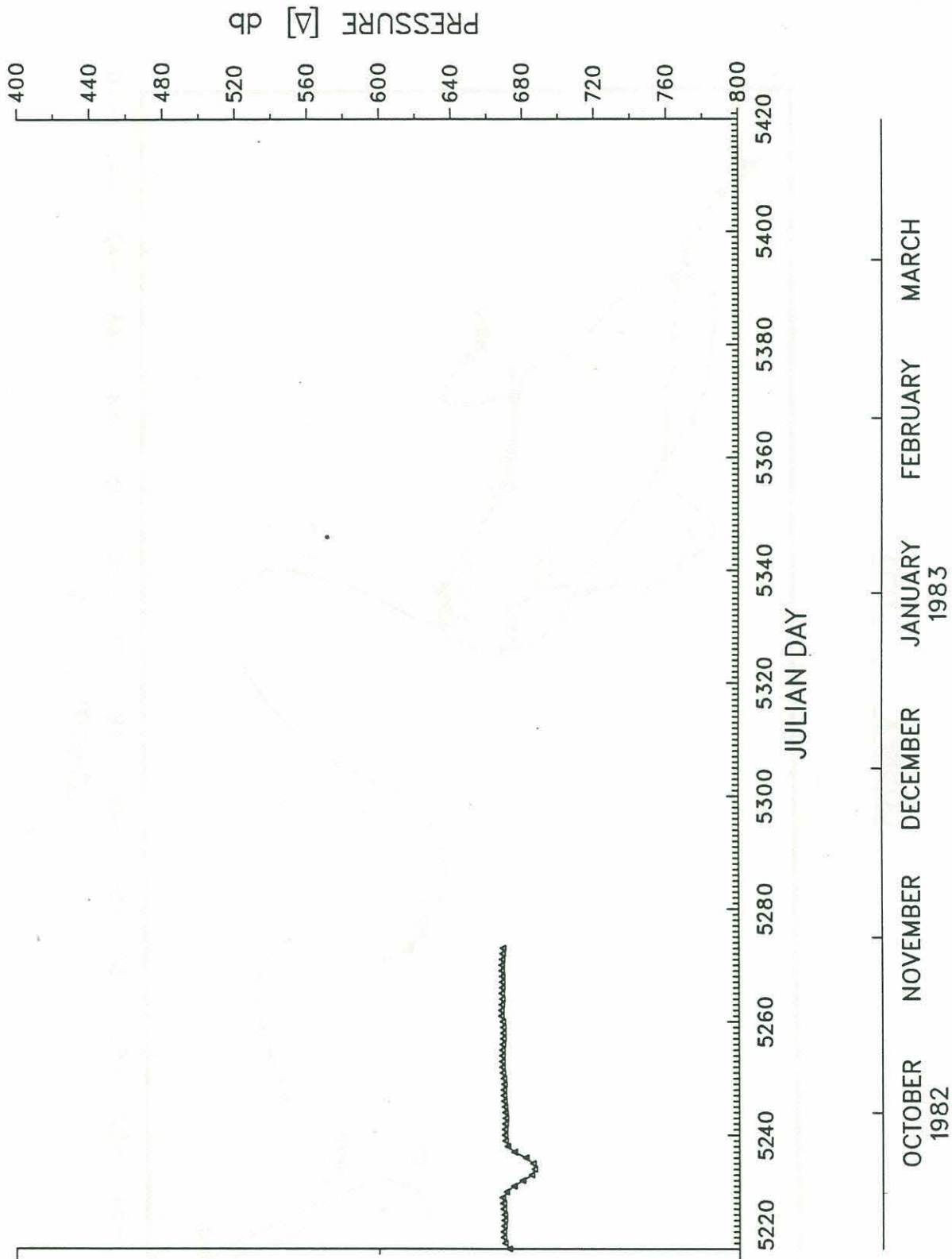




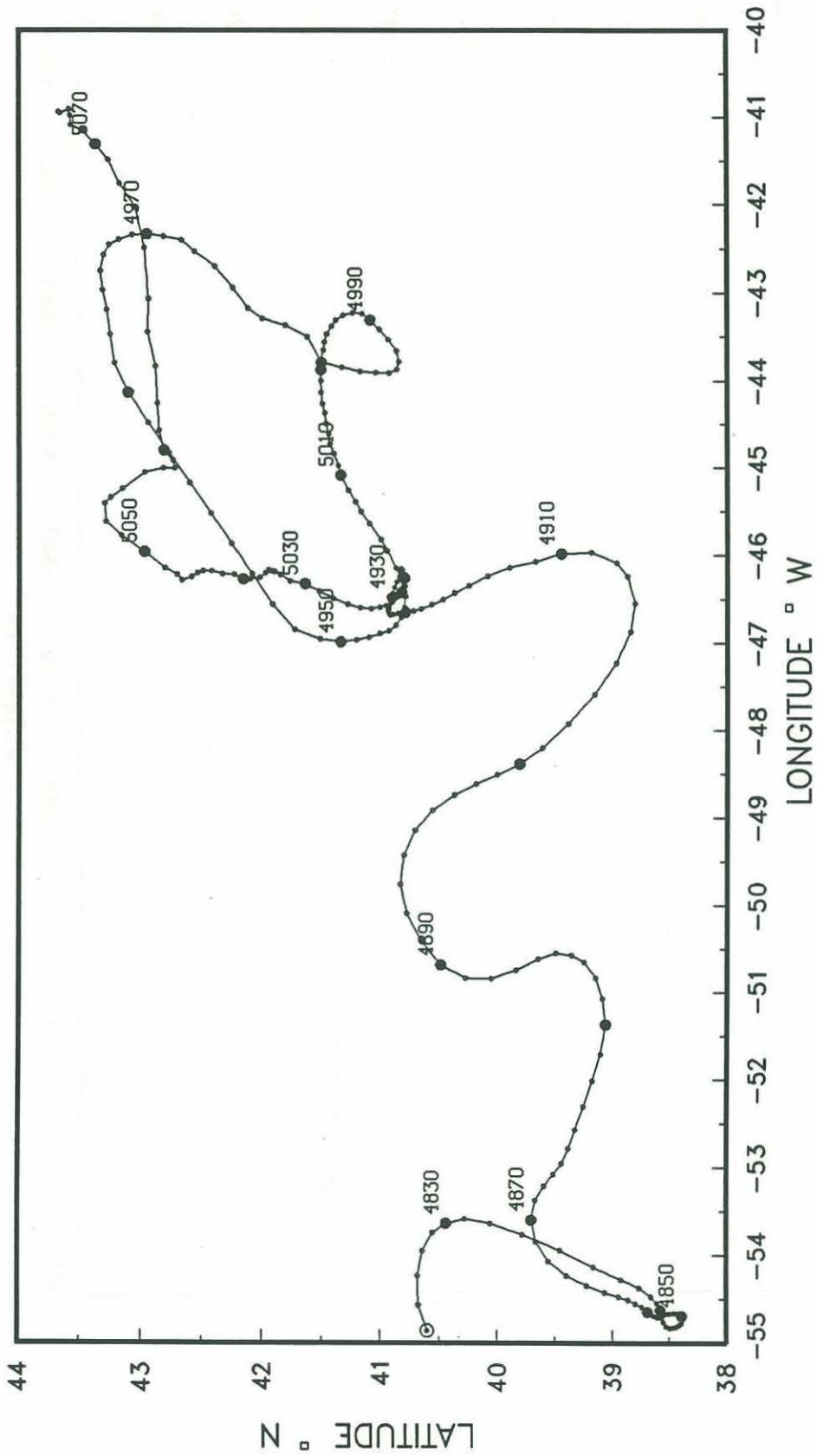


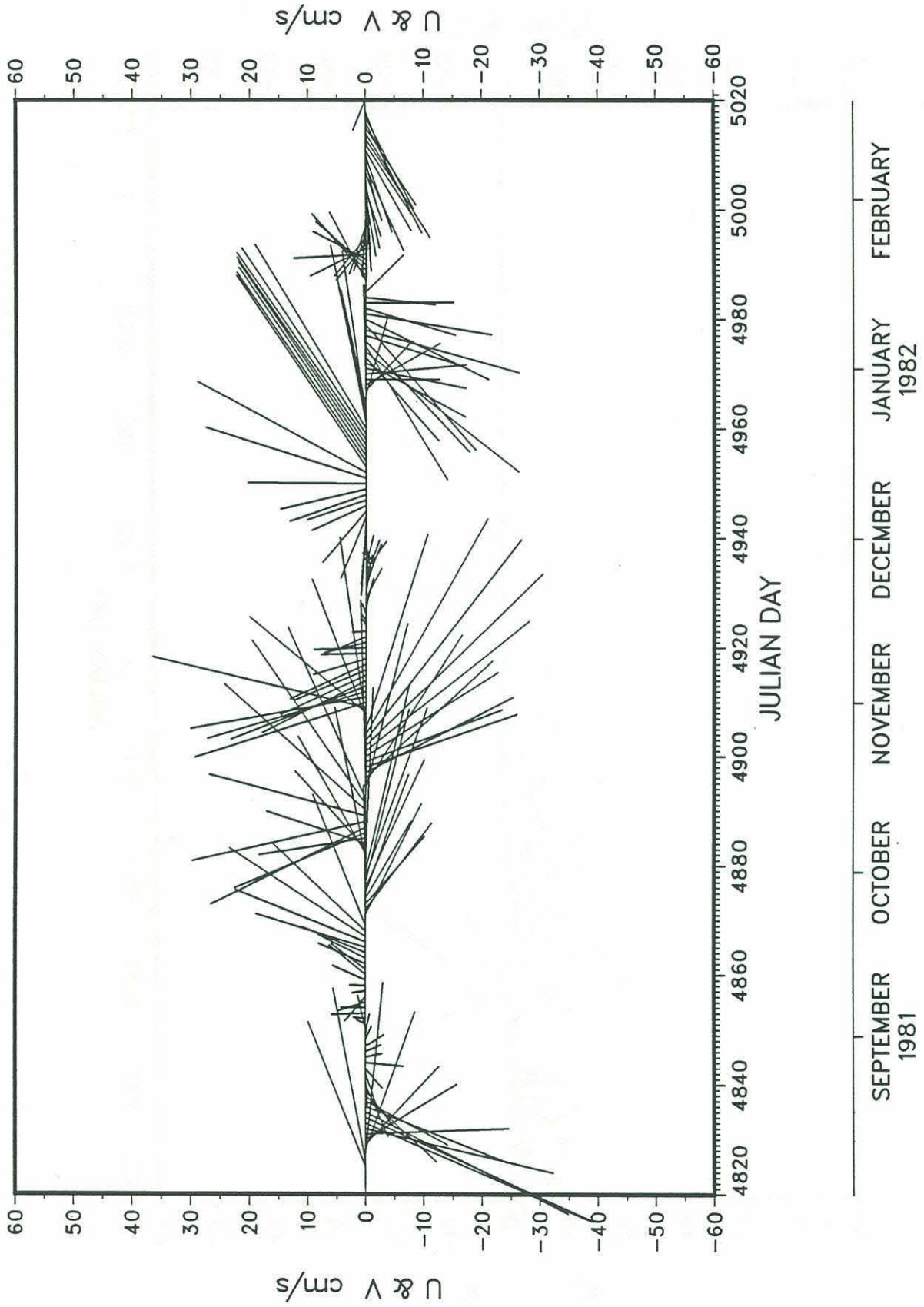




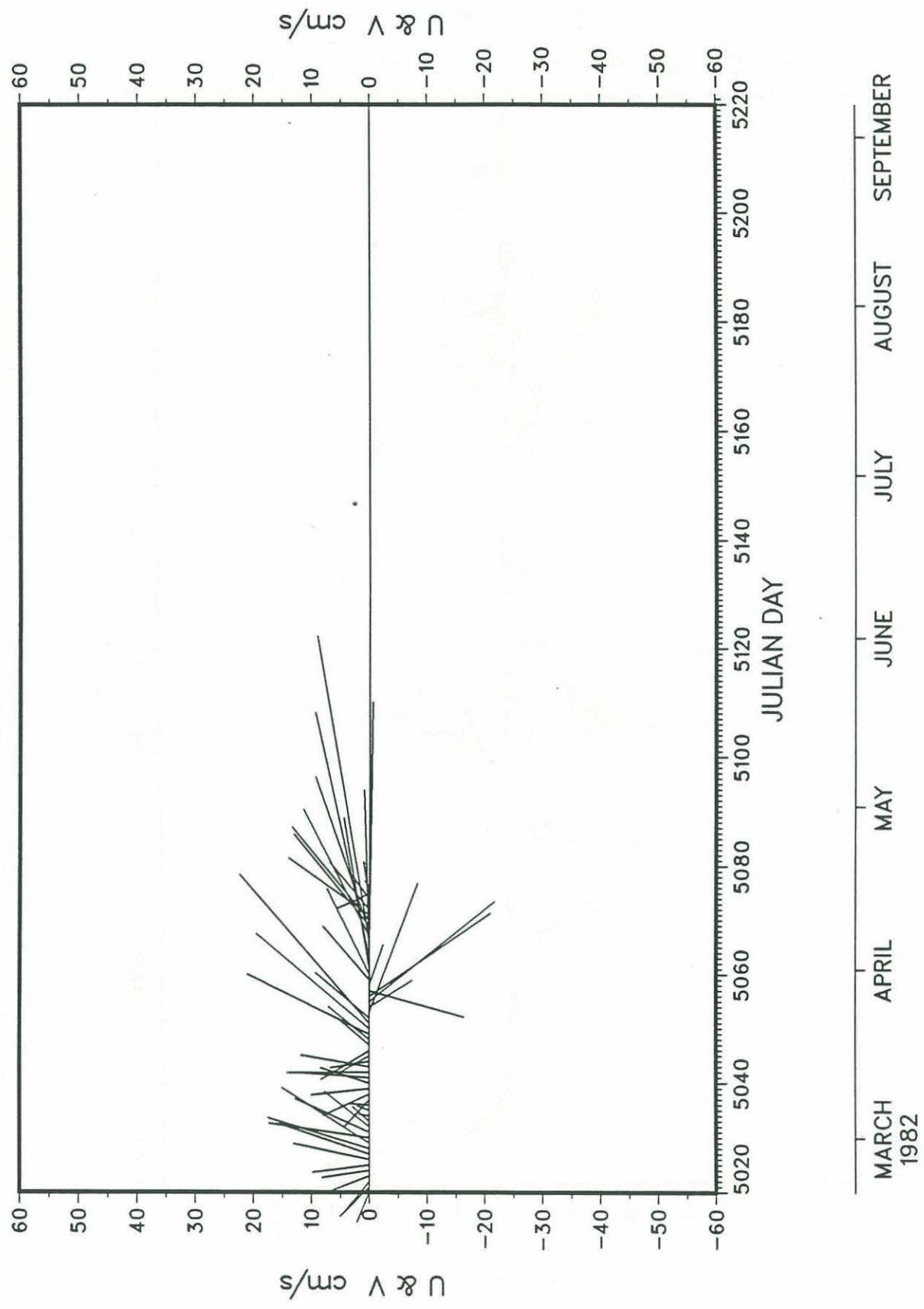


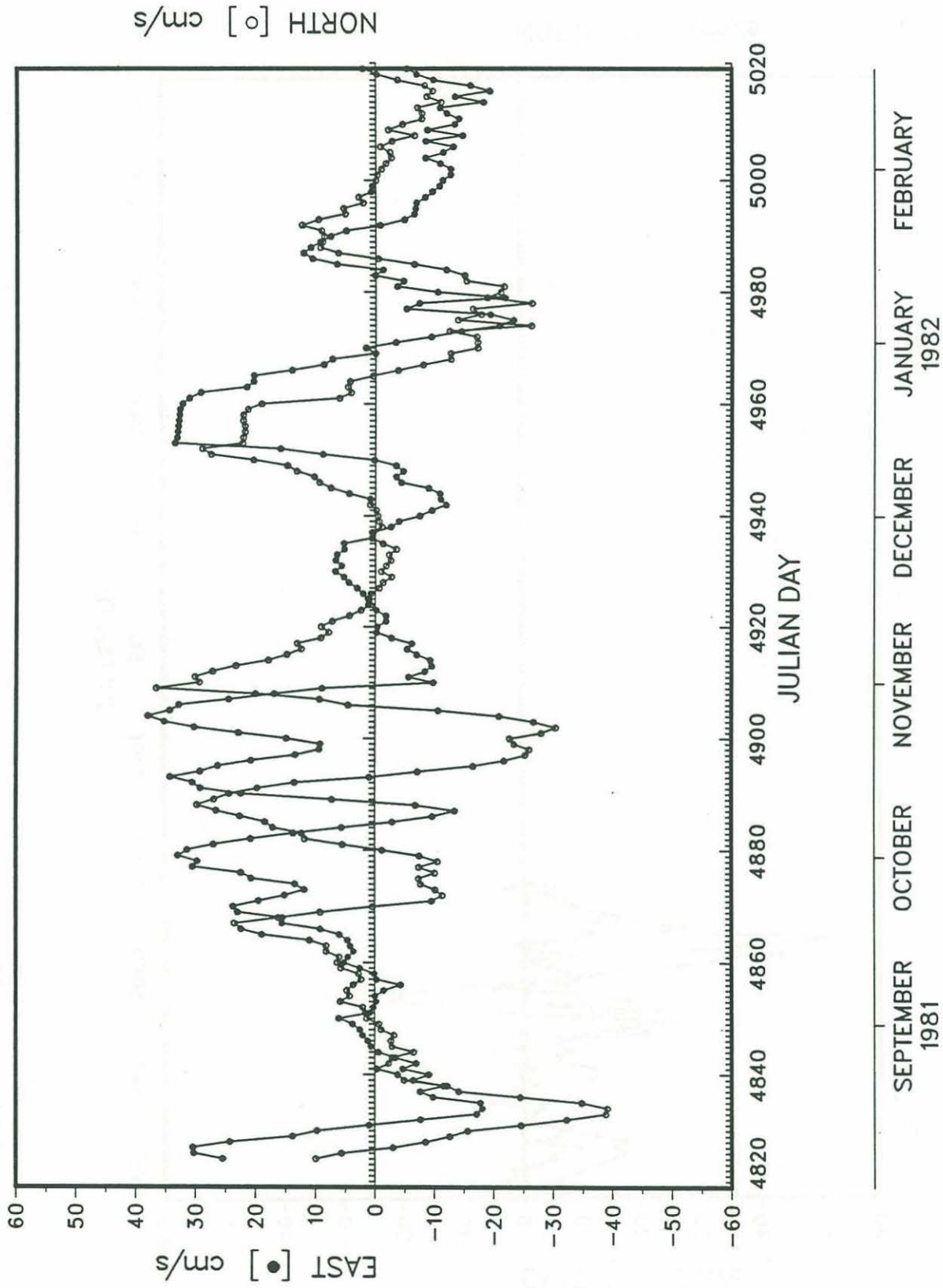
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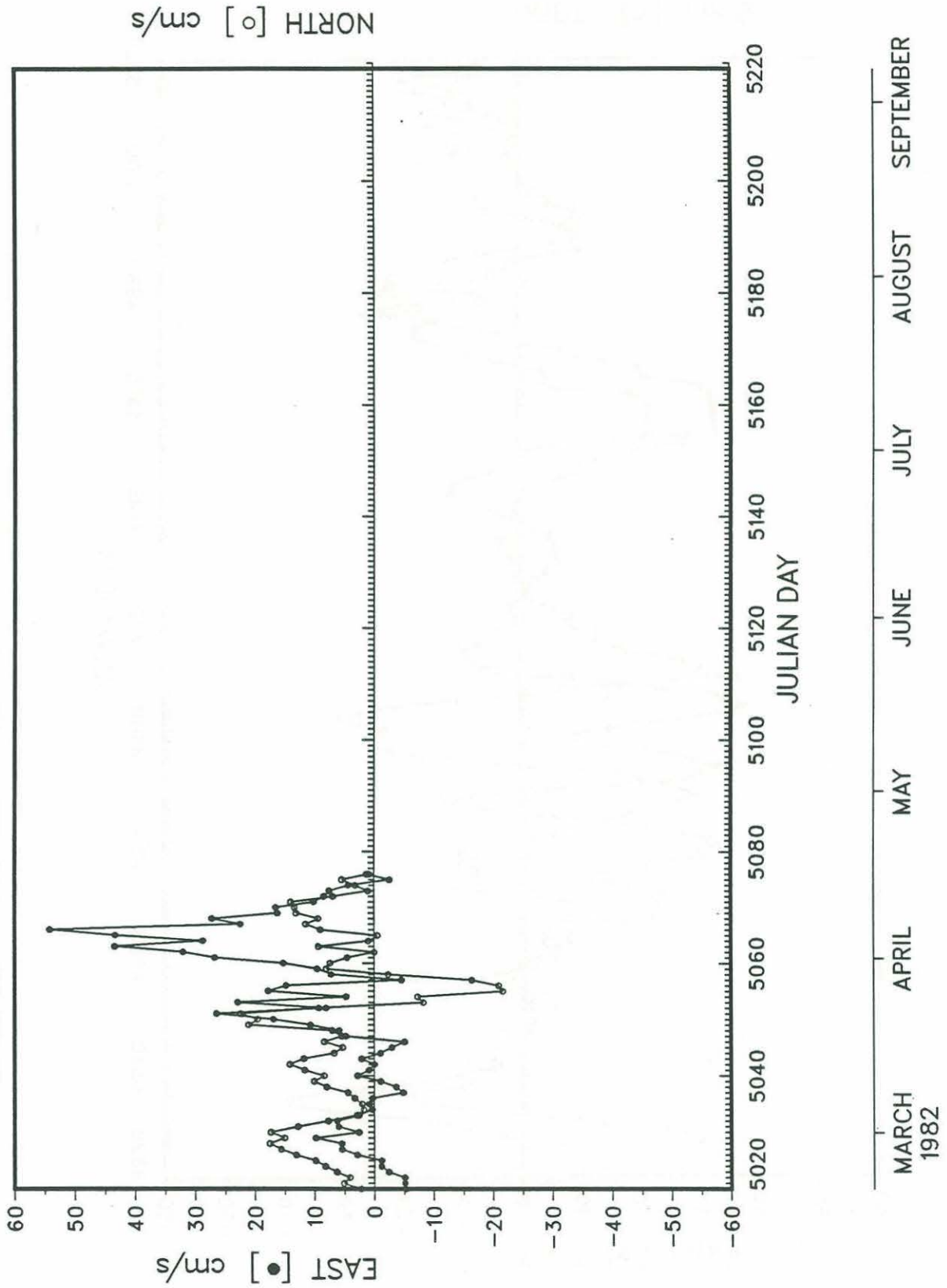


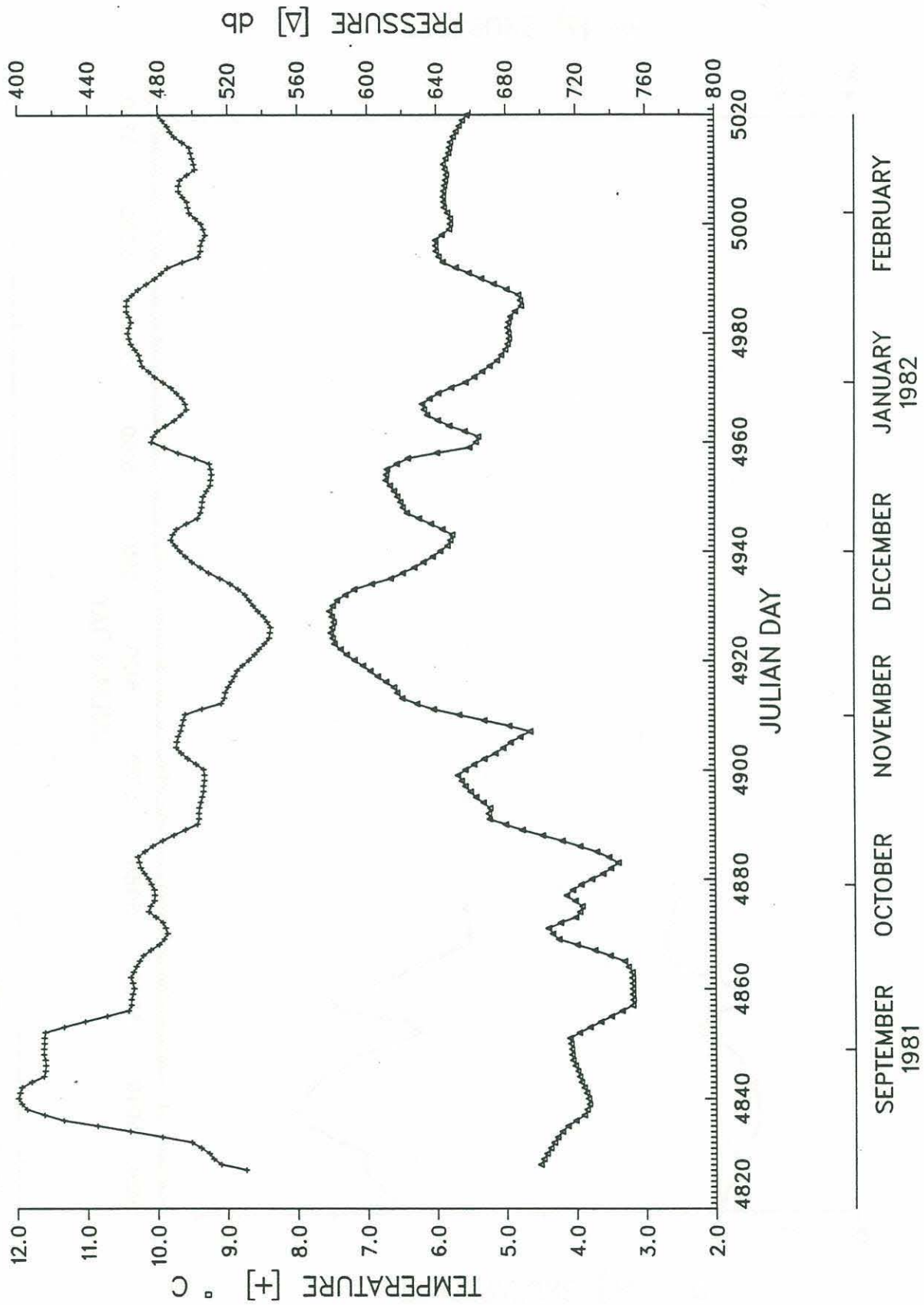
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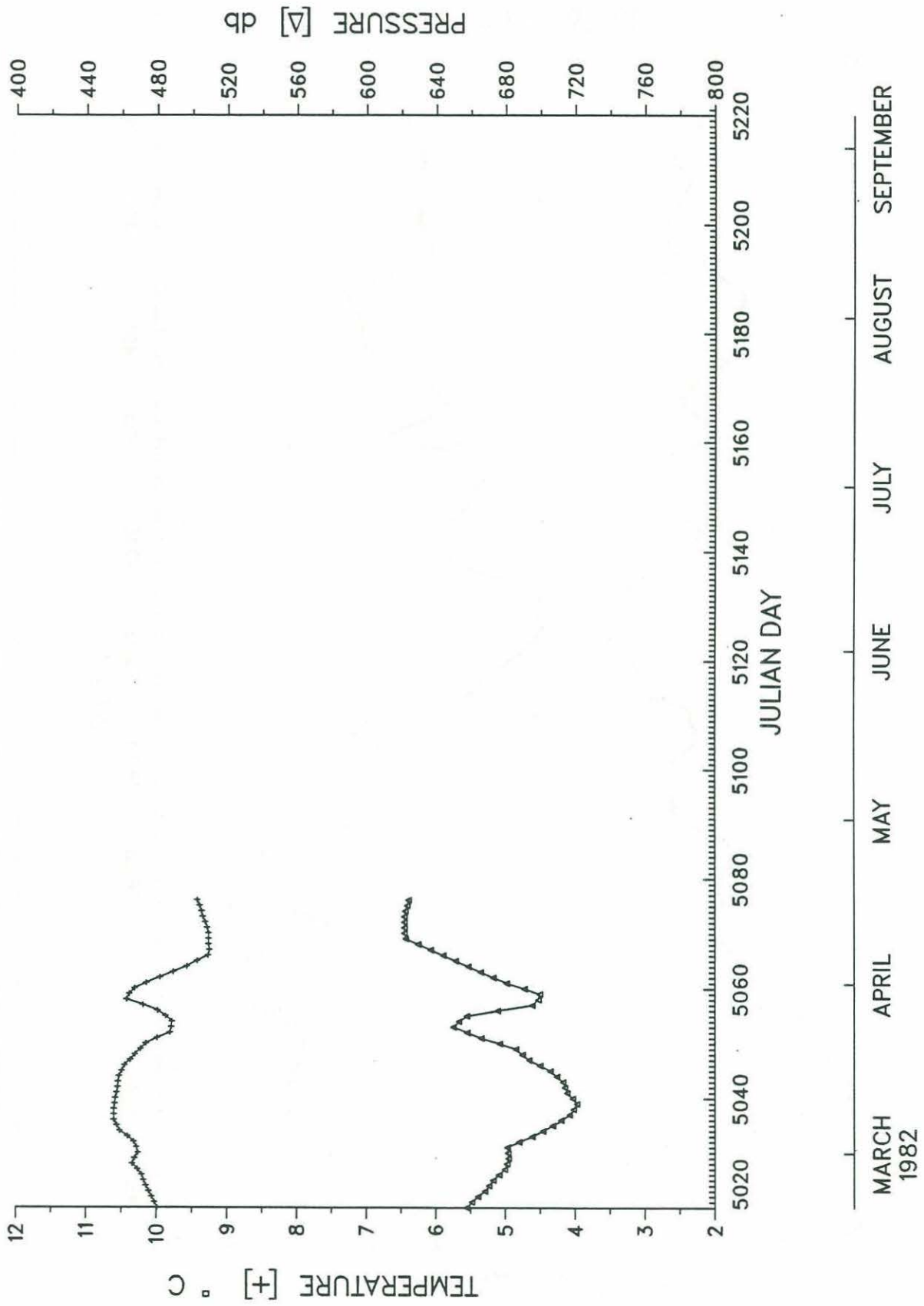


GUSREX 115A

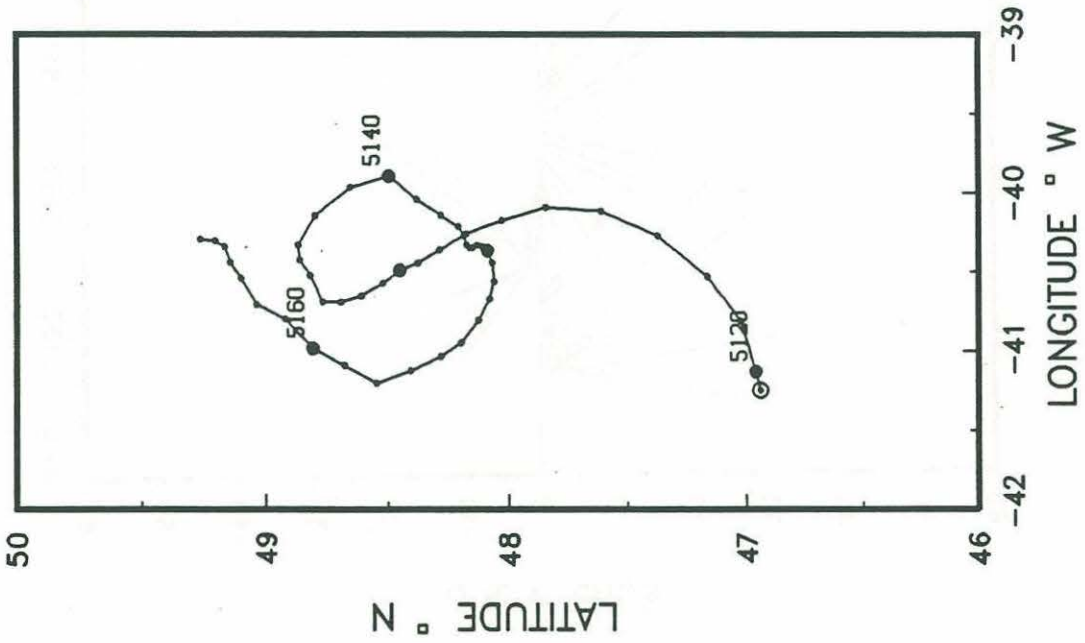




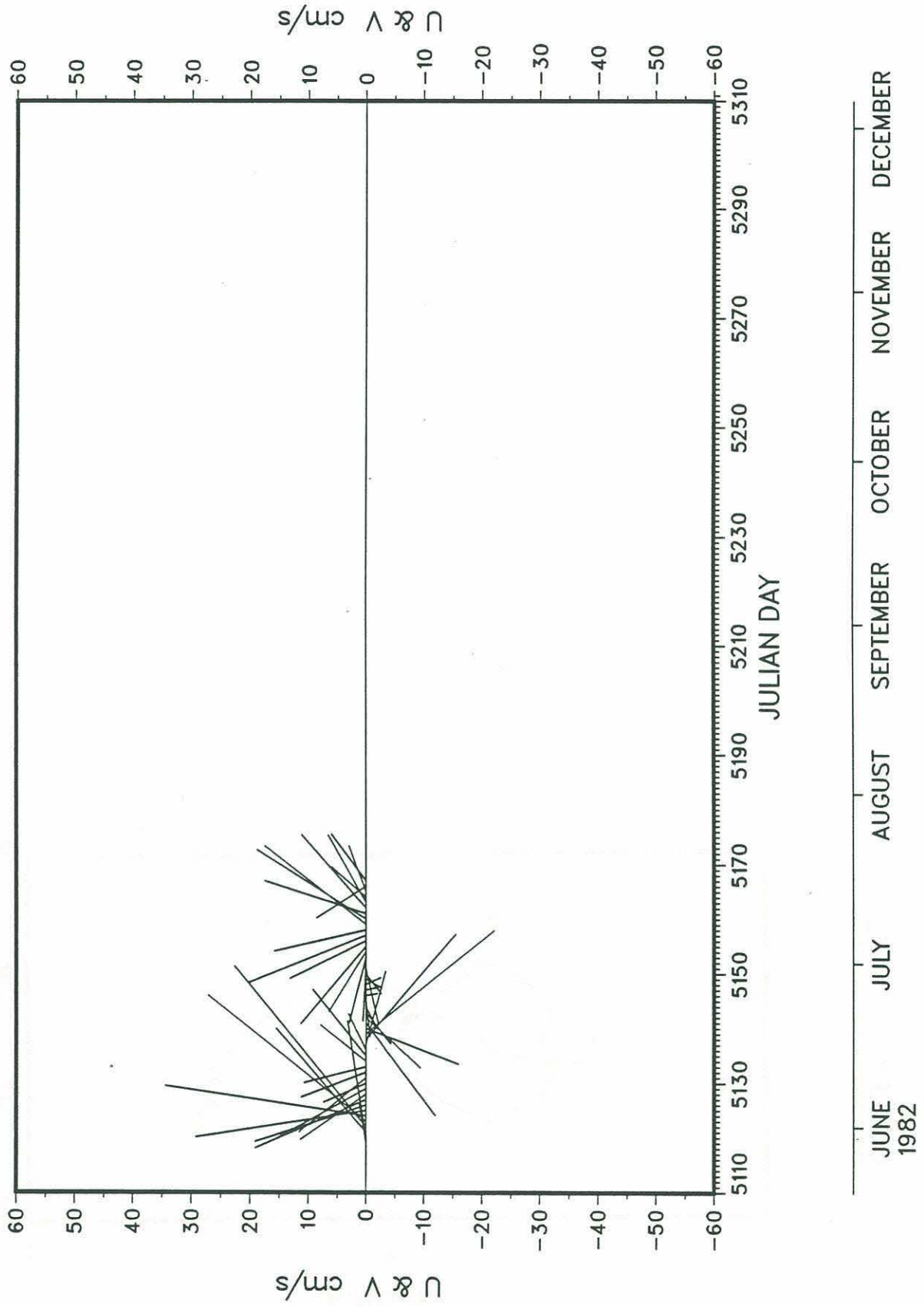
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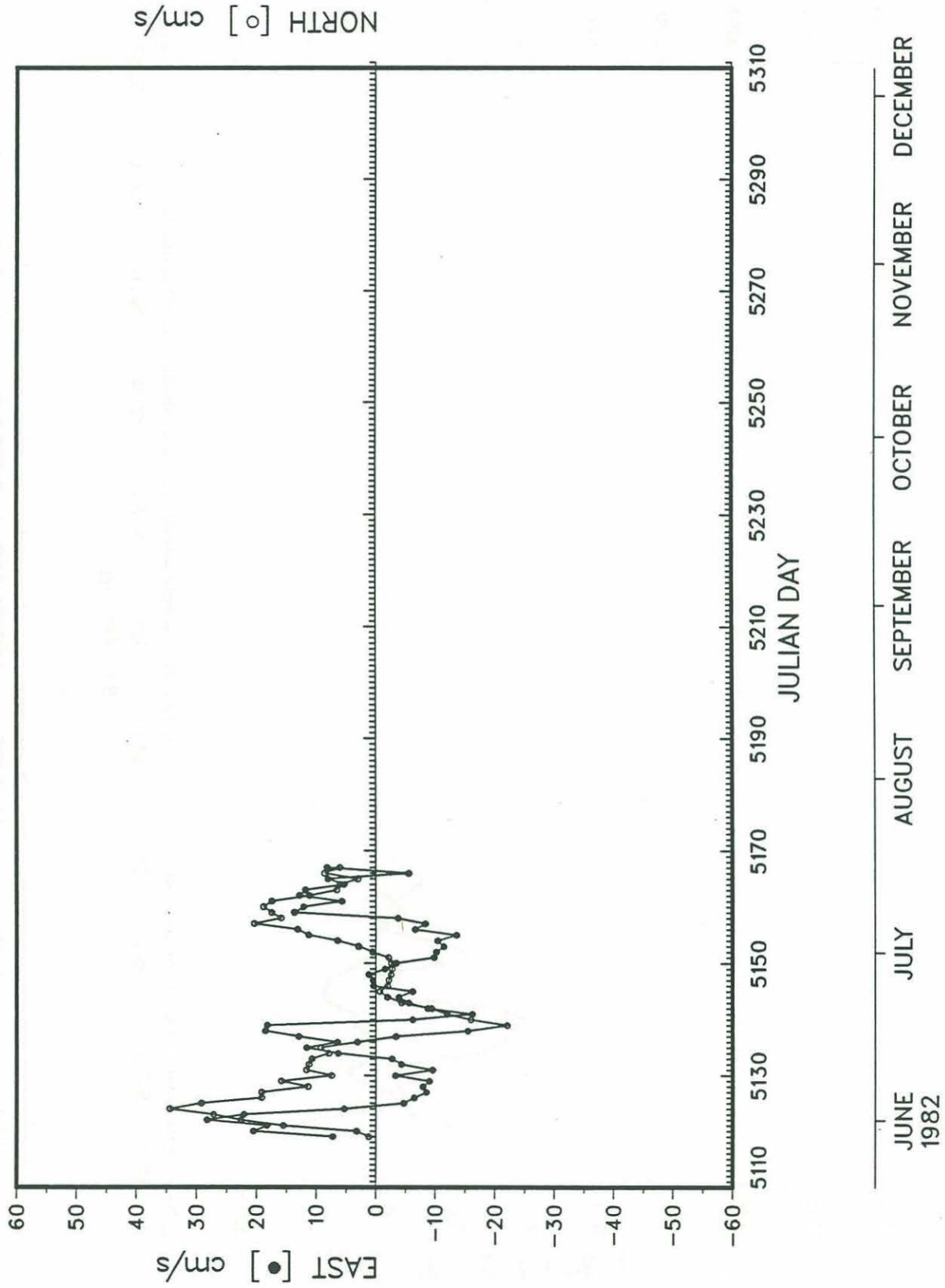


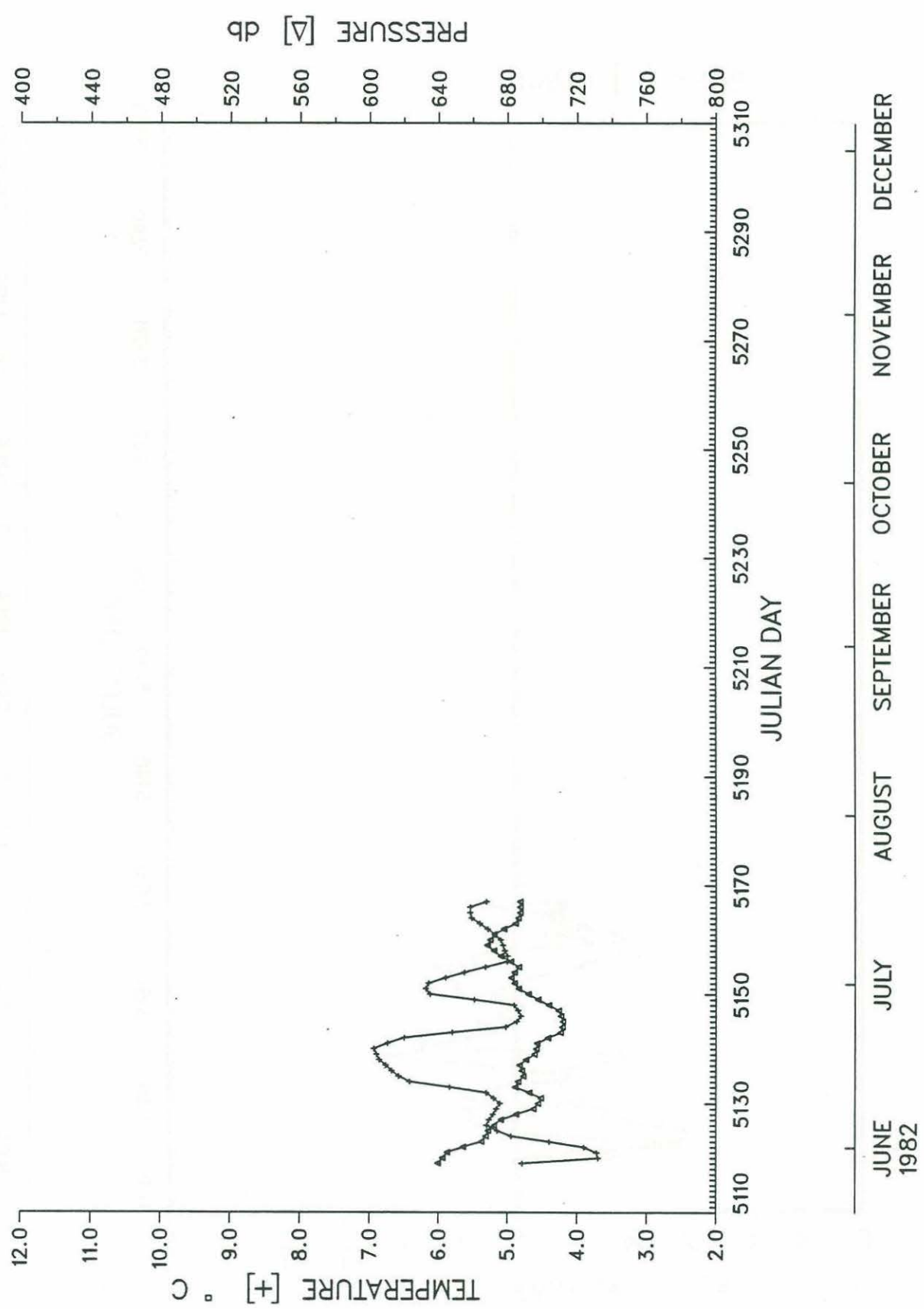
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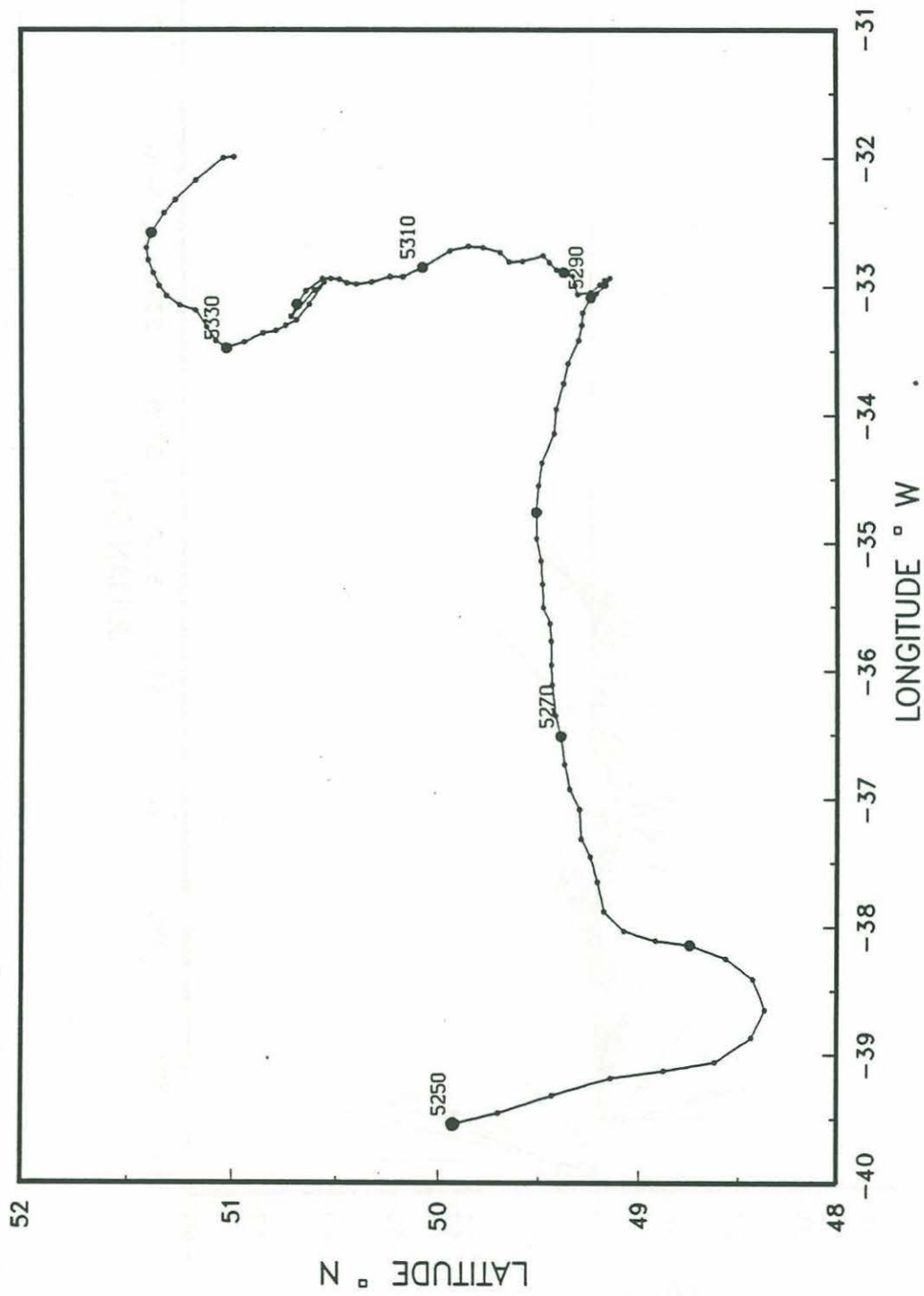


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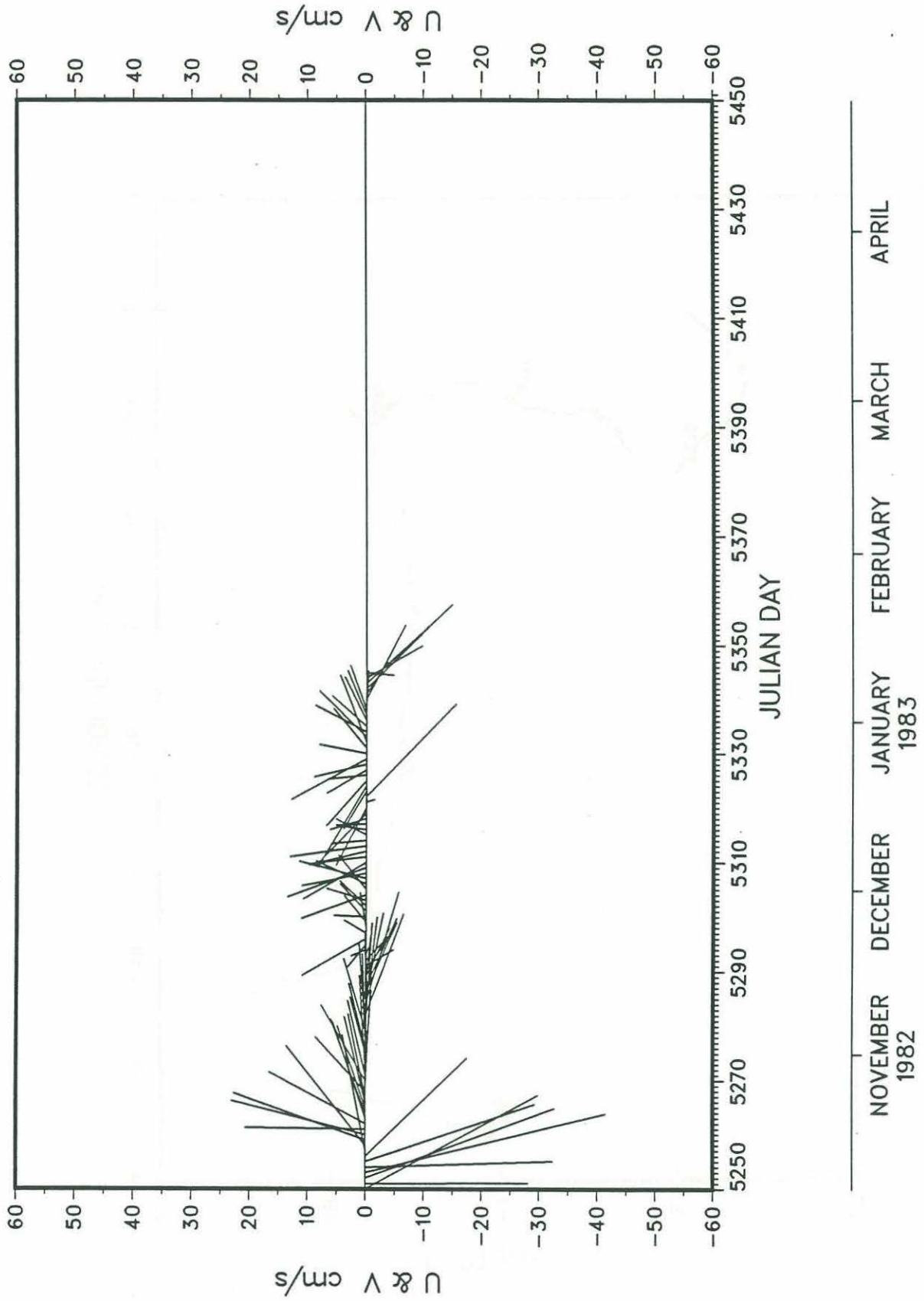


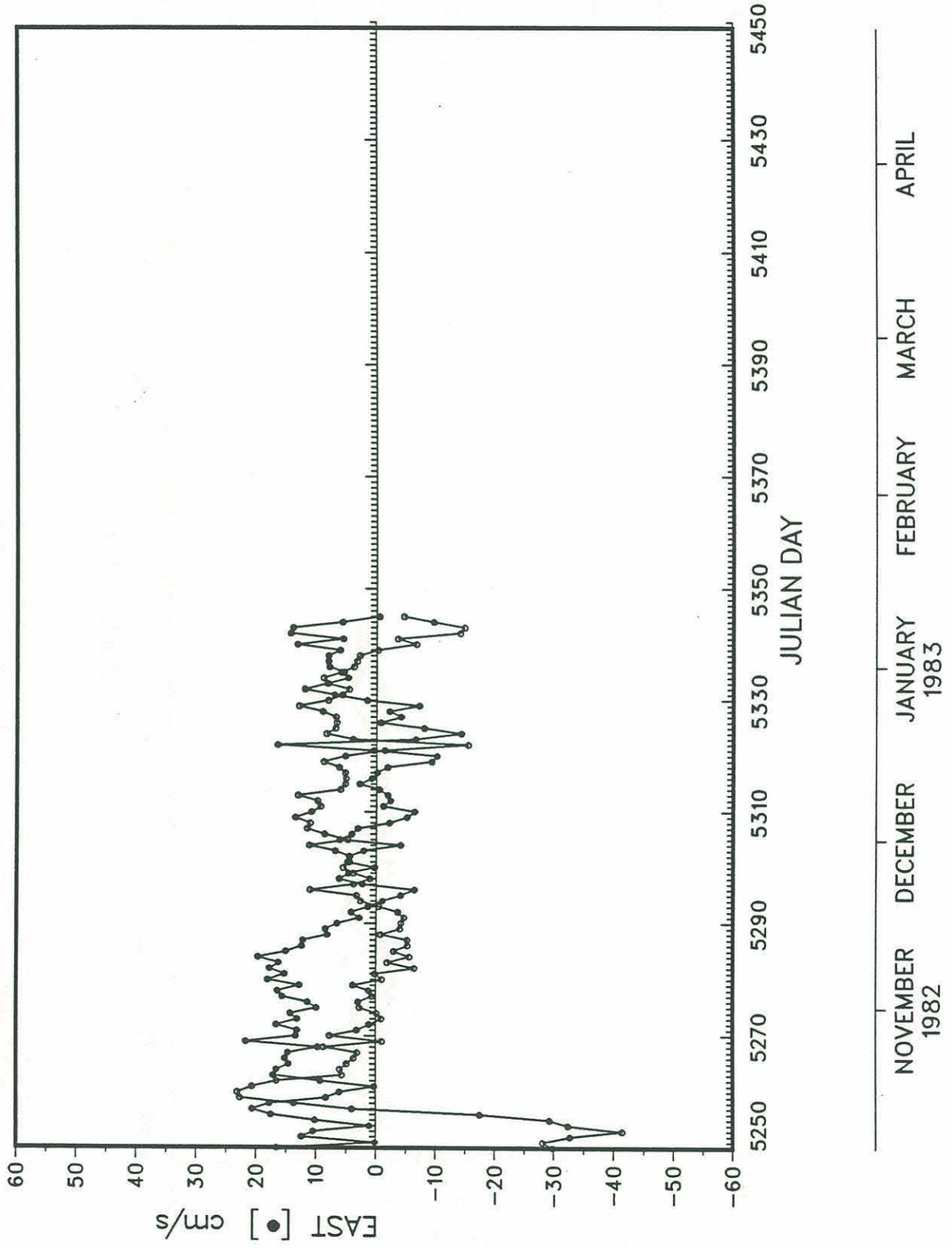


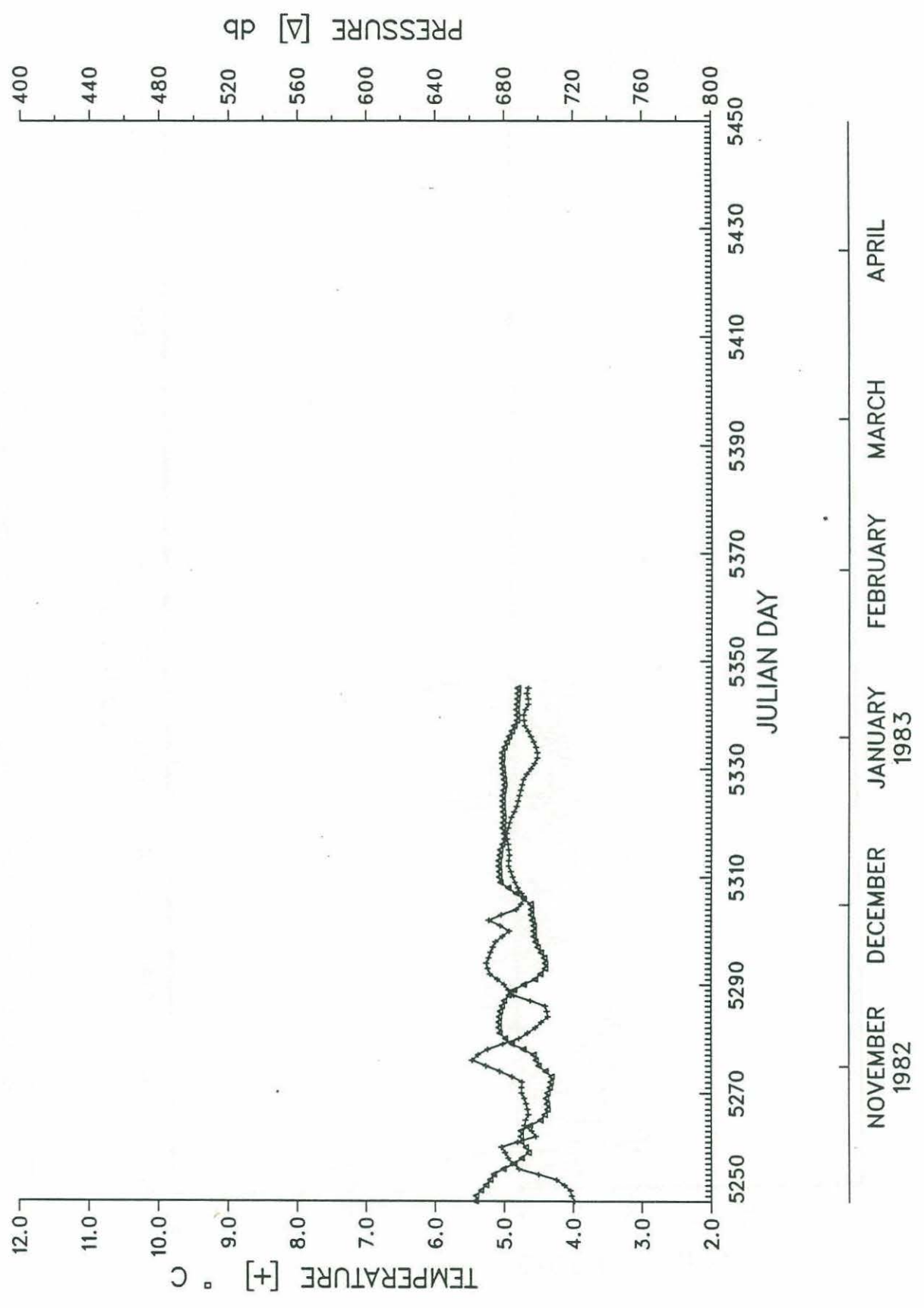




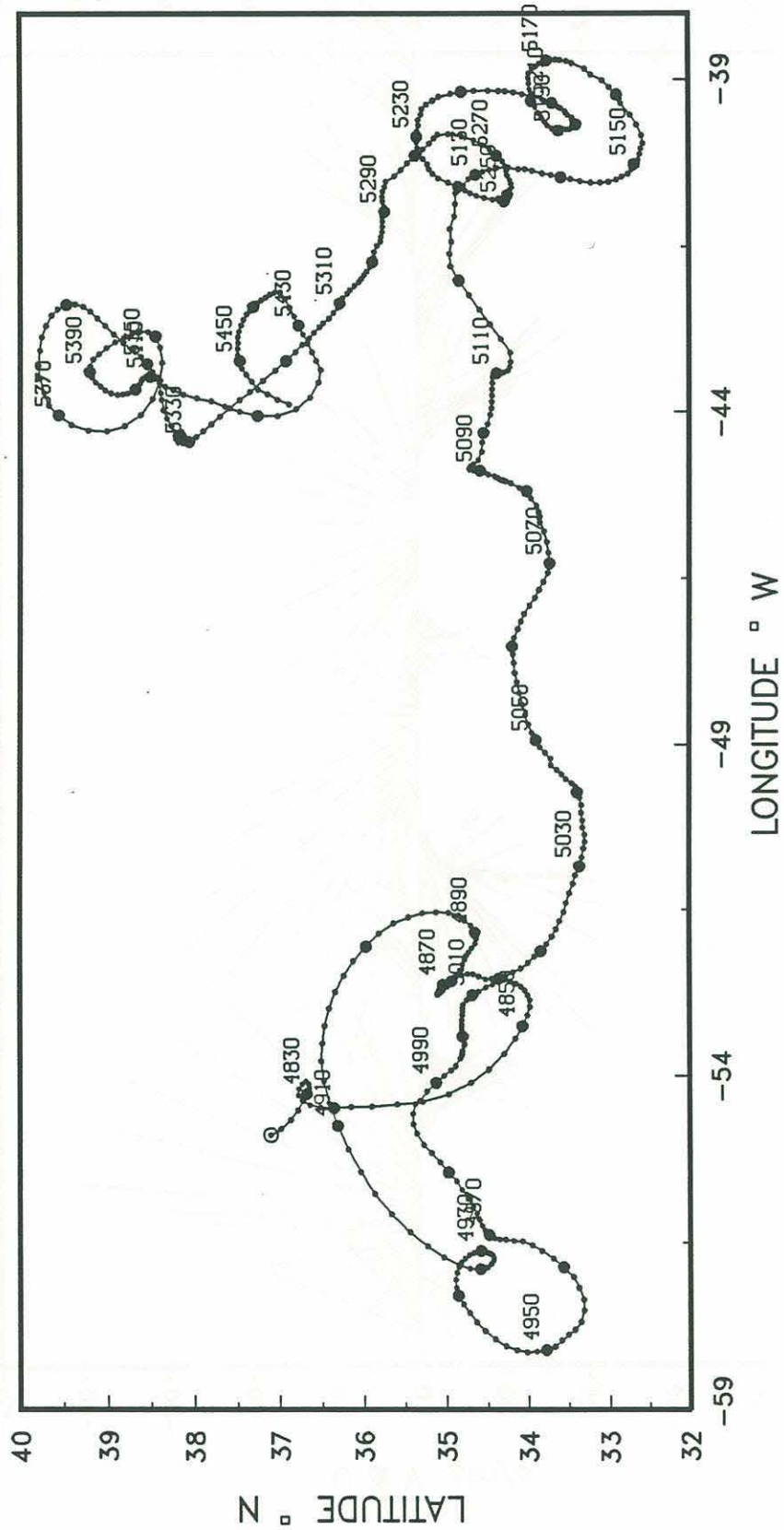
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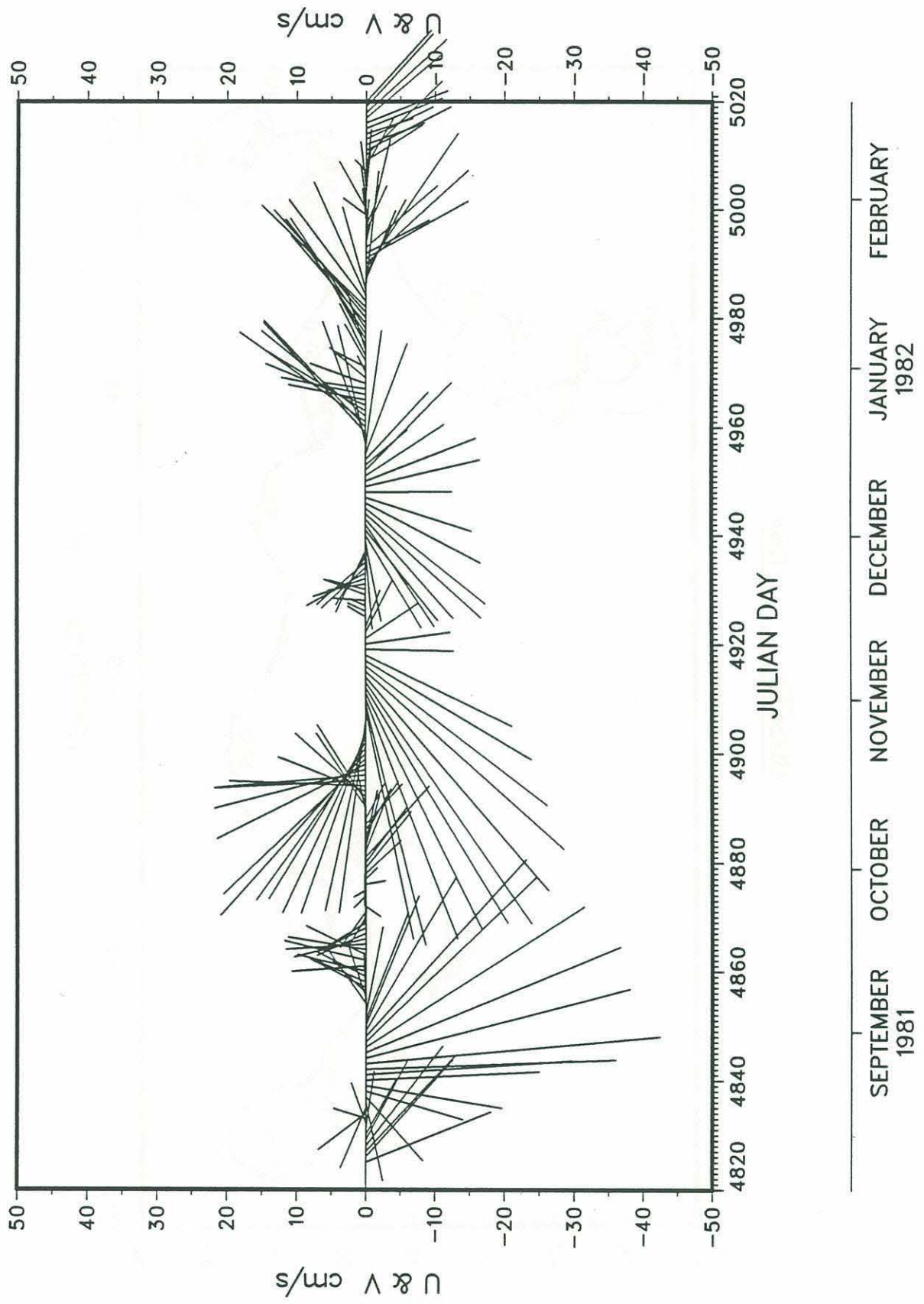




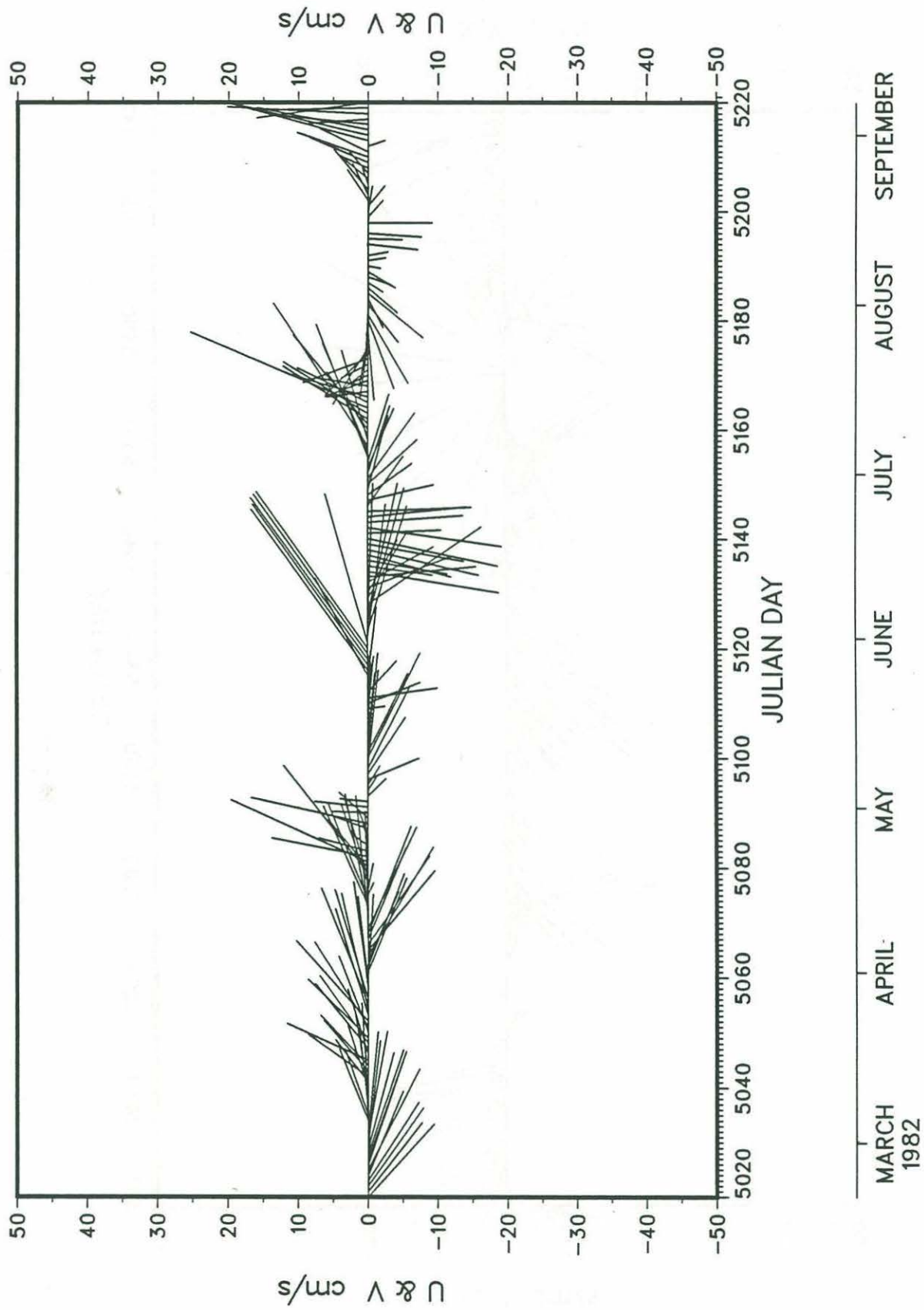


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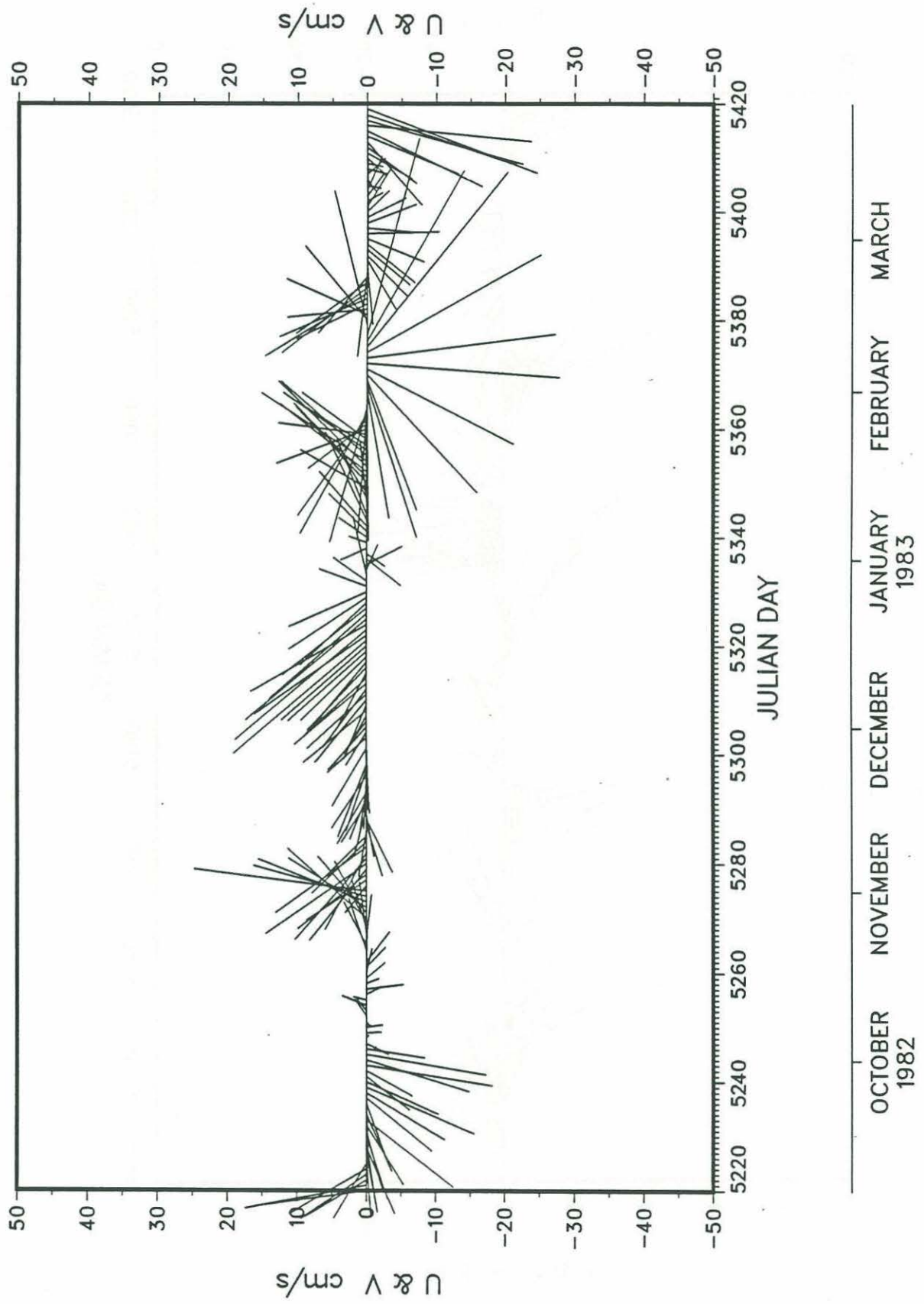


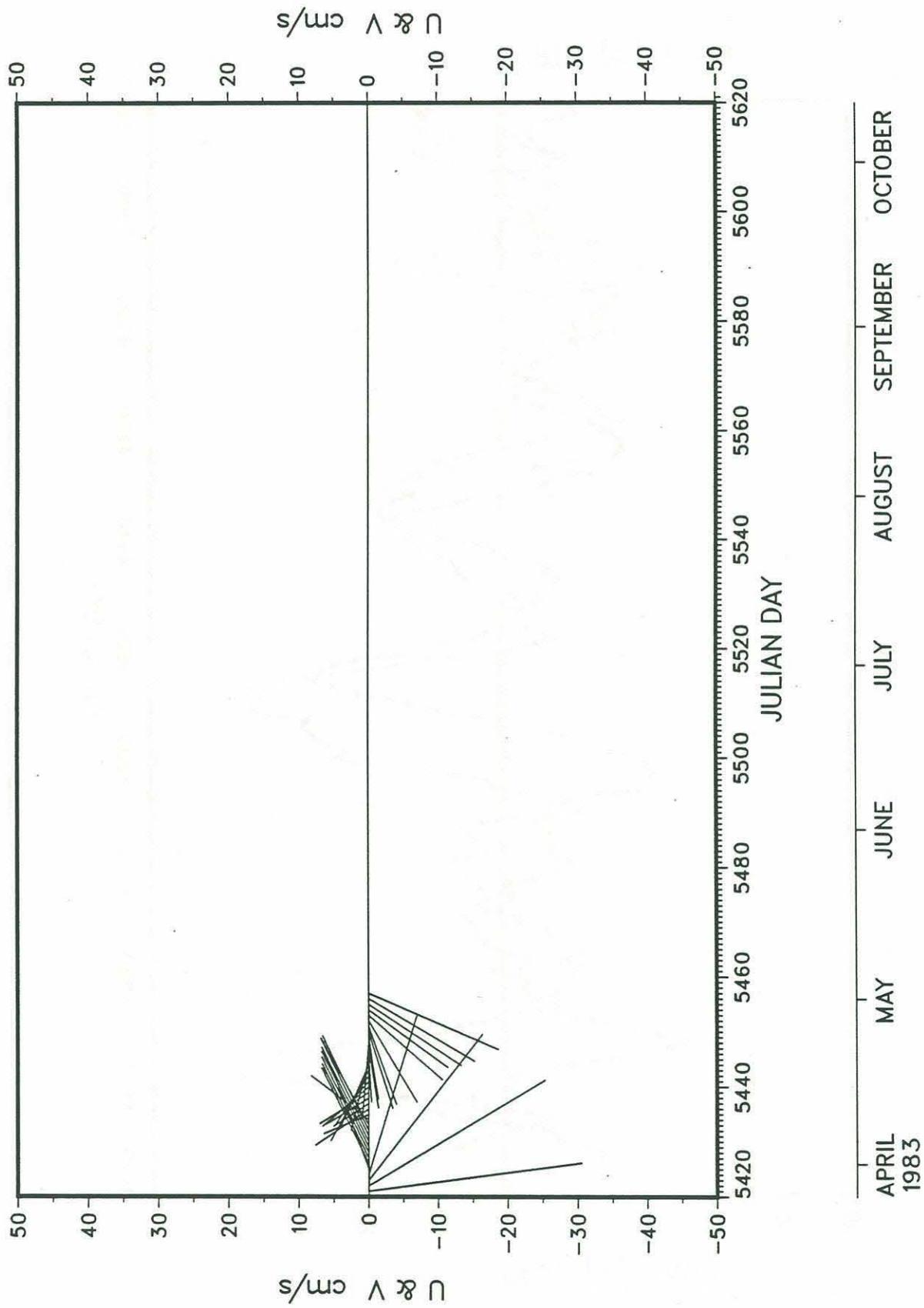


SEPTEMBER 1981 OCTOBER NOVEMBER DECEMBER JANUARY 1982 FEBRUARY

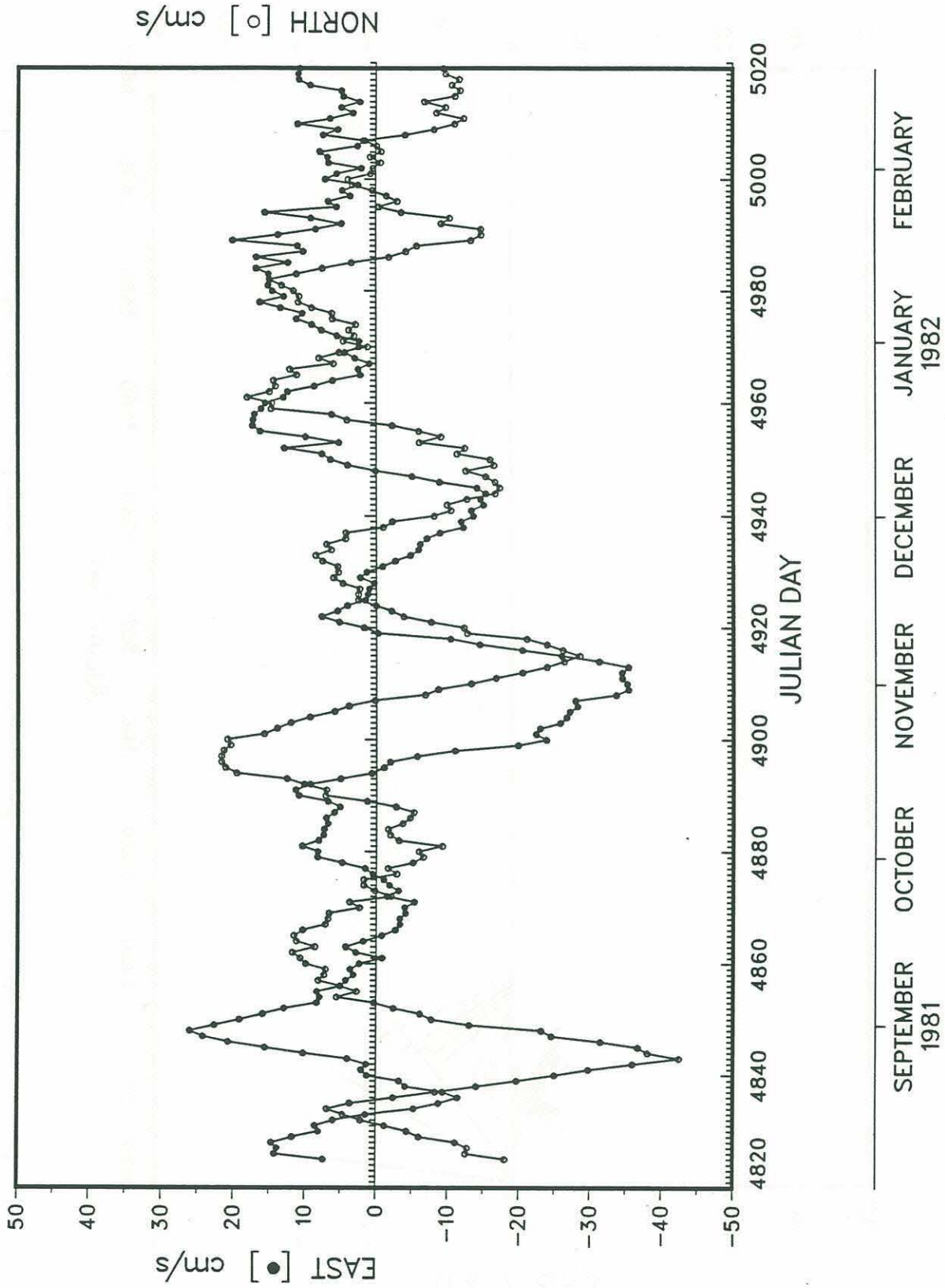


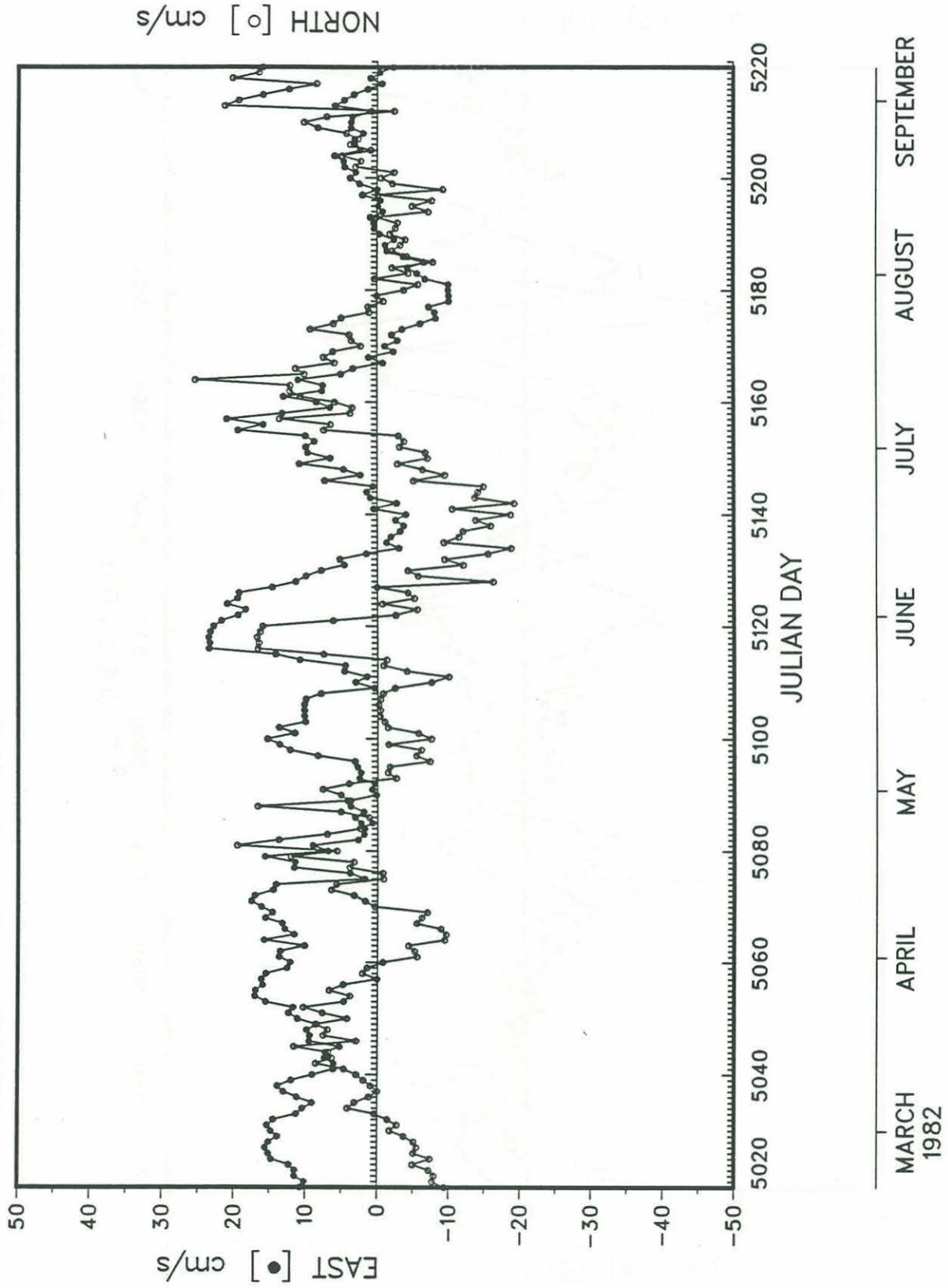
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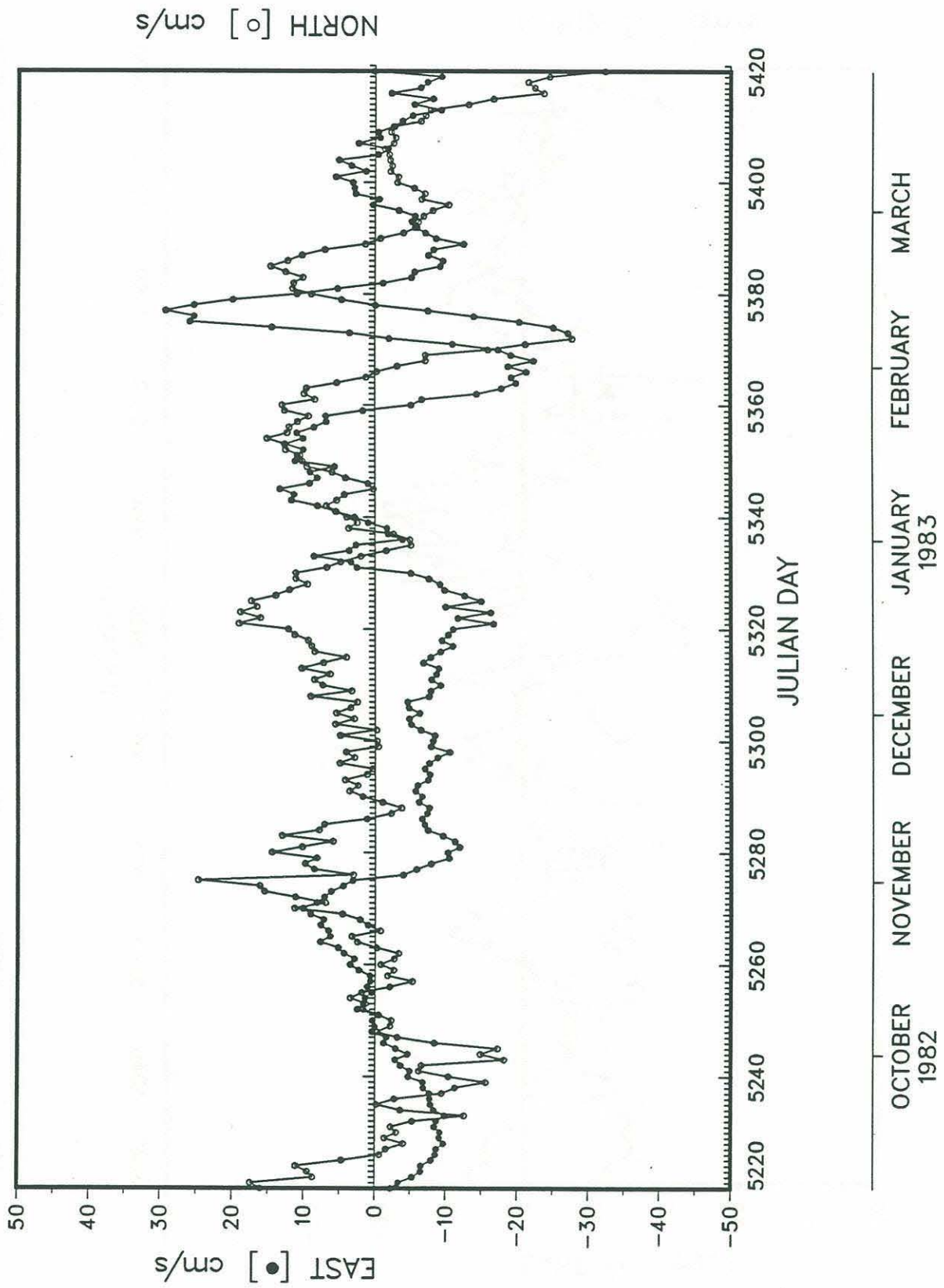


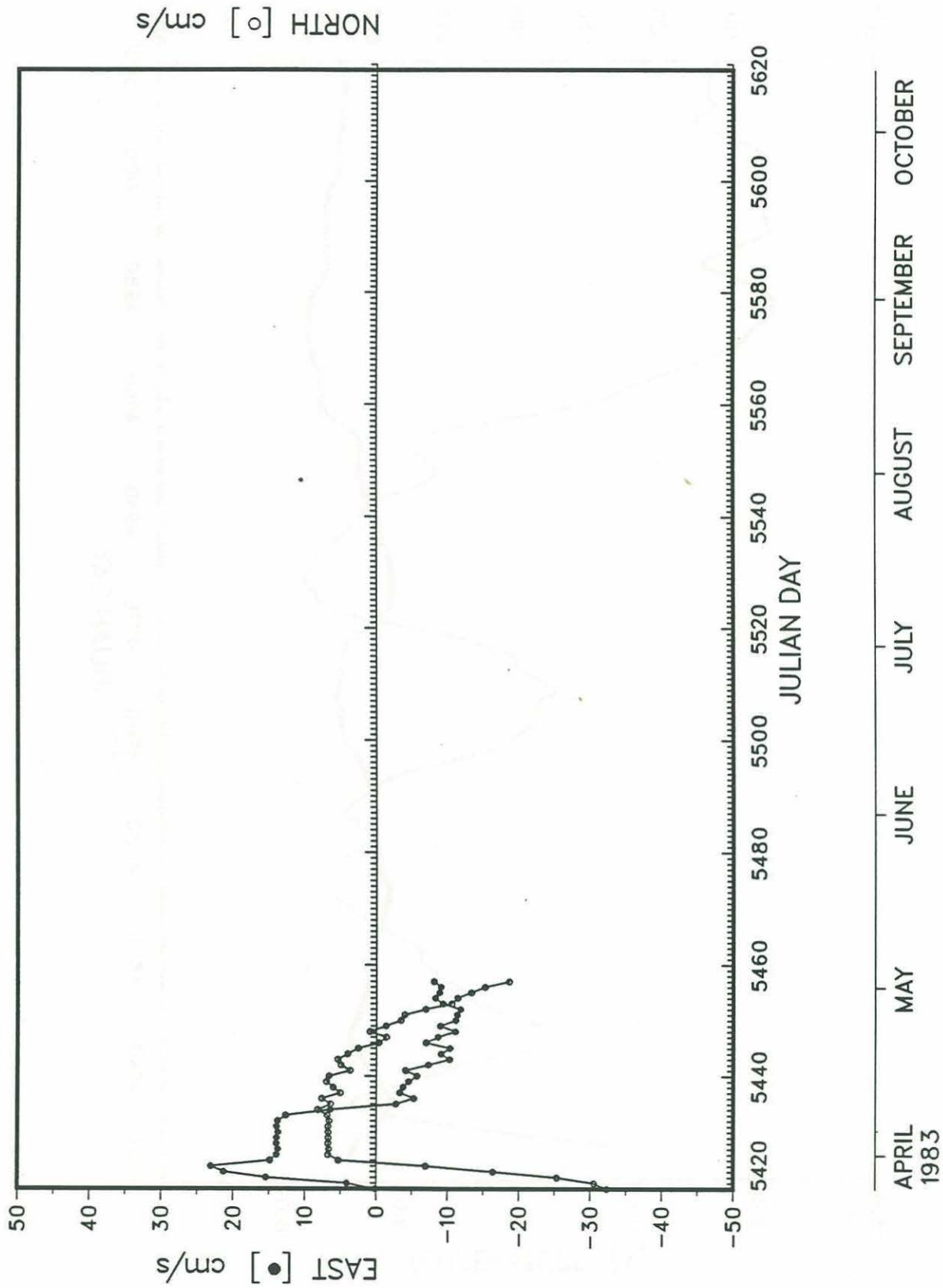


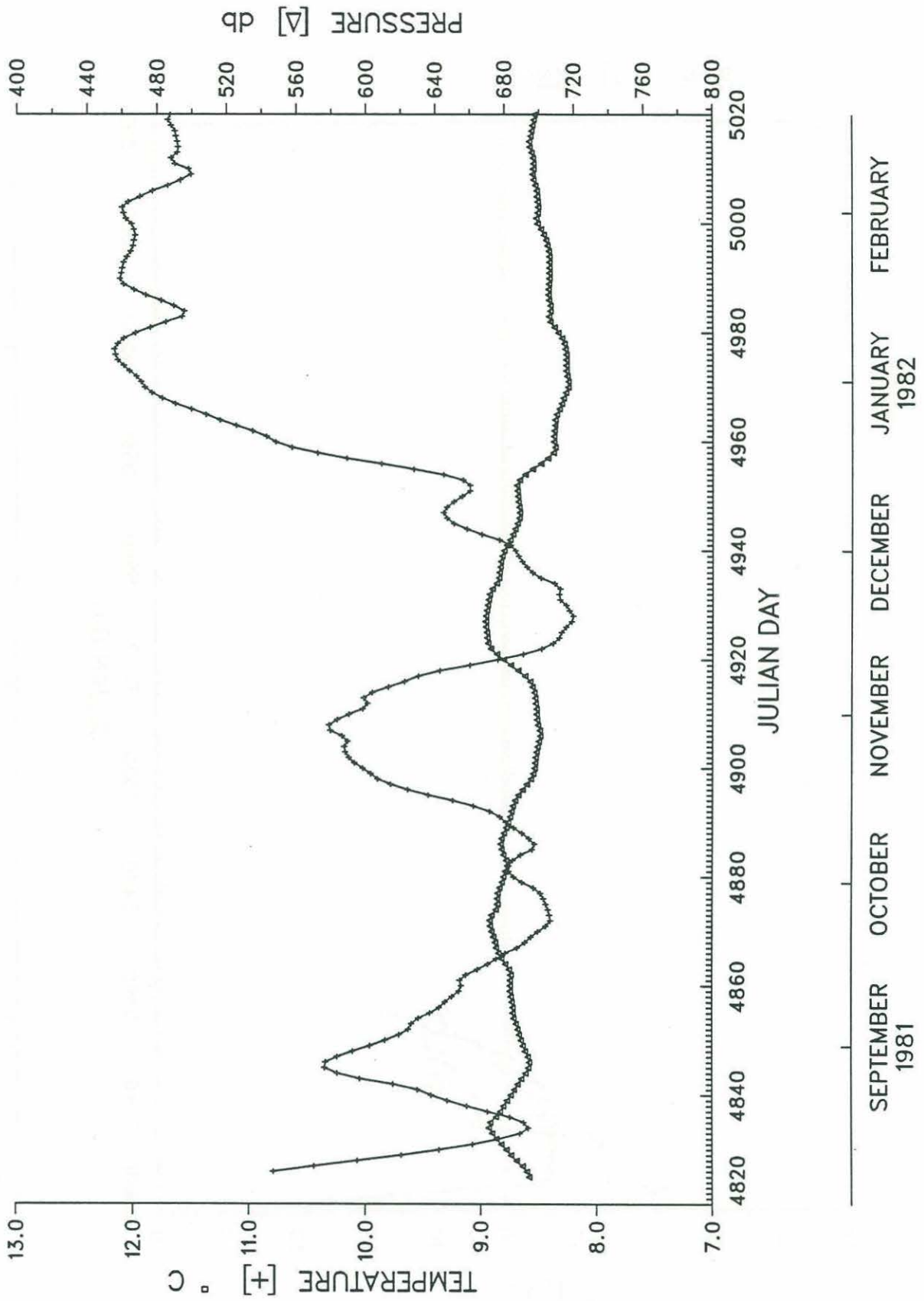
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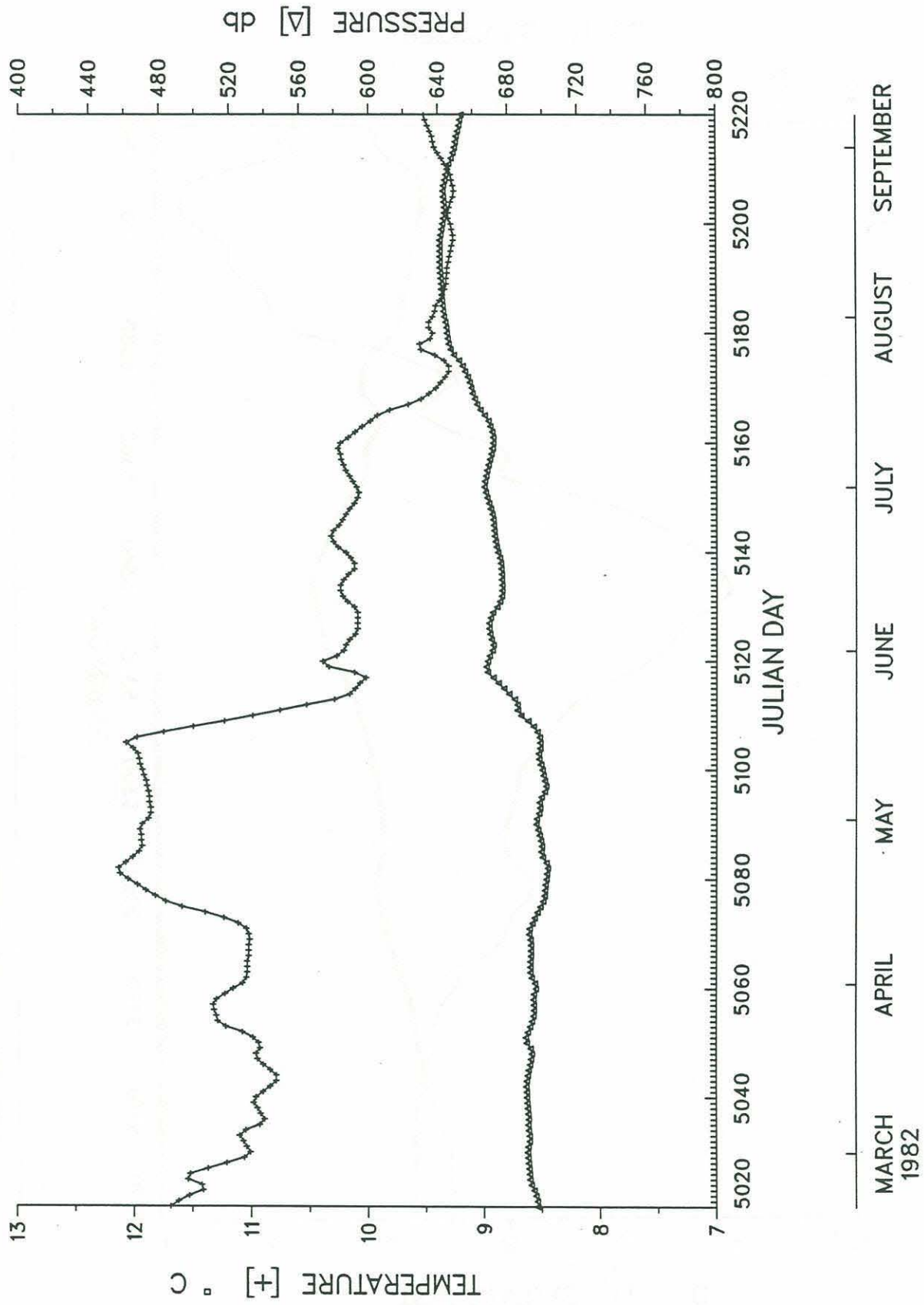


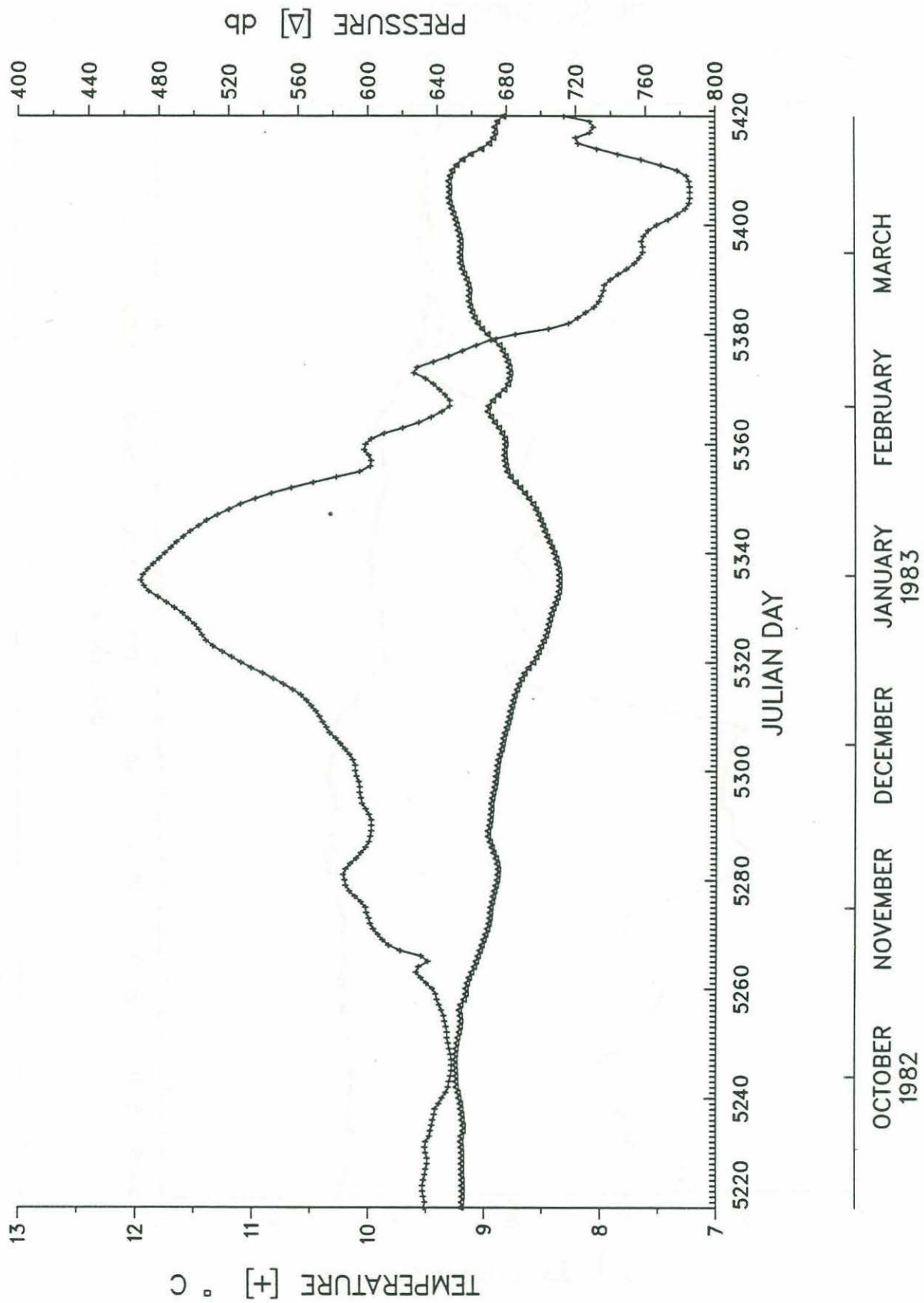


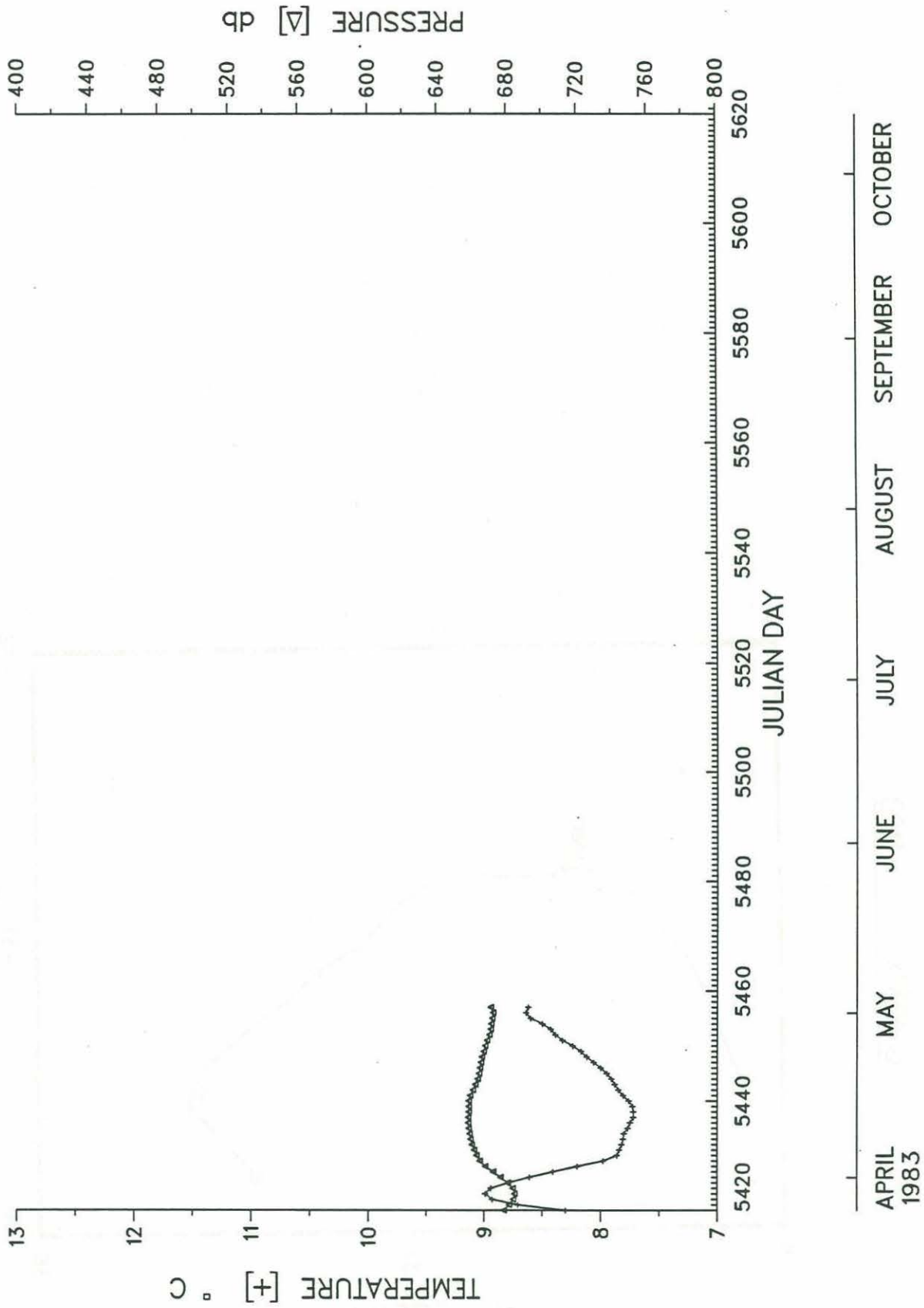




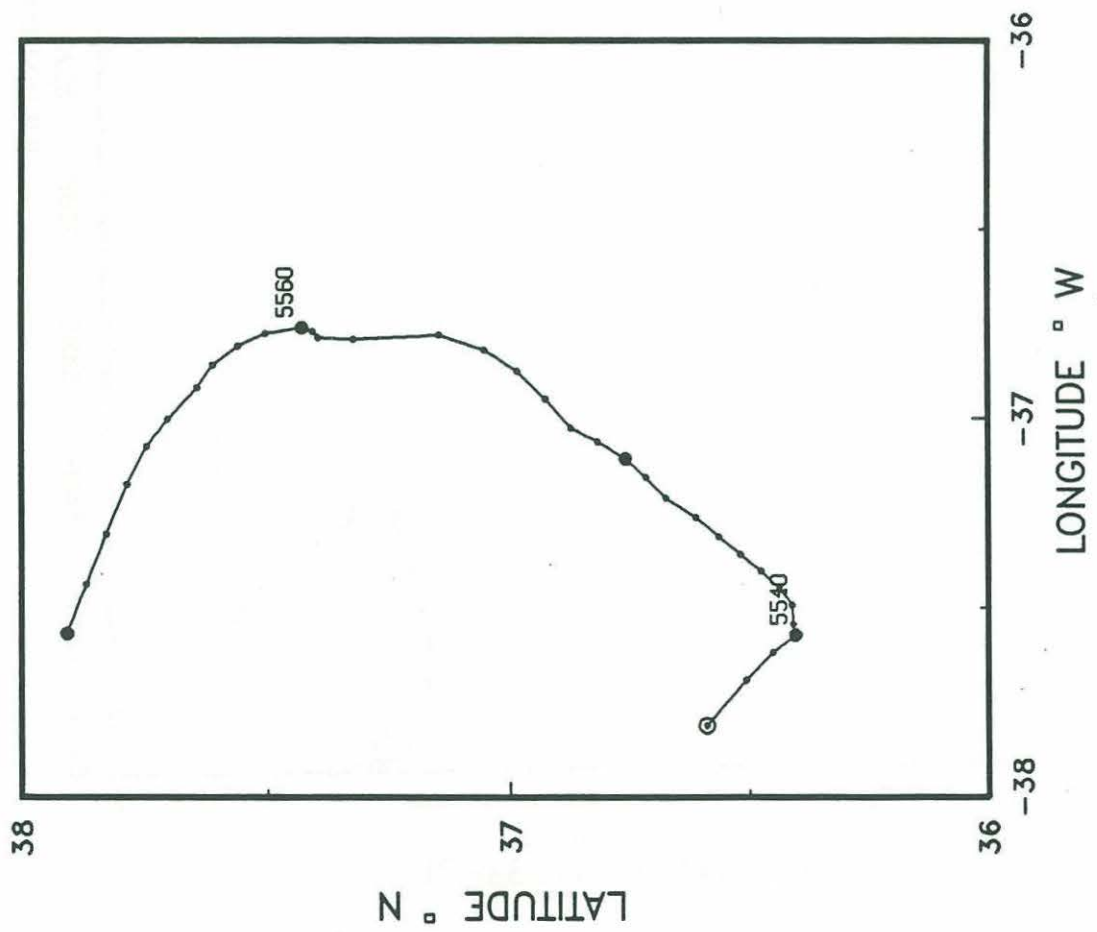


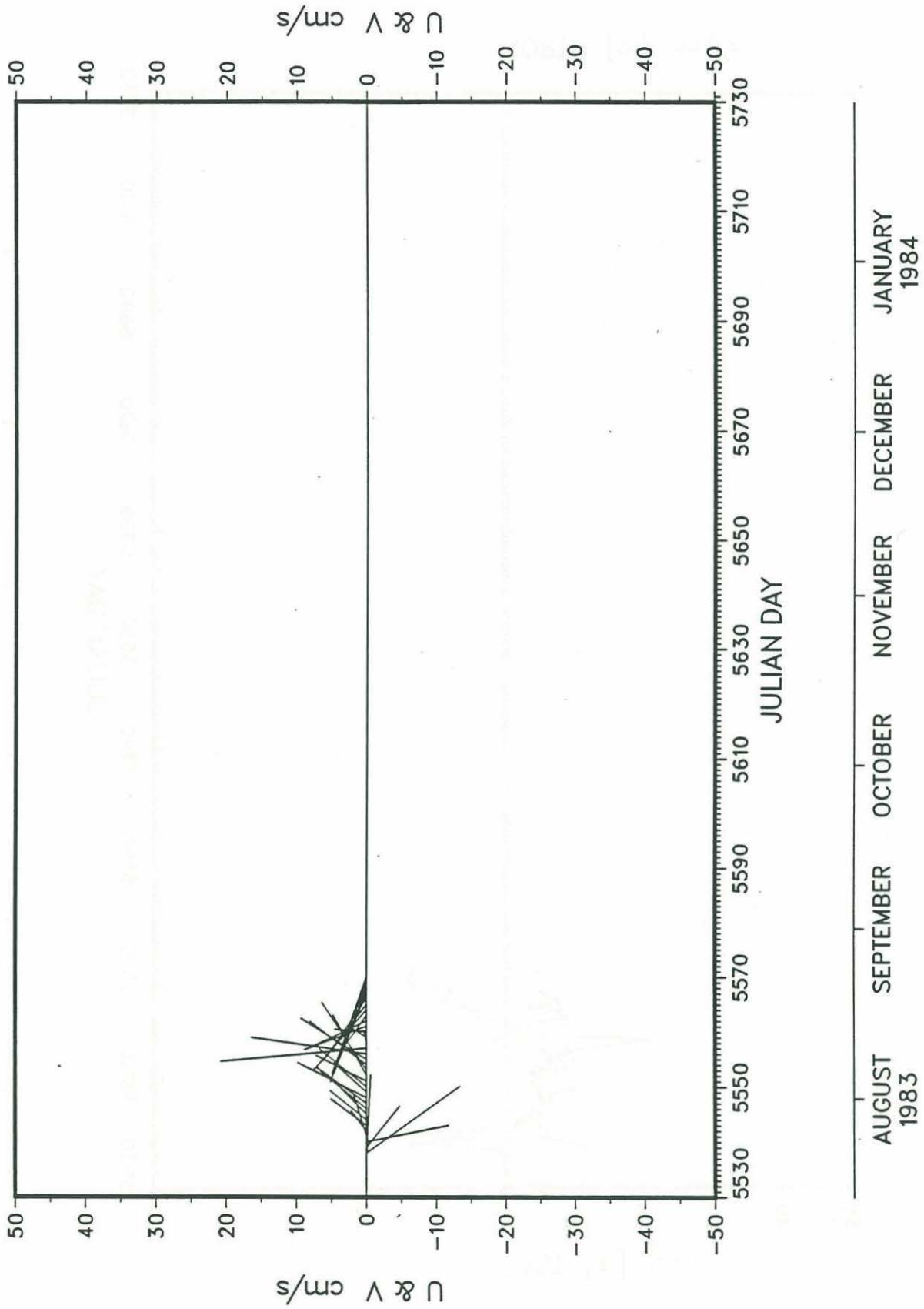




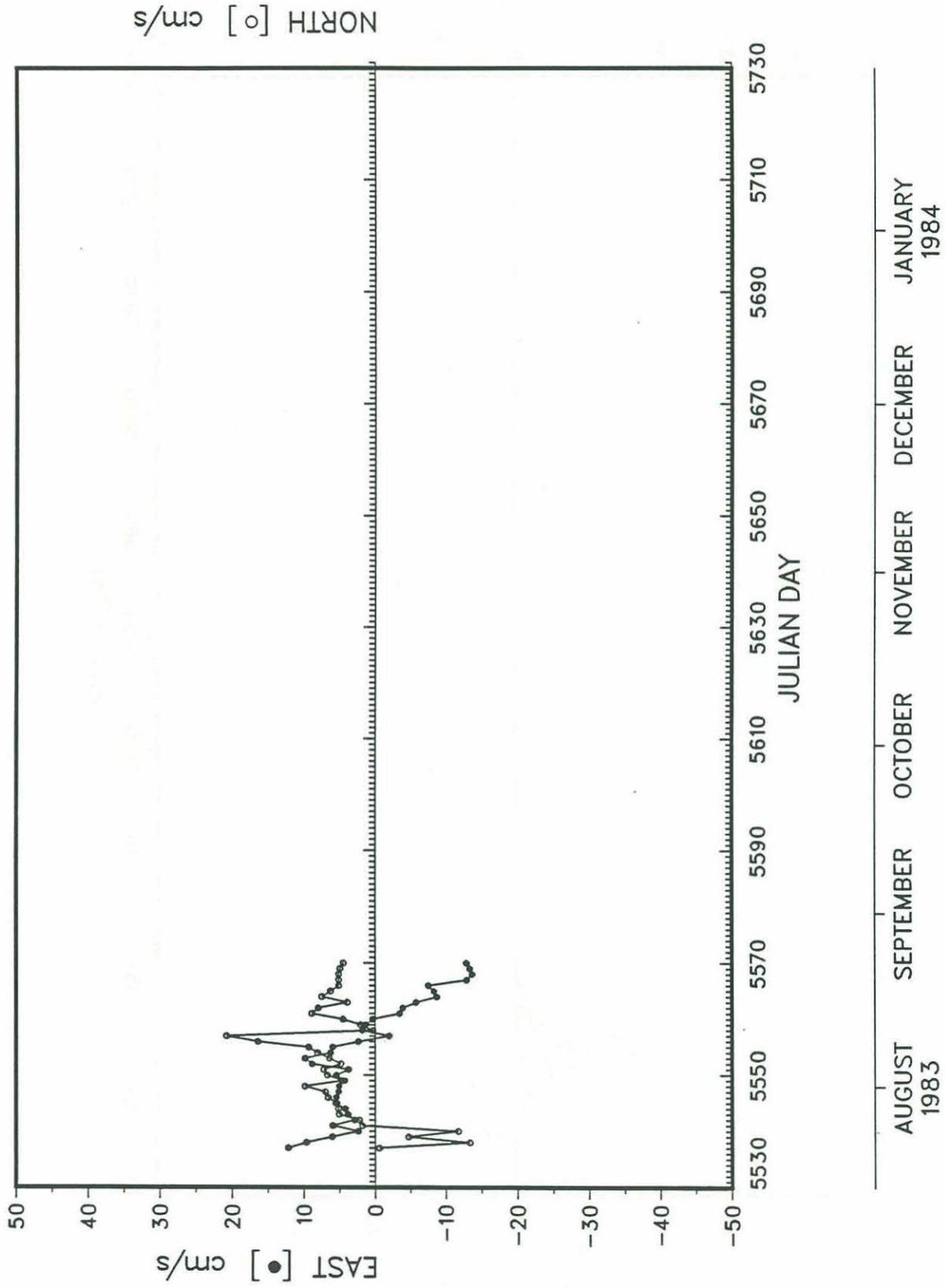


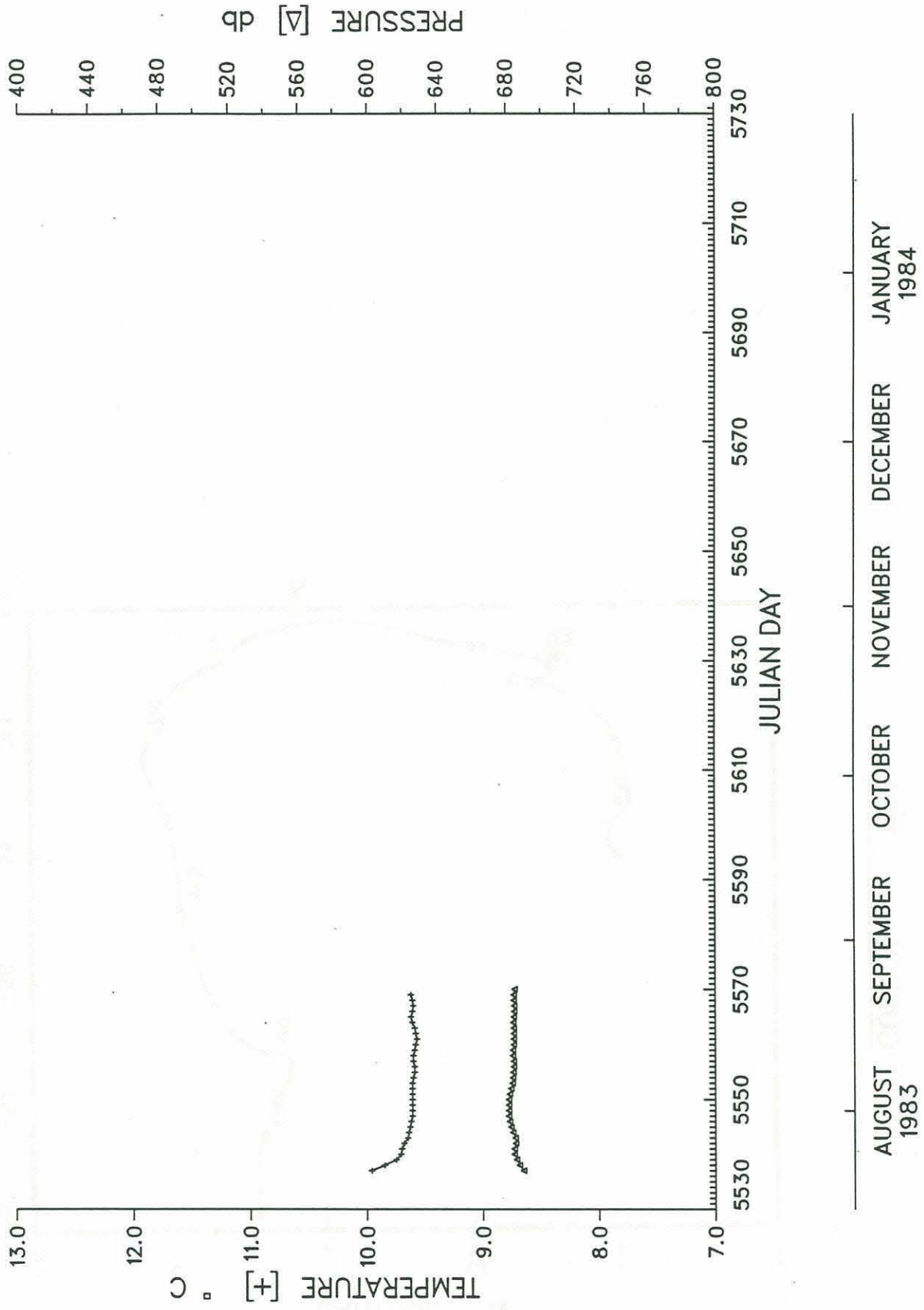
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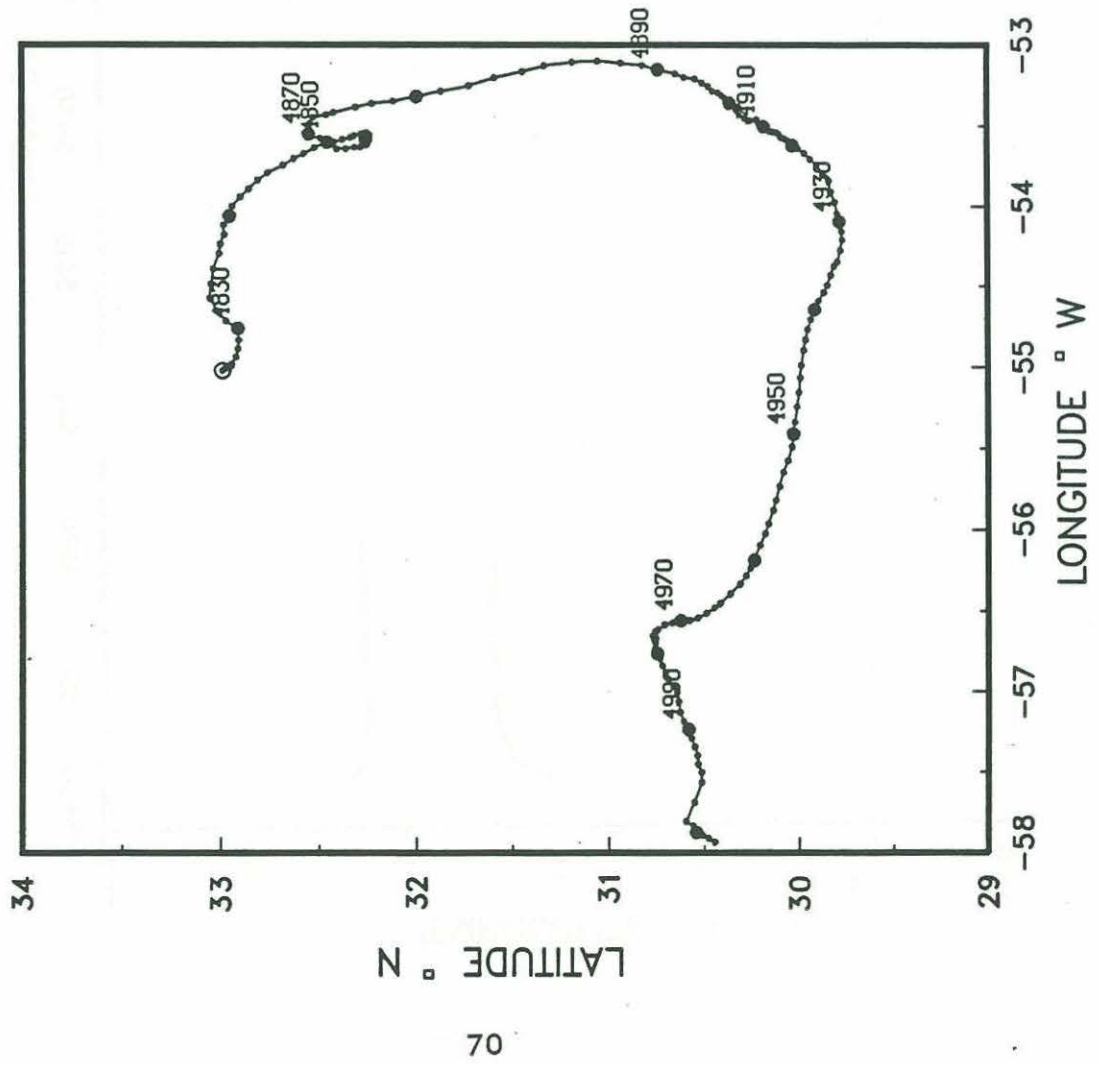


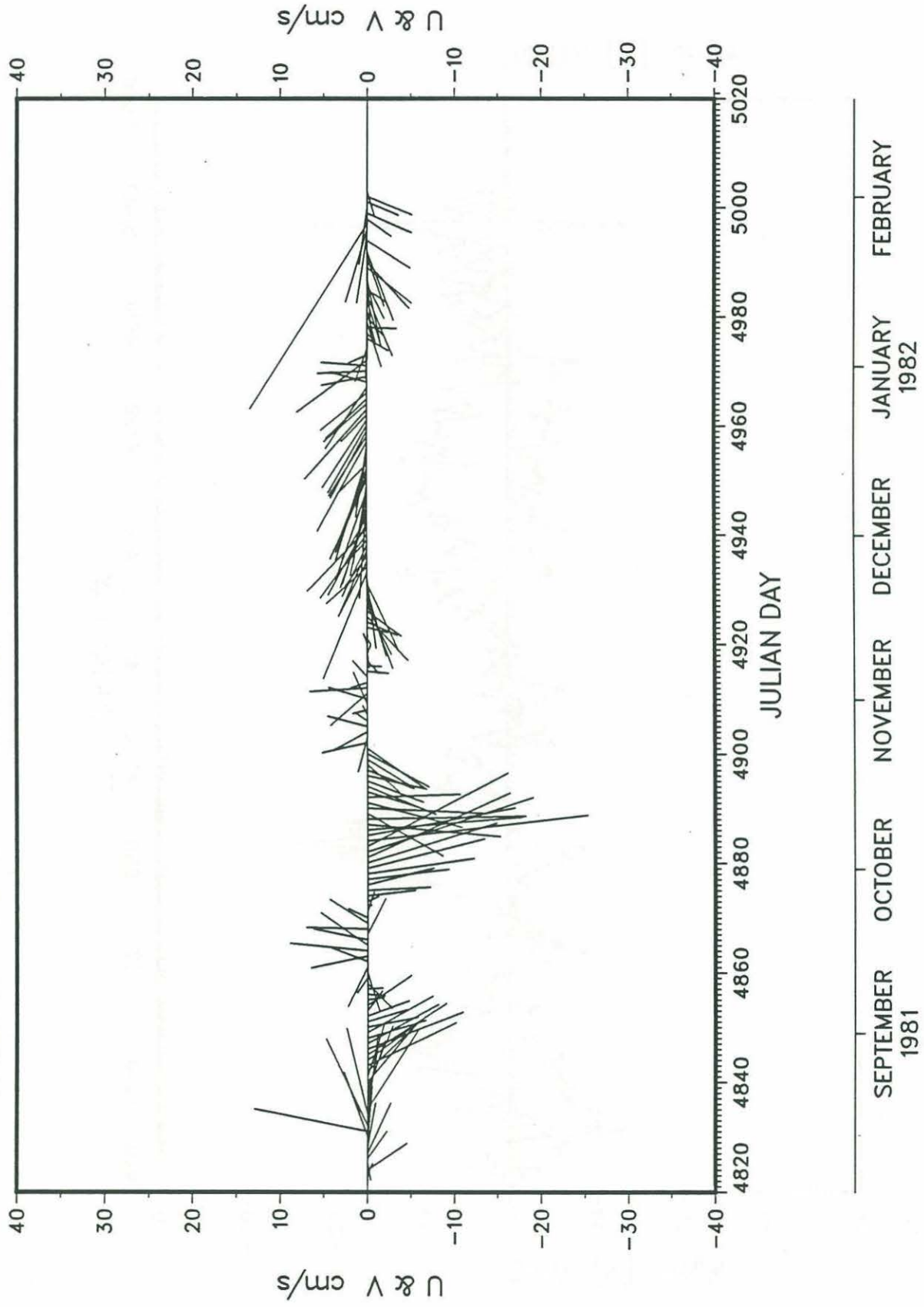
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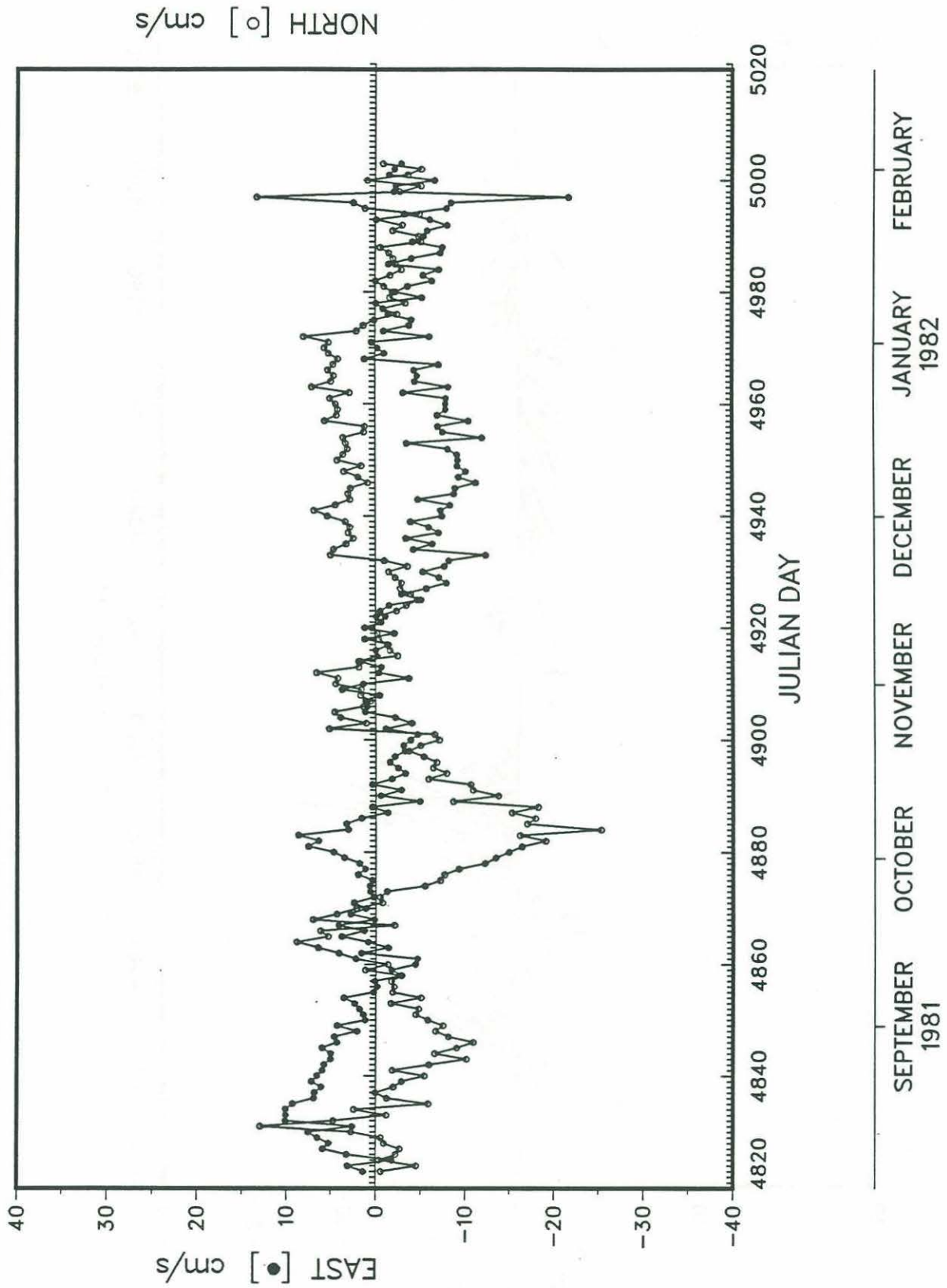


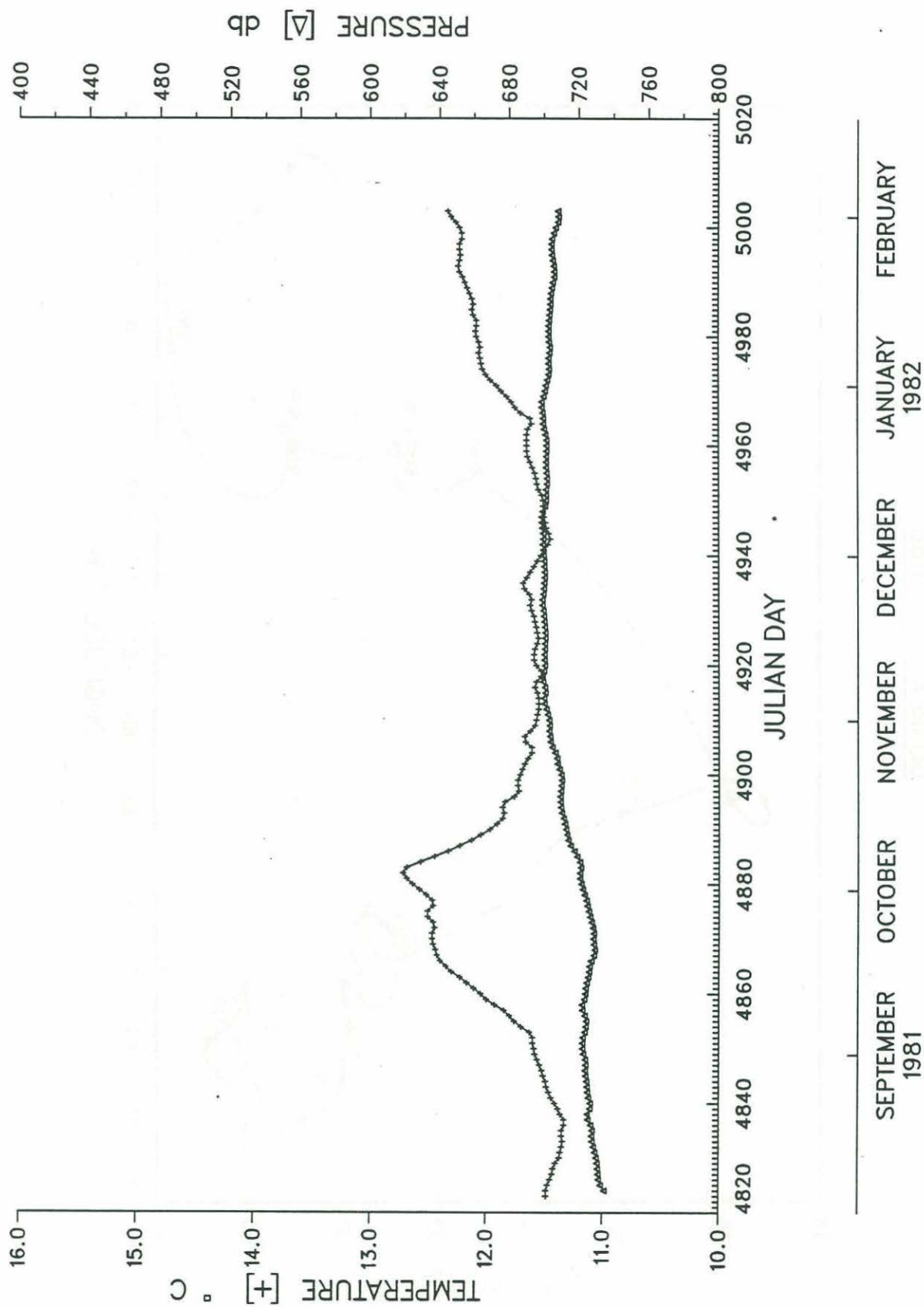


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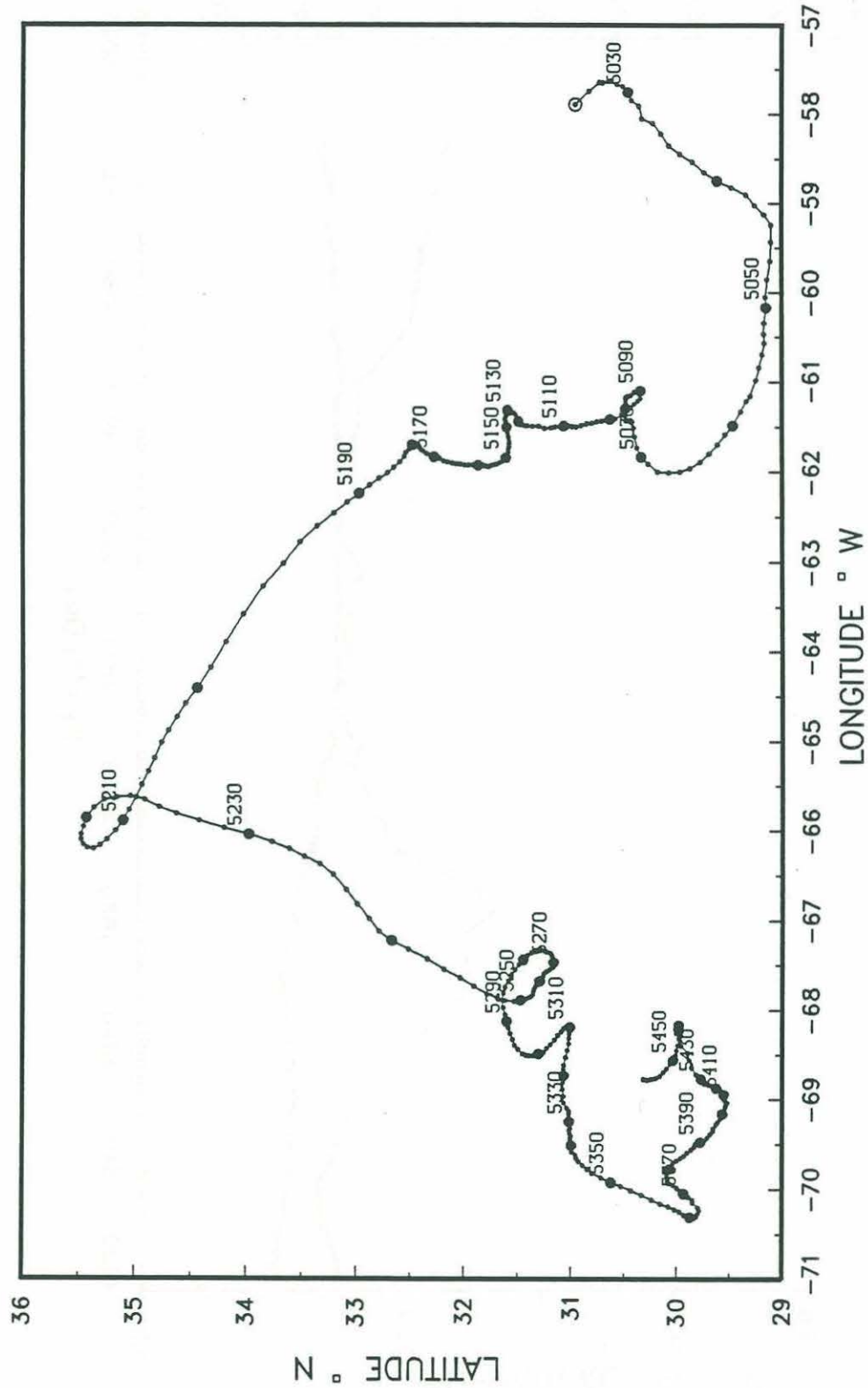


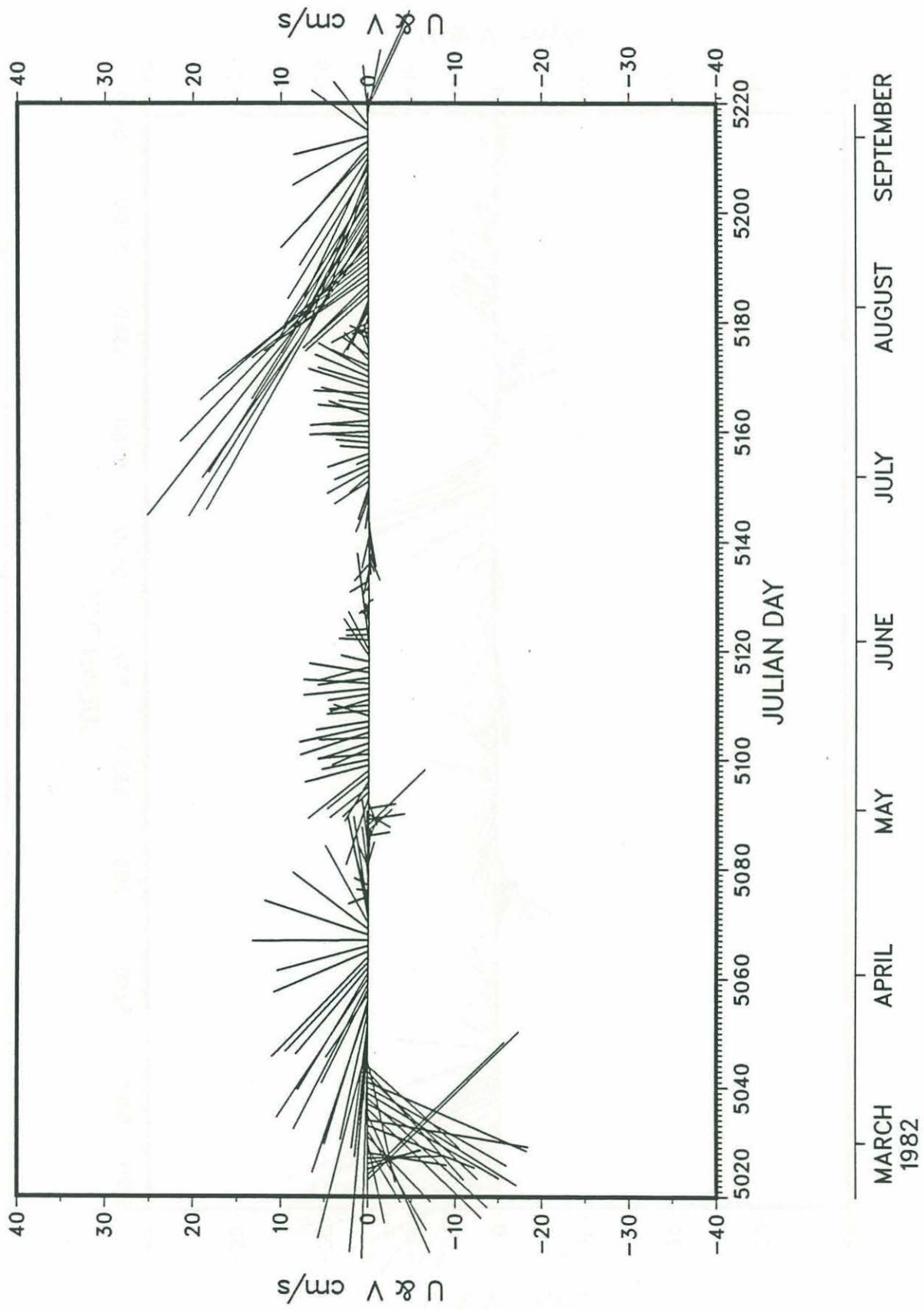


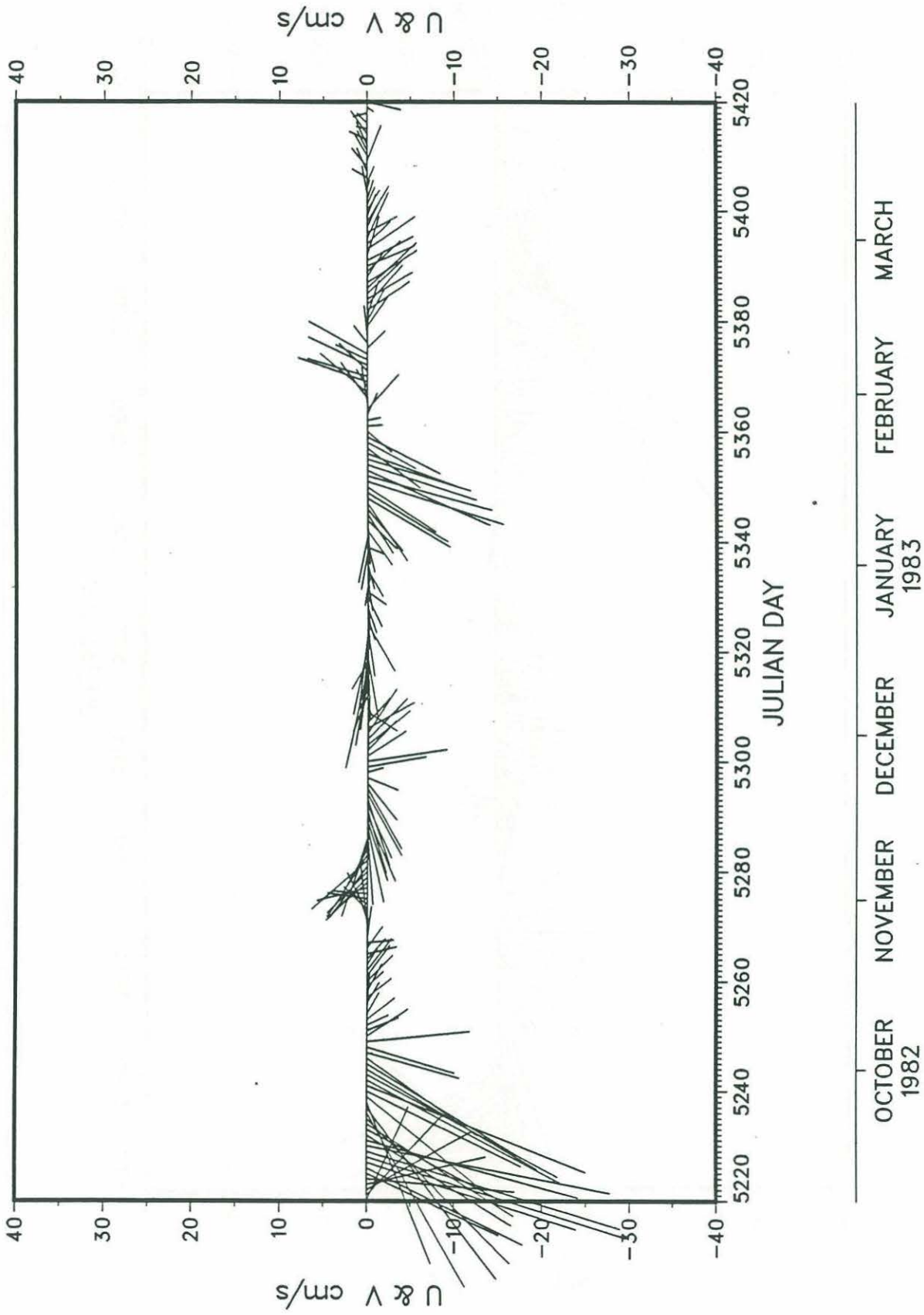


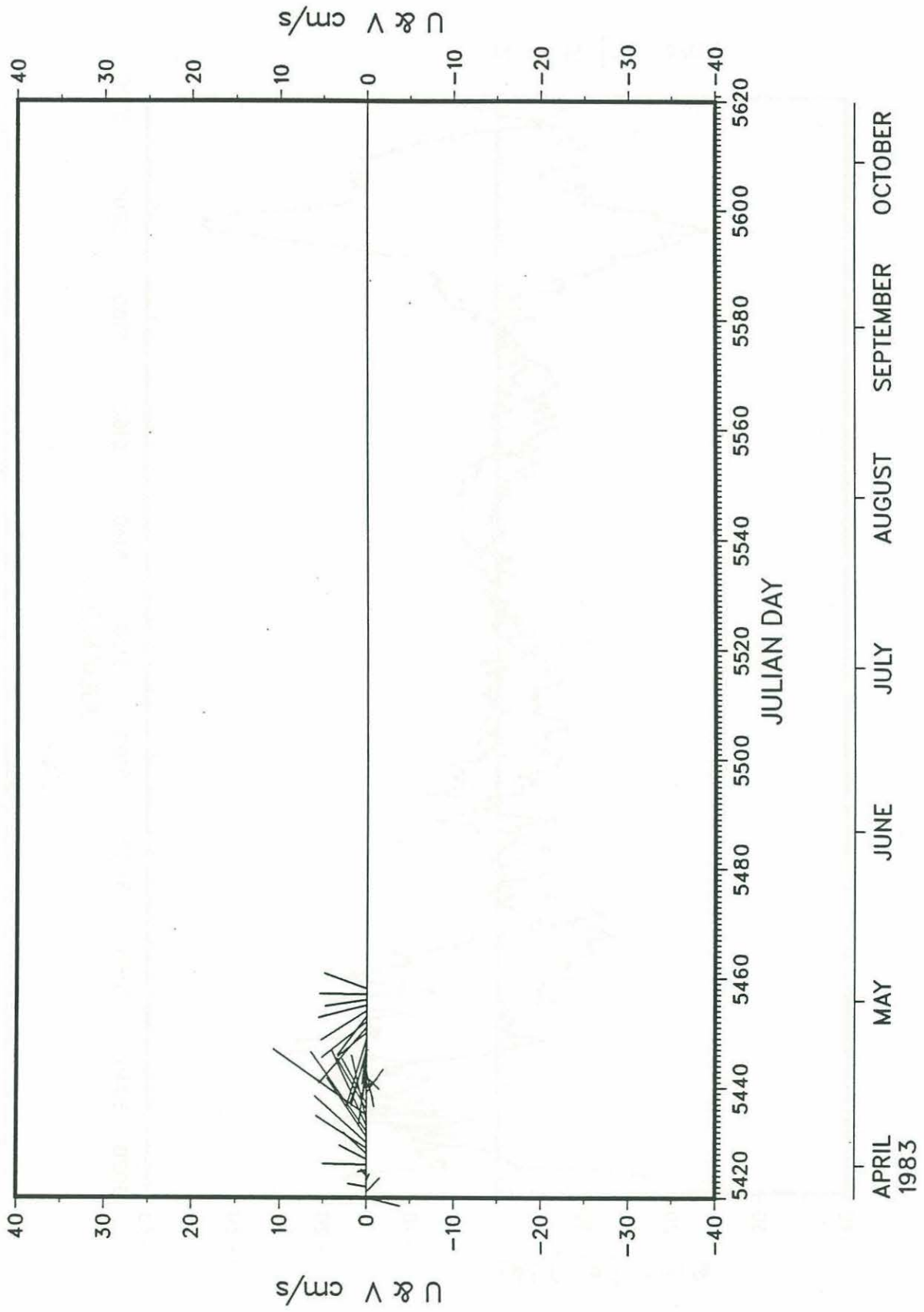


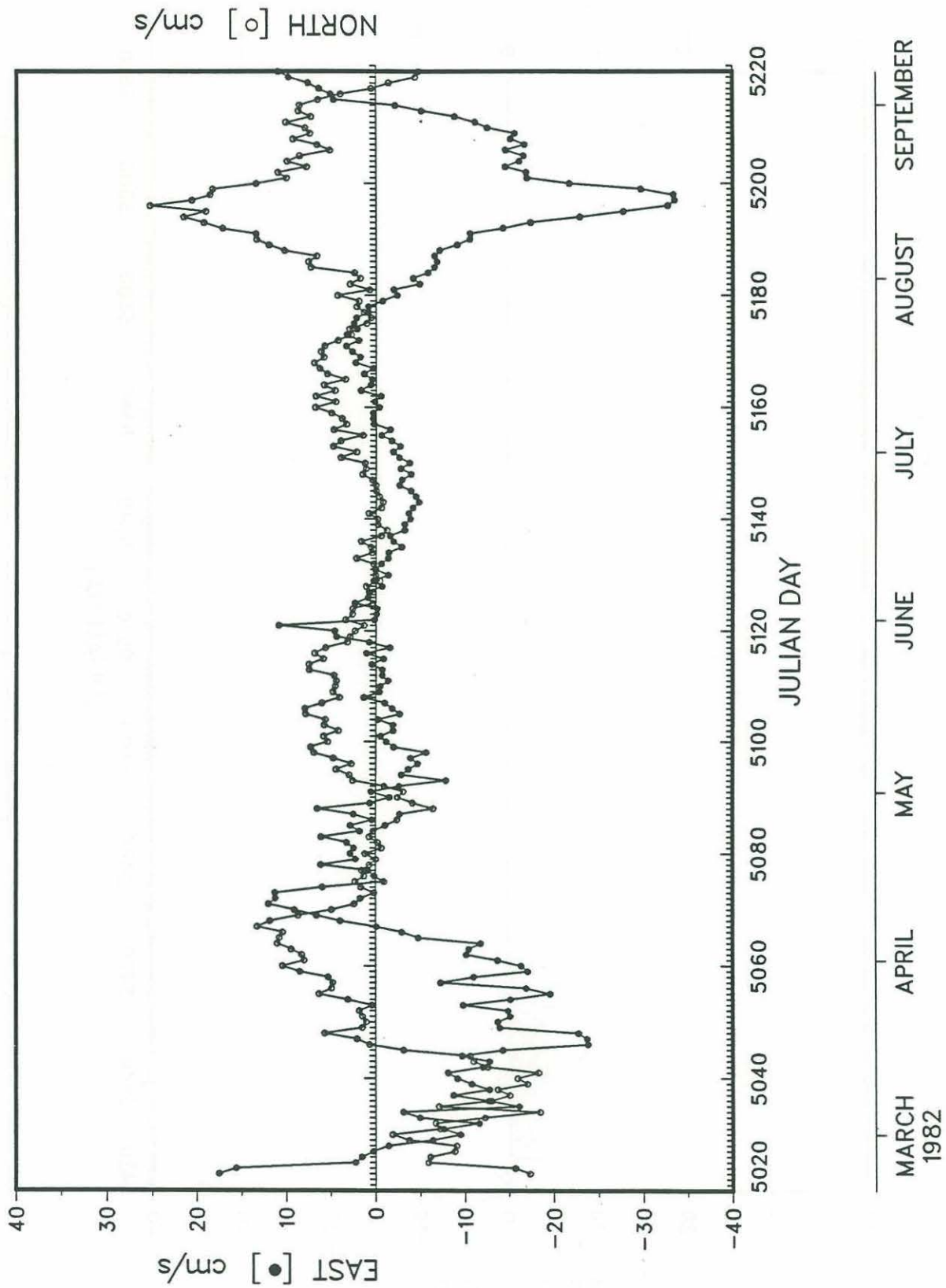
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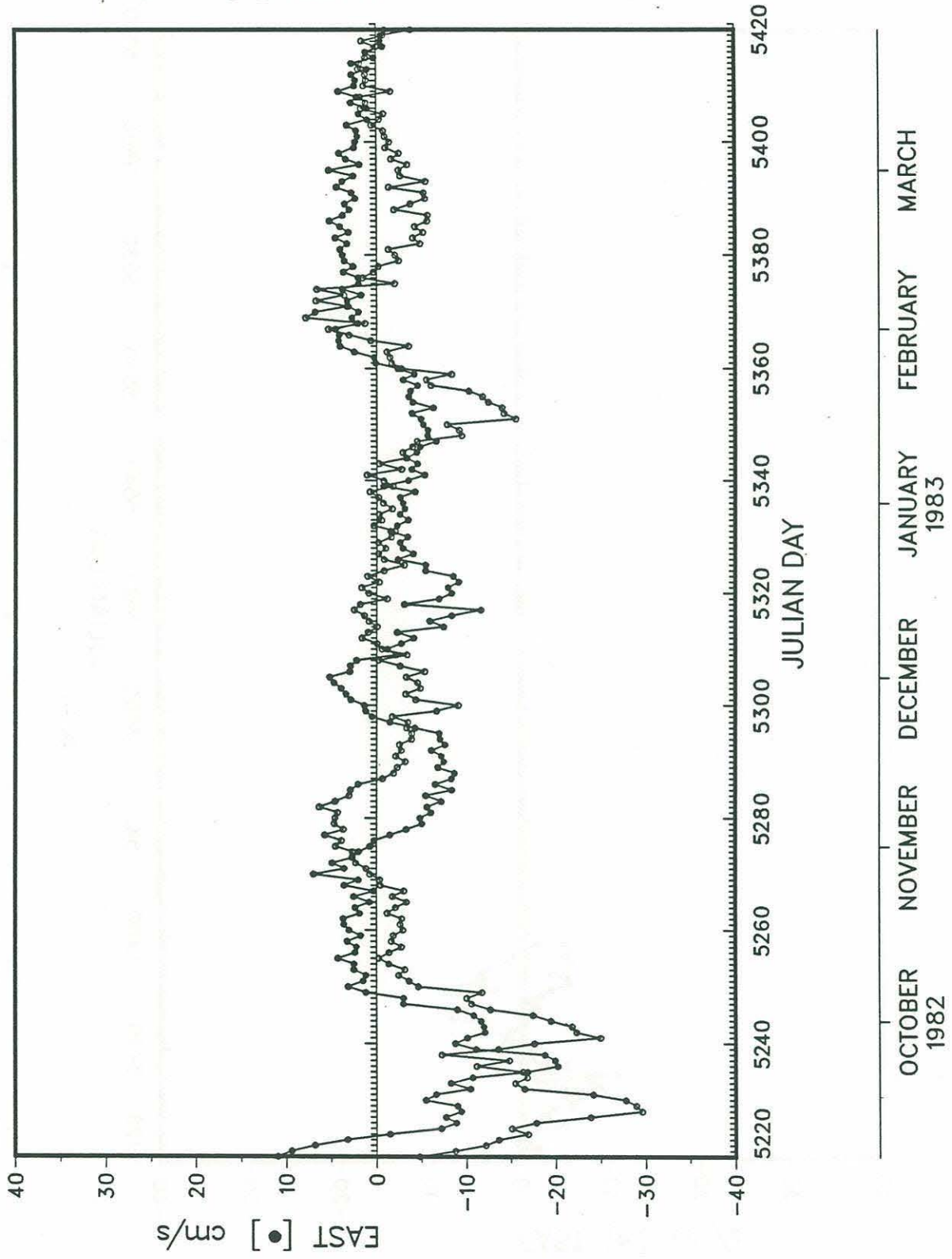




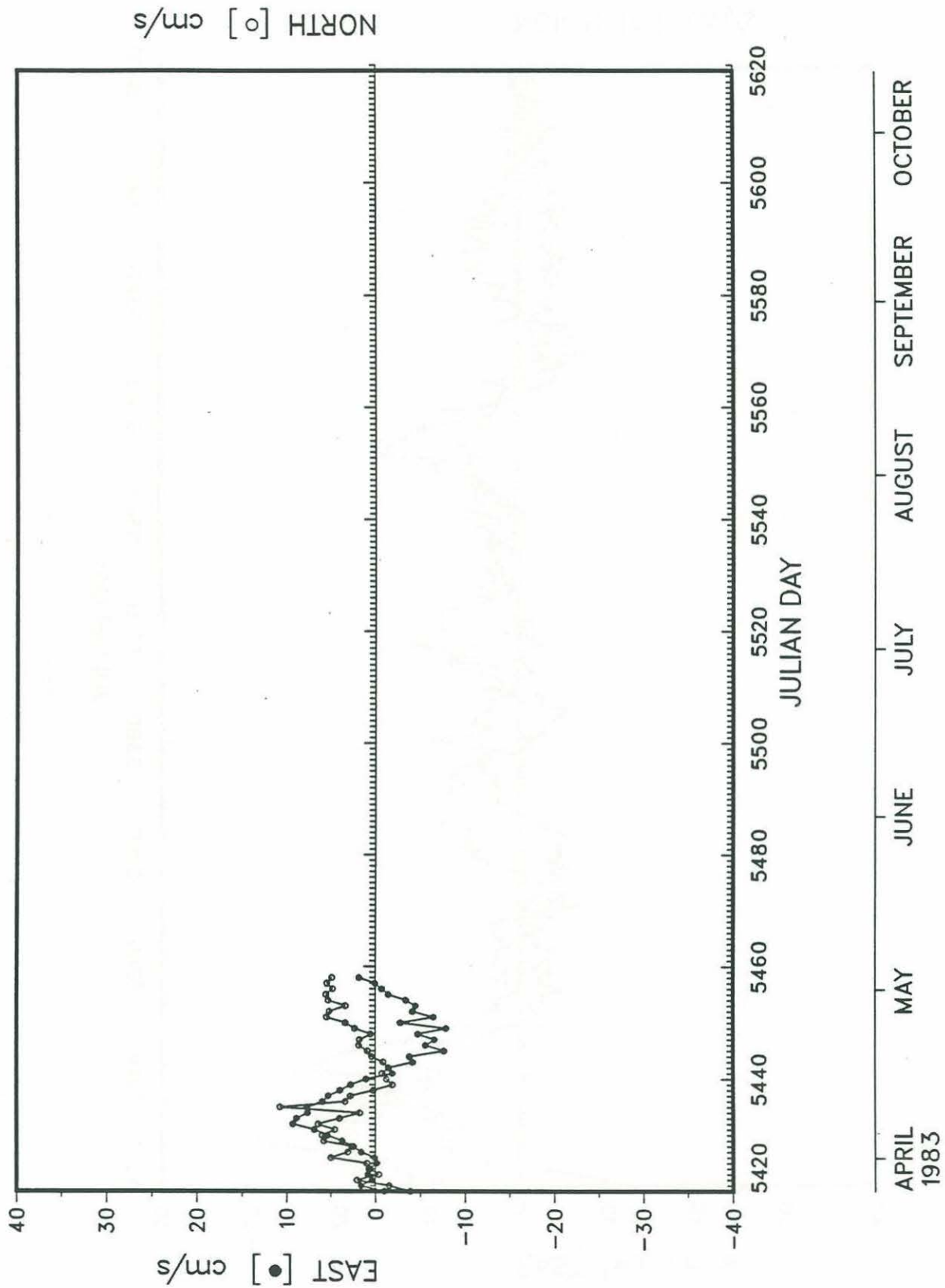


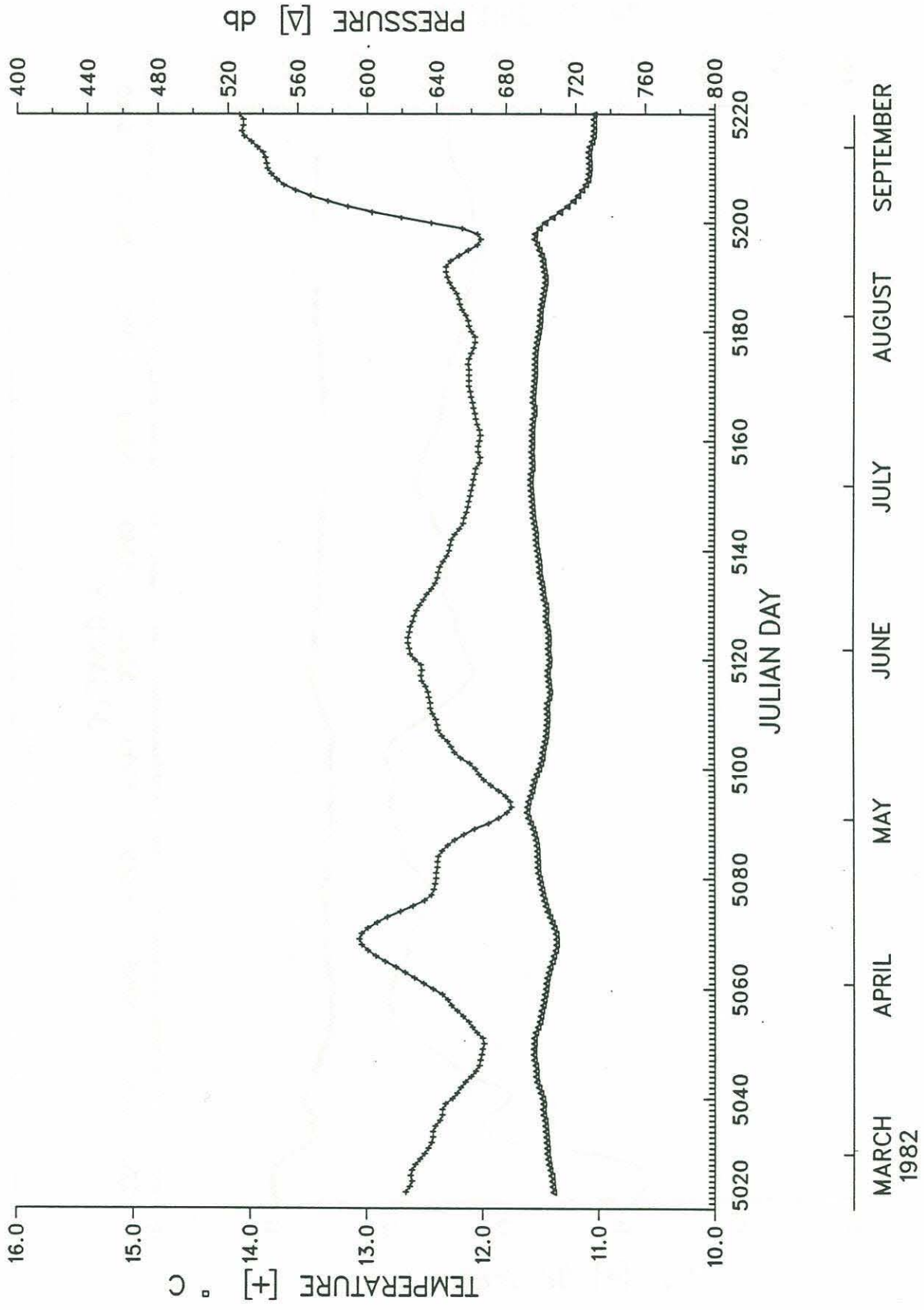




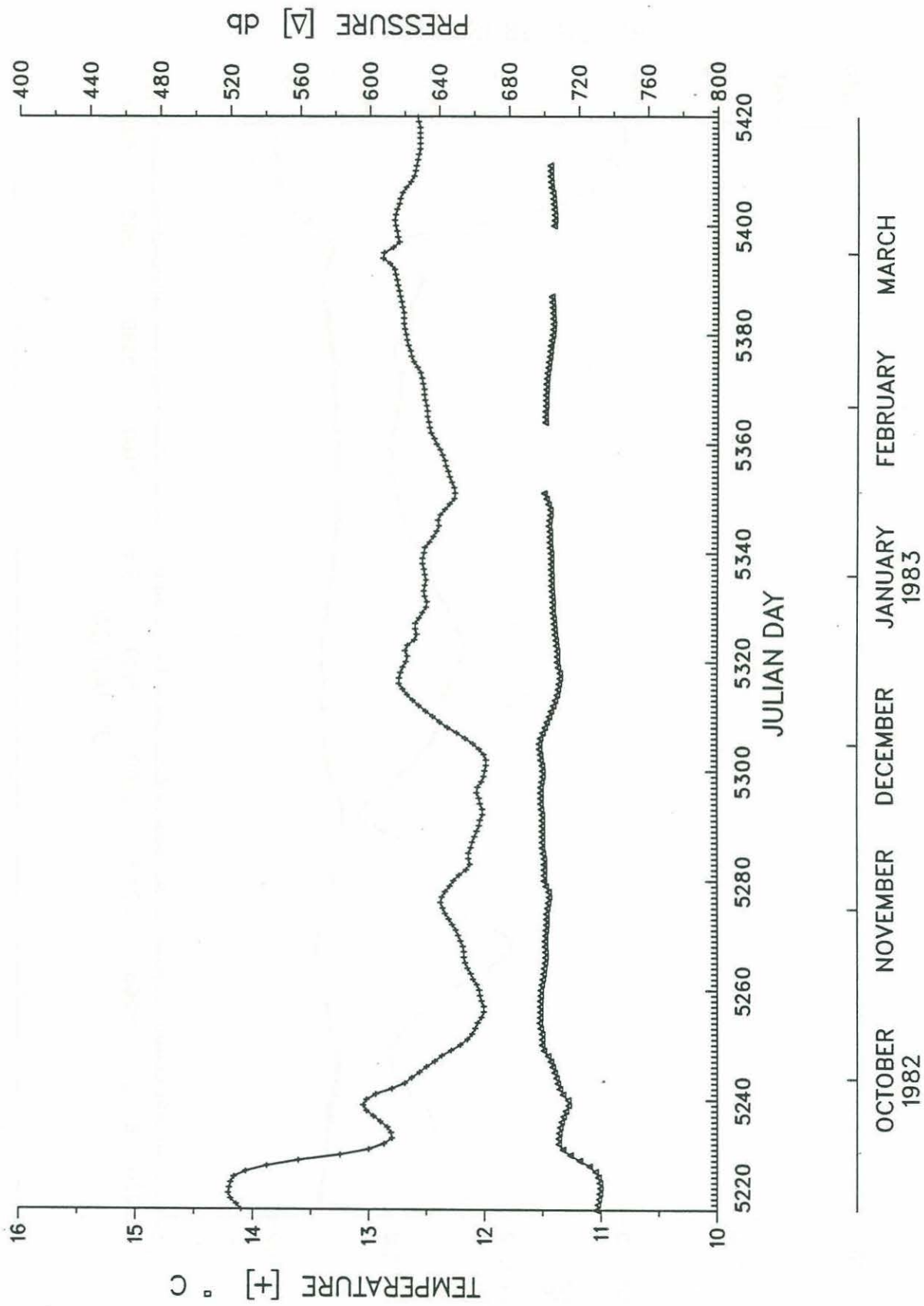


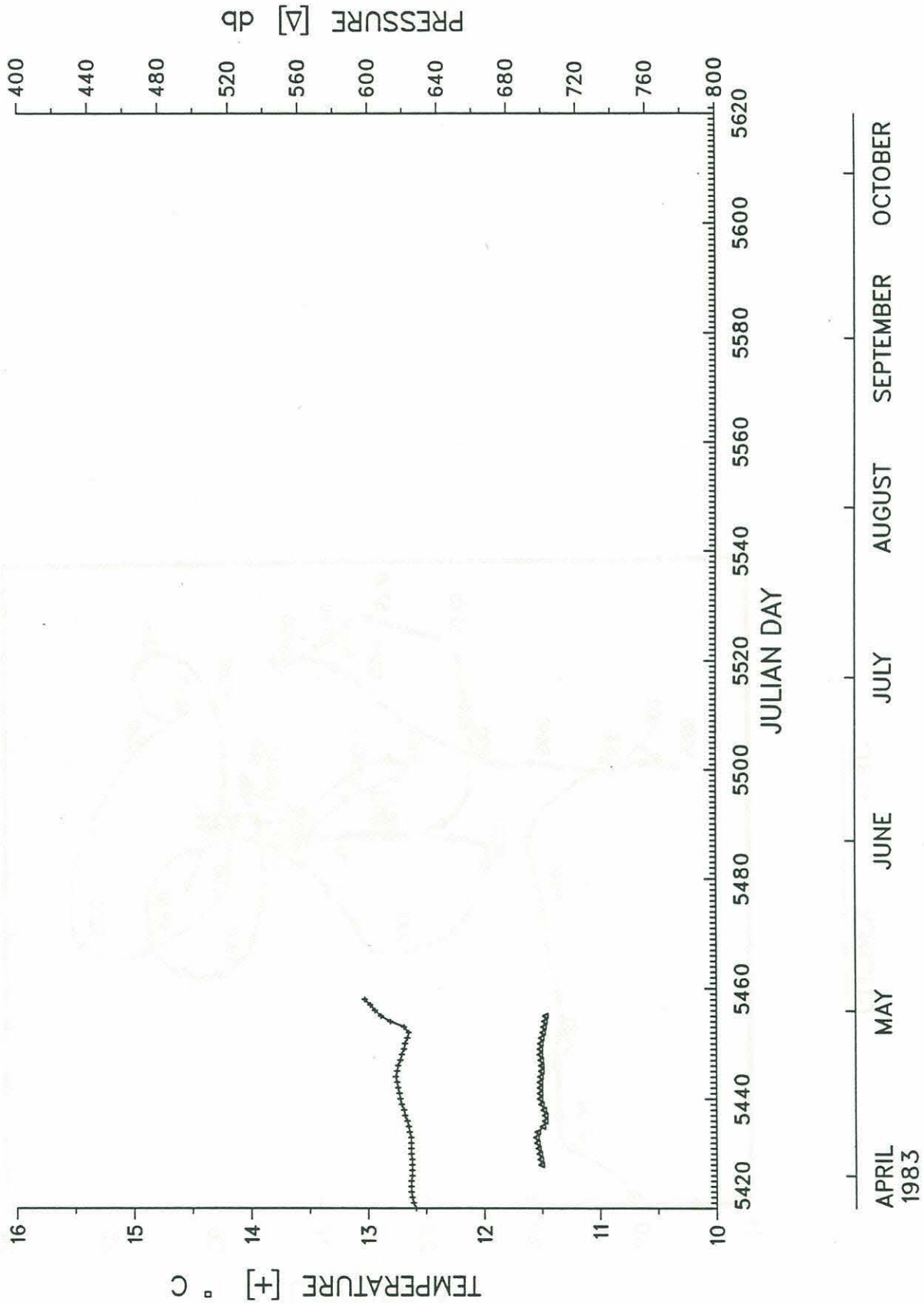
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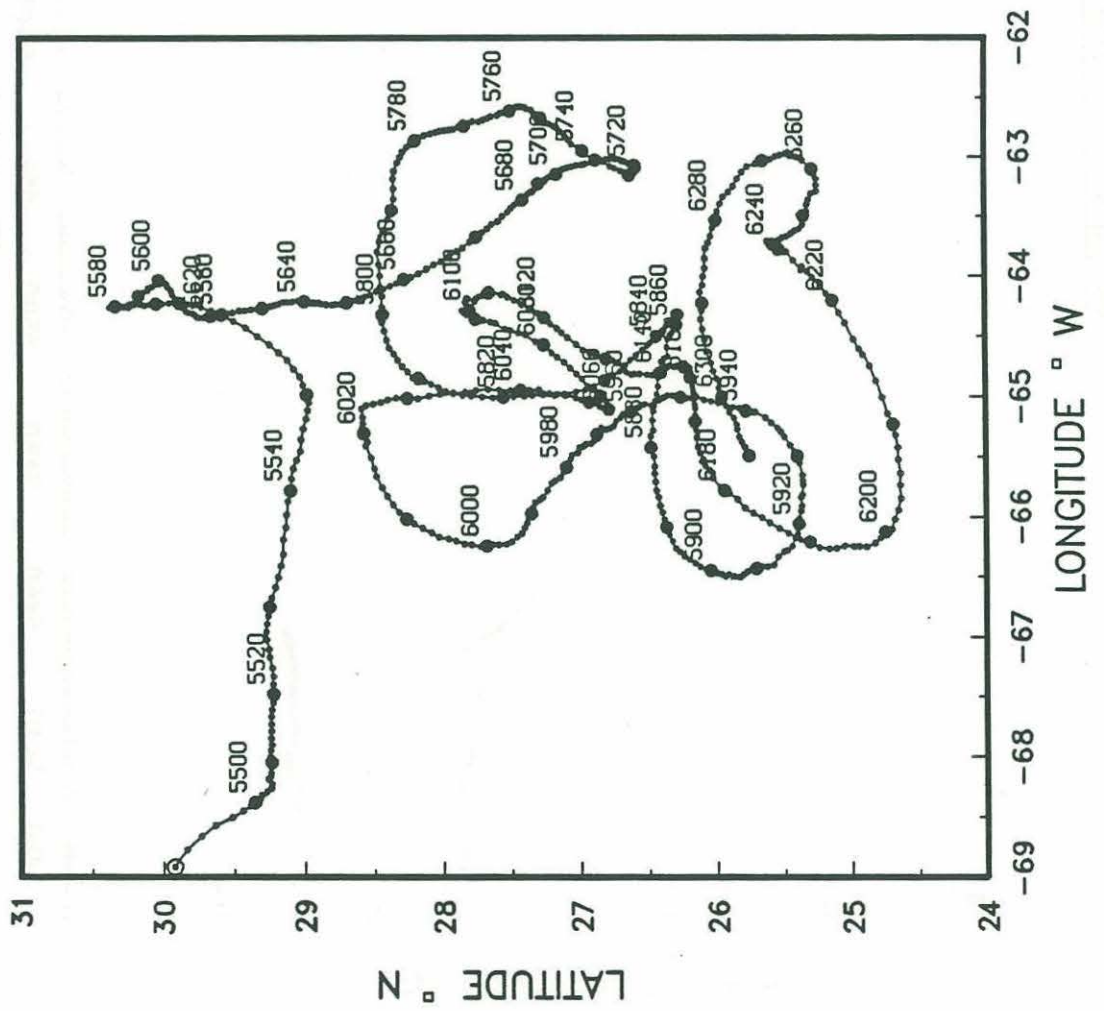


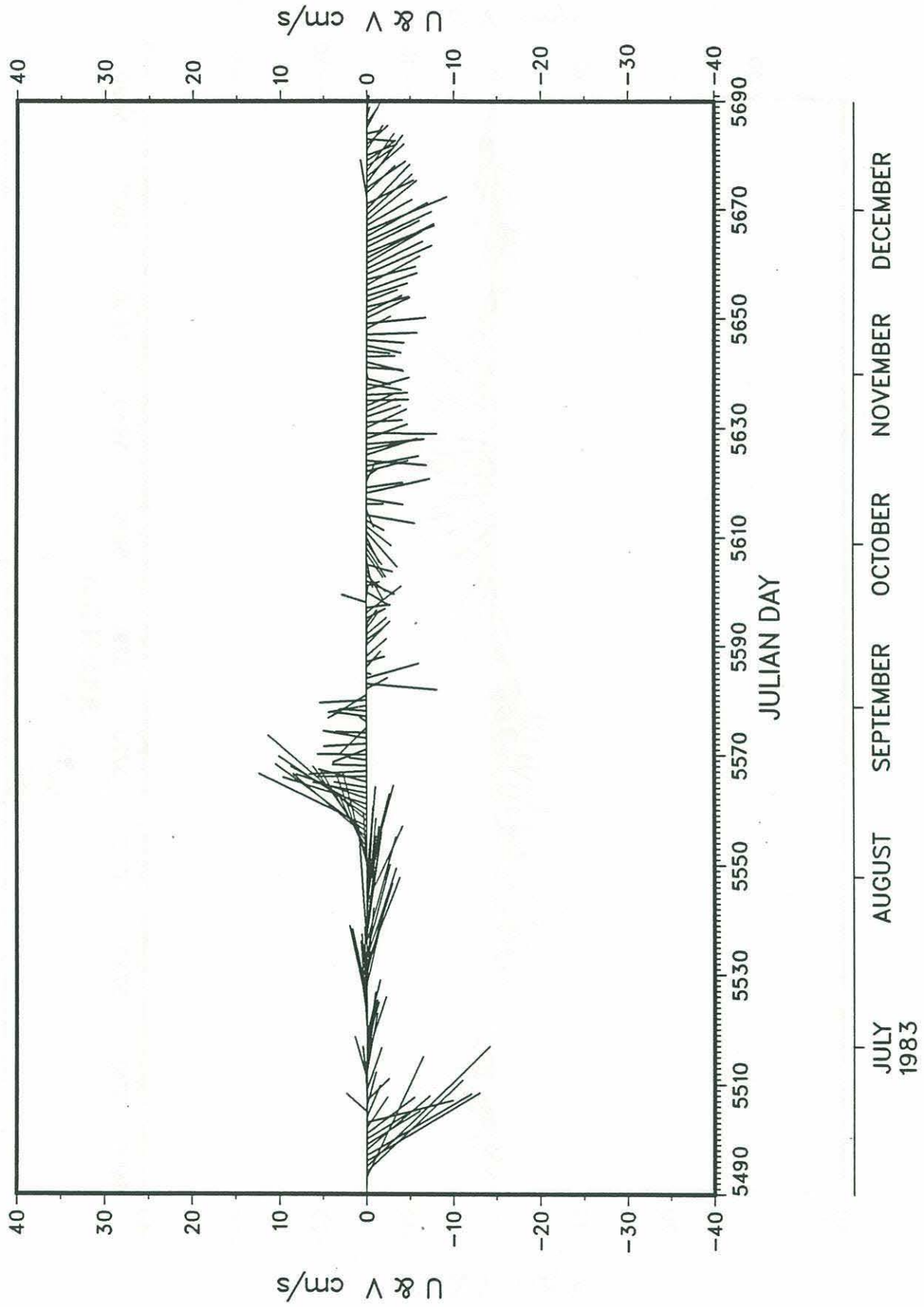
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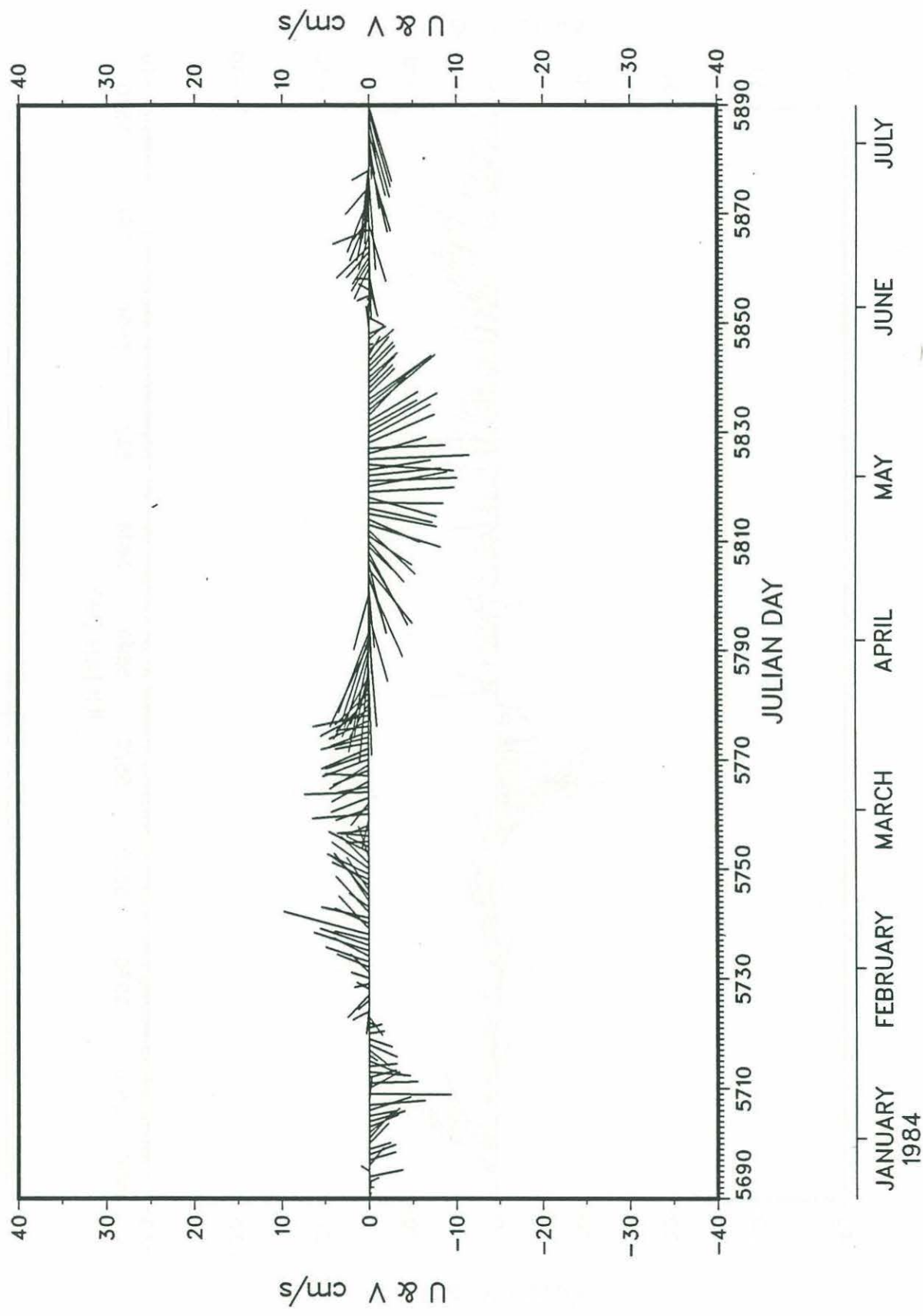


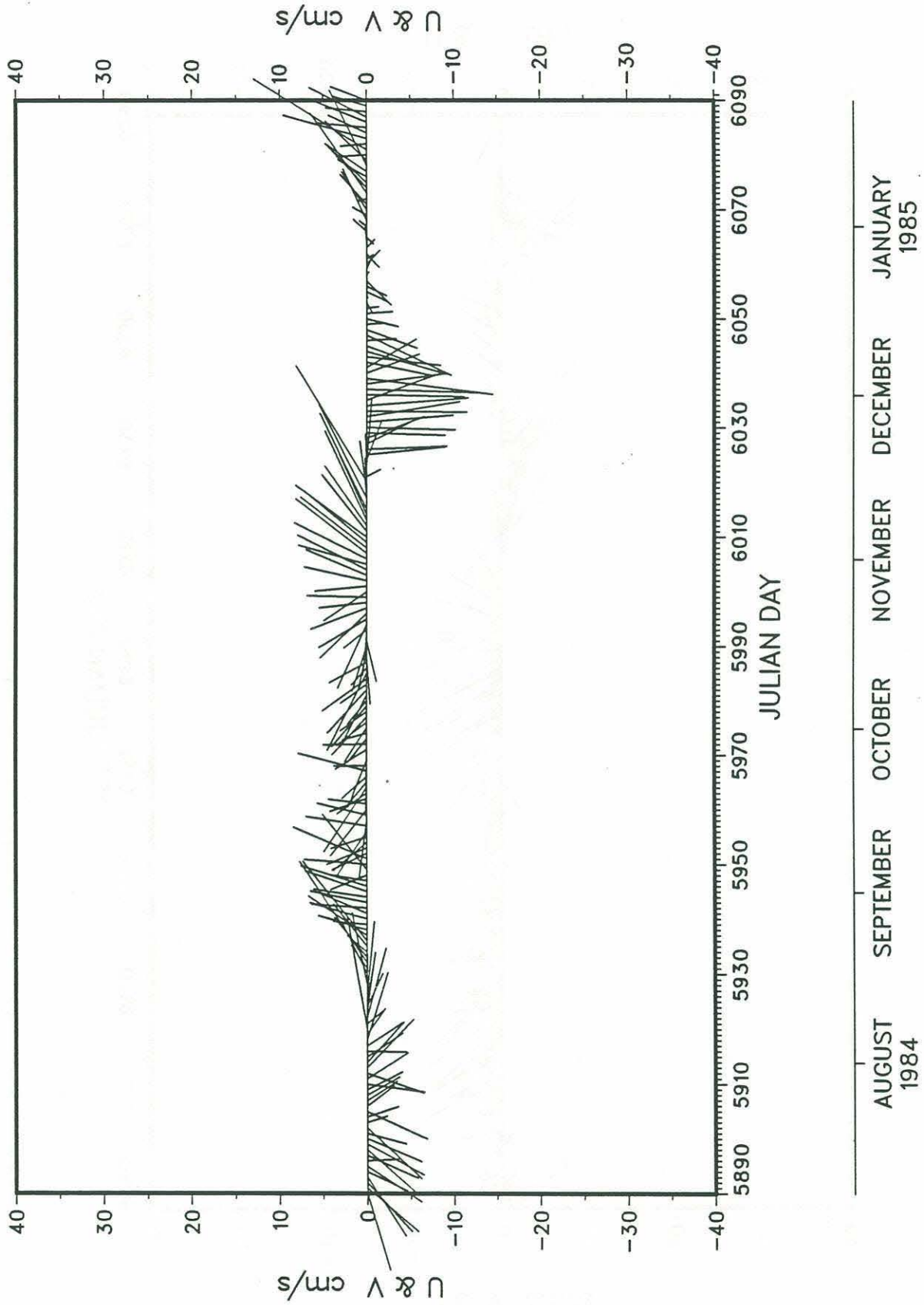
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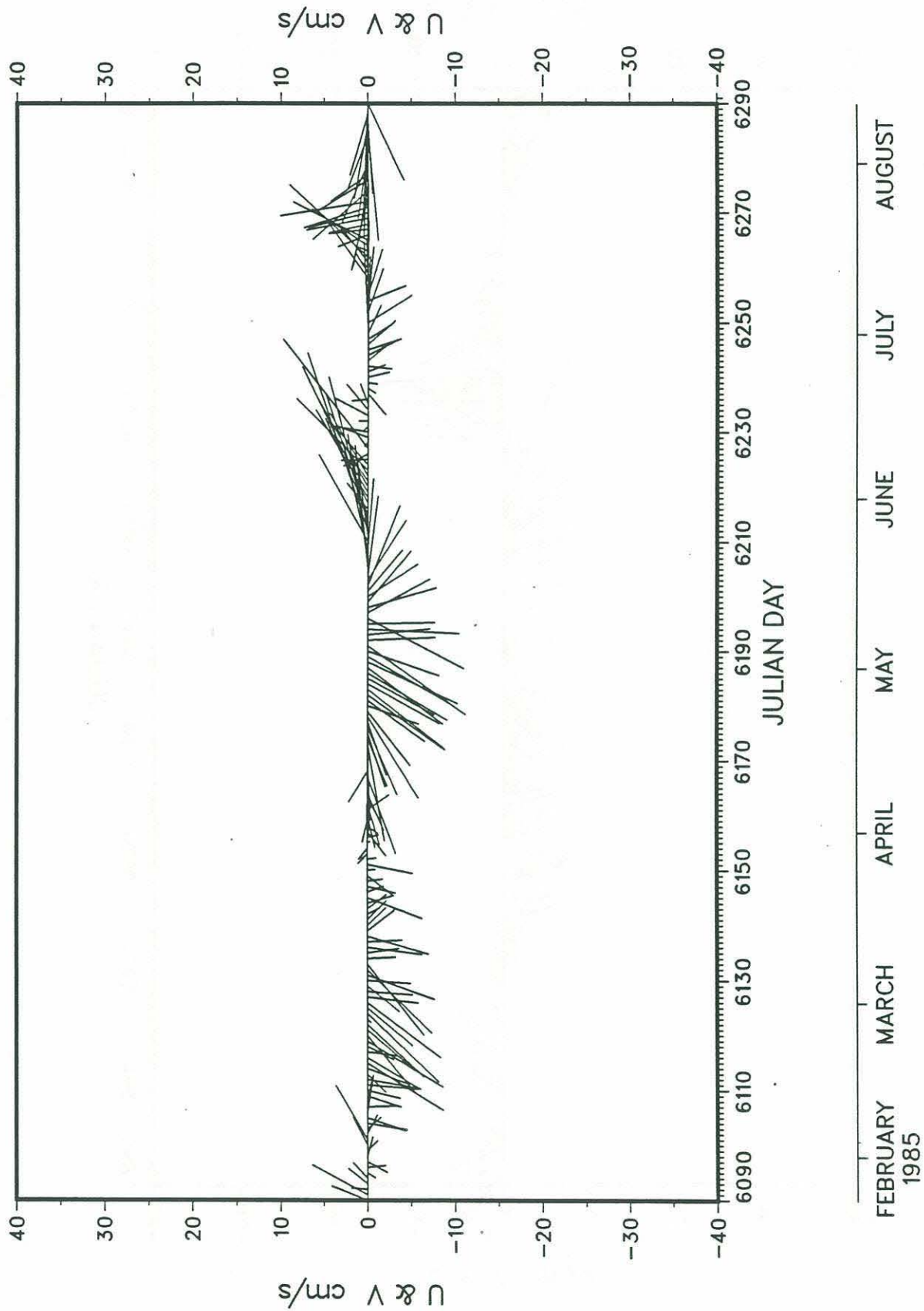


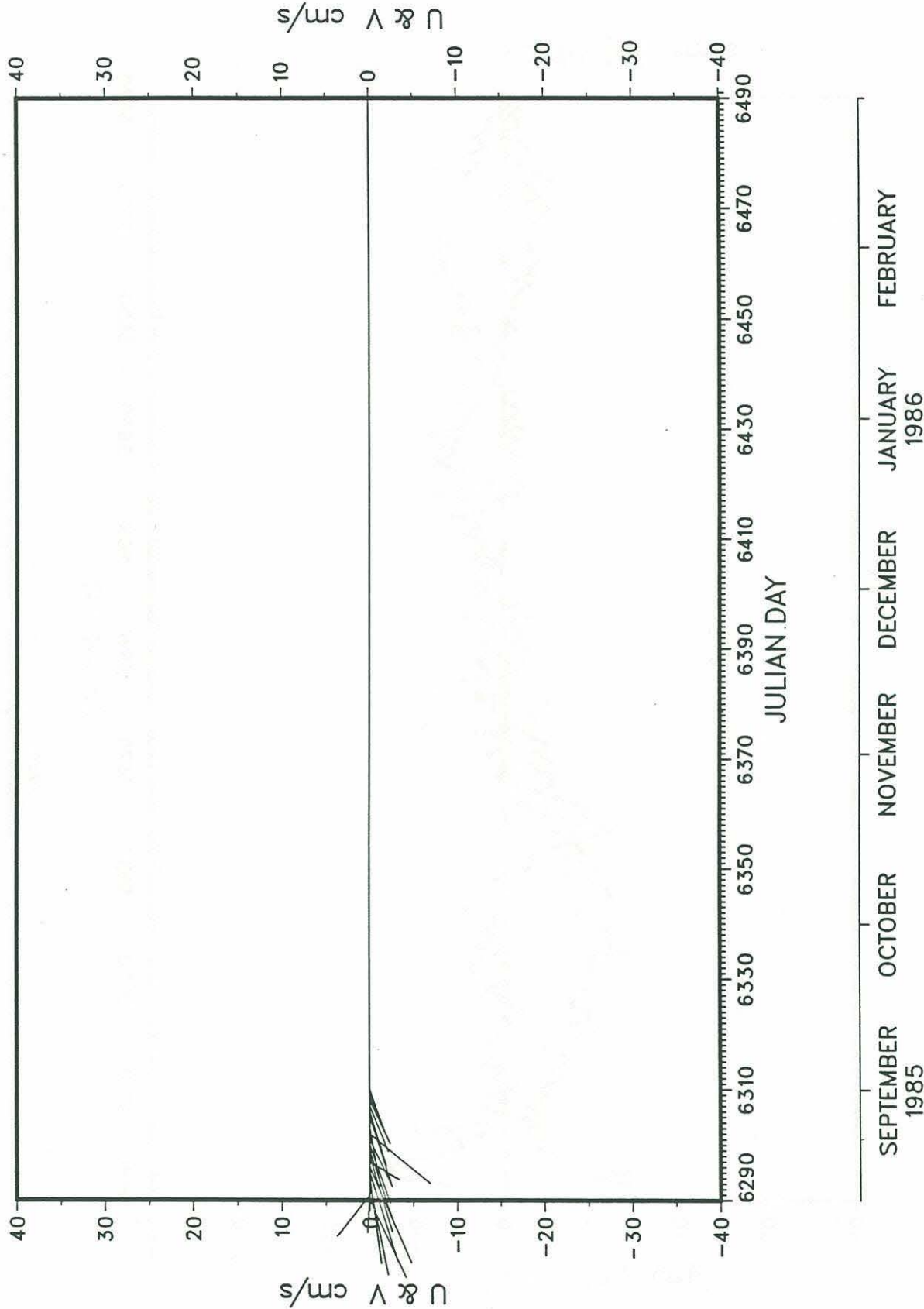
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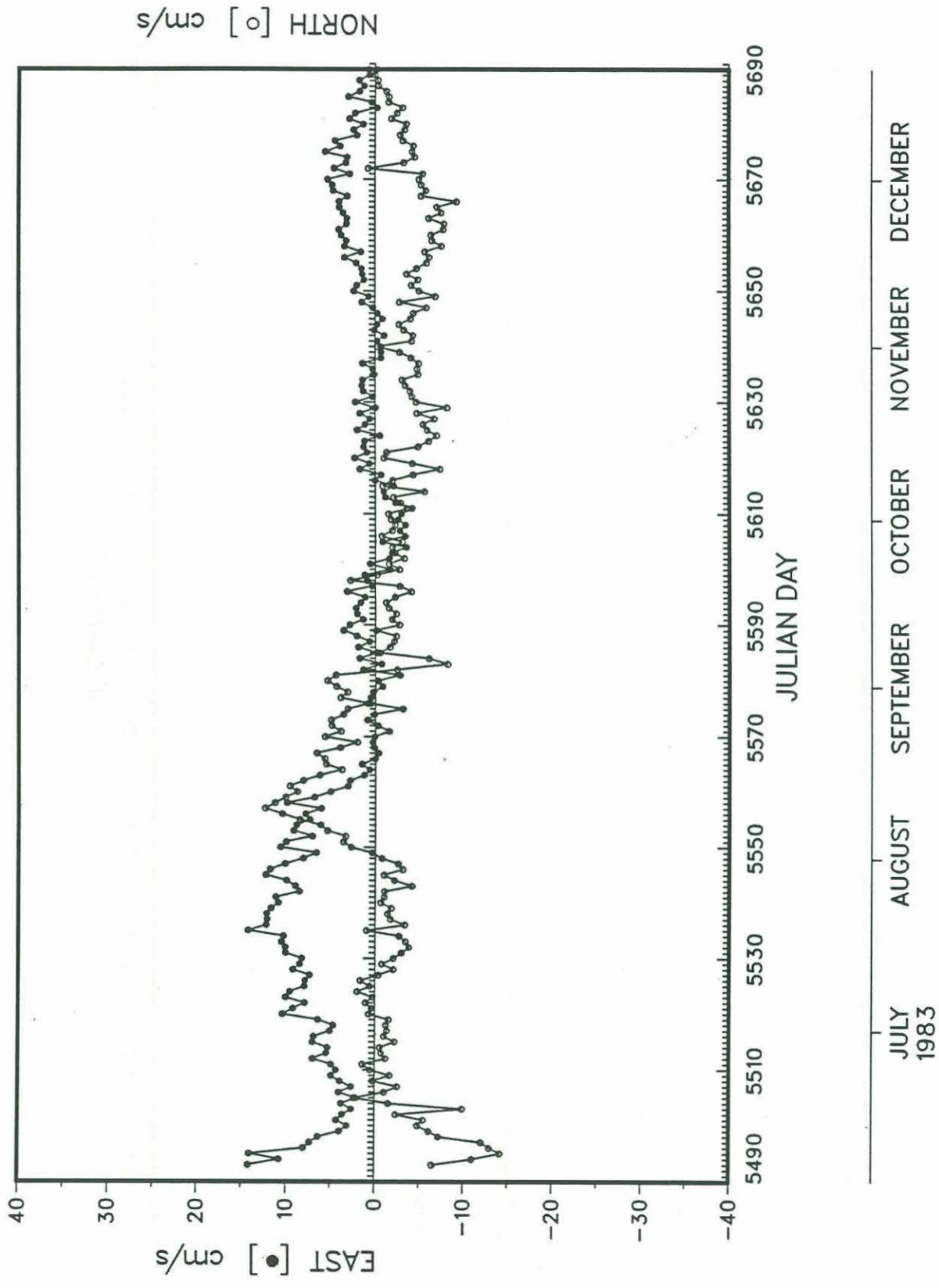


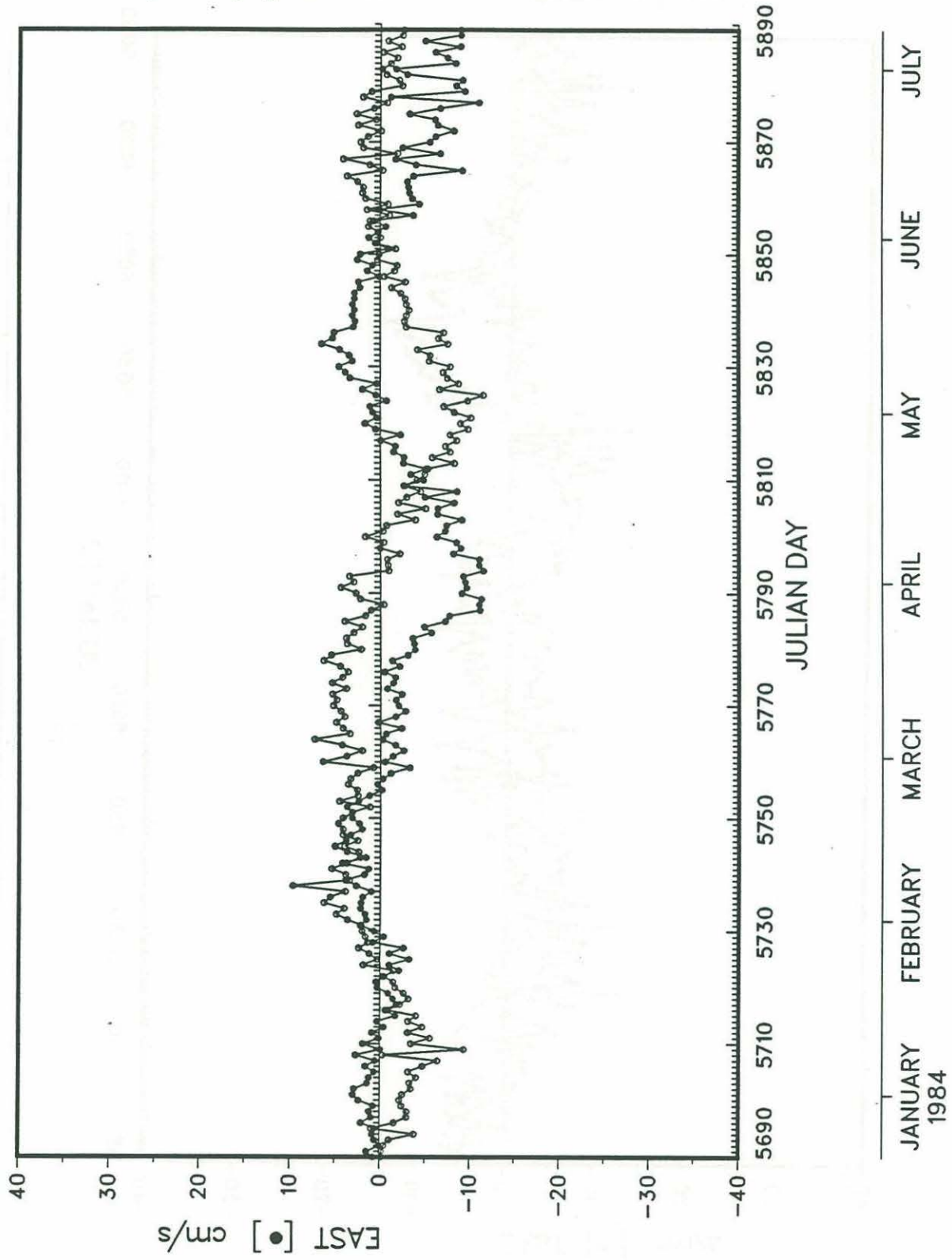


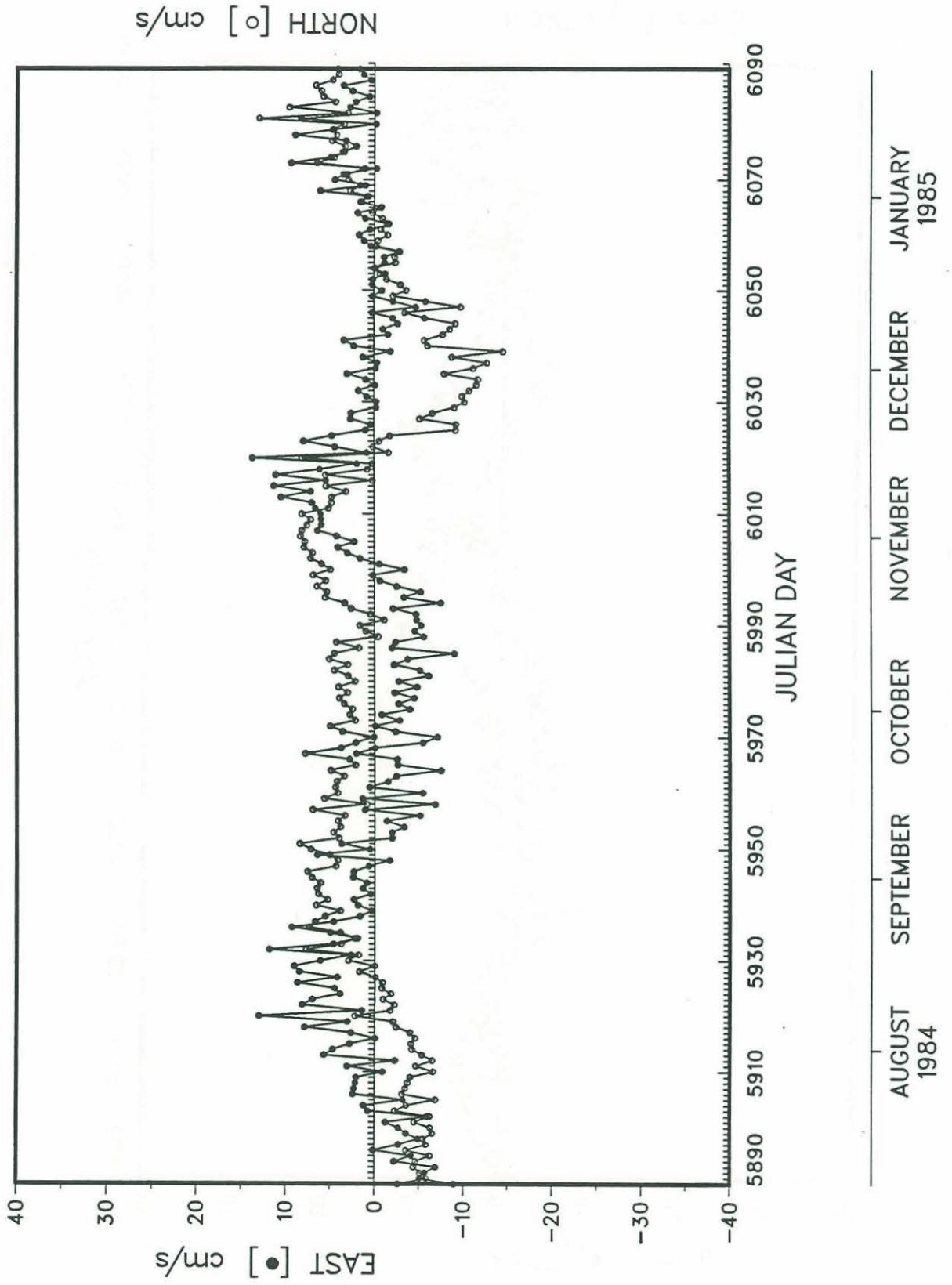
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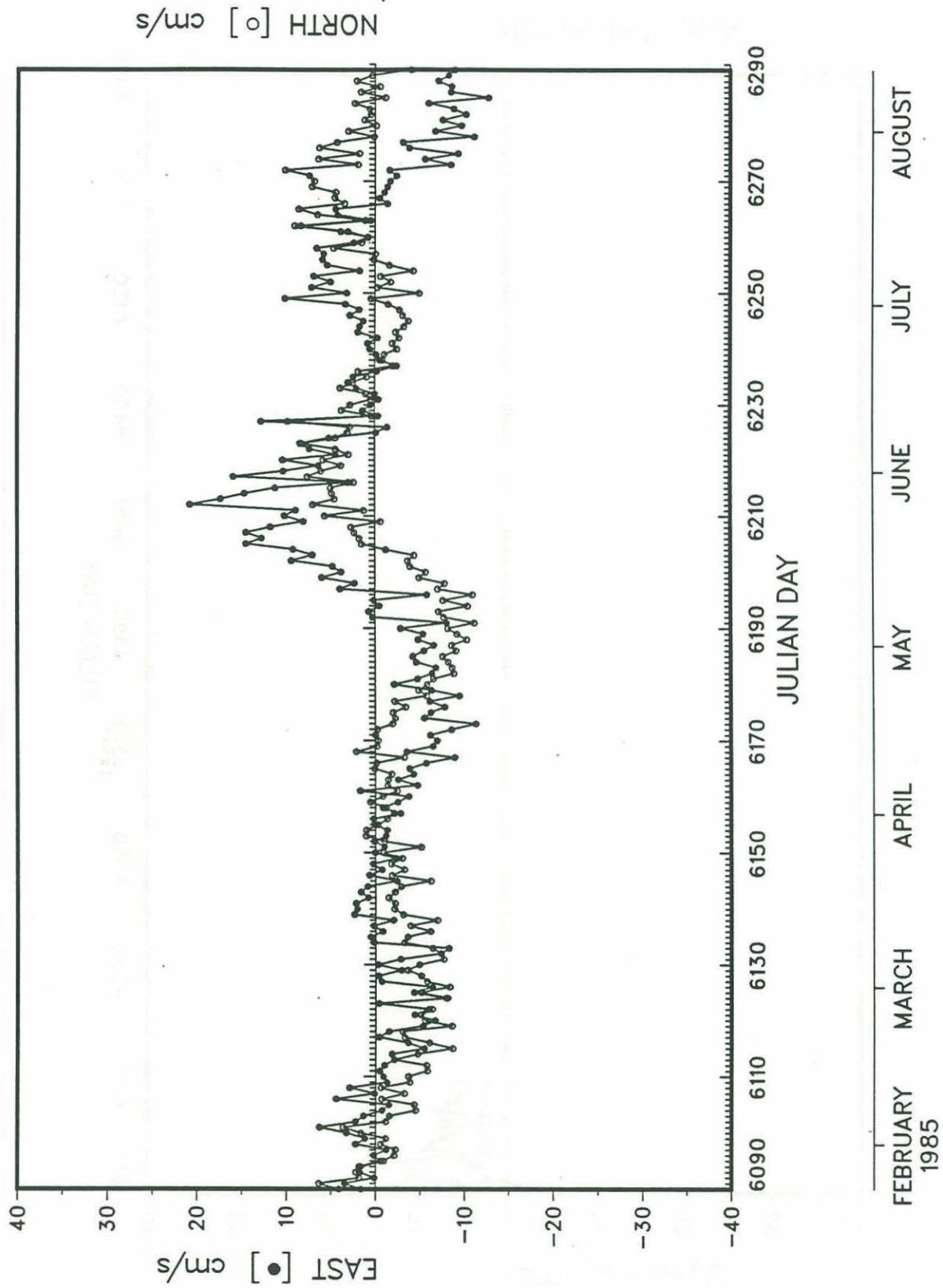




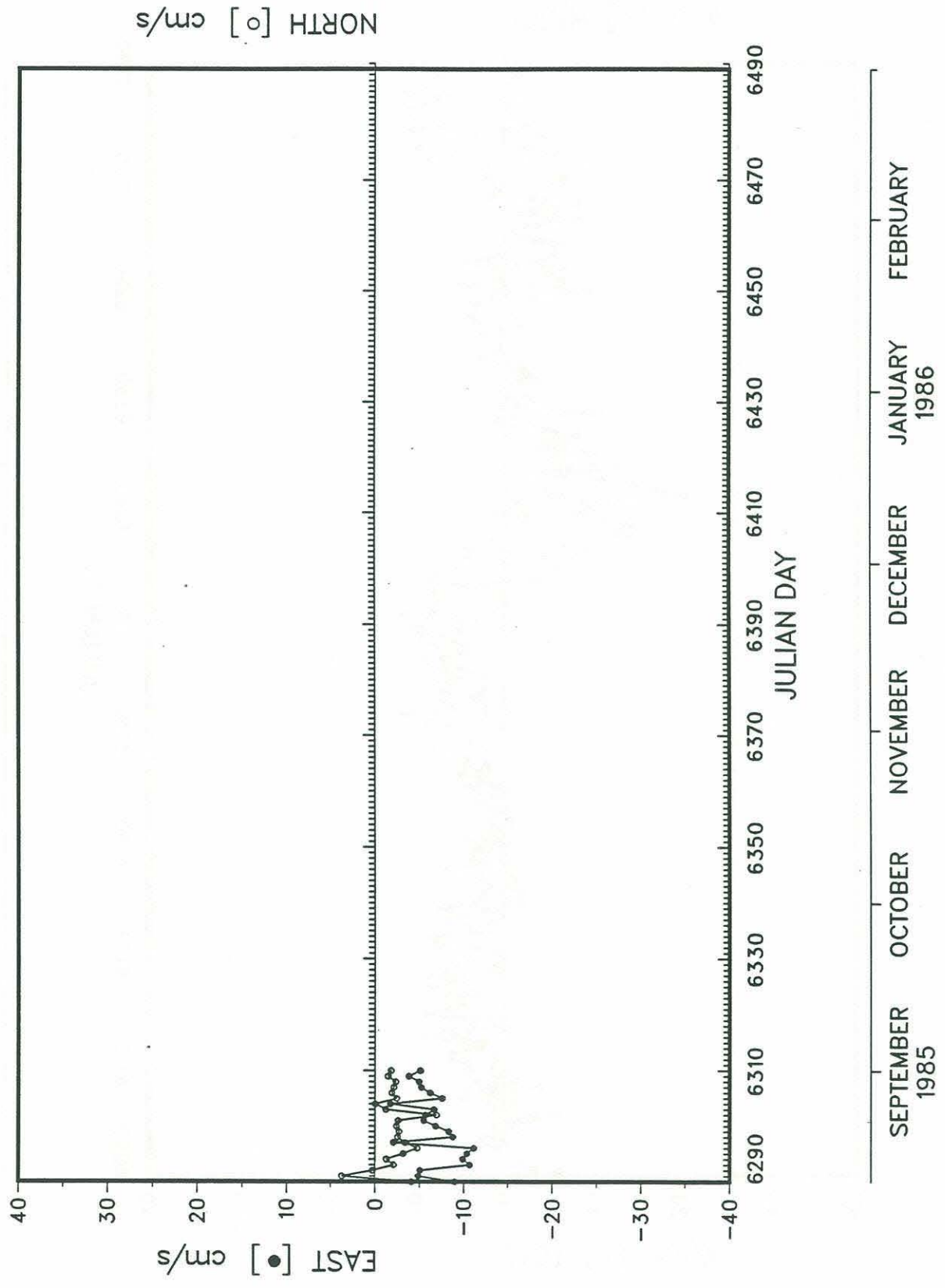


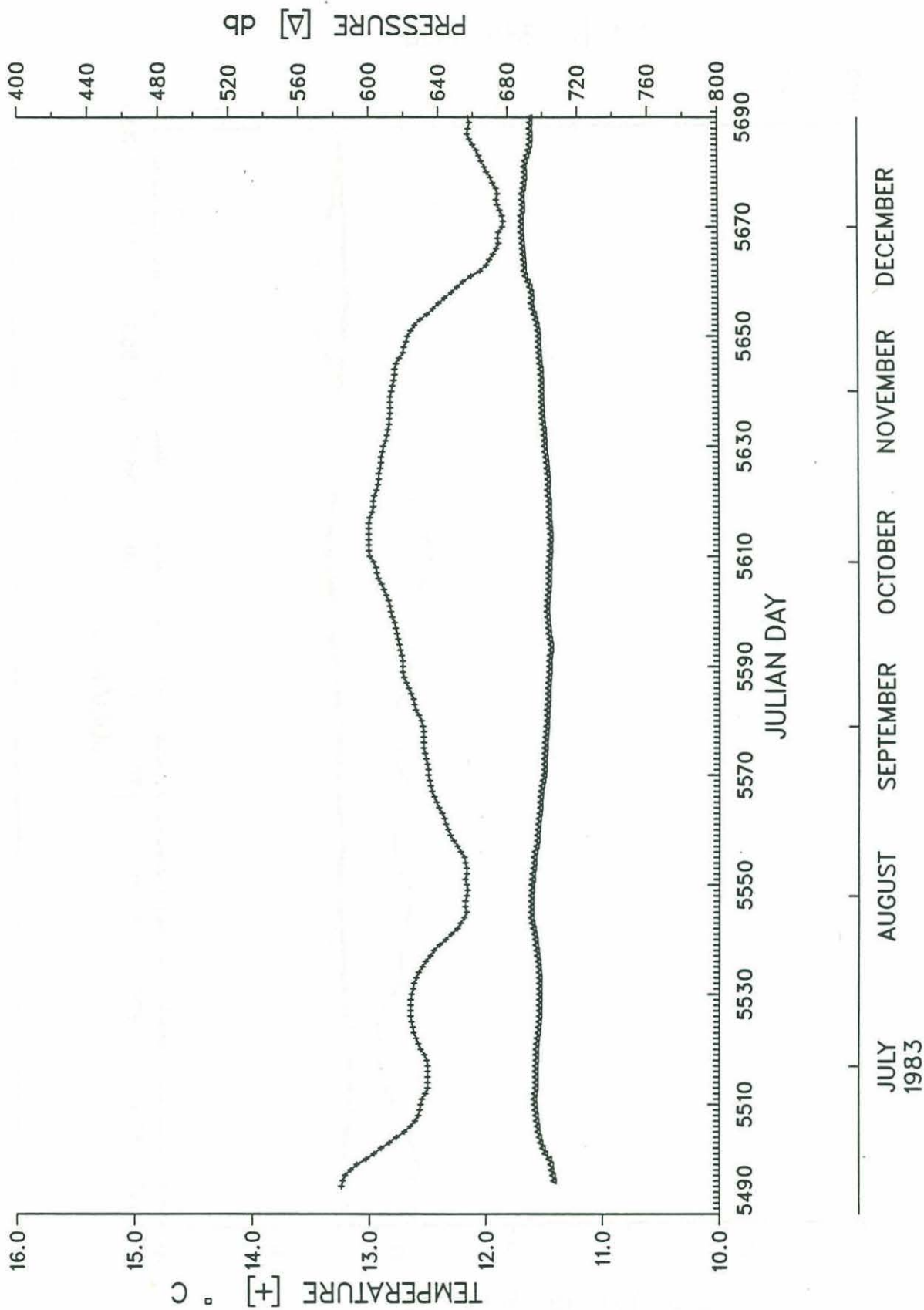




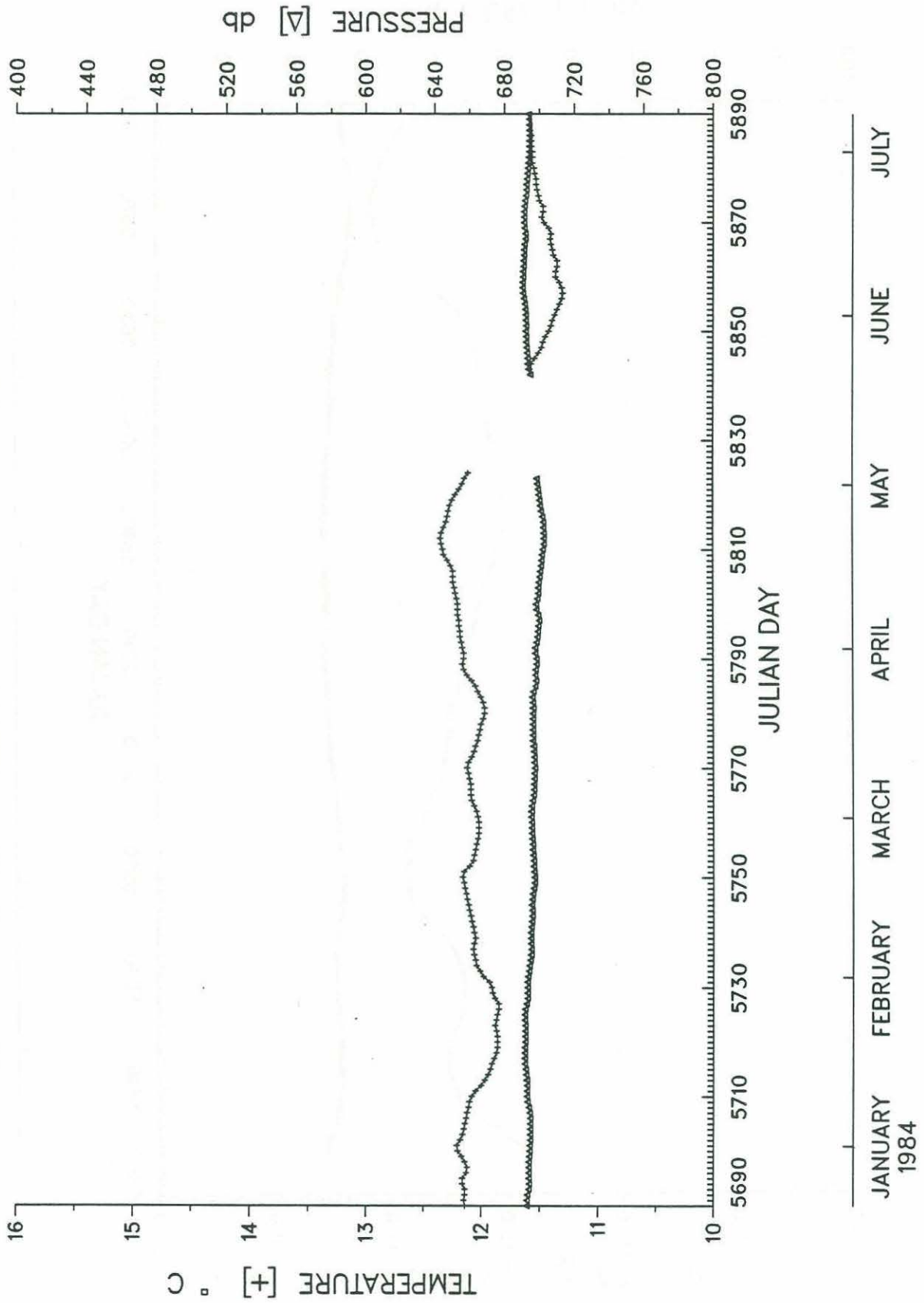


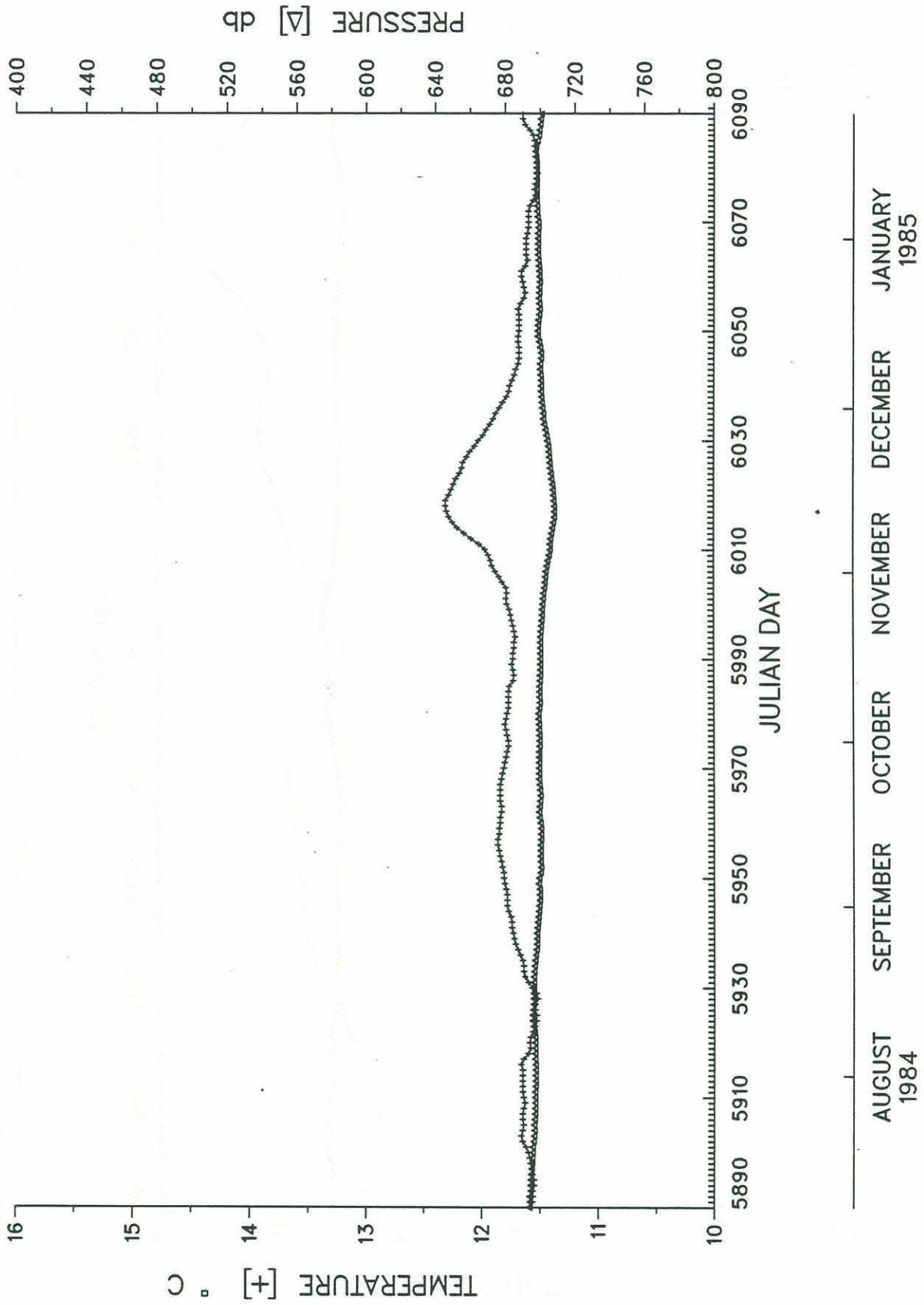
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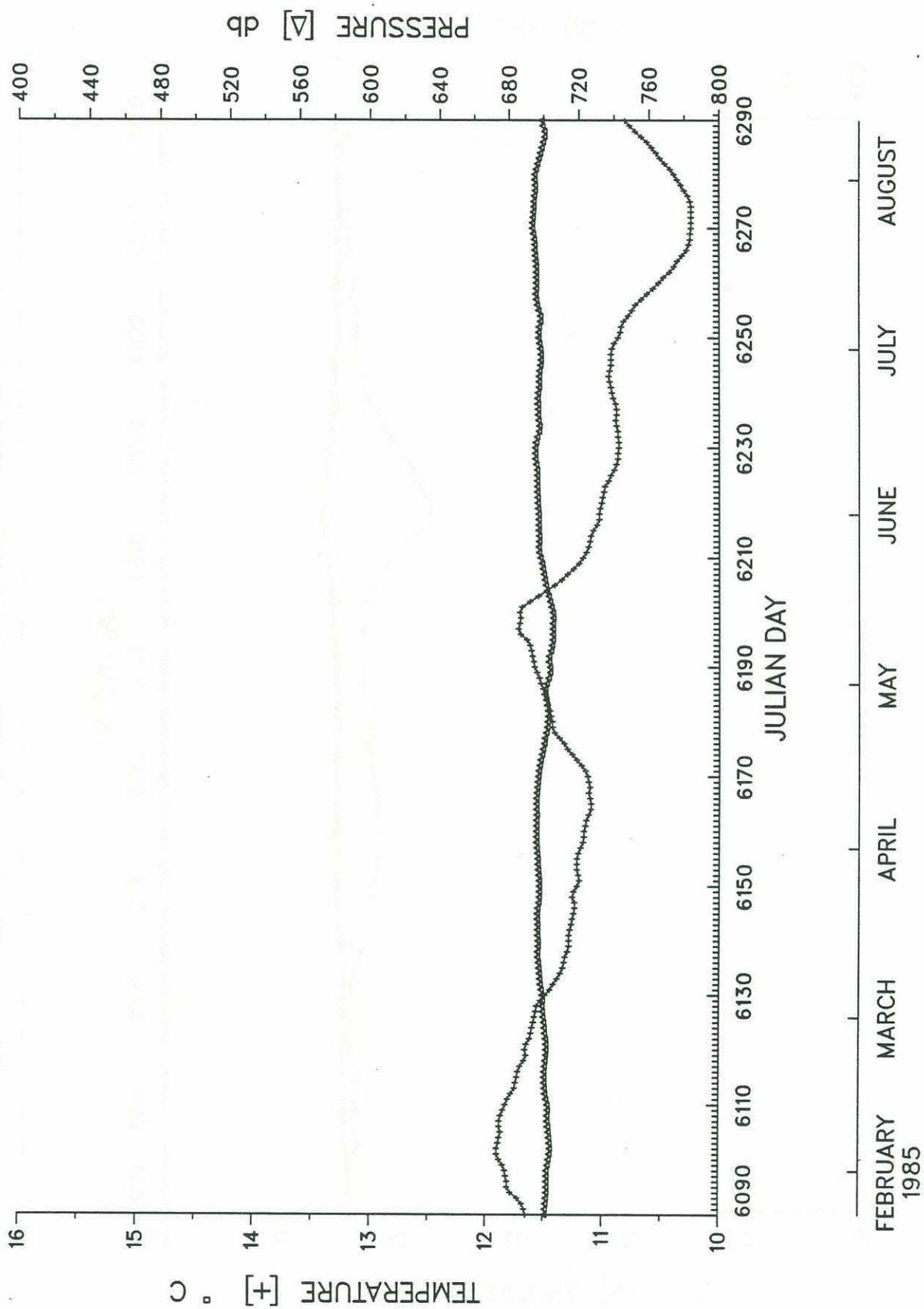


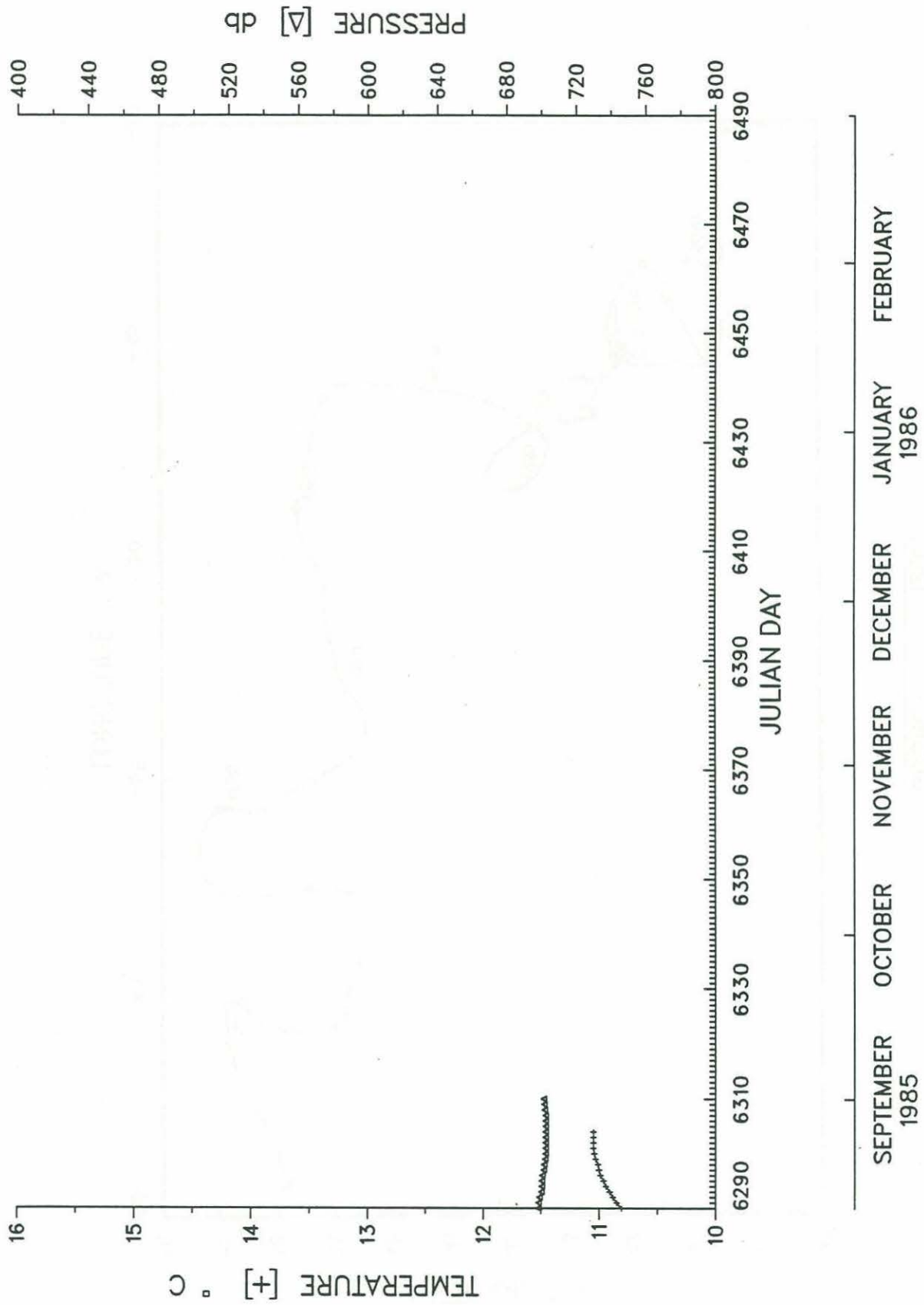


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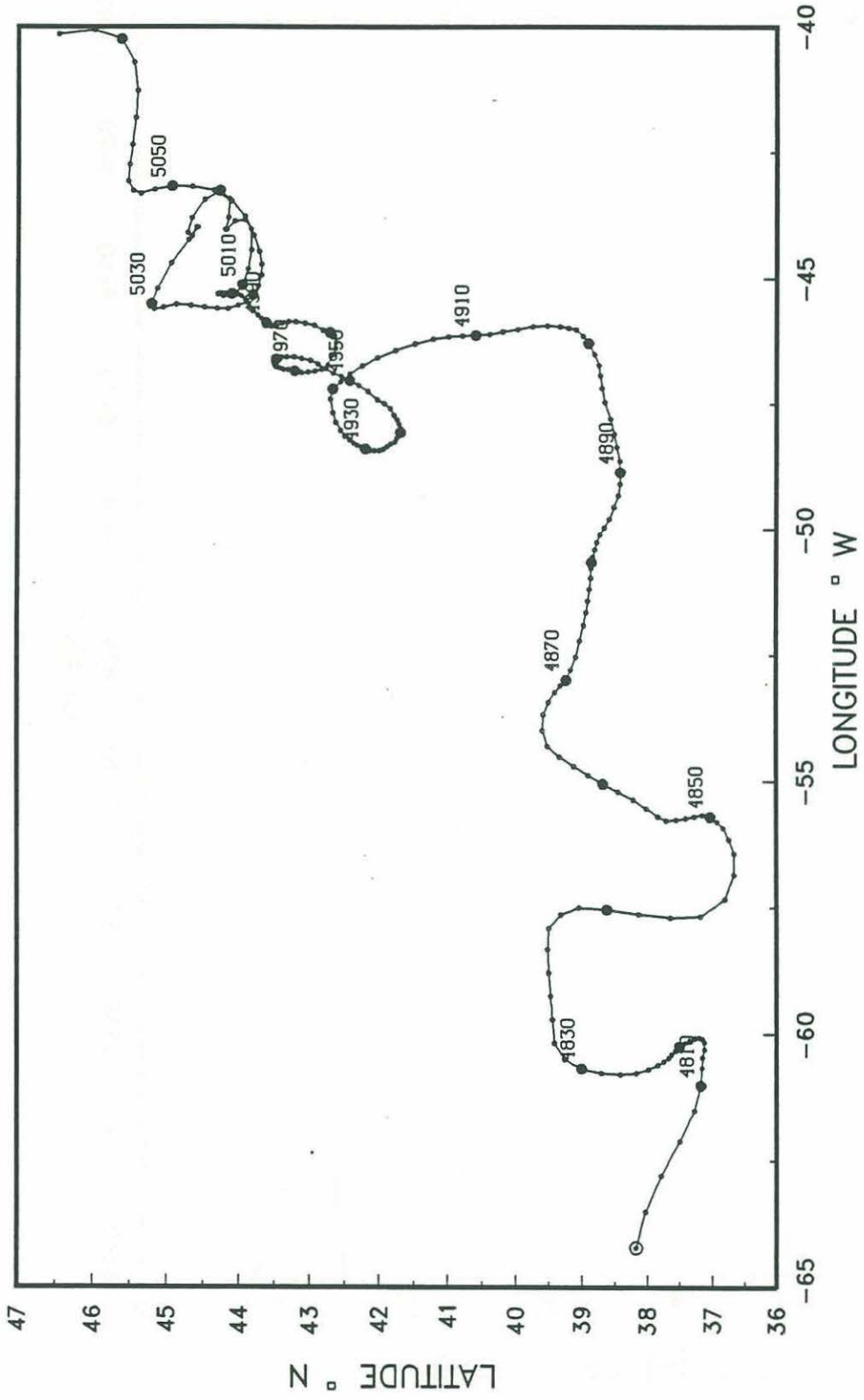


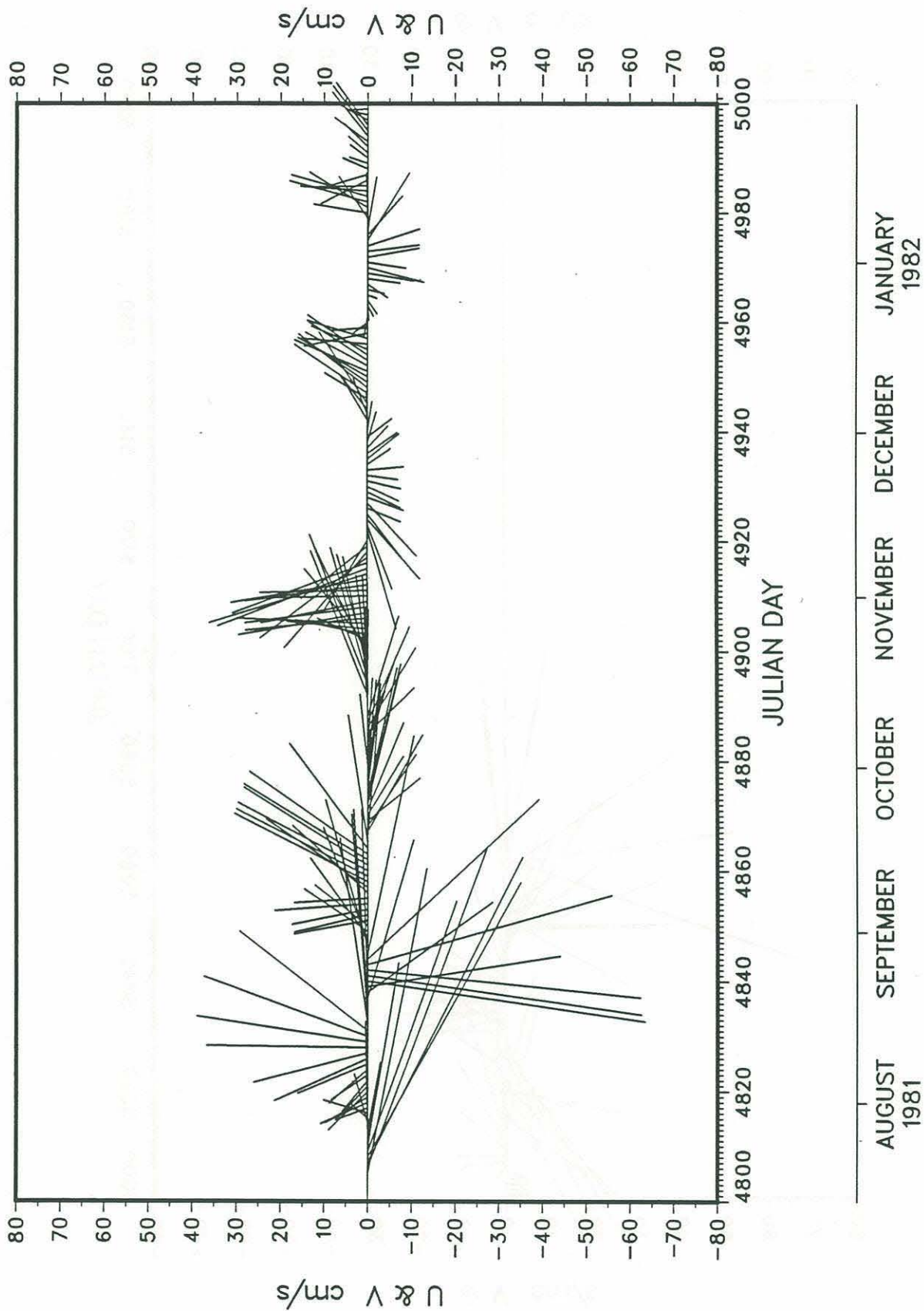




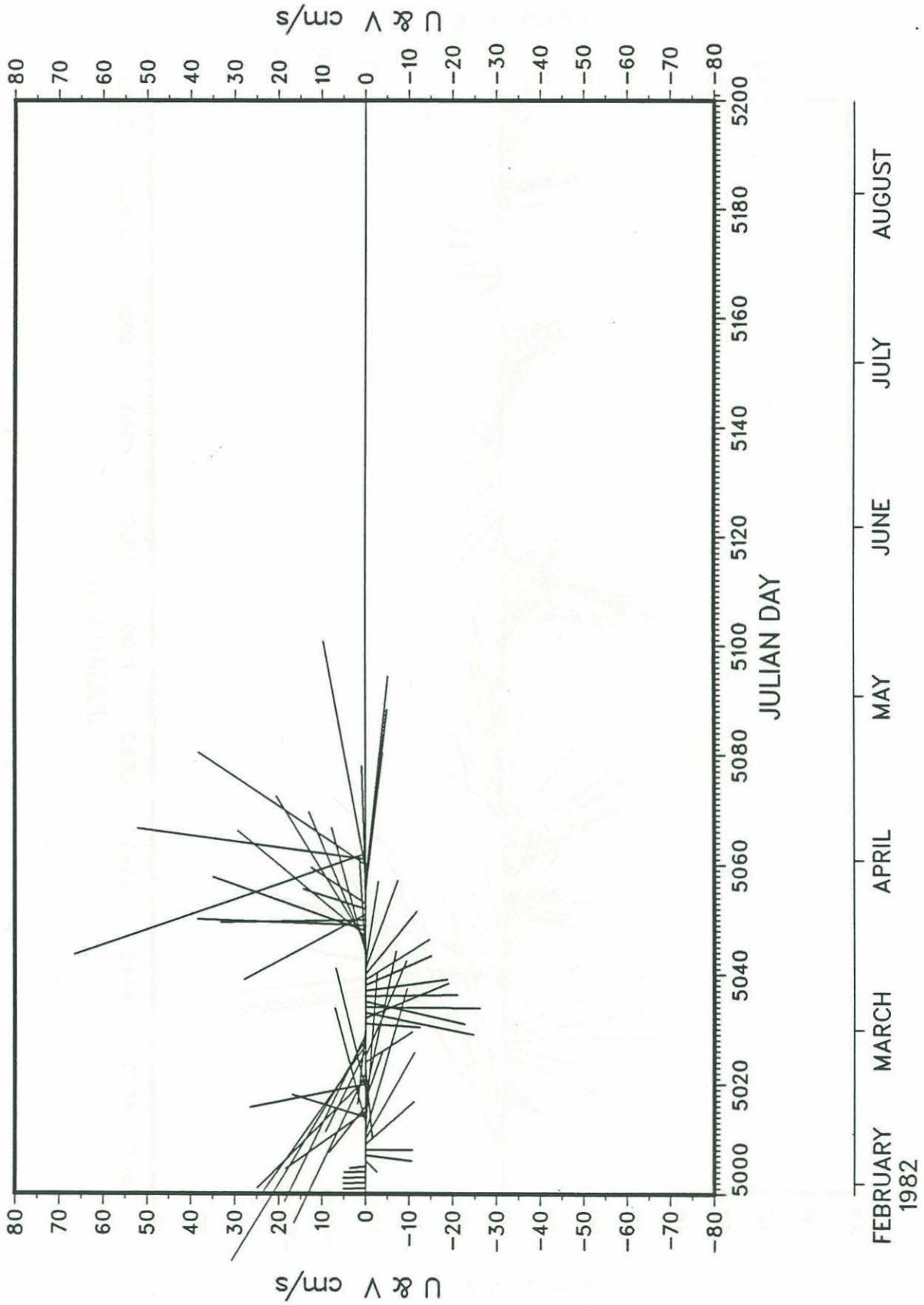


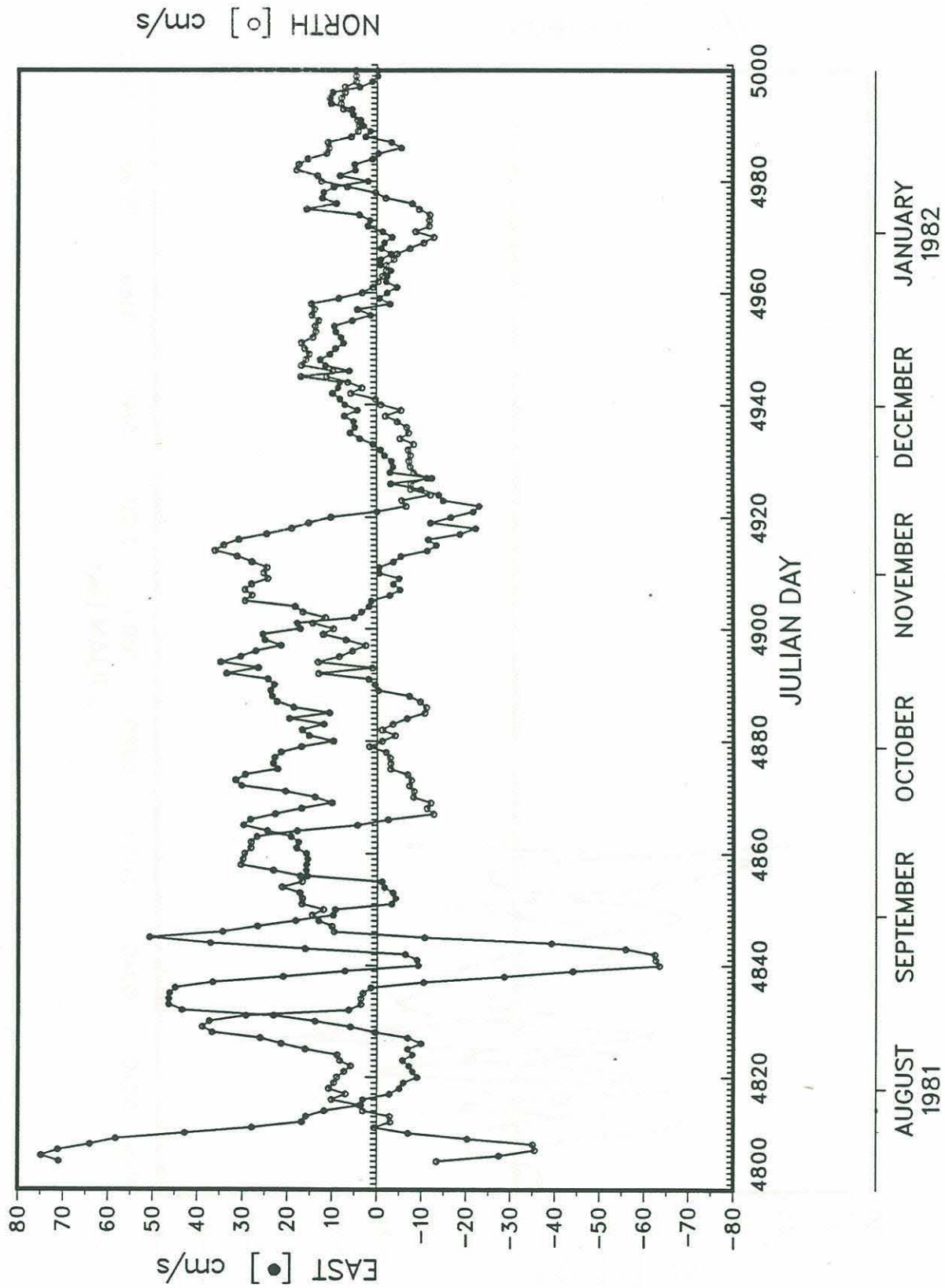
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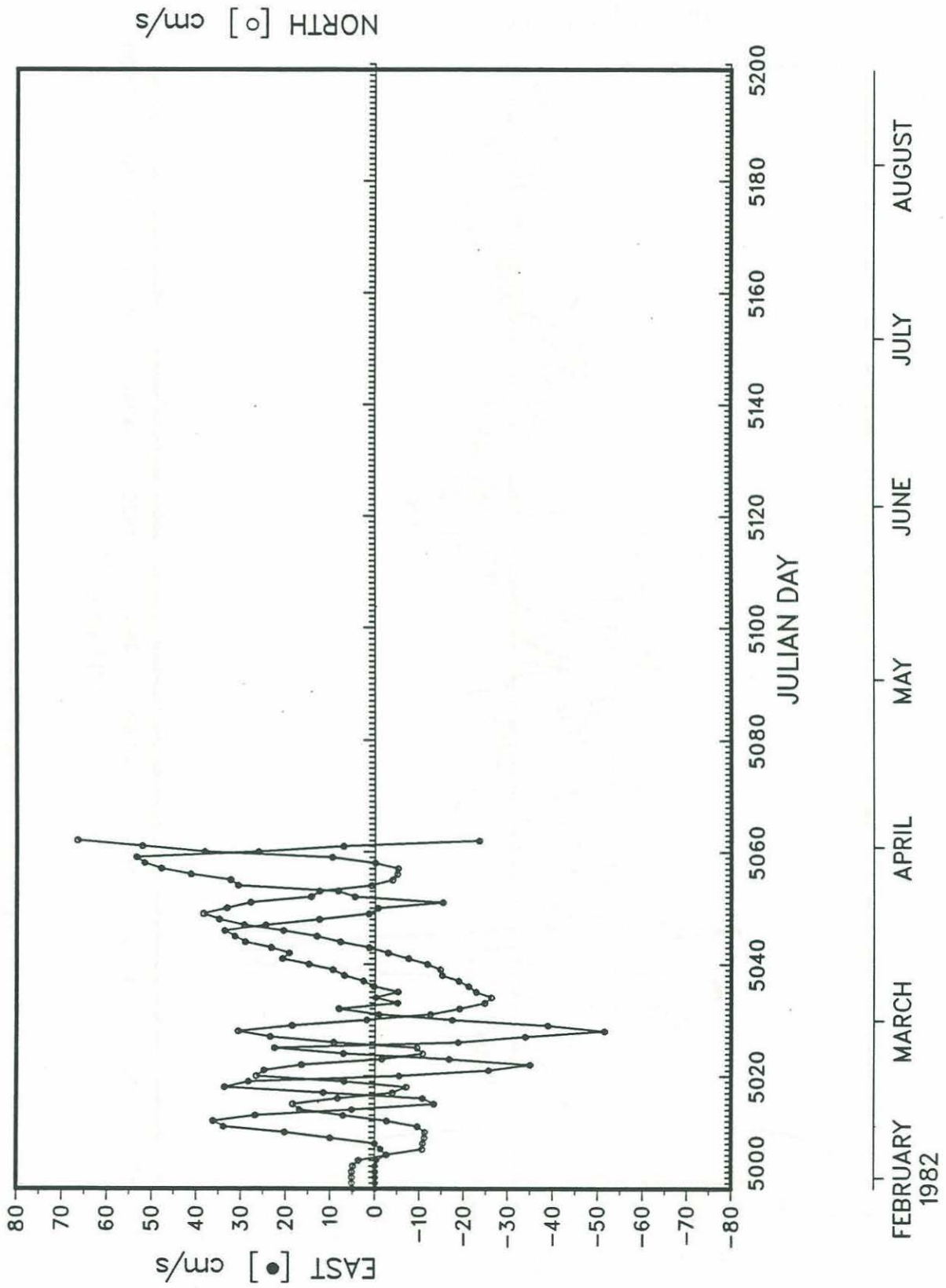


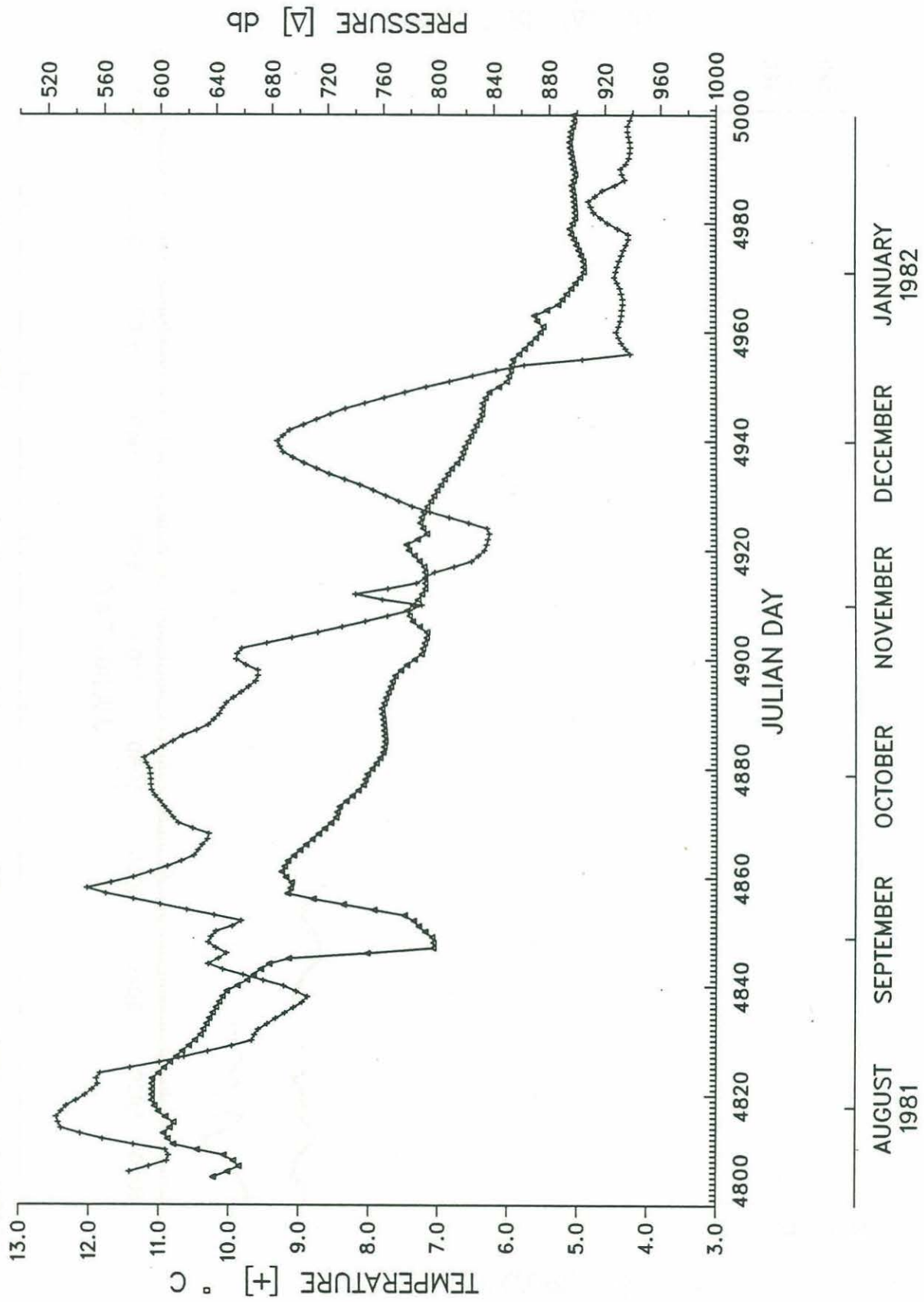
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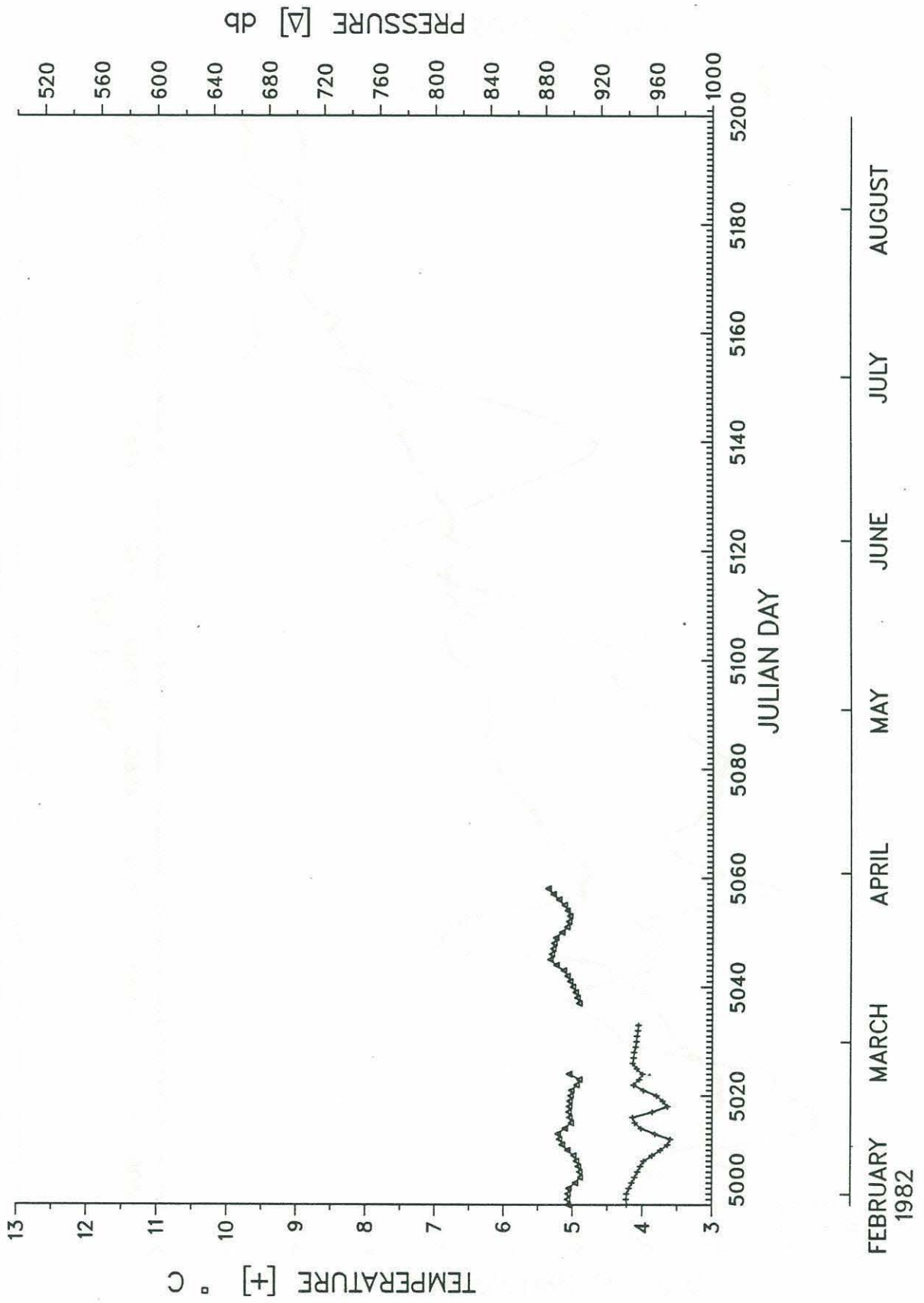


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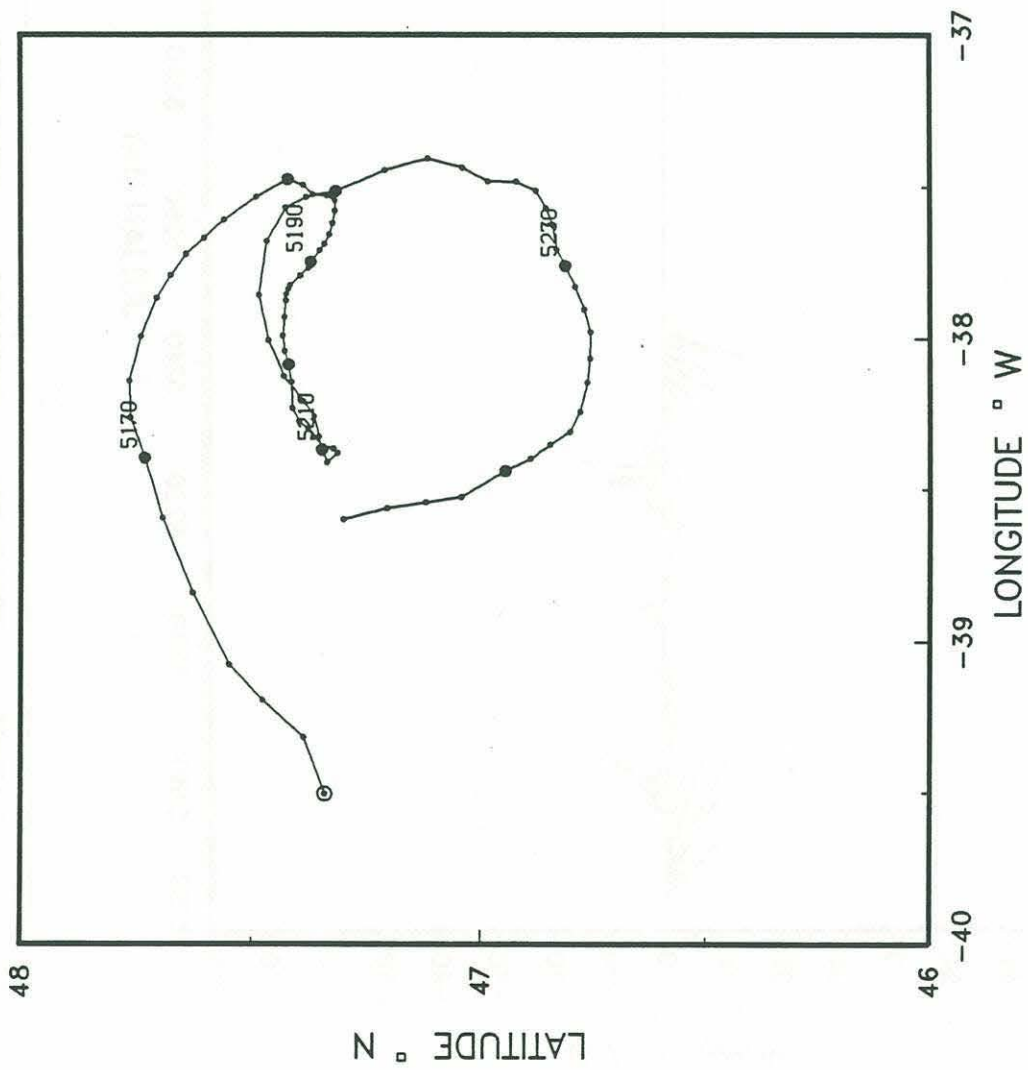




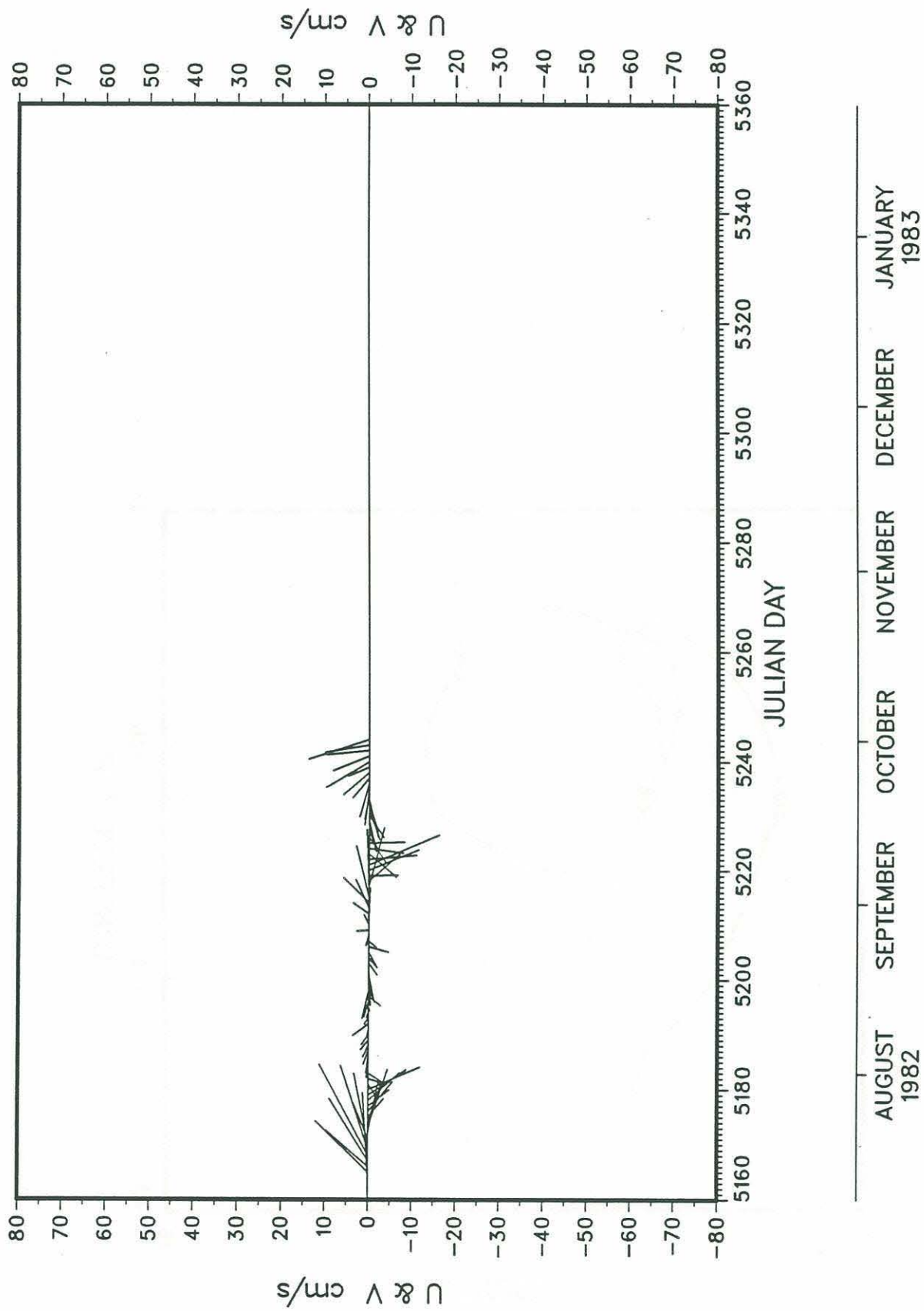
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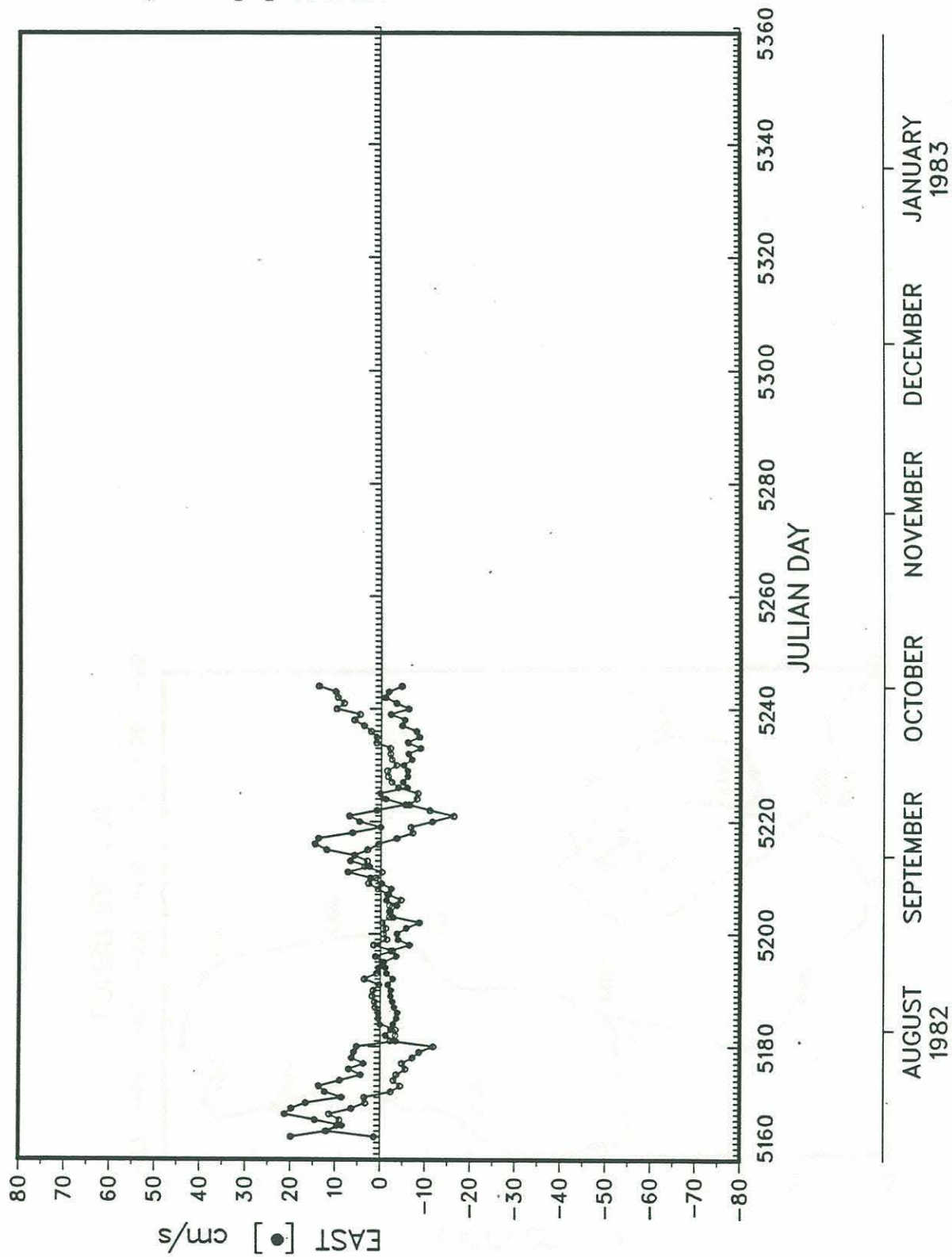


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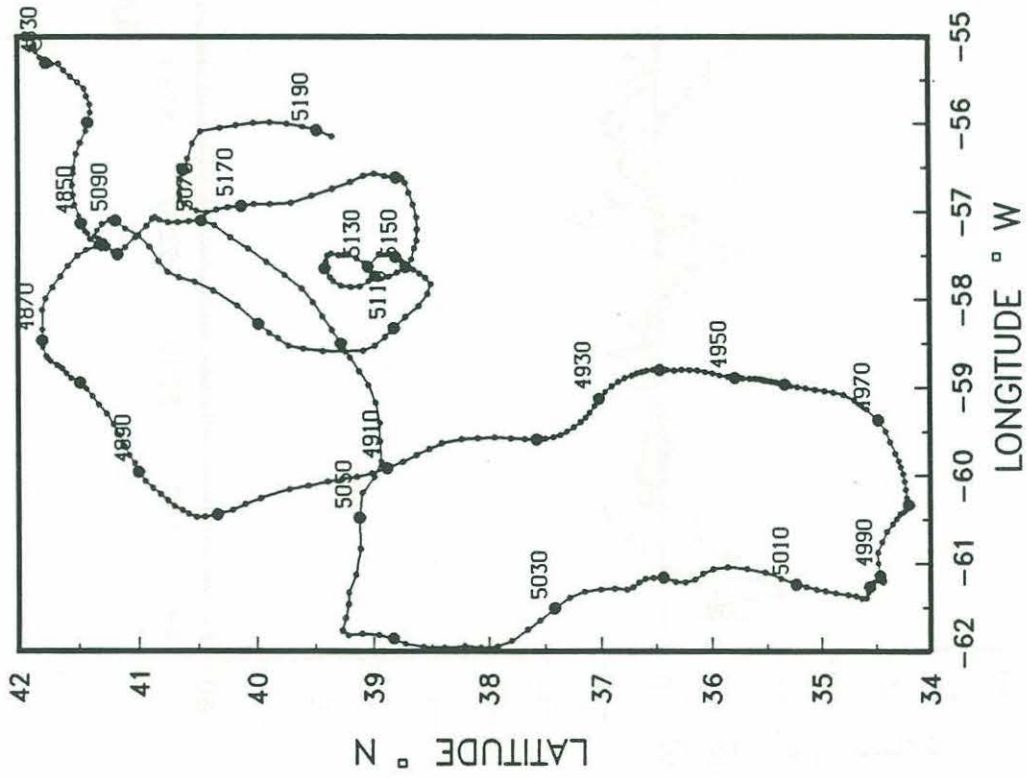


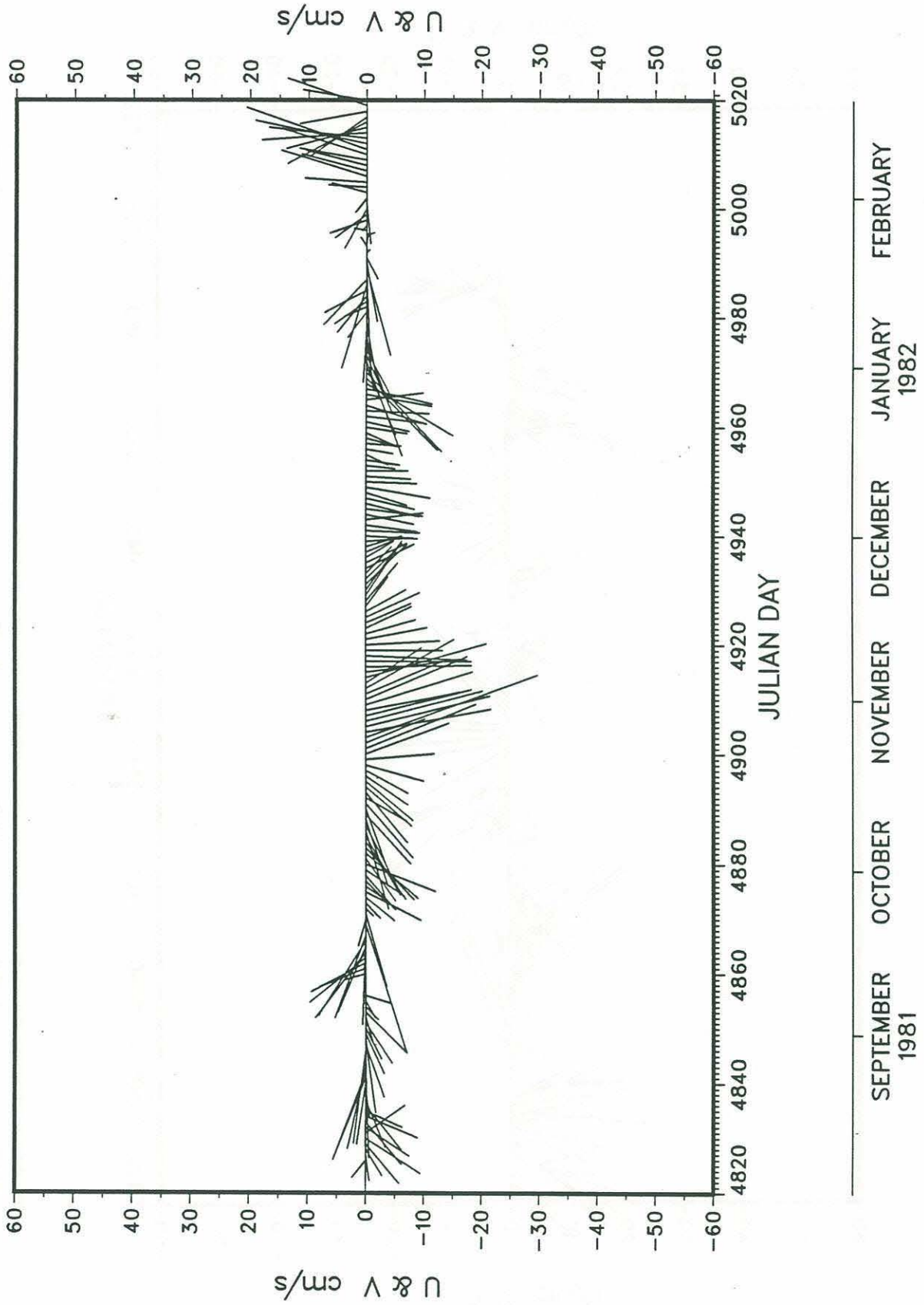
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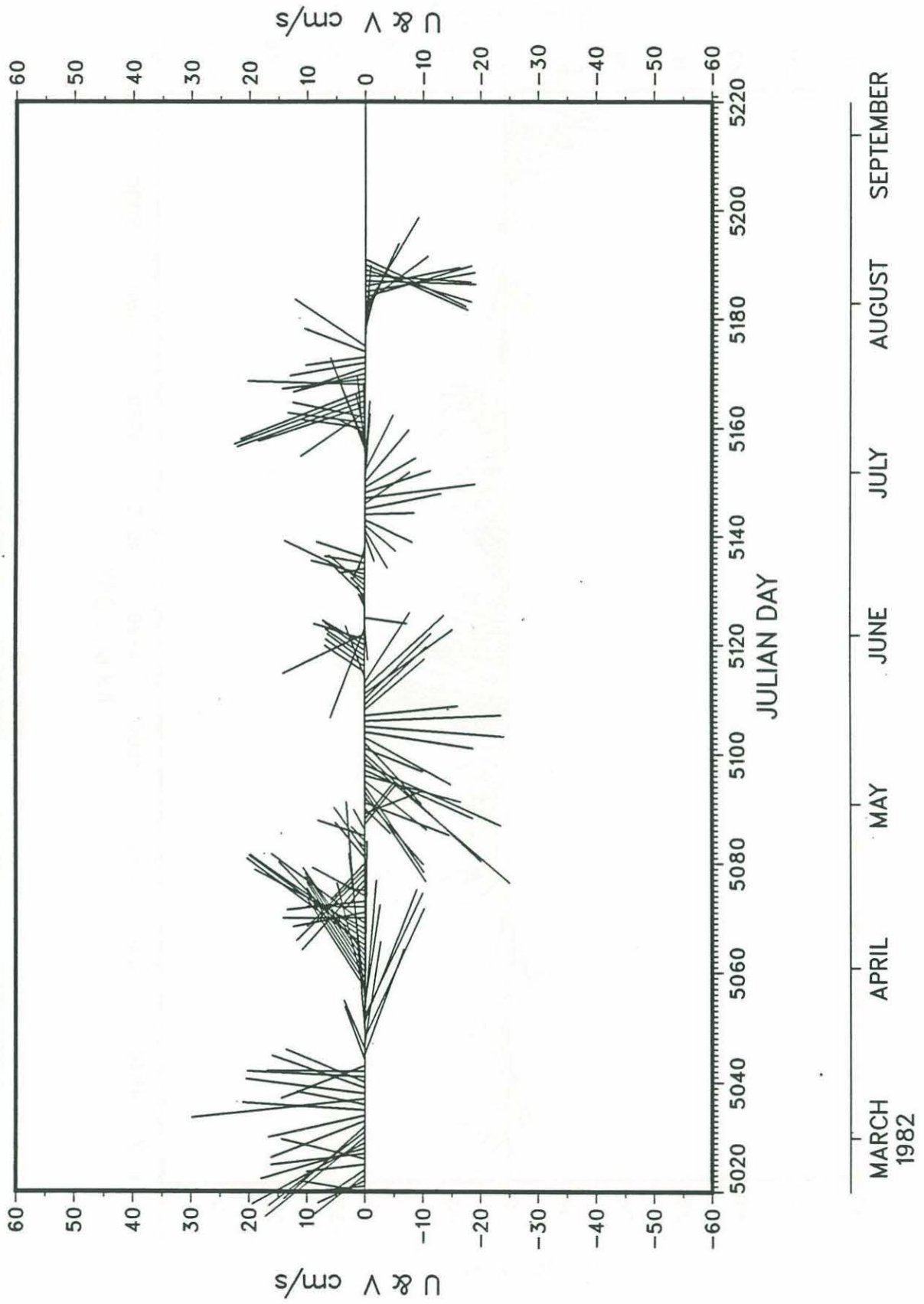


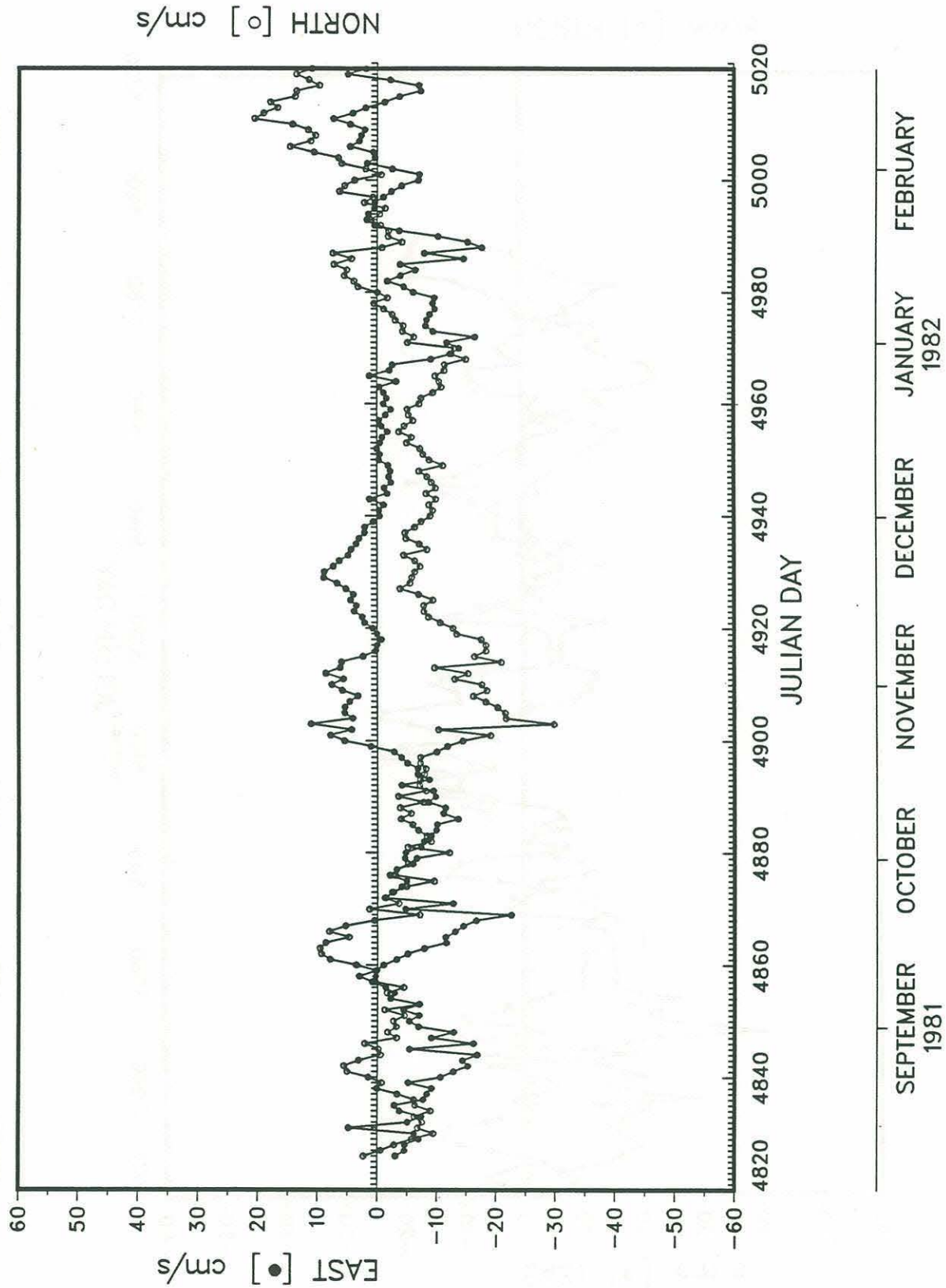
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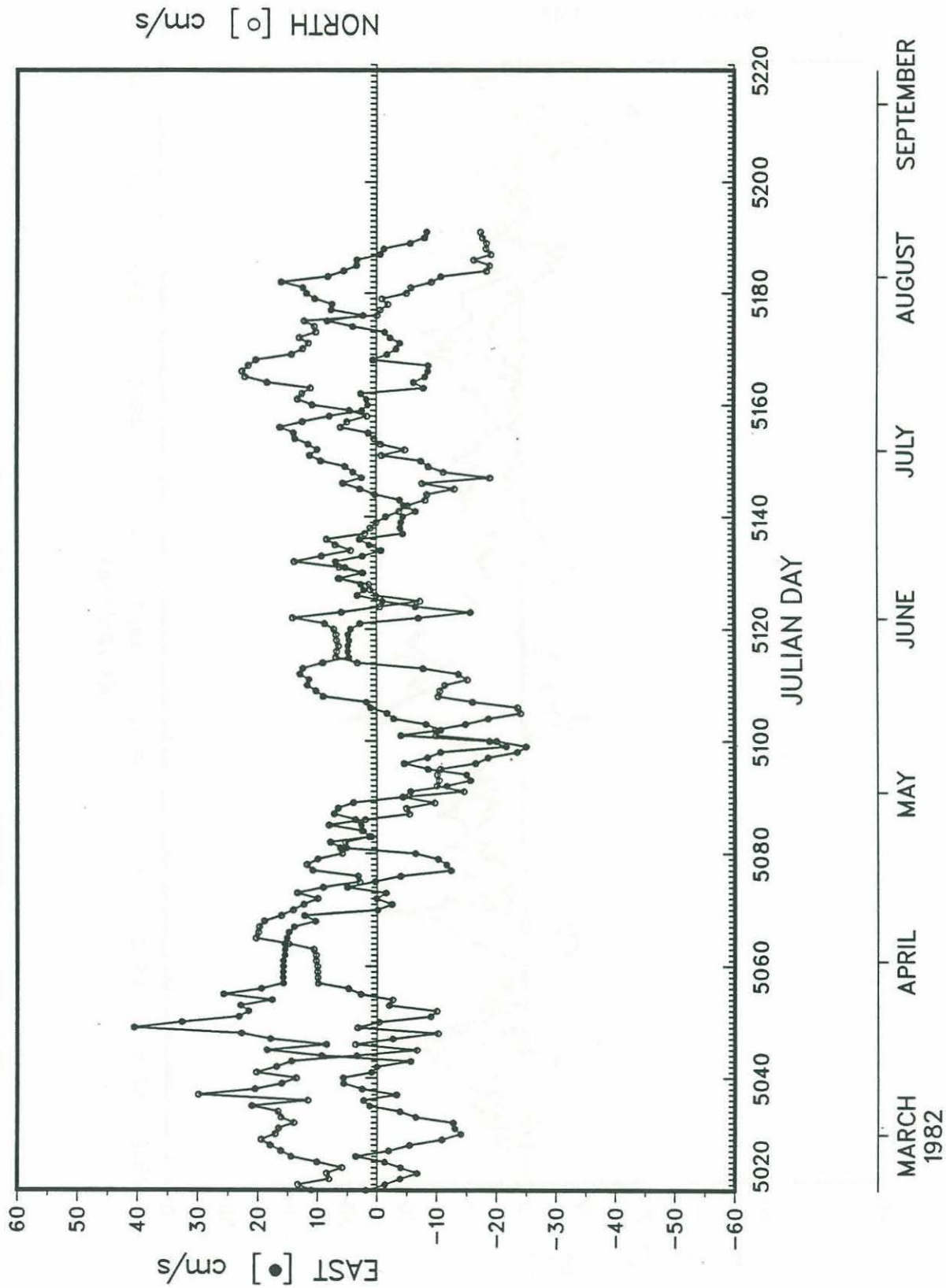


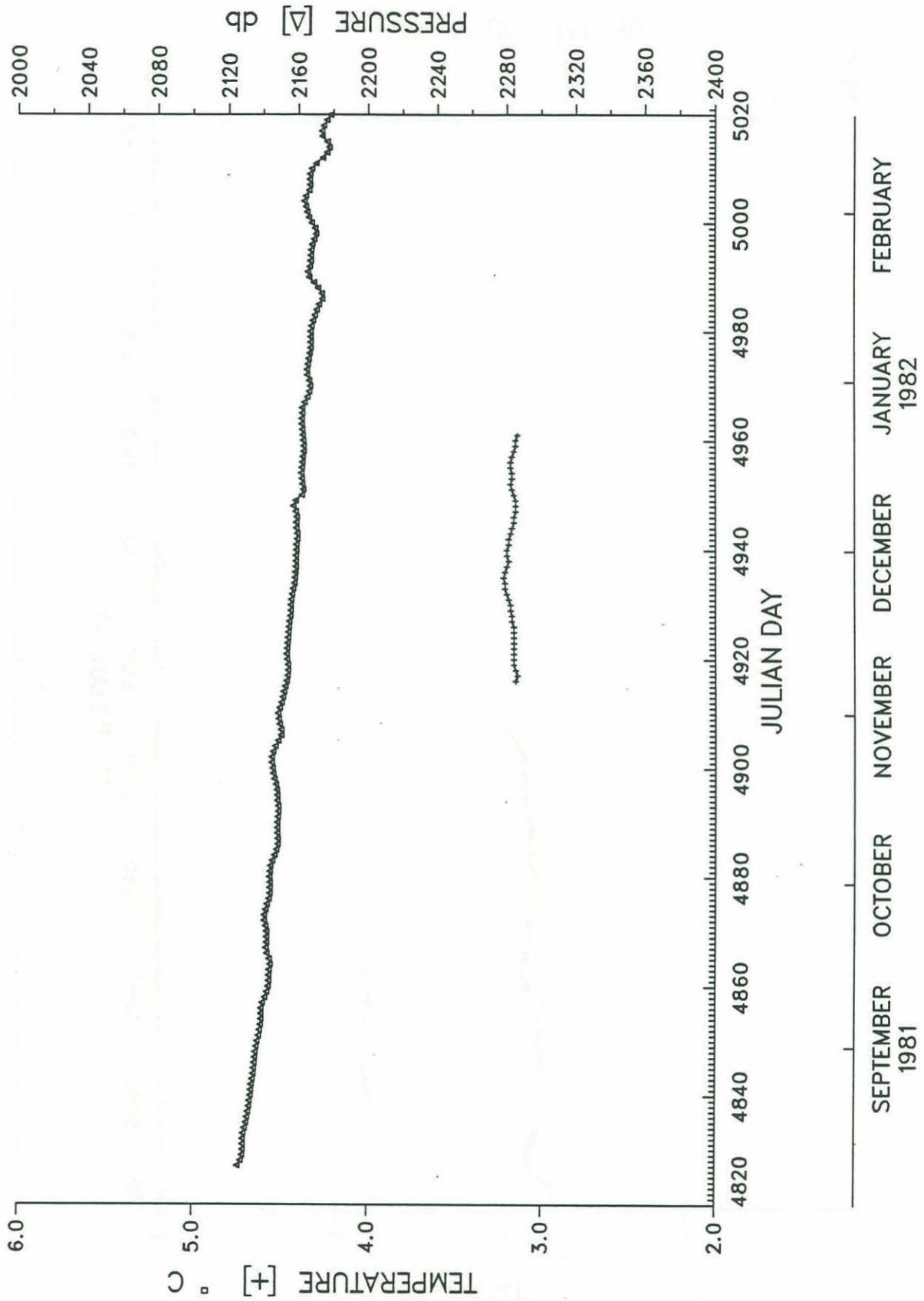
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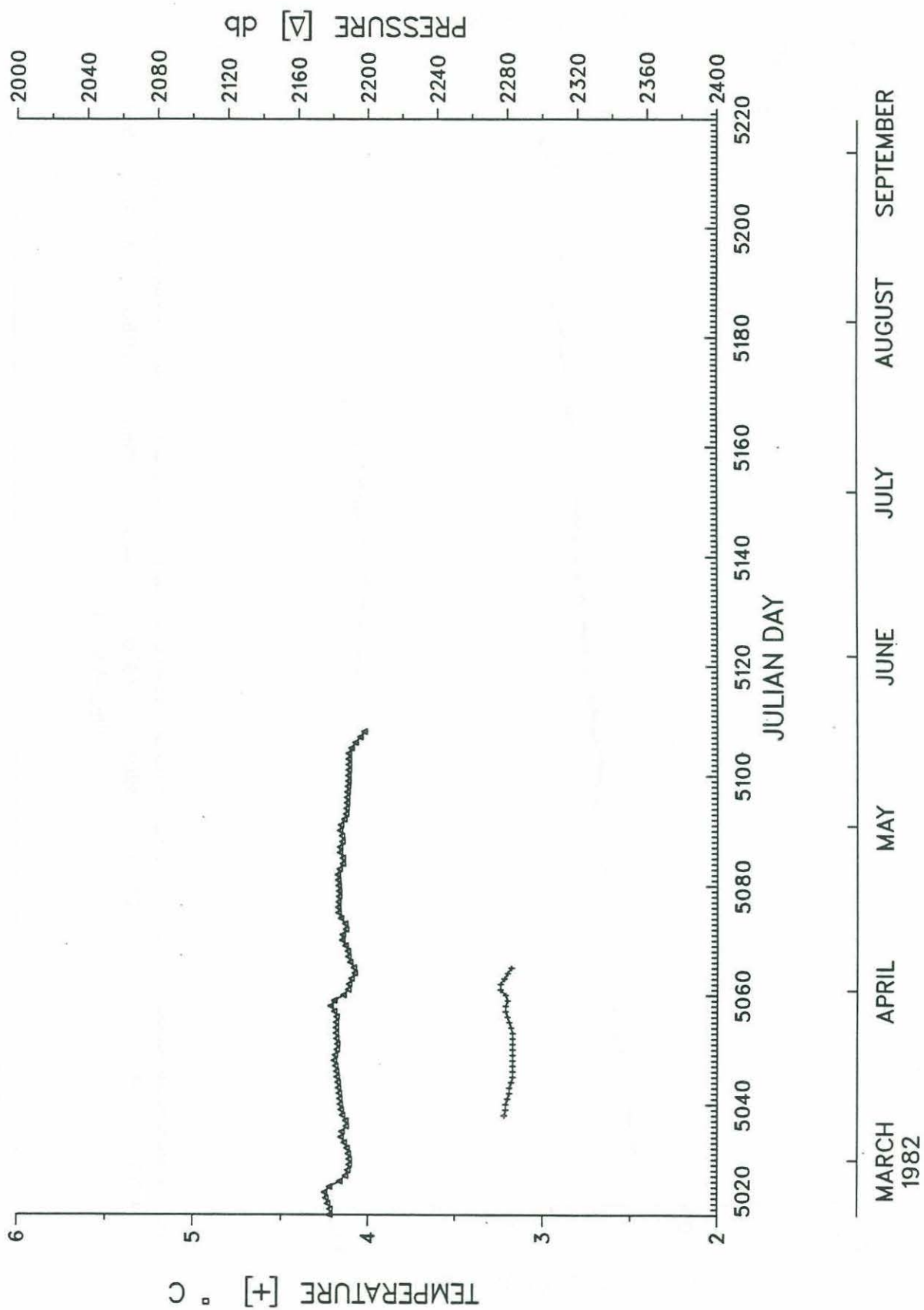


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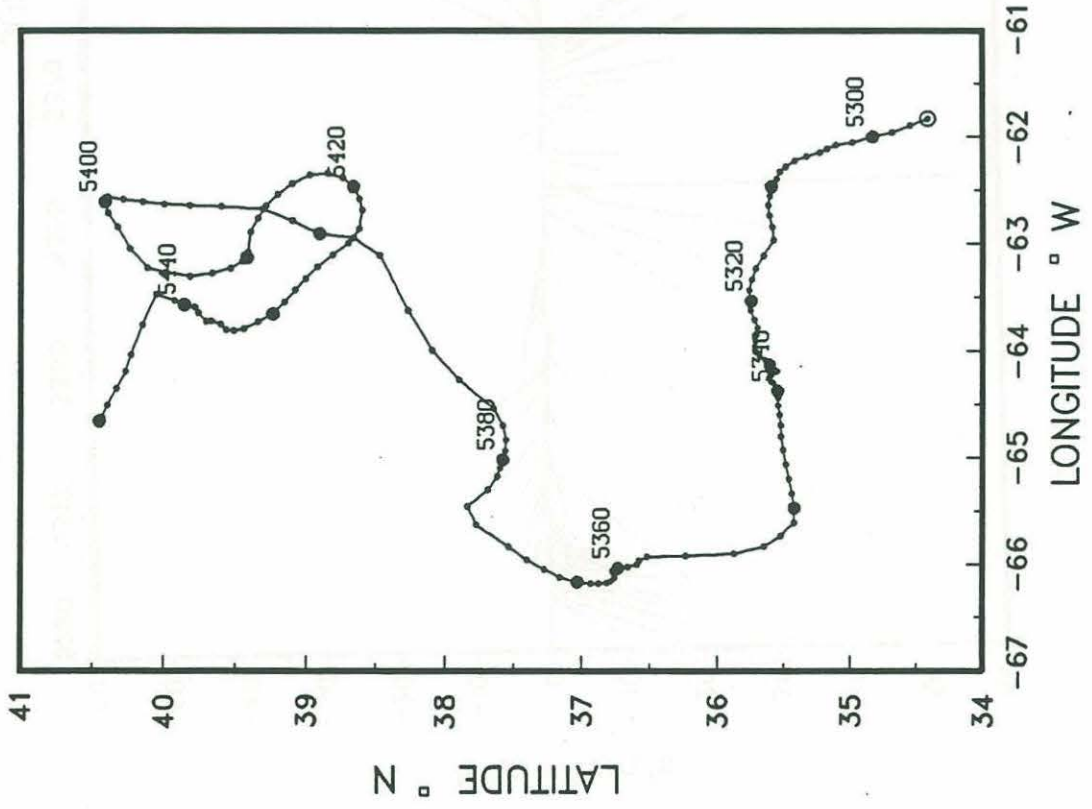




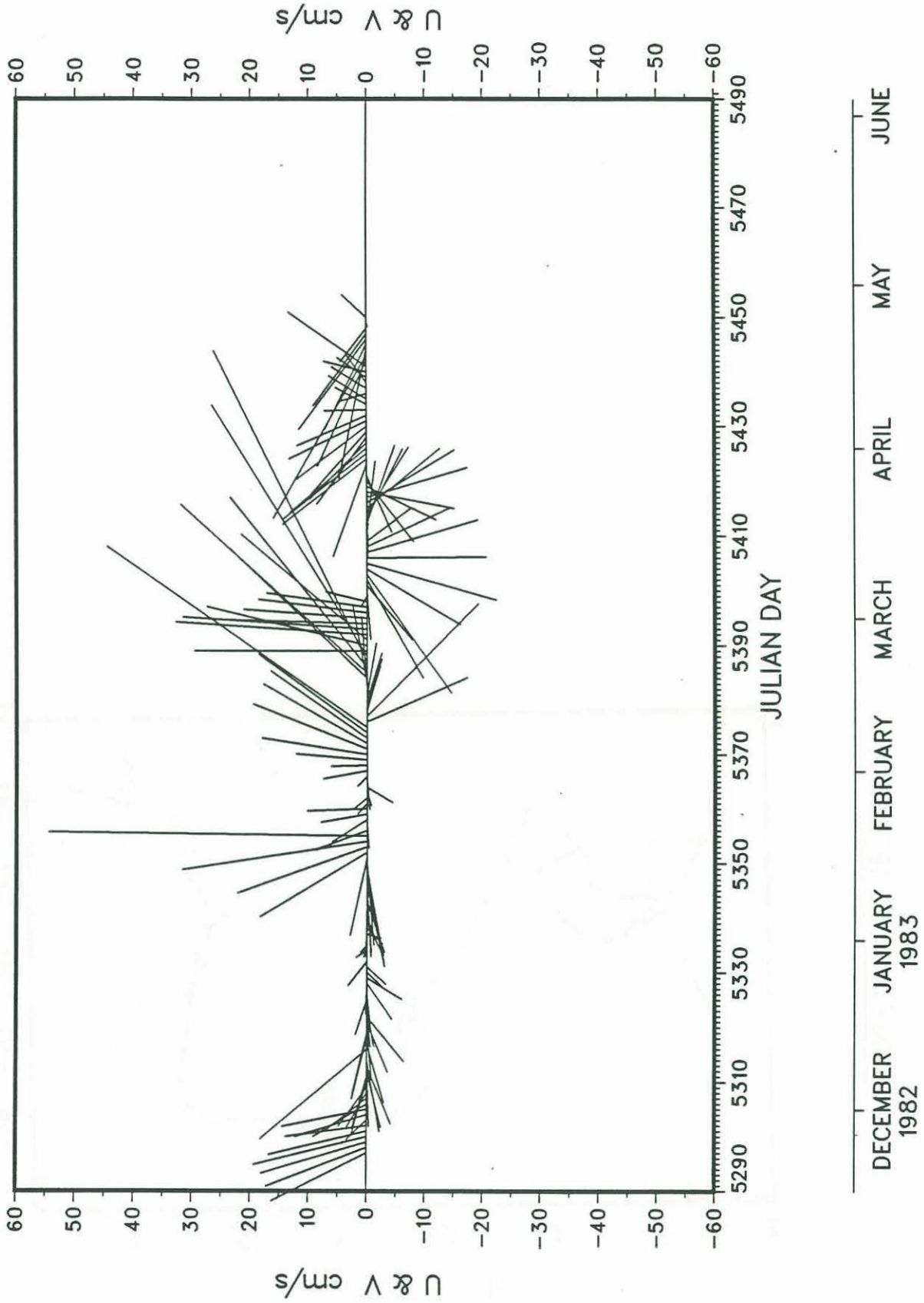
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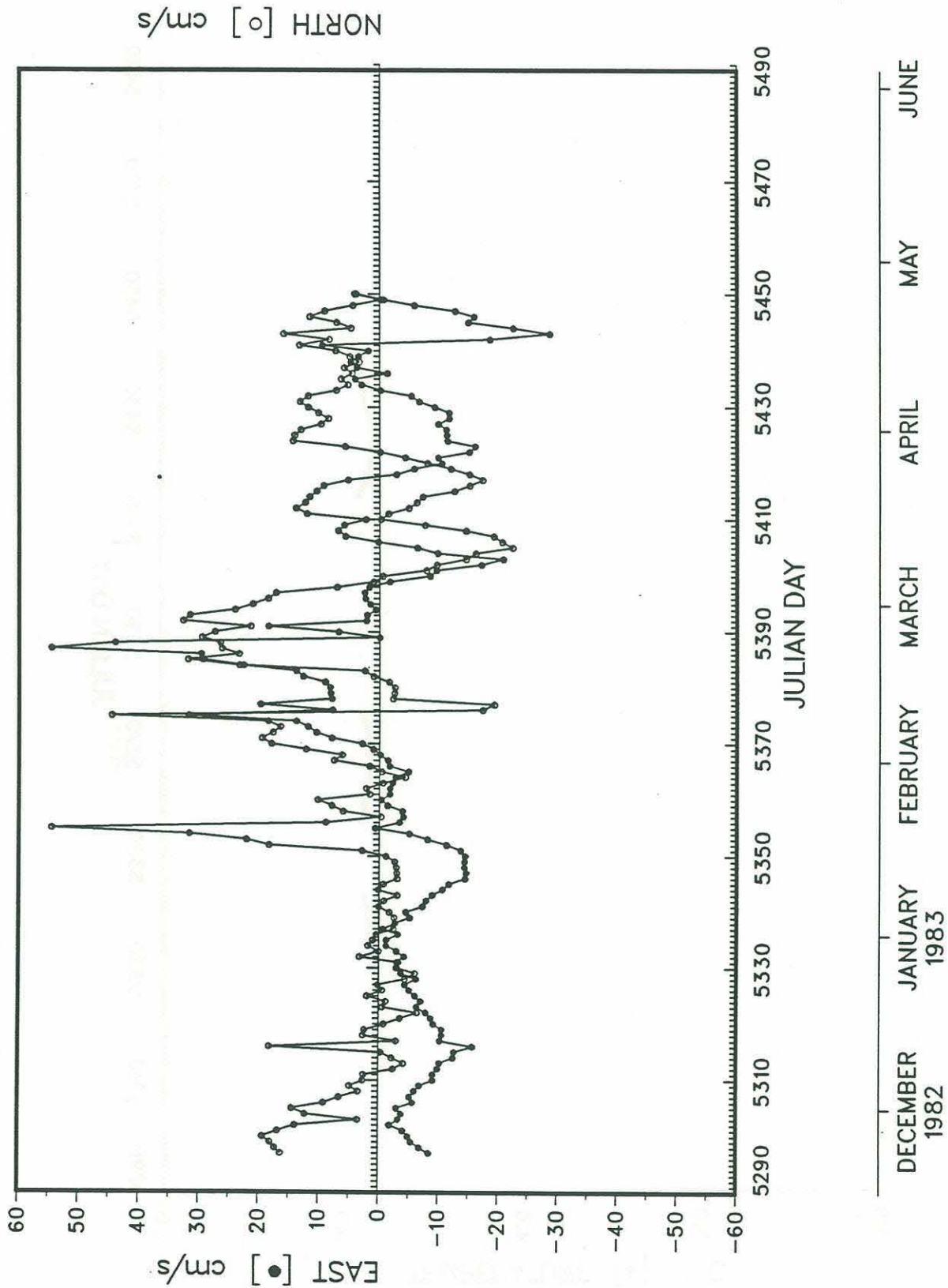


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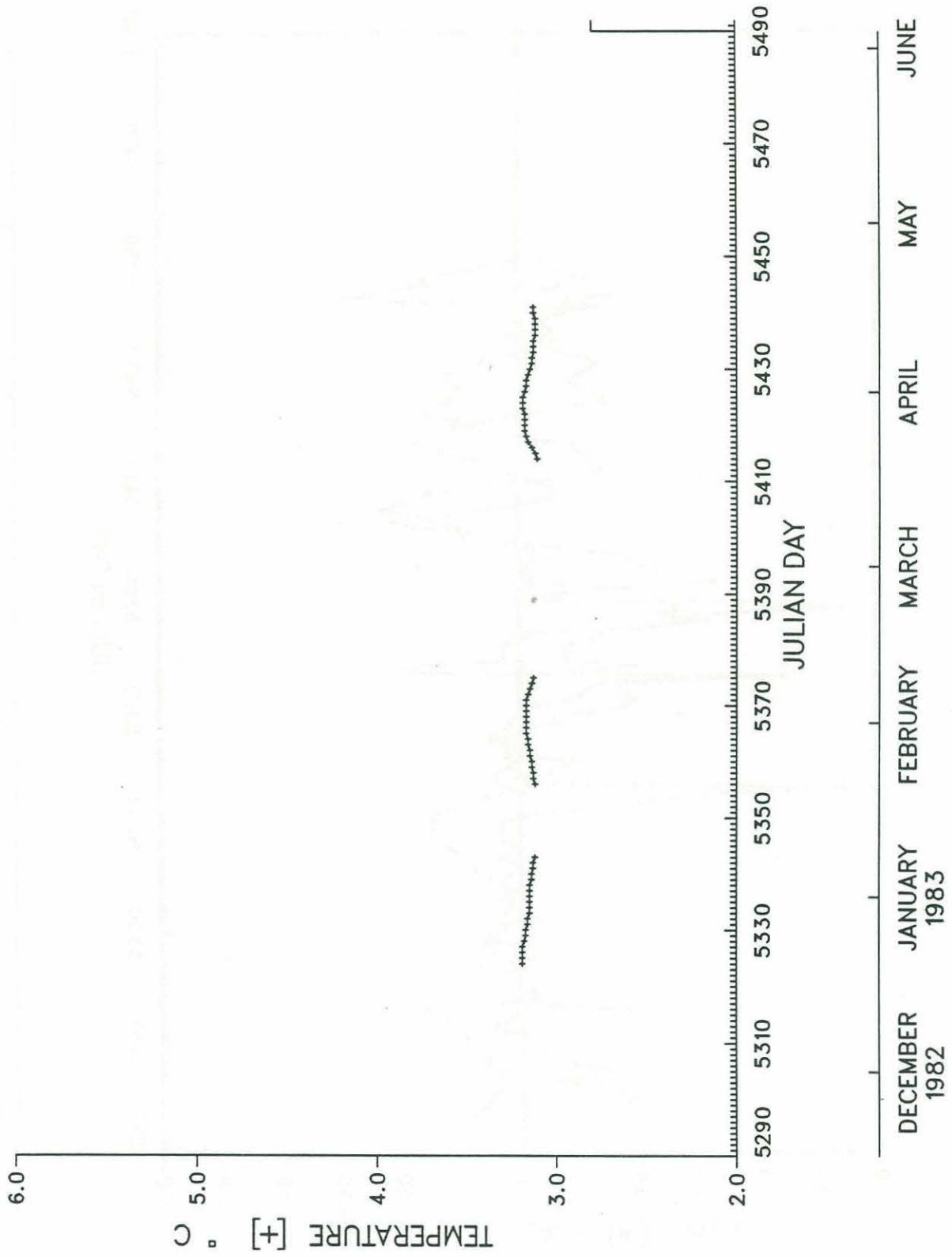


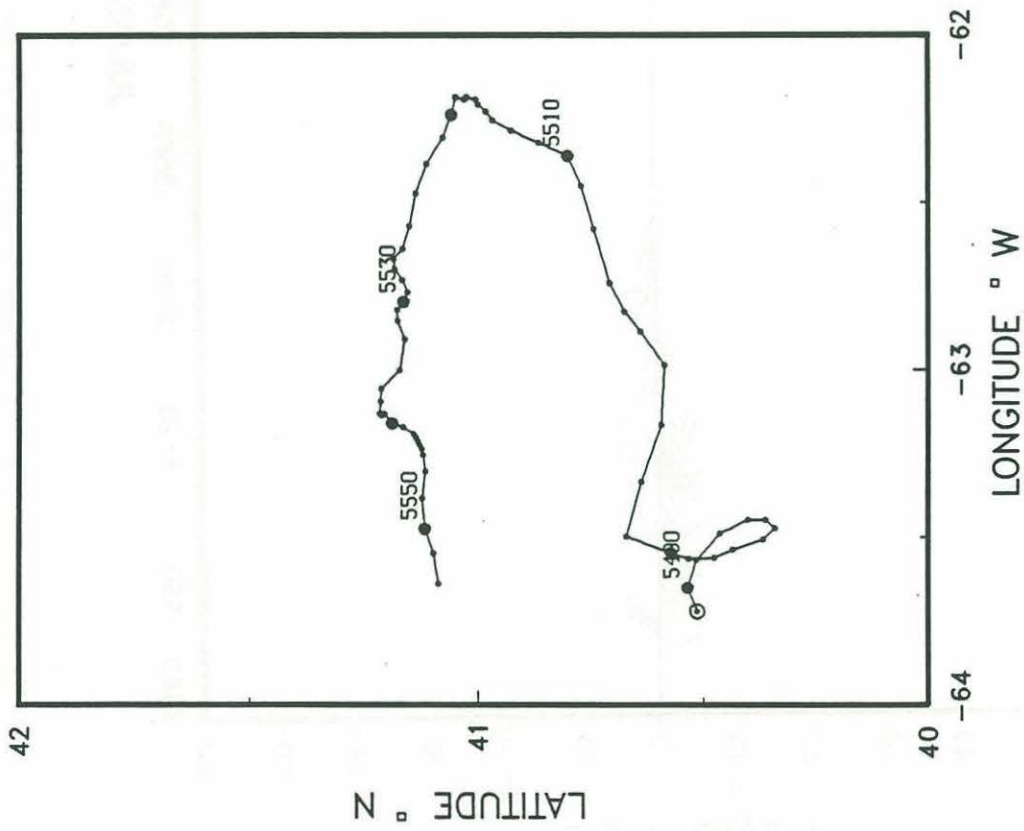
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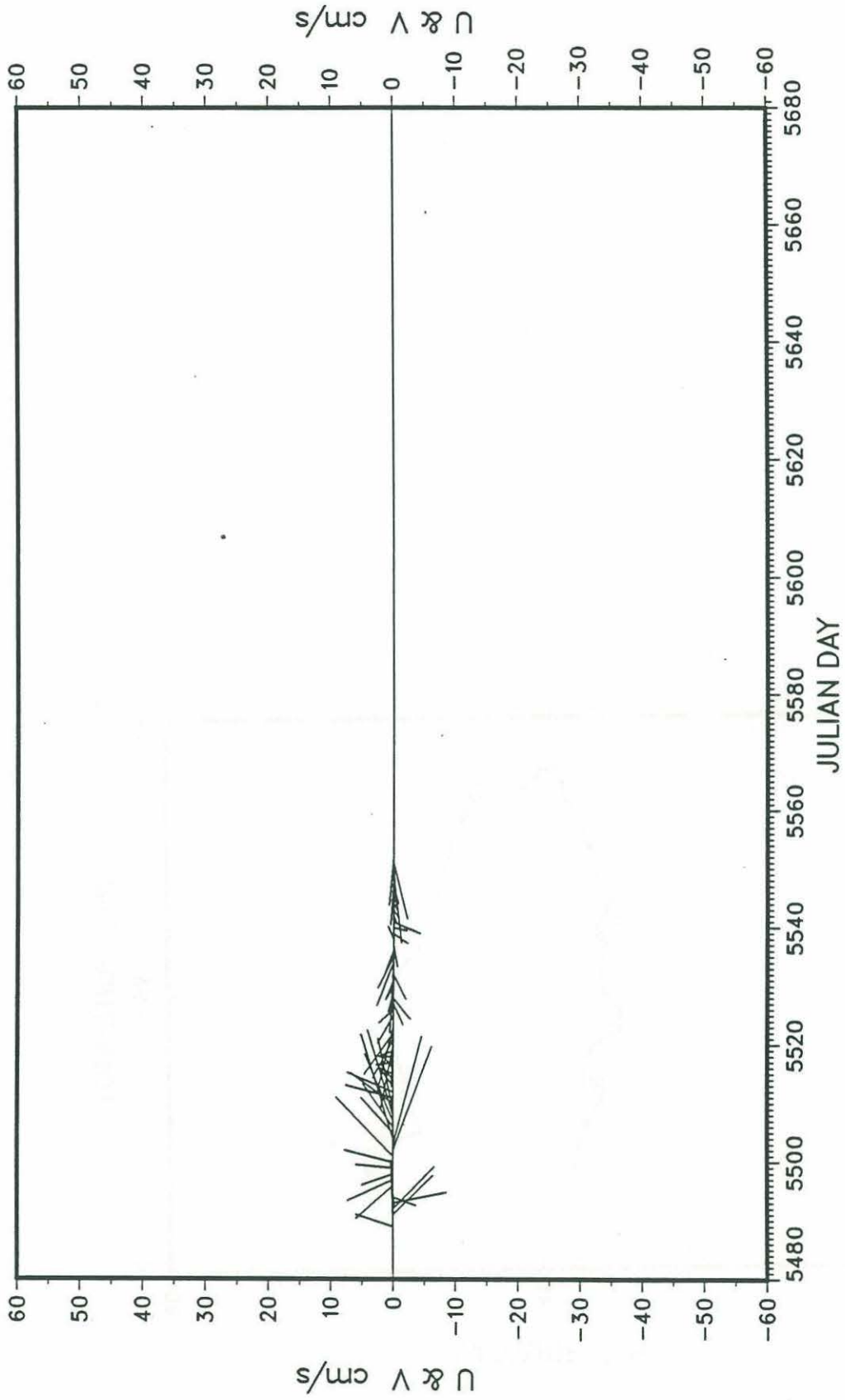


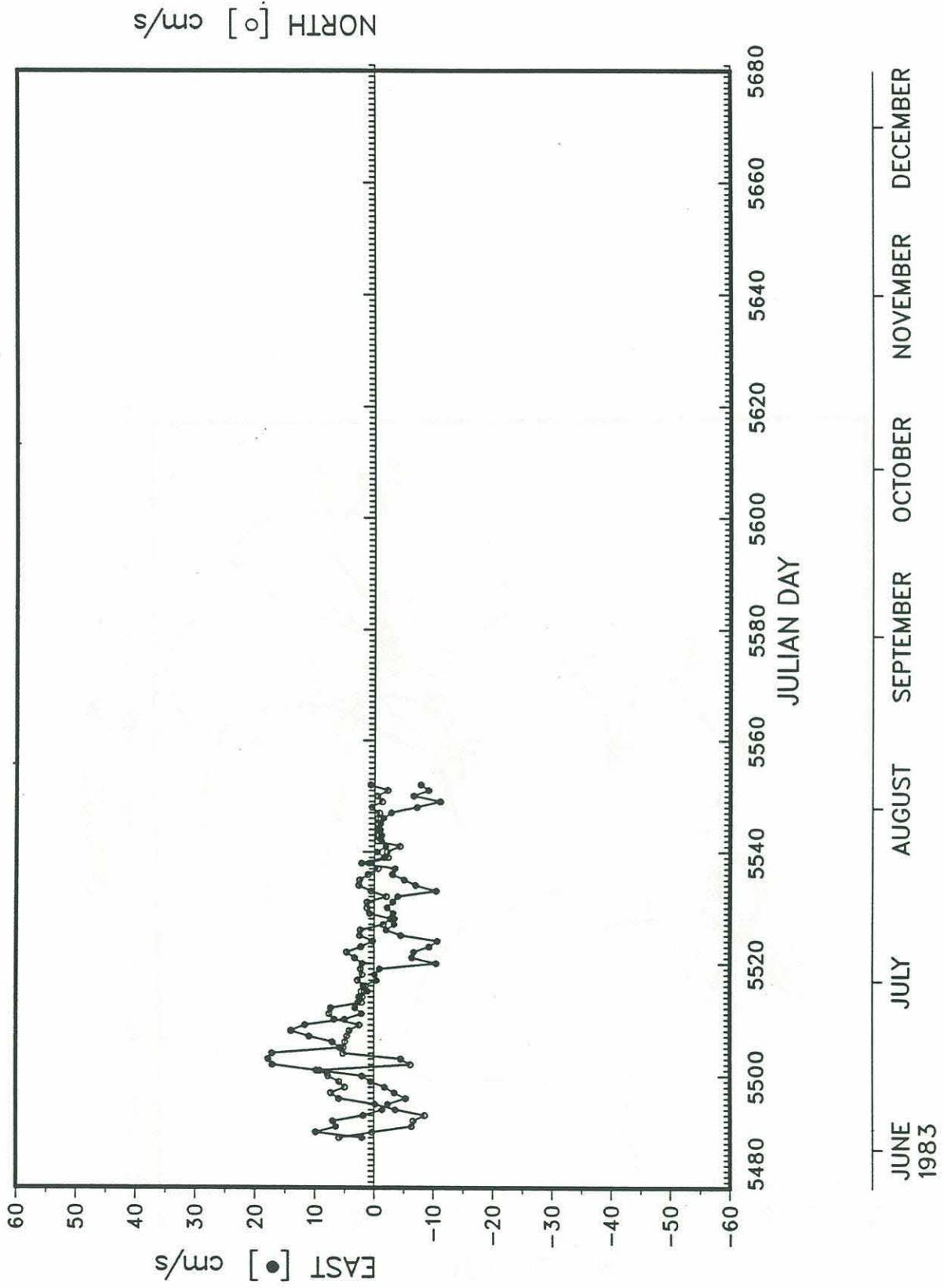
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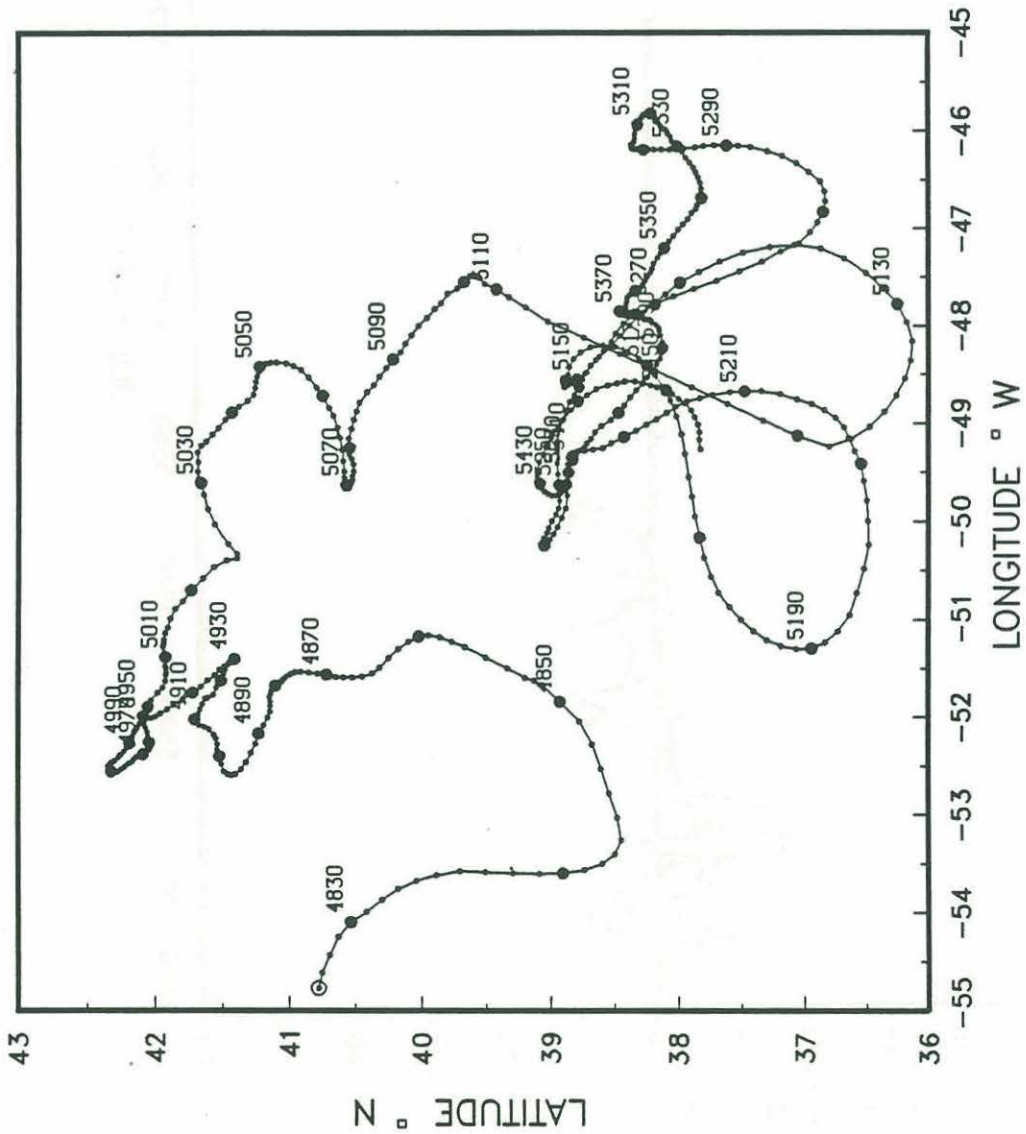


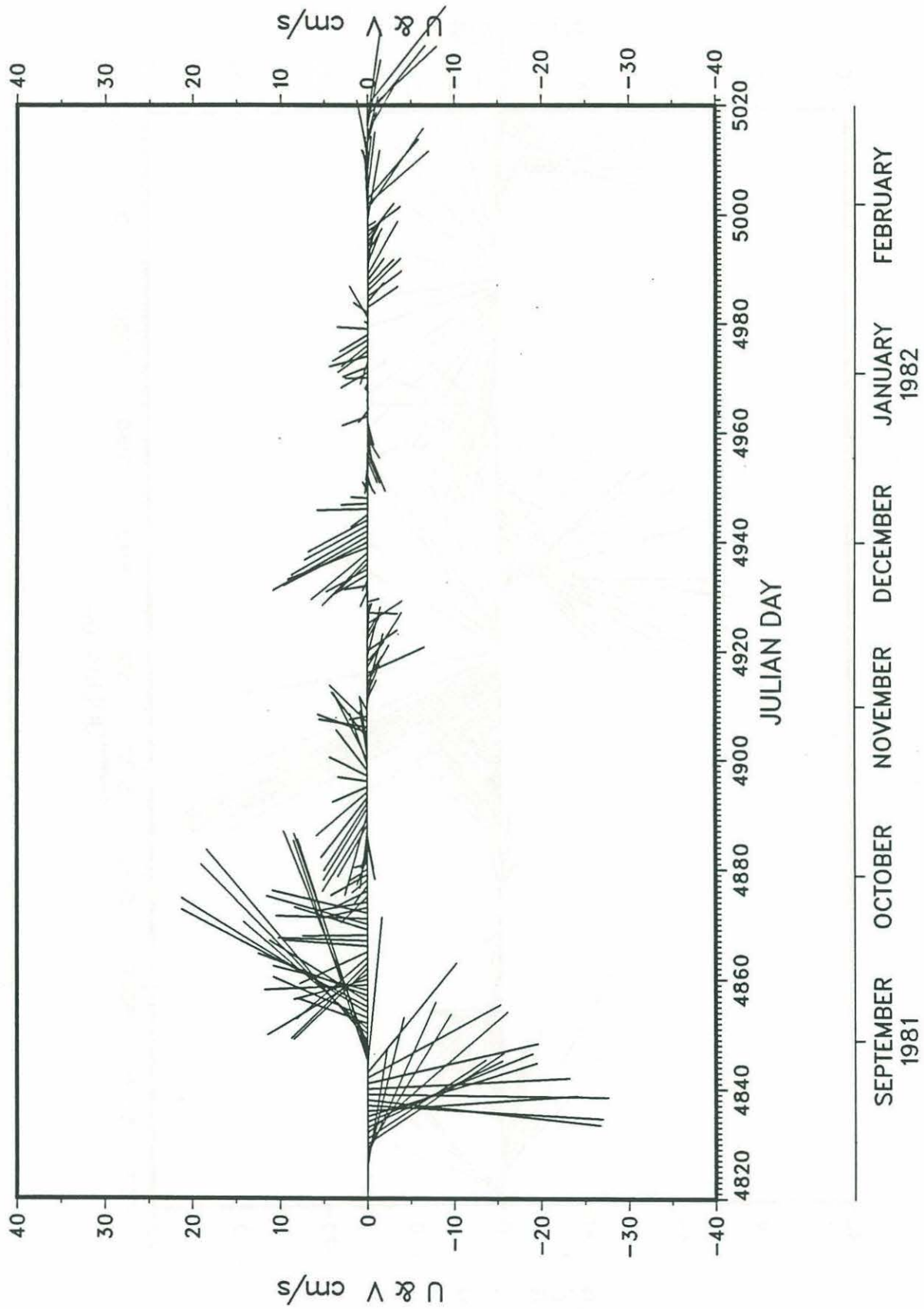
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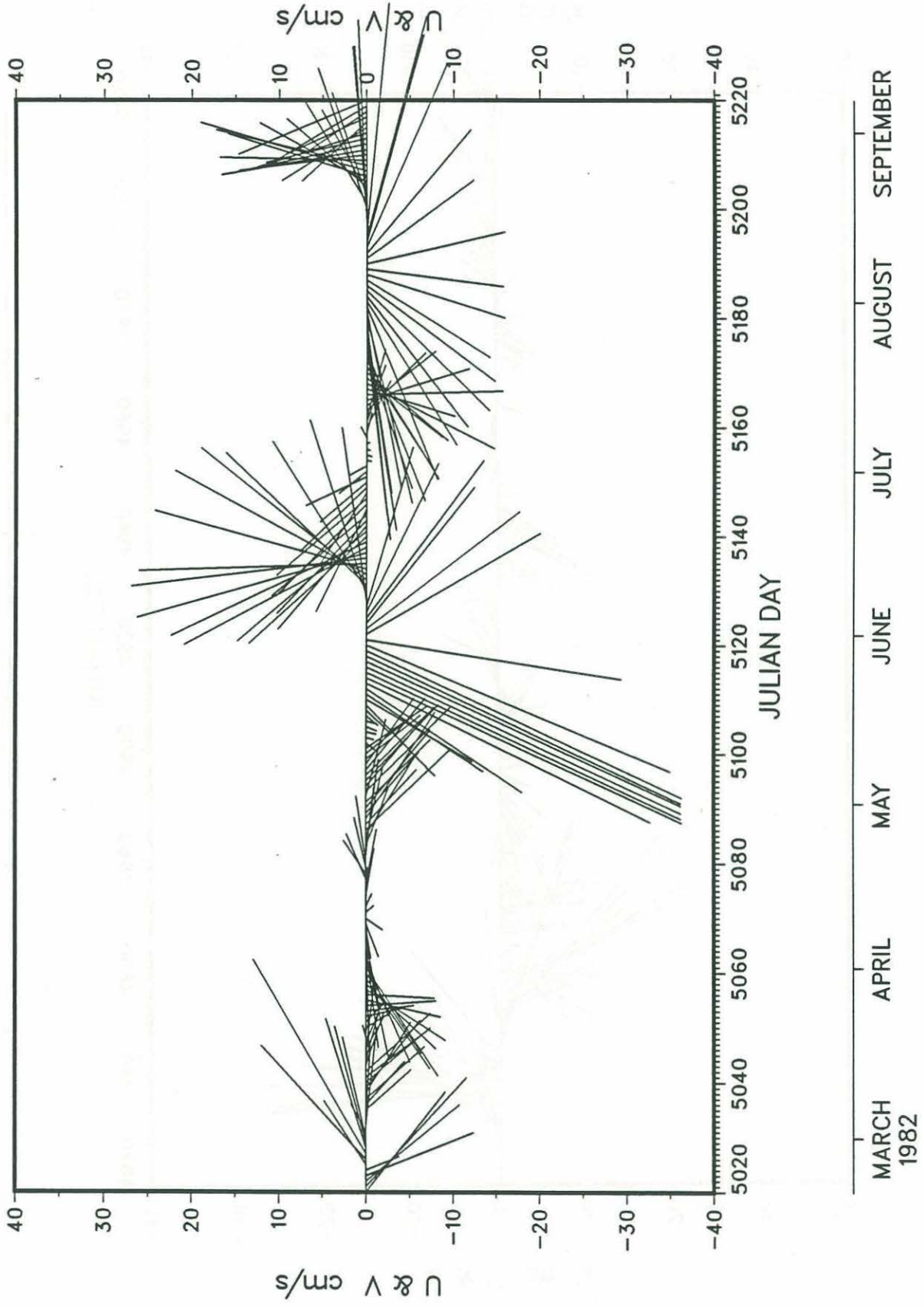


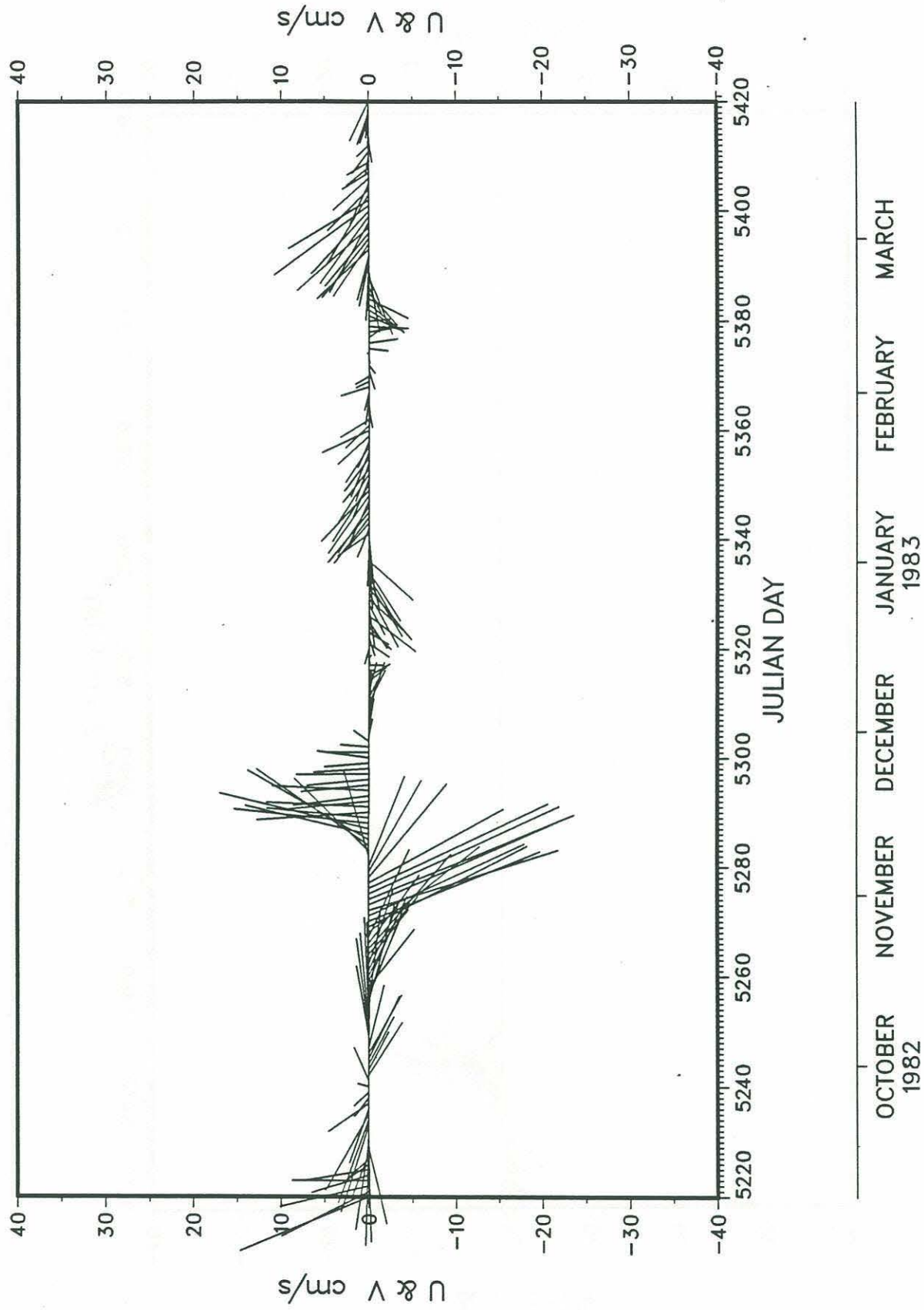
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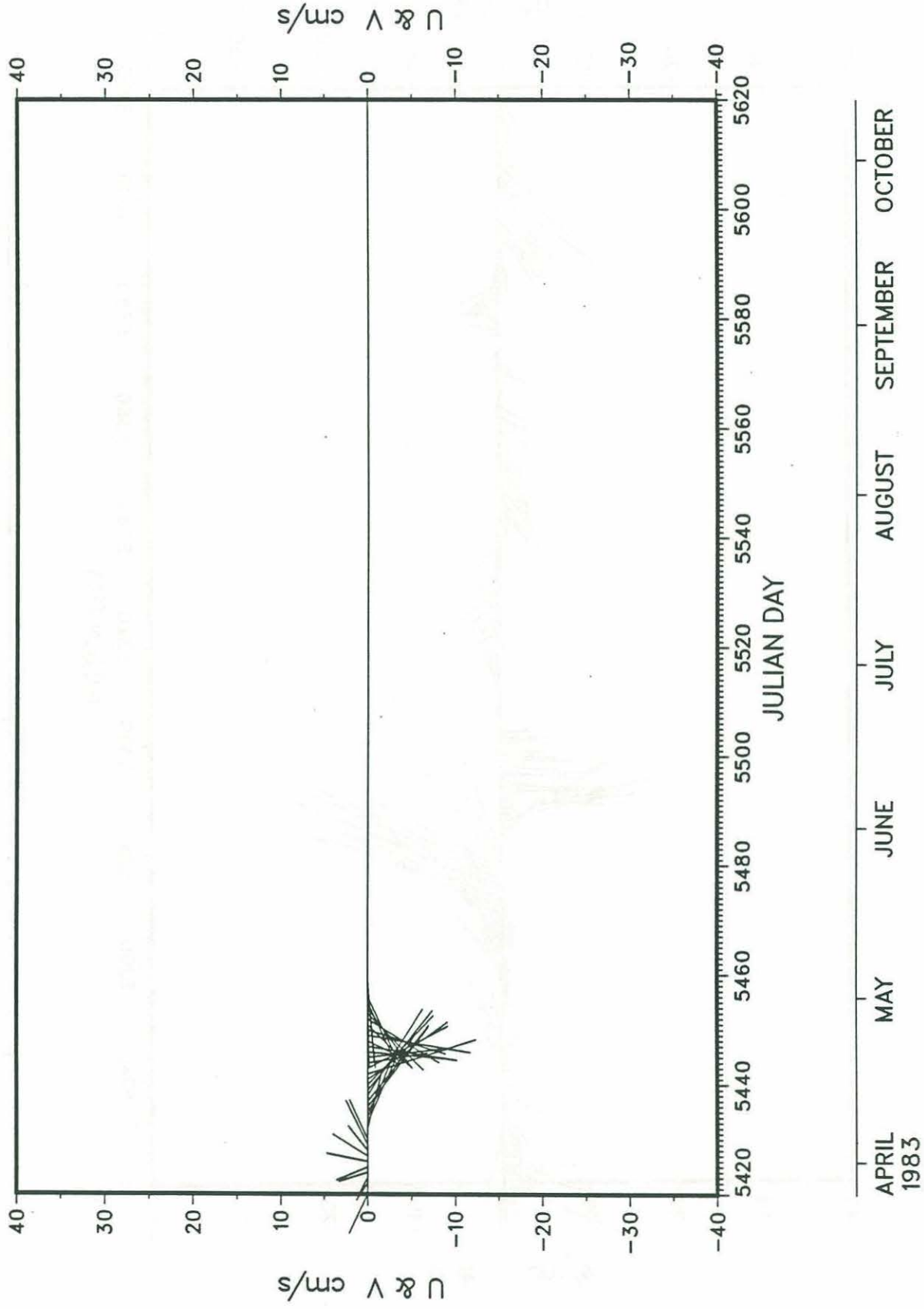


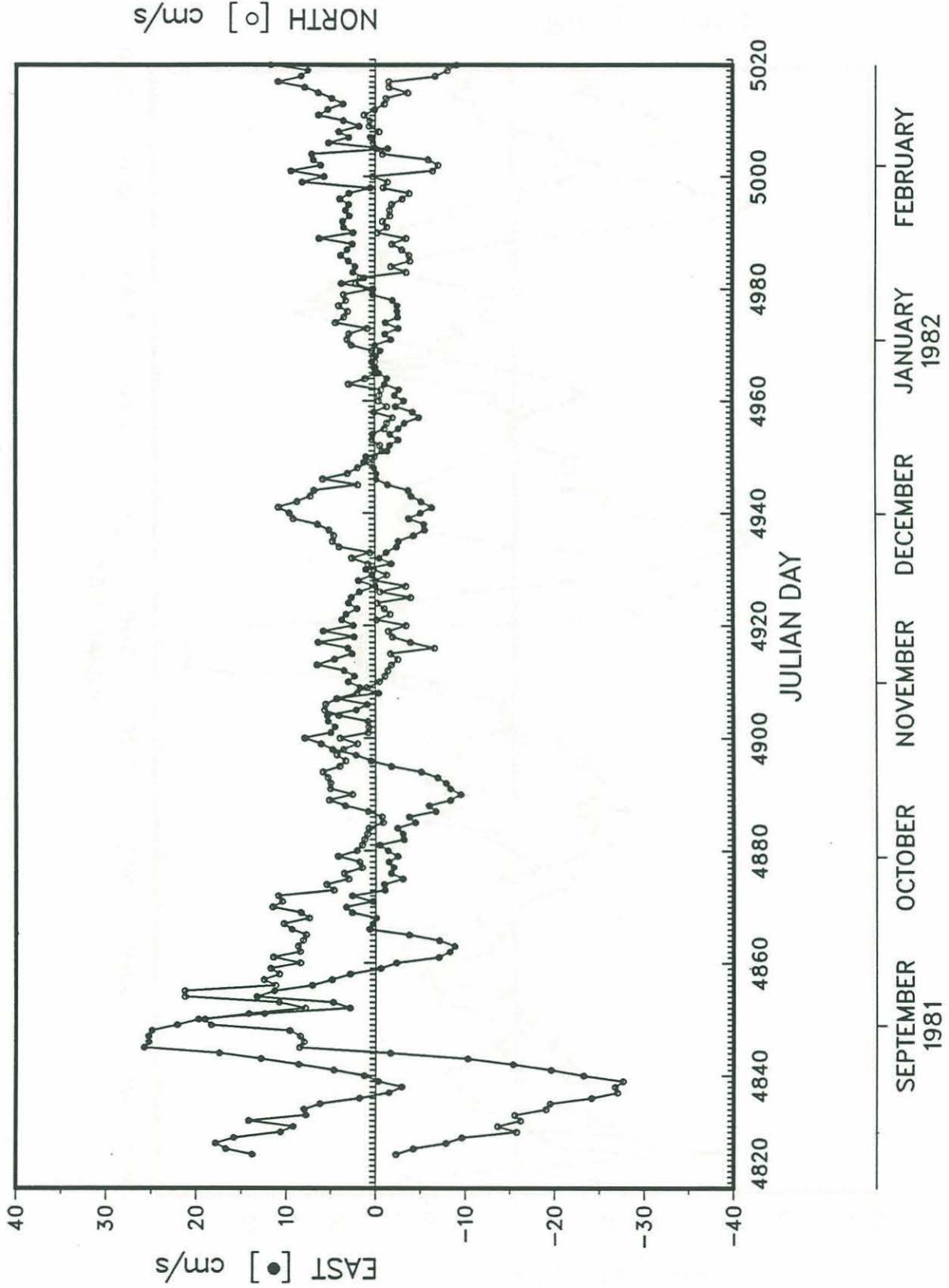
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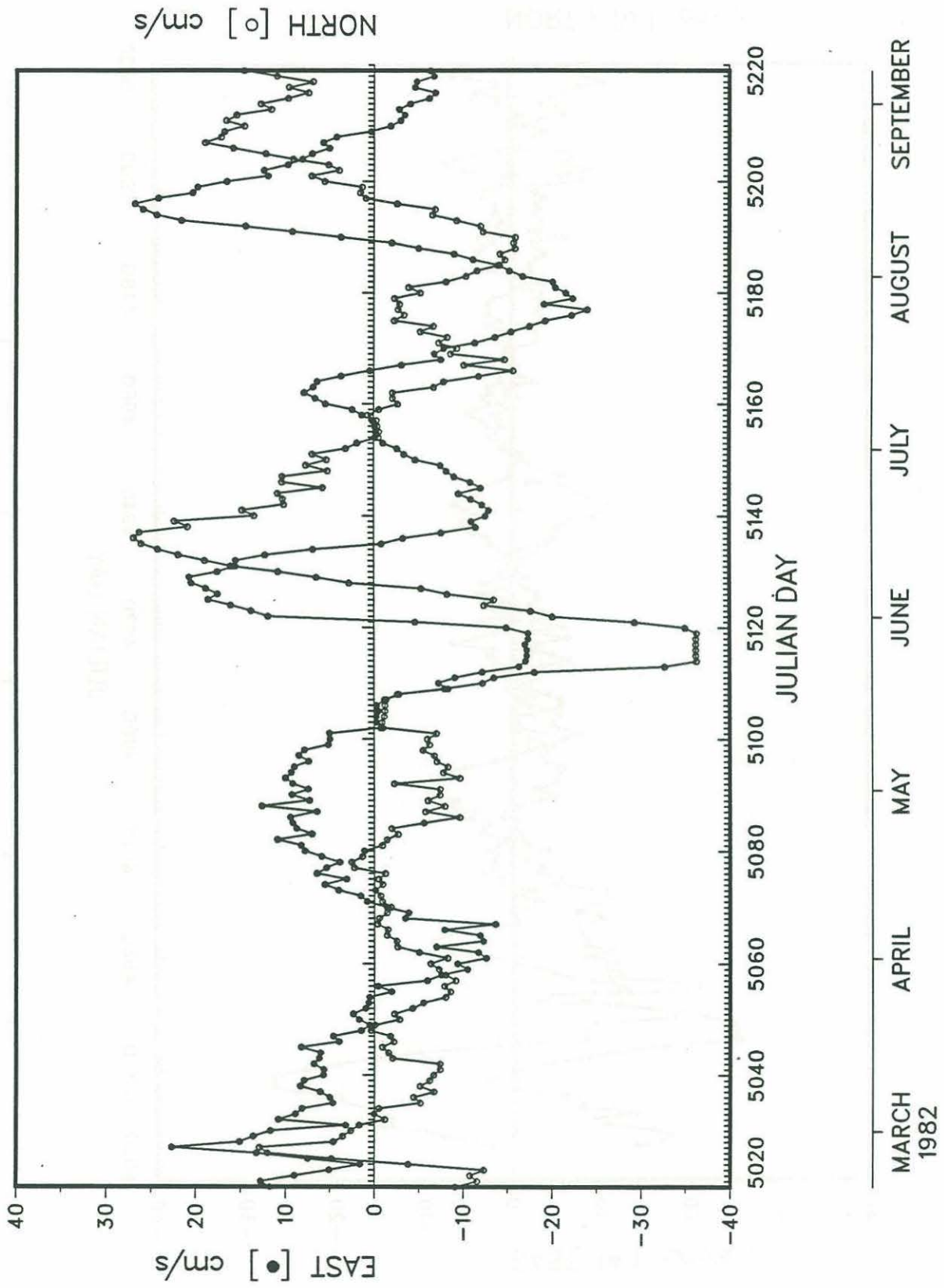


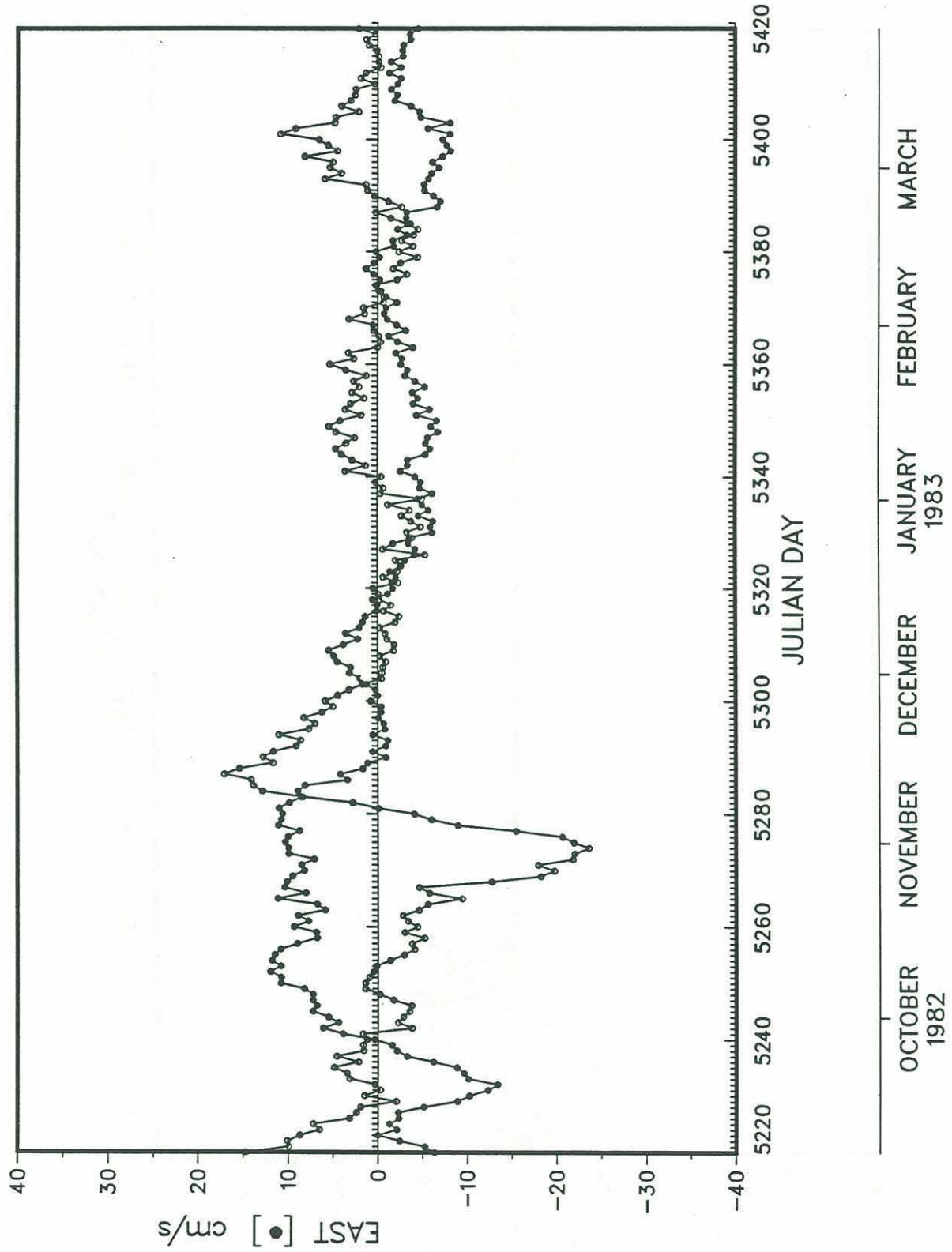
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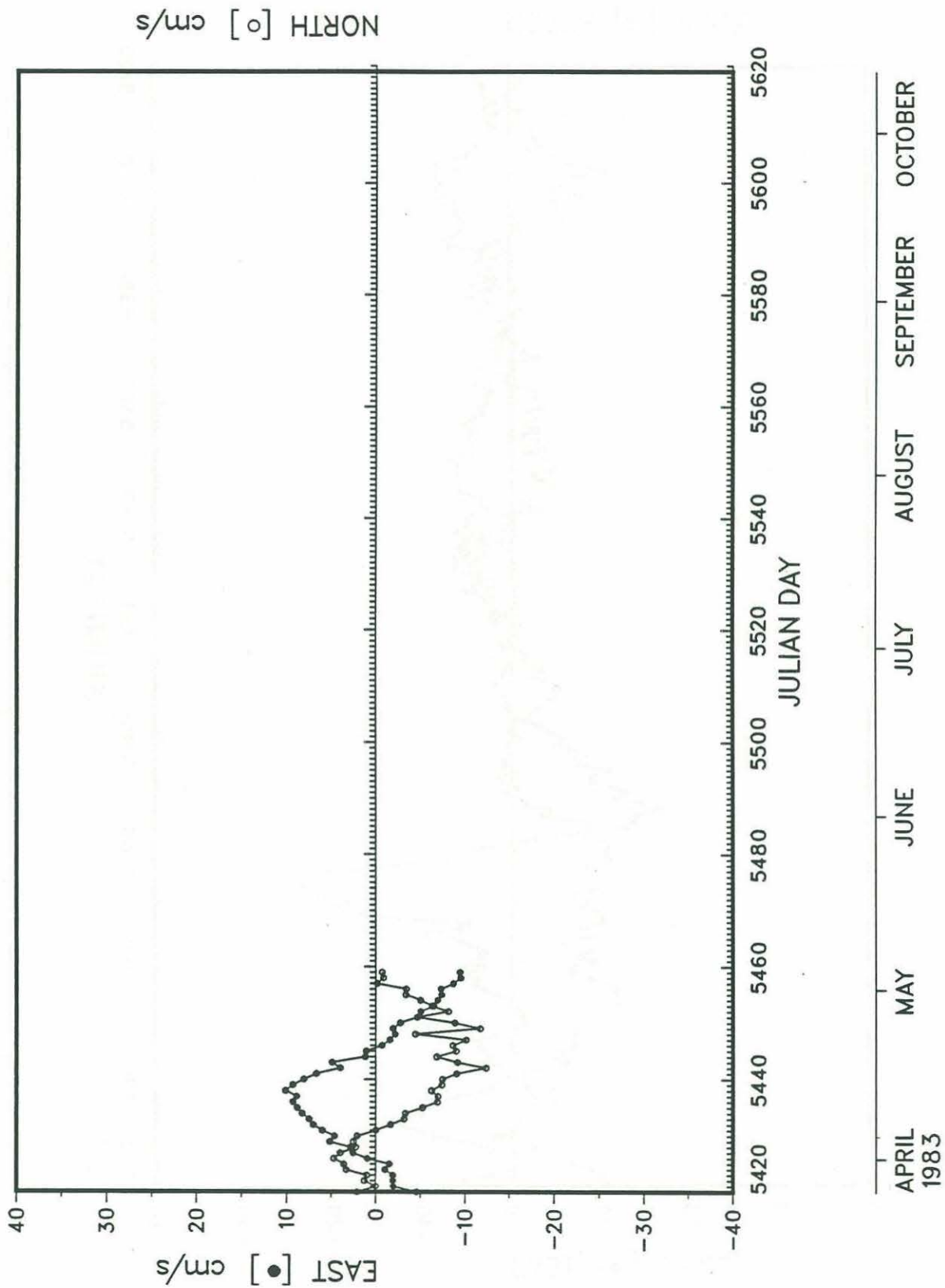


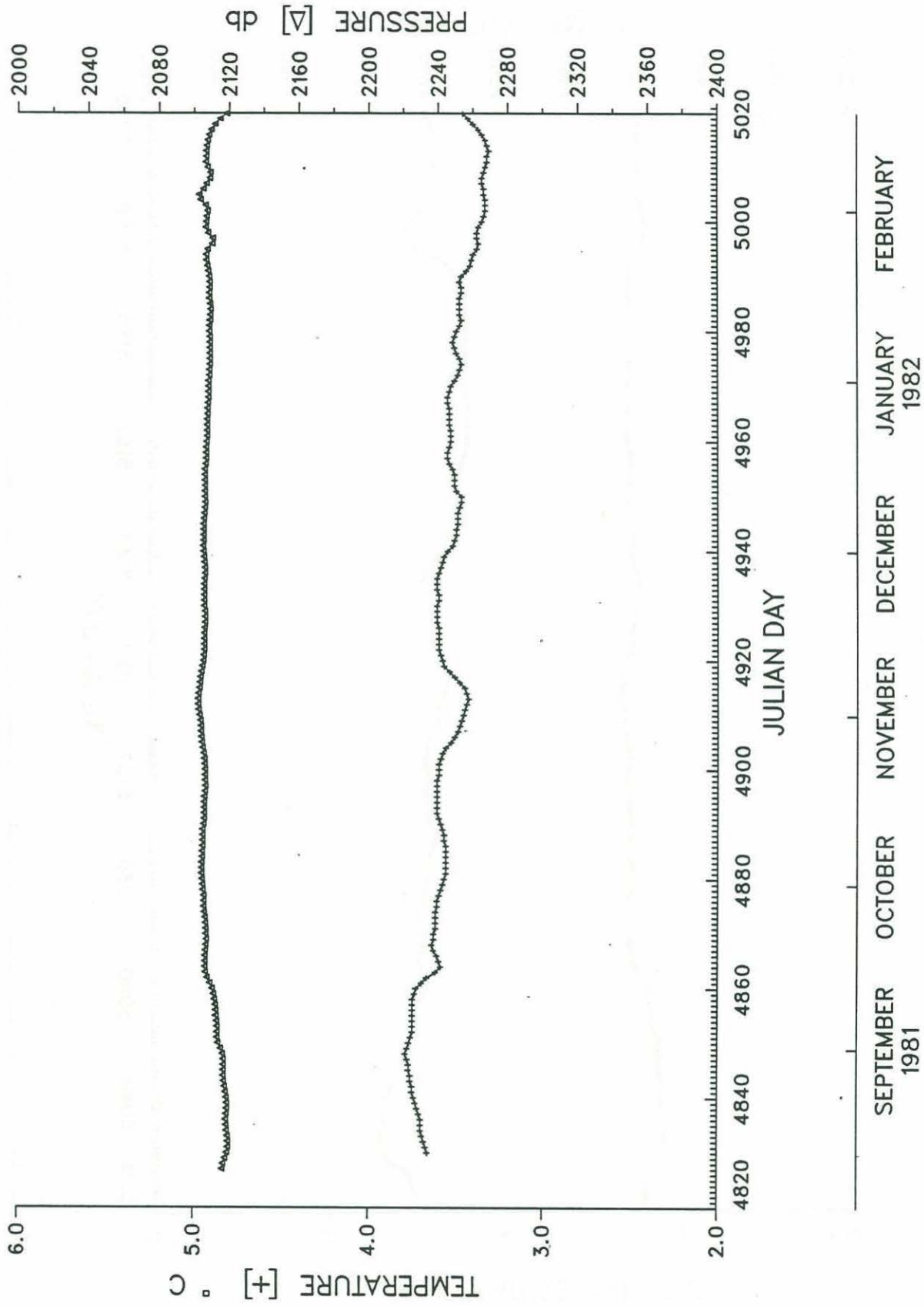
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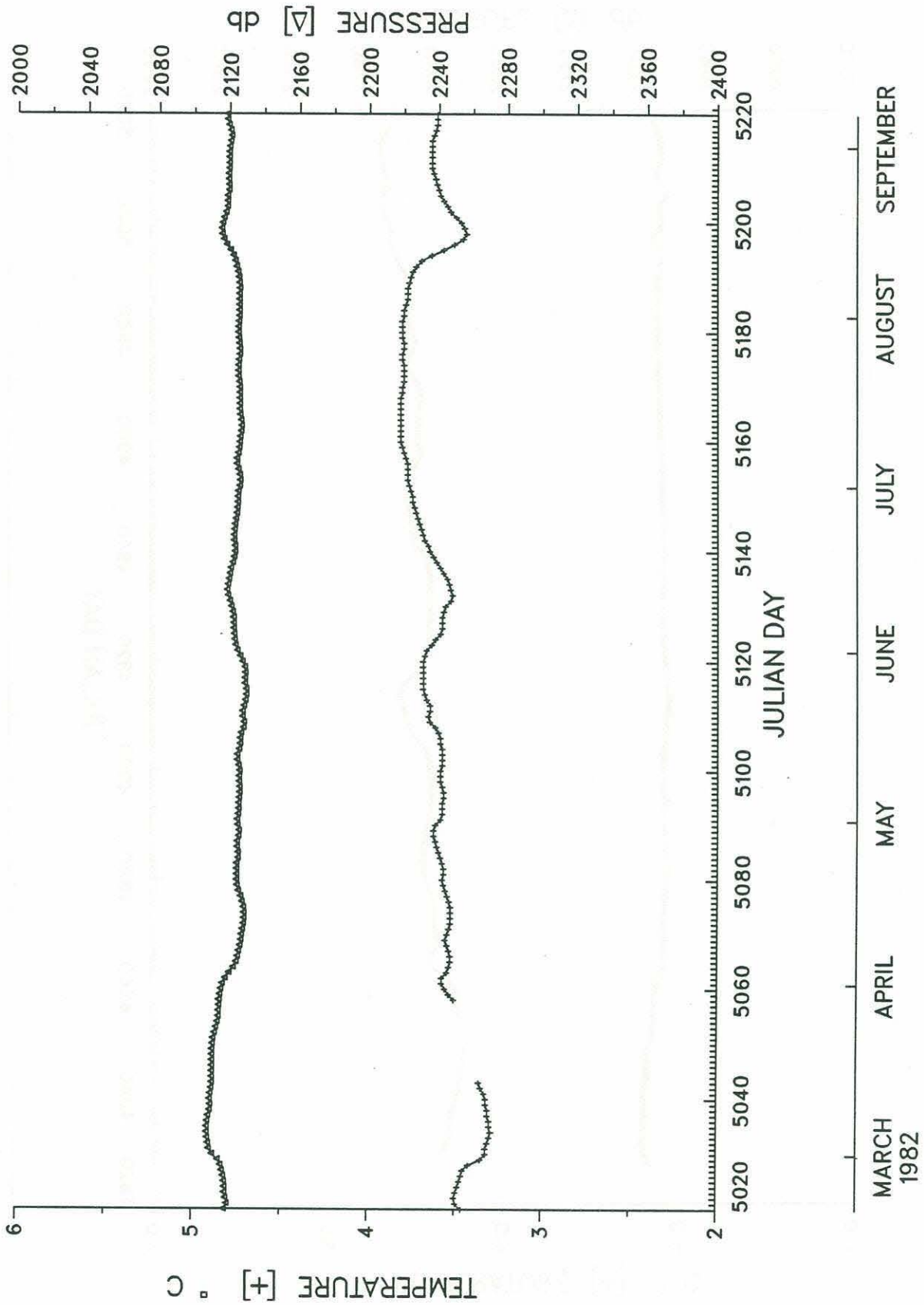


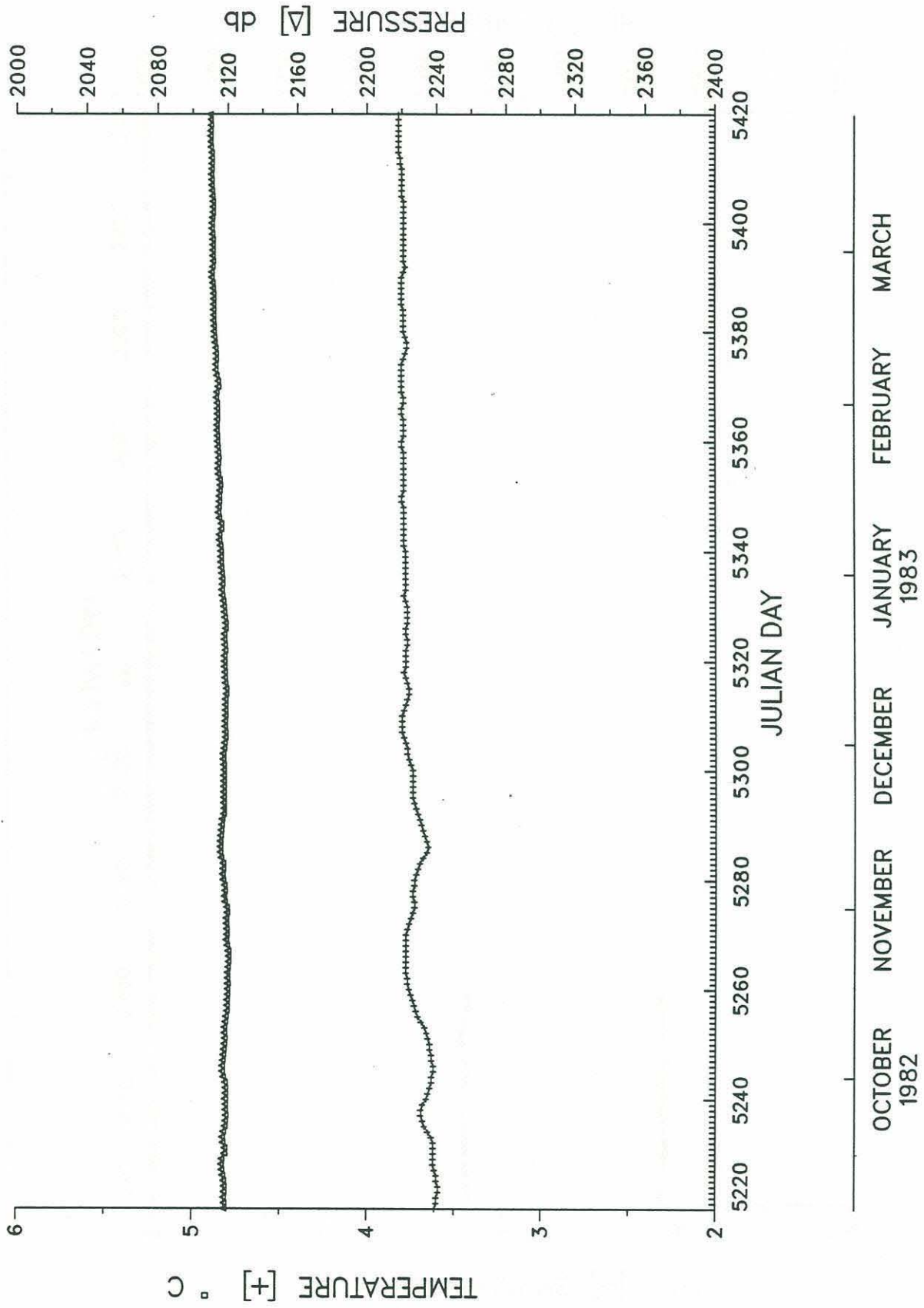
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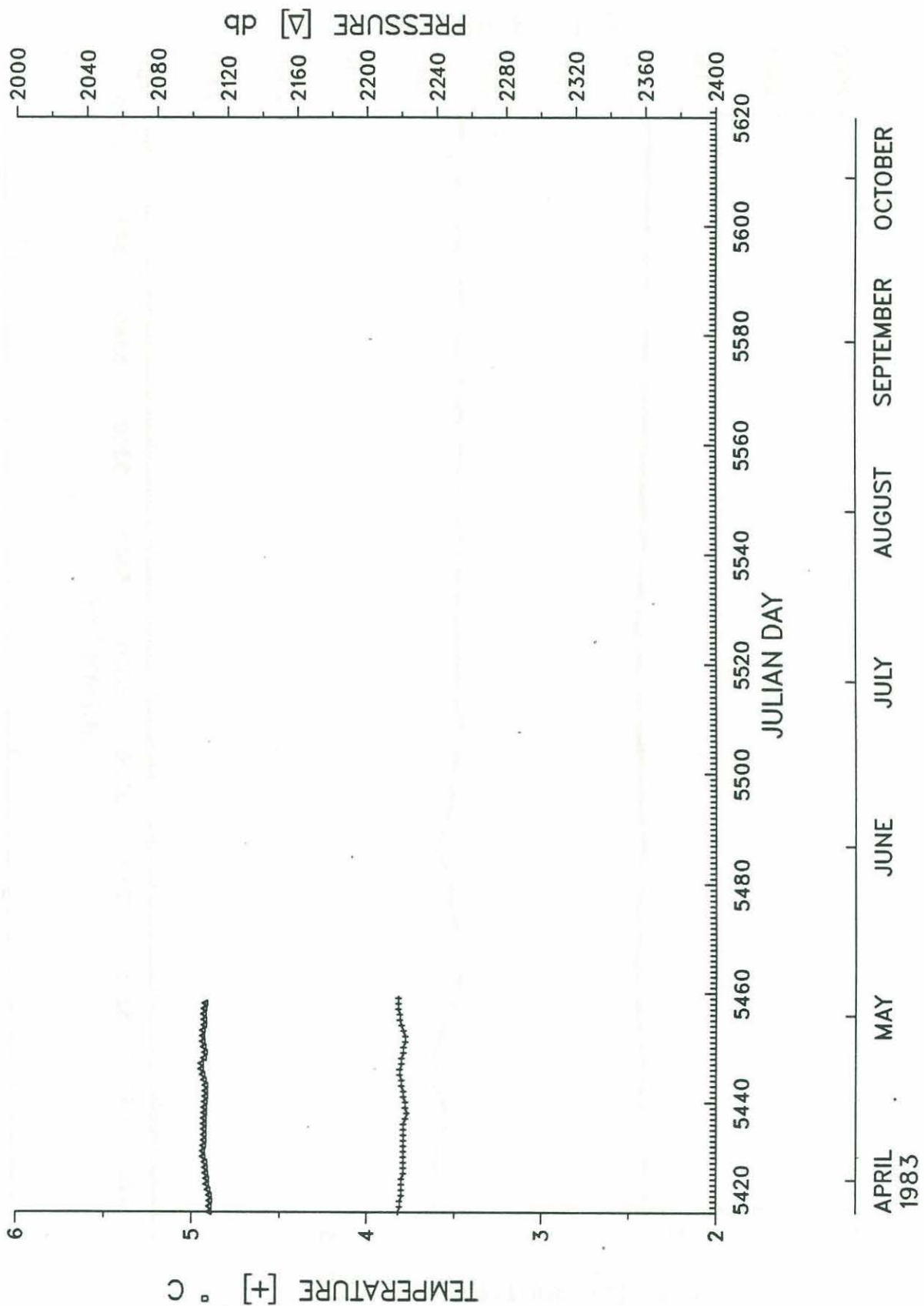


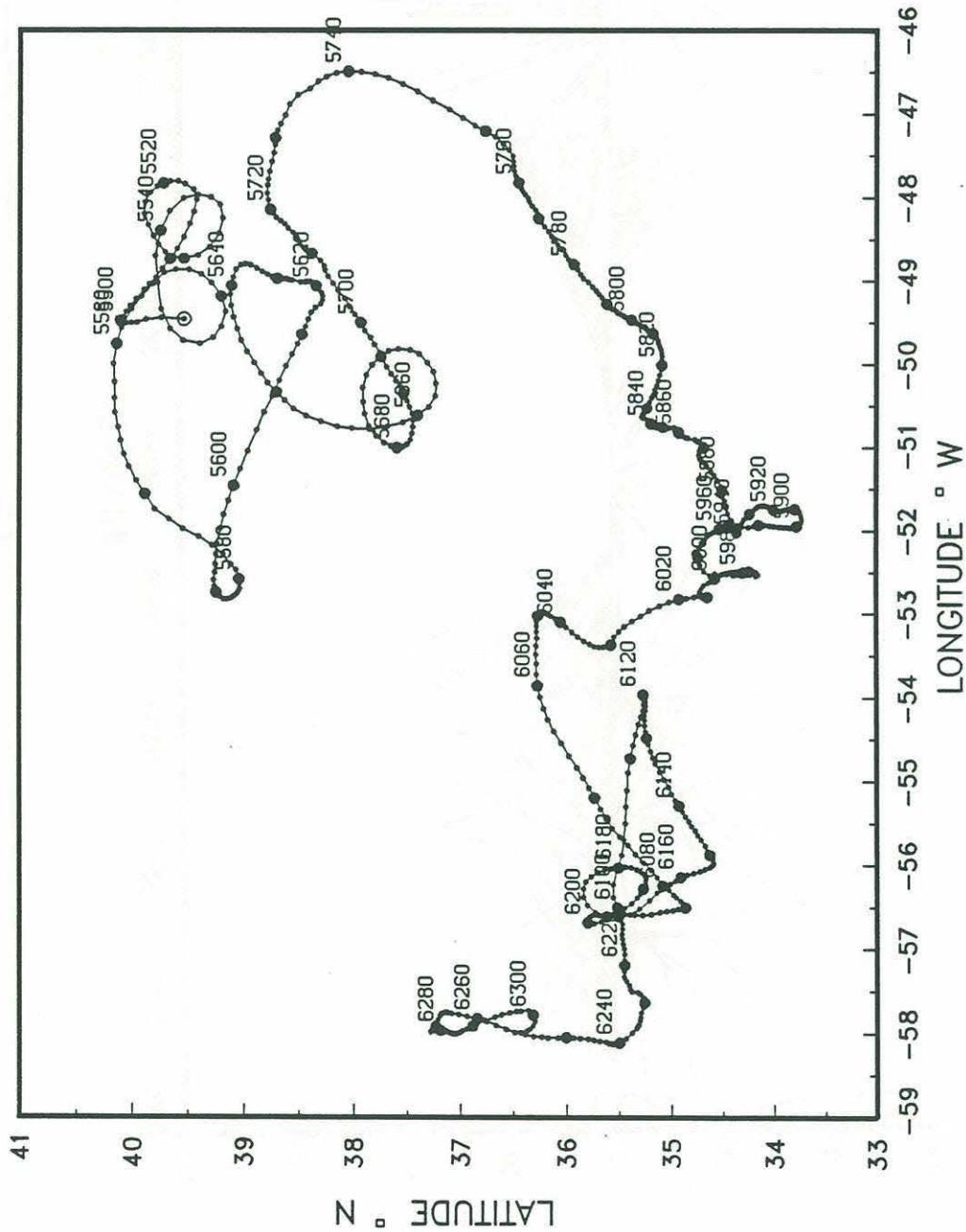
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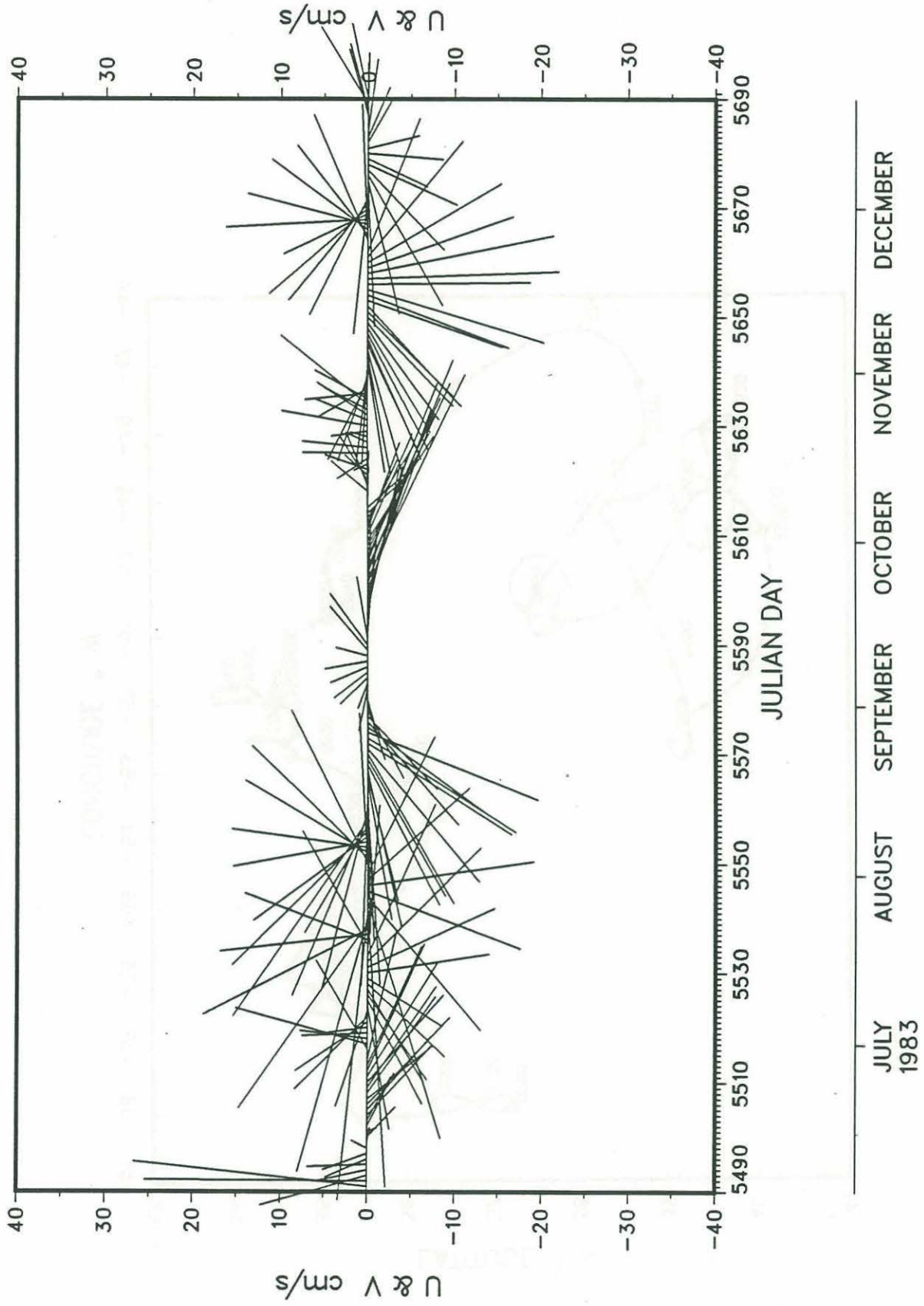


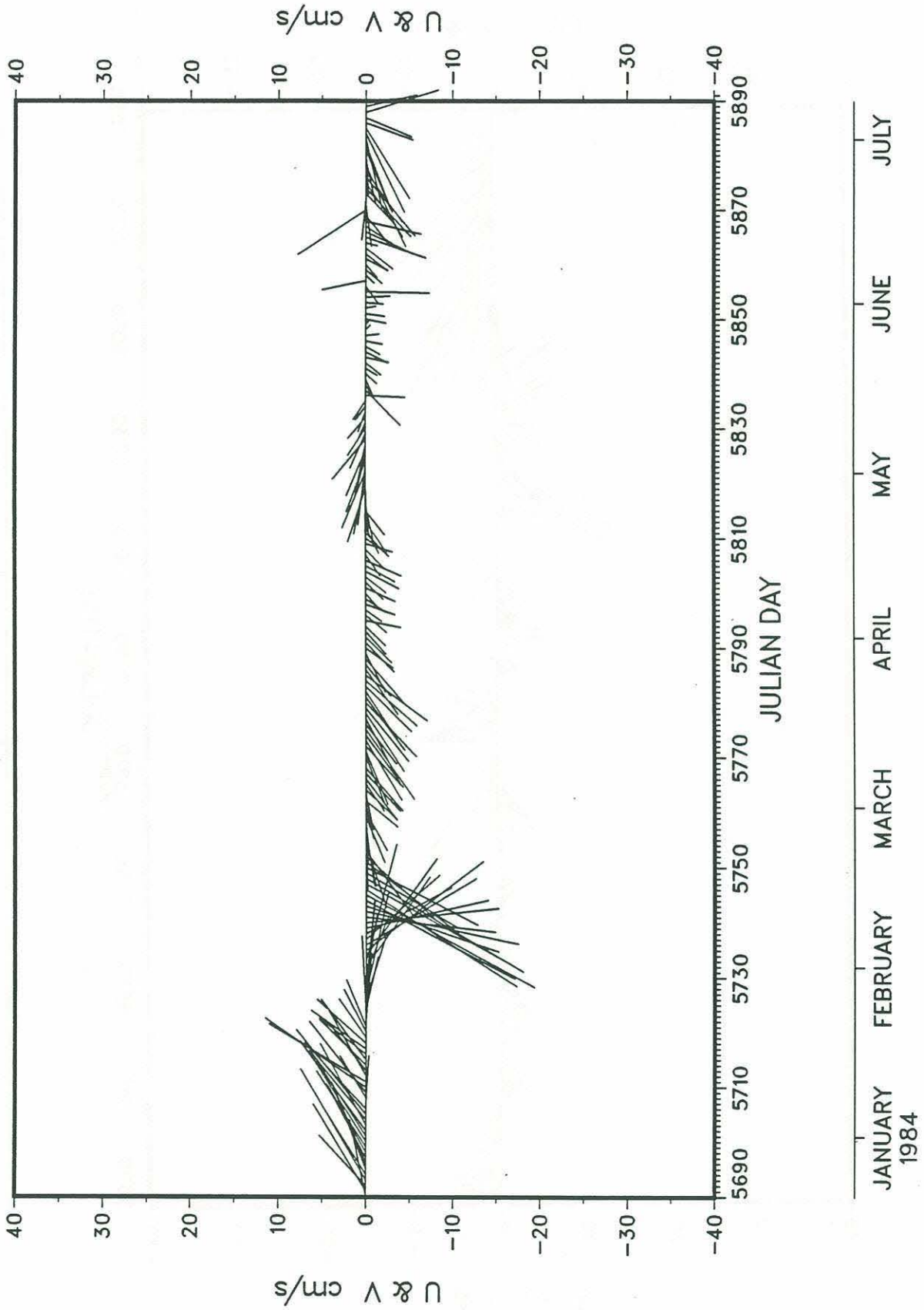
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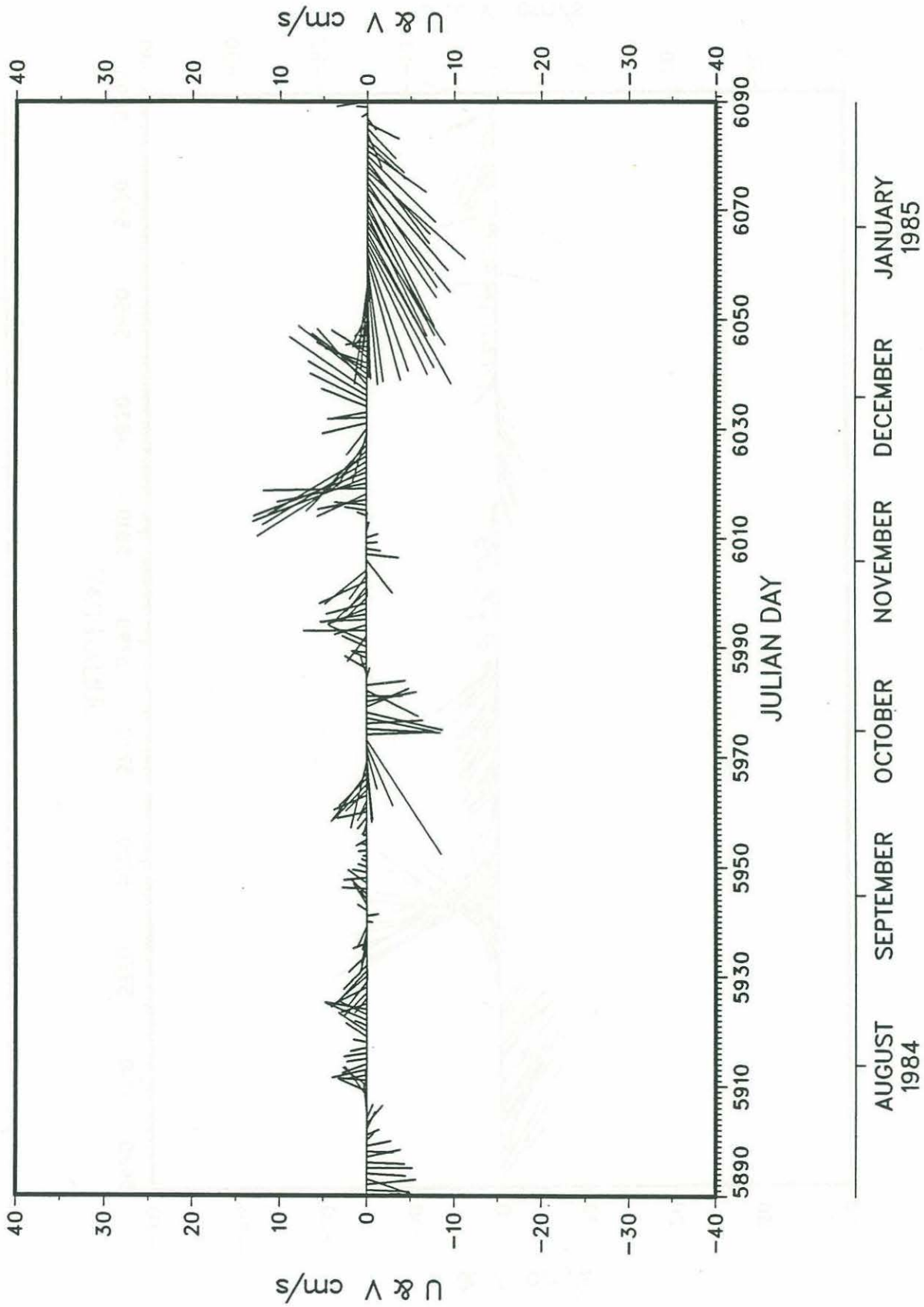


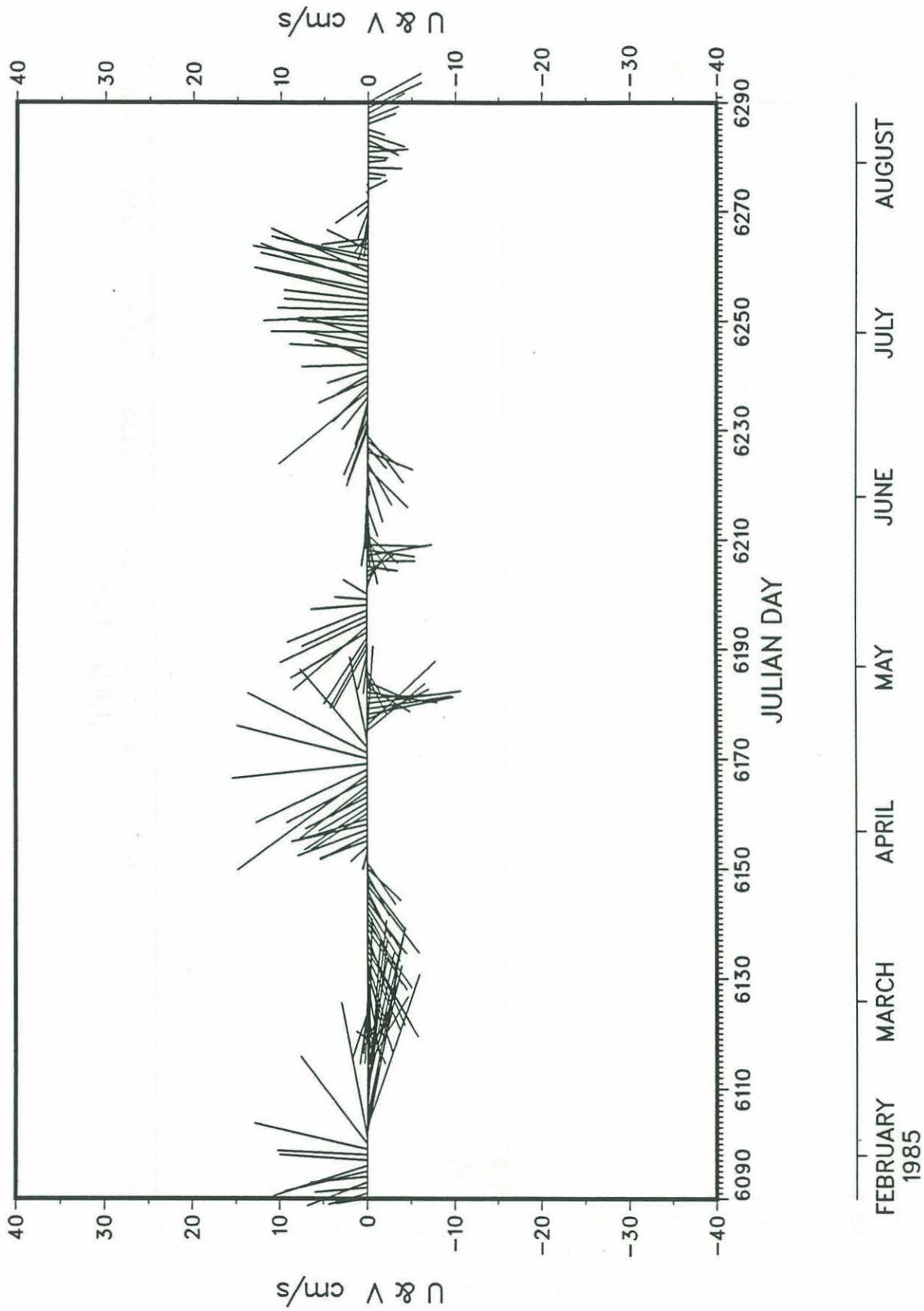
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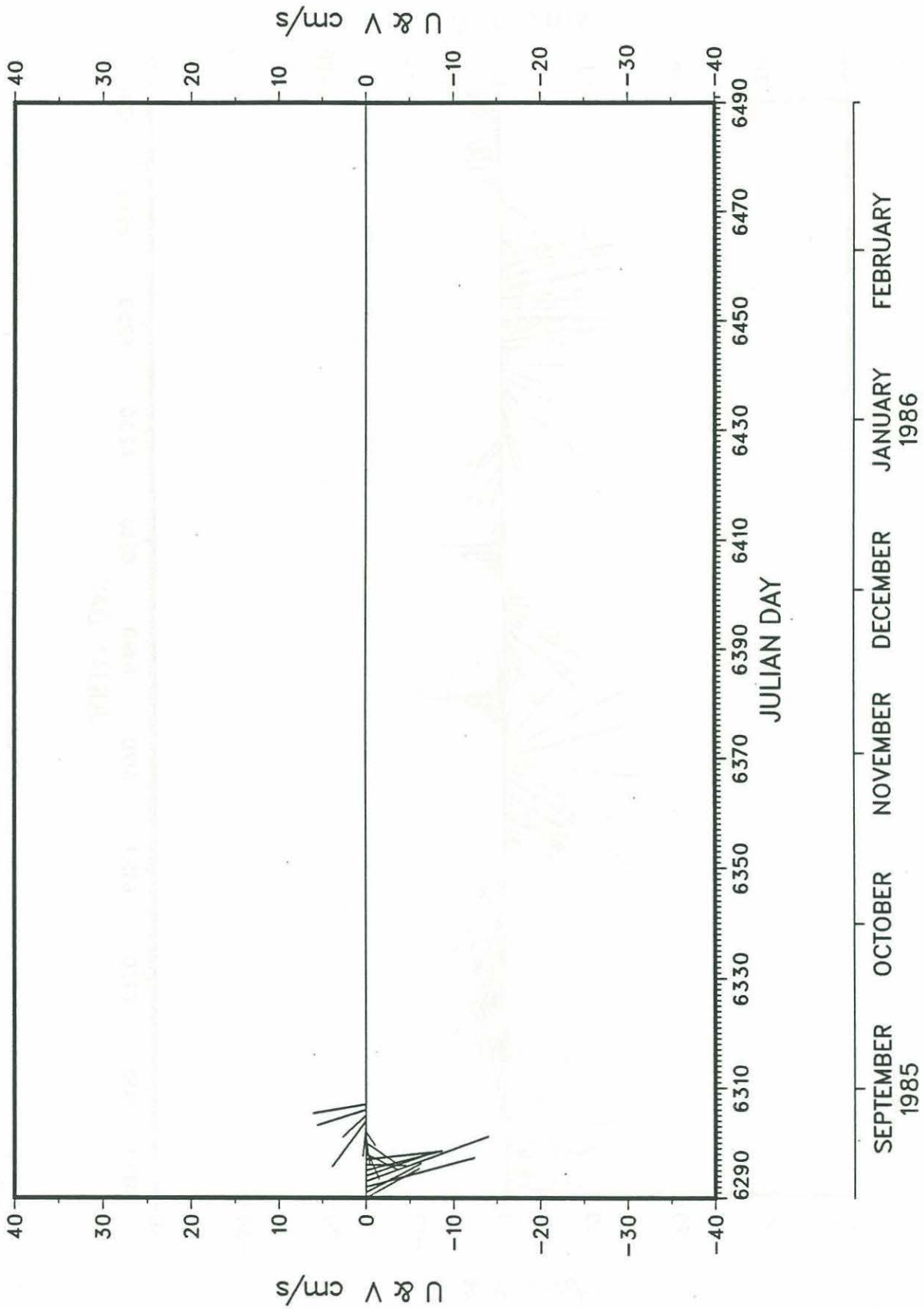


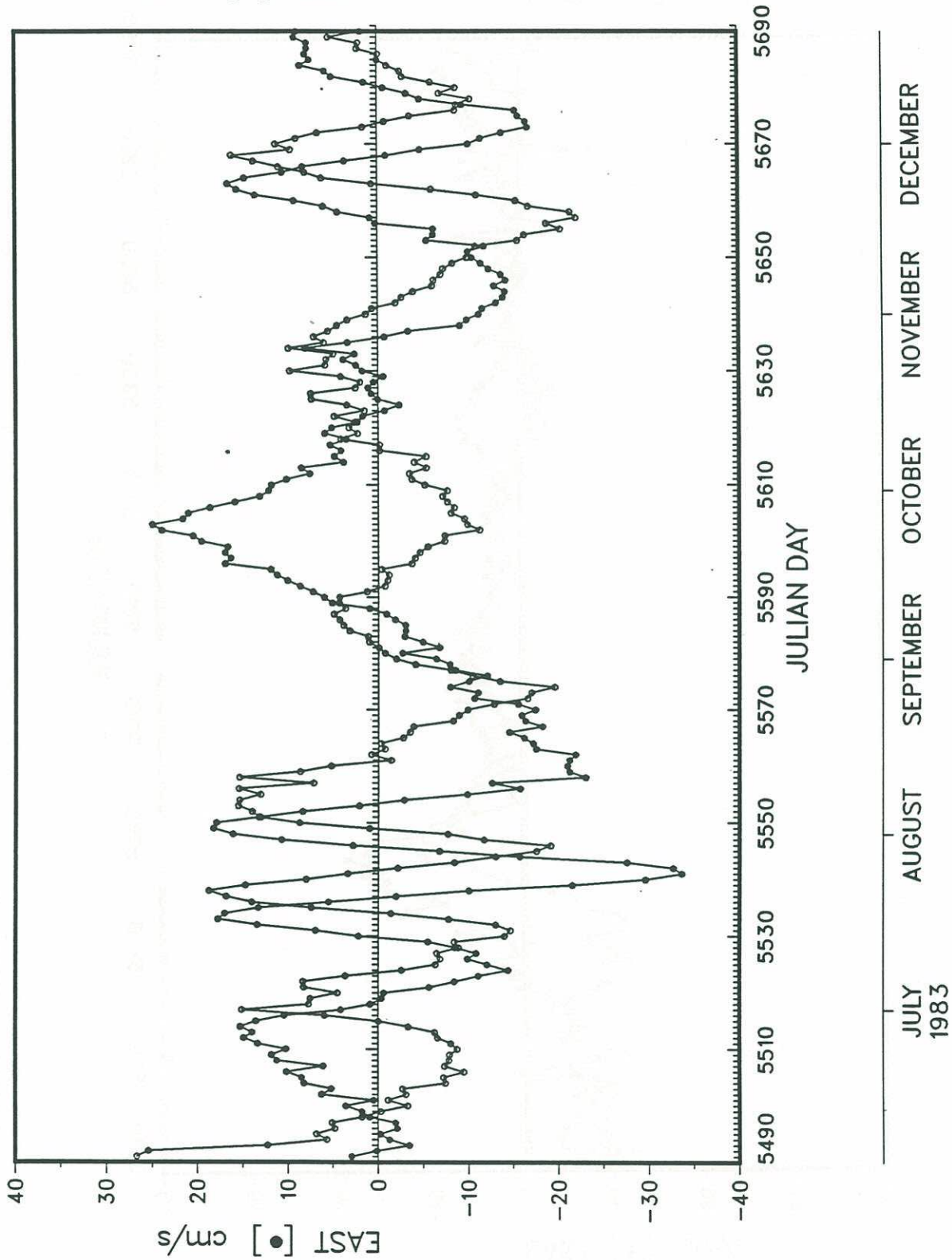
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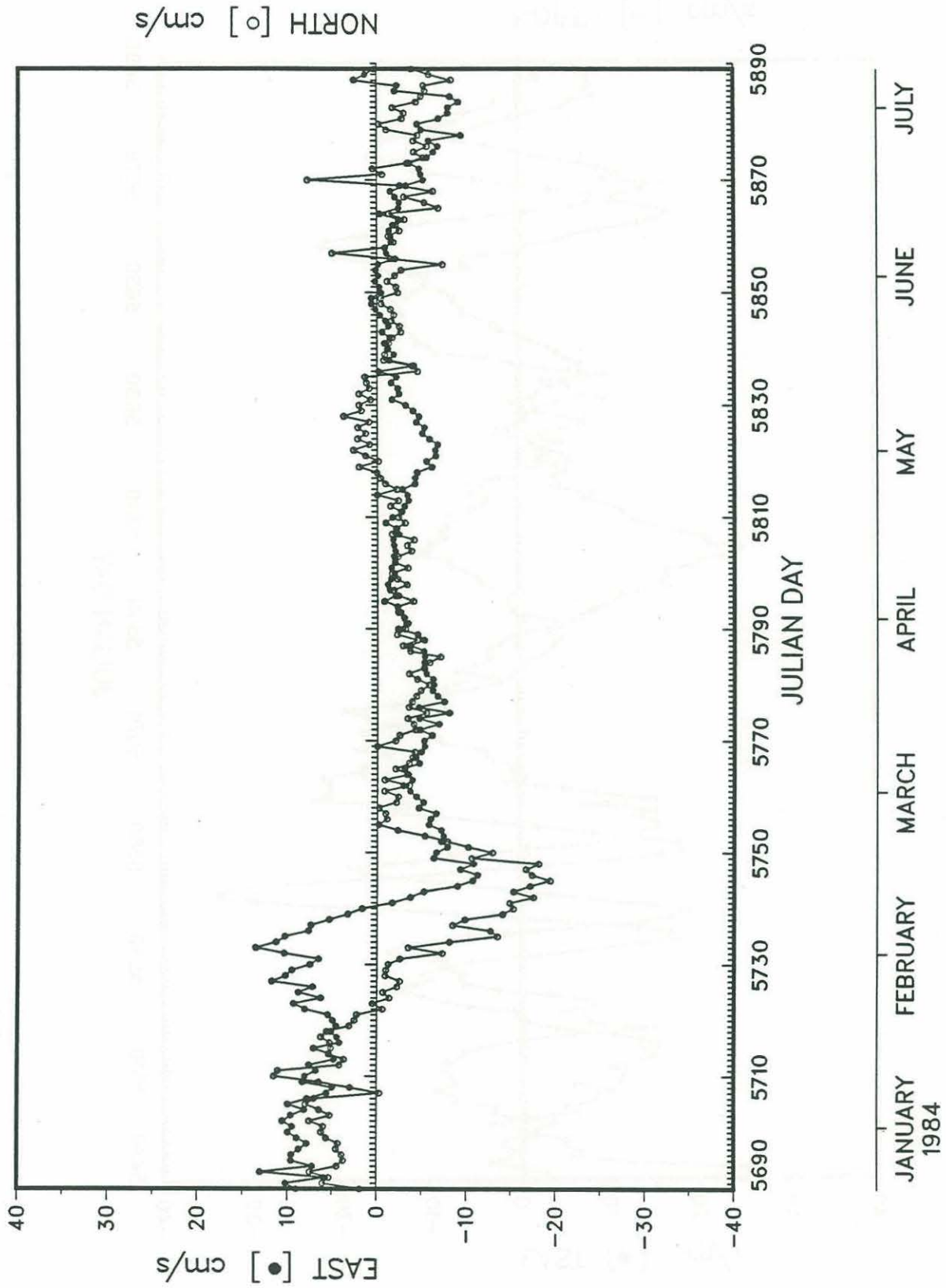


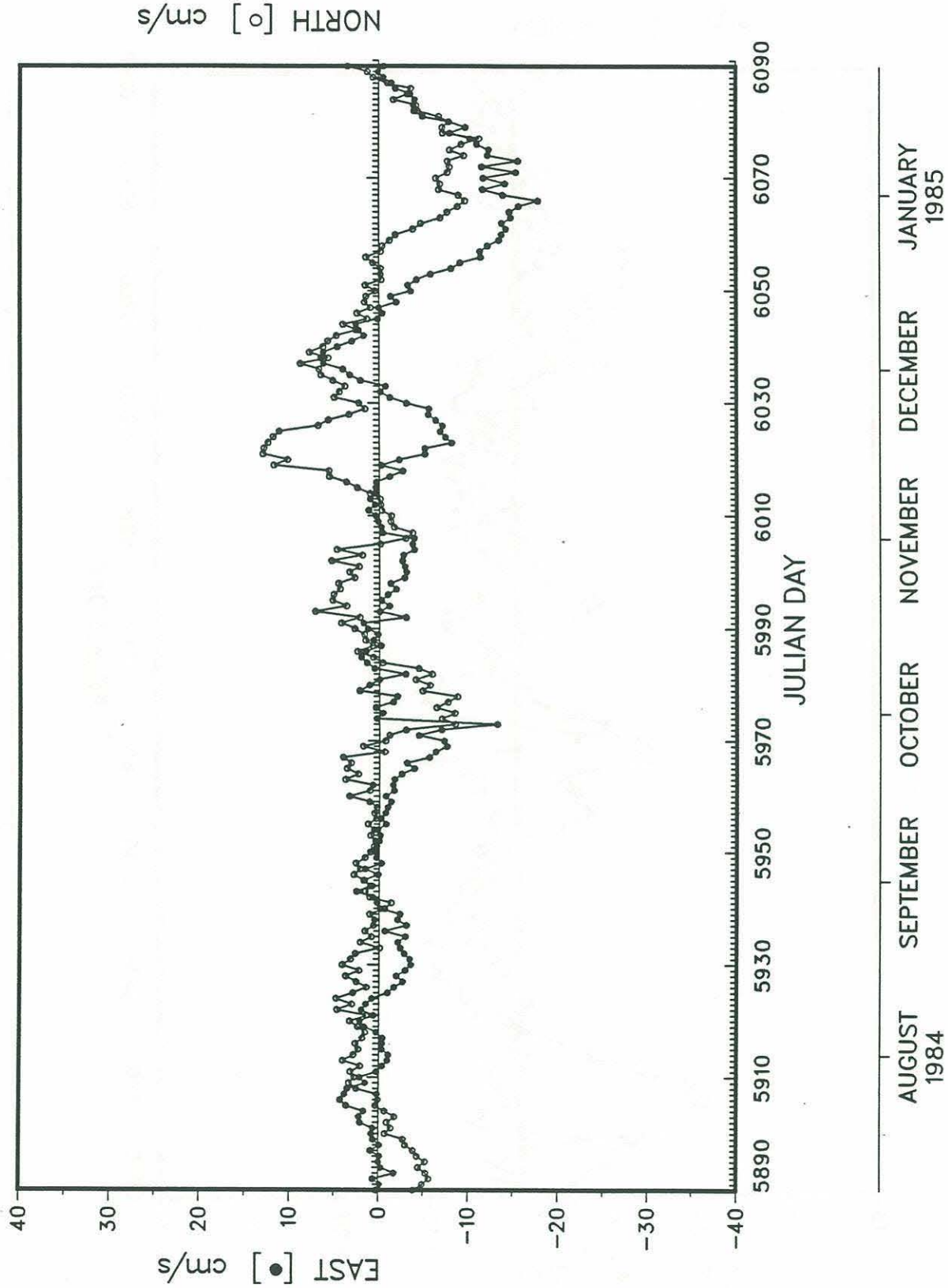
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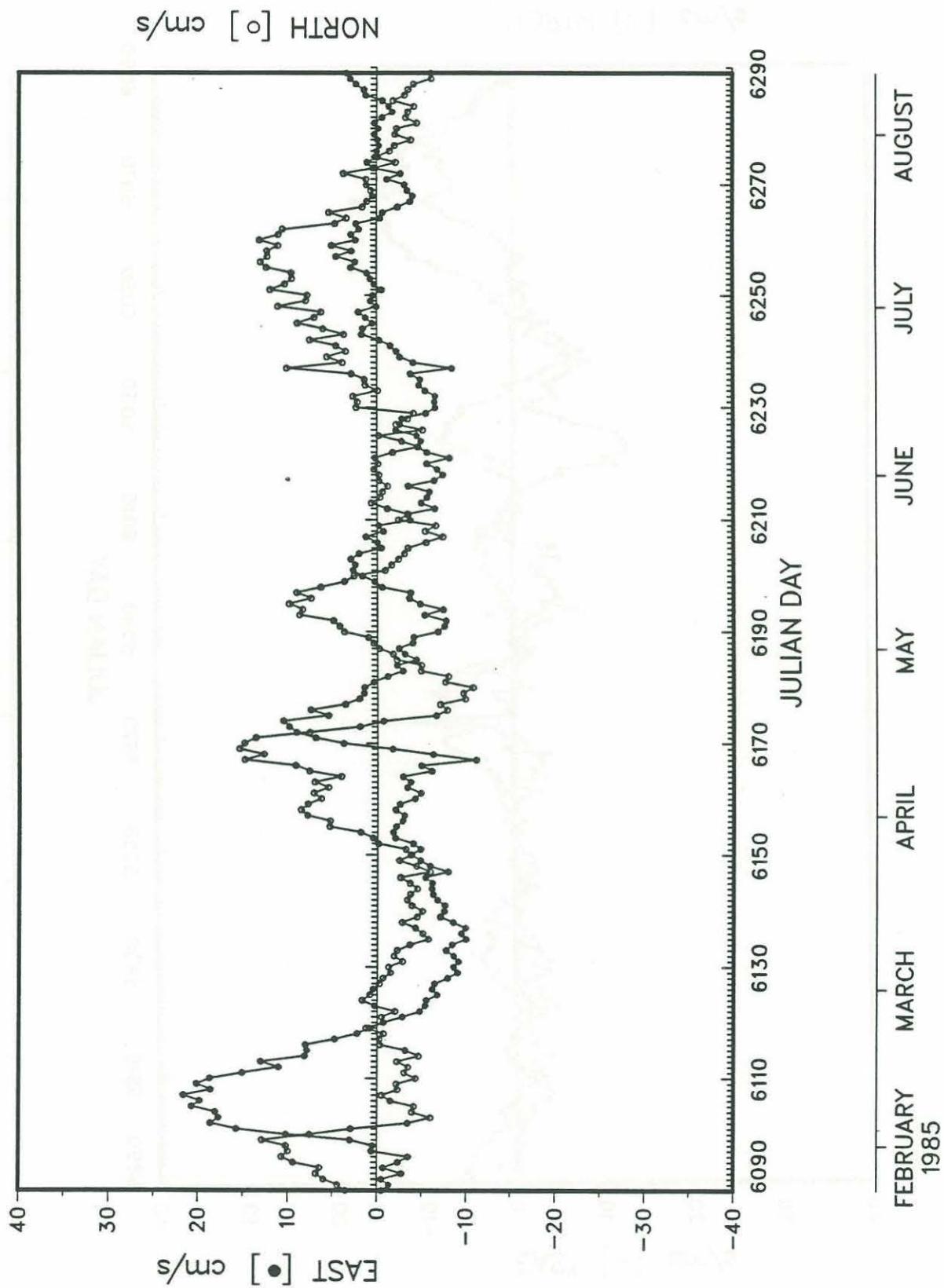


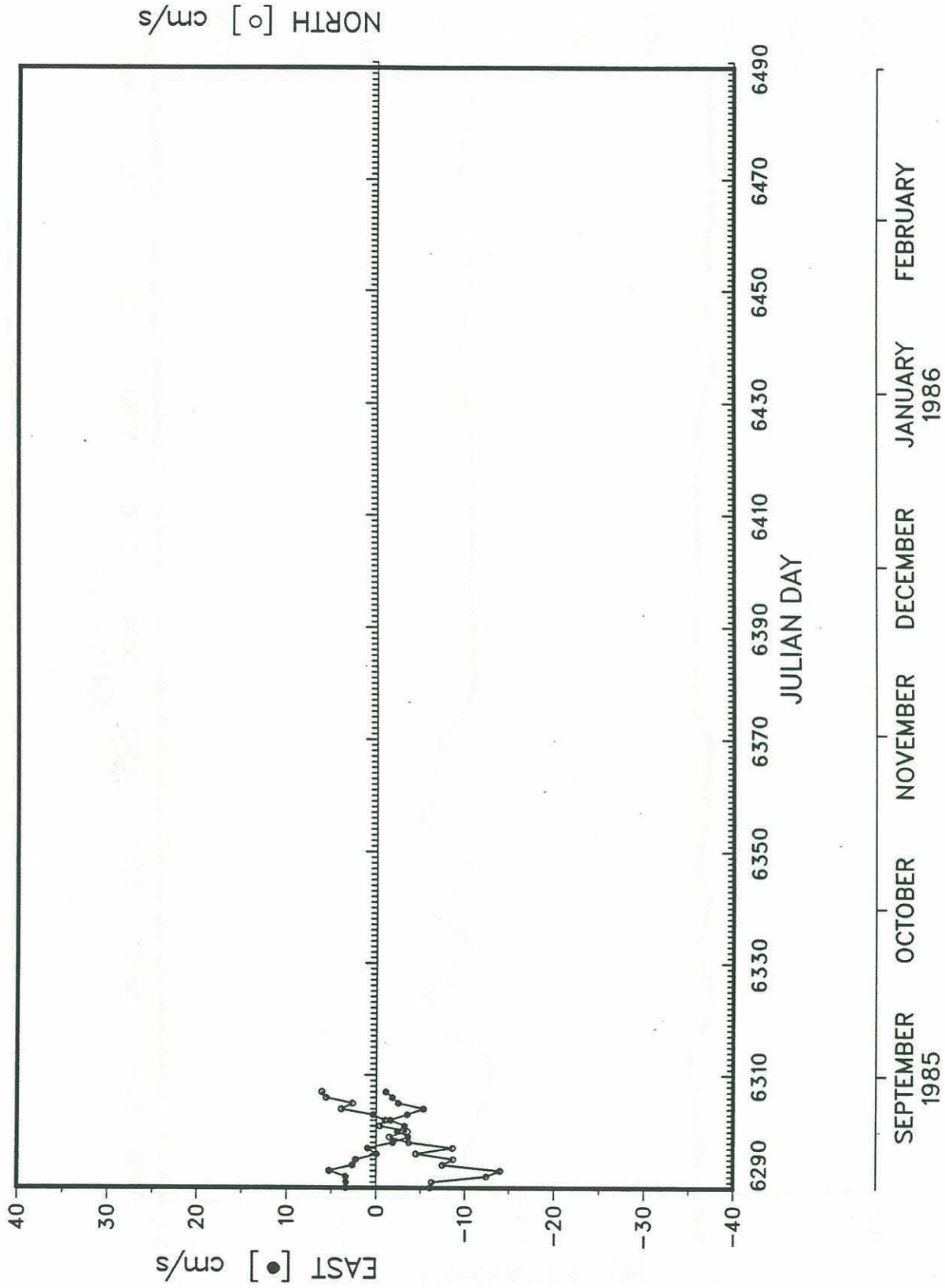
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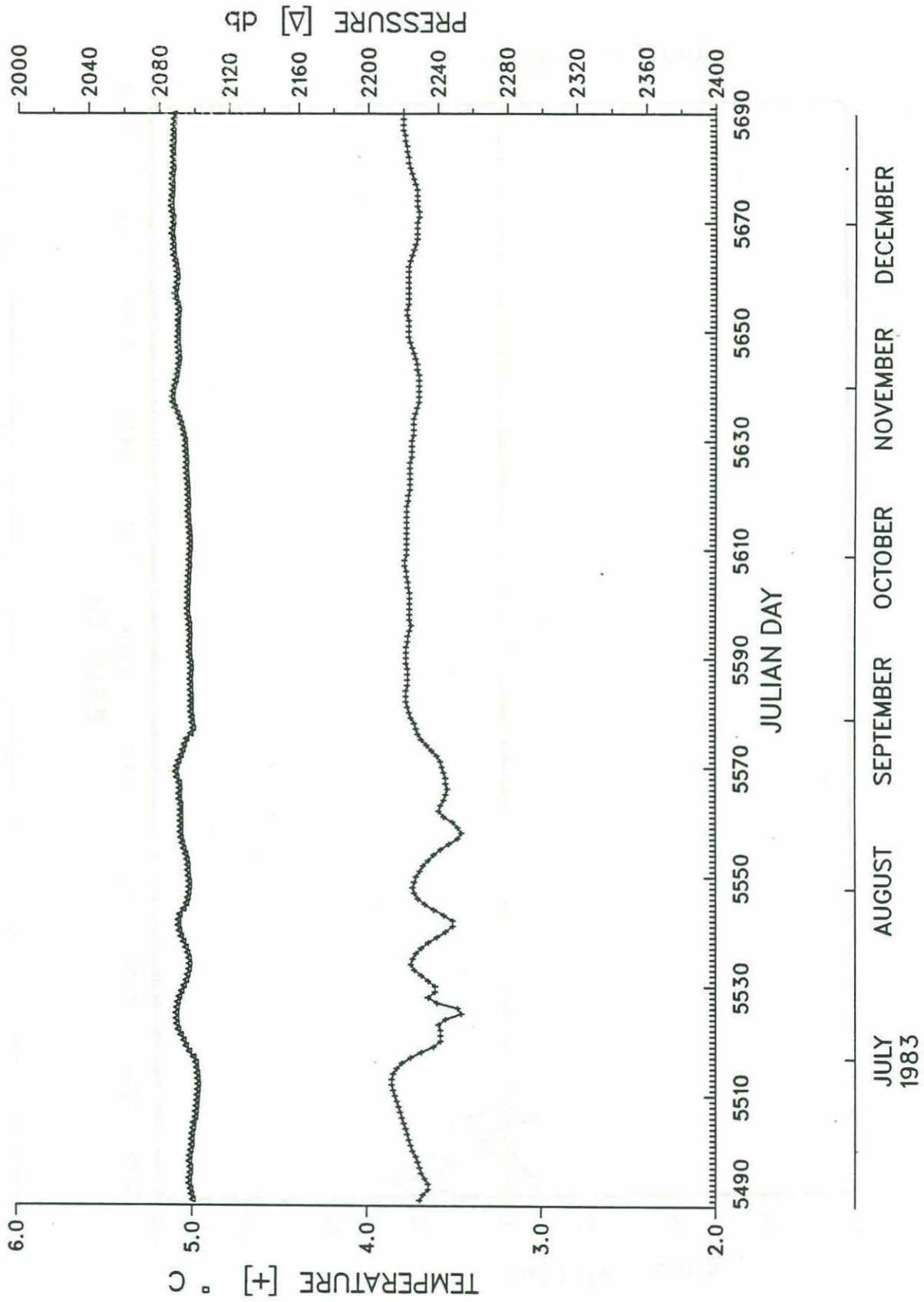


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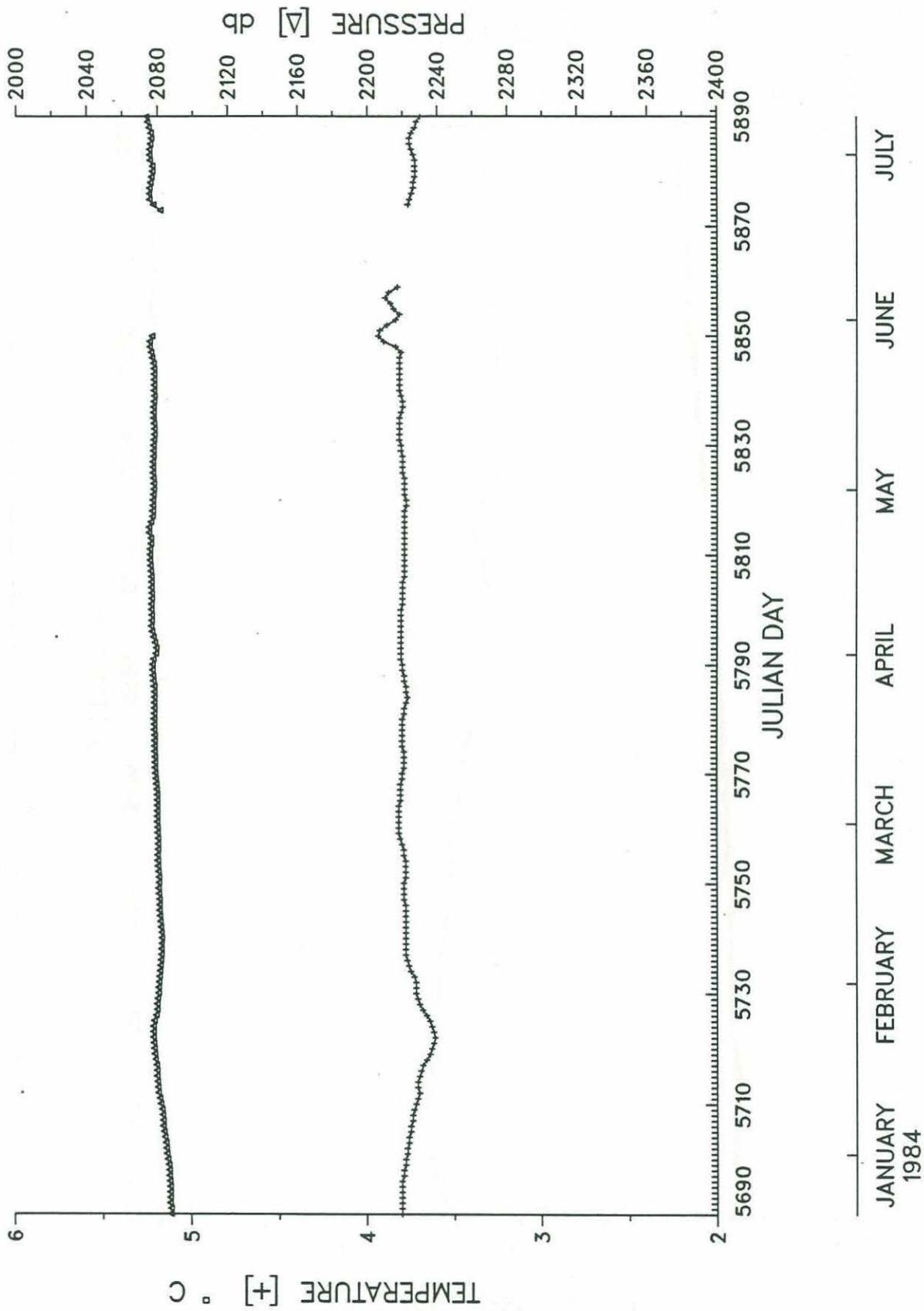




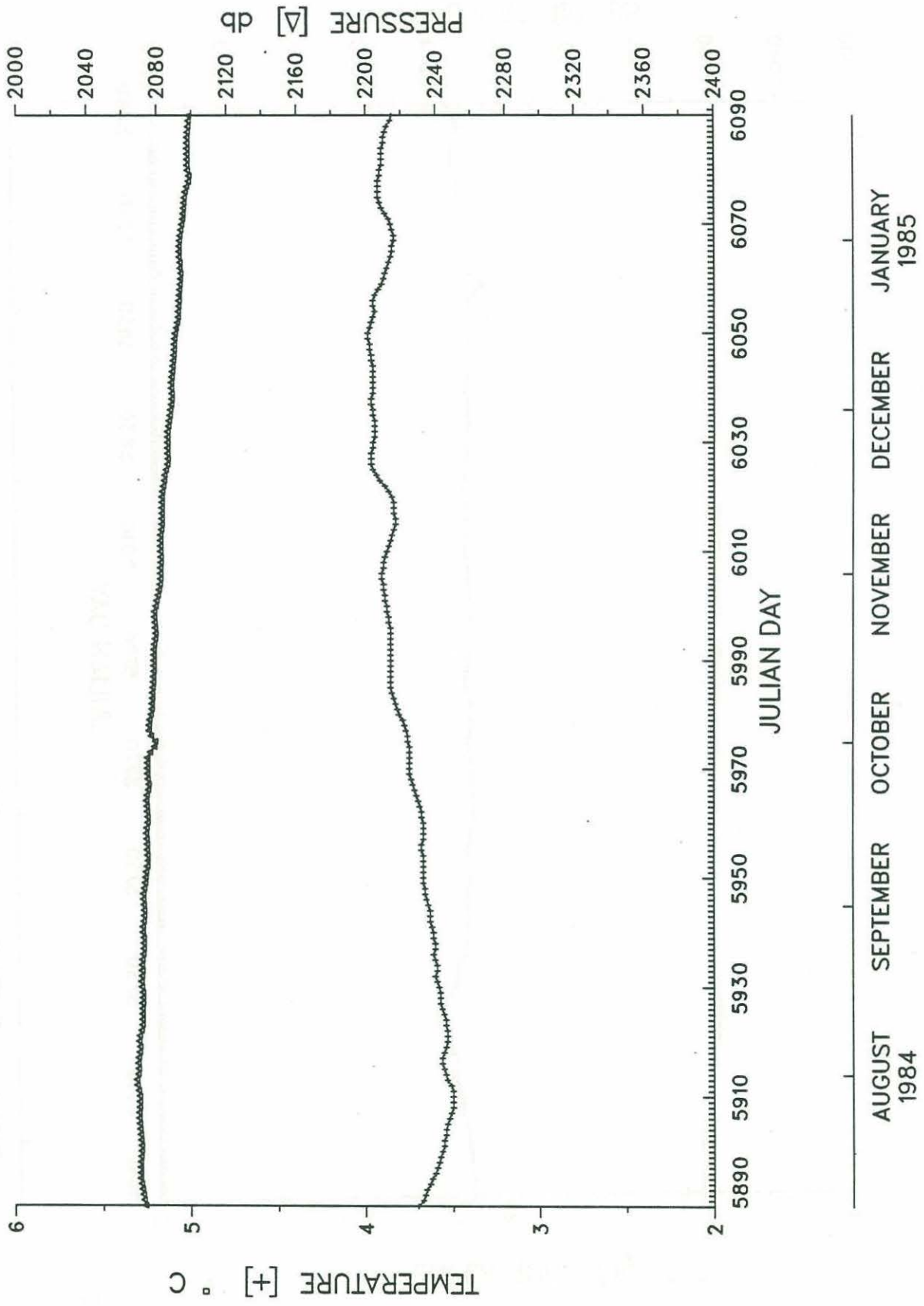
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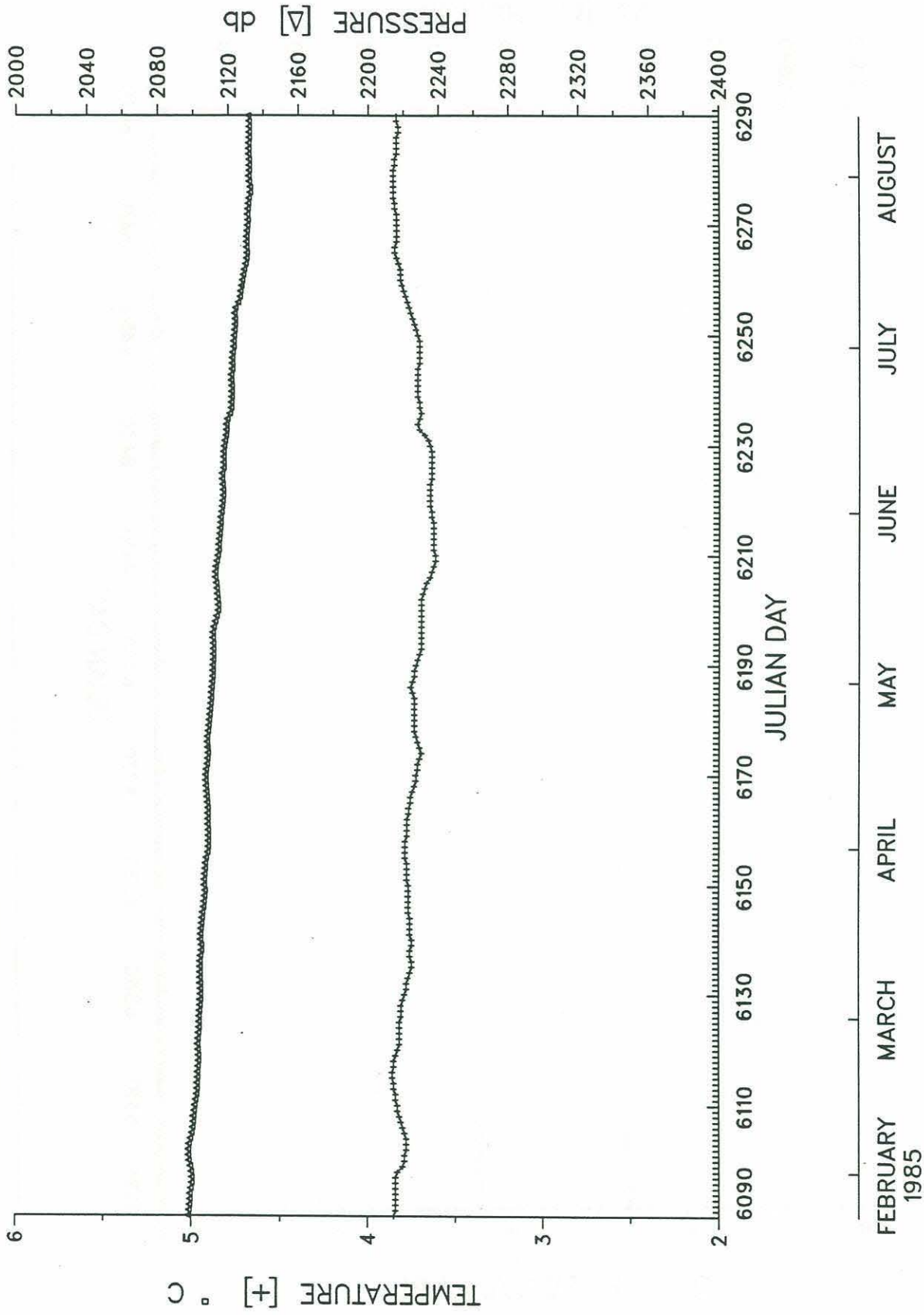


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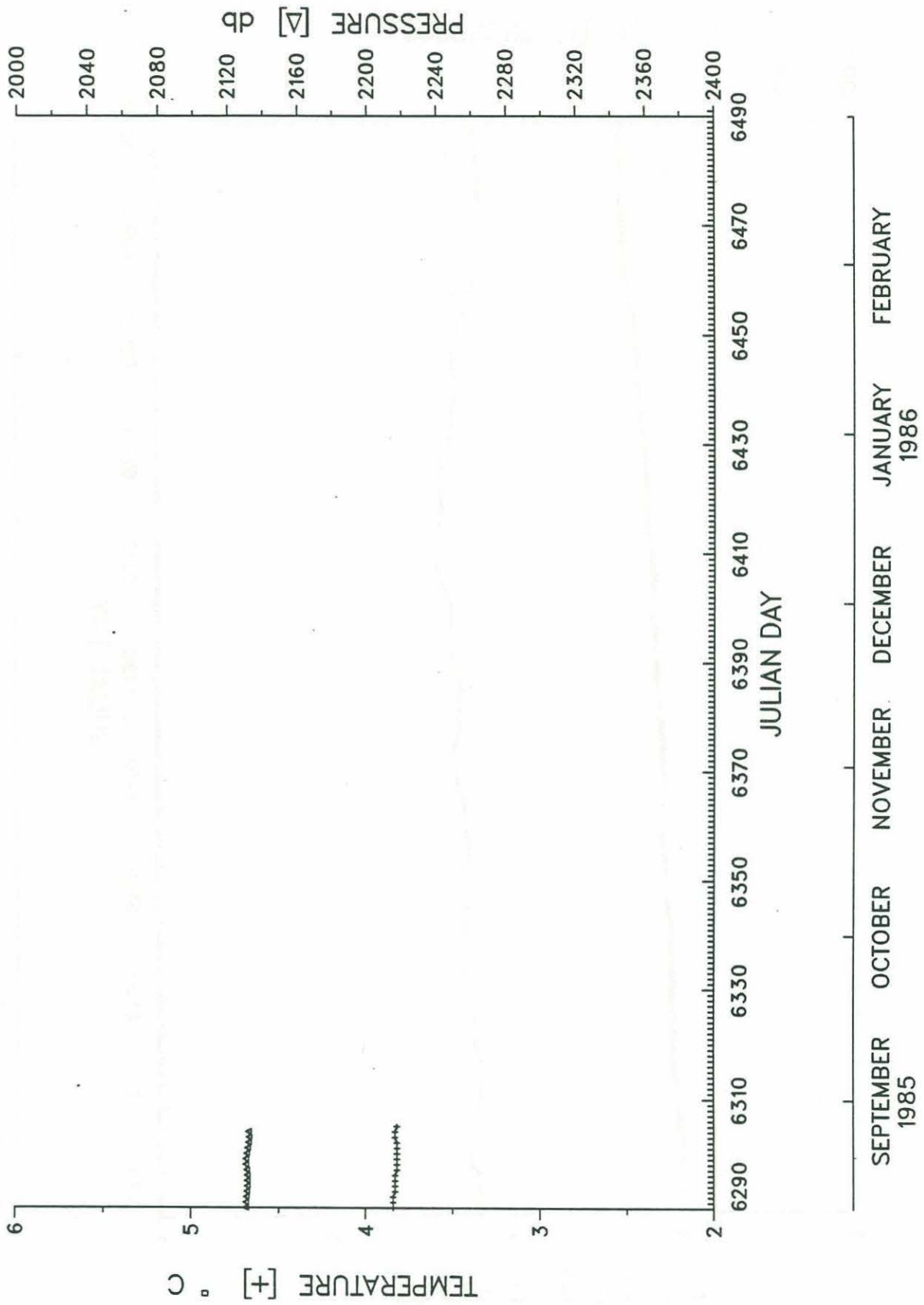


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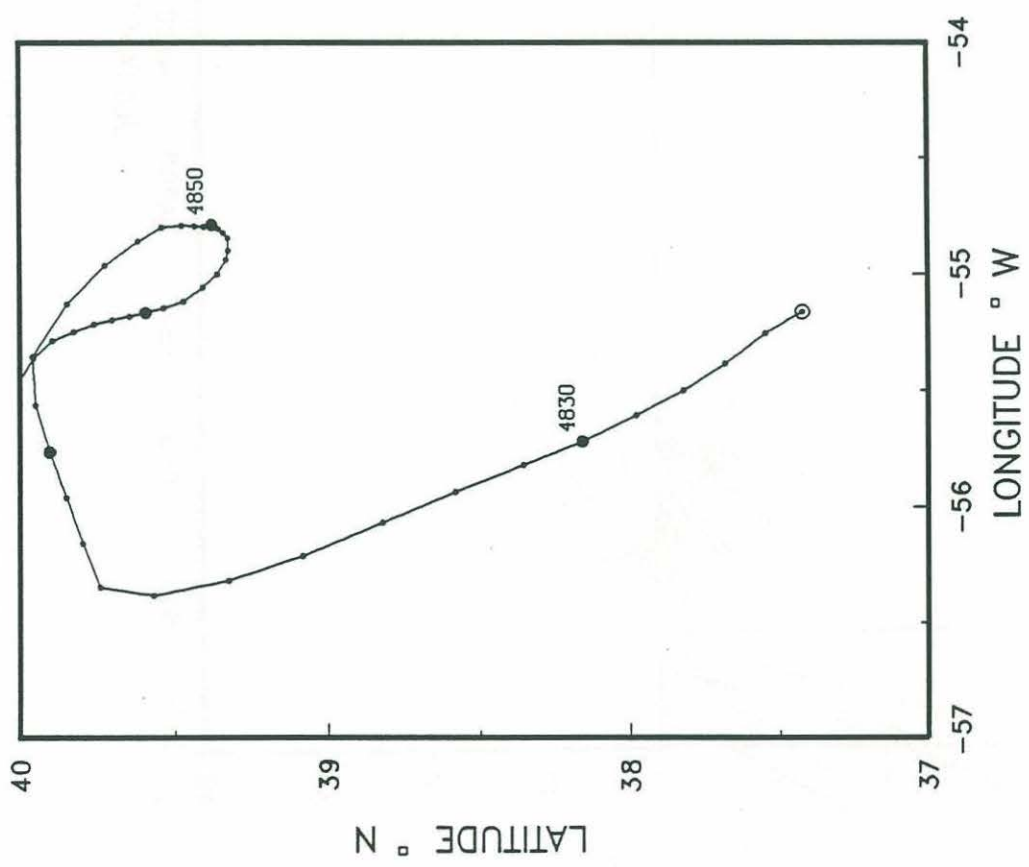




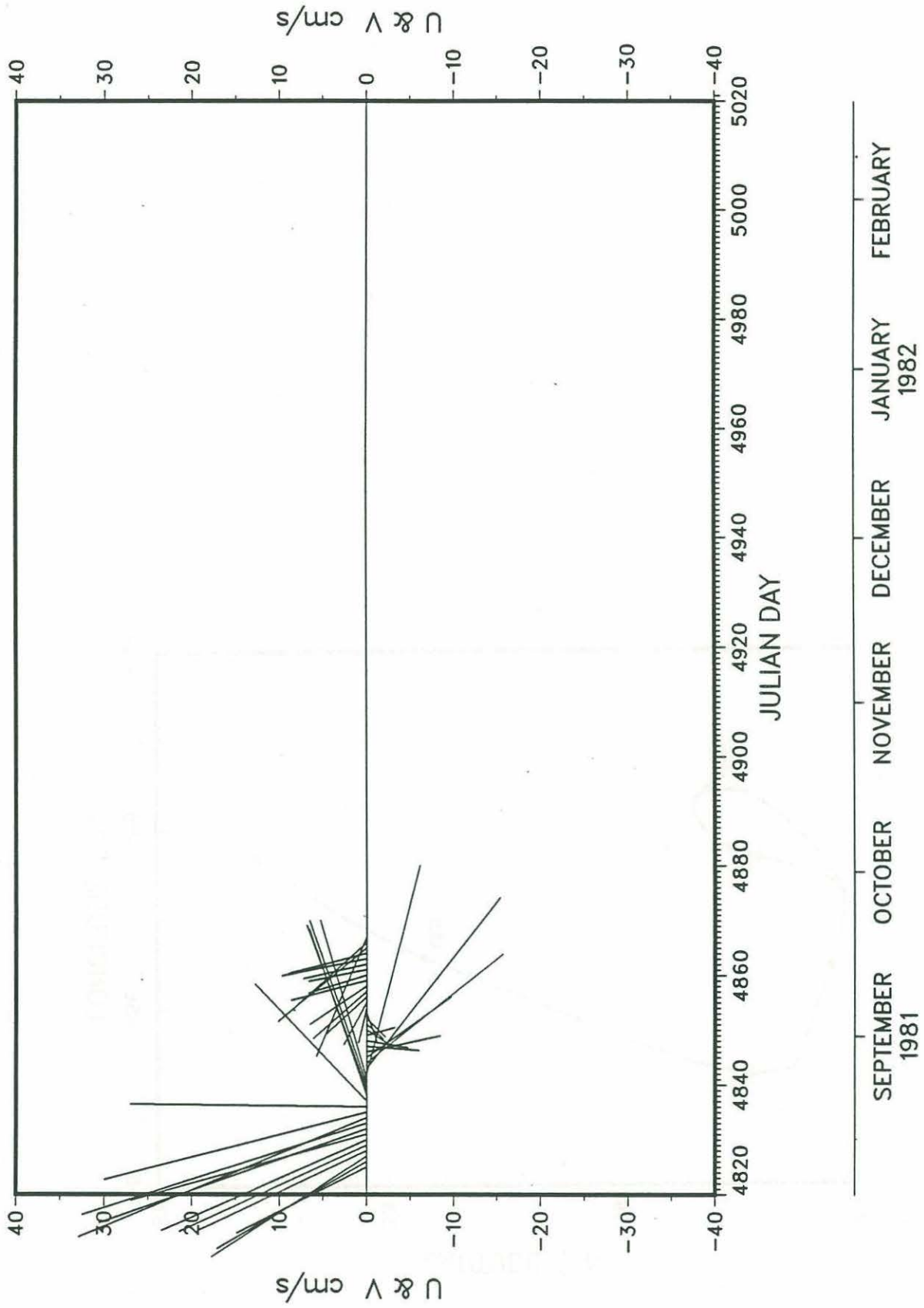
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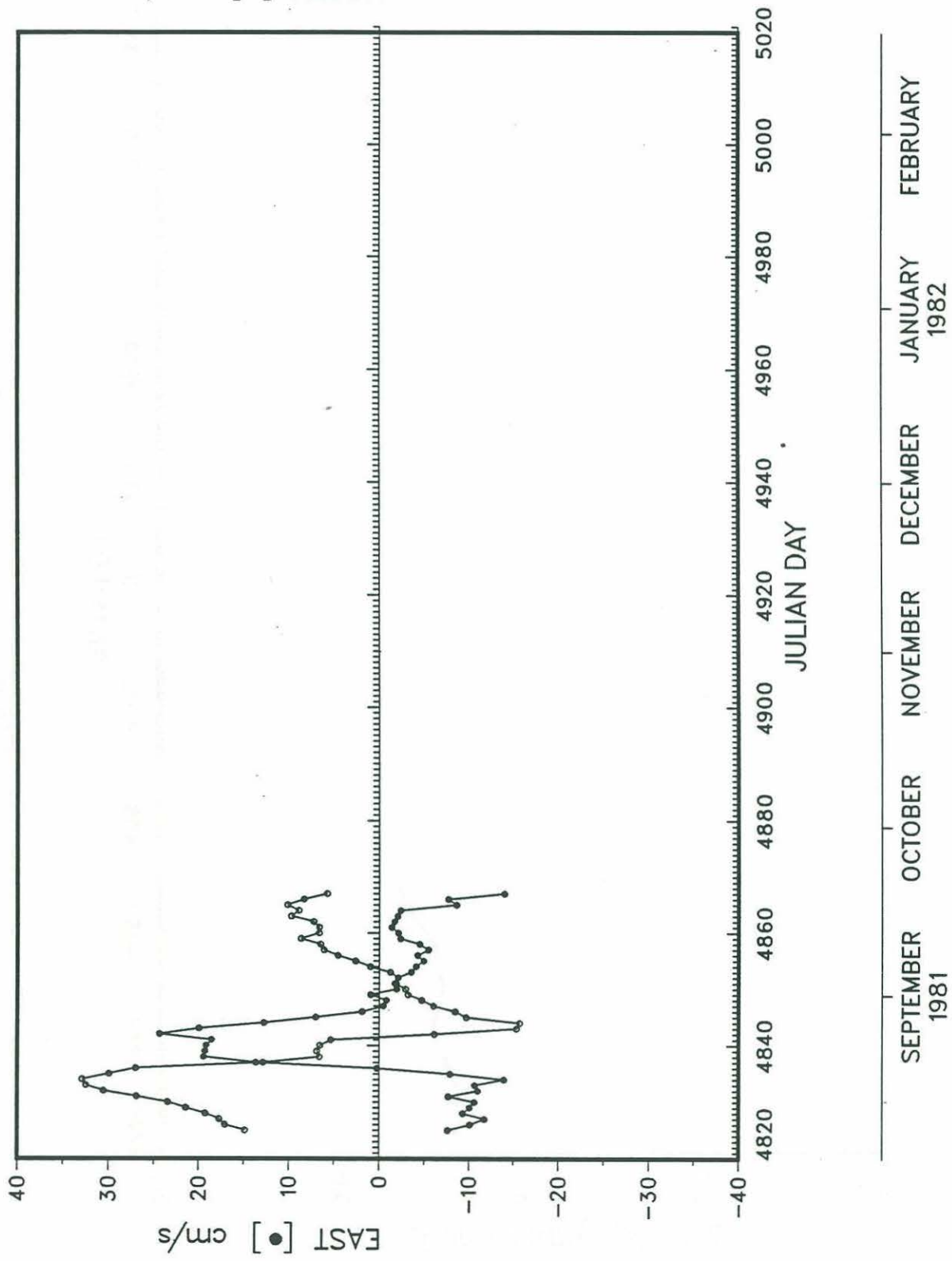


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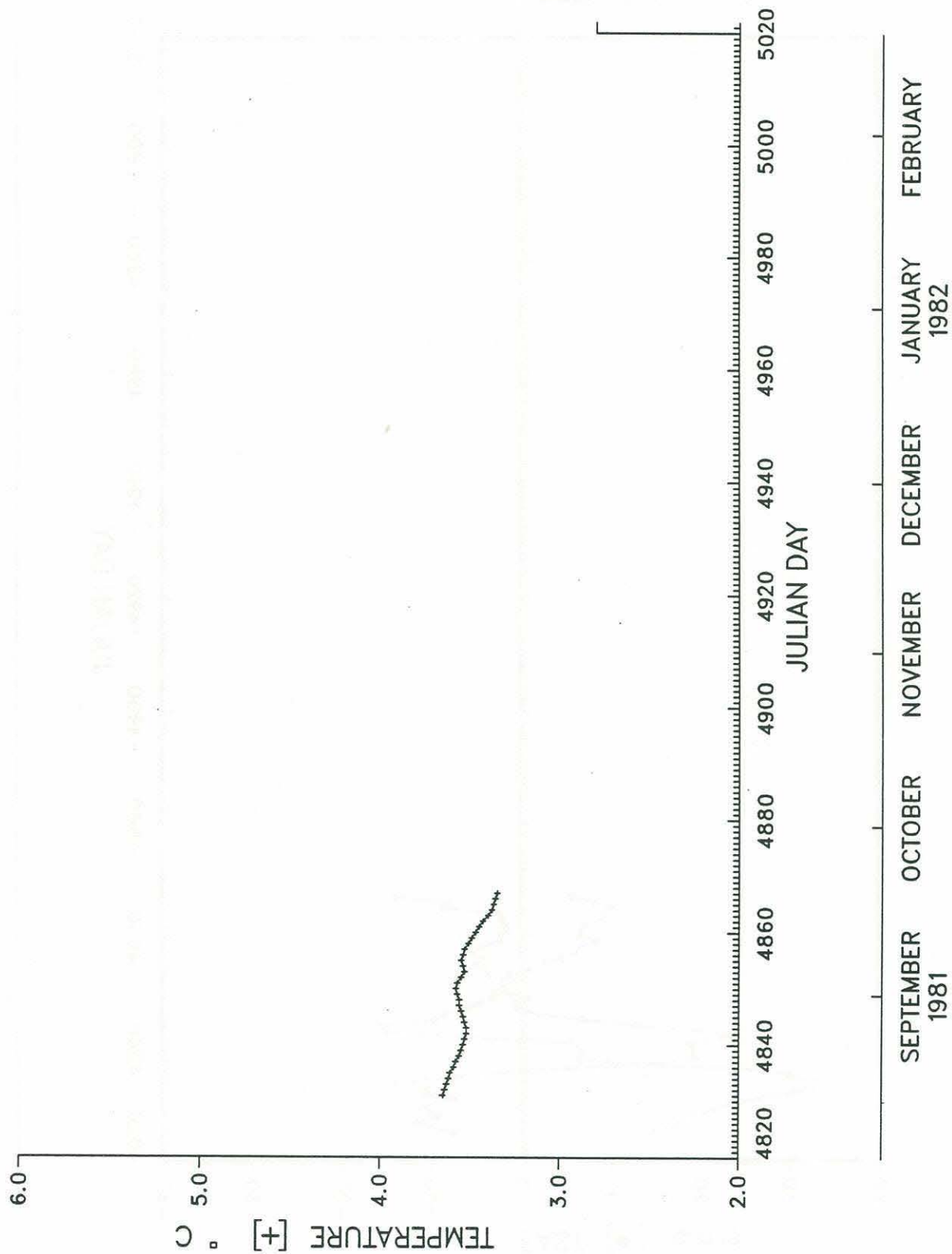


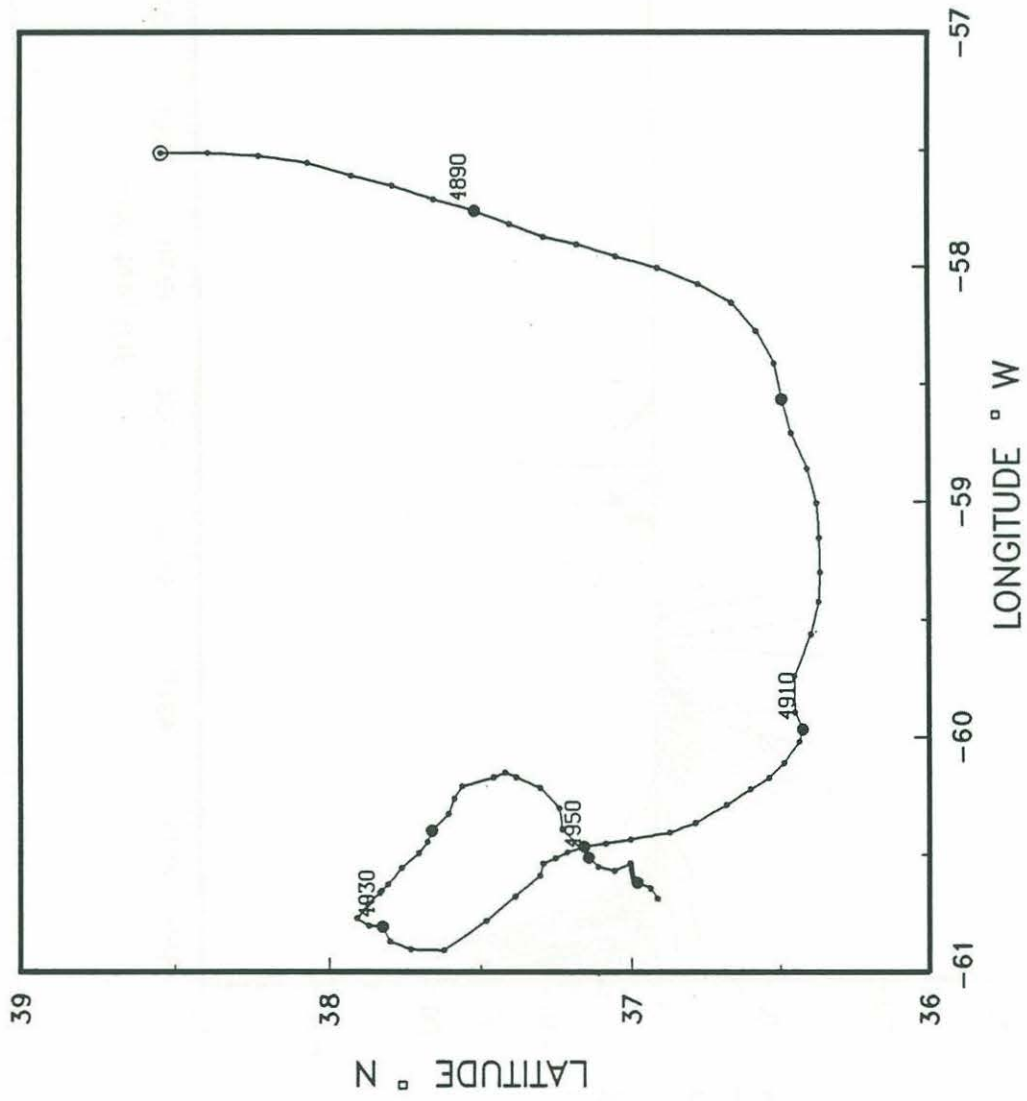
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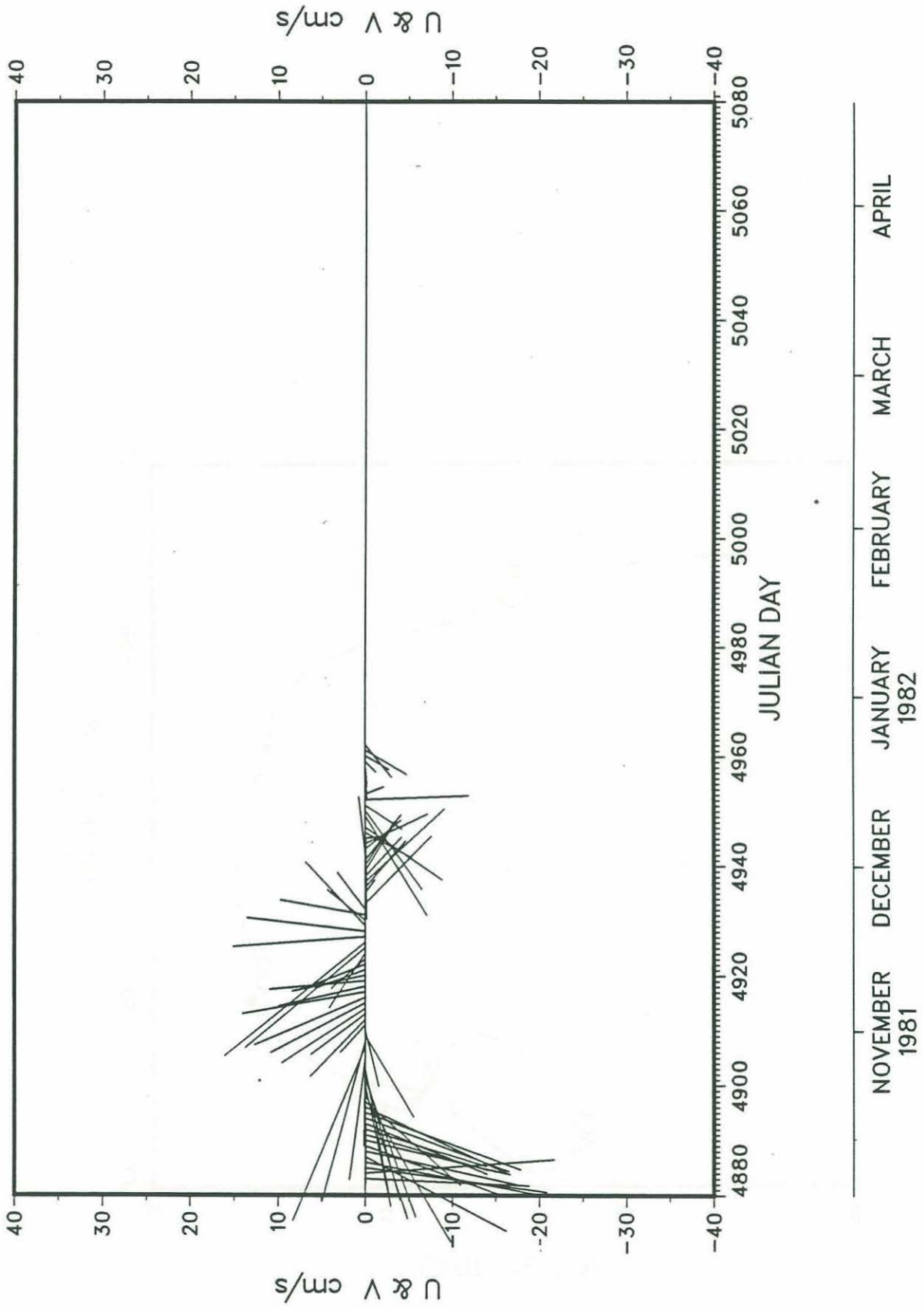


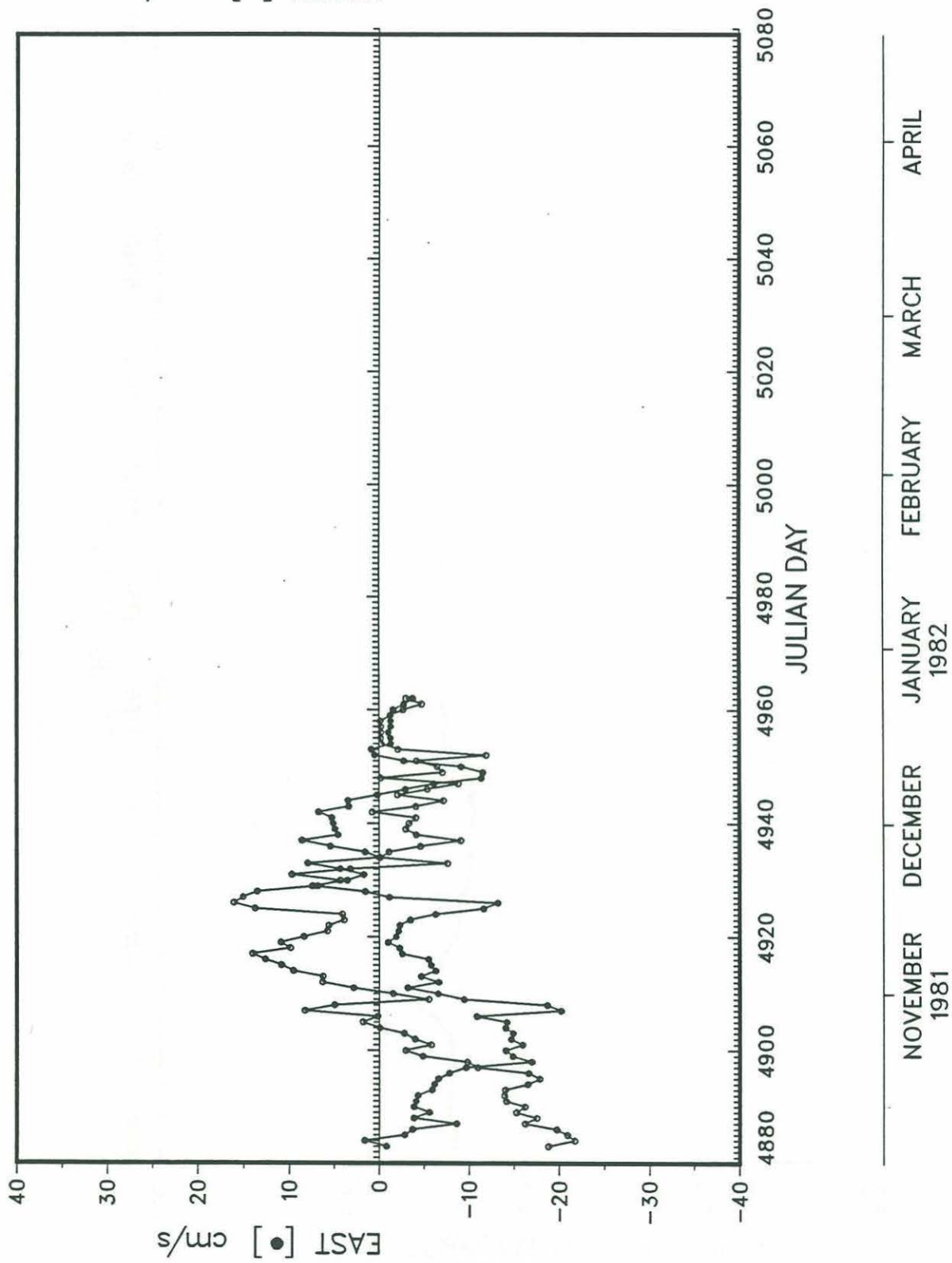
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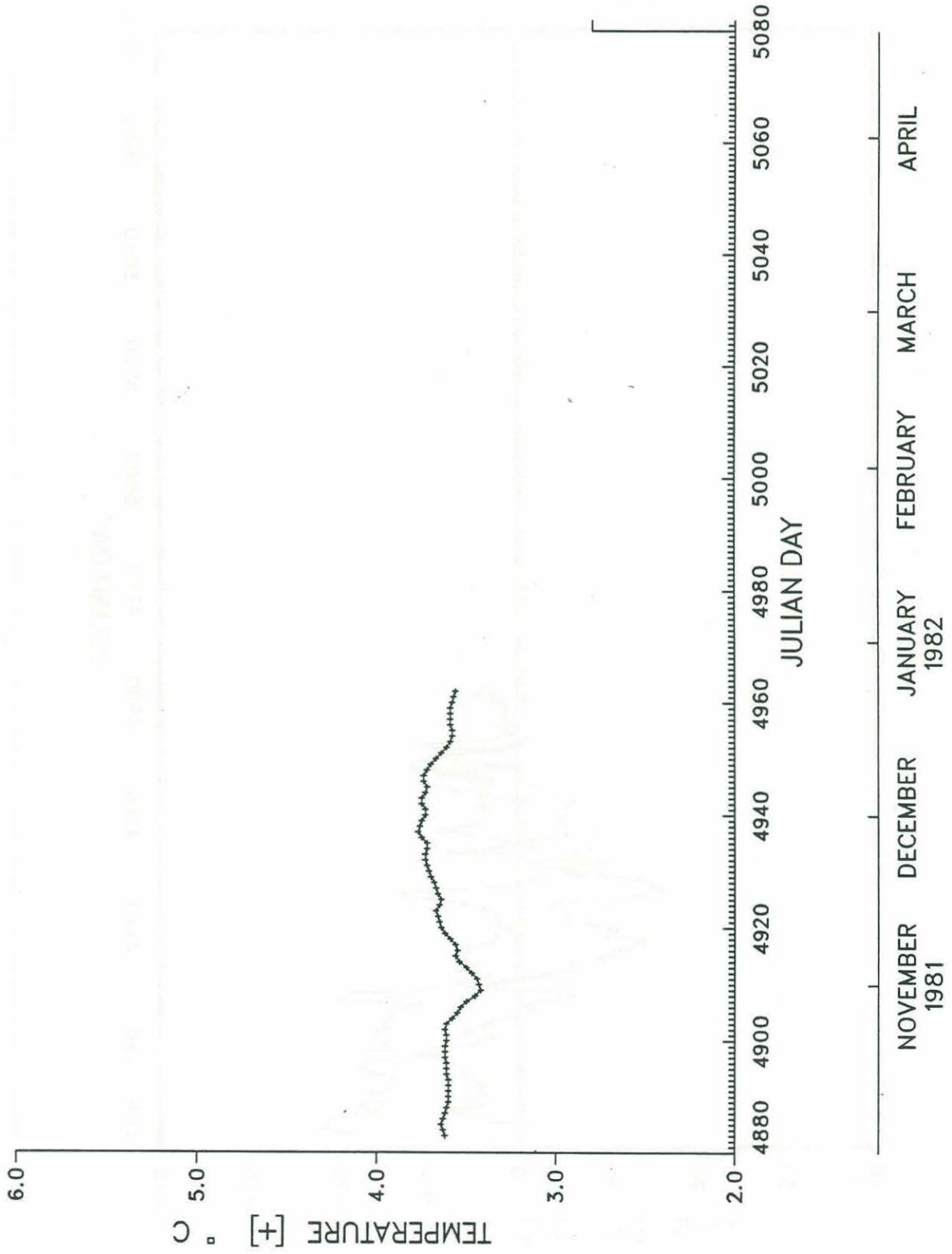


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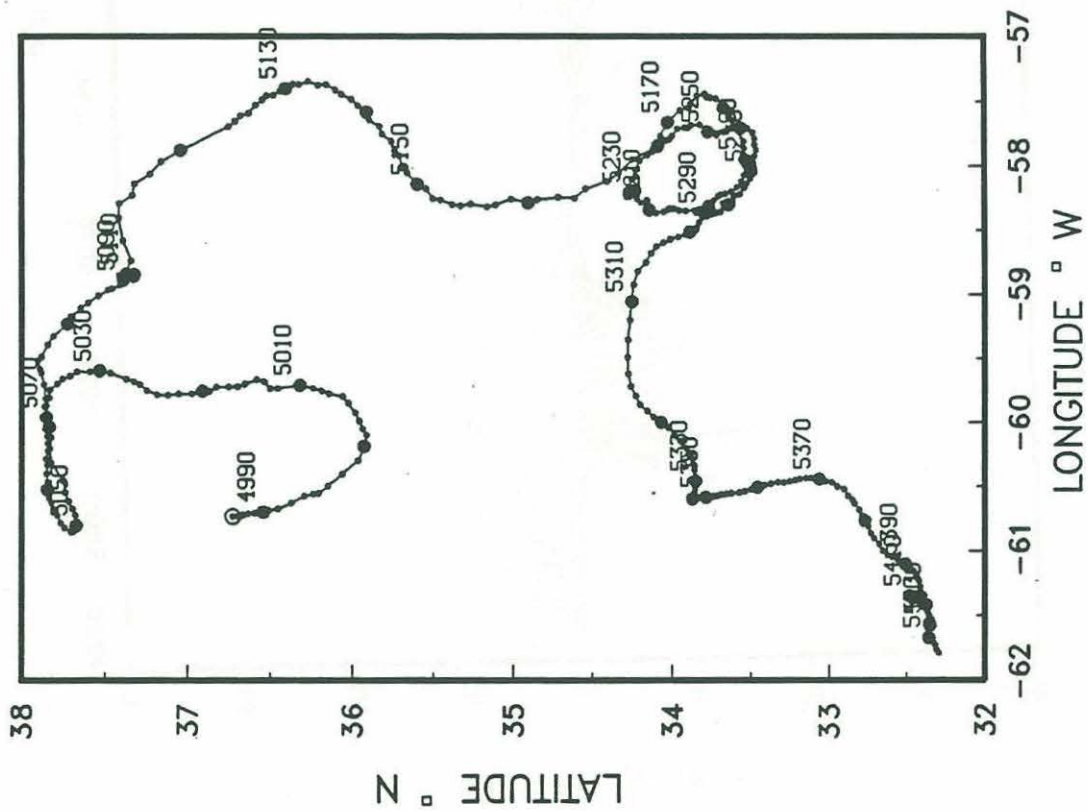




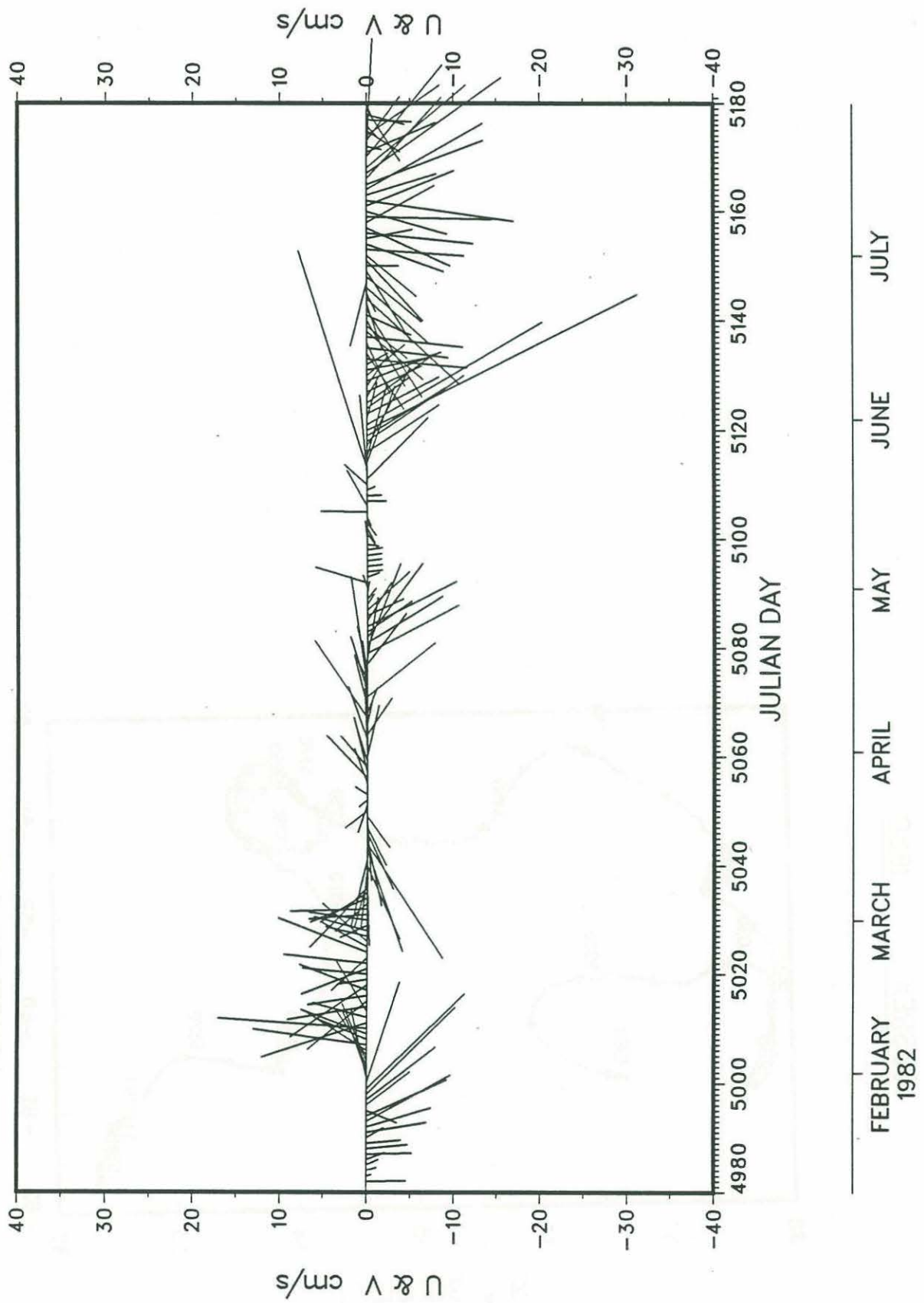
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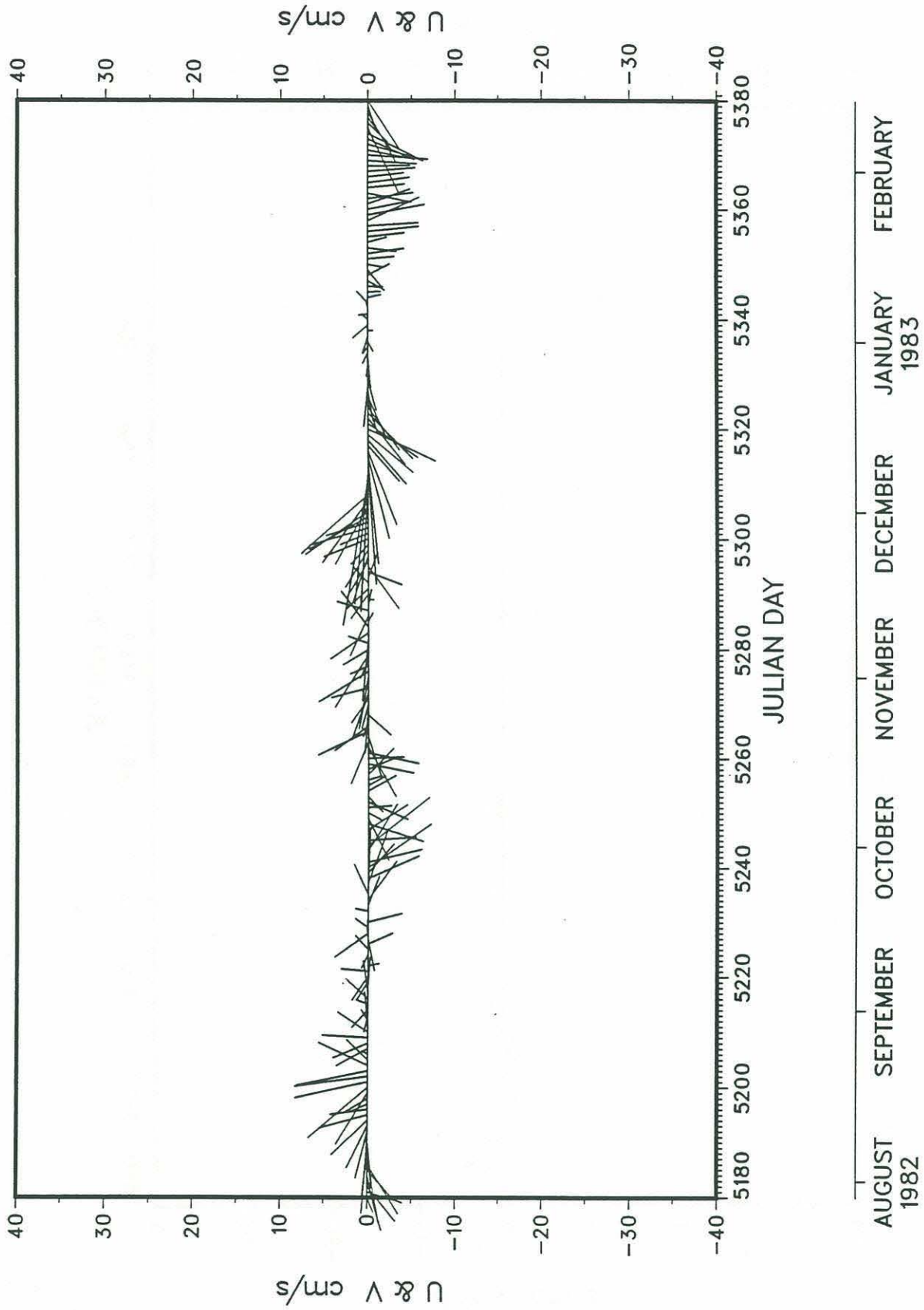


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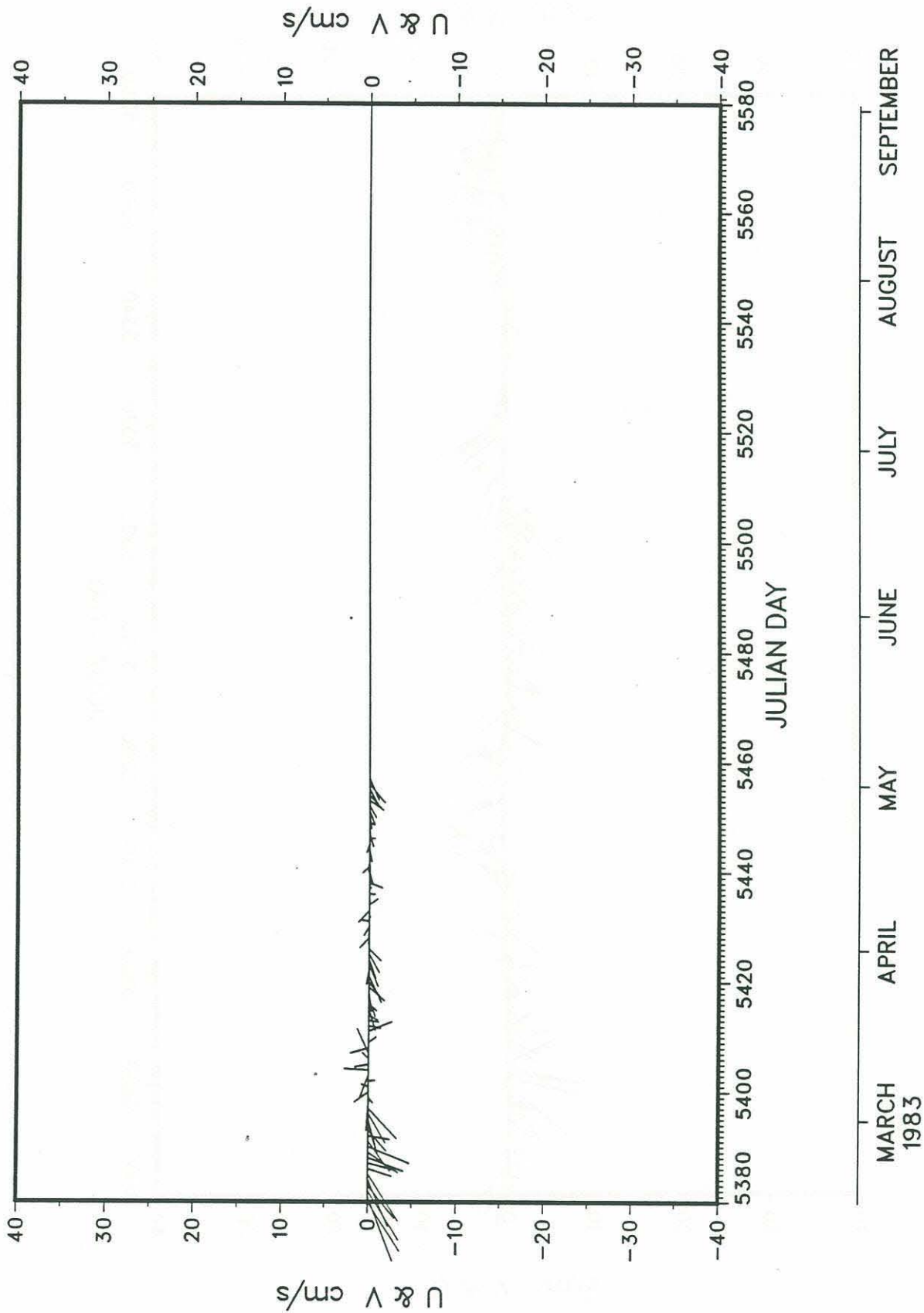


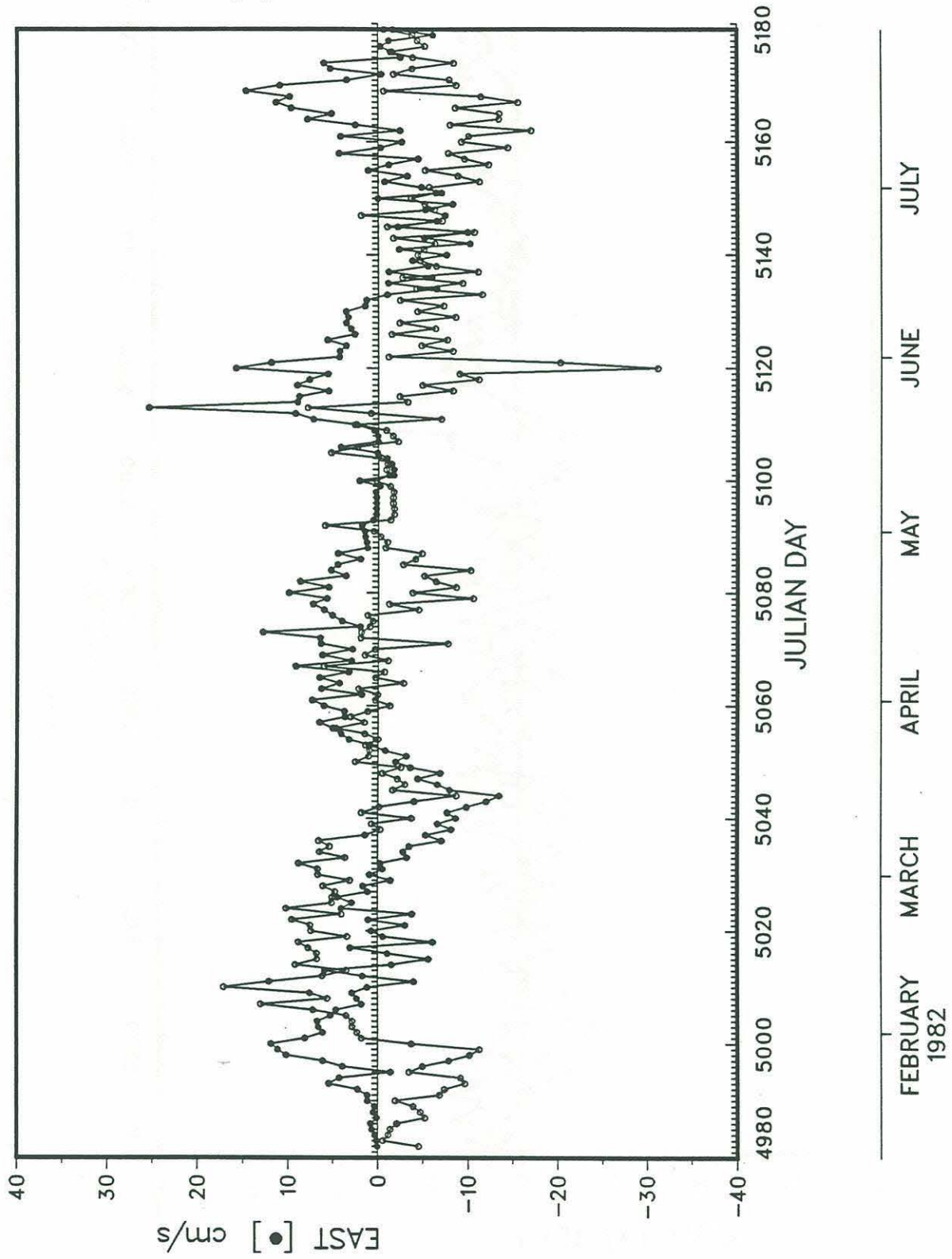
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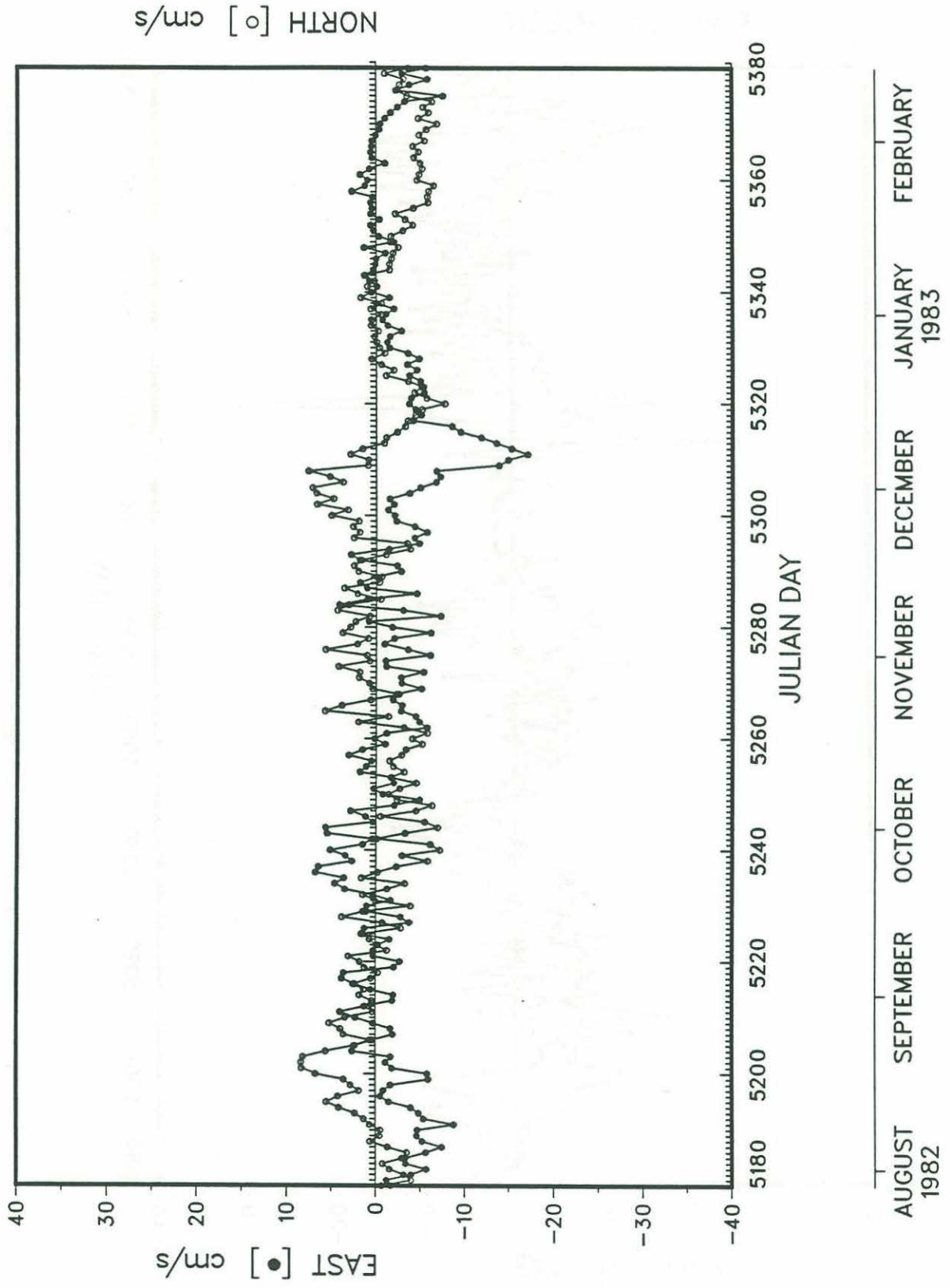


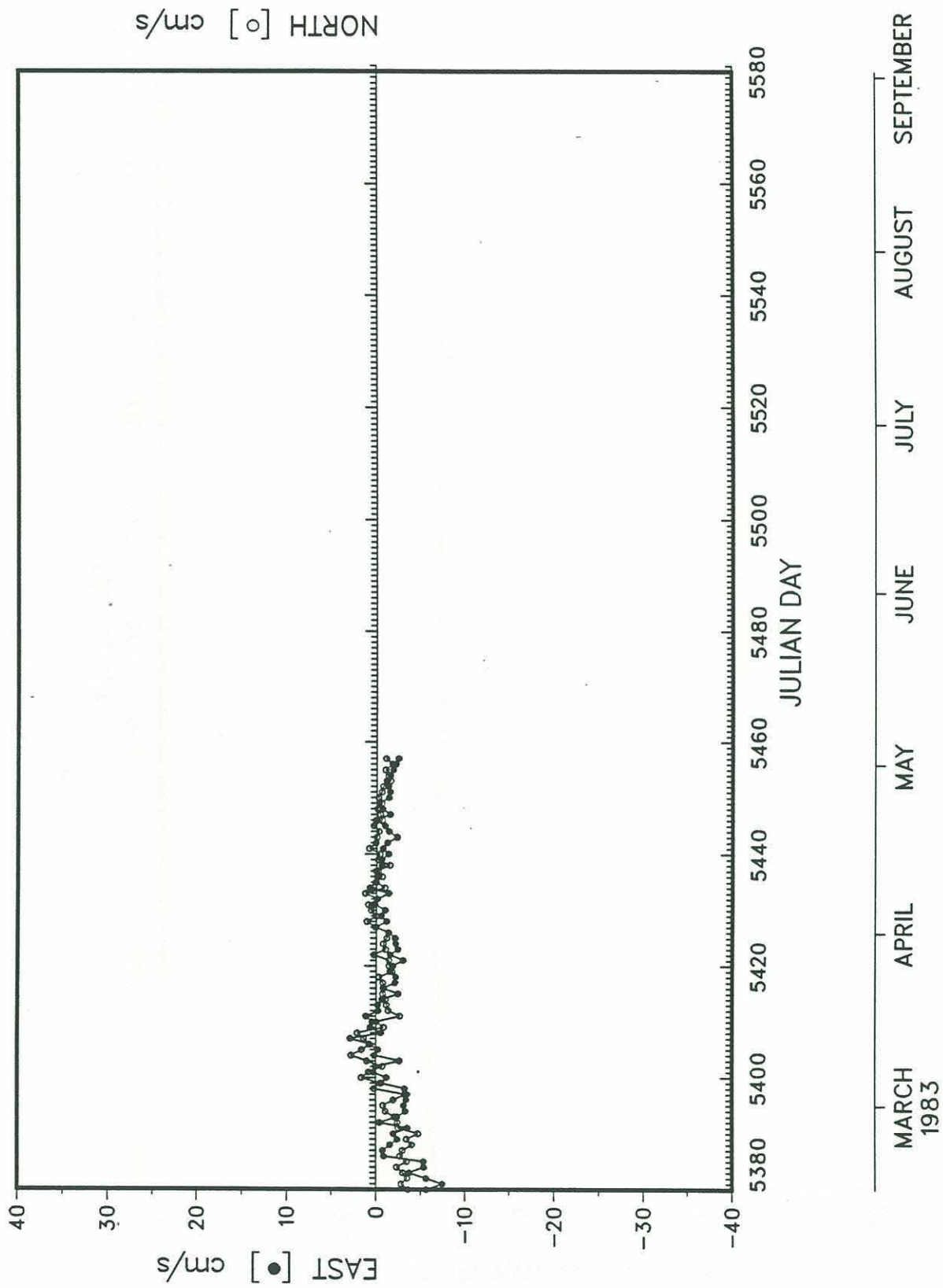
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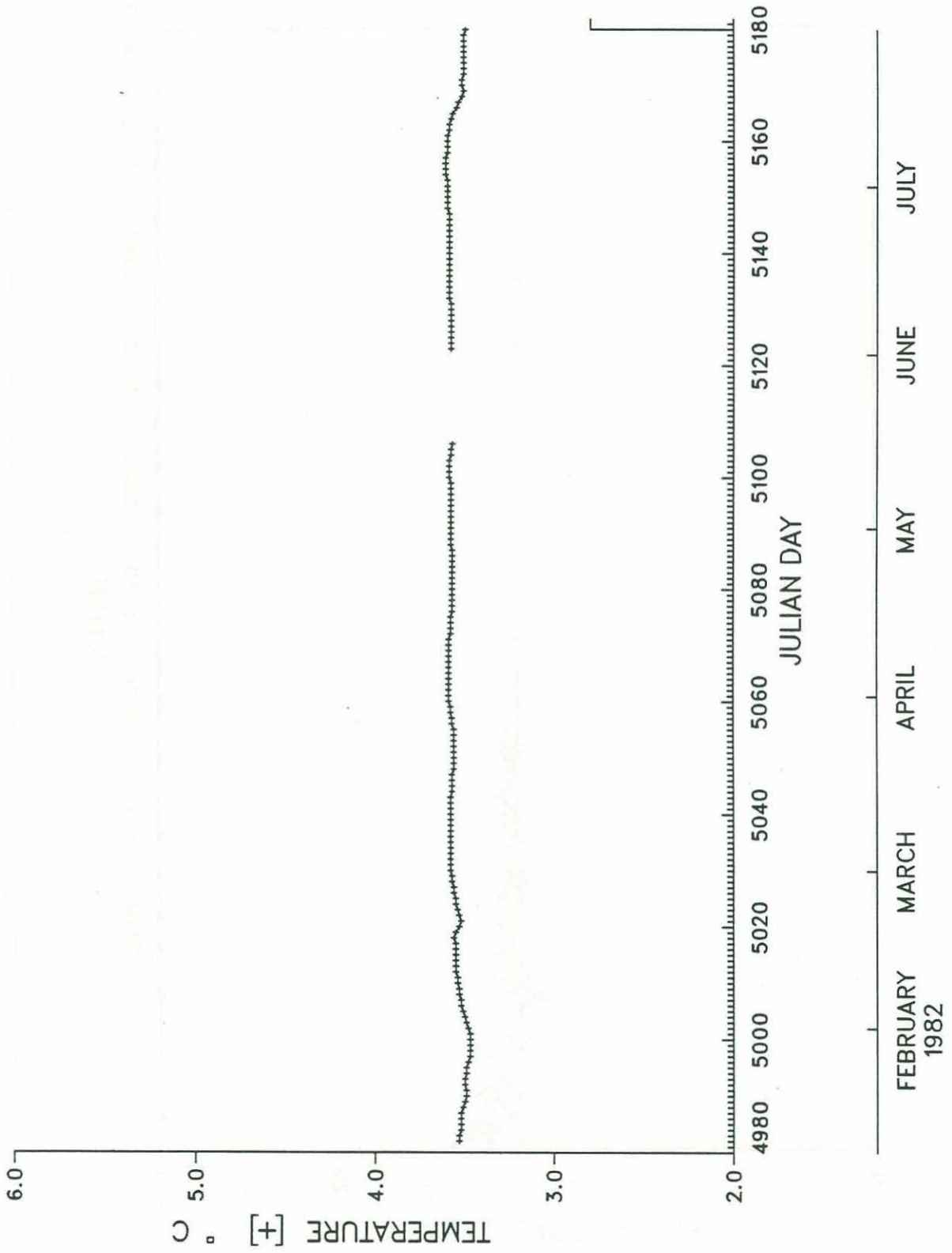


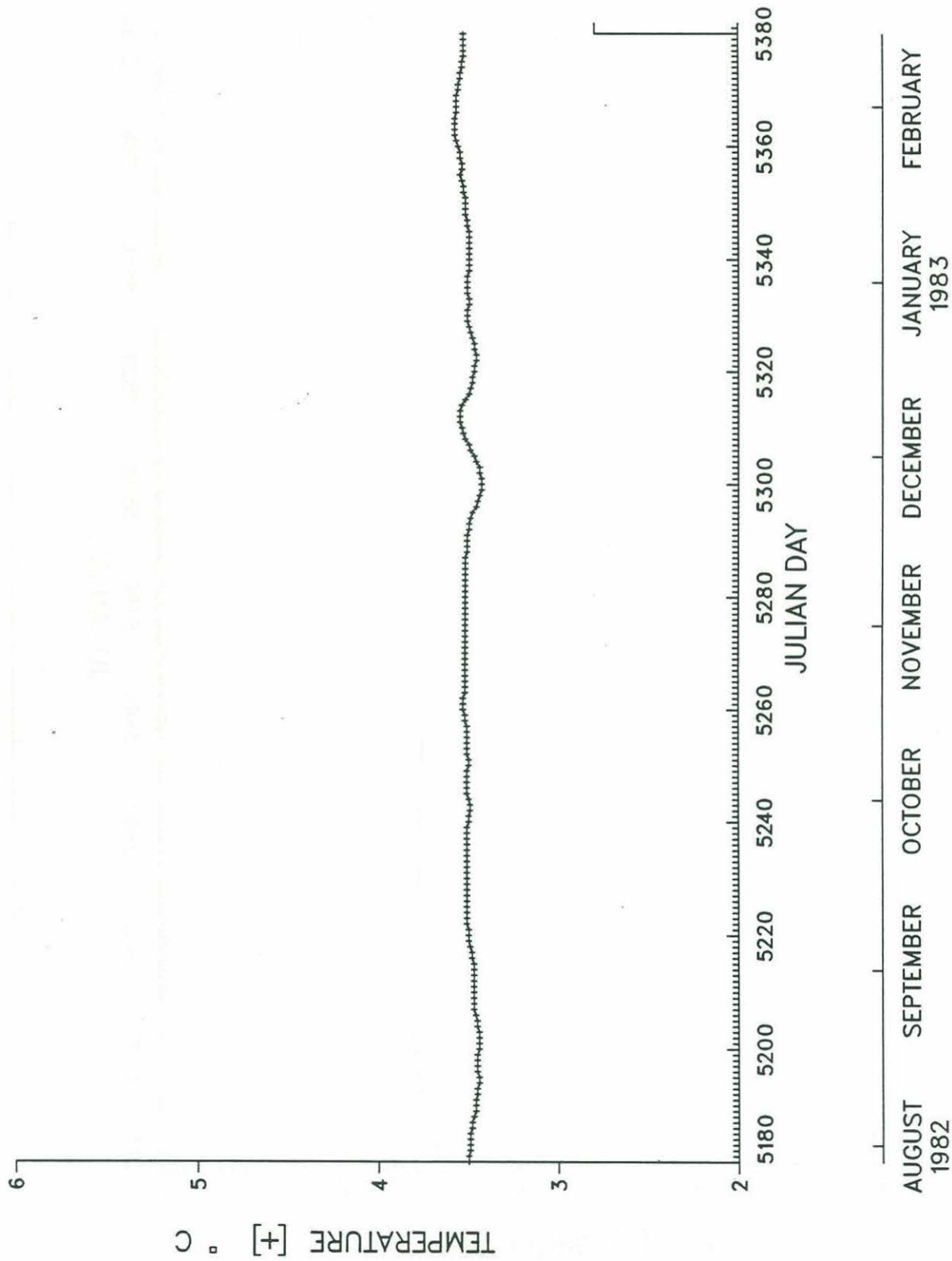
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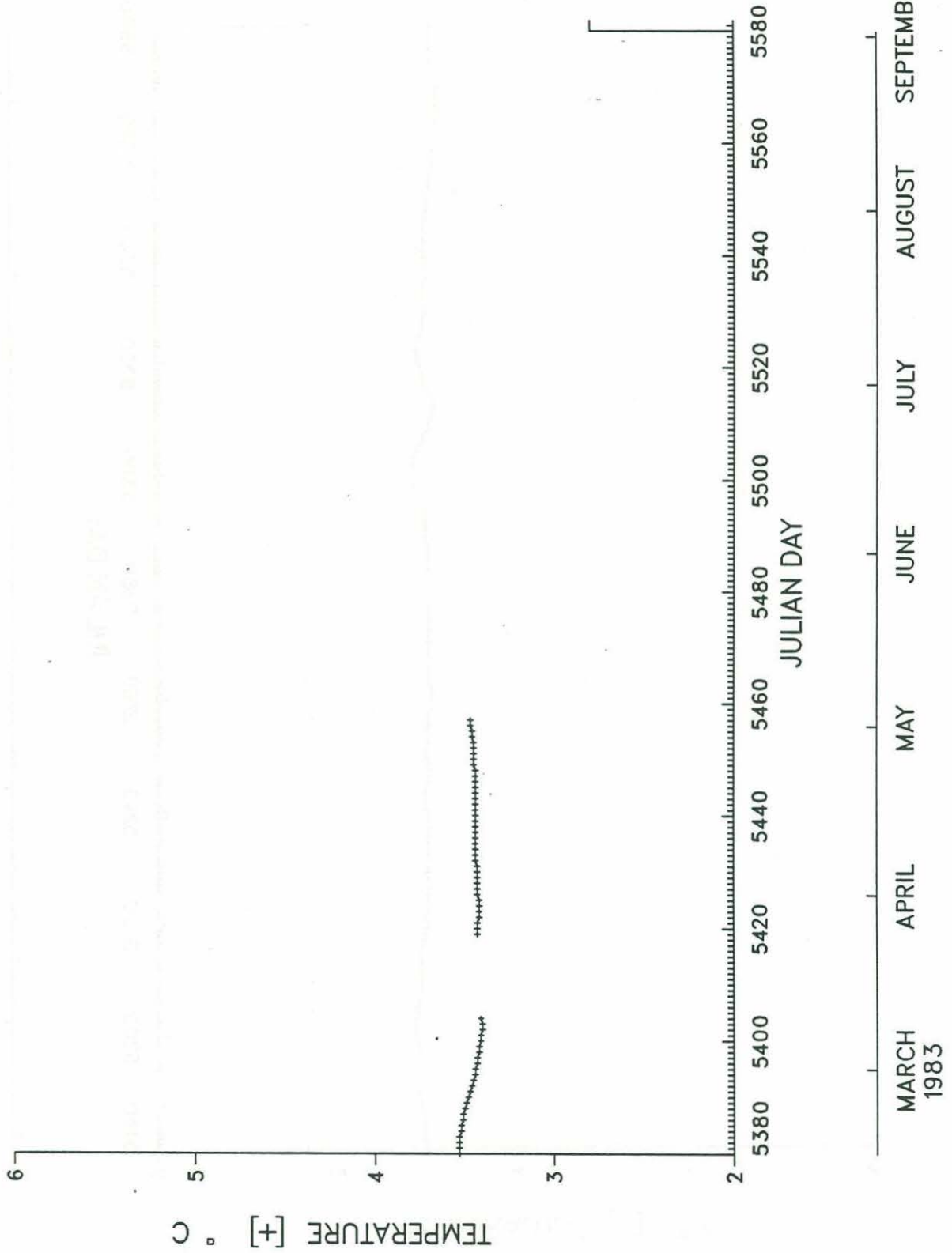


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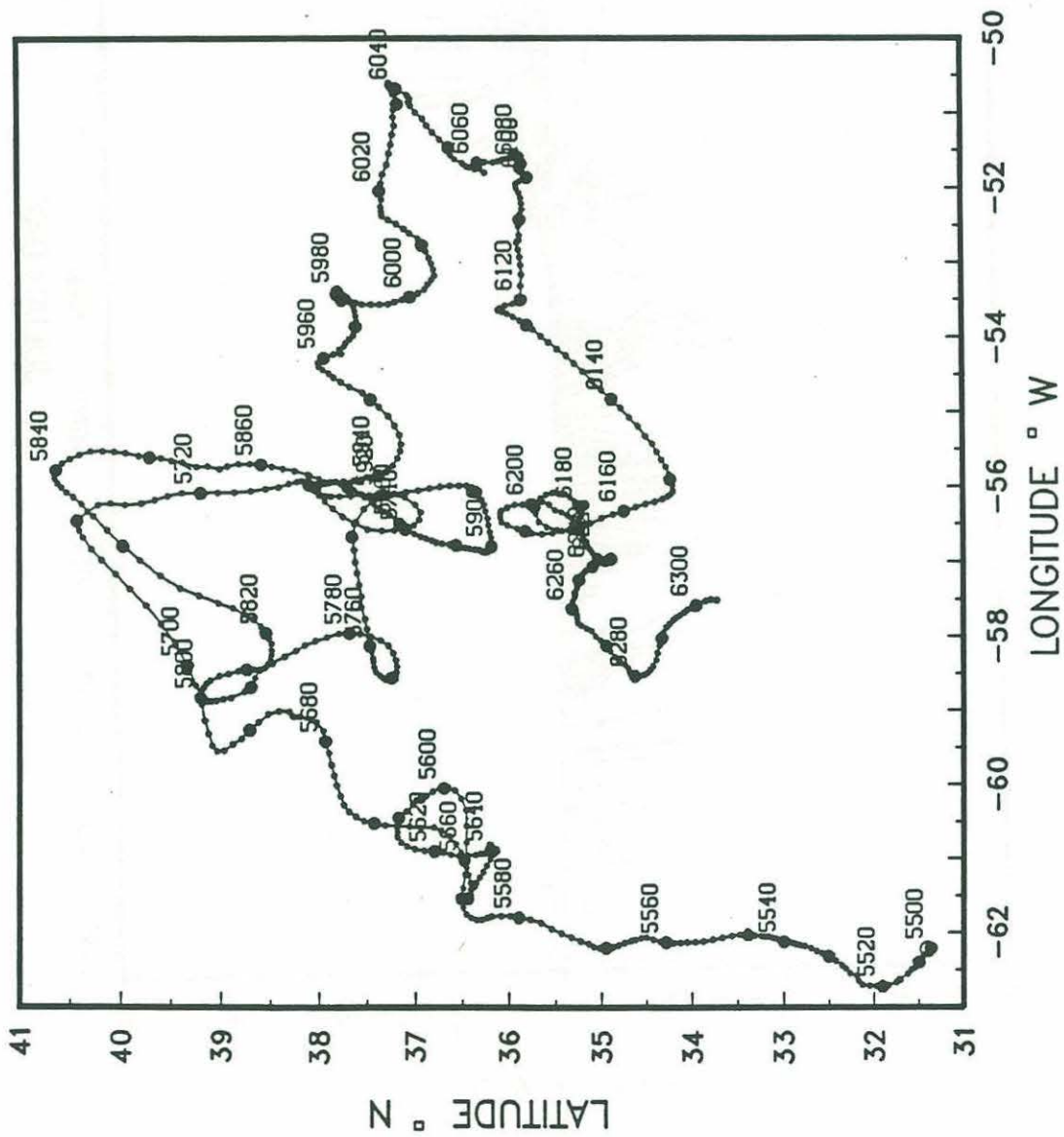




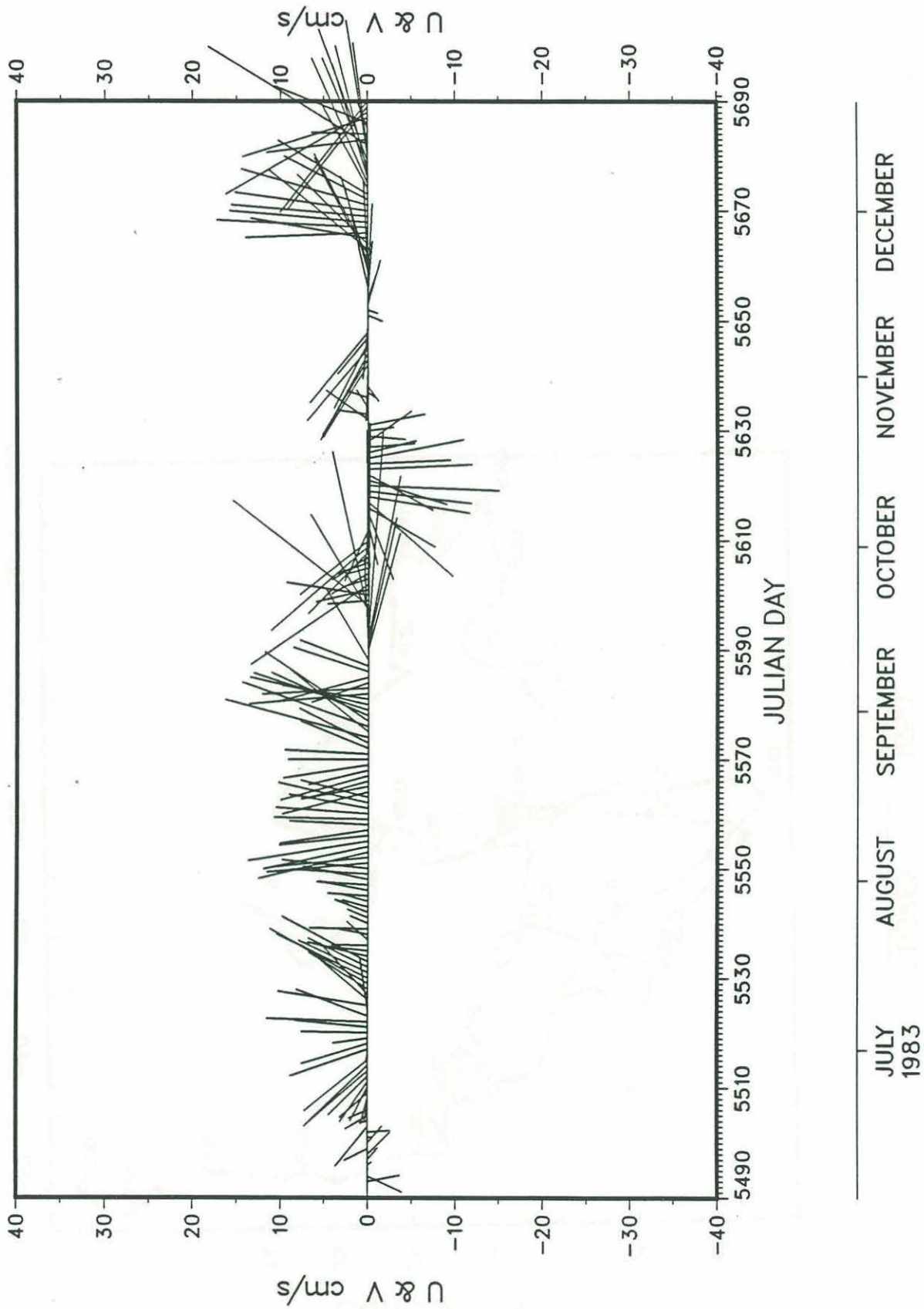
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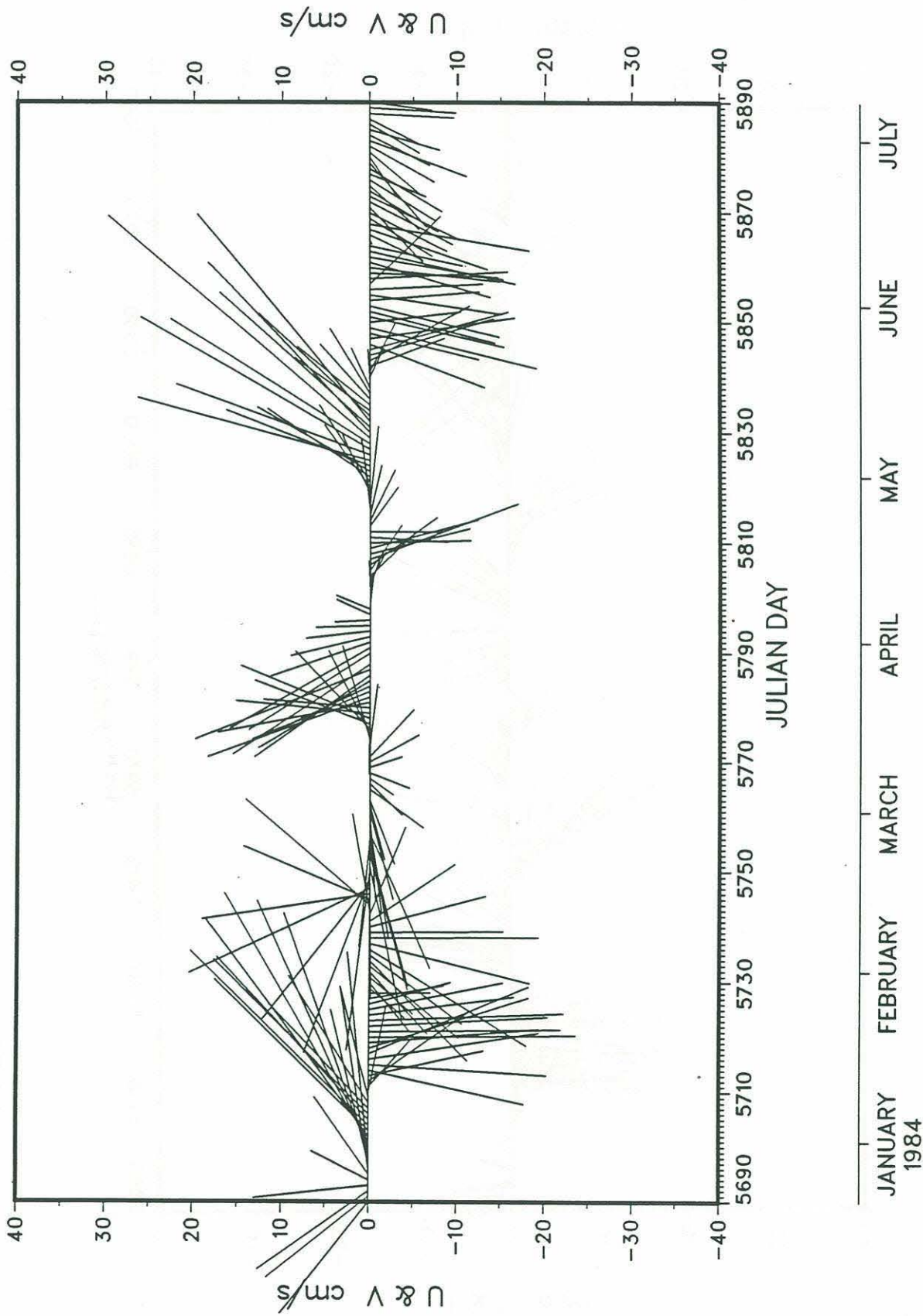


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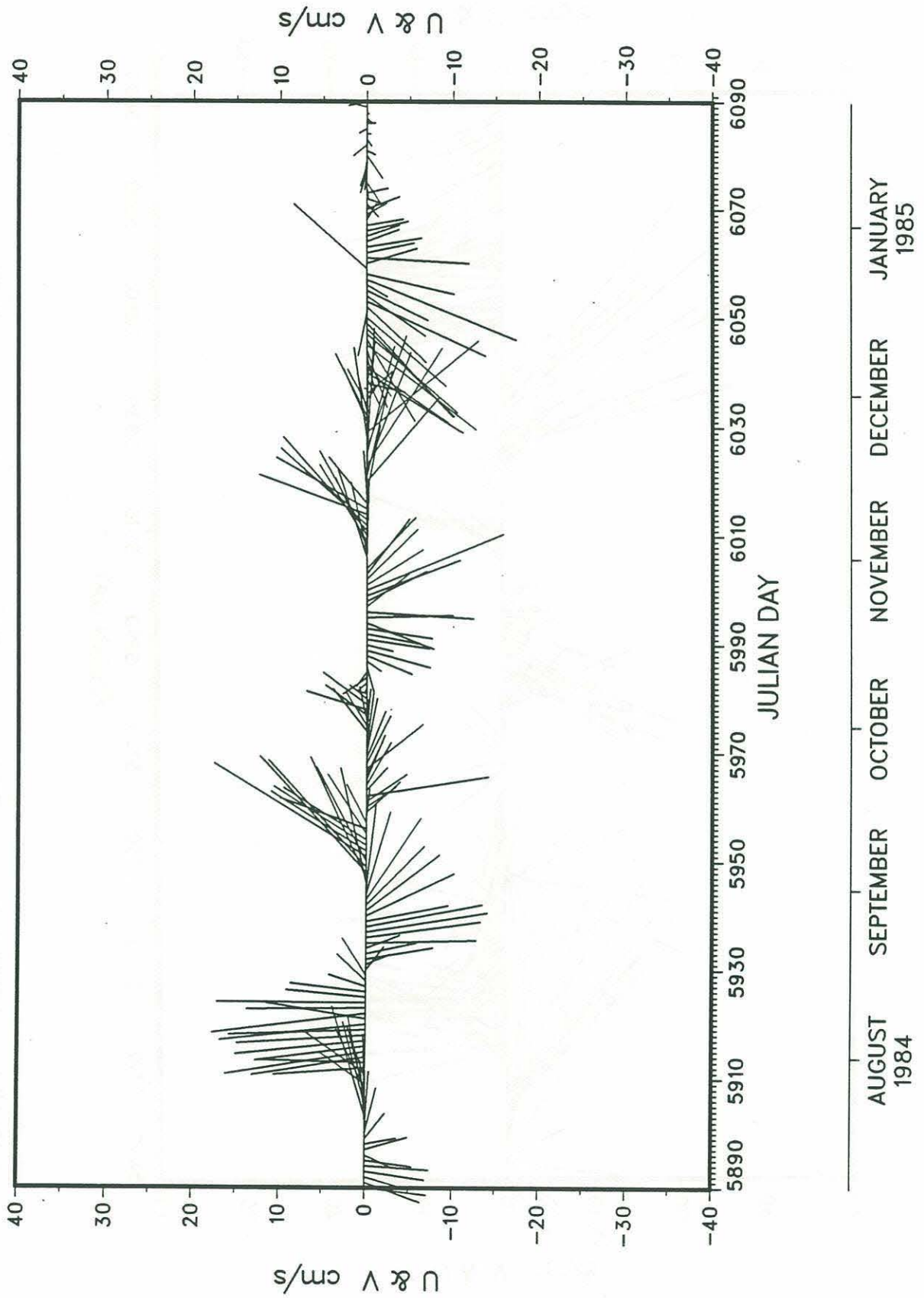


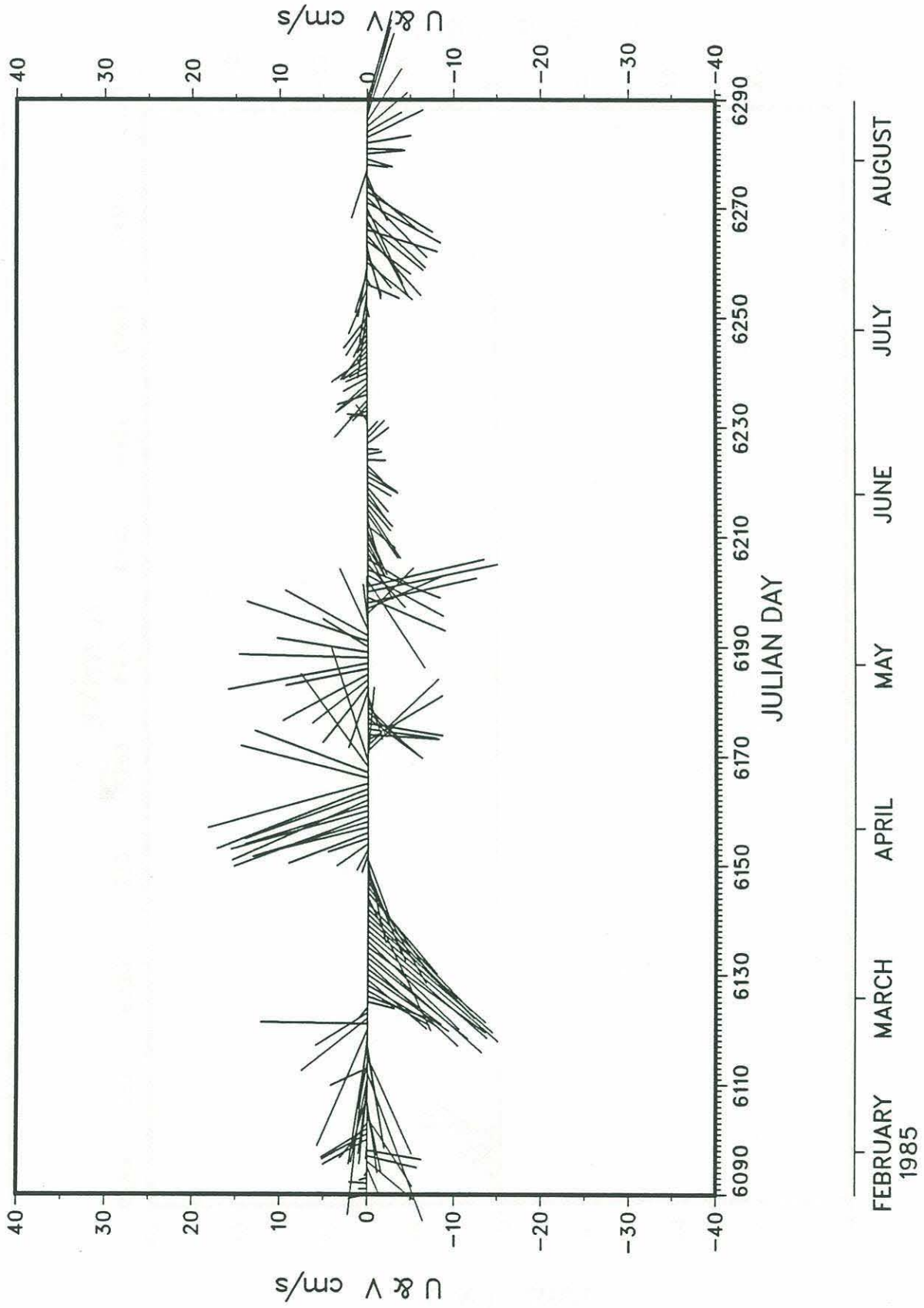
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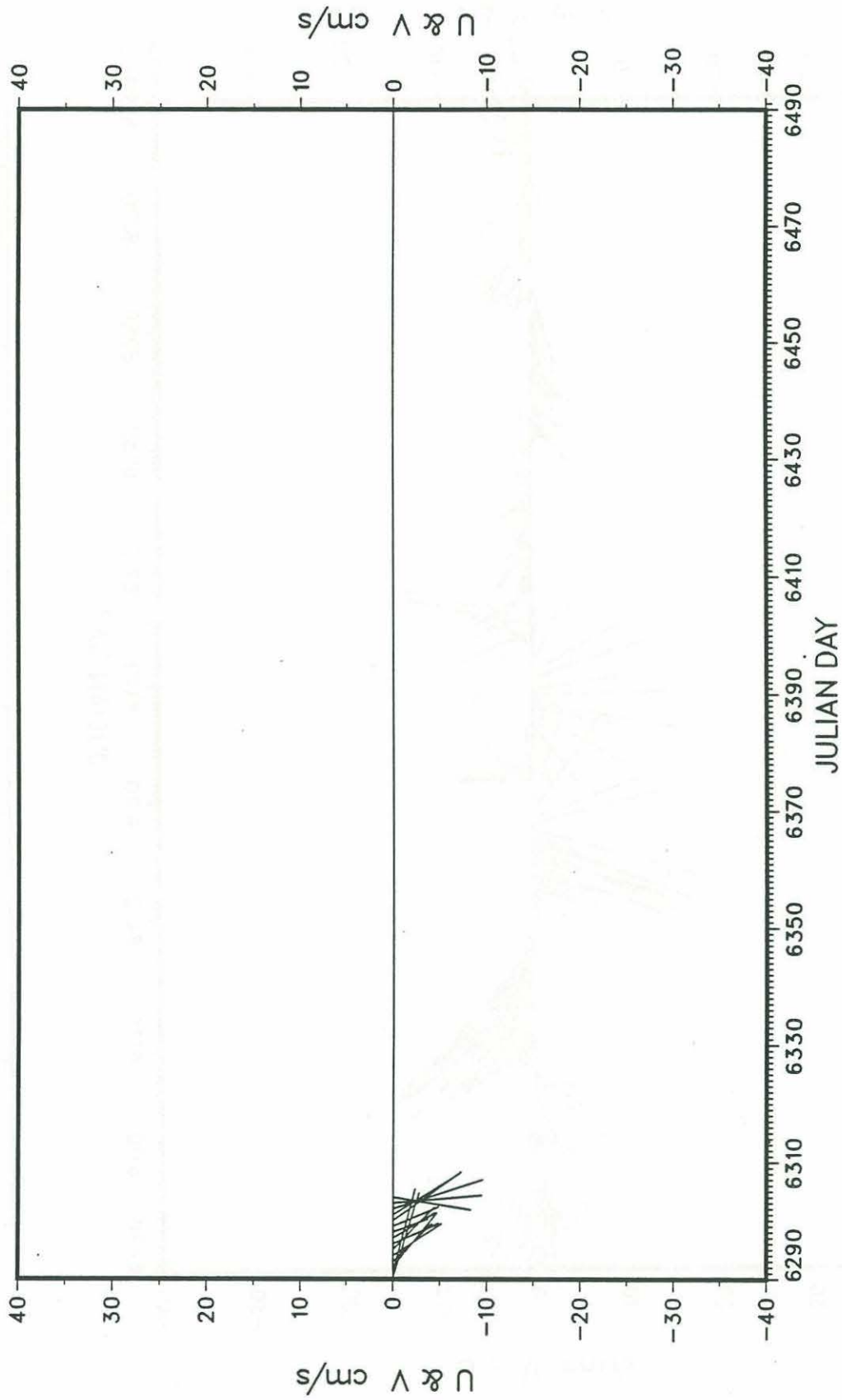


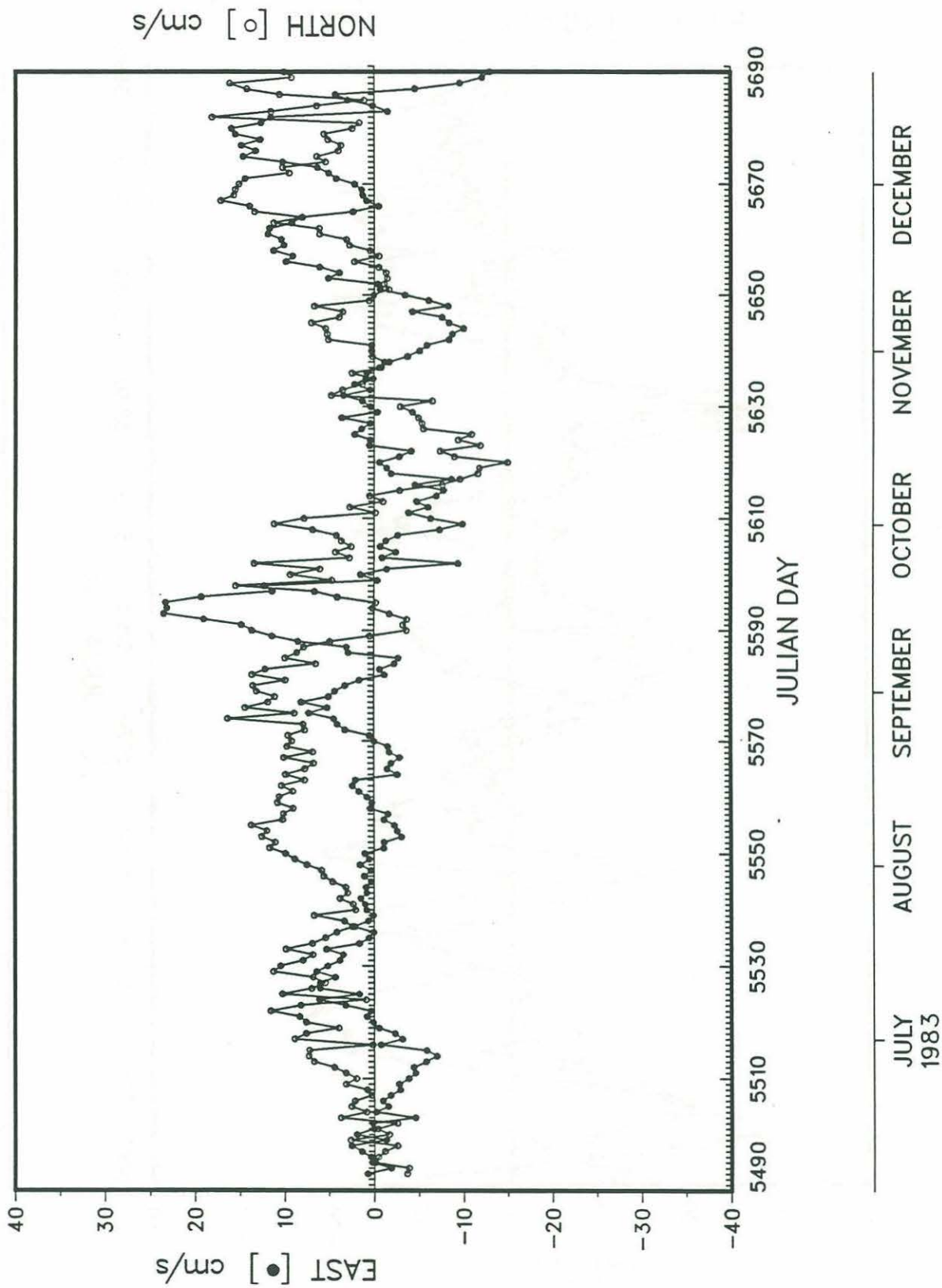
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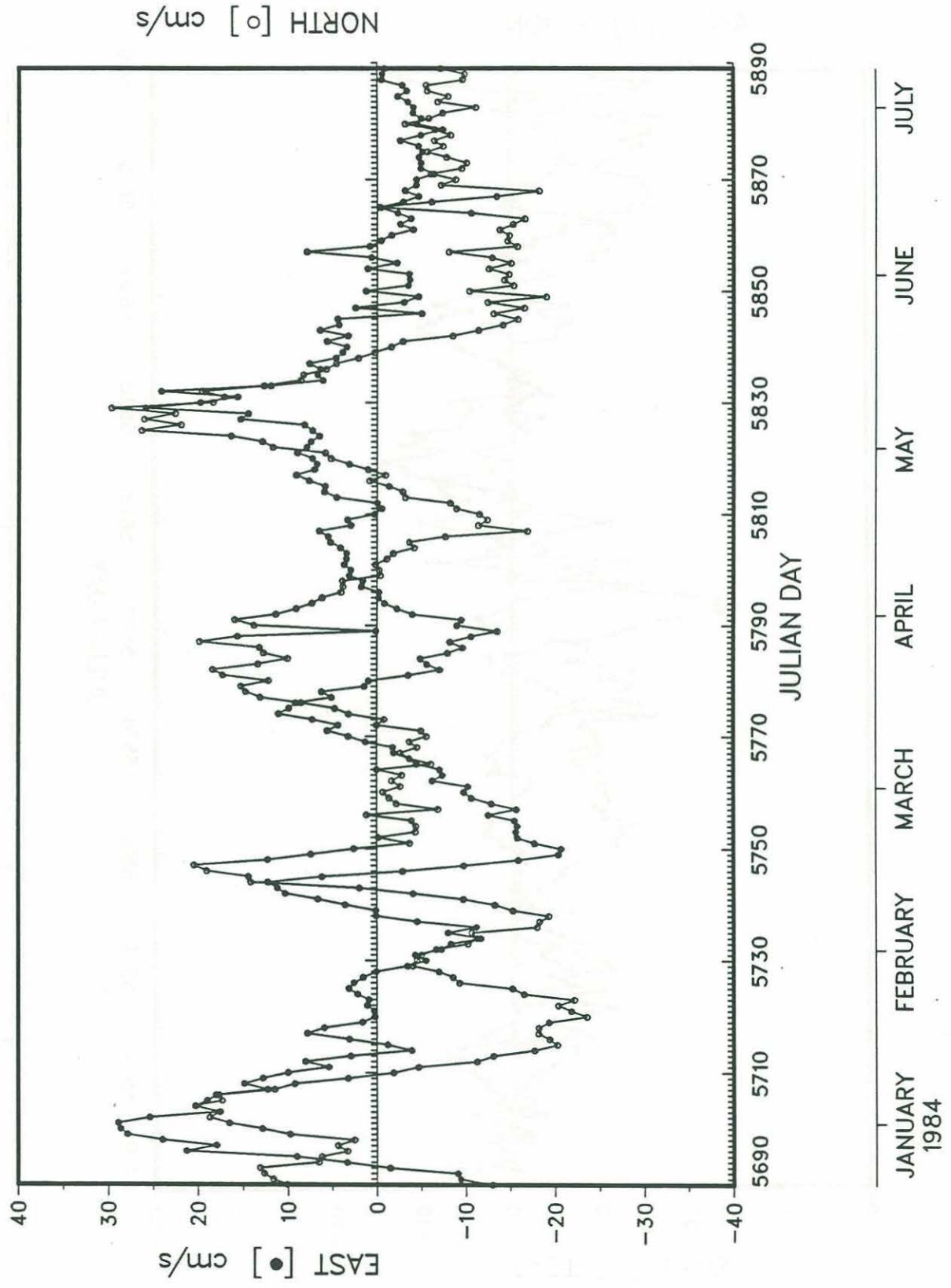


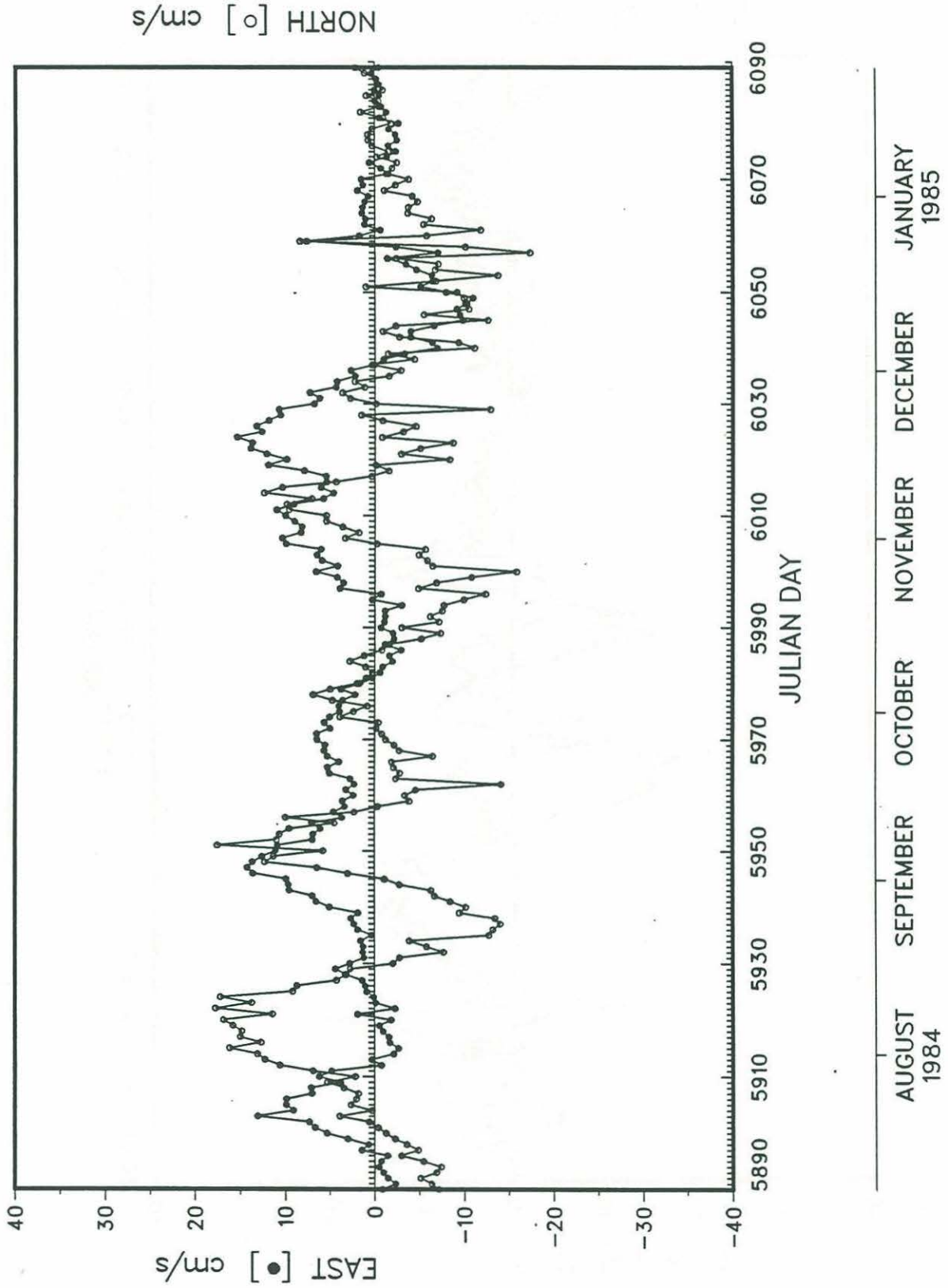


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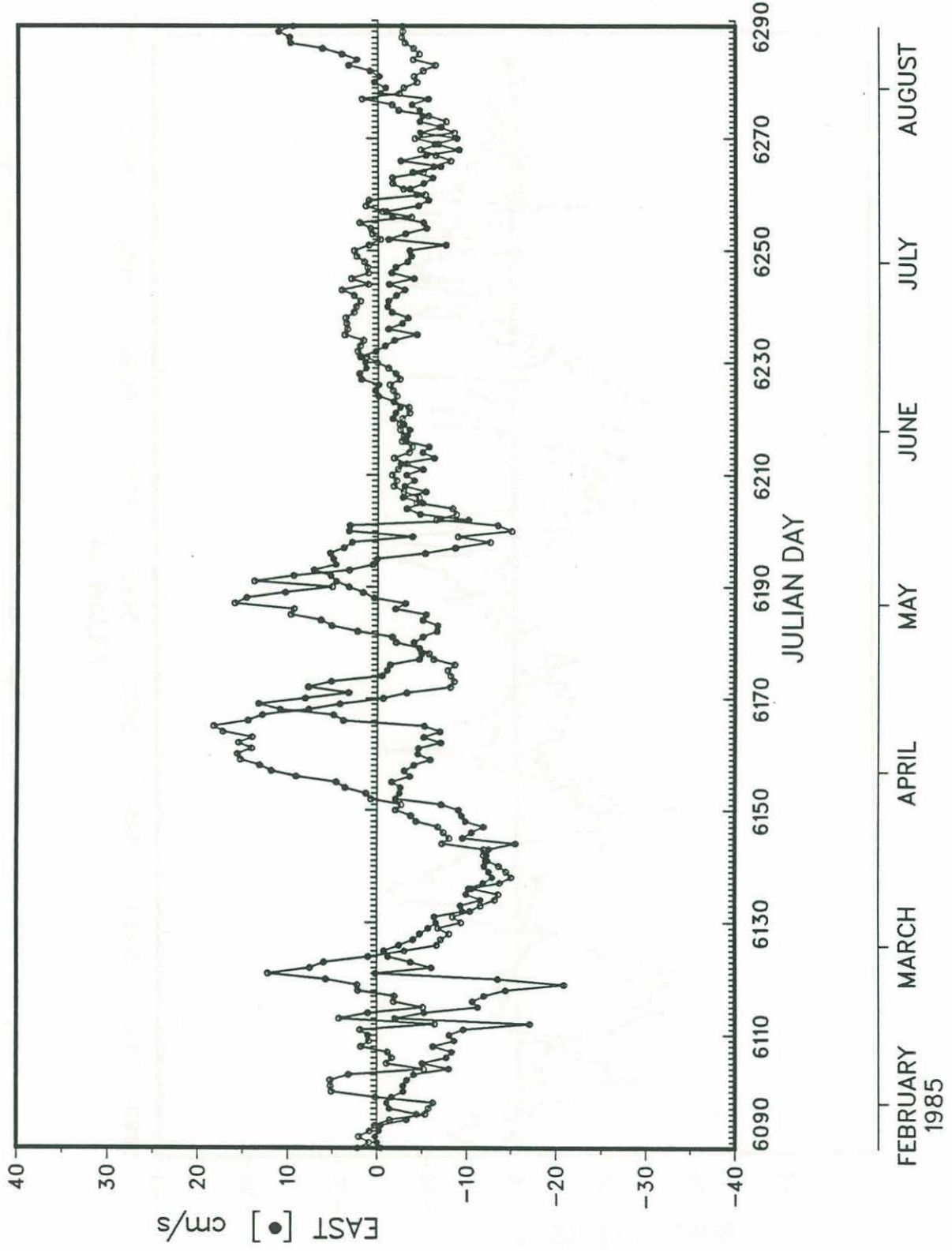


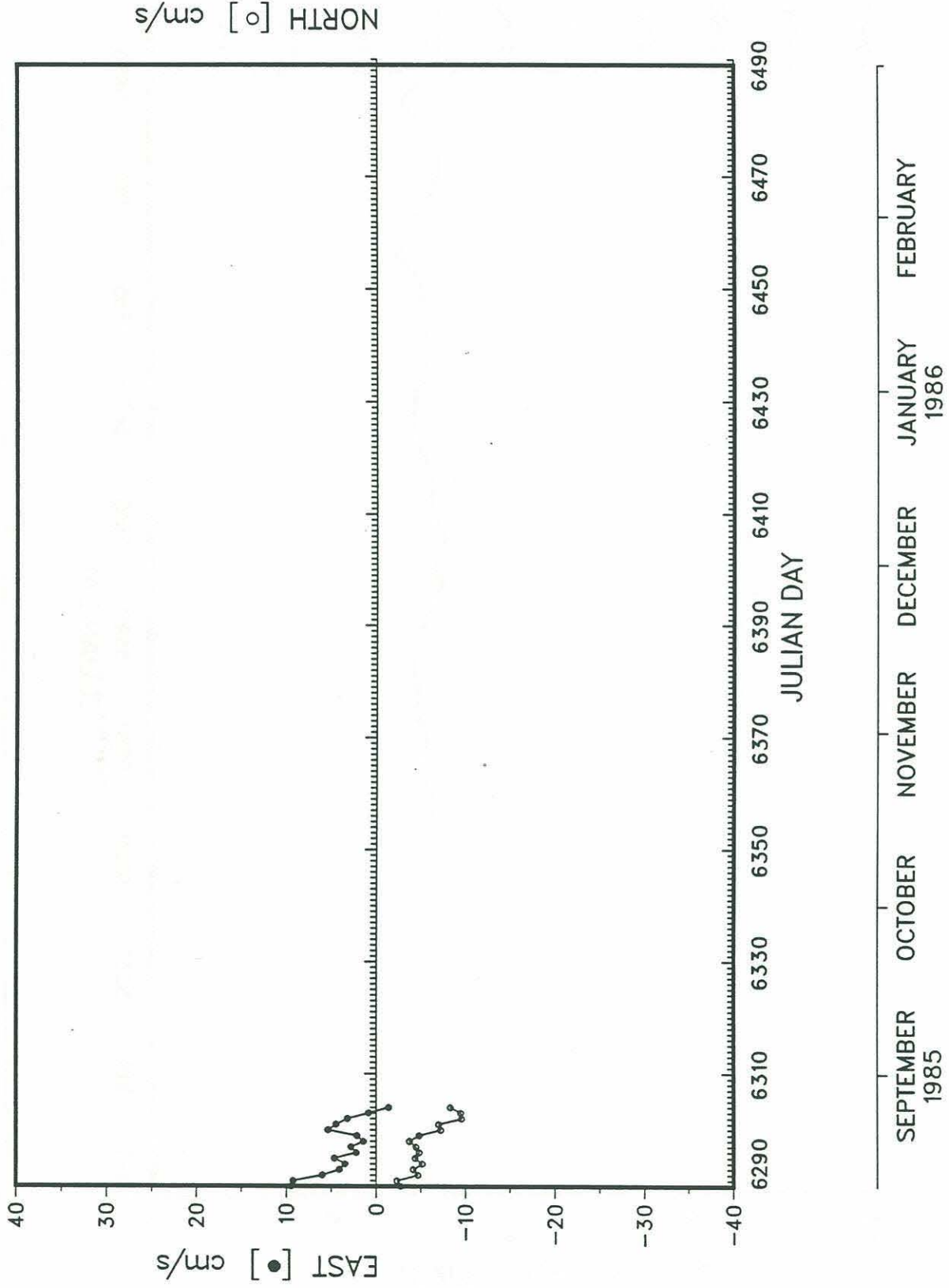




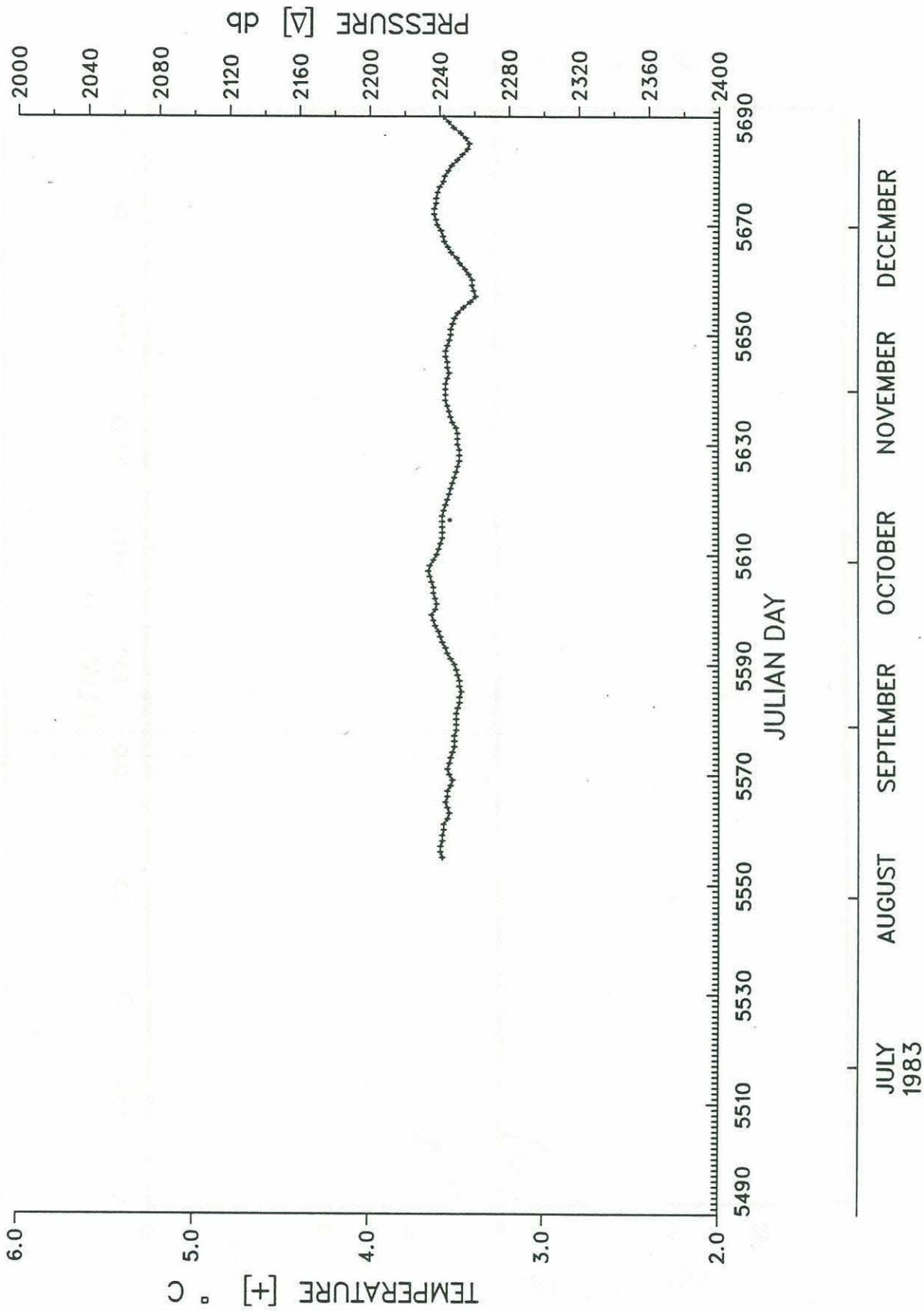


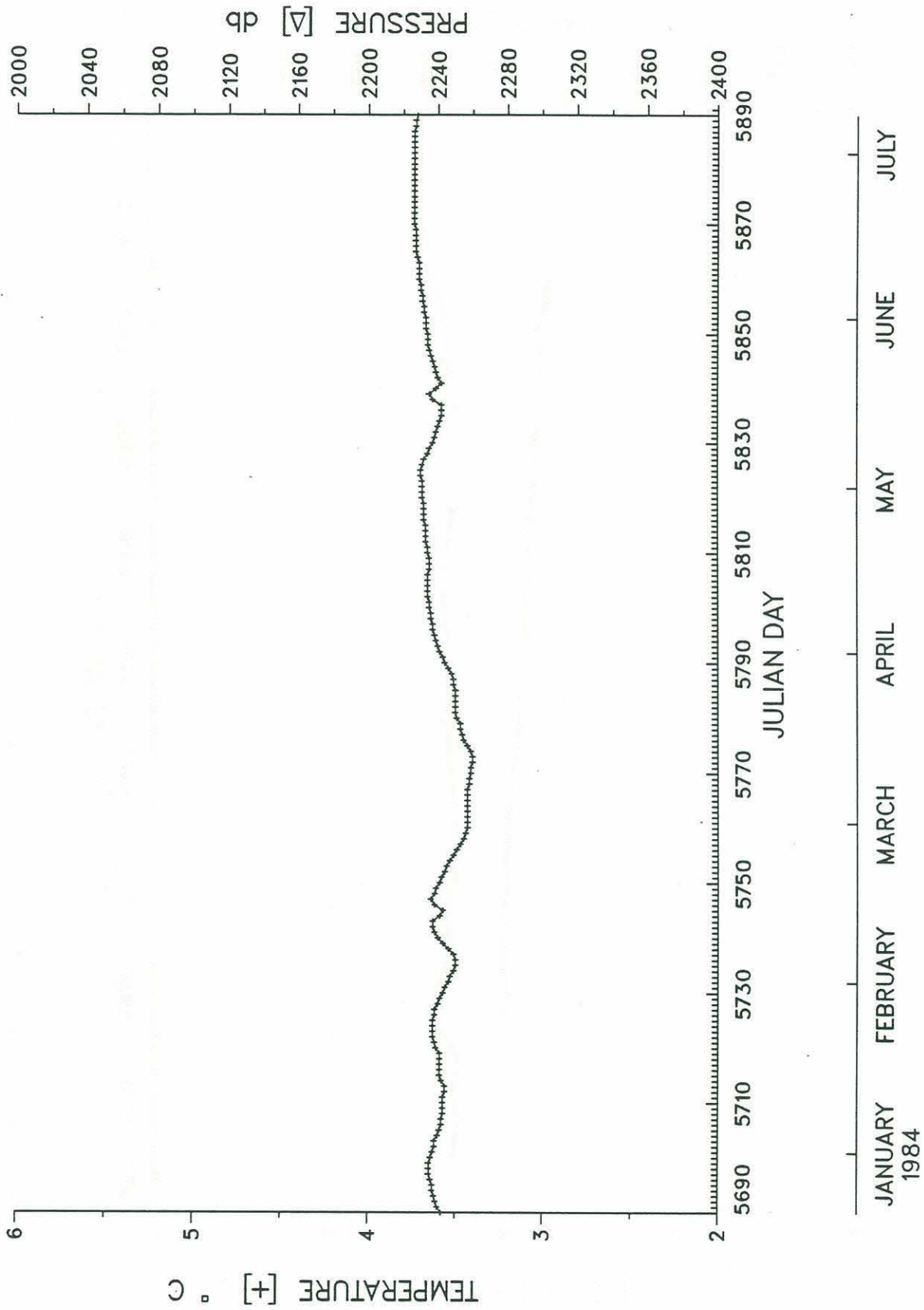
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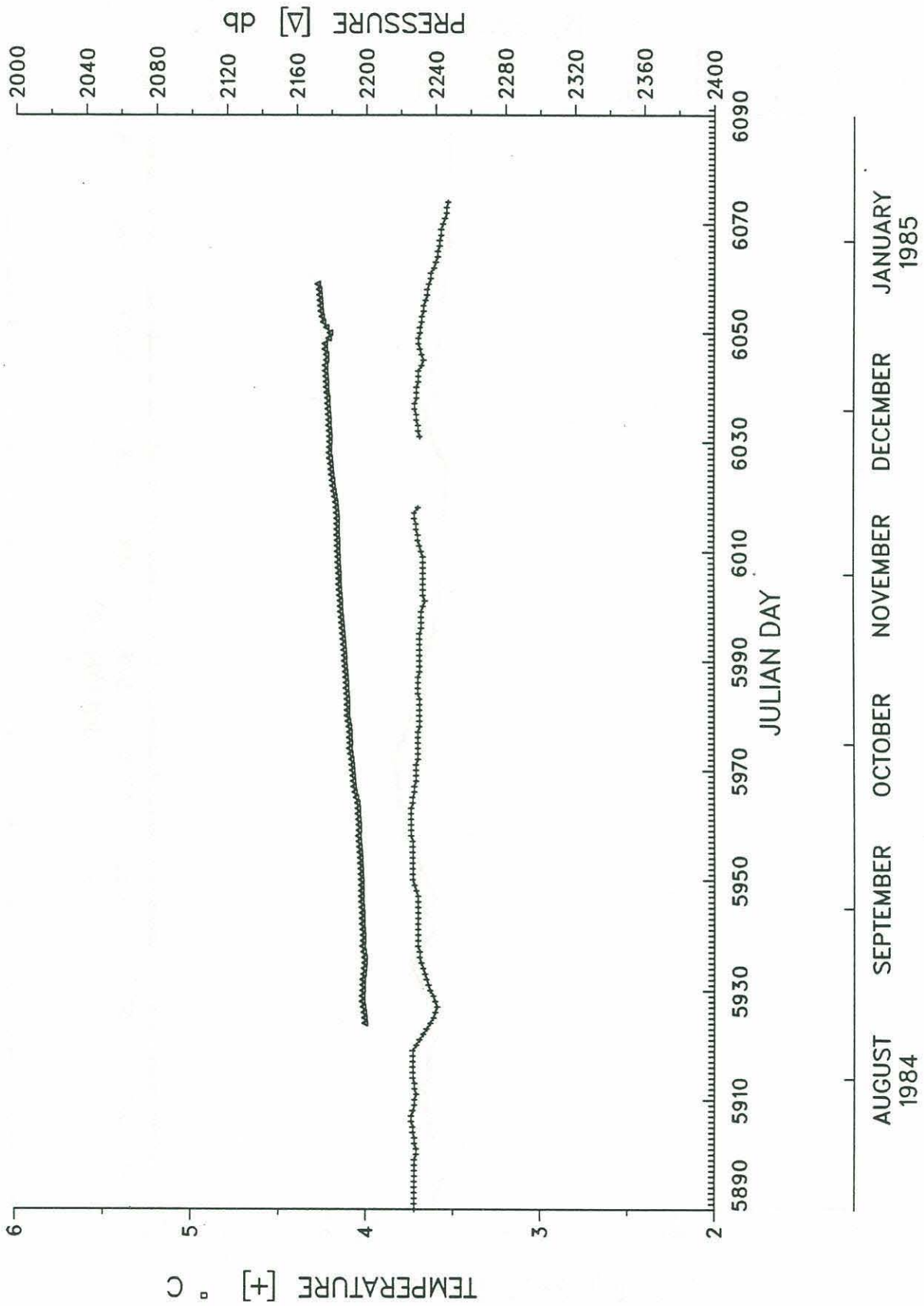


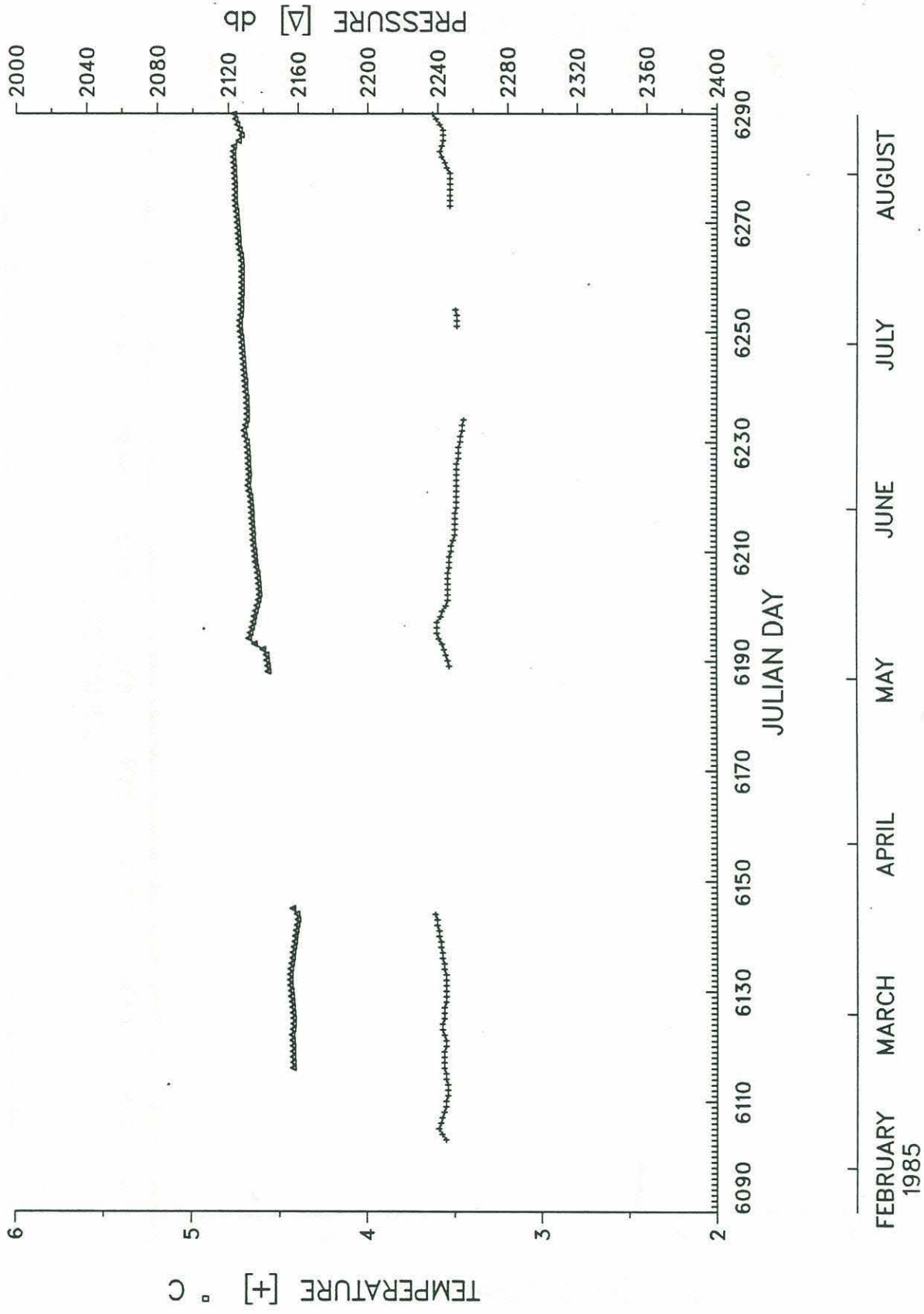
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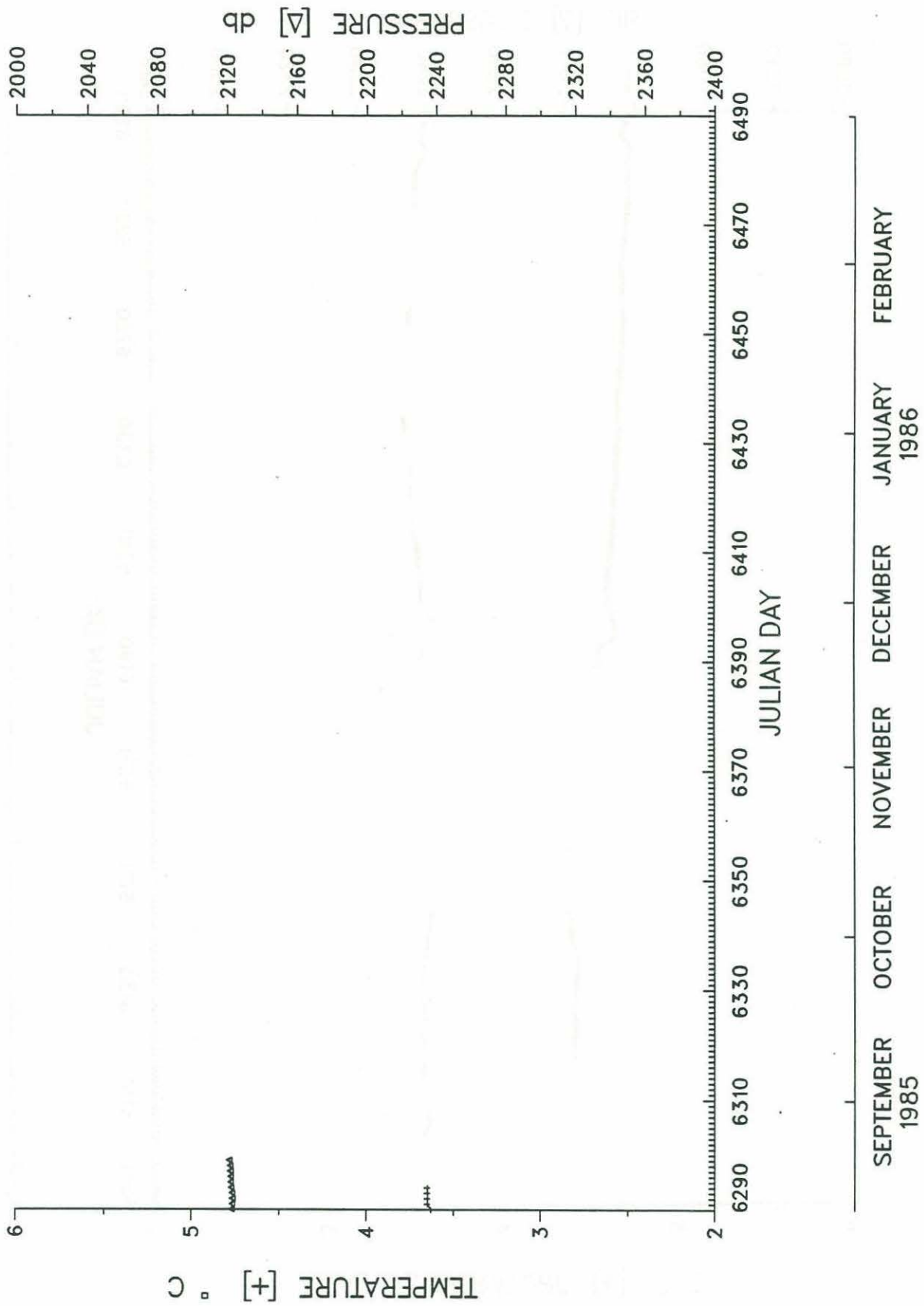


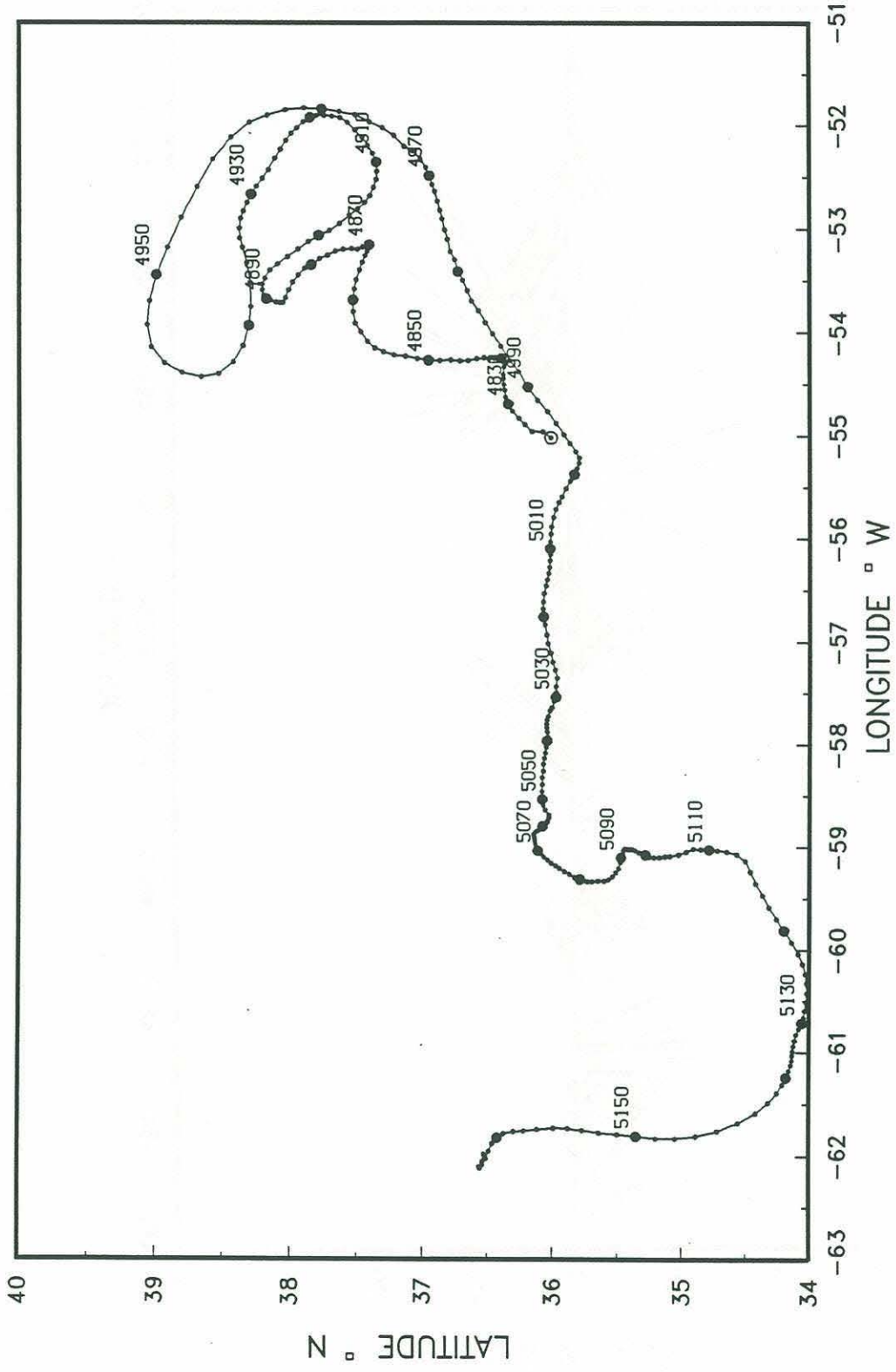
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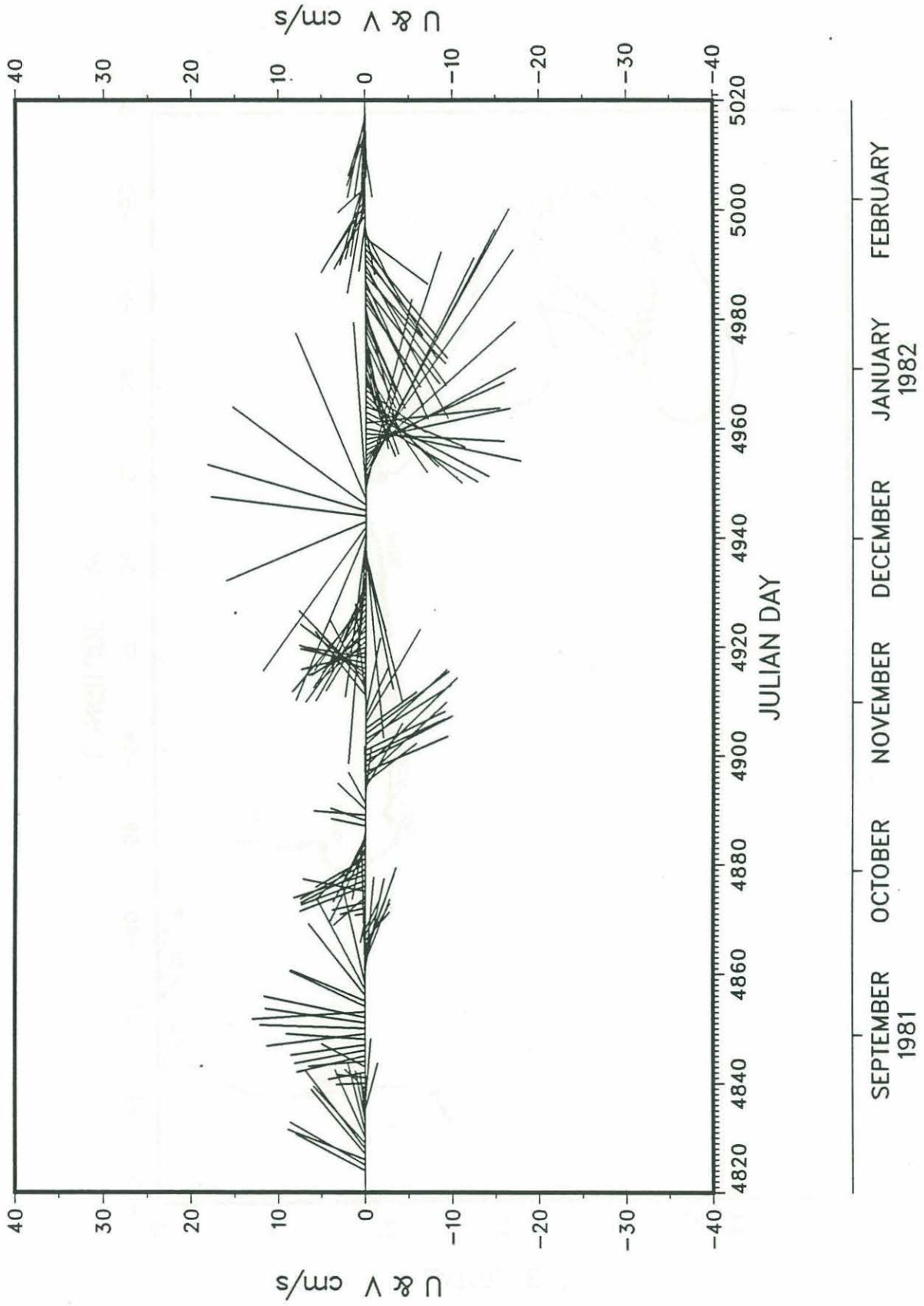


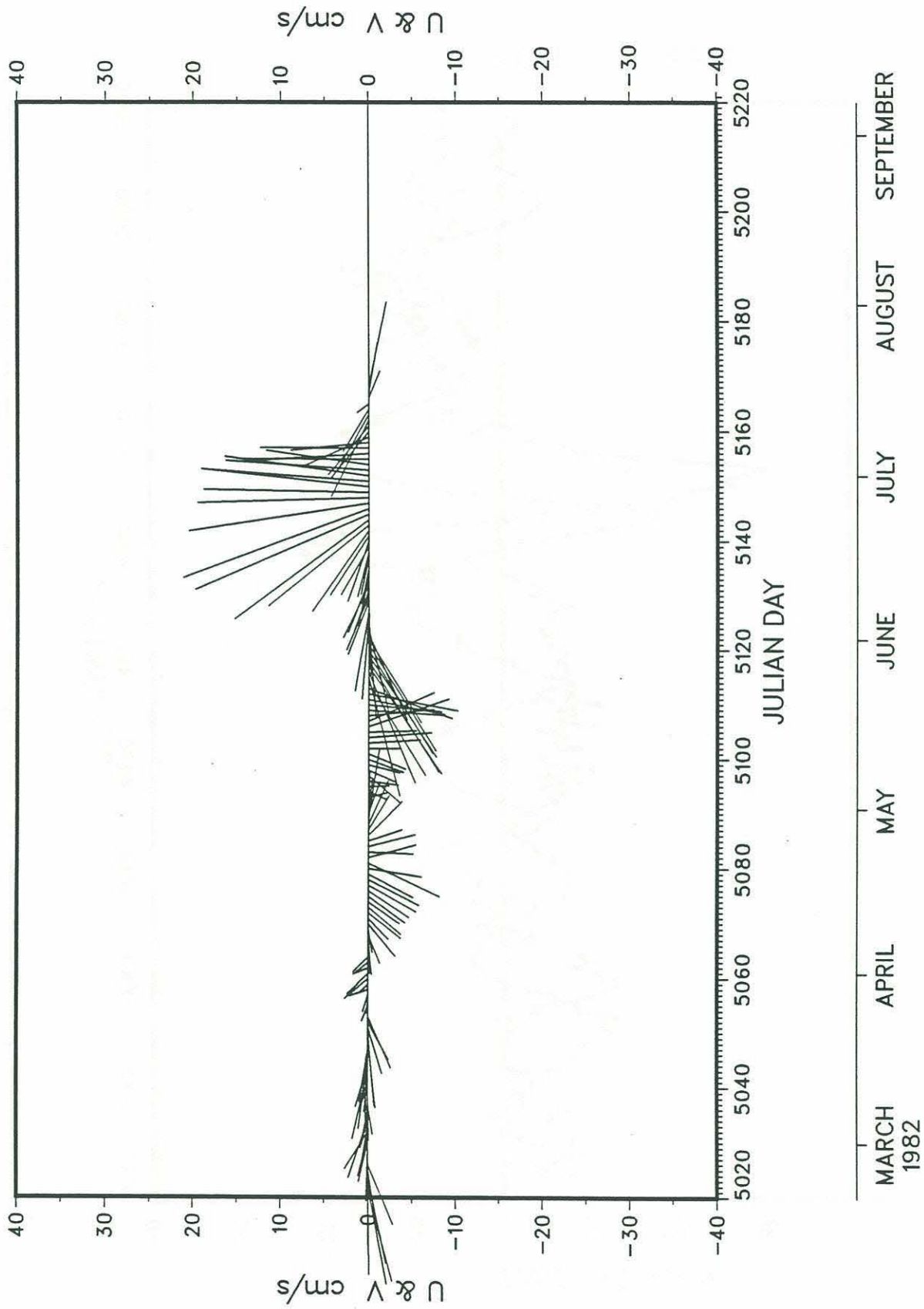


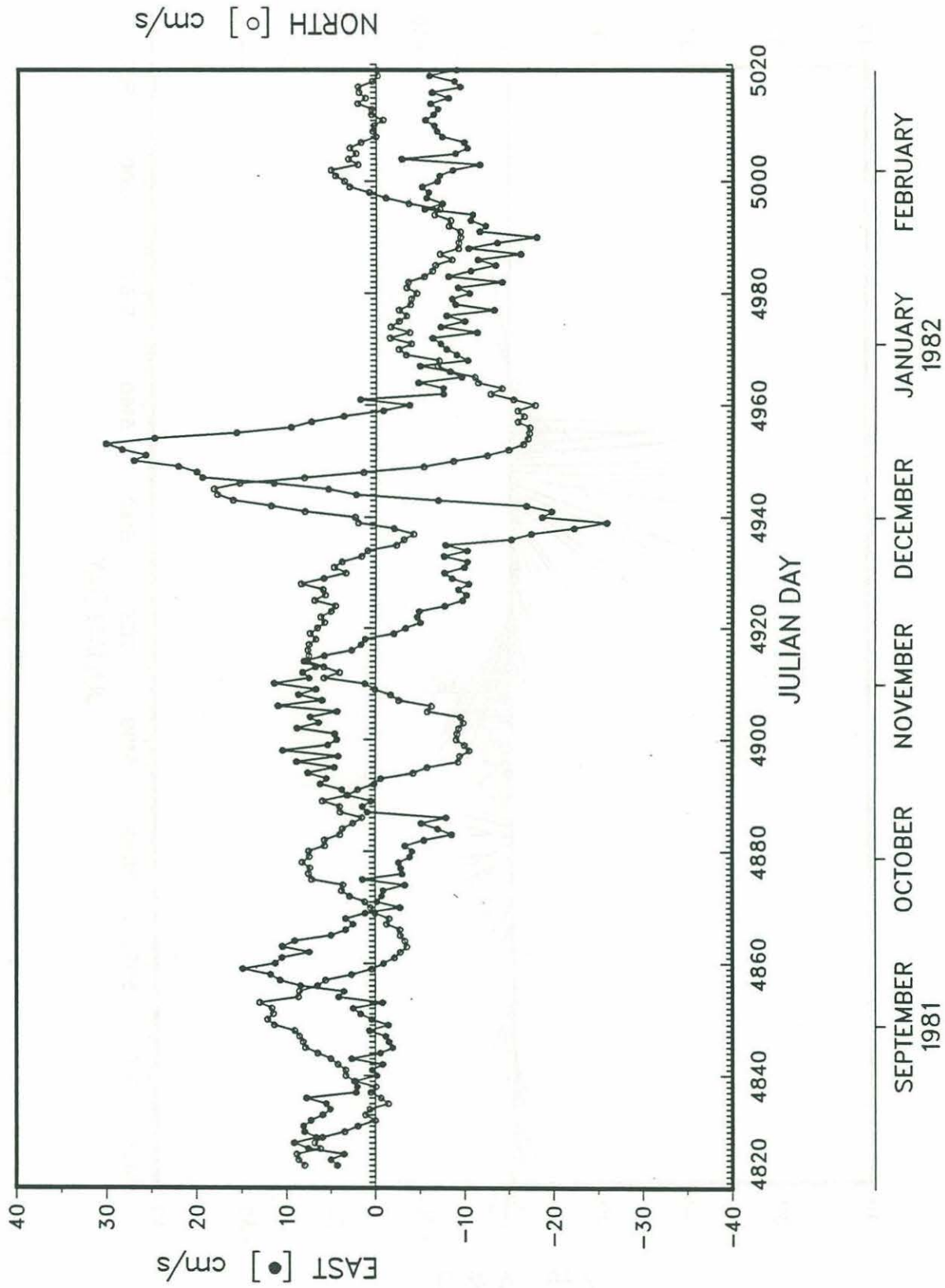
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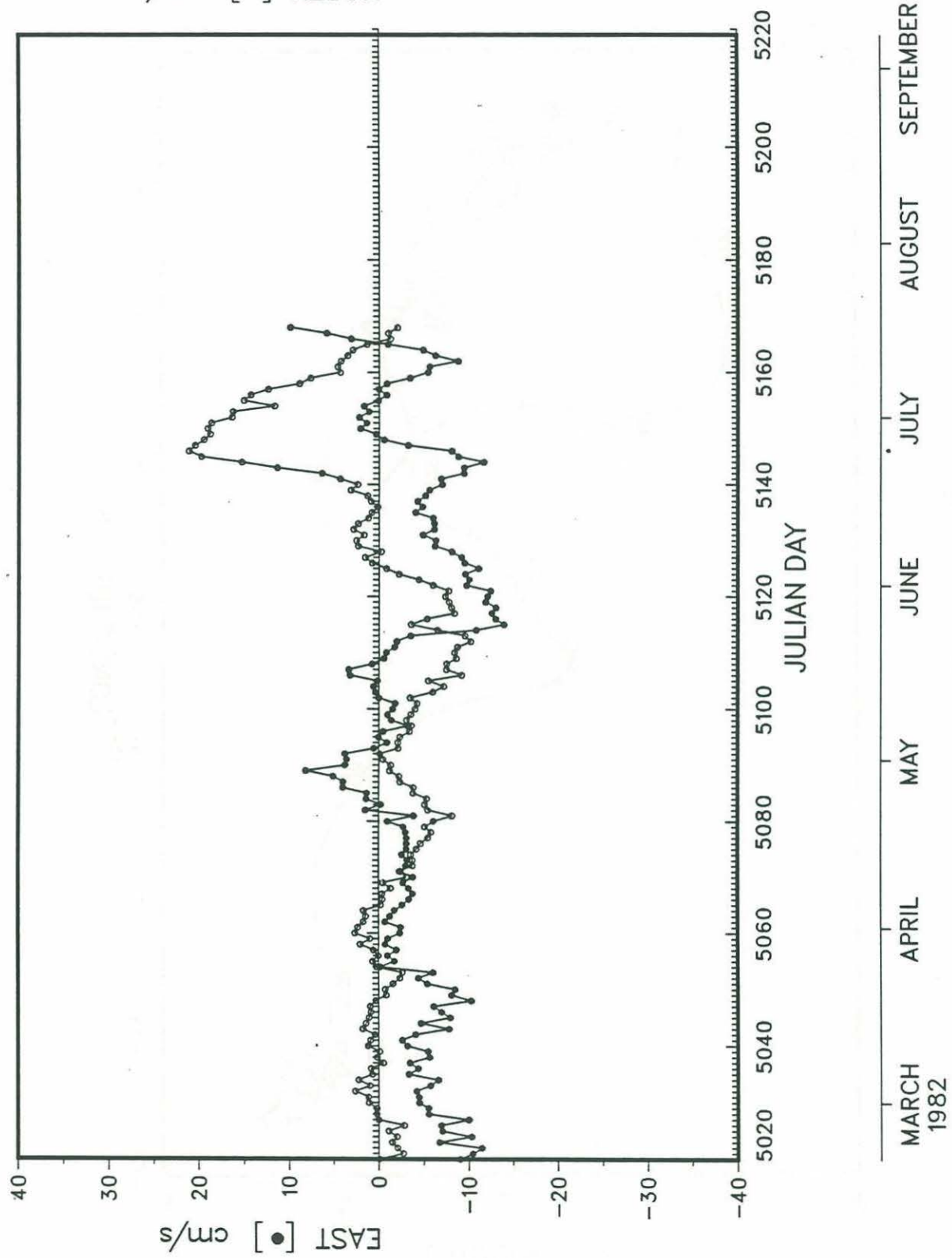


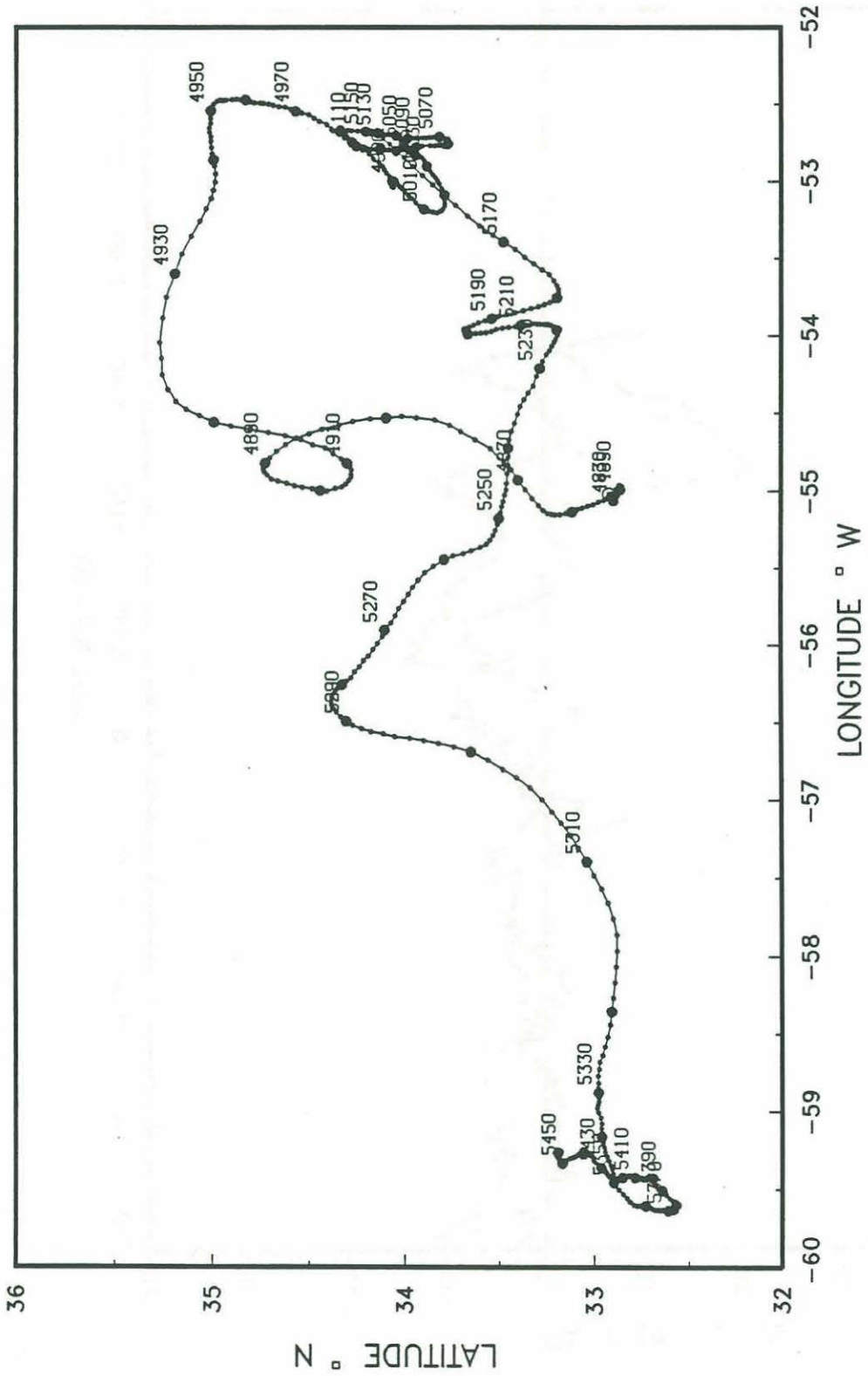


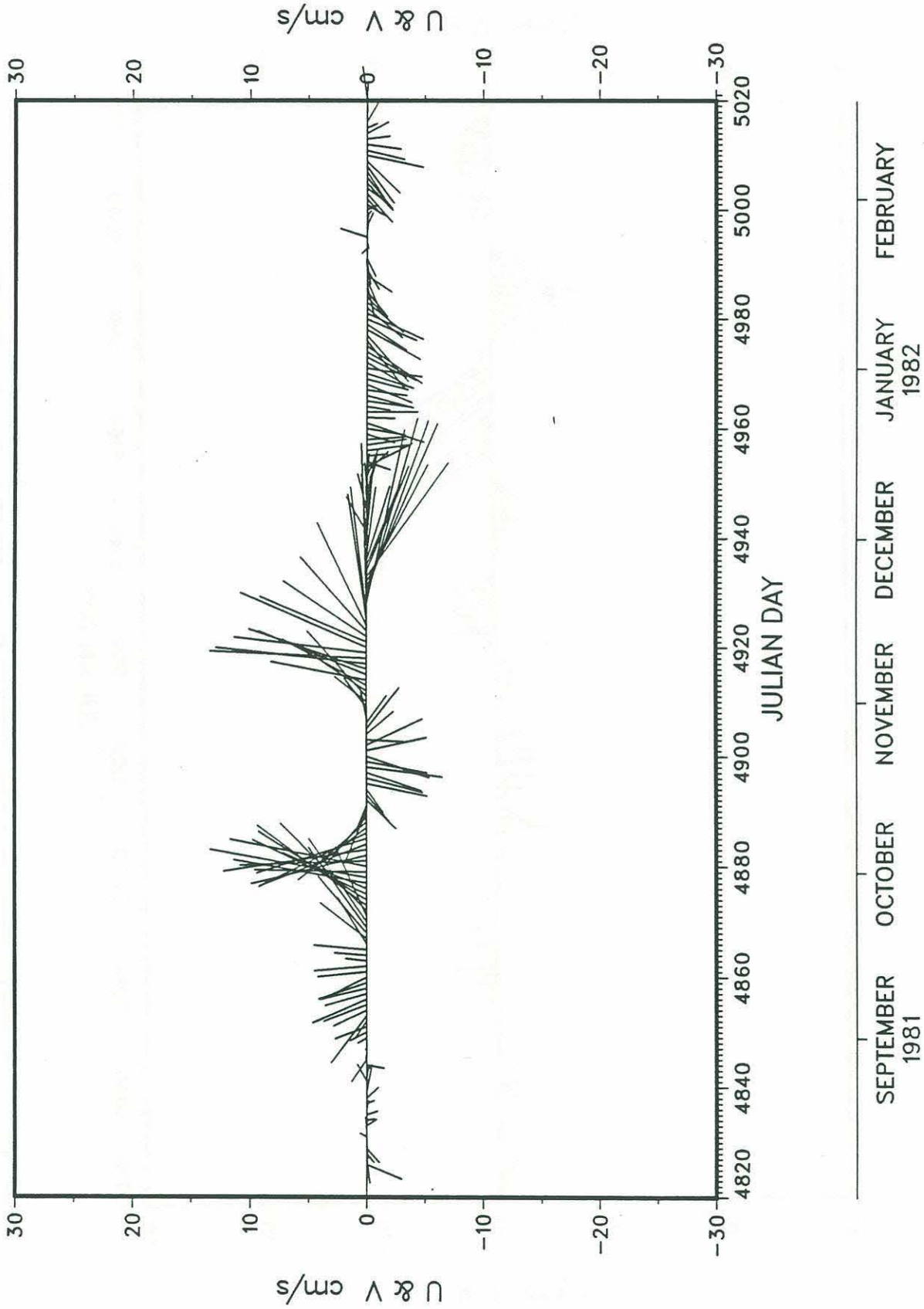




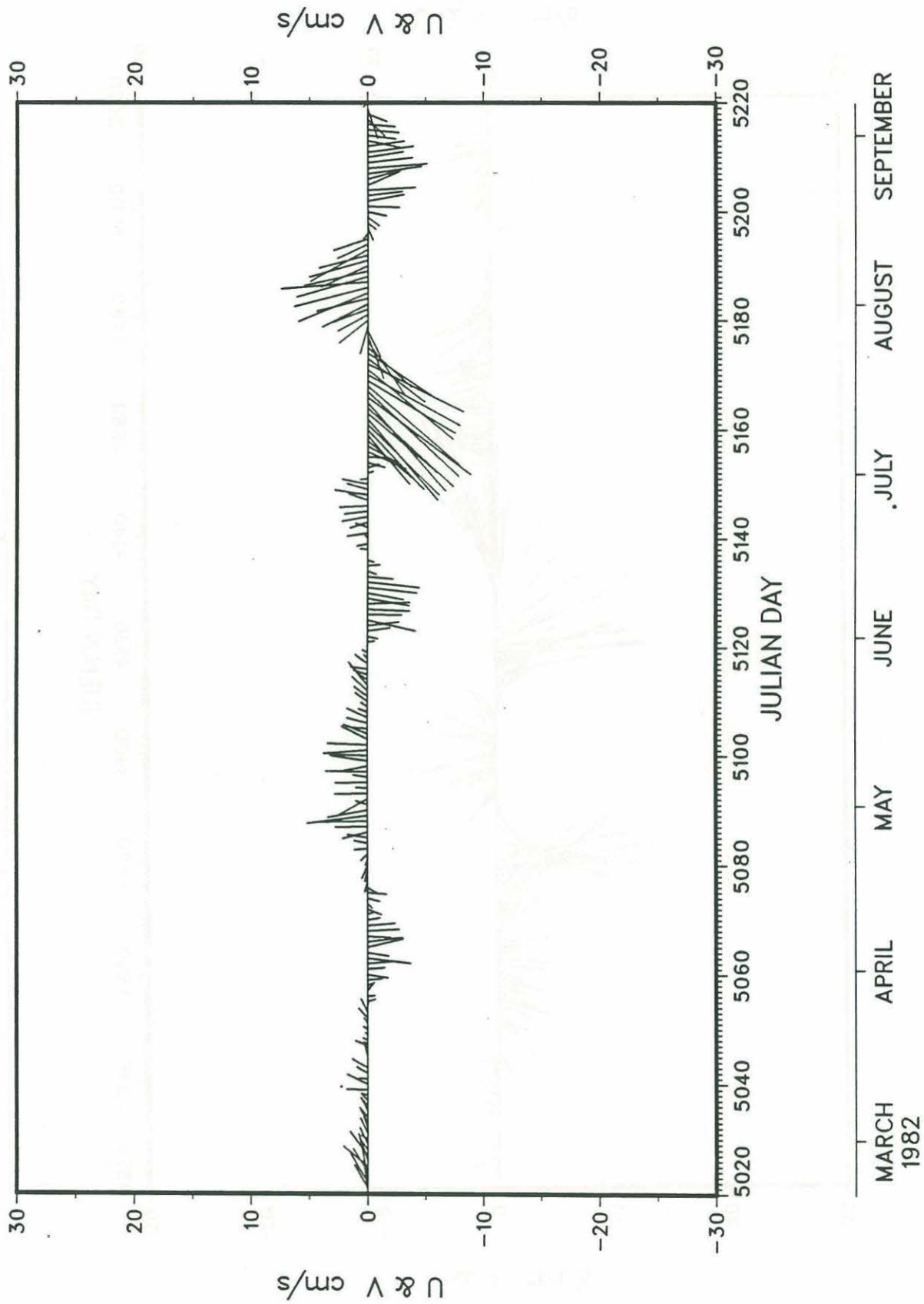


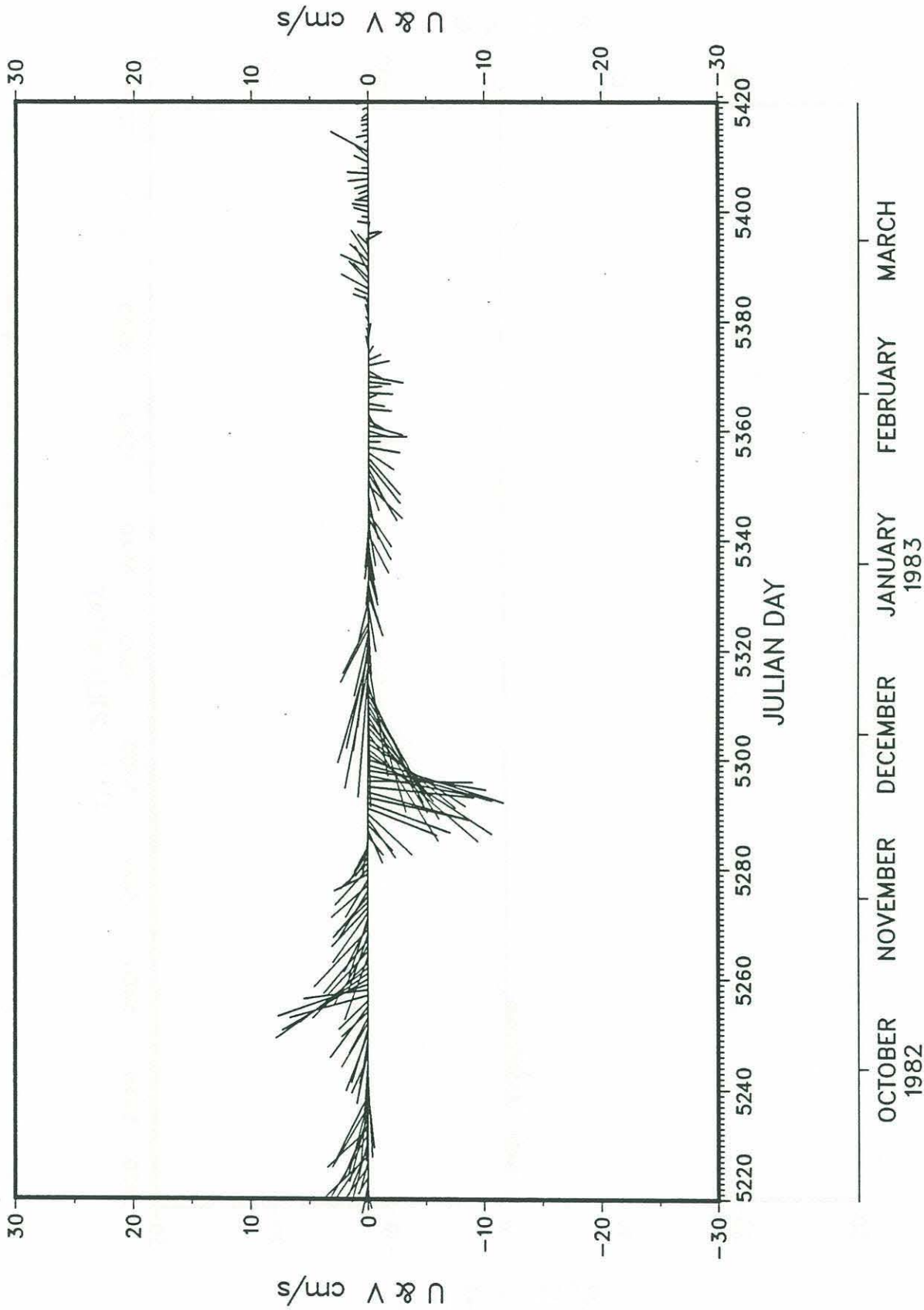




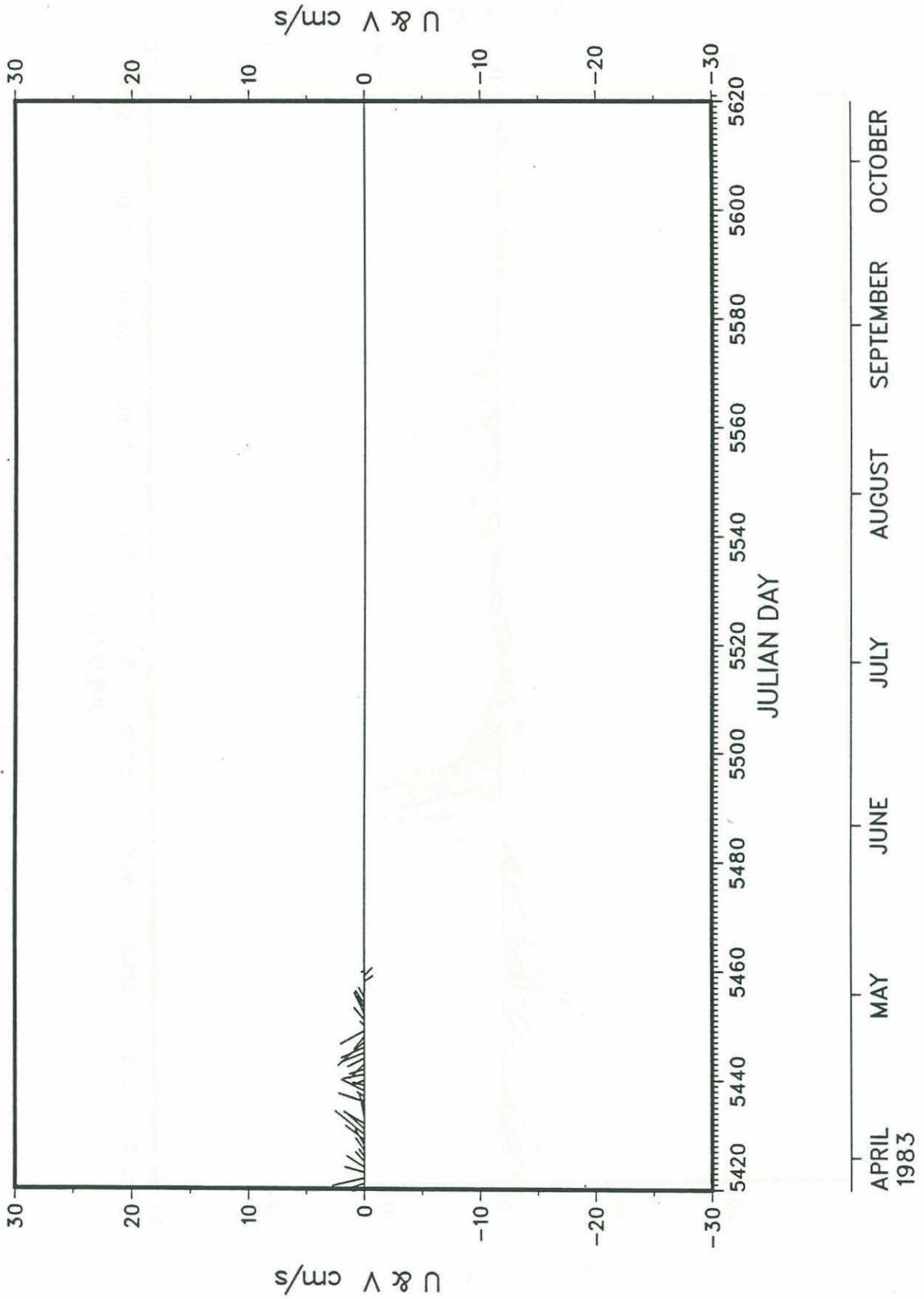


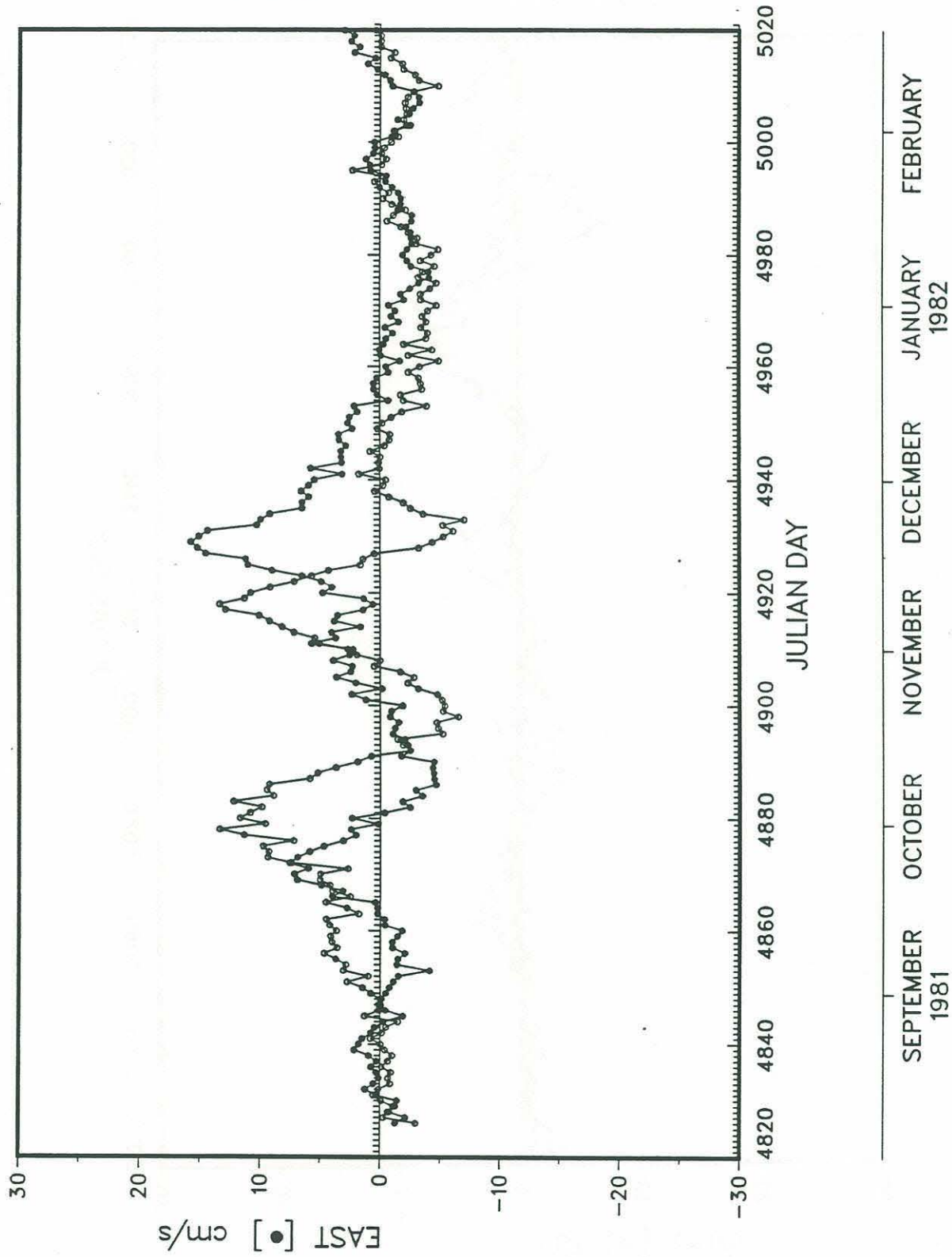
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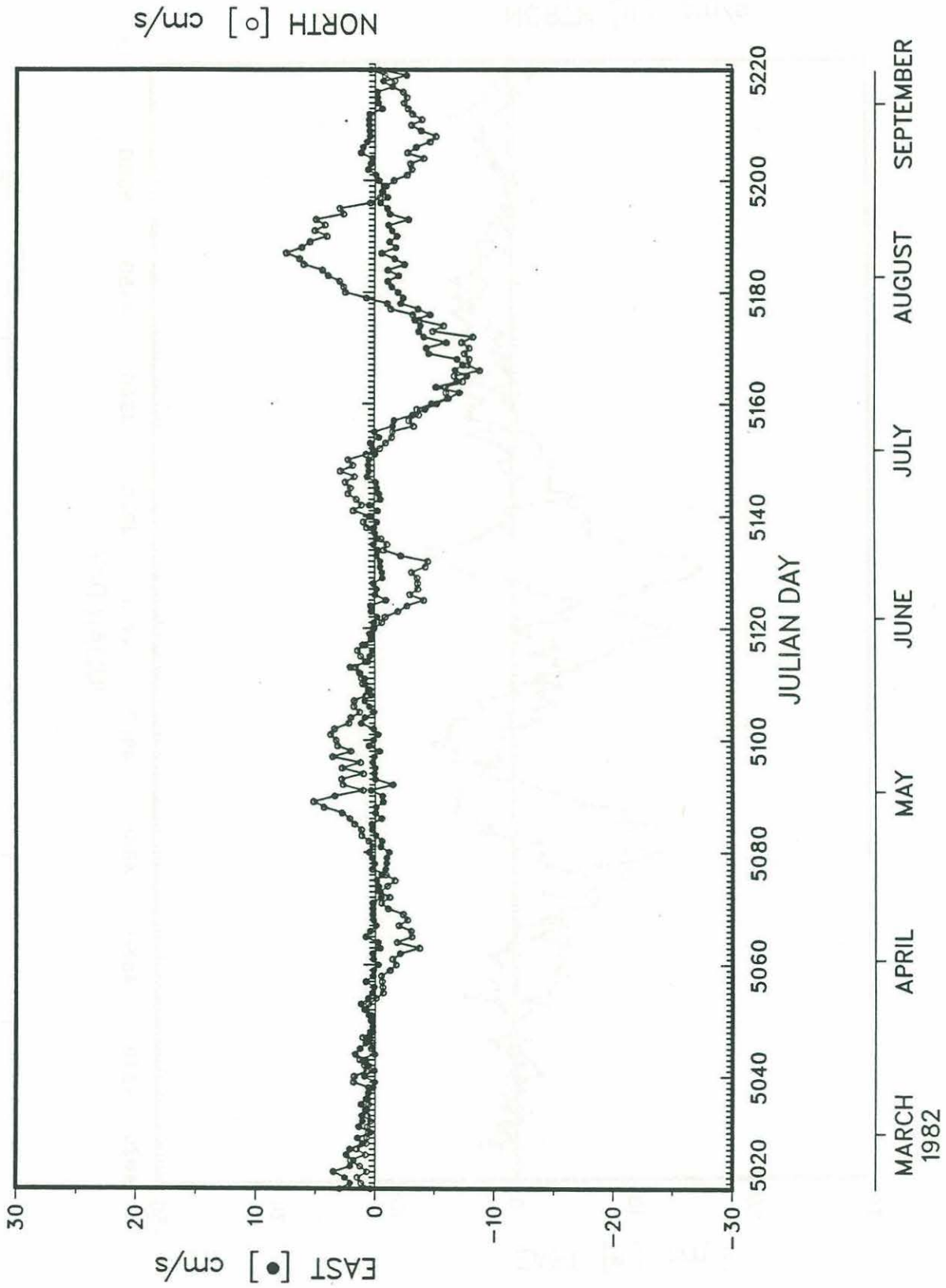


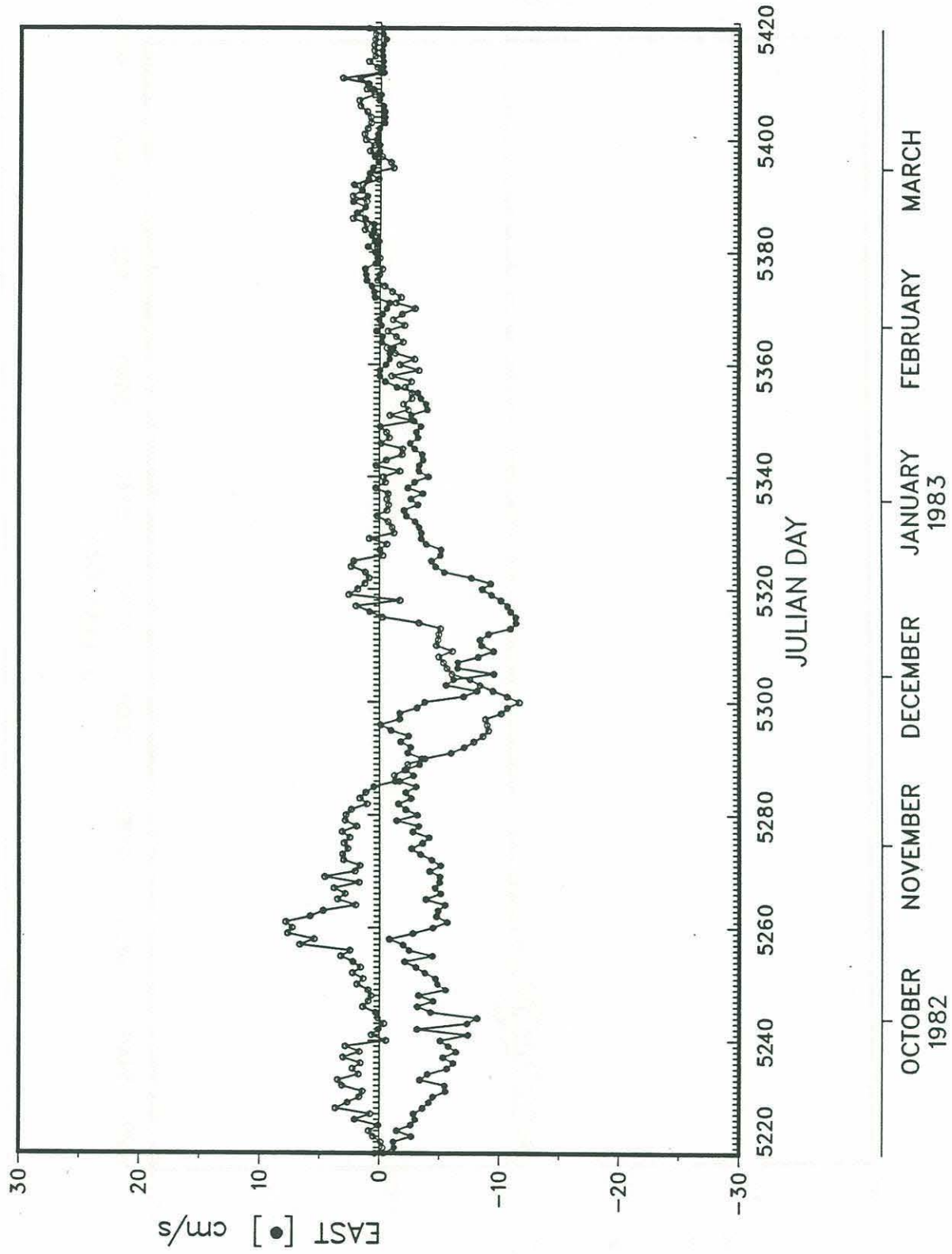
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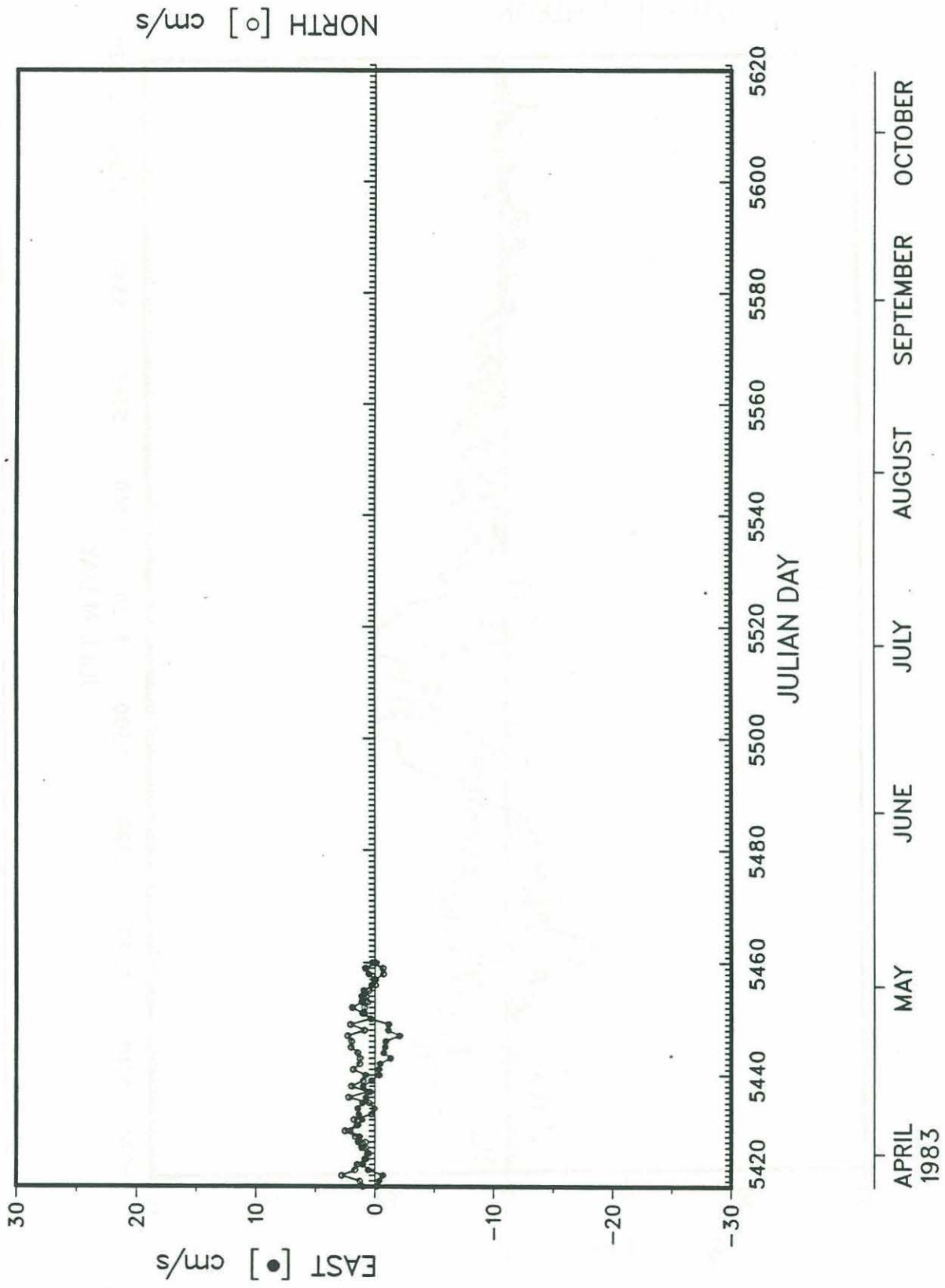


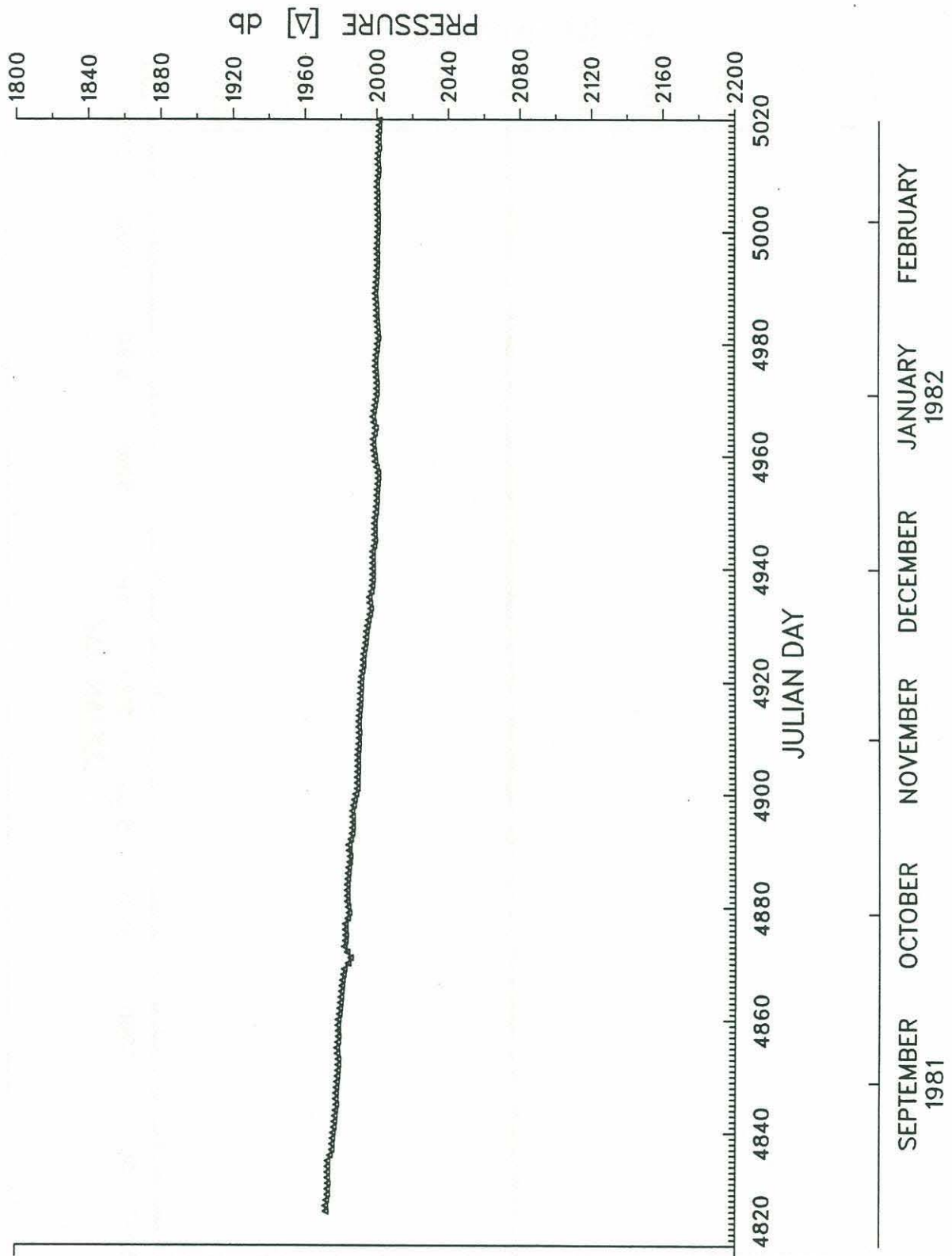
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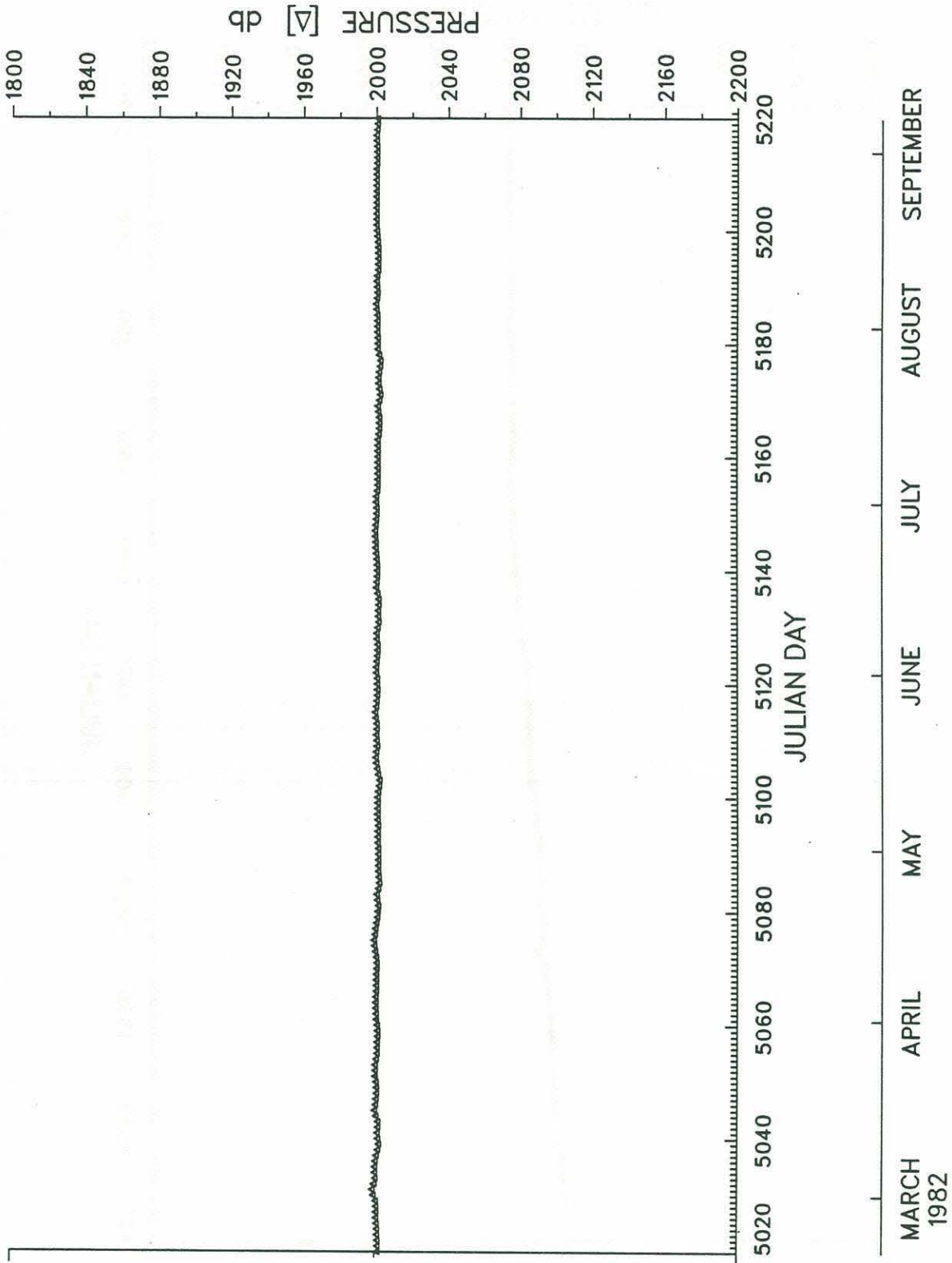


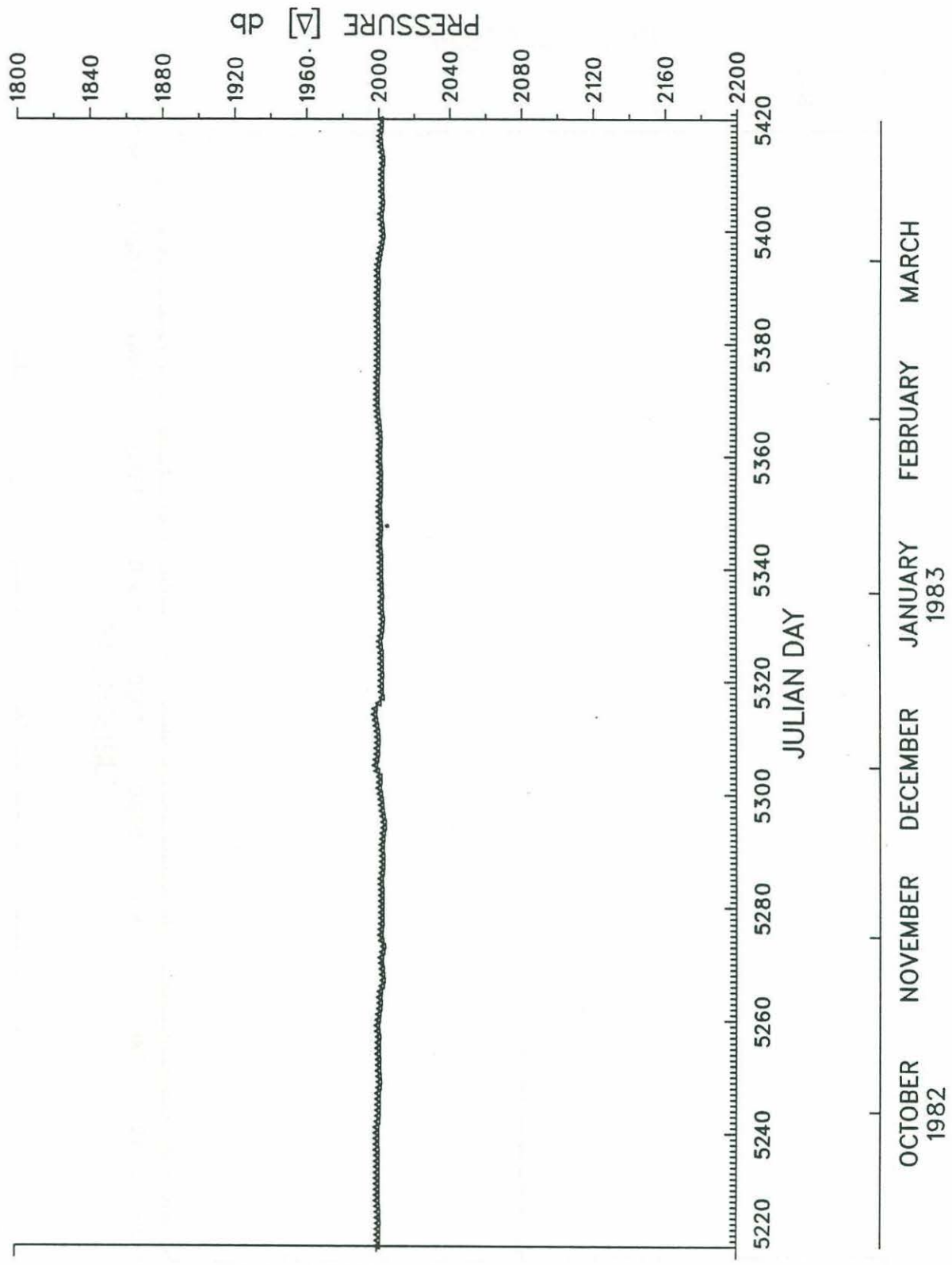
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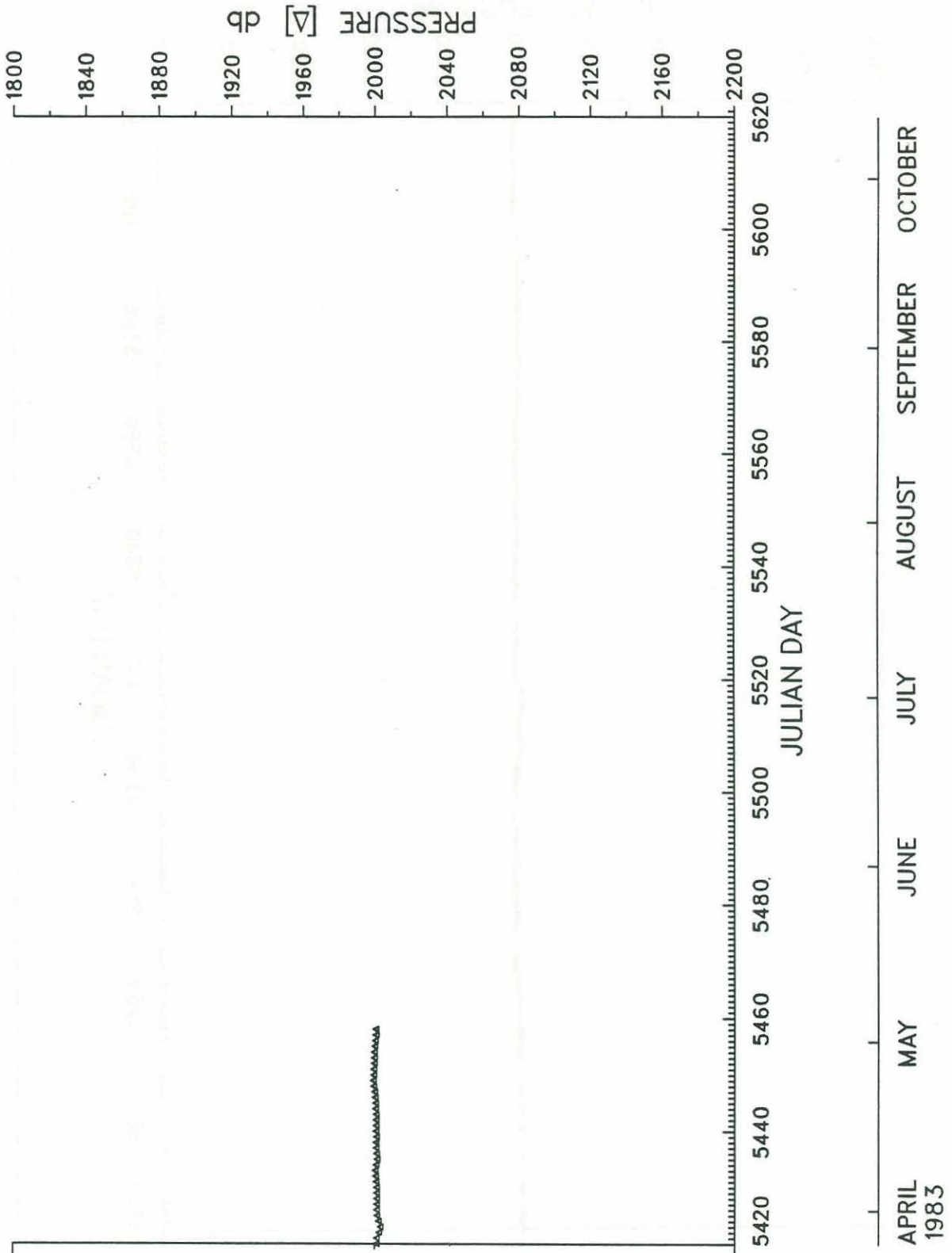


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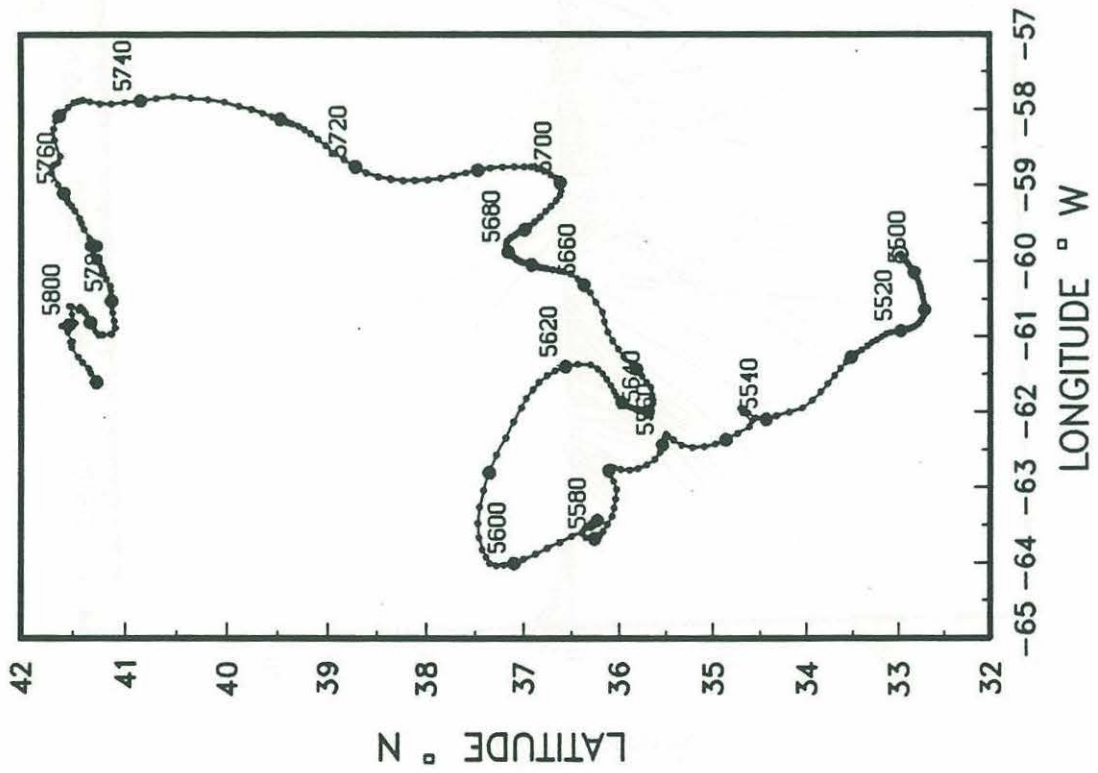




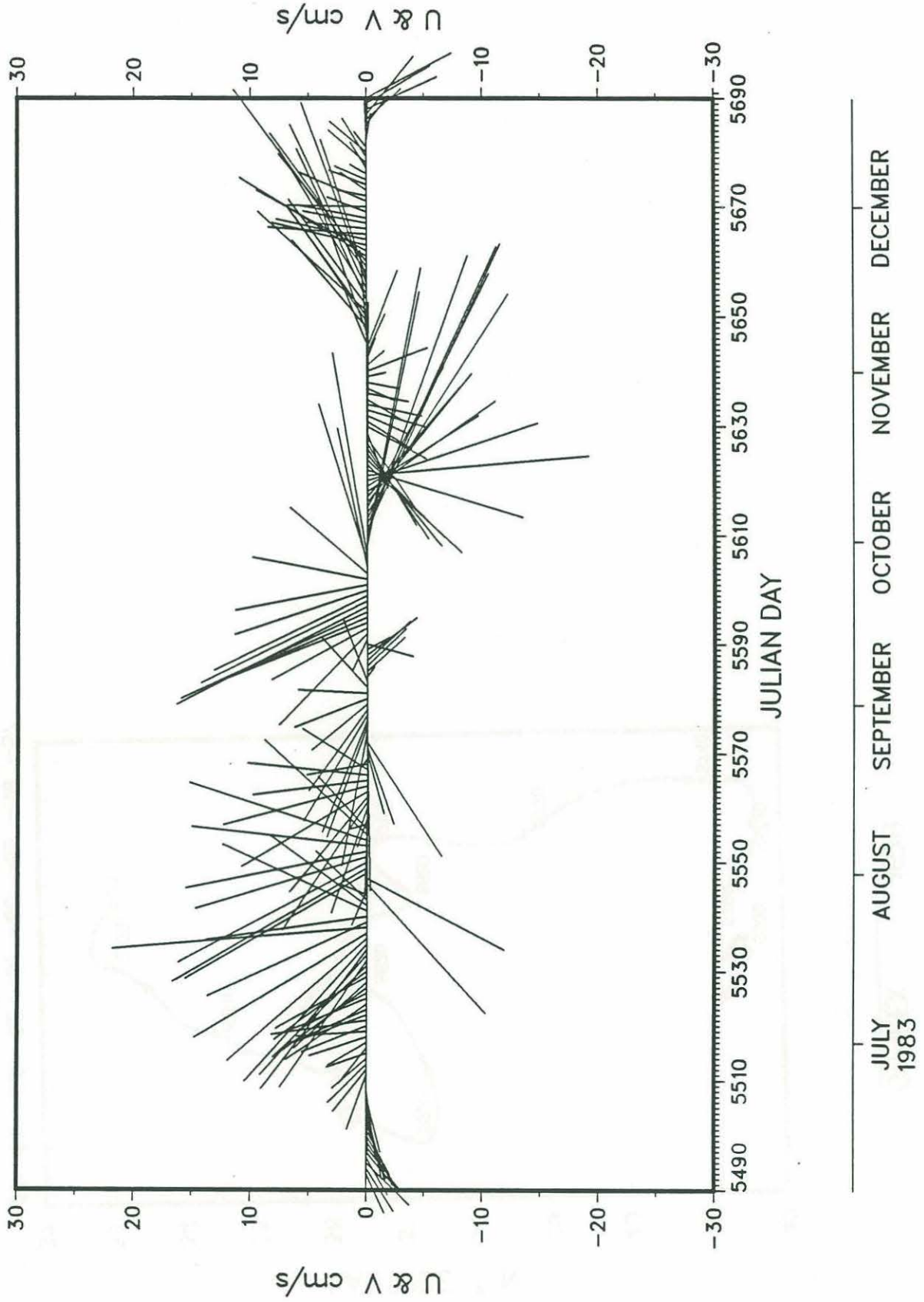
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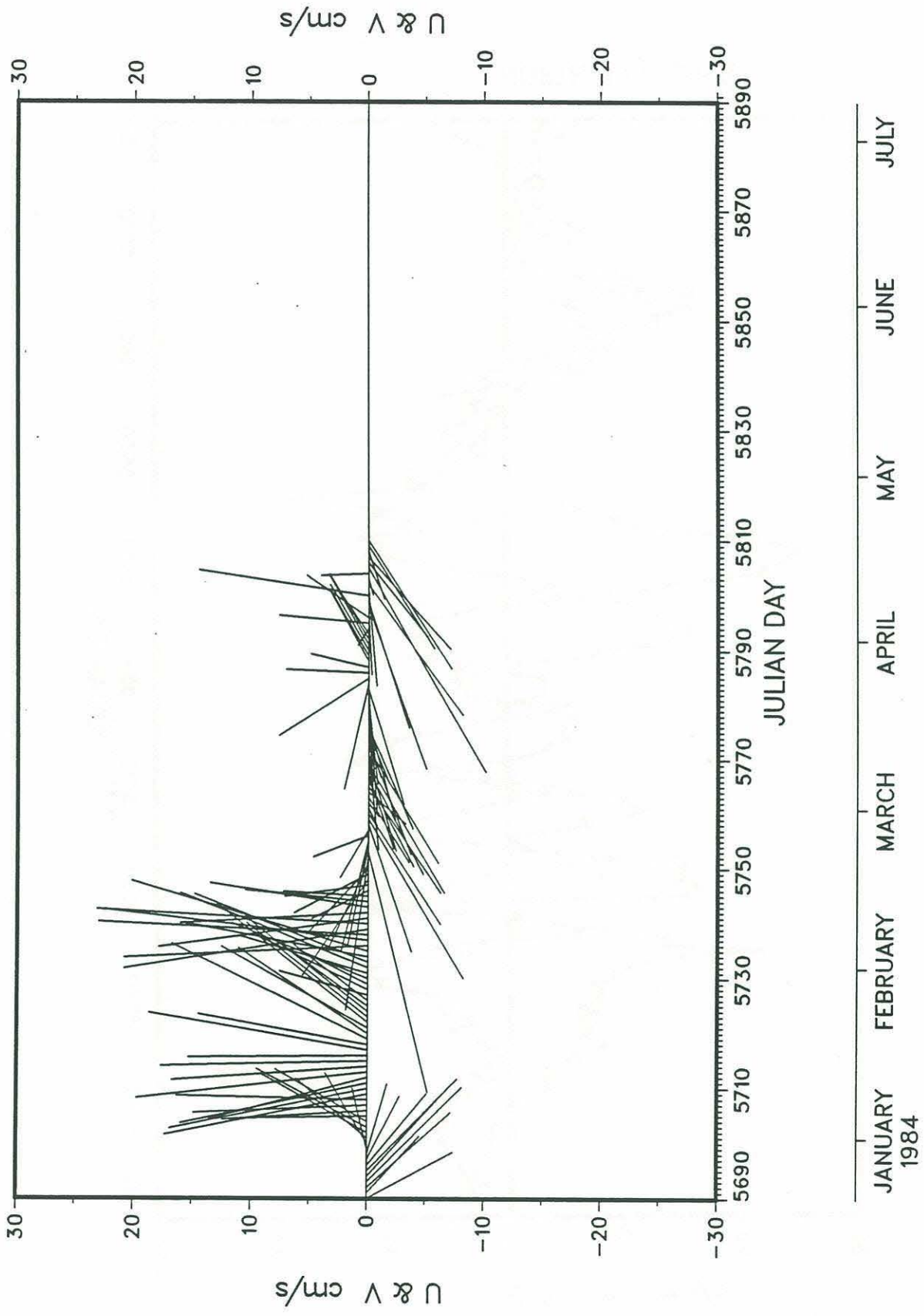


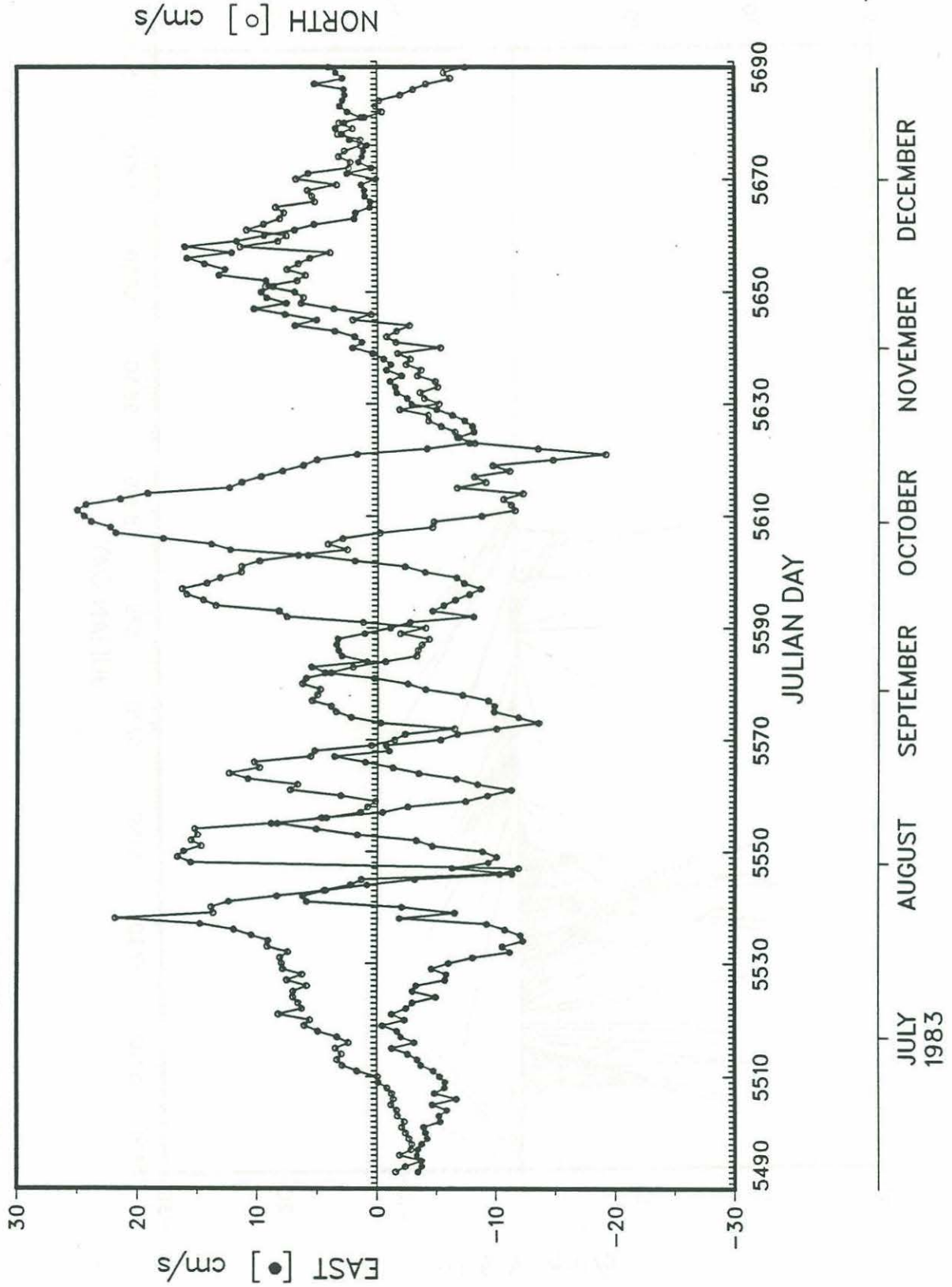
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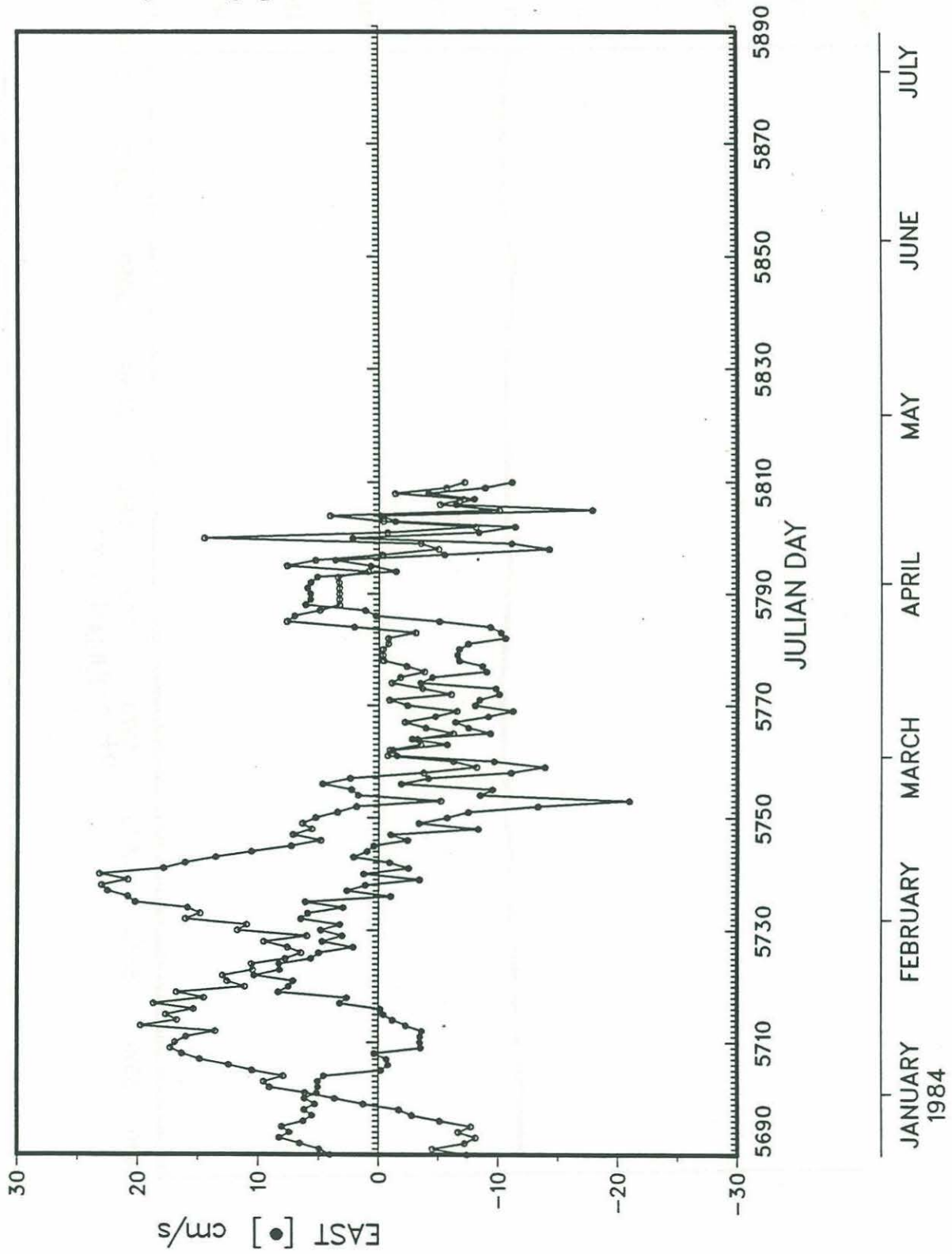


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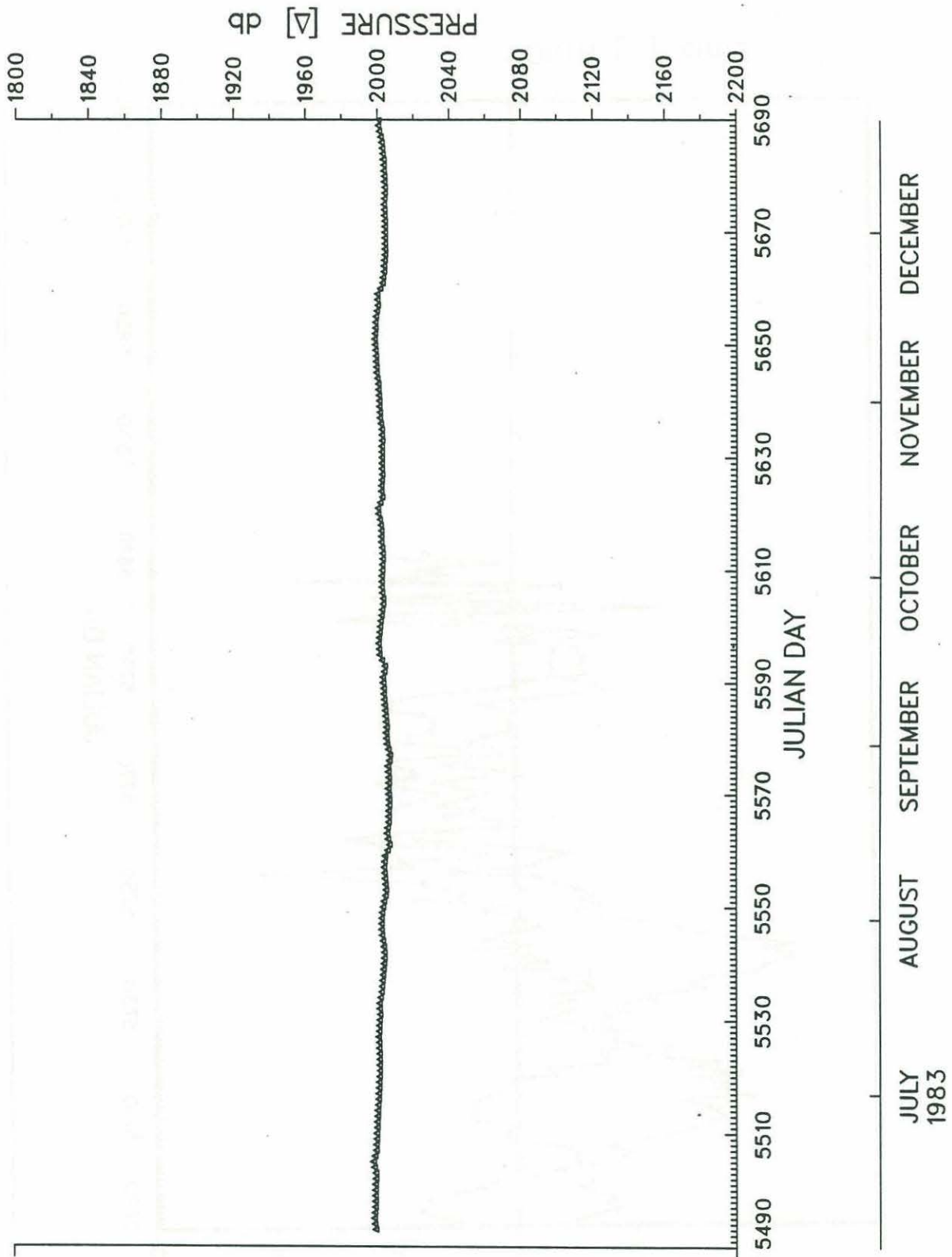


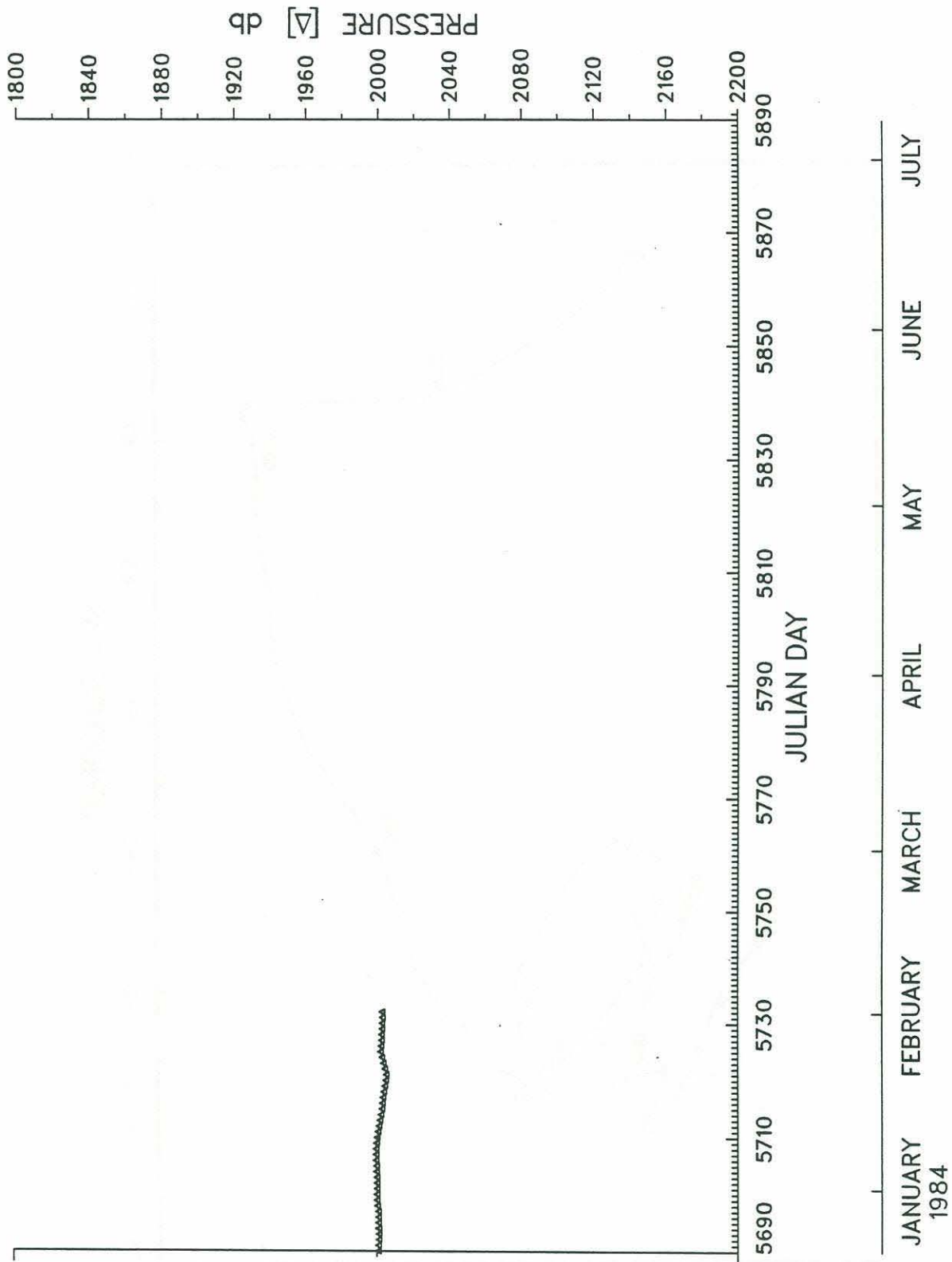




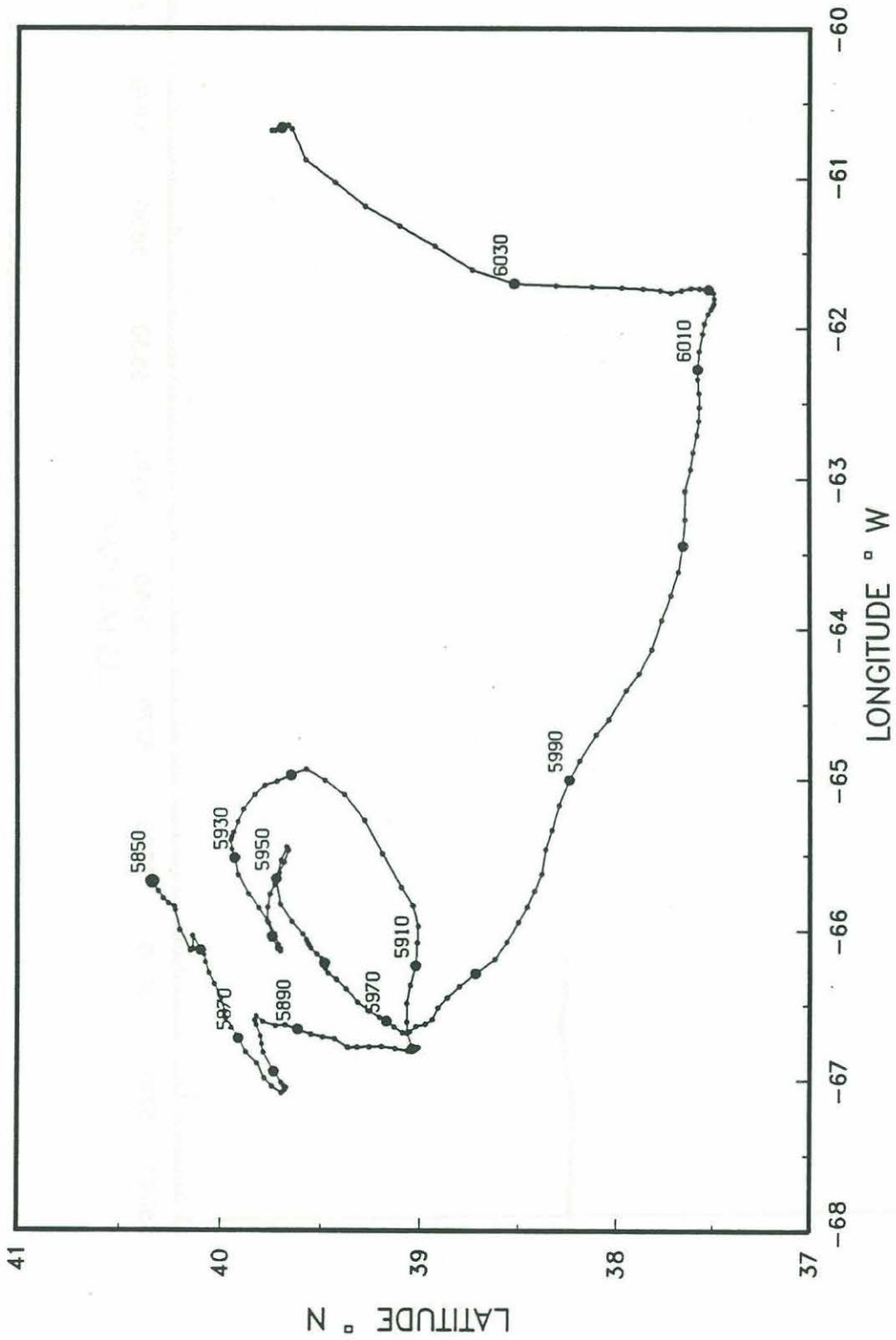


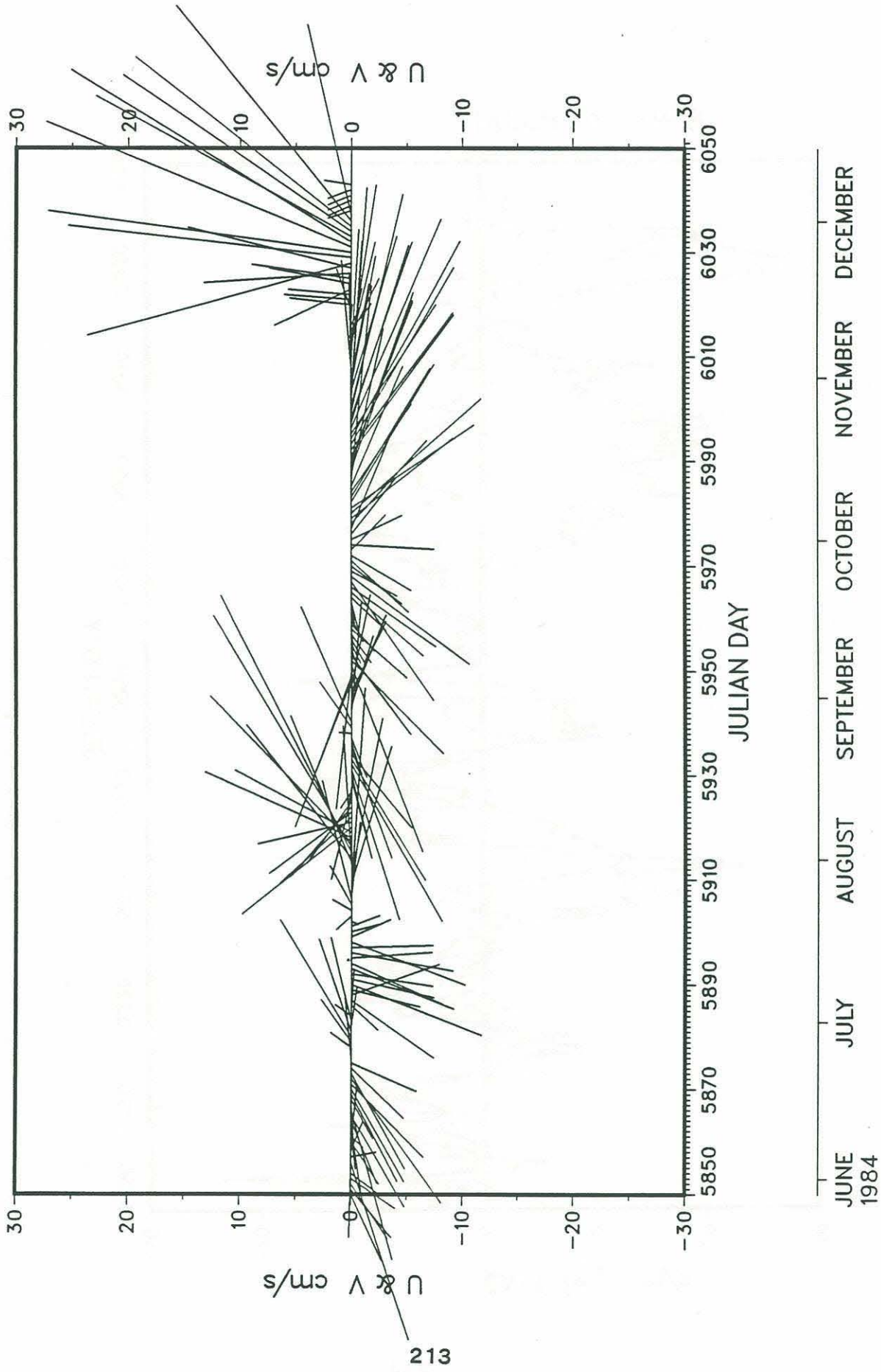
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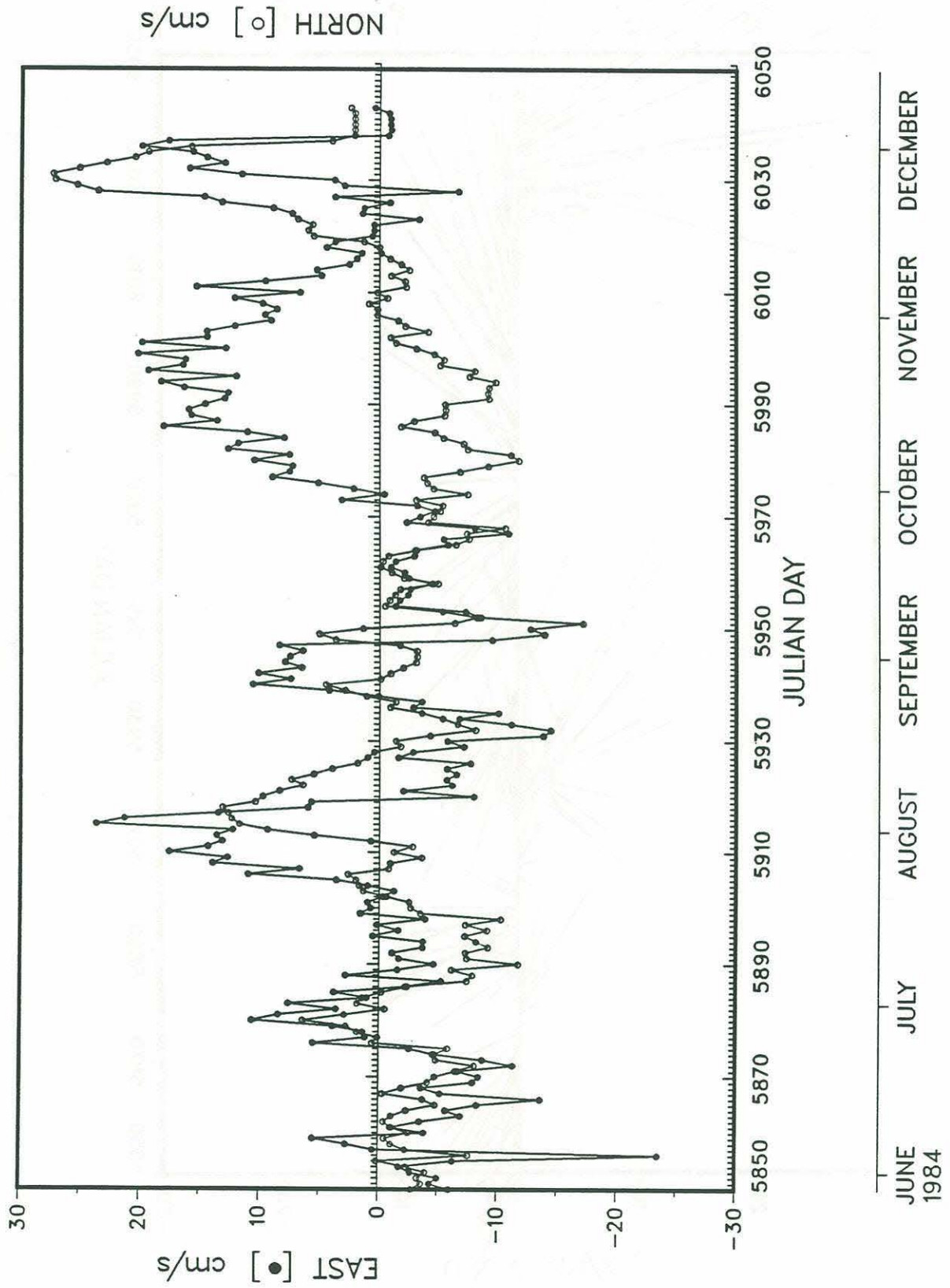


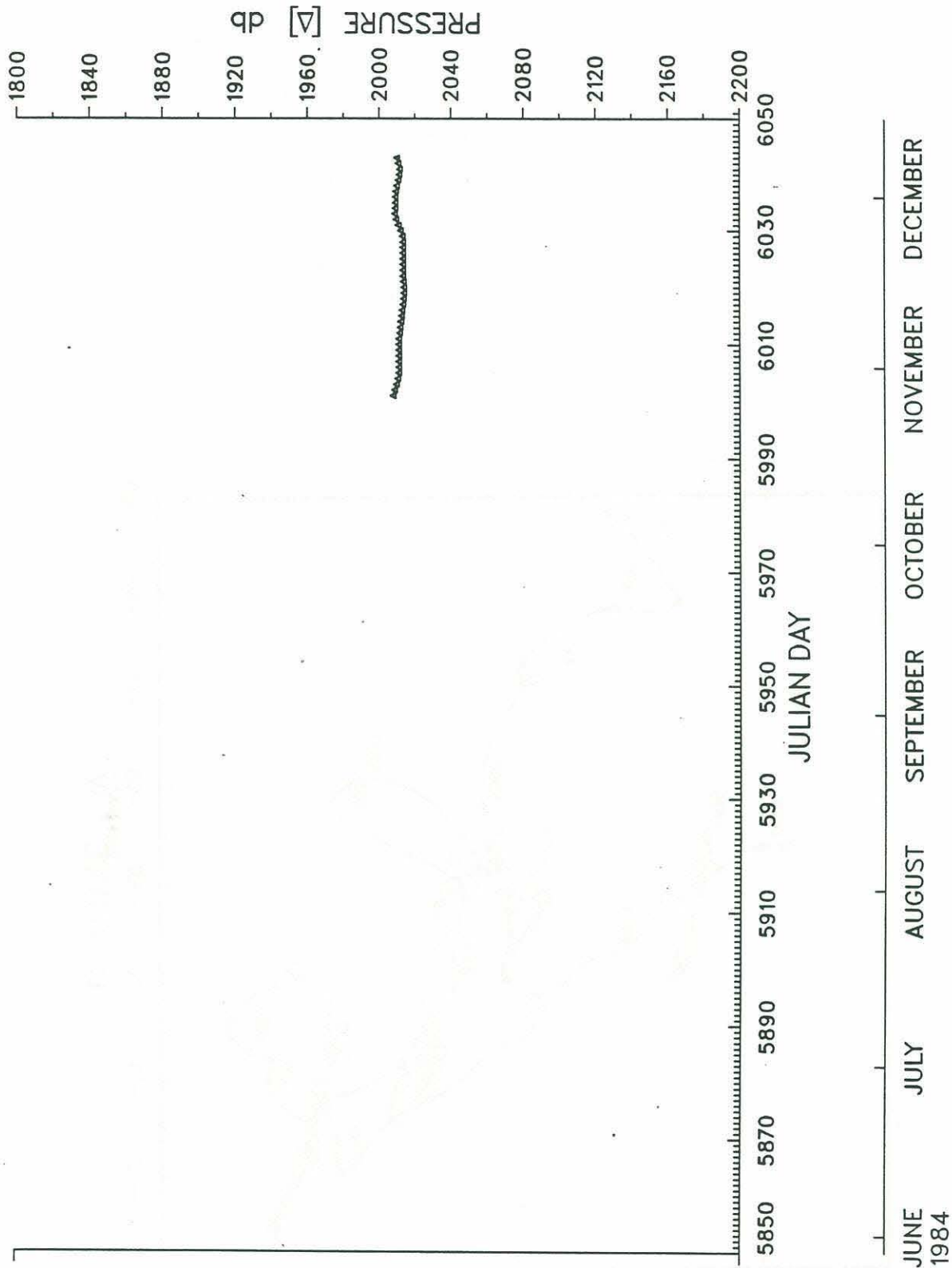


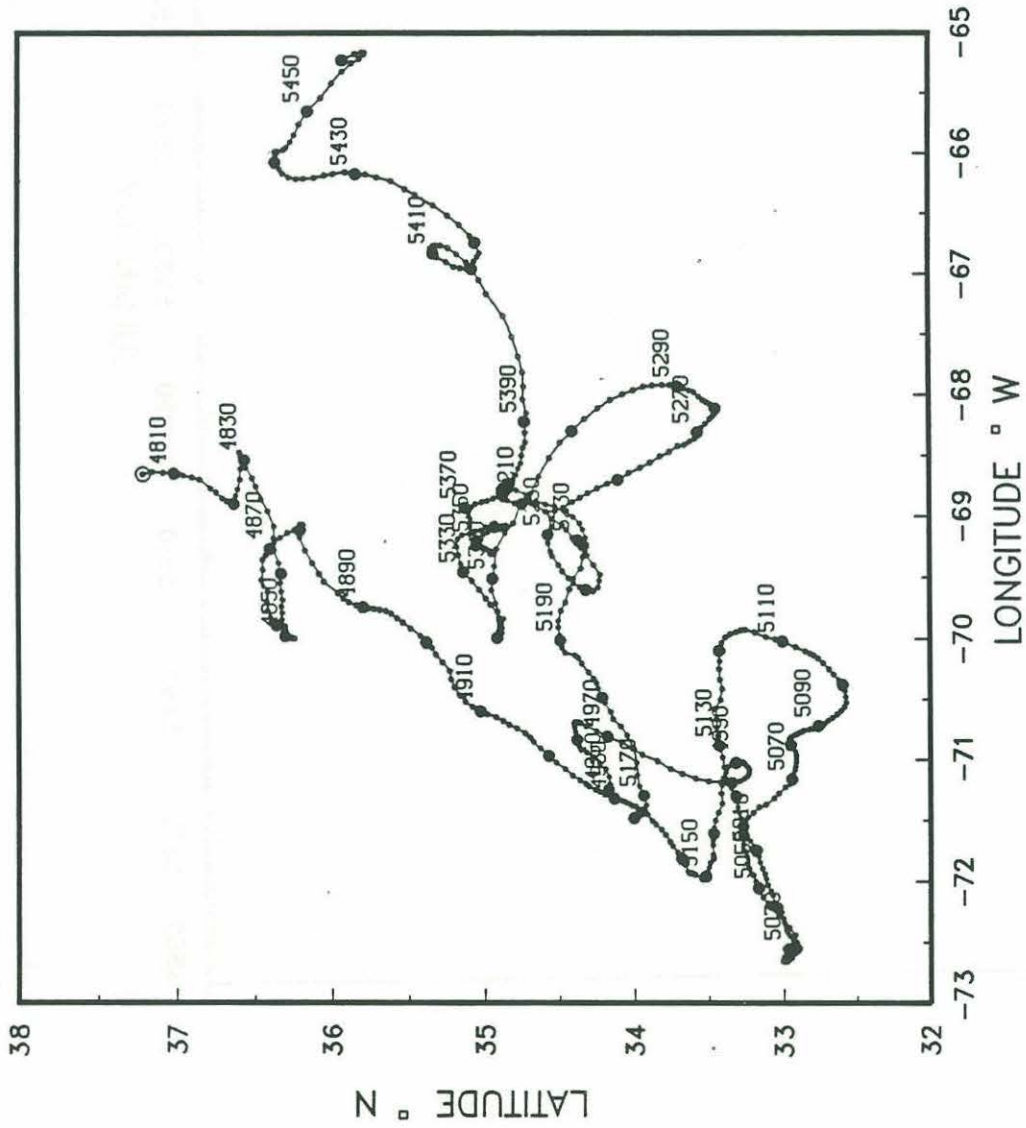
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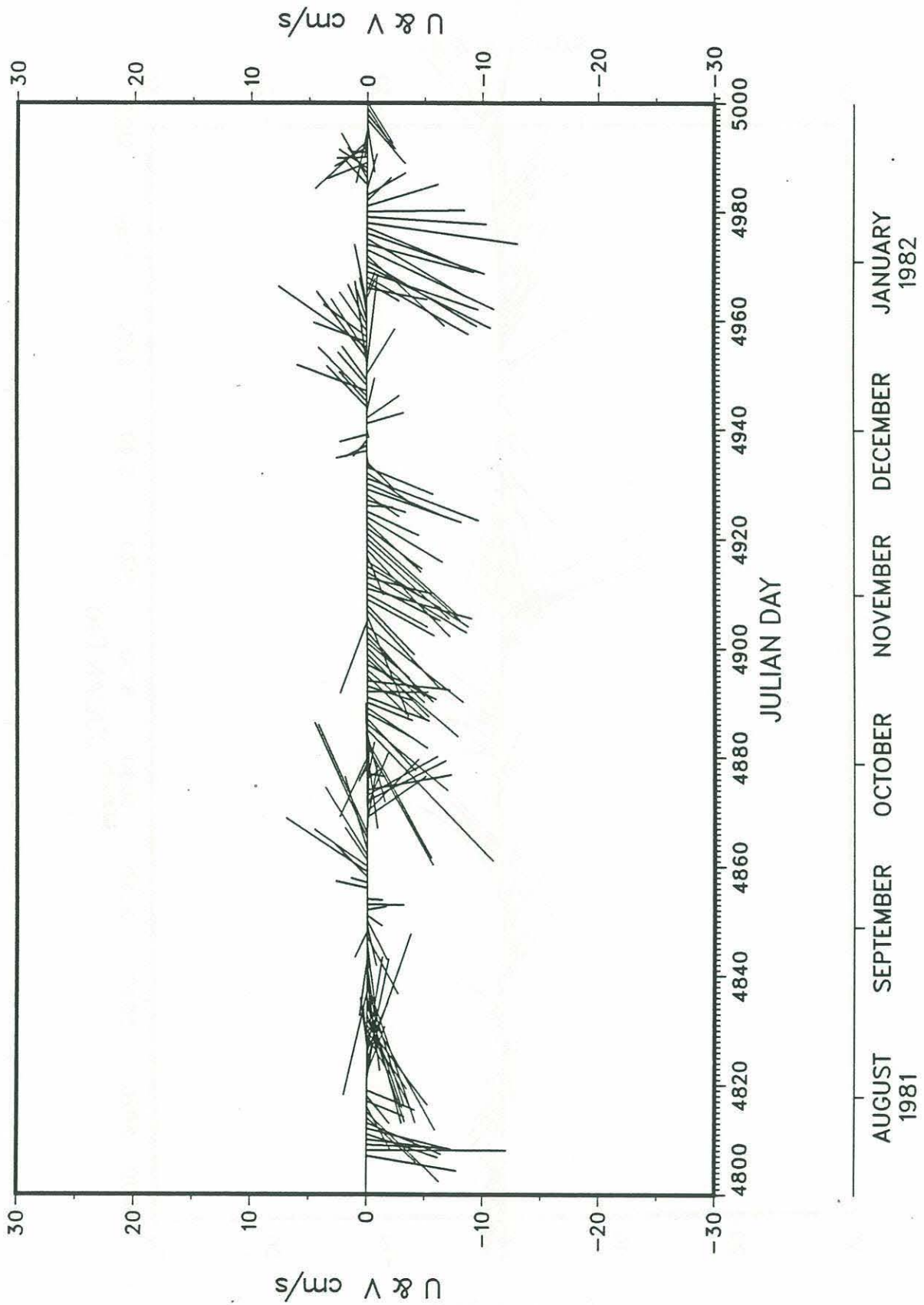




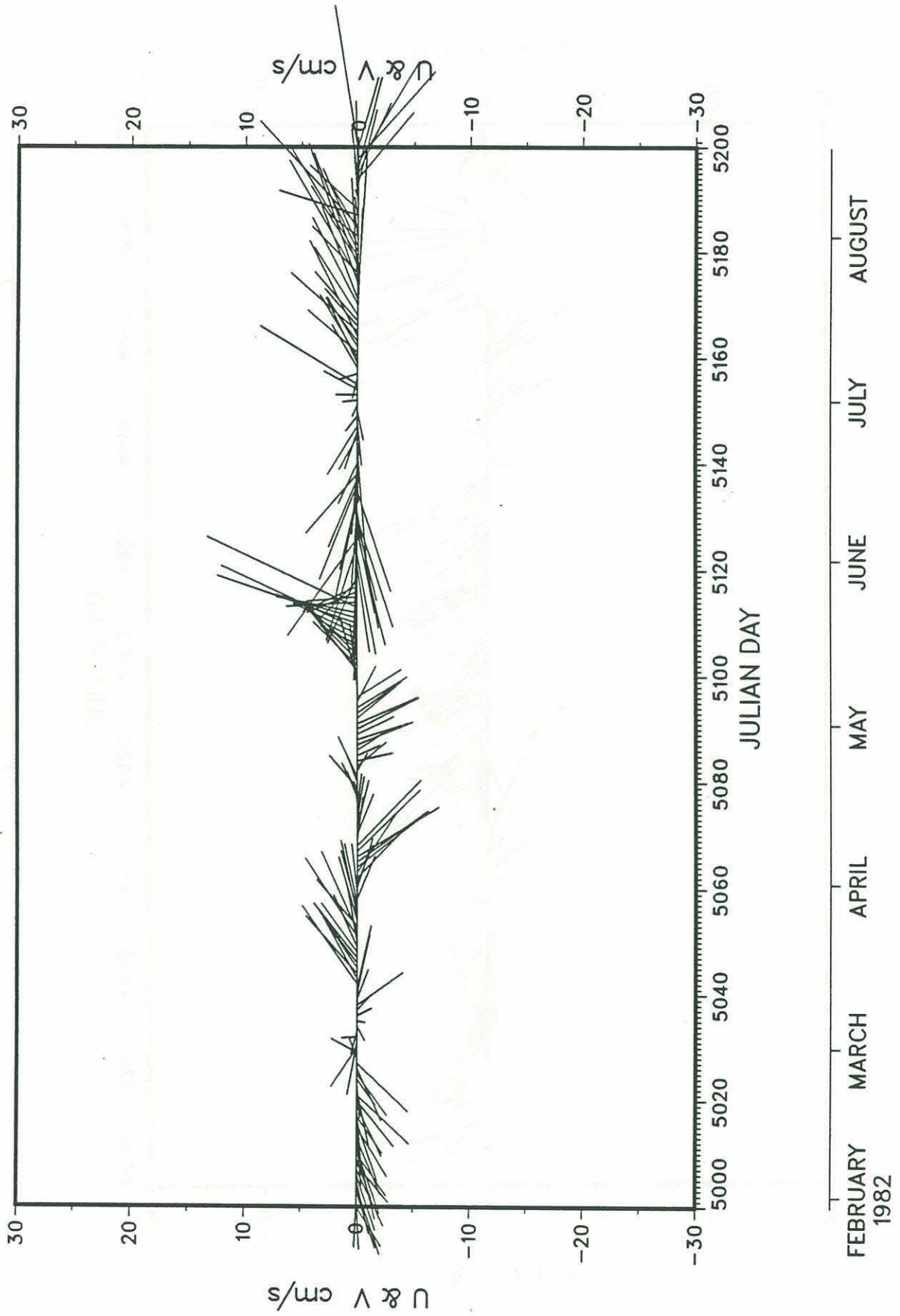


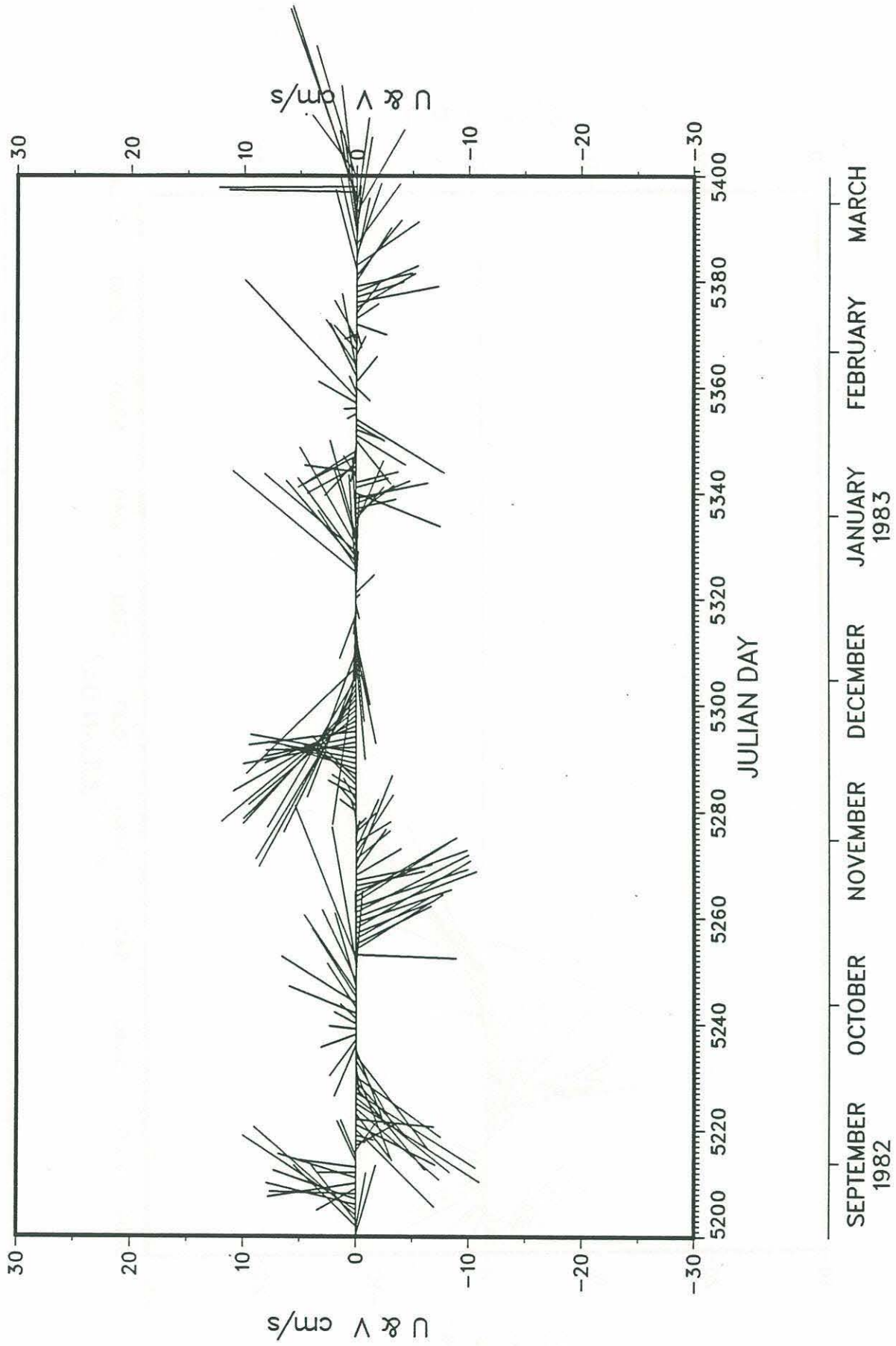




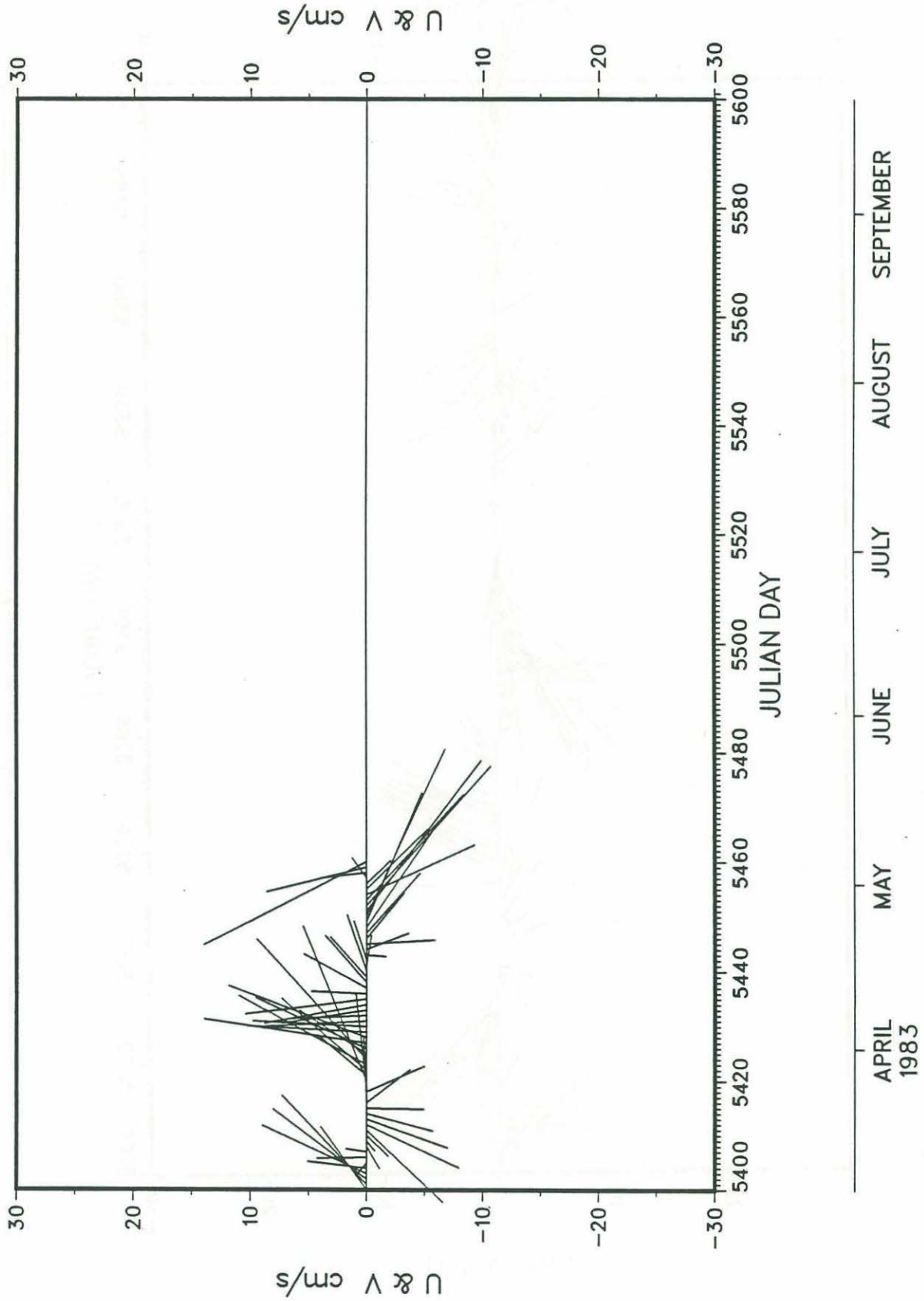


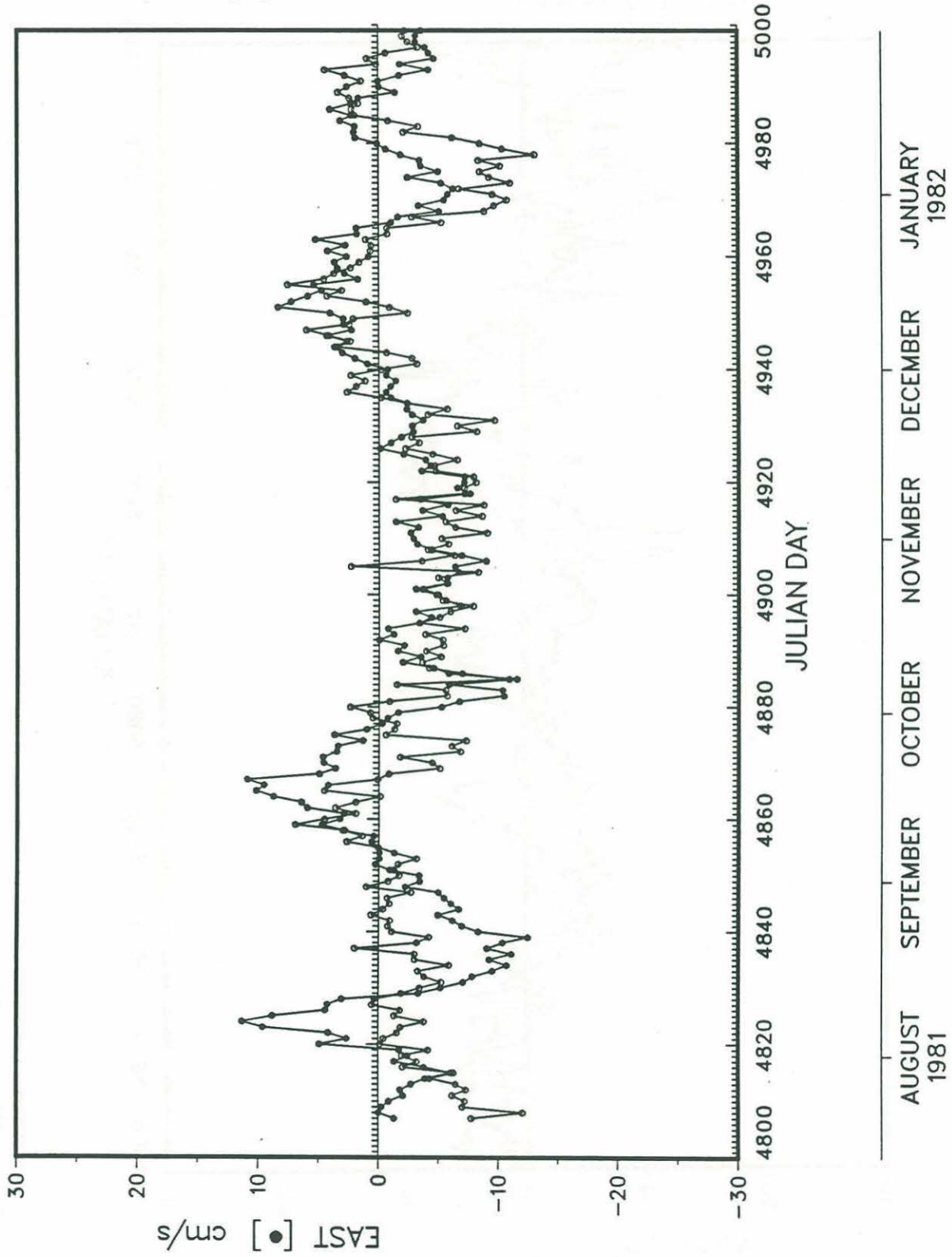
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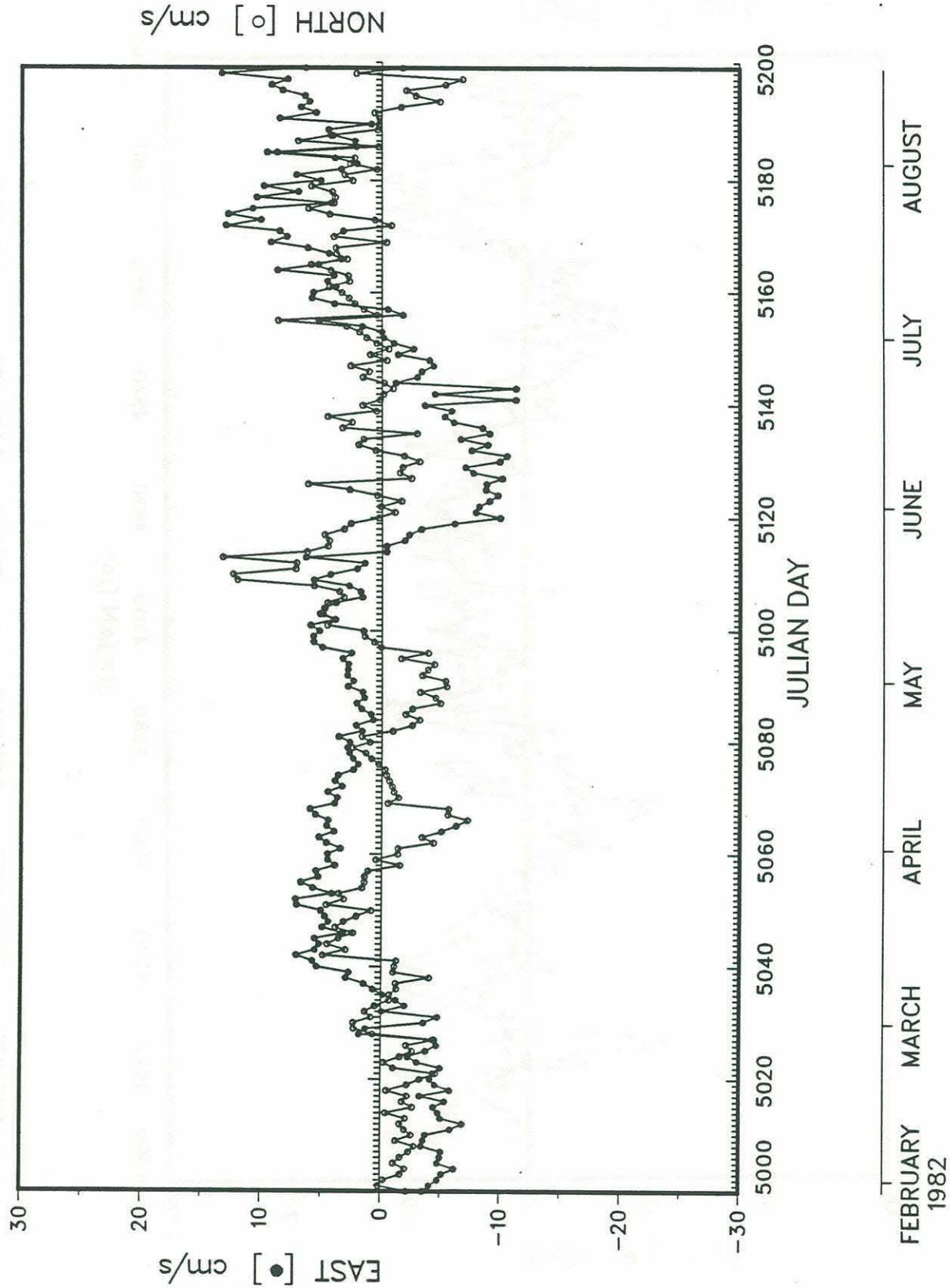


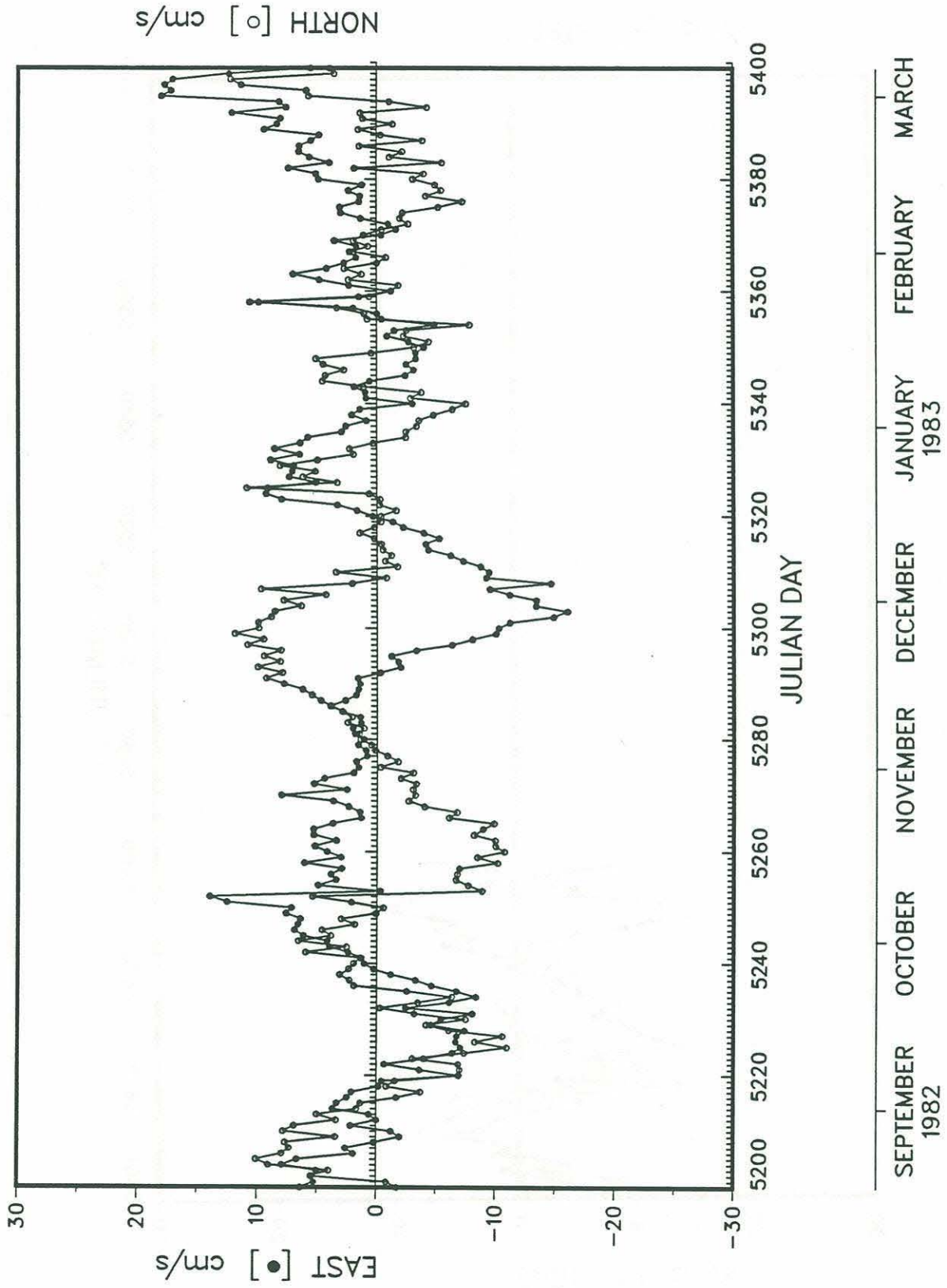
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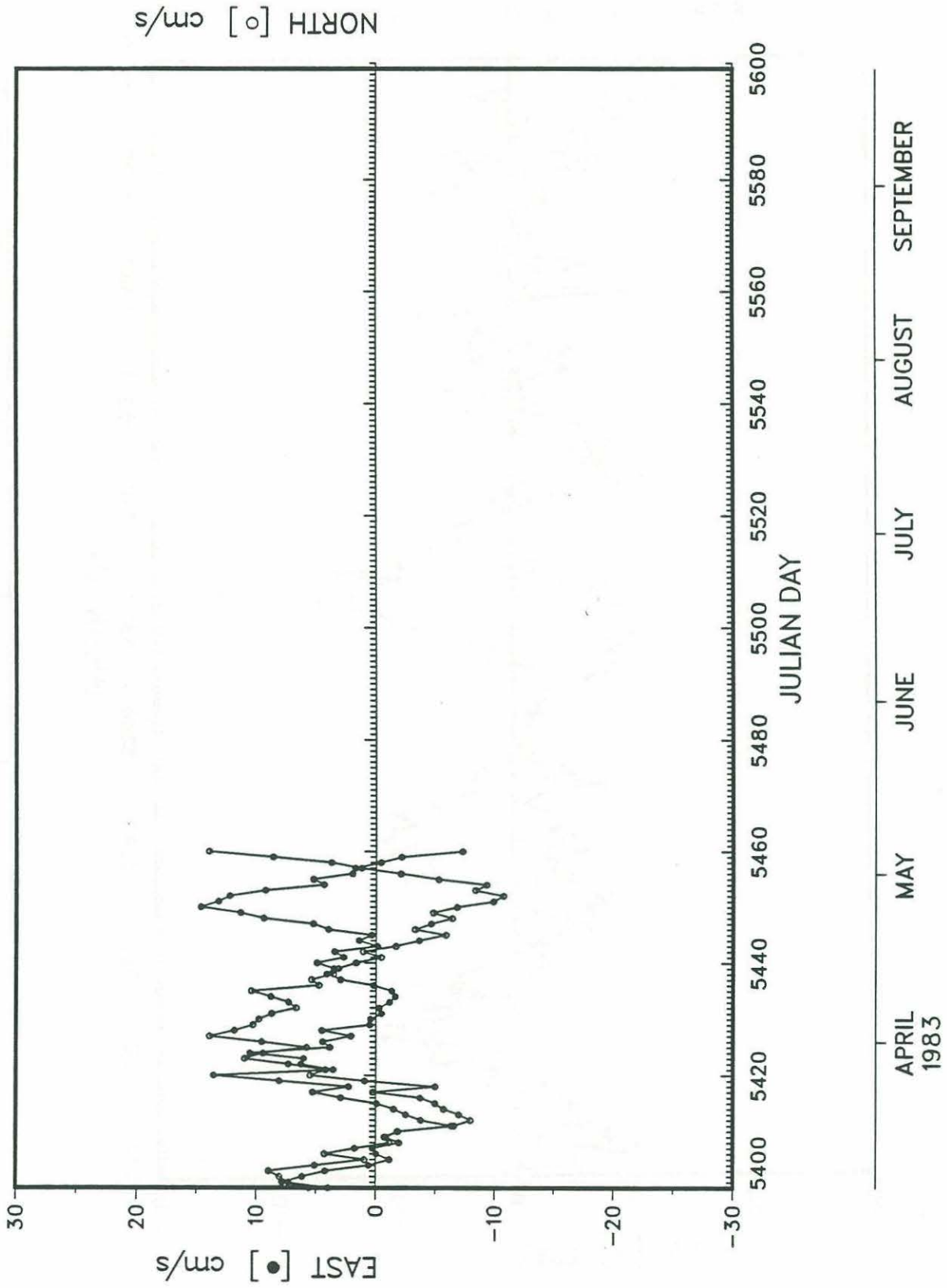


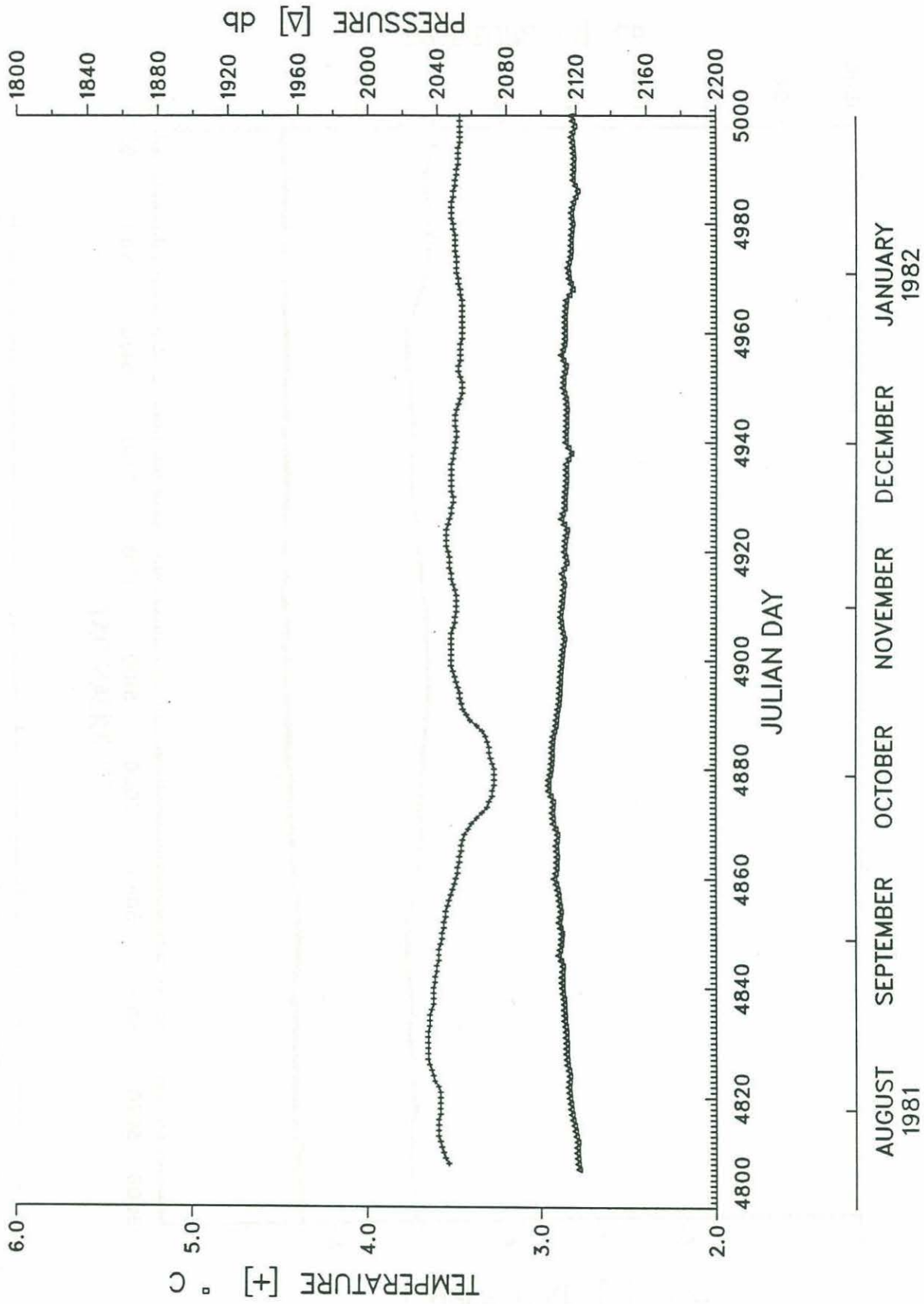
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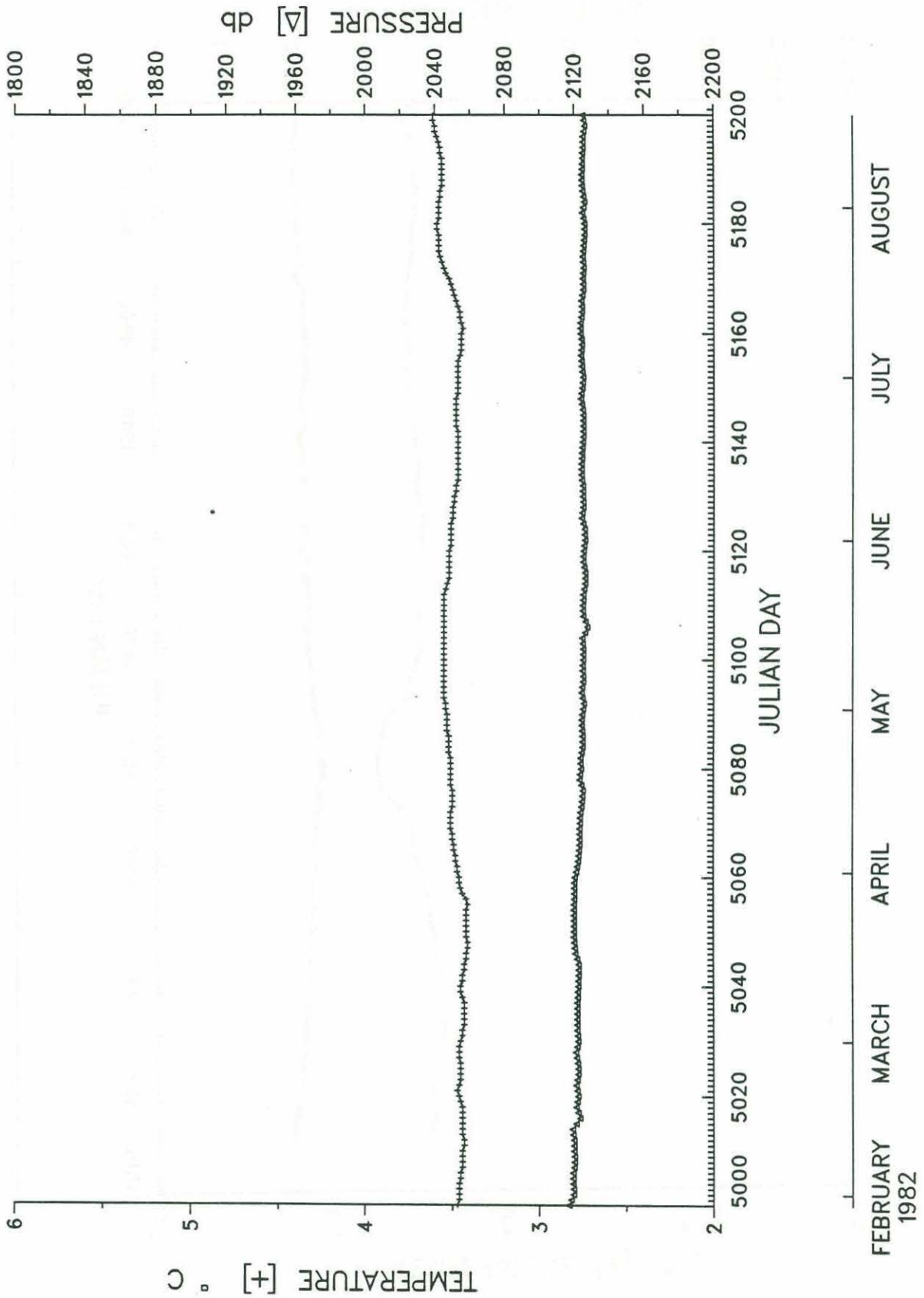


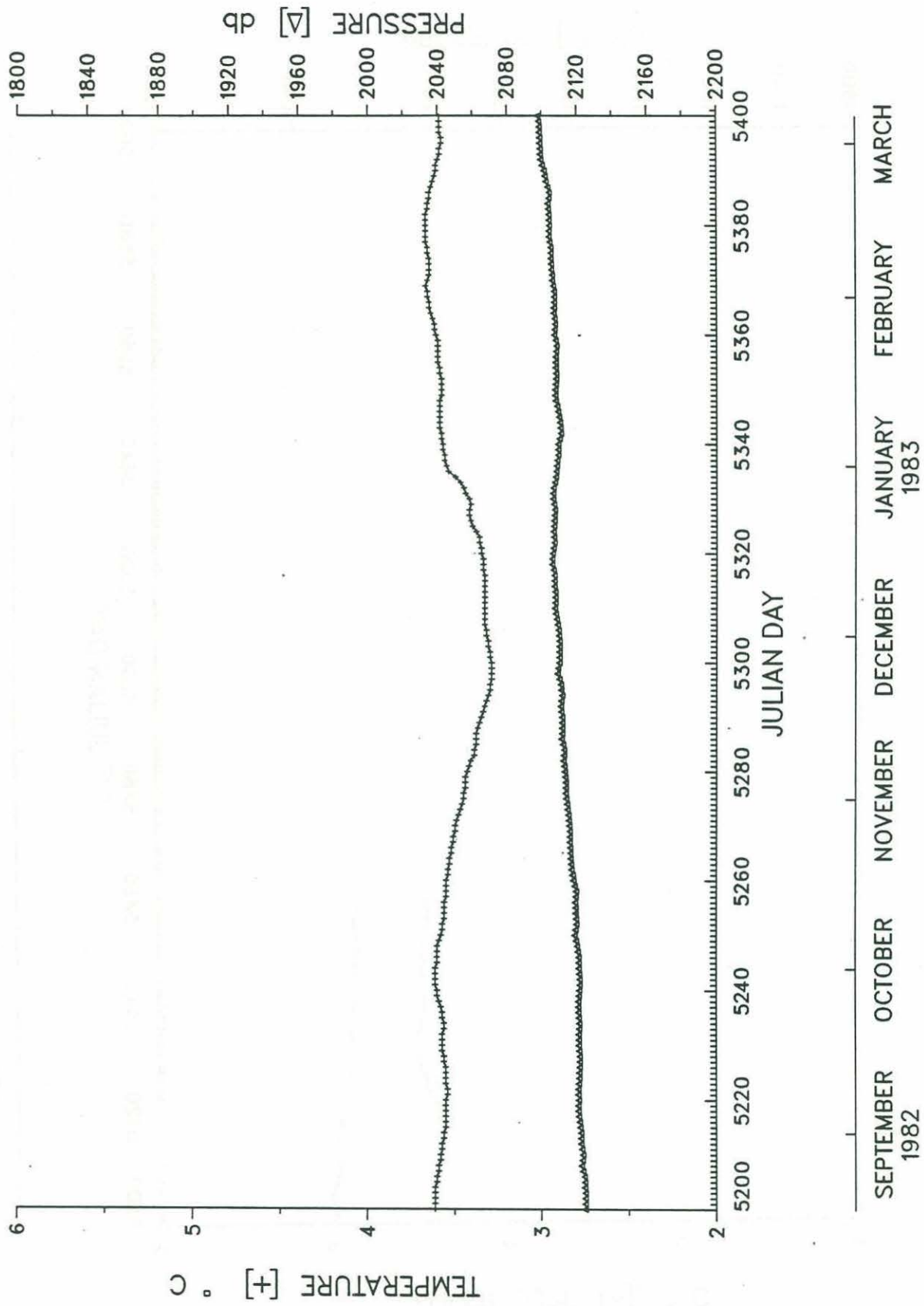
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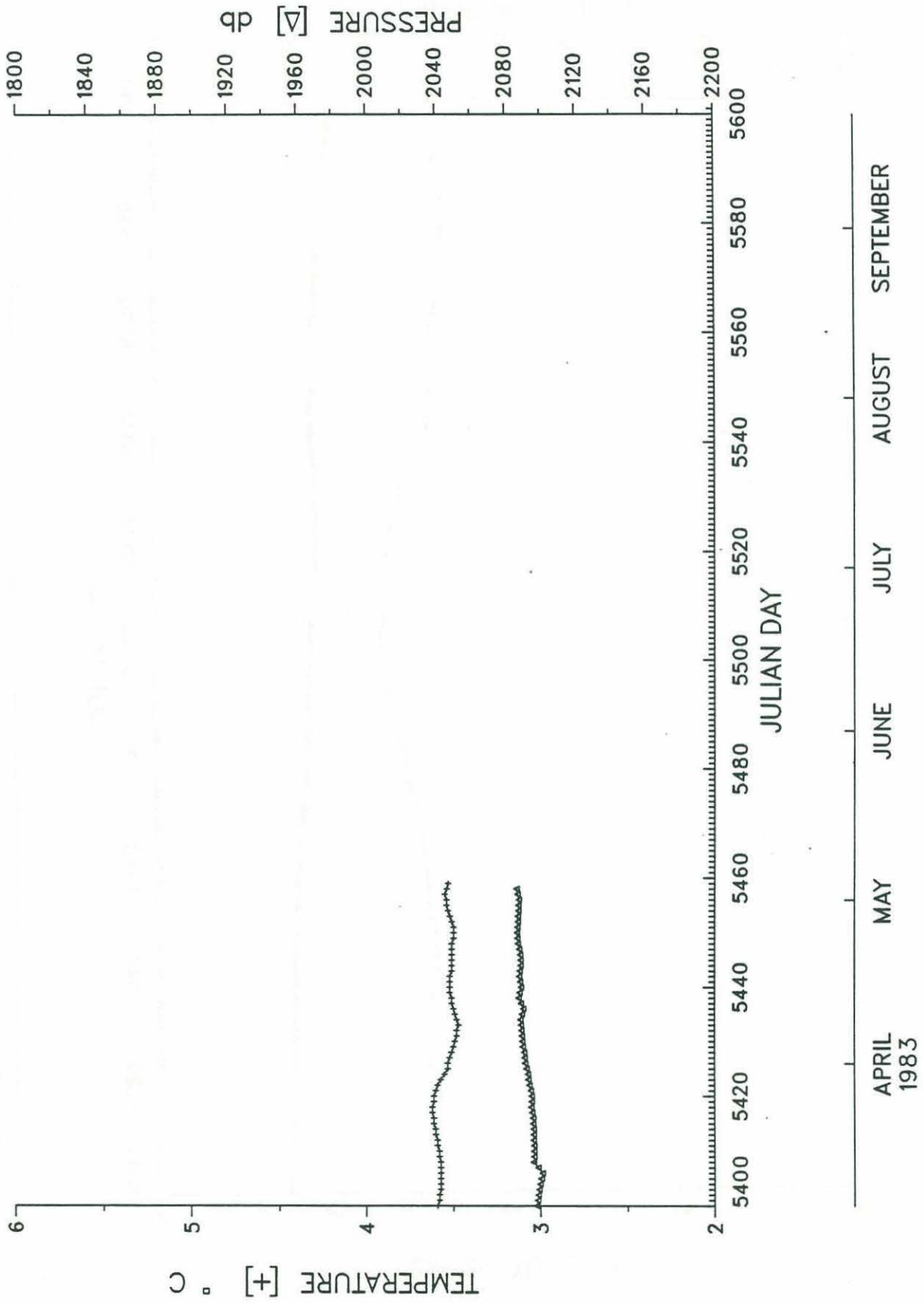


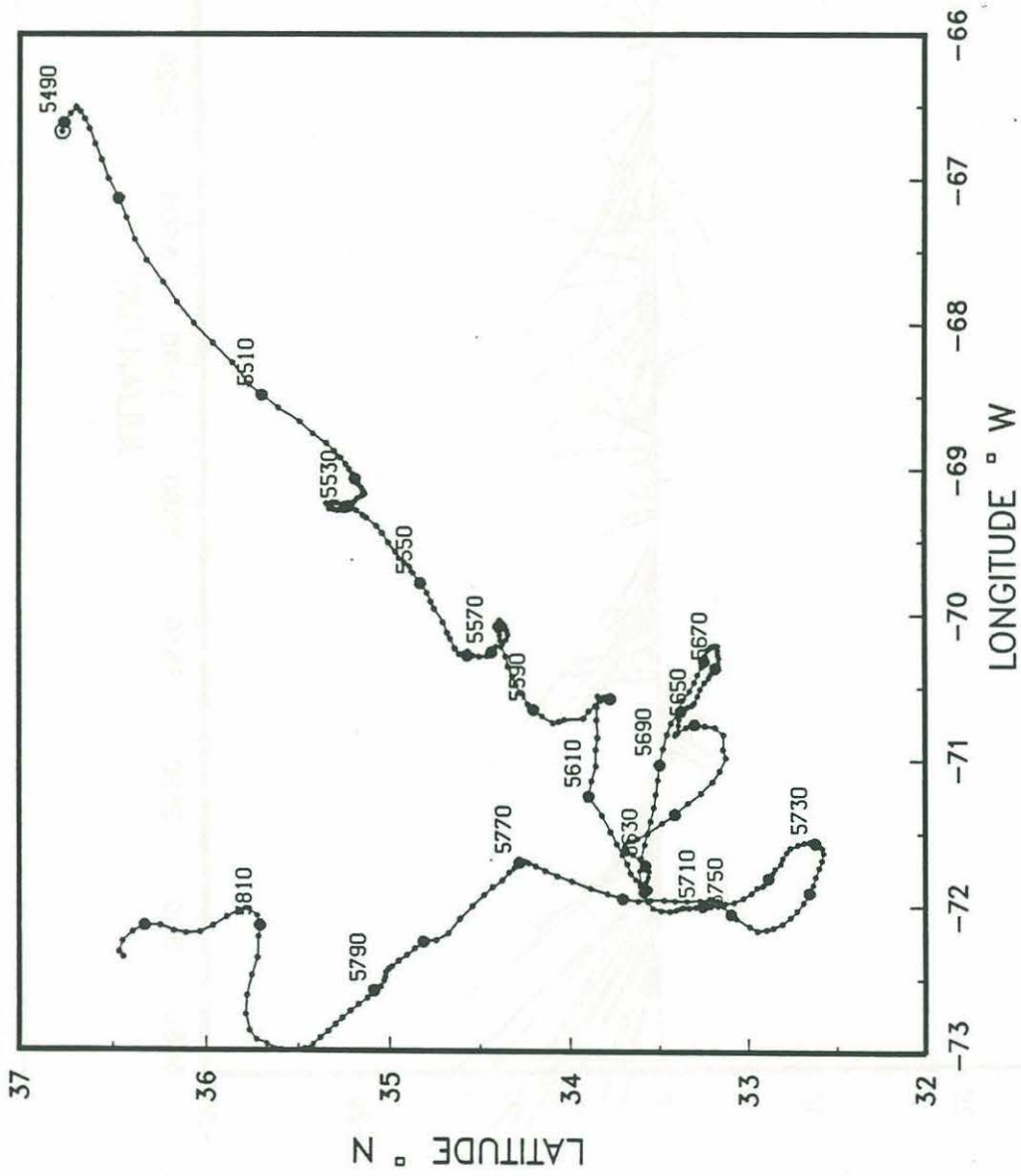
GUSREX 169A



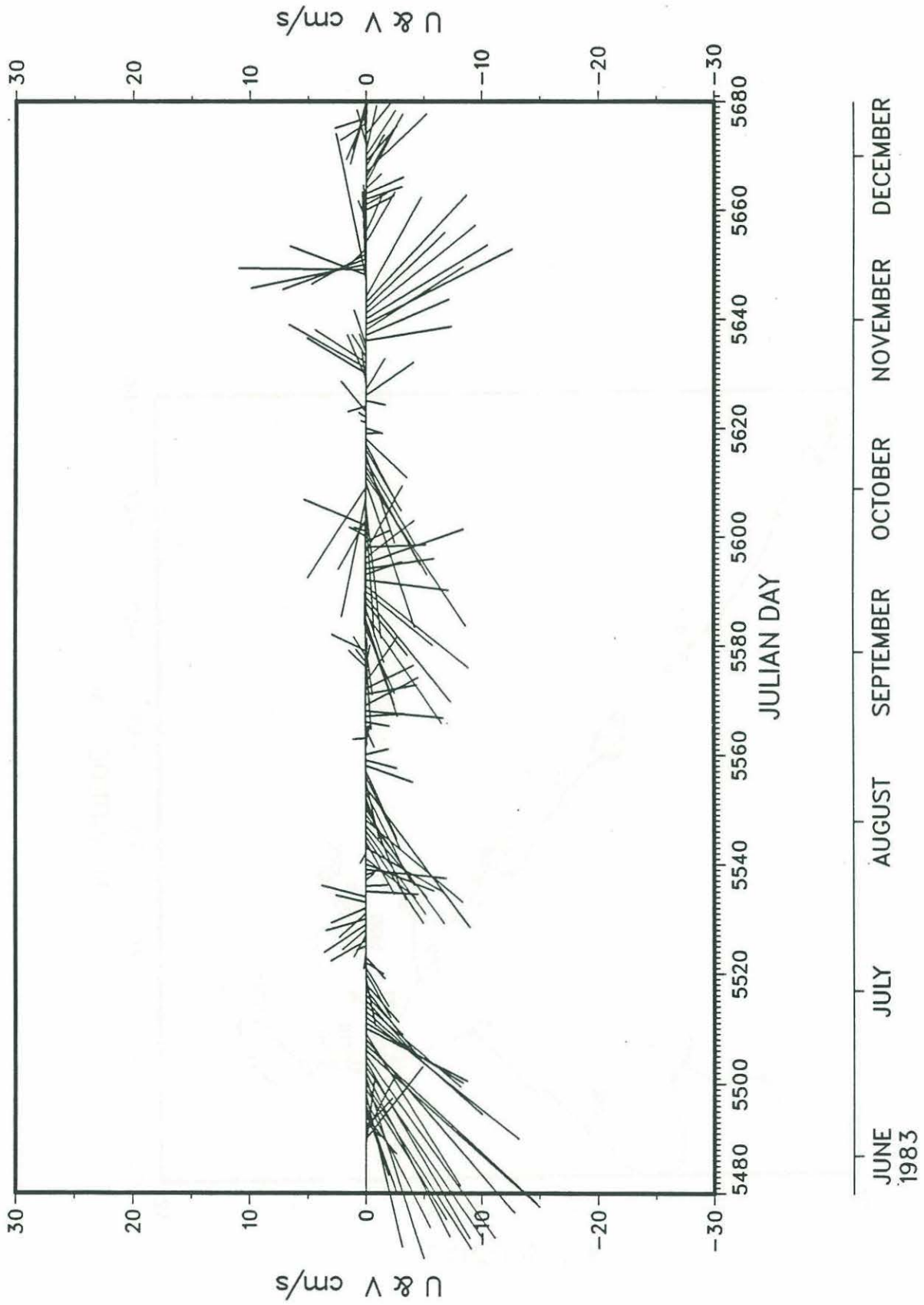


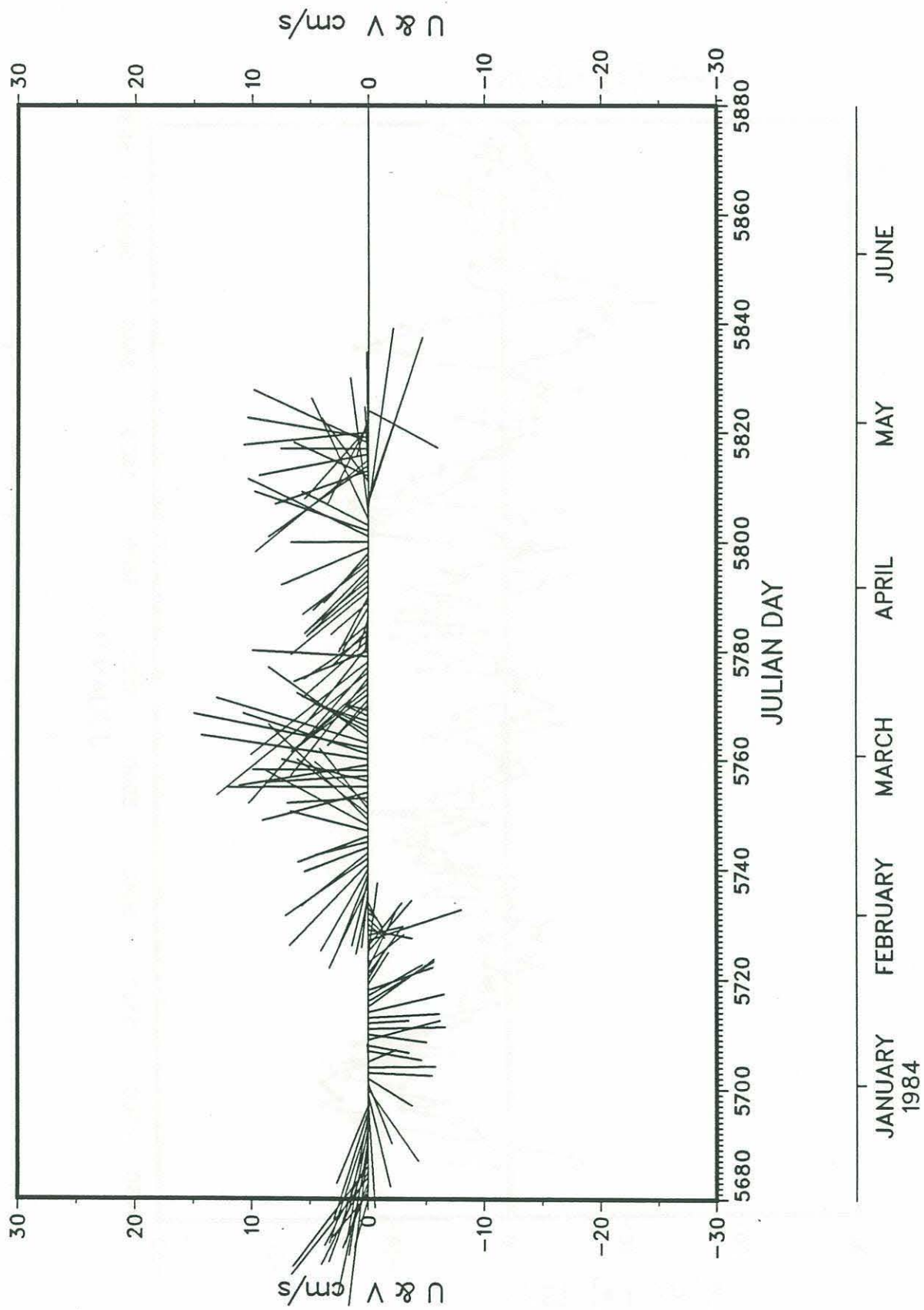
GUSREX 169A



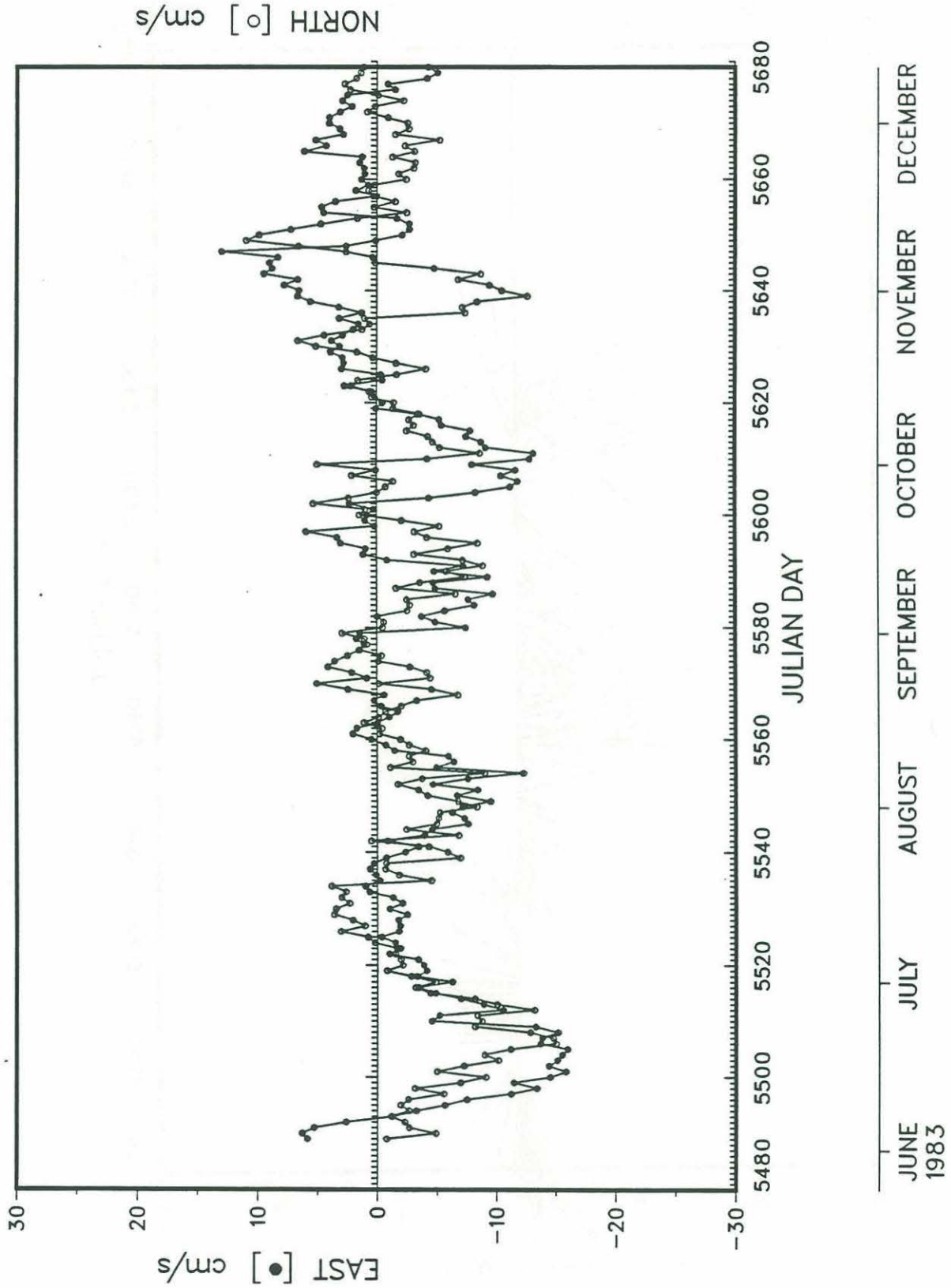


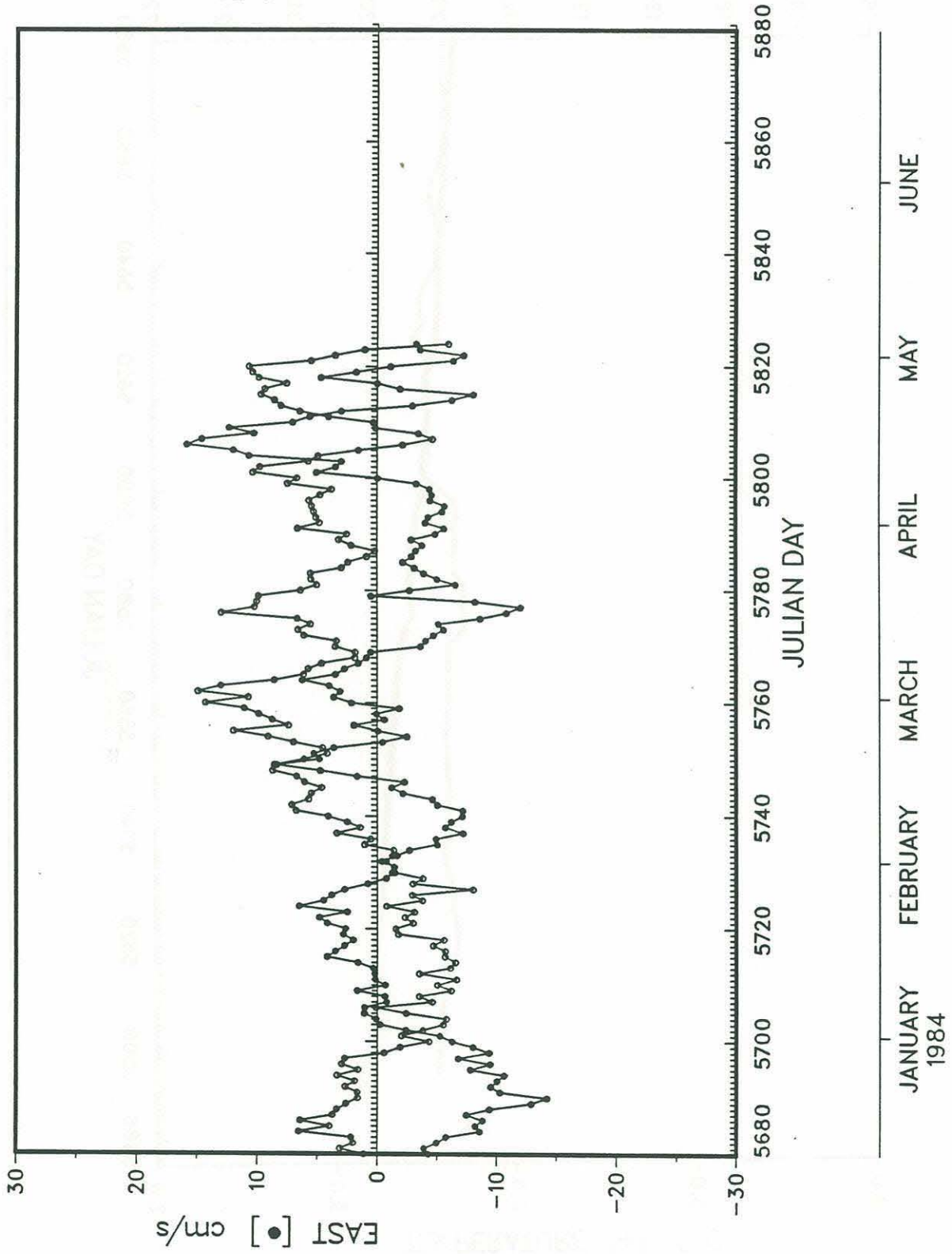
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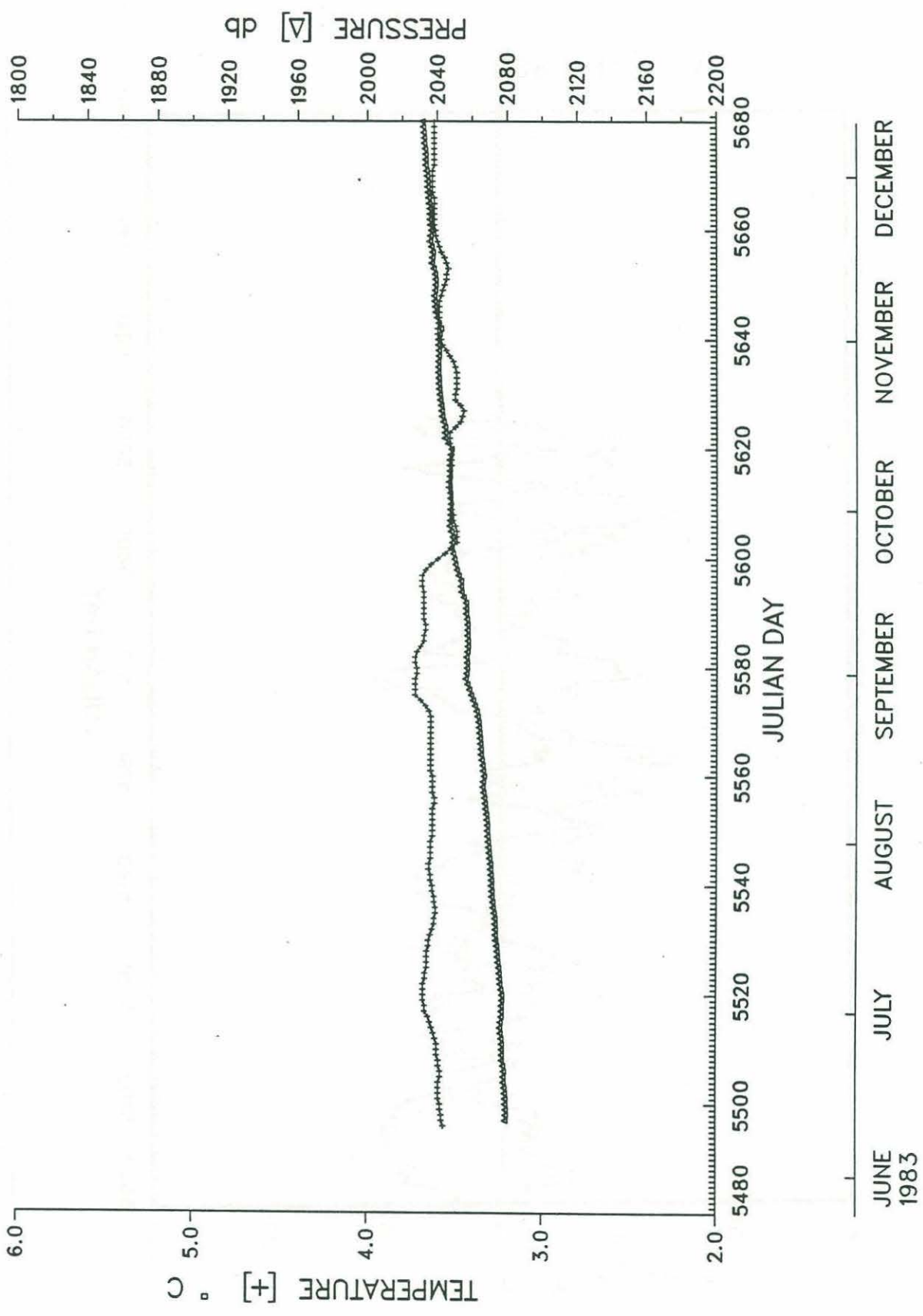


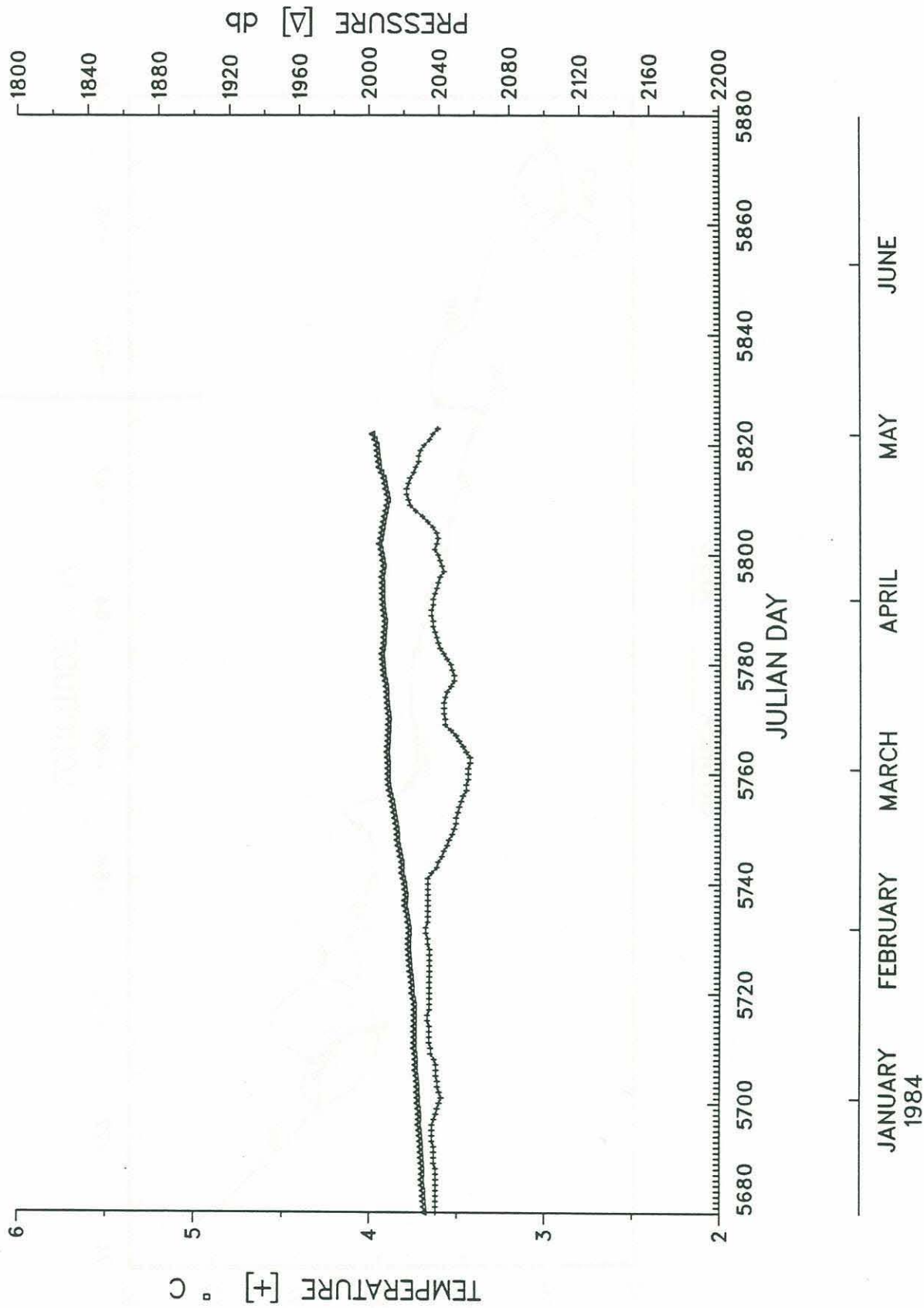
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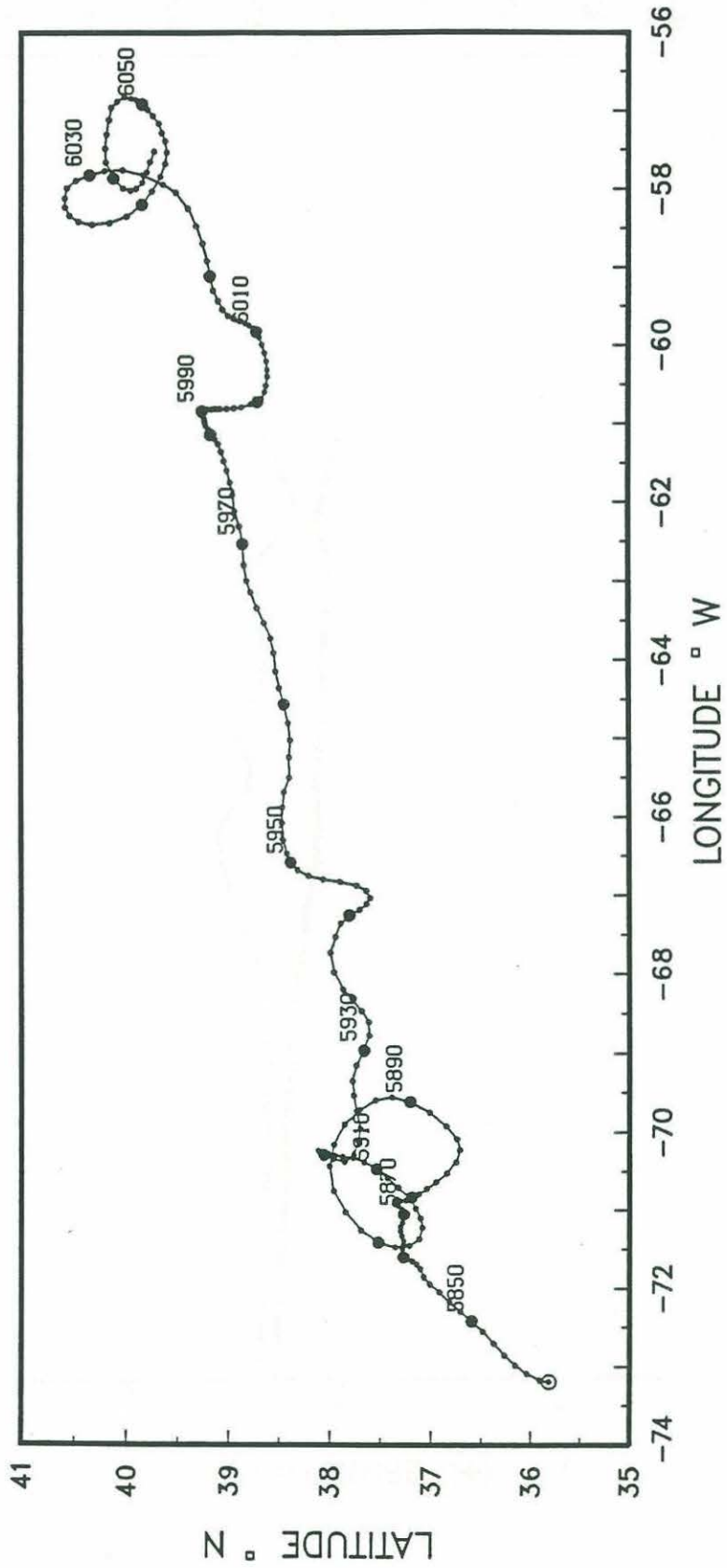


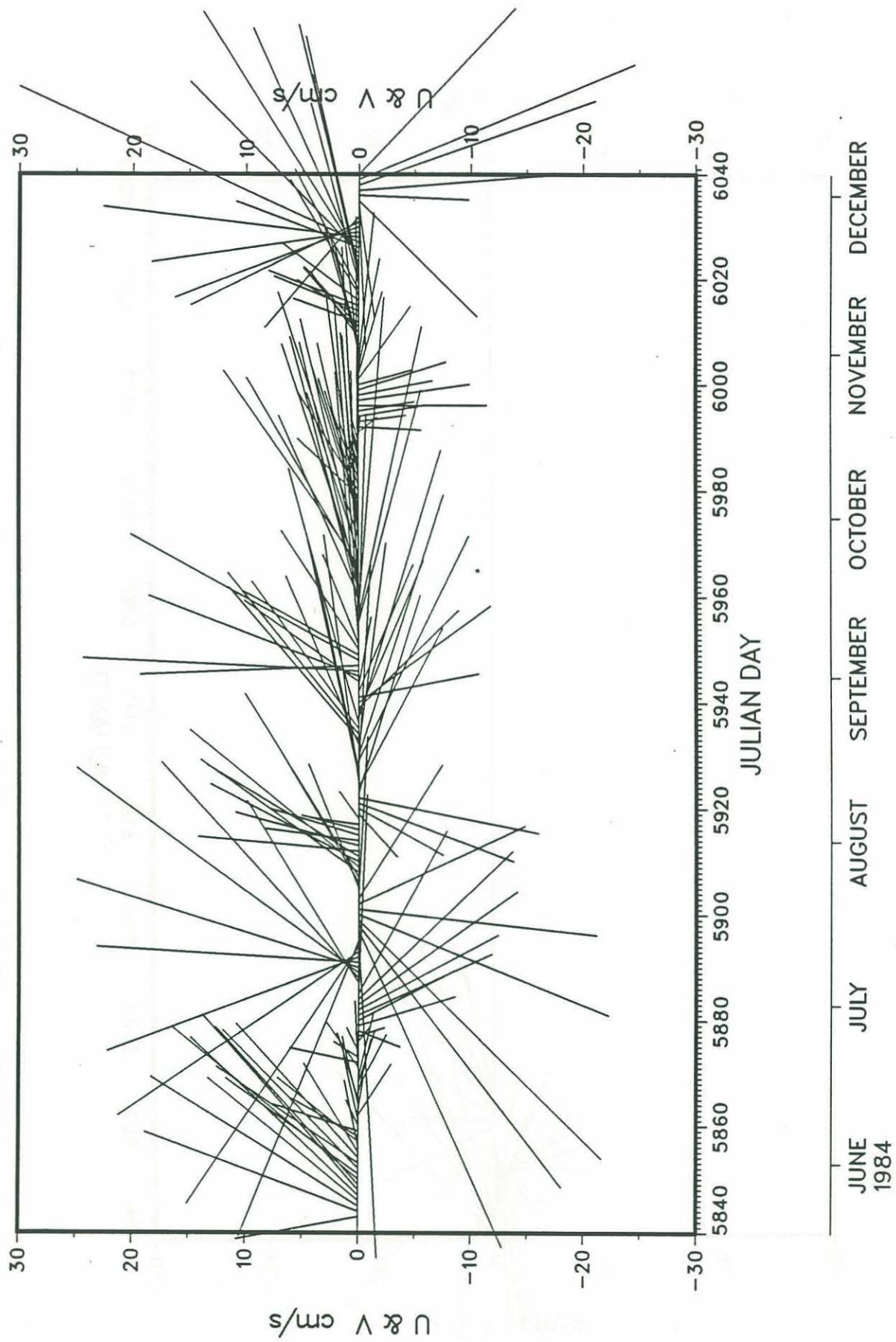
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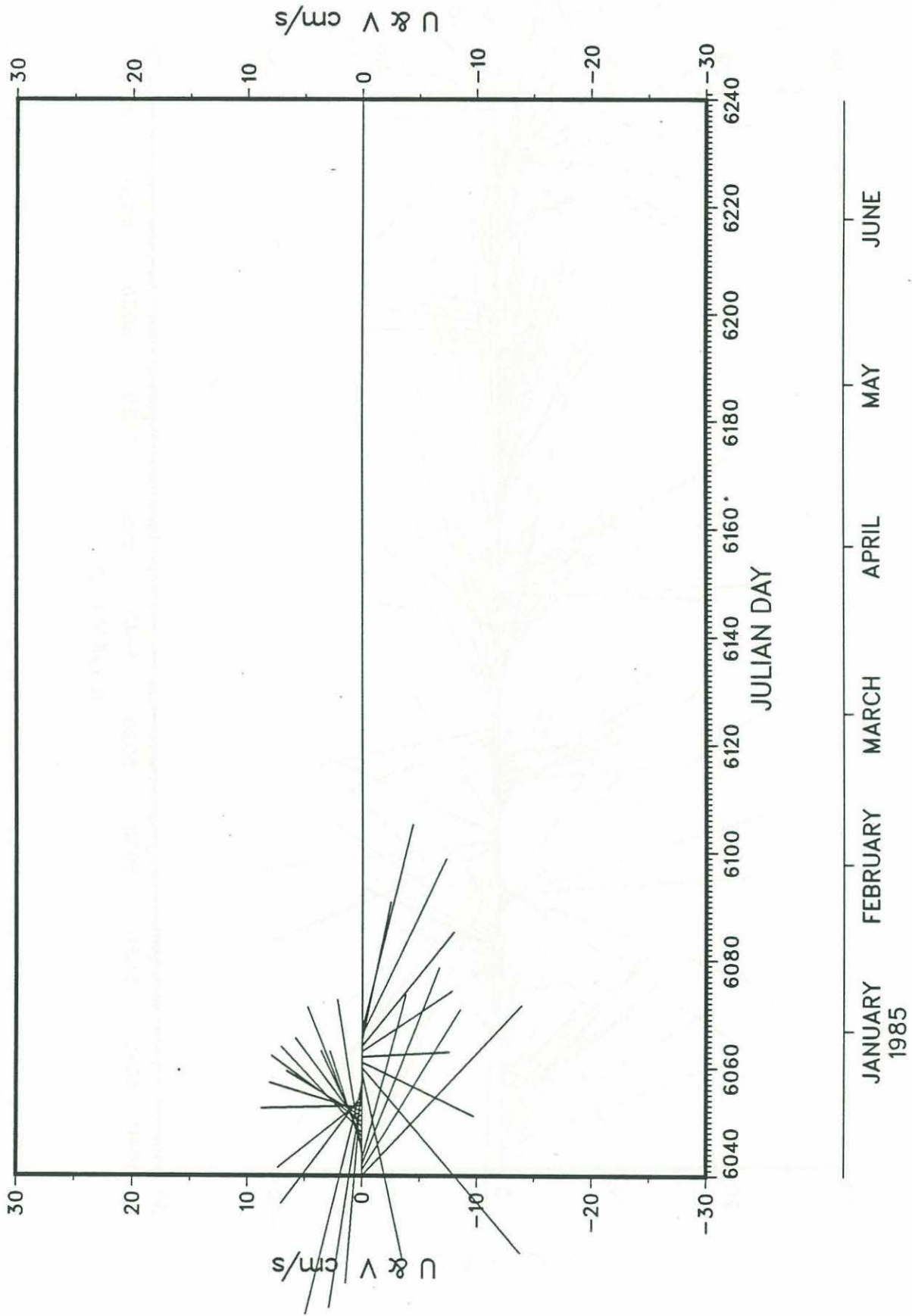


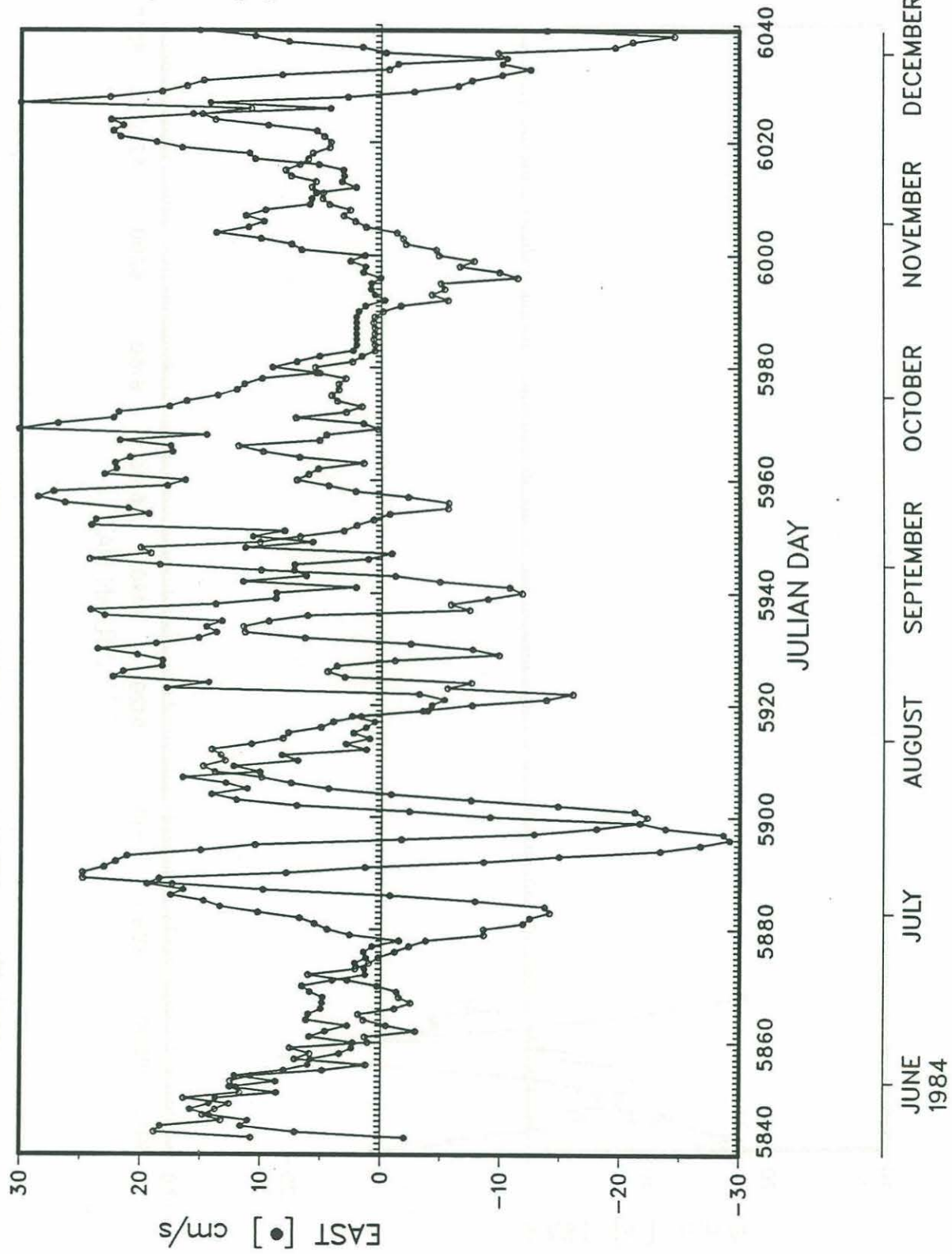
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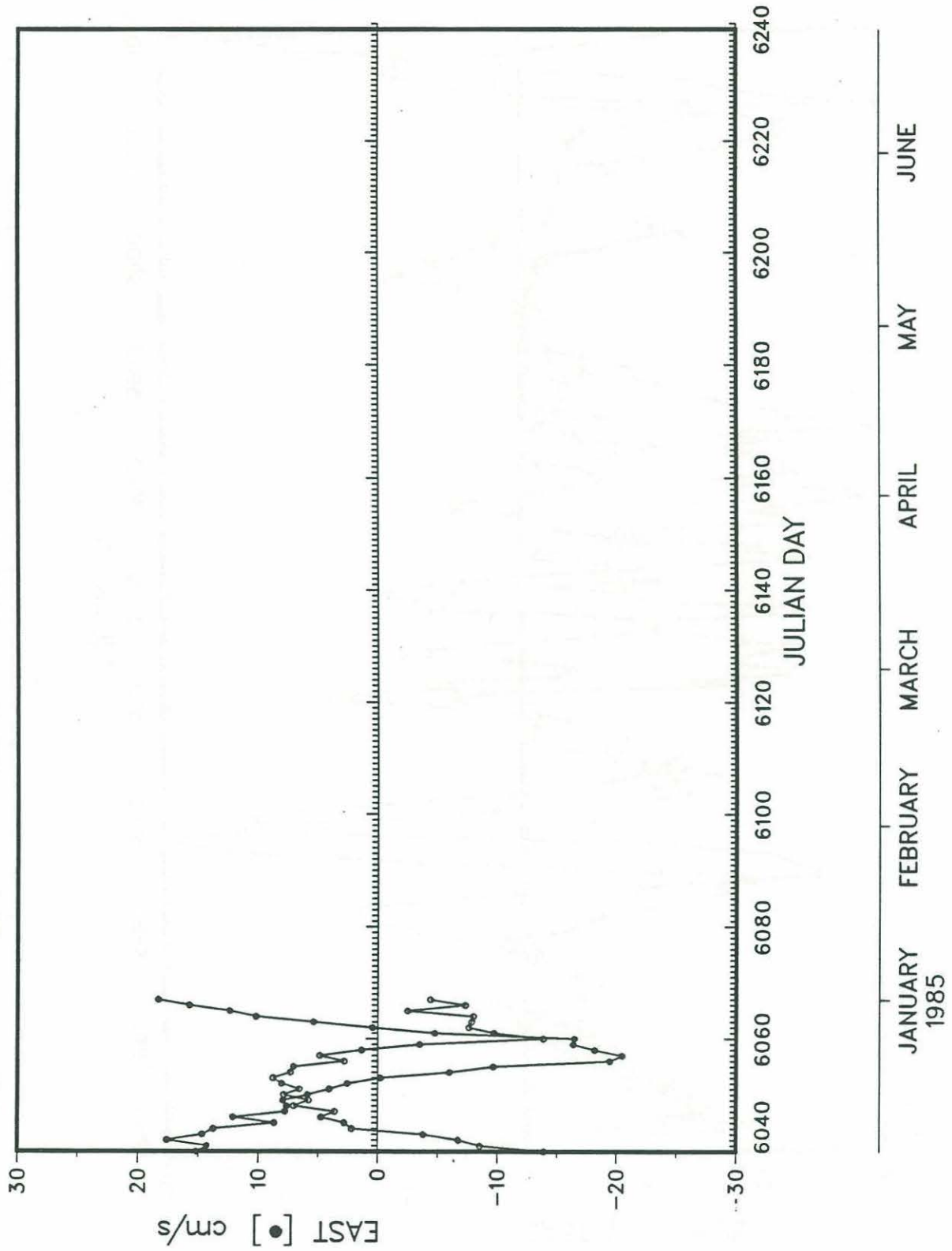


GUSREX 169C

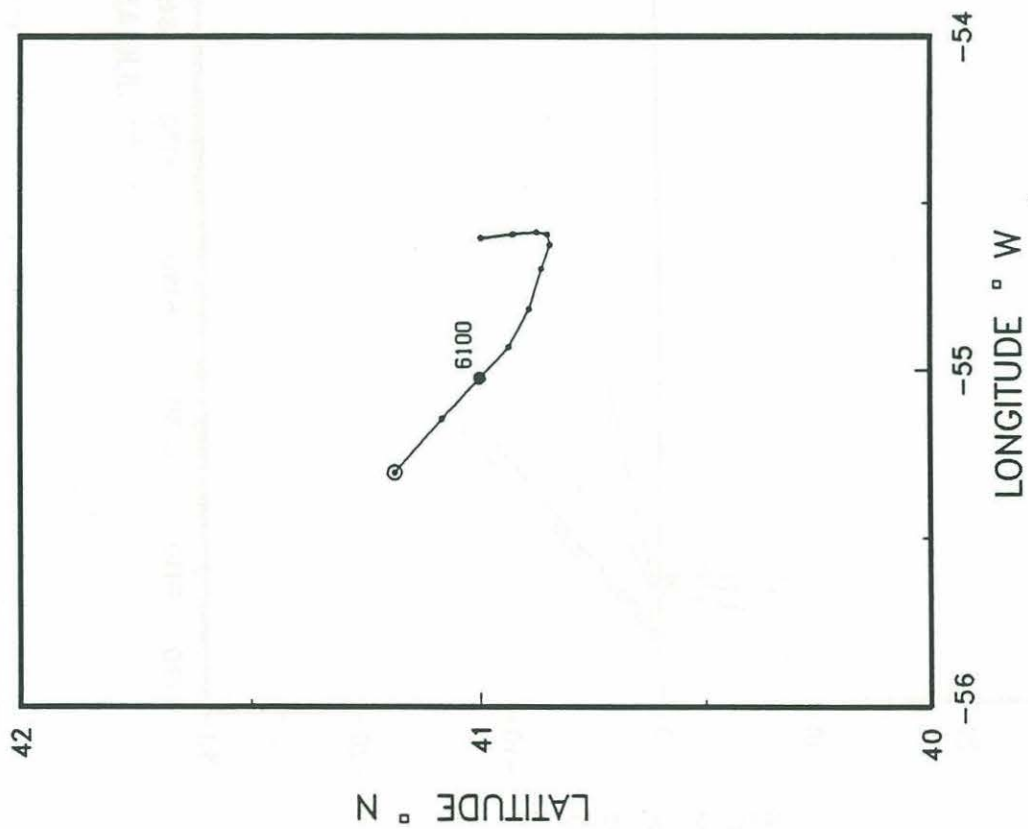




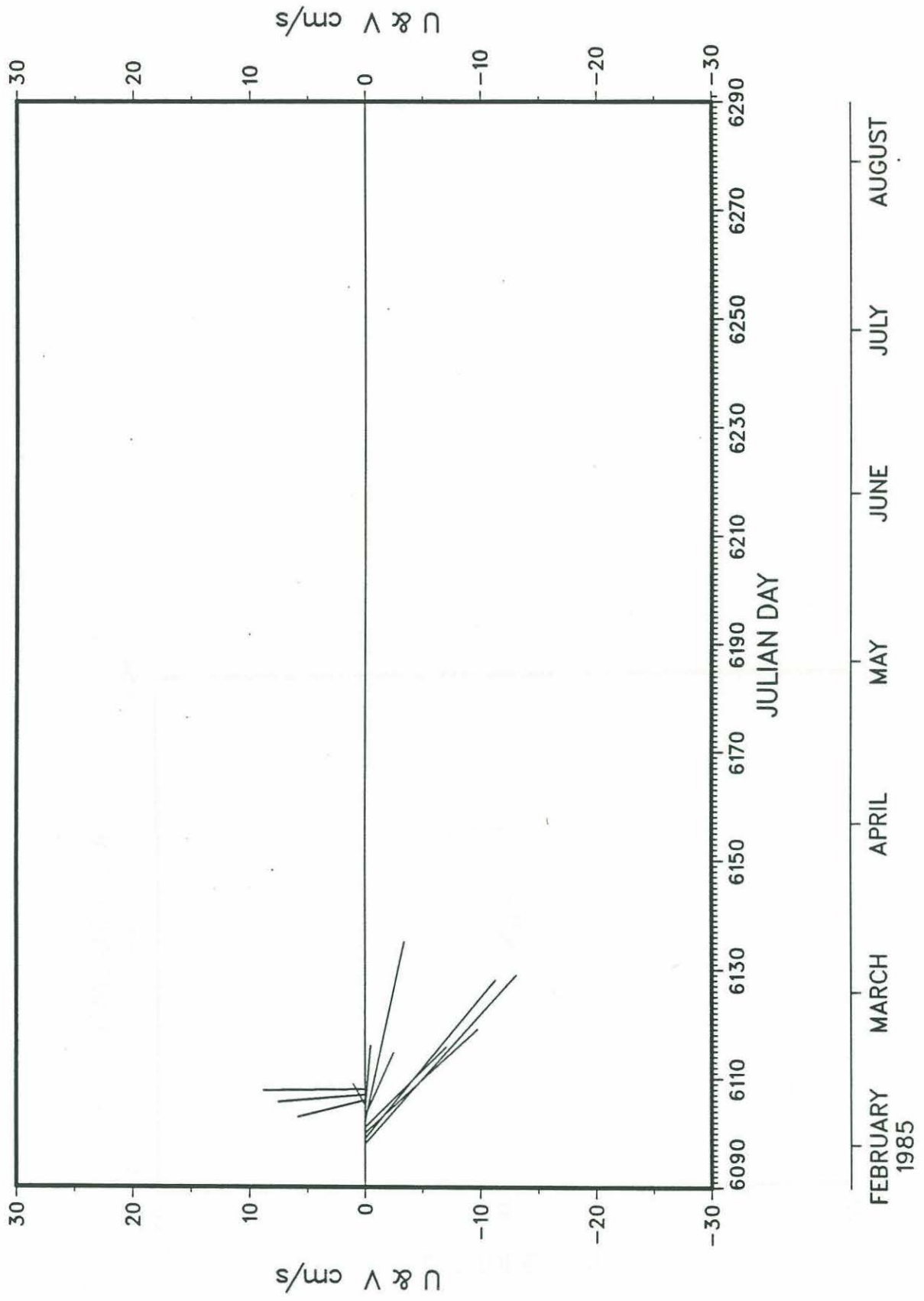
GUSREX 169C

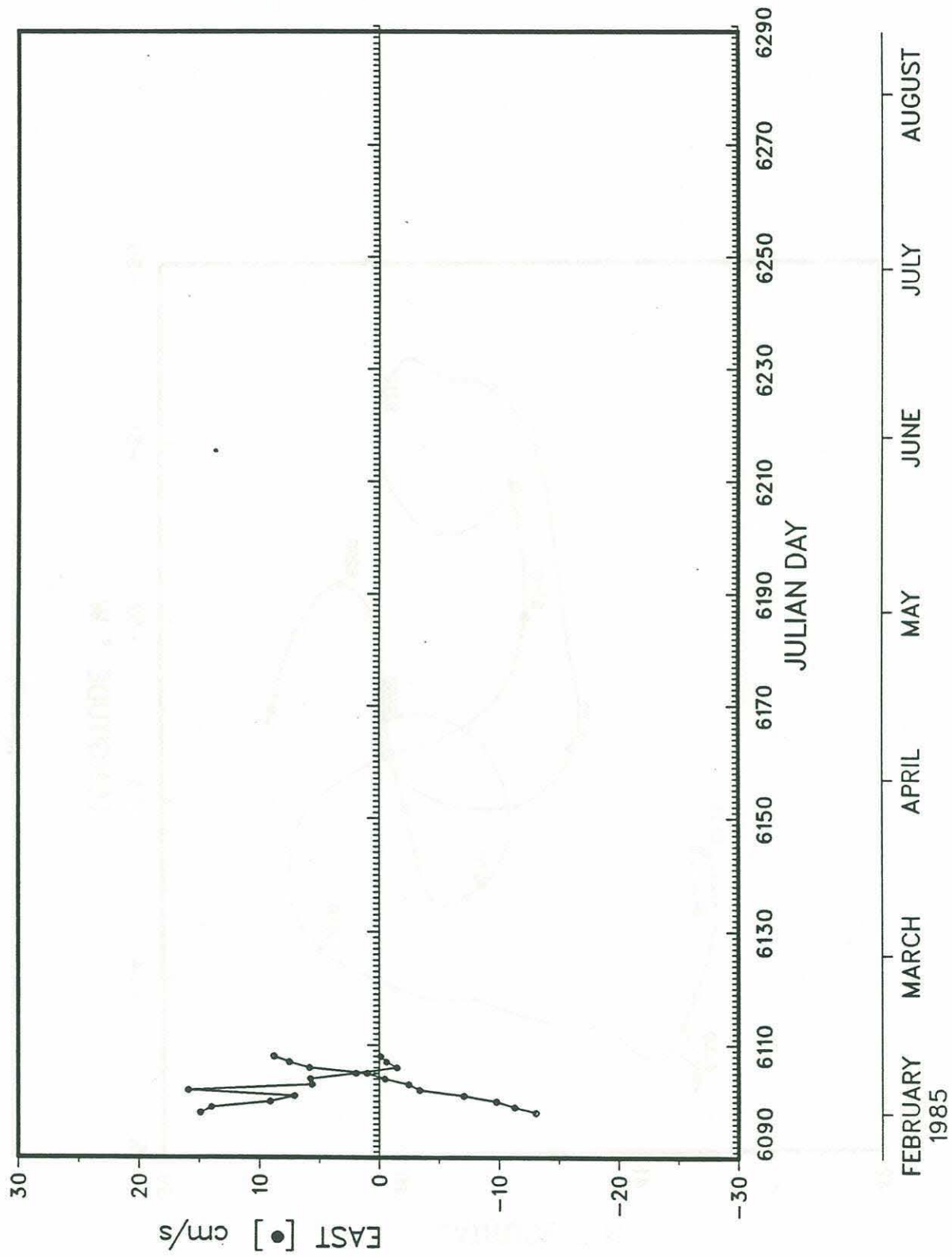


GUSREX 169D

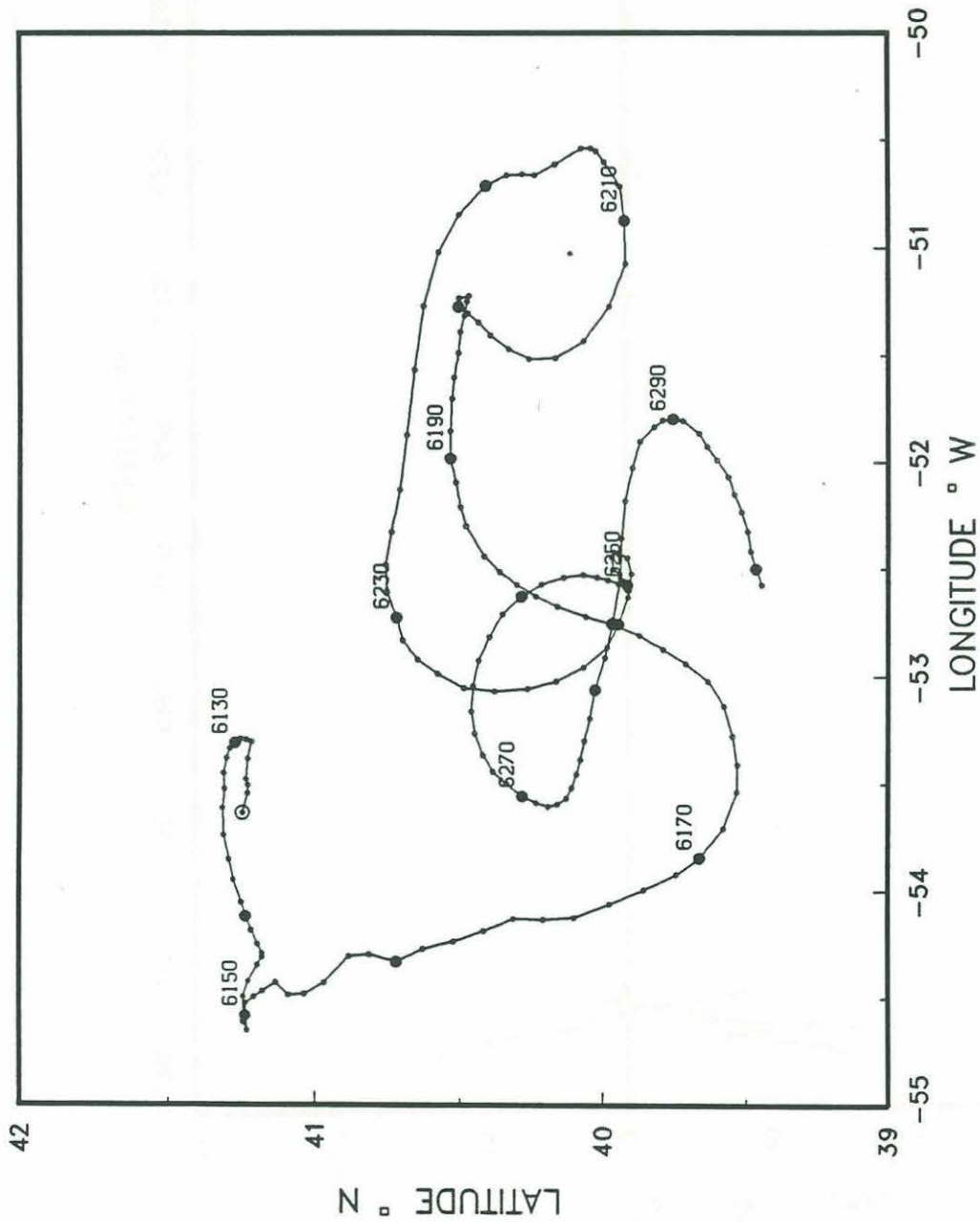


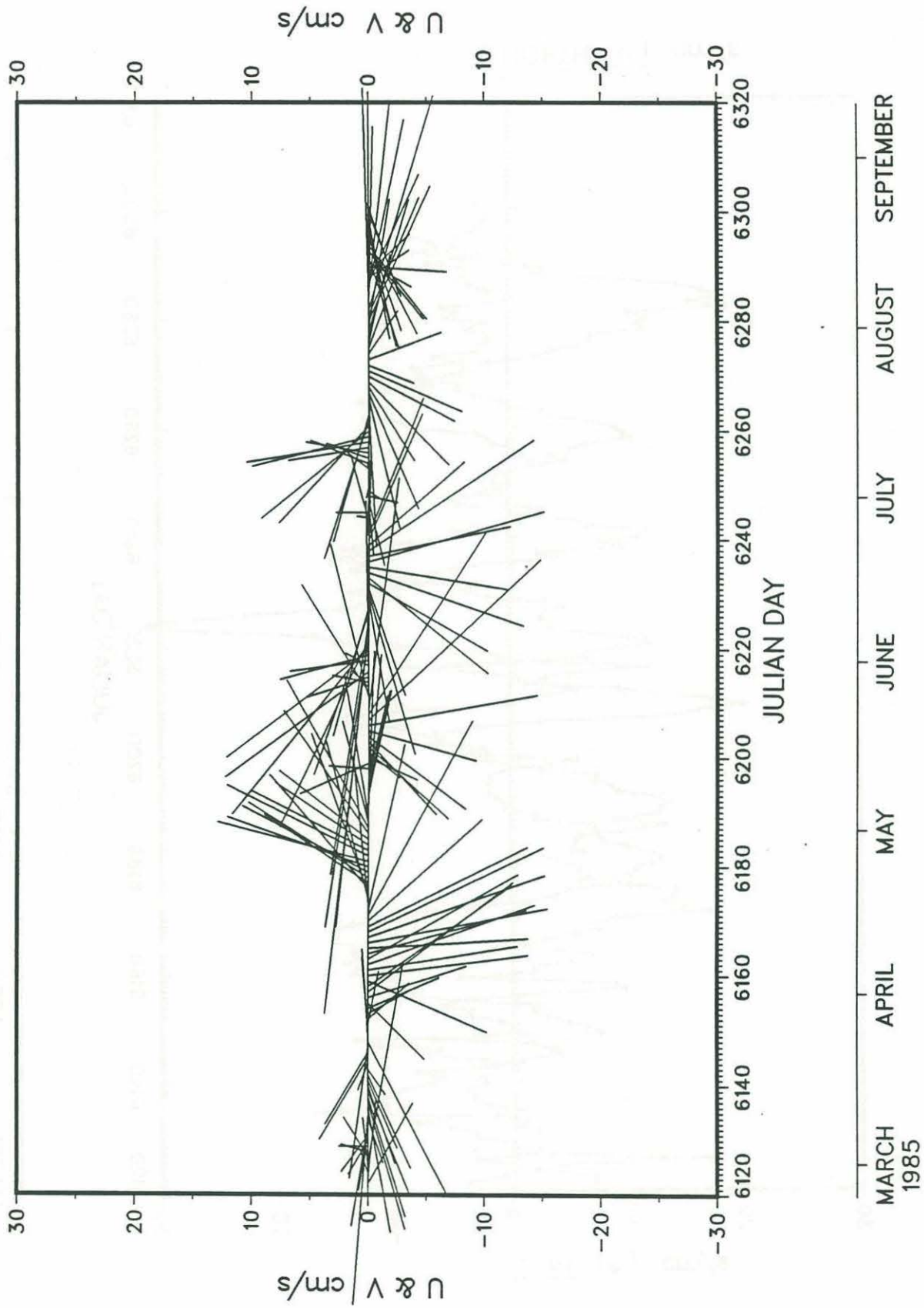
GUSREX 169D

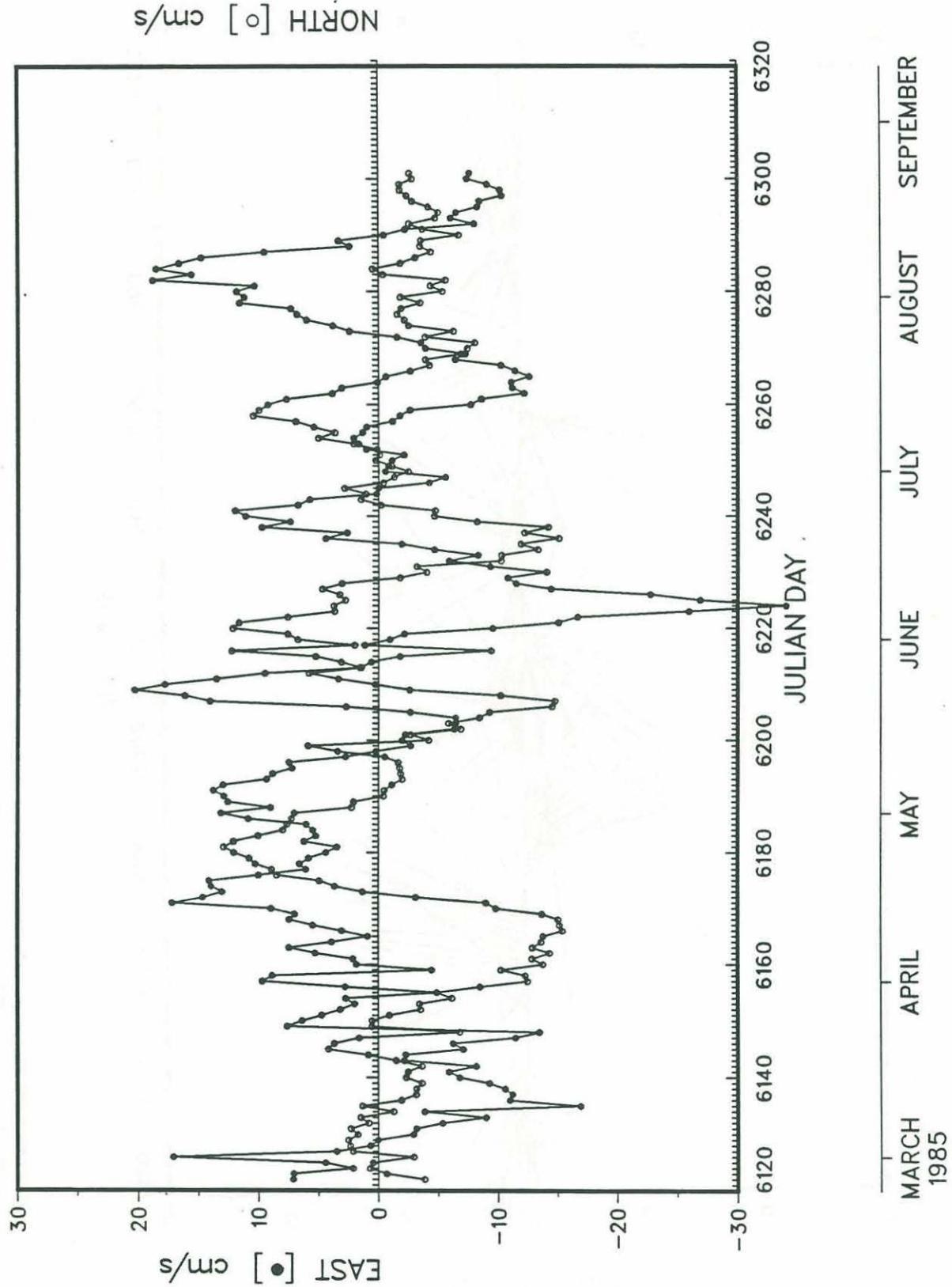




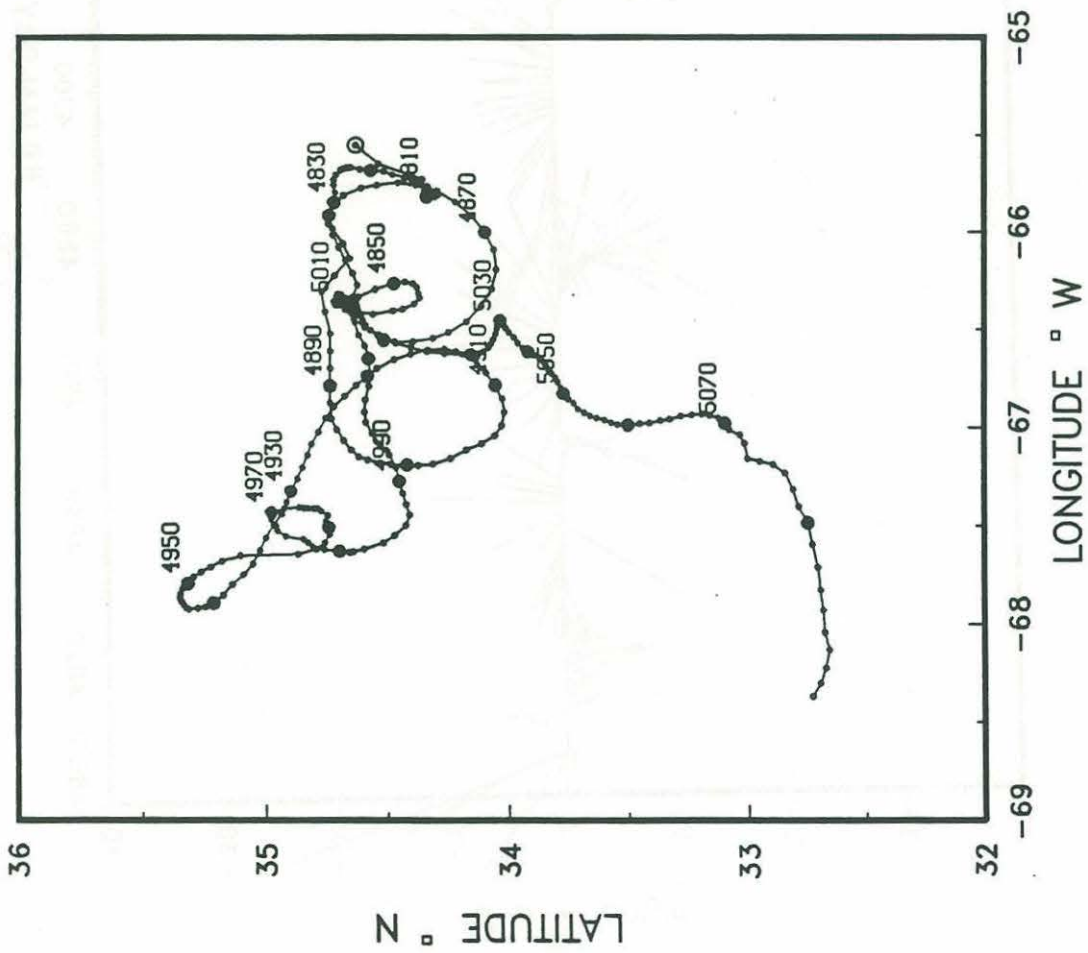
GUSREX 169E



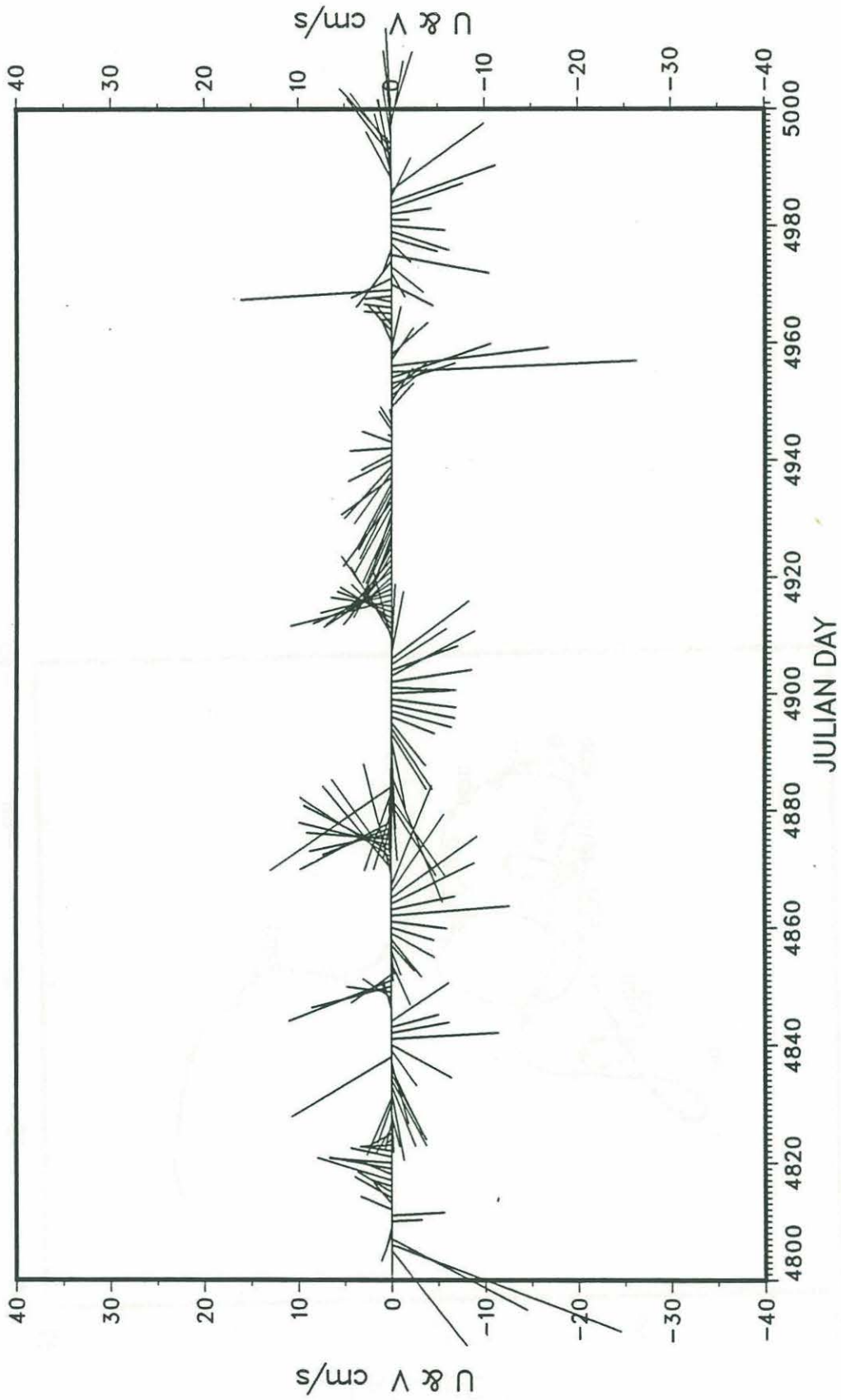




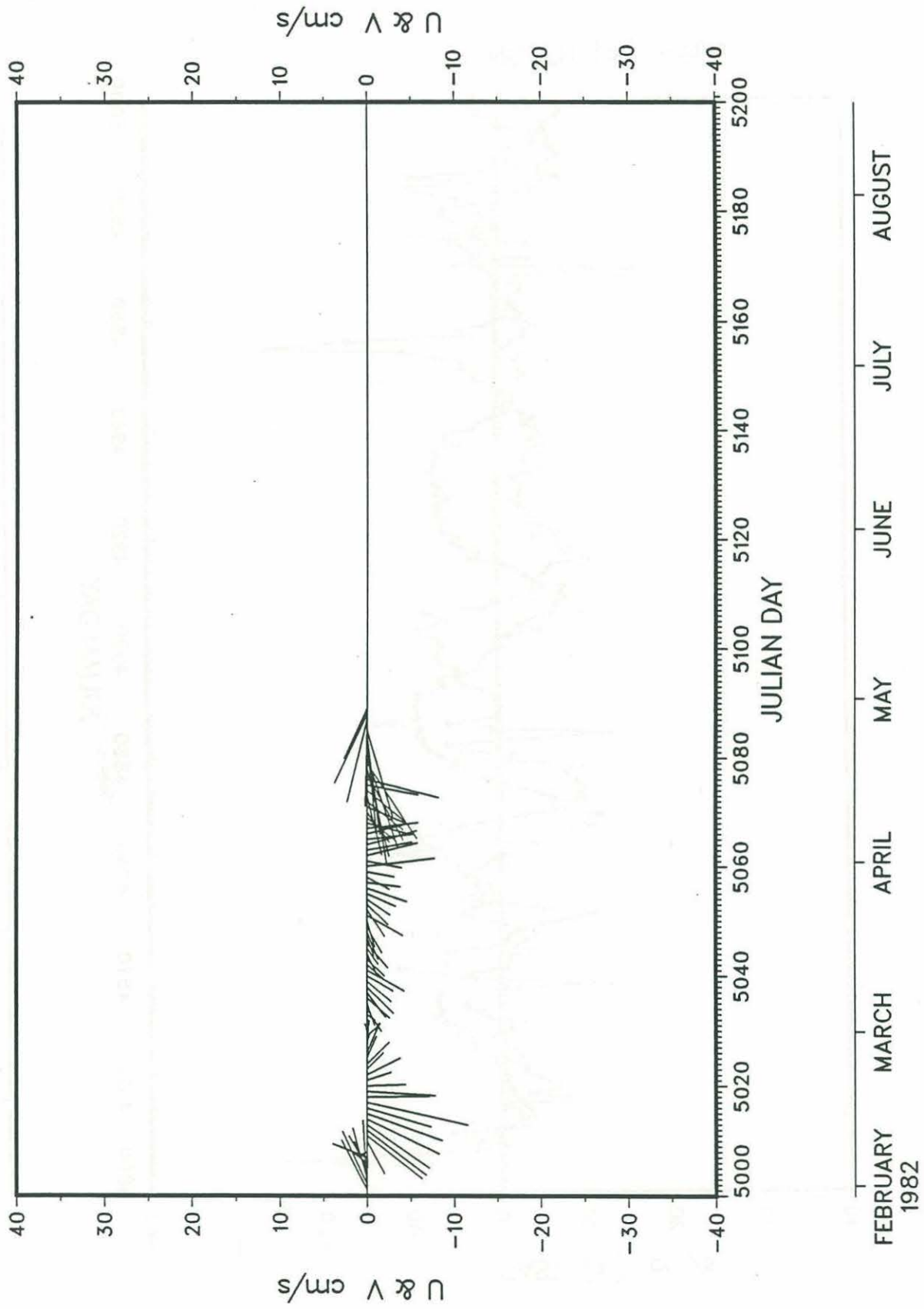
GUSREX 170A



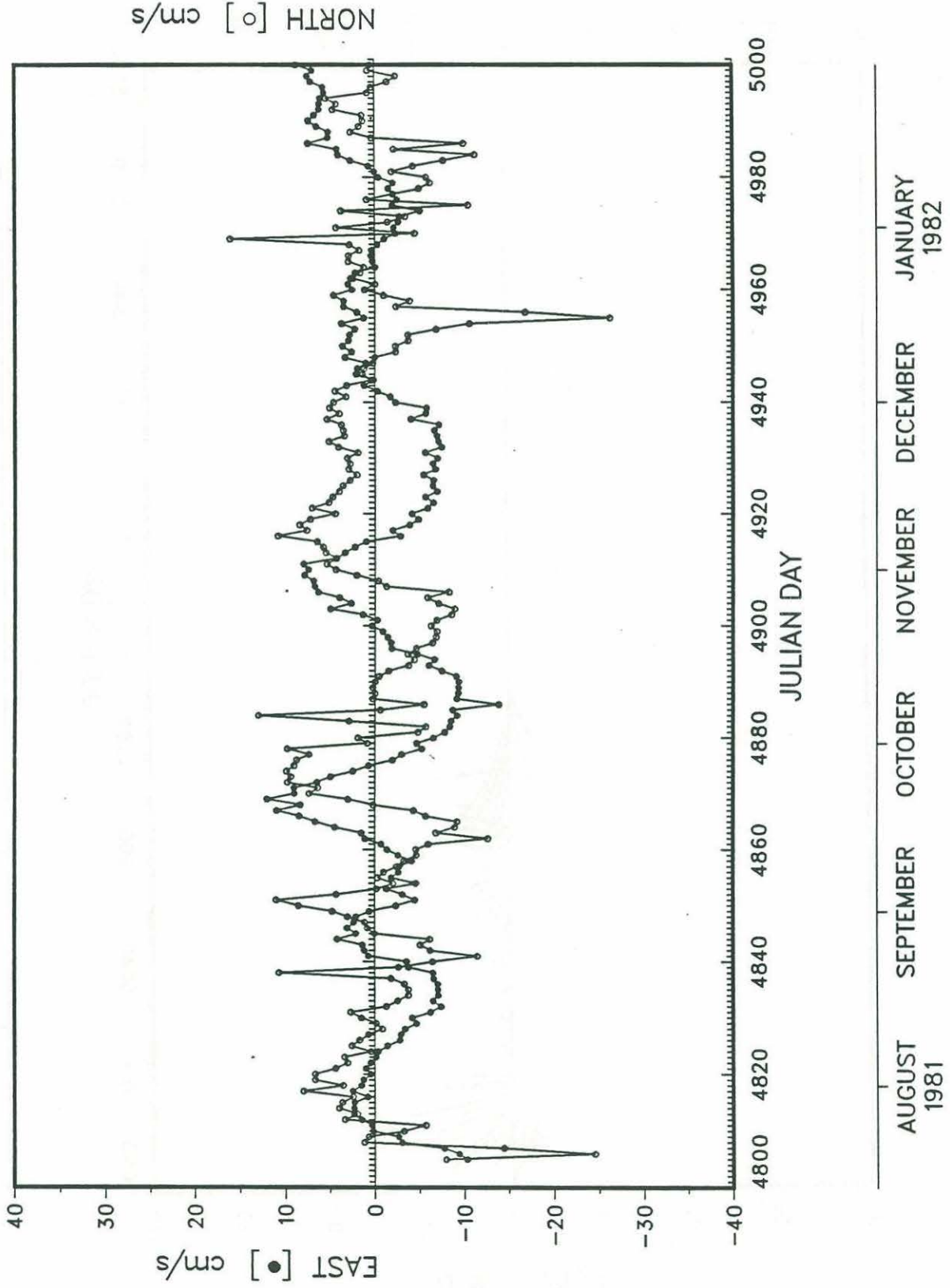
GUSREX 170A

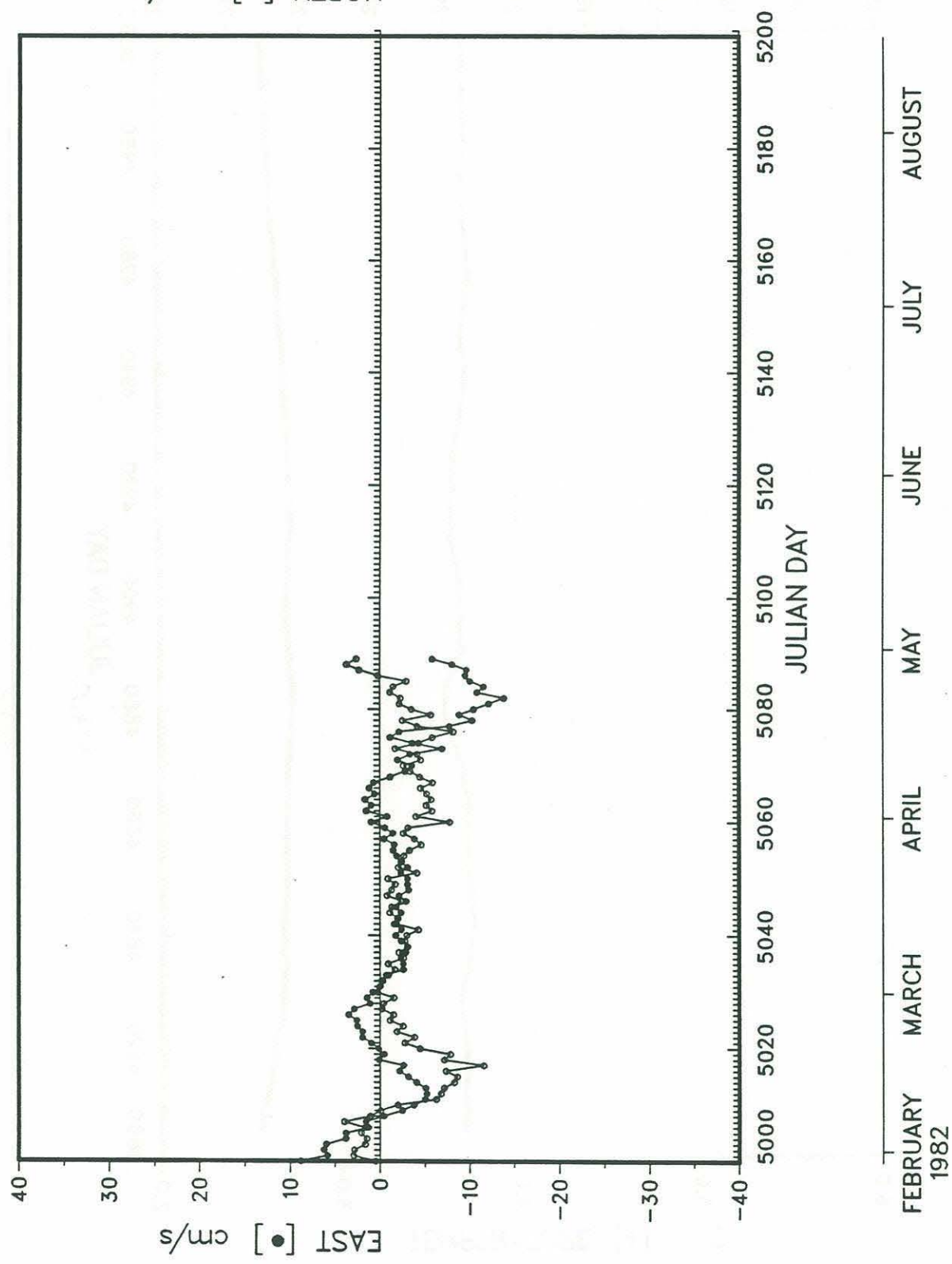


AUGUST 1981 SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY 1982

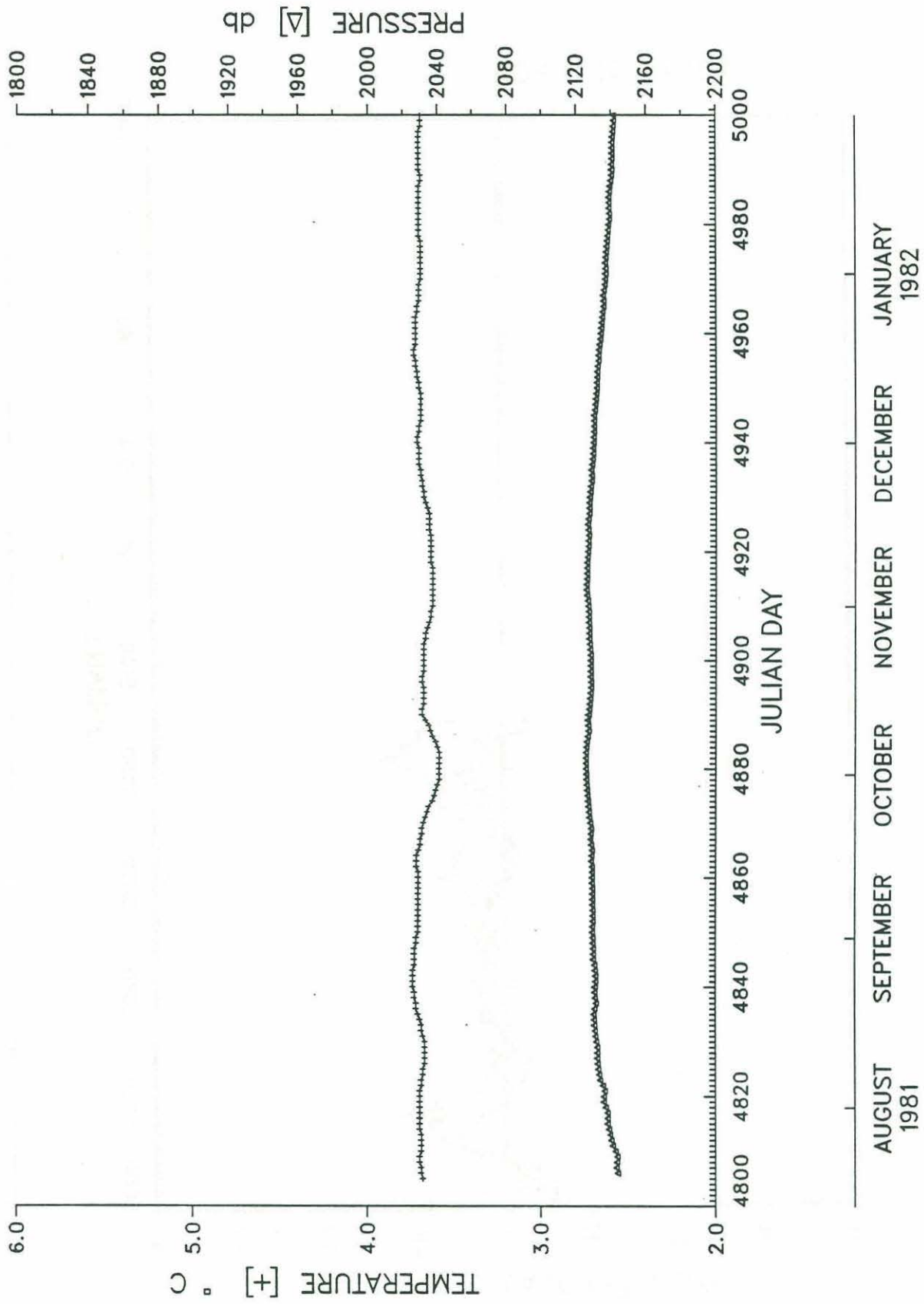


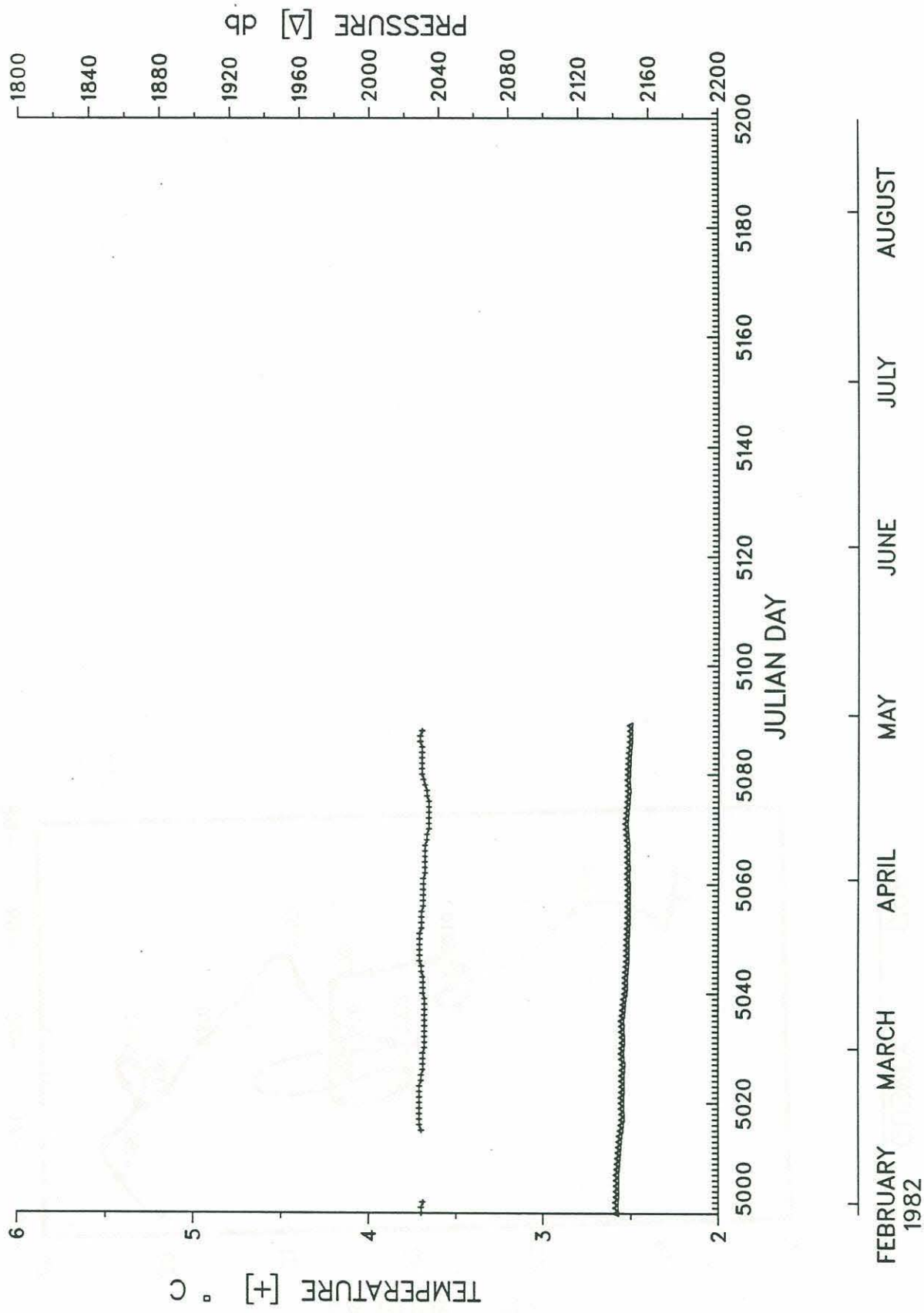
GUSREX 170A



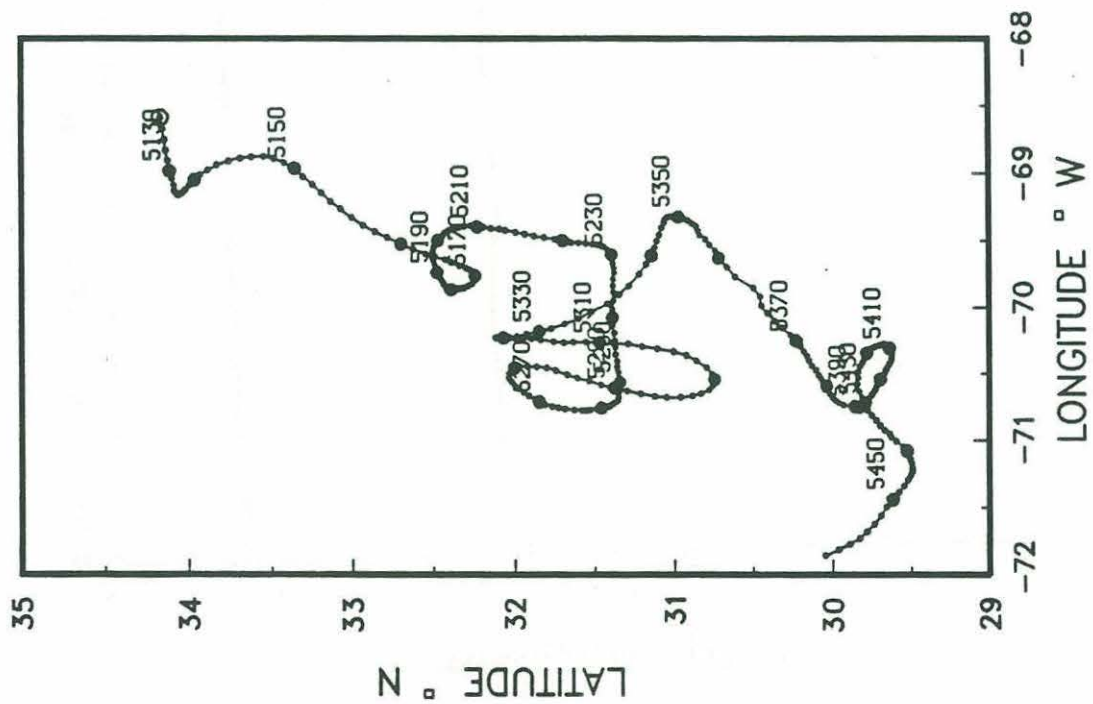


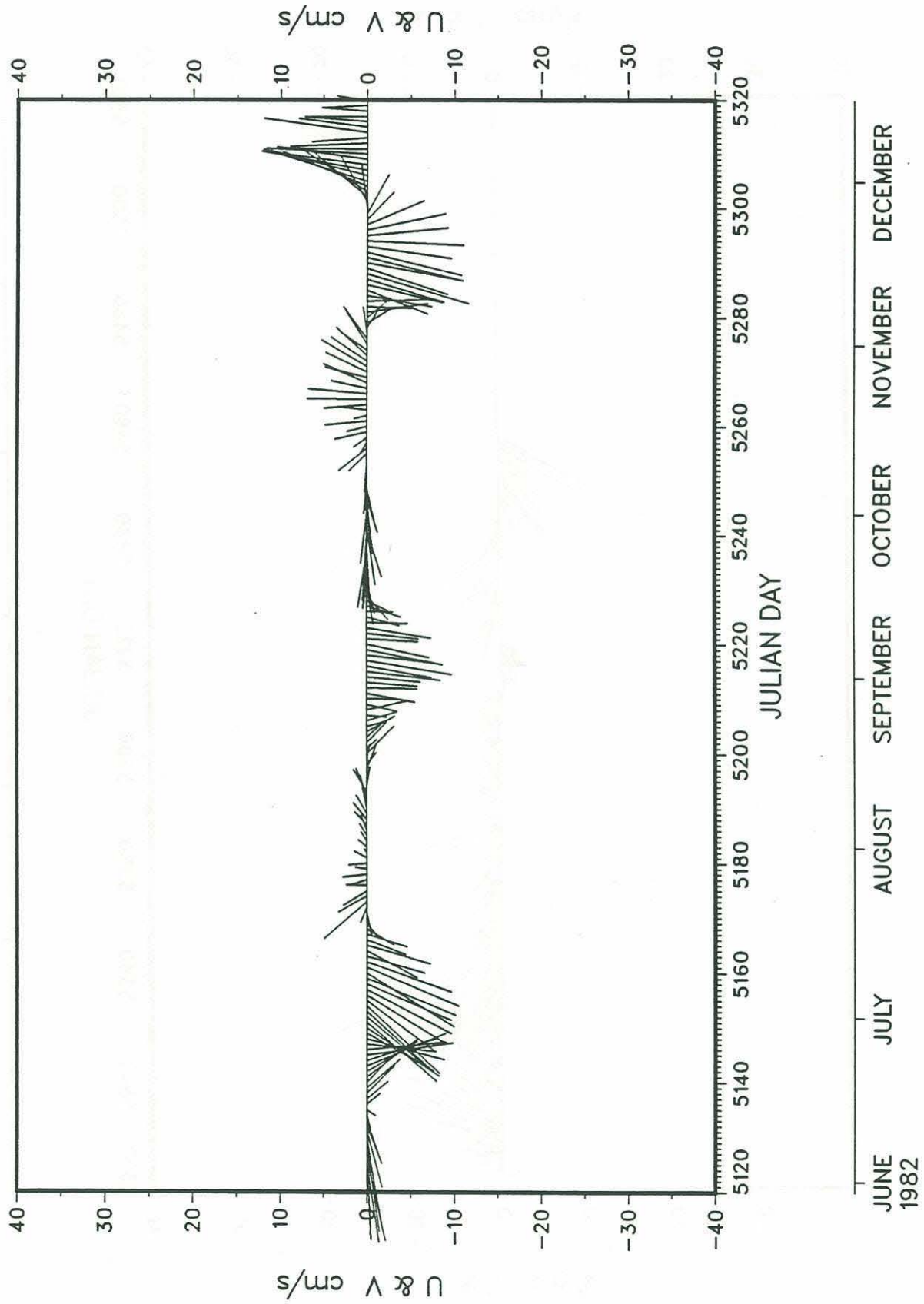
GUSREX 170A



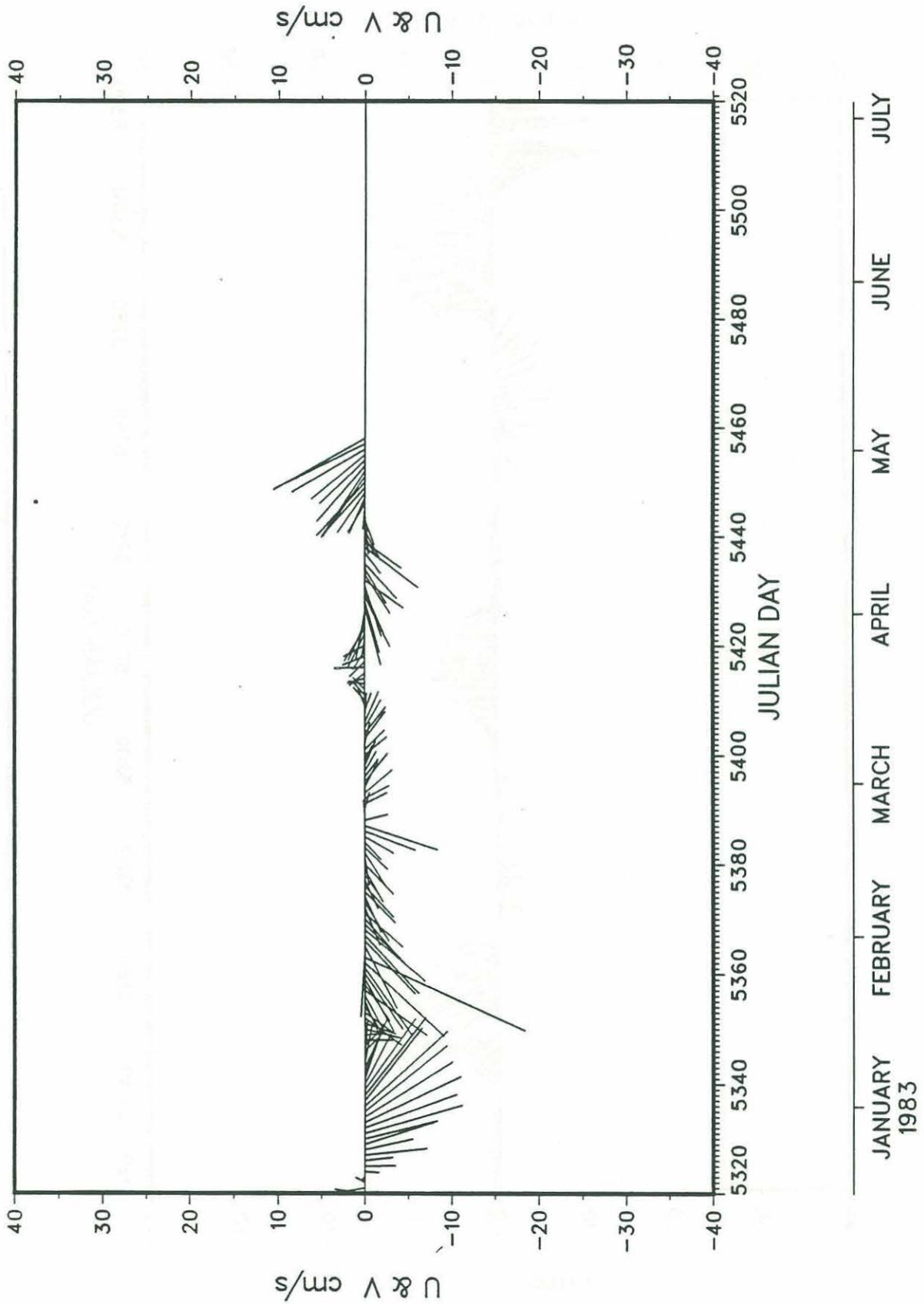


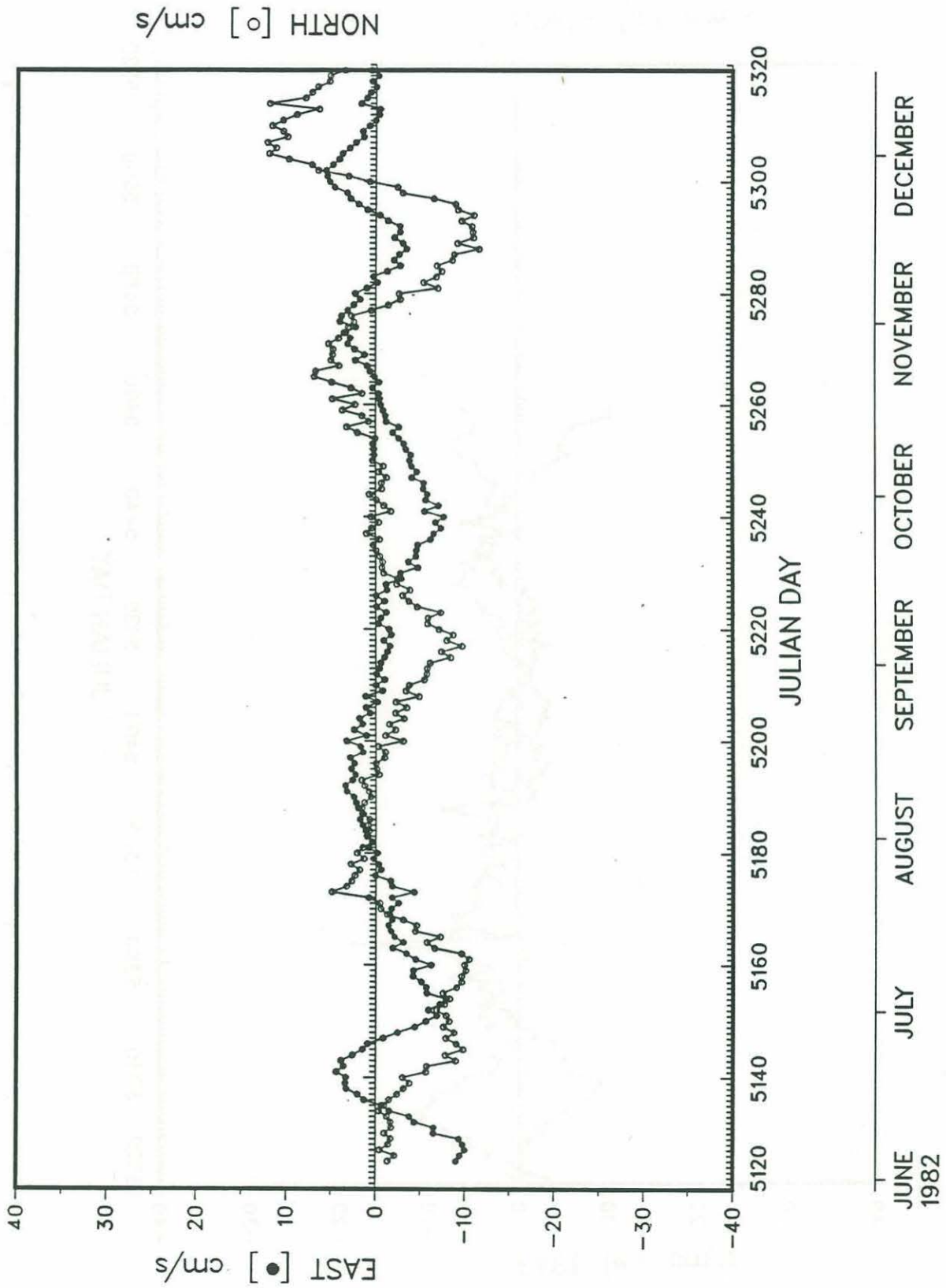
GUSREX 170B



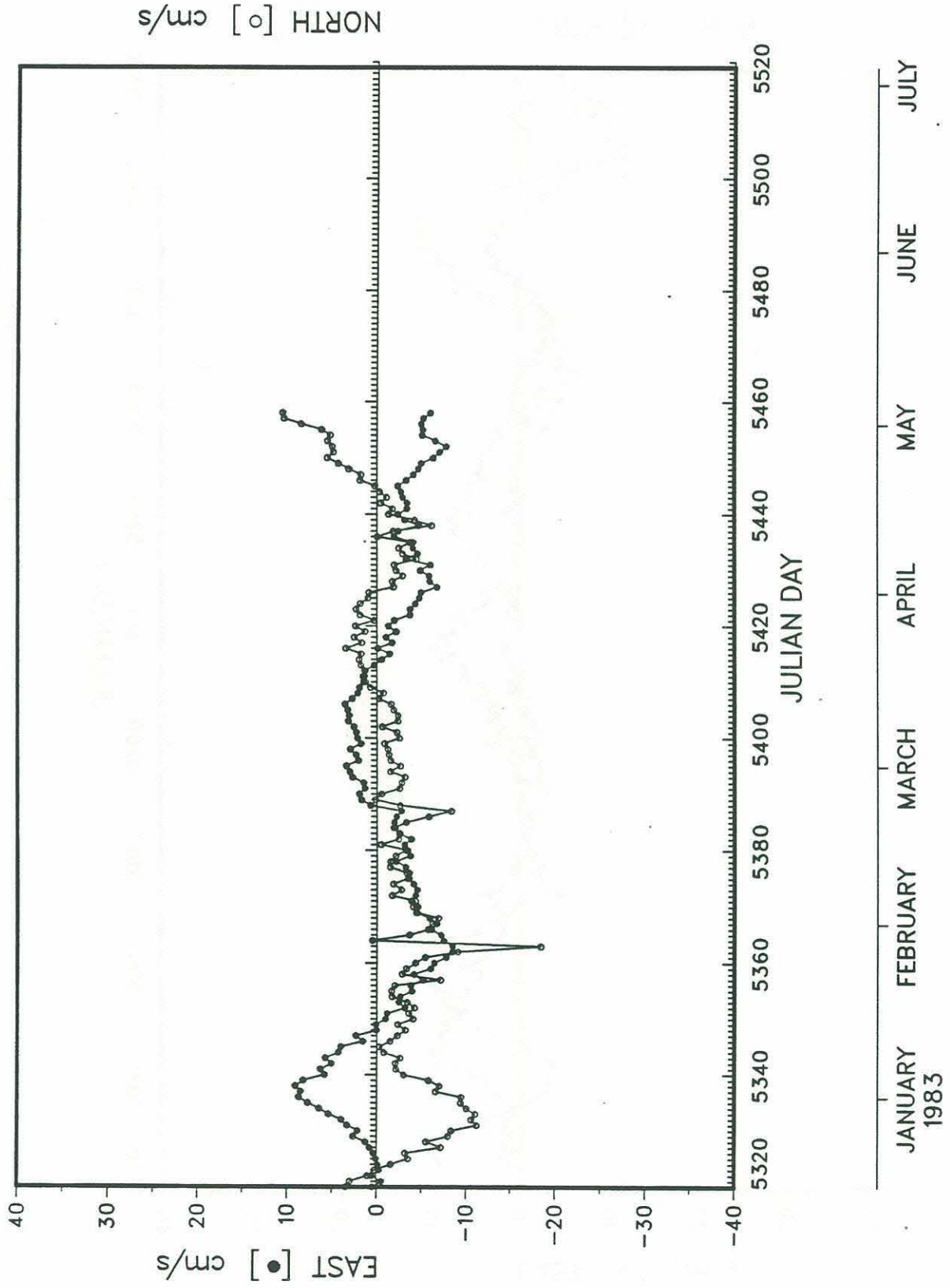


GUSREX 170B

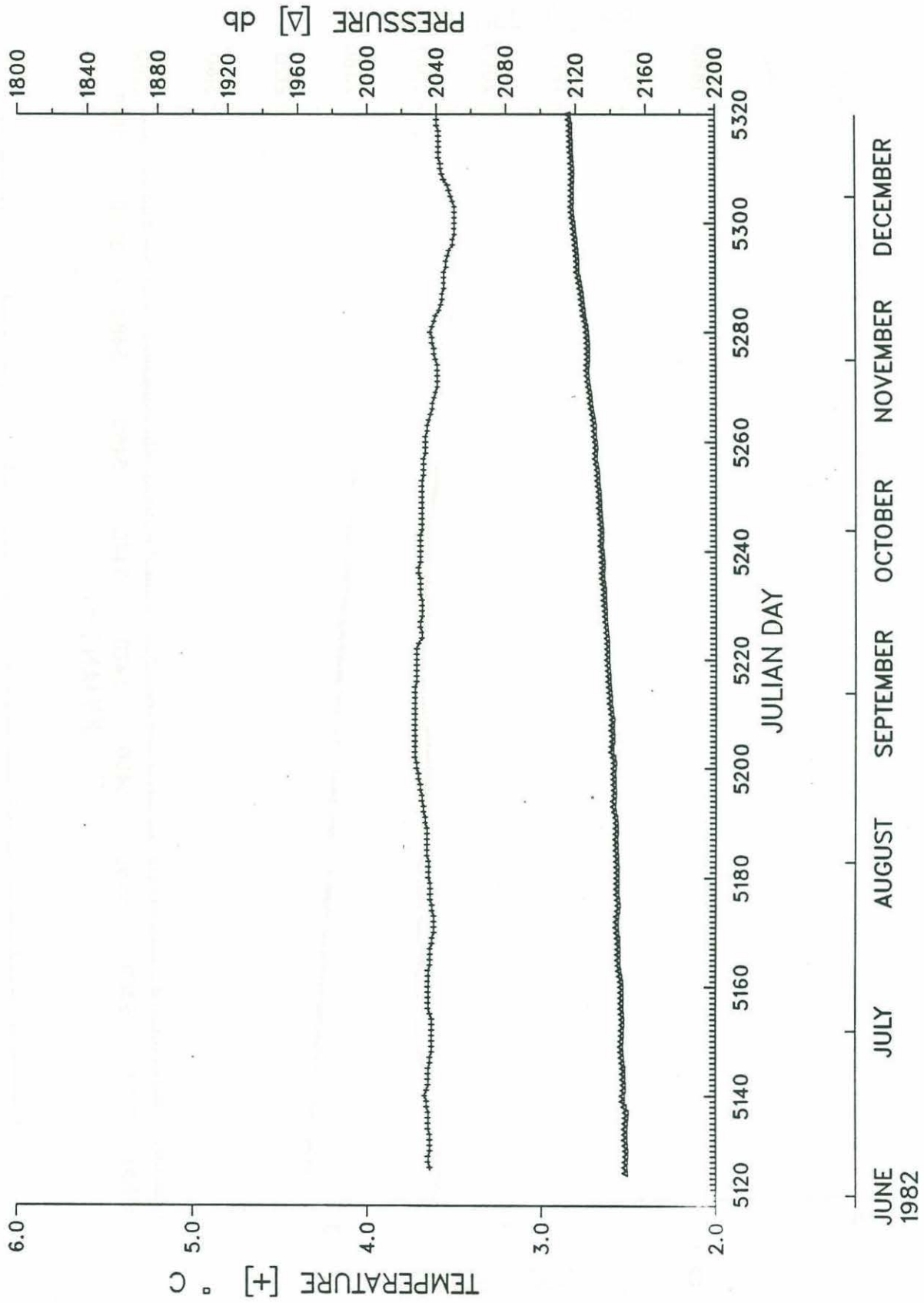




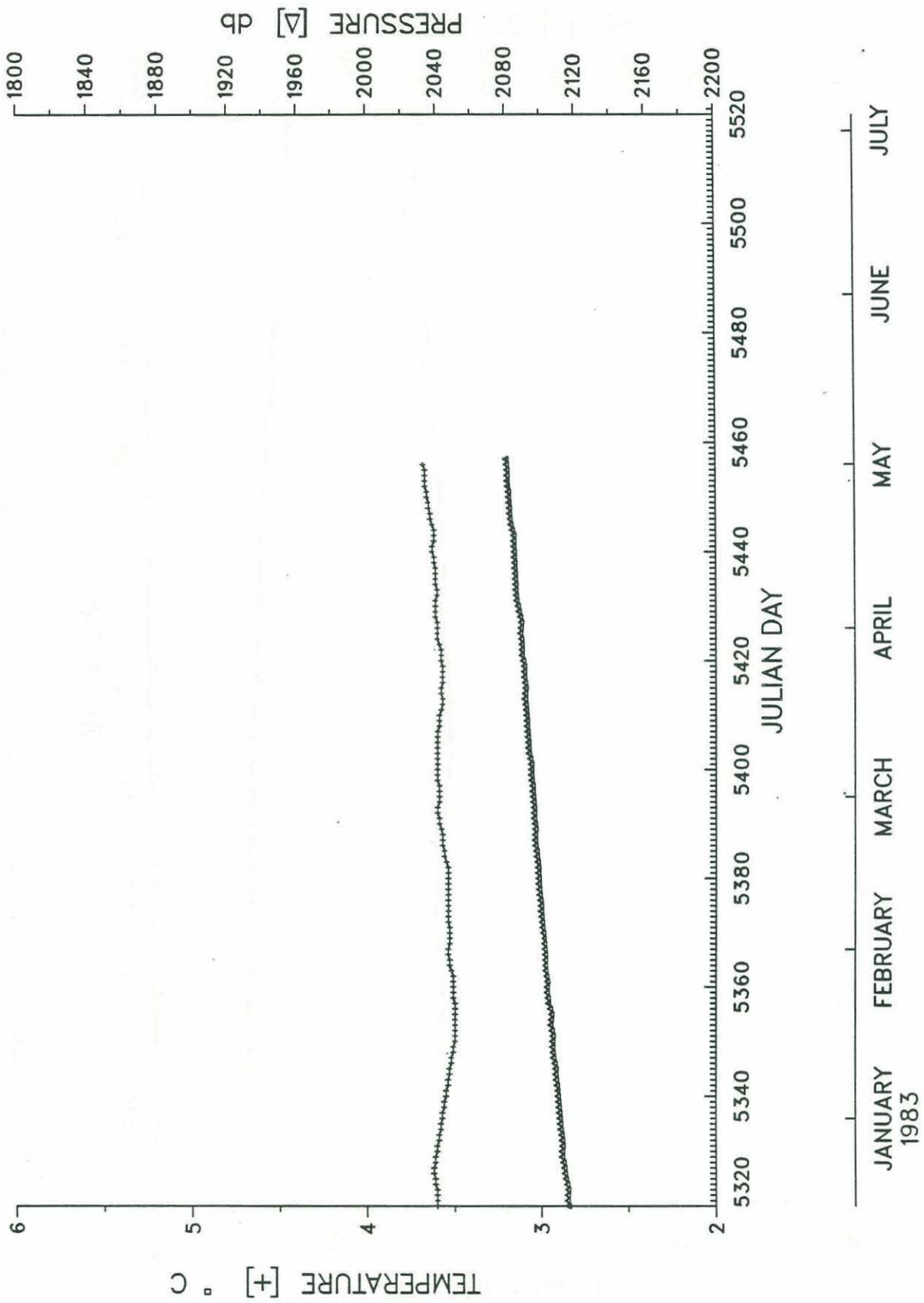
GUSREX 170B



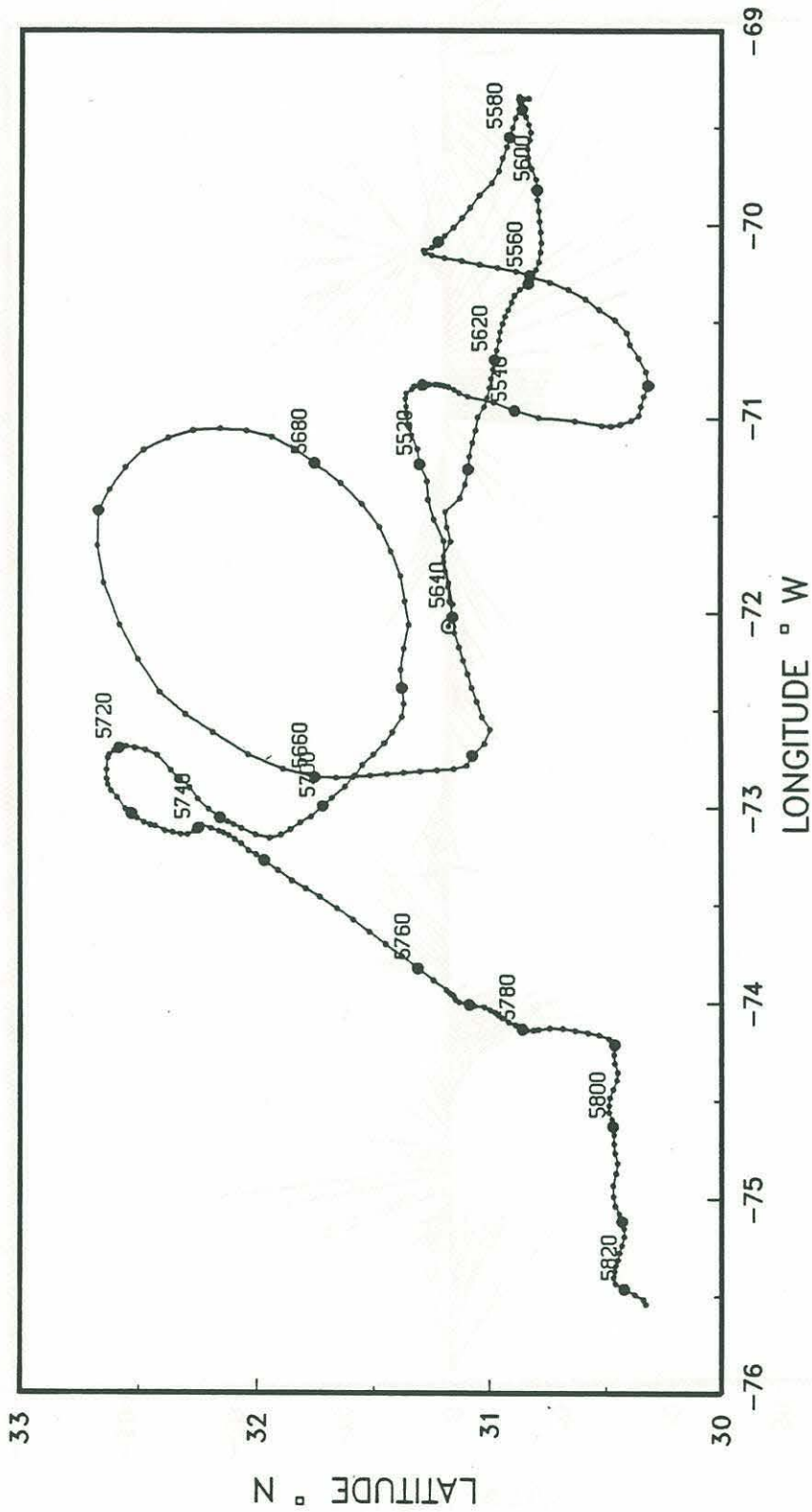
GUSREX 170B



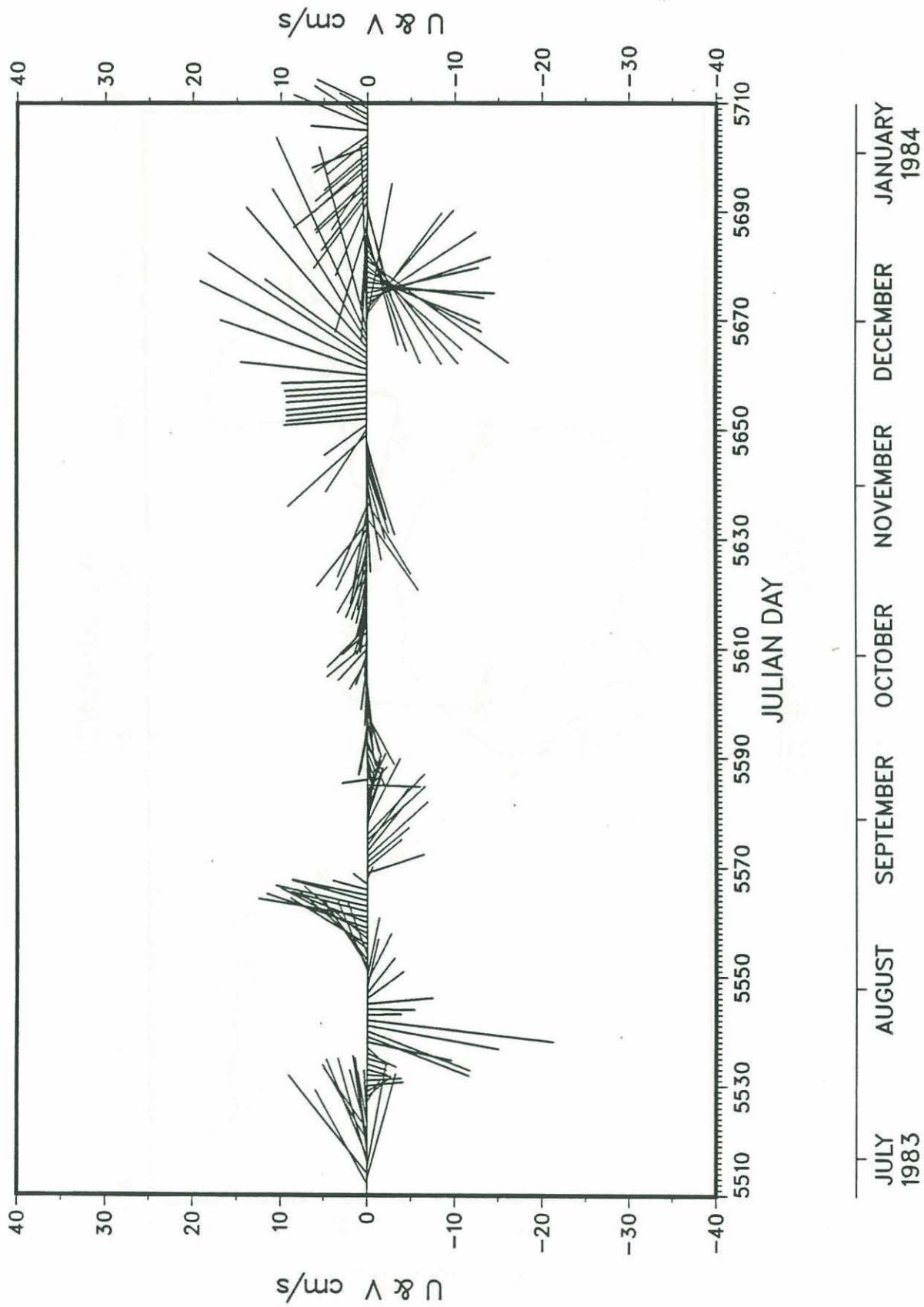
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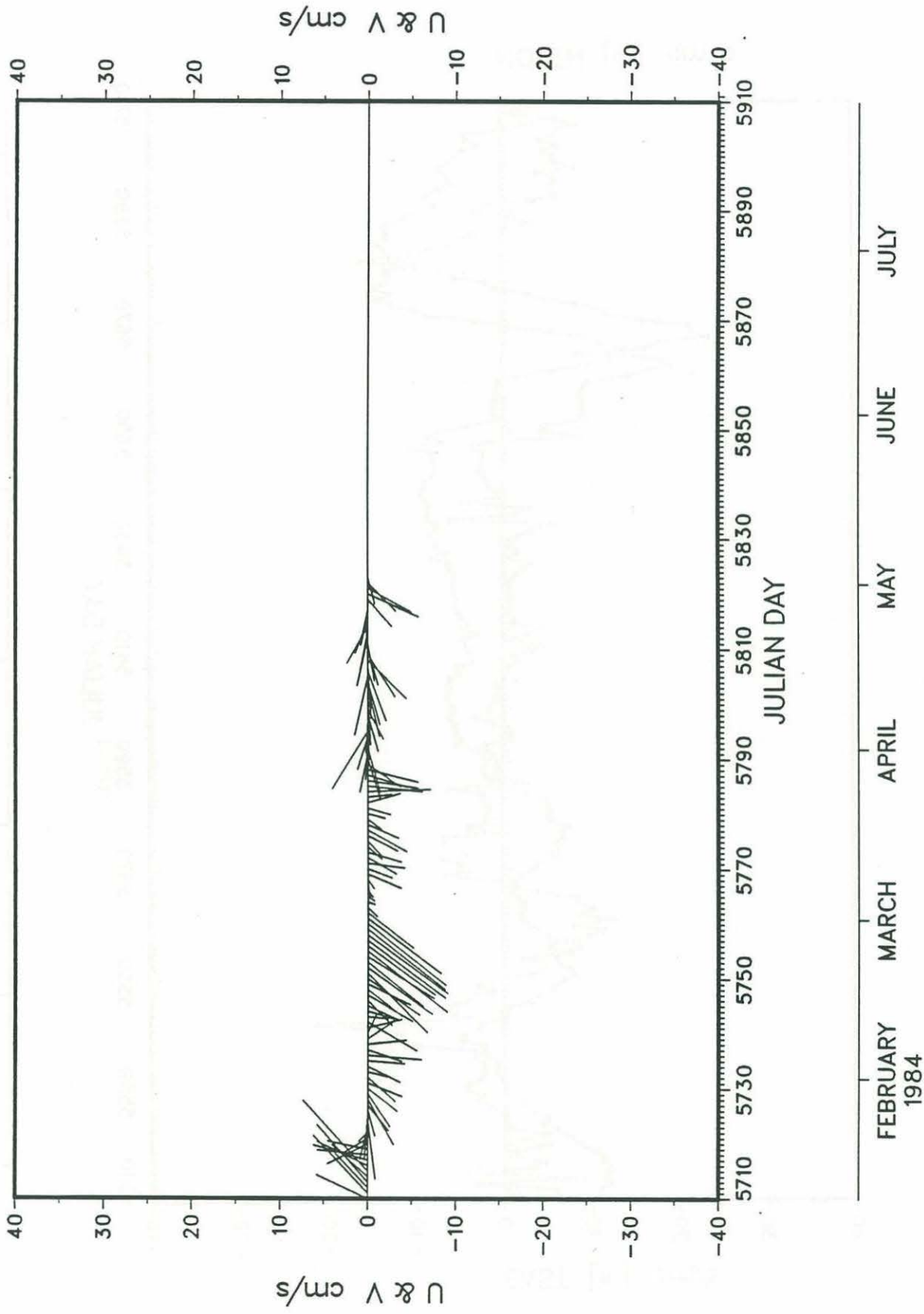
GUSREX 170C



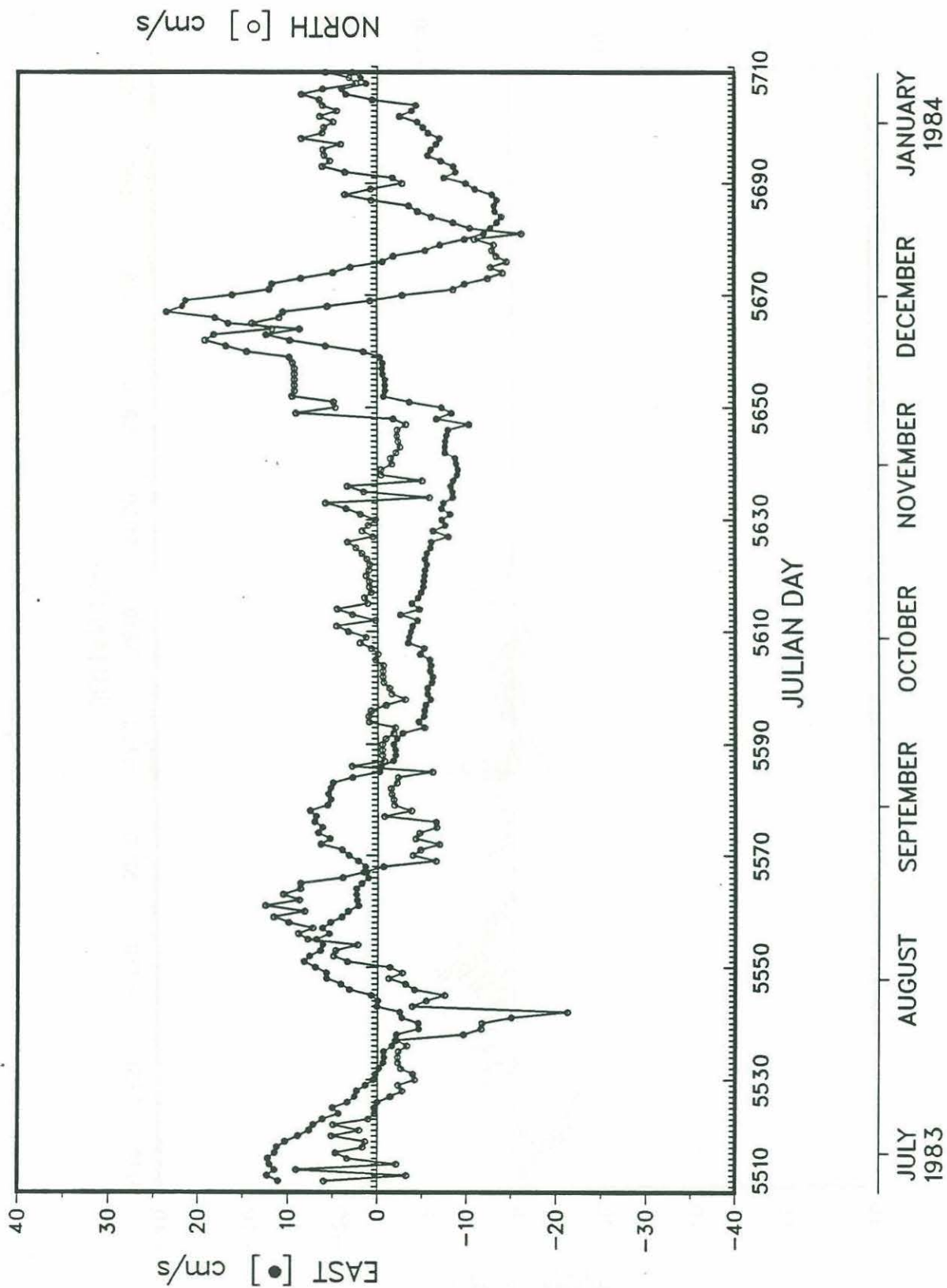
GUSREX 170C

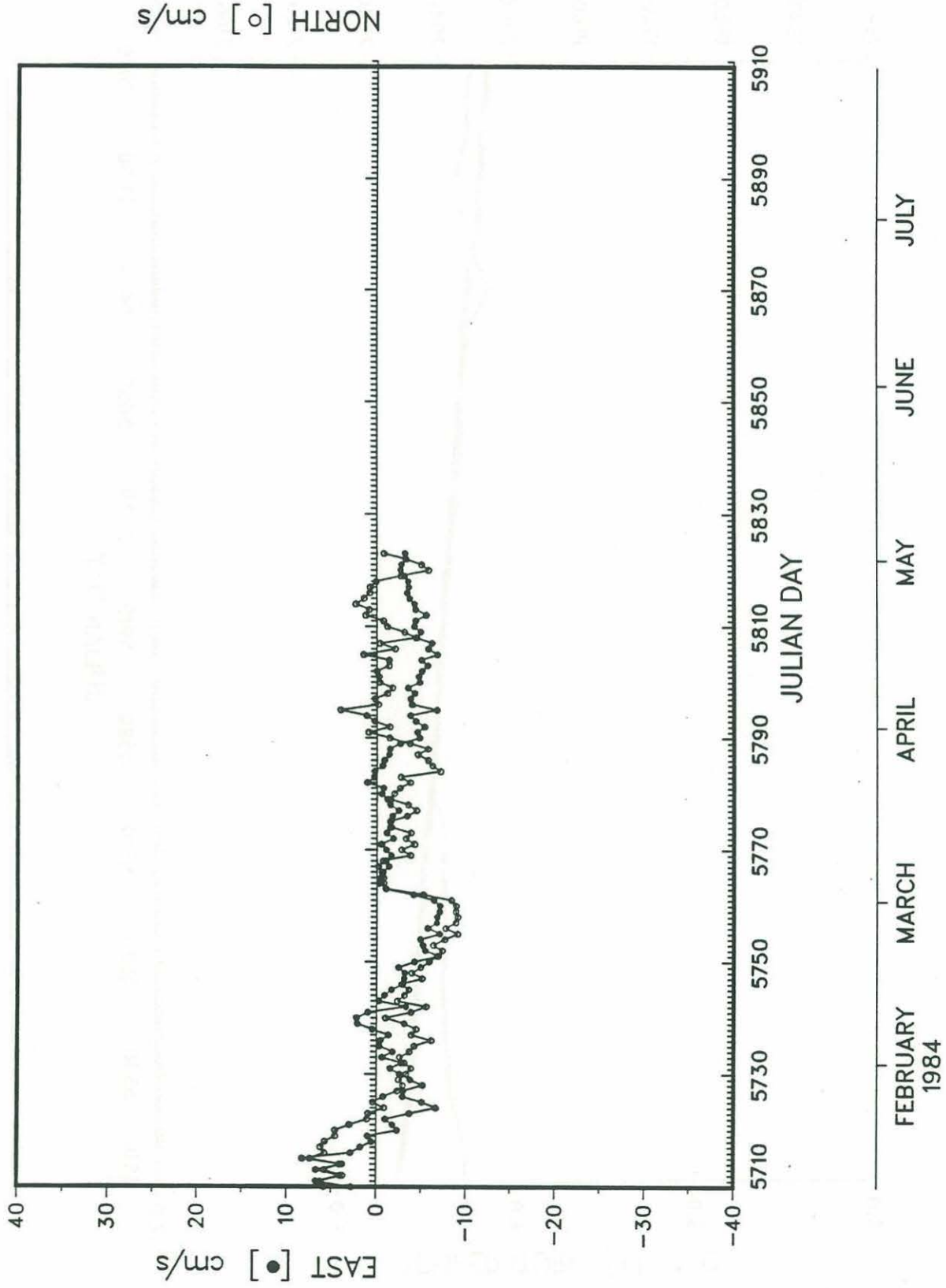


GUSREX 170C

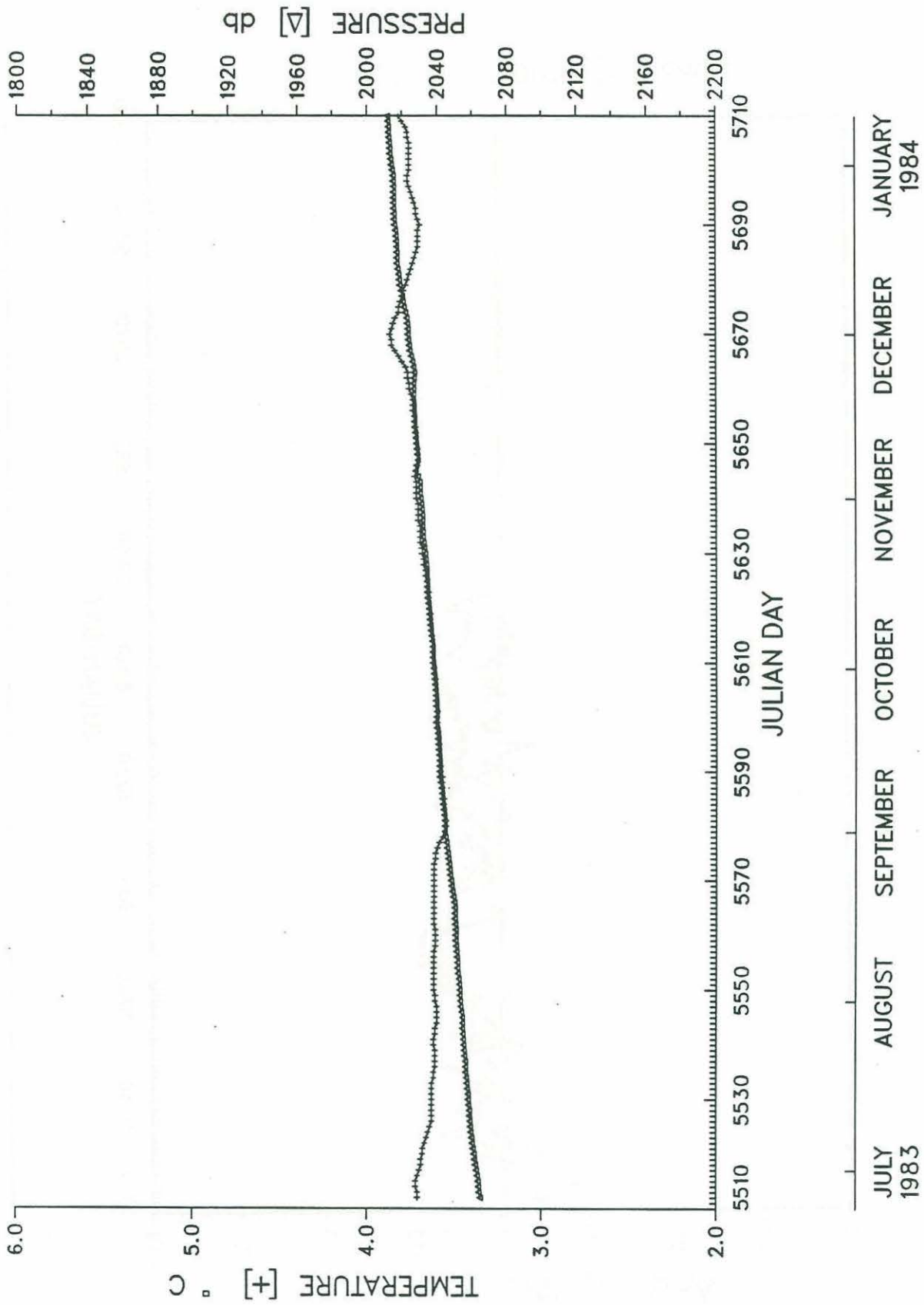


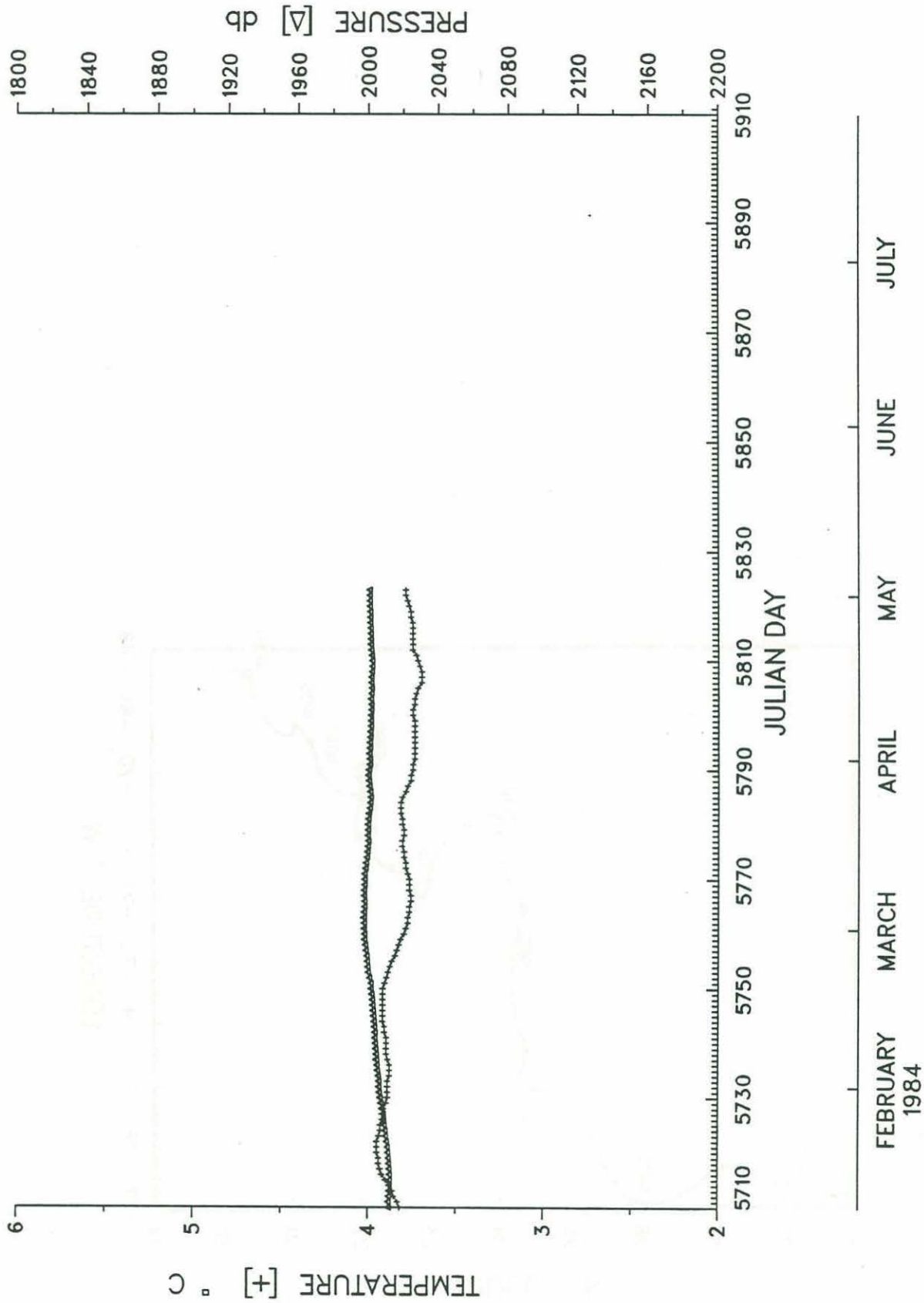
GUSREX 170C



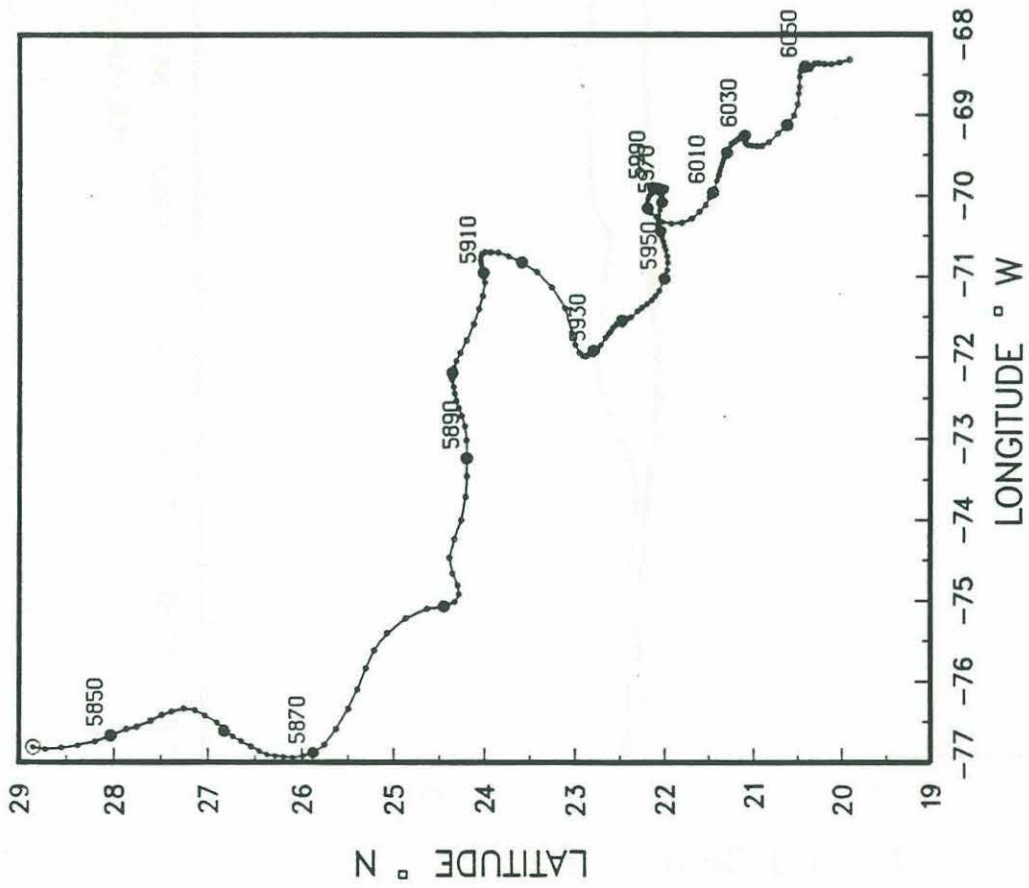


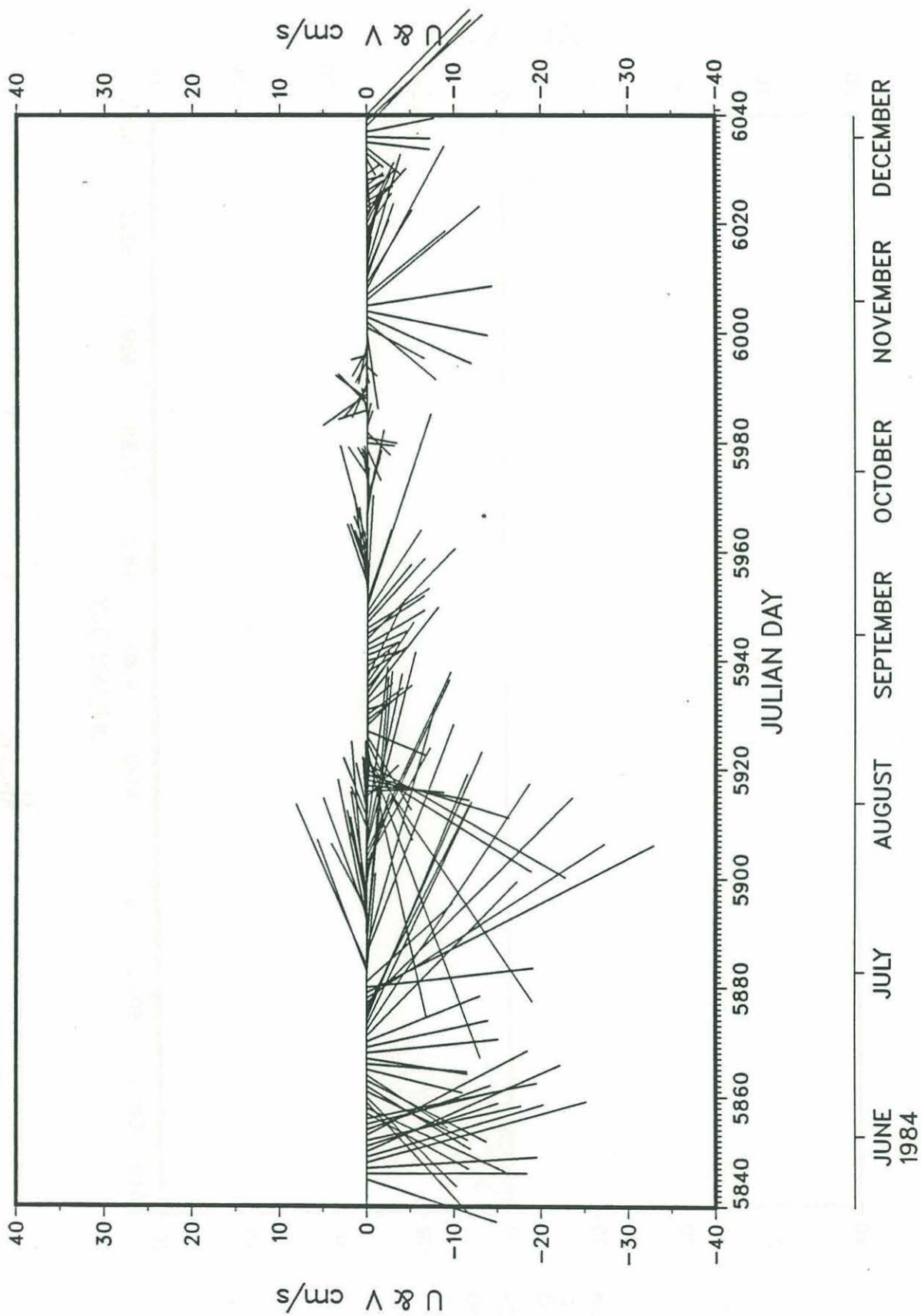
GUSREX 170C



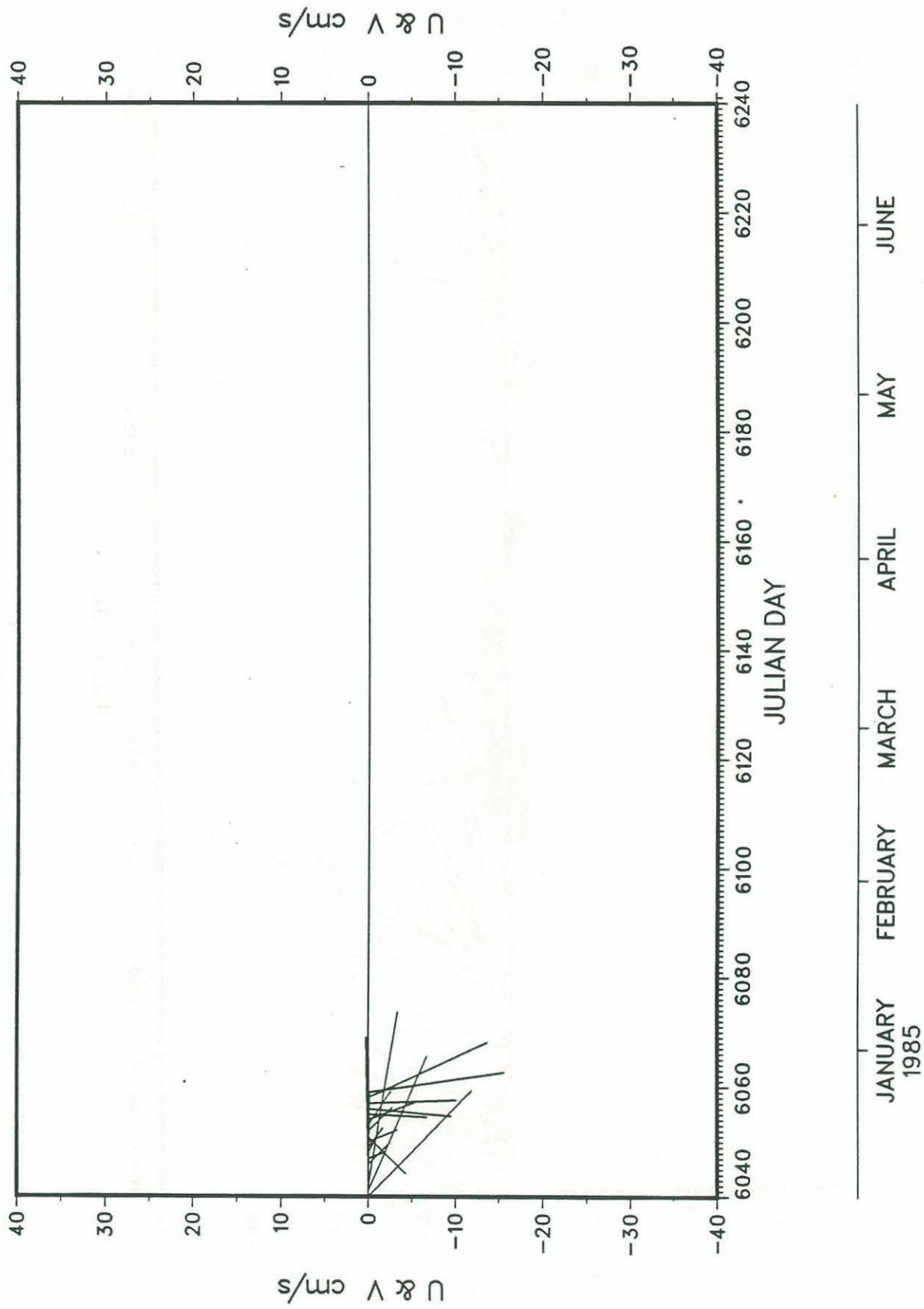


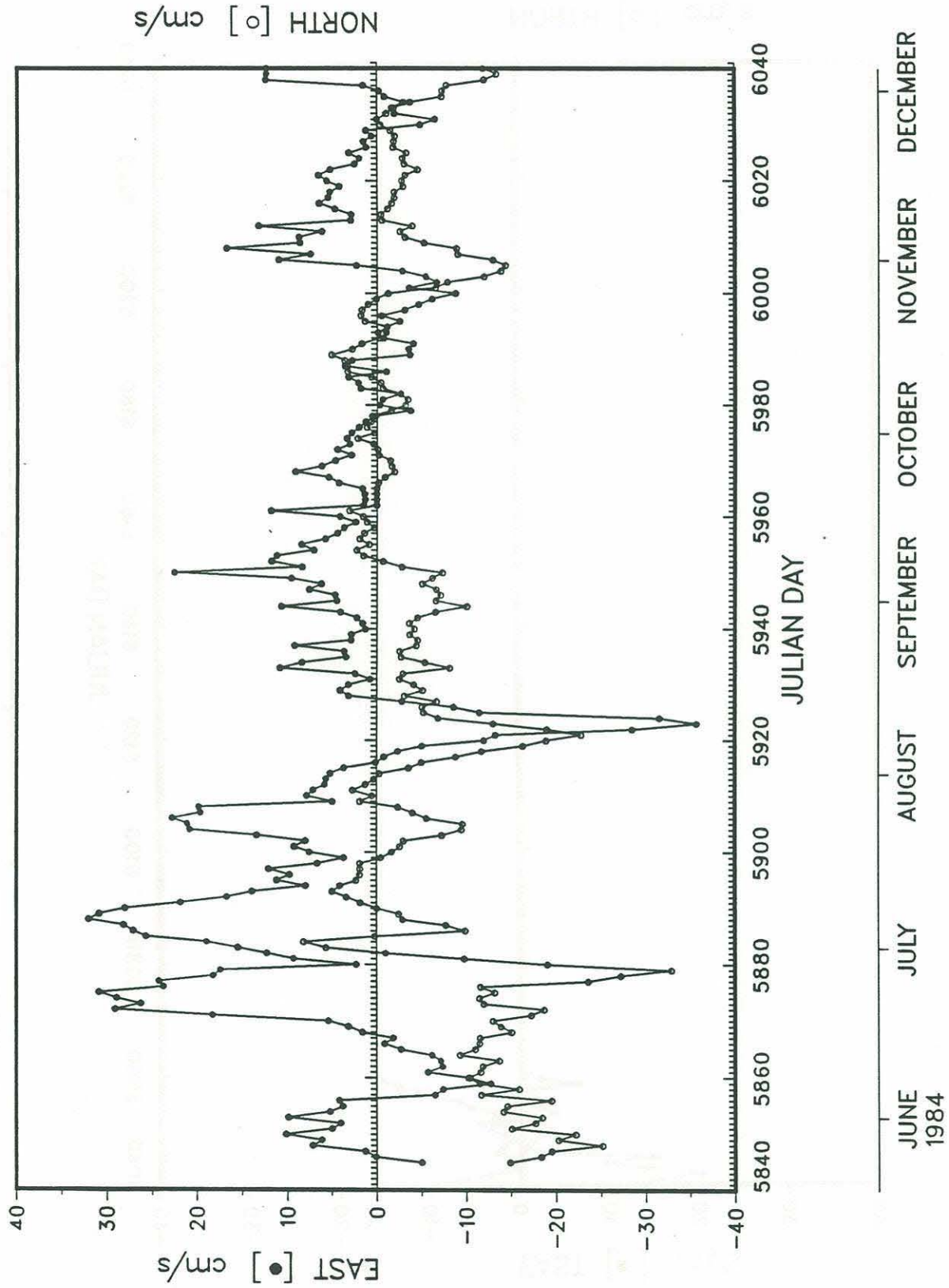
GUSREX 170D



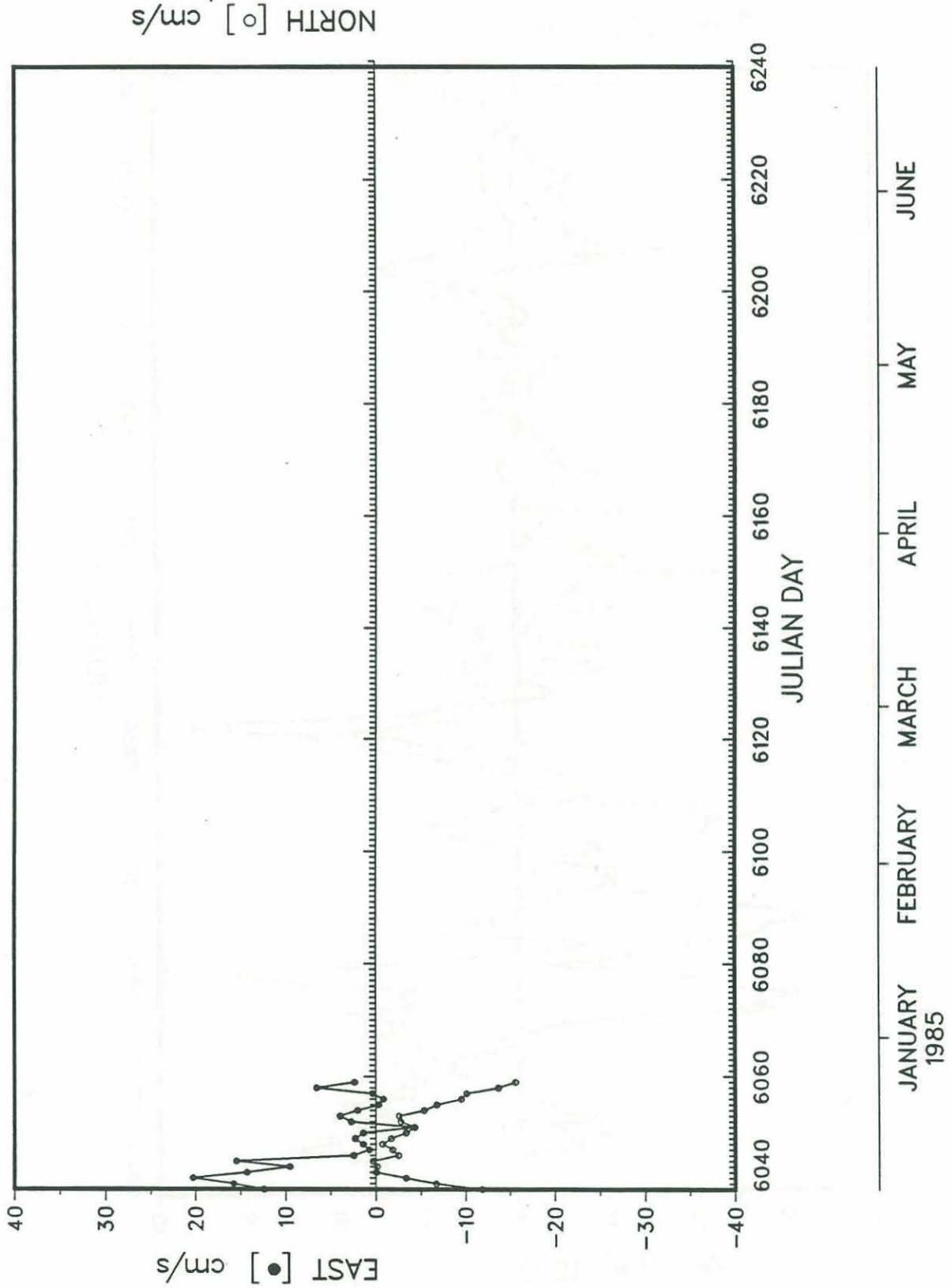


GUSREX 170D

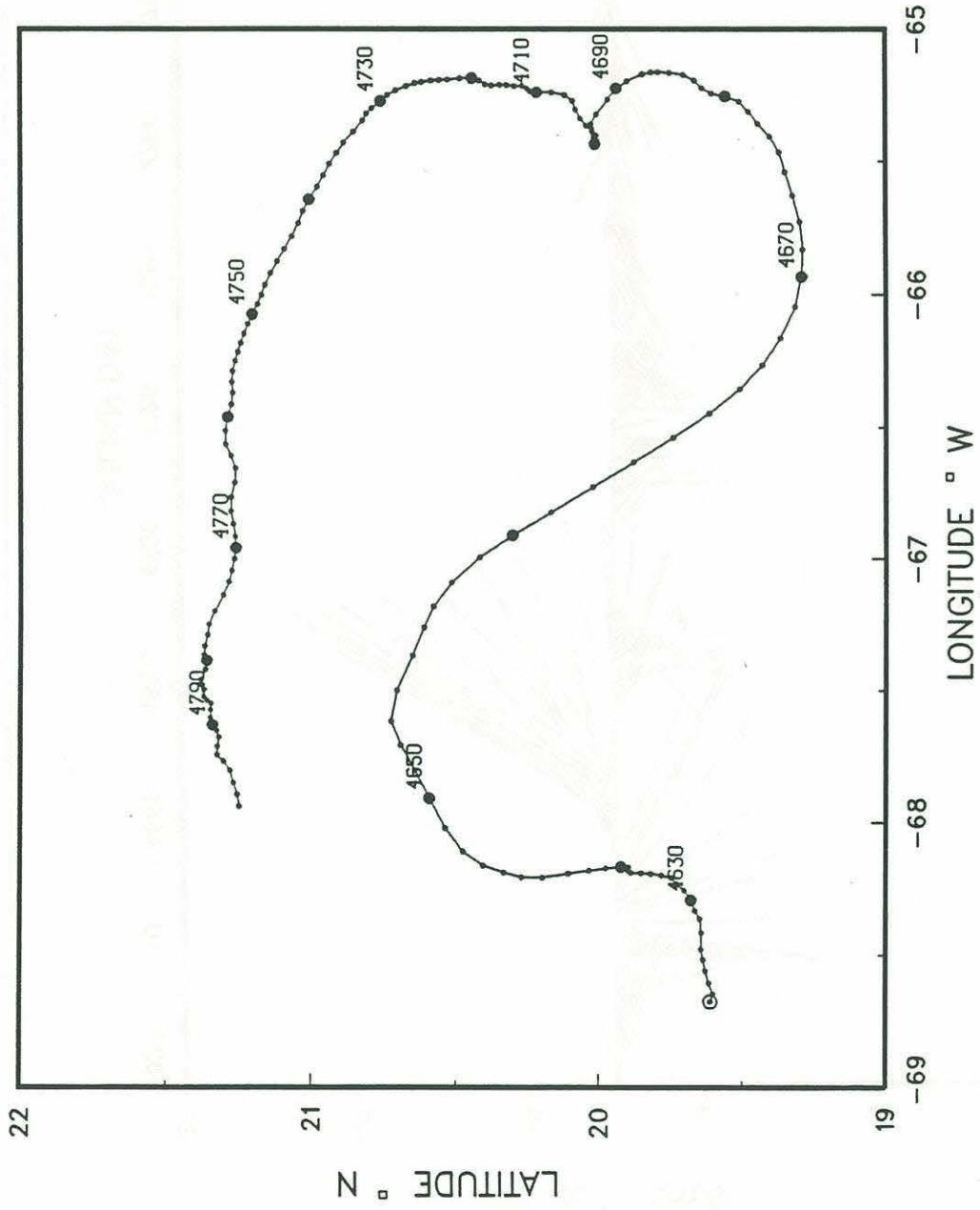




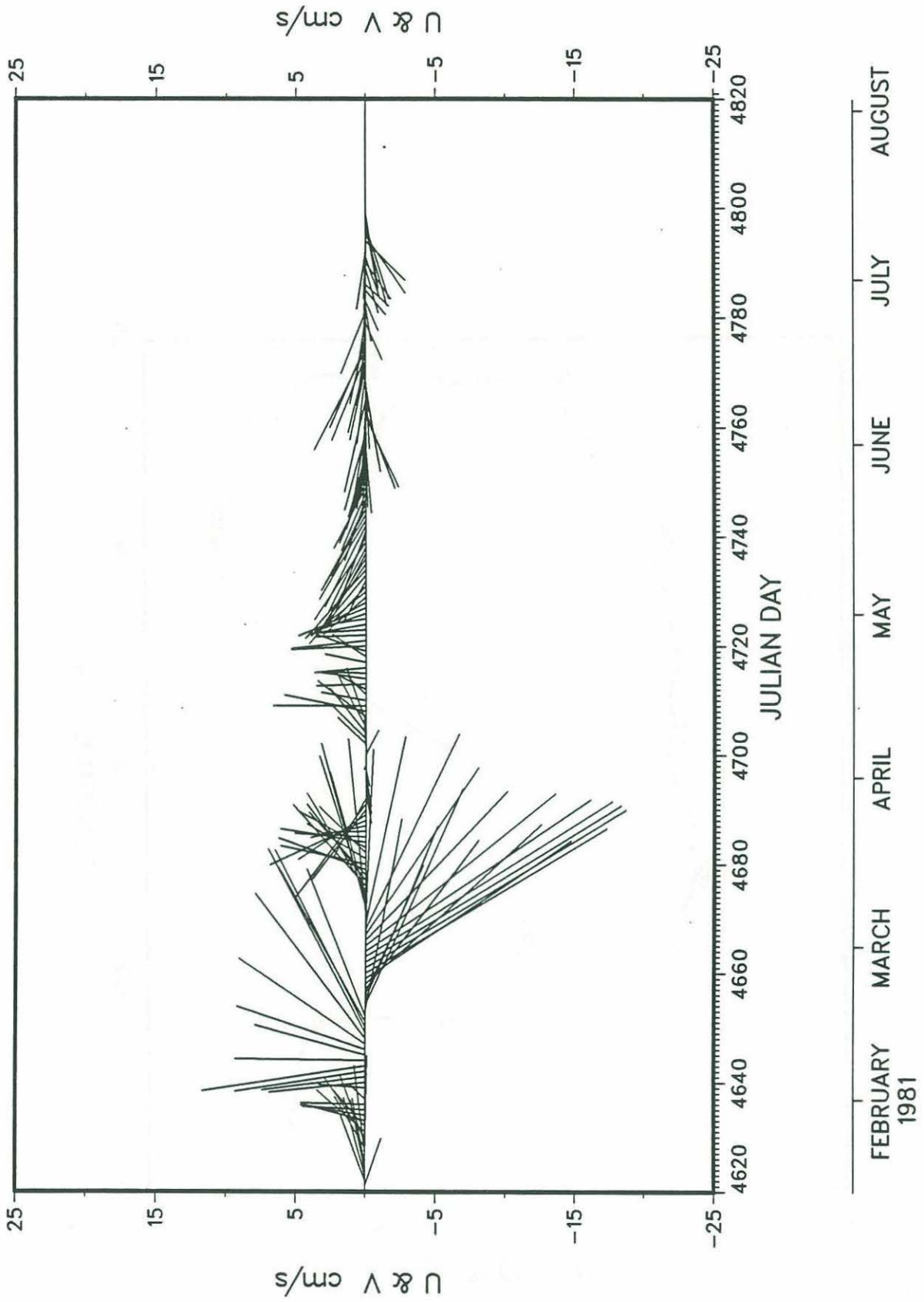
GUSREX 170D

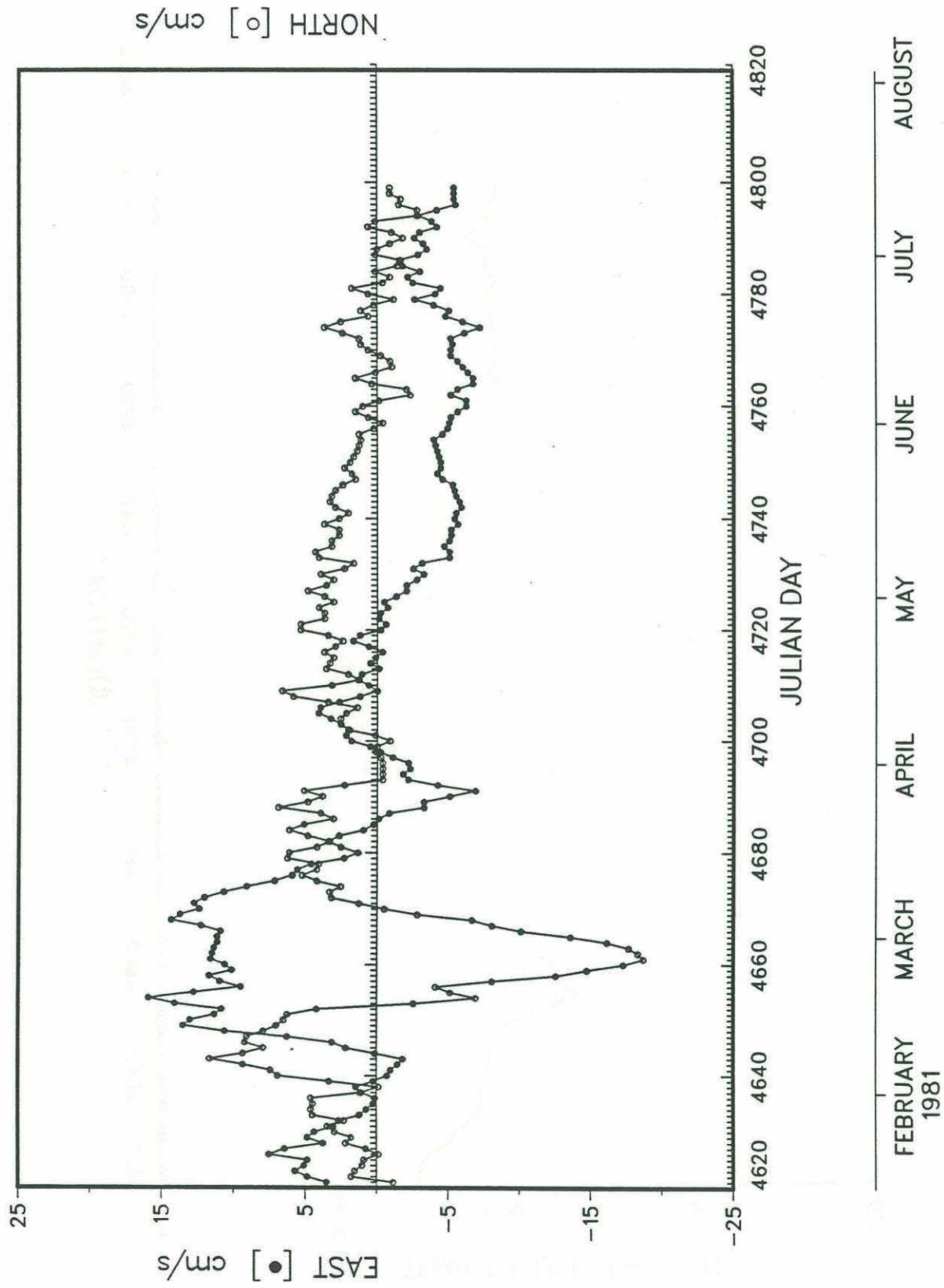


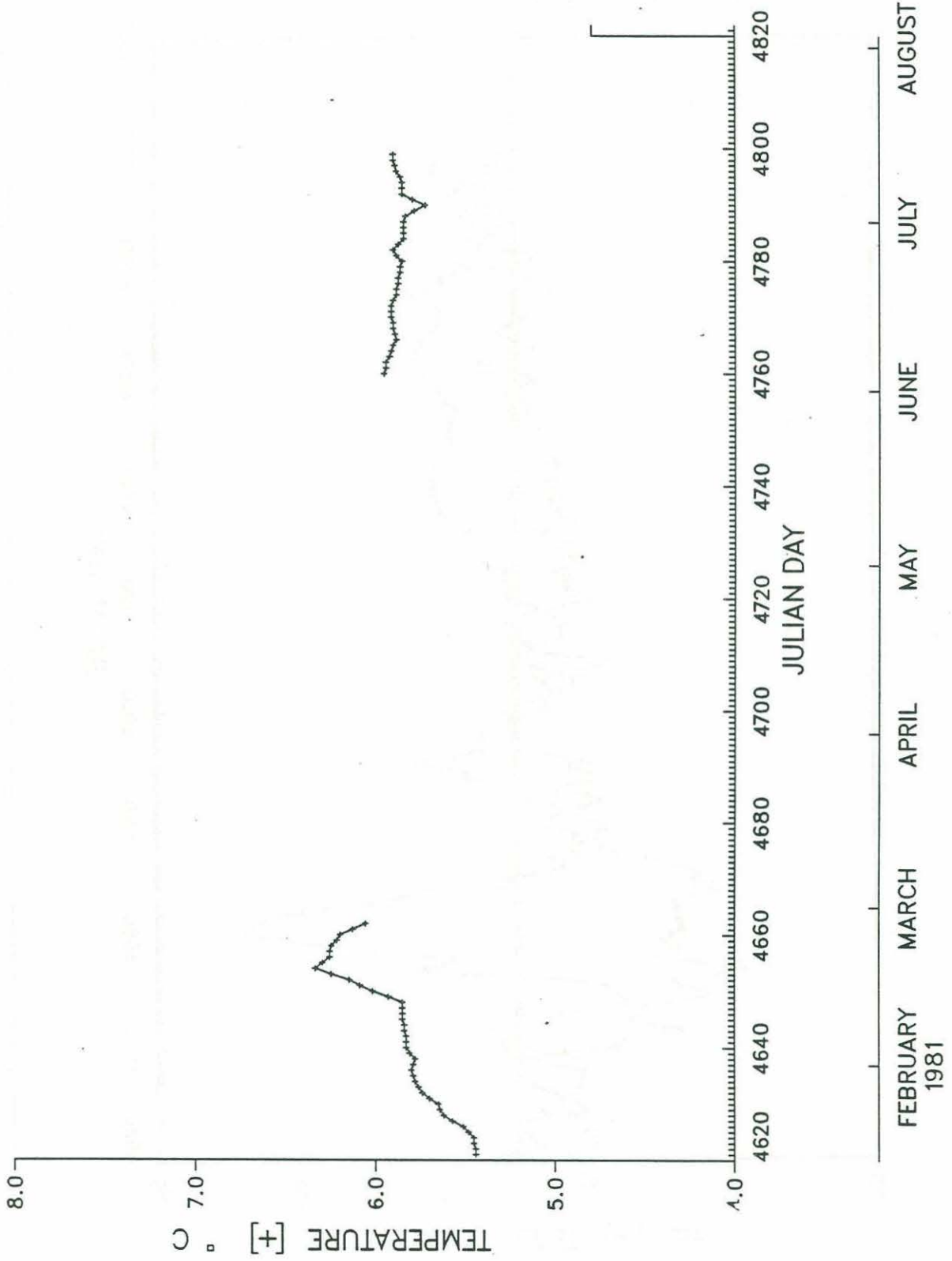
PRE LDE 12D



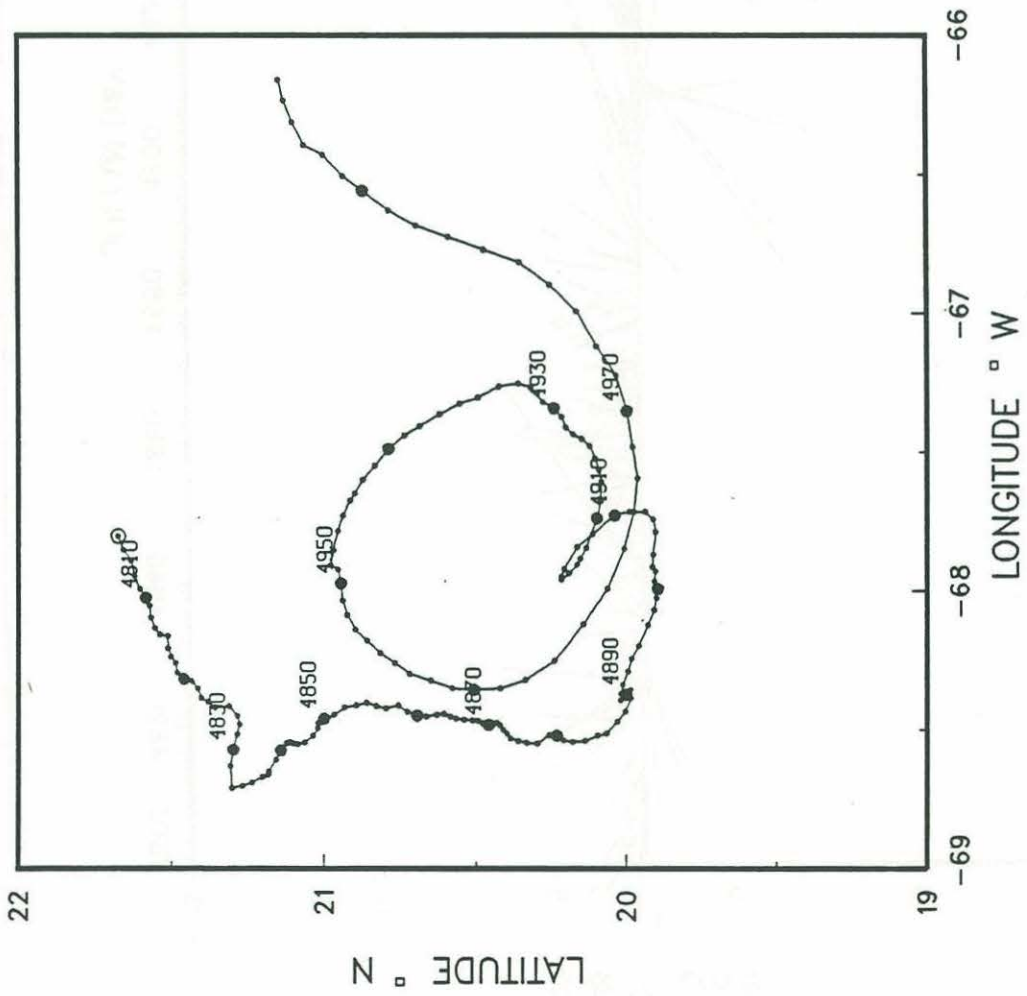
PRE LDE 12D



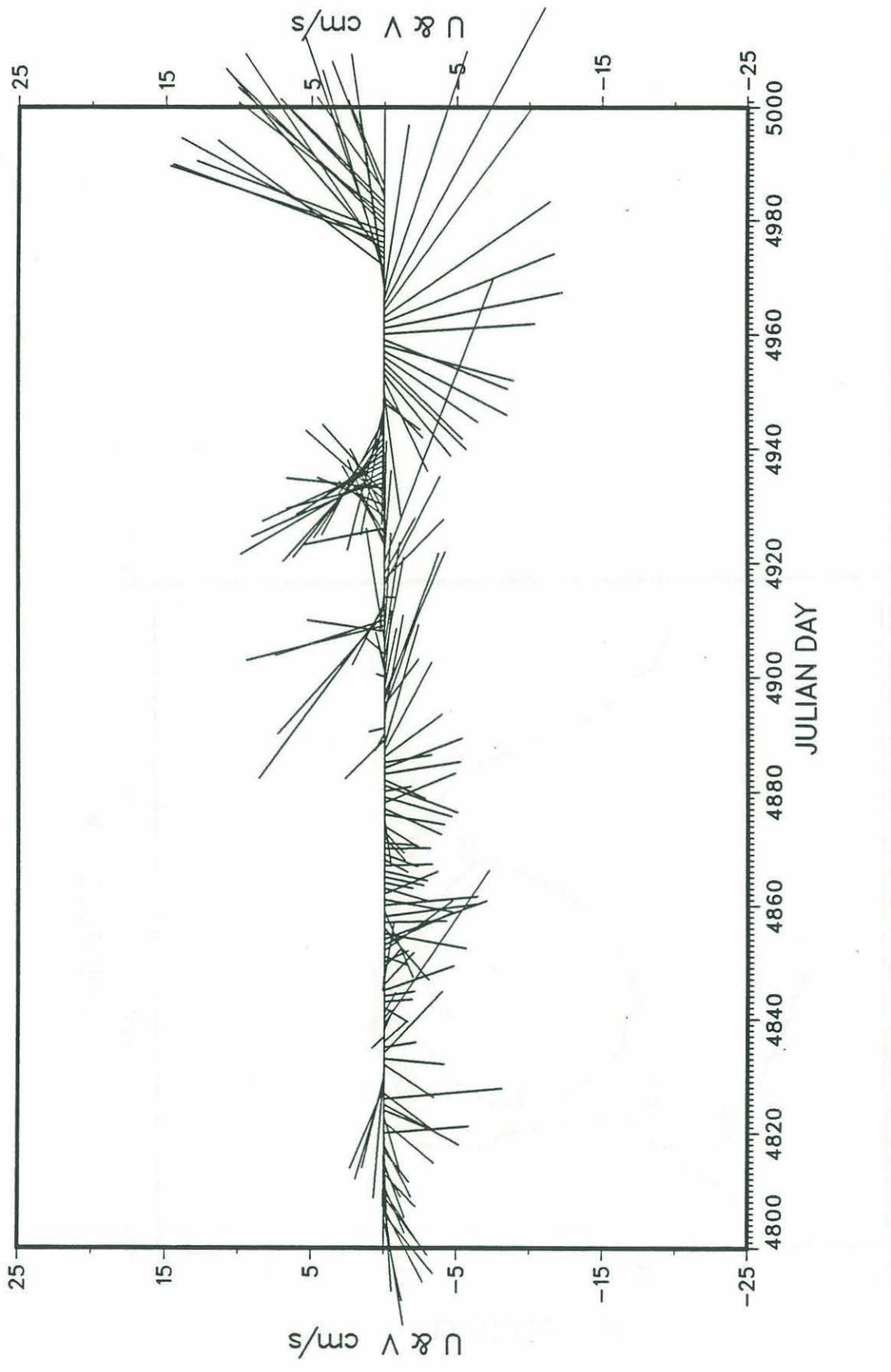


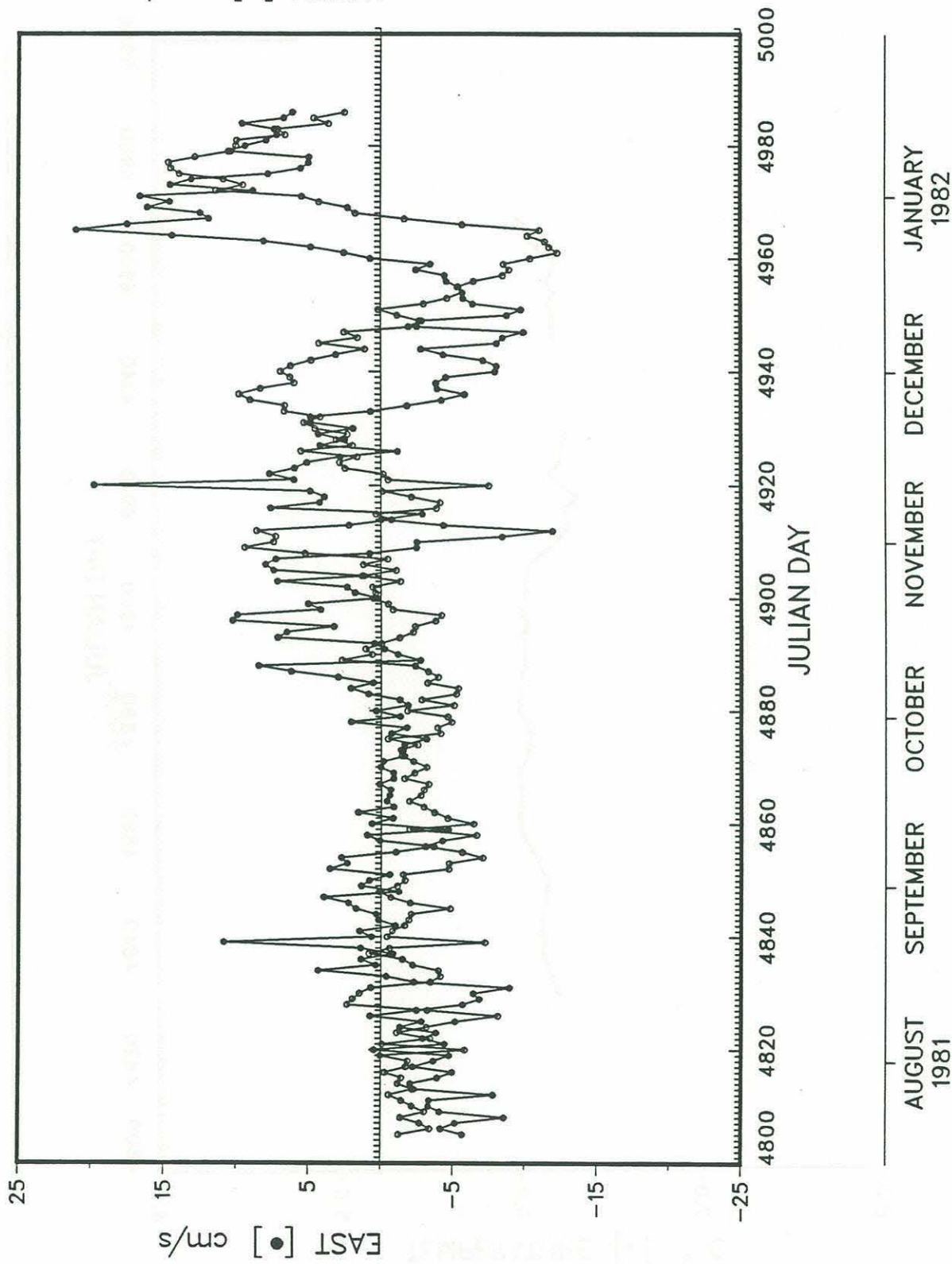


PRE LDE 12E

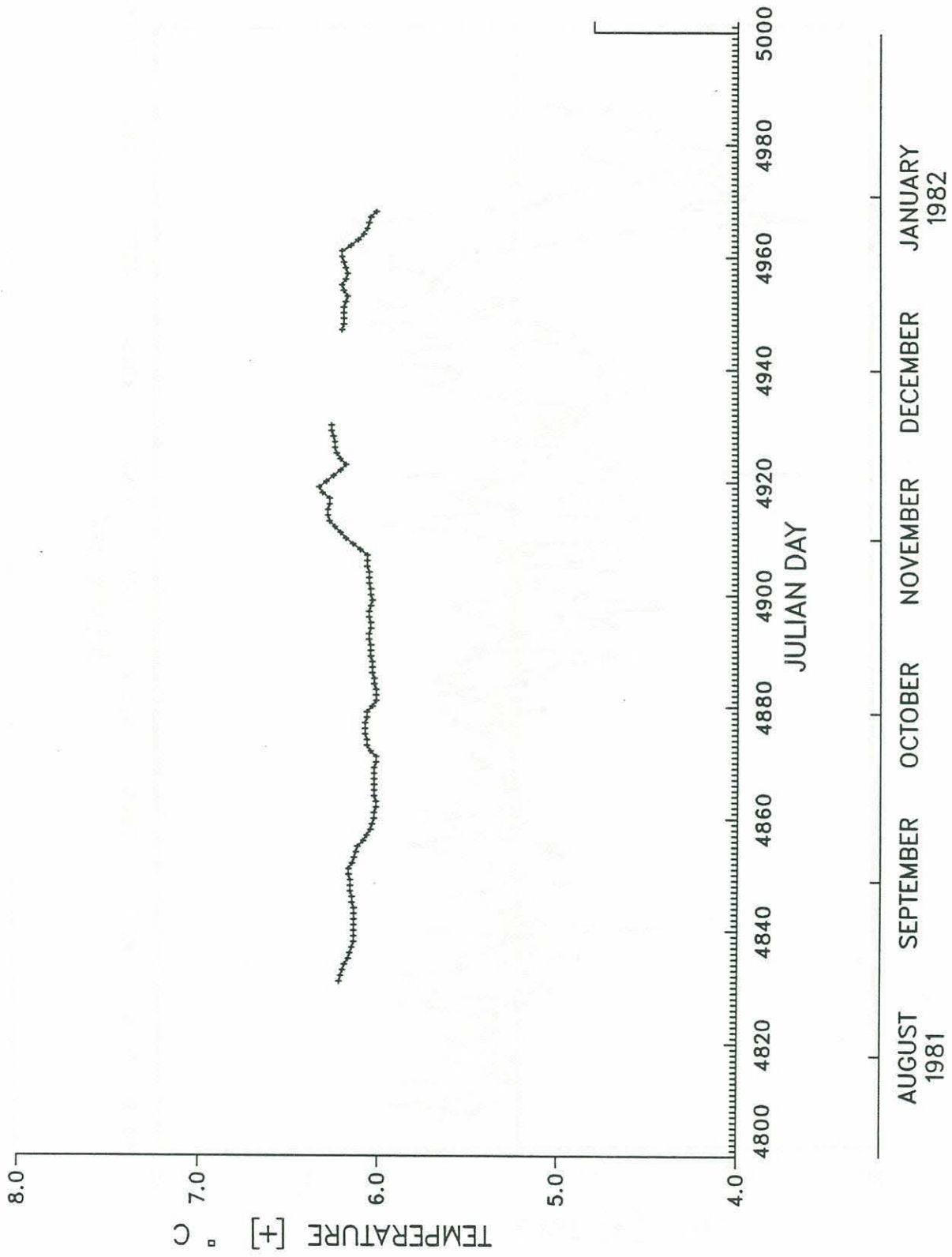


PRE LDE 12E

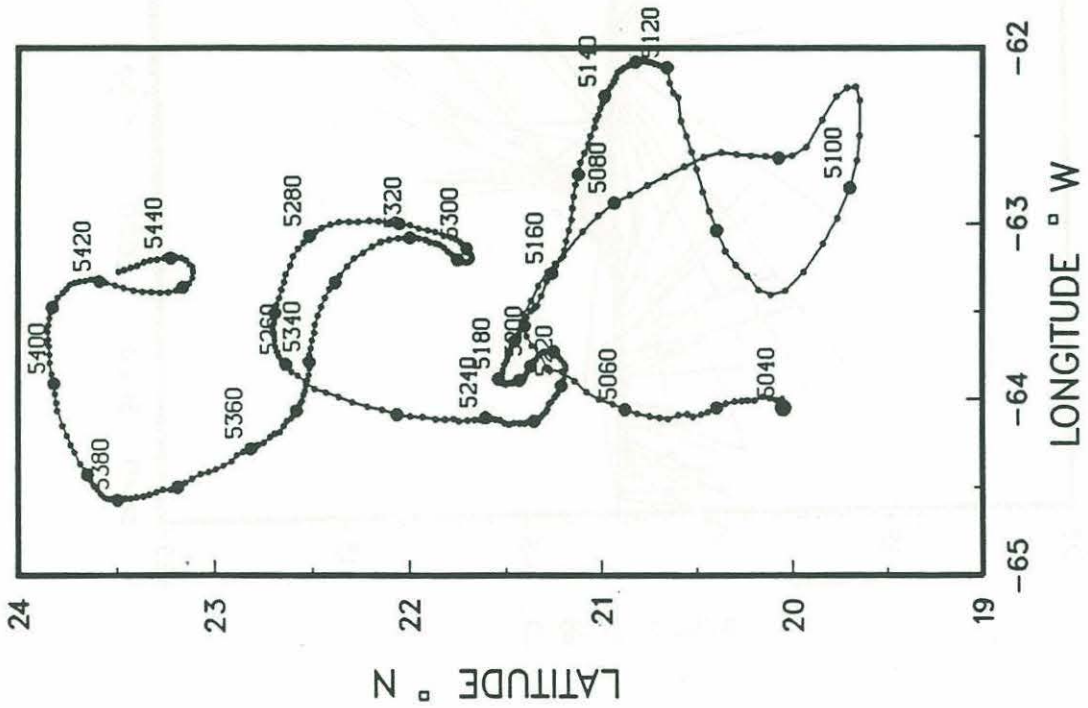




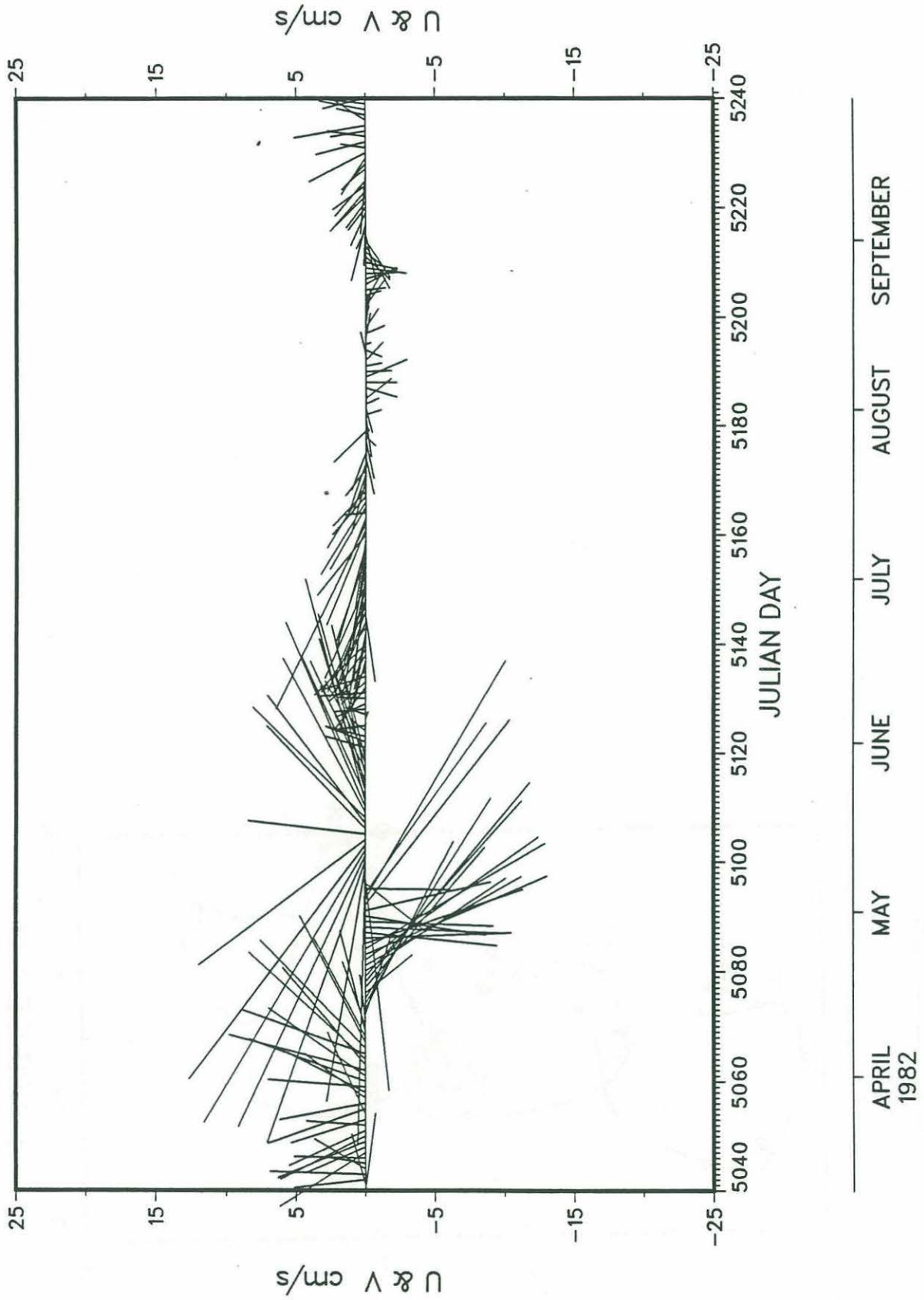
PRE LDE 12E

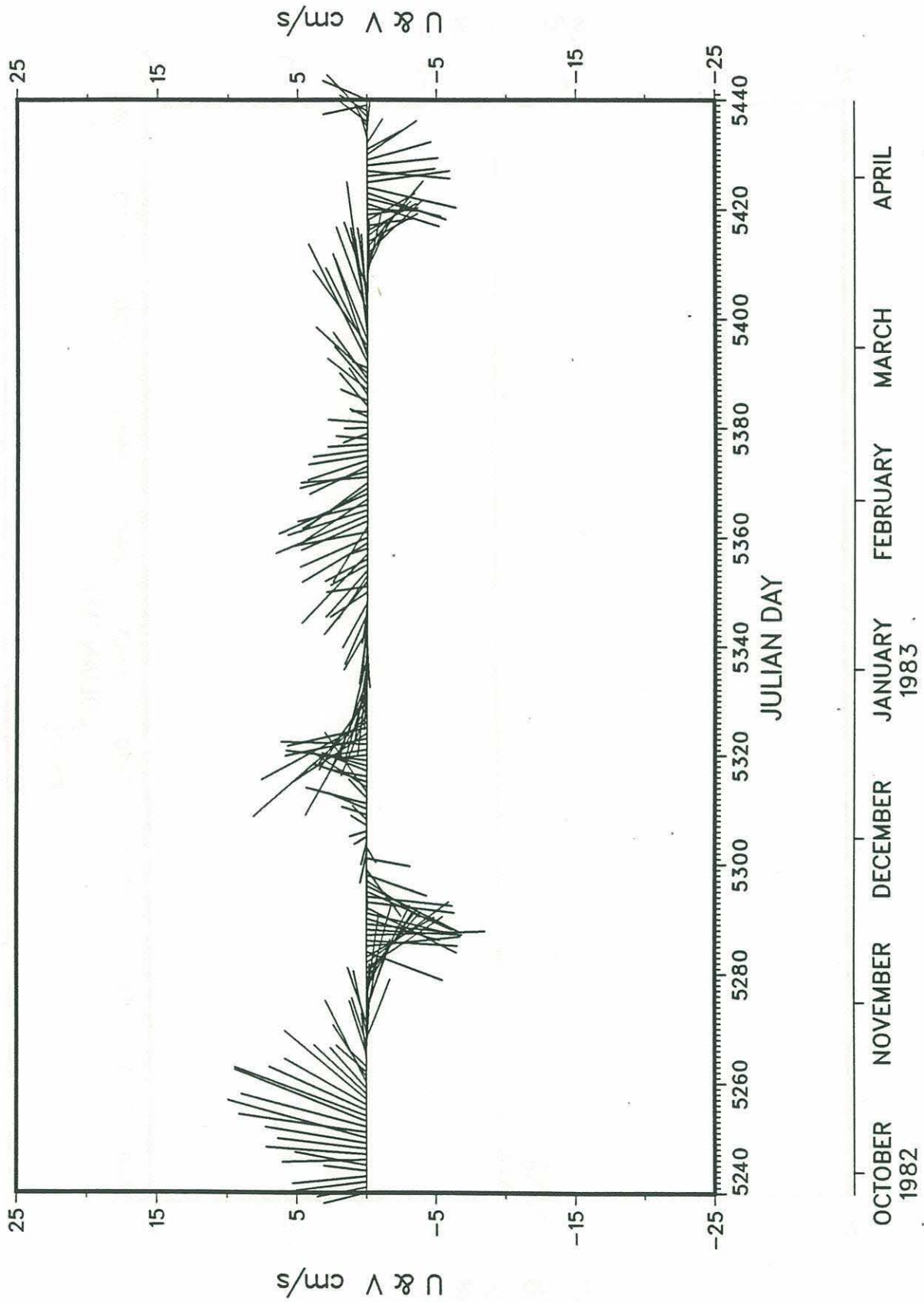


PRE LDE 12F

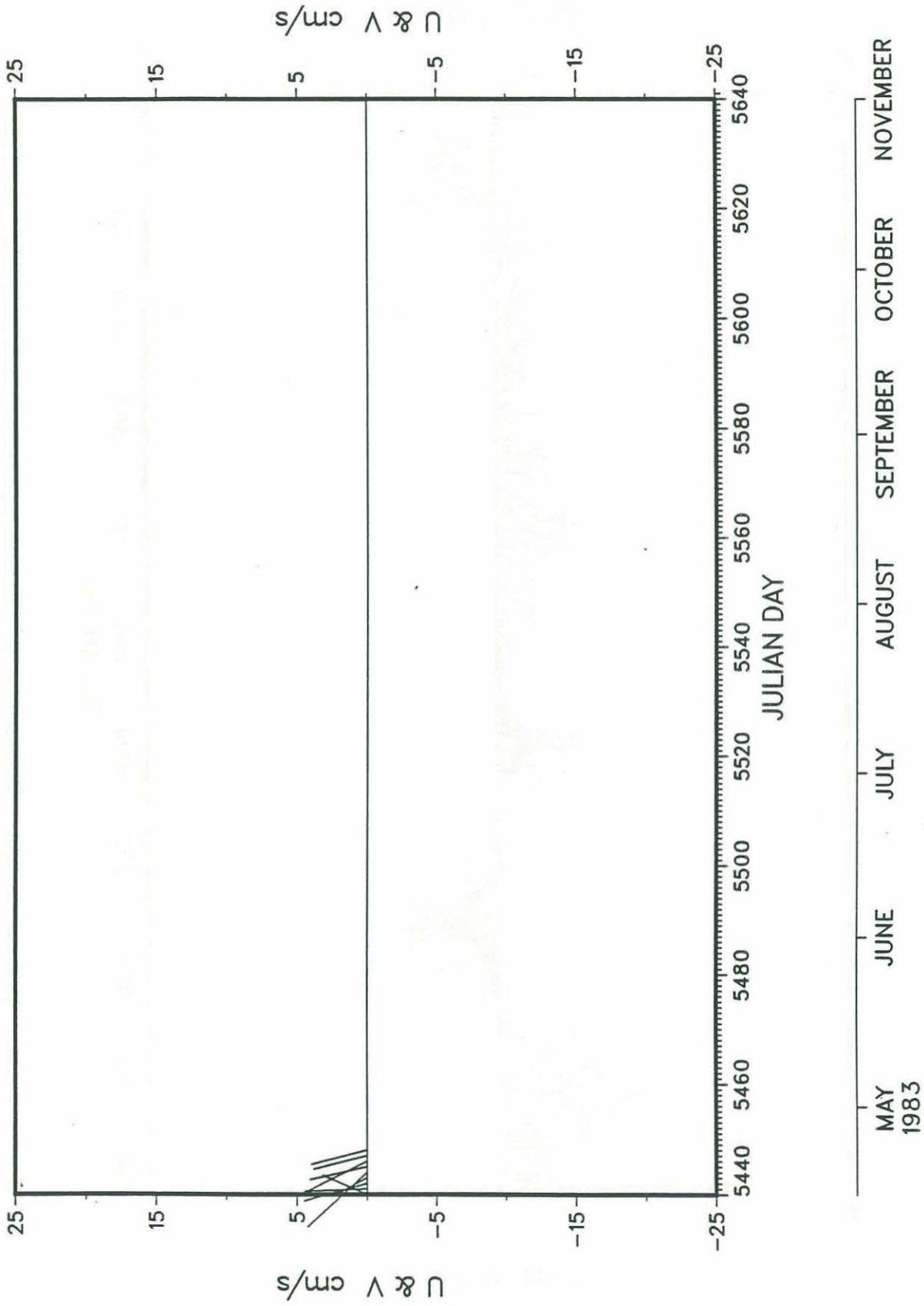


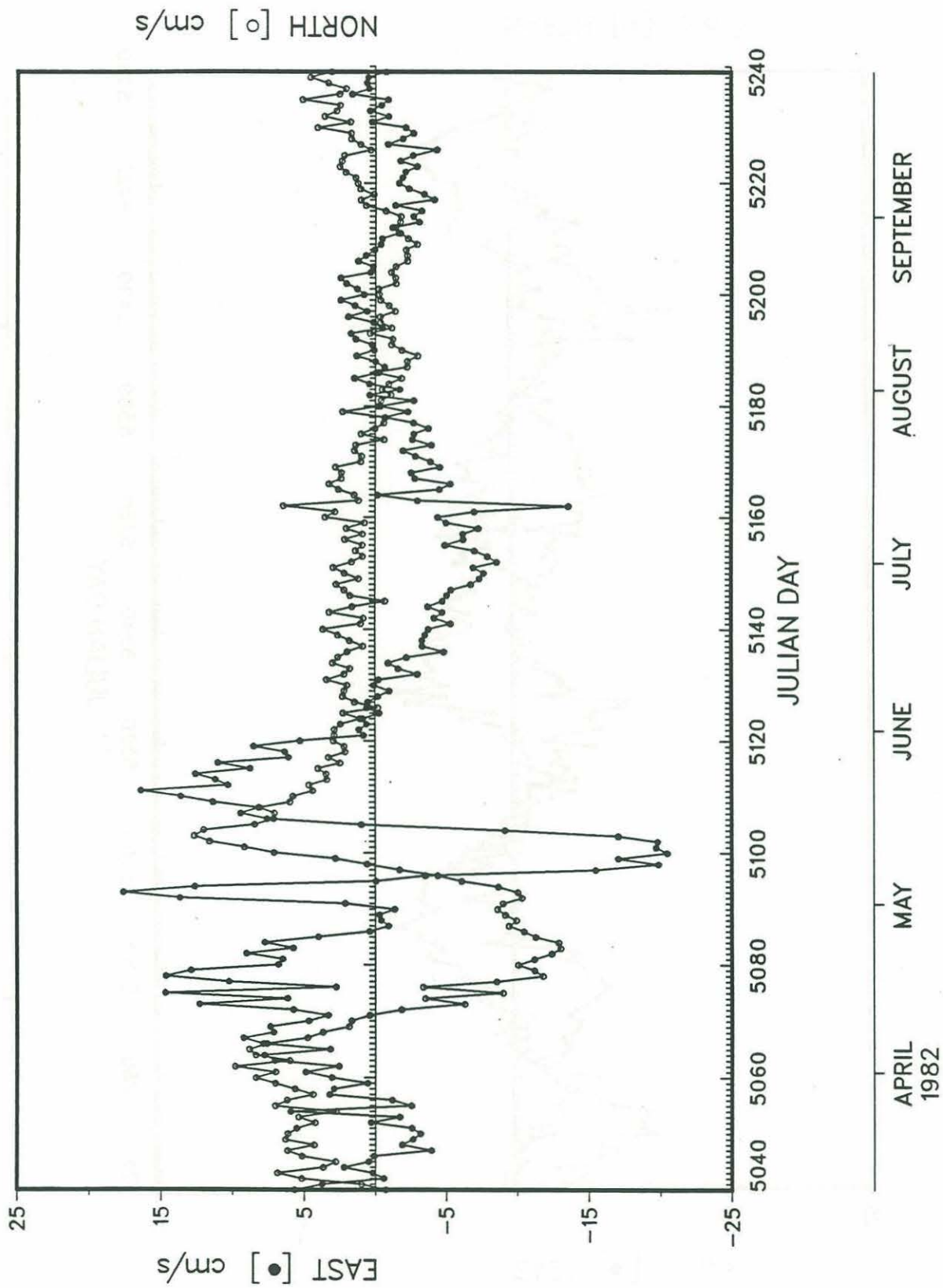
PRE LDE 12F



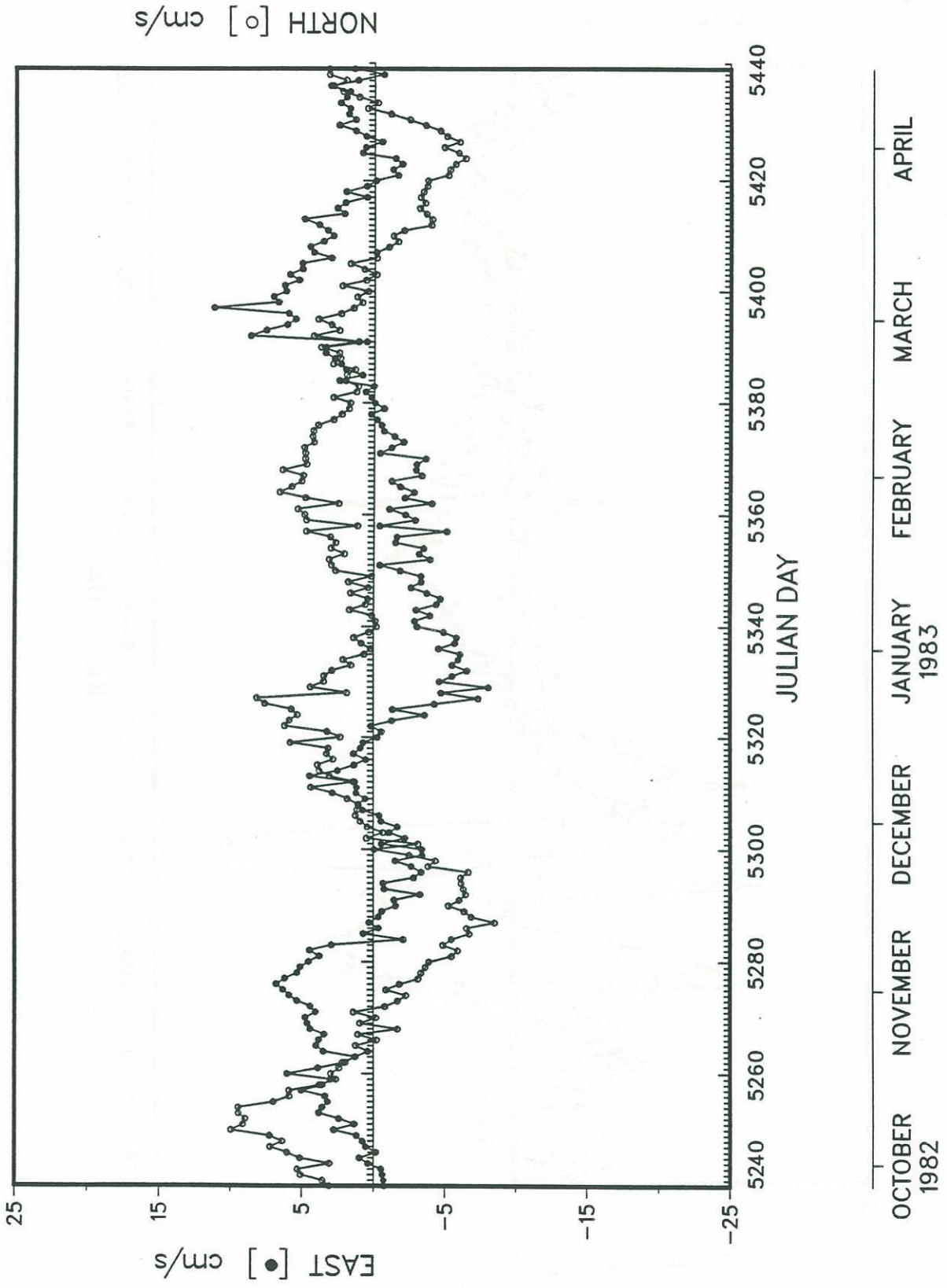


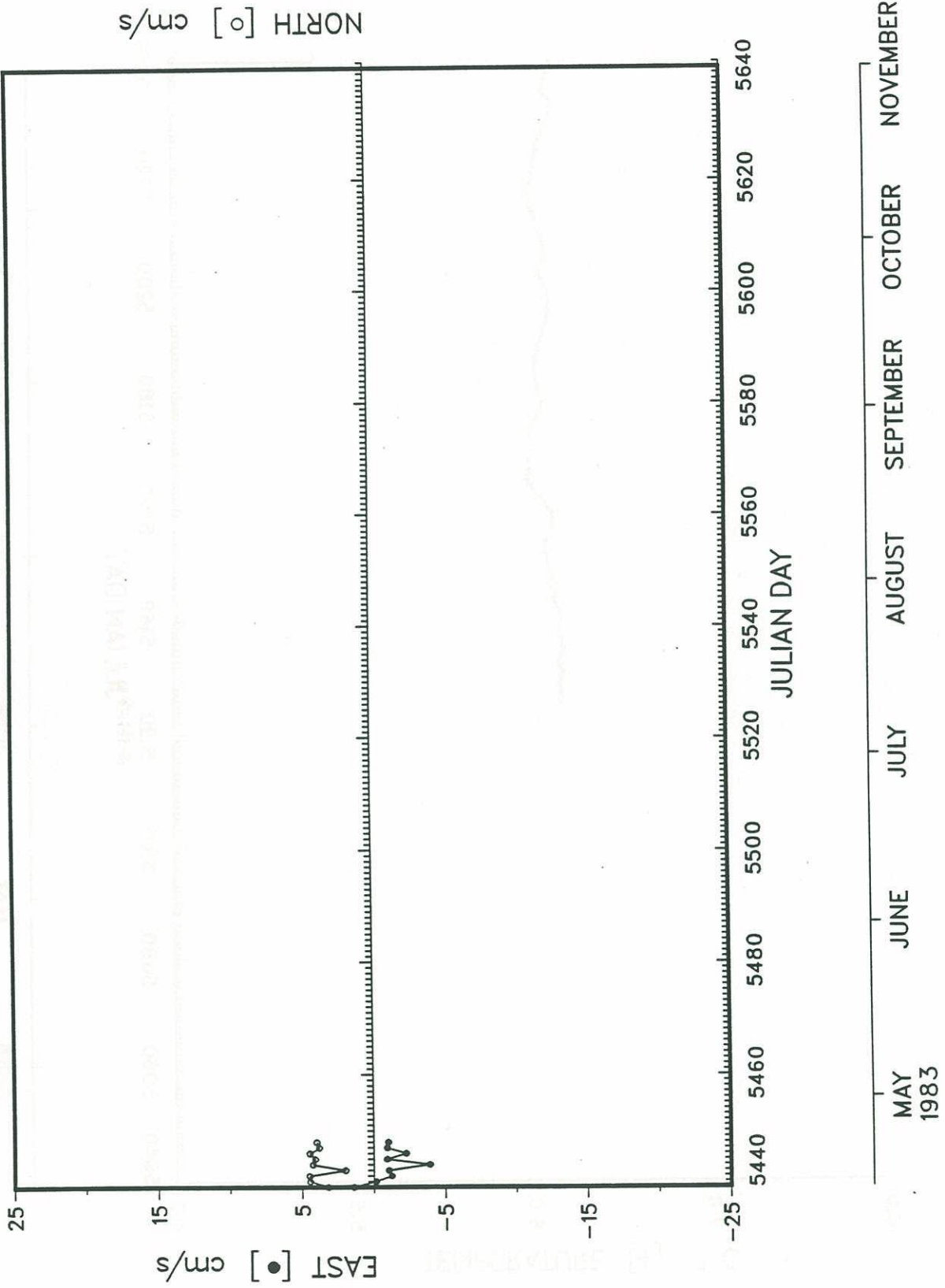
PRE LDE 12F



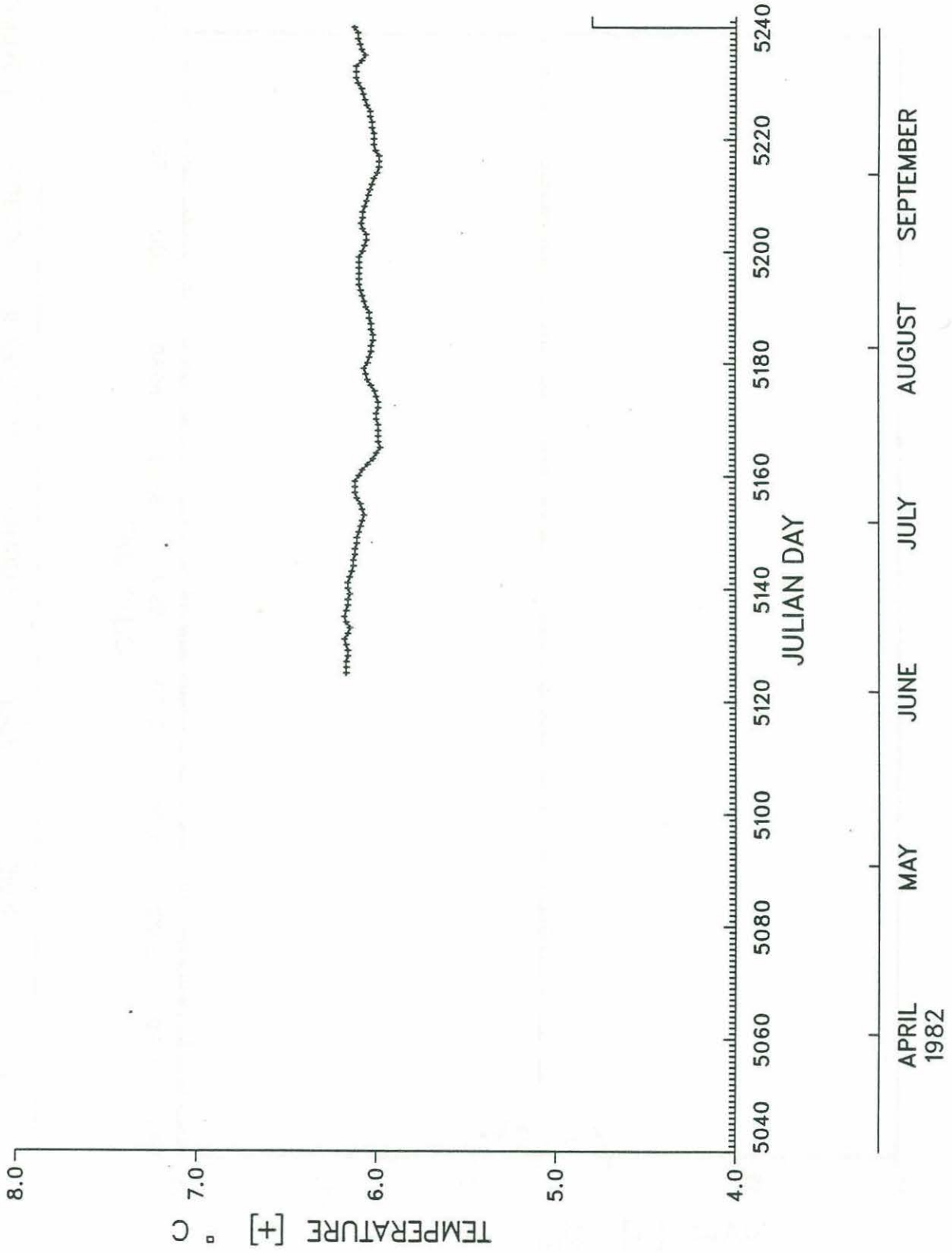


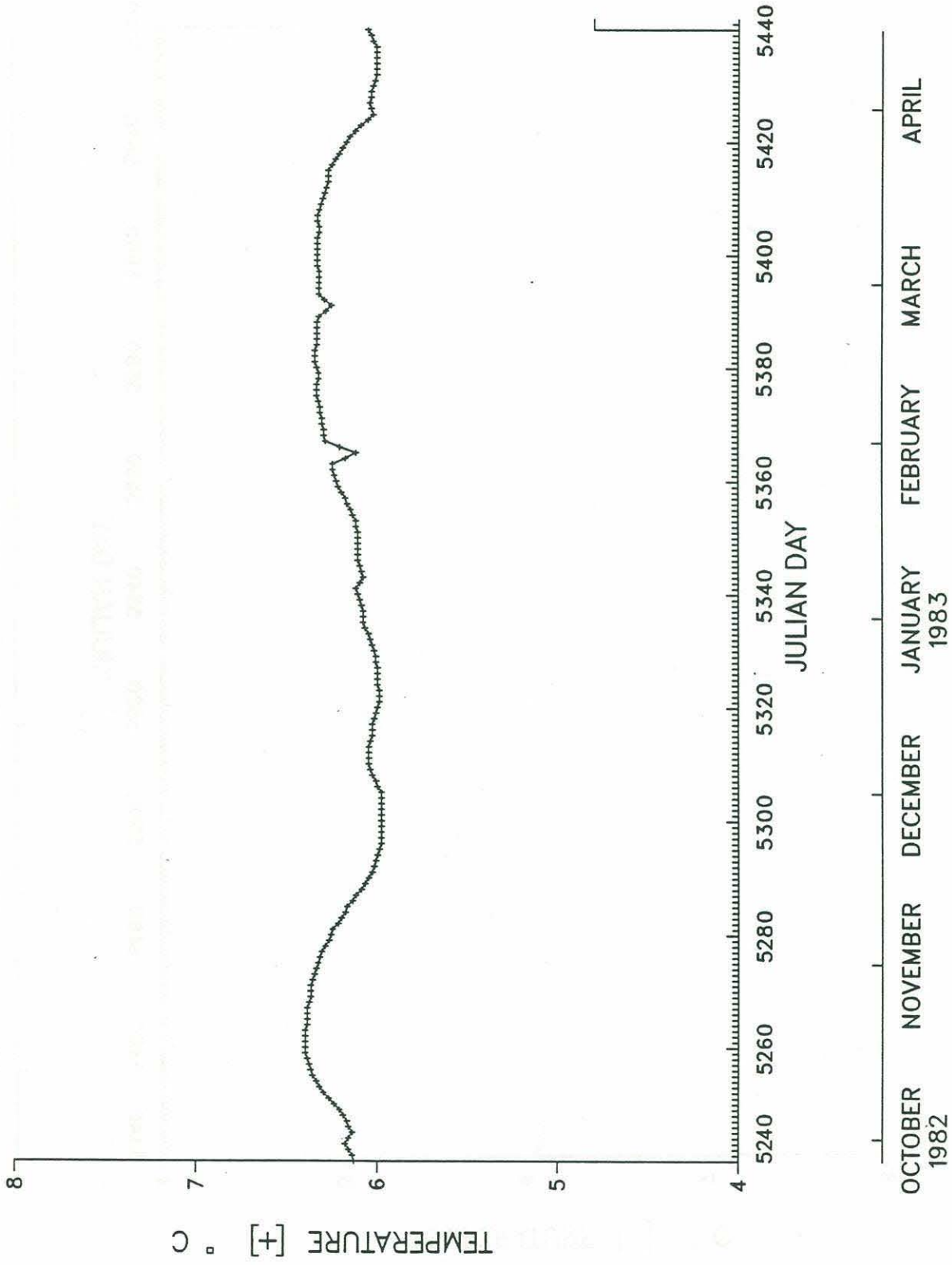
PRE LDE 12F



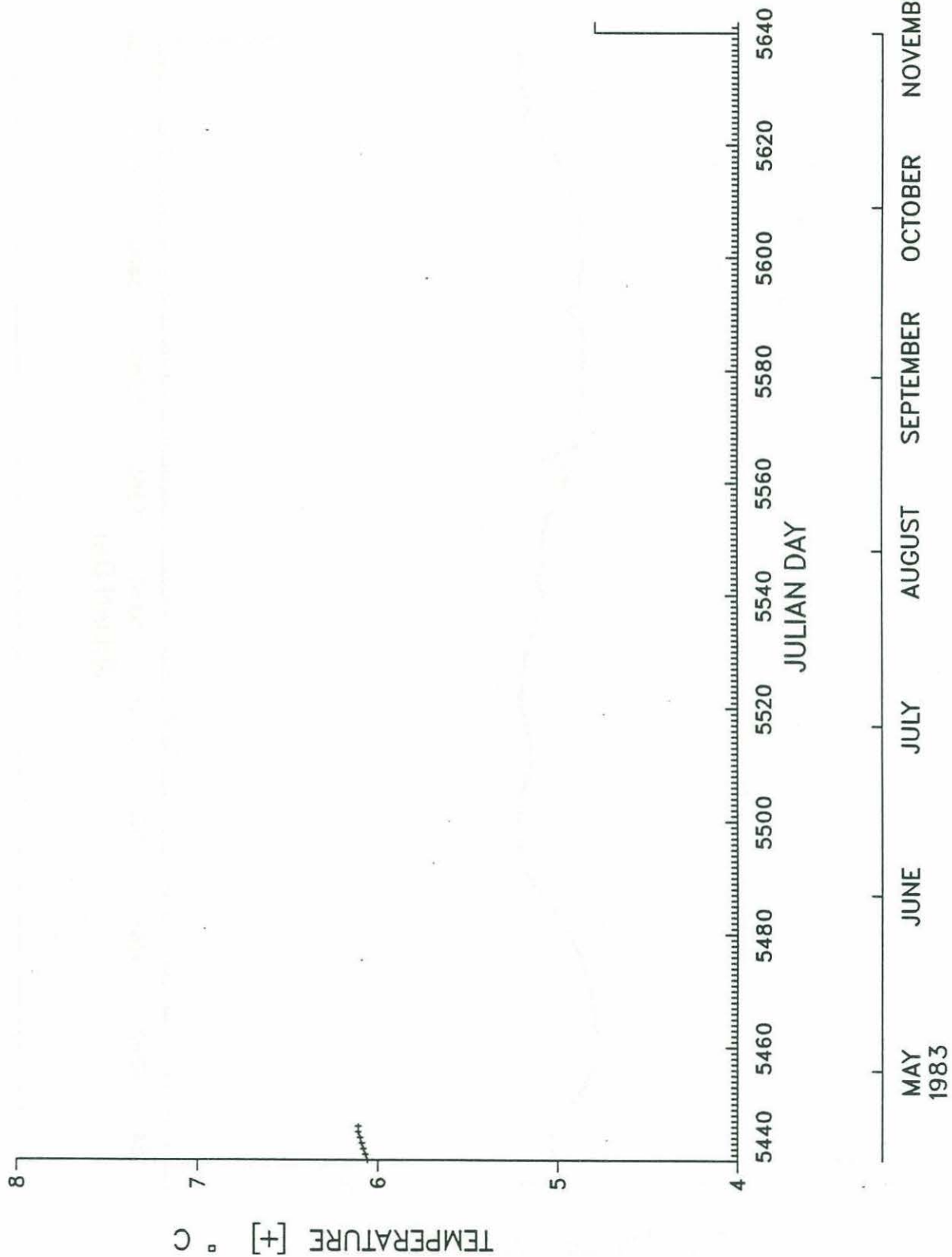


PRE LDE 12F

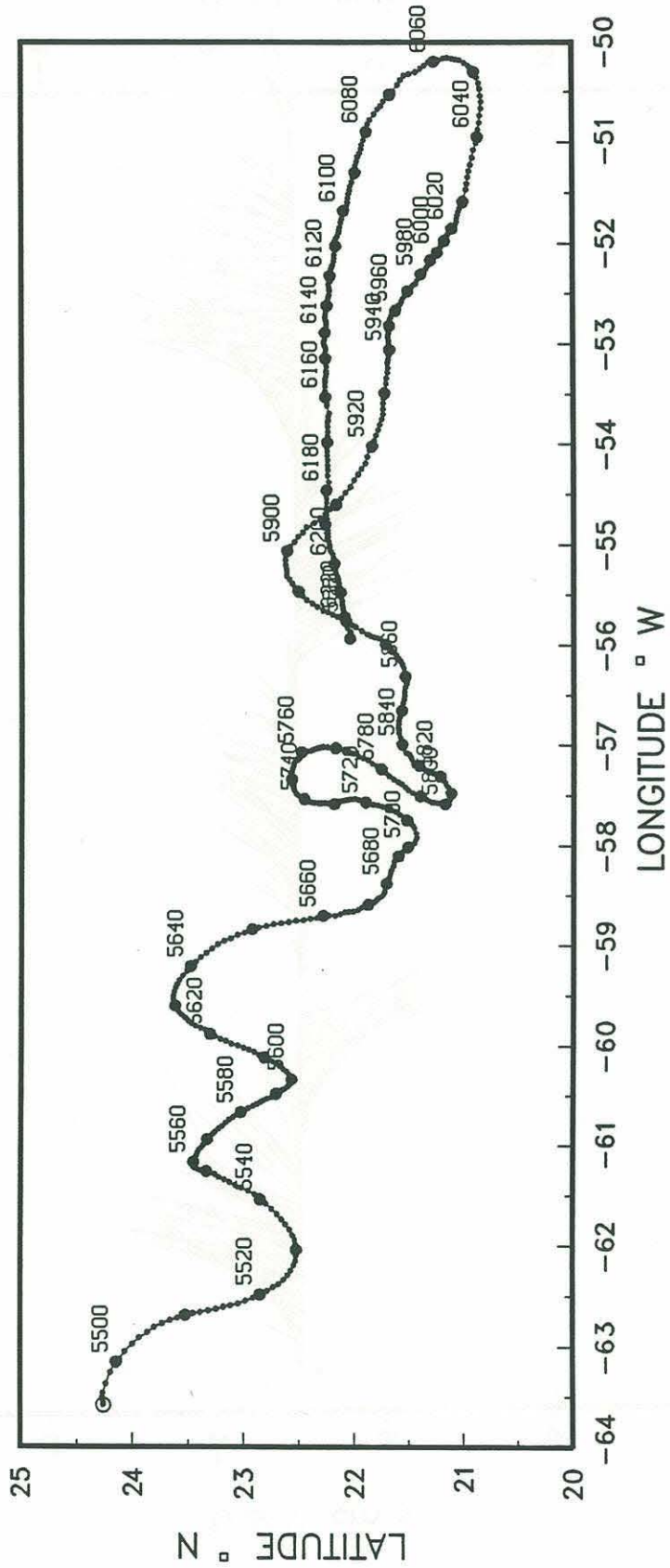




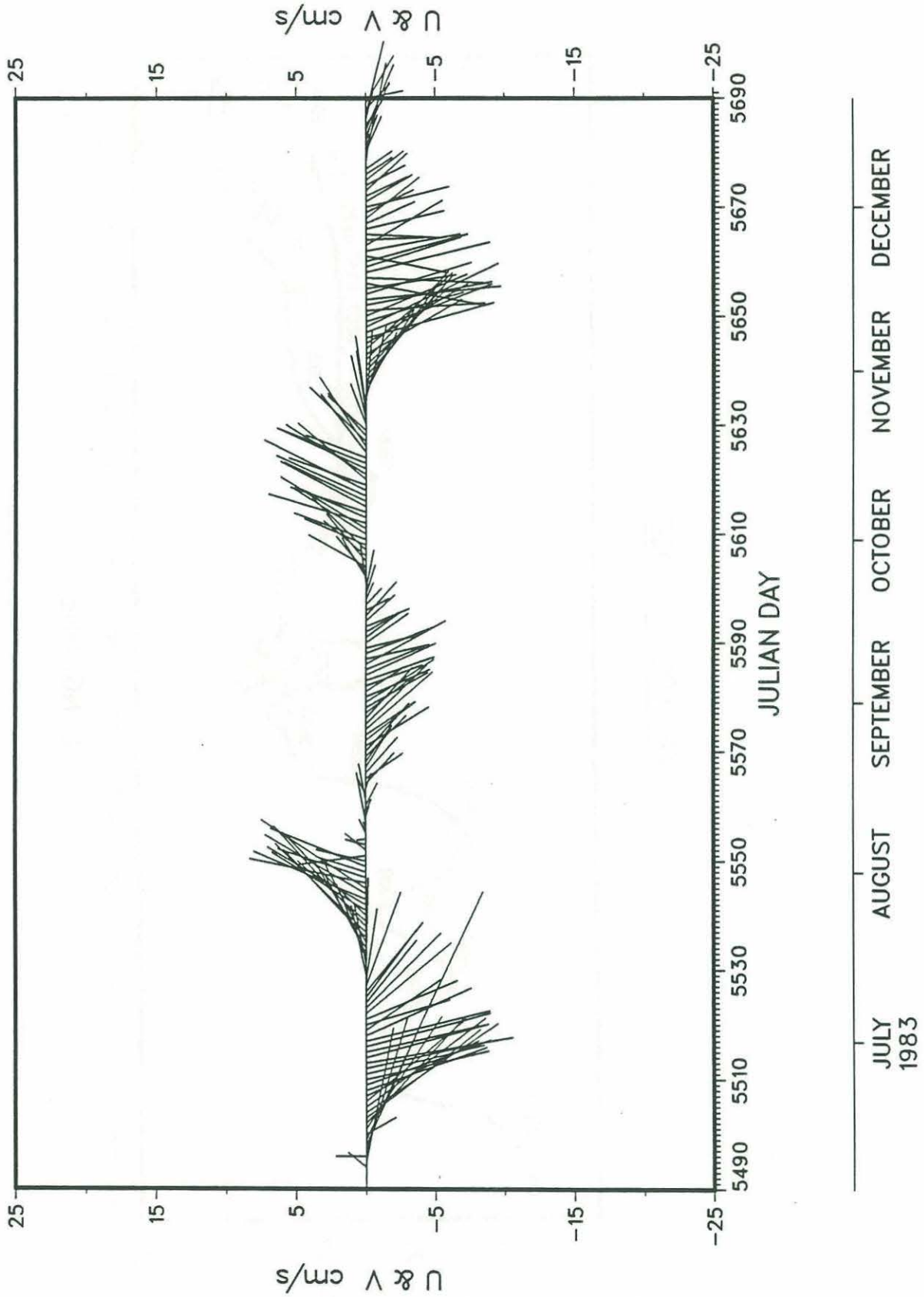
PRE LDE 12F



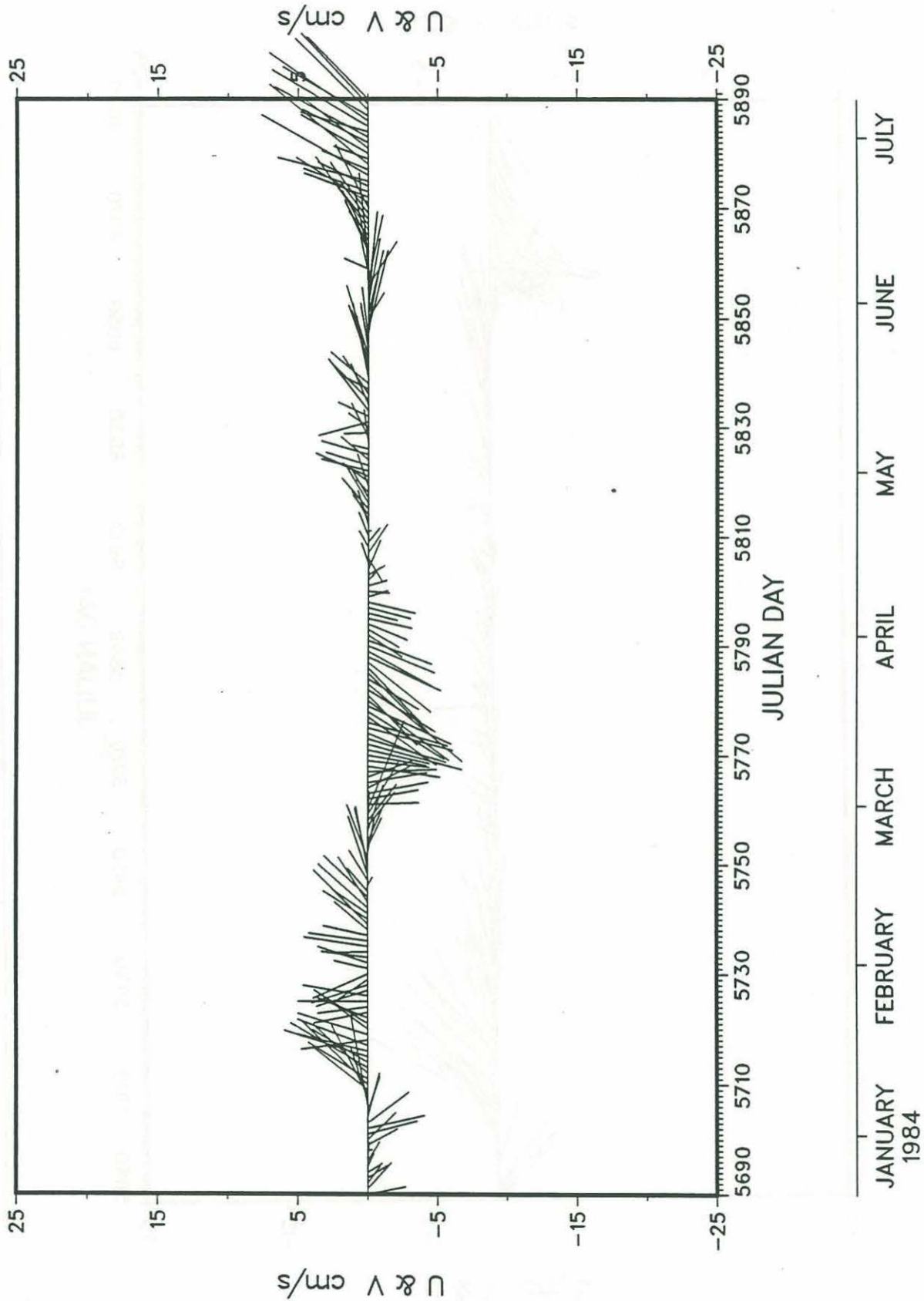
PRE LDE 12G



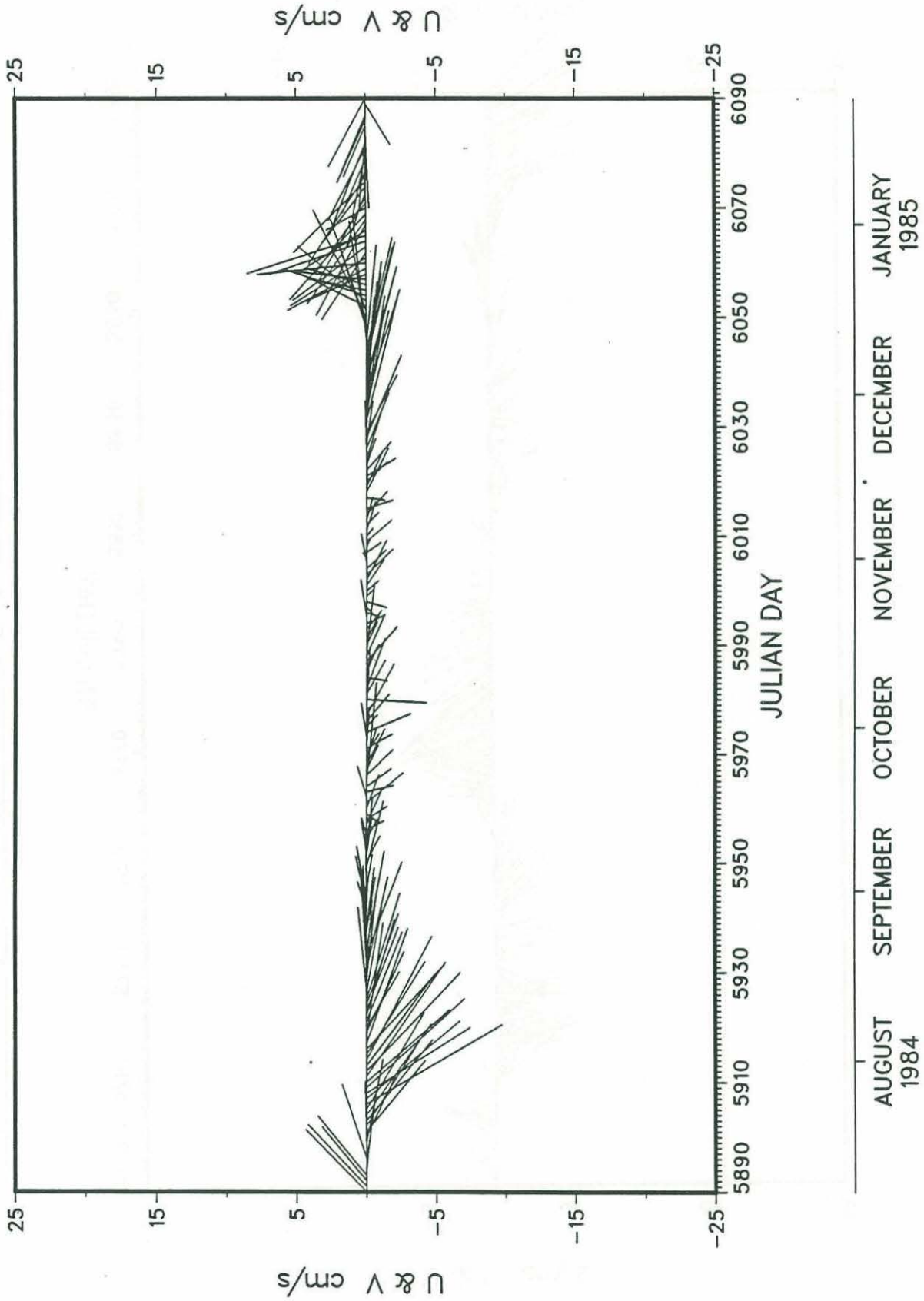
PRE LDE 12G

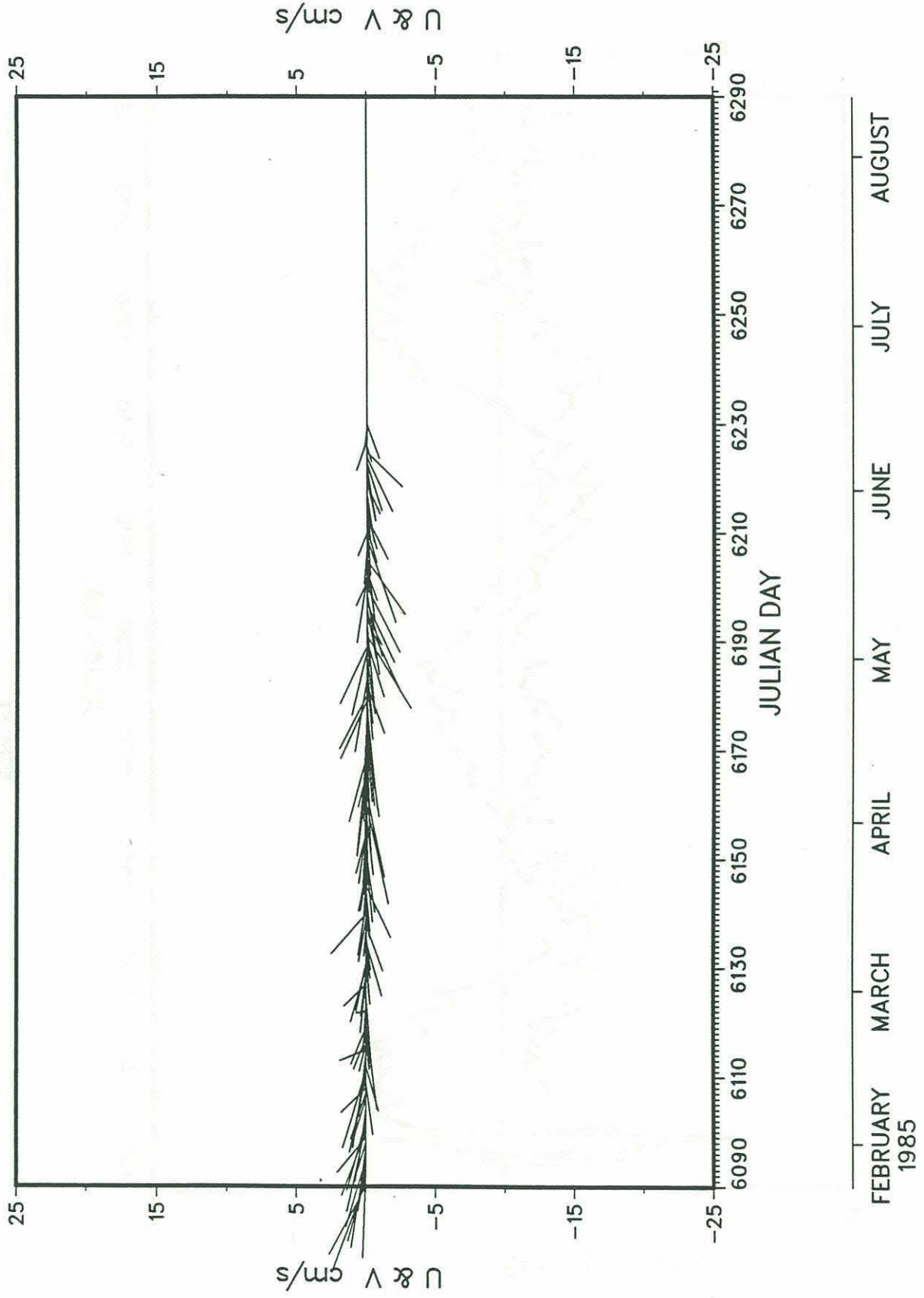


PRE LDE 12G

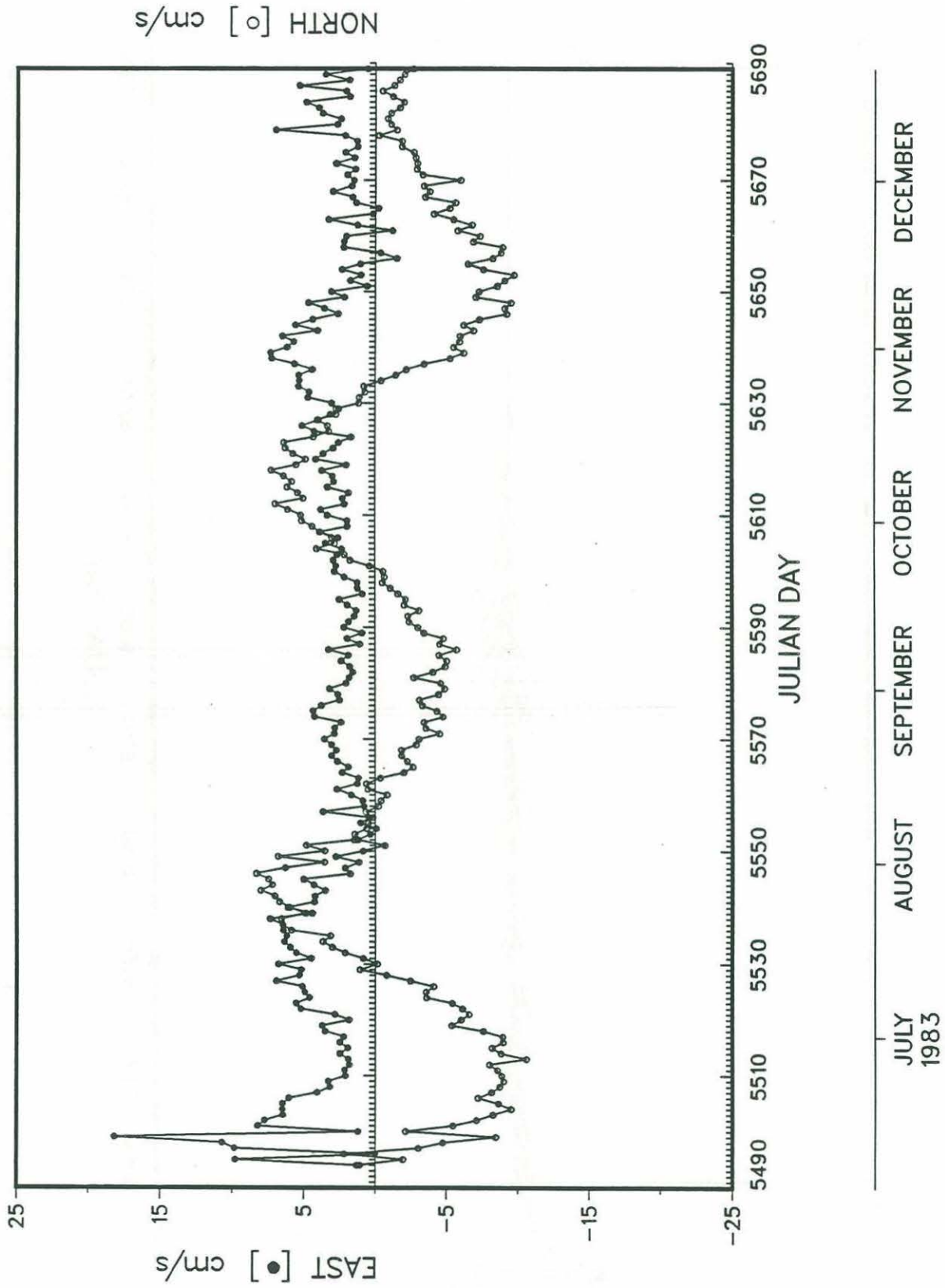


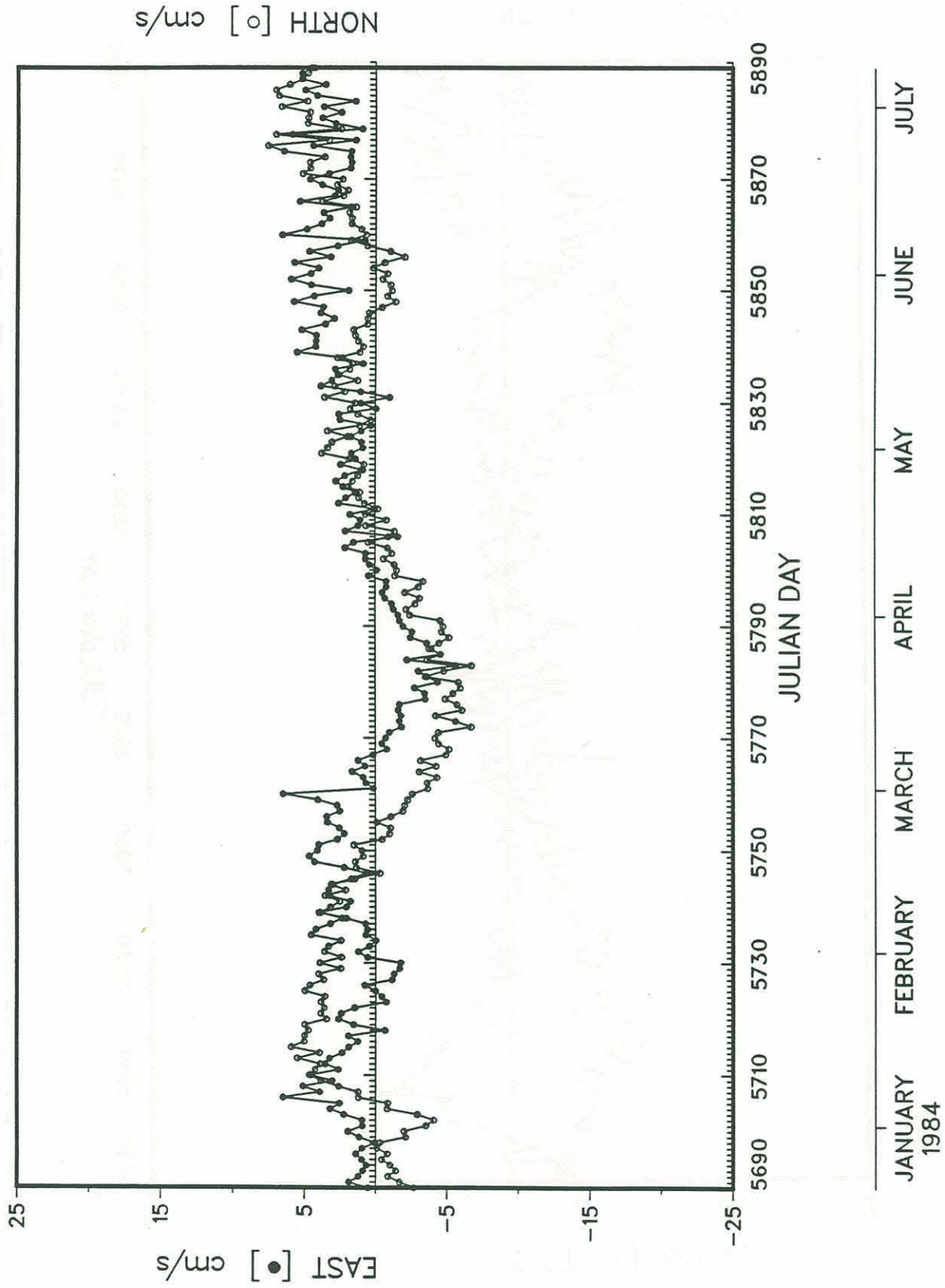
PRE LDE 12G



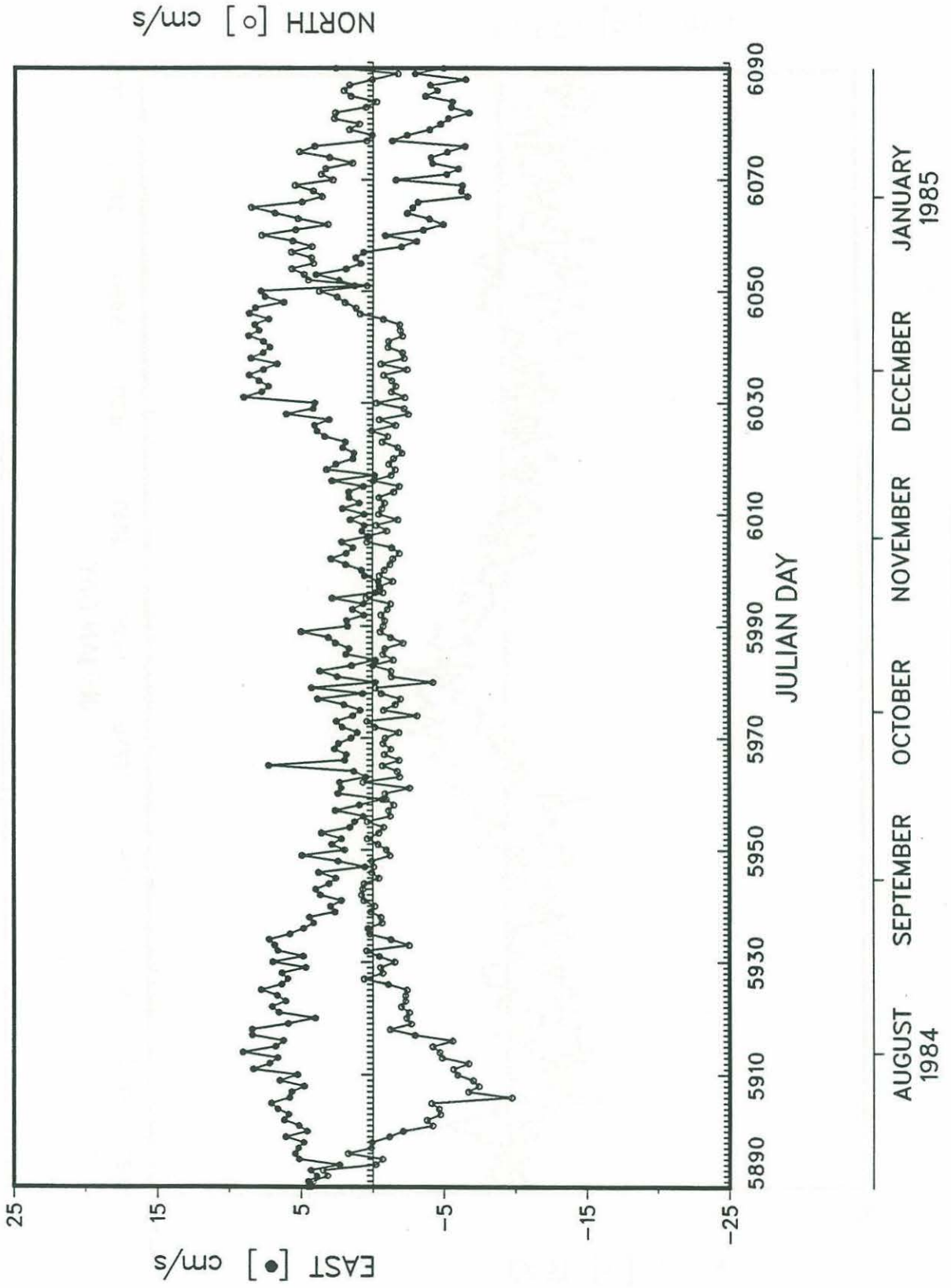


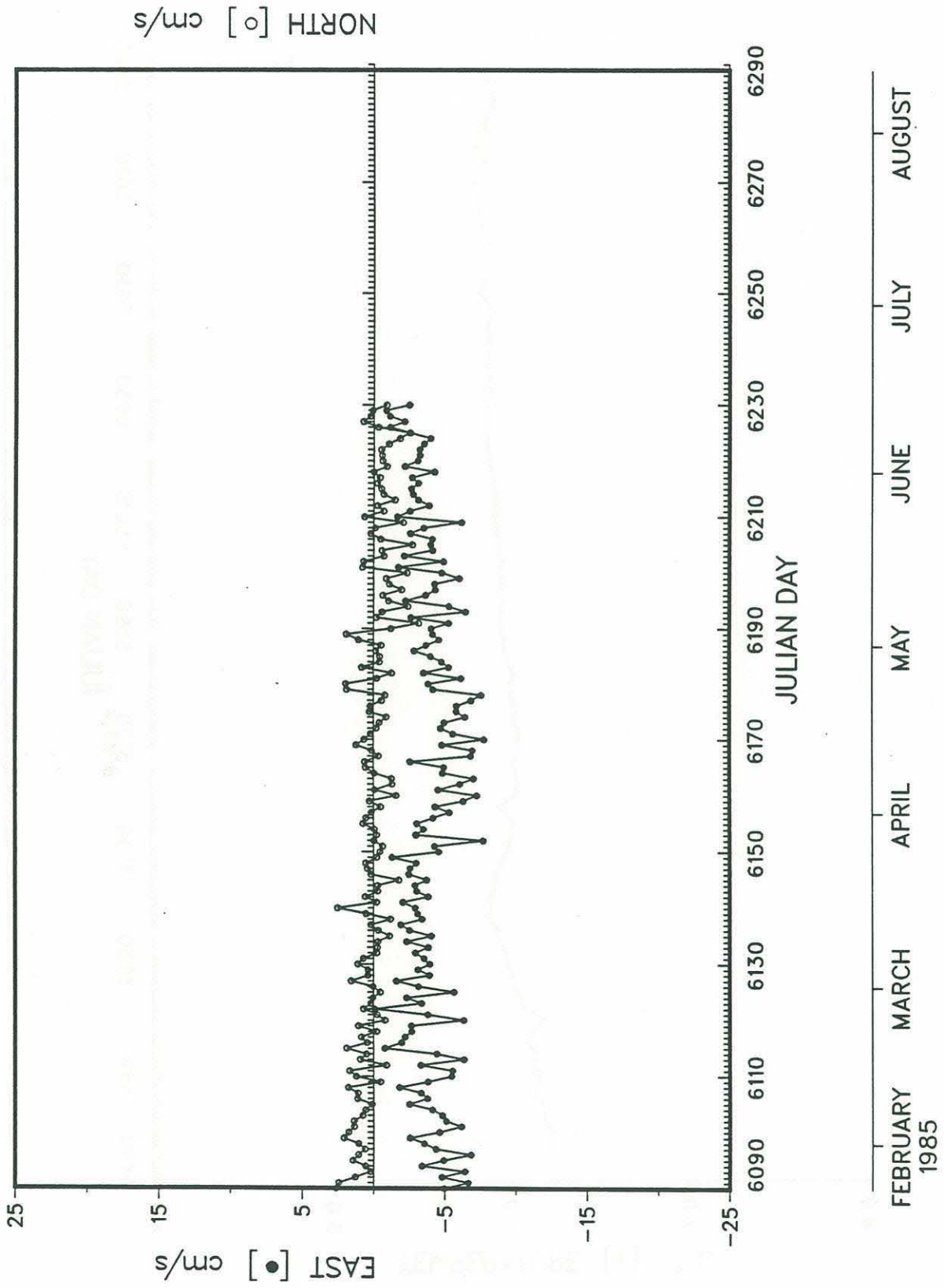
PRE LDE 12G



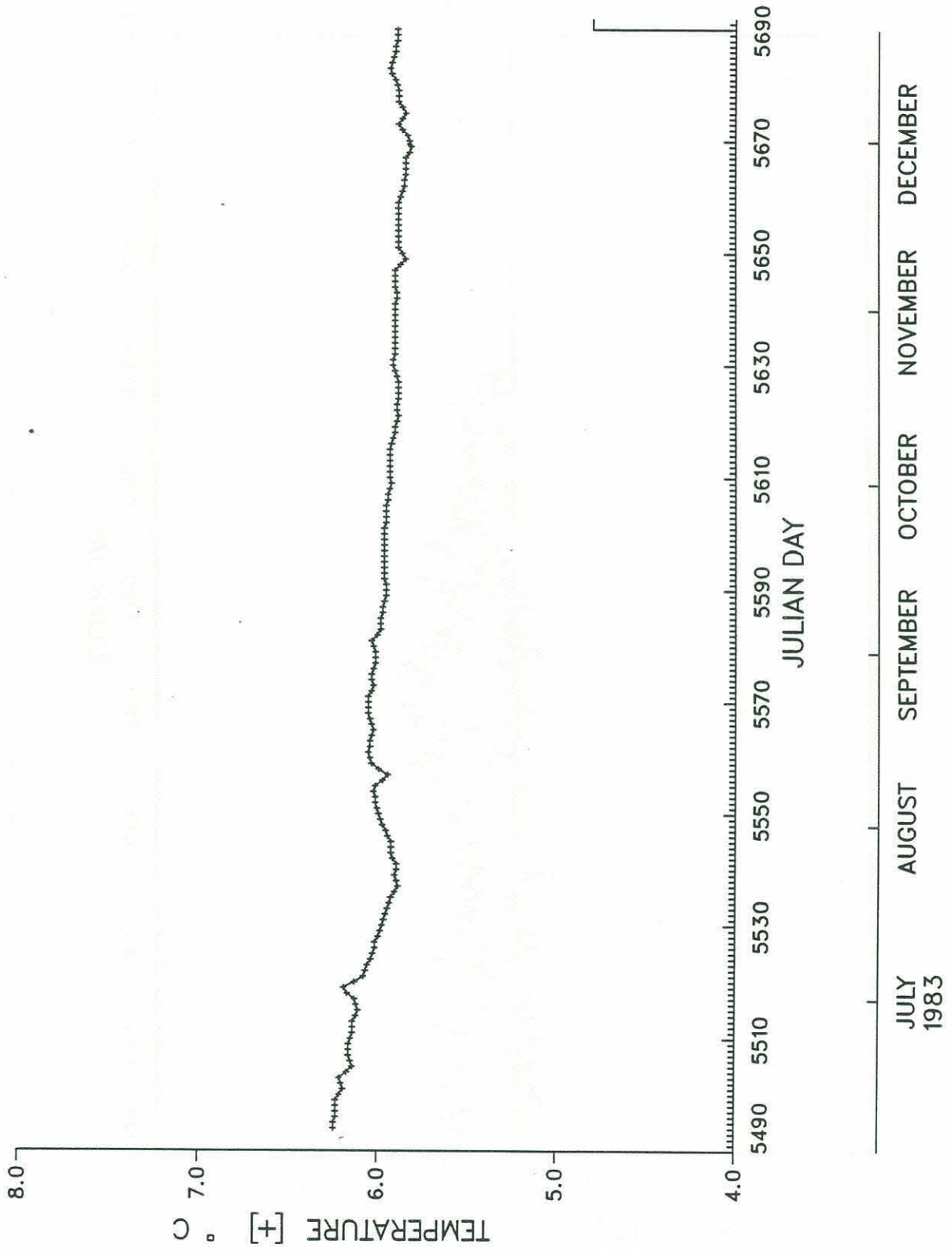


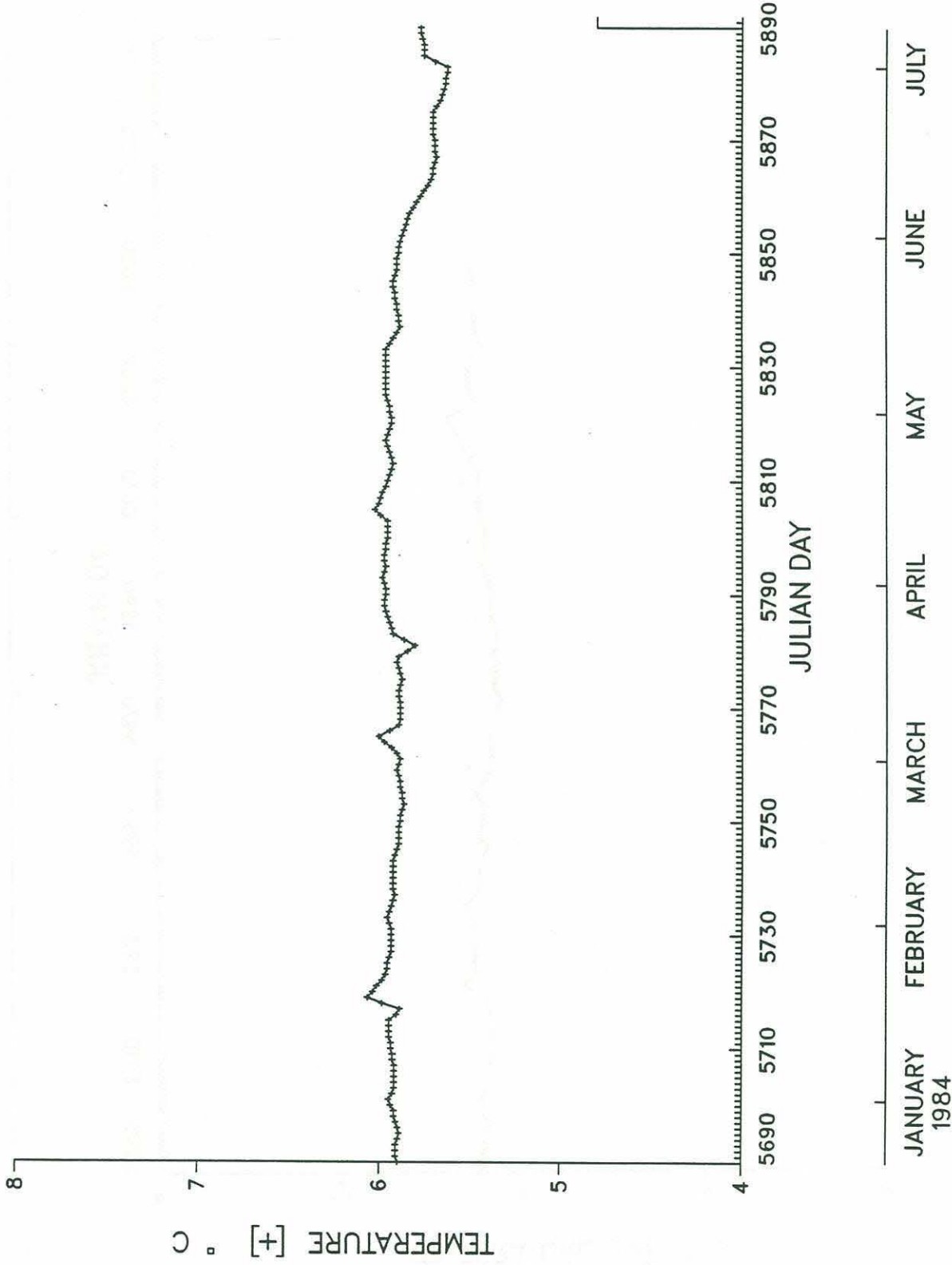
PRE LDE 12G



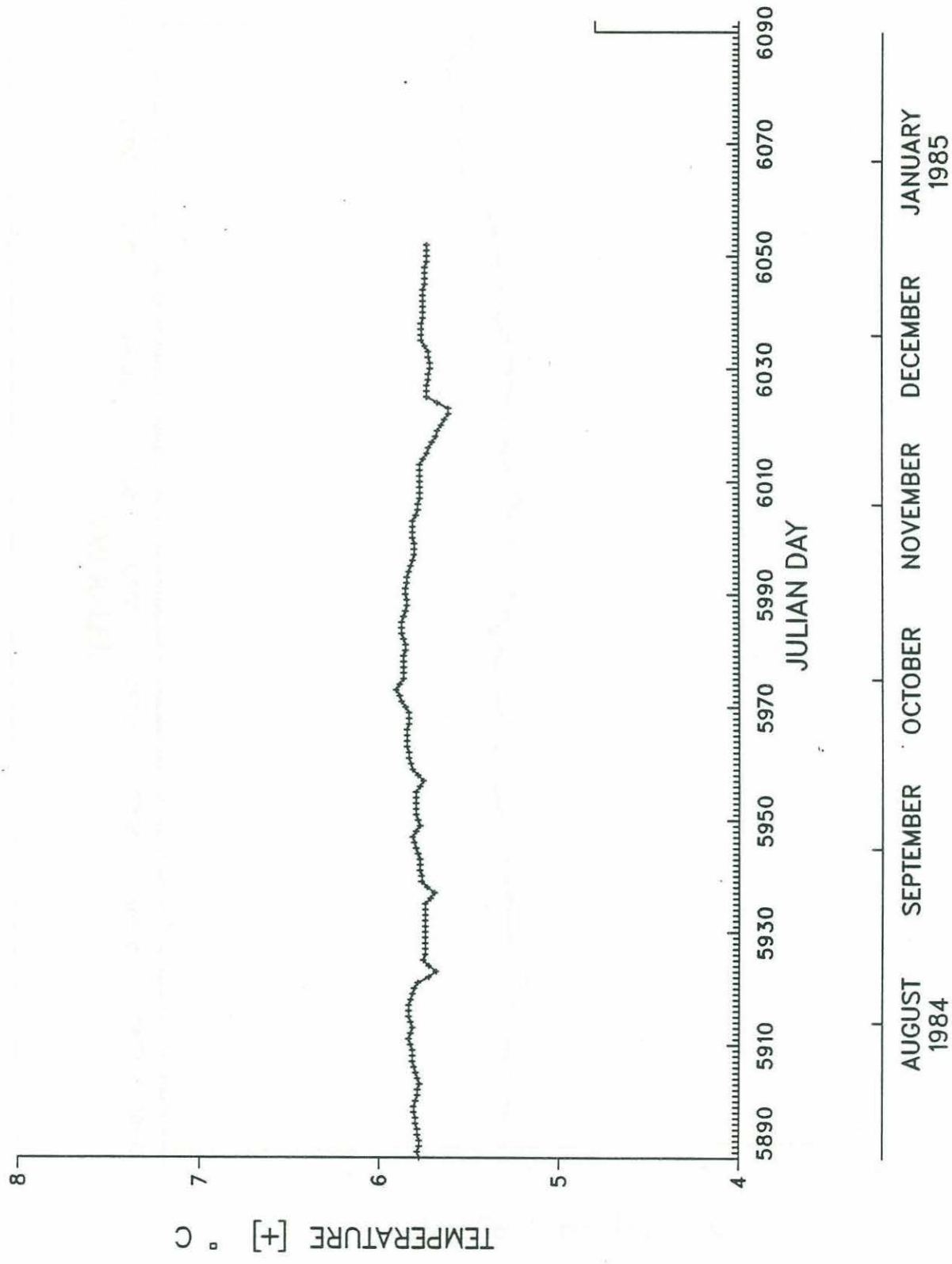


PRE LDE 12G





PRE LDE 12G



APPENDIX B: Publications Using GUSREX Float Data

- Owens, W. B., 1984. A synoptic and statistical description of the Gulf Stream and subtropical gyre using SOFAR floats. *Journal of Physical Oceanography*, **14**, 104–113.
- Owens, W. B., P. L. Richardson, W. J. Schmitz, Jr., H. T. Rossby, and D. C. Webb, 1988. Nine-year trajectory of a SOFAR float in the southwestern North Atlantic. *Deep-Sea Research*, **35**, 1851–1857.
- Price, J. F., 1985. Particle dispersion in the western North Atlantic. Unpublished manuscript.
- Price, J. F., and H. T. Rossby, 1982. Observations of a barotropic planetary wave in the western North Atlantic. *Journal of Marine Research*, **40**(Suppl.), 543–558.
- Richardson, P. L., 1983. A vertical section of eddy kinetic energy through the Gulf Stream system. *Journal of Geophysical Research*, **88**, 2705–2709.
- Richardson, P. L., 1985. Average velocity and transport of the Gulf Stream near 55°W. *Journal of Marine Research*, **43**, 83–111.
- Schmitz, W. J., Jr., 1985. SOFAR float trajectories associated with the Newfoundland Basin. *Journal of Marine Research*, **43**, 761–778.
- Schmitz, W. J., J. F. Price, and P. L. Richardson, 1988. Recent moored current meter and SOFAR float observations in the eastern Atlantic near 32N. *Journal of Marine Research*, **46**, 301–319.
- Shaw, P., and H. T. Rossby, 1984. Towards a Lagrangian description of the Gulf Stream. *Journal of Physical Oceanography*, **14**, 528–540.

APPENDIX C: Calendar Conversion Tables — 1981 to 1986

These tables give the year-day and truncated Julian day for each calendar date for the years 1981 through 1986. The truncated Julian days range from 4606 to 6796. To convert to true Julian day, add 2440000.5 to these numbers.

1981

JAN

FEB

MAR

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
				4606	4607	4608	4637	4638	4639	4640	4641	4642	4643	4665	4666	4667	4668	4669	4670	4671	4665	4666	4667	4668	4669	4670	4671
4	5	6	7	8	9	10	8	9	10	11	12	13	14	8	9	10	11	12	13	14	67	68	69	70	71	72	73
4	5	6	7	8	9	10	39	40	41	42	43	44	45	4672	4673	4674	4675	4676	4677	4678	4672	4673	4674	4675	4676	4677	4678
4609	4610	4611	4612	4613	4614	4615	4644	4645	4646	4647	4648	4649	4650	4672	4673	4674	4675	4676	4677	4678	4672	4673	4674	4675	4676	4677	4678
							15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
							46	47	48	49	50	51	52	74	75	76	77	78	79	80	74	75	76	77	78	79	80
							4651	4652	4653	4654	4655	4656	4657	4679	4680	4681	4682	4683	4684	4685	4679	4680	4681	4682	4683	4684	4685
							22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
							53	54	55	56	57	58	59	81	82	83	84	85	86	87	81	82	83	84	85	86	87
							4658	4659	4660	4661	4662	4663	4664	4686	4687	4688	4689	4690	4691	4686	4687	4688	4689	4690	4691	4692	4692
														29	30	31					29	30	31				
														88	89	90					88	89	90				
														4693	4694	4695					4693	4694	4695				

MAY

JUN

APR

MAY

JUN

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
				4696	4697	4698	4728	4729	4730	4731	4732	4733	4734	4757	4758	4759	4760	4761	4762	4757	4758	4759	4760	4761	4762	4762	
5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13	7	8	9	10	11	12	13
95	96	97	98	99	100	101	123	124	125	126	127	128	129	158	159	160	161	162	163	164	158	159	160	161	162	163	164
4700	4701	4702	4703	4704	4705	4706	4728	4729	4730	4731	4732	4733	4734	4763	4764	4765	4766	4767	4768	4769	4763	4764	4765	4766	4767	4768	4769
							10	11	12	13	14	15	16	14	15	16	17	18	19	20	14	15	16	17	18	19	20
							130	131	132	133	134	135	136	165	166	167	168	169	170	171	165	166	167	168	169	170	171
							4735	4736	4737	4738	4739	4740	4741	4770	4771	4772	4773	4774	4775	4776	4770	4771	4772	4773	4774	4775	4776
							17	18	19	20	21	22	23	21	22	23	24	25	26	27	21	22	23	24	25	26	27
							137	138	139	140	141	142	143	172	173	174	175	176	177	178	172	173	174	175	176	177	178
							4742	4743	4744	4745	4746	4747	4748	4777	4778	4779	4780	4781	4782	4783	4777	4778	4779	4780	4781	4782	4783
							24	25	26	27	28	29	30	28	29	30					28	29	30				
							144	145	146	147	148	149	150	179	180	181					179	180	181				
							4749	4750	4751	4752	4753	4754	4755	4784	4785	4786					4784	4785	4786				

JUL							AUG							SEP						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
186	187	188	189	190	191	192	214	215	216	217	218	219	220	249	250	251	252	253	254	255
4791	4792	4793	4794	4795	4796	4797	4819	4820	4821	4822	4823	4824	4825	4854	4855	4856	4857	4858	4859	4860
12	13	14	15	16	17	18	9	10	11	12	13	14	15	13	14	15	16	17	18	19
193	194	195	196	197	198	199	221	222	223	224	225	226	227	256	257	258	259	260	261	262
4798	4799	4800	4801	4802	4803	4804	4826	4827	4828	4829	4830	4831	4832	4861	4862	4863	4864	4865	4866	4867
18	20	21	22	23	24	25	16	17	18	19	20	21	22	20	21	22	23	24	25	26
200	201	202	203	204	205	206	228	229	230	231	232	233	234	263	264	265	266	267	268	269
4805	4806	4807	4808	4809	4810	4811	4833	4834	4835	4836	4837	4838	4839	4868	4869	4870	4871	4872	4873	4874
26	27	28	29	30	31		23	24	25	26	27	28	29	27	28	29	30			
207	208	209	210	211	212		235	236	237	238	239	240	241	270	271	272	273			
4812	4813	4814	4815	4816	4817		4840	4841	4842	4843	4844	4845	4846	4875	4876	4877	4878			
							30	31												
							242	243												
							4847	4848												

OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
277	278	279	280	281	282	283	312	313	314	315	316	317	318	340	341	342	343	344	345	346
4862	4863	4864	4865	4866	4867	4868	4917	4918	4919	4920	4921	4922	4923	4945	4946	4947	4948	4949	4950	4951
4	5	6	7	8	9	10	8	9	10	11	12	13	14	6	7	8	9	10	11	12
277	278	279	280	281	282	283	312	313	314	315	316	317	318	340	341	342	343	344	345	346
4862	4863	4864	4865	4866	4867	4868	4917	4918	4919	4920	4921	4922	4923	4945	4946	4947	4948	4949	4950	4951
11	12	13	14	15	16	17	15	16	17	18	19	20	21	13	14	15	16	17	18	19
284	285	286	287	288	289	290	319	320	321	322	323	324	325	347	348	349	350	351	352	353
4869	4890	4891	4892	4893	4894	4895	4924	4925	4926	4927	4928	4929	4930	4952	4953	4954	4955	4956	4957	4958
18	19	20	21	22	23	24	22	23	24	25	26	27	28	20	21	22	23	24	25	26
291	292	293	294	295	296	297	326	327	328	329	330	331	332	354	355	356	357	358	359	360
4896	4897	4898	4899	4900	4901	4902	4931	4932	4933	4934	4935	4936	4937	4959	4960	4961	4962	4963	4964	4965
25	26	27	28	29	30	31	29	30						27	28	29	30	31		
298	299	300	301	302	303	304	333	334						361	362	363	364	365		
4903	4904	4905	4906	4907	4908	4909	4938	4939						4966	4967	4968	4969	4970		

JAN							FEB							MAR						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	10	11	12	13	
3	4	5	6	7	8	9	32	33	34	35	36	37	60	61	62	63	64	65		
4973	4974	4975	4976	4977	4978	4979	5002	5003	5004	5005	5006	5007	5030	5031	5032	5033	5034	5035		
10	11	12	13	14	15	16	17	18	19	20	21	22	14	15	16	17	18	19		
10	11	12	13	14	15	16	45	46	47	48	49	50	73	74	75	76	77	78		
4980	4981	4982	4983	4984	4985	4986	5015	5016	5017	5018	5019	5020	5043	5044	5045	5046	5047	5048		
17	18	19	20	21	22	23	24	25	26	27	28	29	21	22	23	24	25	26		
17	18	19	20	21	22	23	52	53	54	55	56	57	80	81	82	83	84	85		
4987	4988	4989	4990	4991	4992	4993	5022	5023	5024	5025	5026	5027	5050	5051	5052	5053	5054	5055		
24	25	26	27	28	29	30	28	29	30	31	32	33	28	29	30	31	32	33		
24	25	26	27	28	29	30	59	5029					87	88	89	90	91	92		
4994	4995	4996	4997	4998	4999	5000							5057	5058	5059	5060				

31
31
5001

APR							MAY							JUN						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7	1	2	3	4	5	6	1	2	3	4	5	6		
91	92	93	94	95	96	97	121	122	123	124	125	126	152	153	154	155	156	157		
5061	5062	5063	5064	5065	5066	5067	5091	5092	5093	5094	5095	5096	5122	5123	5124	5125	5126	5127		
8	9	10	11	12	13	14	8	9	10	11	12	13	8	9	10	11	12	13		
98	99	100	101	102	103	104	127	128	129	130	131	132	158	159	160	161	162	163		
5068	5069	5070	5071	5072	5073	5074	5097	5098	5099	5100	5101	5102	5128	5129	5130	5131	5132	5133		
15	16	17	18	19	20	21	14	15	16	17	18	19	14	15	16	17	18	19		
105	106	107	108	109	110	111	133	134	135	136	137	138	164	165	166	167	168	169		
5075	5076	5077	5078	5079	5080	5081	5103	5104	5105	5106	5107	5108	5134	5135	5136	5137	5138	5139		
22	23	24	25	26	27	28	20	21	22	23	24	25	20	21	22	23	24	25		
112	113	114	115	116	117	118	140	141	142	143	144	145	171	172	173	174	175	176		
5082	5083	5084	5085	5086	5087	5088	5110	5111	5112	5113	5114	5115	5141	5142	5143	5144	5145	5146		
29	30	31					28	29	30	31			27	28	29	30				
119	120						147	148	149	150	151	152	178	179	180	181				
5089	5090						5117	5118	5119	5120	5121	5122	5148	5149	5150	5151				

30
31
150
151
5120
5121

JUL

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
				1	2	3	1	2	3	4	5	6	7								
				182	183	184	213	214	215	216	217	218	219								
				5152	5153	5154	5183	5184	5185	5186	5187	5188	5189								
4	5	6	7	8	9	10	8	9	10	11	12	13	14	5	6	7	8	9	10	11	
185	186	187	188	189	190	191	220	221	222	223	224	225	226	248	249	250	251	252	253	254	
5155	5156	5157	5158	5159	5160	5161	5190	5191	5192	5193	5194	5195	5196	5218	5219	5220	5221	5222	5223	5224	
11	12	13	14	15	16	17	15	16	17	18	19	20	21	12	13	14	15	16	17	18	
192	193	194	195	196	197	198	227	228	229	230	231	232	233	255	256	257	258	259	260	261	
5162	5163	5164	5165	5166	5167	5168	5197	5198	5199	5200	5201	5202	5203	5225	5226	5227	5228	5229	5230	5231	
18	19	20	21	22	23	24	22	23	24	25	26	27	28	19	20	21	22	23	24	25	
199	200	201	202	203	204	205	234	235	236	237	238	239	240	262	263	264	265	266	267	268	
5169	5170	5171	5172	5173	5174	5175	5204	5205	5206	5207	5208	5209	5210	5232	5233	5234	5235	5236	5237	5238	
25	26	27	28	29	30	31	29	30	31					26	27	28	29	30			
206	207	208	209	210	211	212	241	242	243					269	270	271	272	273			
5176	5177	5178	5179	5180	5181	5182	5211	5212	5213					5239	5240	5241	5242	5243			

AUG

OCT

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
3	4	5	6	7	8	9	7	8	9	10	11	12	13	5	6	7	8	9	10	11
276	277	278	279	280	281	282	311	312	313	314	315	316	317	339	340	341	342	343	344	345
5246	5247	5248	5249	5250	5251	5252	5281	5282	5283	5284	5285	5286	5287	5309	5310	5311	5312	5313	5314	5315
10	11	12	13	14	15	16	14	15	16	17	18	19	20	12	13	14	15	16	17	18
283	284	285	286	287	288	289	318	319	320	321	322	323	324	346	347	348	349	350	351	352
5253	5254	5255	5256	5257	5258	5259	5288	5289	5290	5291	5292	5293	5294	5316	5317	5318	5319	5320	5321	5322
17	18	19	20	21	22	23	21	22	23	24	25	26	27	19	20	21	22	23	24	25
290	291	292	293	294	295	296	325	326	327	328	329	330	331	353	354	355	356	357	358	359
5260	5261	5262	5263	5264	5265	5266	5295	5296	5297	5298	5299	5300	5301	5323	5324	5325	5326	5327	5328	5329
24	25	26	27	28	29	30	28	29	30					26	27	28	29	30	31	
297	298	299	300	301	302	303	332	333	334					360	361	362	363	364	365	
5267	5268	5269	5270	5271	5272	5273	5302	5303	5304					5330	5331	5332	5333	5334	5335	

NOV

DEC

JAN

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
						1															
						1															
						5336															
2	3	4	5	6	7	8	6	7	8	9	10	11	12	6	7	8	9	10	11	12	
2	3	4	5	6	7	8	37	38	39	40	41	42	43	65	66	67	68	69	70	71	
5337	5338	5339	5340	5341	5342	5343	5372	5373	5374	5375	5376	5377	5378	5400	5401	5402	5403	5404	5405	5406	
9	10	11	12	13	14	15	13	14	15	16	17	18	19	13	14	15	16	17	18	19	
9	10	11	12	13	14	15	44	45	46	47	48	49	50	72	73	74	75	76	77	78	
5344	5345	5346	5347	5348	5349	5350	5379	5380	5381	5382	5383	5384	5385	5407	5408	5409	5410	5411	5412	5413	
16	17	18	19	20	21	22	20	21	22	23	24	25	26	20	21	22	23	24	25	26	
16	17	18	19	20	21	22	51	52	53	54	55	56	57	79	80	81	82	83	84	85	
5351	5352	5353	5354	5355	5356	5357	5386	5387	5388	5389	5390	5391	5392	5414	5415	5416	5417	5418	5419	5420	
23	24	25	26	27	28	29	27	28	29					27	28	29	30	31			
23	24	25	26	27	28	29	58	59						86	87	88	89	90			
5358	5359	5360	5361	5362	5363	5364	5393	5394						5421	5422	5423	5424	5425			

MAR

FEB

APR

MAY

JUN

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11	
93	94	95	96	97	98	99	128	129	130	131	132	133	134	156	157	158	159	160	161	162	
5428	5429	5430	5431	5432	5433	5434	5463	5464	5465	5466	5467	5468	5469	5491	5492	5493	5494	5495	5496	5497	
10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18	
100	101	102	103	104	105	106	135	136	137	138	139	140	141	163	164	165	166	167	168	169	
5435	5436	5437	5438	5439	5440	5441	5470	5471	5472	5473	5474	5475	5476	5498	5499	5500	5501	5502	5503	5504	
17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25	
107	108	109	110	111	112	113	142	143	144	145	146	147	148	170	171	172	173	174	175	176	
5442	5443	5444	5445	5446	5447	5448	5477	5478	5479	5480	5481	5482	5483	5505	5506	5507	5508	5509	5510	5511	
24	25	26	27	28	29	30	29	30	31					26	27	28	29	30			
114	115	116	117	118	119	120	149	150	151					177	178	179	180	181			
5449	5450	5451	5452	5453	5454	5455	5484	5485	5486					5512	5513	5514	5515	5516			

JUL							AUG							SEP						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
3	4	5	6	7	8	9	7	8	9	10	11	12	13	4	5	6	7	8	9	10
184	185	186	187	188	189	190	219	220	221	222	223	224	225	247	248	249	250	251	252	253
5519	5520	5521	5522	5523	5524	5525	5554	5555	5556	5557	5558	5559	5560	5582	5583	5584	5585	5586	5587	5588
10	11	12	13	14	15	16	14	15	16	17	18	19	20	11	12	13	14	15	16	17
191	192	193	194	195	196	197	226	227	228	229	230	231	232	254	255	256	257	258	259	260
5526	5527	5528	5529	5530	5531	5532	5561	5562	5563	5564	5565	5566	5567	5589	5590	5591	5592	5593	5594	5595
17	18	19	20	21	22	23	21	22	23	24	25	26	27	18	19	20	21	22	23	24
198	199	200	201	202	203	204	233	234	235	236	237	238	239	261	262	263	264	265	266	267
5533	5534	5535	5536	5537	5538	5539	5568	5569	5570	5571	5572	5573	5574	5596	5597	5598	5599	5600	5601	5602
24	25	26	27	28	29	30	28	29	30	31				25	26	27	28	29	30	
205	206	207	208	209	210	211	240	241	242	243				268	269	270	271	272	273	
5540	5541	5542	5543	5544	5545	5546	5575	5576	5577	5578				5603	5604	5605	5606	5607	5608	
31	212	5547																		

OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
2	3	4	5	6	7	8	6	7	8	9	10	11	12	4	5	6	7	8	9	10
275	276	277	278	279	280	281	310	311	312	313	314	315	316	338	339	340	341	342	343	344
5610	5611	5612	5613	5614	5615	5616	5645	5646	5647	5648	5649	5650	5651	5673	5674	5675	5676	5677	5678	5679
9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17
282	283	284	285	286	287	288	317	318	319	320	321	322	323	345	346	347	348	349	350	351
5617	5618	5619	5620	5621	5622	5623	5652	5653	5654	5655	5656	5657	5658	5680	5681	5682	5683	5684	5685	5686
16	17	18	19	20	21	22	20	21	22	23	24	25	26	18	19	20	21	22	23	24
289	290	291	292	293	294	295	324	325	326	327	328	329	330	352	353	354	355	356	357	358
5624	5625	5626	5627	5628	5629	5630	5659	5660	5661	5662	5663	5664	5665	5687	5688	5689	5690	5691	5692	5693
23	24	25	26	27	28	29	27	28	29	30				25	26	27	28	29	30	31
296	297	298	299	300	301	302	331	332	333	334				359	360	361	362	363	364	365
5631	5632	5633	5634	5635	5636	5637	5666	5667	5668	5669				5694	5695	5696	5697	5698	5699	5700
30	31	303	304	5638	5639															

1984

JAN							FEB							MAR						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
5701	5702	5703	5704	5705	5706	5707	5732	5733	5734	5735	5736	5737	5738	5761	5762	5763	5764	5765	5766	5767
8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
5708	5709	5710	5711	5712	5713	5714	5739	5740	5741	5742	5743	5744	5745	5768	5769	5770	5771	5772	5773	5774
15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
5715	5716	5717	5718	5719	5720	5721	5746	5747	5748	5749	5750	5751	5752	5775	5776	5777	5778	5779	5780	5781
22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
5722	5723	5724	5725	5726	5727	5728	5753	5754	5755	5756	5757	5758	5759	5782	5783	5784	5785	5786	5787	5788
29	30	31					29							29	30	31				
5729	5730	5731					5760							5789	5790	5791				

JUN

MAY

APR

APR							MAY							JUN						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
92	93	94	95	96	97	98	122	123	124	125	126	127	128	155	156	157	158	159	160	161
5792	5793	5794	5795	5796	5797	5798	5822	5823	5824	5825	5826	5827	5855	5856	5857	5858	5859	5860	5861	
8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
99	100	101	102	103	104	105	129	130	131	132	133	134	135	162	163	164	165	166	167	168
5799	5800	5801	5802	5803	5804	5805	5829	5830	5831	5832	5833	5834	5862	5863	5864	5865	5866	5867	5868	
15	16	17	18	19	20	21	15	16	17	18	19	20	21	17	18	19	20	21	22	23
5806	5807	5808	5809	5810	5811	5812	5836	5837	5838	5839	5840	5841	5869	5870	5871	5872	5873	5874	5875	
22	23	24	25	26	27	28	22	23	24	25	26	27	28	24	25	26	27	28	29	30
5813	5814	5815	5816	5817	5818	5819	5844	5845	5846	5847	5848	5849	5876	5877	5878	5879	5880	5881	5882	
29	30						29	30	31											
5820	5821						5851	5852	5853	5854	5855	5856								

JUL							AUG							SEP						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7	5	6	7	8	9	10	11	2	3	4	5	6	7	8
183	184	185	186	187	188	189	218	219	220	221	222	223	224	246	247	248	249	250	251	252
5883	5884	5885	5886	5887	5888	5889	5918	5919	5920	5921	5922	5923	5924	5946	5947	5948	5949	5950	5951	5952
8	9	10	11	12	13	14	12	13	14	15	16	17	18	9	10	11	12	13	14	15
190	191	192	193	194	195	196	225	226	227	228	229	230	231	253	254	255	256	257	258	259
5890	5891	5892	5893	5894	5895	5896	5925	5926	5927	5928	5929	5930	5931	5953	5954	5955	5956	5957	5958	5959
15	16	17	18	19	20	21	19	20	21	22	23	24	25	16	17	18	19	20	21	22
197	198	199	200	201	202	203	232	233	234	235	236	237	238	260	261	262	263	264	265	266
5897	5898	5899	5900	5901	5902	5903	5932	5933	5934	5935	5936	5937	5938	5960	5961	5962	5963	5964	5965	5966
22	23	24	25	26	27	28	26	27	28	29	30	31		23	24	25	26	27	28	29
204	205	206	207	208	209	210	239	240	241	242	243	244		267	268	269	270	271	272	273
5904	5905	5906	5907	5908	5909	5910	5939	5940	5941	5942	5943	5944		5967	5968	5969	5970	5971	5972	5973
29	30	31												30						
211	212	213												274						
5911	5912	5913												5974						

OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6		1	2	3		1	2	3	9	10	11	12	13	14	15
275	276	277	278	279	280		306	307	308		306	307	308	337	338	339	340	341	342	343
5975	5976	5977	5978	5979	5980		6006	6007	6008		6006	6007	6008	6037	6038	6039	6040	6041	6042	6043
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8
281	282	283	284	285	286	287	309	310	311	312	313	314	315	337	338	339	340	341	342	343
5981	5982	5983	5984	5985	5986	5987	6009	6010	6011	6012	6013	6014	6015	6037	6038	6039	6040	6041	6042	6043
14	15	16	17	18	19	20	11	12	13	14	15	16	17	9	10	11	12	13	14	15
288	289	290	291	292	293	294	316	317	318	319	320	321	322	344	345	346	347	348	349	350
5988	5989	5990	5991	5992	5993	5994	6016	6017	6018	6019	6020	6021	6022	6044	6045	6046	6047	6048	6049	6050
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22
295	296	297	298	299	300	301	323	324	325	326	327	328	329	351	352	353	354	355	356	357
5995	5996	5997	5998	5999	6000	6001	6023	6024	6025	6026	6027	6028	6029	6051	6052	6053	6054	6055	6056	6057
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29
302	303	304	305				330	331	332	333	334	335		358	359	360	361	362	363	364
6002	6003	6004	6005				6030	6031	6032	6033	6034	6035		6058	6059	6060	6061	6062	6063	6064
														30	31					
														365	366					
														6065	6066					

1985

JAN

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
		1	2	3	4	5						1	2								
		6067	6068	6069	6070	6071						6098	6099								
6	7	8	9	10	11	12	3	4	5	6	7	8	9	3	4	5	6	7	8	9	
6072	6073	6074	6075	6076	6077	6078	6100	6101	6102	6103	6104	6105	6106	6128	6129	6130	6131	6132	6133	6134	
13	14	15	16	17	18	19	10	11	12	13	14	15	16	10	11	12	13	14	15	16	
6079	6080	6081	6082	6083	6084	6085	6107	6108	6109	6110	6111	6112	6113	6135	6136	6137	6138	6139	6140	6141	
20	21	22	23	24	25	26	17	18	19	20	21	22	23	17	18	19	20	21	22	23	
6086	6087	6088	6089	6090	6091	6092	6114	6115	6116	6117	6118	6119	6120	6142	6143	6144	6145	6146	6147	6148	
27	28	29	30	31			24	25	26	27	28	29		24	25	26	27	28	29	30	
6093	6094	6095	6096	6097			6121	6122	6123	6124	6125	6126		6149	6150	6151	6152	6153	6154	6155	

MAR

FEB

APR

MAY

JUN

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
		1	2	3	4	5															
		6157	6158	6159	6160	6161	6162														
7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8	
6163	6164	6165	6166	6167	6168	6169	6191	6192	6193	6194	6195	6196	6197	6219	6220	6221	6222	6223	6224	6225	
14	15	16	17	18	19	20	12	13	14	15	16	17	18	9	10	11	12	13	14	15	
6170	6171	6172	6173	6174	6175	6176	6198	6199	6200	6201	6202	6203	6204	6226	6227	6228	6229	6230	6231	6232	
21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22	
6177	6178	6179	6180	6181	6182	6183	6205	6206	6207	6208	6209	6210	6211	6233	6234	6235	6236	6237	6238	6239	
28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29	
6184	6185	6186					6212	6213	6214	6215	6216	6217		6240	6241	6242	6243	6244	6245	6246	

SEP

AUG

JUL

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
	182	183	184	185	186	187					213	214	215	244	245	246	247	248	249	250
	6248	6249	6250	6251	6252	6253				6279	6280	6281	6281	6310	6311	6312	6313	6314	6315	6316
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
188	189	190	191	192	193	194	216	217	218	219	220	221	222	251	252	253	254	255	256	257
6254	6255	6256	6257	6258	6259	6260	6282	6283	6284	6285	6286	6287	6288	6317	6318	6319	6320	6321	6322	6323
14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21
195	196	197	198	199	200	201	223	224	225	226	227	228	229	258	259	260	261	262	263	264
6261	6262	6263	6264	6265	6266	6267	6289	6290	6291	6292	6293	6294	6295	6324	6325	6326	6327	6328	6329	6330
21	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28
202	203	204	205	206	207	208	230	231	232	233	234	235	236	265	266	267	268	269	270	271
6268	6269	6270	6271	6272	6273	6274	6296	6297	6298	6299	6300	6301	6302	6331	6332	6333	6334	6335	6336	6337
28	29	30	31				25	26	27	28	29	30	31	29	30					
209	210	211	212				237	238	239	240	241	242	243	272	273					
6275	6276	6277	6278				6303	6304	6305	6306	6307	6308	6309	6338	6339					

DEC

NOV

OCT

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5						1	2	1	2	3	4	5	6	7
		274	275	276	277	278						305	306	335	336	337	338	339	340	341
		6340	6341	6342	6343	6344					6371	6372	6372	6401	6402	6403	6404	6405	6406	6407
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14
279	280	281	282	283	284	285	307	308	309	310	311	312	313	342	343	344	345	346	347	348
6345	6346	6347	6348	6349	6350	6351	6373	6374	6375	6376	6377	6378	6379	6408	6409	6410	6411	6412	6413	6414
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21
286	287	288	289	290	291	292	314	315	316	317	318	319	320	349	350	351	352	353	354	355
6352	6353	6354	6355	6356	6357	6358	6380	6381	6382	6383	6384	6385	6386	6415	6416	6417	6418	6419	6420	6421
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28
293	294	295	296	297	298	299	321	322	323	324	325	326	327	356	357	358	359	360	361	362
6359	6360	6361	6362	6363	6364	6365	6387	6388	6389	6390	6391	6392	6393	6422	6423	6424	6425	6426	6427	6428
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				
300	301	302	303	304			328	329	330	331	332	333	334	363	364	365				
6366	6367	6368	6369	6370			6394	6395	6396	6397	6398	6399	6400	6429	6430	6431				

JAN

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
			1	2	3	4							1								1
			1	2	3	4							32								60
			6432	6433	6434	6435							6463								6491

MAR

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
5	6	7	8	9	10	11	2	3	4	5	6	7	8	2	3	4	5	6	7	8
5	6	7	8	9	10	11	33	34	35	36	37	38	39	61	62	63	64	65	66	67
6436	6437	6438	6439	6440	6441	6442	6464	6465	6466	6467	6468	6469	6470	6492	6493	6494	6495	6496	6497	6498
12	13	14	15	16	17	18	9	10	11	12	13	14	15	9	10	11	12	13	14	15
12	13	14	15	16	17	18	40	41	42	43	44	45	46	68	69	70	71	72	73	74
6443	6444	6445	6446	6447	6448	6449	6471	6472	6473	6474	6475	6476	6477	6499	6500	6501	6502	6503	6504	6505
19	20	21	22	23	24	25	16	17	18	19	20	21	22	16	17	18	19	20	21	22
19	20	21	22	23	24	25	47	48	49	50	51	52	53	75	76	77	78	79	80	81
6450	6451	6452	6453	6454	6455	6456	6478	6479	6480	6481	6482	6483	6484	6506	6507	6508	6509	6510	6511	6512
26	27	28	29	30	31		23	24	25	26	27	28	29	23	24	25	26	27	28	29
26	27	28	29	30	31		54	55	56	57	58	59	60	82	83	84	85	86	87	88
6457	6458	6459	6460	6461	6462		6485	6486	6487	6488	6489	6490	6491	6513	6514	6515	6516	6517	6518	6519
														30	31					
														89	90					
														6520	6521					

APR

SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
6	7	8	9	10	11	12	4	5	6	7	8	9	10	8	9	10	11	12	13	14
96	97	98	99	100	101	102	124	125	126	127	128	129	130	159	160	161	162	163	164	165
6527	6528	6529	6530	6531	6532	6533	6555	6556	6557	6558	6559	6560	6561	6590	6591	6592	6593	6594	6595	6596
13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21
103	104	105	106	107	108	109	131	132	133	134	135	136	137	166	167	168	169	170	171	172
6534	6535	6536	6537	6538	6539	6540	6562	6563	6564	6565	6566	6567	6568	6597	6598	6599	6600	6601	6602	6603
20	21	22	23	24	25	26	18	19	20	21	22	23	24	22	23	24	25	26	27	28
110	111	112	113	114	115	116	138	139	140	141	142	143	144	173	174	175	176	177	178	179
6541	6542	6543	6544	6545	6546	6547	6569	6570	6571	6572	6573	6574	6575	6604	6605	6606	6607	6608	6609	6610
27	28	29	30				25	26	27	28	29	30	31	29	30					
117	118	119	120				145	146	147	148	149	150	151	180	181					
6548	6549	6550	6551				6576	6577	6578	6579	6580	6581	6582	6611	6612					

JUN

JUL							AUG							SEP							
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	
		1	2	3	4	5			4	5	6	7	8	9		1	2	3	4	5	6
		182	183	184	185	186			216	217	218	219	220	221		244	245	246	247	248	249
		6613	6614	6615	6616	6617			6646	6648	6649	6650	6651	6652		6675	6676	6677	6678	6679	6680
6	7	8	9	10	11	12	3	4	5	6	7	8	9	7	8	9	10	11	12	13	
187	188	189	190	191	192	193	215	216	217	218	219	220	221	250	251	252	253	254	255	256	
6618	6619	6620	6621	6622	6623	6624	6646	6647	6648	6649	6650	6651	6652	6681	6682	6683	6684	6685	6686	6687	
13	14	15	16	17	18	19	10	11	12	13	14	15	16	14	15	16	17	18	19	20	
194	195	196	197	198	199	200	222	223	224	225	226	227	228	257	258	259	260	261	262	263	
6625	6626	6627	6628	6629	6630	6631	6653	6654	6655	6656	6657	6658	6659	6688	6689	6690	6691	6692	6693	6694	
20	21	22	23	24	25	26	17	18	19	20	21	22	23	21	22	23	24	25	26	27	
201	202	203	204	205	206	207	229	230	231	232	233	234	235	264	265	266	267	268	269	270	
6632	6633	6634	6635	6636	6637	6638	6660	6661	6662	6663	6664	6665	6666	6695	6696	6697	6698	6699	6700	6701	
27	28	29	30	31			24	25	26	27	28	29	30	28	29	30					
208	209	210	211	212			236	237	238	239	240	241	242	271	272	273					
6639	6640	6641	6642	6643			6667	6668	6669	6670	6671	6672	6673	6702	6703	6704					
							31														
							243														
							6674														

OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4							1		1	2	3	4	5	6
			274	275	276	277							305		335	336	337	338	339	340
			6705	6706	6707	6708							6736		6766	6767	6768	6769	6770	6771
5	6	7	8	9	10	11	2	3	4	5	6	7	8	7	8	9	10	11	12	13
278	279	280	281	282	283	284	306	307	308	309	310	311	312	341	342	343	344	345	346	347
6709	6710	6711	6712	6713	6714	6715	6737	6738	6739	6740	6741	6742	6743	6772	6773	6774	6775	6776	6777	6778
12	13	14	15	16	17	18	9	10	11	12	13	14	15	14	15	16	17	18	19	20
285	286	287	288	289	290	291	313	314	315	316	317	318	319	348	349	350	351	352	353	354
6716	6717	6718	6719	6720	6721	6722	6744	6745	6746	6747	6748	6749	6750	6779	6780	6781	6782	6783	6784	6785
19	20	21	22	23	24	25	16	17	18	19	20	21	22	21	22	23	24	25	26	27
292	293	294	295	296	297	298	320	321	322	323	324	325	326	355	356	357	358	359	360	361
6723	6724	6725	6726	6727	6728	6729	6751	6752	6753	6754	6755	6756	6757	6786	6787	6788	6789	6790	6791	6792
26	27	28	29	30	31		23	24	25	26	27	28	29	28	29	30	31			
299	300	301	302	303	304		327	328	329	330	331	332	333	362	363	364	365			
6730	6731	6732	6733	6734	6735		6758	6759	6760	6761	6762	6763	6764	6793	6794	6795	6796			
							30													
							334													
							6765													

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