NOAA Data Report ERL AOML-14

DRIFTING BUOY DATA FROM WESTERN TROPICAL PACIFIC FOR THE PERIOD FEBRUARY 1, 1986, THROUGH FEBRUARY 28, 1989

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July 1989

UNITED STATES DEPARTMENT OF COMMERCE

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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CONTENTS

Page

INTRODUCTION..... 1

DATA ACQUISITION..... 1

BUOY CONSTRUCTION AND HARDWARE..... 1

DESCRIPTION OF SENSOR..... 2

DATA PROCESSING.....2

DATA DISPLAY..... 3

BIBLIOGRAPHY.....4

DRIFTING BUOY DATA FROM WESTERN TROPICAL PACIFIC FOR THE PERIOD

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INTRODUCTION

This report contains satellite-tracked drifting buoy data collected in the Western Tropical Pacific Ocean as part of The People's Republic of China and U.S. cooperative study air-sea interaction in the Western Tropical Pacific program. This data report will cover the deployed drifting buoy from cruise 1 to cruise 4. table 1 details deployment time and locations and end time and locations of each buoy.

DATA ACQUISITION

The buoy data are collected by the ARGOS data collection and location system, which offers capabilities for the location of fixed and moving platforms and the collection of sensor data transmitted by platforms located anywhere on the Earth's surface.

The space segment of the ARGOS system usually consists of two operational orbiting satellites, carrying the ARGOS Data Collection System (DCS). The satellites are equipped with receivers that pick up messages transmitted by buoys within the satellite's coverage. Each buoy contains a platform transmitter terminal (PTT), providing the up-link between buoy and satellite. All PTT's transmit on the same frequency (401.650 MHz) and at regular intervals of 60 to 90 seconds. Message duration is less than 1 second. Message reception is on a random access basis. These data are formatted and stored on magnetic tape, then each time the satellite passes over one of the three telemetry stations the data on tape are transmitted to the ground station. When the satellite has completed data transmission for a particular pass, the received data are transmitted to the National Environmental Satellite Service Center at Suitland (Maryland) where the data that concern the ARGOS system are separated and sent to the ARGOS Data Processing Center, Landover Maryland. The center processes the data, determining platform positions and extracting sensor data. A magnetic tape with all buoy data for the previous month is received at Atlantic Oceanographic and Meteorological Laboratory once a month where further data reduction is done.

BUOY CONSTRUCTION AND HARDWARE

The drifting buoys were designed and constructed at AOML (Bitterman and Hansen,1986). These buoys designs were released with a 10 m length x 0.5 m diameter subsurface drogue, centered at a depth of 15 meters. Drogues were used of the holey socks design.

DESCRIPTION OF SENSOR

Sea surface Temperature. Water temperature is measured with a precision thermistor held against the inside wall near the lower end of the tube by urethane foam. Its temperature versus resistance characteristics are known to within ±0.1 drgrees Celsius, and the overall accuracy of the measurement is estimated at ±0.2 degrees Celsius, not taking into considerration any heating effect on the tube by incident sunlight.

DATA PROCESSING

After separating the buoys by hemisphere,the first step was to eliminate positions that imply accelerations greater than 0.00134 cm/sec^2 . The temperatures are edited by first discarding those that are less than 17°C and greater than 35°C, and also temperature changes greater than 3.0°C per day. The second step is to interpolate locations and temperatures at equal six-hour intervals using a method of interpolation known as Kriging.(Mayra C. Pazos,1988).

Kriging is extensively used in application to two and three-dimensional analyses in mining engineering, and other terrestrial applications. It is similar in philosophy to the method frequently used in analyses of meteorological and oceanic fields, and is discussed briefly by Gandin(1963), but also has some significant differences. An extensive discussion of Kriging can be found in Journel and Huijbregts(1978).

Each of our variables, latitude, longitude, and sea surface temperature, is treated as an independent sequence of values in time. Values of these parameters are interpolated at uniform six-hour intervals as a linear combination of near by observed values,i.e.,

$$x_o^* = \sum_{i=1}^{n} w_i x_i, \qquad (1)$$

in which x_o^* is an estimated value at a time to be interpolated for, x_i are the values observed at nearby times, and w_i are weights to be selected in such a way as to obtain the best interpolated values. "Best" can be qualified in many ways. The weights used in Kriging are determined so as to obtain estimates that have zero mean difference, and minimm mean square difference relative to the true field values. That is

$$E(x - x^*) = 0 \qquad (2)$$

$$E(x - x^*)^2 = \text{minimum}. \qquad (3)$$

Use of equations (1) and (2) leads to

$$\sum_{i=1}^{n} w_i = 1. \qquad (4)$$

Similarly, substitution of (1) into (3) and differentiating with repect to the coefficients leads to the set of equations

$$\sum_{j=1}^{n} w_j \gamma_{ij} + \lambda = \gamma_{oi}, \qquad (i=1,2,...n), \qquad (5)$$

in which λ is the Lagrange multiplier associated with minimizing (3) subject to the unbias constraint(4), and

$$\gamma_{ij} = \frac{1}{2} E(x_i - x_j)^2. \qquad (6)$$

The function γ_{ij} , expressed as a function of the time difference between points of interest is called the variogram, but is more familiar to oceanographers and meteorologists as the struture function. It is presumed to be known or to be determinable from the data to be interpolated. As a practical matter, a single structure function is taken to represent all parts of a particular data element.

A useful feature of the method is that together with the interpolated series it provides with each interpolated value a quality measure in the form of a "Kriging variance," or mean square uncertainty of the analysis,

$$\sigma_k^2 = E(x - x^*)^2 = \sum_{i=1}^{n} w_i \gamma_{oi} - \lambda. \qquad (7)$$

Software packages are commercially available to perform the matrix operations.For this work we used KRIGPAG subroutine GKRIGQ. KRIGPAK is a UNIRAS corporation product. The functional representation of the structure functions needed for this procedure were taken from Hansen and Herman(1989).

DATA DISPLAY

Table 2 shows conversion from Julian day to day,month,and year.Bar charts that illustrate buoy lifetimes are shown in Fig.1 and Fig.2. Monthly displacement of buoys are shown from page 16 to page 28. Trajectory and time series plots for each buoy are displayed from page 29 to 126. Trajectory plots are marked with a star to denote the beginning of buoy life or beginning for this period, open circles denote end of trajectory, closed circles show loss of drogue. On the time series plots some temperature records are shorter than velocity records on a particular buoy. This occurs mostly when the battery voltage becomes low, resulting in erroneous temperature data, although position data are still reliable. The temperature data judged to be in error were deleted.

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Table 1: Drift Buoy History

BUOY No.	BUOY ID	DEP. DATE M	D	Y	DEP LAT	DEP LON	END DATE M	D	Y	LOST DROGUE M	D	Y	DAYS OF LIFE		DAYS DROGUE LIFE	
1-1	3084	2	3	86	0.06	-164.89	2	16	87	9	7	86	378		216	
1-2	3085	2	4	86	-3.03	-164.96	3	10	86	3	10	86	34		34	
1-3	3086	2	5	86	-1.36	-164.73	4	16	86	4	16	86	70		70	
1-4	3087	2	4	86	-2.08	-164.87	7	13	86	5	28	86	159		113	
1-5	3088	2	3	86	1.00	-164.00	1	28	87	1	28	87	359		359	
1-6	3089	2	4	86	3.05	-164.00	4	23	87	10	24	86	443		262	
1-7	3090	2	3	86	1.96	-164.80	12	20	86	12	20	86	320		320	
2-1	2240	11	30	86	0.00	-141.50	8	13	87	8	13	87	256		256	
2-2	3143	12	12	86	-0.04	-164.90	10	26	87	10	26	87	318		318	
2-3	3144	12	04	86	0.00	-157.00	12	30	86	12	30	86	26		26	
2-4	3145	12	16	86	-3.70	-165.26	8	7	87	8	7	87	236		236	
2-5	3146	11	24	86	10.00	-127.90	1	2	87	1	2	87	39		39	
2-6	3147	11	24	86	10.00	-129.90	12	15	86	12	15	86	21		21	
2-7	3148	12	10	86	1.90	-165.03	7	4	87	7	4	87	206		206	
2-8	3149	12	10	86	4.00	-165.04	11	26	87	11	26	87	351		351	
2-9	4800	12	13	86	-1.90	-165.03	2	22	87	2	22	87	71		71	
2-10	4801	11	25	86	8.00	-129.90	4	2	87	4	2	87	128		128	
2-11	4802	12	9	86	5.30	-164.90	2	11	87	2	8	87	64		61	
2-12	4803	1	27	87	-2.00	-165.00	10	31	87	11	1	87	277		278	
2-13	4804	1	27	87	2.10	-164.70	11	16	87	11	14	87	293		291	
2-14	4805	1	27	87	-0.03	-164.70	2	3	88	2	3	88	372		372	
3-1	4828	10	14	87	5.00	-165.00	1	29	88	1	29	88	107		107	
3-2	4829	9	29	87	7.90	-135.00	3	27	88	3	27	88	180		180	
3-3	6850	10	18	87	0.00	-165.00	8	15	88	8	15	88	302		302	
3-4	6851	10	20	87	-4.80	-165.00	4	30	89	0	0	0	558	*	558	*
3-5	6852	9	28	87	7.90	-129.90	10	16	87	10	17	87	18		19	
4-1	6870	5	18	88	-0.01	-165.00	4	28	89	11	17	88	345	*	183	
4-2	6879	5	1	88	10.22	-129.17	5	23	88	5	23	88	22		22	
4-3	6880	5	16	88	5.01	-164.96	4	30	89	11	29	88	349	*	197	
4-4	6882	5	1	88	8.01	-130.03	5	11	88	5	11	88	10		10	
										TOTAL			55838		34090	

* The buoys 3-4, 4-1 and 4-3 were still transmitting

Table 2: Julian Date Calendar

1	1 JAN 86	58	27 FEB 86
2	2 JAN 86	59	28 FEB 86
3	3 JAN 86	60	1 MAR 86
4	4 JAN 86	61	2 MAR 86
5	5 JAN 86	62	3 MAR 86
6	6 JAN 86	63	4 MAR 86
7	7 JAN 86	64	5 MAR 86
8	8 JAN 86	65	6 MAR 86
9	9 JAN 86	66	7 MAR 86
10	10 JAN 86	67	8 MAR 86
11	11 JAN 86	68	9 MAR 86
12	12 JAN 86	69	10 MAR 86
13	13 JAN 86	70	11 MAR 86
14	14 JAN 86	71	12 MAR 86
15	15 JAN 86	72	13 MAR 86
16	16 JAN 86	73	14 MAR 86
17	17 JAN 86	74	15 MAR 86
18	18 JAN 86	75	16 MAR 86
19	19 JAN 86	76	17 MAR 86
20	20 JAN 86	77	18 MAR 86
21	21 JAN 86	78	19 MAR 86
22	22 JAN 86	79	20 MAR 86
23	23 JAN 86	80	21 MAR 86
24	24 JAN 86	81	22 MAR 86
25	25 JAN 86	82	23 MAR 86
26	26 JAN 86	83	24 MAR 86
27	27 JAN 86	84	25 MAR 86
28	28 JAN 86	85	26 MAR 86
29	29 JAN 86	86	27 MAR 86
30	30 JAN 86	87	28 MAR 86
31	31 JAN 86	88	29 MAR 86
32	1 FEB 86	89	30 MAR 86
33	2 FEB 86	90	31 MAR 86
34	3 FEB 86	91	1 APR 86
35	4 FEB 86	92	2 APR 86
36	5 FEB 86	93	3 APR 86
37	6 FEB 86	94	4 APR 86
38	7 FEB 86	95	5 APR 86
39	8 FEB 86	96	6 APR 86
40	9 FEB 86	97	7 APR 86
41	10 FEB 86	98	8 APR 86
42	11 FEB 86	99	9 APR 86
43	12 FEB 86	100	10 APR 86
44	13 FEB 86	101	11 APR 86
45	14 FEB 86	102	12 APR 86
46	15 FEB 86	103	13 APR 86
47	16 FEB 86	104	14 APR 86
48	17 FEB 86	105	15 APR 86
49	18 FEB 86	106	16 APR 86
50	19 FEB 86	107	17 APR 86
51	20 FEB 86	108	18 APR 86
52	21 FEB 86	109	19 APR 86
53	22 FEB 86	110	20 APR 86
54	23 FEB 86	111	21 APR 86
55	24 FEB 86	112	22 APR 86
56	25 FEB 86	113	23 APR 86
57	26 FEB 86	114	24 APR 86
115	25 APR 86		
116	26 APR 86		
117	27 APR 86		
118	28 APR 86		
119	29 APR 86		
120	30 APR 86		
121	1 MAY 86		
122	2 MAY 86		
123	3 MAY 86		
124	4 MAY 86		
125	5 MAY 86		
126	6 MAY 86		
127	7 MAY 86		
128	8 MAY 86		
129	9 MAY 86		
130	10 MAY 86		
131	11 MAY 86		
132	12 MAY 86		
133	13 MAY 86		
134	14 MAY 86		
135	15 MAY 86		
136	16 MAY 86		
137	17 MAY 86		
138	18 MAY 86		
139	19 MAY 86		
140	20 MAY 86		
141	21 MAY 86		
142	22 MAY 86		
143	23 MAY 86		
144	24 MAY 86		
145	25 MAY 86		
146	26 MAY 86		
147	27 MAY 86		
148	28 MAY 86		
149	29 MAY 86		
150	30 MAY 86		
151	31 MAY 86		
152	1 JUN 86		
153	2 JUN 86		
154	3 JUN 86		
155	4 JUN 86		
156	5 JUN 86		
157	6 JUN 86		
158	7 JUN 86		
159	8 JUN 86		
160	9 JUN 86		
161	10 JUN 86		
162	11 JUN 86		
163	12 JUN 86		
164	13 JUN 86		
165	14 JUN 86		
166	15 JUN 86		
167	16 JUN 86		
168	17 JUN 86		
169	18 JUN 86		
170	19 JUN 86		
171	20 JUN 86		

172	21 JUN 86	229	17 AUG 86	286	13 OCT 86
173	22 JUN 86	230	18 AUG 86	287	14 OCT 86
174	23 JUN 86	231	19 AUG 86	288	15 OCT 86
175	24 JUN 86	232	20 AUG 86	289	16 OCT 86
176	25 JUN 86	233	21 AUG 86	290	17 OCT 86
177	26 JUN 86	234	22 AUG 86	291	18 OCT 86
178	27 JUN 86	235	23 AUG 86	292	19 OCT 86
179	28 JUN 86	236	24 AUG 86	293	20 OCT 86
180	29 JUN 86	237	25 AUG 86	294	21 OCT 86
181	30 JUN 86	238	26 AUG 86	295	22 OCT 86
182	1 JUL 86	239	27 AUG 86	296	23 OCT 86
183	2 JUL 86	240	28 AUG 86	297	24 OCT 86
184	3 JUL 86	241	29 AUG 86	298	25 OCT 86
185	4 JUL 86	242	30 AUG 86	299	26 OCT 86
186	5 JUL 86	243	31 AUG 86	300	27 OCT 86
187	6 JUL 86	244	1 SEP 86	301	28 OCT 86
188	7 JUL 86	245	2 SEP 86	302	29 OCT 86
189	8 JUL 86	246	3 SEP 86	303	30 OCT 86
190	9 JUL 86	247	4 SEP 86	304	31 OCT 86
191	10 JUL 86	248	5 SEP 86	305	1 NOV 86
192	11 JUL 86	249	6 SEP 86	306	2 NOV 86
193	12 JUL 86	250	7 SEP 86	307	3 NOV 86
194	13 JUL 86	251	8 SEP 86	308	4 NOV 86
195	14 JUL 86	252	9 SEP 86	309	5 NOV 86
196	15 JUL 86	253	10 SEP 86	310	6 NOV 86
197	16 JUL 86	254	11 SEP 86	311	7 NOV 86
198	17 JUL 86	255	12 SEP 86	312	8 NOV 86
199	18 JUL 86	256	13 SEP 86	313	9 NOV 86
200	19 JUL 86	257	14 SEP 86	314	10 NOV 86
201	20 JUL 86	258	15 SEP 86	315	11 NOV 86
202	21 JUL 86	259	16 SEP 86	316	12 NOV 86
203	22 JUL 86	260	17 SEP 86	317	13 NOV 86
204	23 JUL 86	261	18 SEP 86	318	14 NOV 86
205	24 JUL 86	262	19 SEP 86	319	15 NOV 86
206	25 JUL 86	263	20 SEP 86	320	16 NOV 86
207	26 JUL 86	264	21 SEP 86	321	17 NOV 86
208	27 JUL 86	265	22 SEP 86	322	18 NOV 86
209	28 JUL 86	266	23 SEP 86	323	19 NOV 86
210	29 JUL 86	267	24 SEP 86	324	20 NOV 86
211	30 JUL 86	268	25 SEP 86	325	21 NOV 86
212	31 JUL 86	269	26 SEP 86	326	22 NOV 86
213	1 AUG 86	270	27 SEP 86	327	23 NOV 86
214	2 AUG 86	271	28 SEP 86	328	24 NOV 86
215	3 AUG 86	272	29 SEP 86	329	25 NOV 86
216	4 AUG 86	273	30 SEP 86	330	26 NOV 86
217	5 AUG 86	274	1 OCT 86	331	27 NOV 86
218	6 AUG 86	275	2 OCT 86	332	28 NOV 86
219	7 AUG 86	276	3 OCT 86	333	29 NOV 86
220	8 AUG 86	277	4 OCT 86	334	30 NOV 86
221	9 AUG 86	278	5 OCT 86	335	1 DEC 86
222	10 AUG 86	279	6 OCT 86	336	2 DEC 86
223	11 AUG 86	280	7 OCT 86	337	3 DEC 86
224	12 AUG 86	281	8 OCT 86	338	4 DEC 86
225	13 AUG 86	282	9 OCT 86	339	5 DEC 86
226	14 AUG 86	283	10 OCT 86	340	6 DEC 86
227	15 AUG 86	284	11 OCT 86	341	7 DEC 86
228	16 AUG 86	285	12 OCT 86	342	8 DEC 86

343	9	DEC 86	400	4	FEB 87	457	2	APR 87
344	10	DEC 86	401	5	FEB 87	458	3	APR 87
345	11	DEC 86	402	6	FEB 87	459	4	APR 87
346	12	DEC 86	403	7	FEB 87	460	5	APR 87
347	13	DEC 86	404	8	FEB 87	461	6	APR 87
348	14	DEC 86	405	9	FEB 87	462	7	APR 87
349	15	DEC 86	406	10	FEB 87	463	8	APR 87
350	16	DEC 86	407	11	FEB 87	464	9	APR 87
351	17	DEC 86	408	12	FEB 87	465	10	APR 87
352	18	DEC 86	409	13	FEB 87	466	11	APR 87
353	19	DEC 86	410	14	FEB 87	467	12	APR 87
354	20	DEC 86	411	15	FEB 87	468	13	APR 87
355	21	DEC 86	412	16	FEB 87	469	14	APR 87
356	22	DEC 86	413	17	FEB 87	470	15	APR 87
357	23	DEC 86	414	18	FEB 87	471	16	APR 87
358	24	DEC 86	415	19	FEB 87	472	17	APR 87
359	25	DEC 86	416	20	FEB 87	473	18	APR 87
360	26	DEC 86	417	21	FEB 87	474	19	APR 87
361	27	DEC 86	418	22	FEB 87	475	20	APR 87
362	28	DEC 86	419	23	FEB 87	476	21	APR 87
363	29	DEC 86	420	24	FEB 87	477	22	APR 87
364	30	DEC 86	421	25	FEB 87	478	23	APR 87
365	31	DEC 86	422	26	FEB 87	479	24	APR 87
366	1	JAN 87	423	27	FEB 87	480	25	APR 87
367	2	JAN 87	424	28	FEB 87	481	26	APR 87
368	3	JAN 87	425	1	MAR 87	482	27	APR 87
369	4	JAN 87	426	2	MAR 87	483	28	APR 87
370	5	JAN 87	427	3	MAR 87	484	29	APR 87
371	6	JAN 87	428	4	MAR 87	485	30	APR 87
372	7	JAN 87	429	5	MAR 87	486	1	MAY 87
373	8	JAN 87	430	6	MAR 87	487	2	MAY 87
374	9	JAN 87	431	7	MAR 87	488	3	MAY 87
375	10	JAN 87	432	8	MAR 87	489	4	MAY 87
376	11	JAN 87	433	9	MAR 87	490	5	MAY 87
377	12	JAN 87	434	10	MAR 87	491	6	MAY 87
378	13	JAN 87	435	11	MAR 87	492	7	MAY 87
379	14	JAN 87	436	12	MAR 87	493	8	MAY 87
380	15	JAN 87	437	13	MAR 87	494	9	MAY 87
381	16	JAN 87	438	14	MAR 87	495	10	MAY 87
382	17	JAN 87	439	15	MAR 87	496	11	MAY 87
383	18	JAN 87	440	16	MAR 87	497	12	MAY 87
384	19	JAN 87	441	17	MAR 87	498	13	MAY 87
385	20	JAN 87	442	18	MAR 87	499	14	MAY 87
386	21	JAN 87	443	19	MAR 87	500	15	MAY 87
387	22	JAN 87	444	20	MAR 87	501	16	MAY 87
388	23	JAN 87	445	21	MAR 87	502	17	MAY 87
389	24	JAN 87	446	22	MAR 87	503	18	MAY 87
390	25	JAN 87	447	23	MAR 87	504	19	MAY 87
391	26	JAN 87	448	24	MAR 87	505	20	MAY 87
392	27	JAN 87	449	25	MAR 87	506	21	MAY 87
393	28	JAN 87	450	26	MAR 87	507	22	MAY 87
394	29	JAN 87	451	27	MAR 87	508	23	MAY 87
395	30	JAN 87	452	28	MAR 87	509	24	MAY 87
396	31	JAN 87	453	29	MAR 87	510	25	MAY 87
397	1	FEB 87	454	30	MAR 87	511	26	MAY 87
398	2	FEB 87	455	31	MAR 87	512	27	MAY 87
399	3	FEB 87	456	1	APR 87	513	28	MAY 87

514	29	MAY 87	571	25	JUL 87	628	20	SEP 87
515	30	MAY 87	572	26	JUL 87	629	21	SEP 87
516	31	MAY 87	573	27	JUL 87	630	22	SEP 87
517	1	JUN 87	574	28	JUL 87	631	23	SEP 87
518	2	JUN 87	575	29	JUL 87	632	24	SEP 87
519	3	JUN 87	576	30	JUL 87	633	25	SEP 87
520	4	JUN 87	577	31	JUL 87	634	26	SEP 87
521	5	JUN 87	578	1	AUG 87	635	27	SEP 87
522	6	JUN 87	579	2	AUG 87	636	28	SEP 87
523	7	JUN 87	580	3	AUG 87	637	29	SEP 87
524	8	JUN 87	581	4	AUG 87	638	30	SEP 87
525	9	JUN 87	582	5	AUG 87	639	1	OCT 87
526	10	JUN 87	583	6	AUG 87	640	2	OCT 87
527	11	JUN 87	584	7	AUG 87	641	3	OCT 87
528	12	JUN 87	585	8	AUG 87	642	4	OCT 87
529	13	JUN 87	586	9	AUG 87	643	5	OCT 87
530	14	JUN 87	587	10	AUG 87	644	6	OCT 87
531	15	JUN 87	588	11	AUG 87	645	7	OCT 87
532	16	JUN 87	589	12	AUG 87	646	8	OCT 87
533	17	JUN 87	590	13	AUG 87	647	9	OCT 87
534	18	JUN 87	591	14	AUG 87	648	10	OCT 87
535	19	JUN 87	592	15	AUG 87	649	11	OCT 87
536	20	JUN 87	593	16	AUG 87	650	12	OCT 87
537	21	JUN 87	594	17	AUG 87	651	13	OCT 87
538	22	JUN 87	595	18	AUG 87	652	14	OCT 87
539	23	JUN 87	596	19	AUG 87	653	15	OCT 87
540	24	JUN 87	597	20	AUG 87	654	16	OCT 87
541	25	JUN 87	598	21	AUG 87	655	17	OCT 87
542	26	JUN 87	599	22	AUG 87	656	18	OCT 87
543	27	JUN 87	600	23	AUG 87	657	19	OCT 87
544	28	JUN 87	601	24	AUG 87	658	20	OCT 87
545	29	JUN 87	602	25	AUG 87	659	21	OCT 87
546	30	JUN 87	603	26	AUG 87	660	22	OCT 87
547	1	JUL 87	604	27	AUG 87	661	23	OCT 87
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549	3	JUL 87	606	29	AUG 87	663	25	OCT 87
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552	6	JUL 87	609	1	SEP 87	666	28	OCT 87
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558	12	JUL 87	615	7	SEP 87	672	3	NOV 87
559	13	JUL 87	616	8	SEP 87	673	4	NOV 87
560	14	JUL 87	617	9	SEP 87	674	5	NOV 87
561	15	JUL 87	618	10	SEP 87	675	6	NOV 87
562	16	JUL 87	619	11	SEP 87	676	7	NOV 87
563	17	JUL 87	620	12	SEP 87	677	8	NOV 87
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565	19	JUL 87	622	14	SEP 87	679	10	NOV 87
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568	22	JUL 87	625	17	SEP 87	682	13	NOV 87
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686	17 NOV 87	743	13 JAN 88	800	10 MAR 88
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688	19 NOV 87	745	15 JAN 88	802	12 MAR 88
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705	6 DEC 87	762	1 FEB 88	819	29 MAR 88
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707	8 DEC 87	764	3 FEB 88	821	31 MAR 88
708	9 DEC 87	765	4 FEB 88	822	1 APR 88
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716	17 DEC 87	773	12 FEB 88	830	9 APR 88
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719	20 DEC 87	776	15 FEB 88	833	12 APR 88
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722	23 DEC 87	779	18 FEB 88	836	15 APR 88
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724	25 DEC 87	781	20 FEB 88	838	17 APR 88
725	26 DEC 87	782	21 FEB 88	839	18 APR 88
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728	29 DEC 87	785	24 FEB 88	842	21 APR 88
729	30 DEC 87	786	25 FEB 88	843	22 APR 88
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734	4 JAN 88	791	1 MAR 88	848	27 APR 88
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1040	5	NOV 88	1097	1	JAN 89	1154	27	FEB 89
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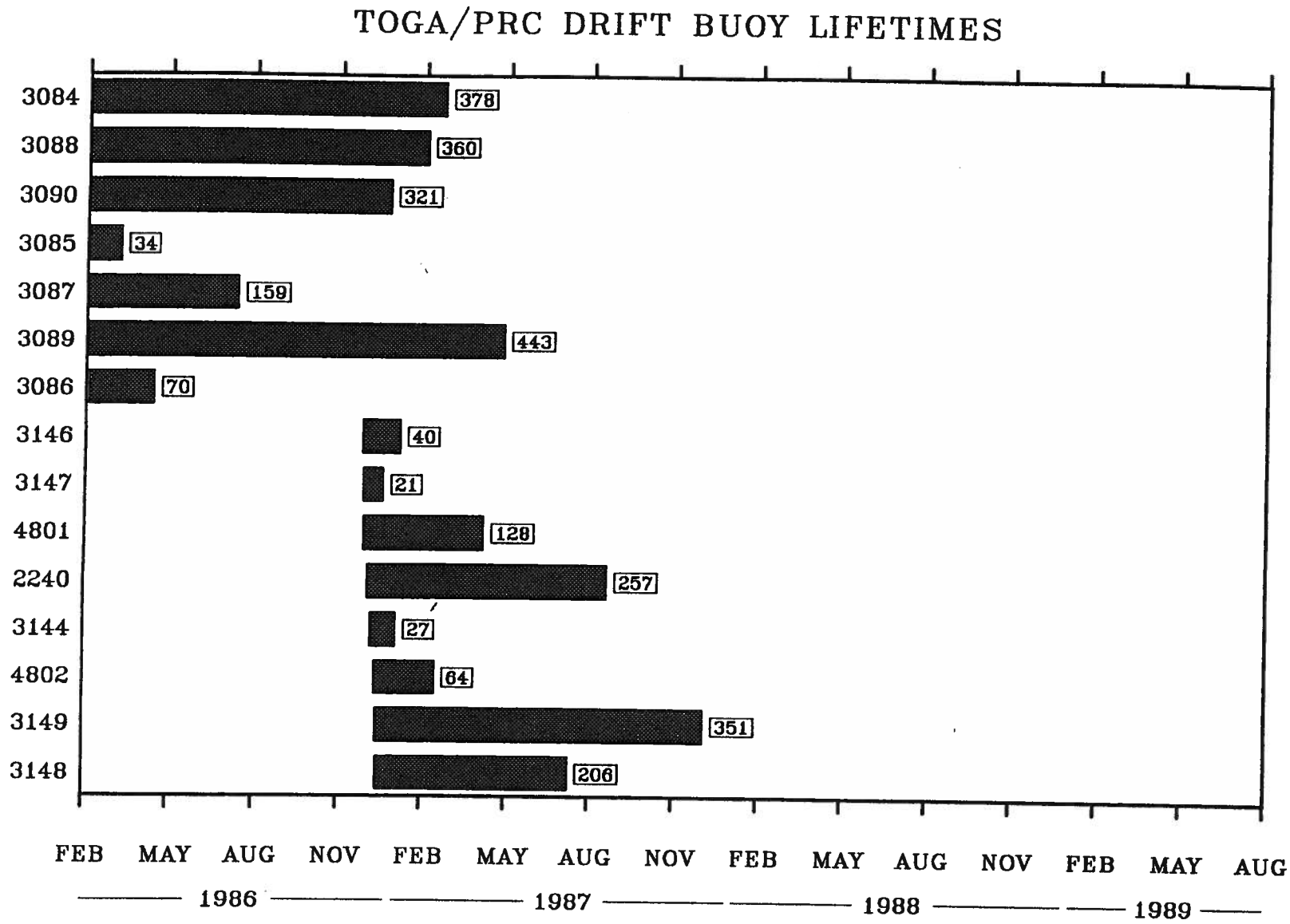


Figure 1. Time span of data from drifting buoys included in this report.

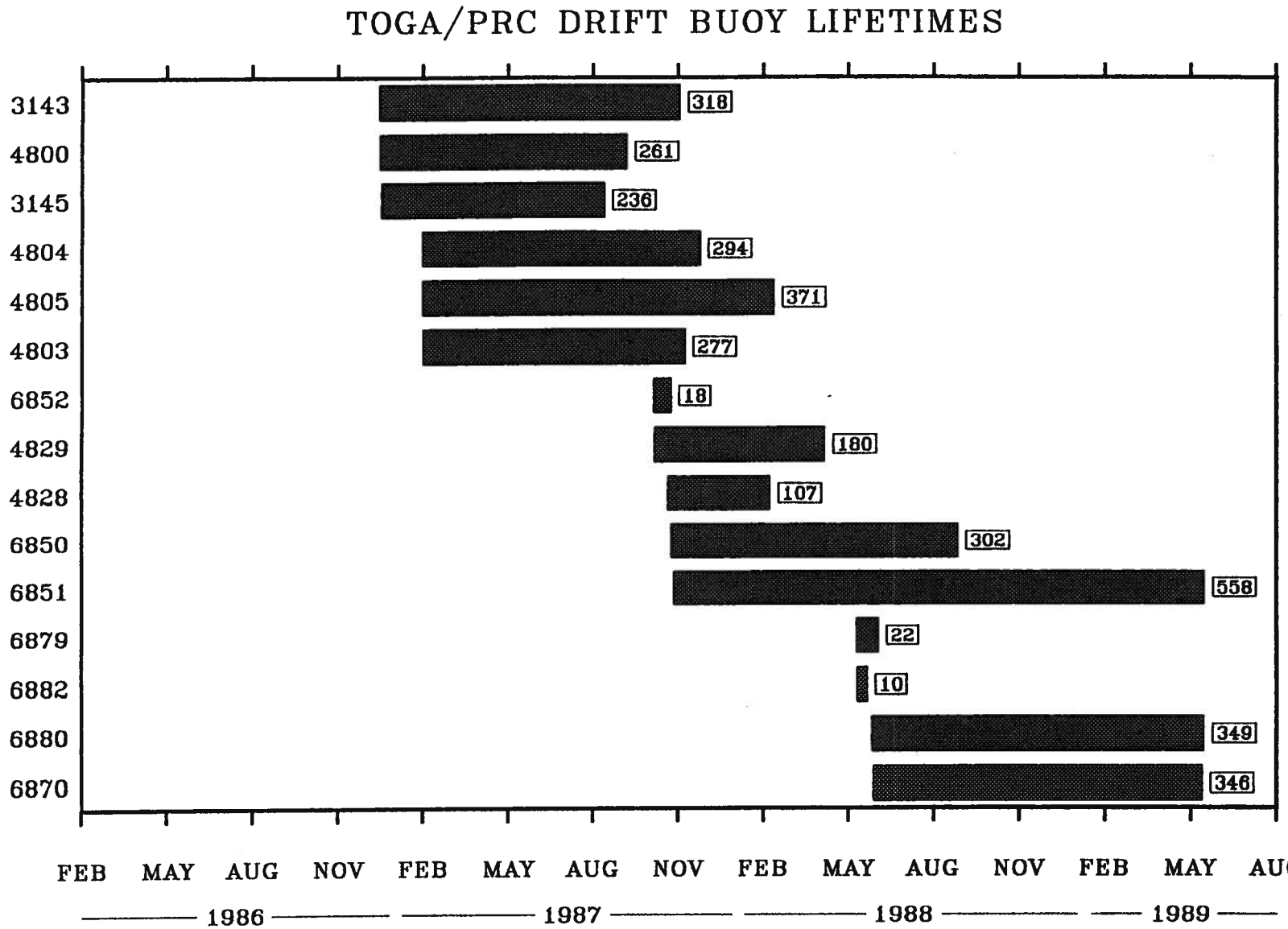


Figure 2. Time span of data from drifting buoys included in this report.

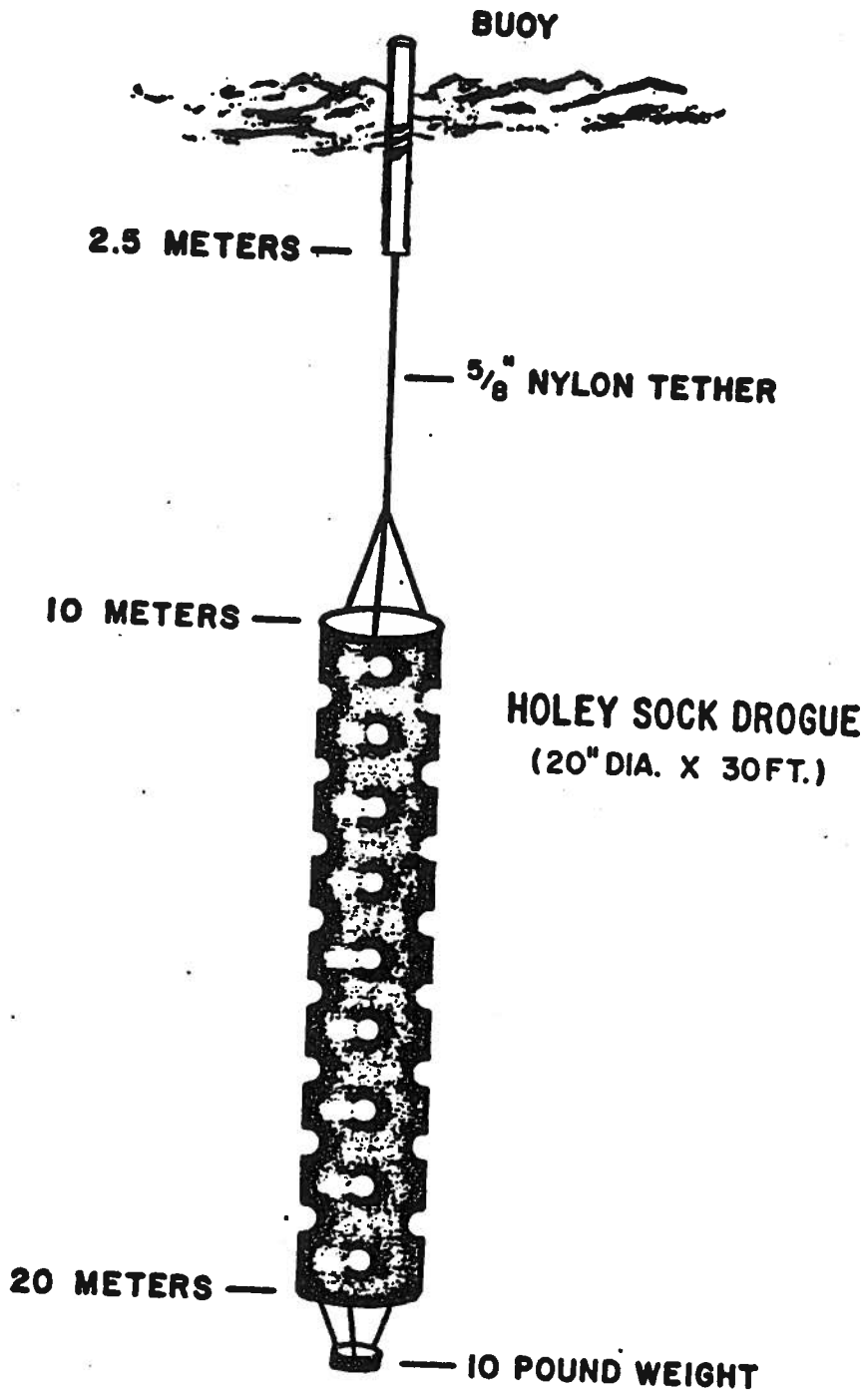
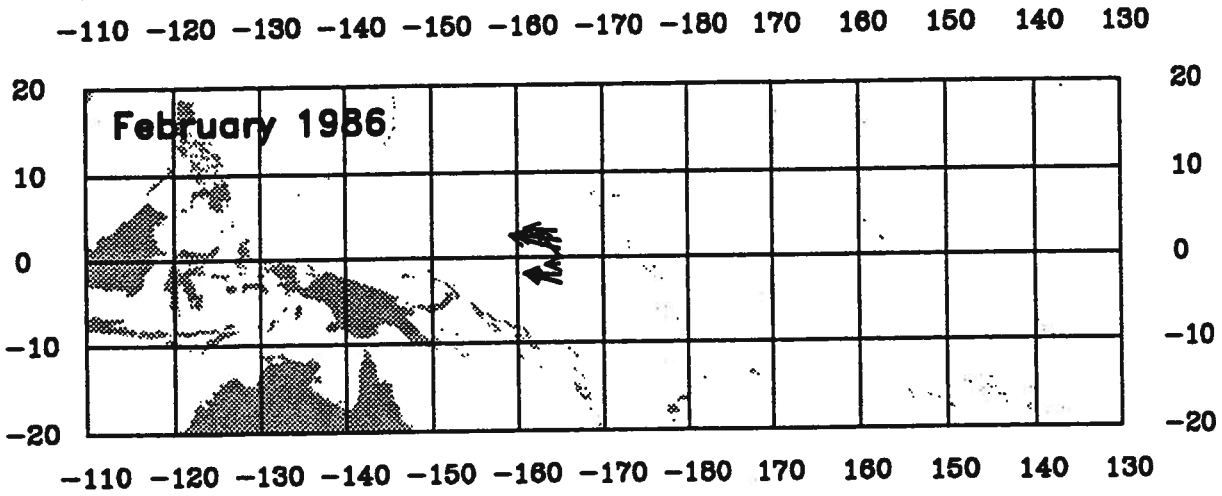
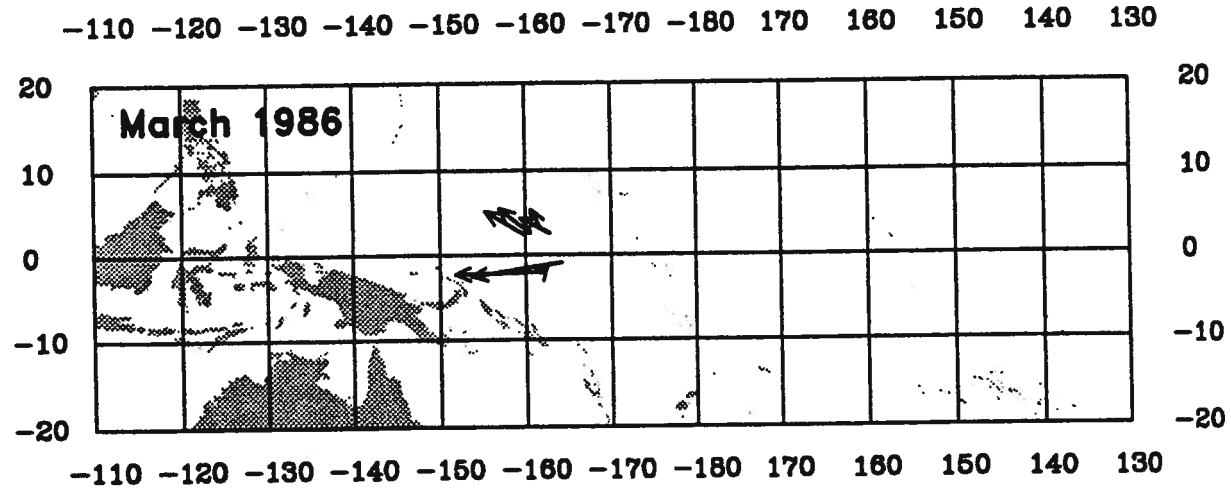
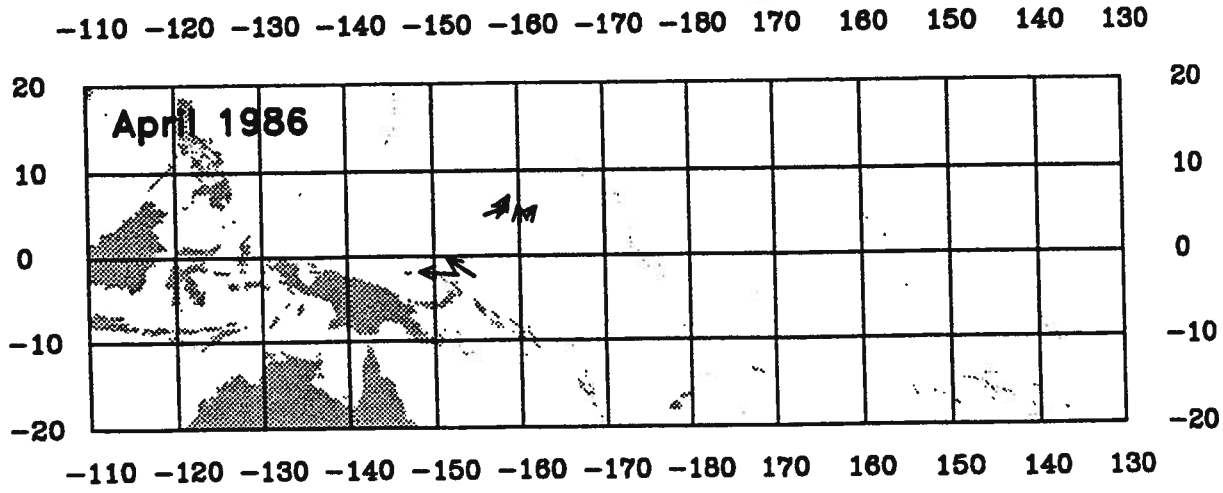


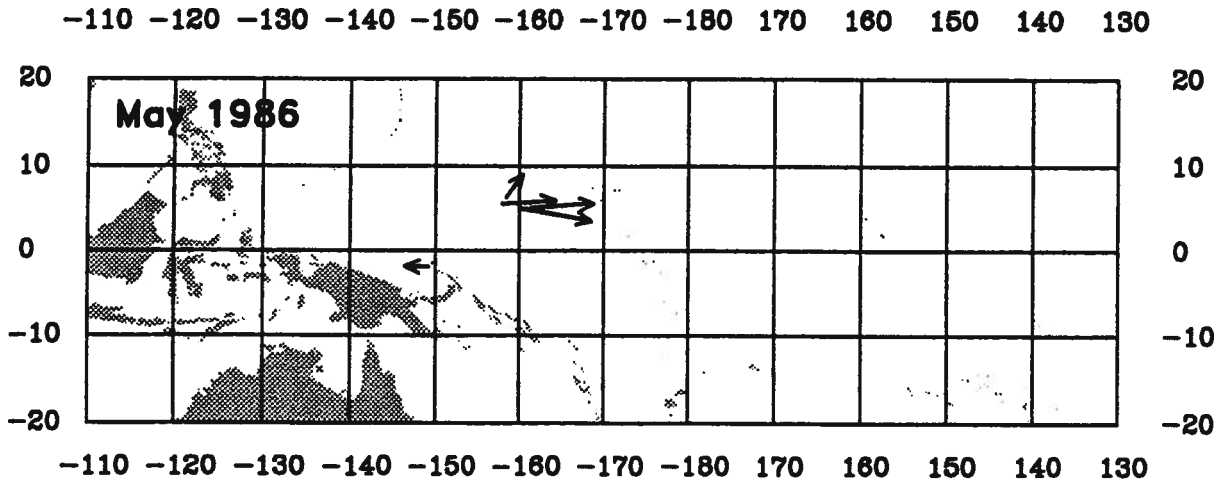
Figure 3. Buoy with drogue

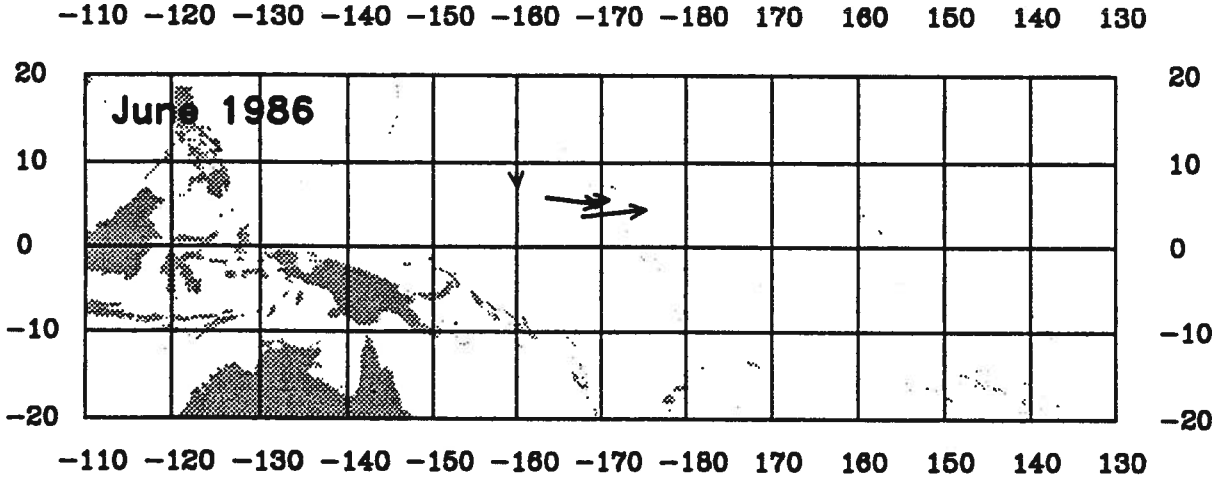


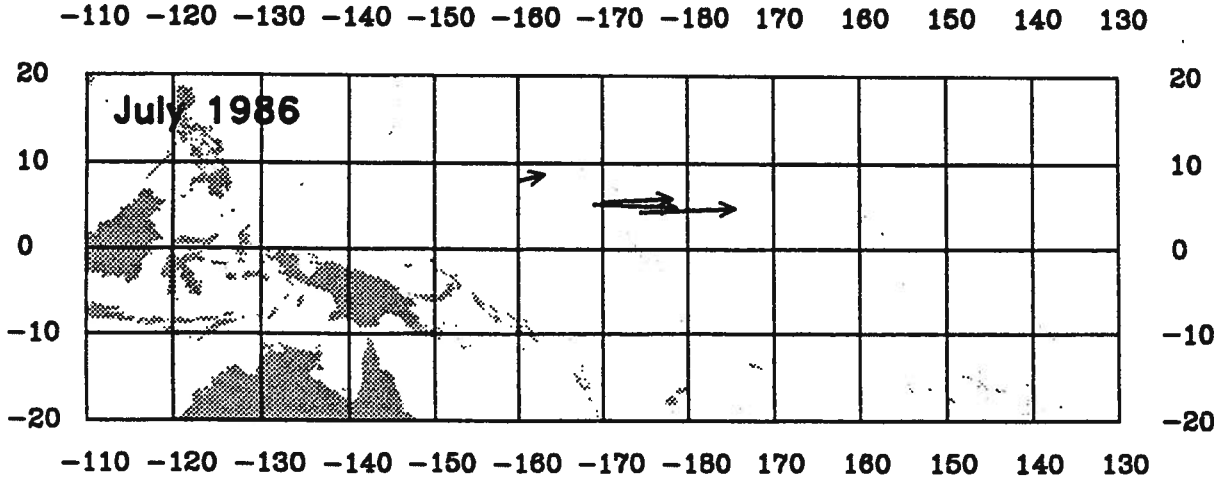




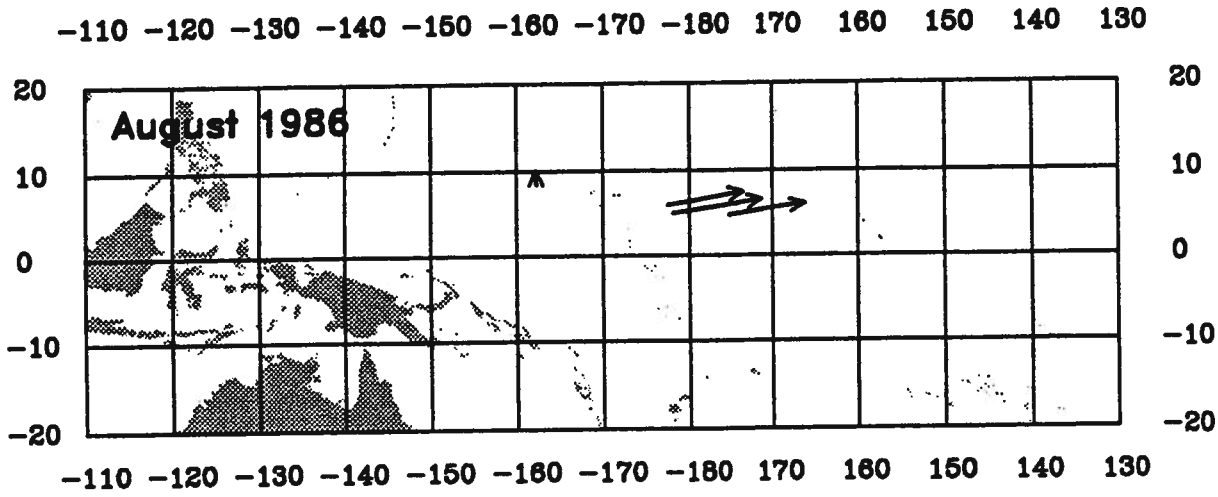
MONTHLY DISPLACEMENT OF BUOYS







MONTHLY DISPLACEMENT OF BUOYS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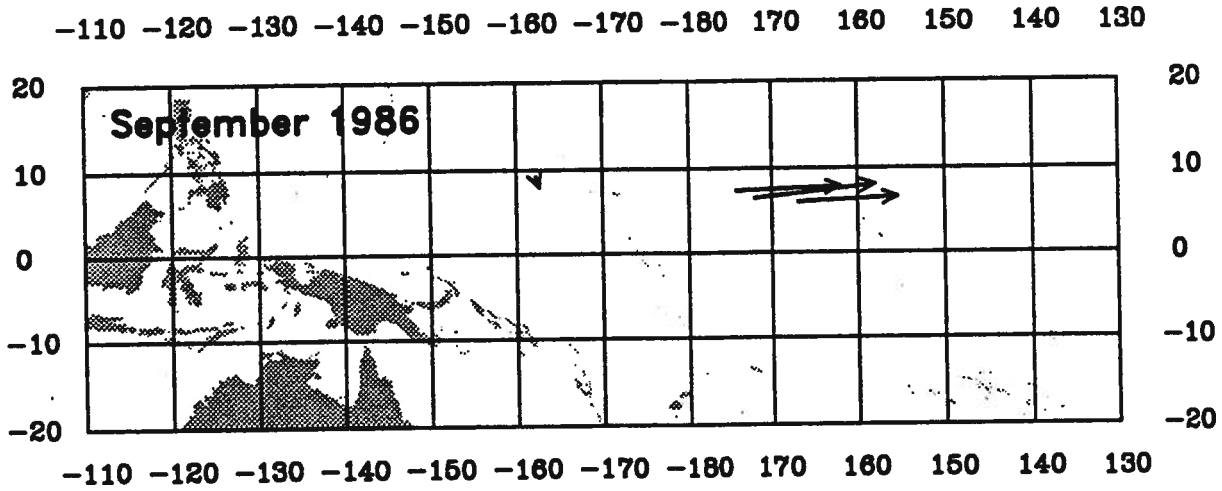
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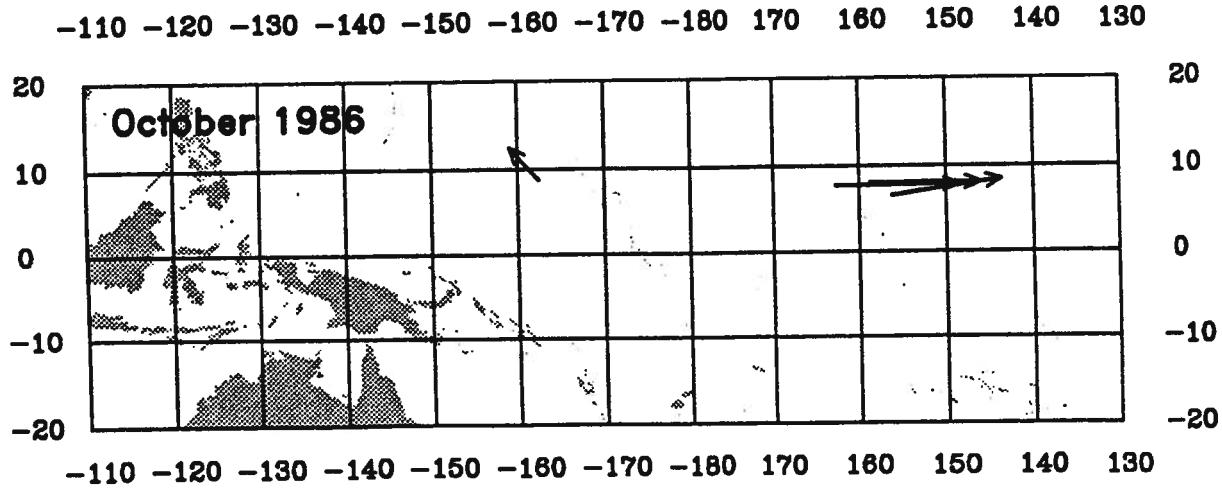
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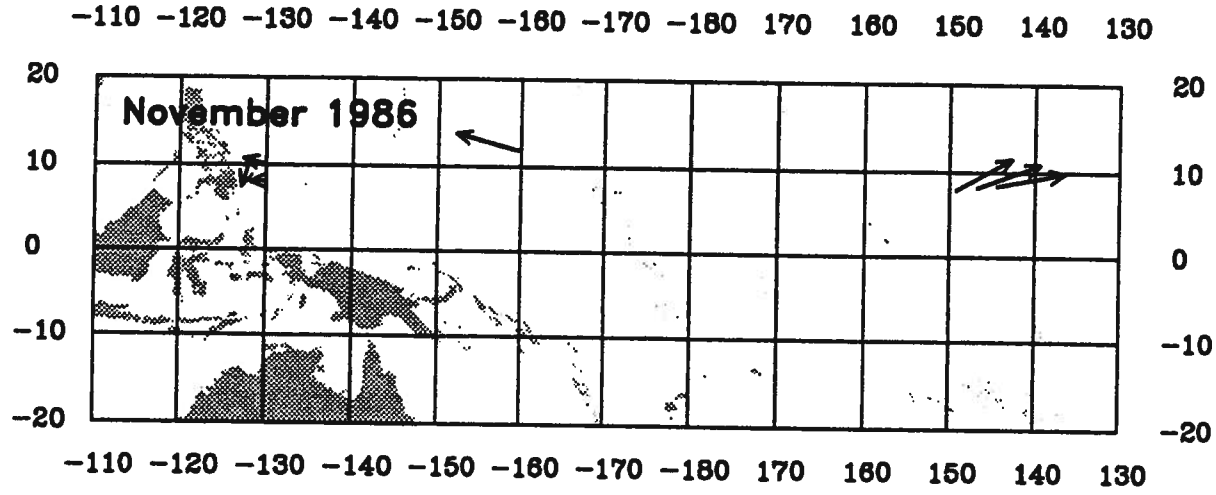
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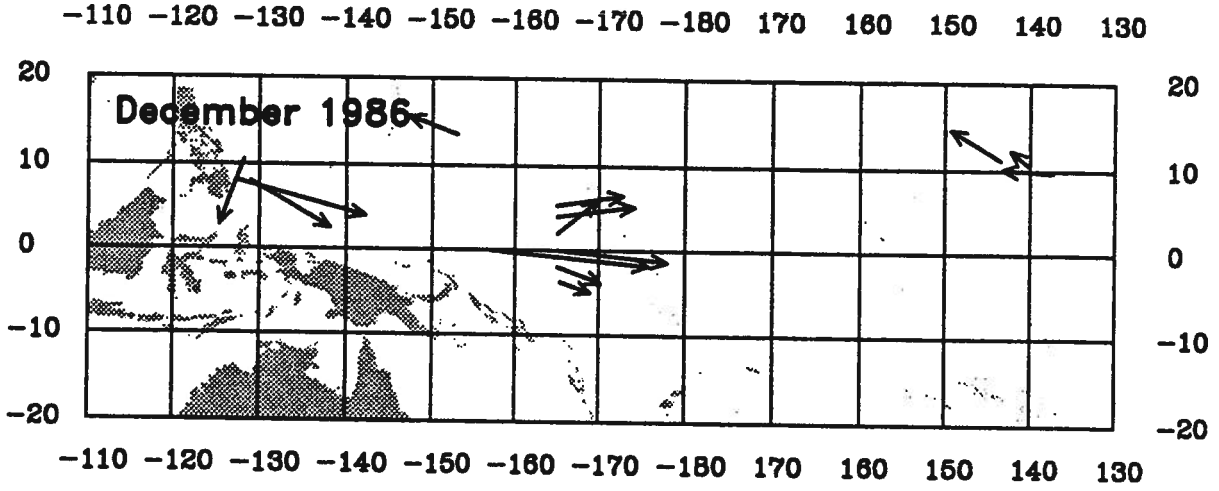
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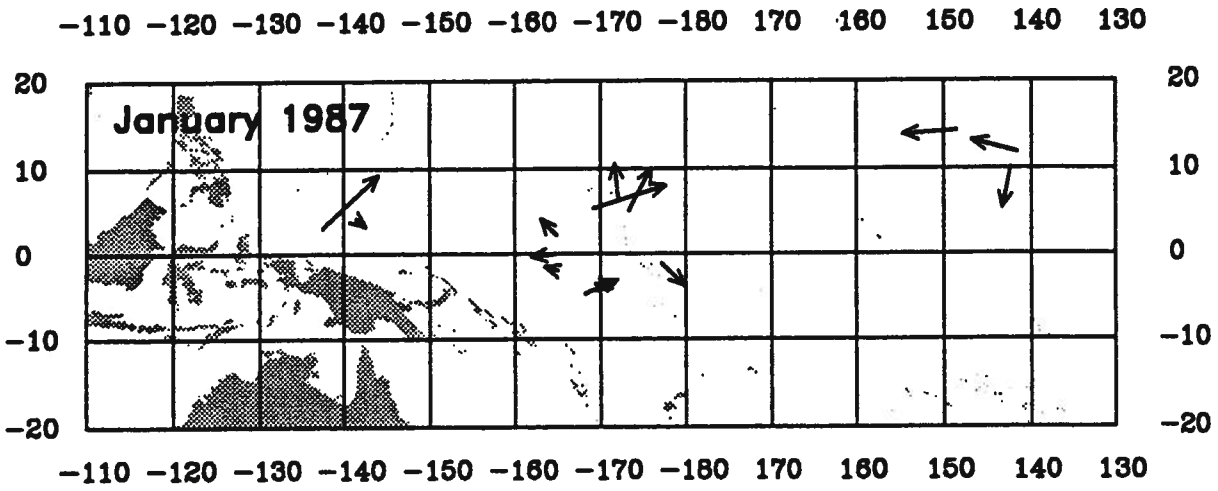
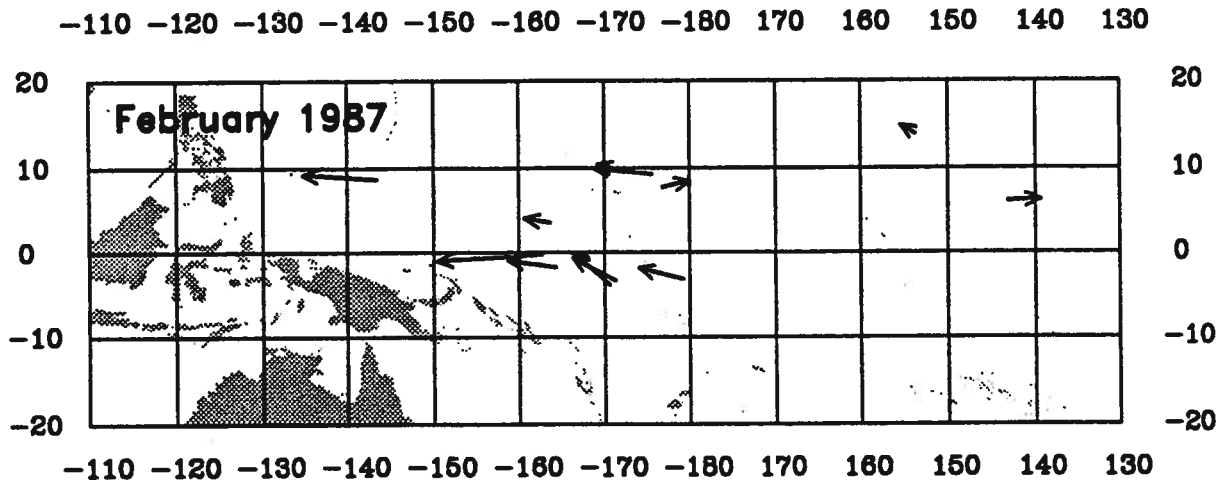
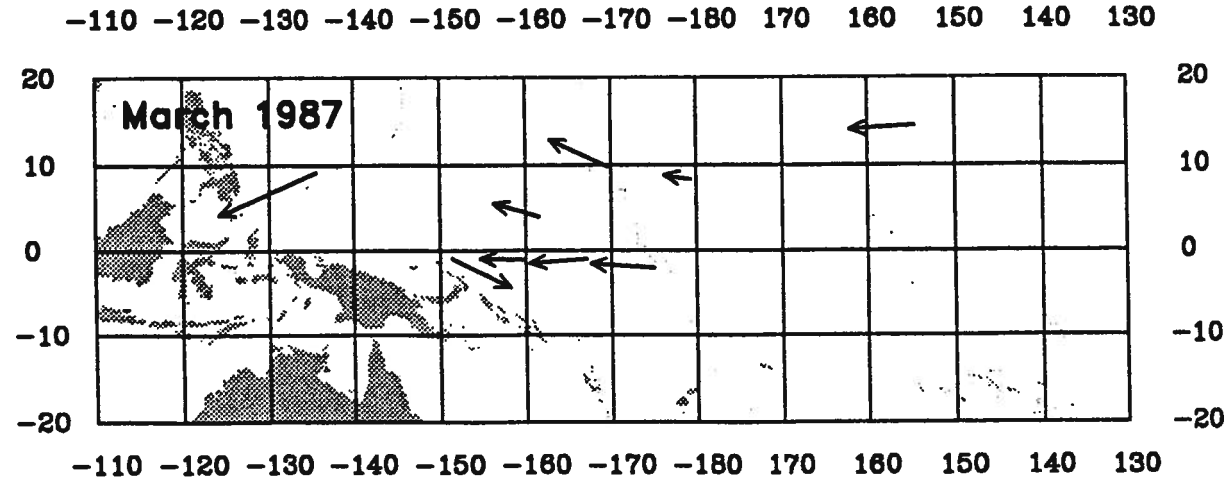
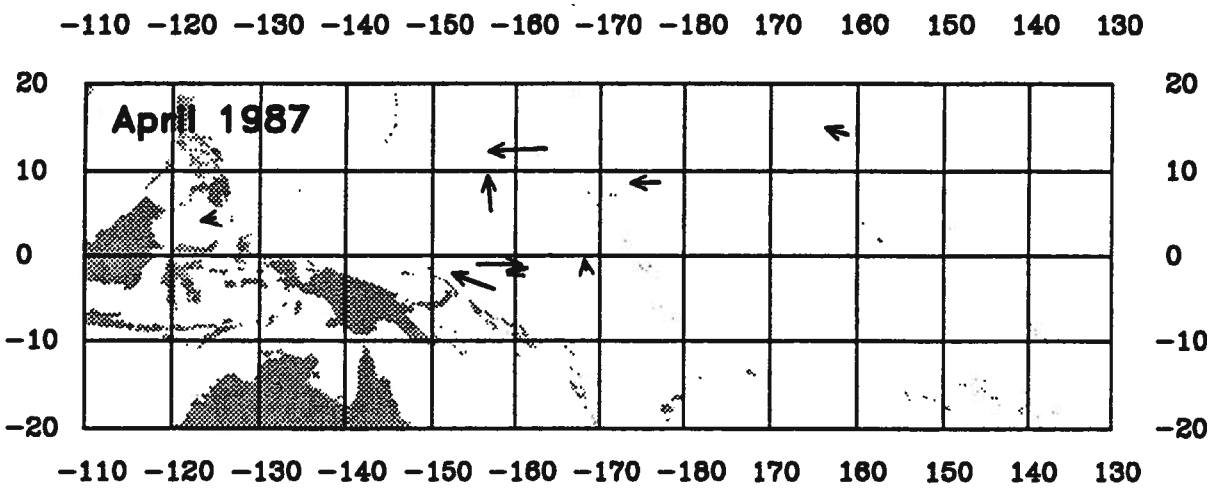






MONTHLY DISPLACEMENT OF BUOYS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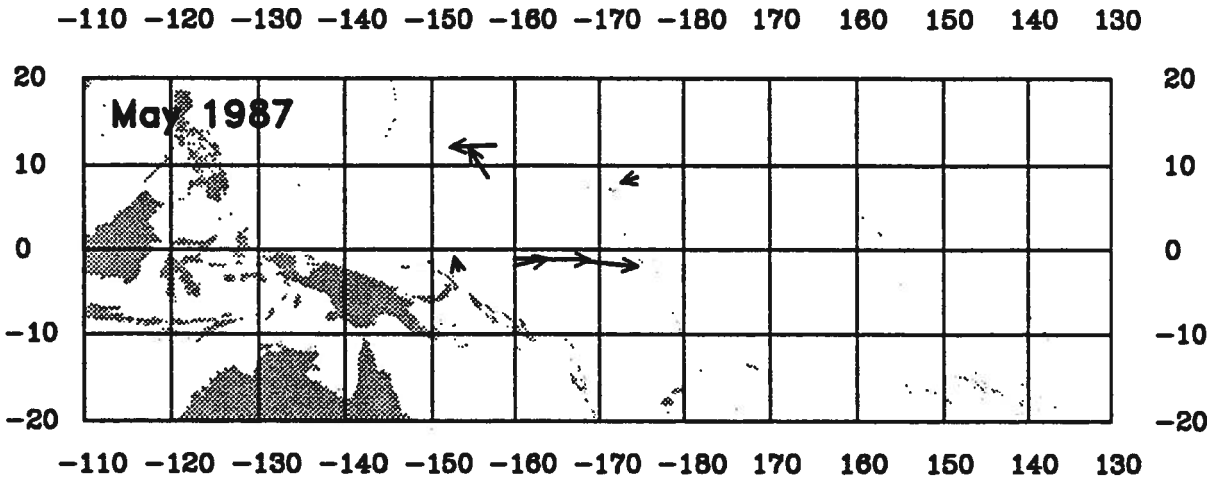
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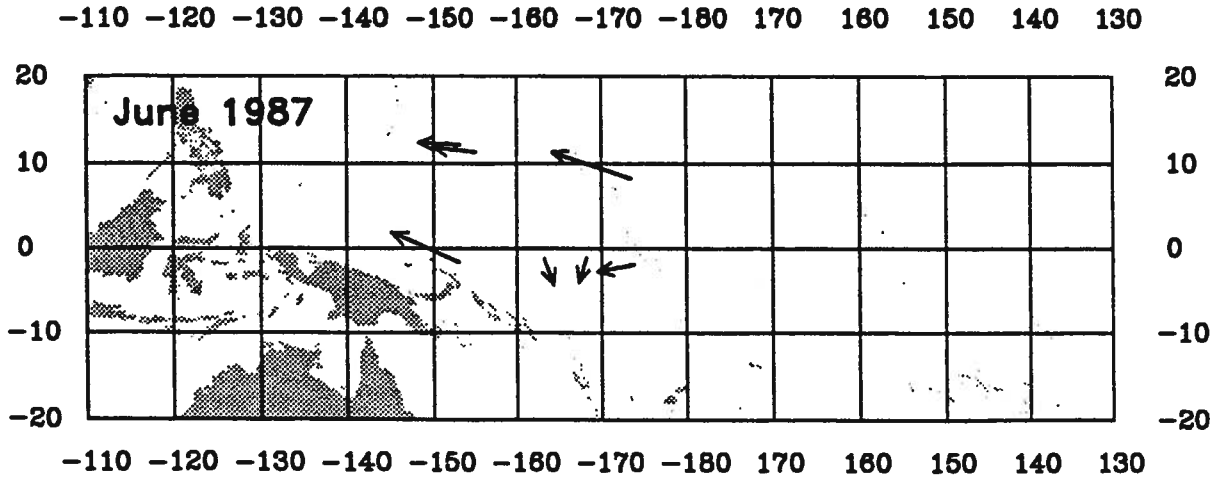
June 1987
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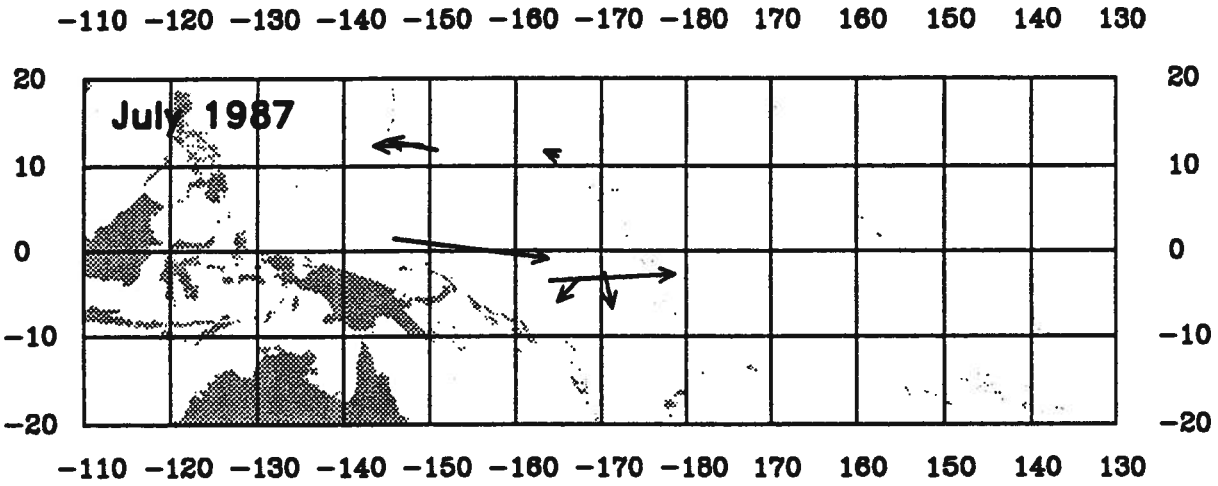
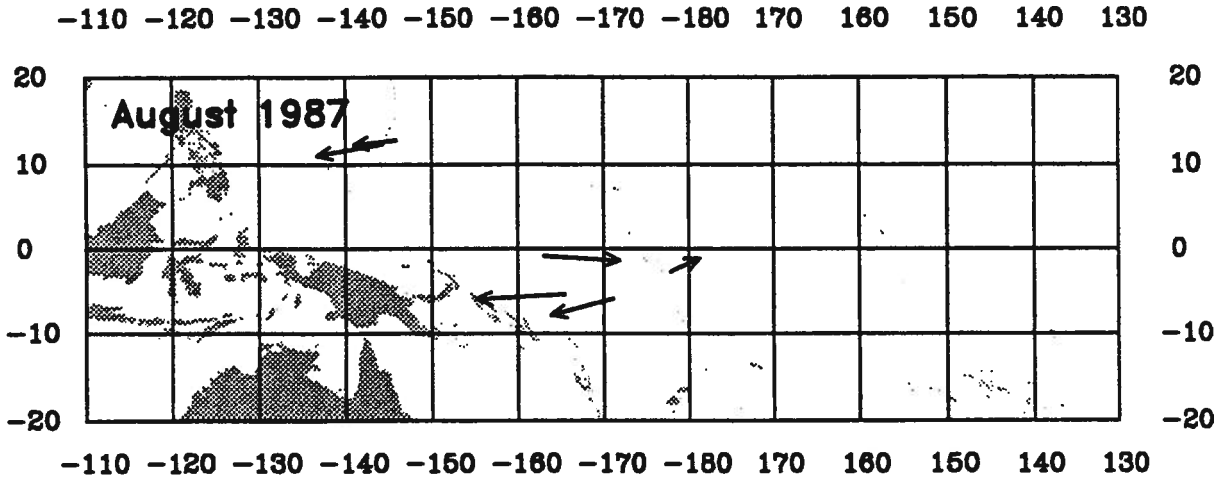
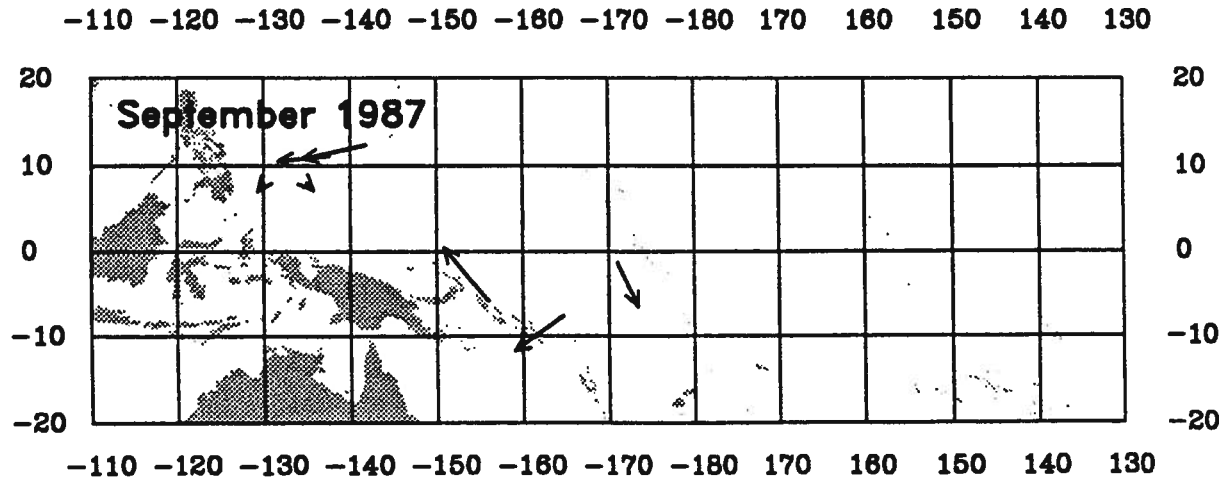
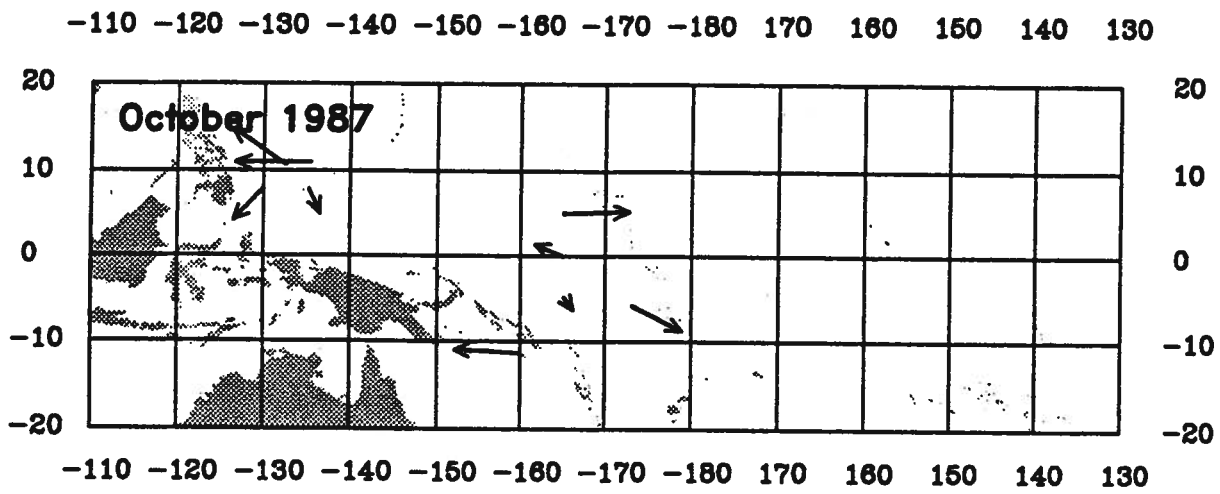
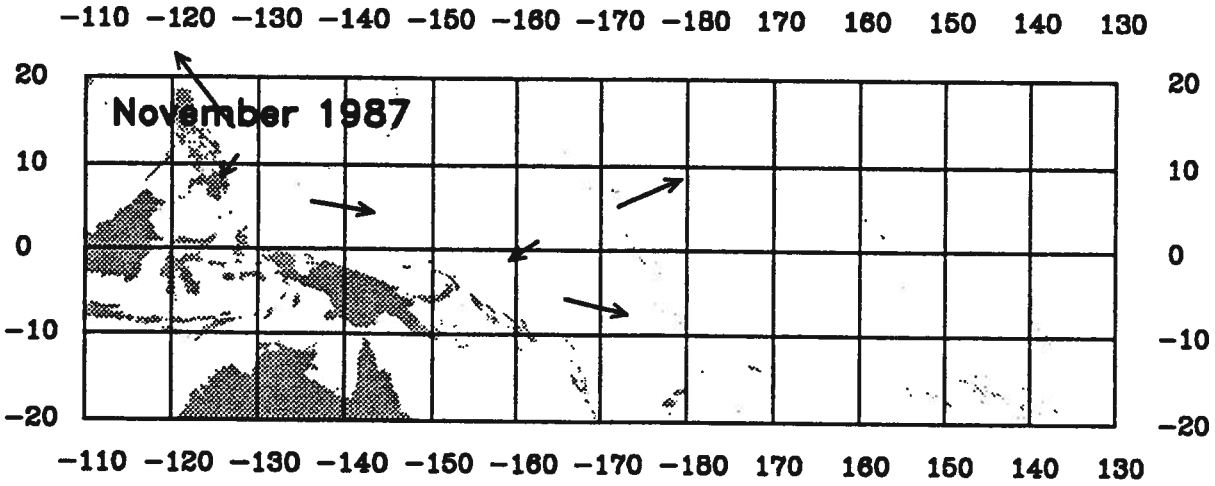


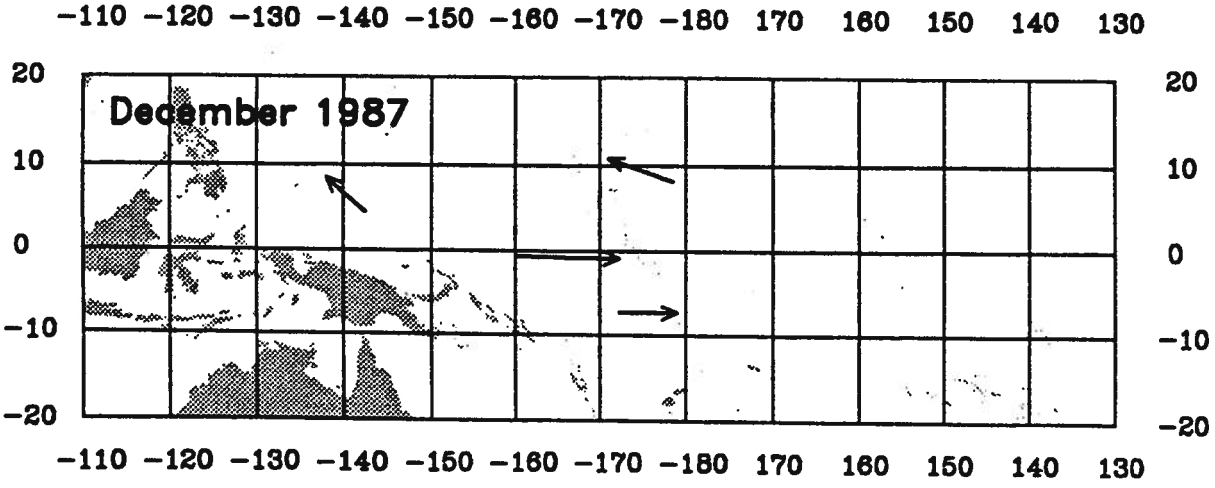




MONTHLY DISPLACEMENT OF BUOYS







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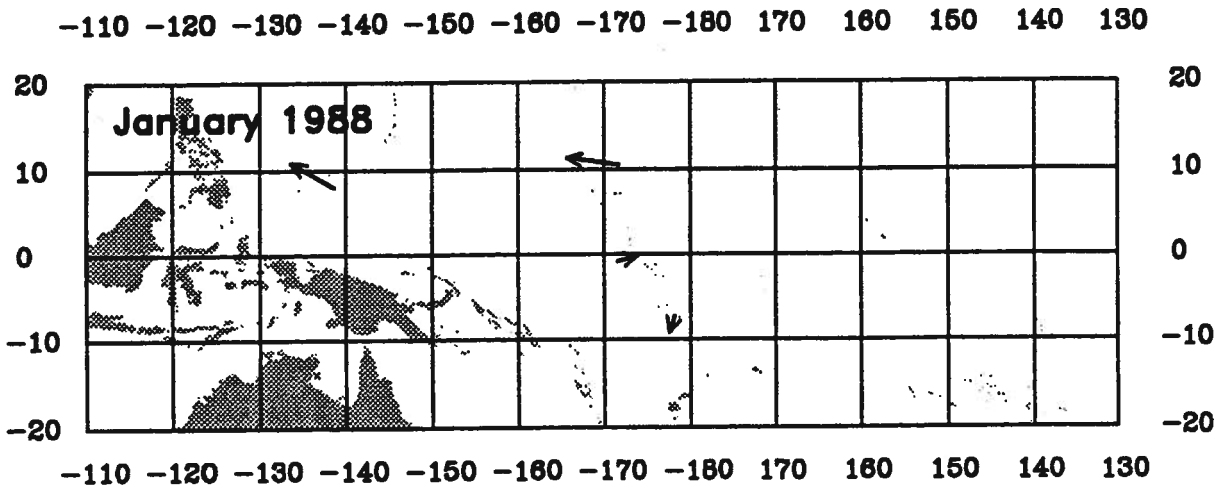

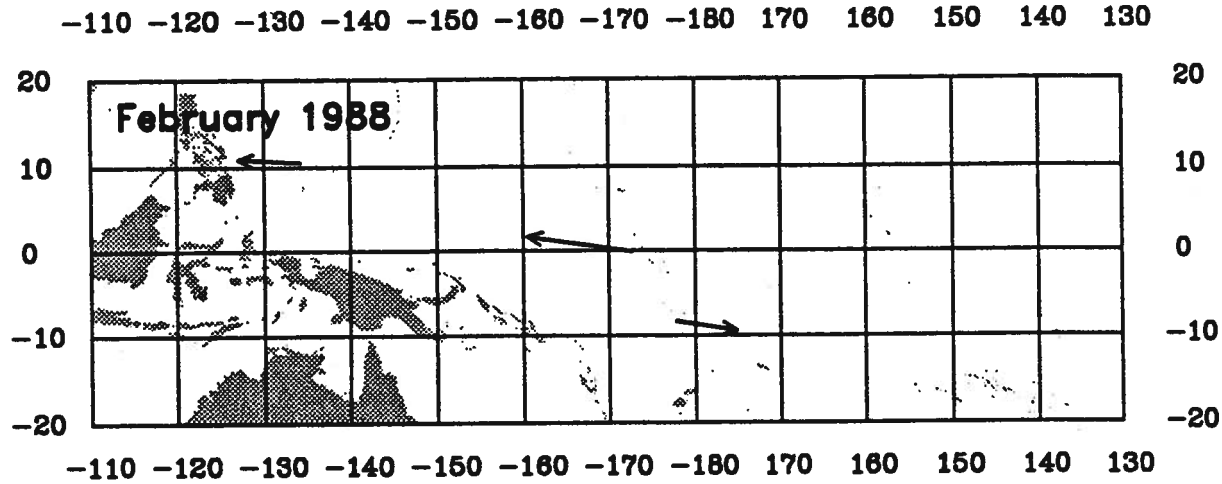

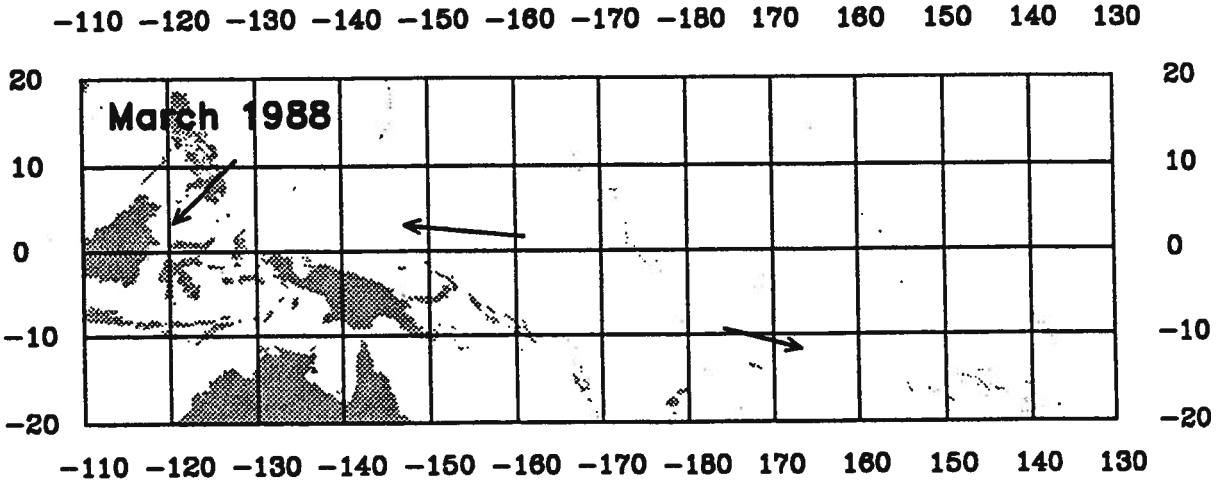

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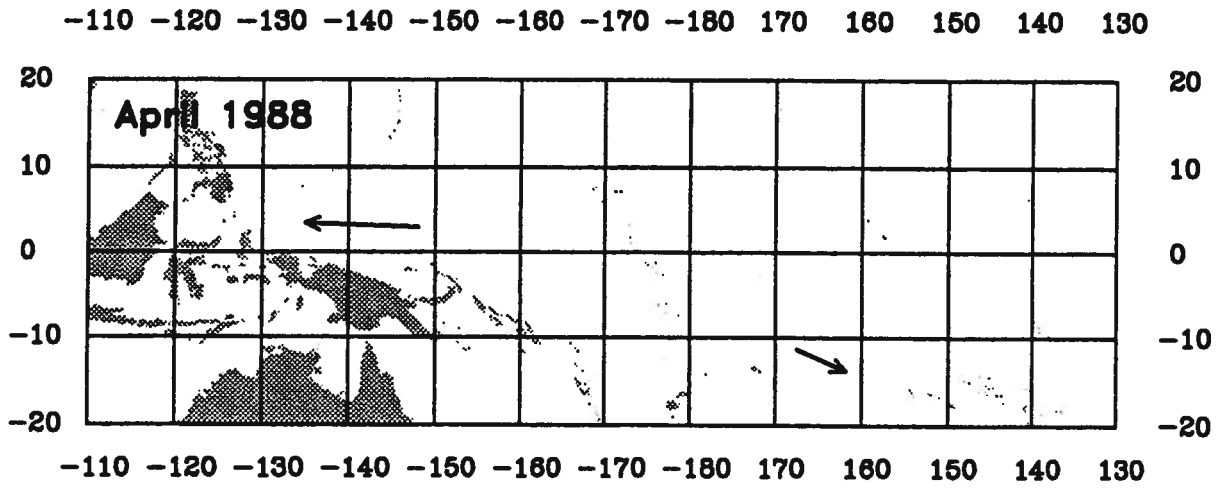

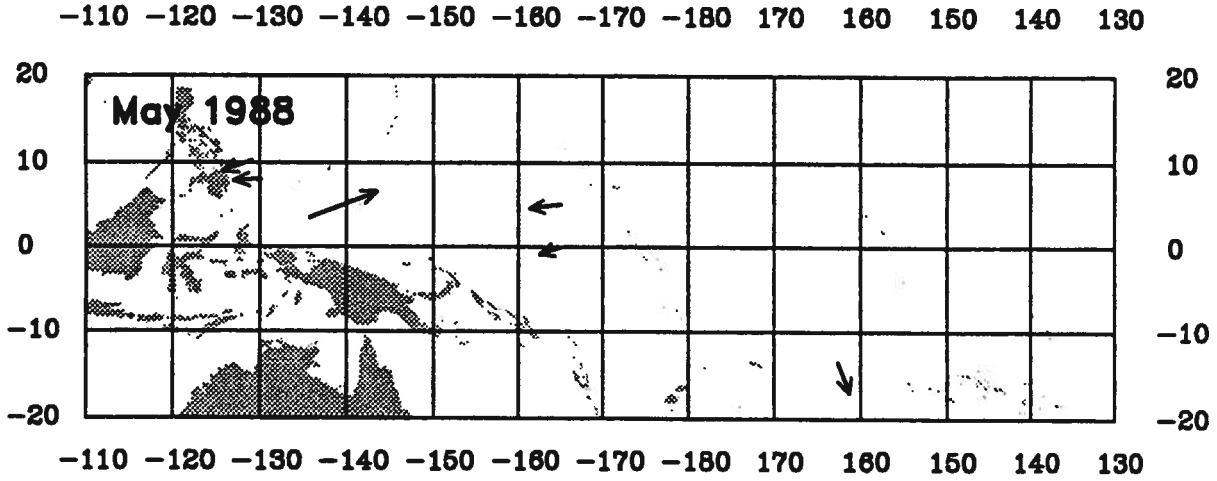

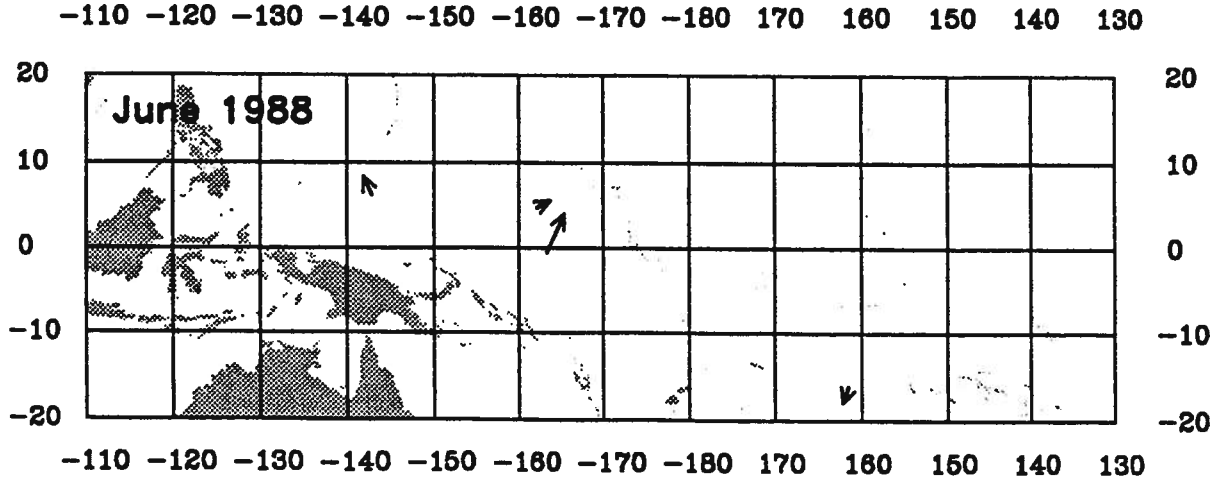

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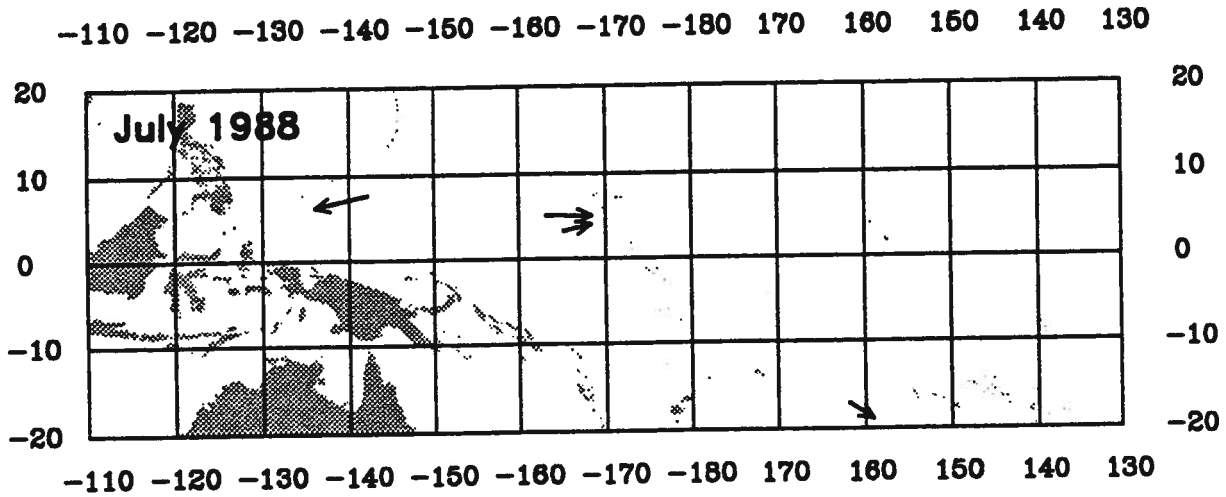
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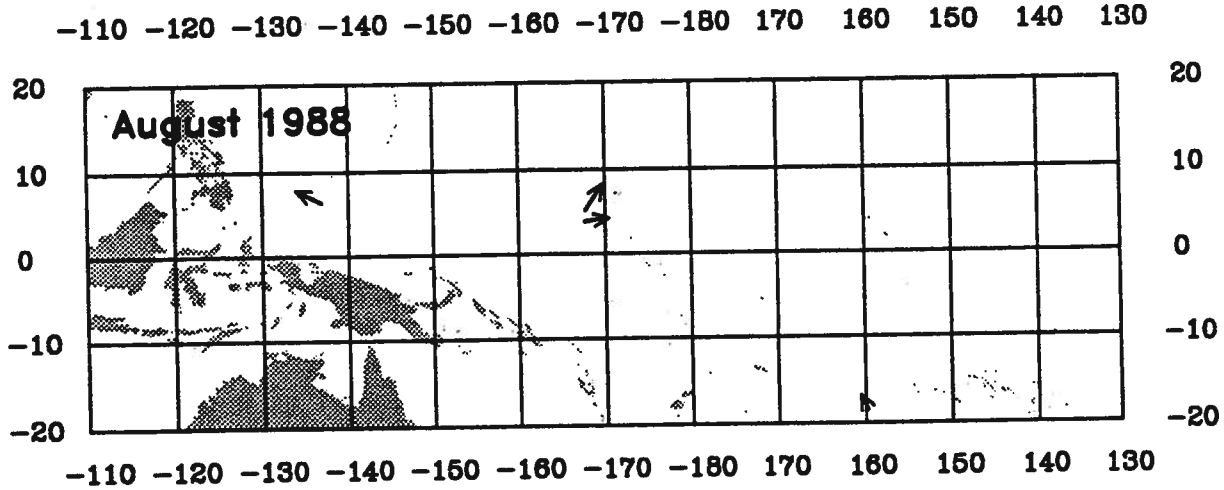
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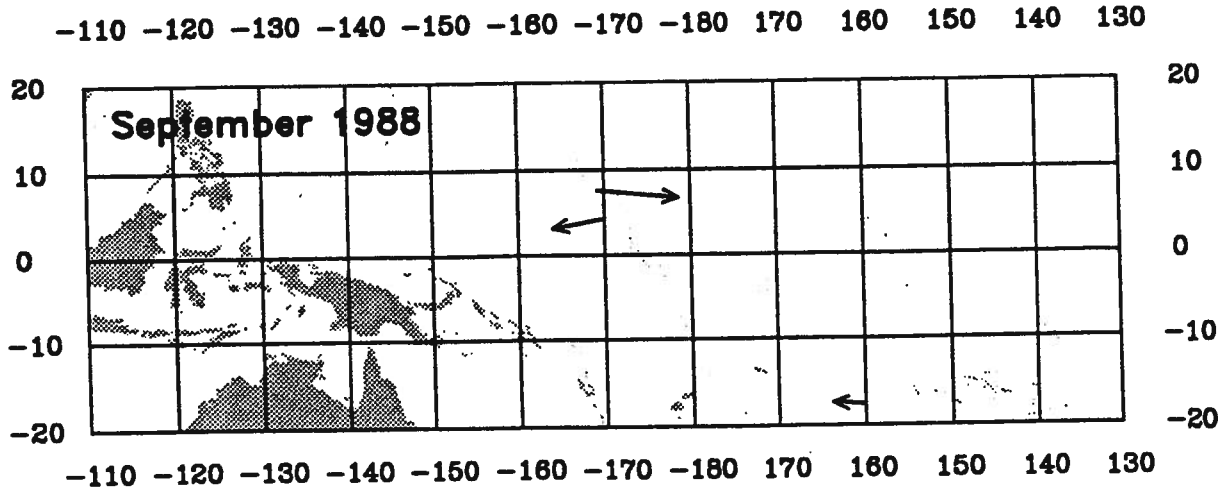
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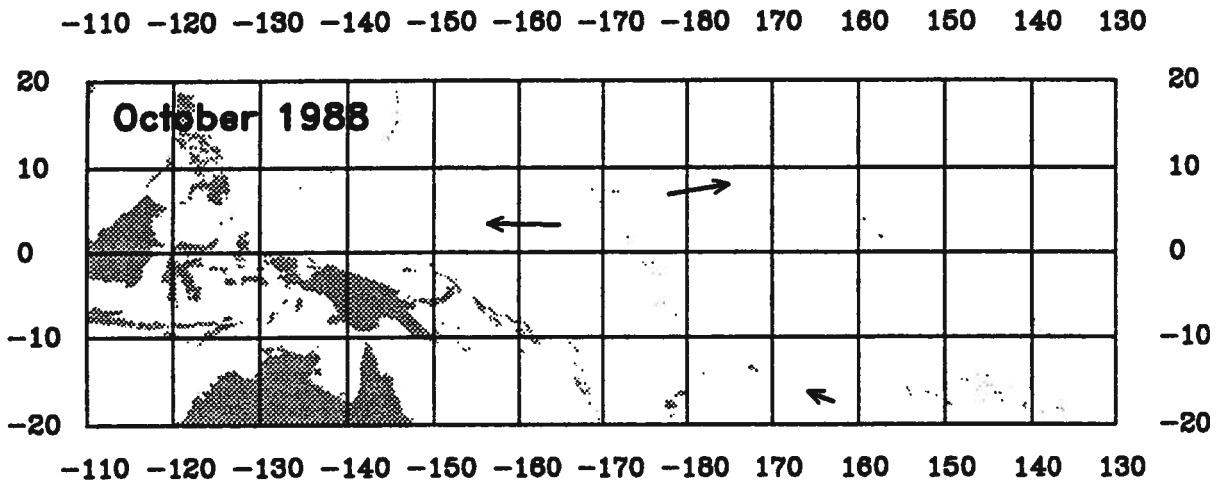
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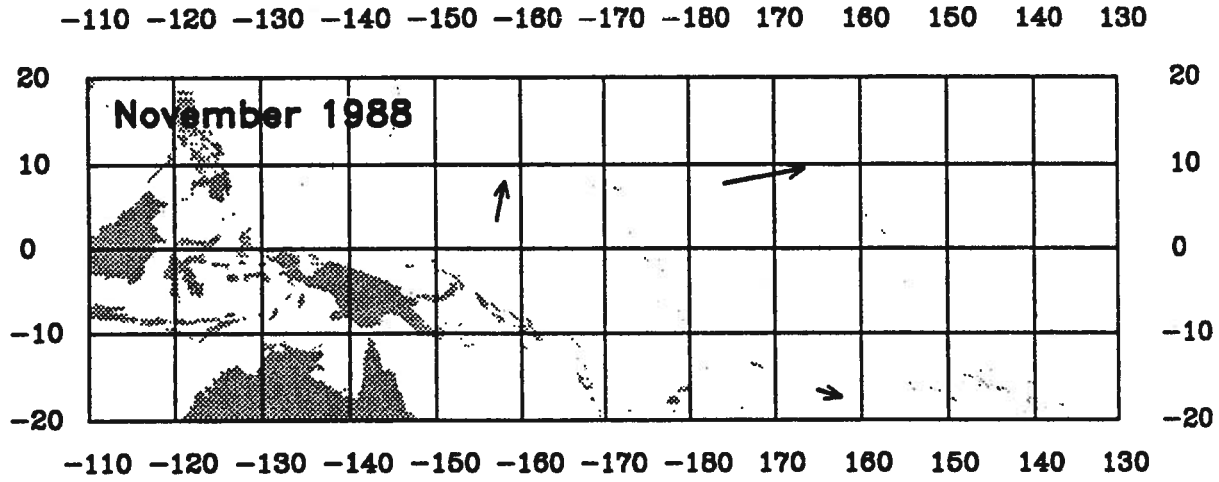
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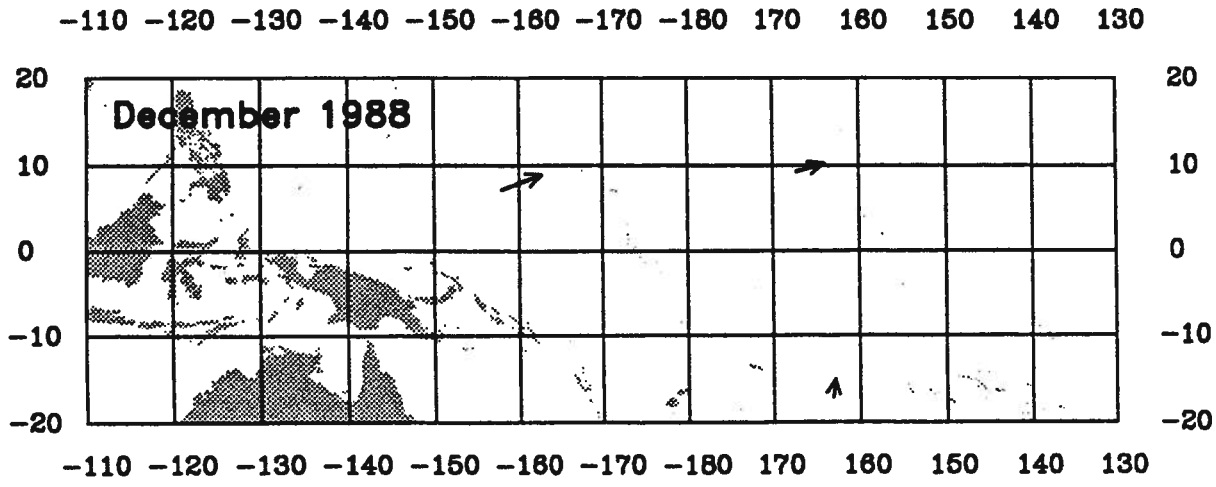
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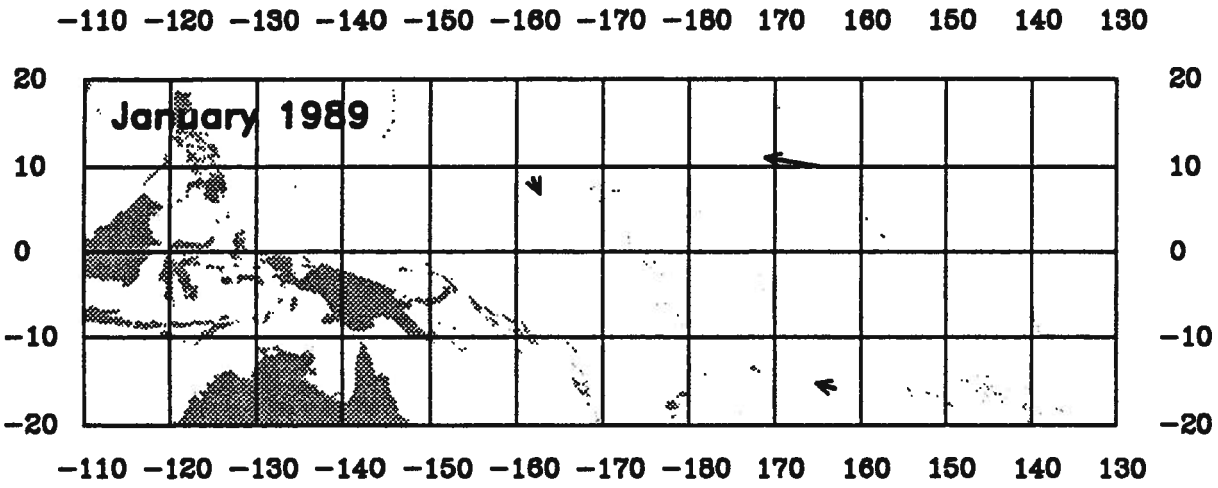
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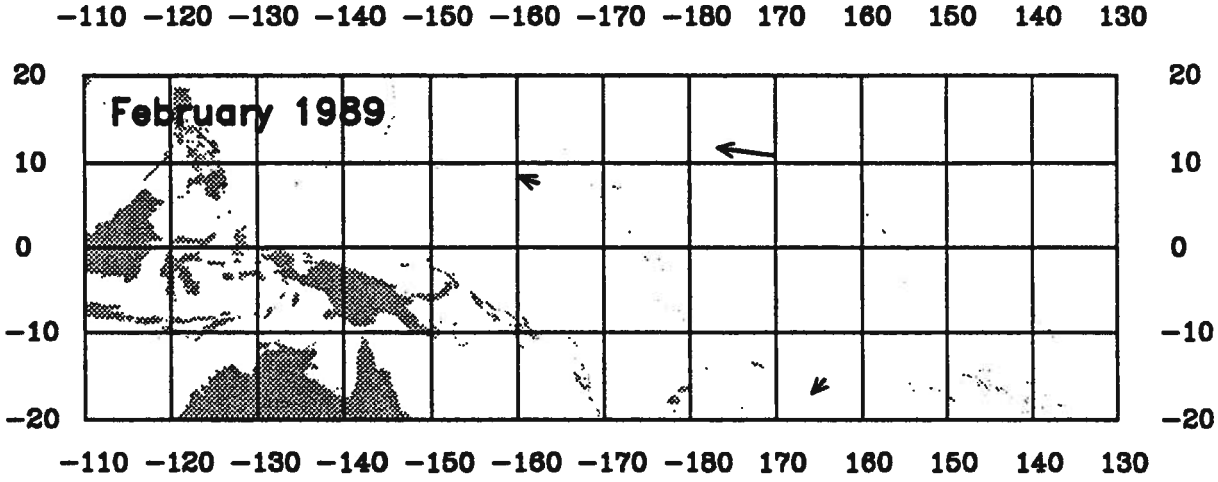
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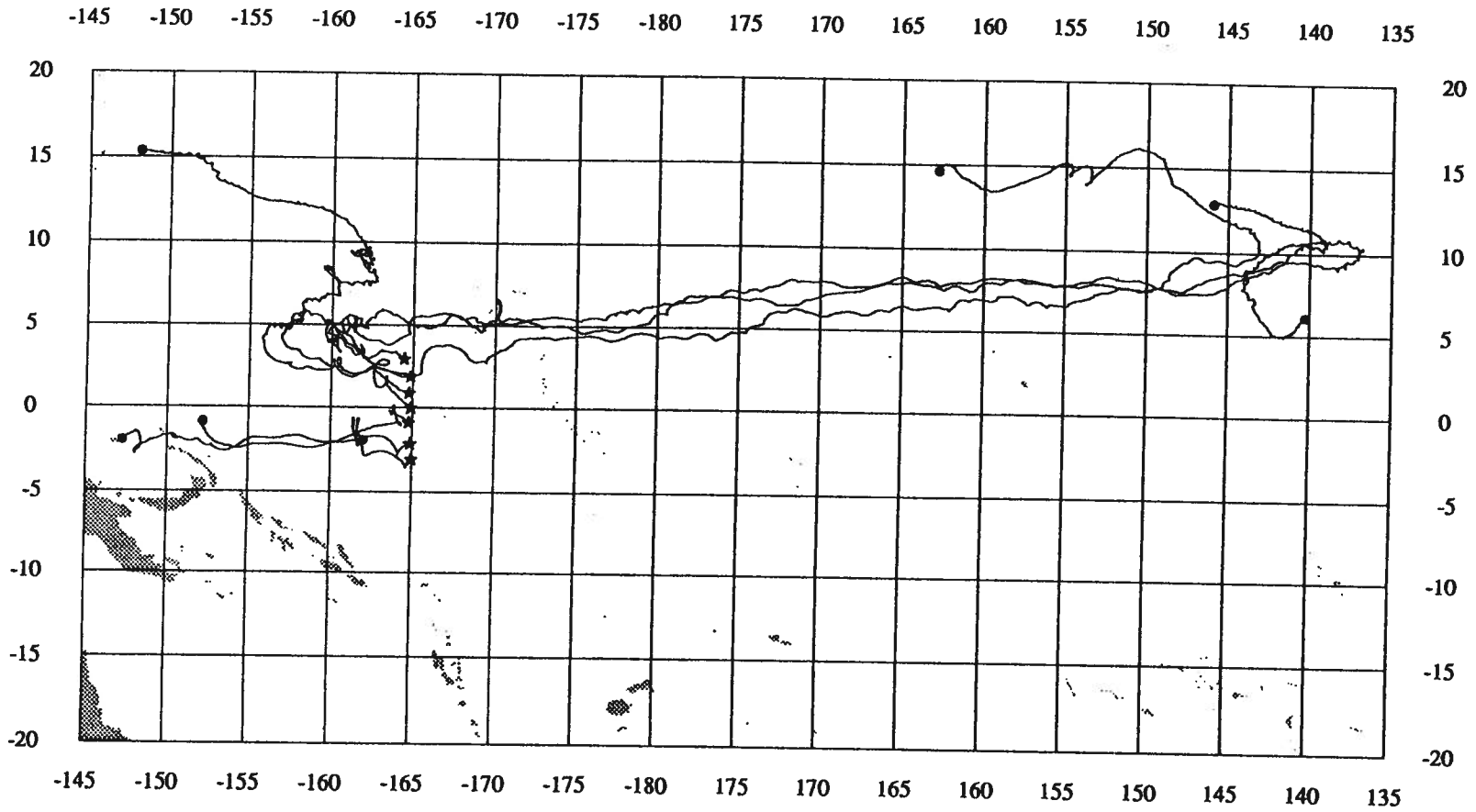
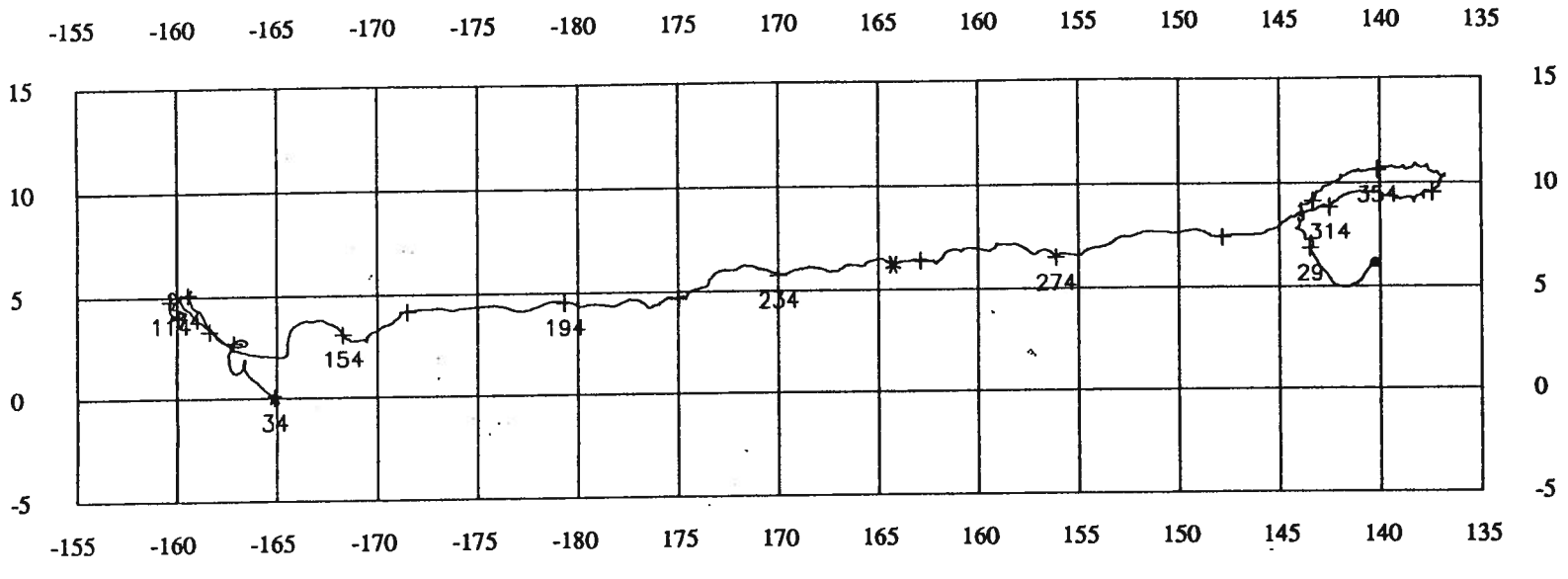
FEBRUARY 1986 – APRIL 1987



BUOY 3084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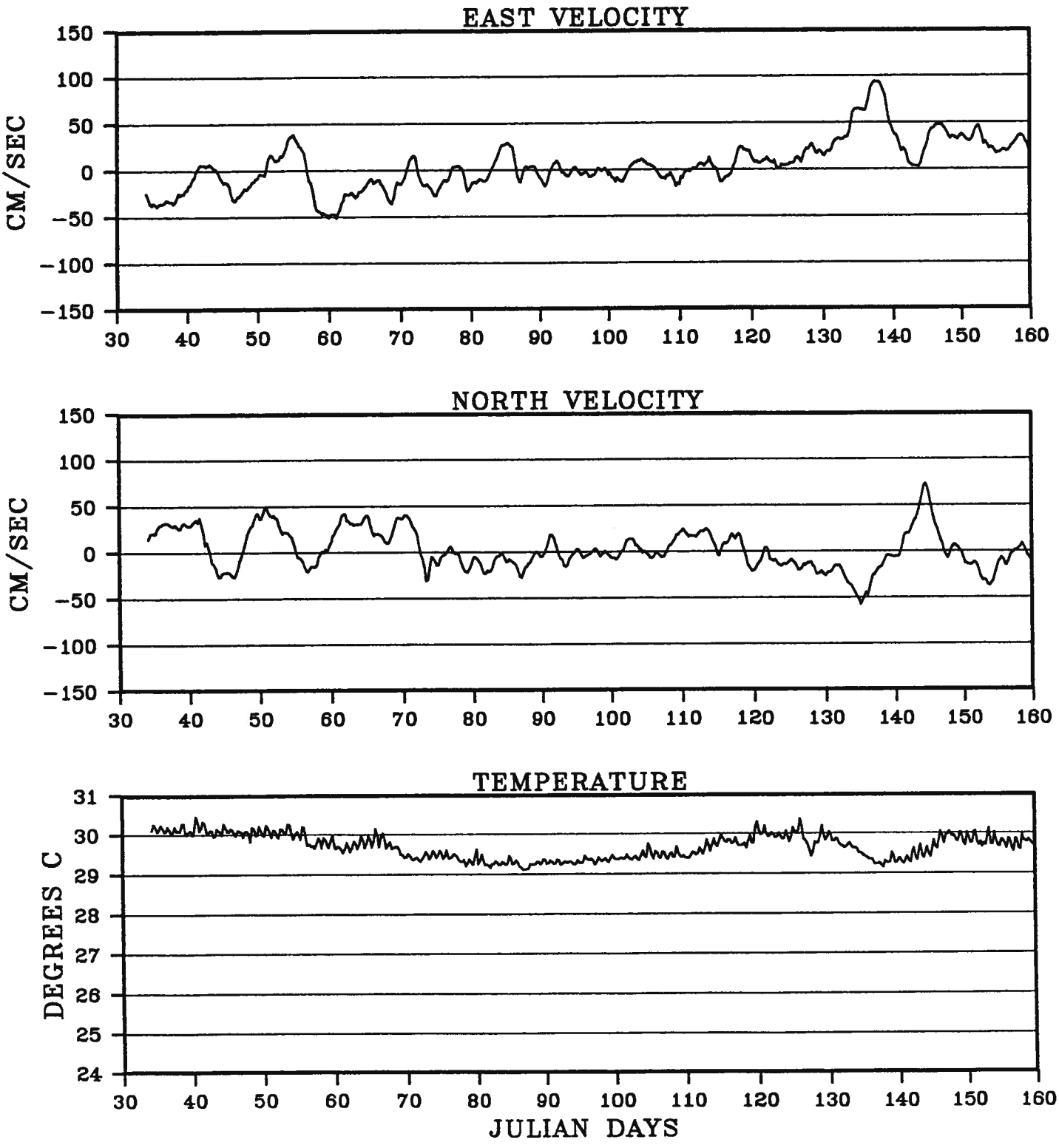
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TEMPERATURE
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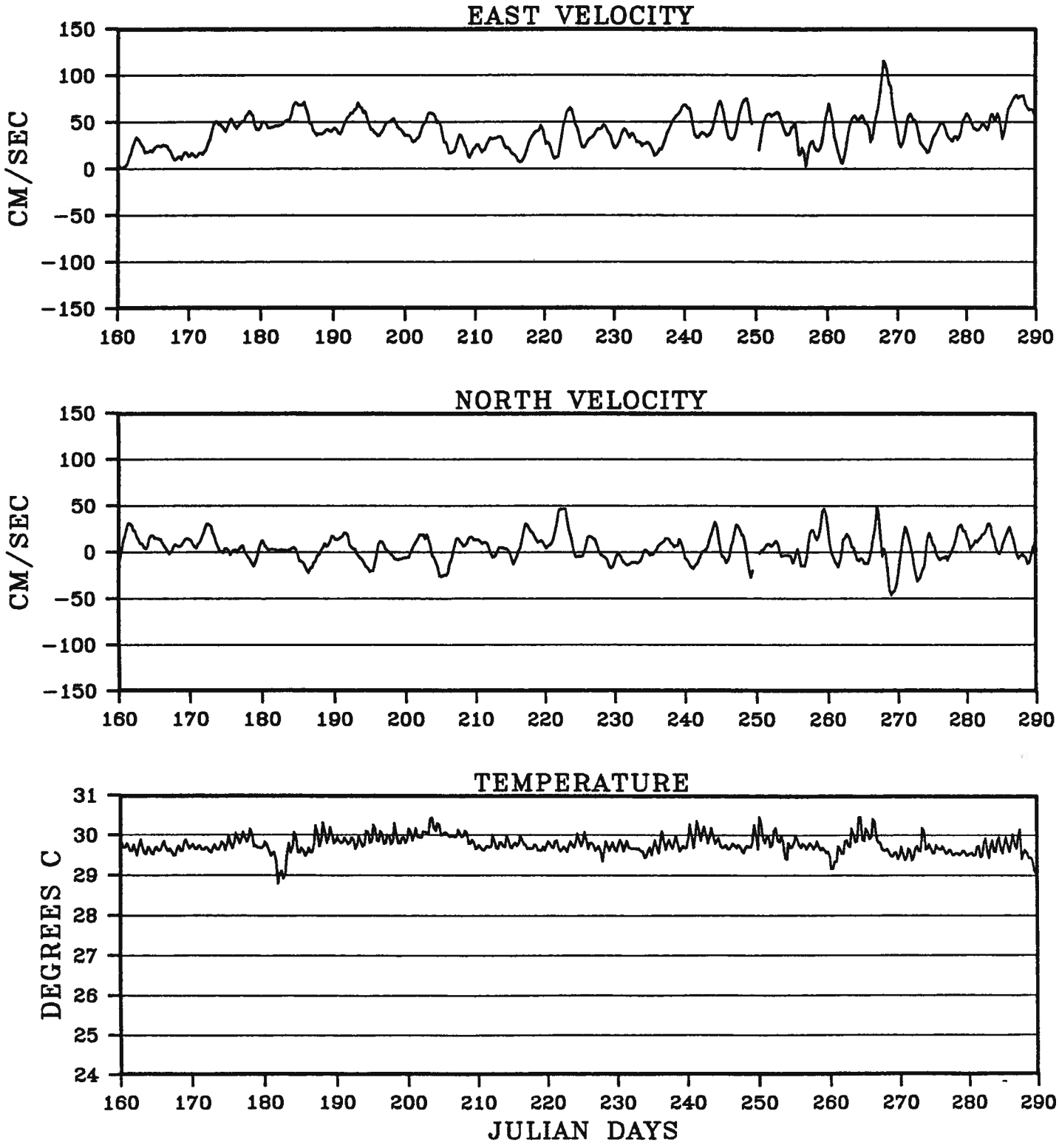
JULIAN DAYS

BUOY 3084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TEMPERATURE
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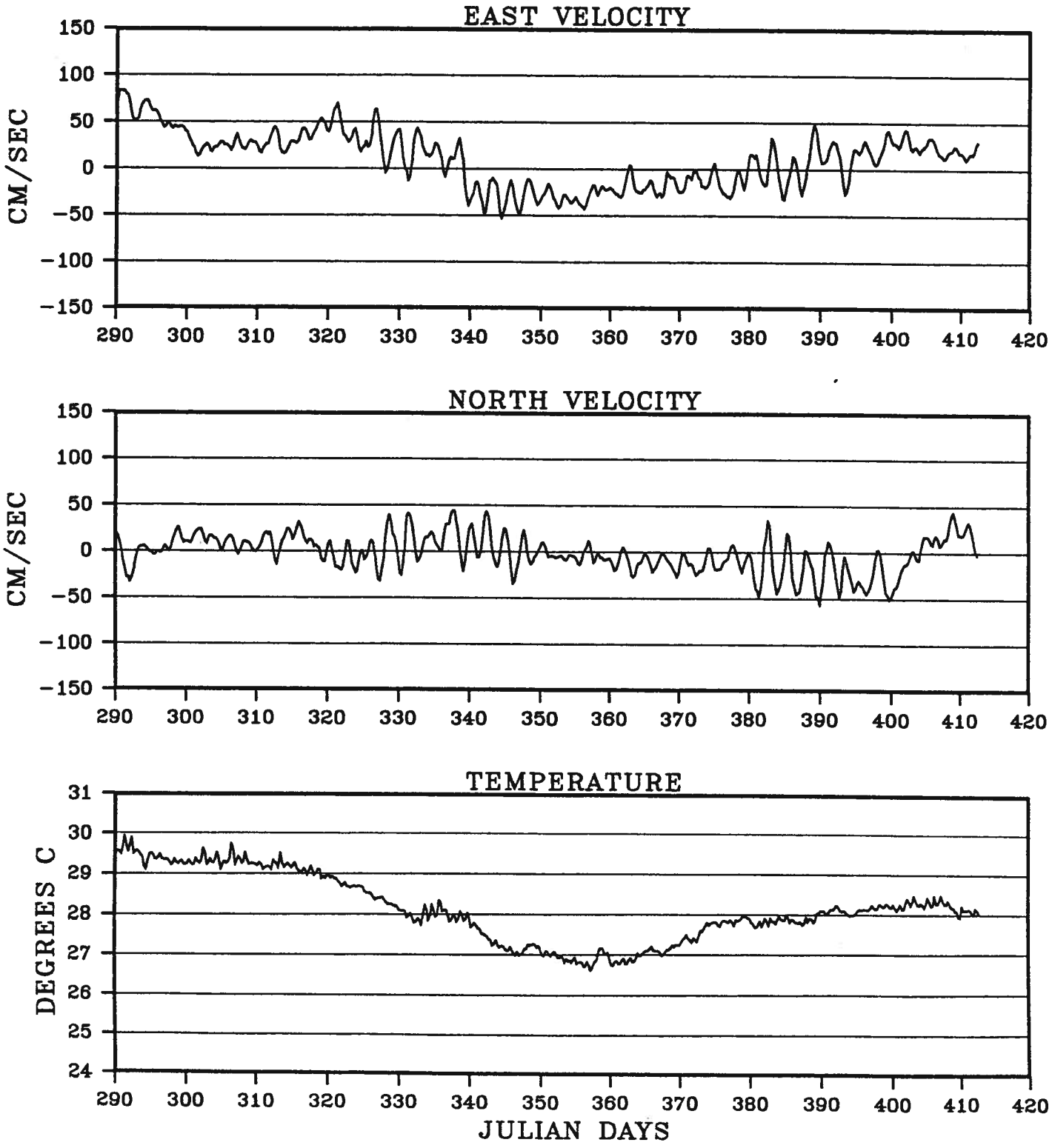
JULIAN DAYS

BUOY 3084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NORTH VELOCITY
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TEMPERATURE
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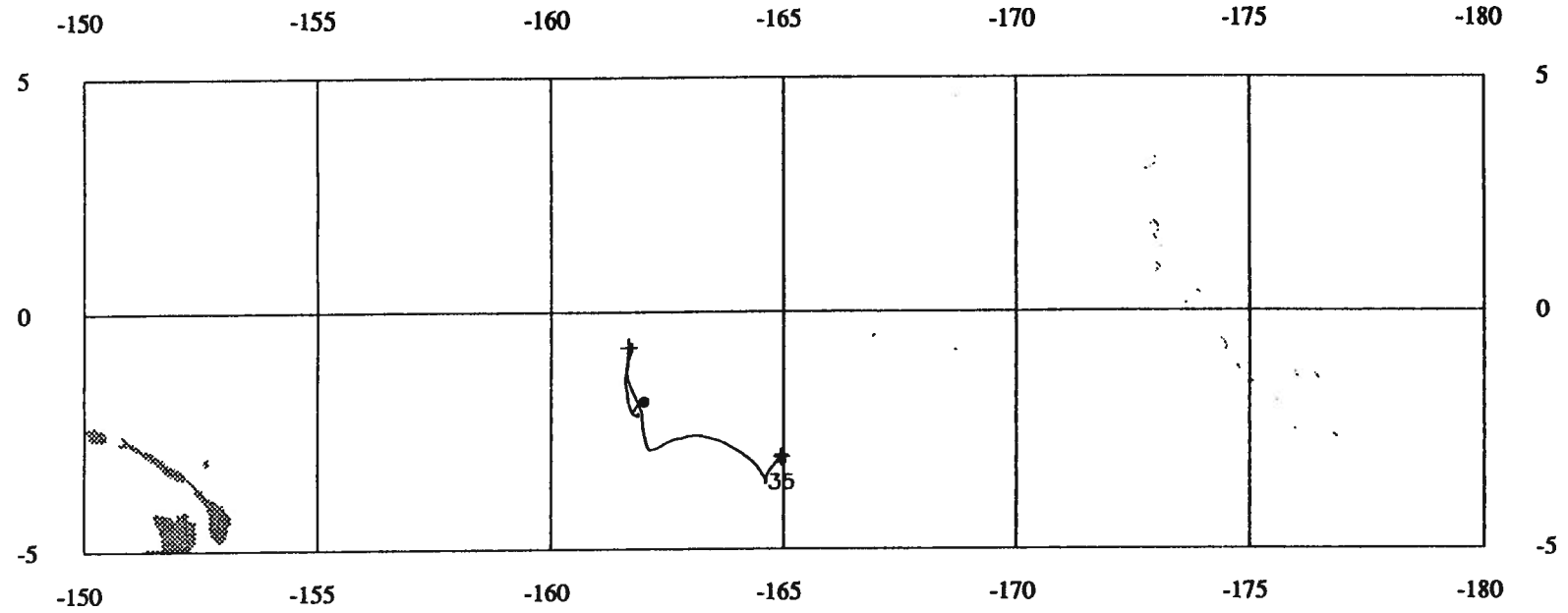
JULIAN DAYS

BUOY 3085



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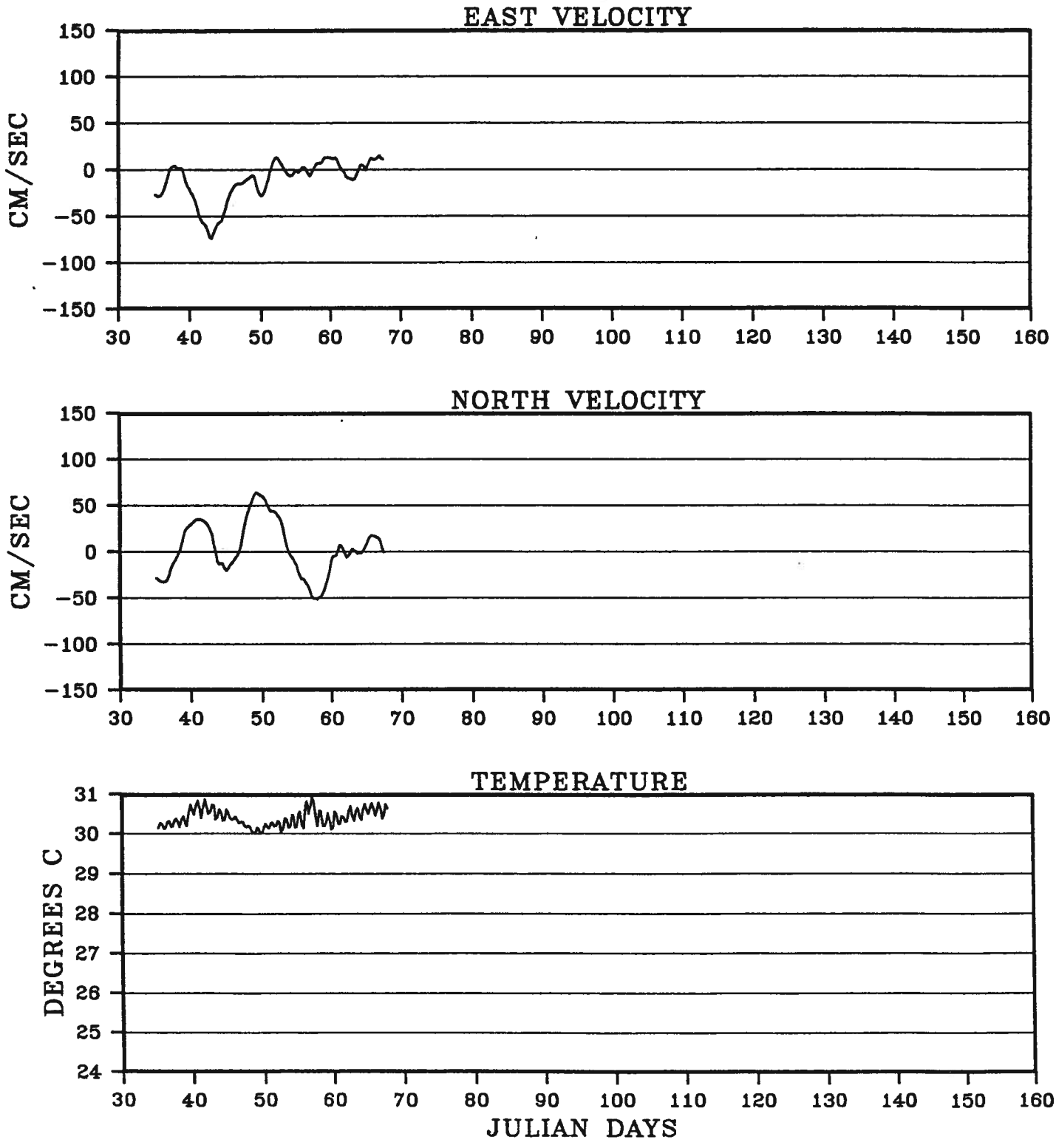
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TEMPERATURE
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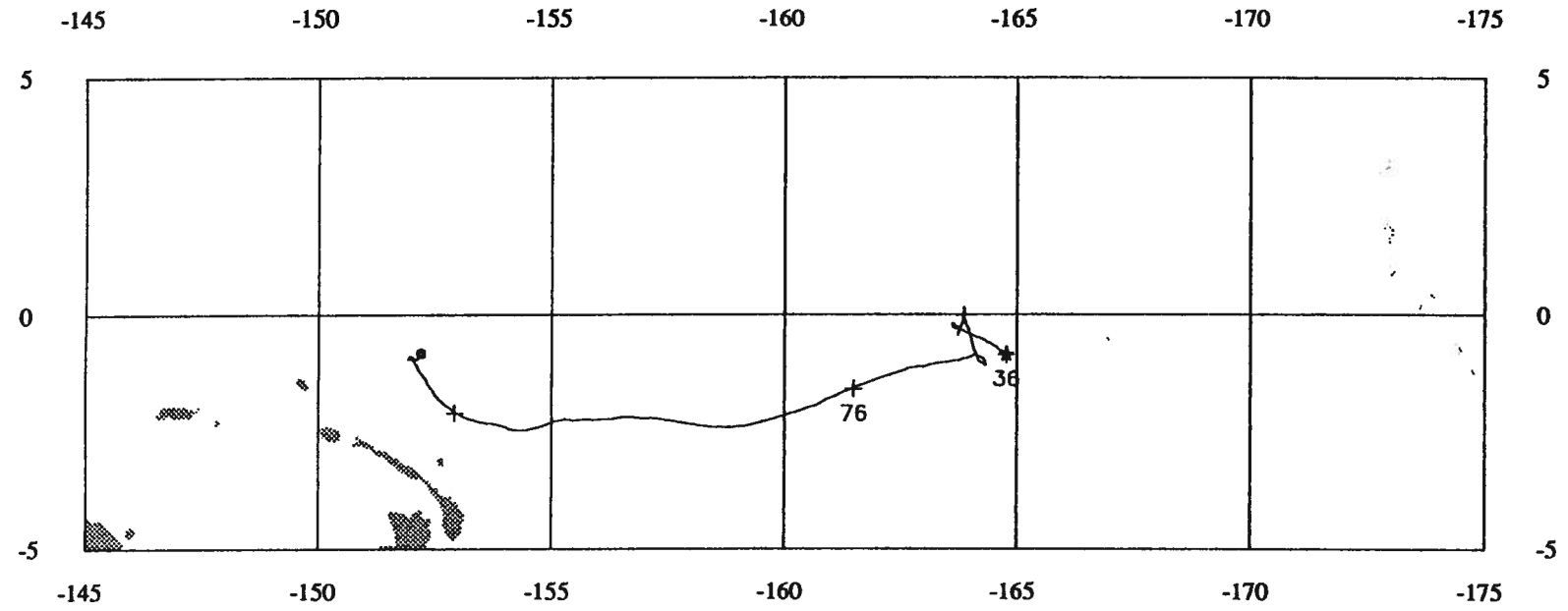
JULIAN DAYS

BUOY 3086



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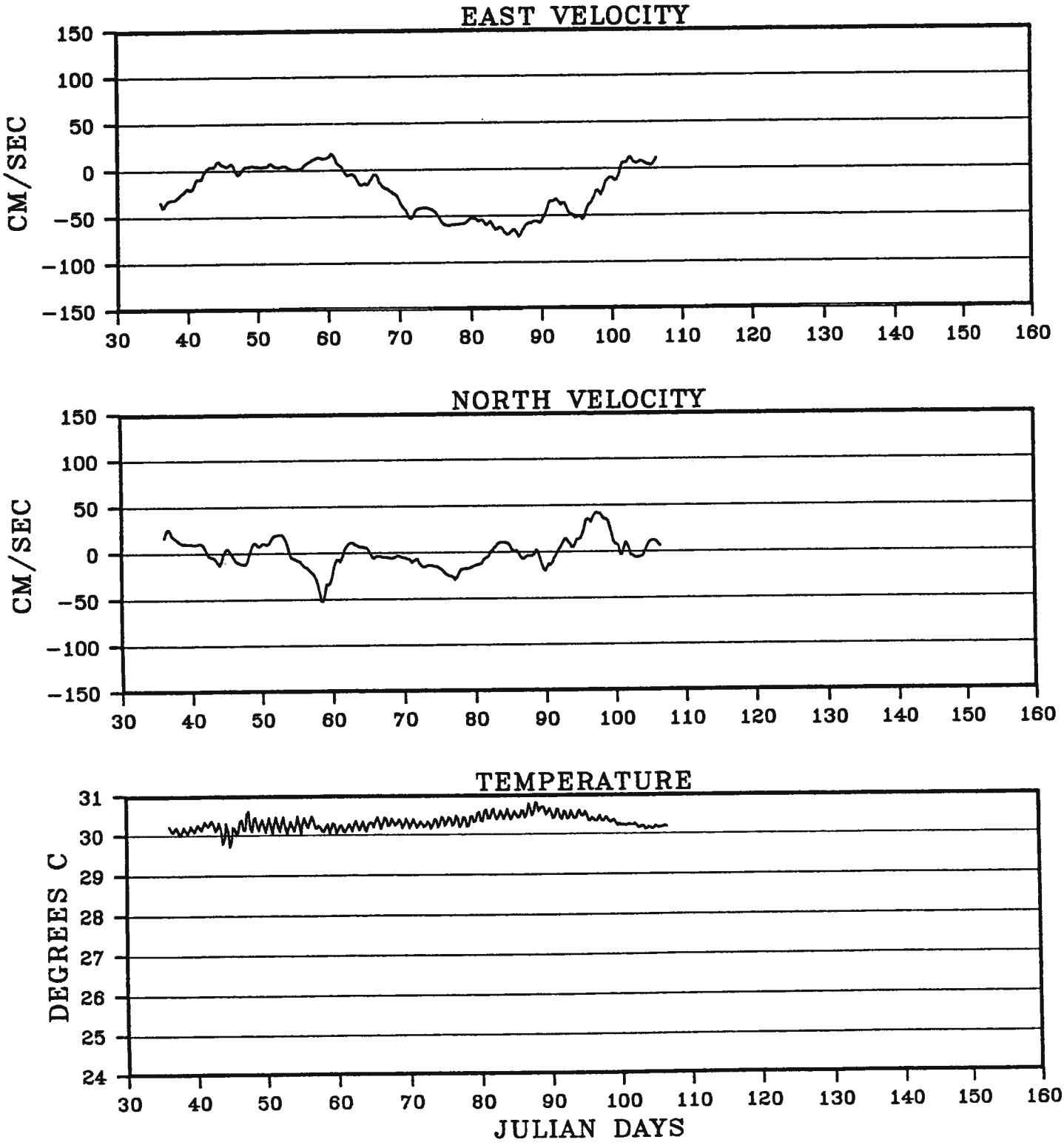
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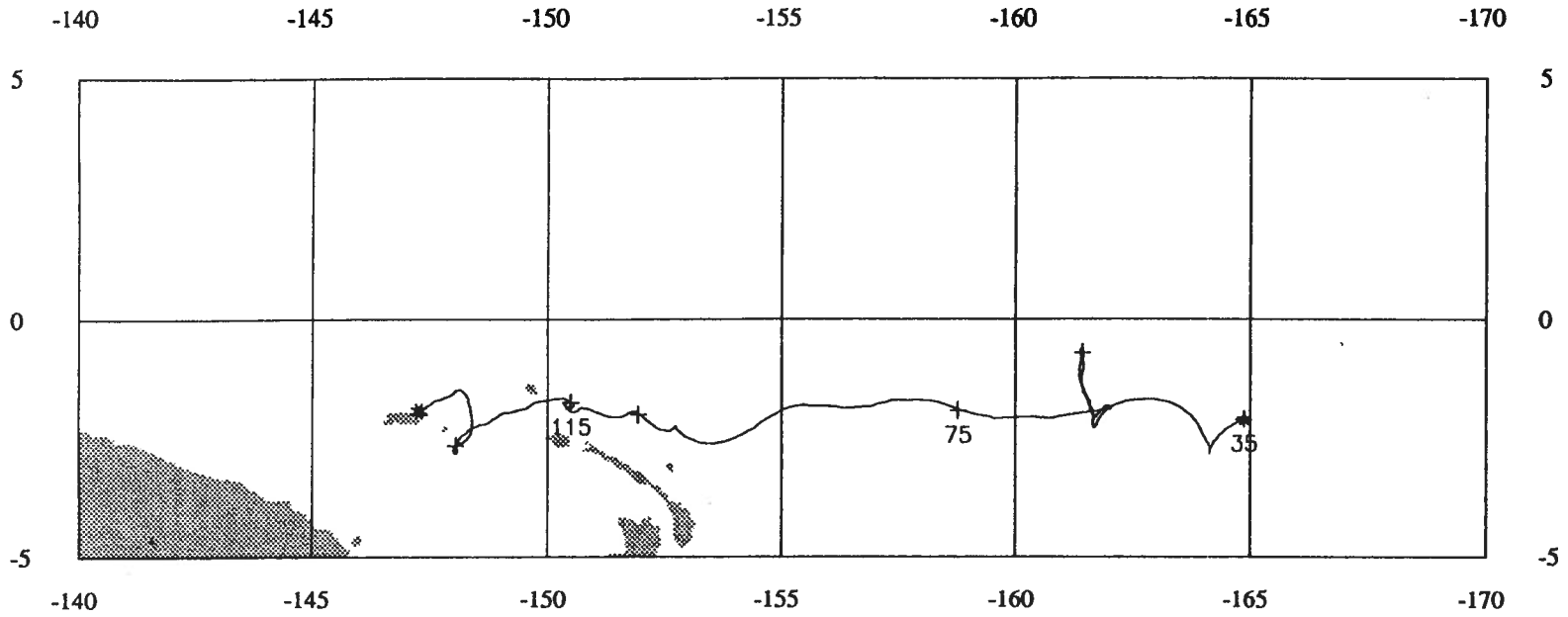
JULIAN DAYS

BUOY 3087



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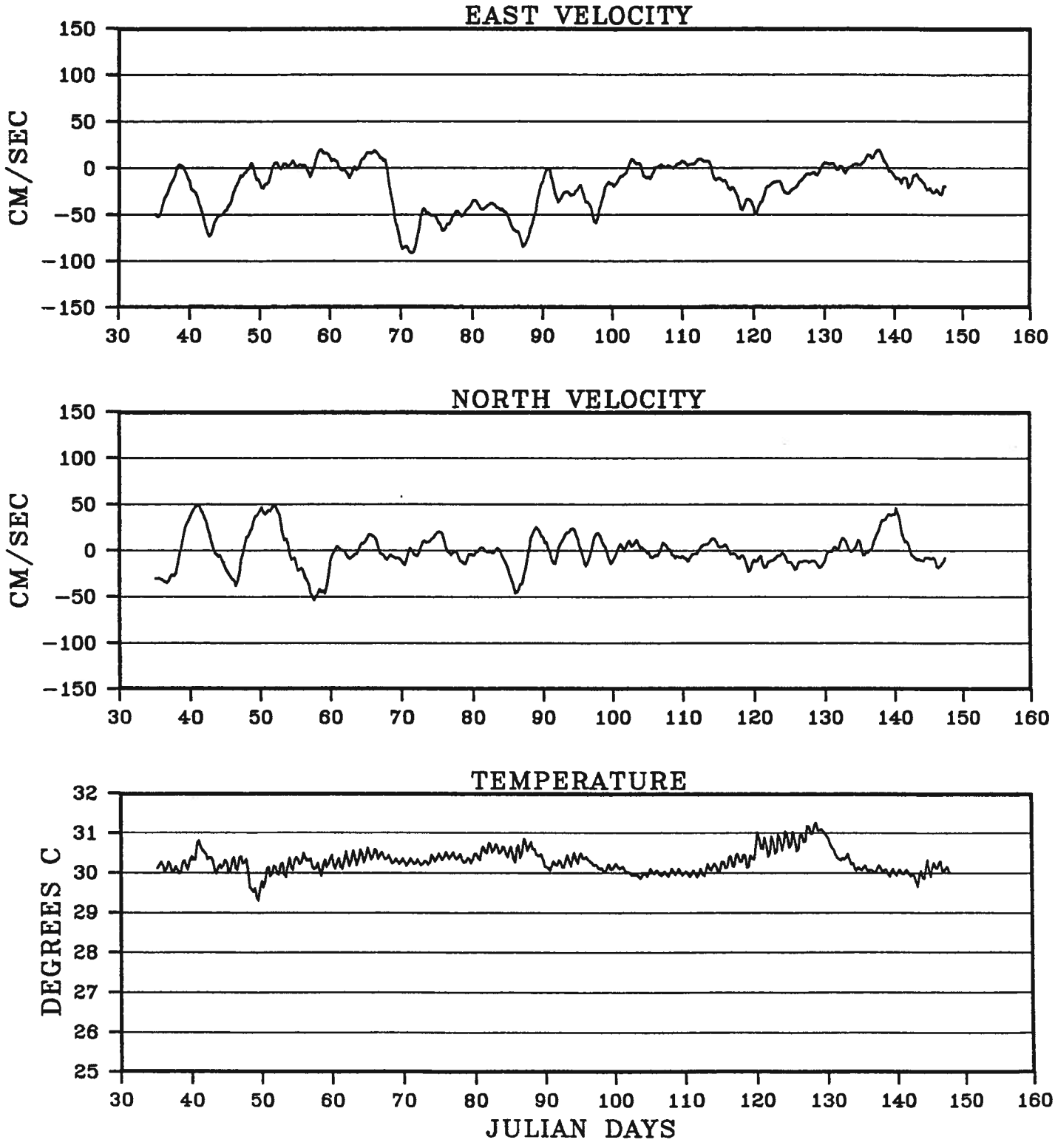
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TEMPERATURE
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JULIAN DAYS

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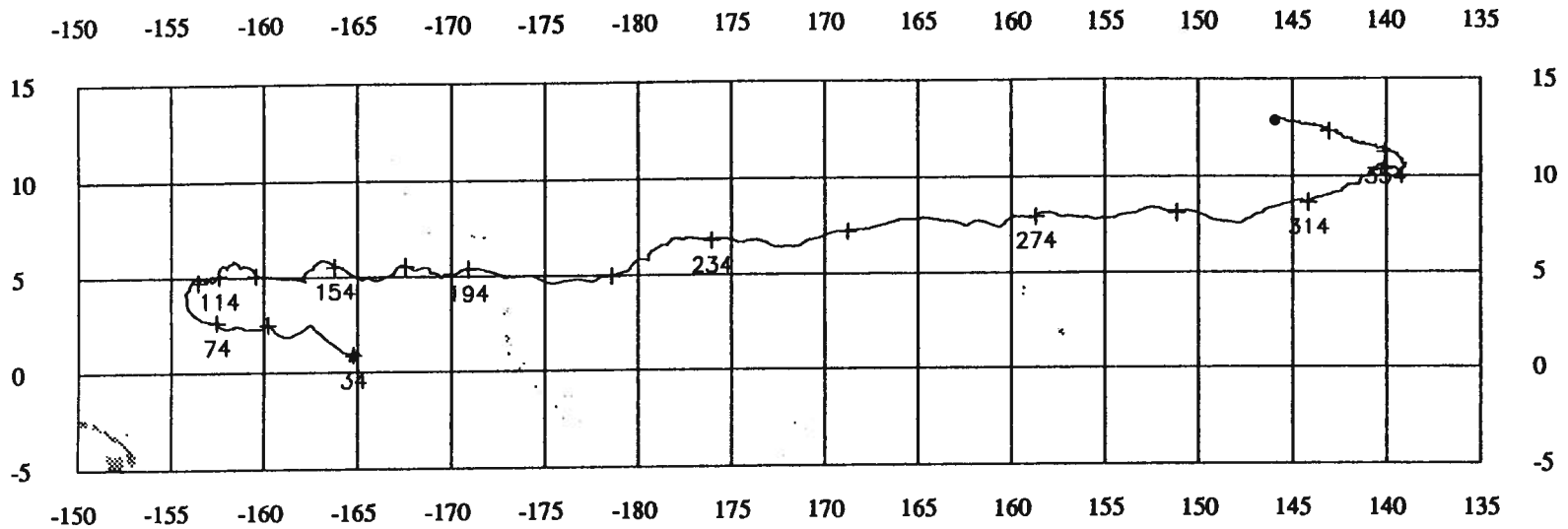
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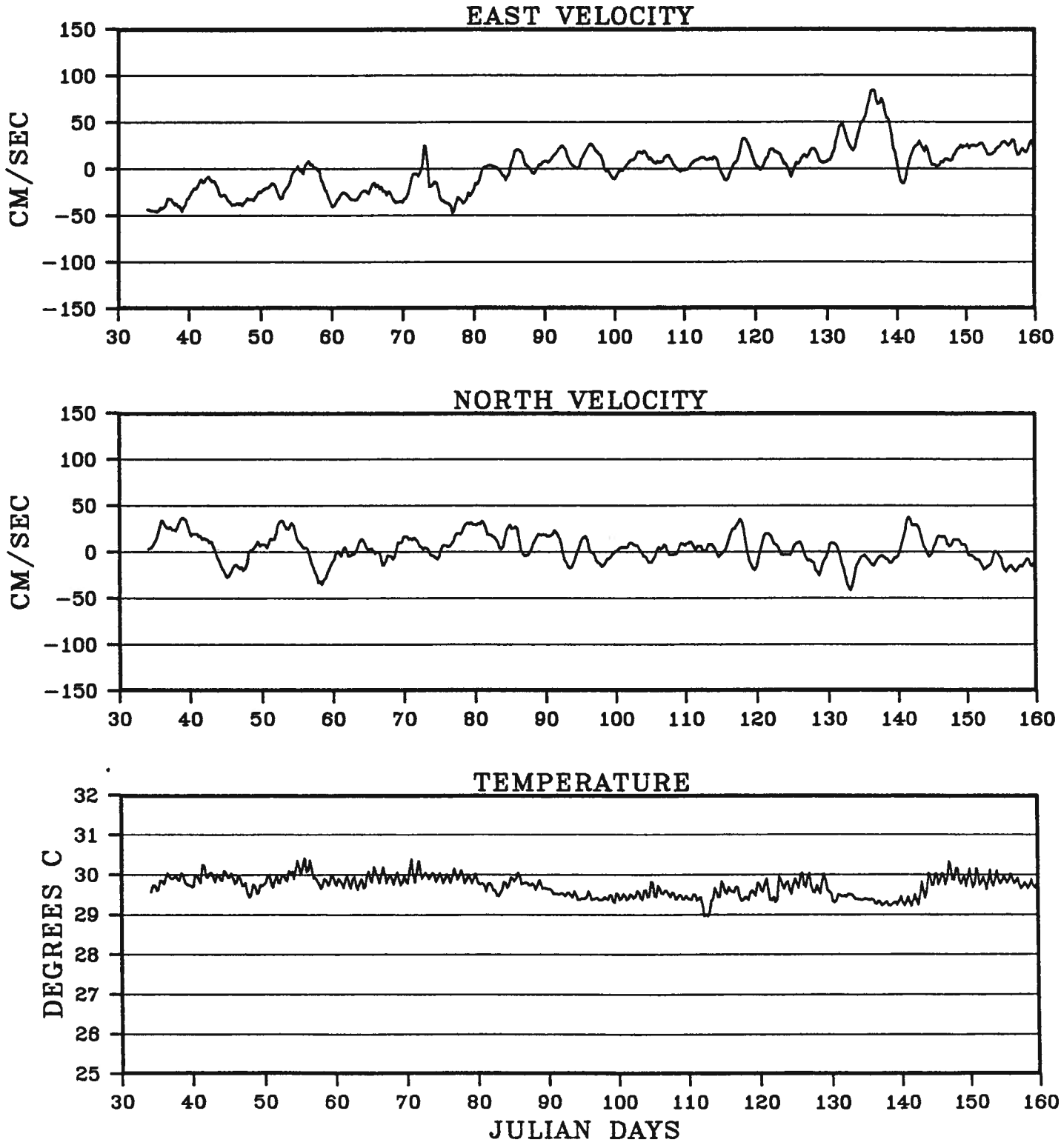
BUOY 3088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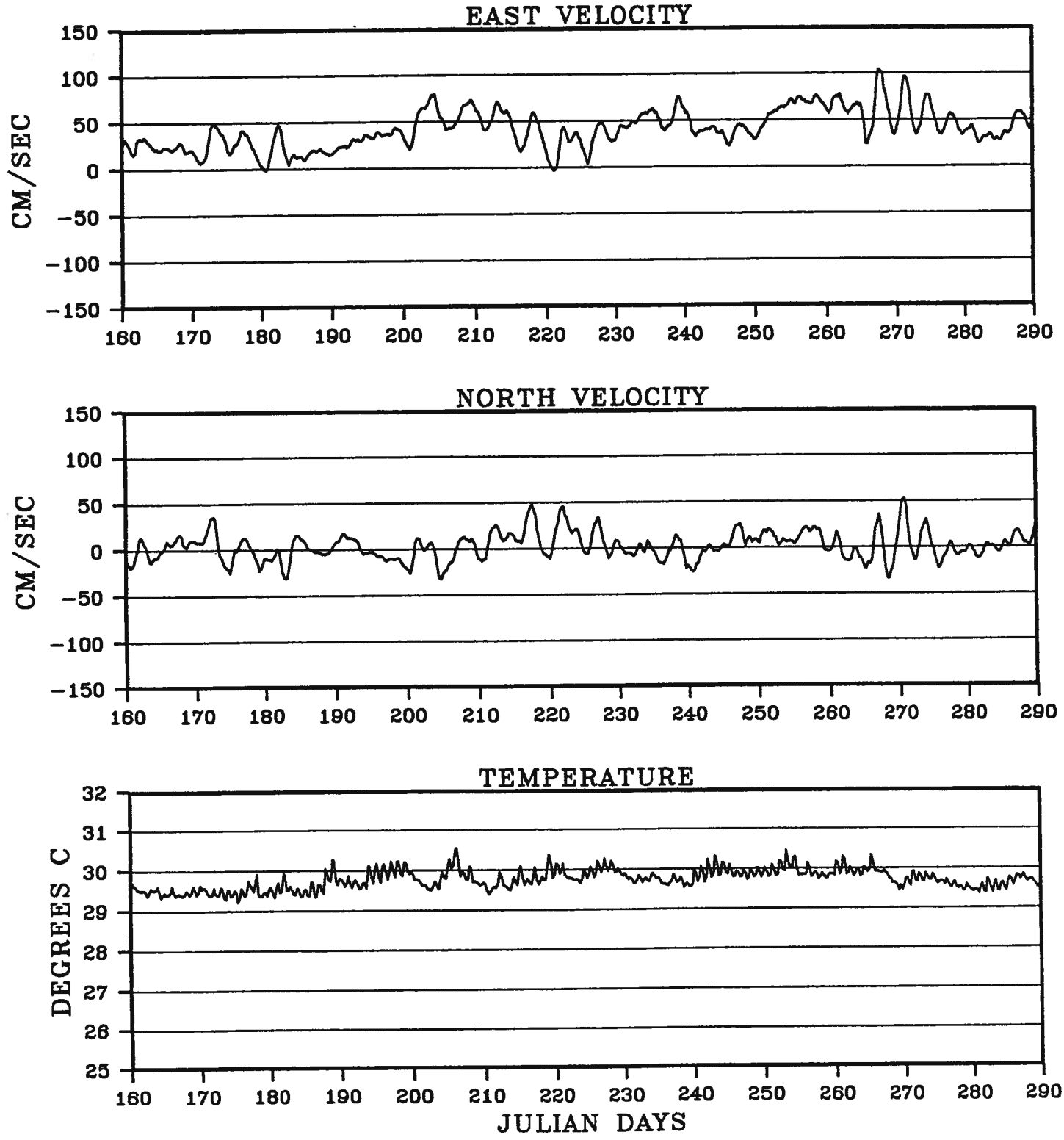
JULIAN DAYS

BUOY 3088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TEMPERATURE
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JULIAN DAYS

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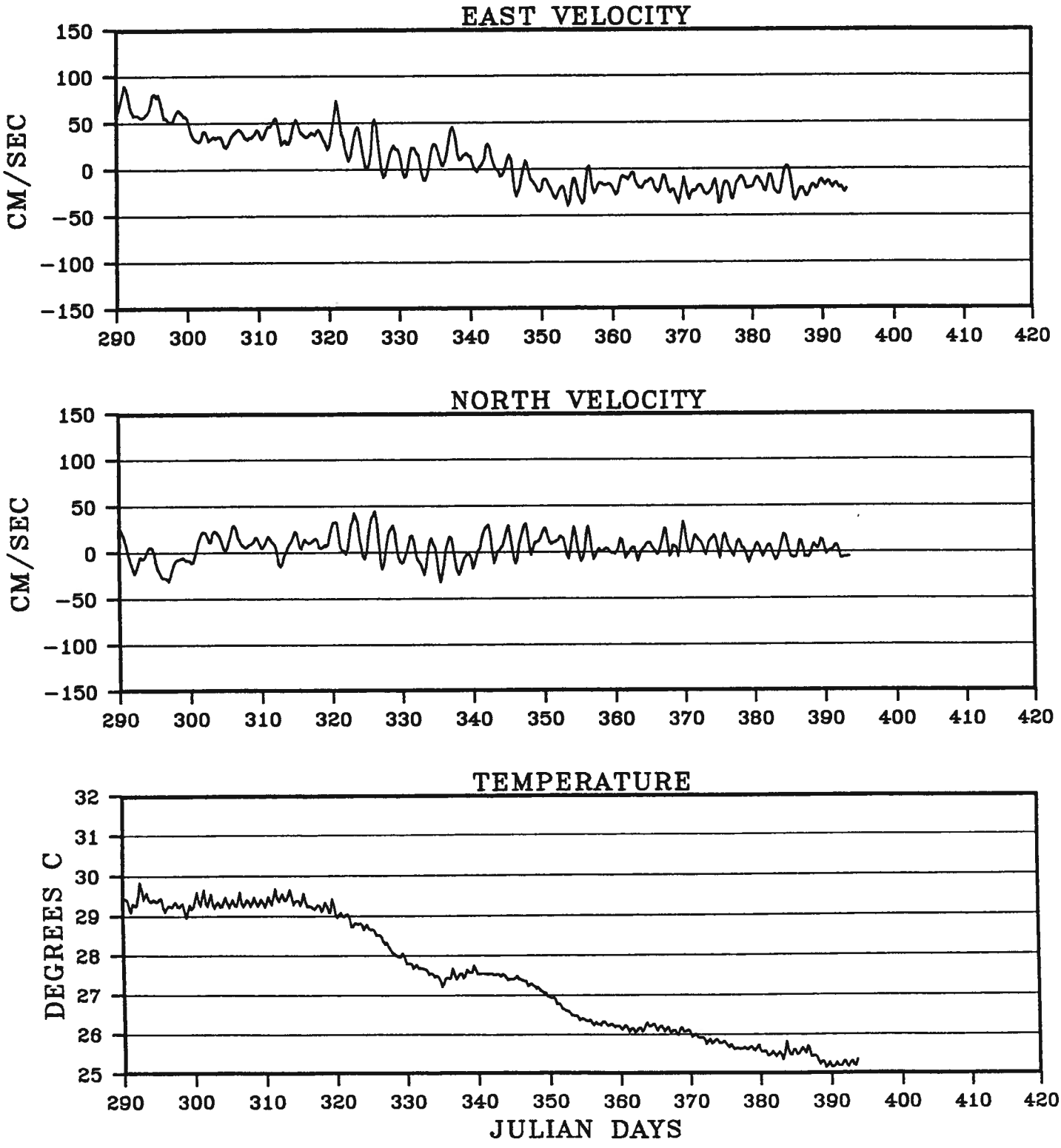
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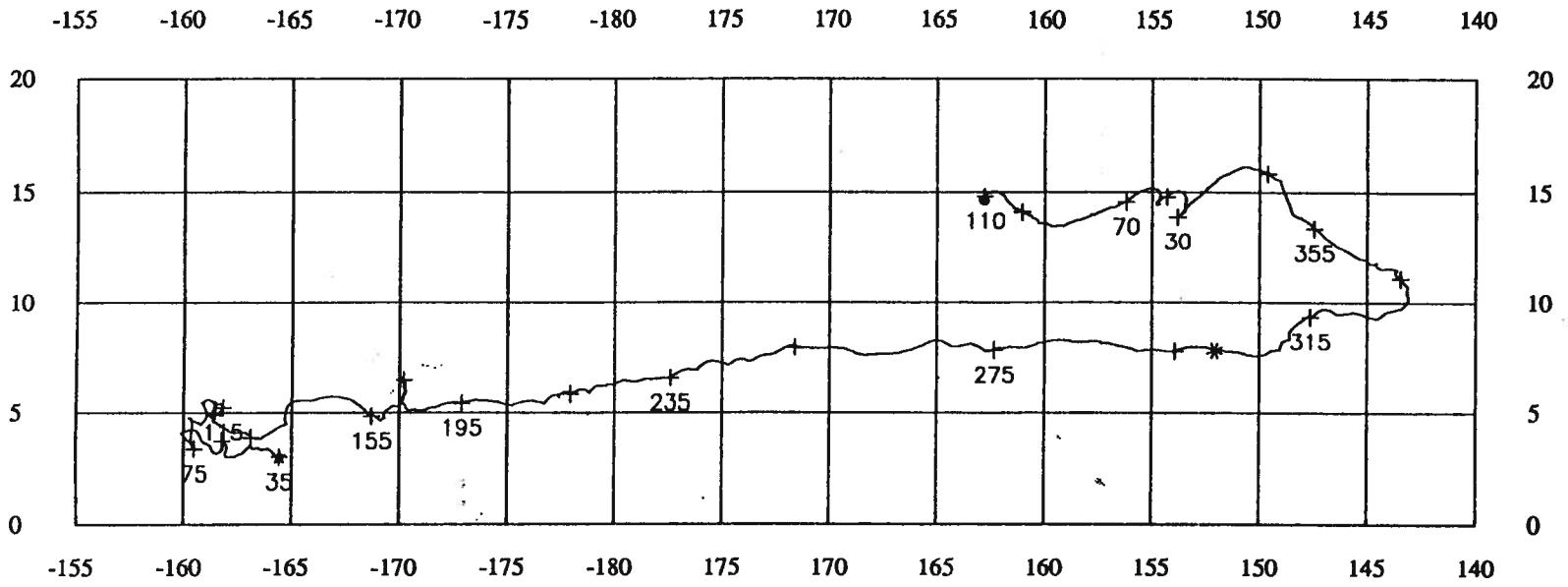
JULIAN DAYS

BUOY 3089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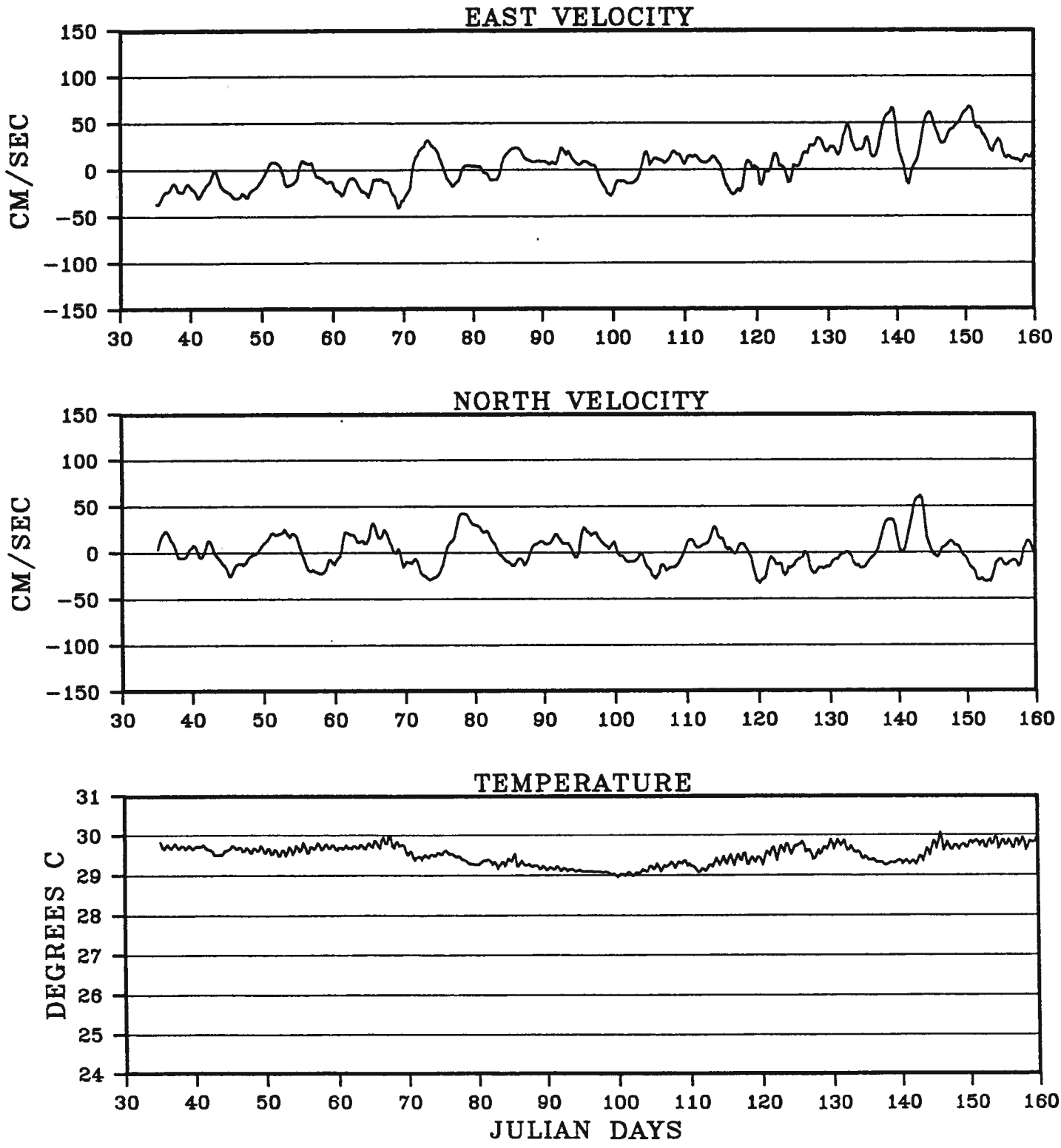
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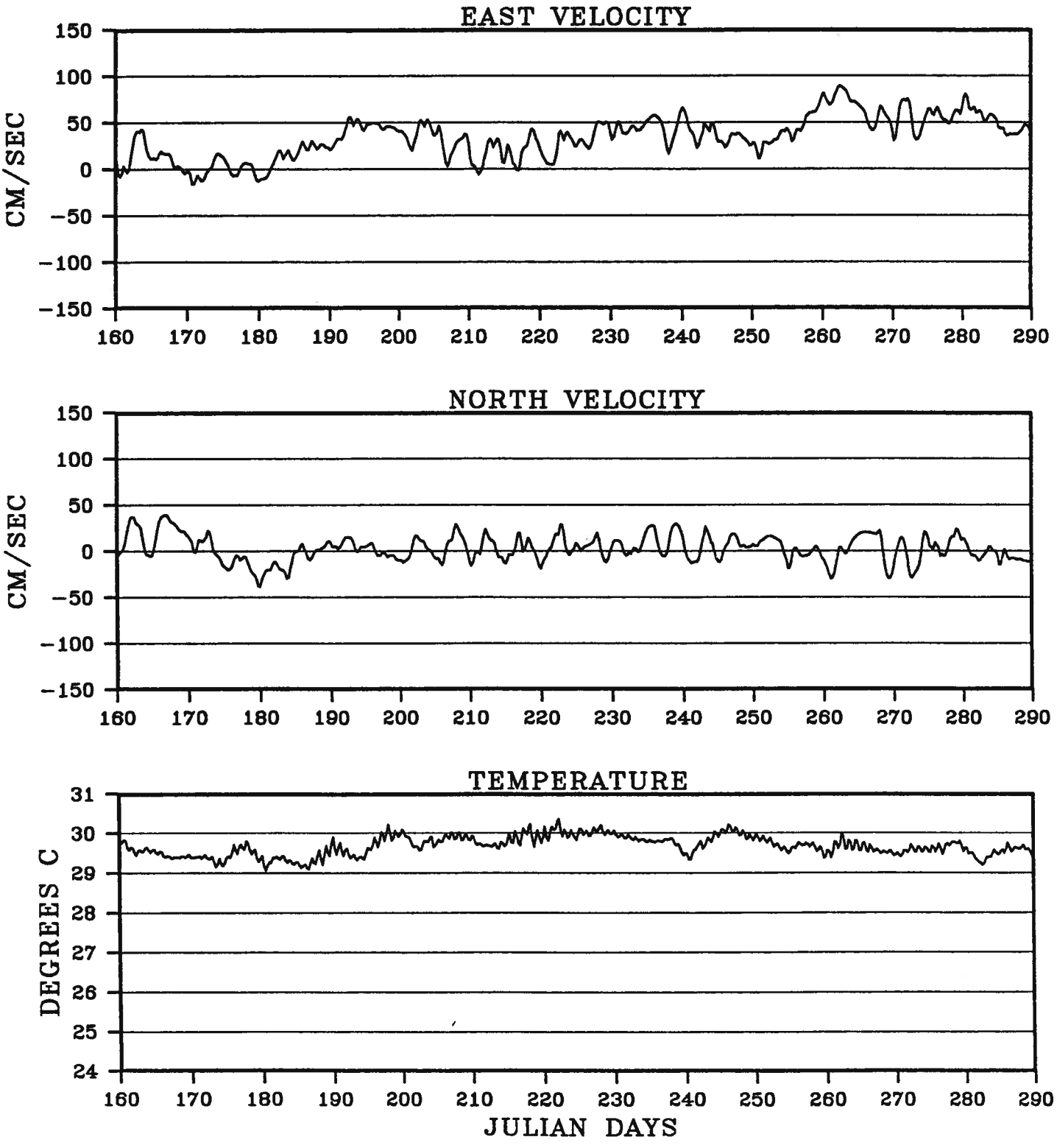
JULIAN DAYS

BUOY 3089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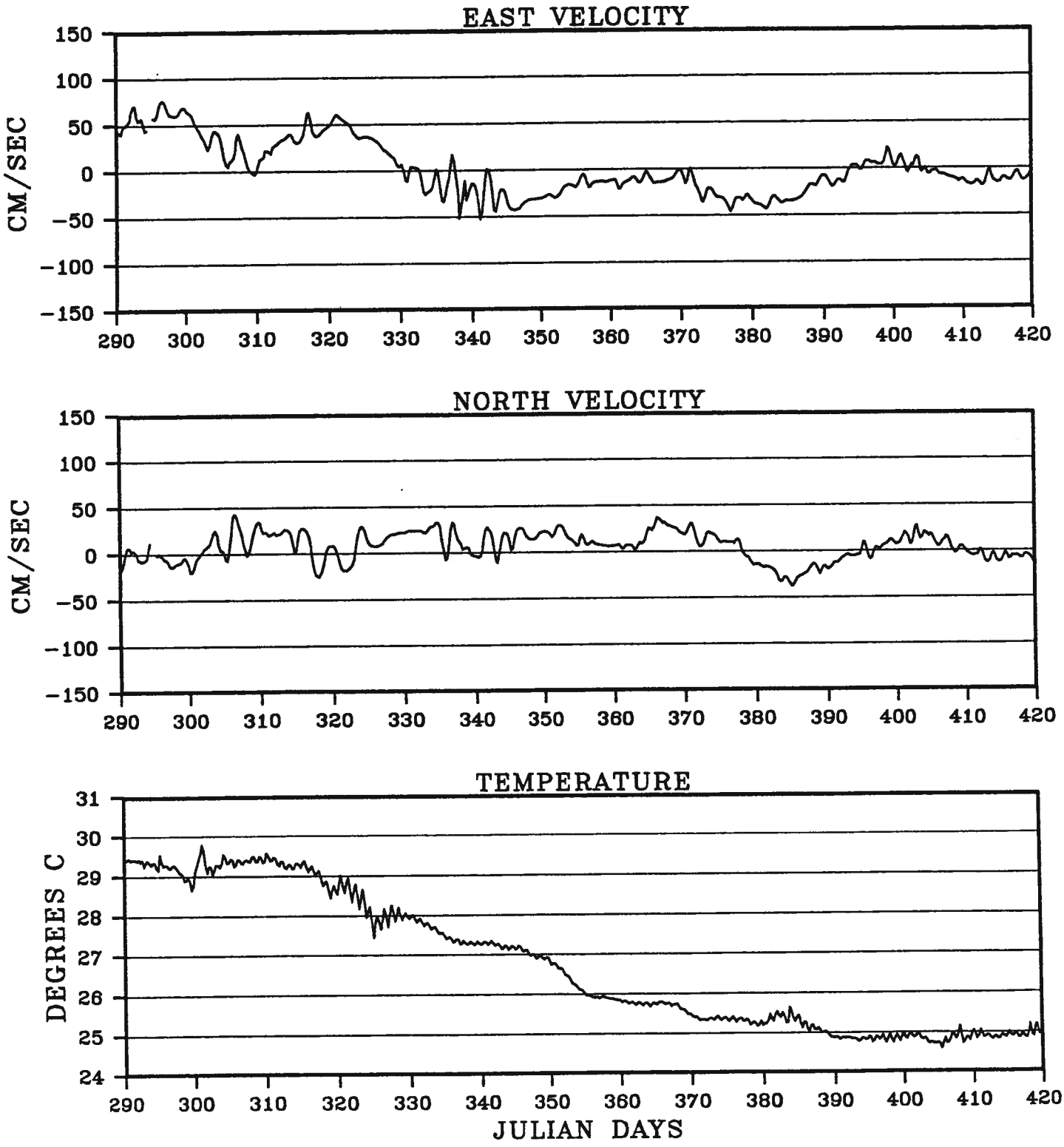
JULIAN DAYS

BUOY 3089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CM/SEC
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TEMPERATURE
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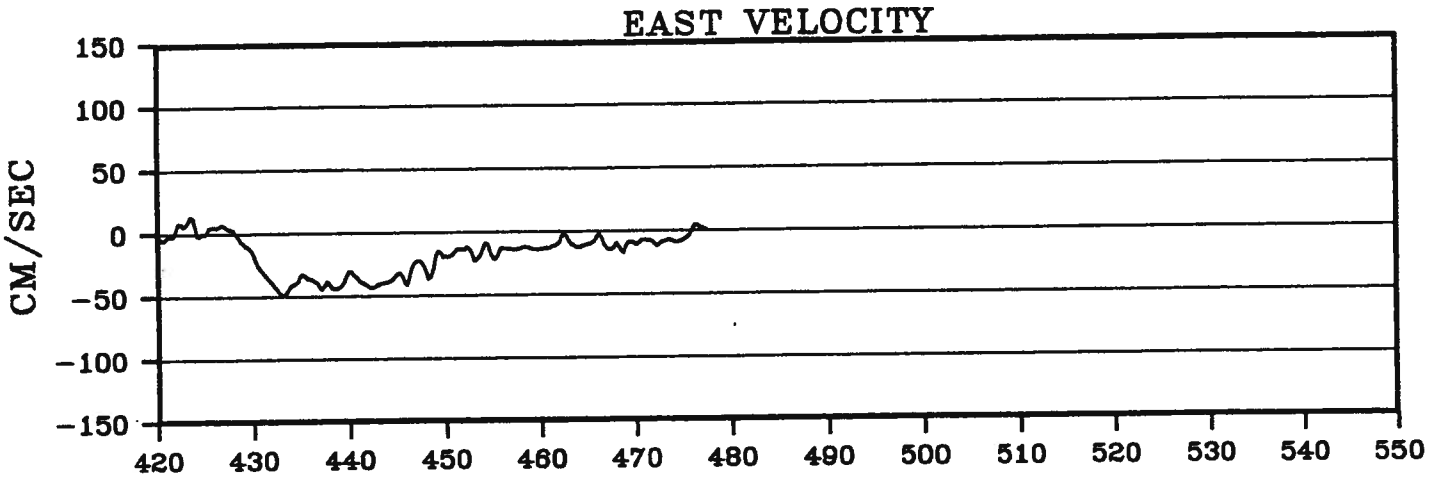
JULIAN DAYS

BUOY 3089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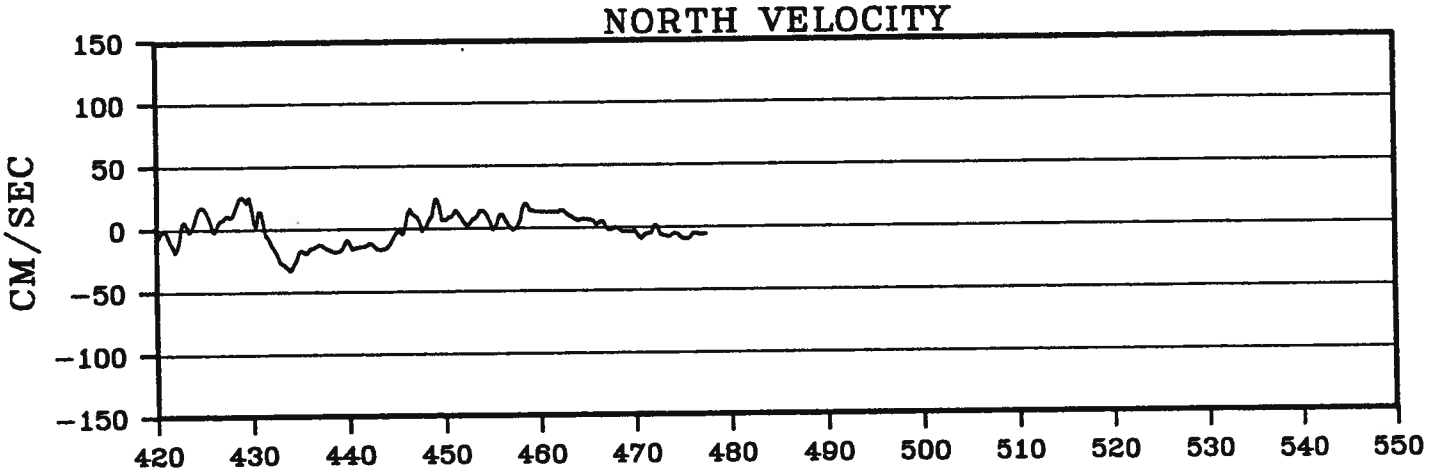
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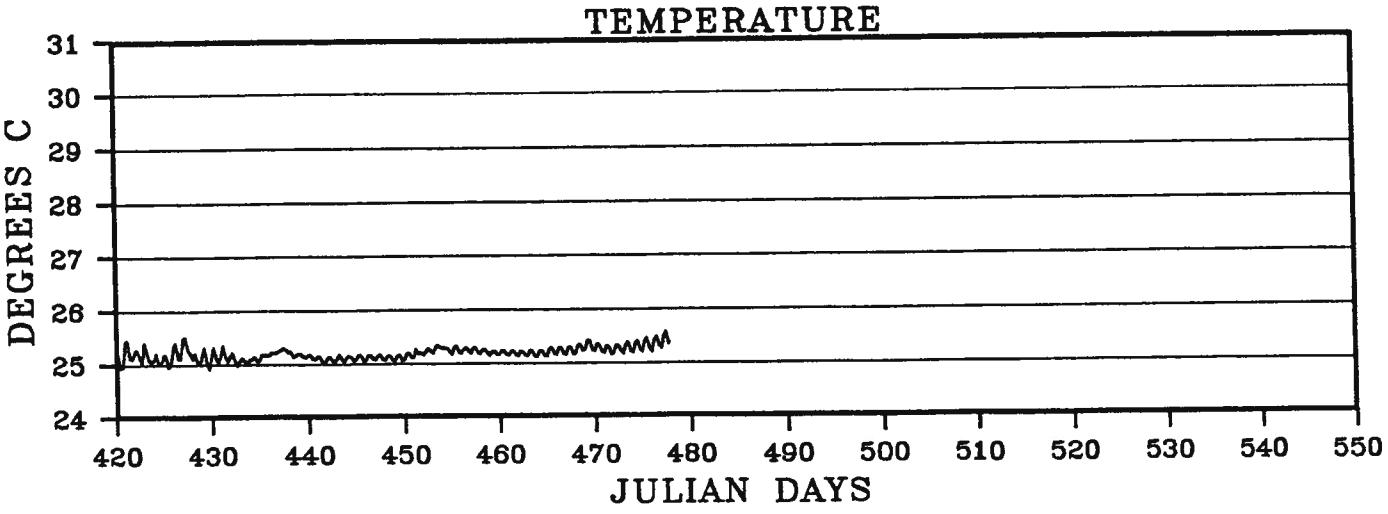
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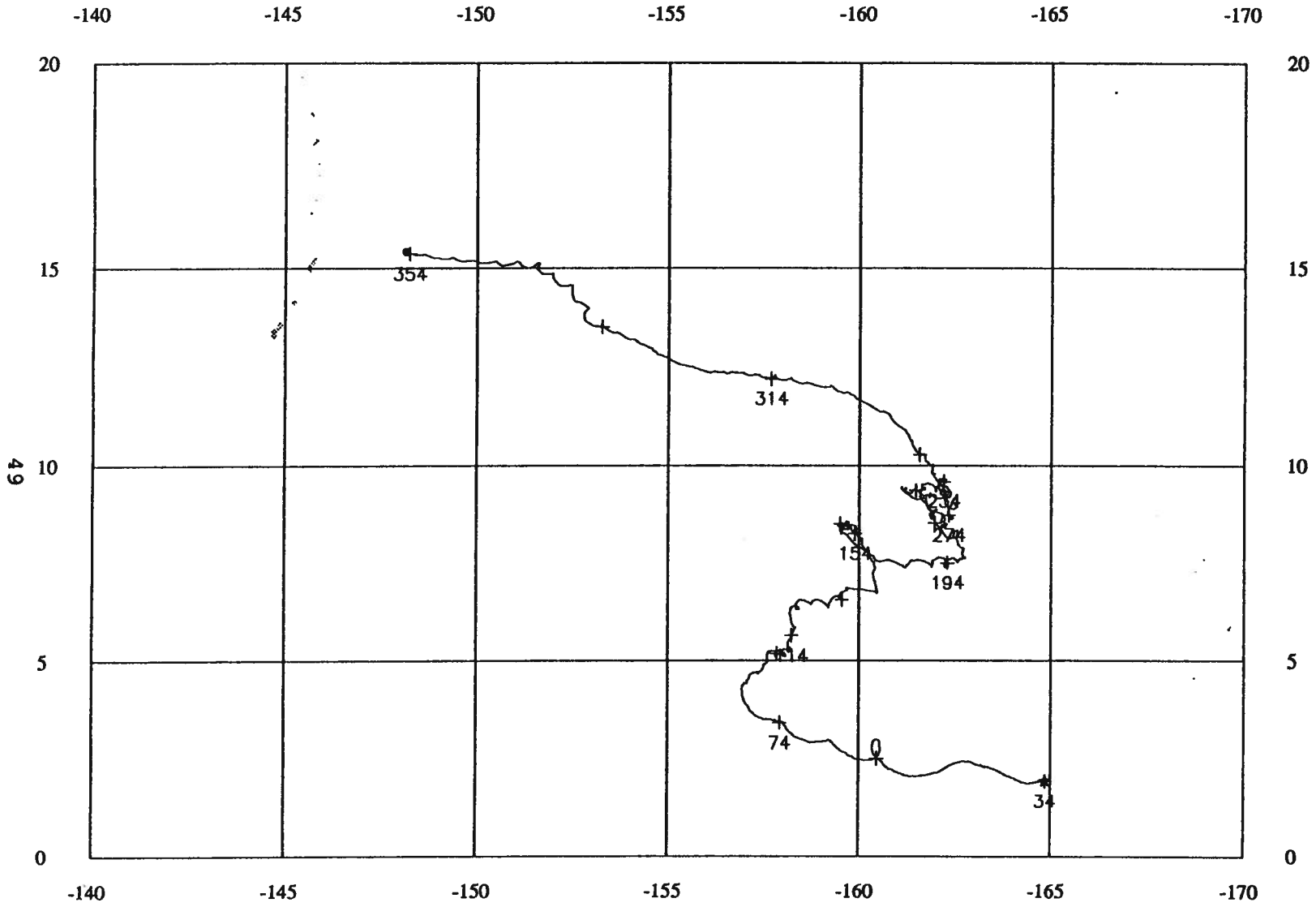
JULIAN DAYS

BUOY 3090



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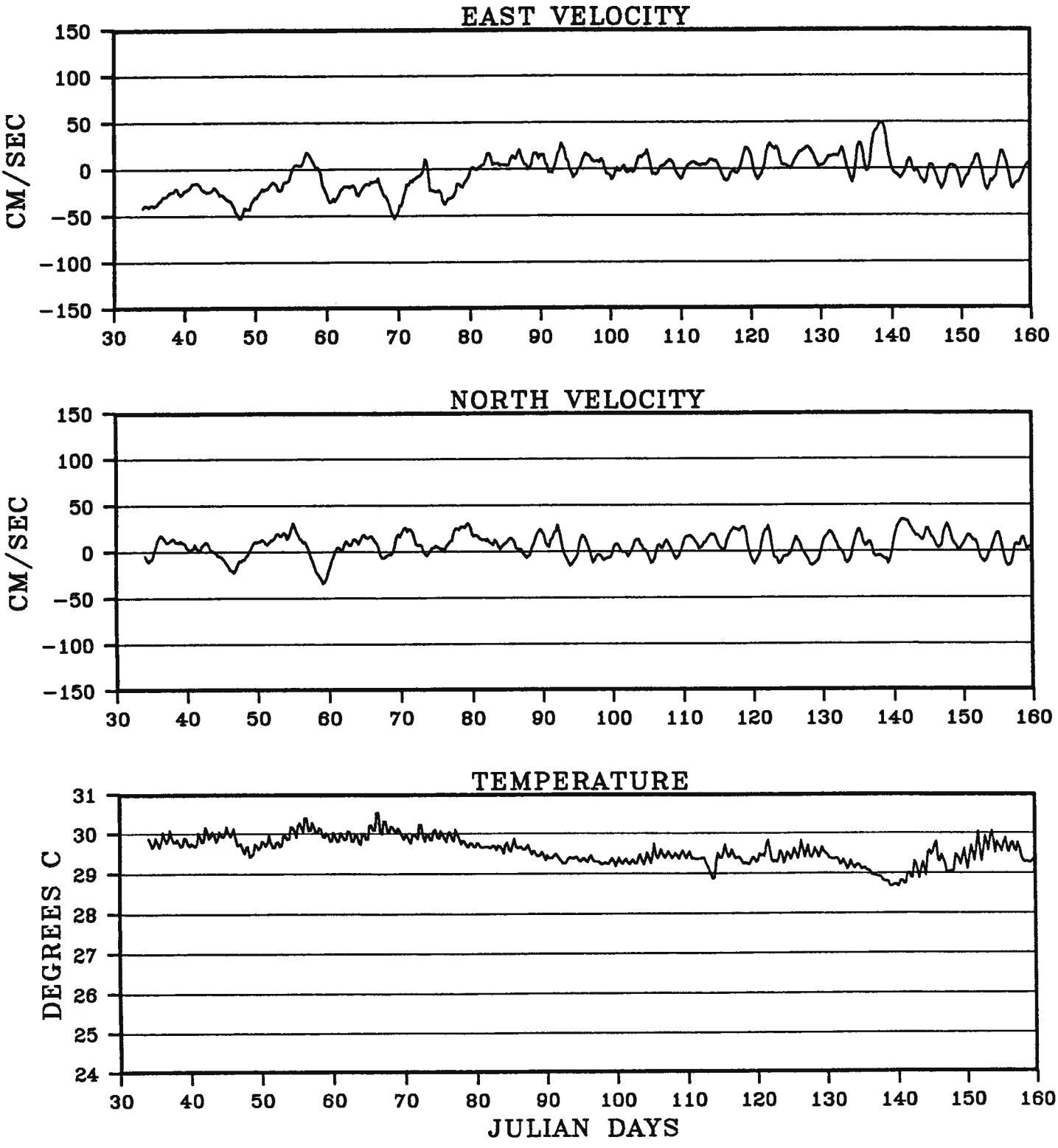
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TEMPERATURE
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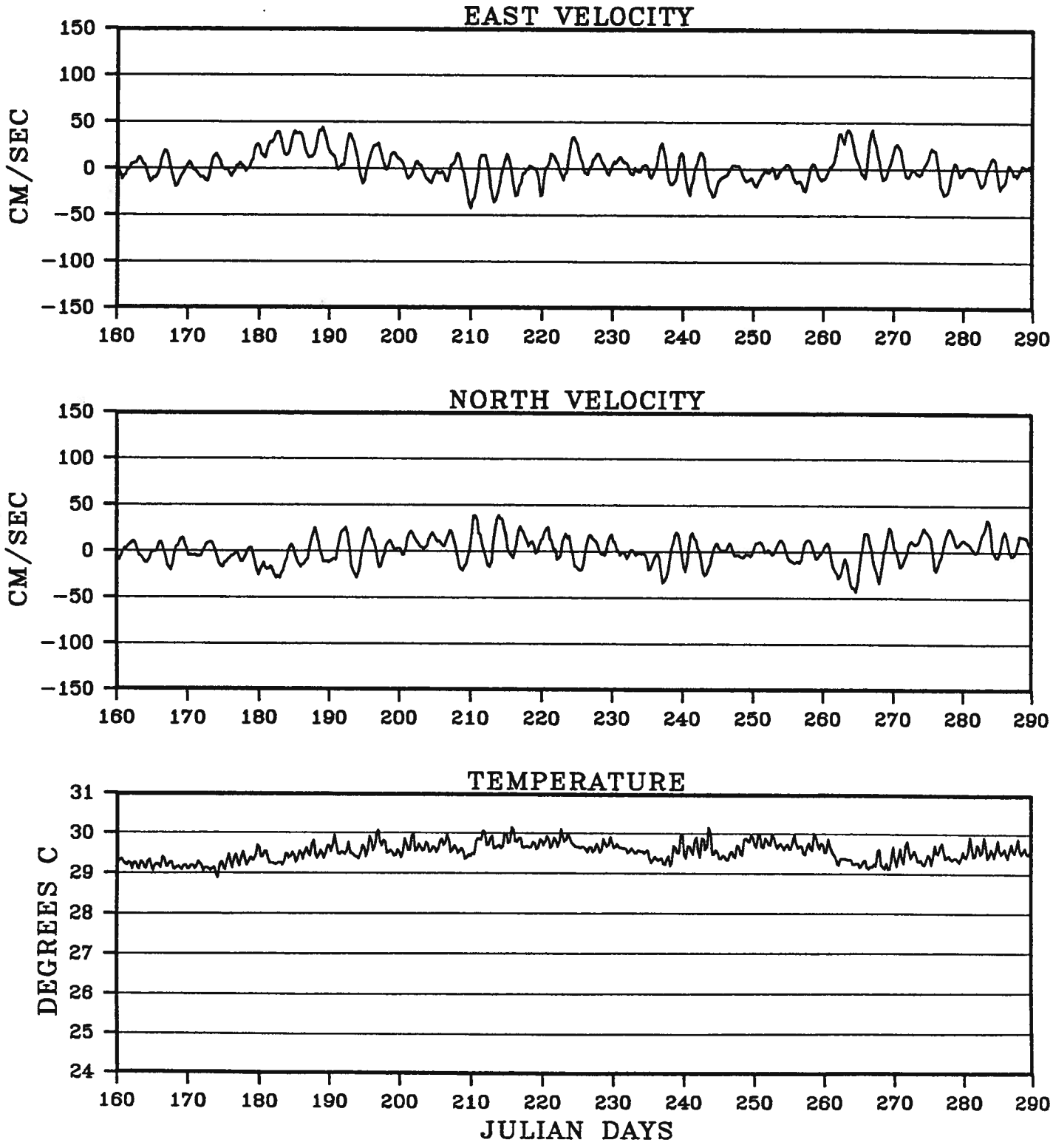
JULIAN DAYS

BUOY 3090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TEMPERATURE
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JULIAN DAYS

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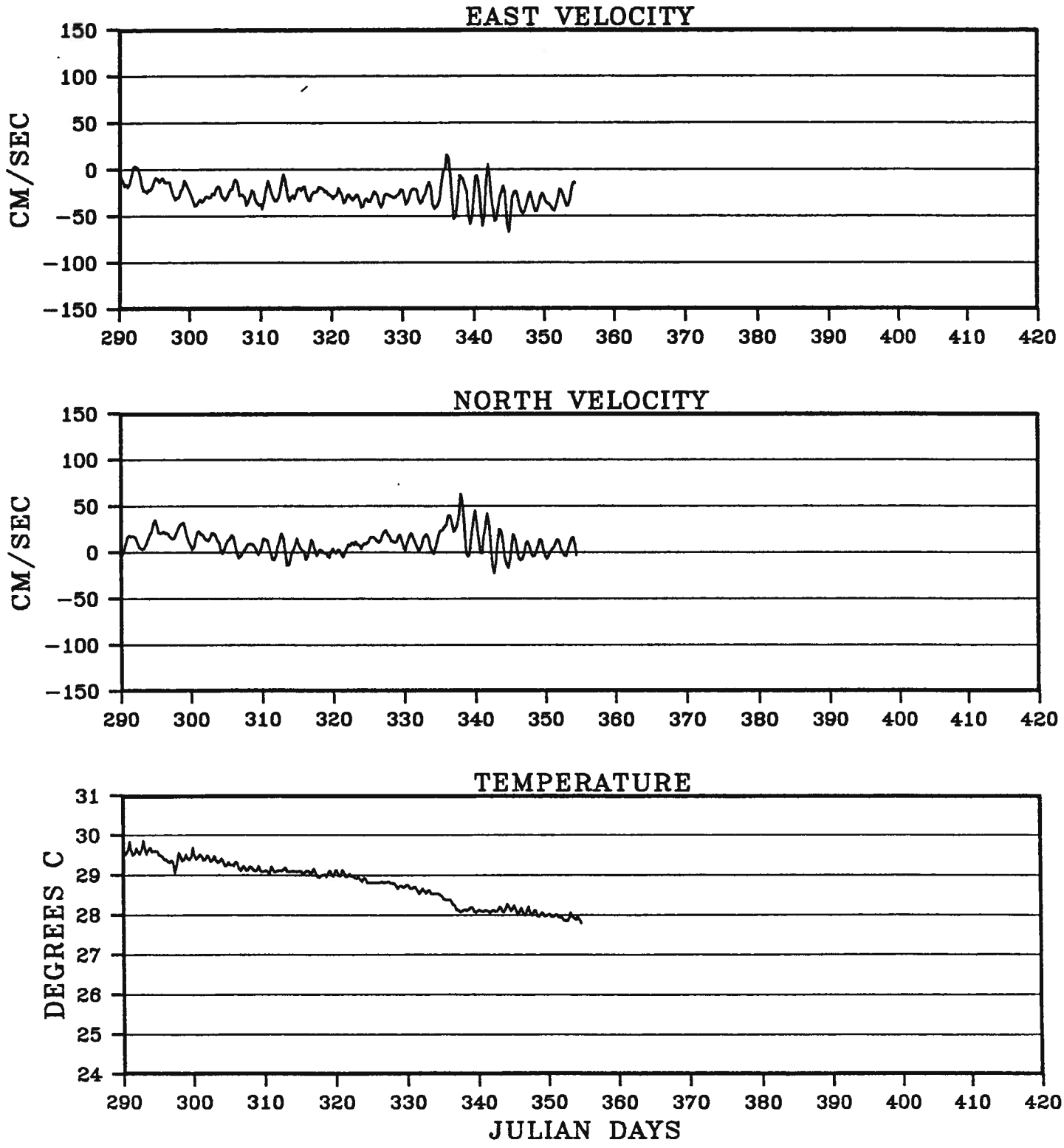
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TEMPERATURE
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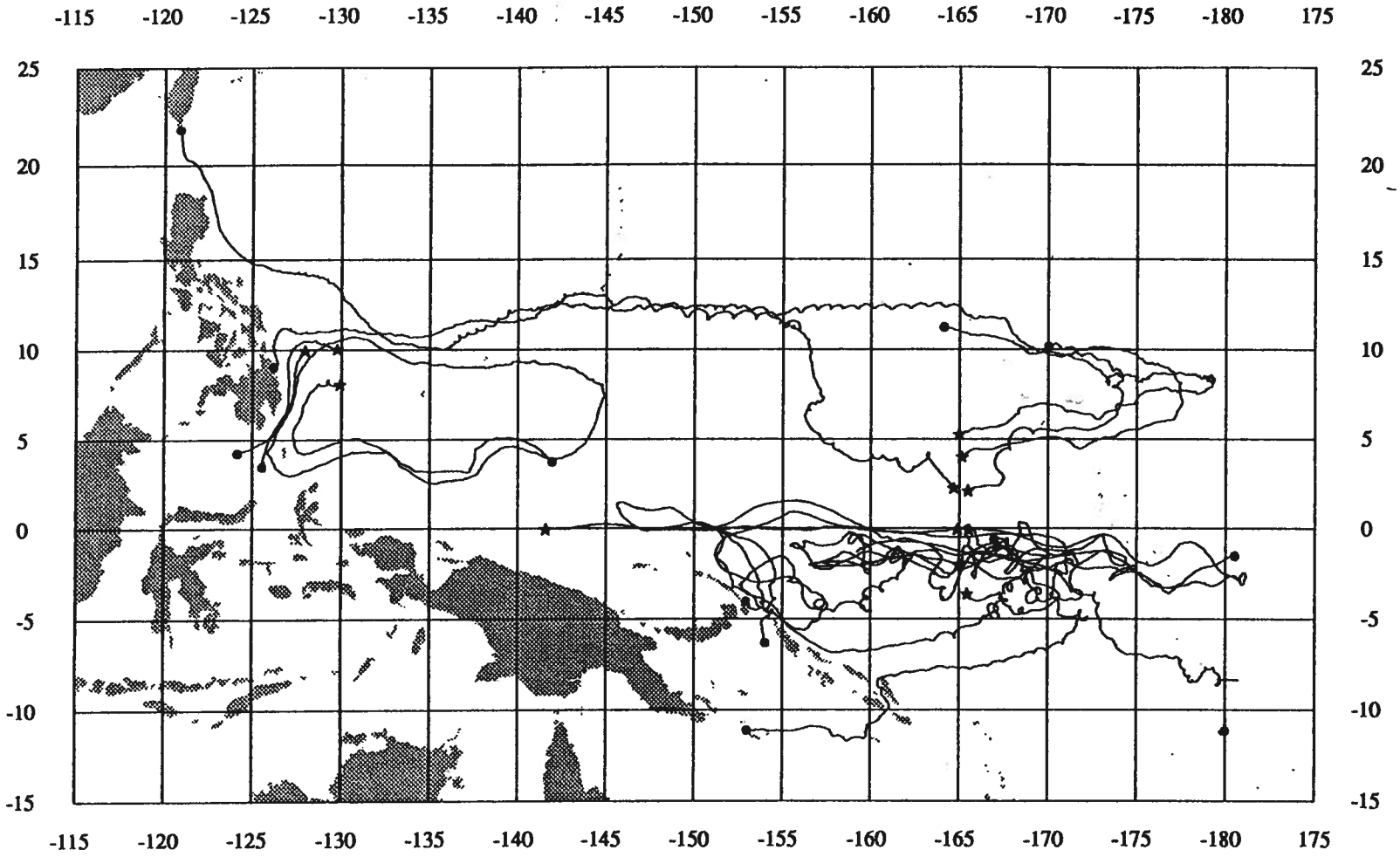
JULIAN DAYS

NOVEMBER 1986 –FEBRUARY 1988



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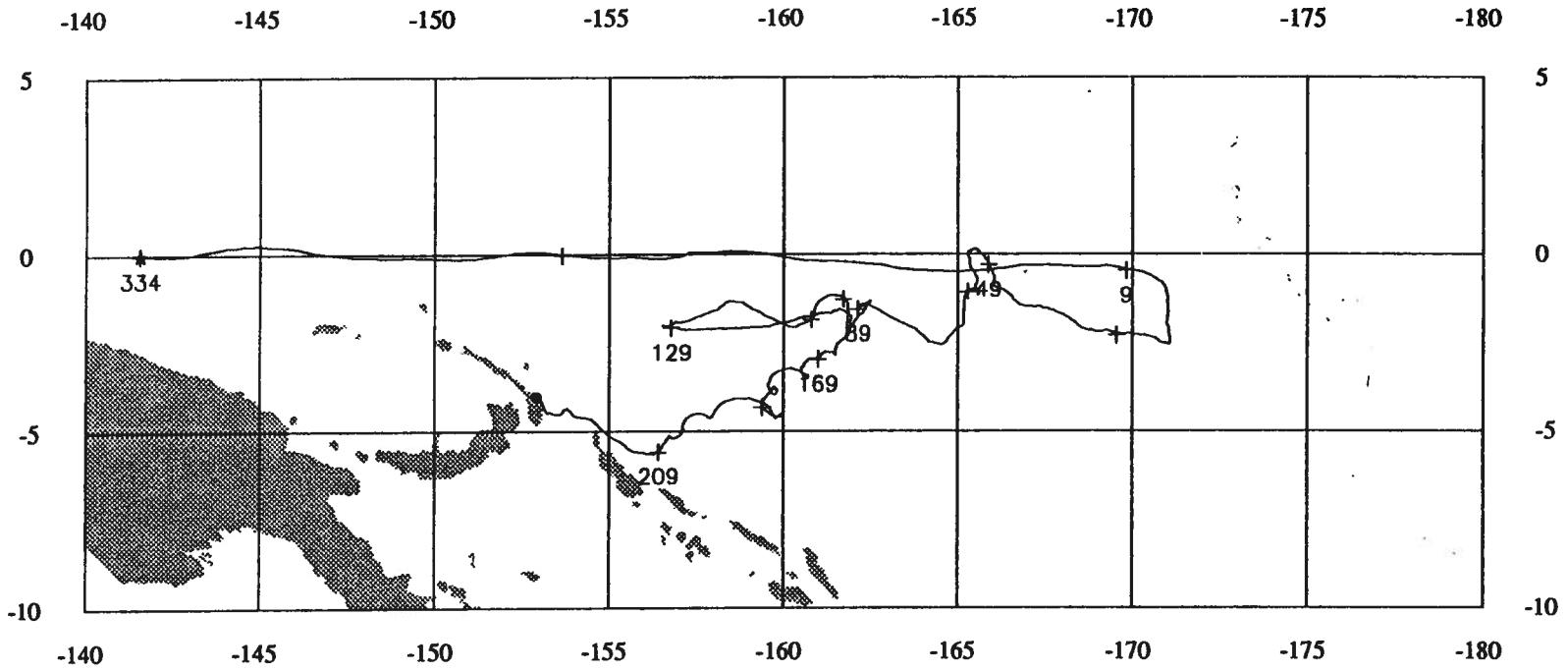

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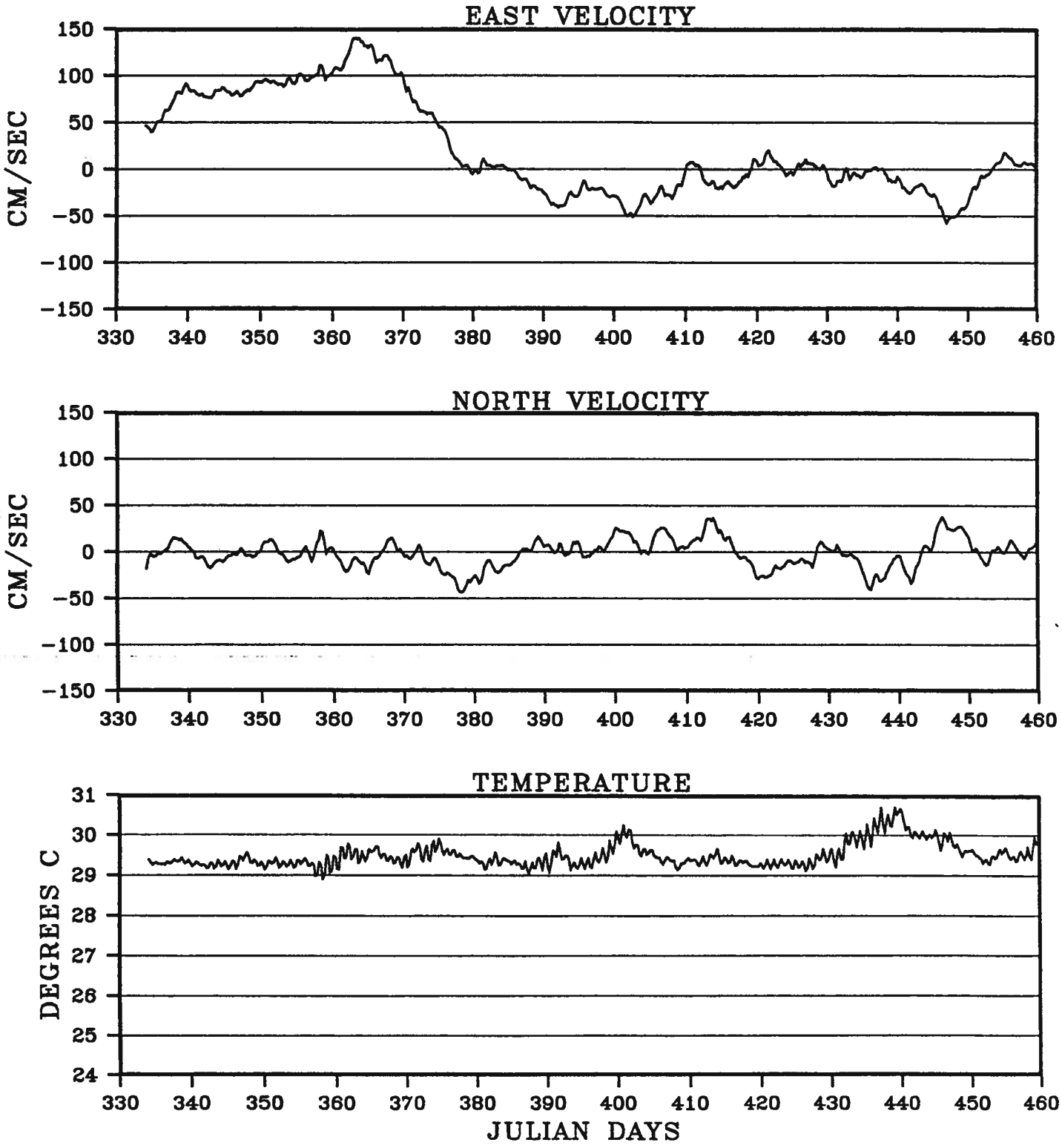
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TEMPERATURE
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JULIAN DAYS

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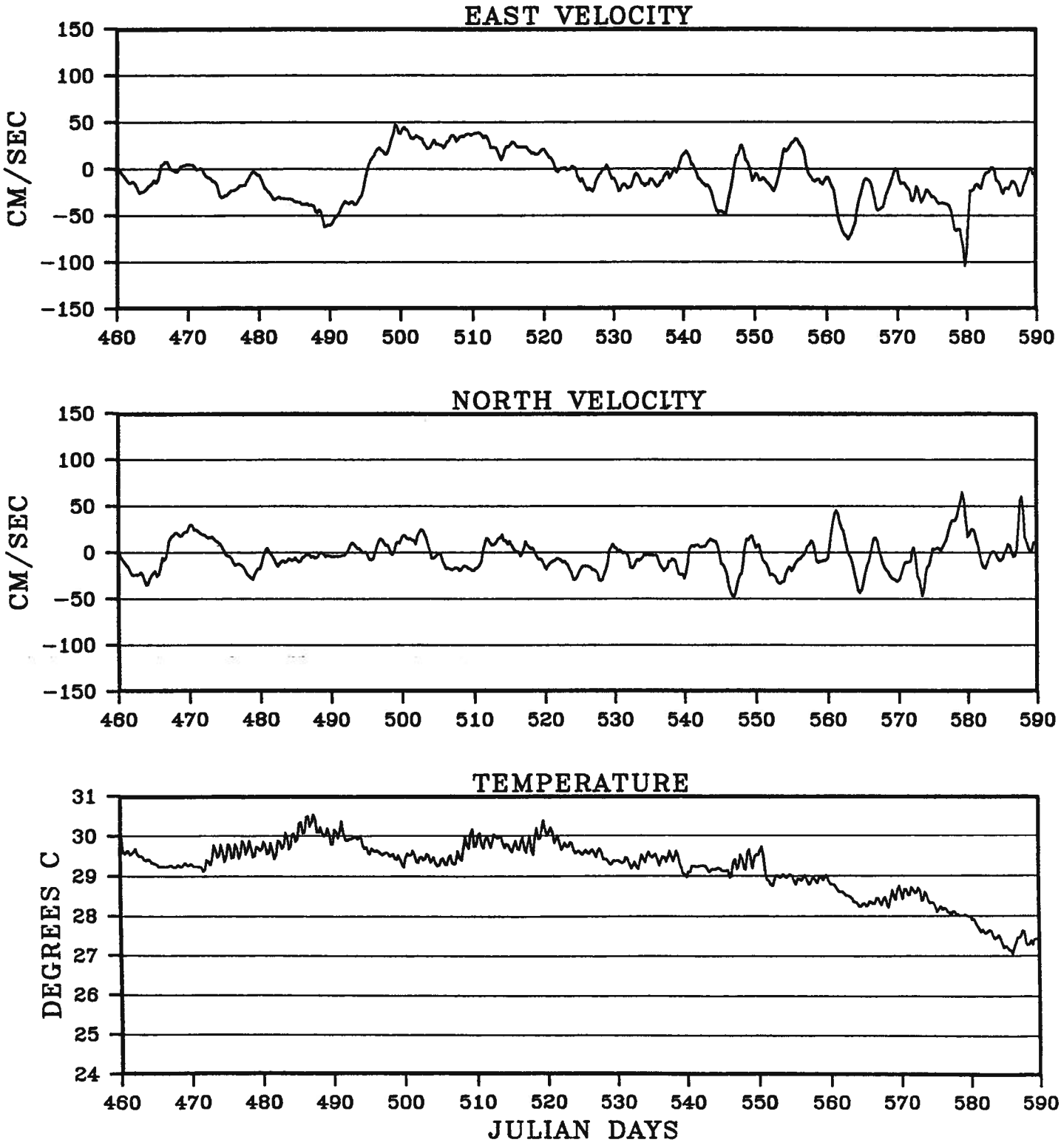
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TEMPERATURE
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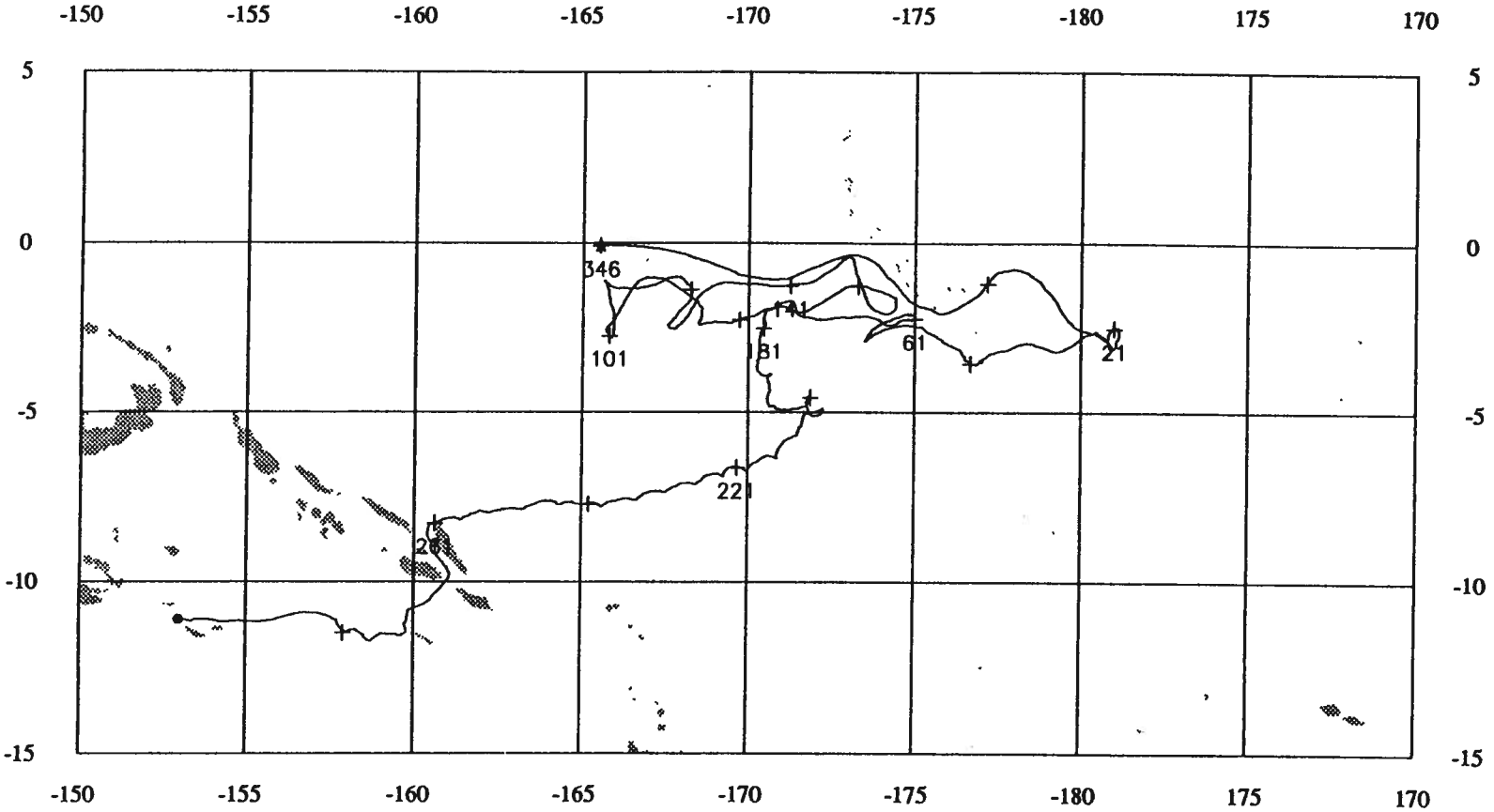
JULIAN DAYS

BUOY 3143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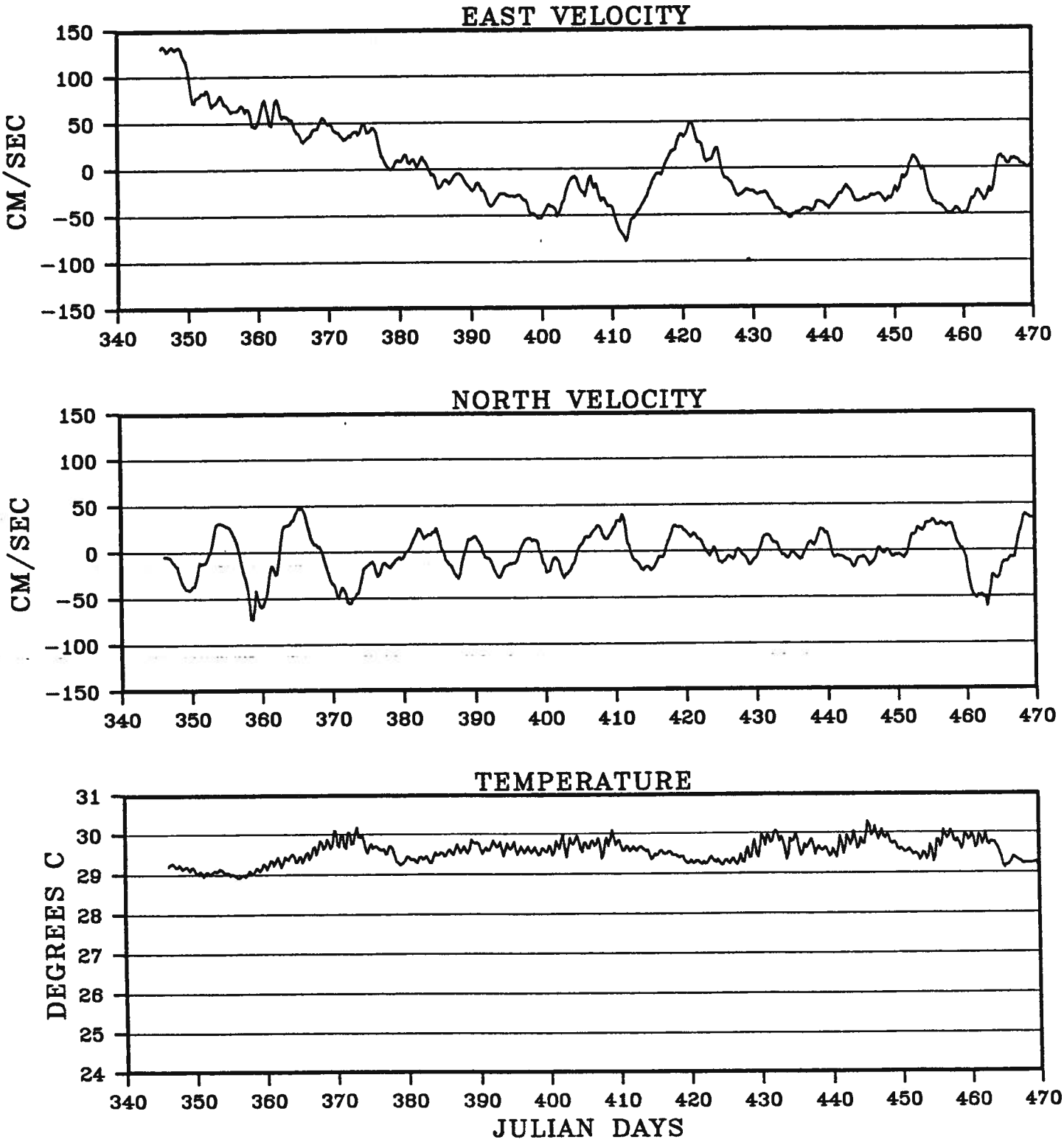
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TEMPERATURE
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JULIAN DAYS

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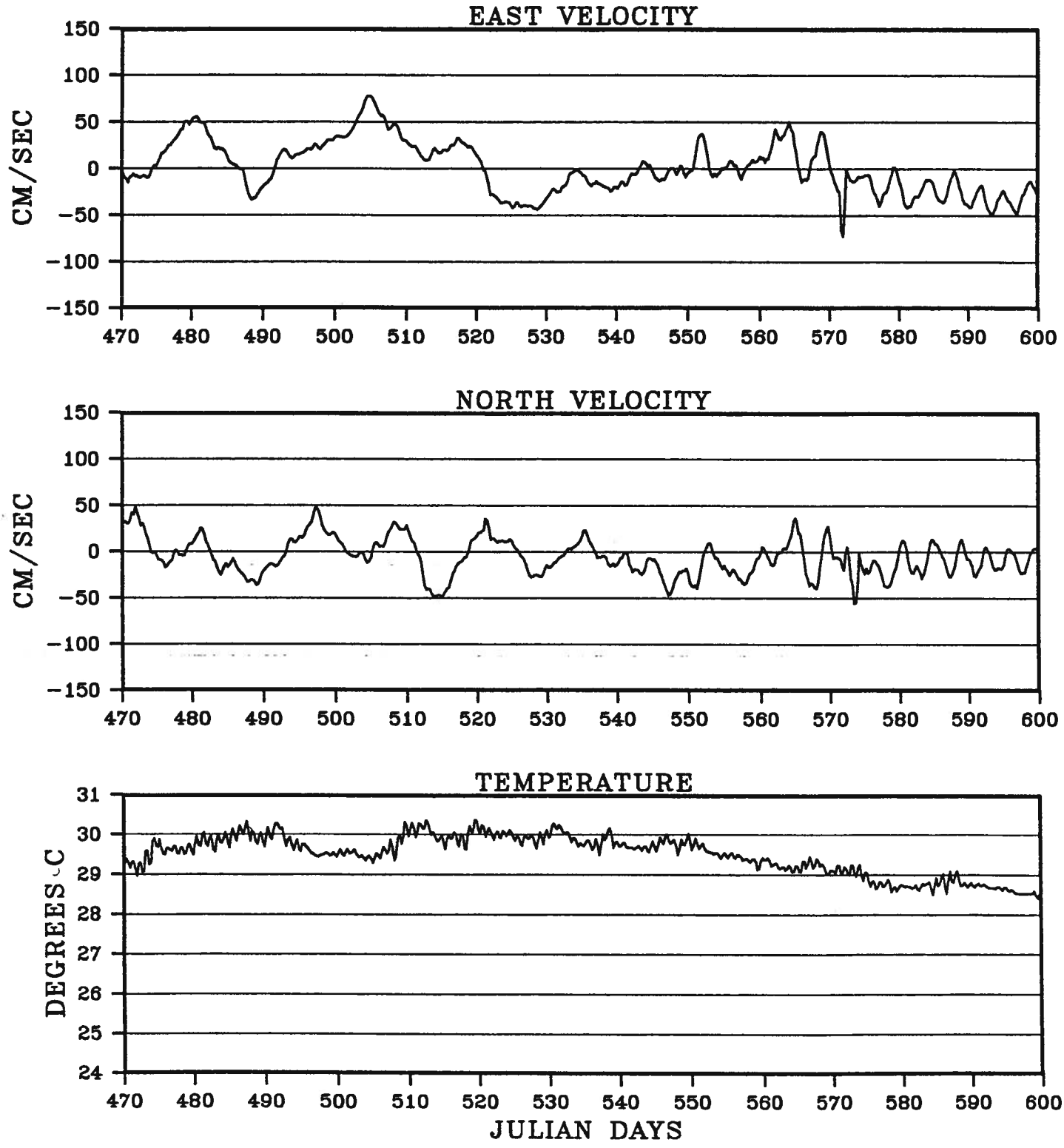
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TEMPERATURE
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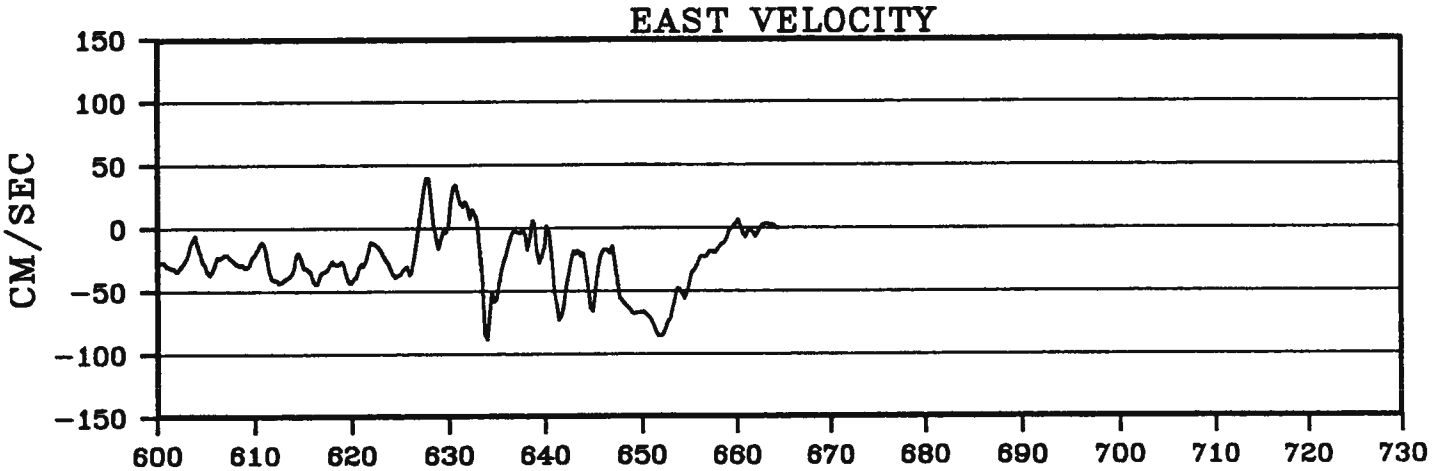
JULIAN DAYS

BUOY 3143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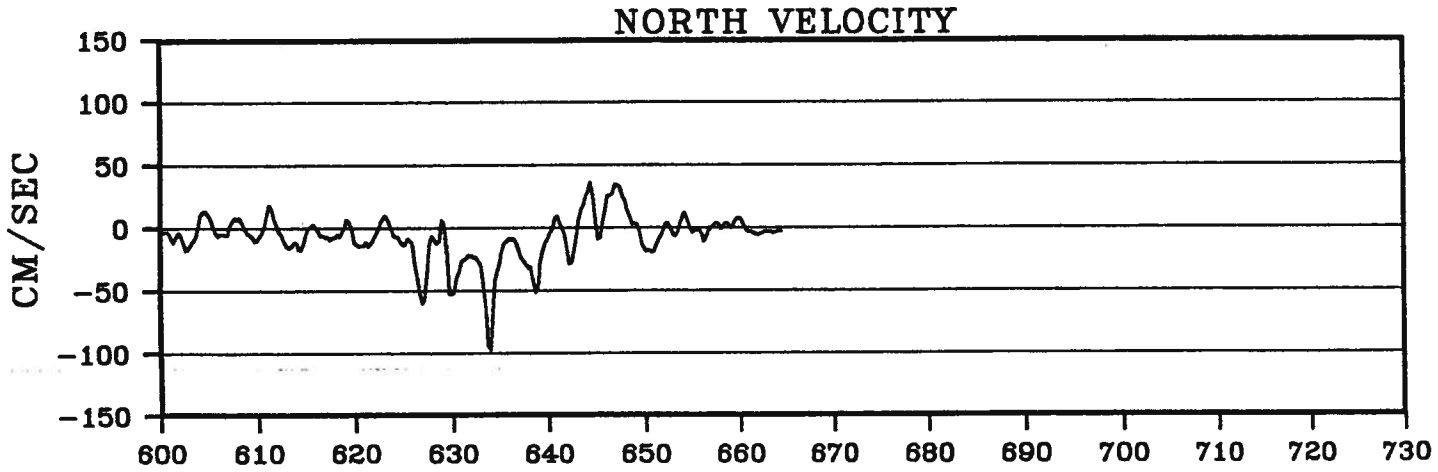
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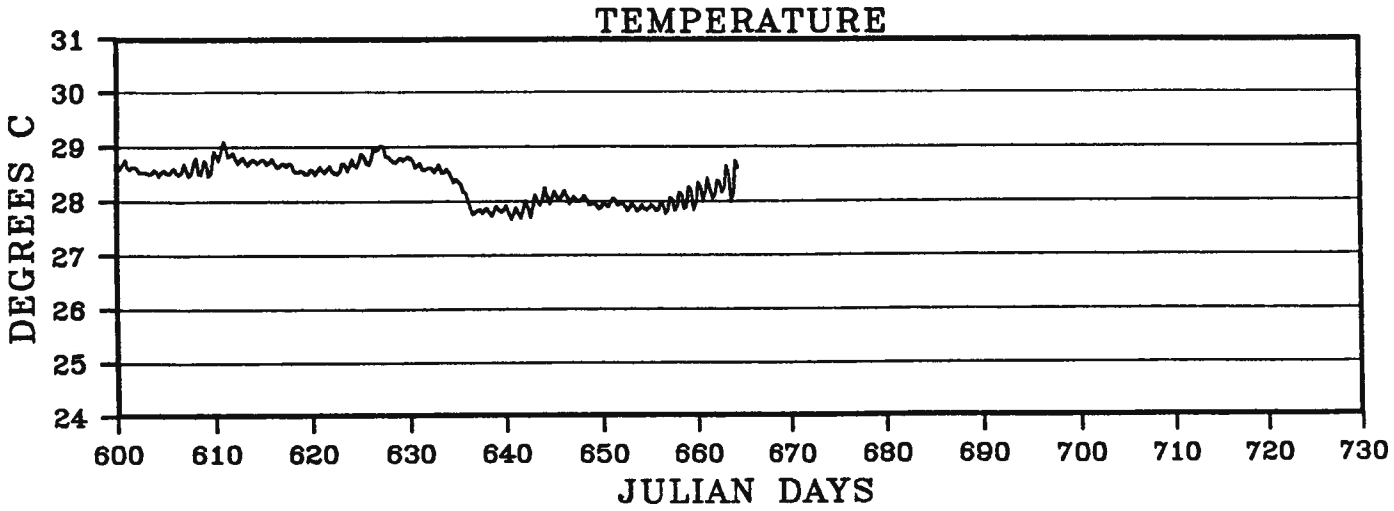
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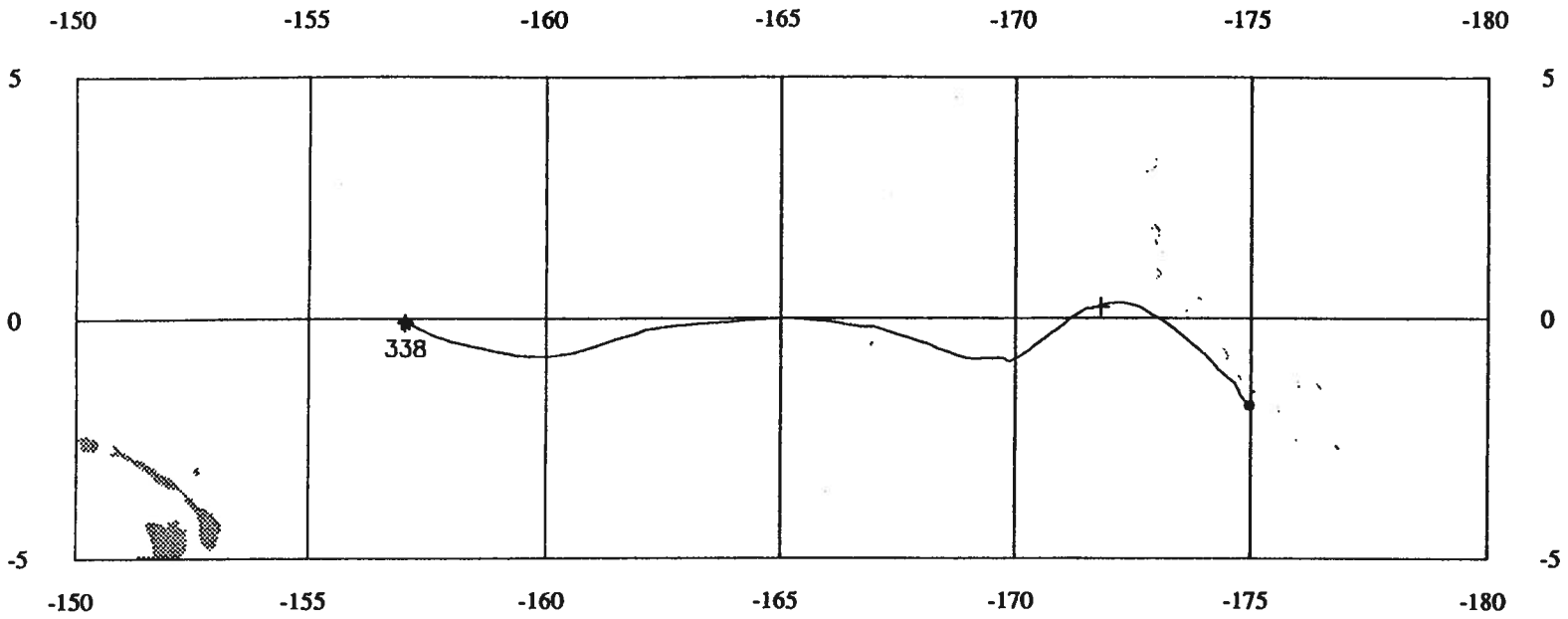
JULIAN DAYS

BUOY 3144



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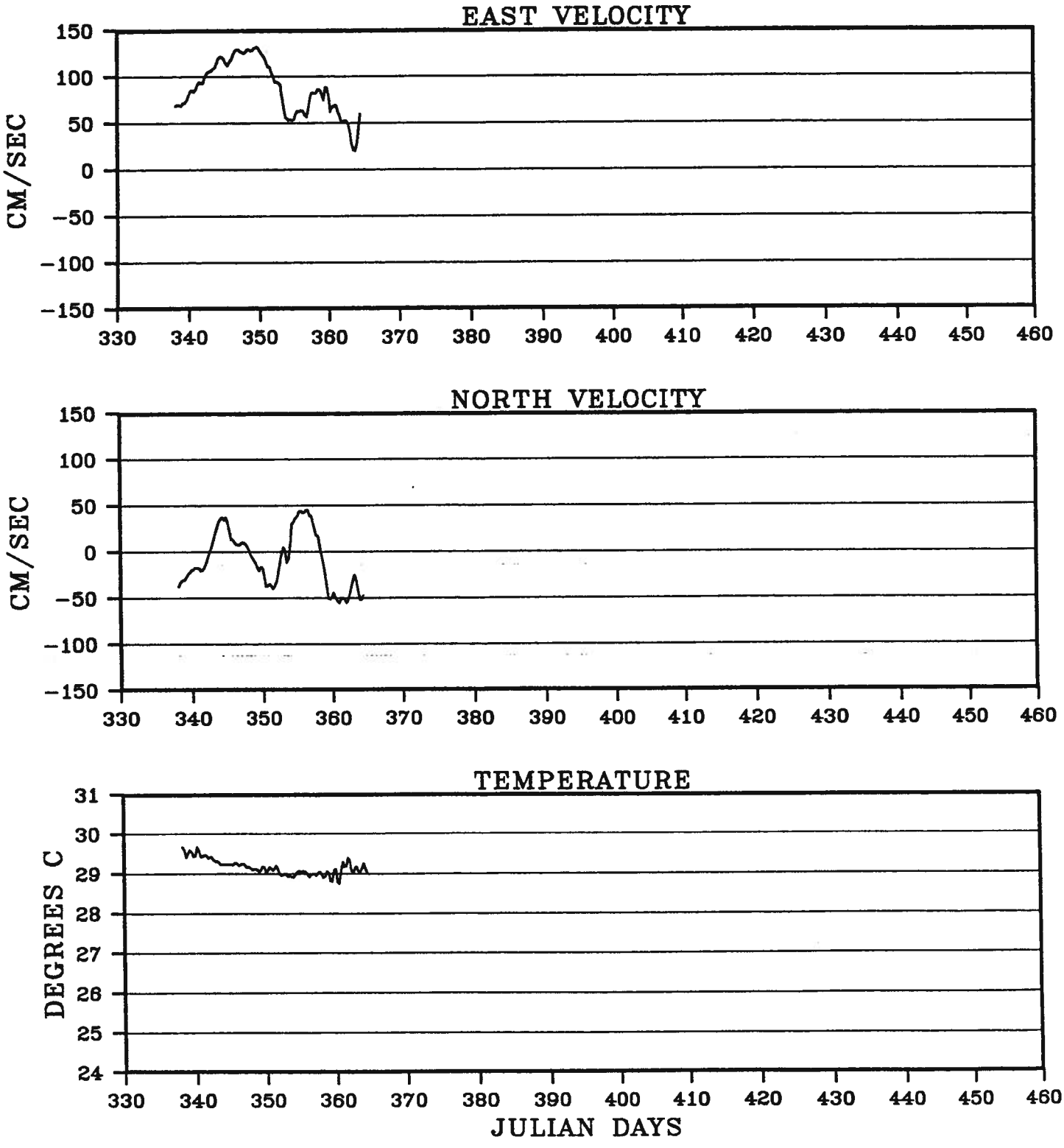
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TEMPERATURE
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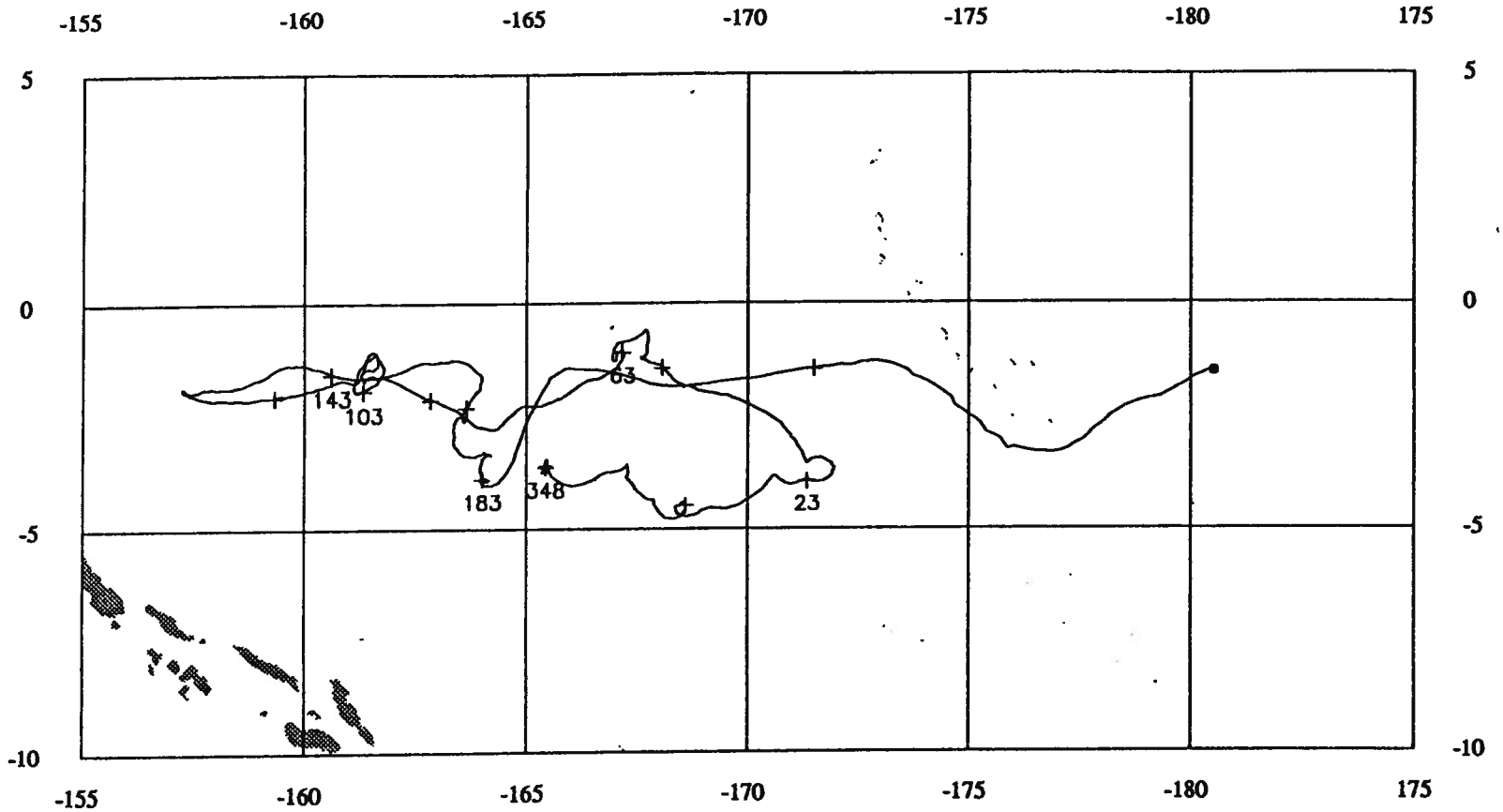
JULIAN DAYS

BUOY 3145



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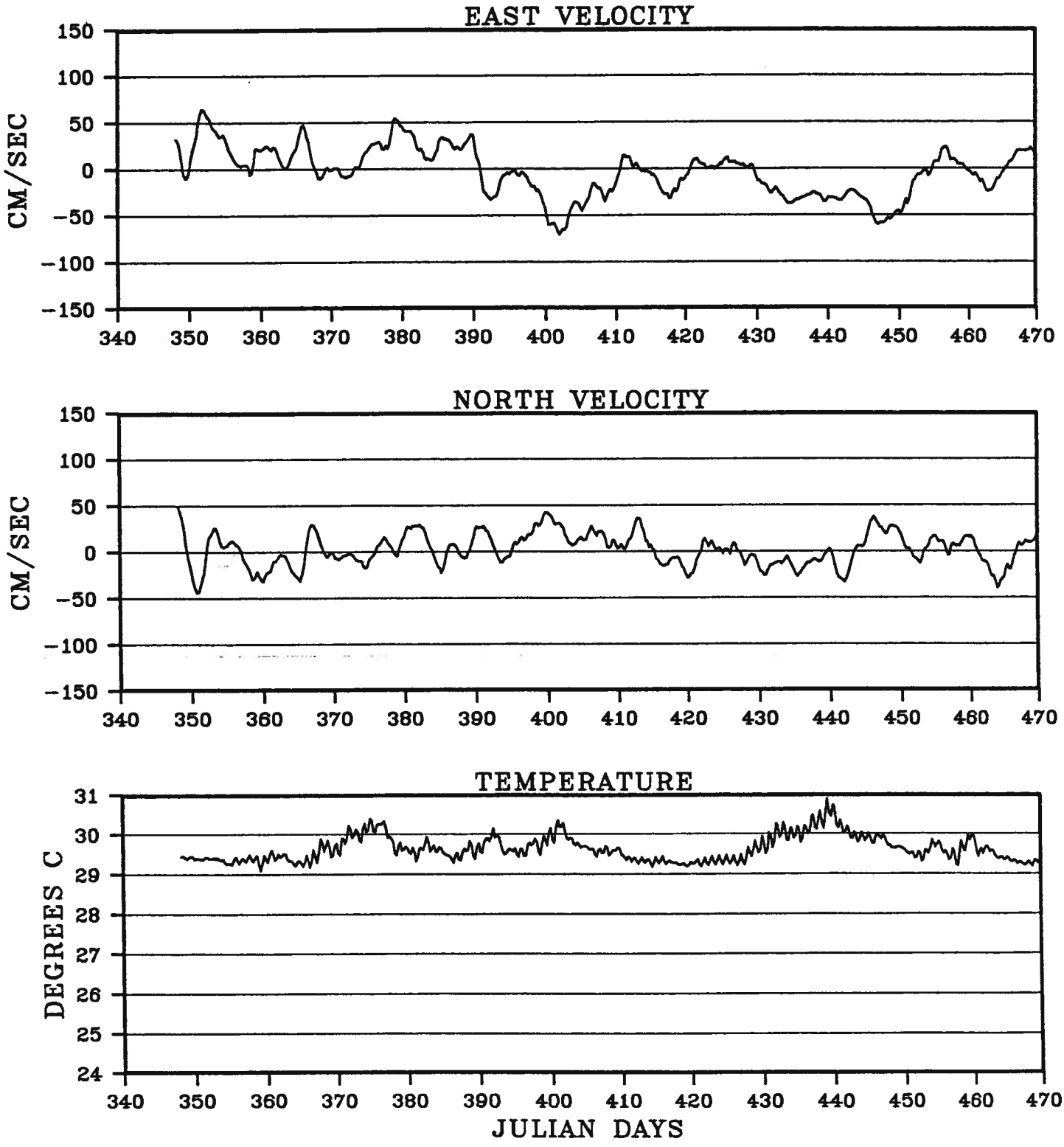
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TEMPERATURE
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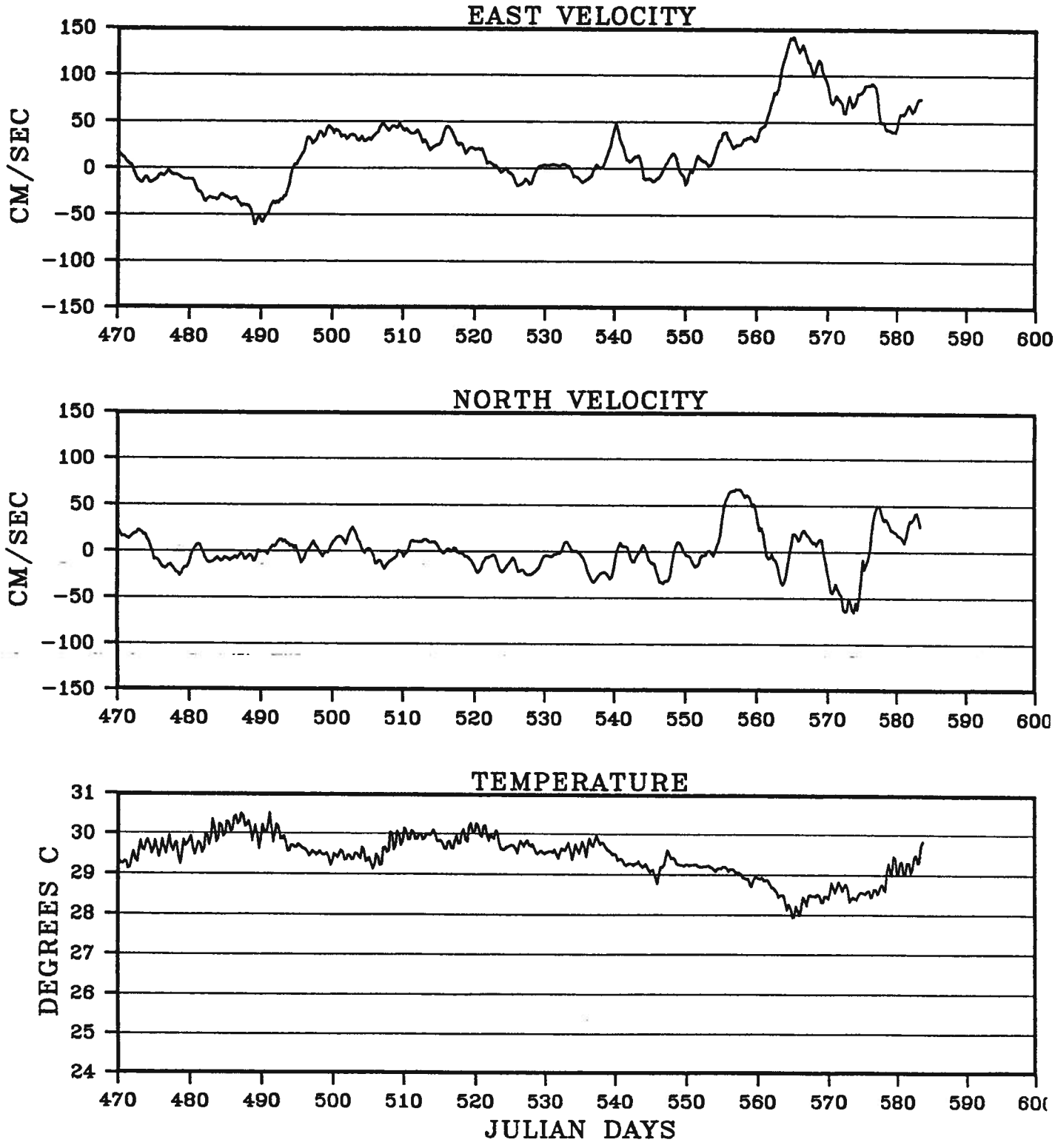
JULIAN DAYS

BUOY 3145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JULIAN DAYS

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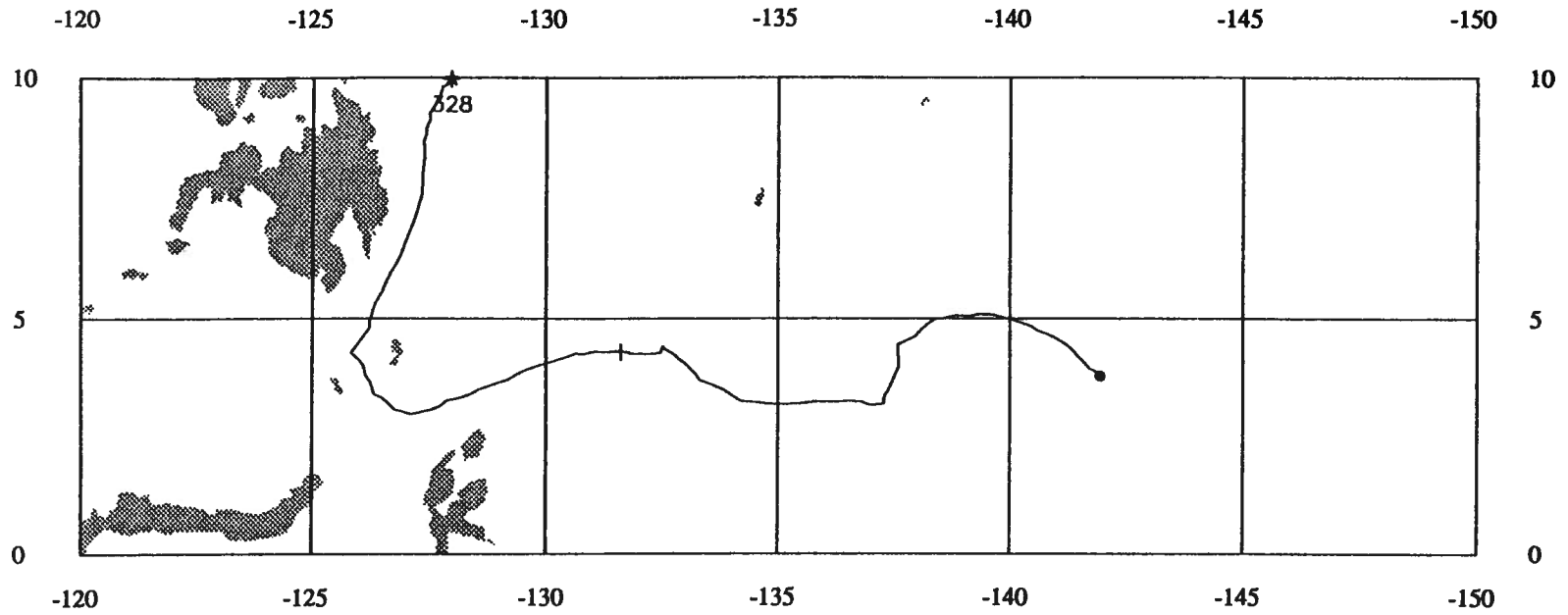

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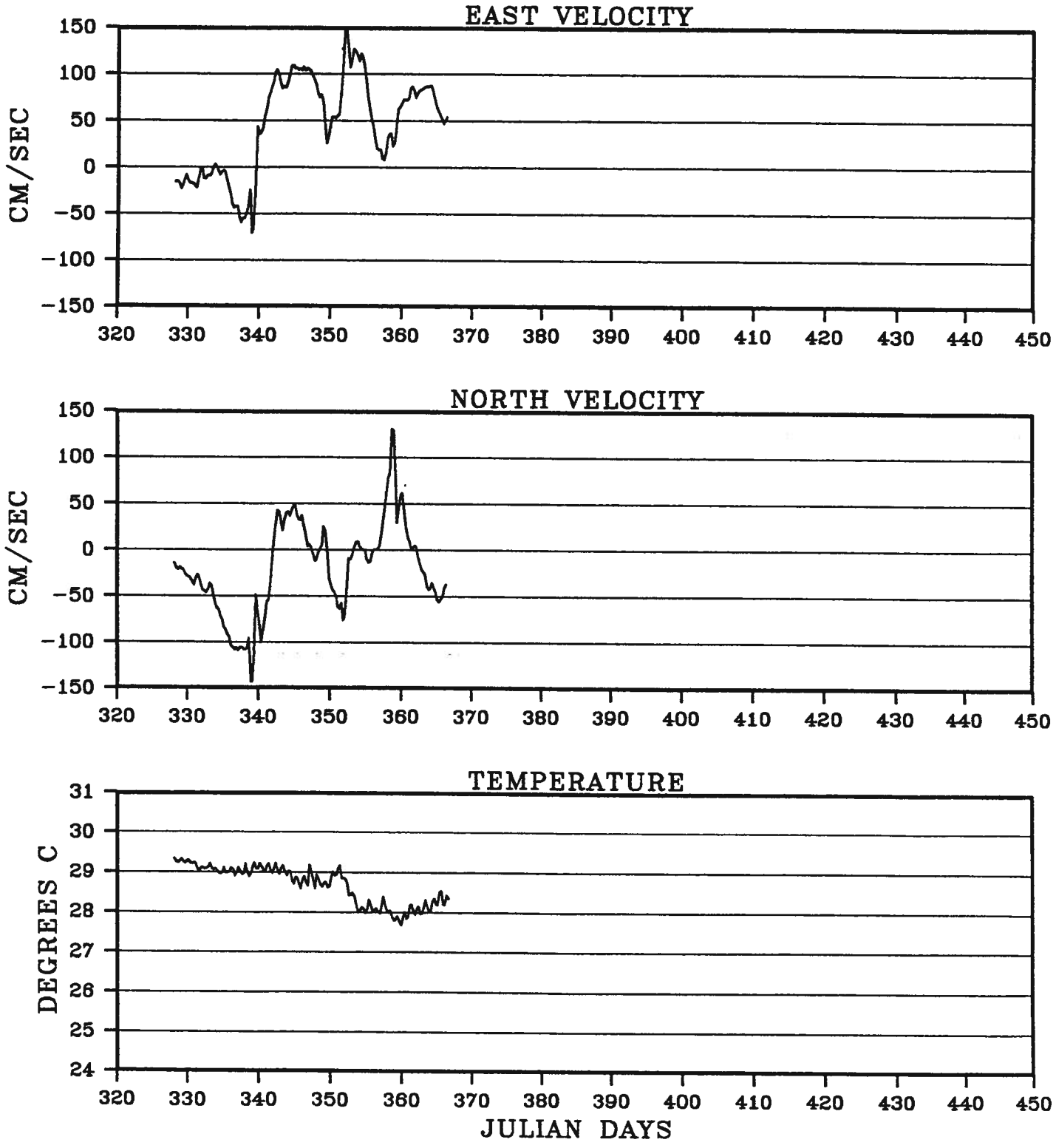
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TEMPERATURE
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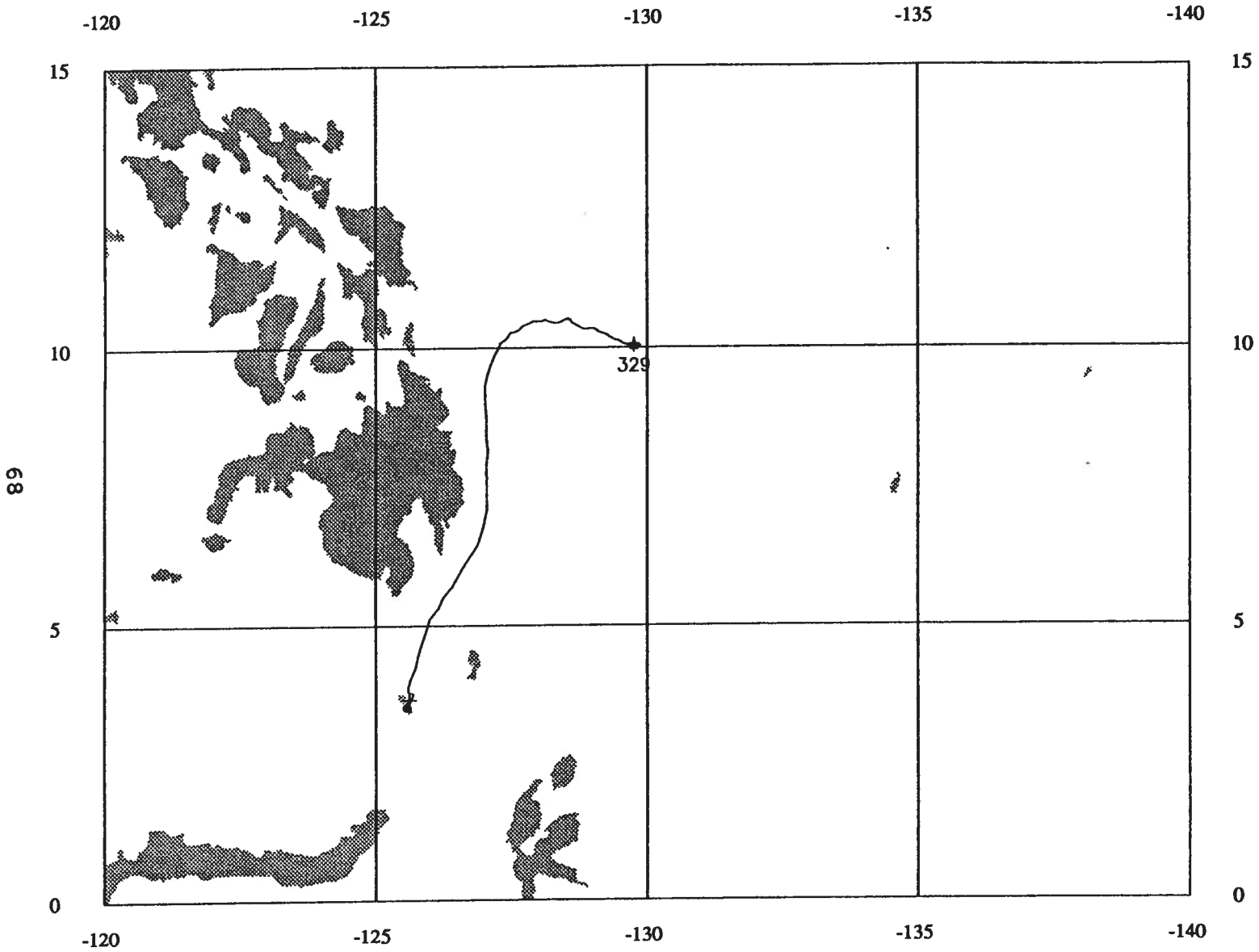
JULIAN DAYS

BUOY 3147



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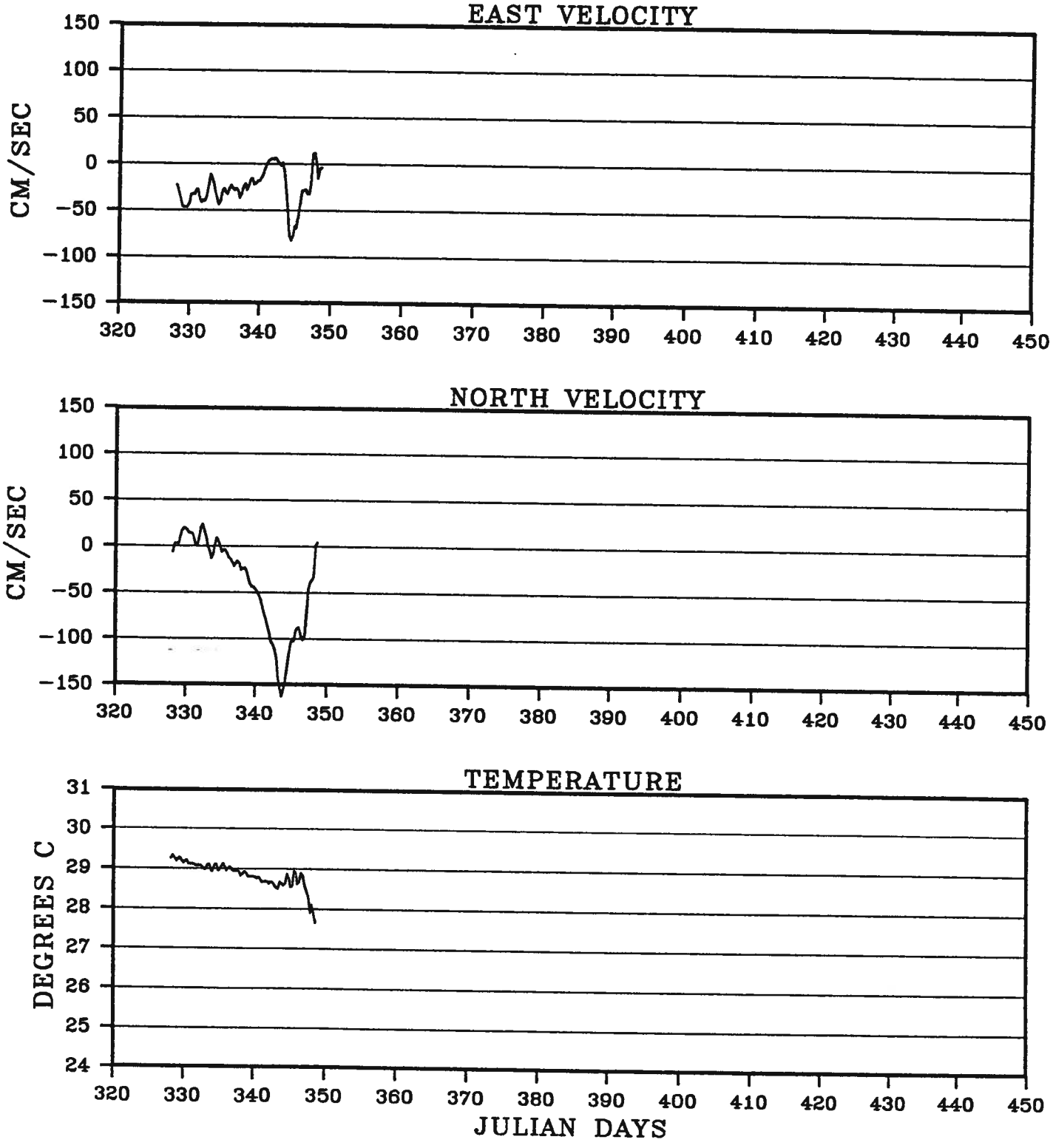
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TEMPERATURE
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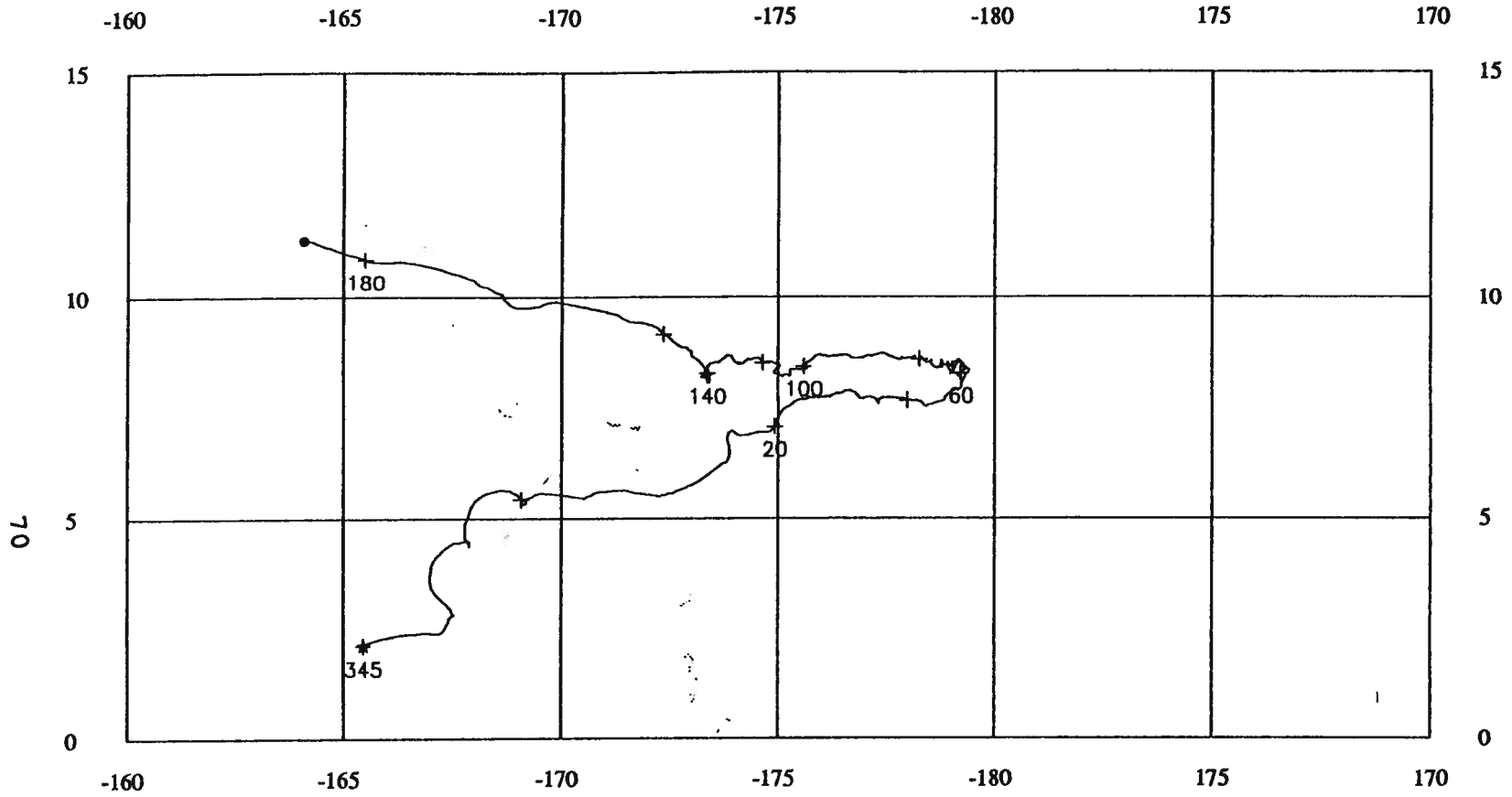
JULIAN DAYS

BUOY 3148



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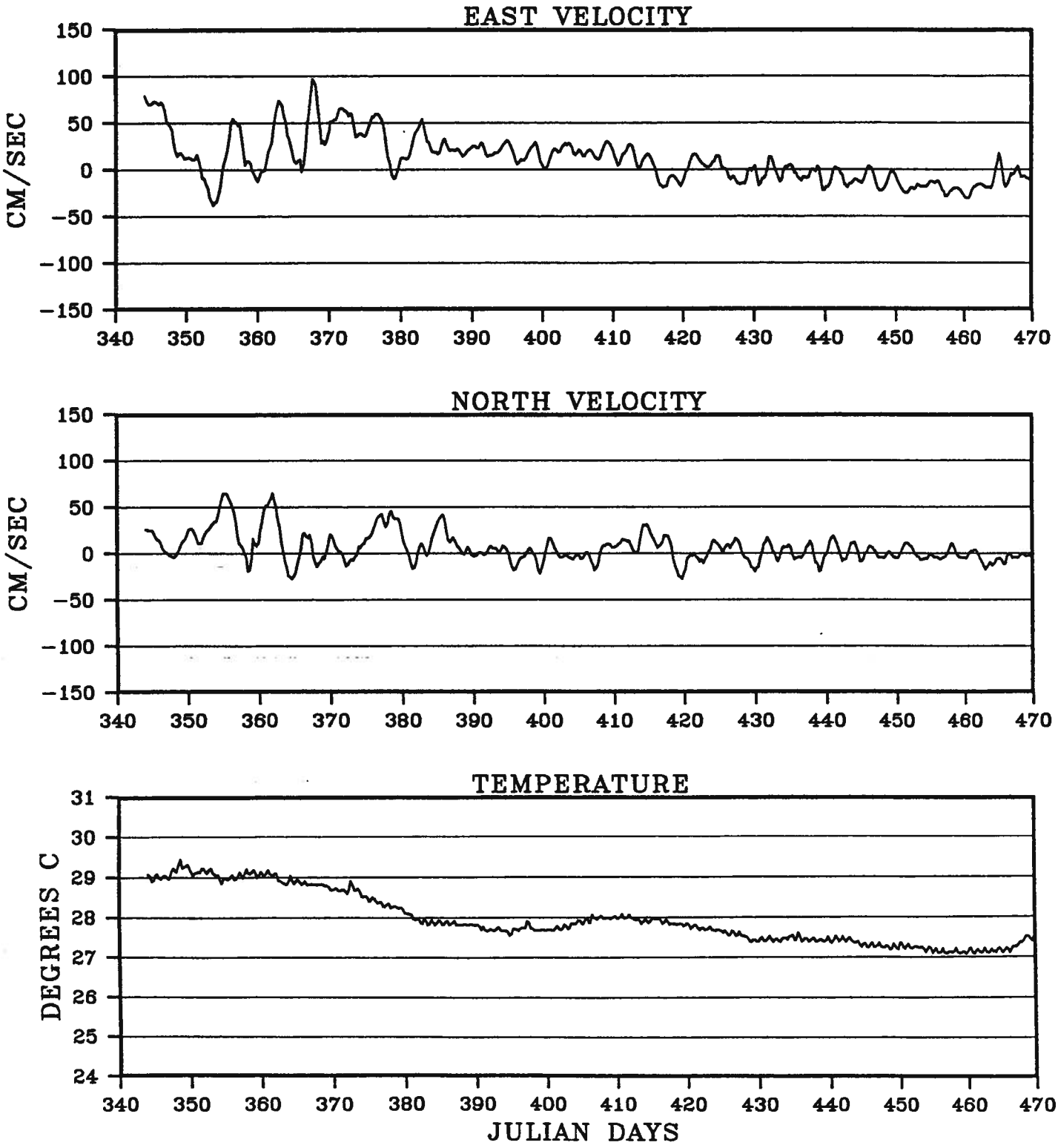
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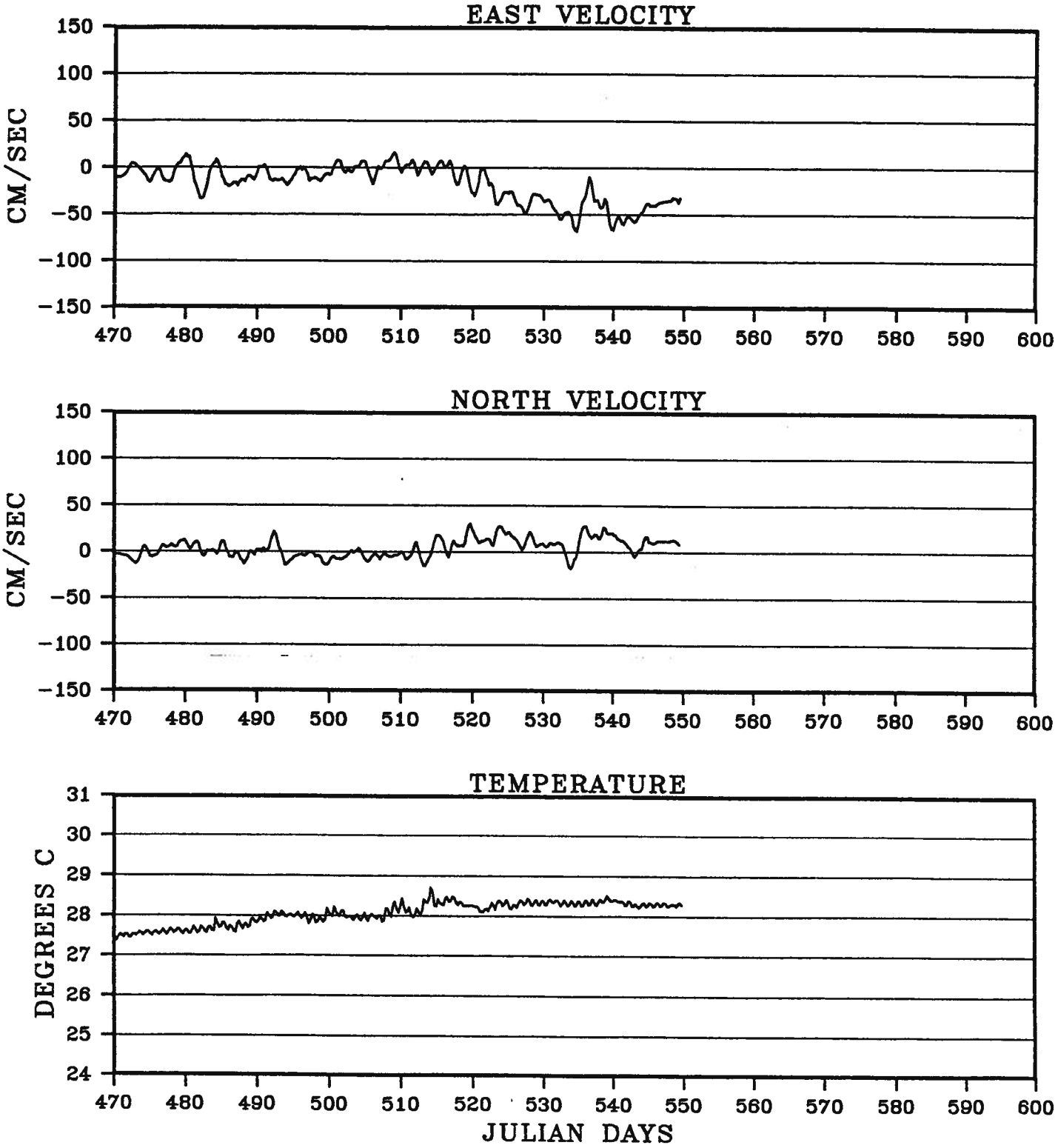
JULIAN DAYS

BUOY 3148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TEMPERATURE
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JULIAN DAYS

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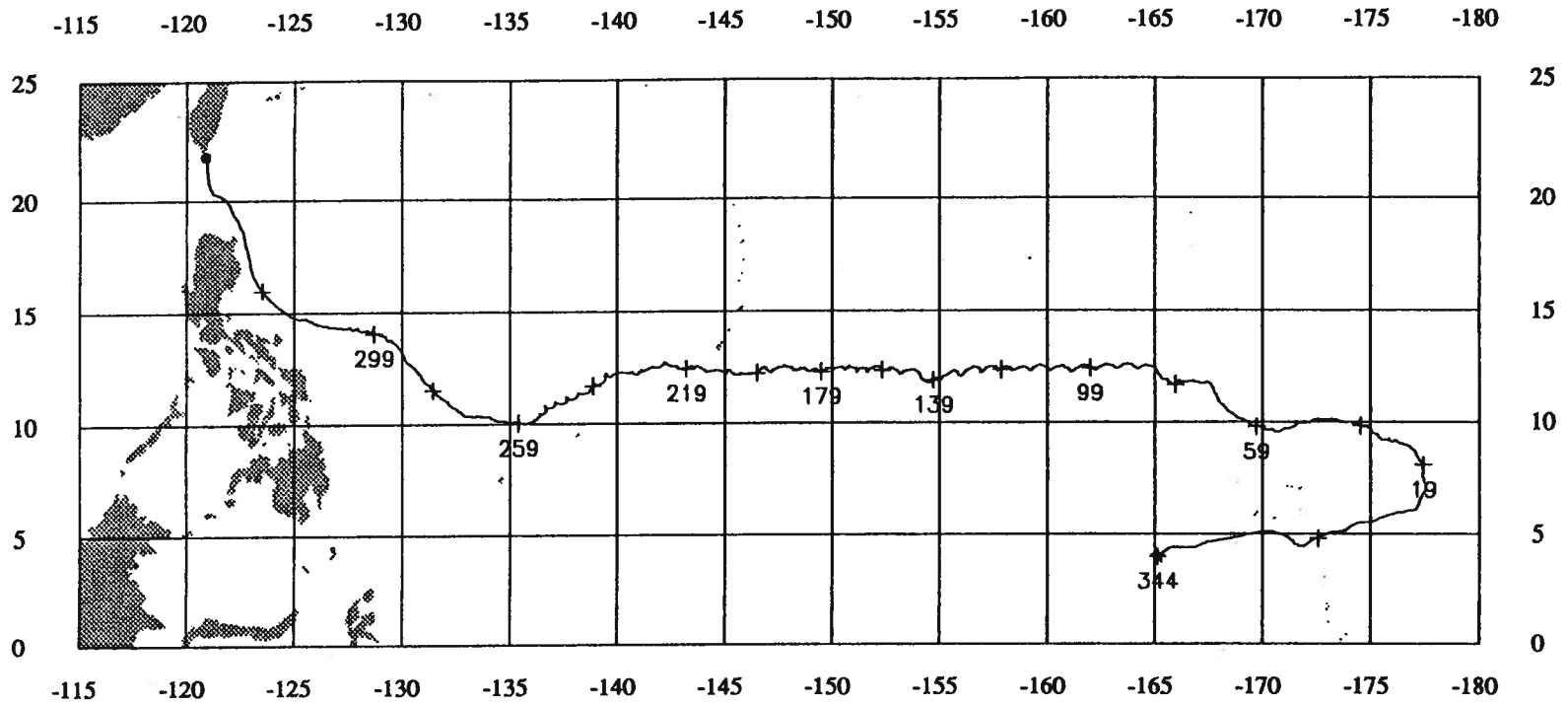
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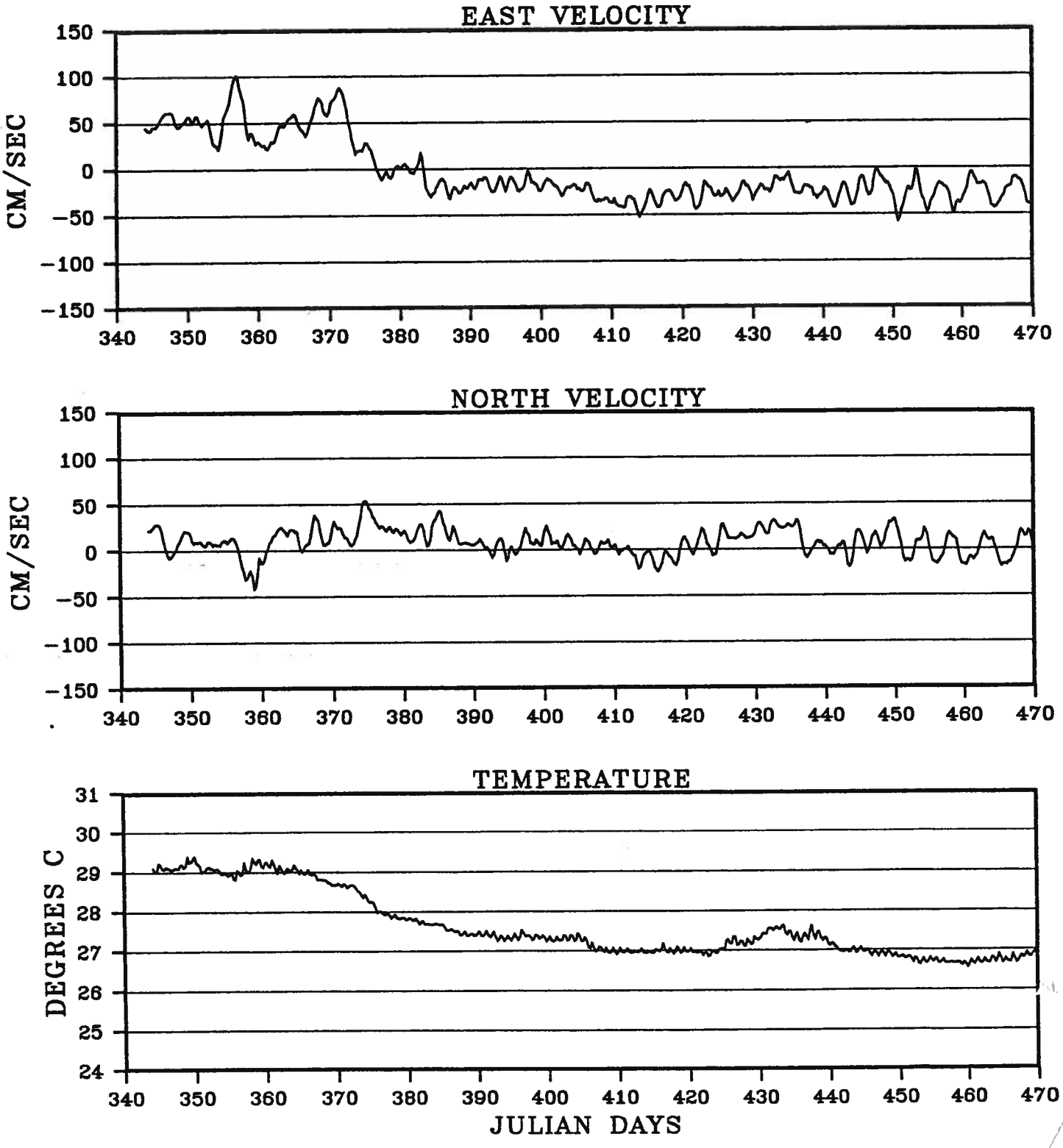
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TEMPERATURE
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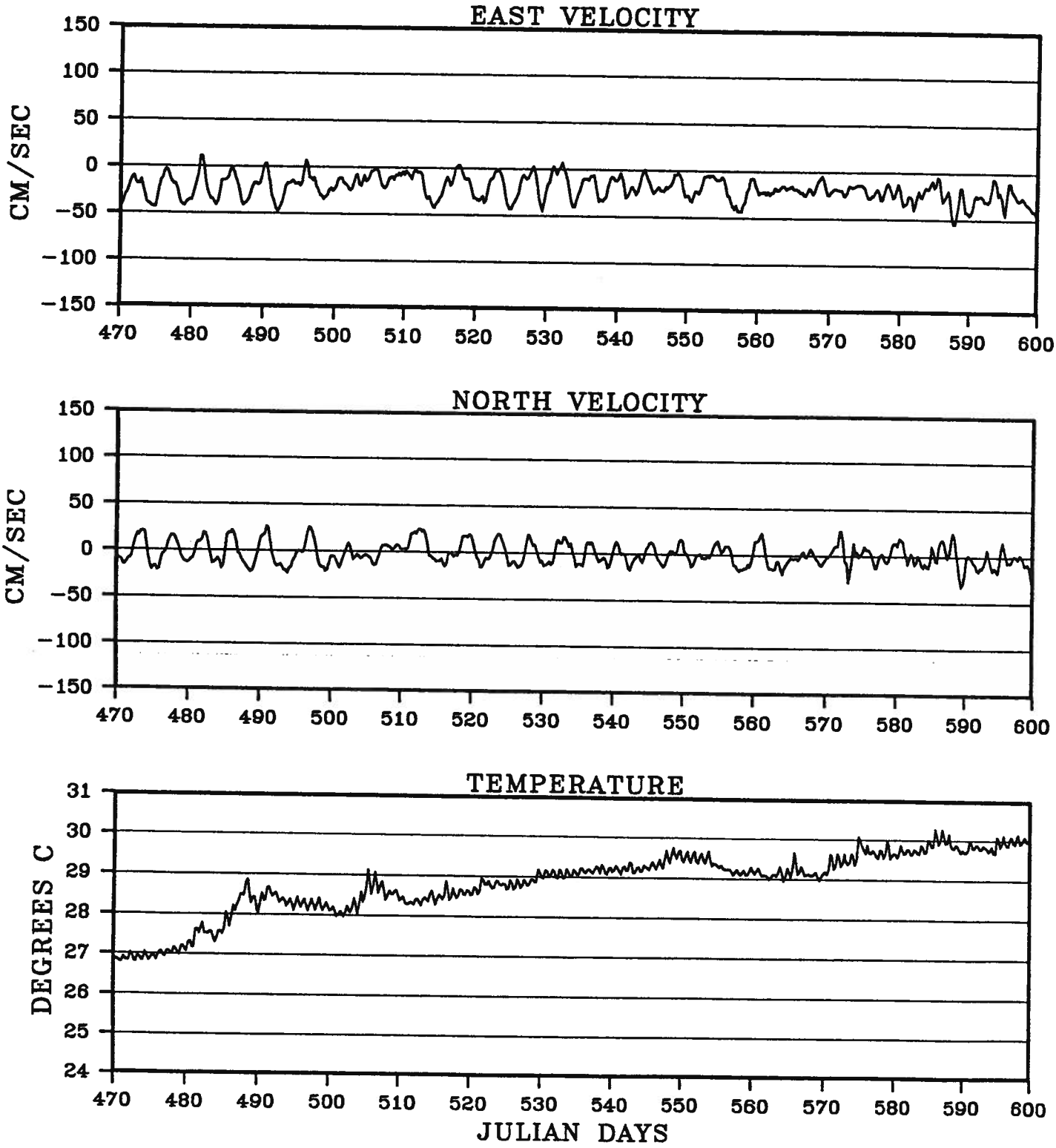
JULIAN DAYS

BUOY 3149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CM/SEC
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560
570
580
590
600
NORTH VELOCITY
CM/SEC
150
100
50
0
−50
−100
−150
470
480
490
500
510
520
530
540
550
560
570
580
590
600
TEMPERATURE
DEGREES C
31
30
29
28
27
26
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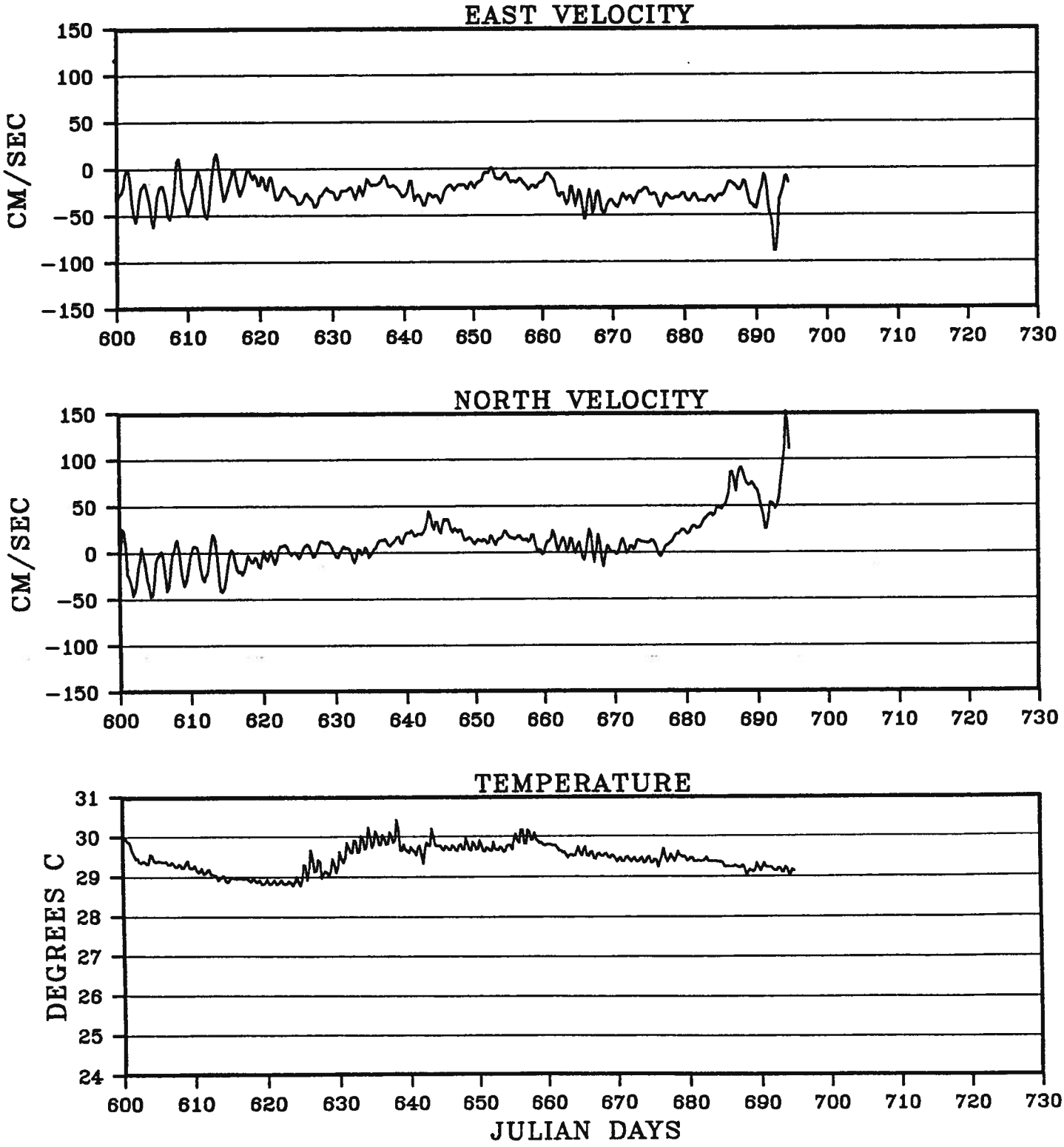
JULIAN DAYS

BUOY 3149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680
690
700
710
720
730
NORTH VELOCITY
CM/SEC
150
100
50
0
−50
−100
−150
600
610
620
630
640
650
660
670
680
690
700
710
720
730
TEMPERATURE
DEGREES C
31
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29
28
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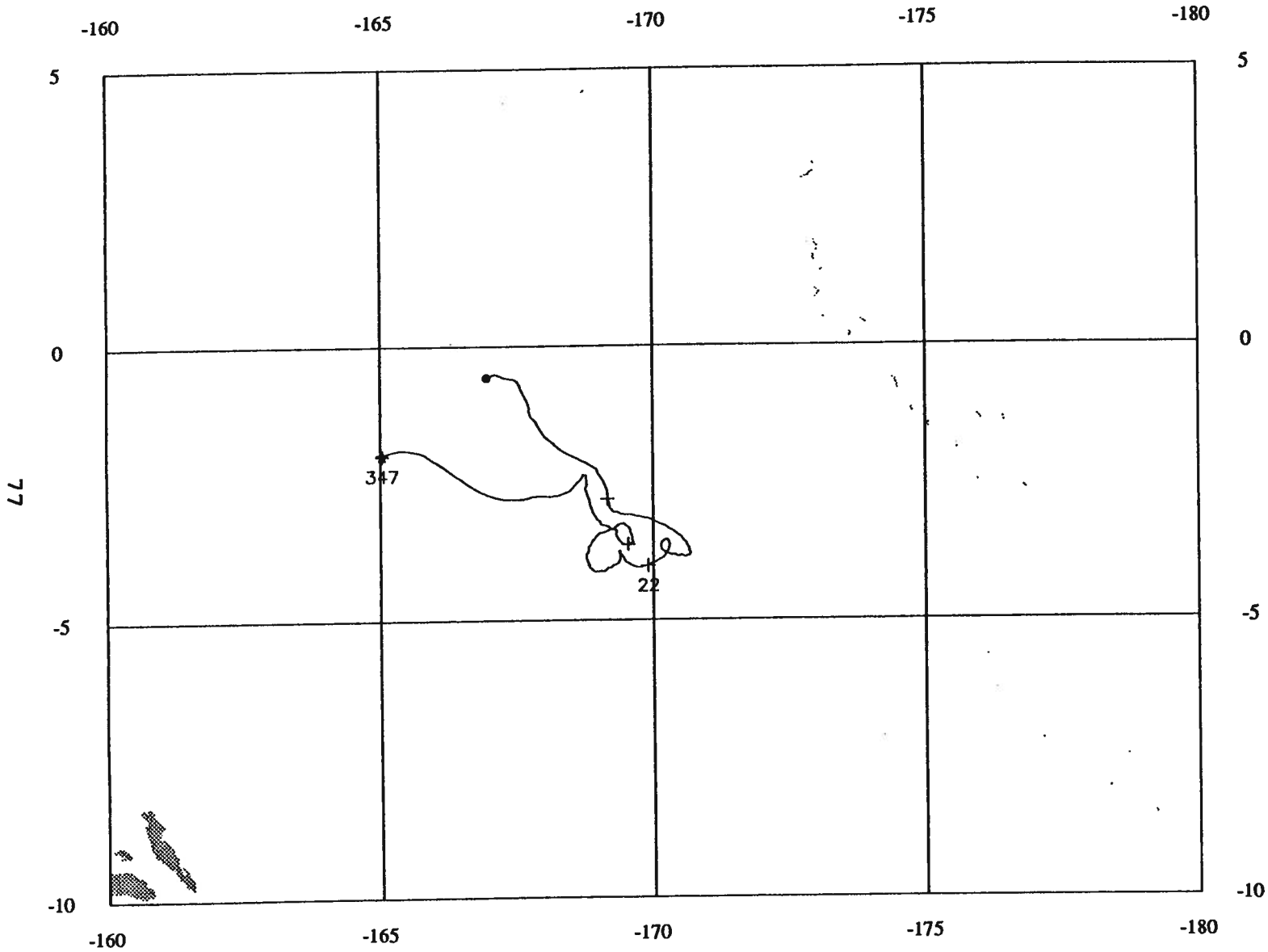
JULIAN DAYS

BUOY 4800



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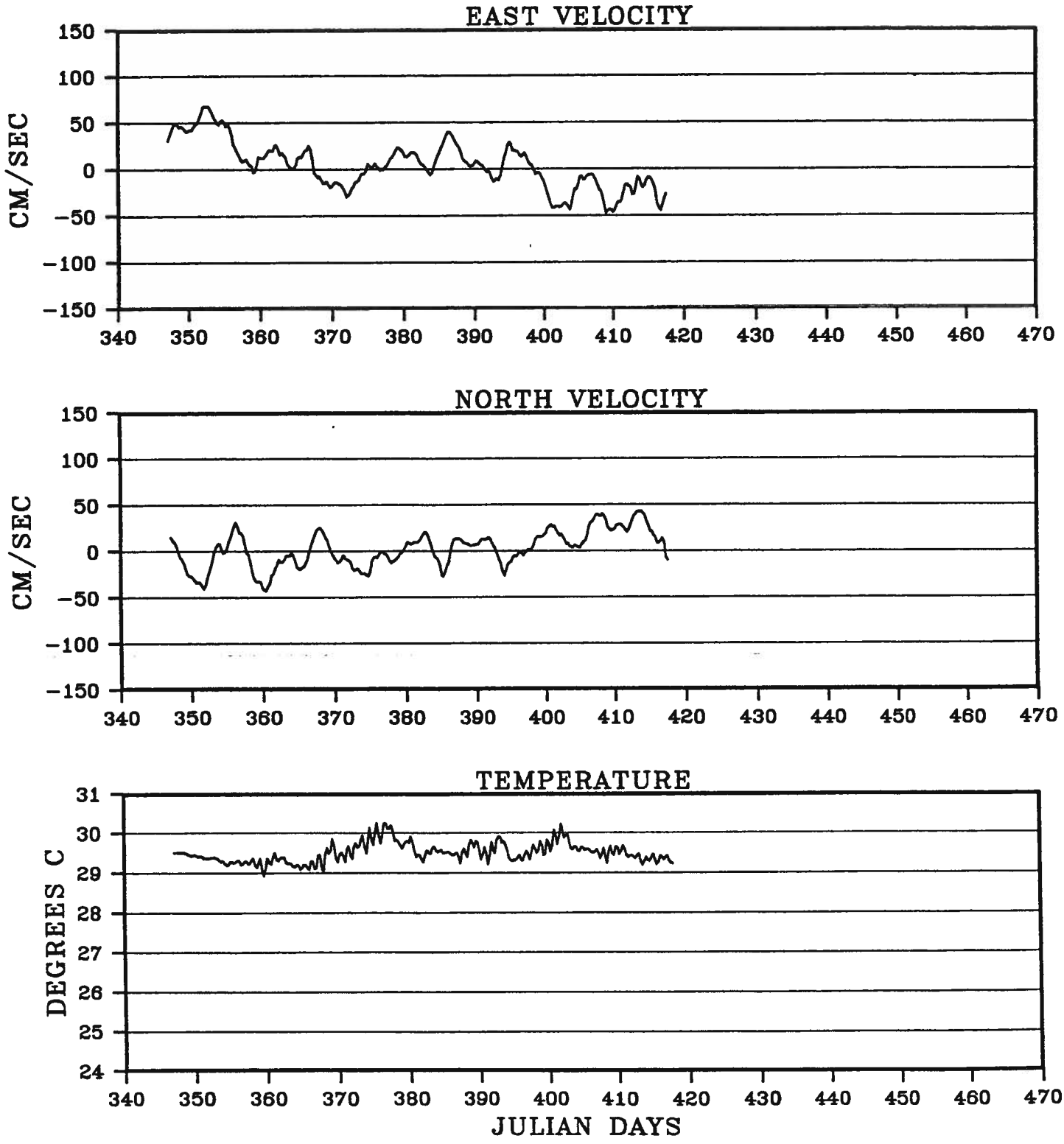
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NORTH VELOCITY
CM/SEC
150
100
50
0
-50
-100
-150
340 350 360 370 380 390 400 410 420 430 440 450 460 470
TEMPERATURE
DEGREES C
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24
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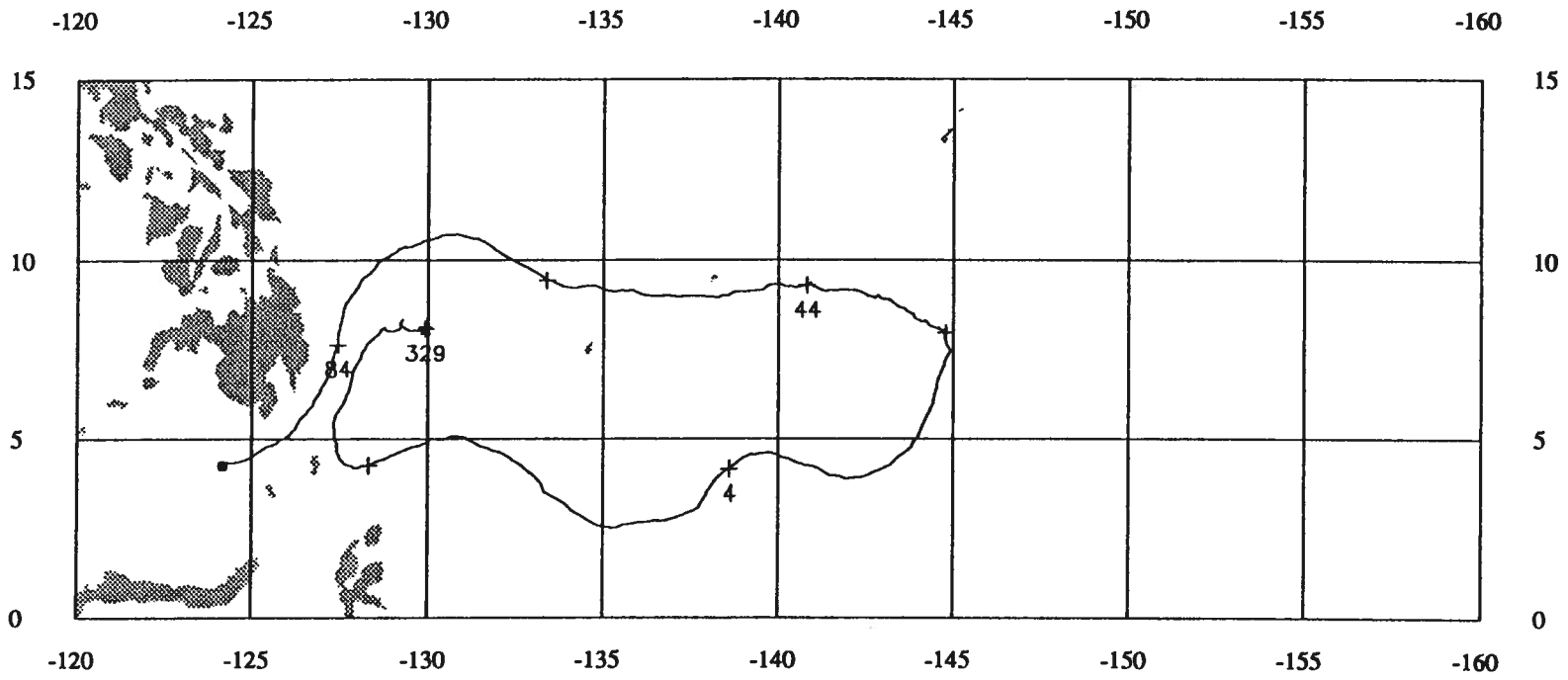
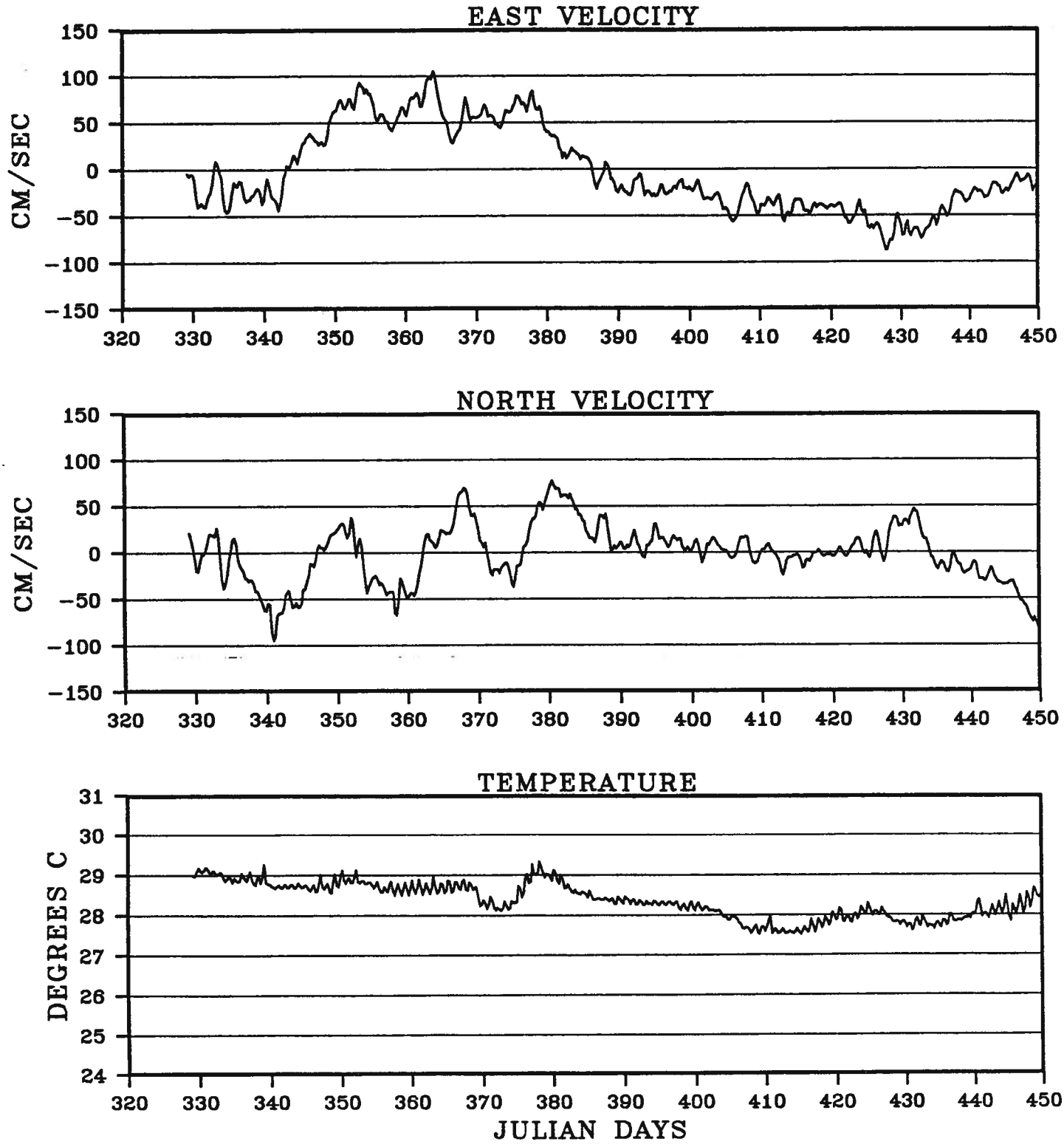
JULIAN DAYS

BUOY 4801



BUOY 4801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400
410
420
430
440
450
NORTH VELOCITY
CM/SEC
150
100
50
0
−50
−100
−150
320
330
340
350
360
370
380
390
400
410
420
430
440
450
TEMPERATURE
DEGREES C
31
30
29
28
27
26
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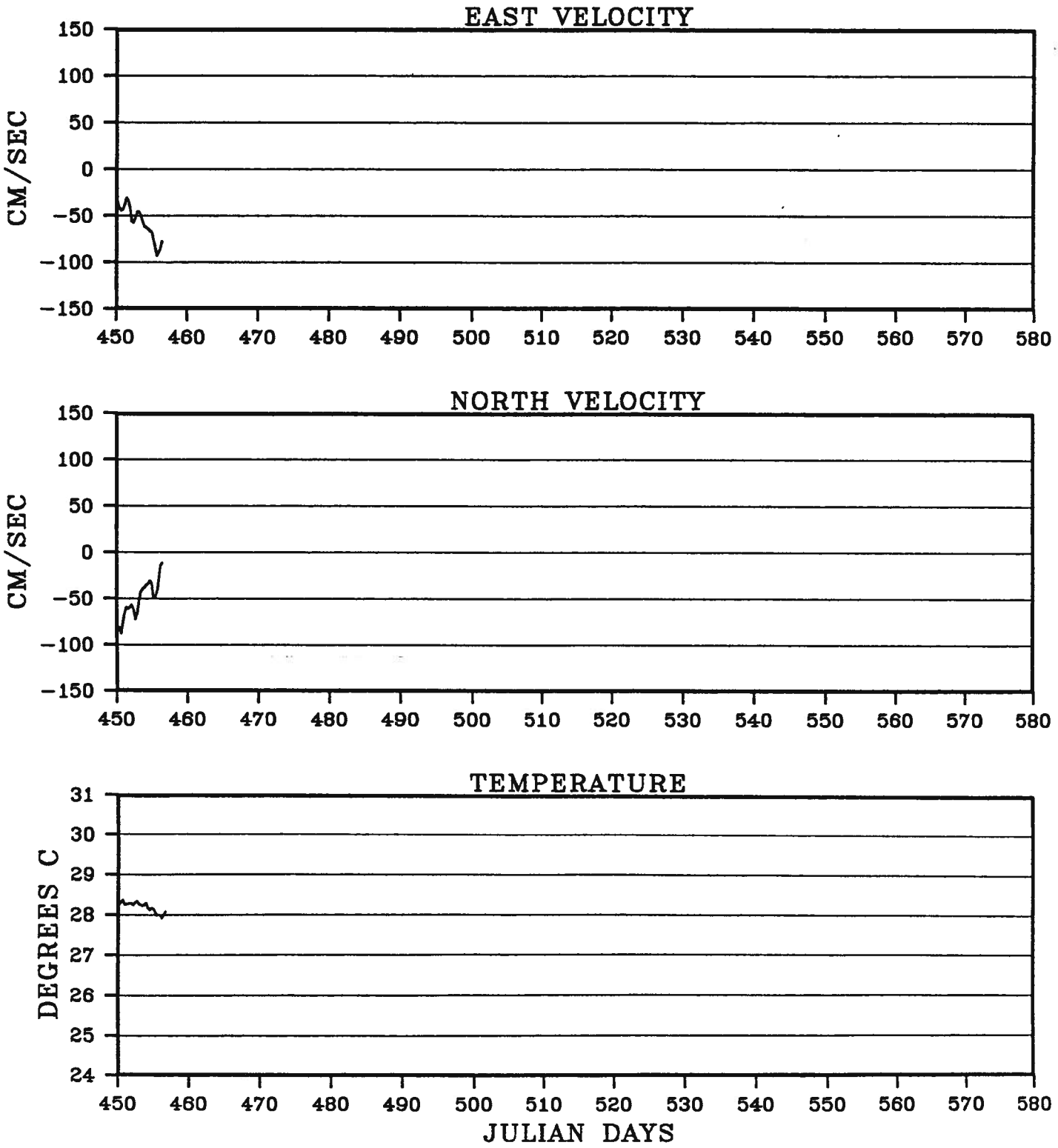
JULIAN DAYS

BUOY 4801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NORTH VELOCITY
CM/SEC
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100
50
0
-50
-100
-150
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TEMPERATURE
DEGREES C
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24
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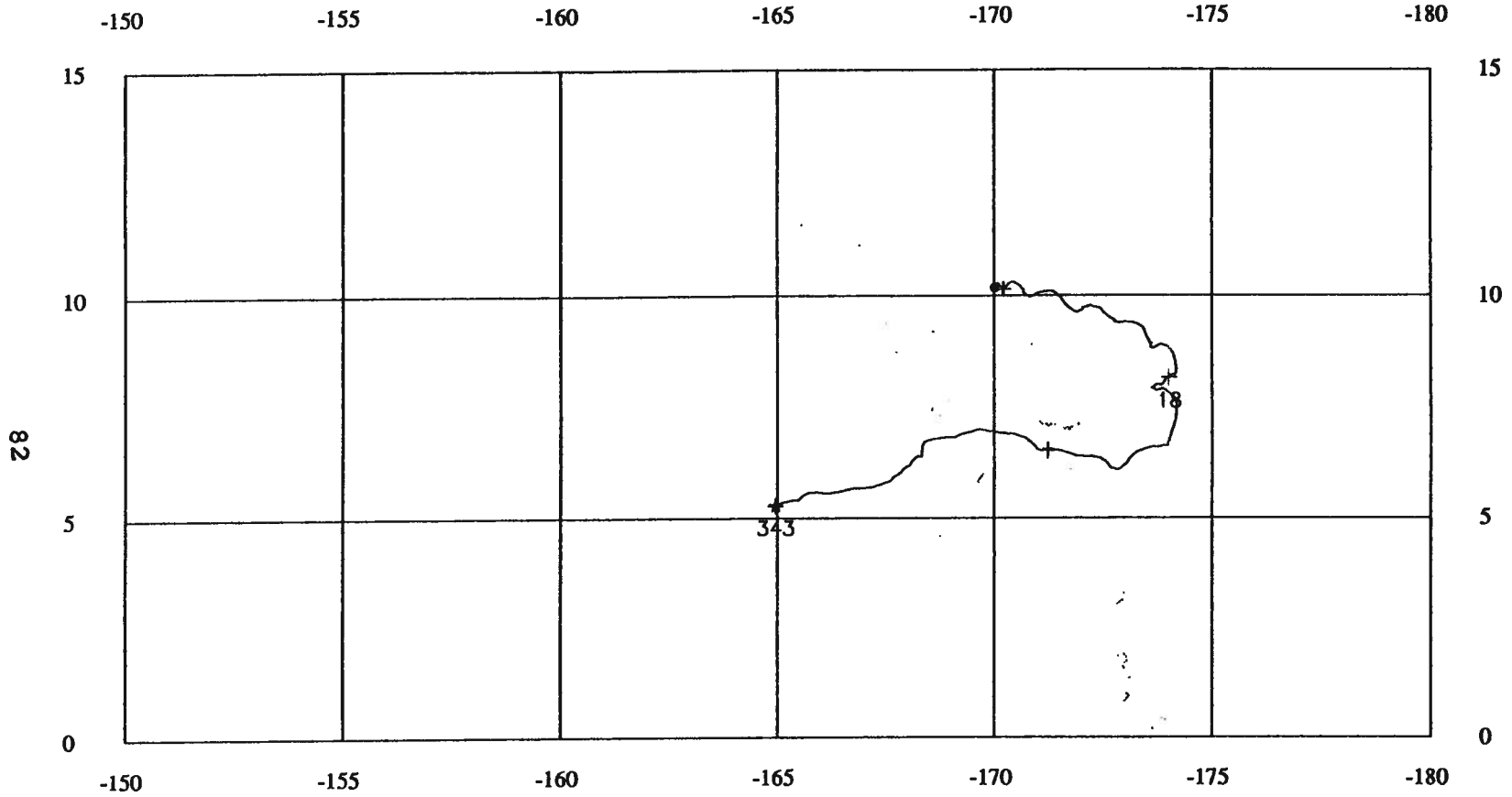
JULIAN DAYS

BUOY 4802



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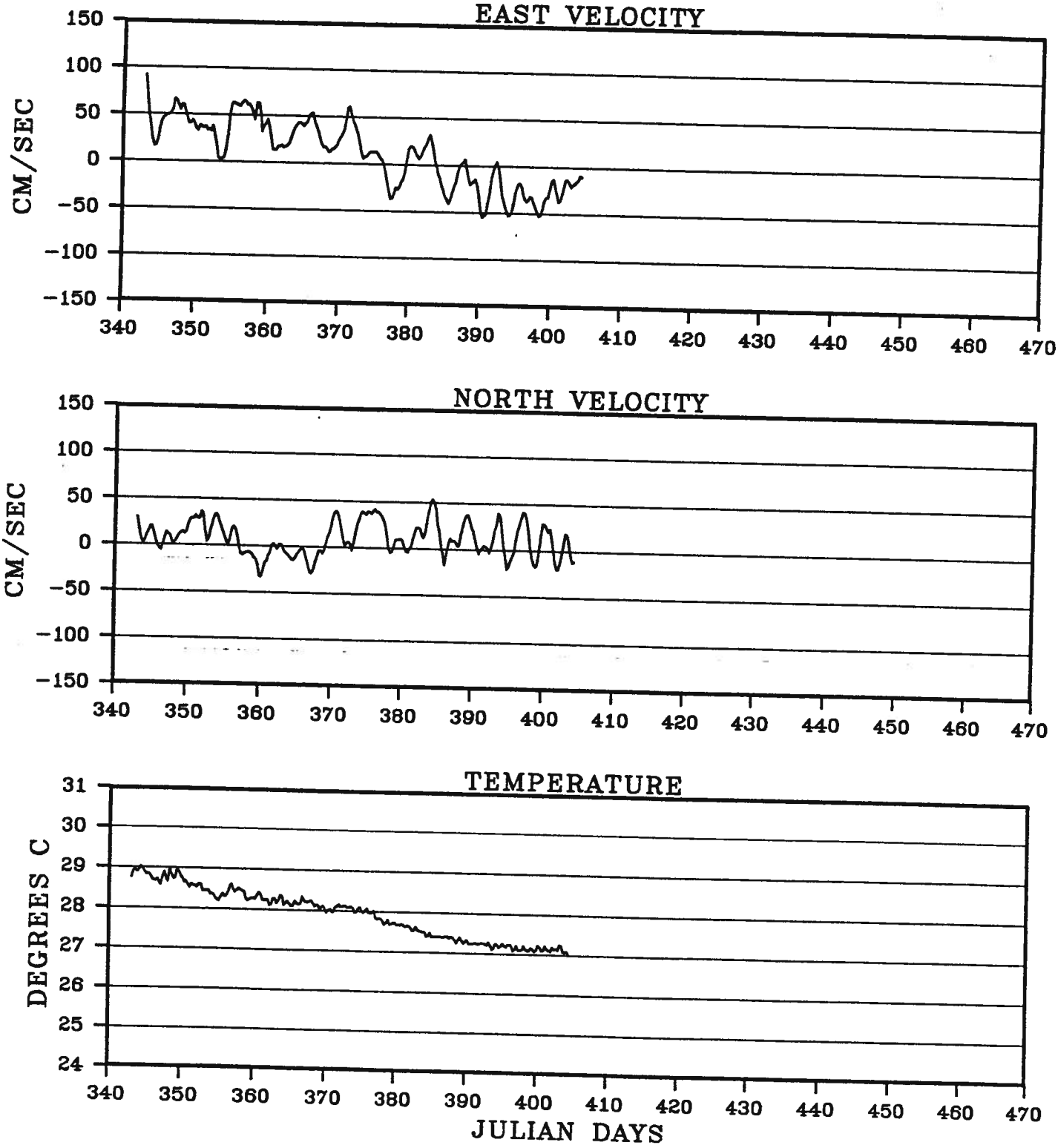
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NORTH VELOCITY
CM/SEC
150
100
50
0
-50
-100
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TEMPERATURE
DEGREES C
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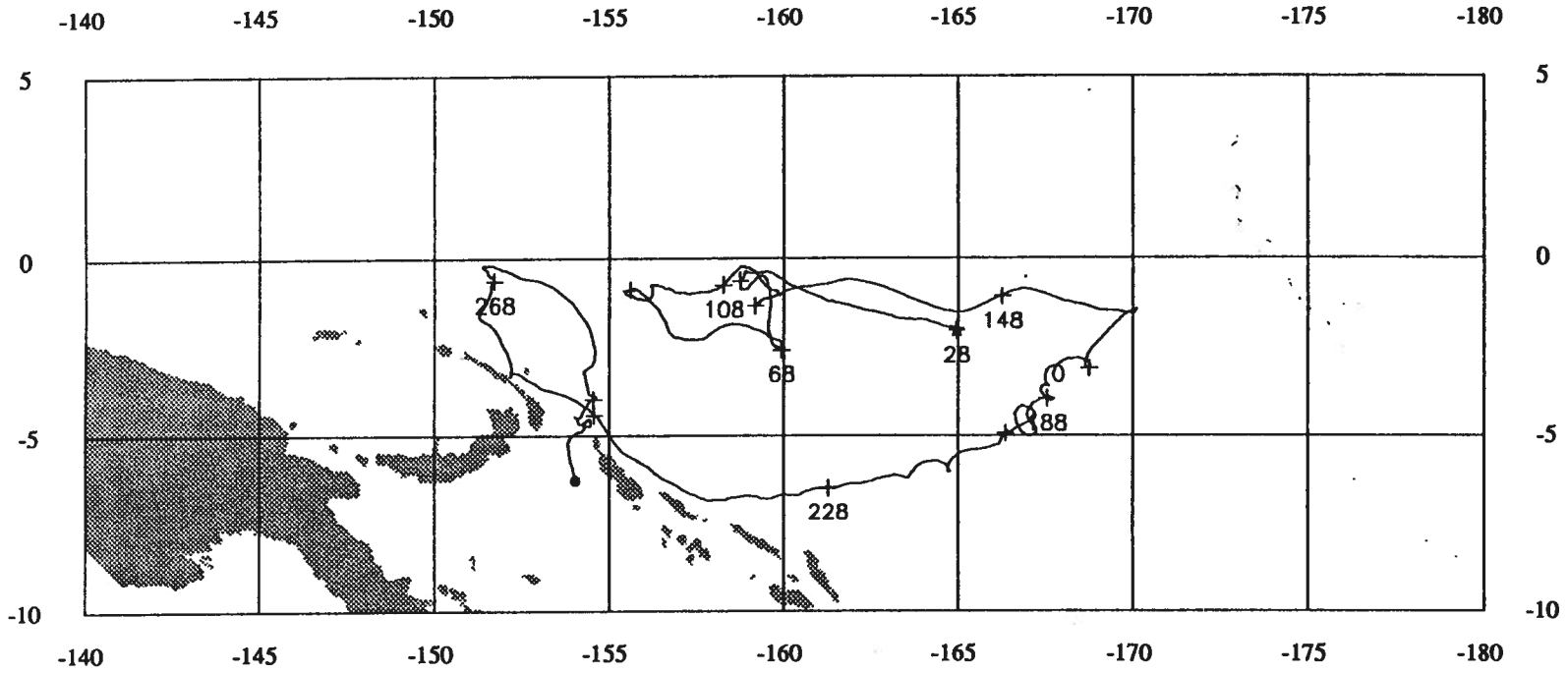
JULIAN DAYS

BUOY 4803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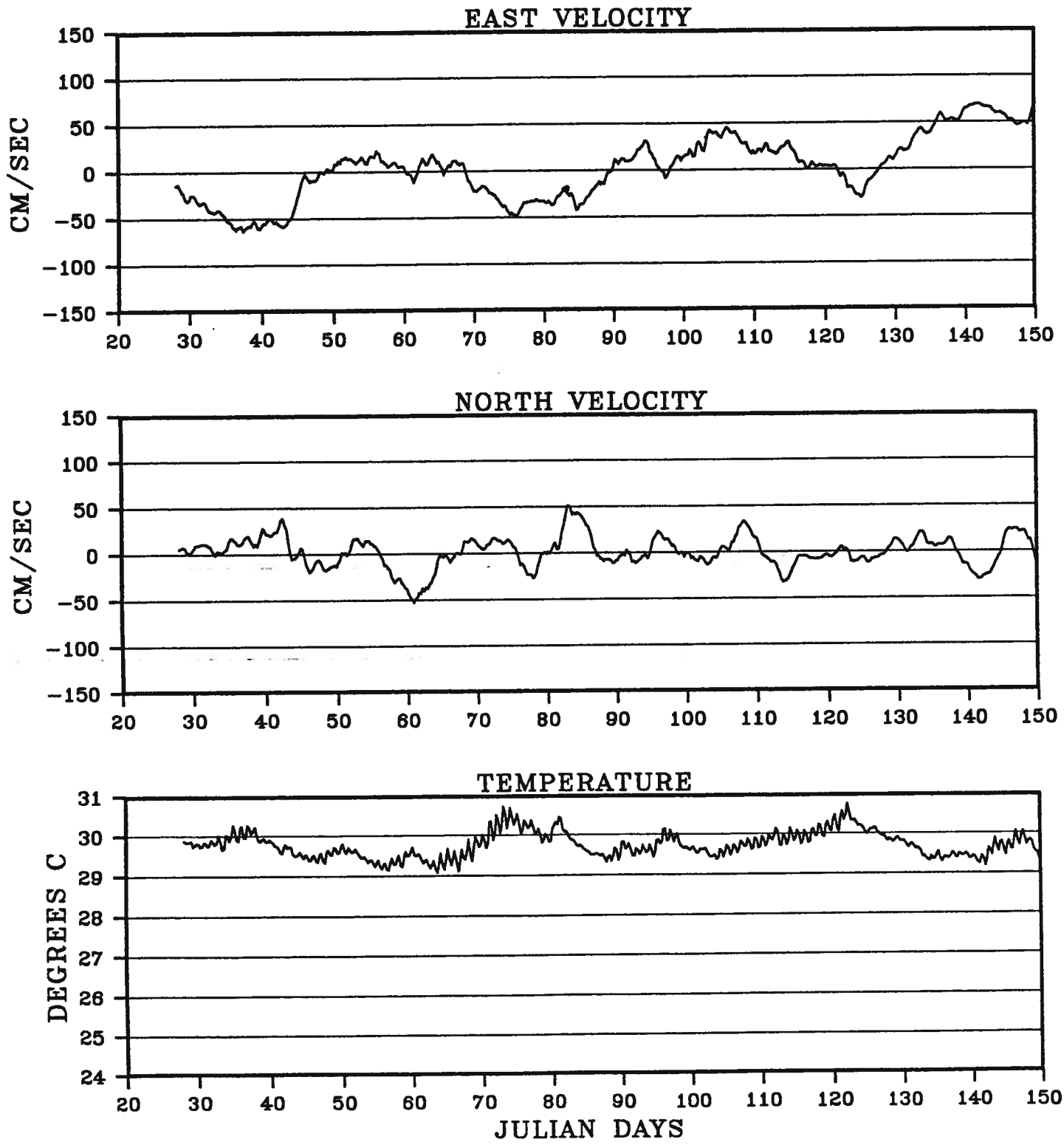
BUOY 4803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NORTH VELOCITY
CM/SEC
150
100
50
0
-50
-100
-150
20 30 40 50 60 70 80 90 100 110 120 130 140 150
TEMPERATURE
DEGREES C
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28
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26
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24
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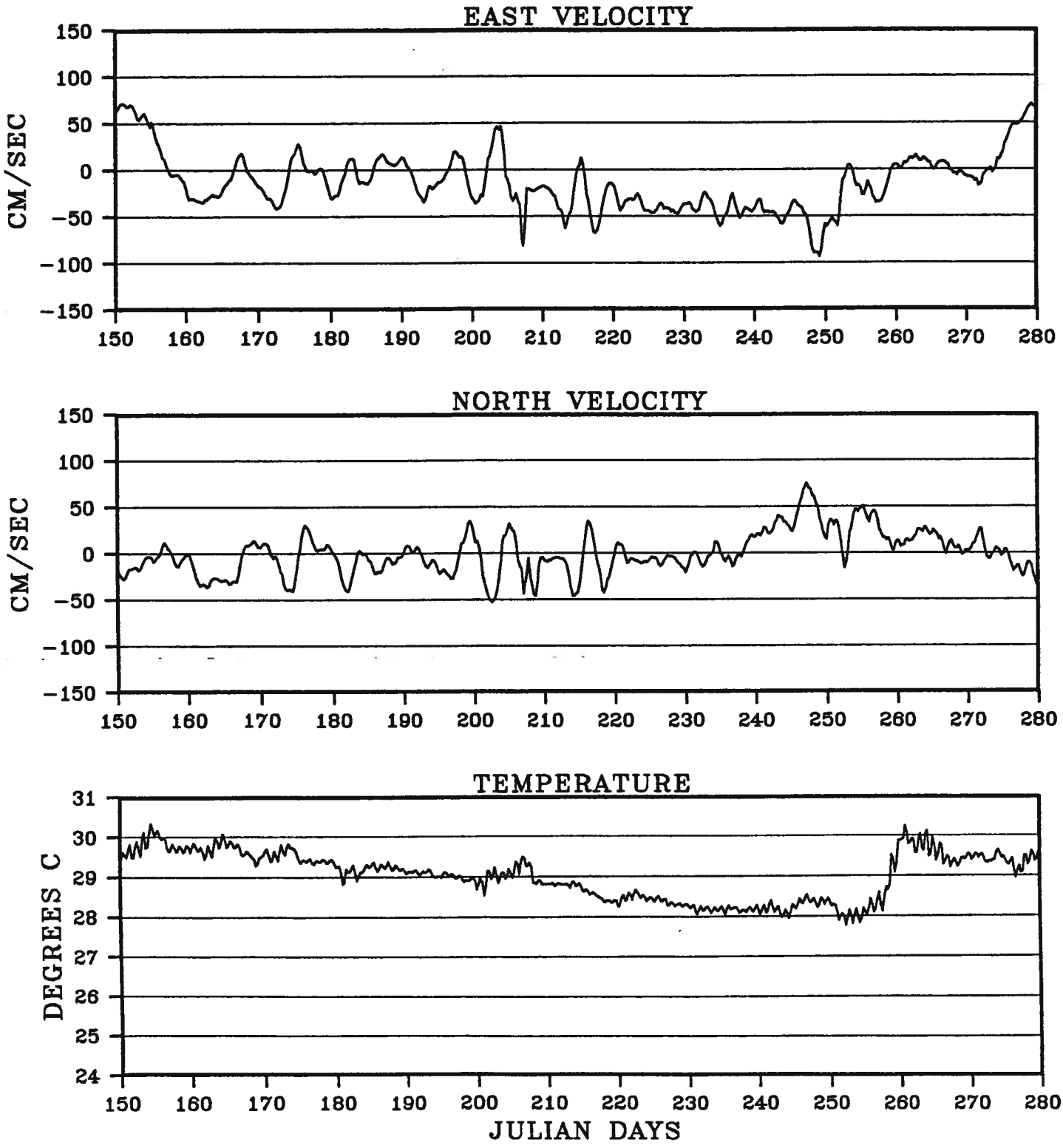
JULIAN DAYS

BUOY 4803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NORTH VELOCITY
CM/SEC
150
100
50
0
-50
-100
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150 160 170 180 190 200 210 220 230 240 250 260 270 280
TEMPERATURE
DEGREES C
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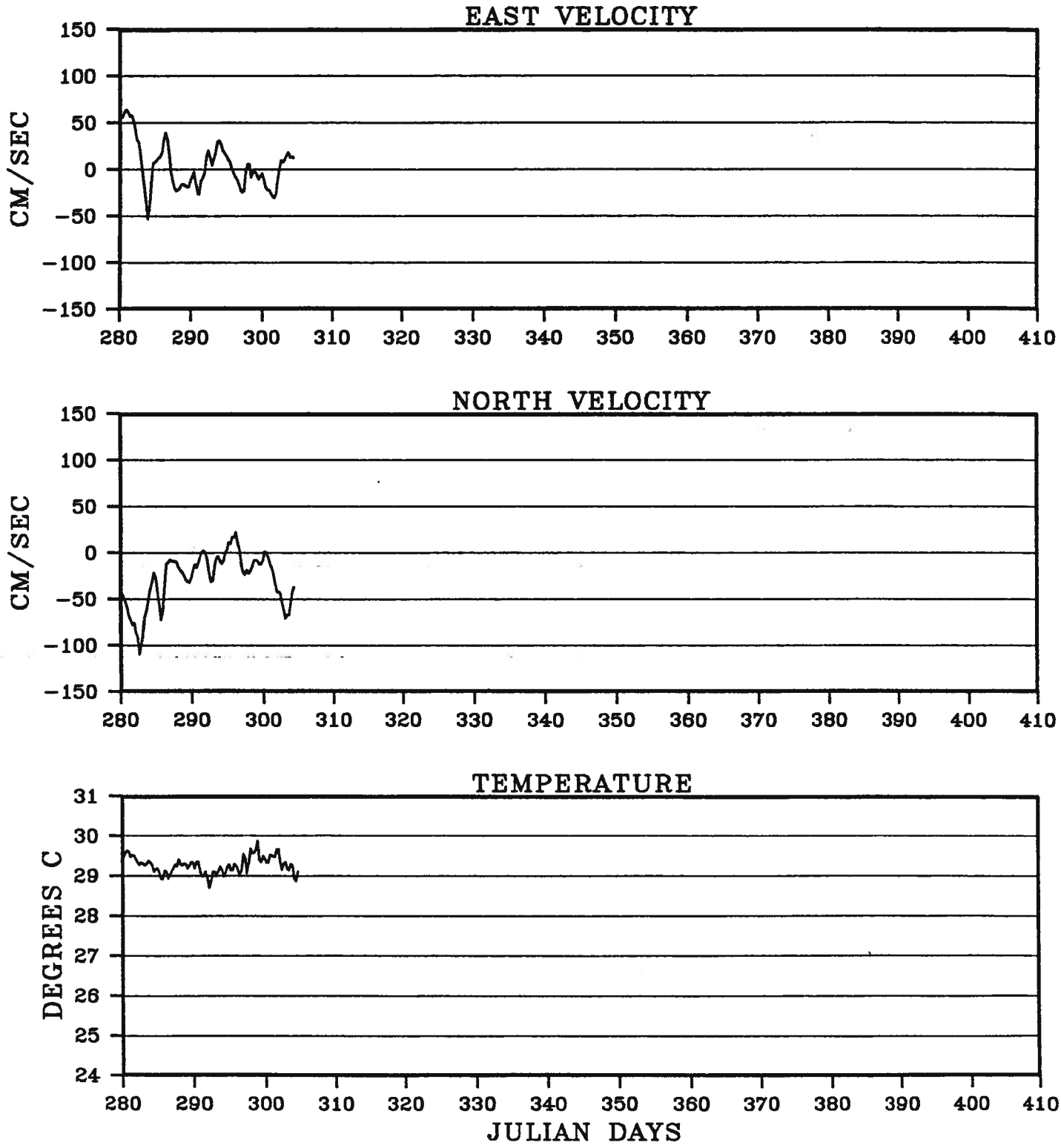
JULIAN DAYS

BUOY 4803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340
350
360
370
380
390
400
410
NORTH VELOCITY
CM/SEC
150
100
50
0
−50
−100
−150
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290
300
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320
330
340
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360
370
380
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410
TEMPERATURE
DEGREES C
31
30
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26
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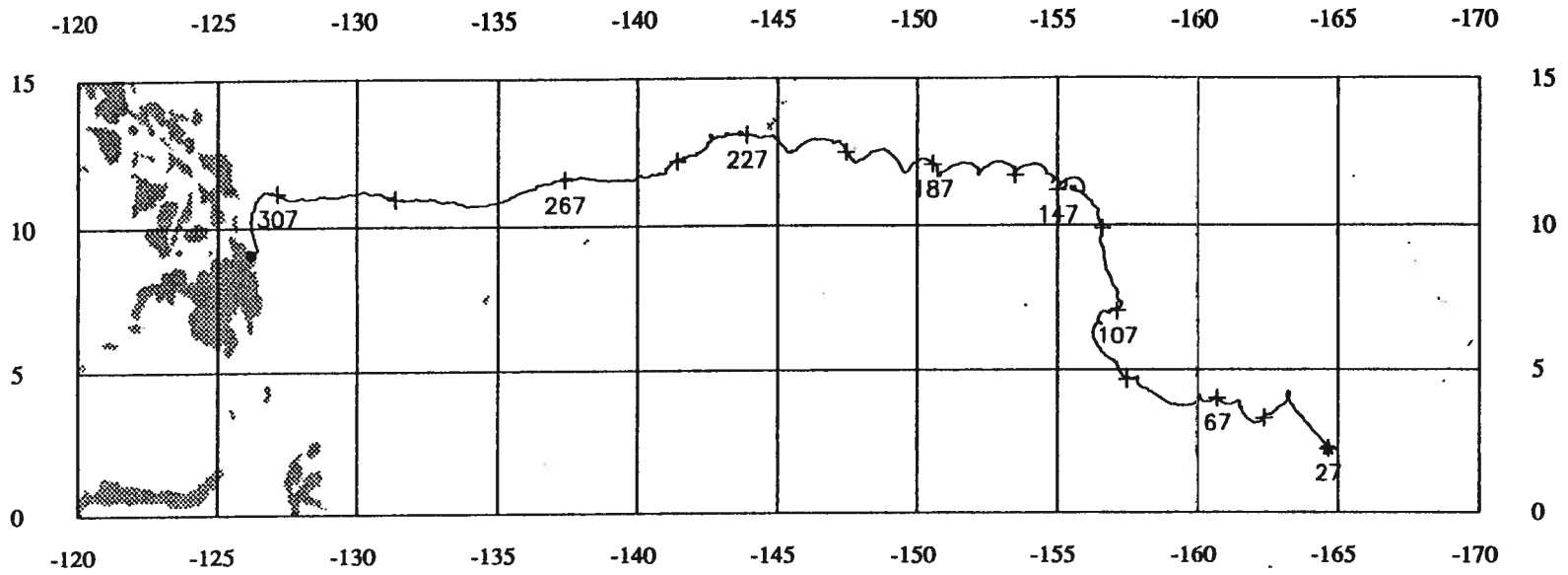
410
JULIAN DAYS

BUOY 4804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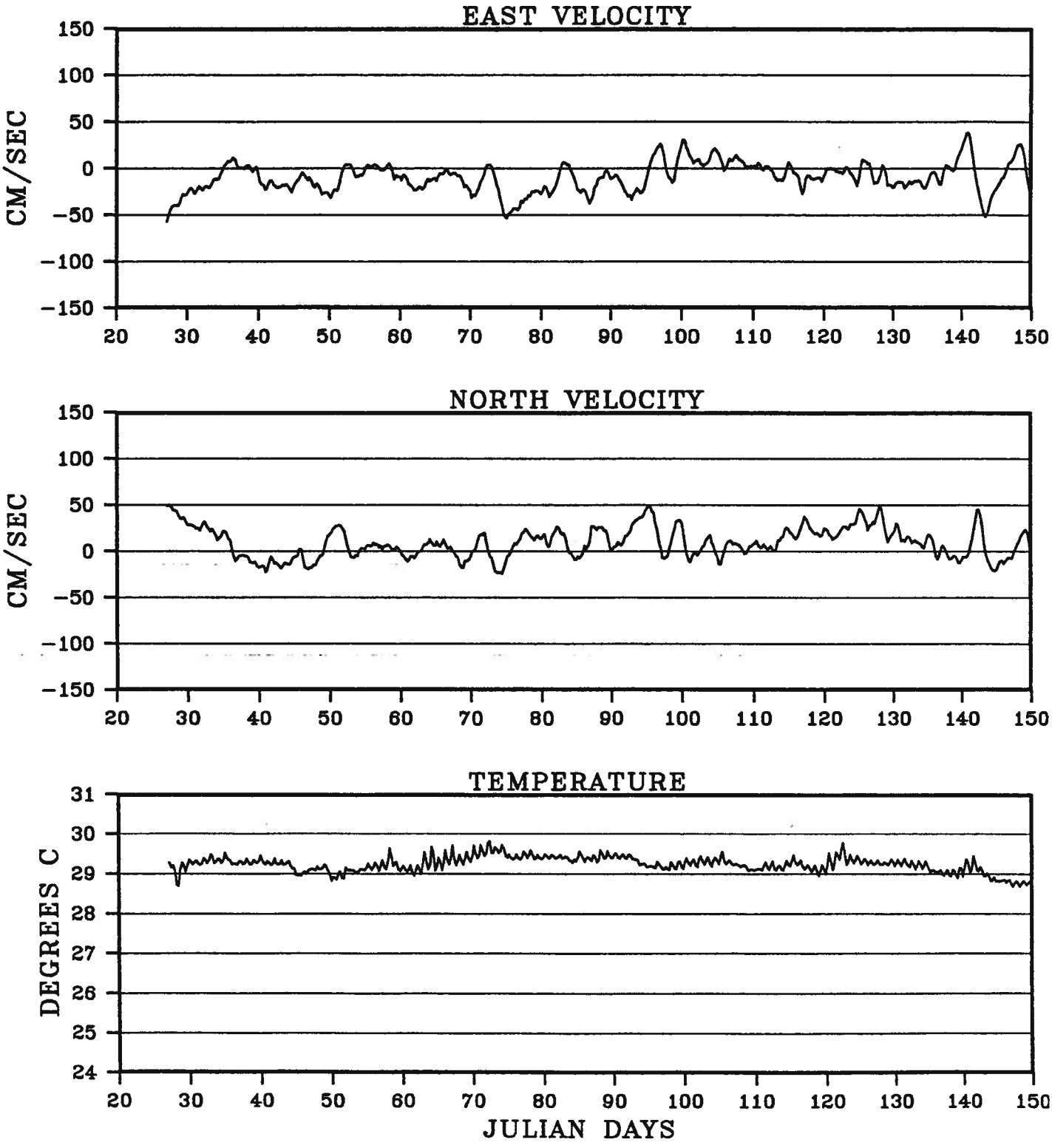
BUOY 4804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NORTH VELOCITY
CM/SEC
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100
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TEMPERATURE
DEGREES C
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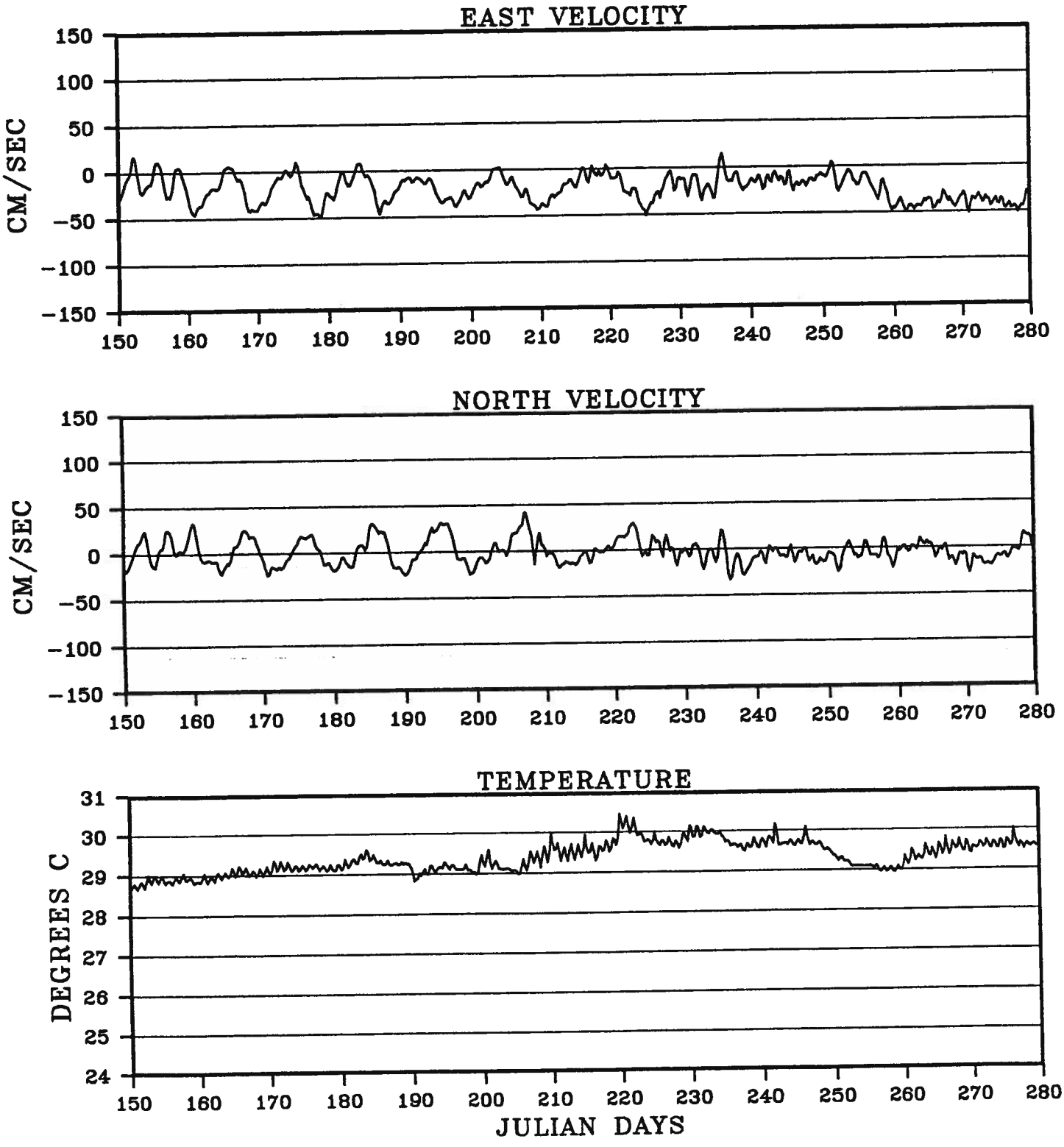
JULIAN DAYS

BUOY 4804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NORTH VELOCITY
CM/SEC
150
100
50
0
-50
-100
-150
150 160 170 180 190 200 210 220 230 240 250 260 270 280
TEMPERATURE
DEGREES C
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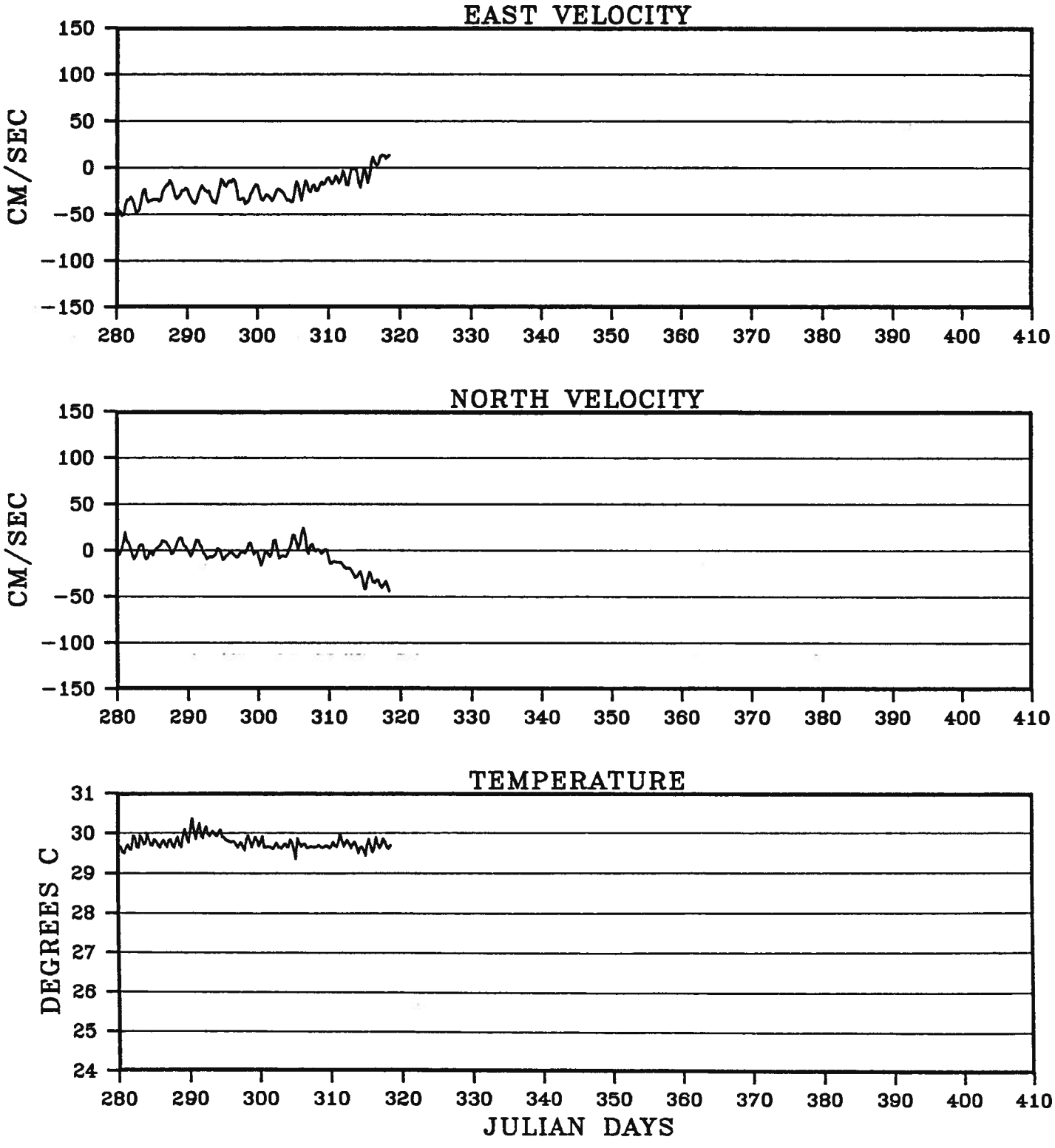
JULIAN DAYS

BUOY 4804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NORTH VELOCITY
CM/SEC
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100
50
0
-50
-100
-150
280 290 300 310 320 330 340 350 360 370 380 390 400 410
TEMPERATURE
DEGREES C
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26
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24
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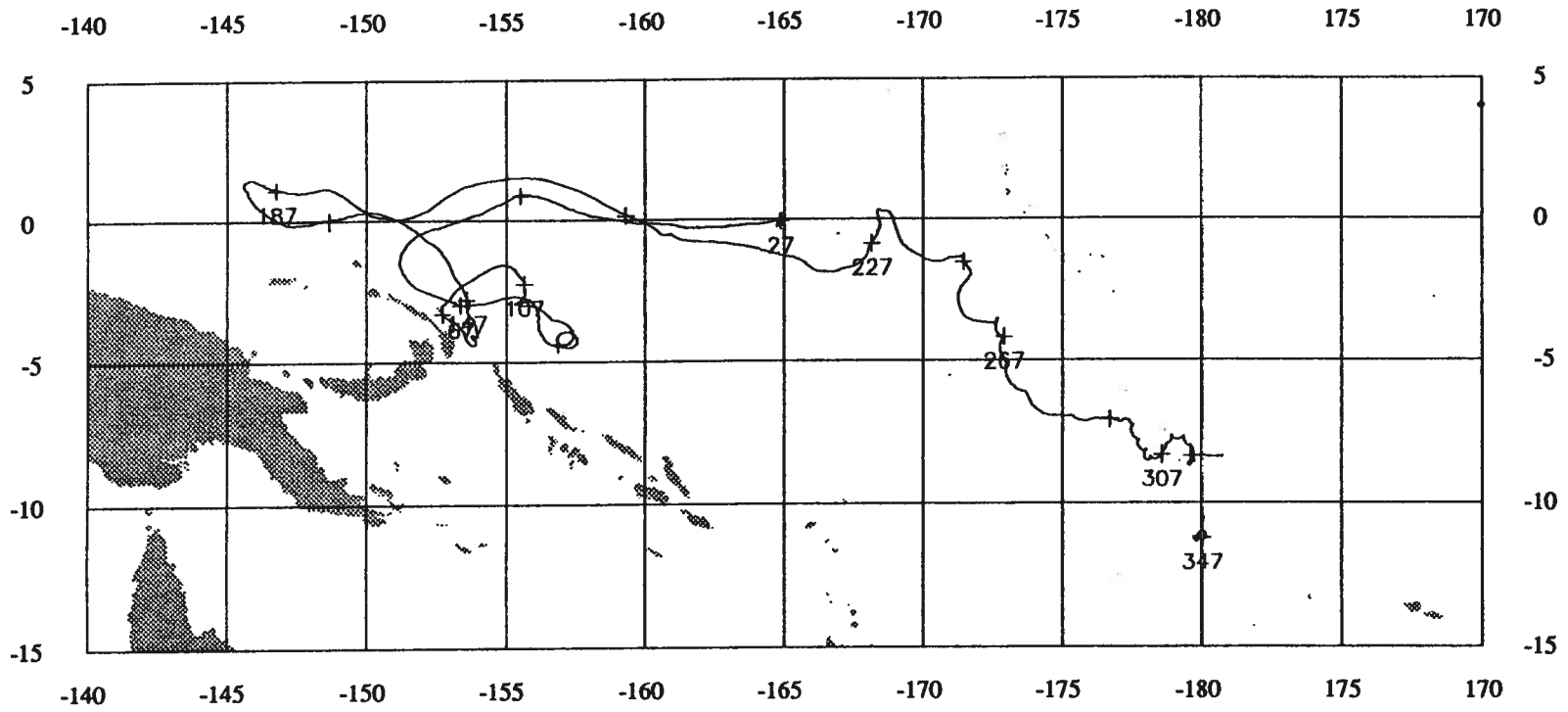
JULIAN DAYS

BUOY 4805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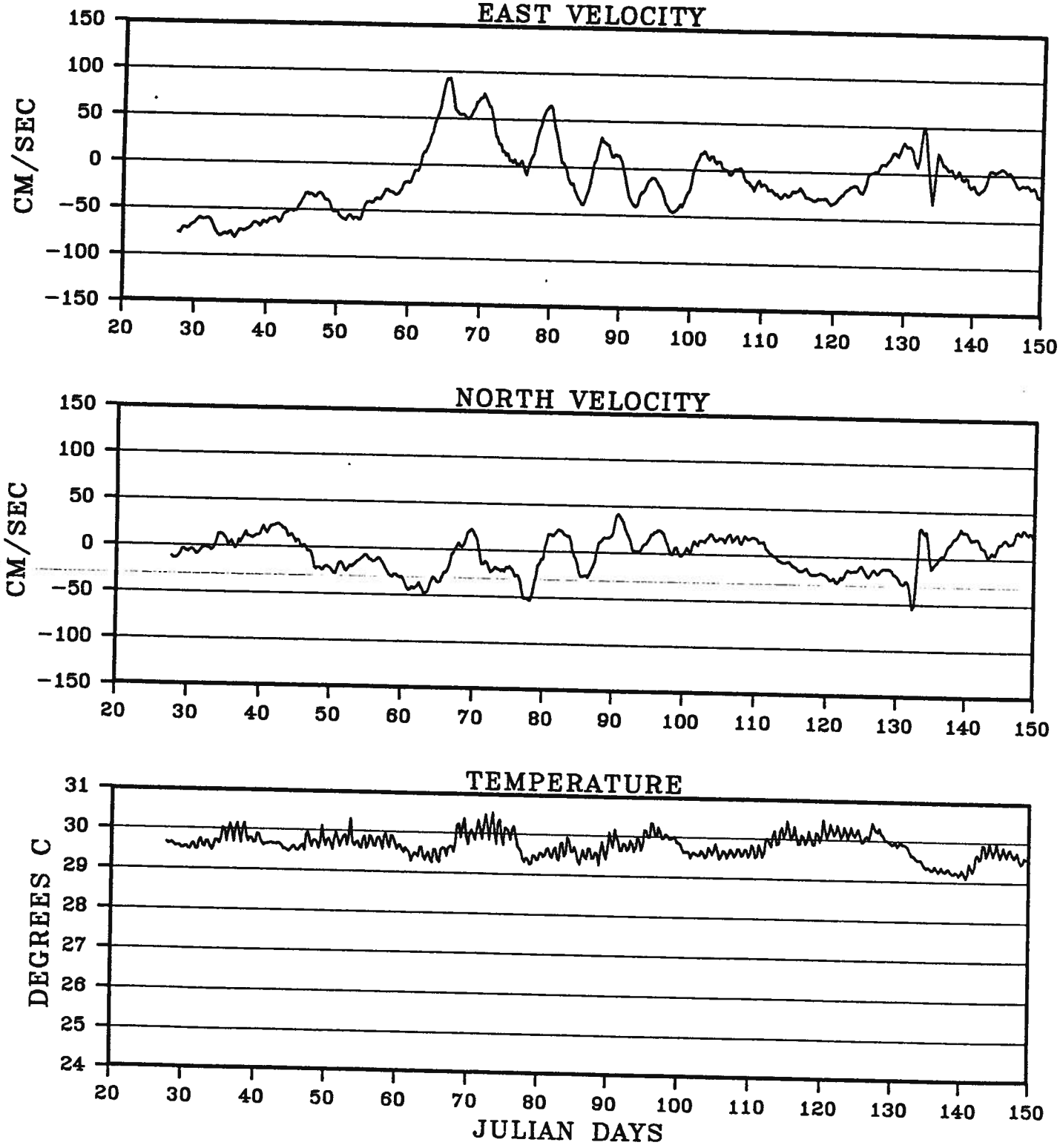
BUOY 4805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NORTH VELOCITY
CM/SEC
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TEMPERATURE
DEGREES C
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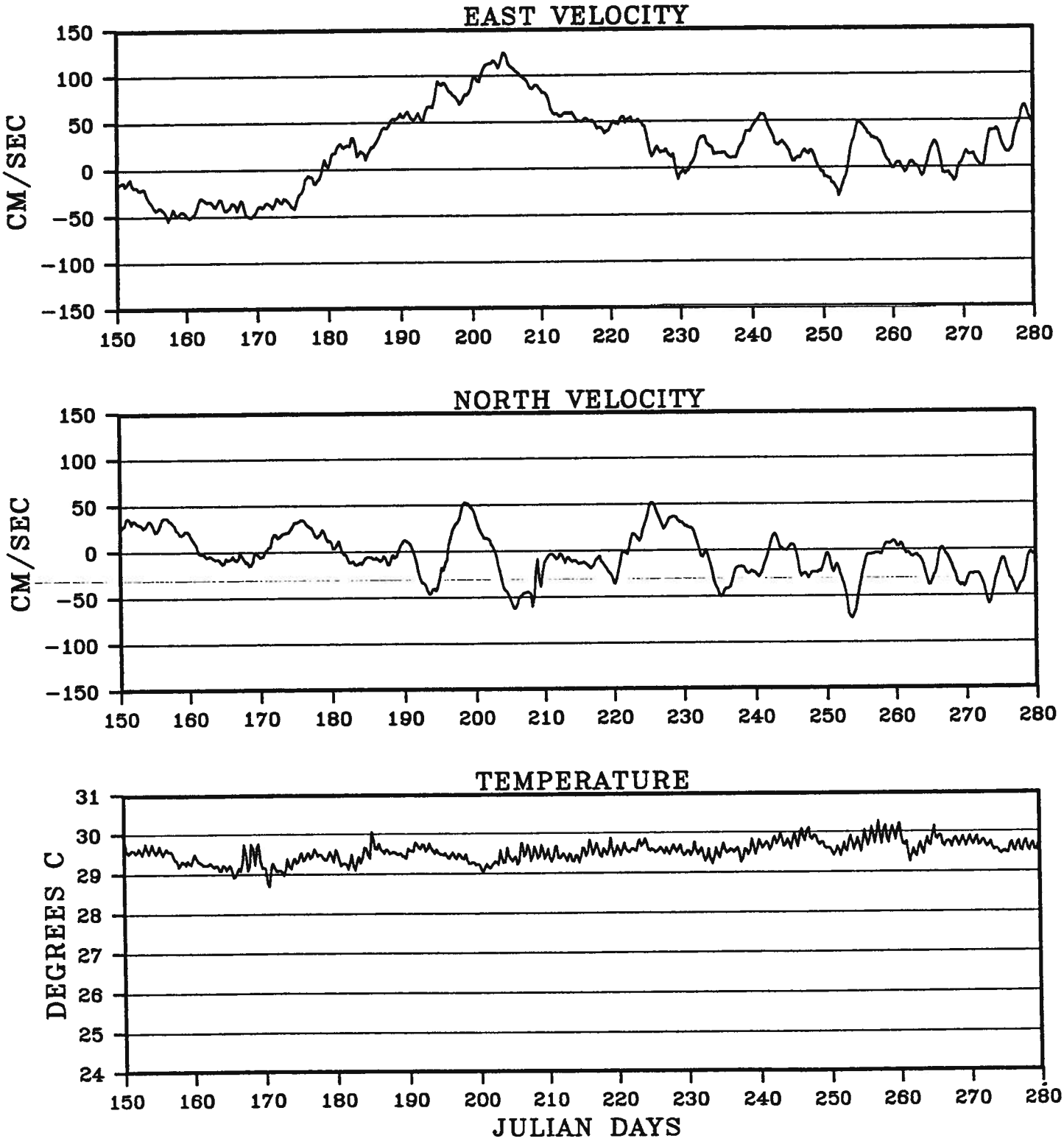
JULIAN DAYS

BUOY 4805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NORTH VELOCITY
CM/SEC
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TEMPERATURE
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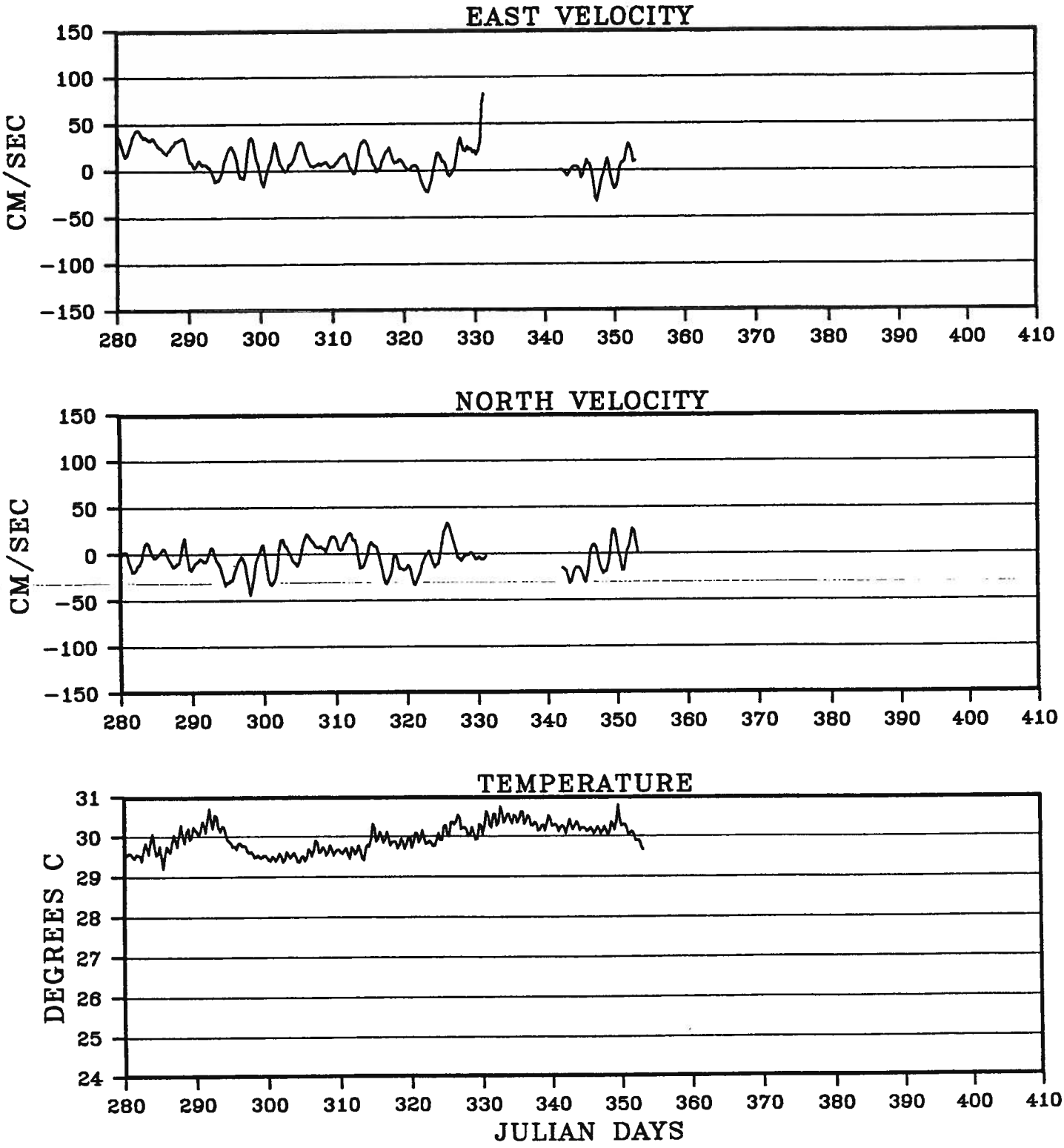
JULIAN DAYS

BUOY 4805


EAST VELOCITY
CM/SEC
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NORTH VELOCITY
CM/SEC
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TEMPERATURE
DEGREES C
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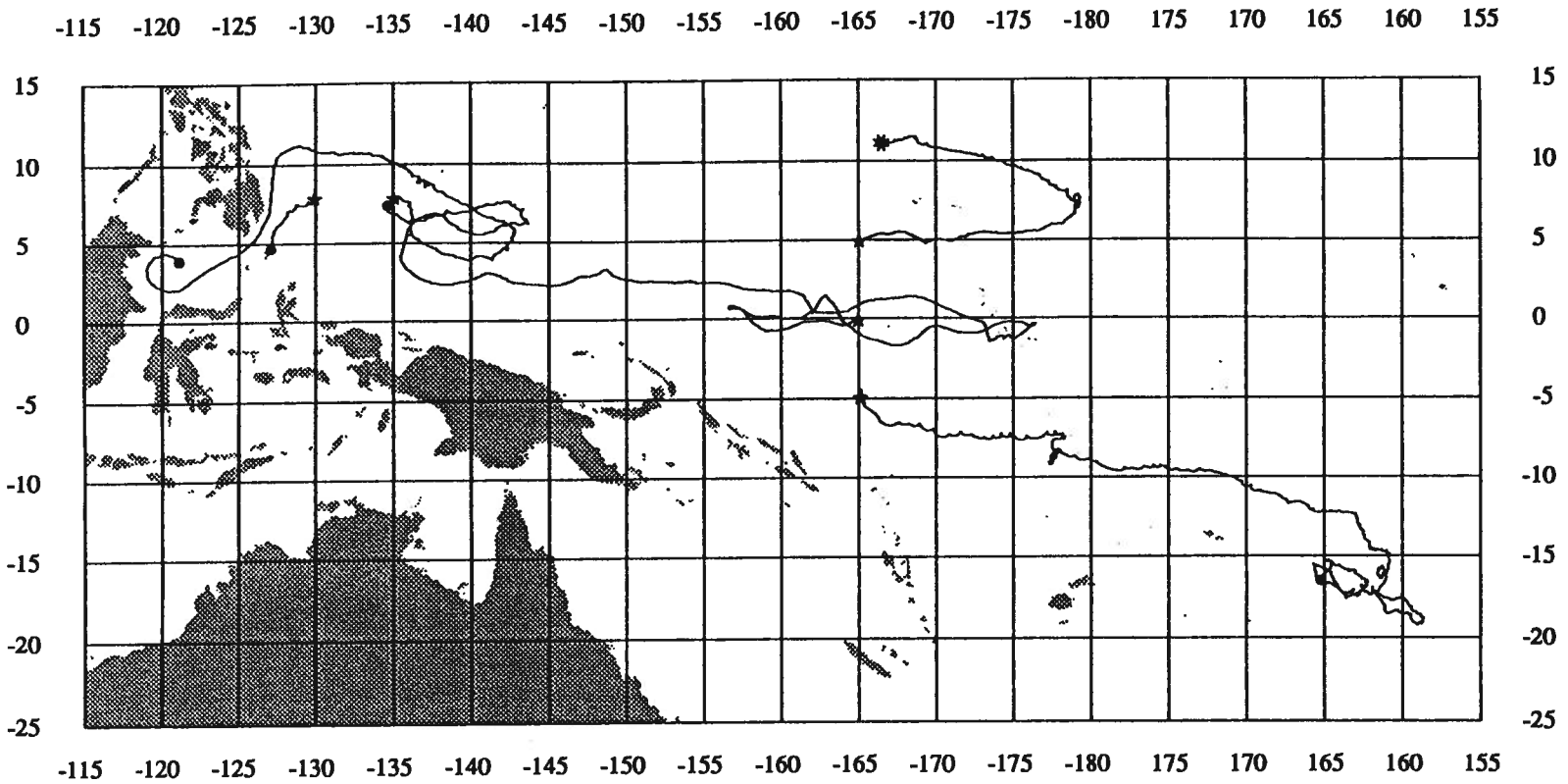
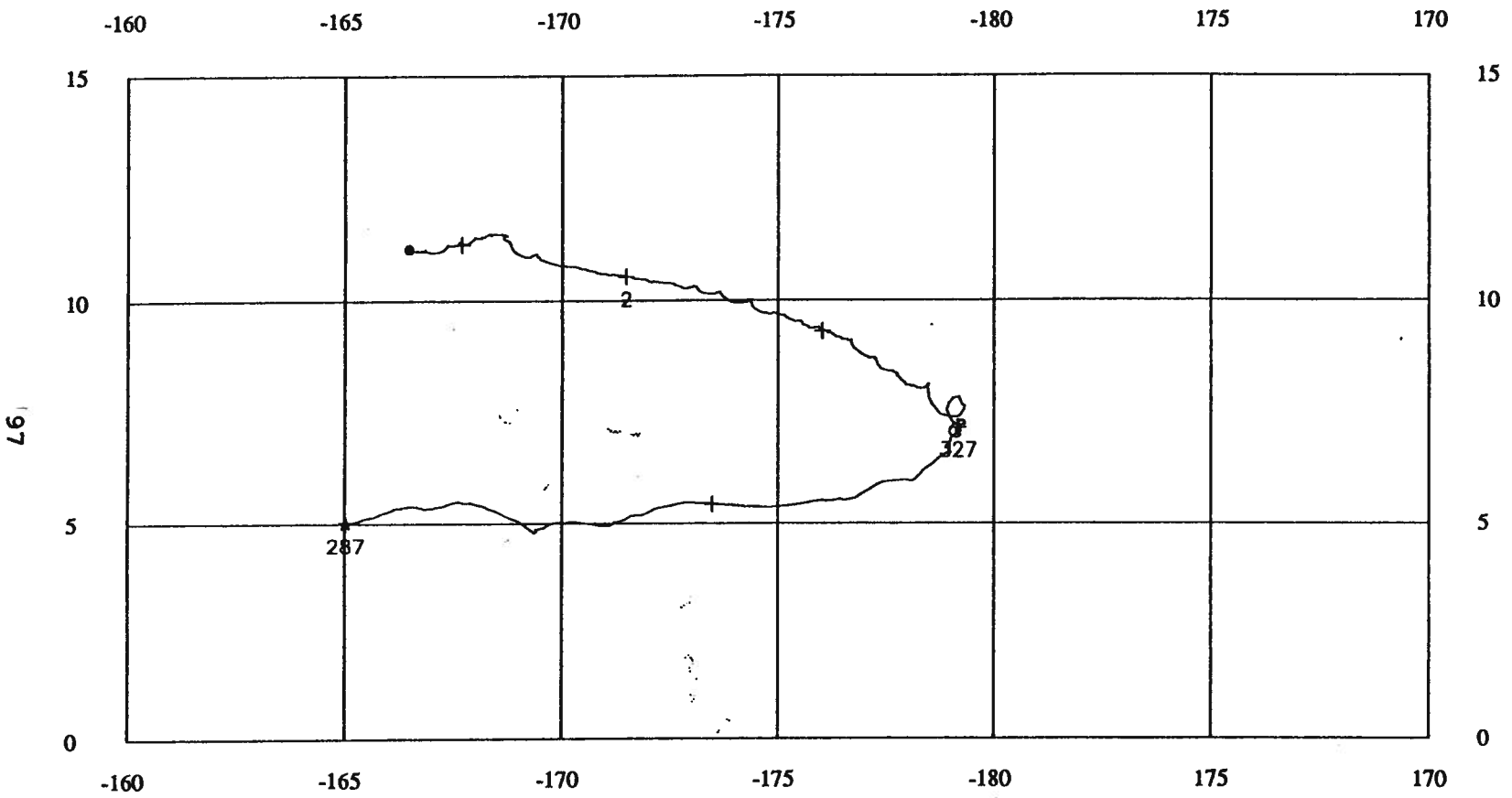
JULIAN DAYS

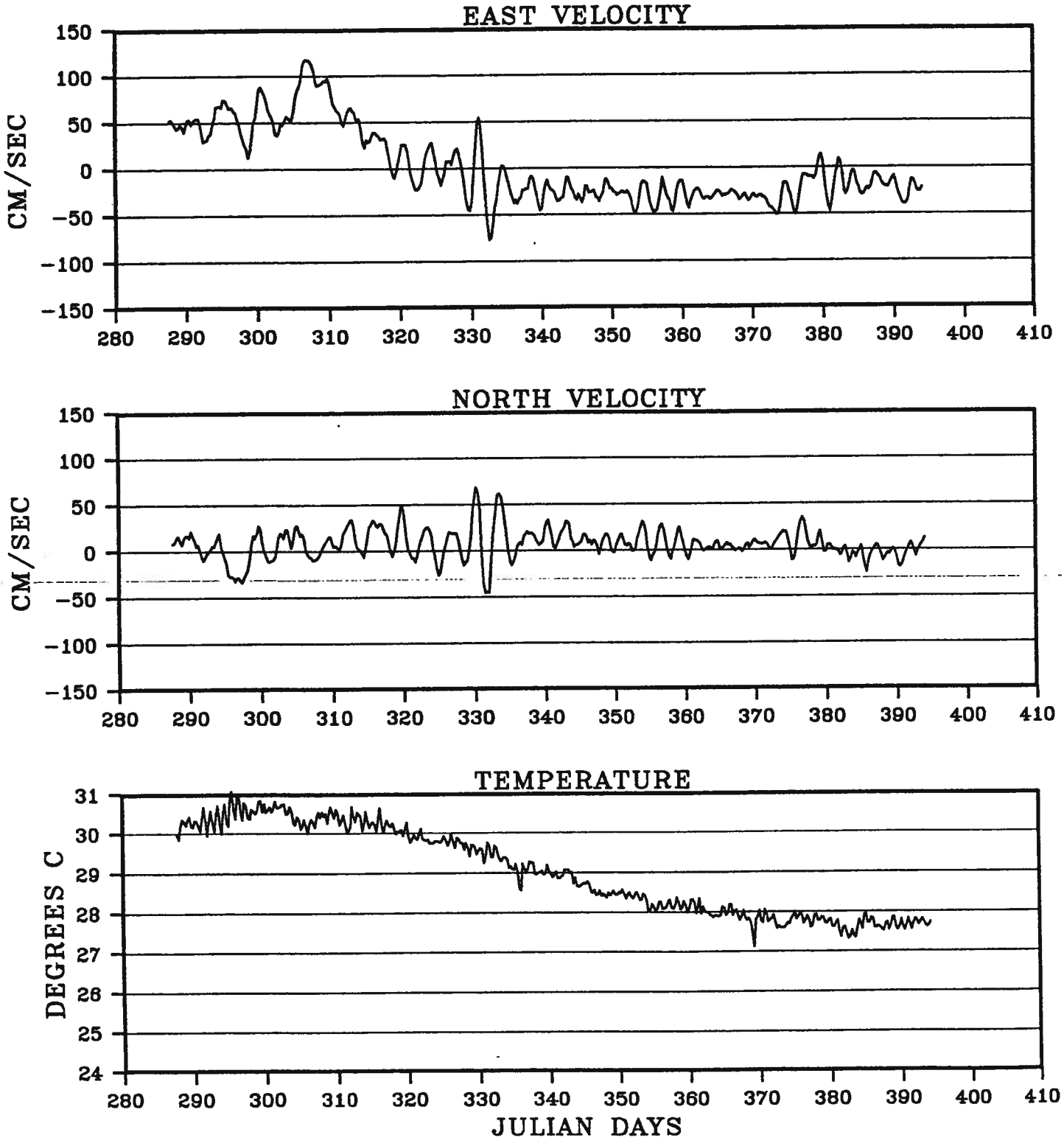
SEPTEMBER 1987– FEBRUARY 1989



BUOY 4828



BUOY 4828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NORTH VELOCITY
CM/SEC
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−150
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TEMPERATURE
DEGREES C
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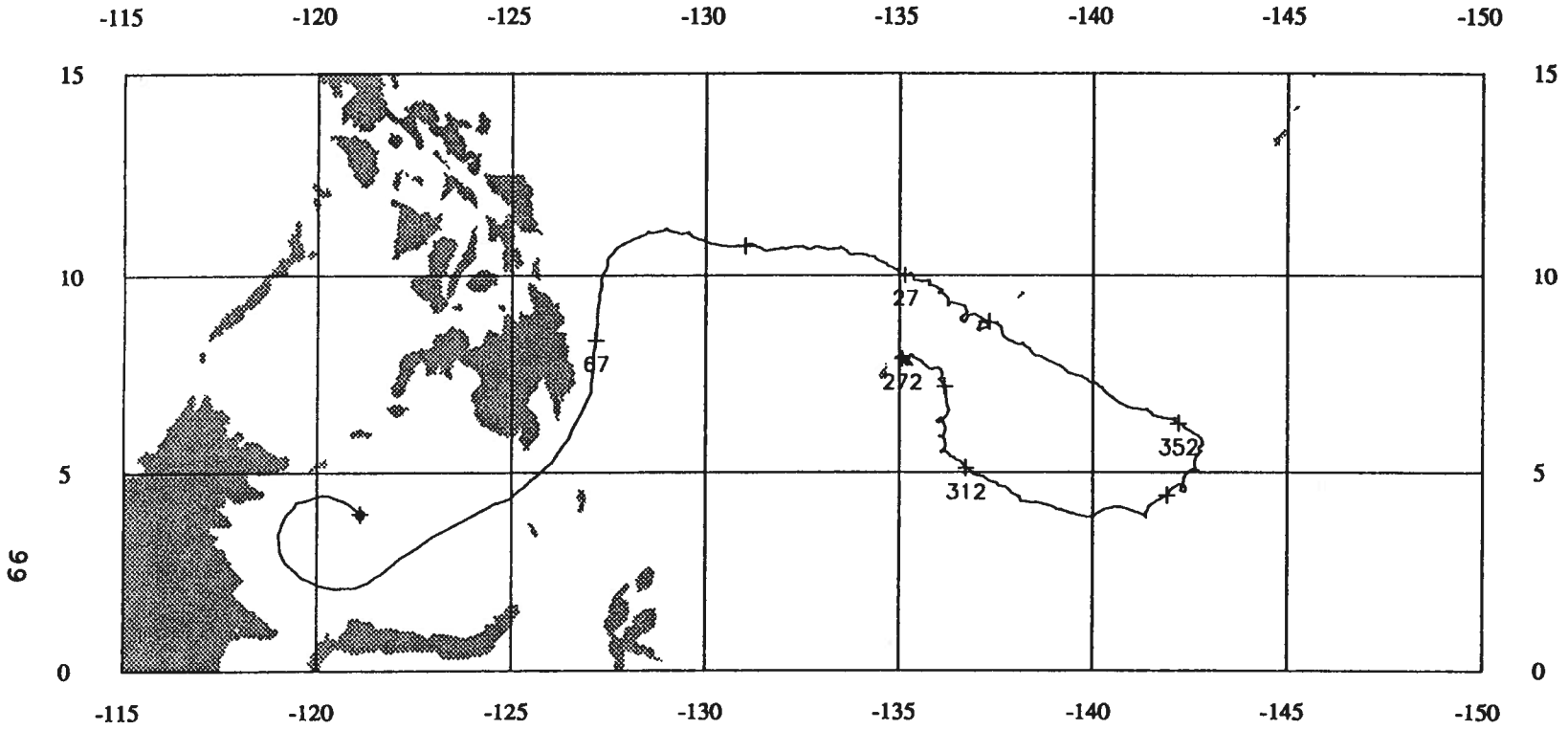
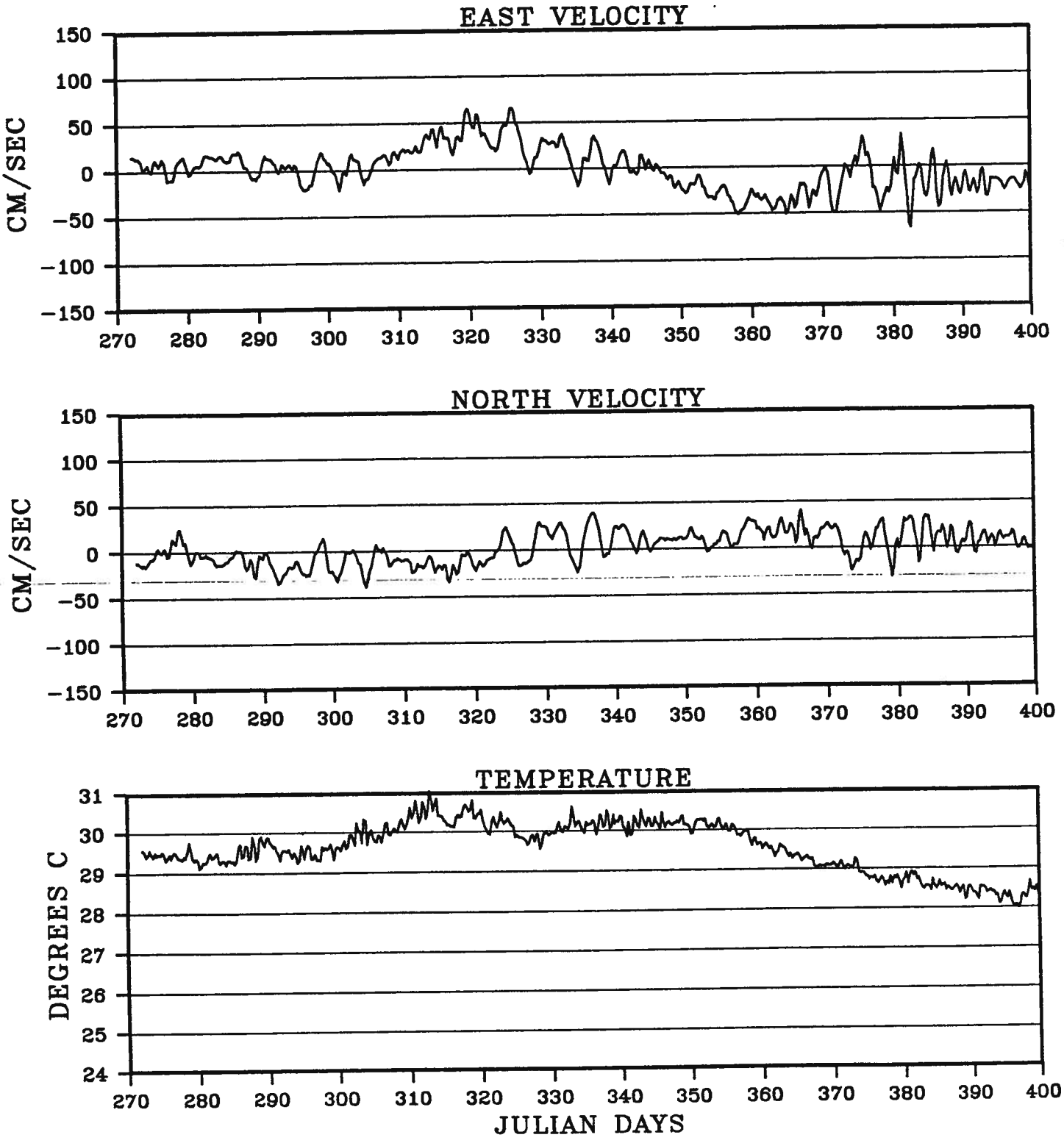
JULIAN DAYS

BUOY 4829



BUOY 4829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NORTH VELOCITY
CM/SEC
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270 280 290 300 310 320 330 340 350 360 370 380 390 400
TEMPERATURE
DEGREES C
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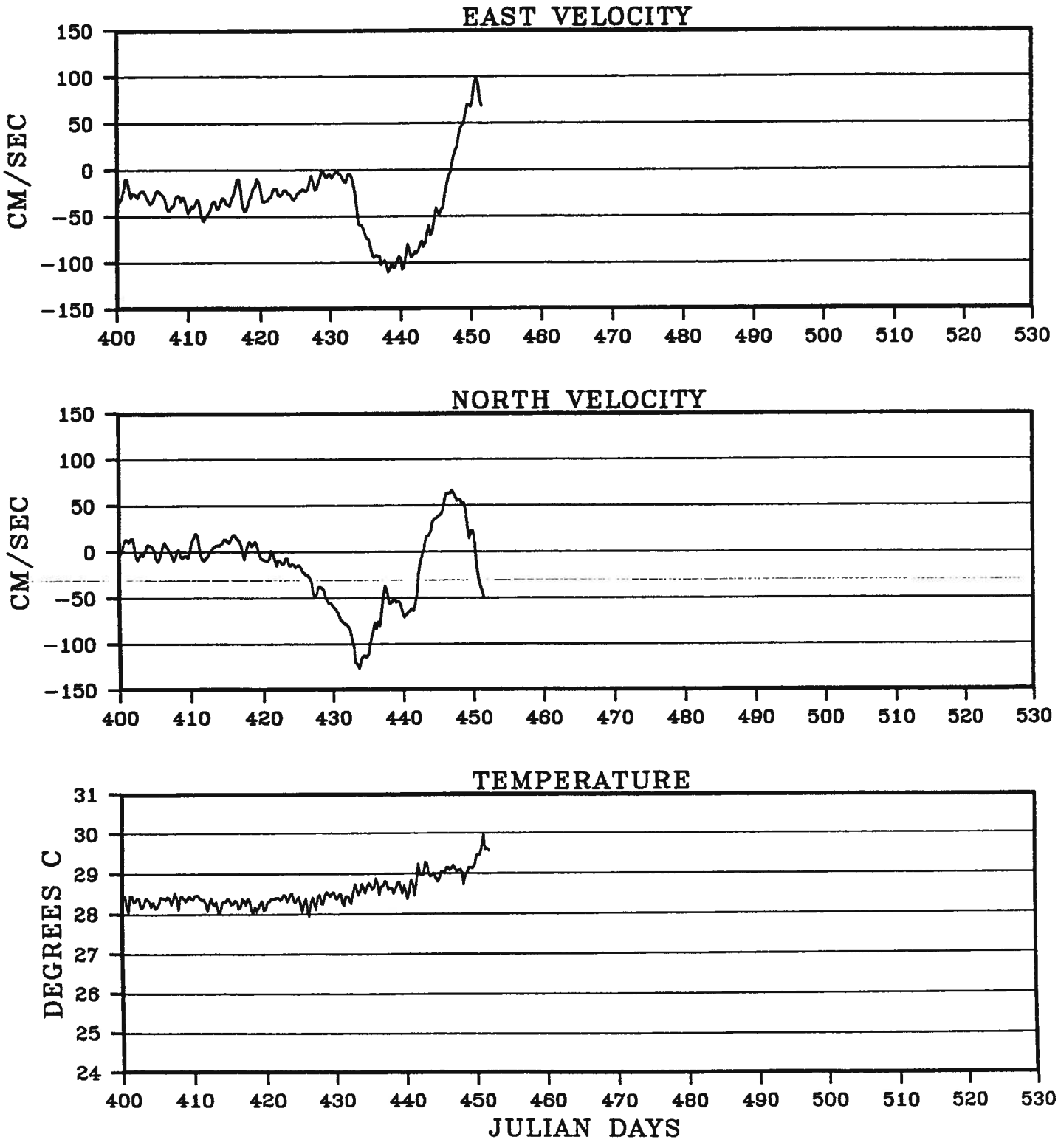
JULIAN DAYS

BUOY 4829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NORTH VELOCITY
CM/SEC
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400 410 420 430 440 450 460 470 480 490 500 510 520 530
TEMPERATURE
DEGREES C
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24
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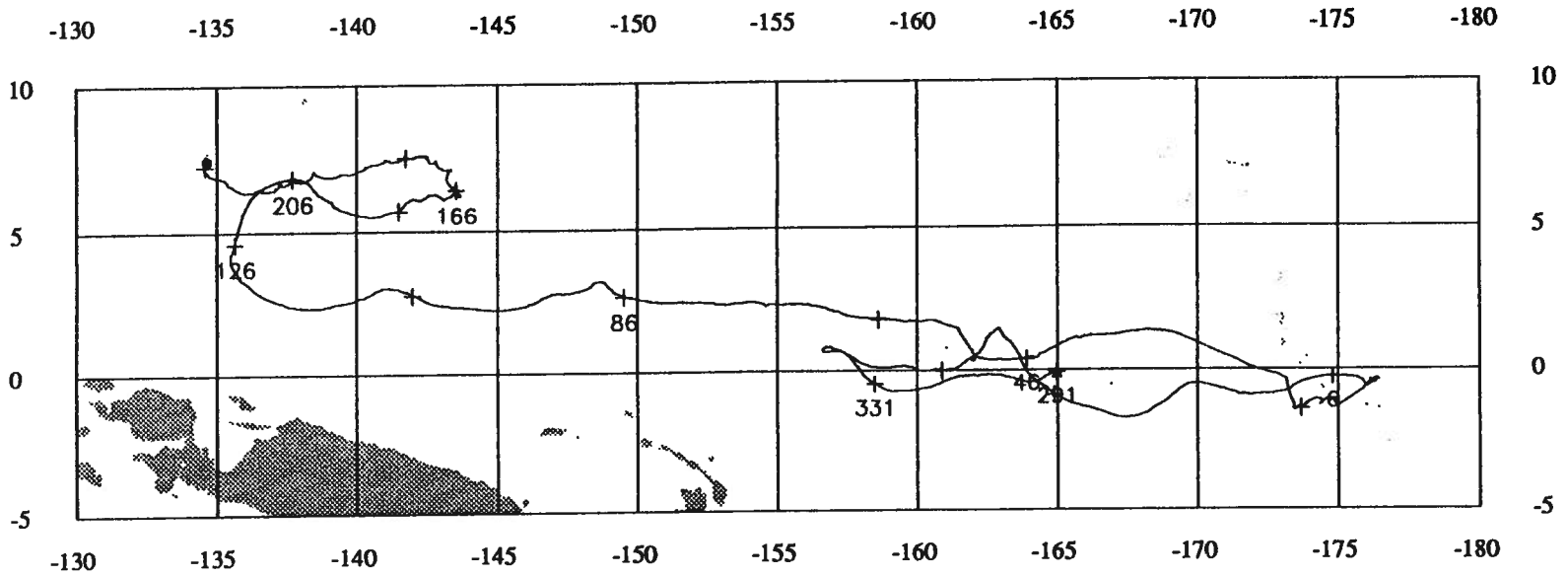
JULIAN DAYS

BUOY 6850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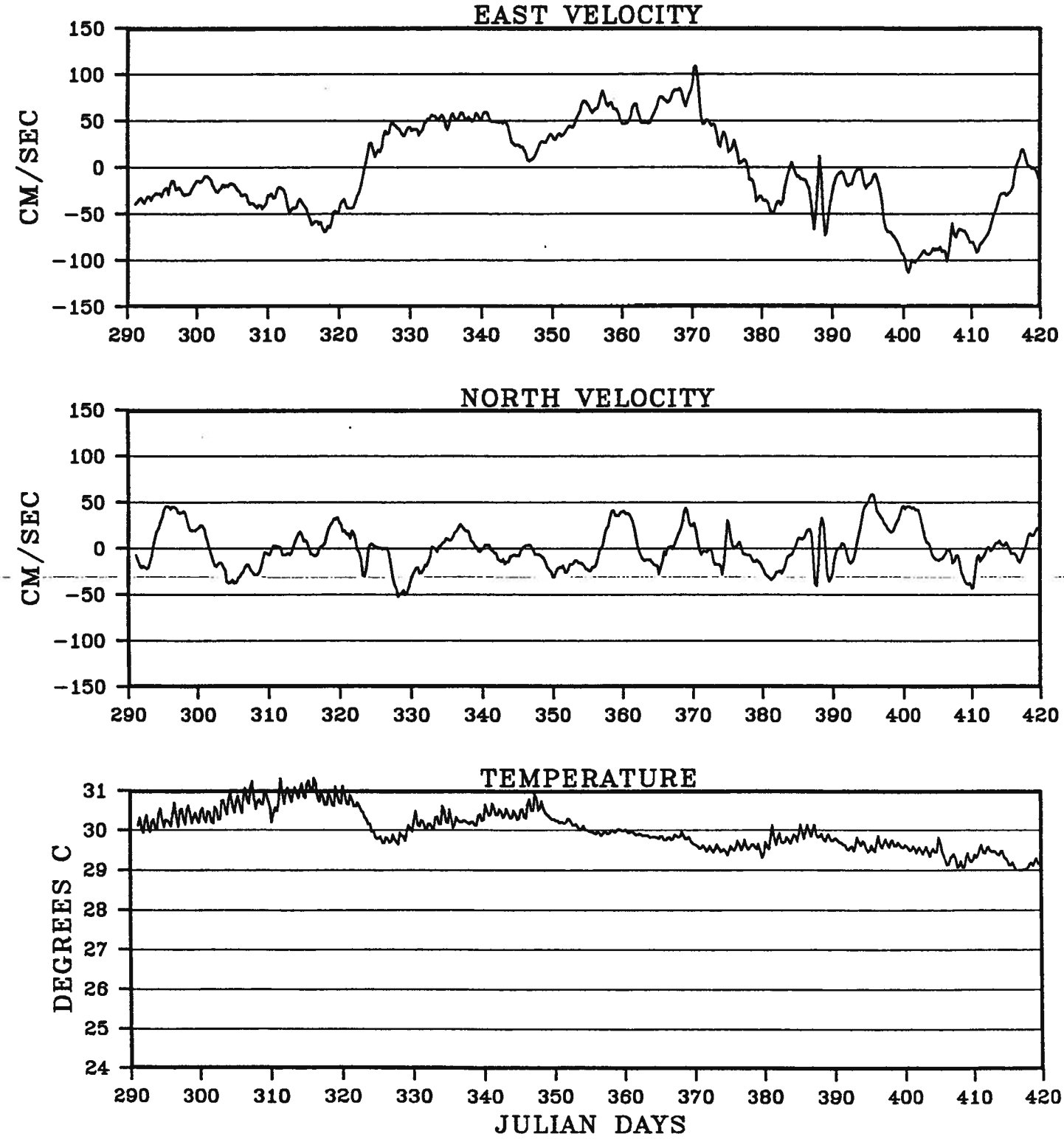
BUOY 6850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380
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400
410
420
NORTH VELOCITY
CM/SEC
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TEMPERATURE
DEGREES C
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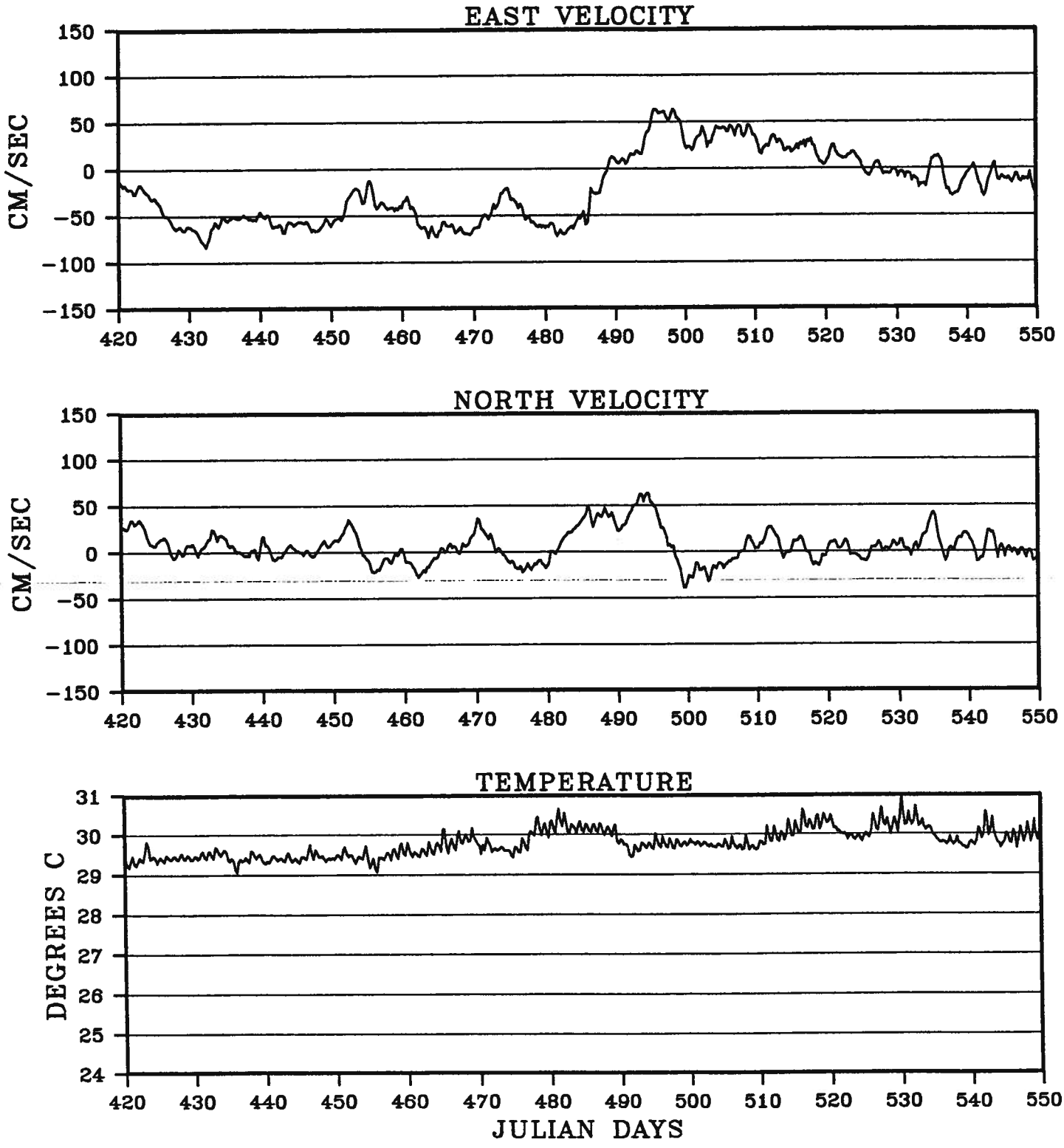
400
410
420
JULIAN DAYS

BUOY 6850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NORTH VELOCITY
CM/SEC
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TEMPERATURE
DEGREES C
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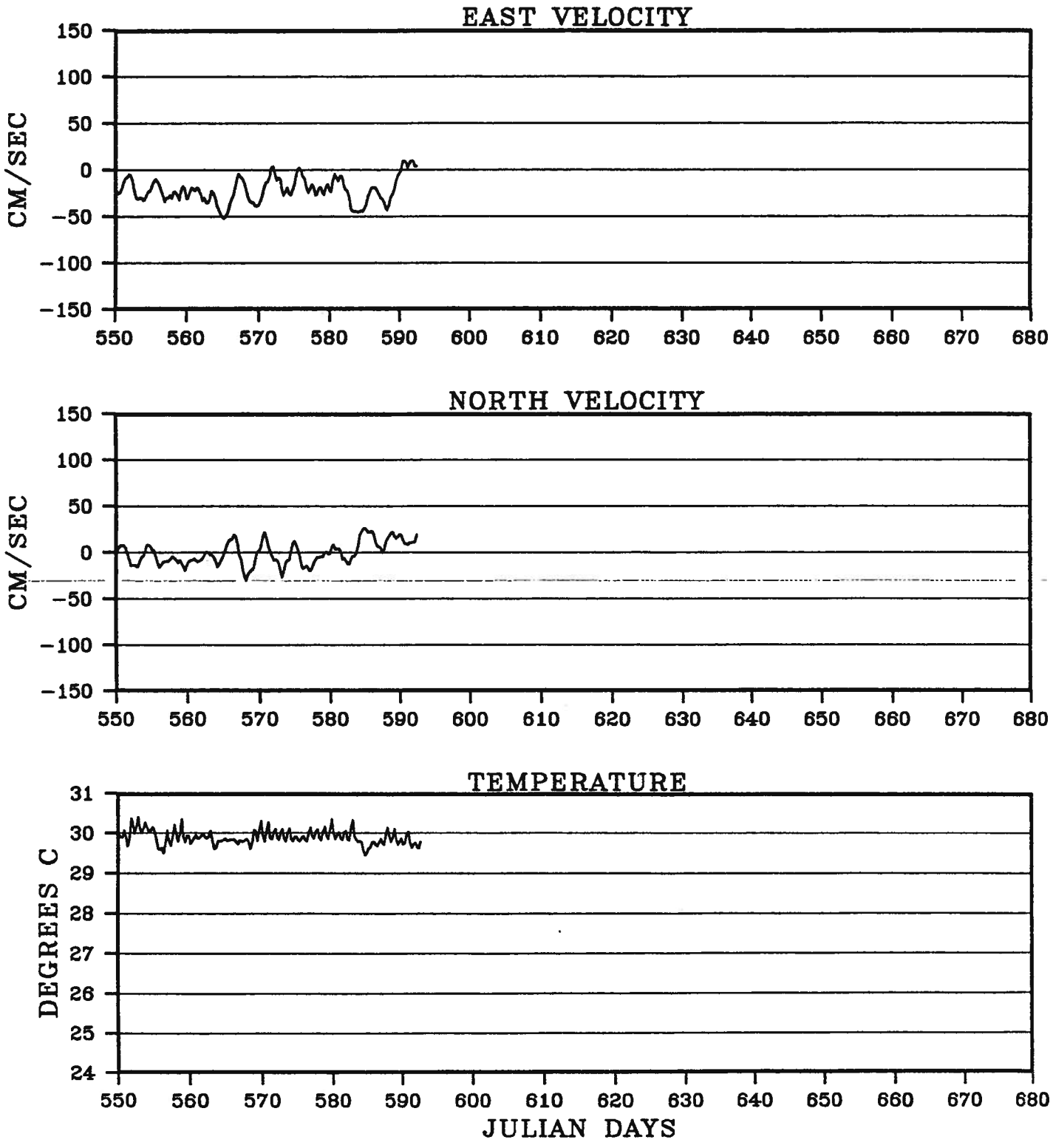
JULIAN DAYS

BUOY 6850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CM/SEC
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NORTH VELOCITY
CM/SEC
150
100
50
0
-50
-100
-150
550 560 570 580 590 600 610 620 630 640 650 660 670 680
TEMPERATURE
DEGREES C
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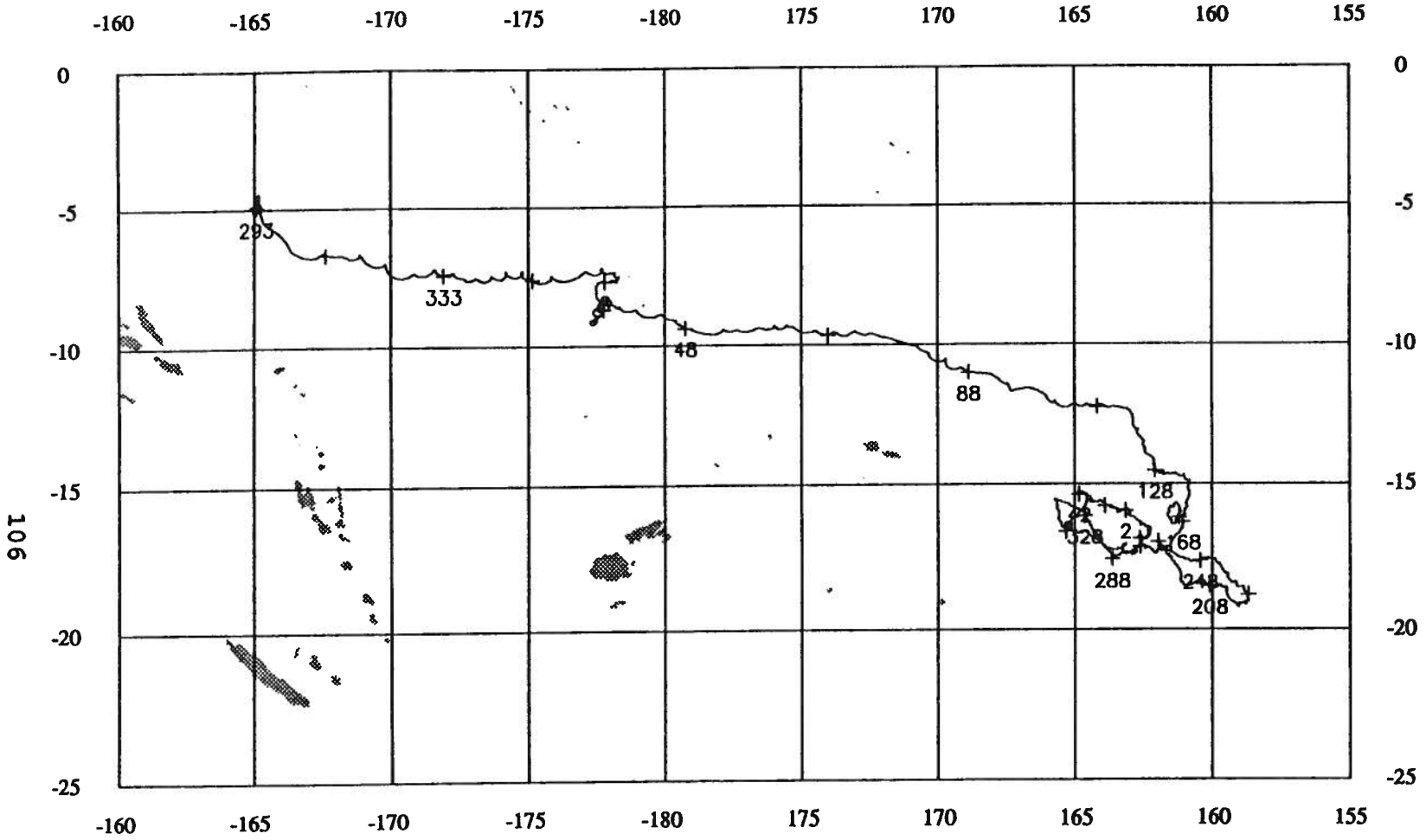
JULIAN DAYS

BUOY 6851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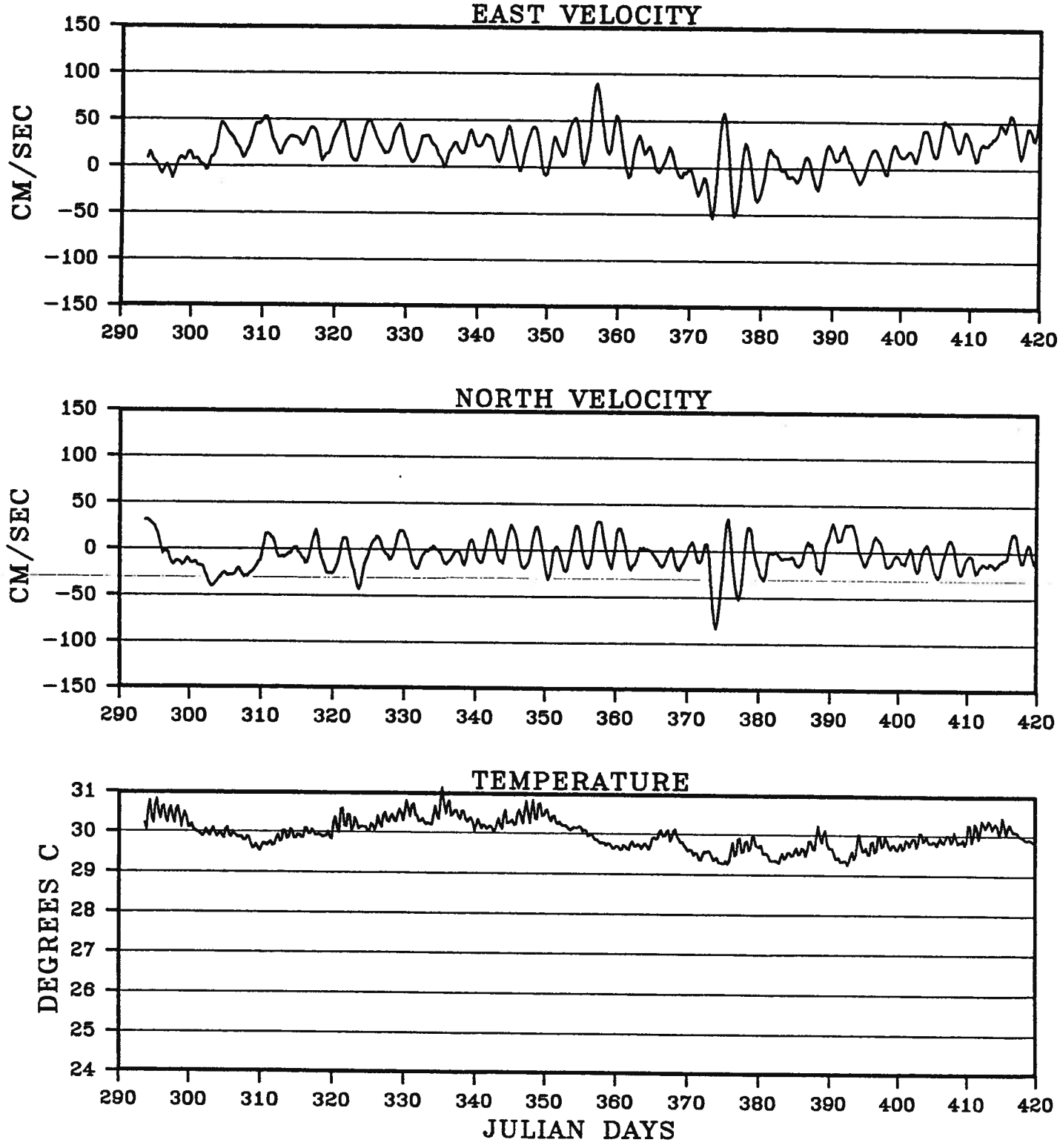
BUOY 6851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400
410
420
NORTH VELOCITY
CM/SEC
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100
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TEMPERATURE
DEGREES C
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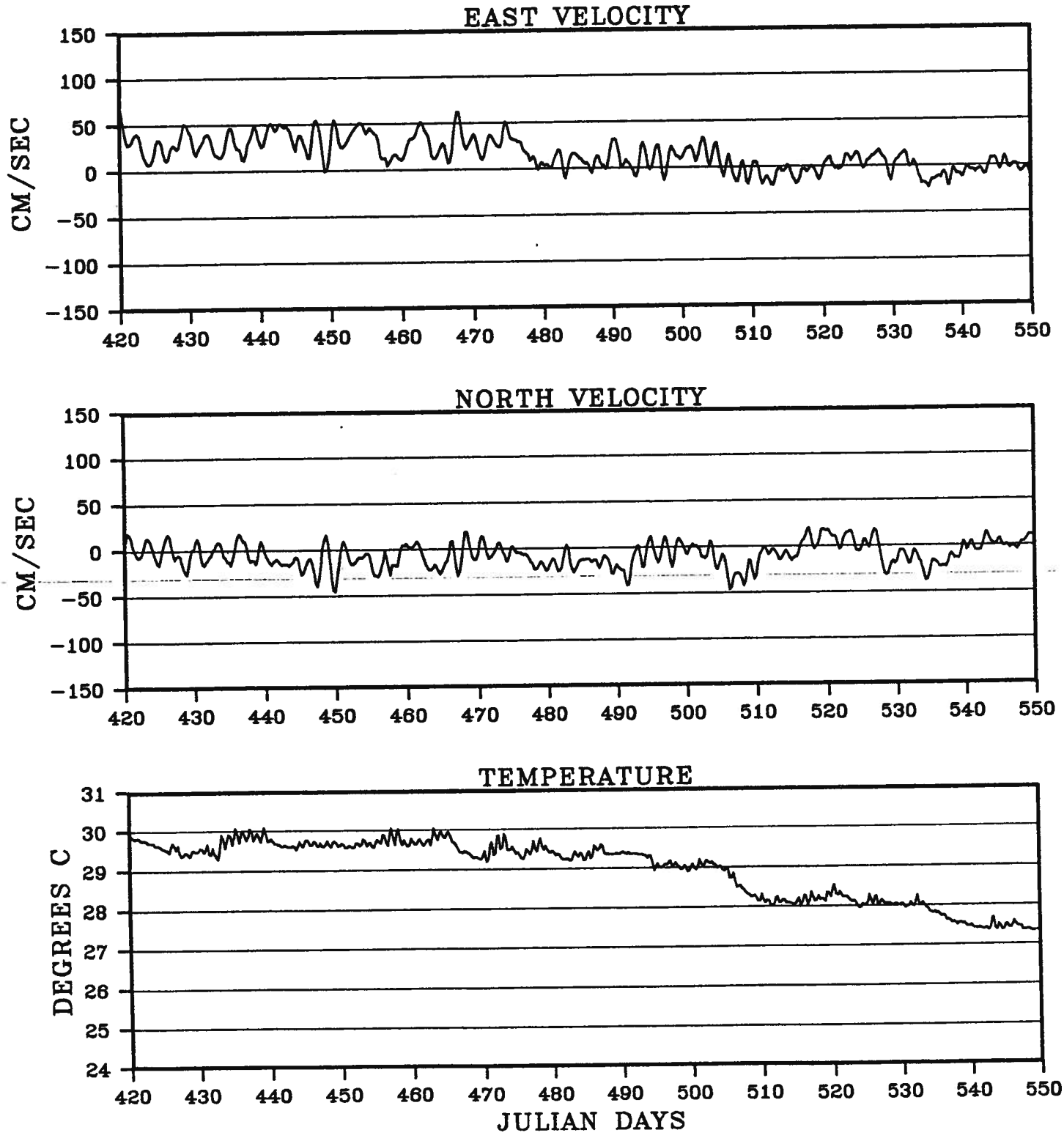
JULIAN DAYS

BUOY 6851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CM/SEC
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420 430 440 450 460 470 480 490 500 510 520 530 540 550
TEMPERATURE
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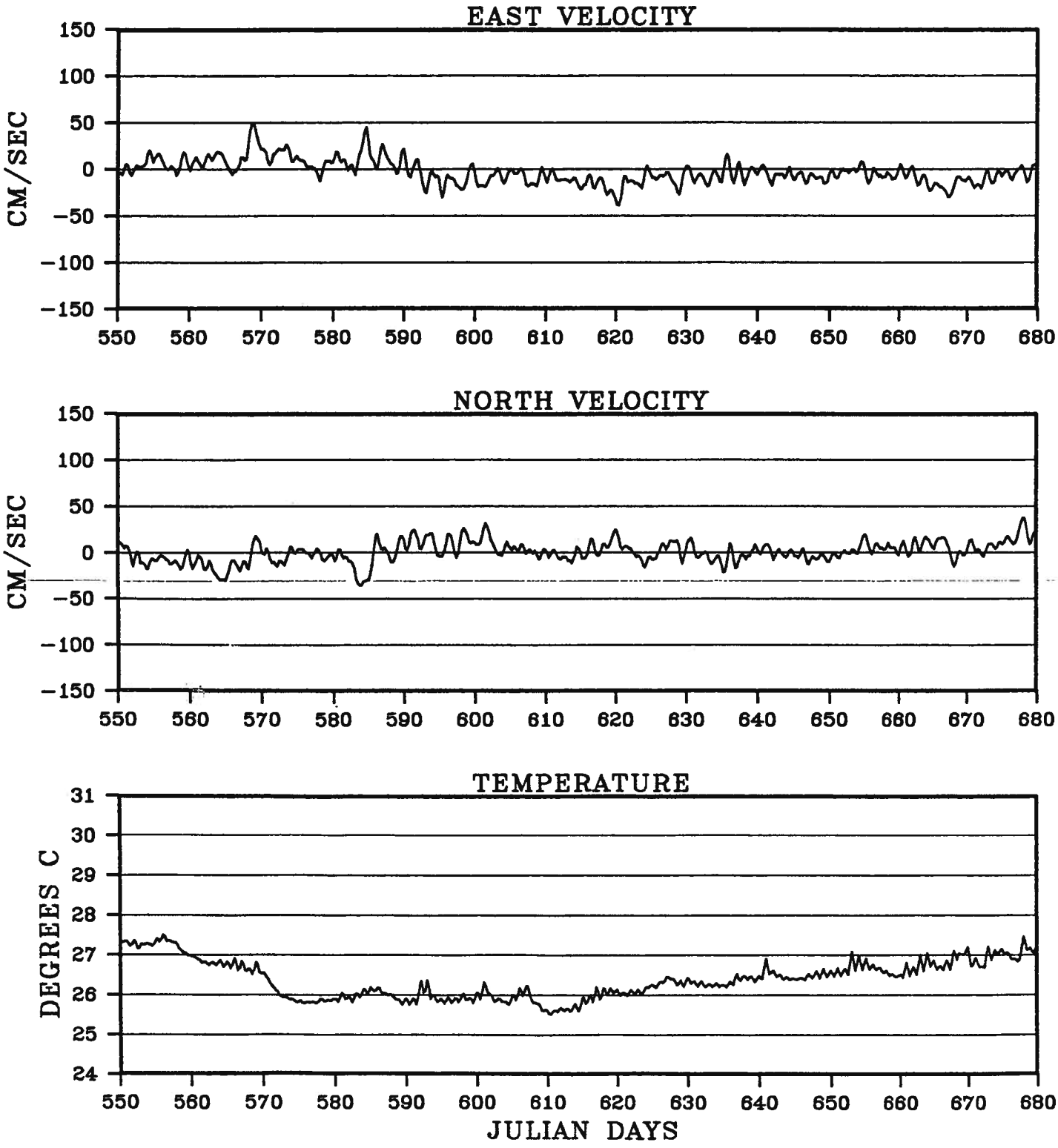
JULIAN DAYS

BUOY 6851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CM/SEC
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TEMPERATURE
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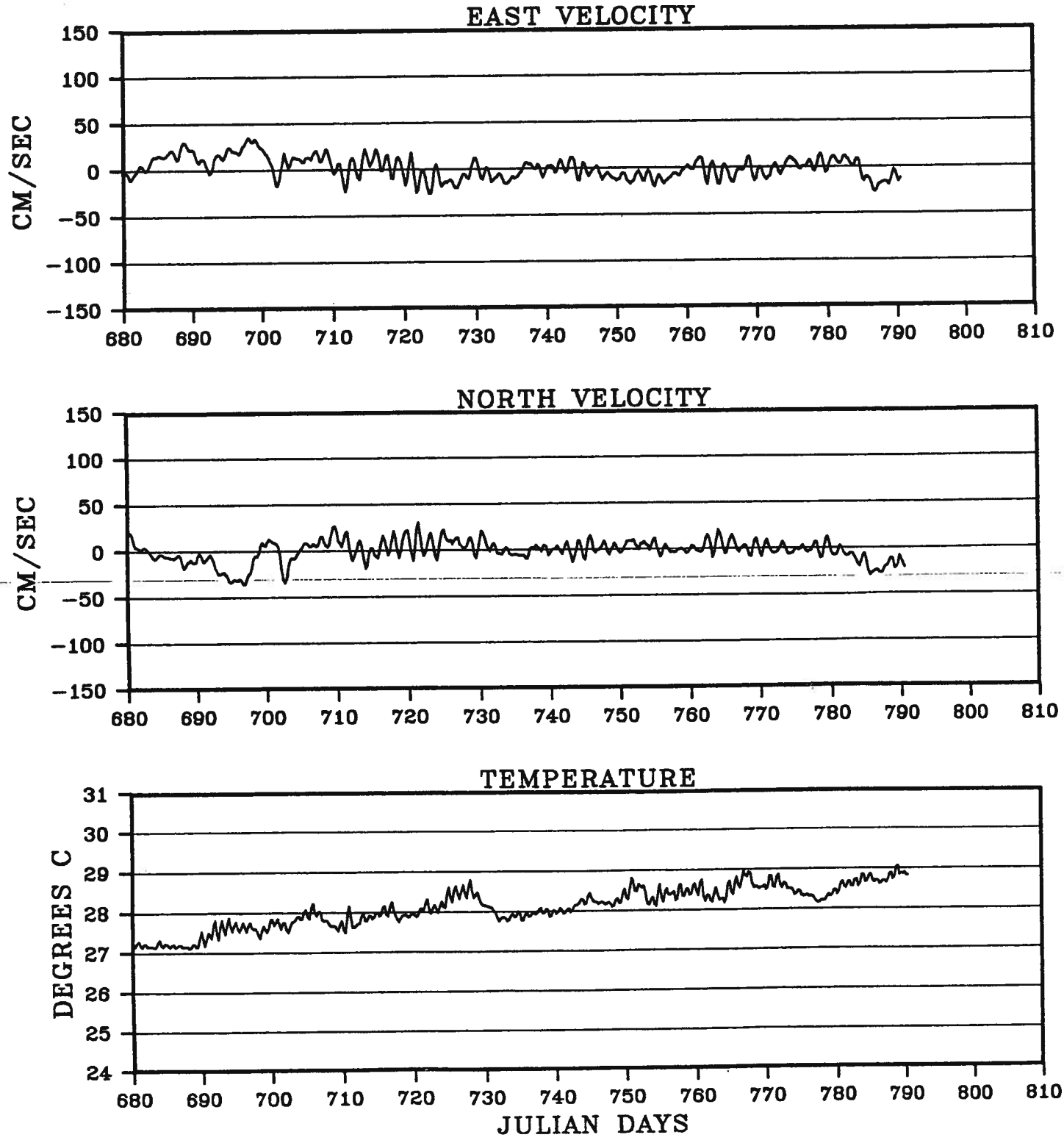
JULIAN DAYS

BUOY 6851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NORTH VELOCITY
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TEMPERATURE
DEGREES C
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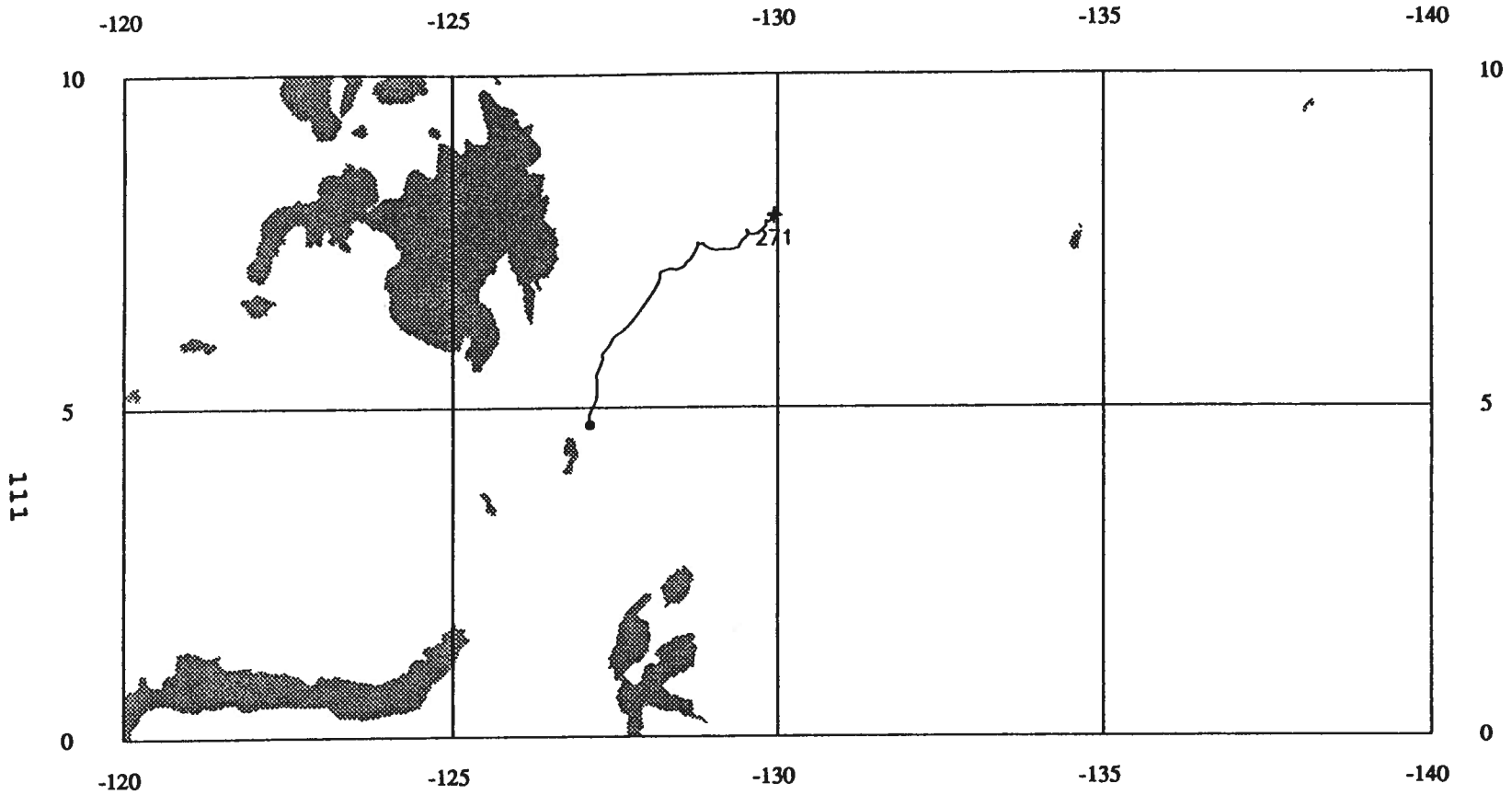
JULIAN DAYS

BUOY 6852



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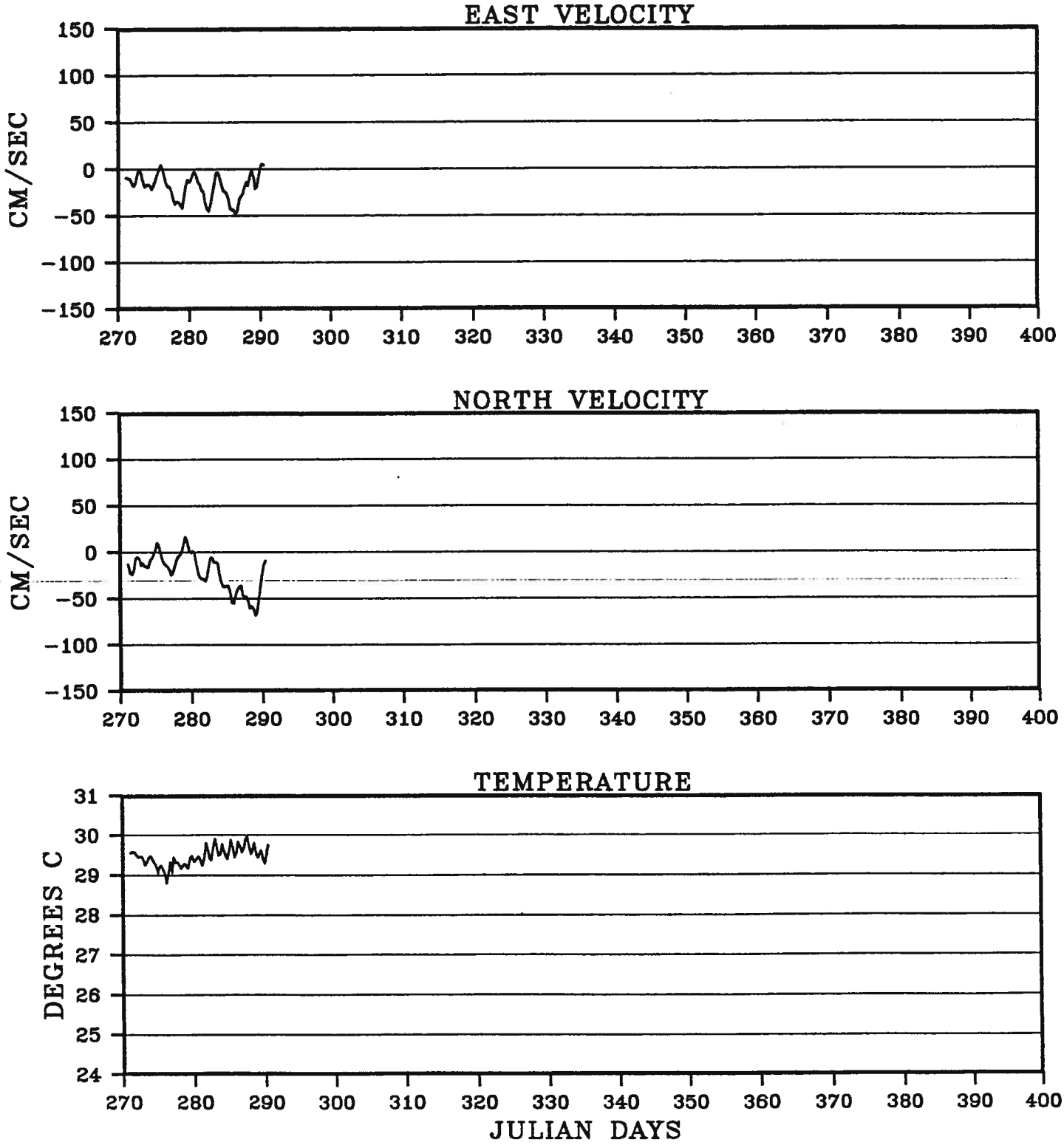
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CM/SEC
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TEMPERATURE
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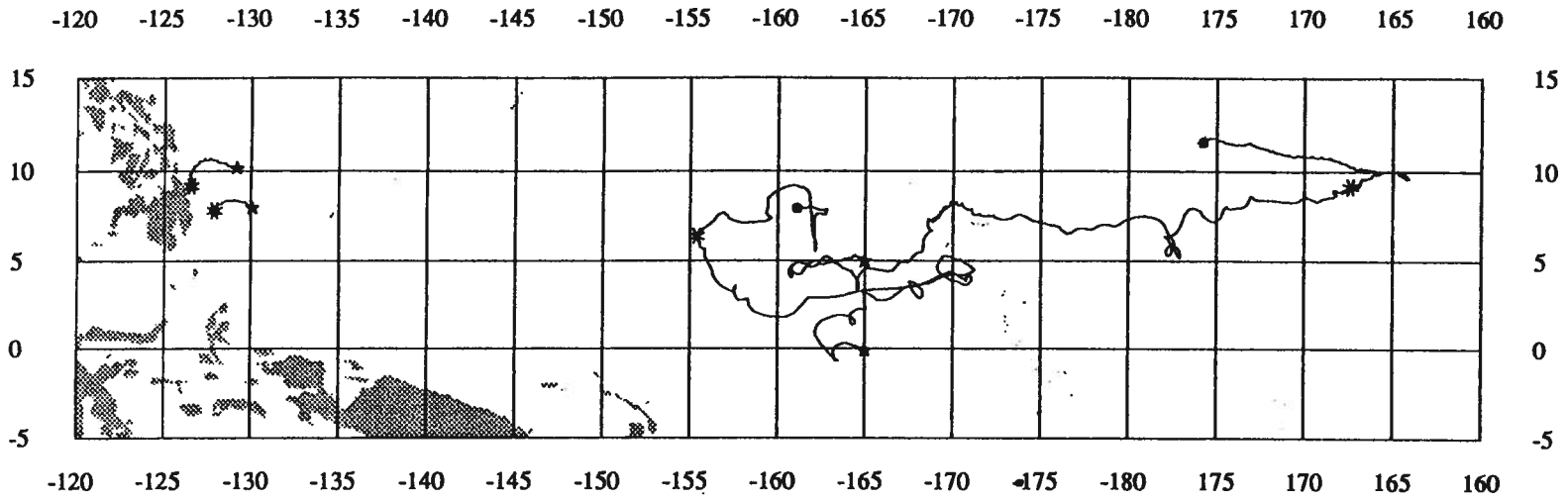
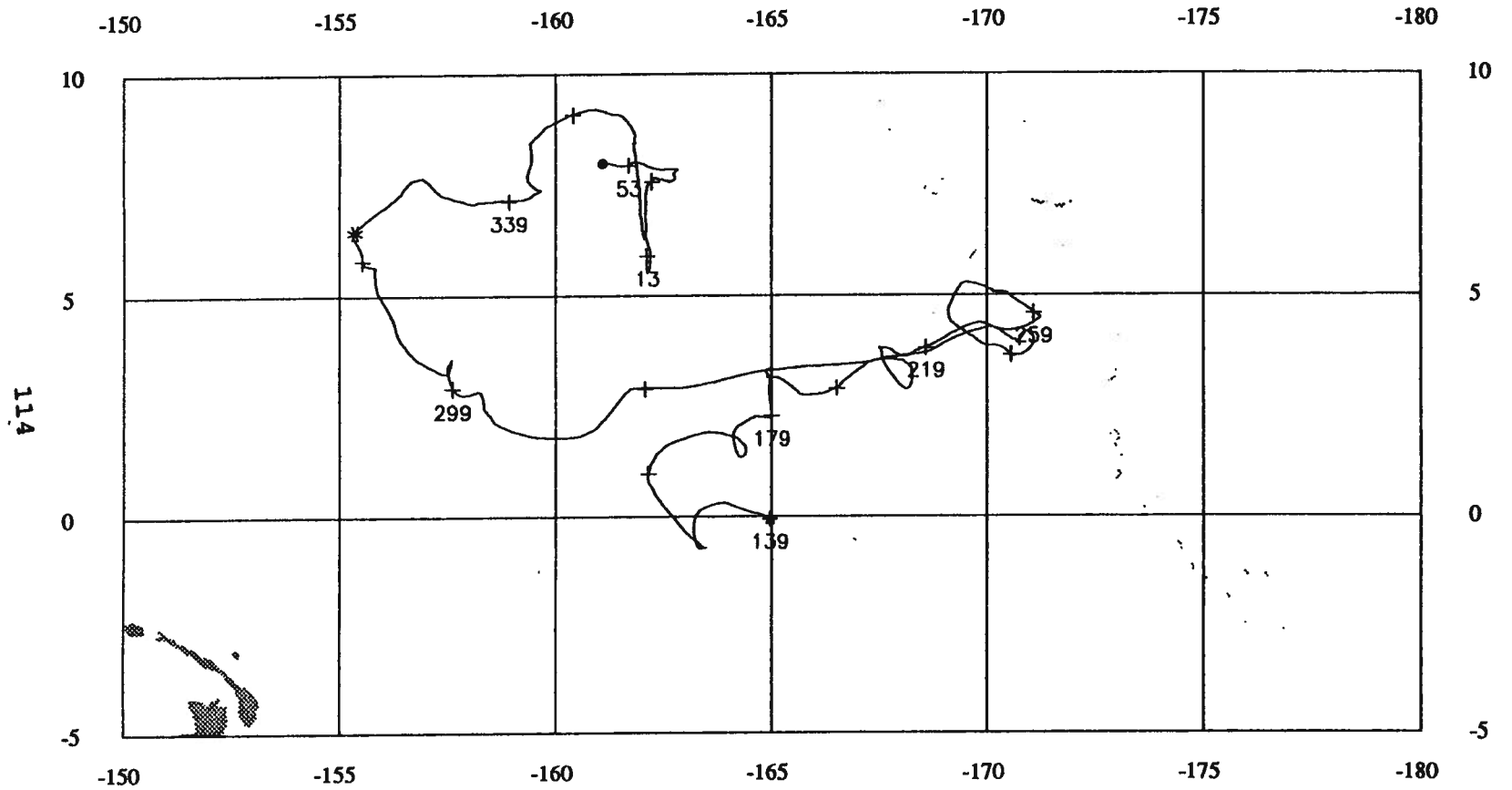
JULIAN DAYS

MAY 1988– FEBRUARY 1989



BUOY 6870



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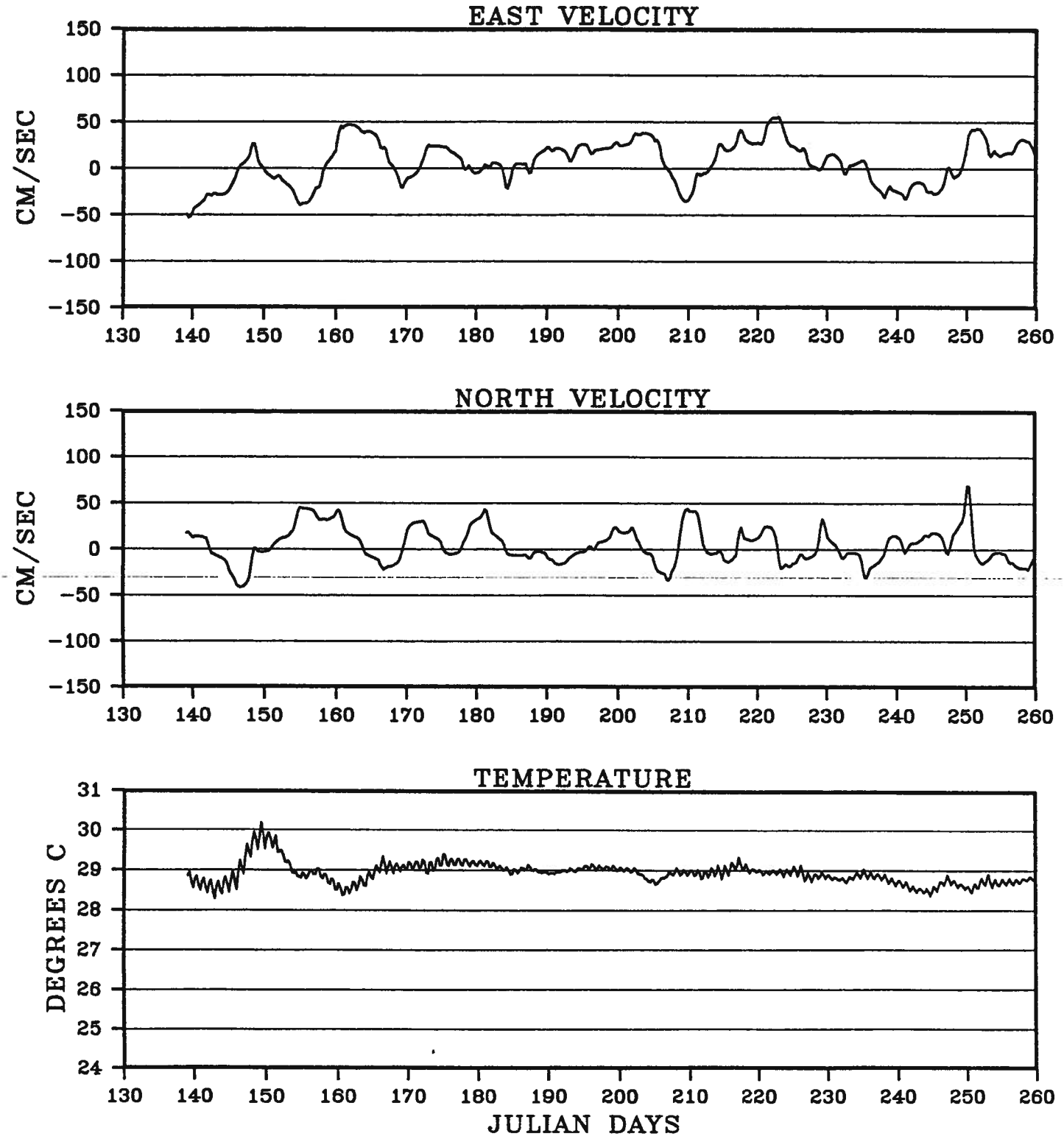
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TEMPERATURE
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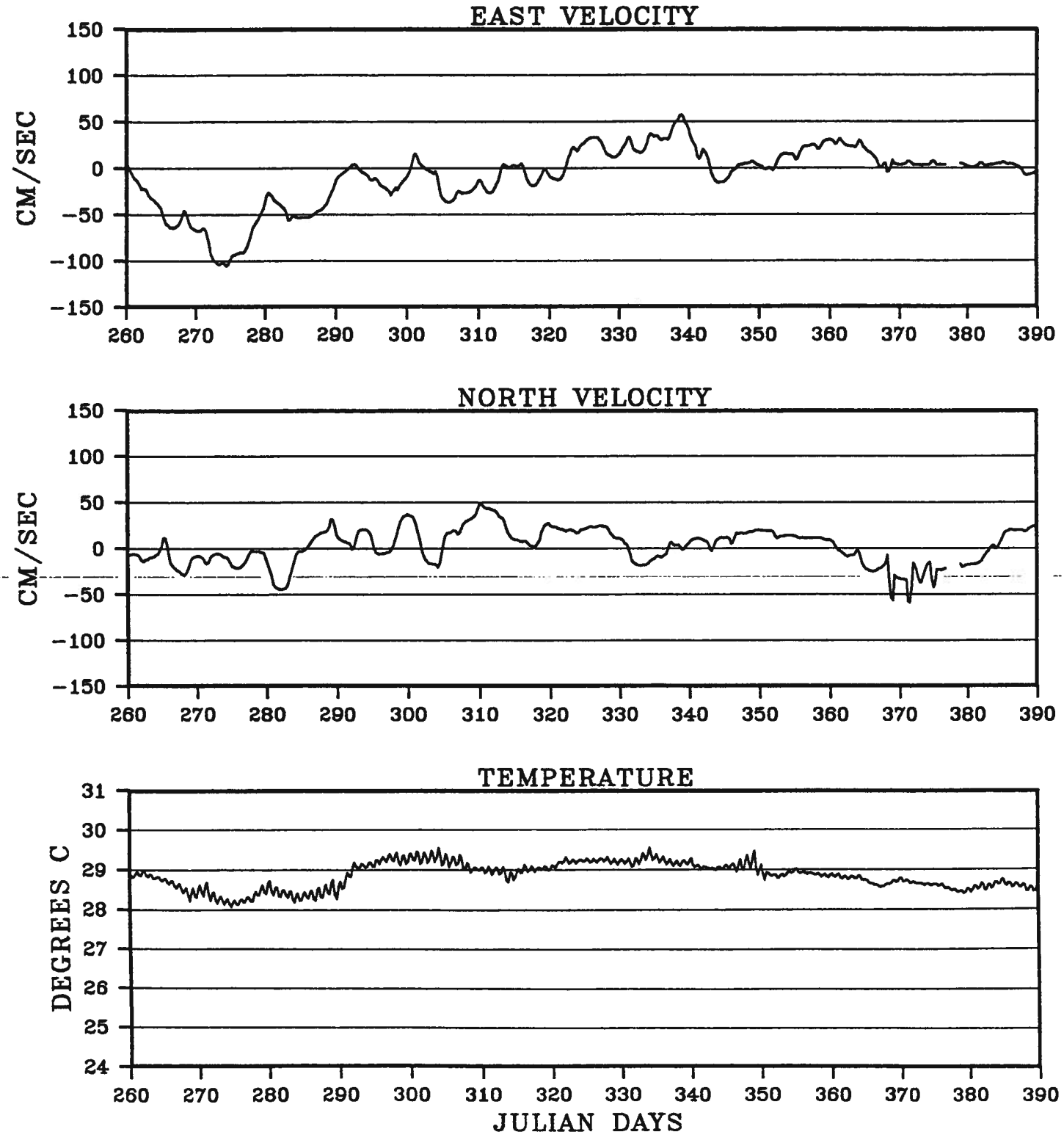
JULIAN DAYS

BUOY 6870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TEMPERATURE
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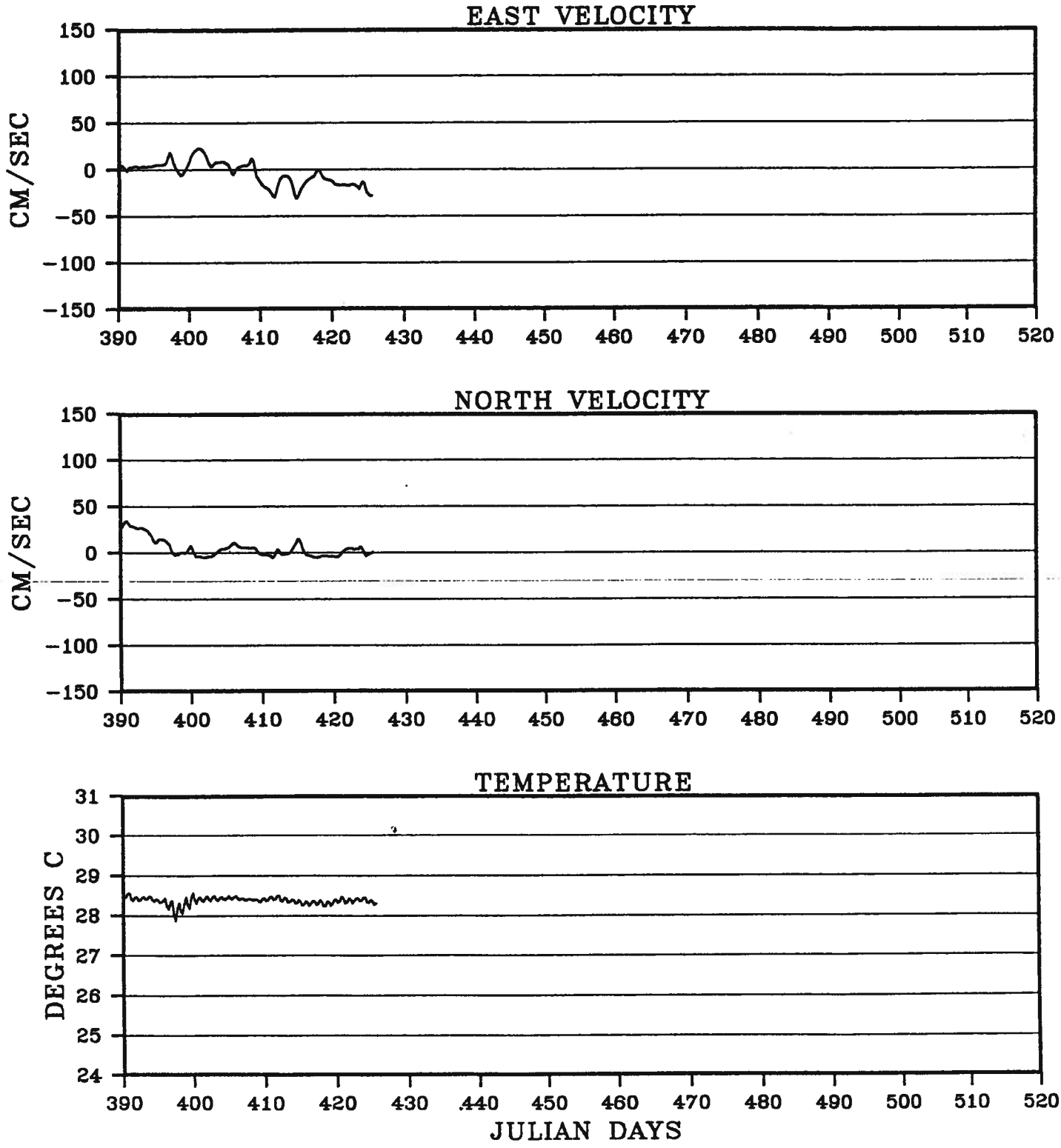
JULIAN DAYS

BUOY 6870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TEMPERATURE
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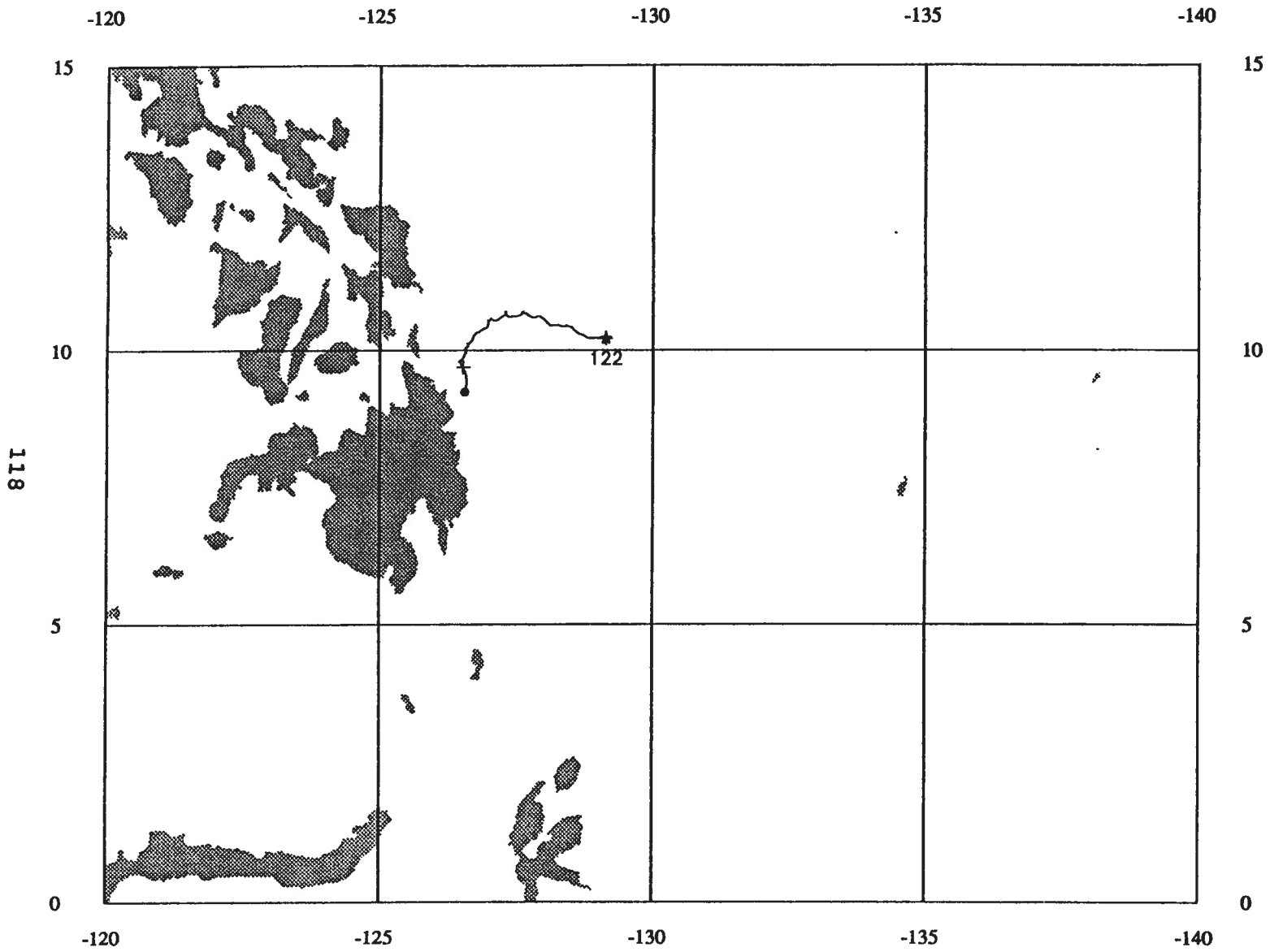
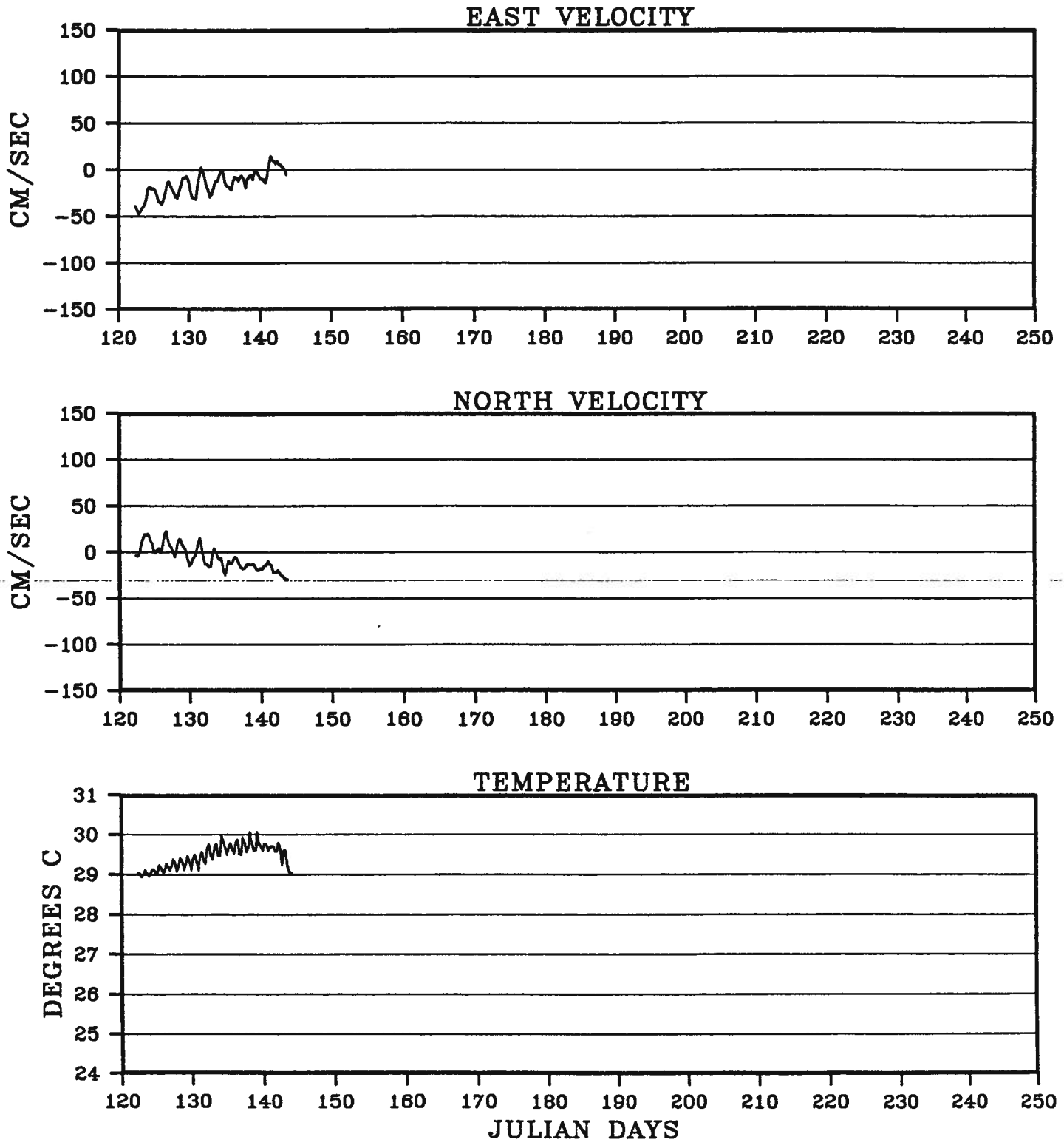
JULIAN DAYS

BUOY 6879



BUOY 6879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TEMPERATURE
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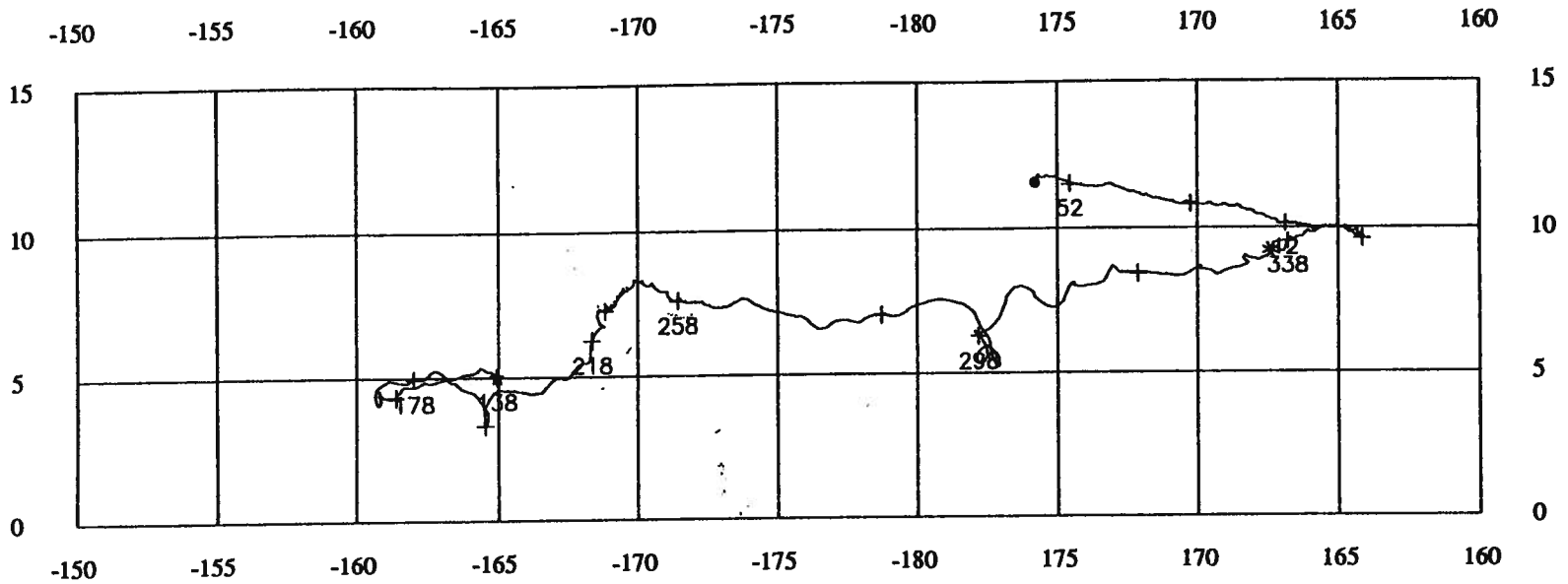
JULIAN DAYS

BUOY 6880



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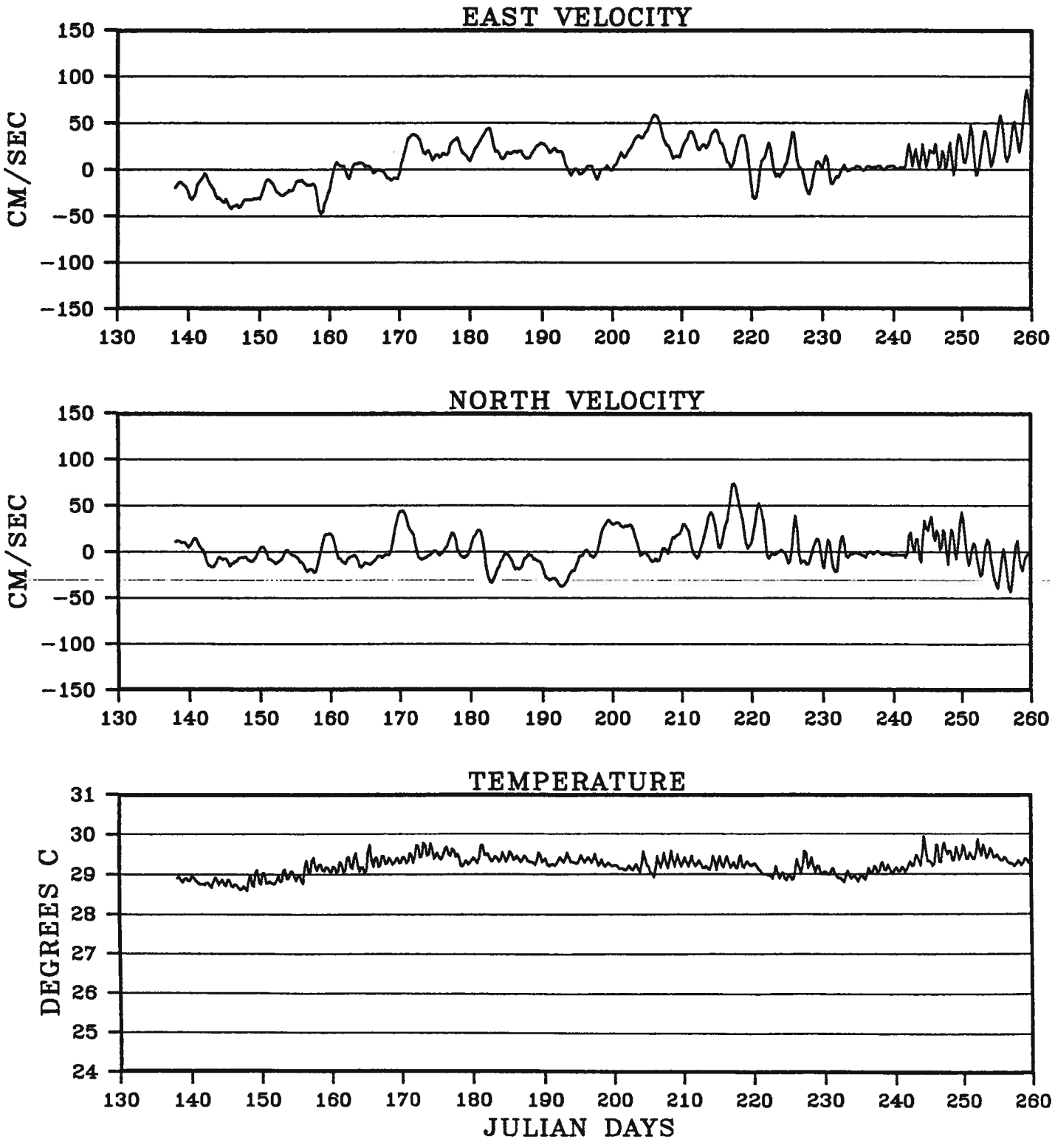
BUOY 6880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NORTH VELOCITY
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TEMPERATURE
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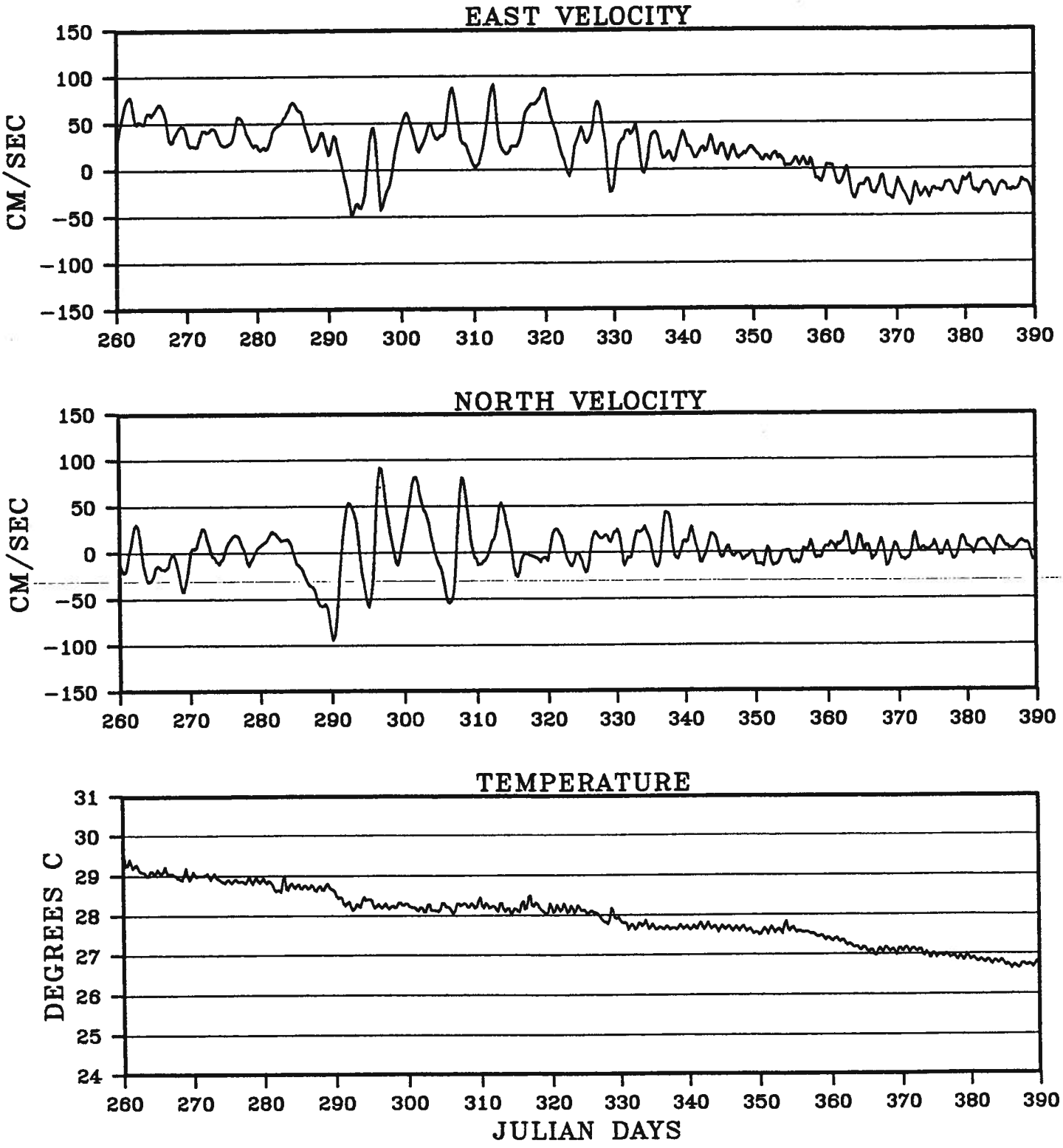
JULIAN DAYS

BUOY 6880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TEMPERATURE
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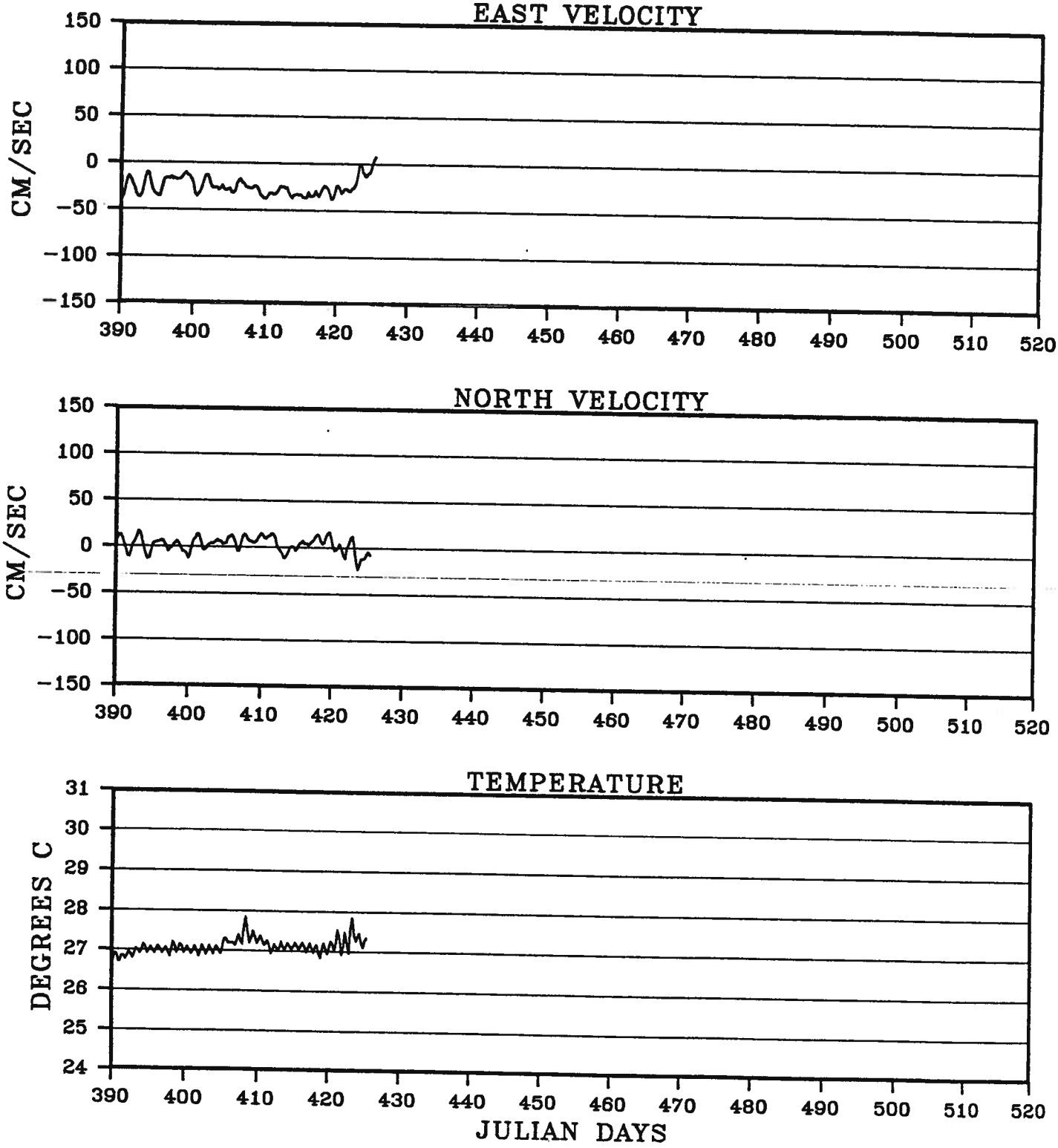
JULIAN DAYS

BUOY 6880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NORTH VELOCITY
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TEMPERATURE
DEGREES C
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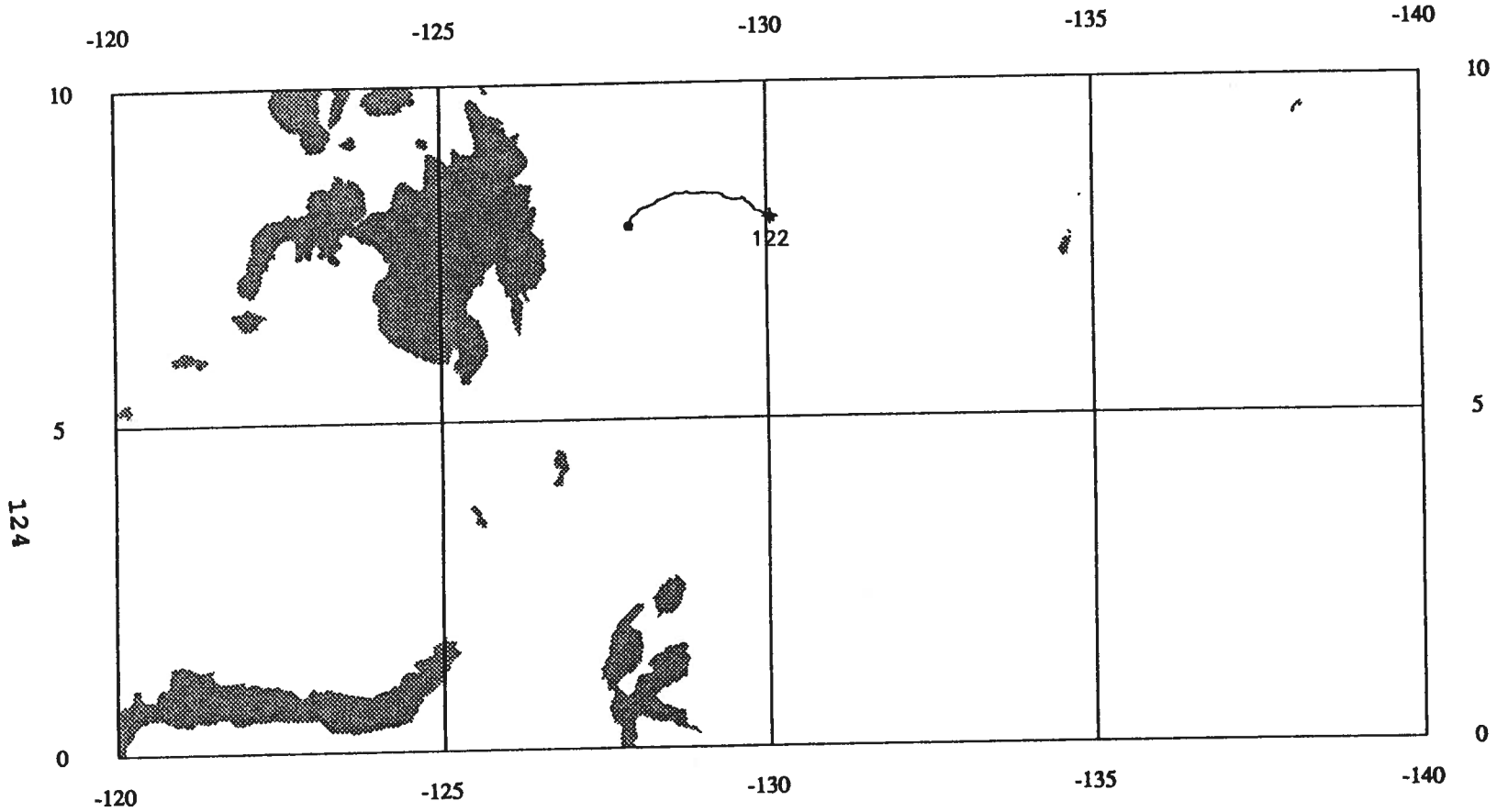
JULIAN DAYS

BUOY 6882



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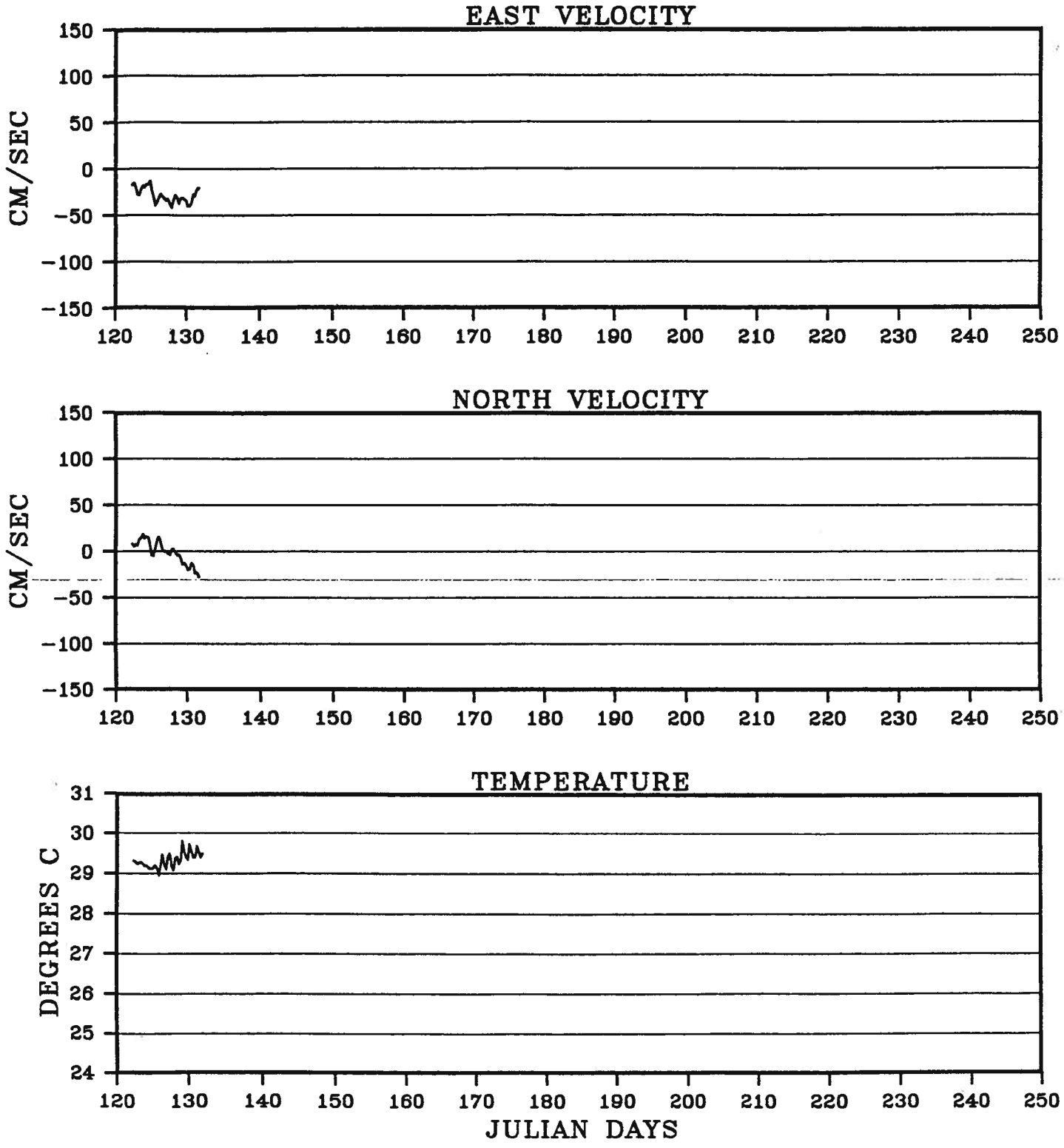
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NORTH VELOCITY
CM/SEC
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TEMPERATURE
DEGREES C
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JULIAN DAYS