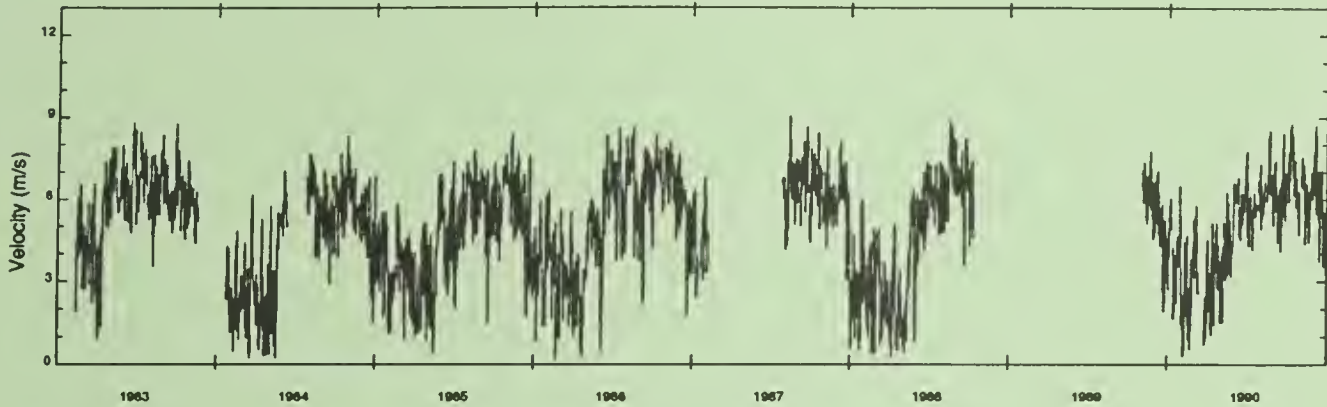


Report of the Meteorological Station at
St. Peter and St. Paul Rocks
(1987-1990)

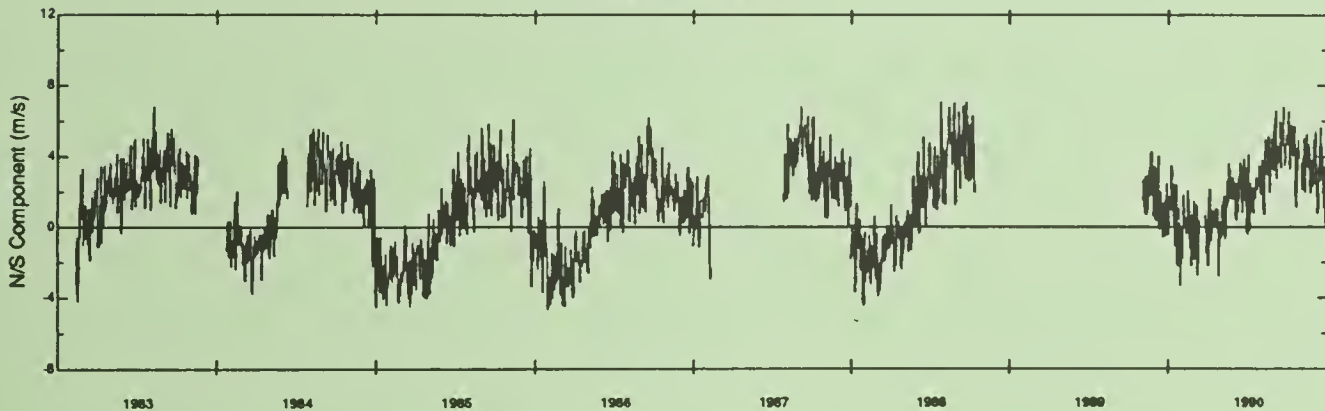
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Header 42

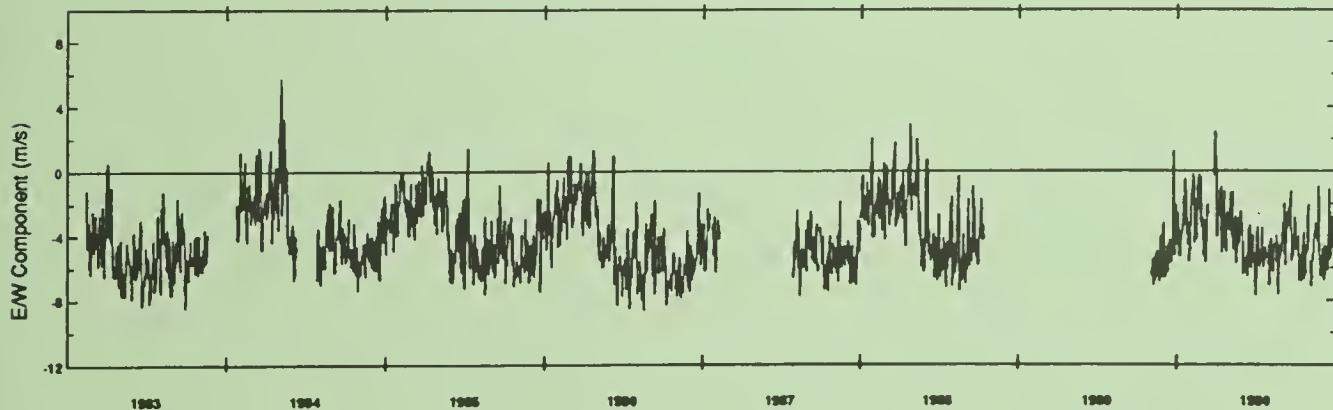
1983-90 Wind Speed
(Daily Values)



1983-90
Meridional Component



1983-90
Zonal Component



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Lamont-Doherty Geological Observatory
of Columbia University
Palisades, New York
1991

**Report of the Meteorological Station at
St. Peter and St. Paul Rocks
Part III: 1987-1990**

By

**Mark Edwards
Silvia L. Garzoli
Eli J. Katz
Miguel Macció
Anthony Martino**

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LAMONT-DOHERTY GEOLOGICAL OBSERVATORY
OF COLUMBIA UNIVERSITY
PALISADES, NEW YORK**



INTRODUCTION

This publication is Part III of a report on the meteorological data obtained at a station deployed at Saint Peter and Saint Paul Rocks. The station was established during February 1983 as part of the SEQUAL program and maintained operational as part of the Tropical Ocean Global Atmosphere (TOGA) program jointly funded by the National Science Foundation and the NOAA/TOGA Office.

In Part I, Mele *et al.* (1986) presented the data for years 1983 and 1984. In Part II, Edwards *et al.* (1988) presented the data collected during the years 1985 and 1986. The present report presents the meteorological observations obtained from 1987 through 1990.

The station was deployed at Saint Peter and Saint Paul Rocks (0°55'N 29°21'W), an outcrop of the Mid-Atlantic Ridge that offers an ideal location to measure in real time continuously mid-ocean winds. It consists of two anemometers and a pressure gauge. The characteristics of the site, as well as a technical description of the station, can be read in Garzoli *et al.* (1982) and Garzoli and Katz (1984). The methodology utilized for data reduction is explained by Mele *et al.* (1986) and Edwards *et al.* (1988).

In this report data collected with the anemometers (wind data) and the atmospheric pressure sensor are presented. As it was described in Part II, the pressure transducer has a drift that appears to be linear with time. This was valid until the beginning of 1989 when the pressure sensor deteriorated and an amplification of the wave amplitude appears. After that date, it was not possible to correct the values and therefore they are not included in this report. For data from the beginning of the records to the end of 1988, the drift was estimated by a simple linear regression to be 6×10^{-3} millibars/day (0.18 millibars/month). In order to correct the data for the instrument drift, this value was added cumulatively to every hour of data.

As for the previous years, only data from one of the wind sensors was fully processed since there is little variation between the two data sets. Data from the other sensor was used to verify and validate what could have been anomalous in the register. Cassette data were used when available to fill gaps in the satellite transmission. When there were no cassette records to correct gaps or the data were obviously spurious, one of two methods was employed to fill in the gaps in the time series of less than 5 days. A linear interpolation was performed if only one or two hours were missing. For longer periods of missing data, values 24 hours before and 24 hours after were used for interpolation purposes to better simulate the diurnal variations.

Part III of the data report follows the format of Parts I and II. The data are presented in four parts, each one corresponding to the years of 1987, 1988, 1989 and 1990, respectively. The oceanographic convention is used to present the wind observations. All figures are hourly values with the exception of the stick plots which are daily averaged data. Each part consists of five yearly figures: a stick plot of velocity (meters/sec) and time series of the pressure (millibars), velocity (meters/sec), north/south and east/west components (meters/sec). Each yearly figure is followed by twelve sets of four plots of the same variables (pressure, velocity, and wind components). In the monthly figures, the left end of the horizontal axis represents the first day of the month, and the right end represents the first day of the following one. Furthermore, a table that shows the monthly values as well as the standard deviation is given at the end of each year. Finally, the complete data for the years 1983 through the end of 1990 is presented in a combined figure. Please note that the scale of the four-year stick plot of velocity is different from the others.

Acknowledgements

We are indebted to the Brazilian government for continuously granting permission to maintain the station in their territory. The authors are indebted to all the crew members of the scientific cruises from which the maintenance and repairs of the station were performed during this period. We also thank Susan Brower for her collaboration in the preparation of the report. The meteorological station at Saint Peter and Saint Paul Rocks is still operational. The data was collected, and this data report was prepared, under NSF Grants OCE-84-15319, OCE-89-15926 and NA89AA-D-AC067

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Garzoli, S., E. Katz, H. Panitz, P. Speth (1982). " In Situ Wind Measurements in the Equatorial Atlantic During 1979". *Oceanol. Acta*. Vol, 5, No. 3.

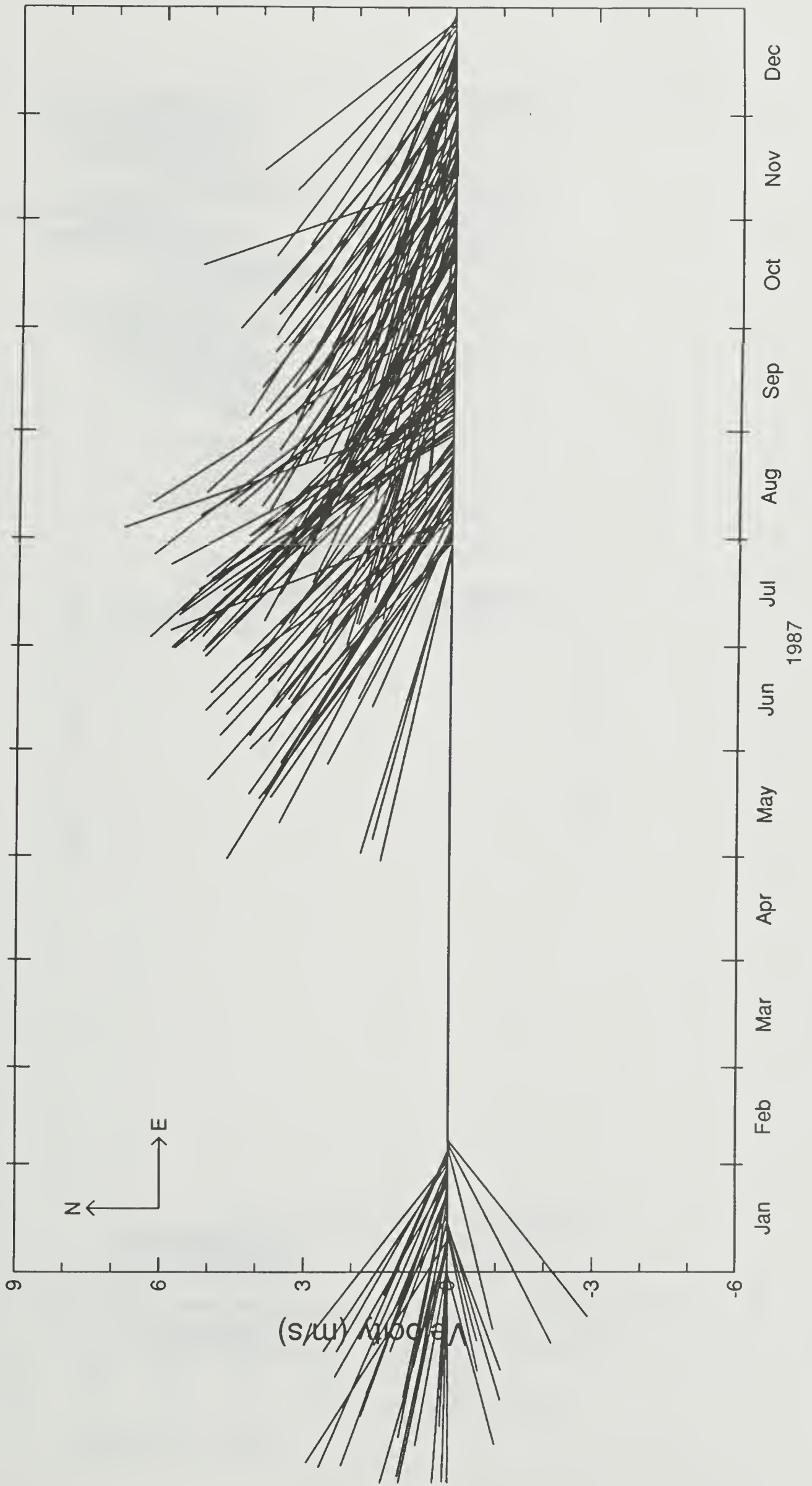
Garzoli, S., and E.J. Katz (1984). Winds at Saint Peter and Saint Paul Rocks During the First SEQUAL Year. *Geophysical Research Letters*, Vol. 11, 8, pp. 715-718.

1987

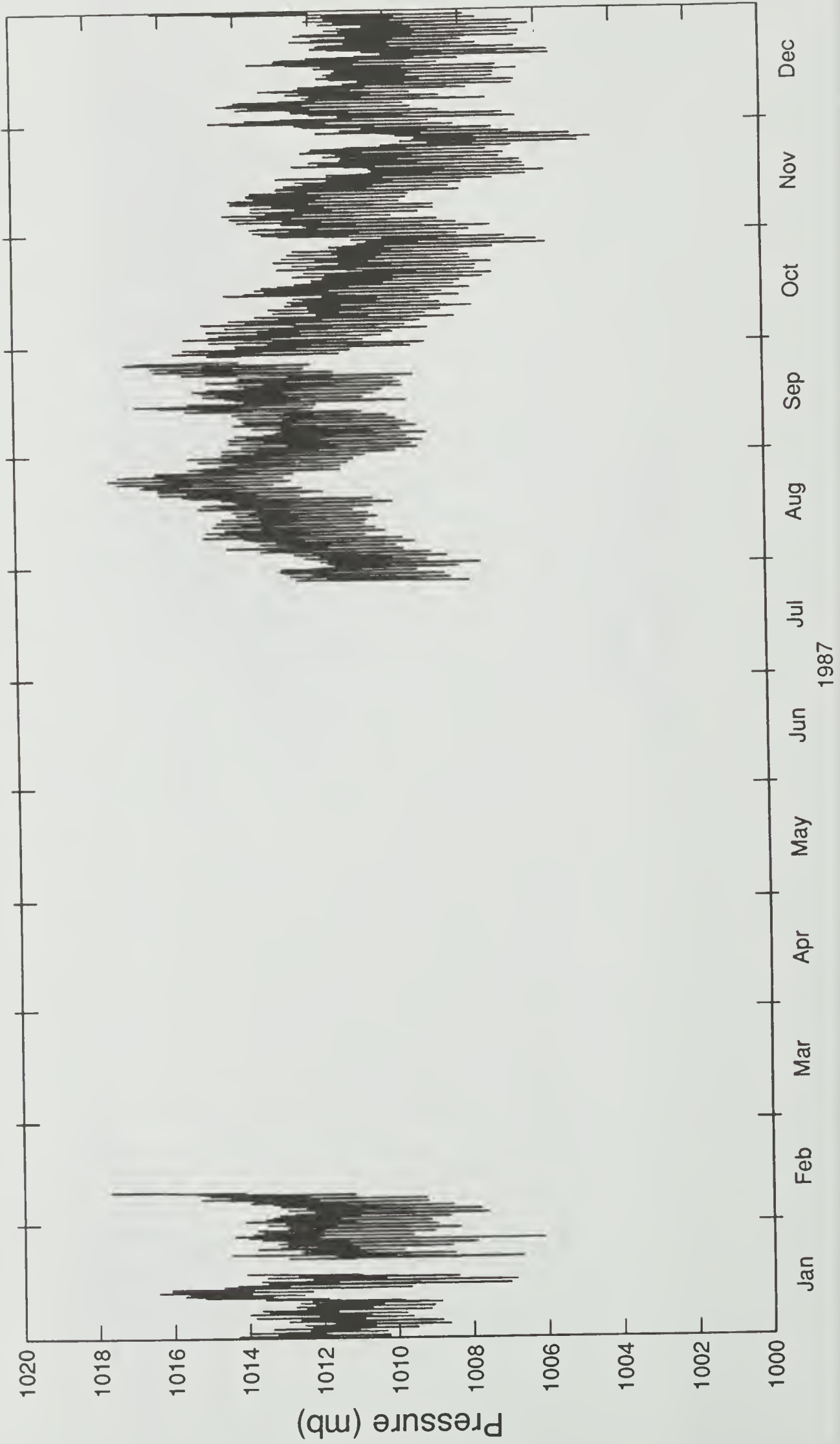
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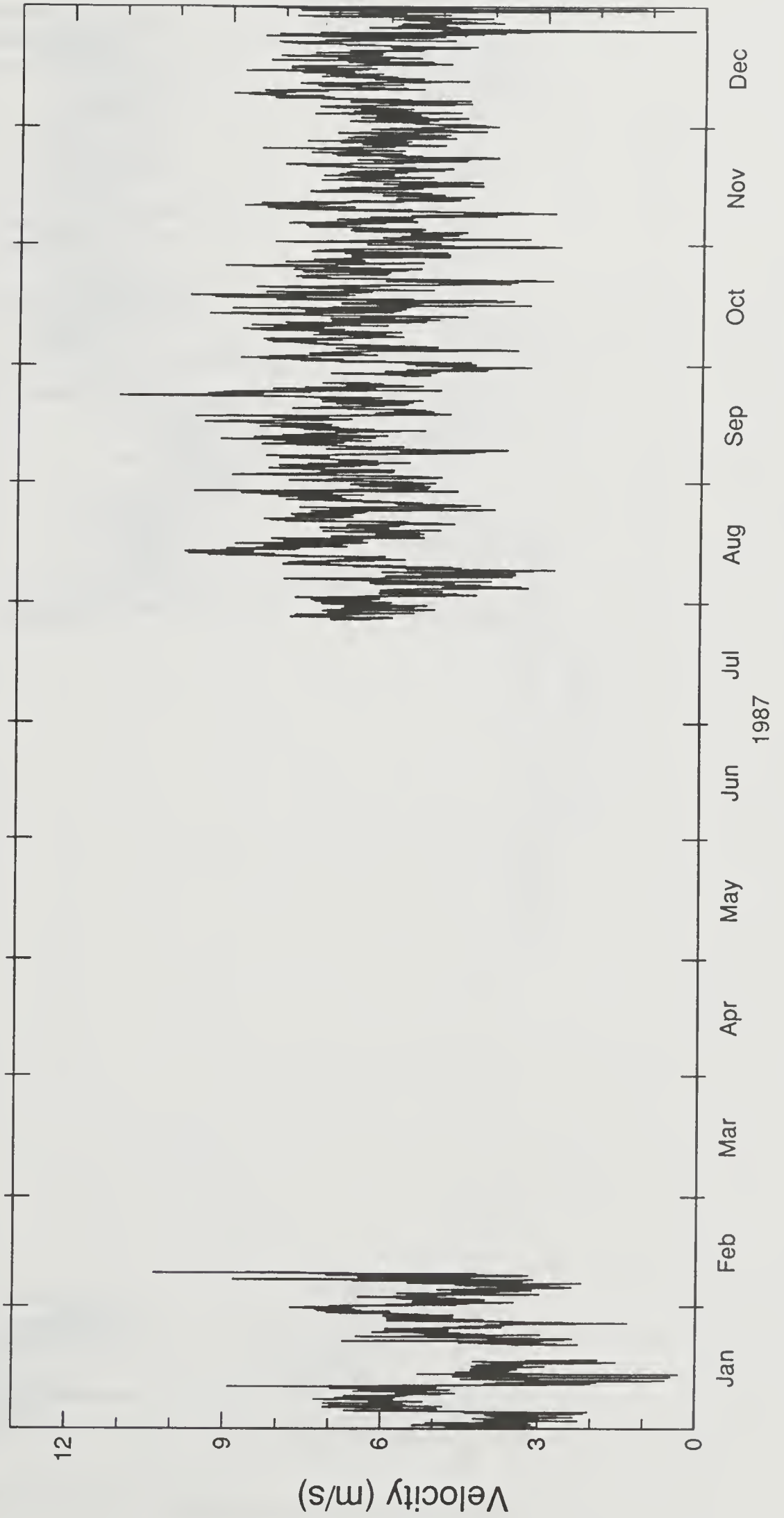
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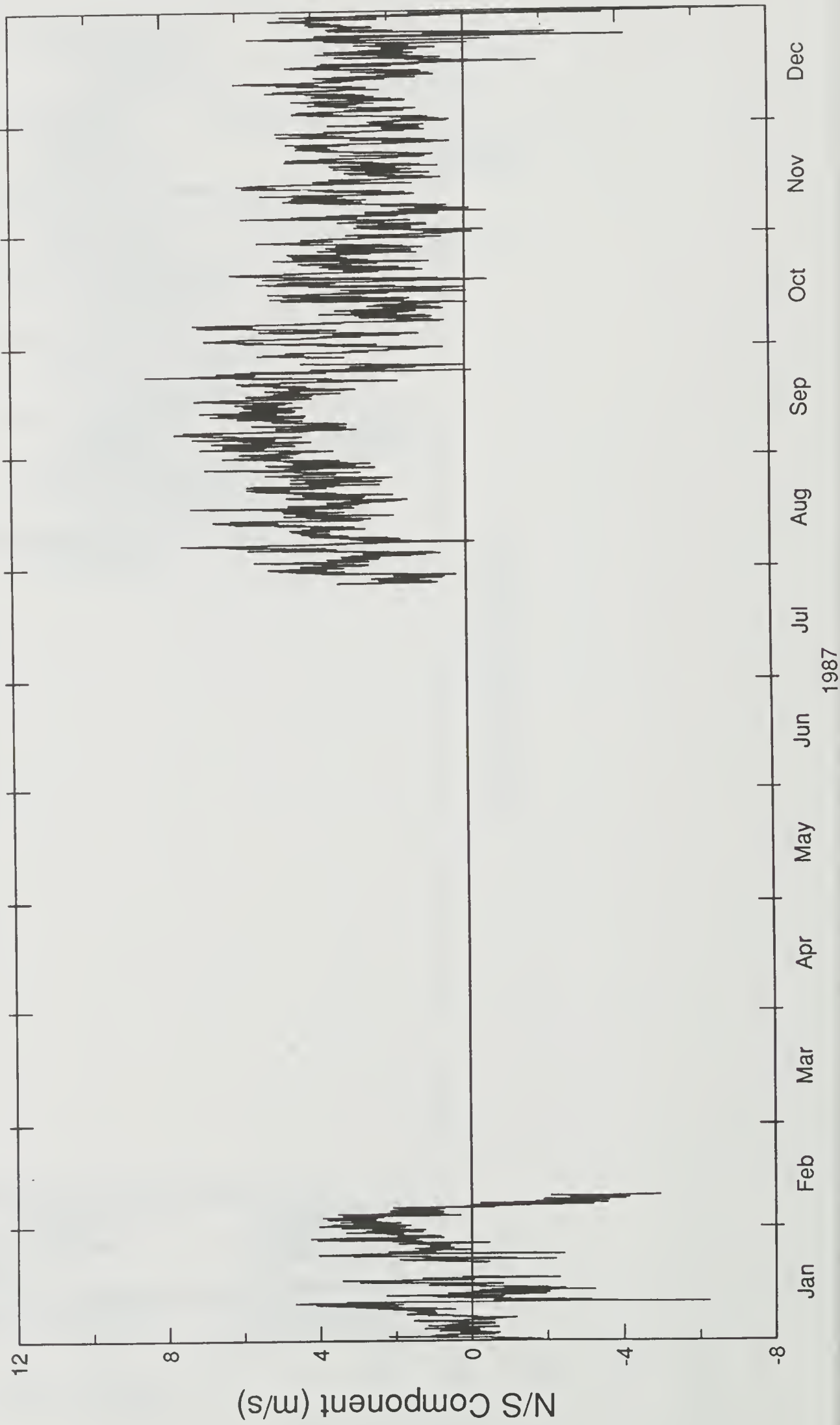
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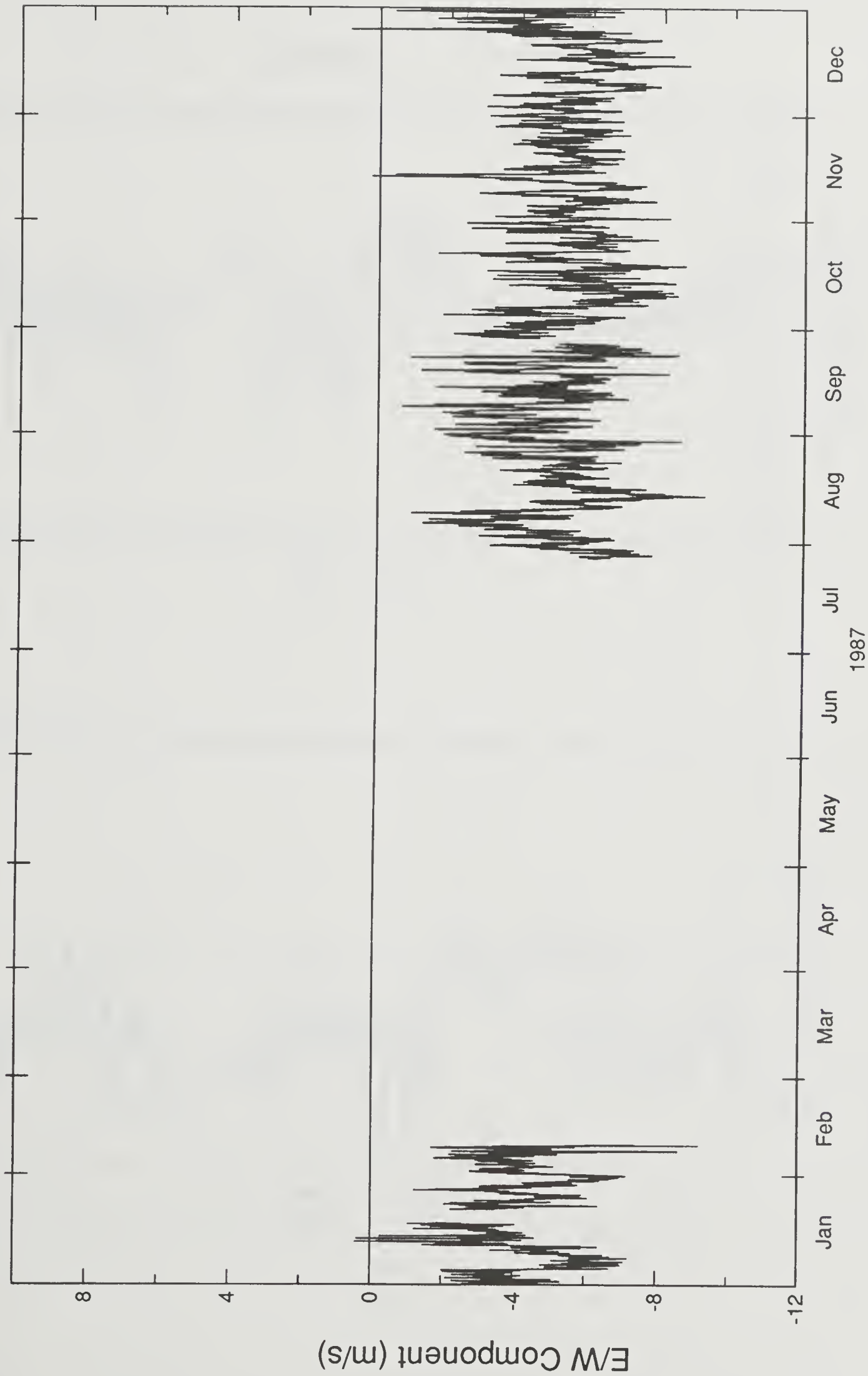
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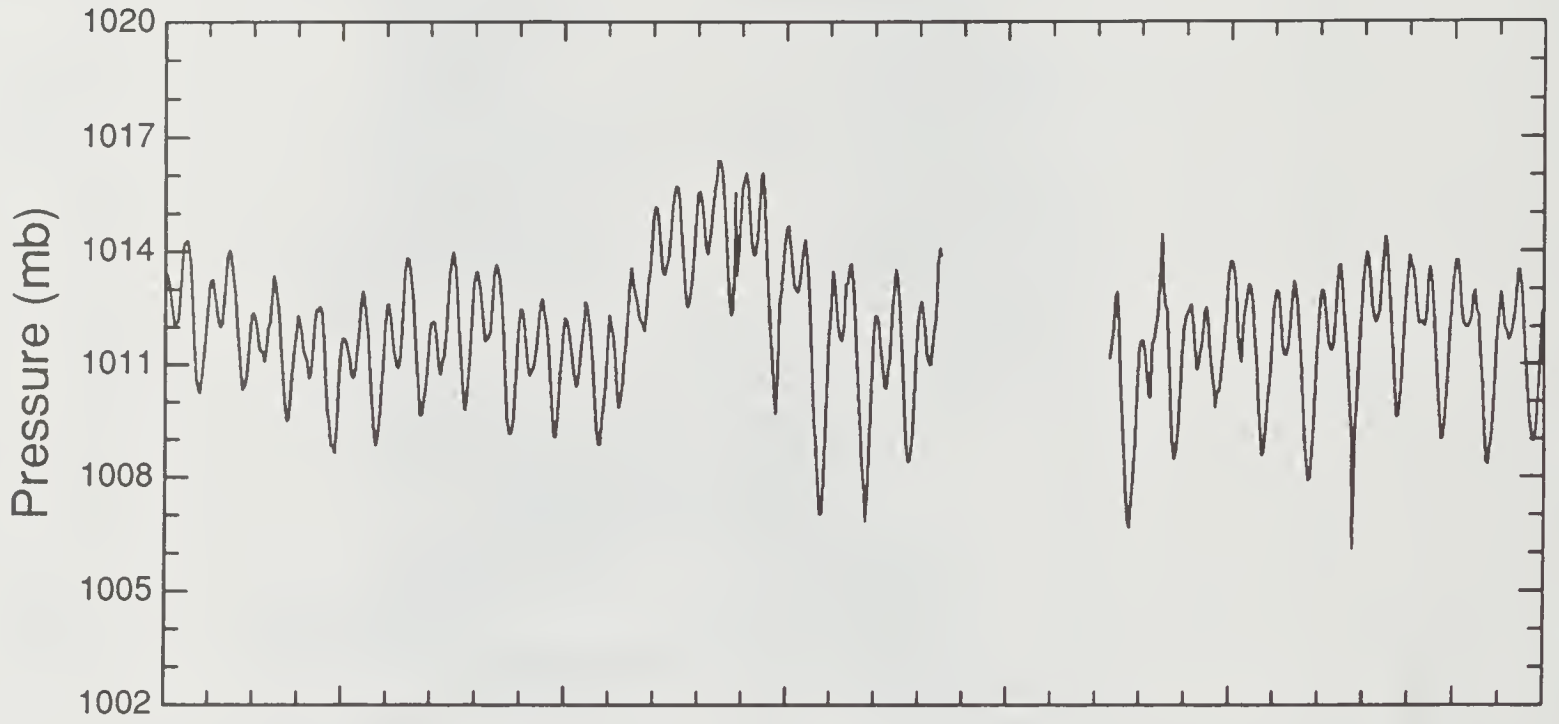
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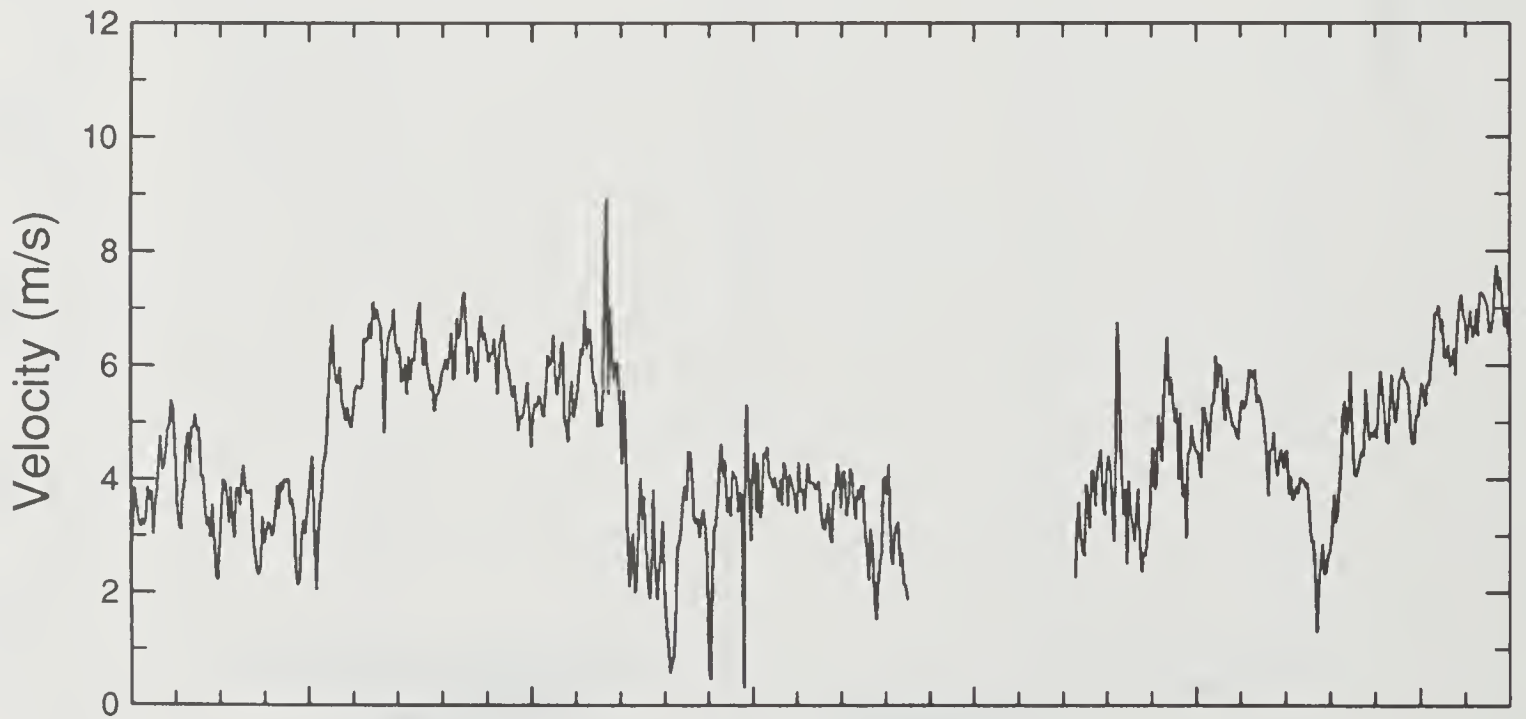
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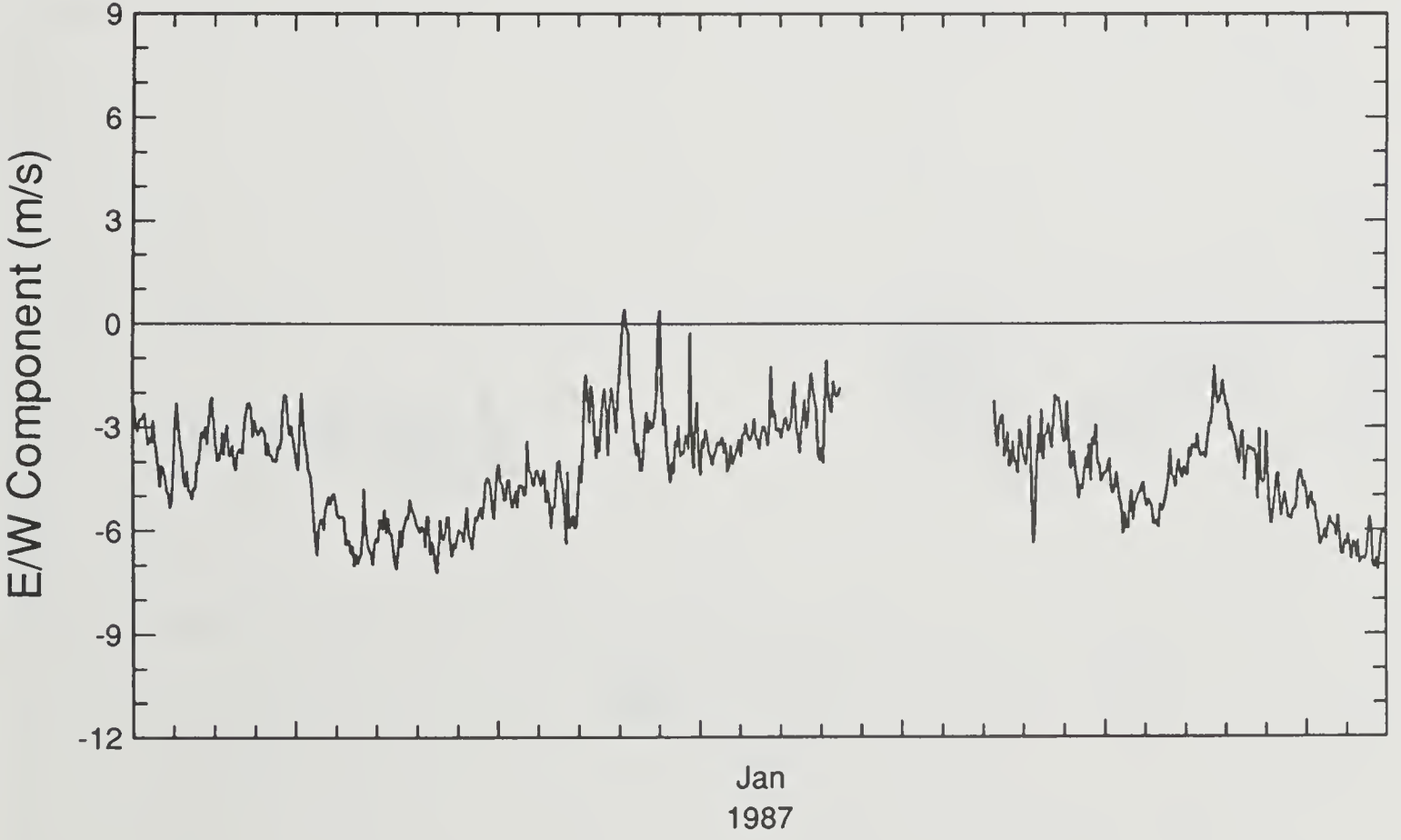
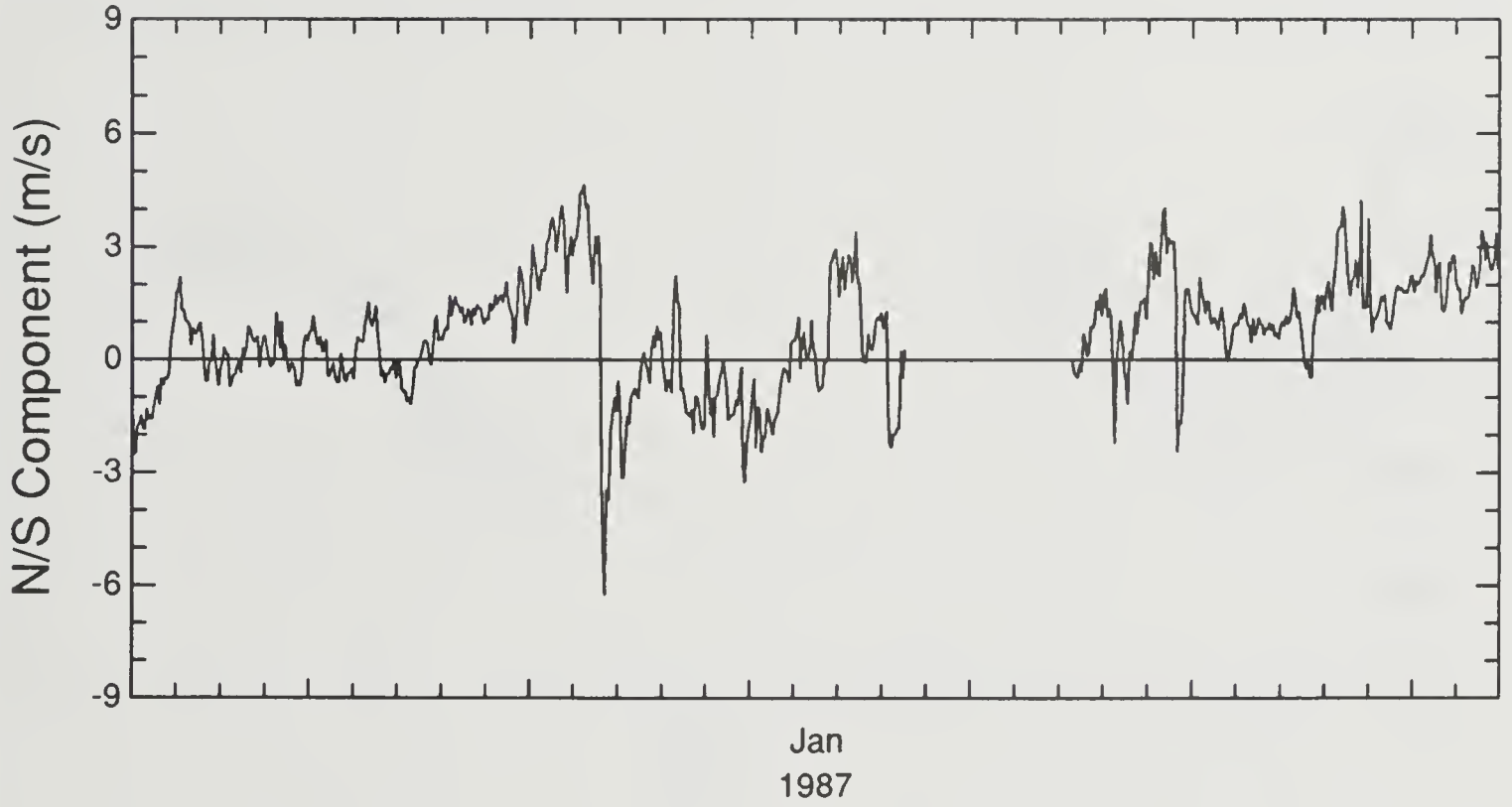
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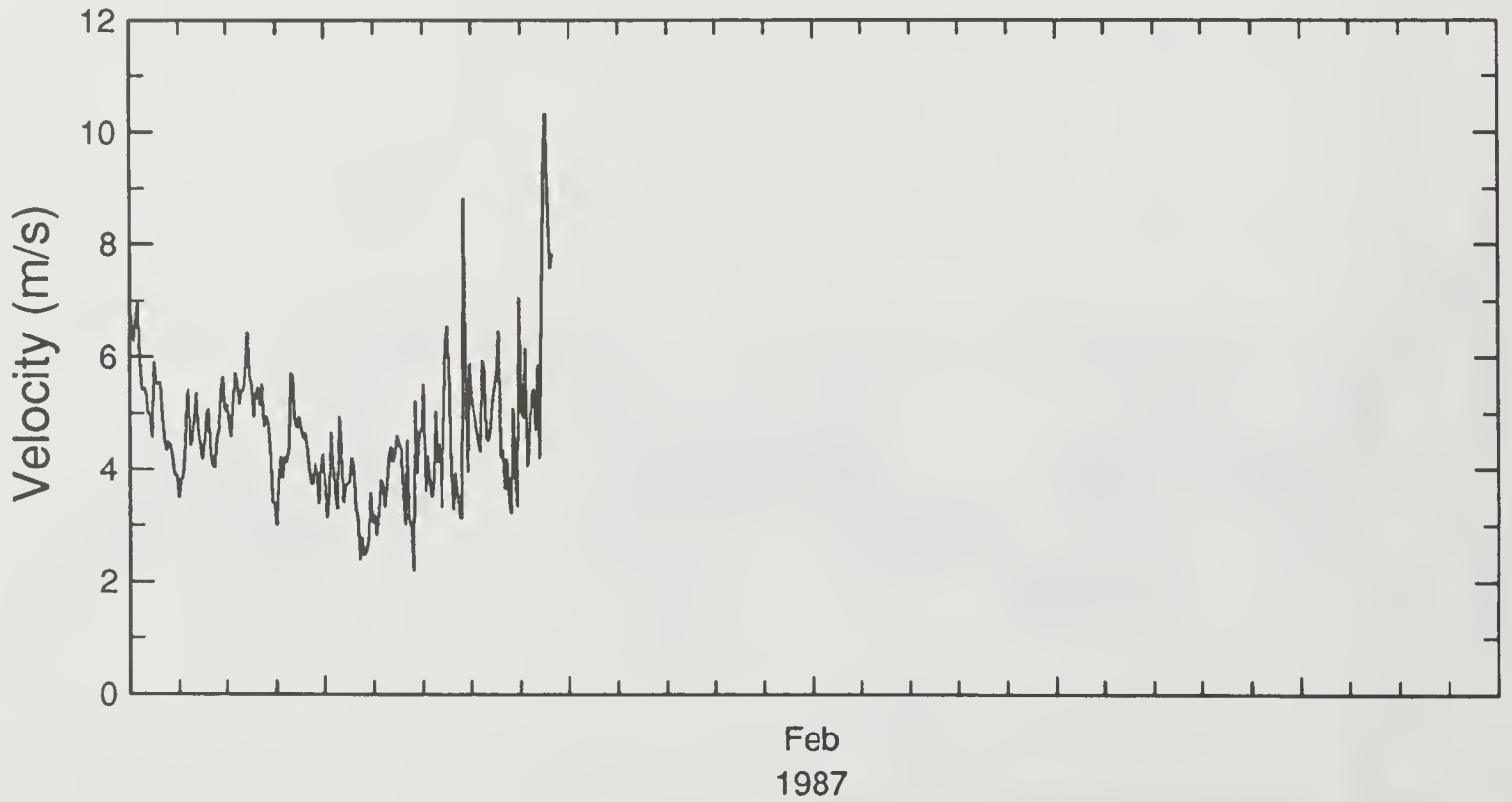
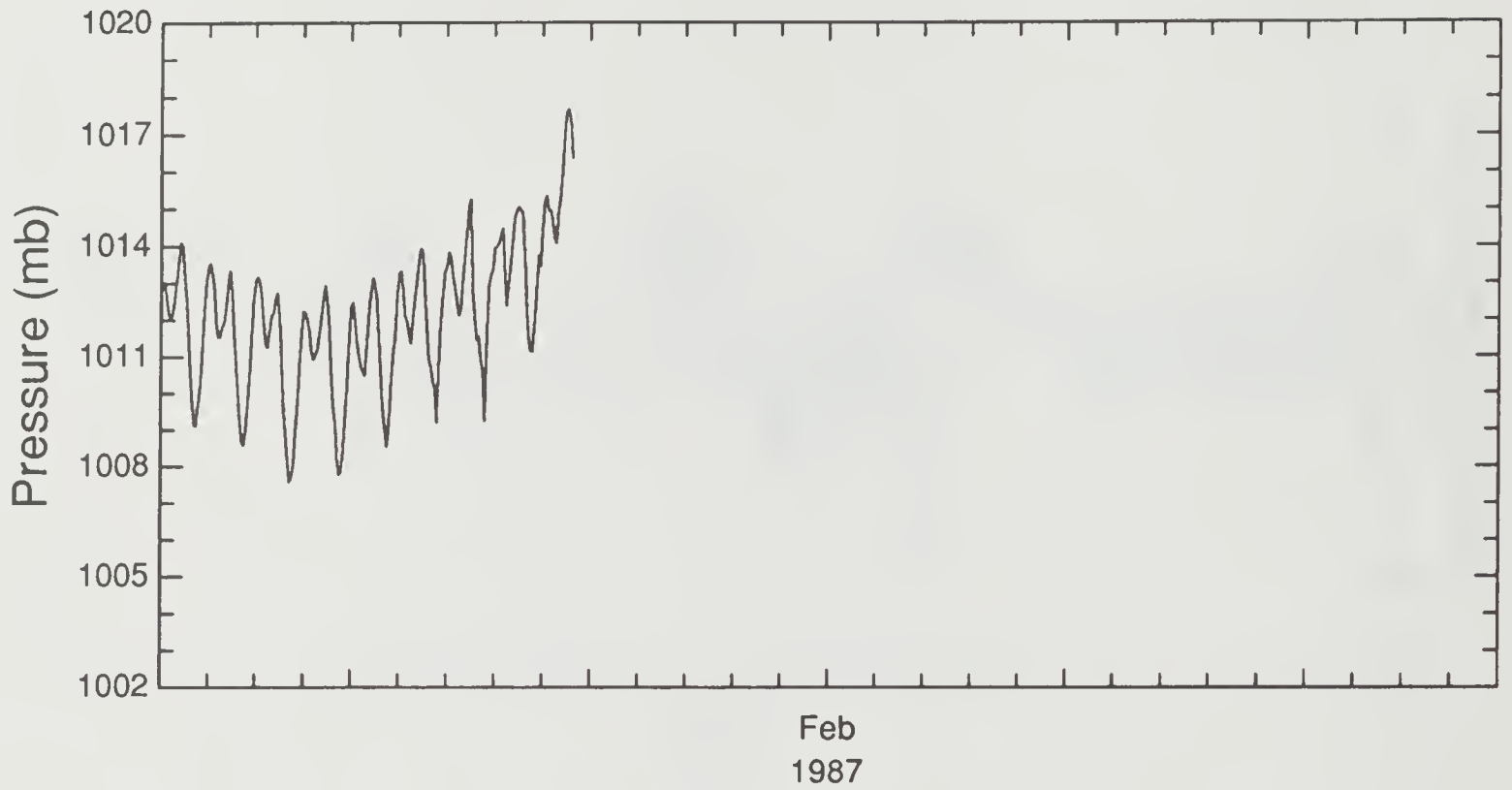
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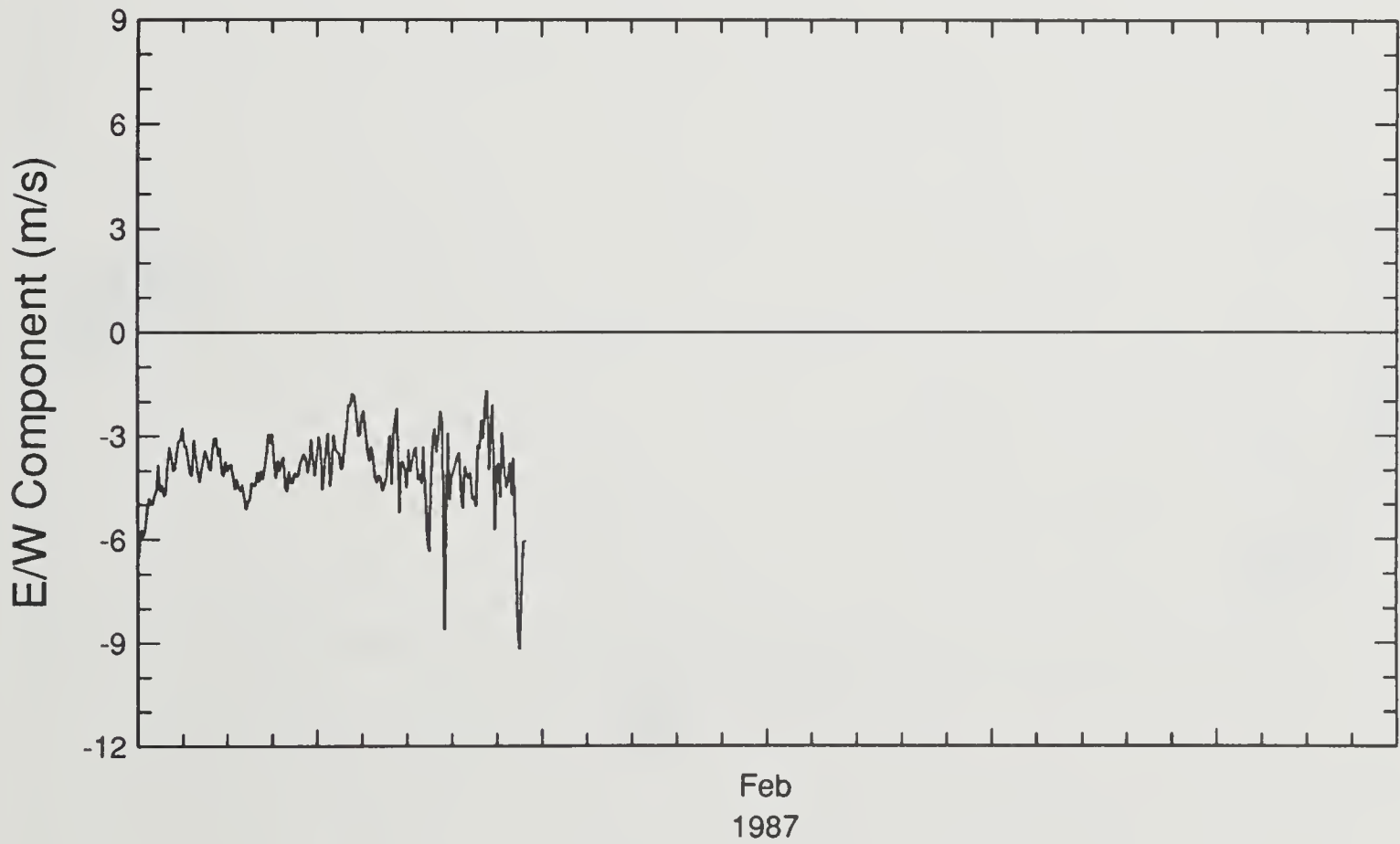
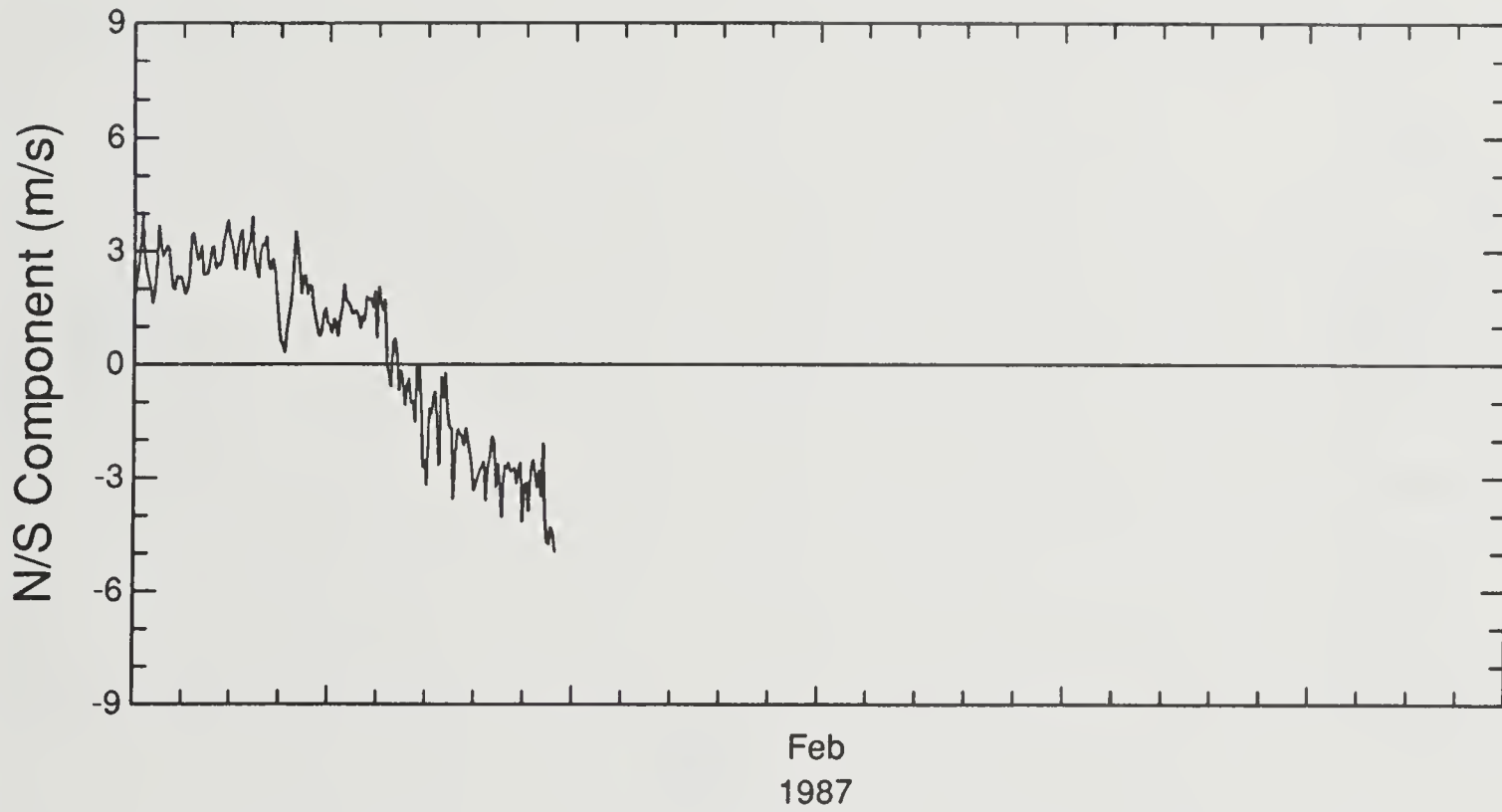


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February





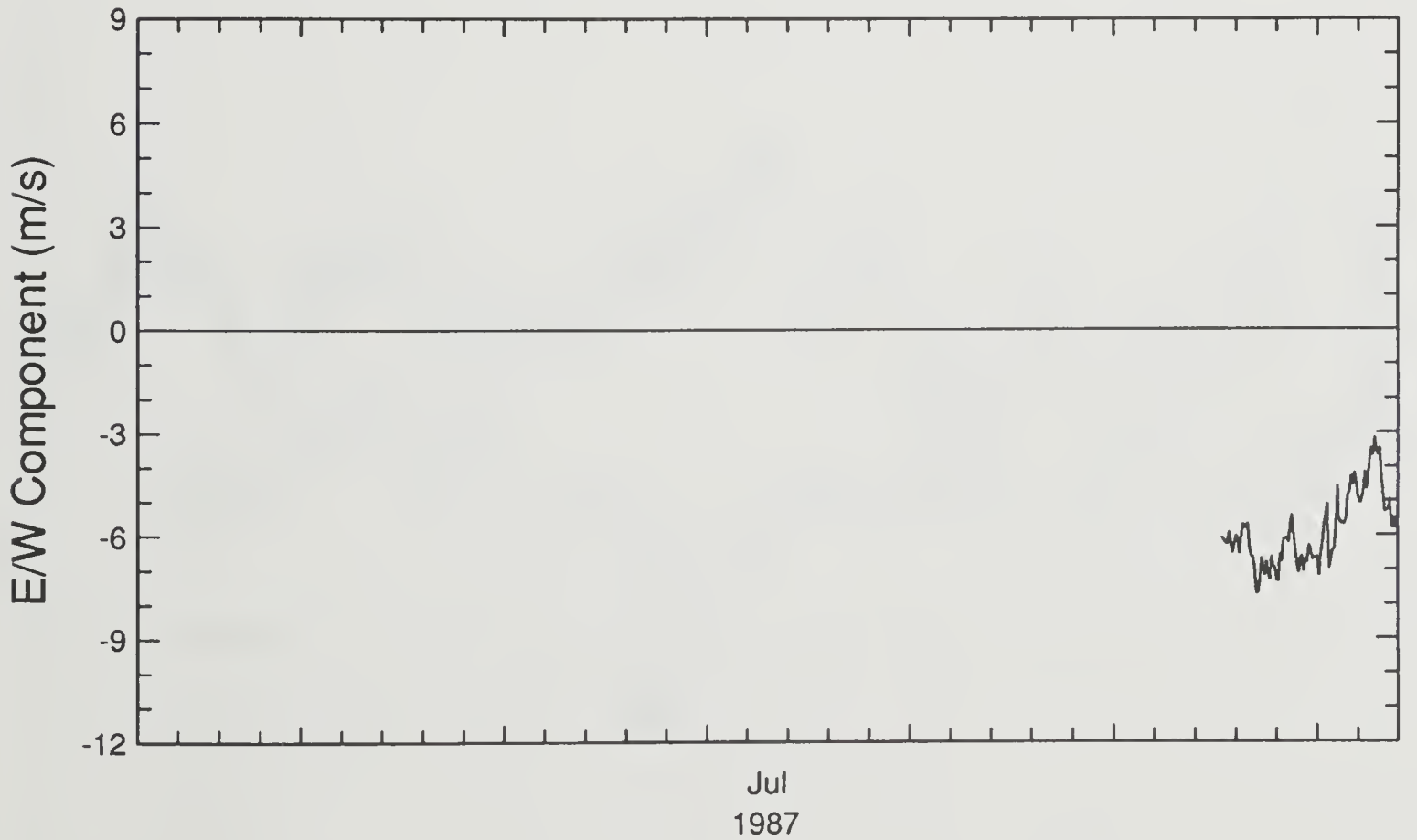
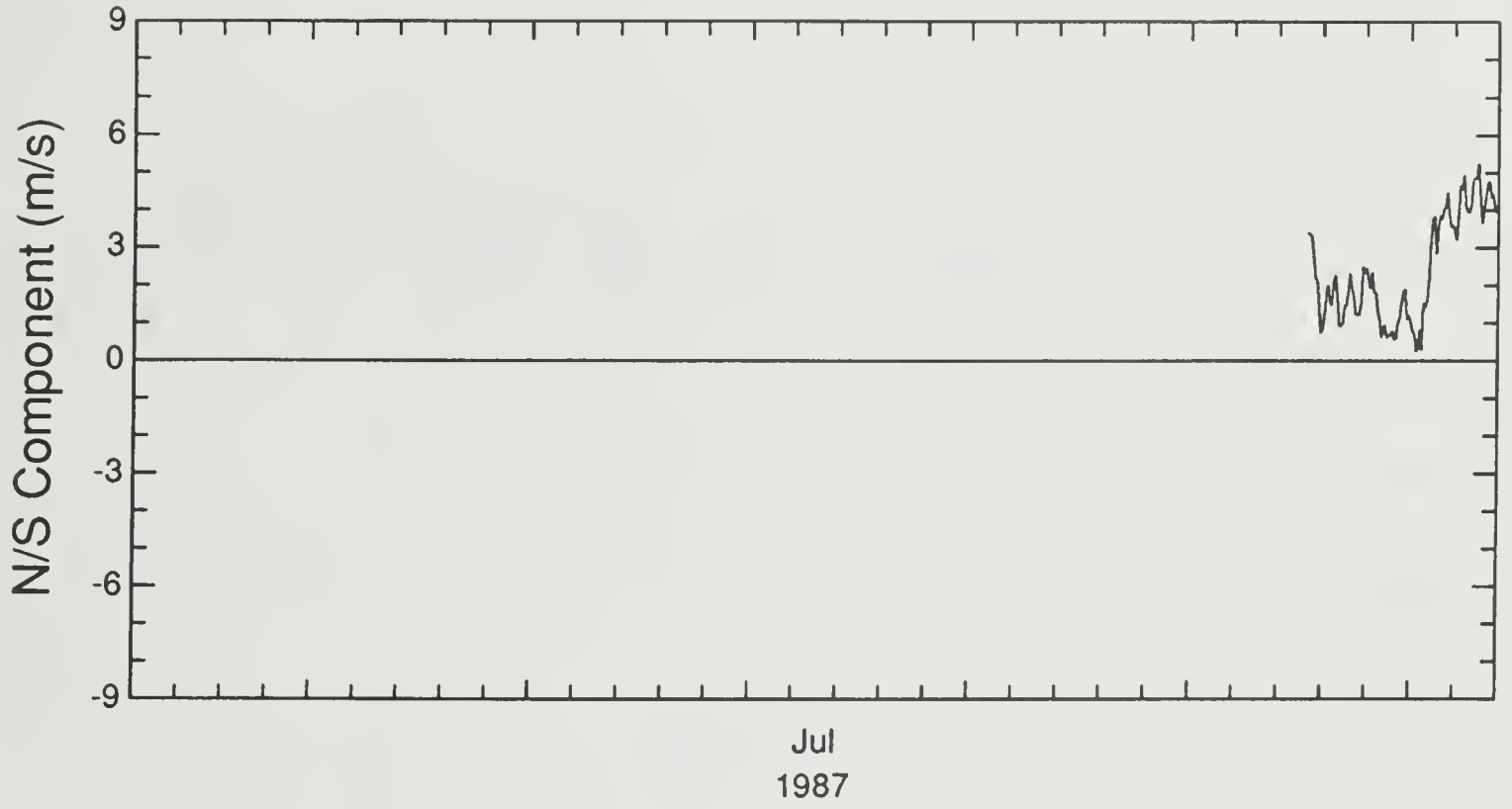
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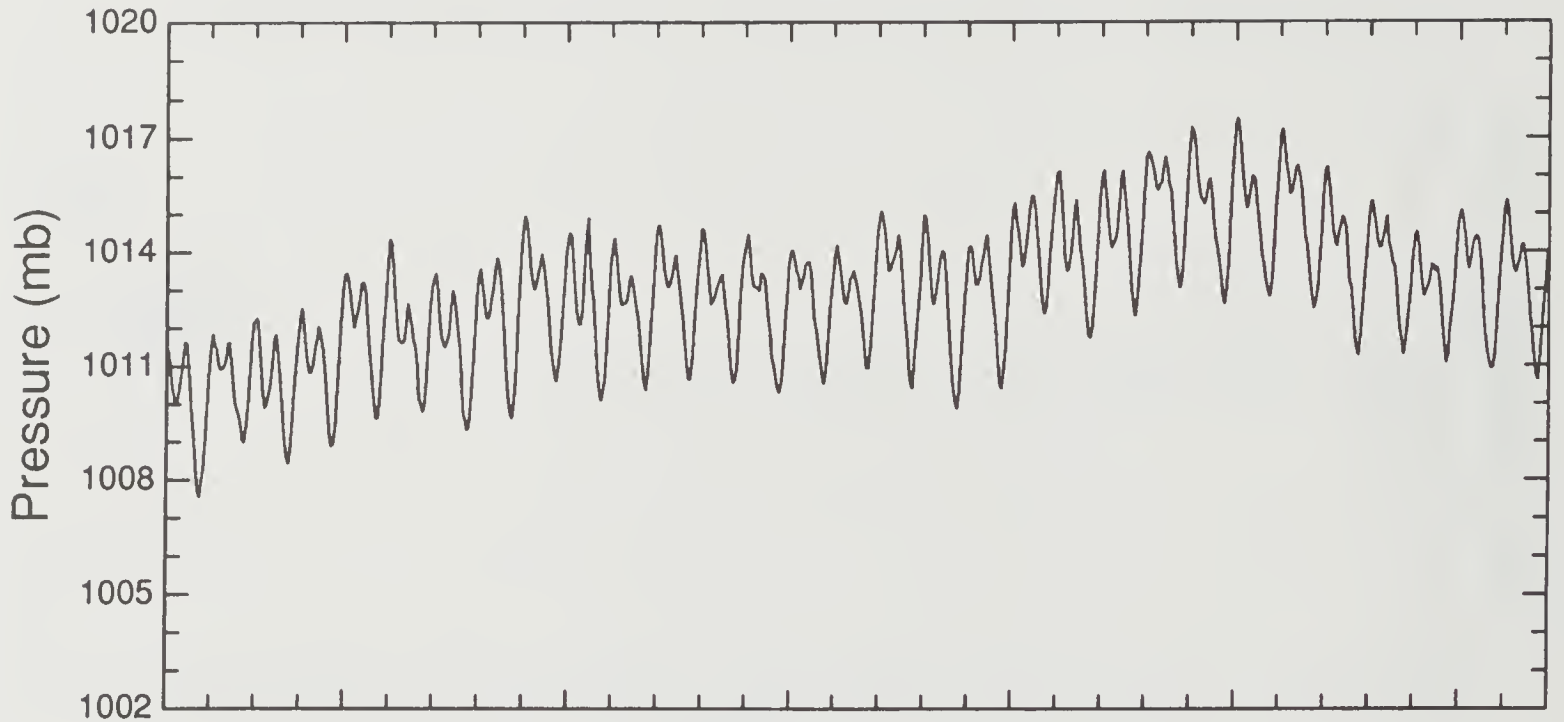
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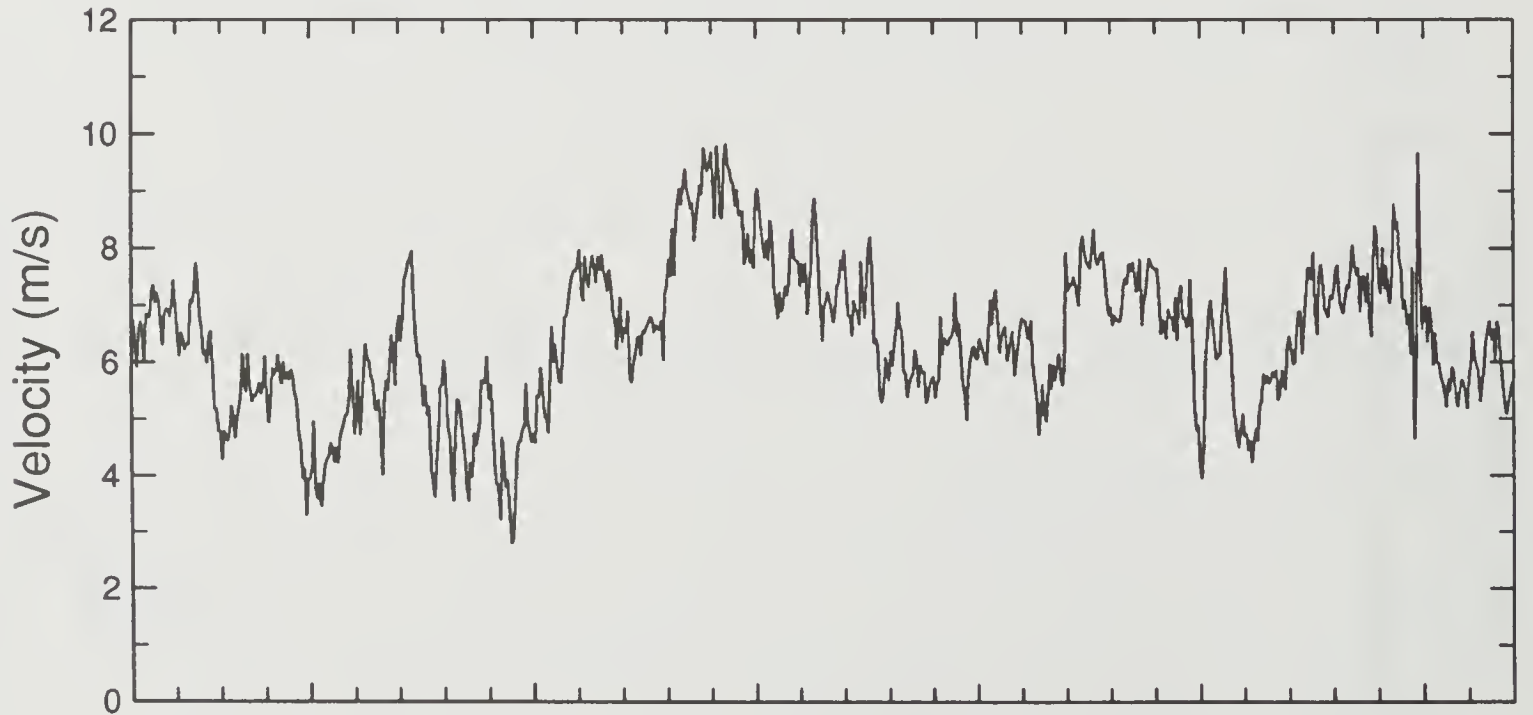
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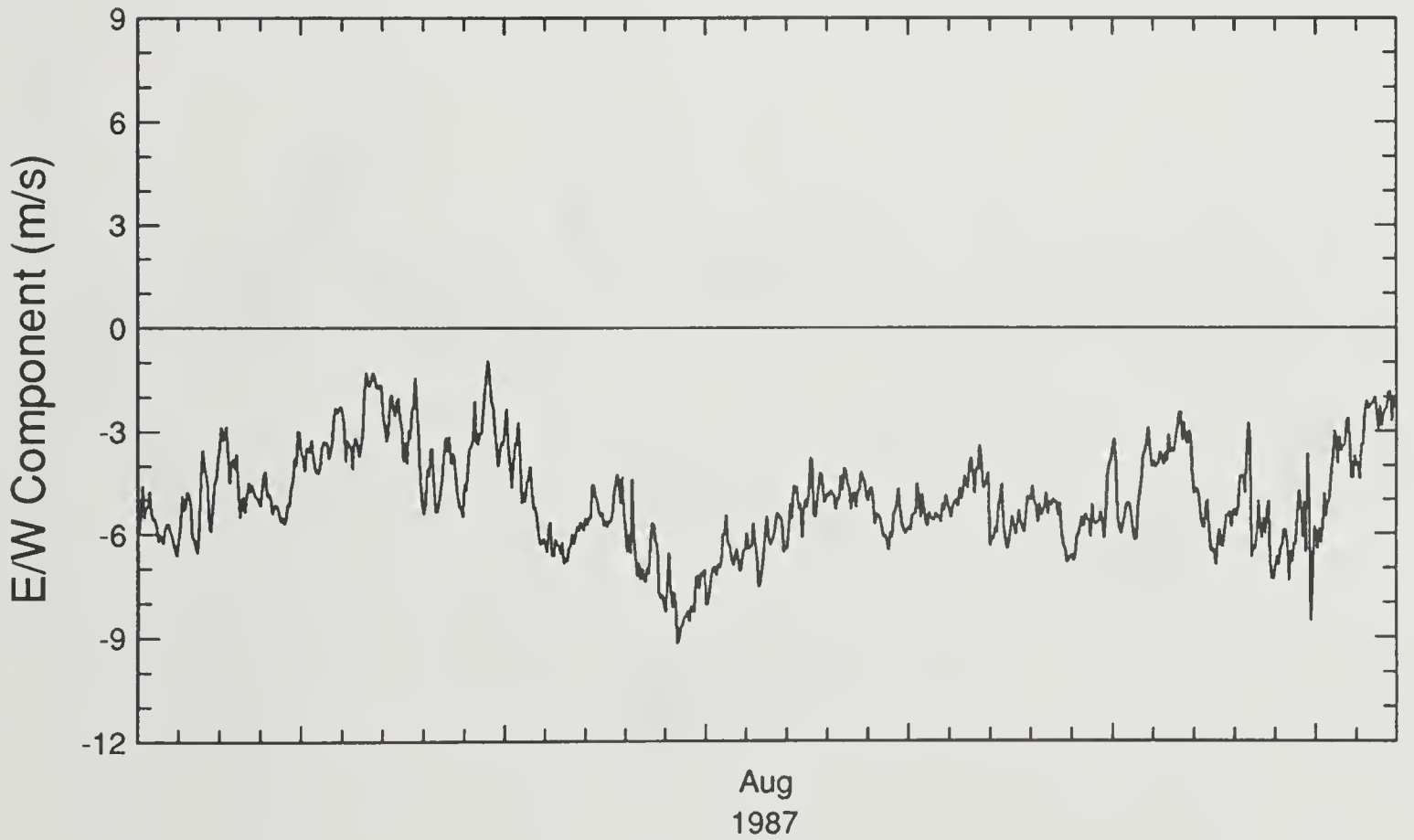
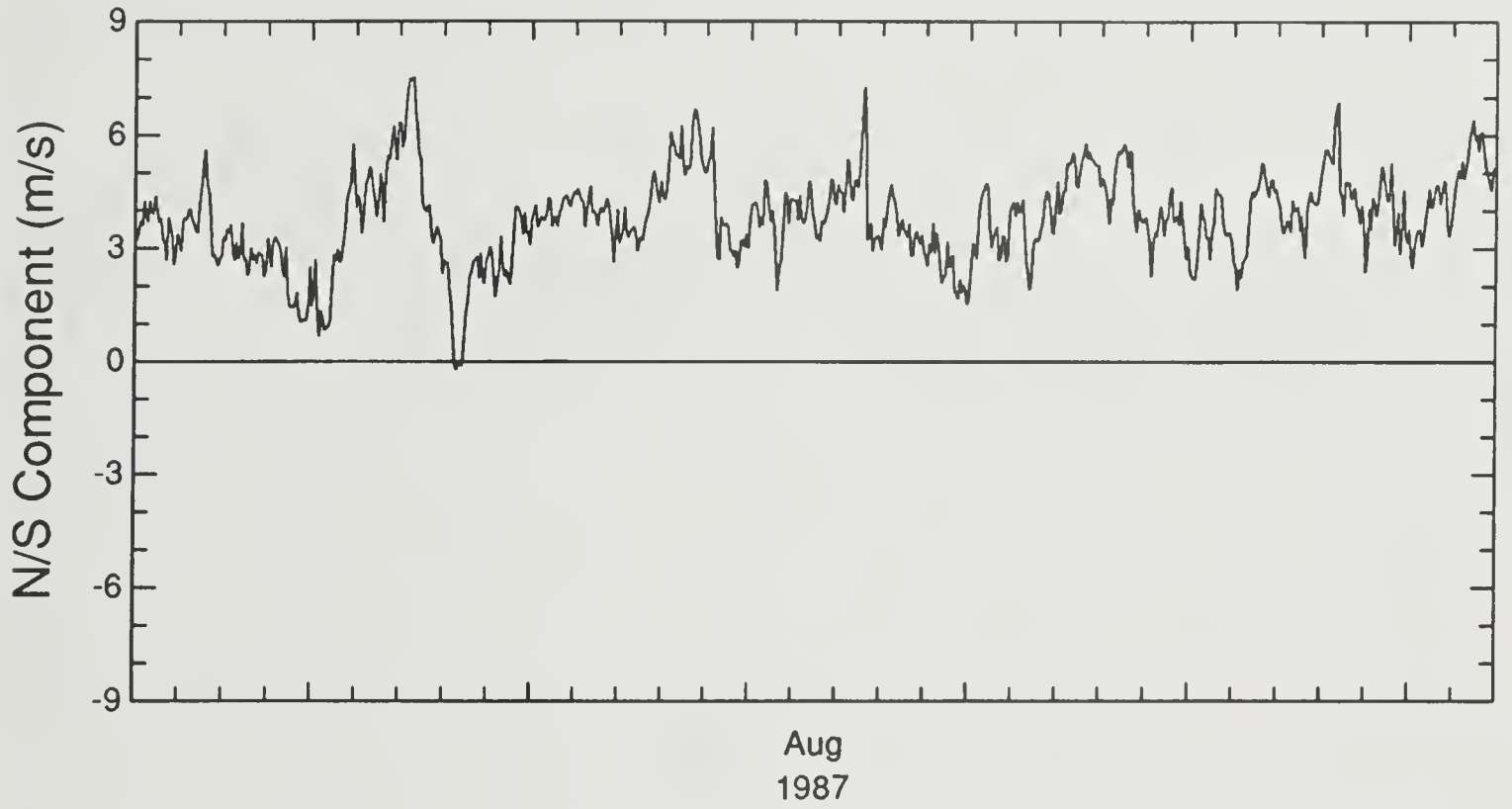
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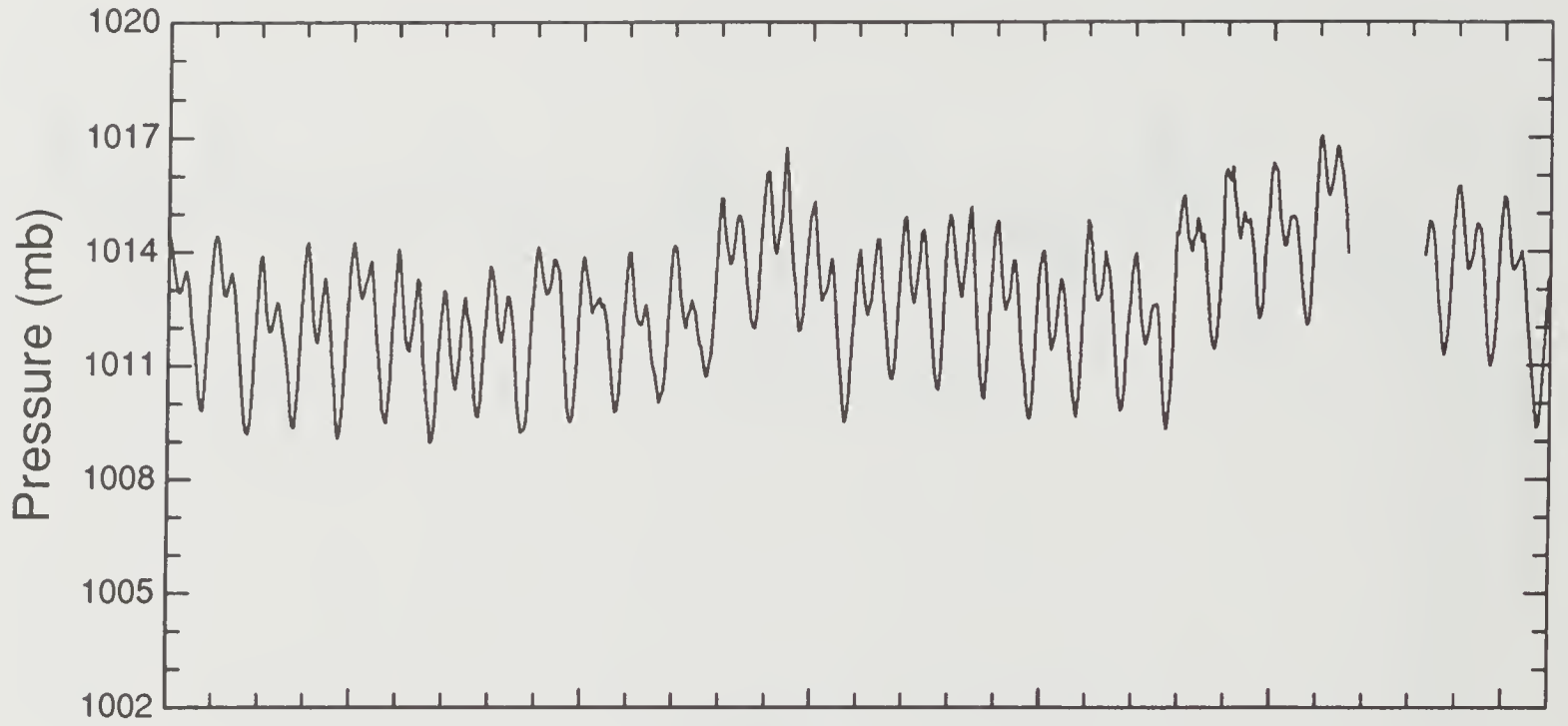
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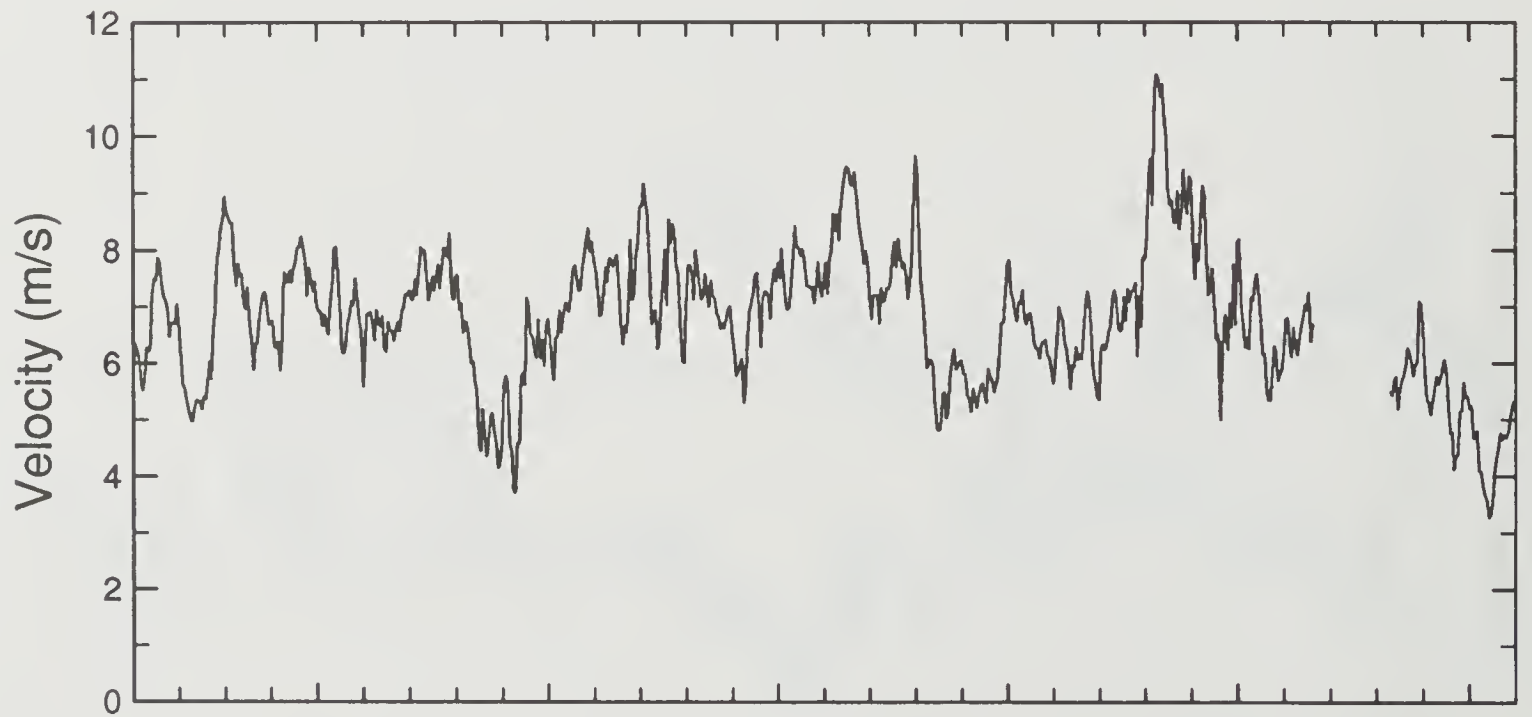
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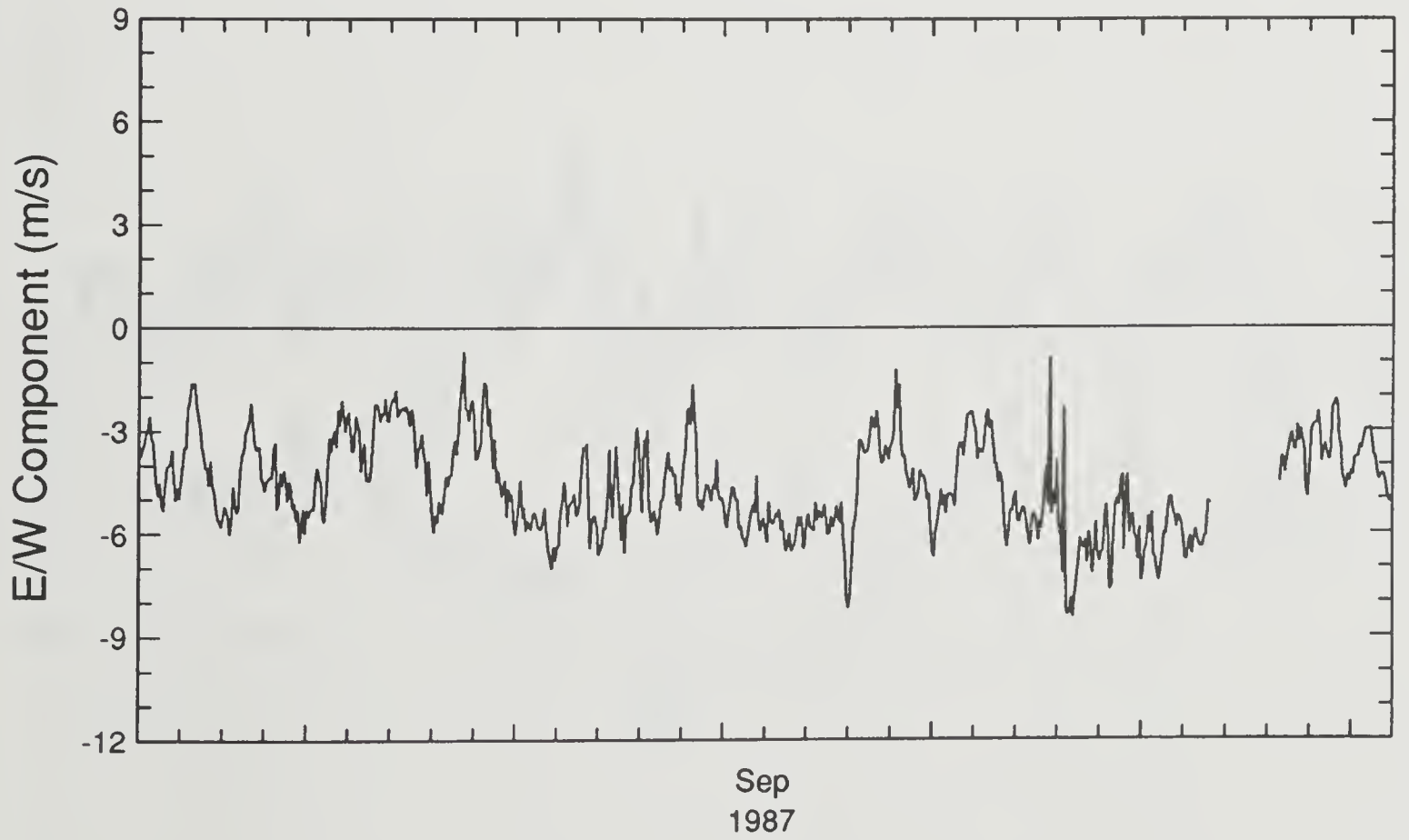
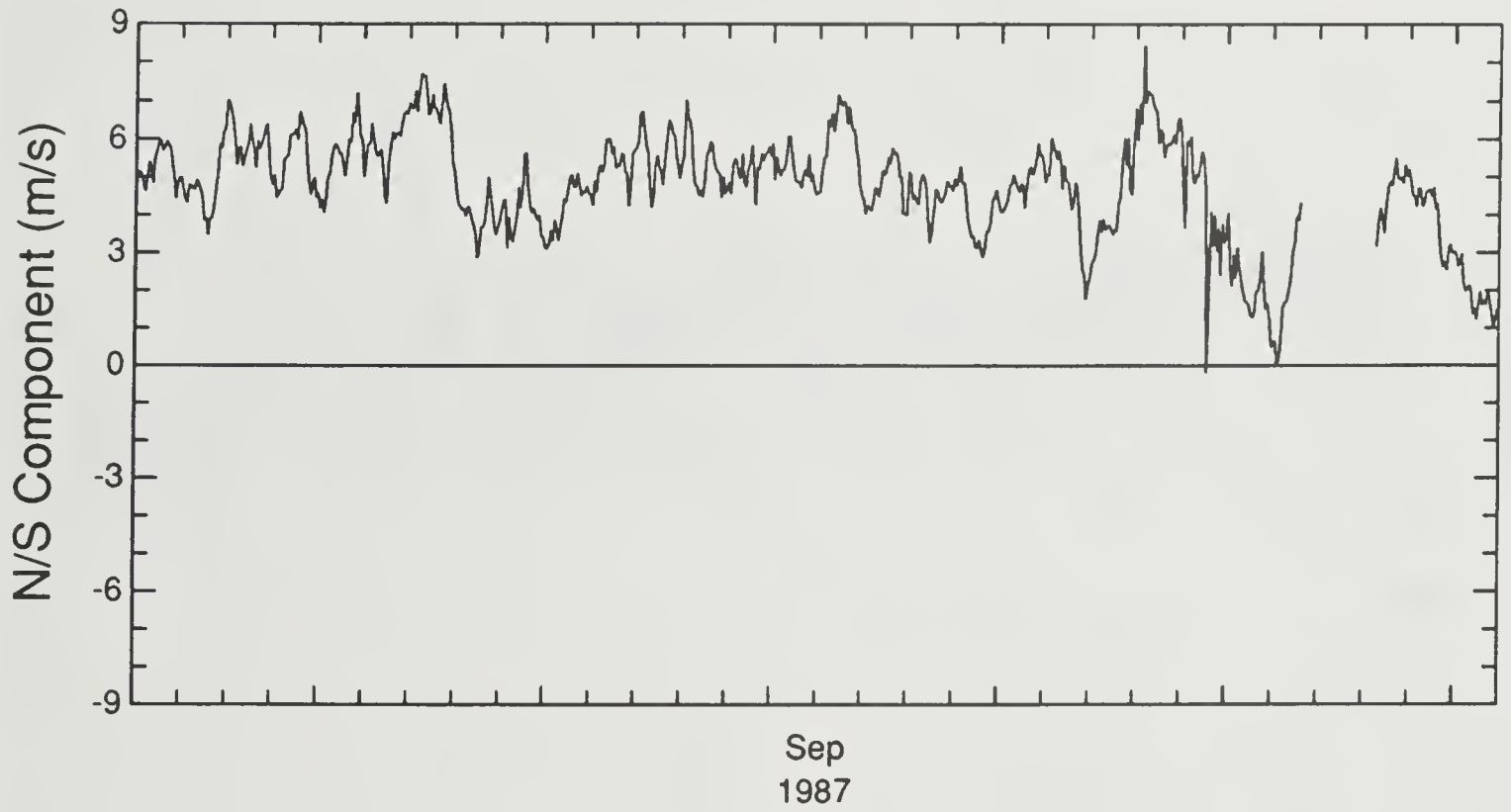
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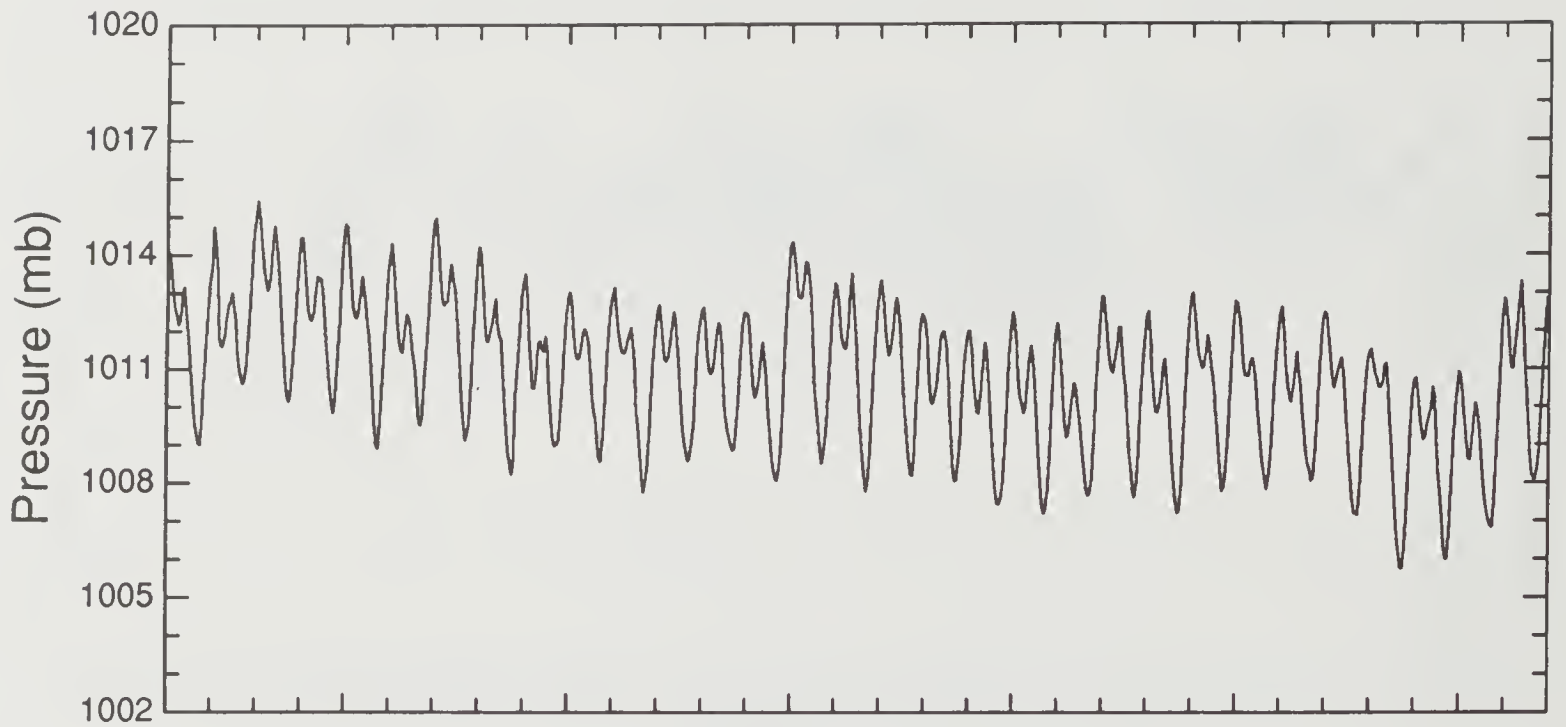
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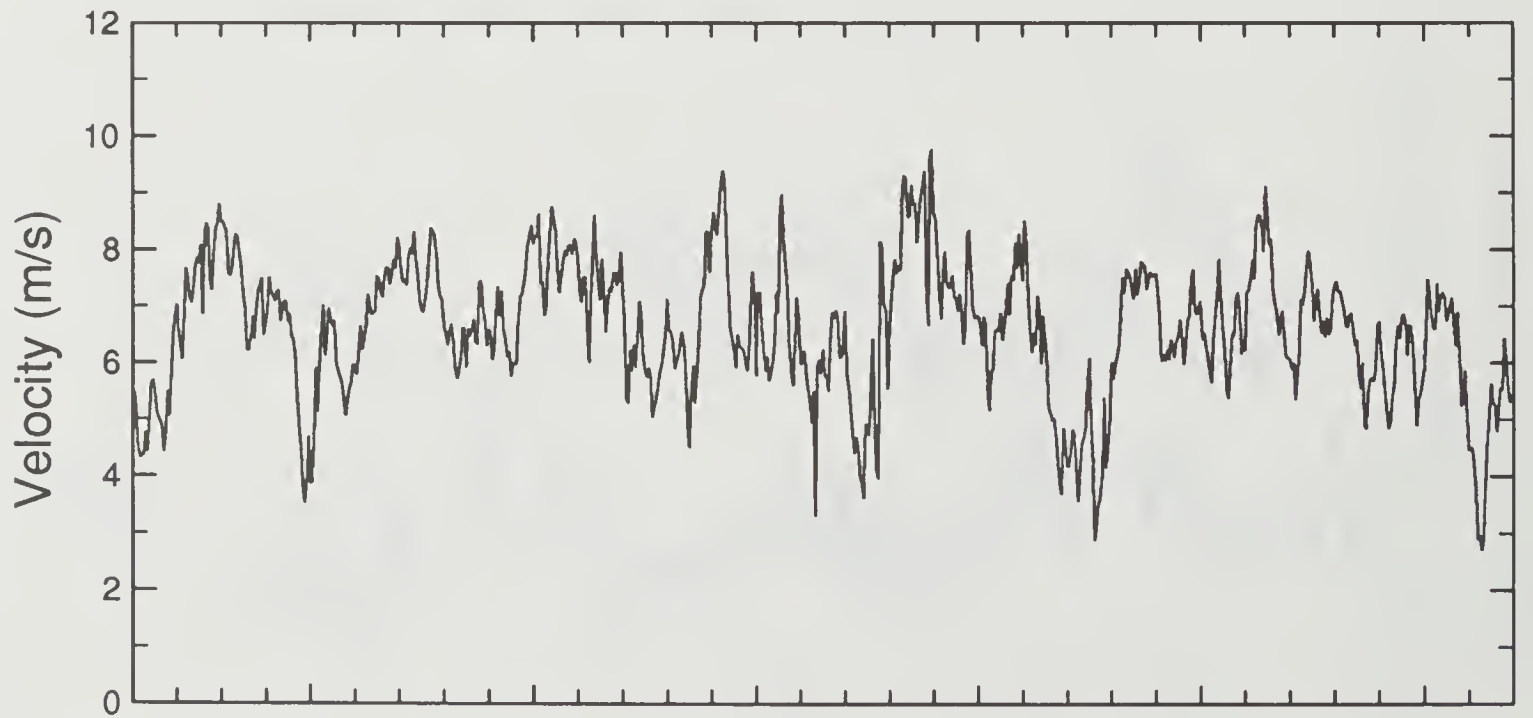
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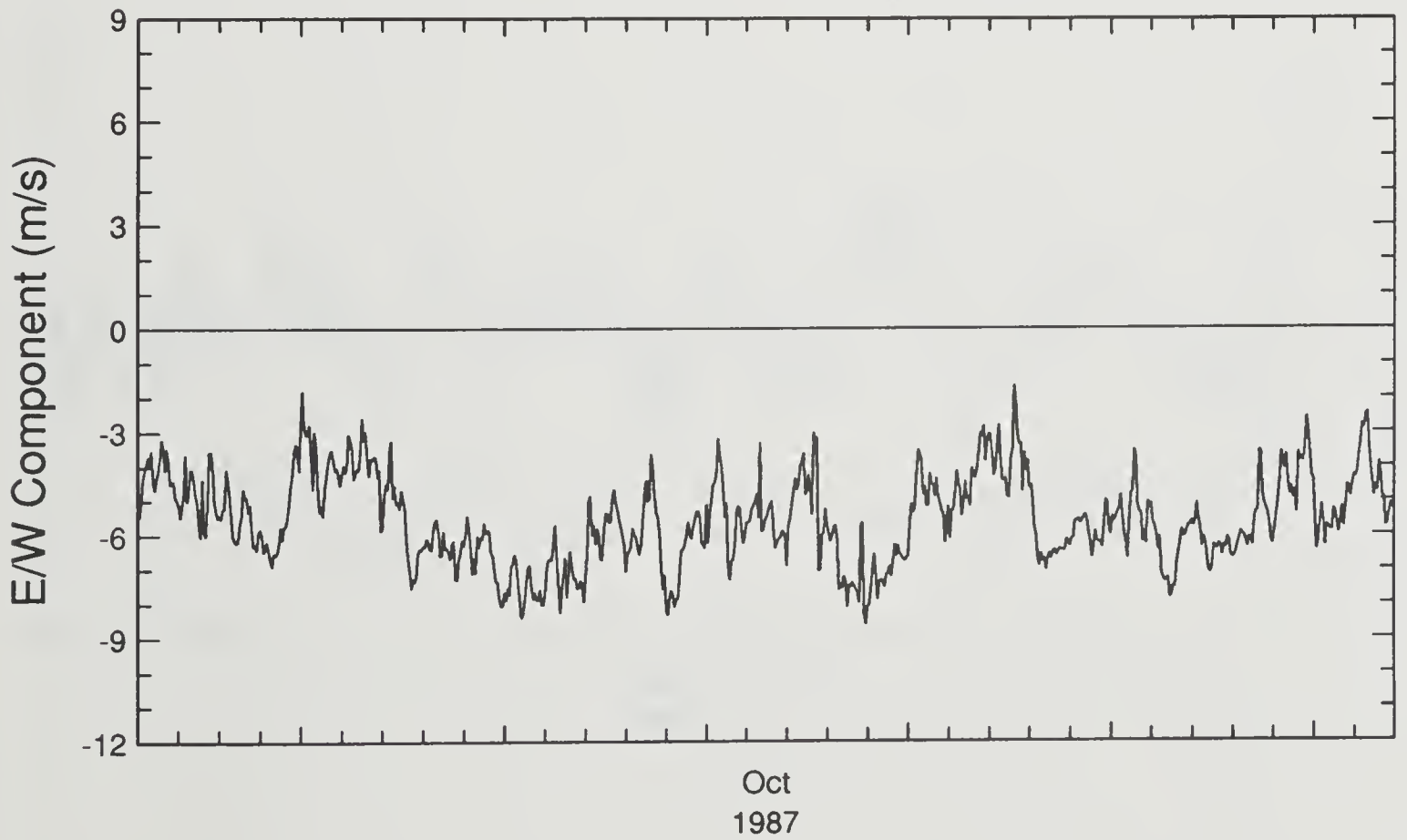
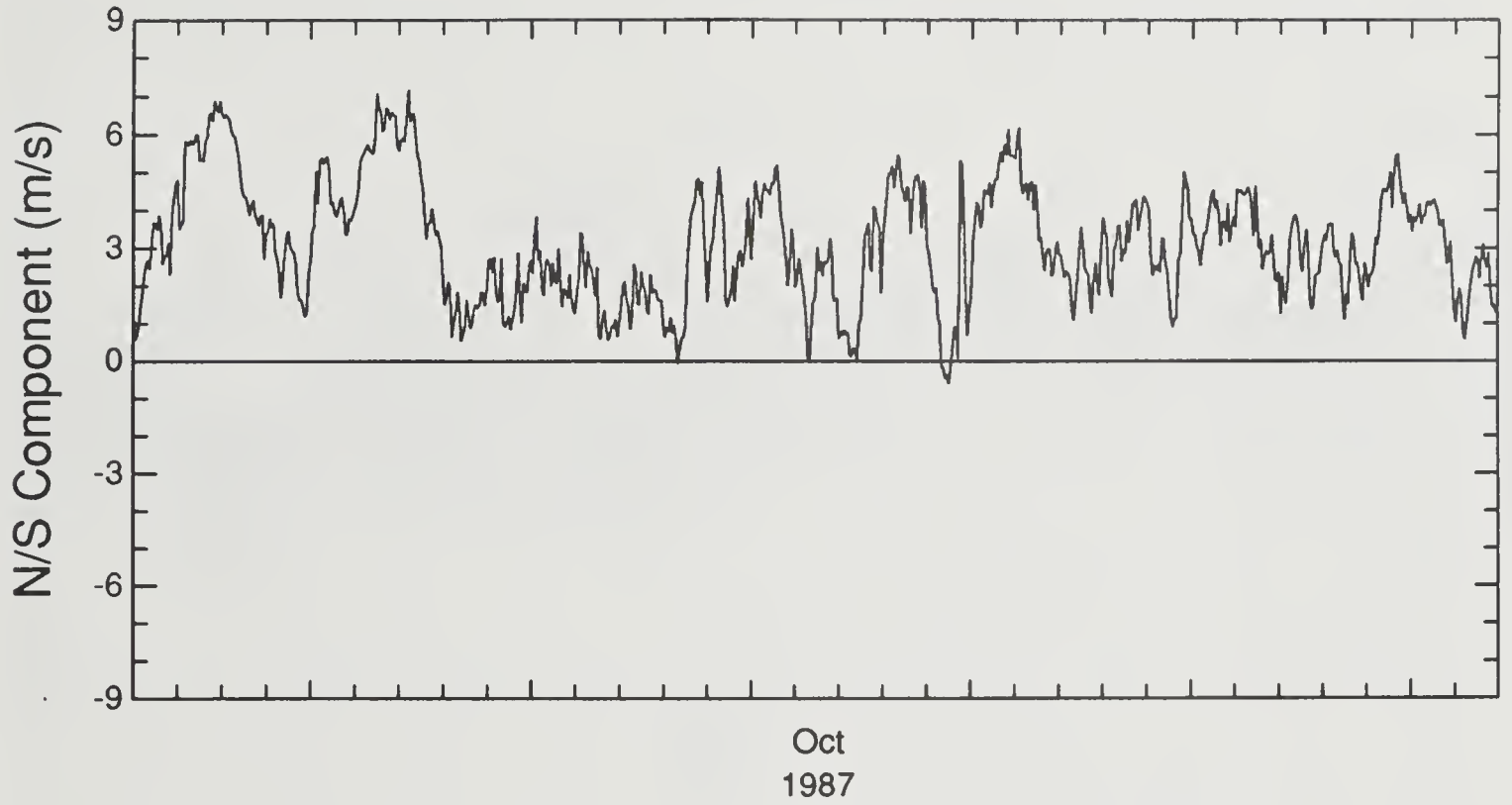
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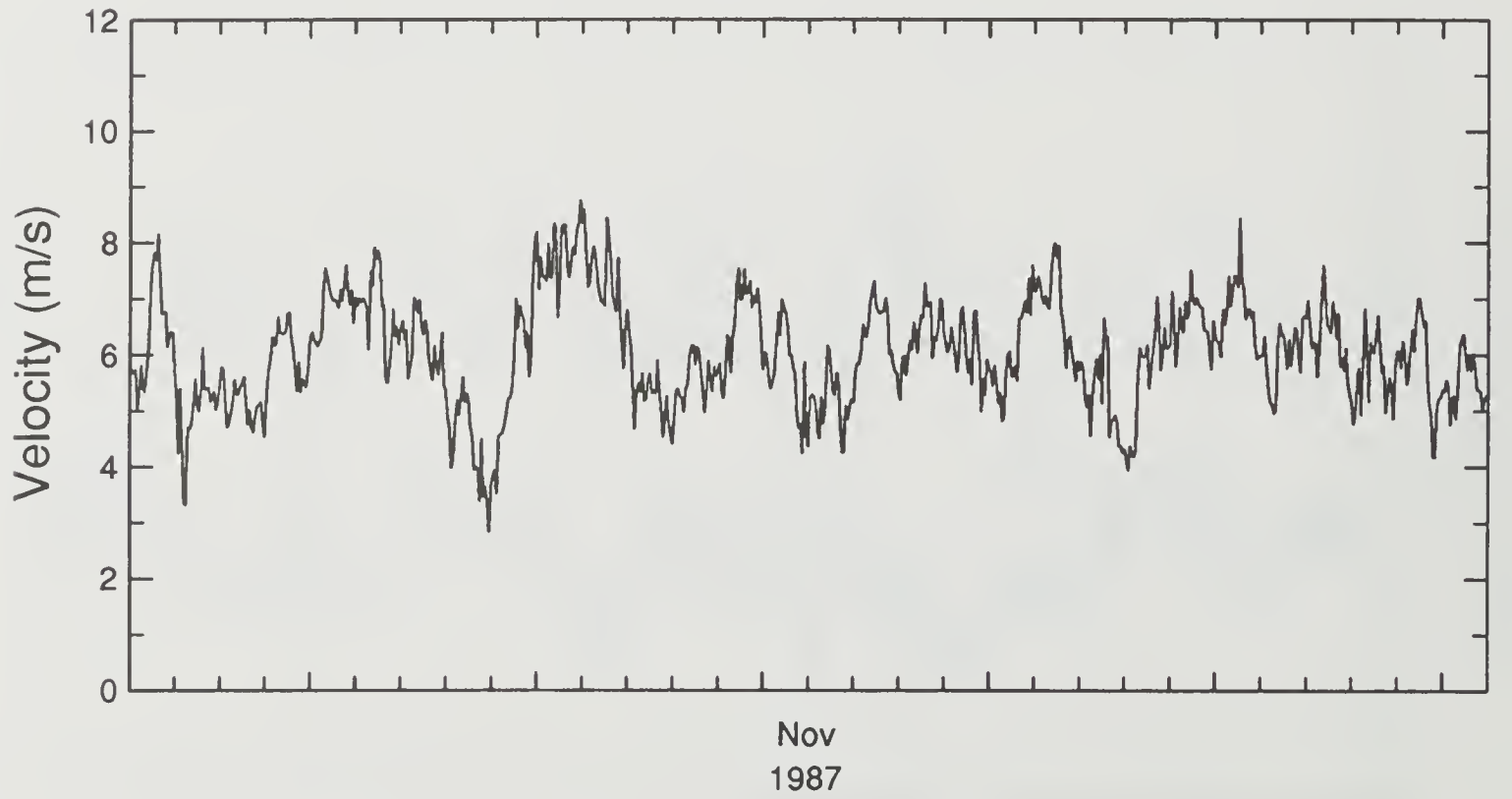
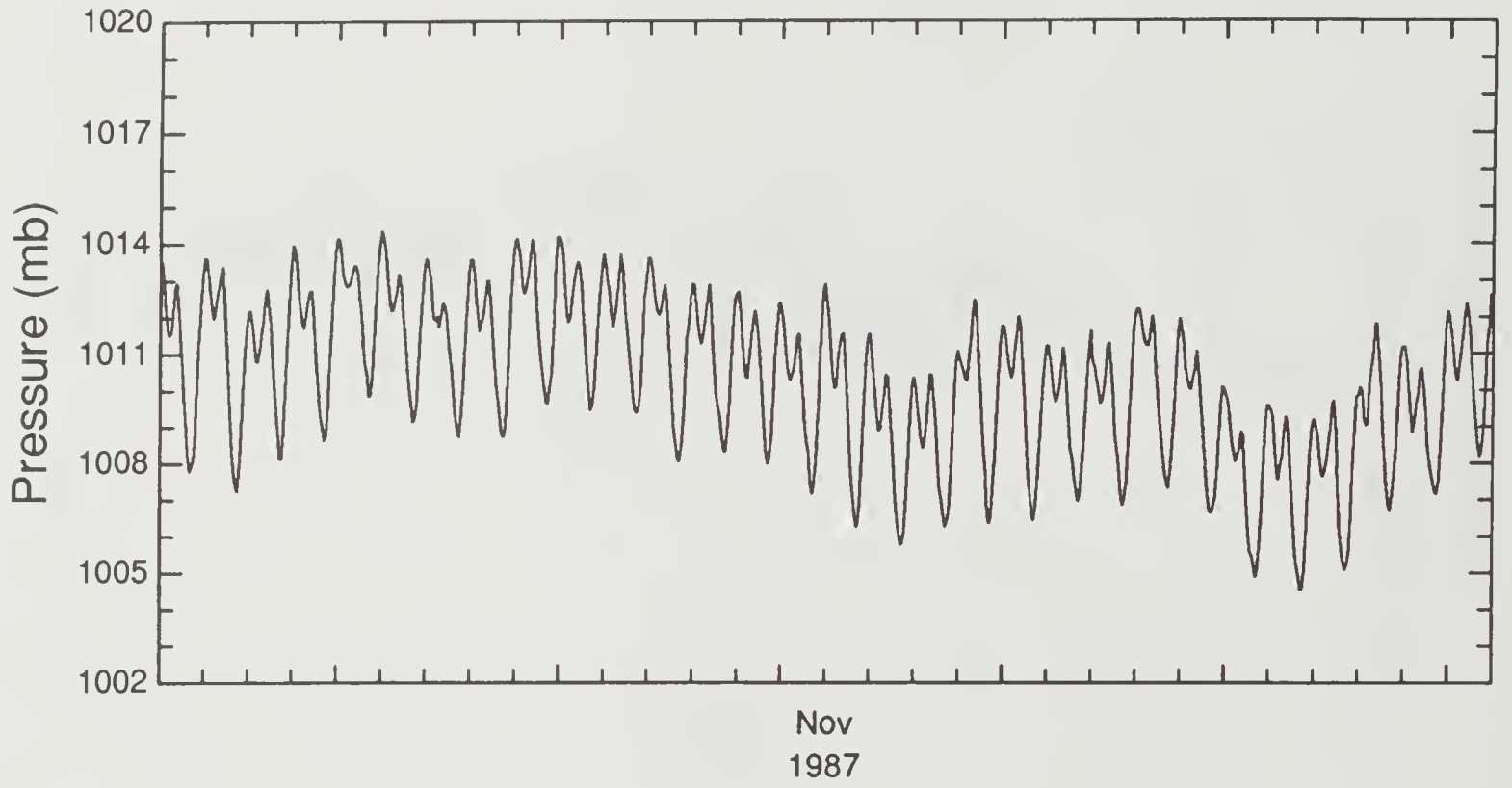
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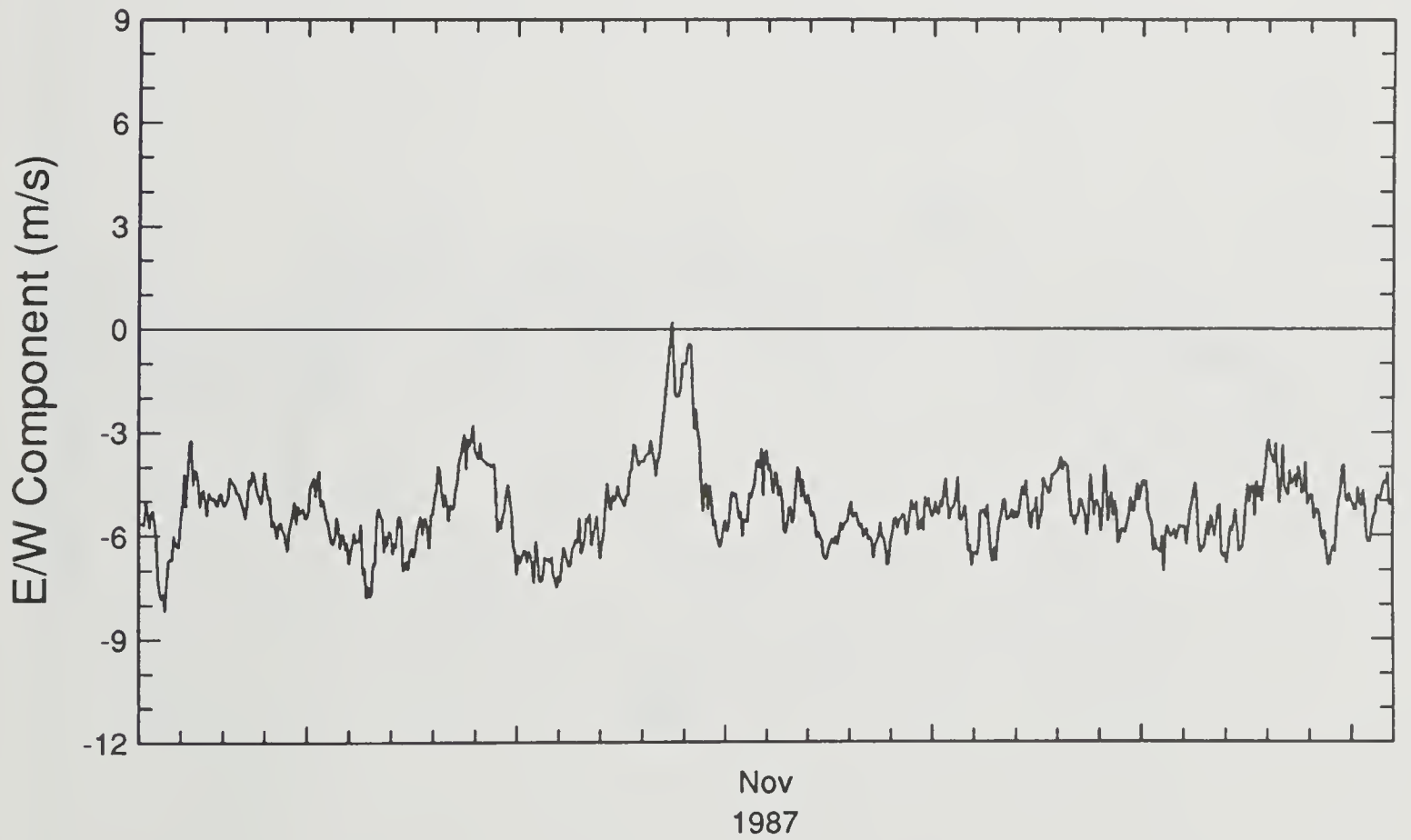
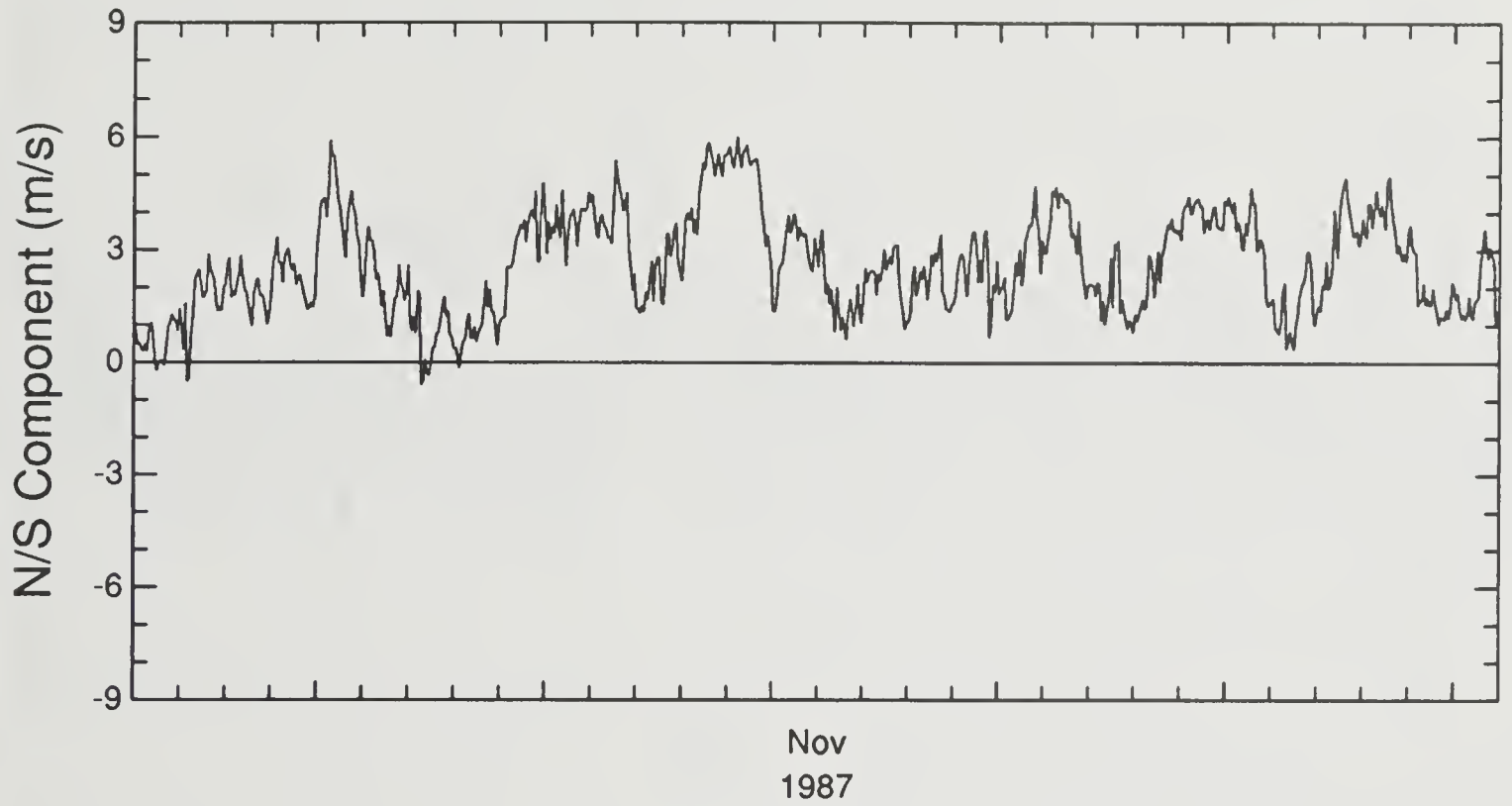


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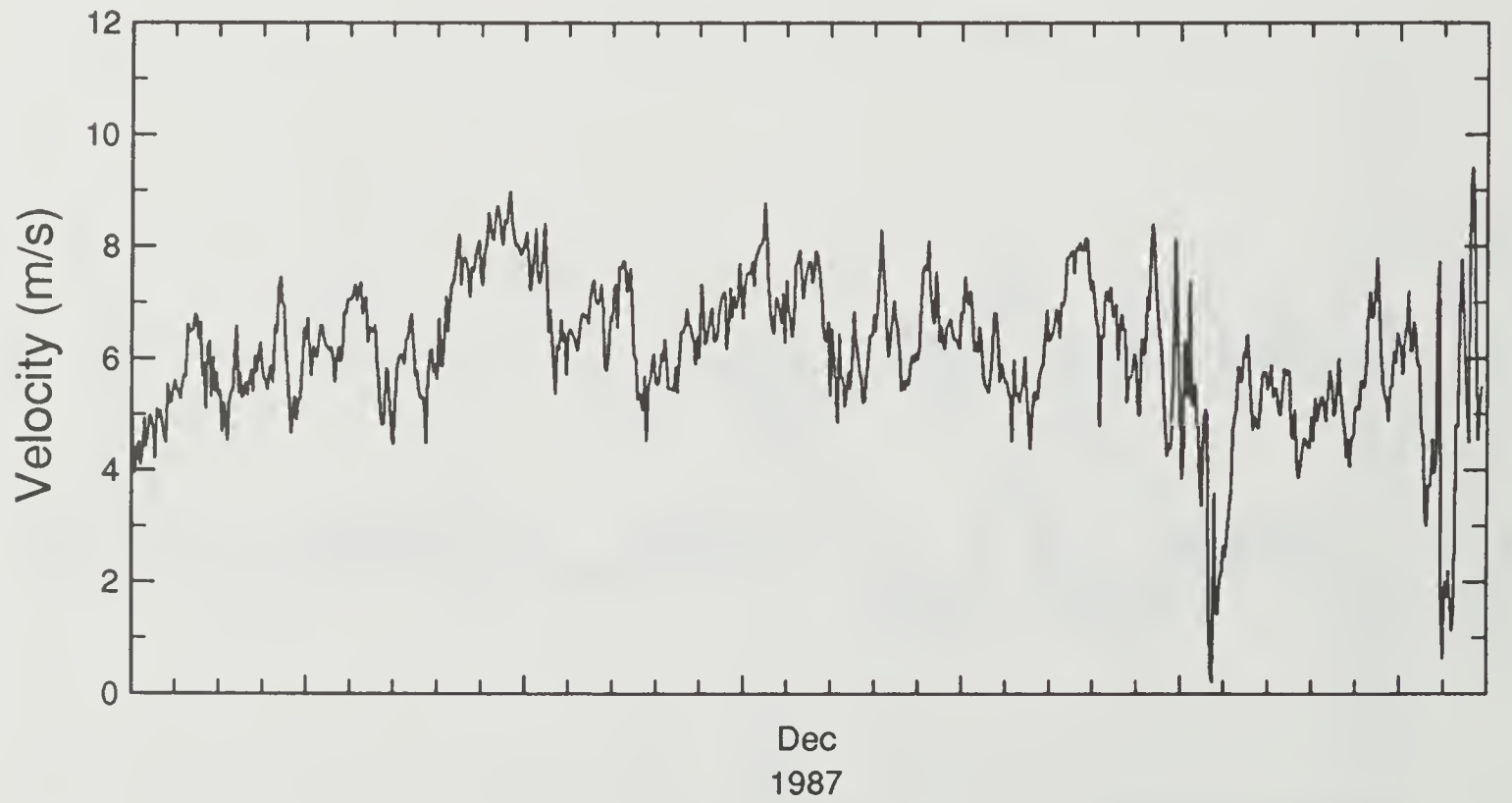
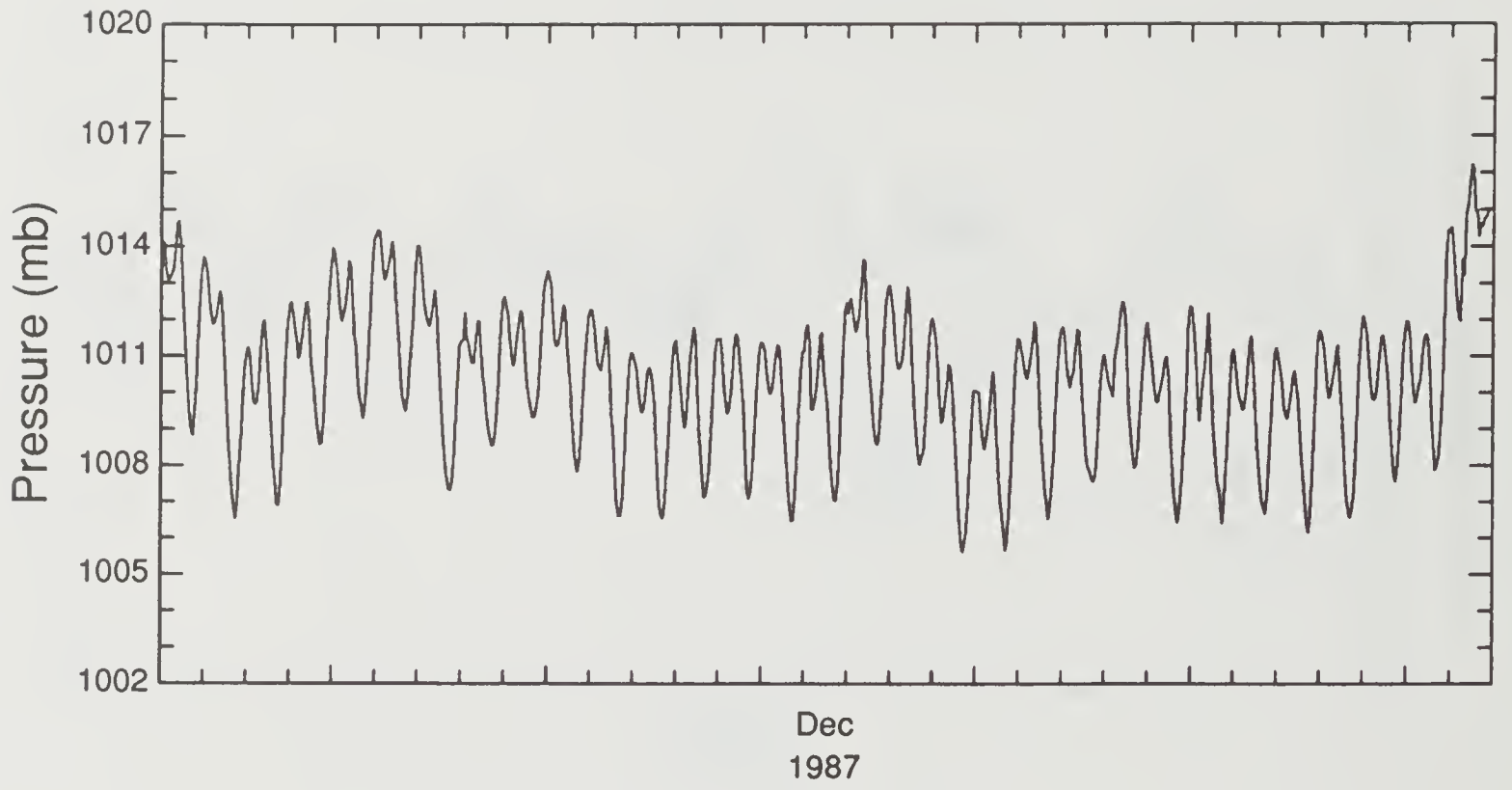


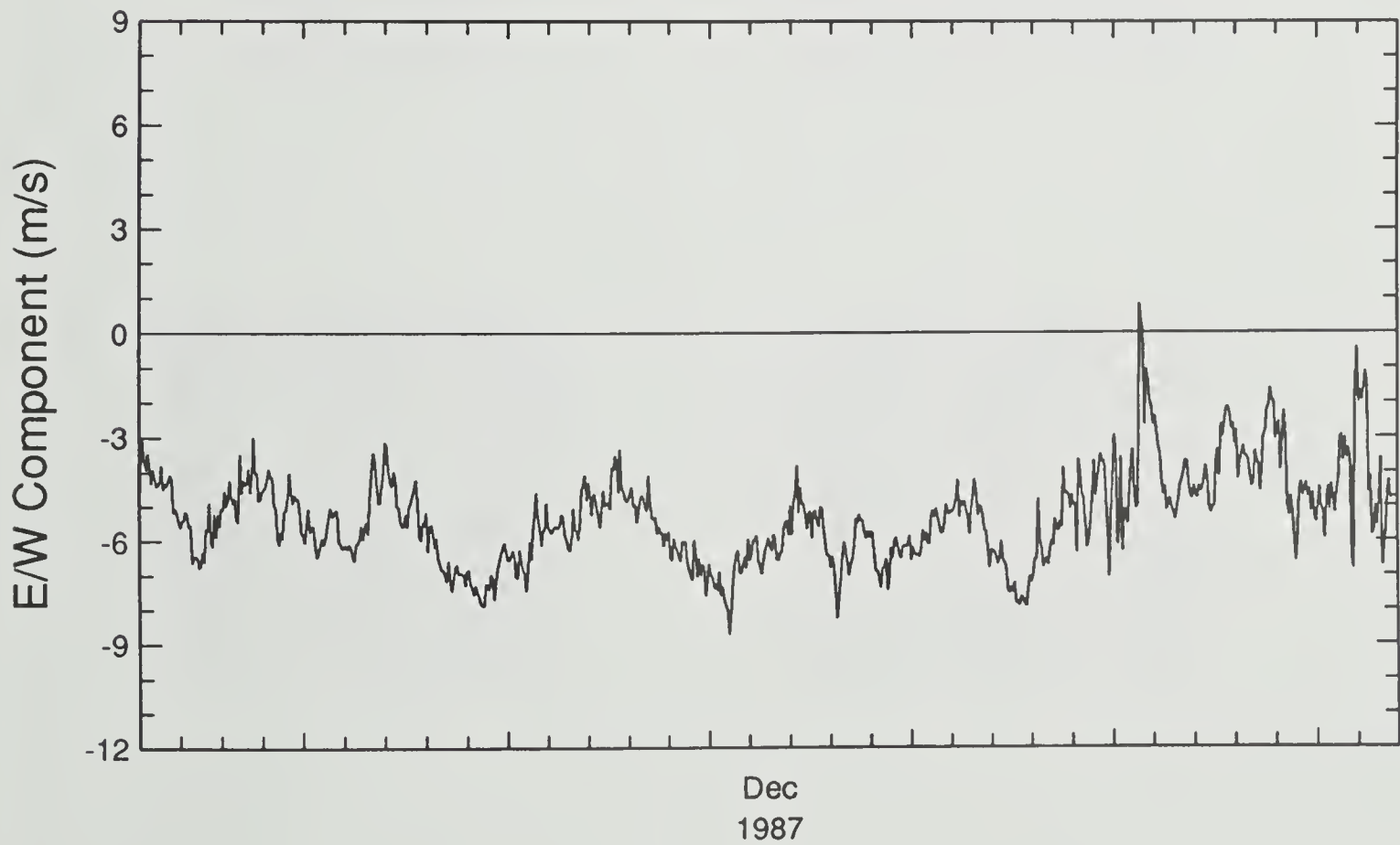
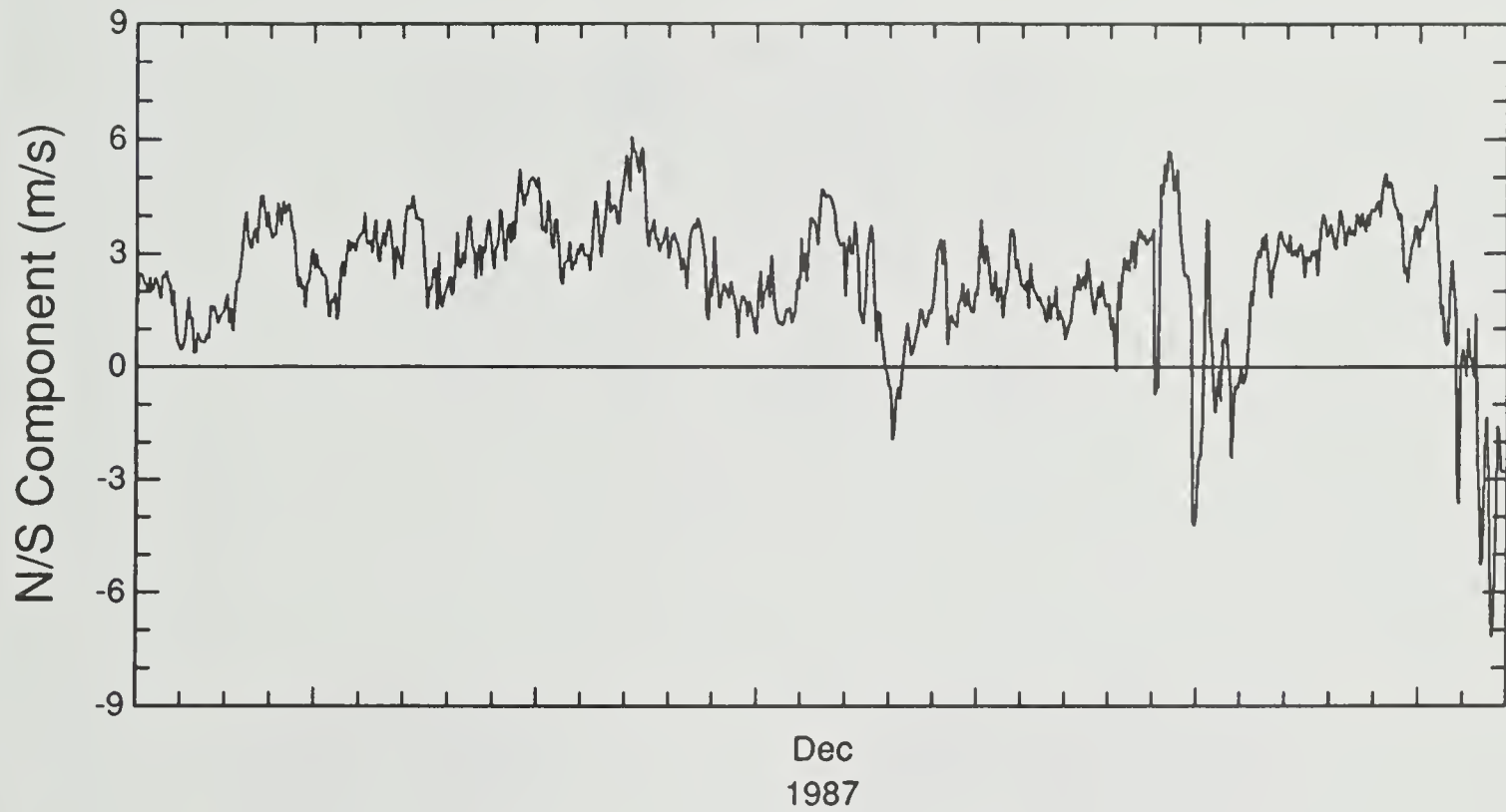
November





December





1987 Pressure (mb)			
Month	Mean	Std Dev	# Pts
Jan	1011.85	1.73	654
Feb	1012.12	1.95	208
Jul	1010.81	1.41	104
Aug	1012.93	1.81	744
Sep	1012.74	1.70	681
Oct	1010.87	1.84	744
Nov	1010.30	2.11	720
Dec	1010.38	1.98	744

1987 Velocity		
Month	Mean	Std Dev
Jan	4.28	1.41
Feb	4.01	1.22
Jul	6.35	0.58
Aug	6.26	1.28
Sep	6.61	1.08
Oct	6.38	1.21
Nov	5.85	0.97
Dec	5.84	1.29

1987 Direction	
Month	Mean
Jan	-80.58
Feb	-83.42
Jul	-67.59
Aug	-52.52
Sep	-44.08
Oct	-60.42
Nov	-63.52
Dec	-65.23

1987 N-S Component		
Month	Mean	Std Dev
Jan	0.70	1.38
Feb	0.46	2.41
Jul	2.42	1.42
Aug	3.81	1.19
Sep	4.75	1.31
Oct	3.15	1.57
Nov	2.61	1.34
Dec	2.45	1.72

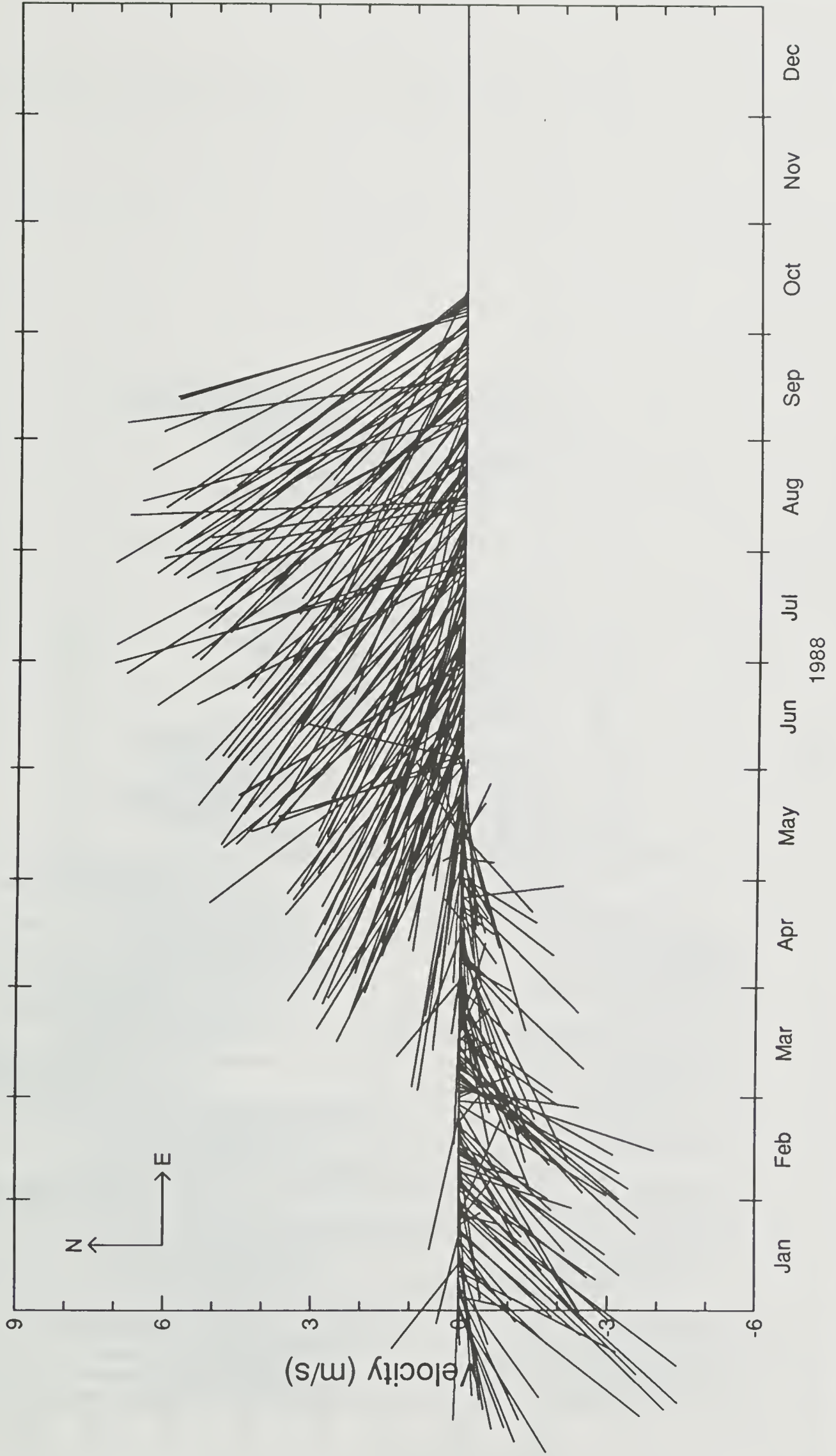
1987 E-W Component		
Month	Mean	Std Dev
Jan	-4.22	1.42
Feb	-3.99	1.08
Jul	-5.87	1.05
Aug	-4.97	1.46
Sep	-4.60	0.91
Oct	-5.55	1.29
Nov	-5.24	1.13
Dec	-5.31	1.36

1988

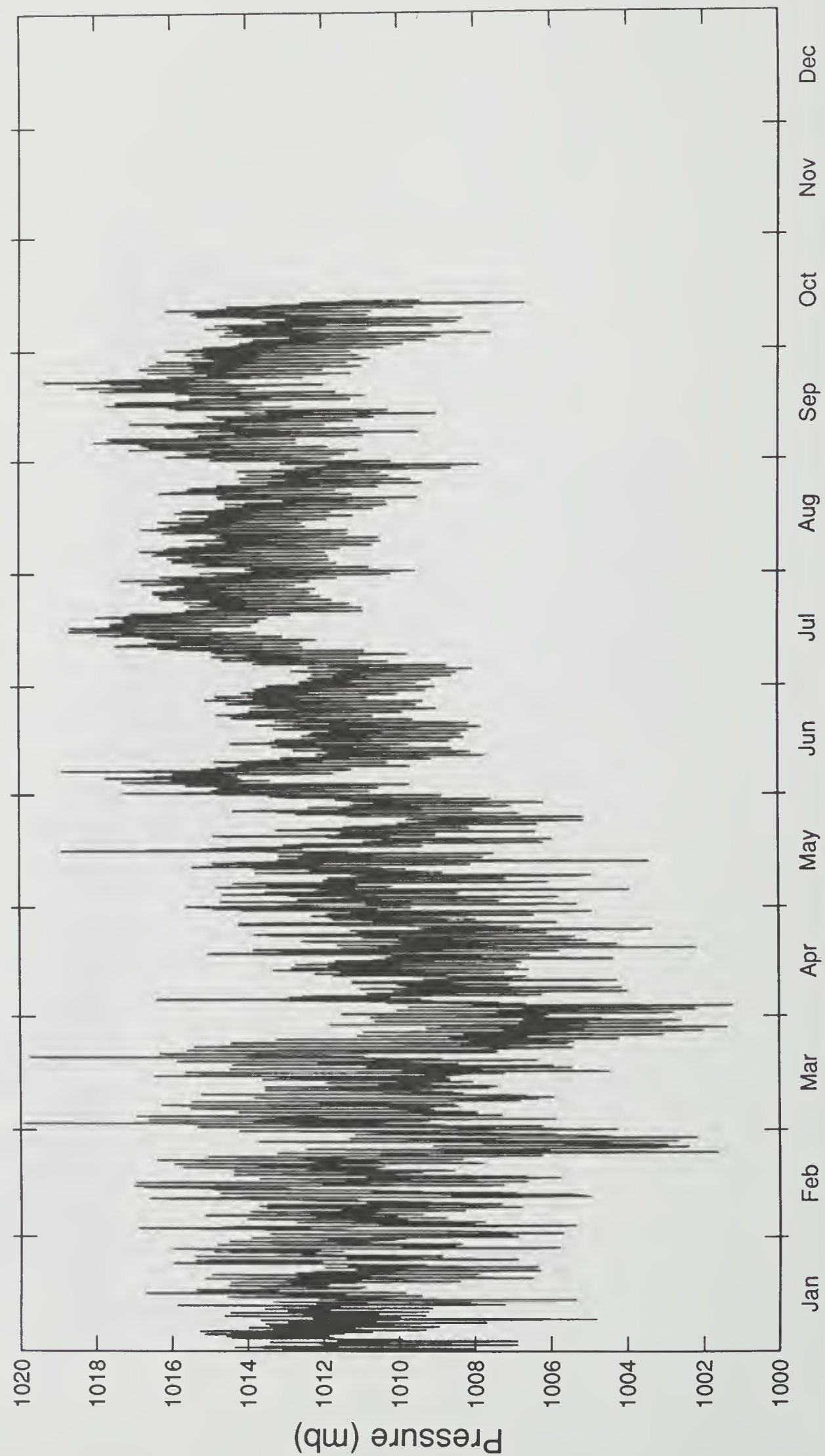
January 1 - October 15



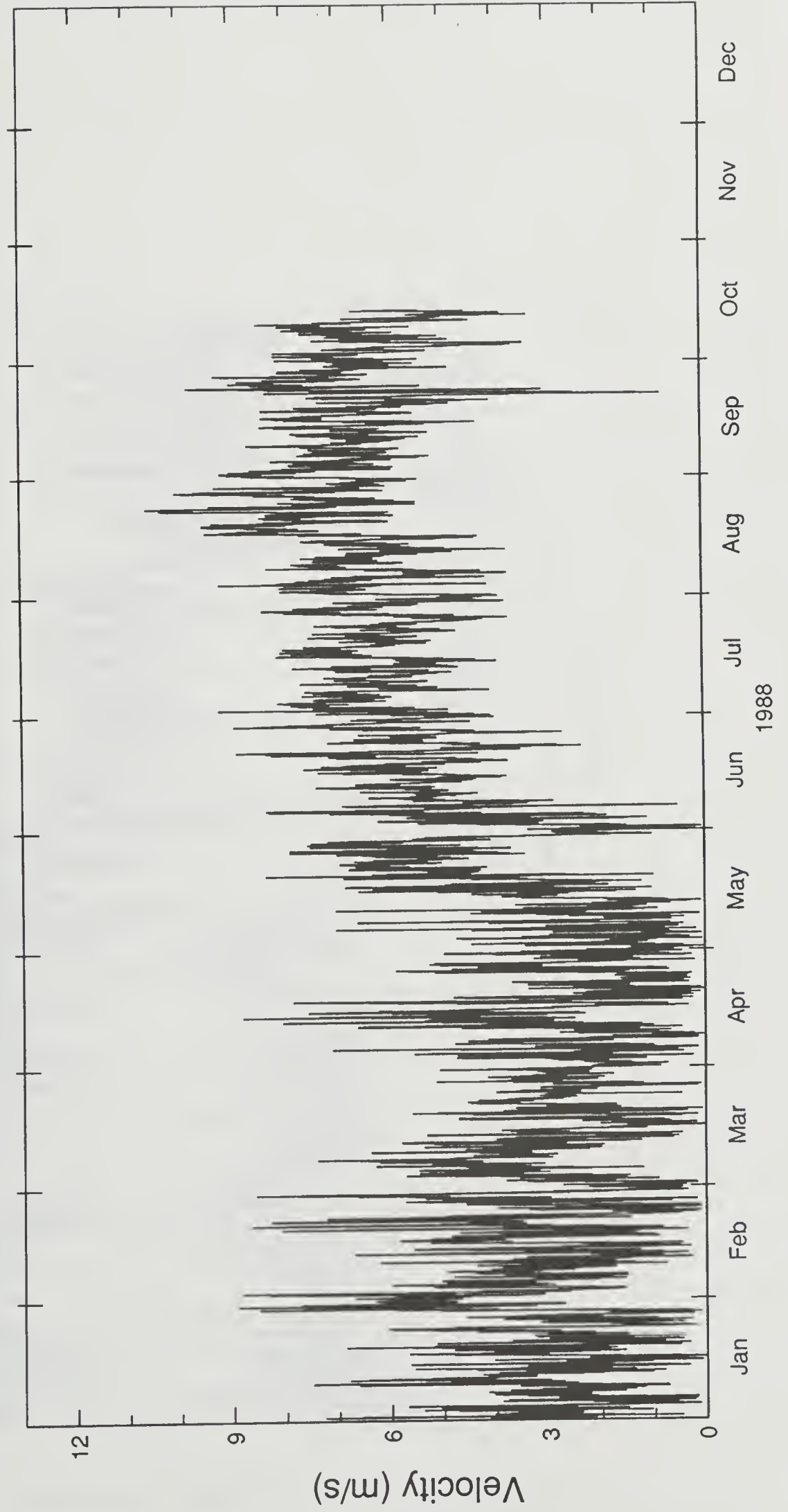
1988 Wind Speed (Daily Values)



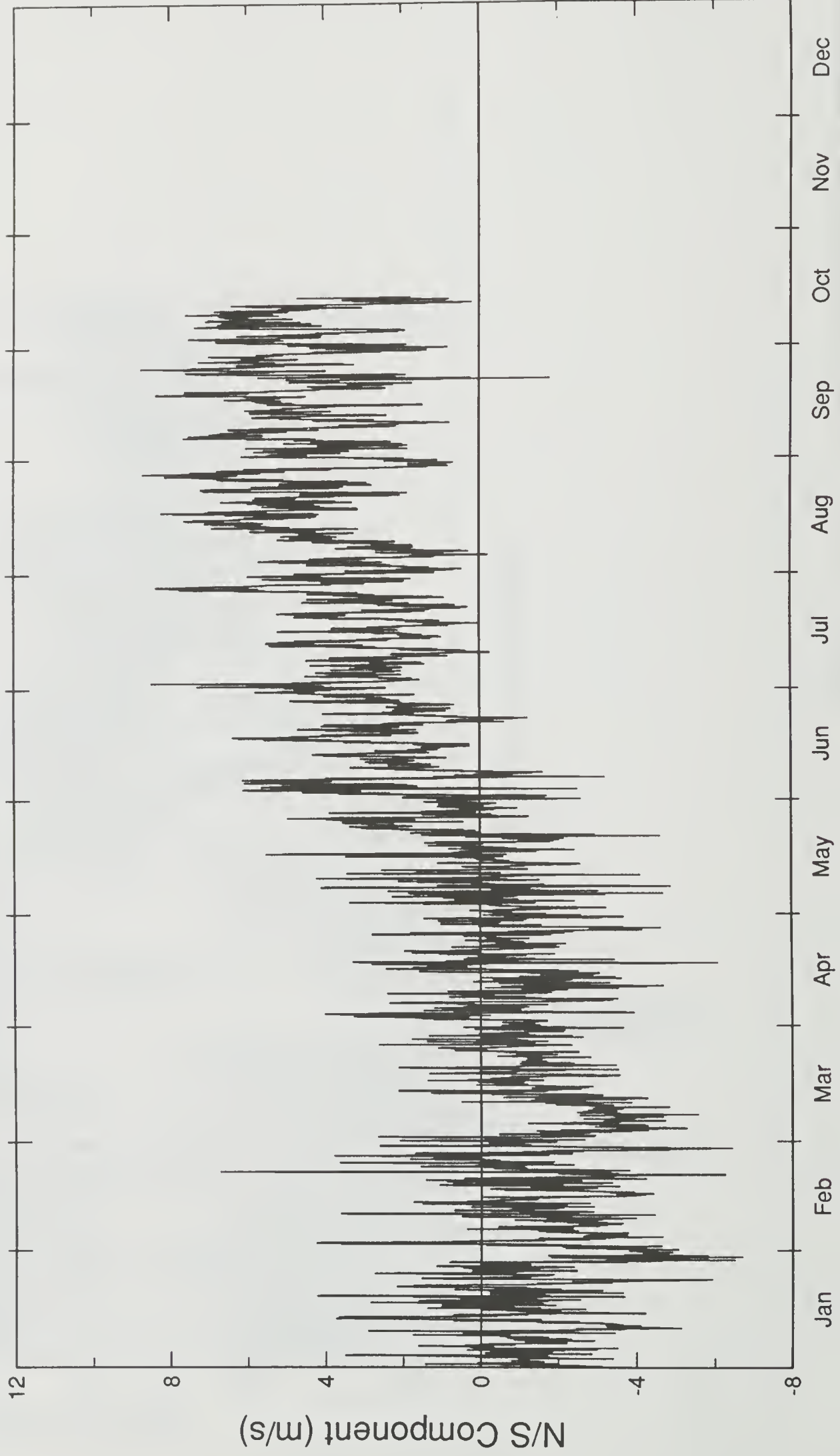
1988 Pressure



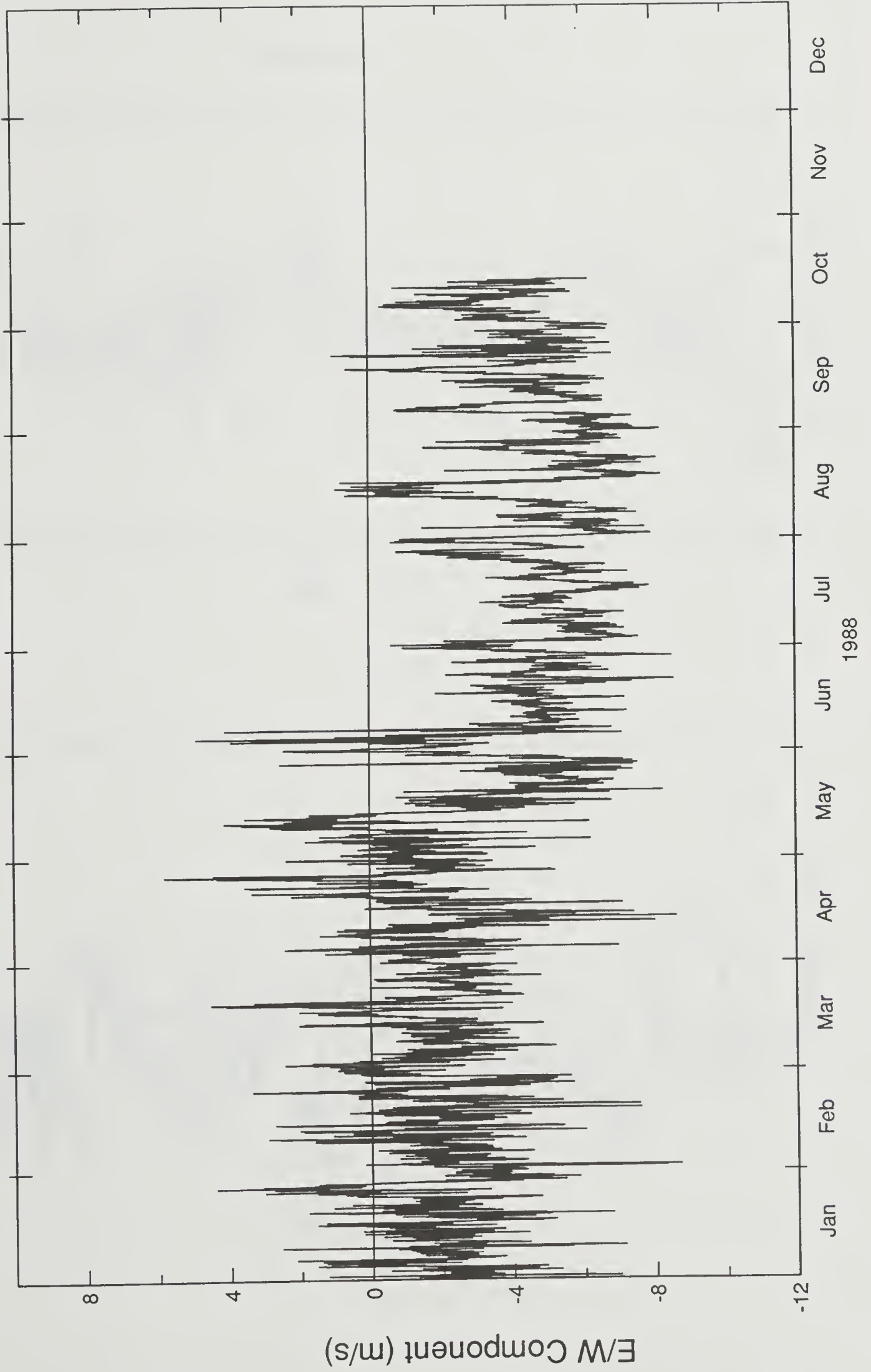
1988 Wind Speed



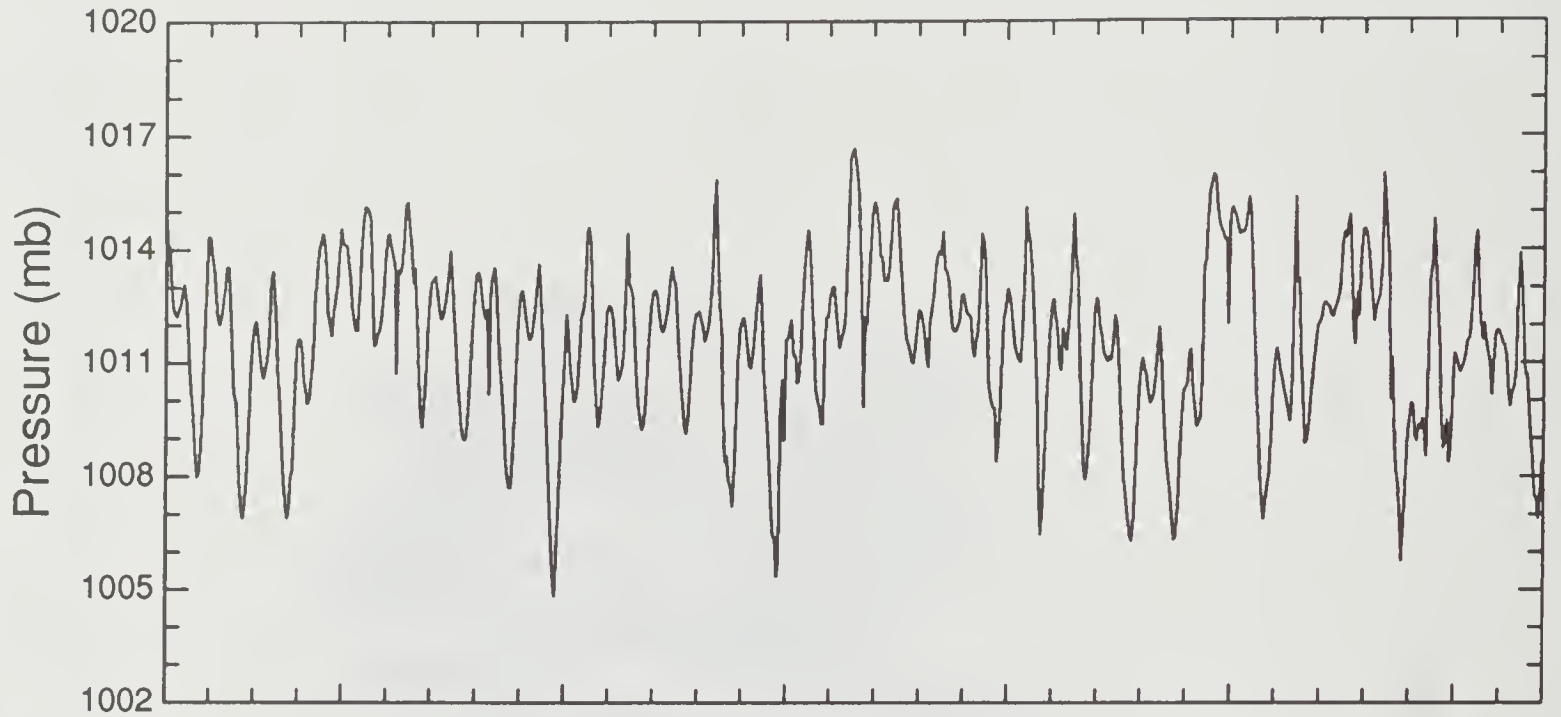
1988 Wind
Meridional Component



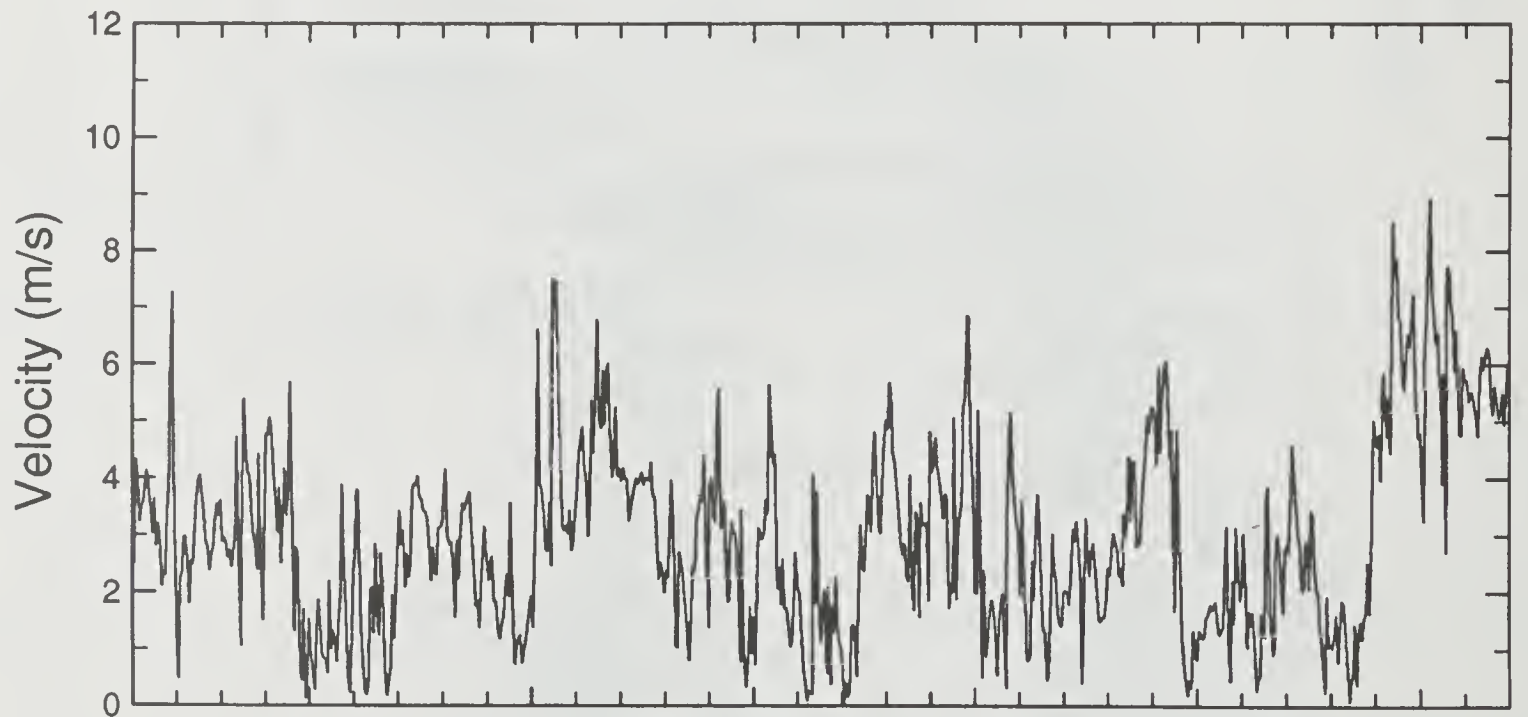
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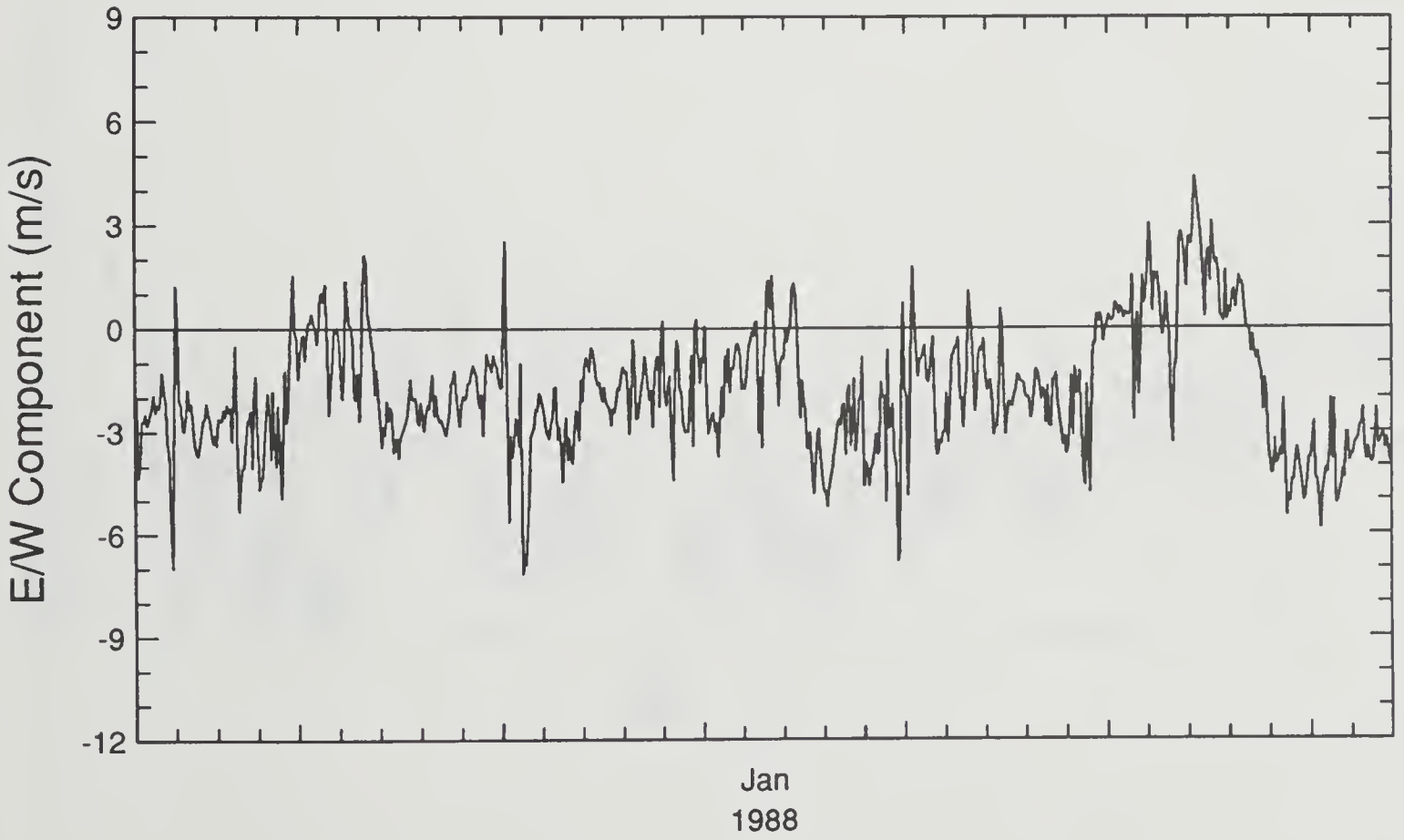
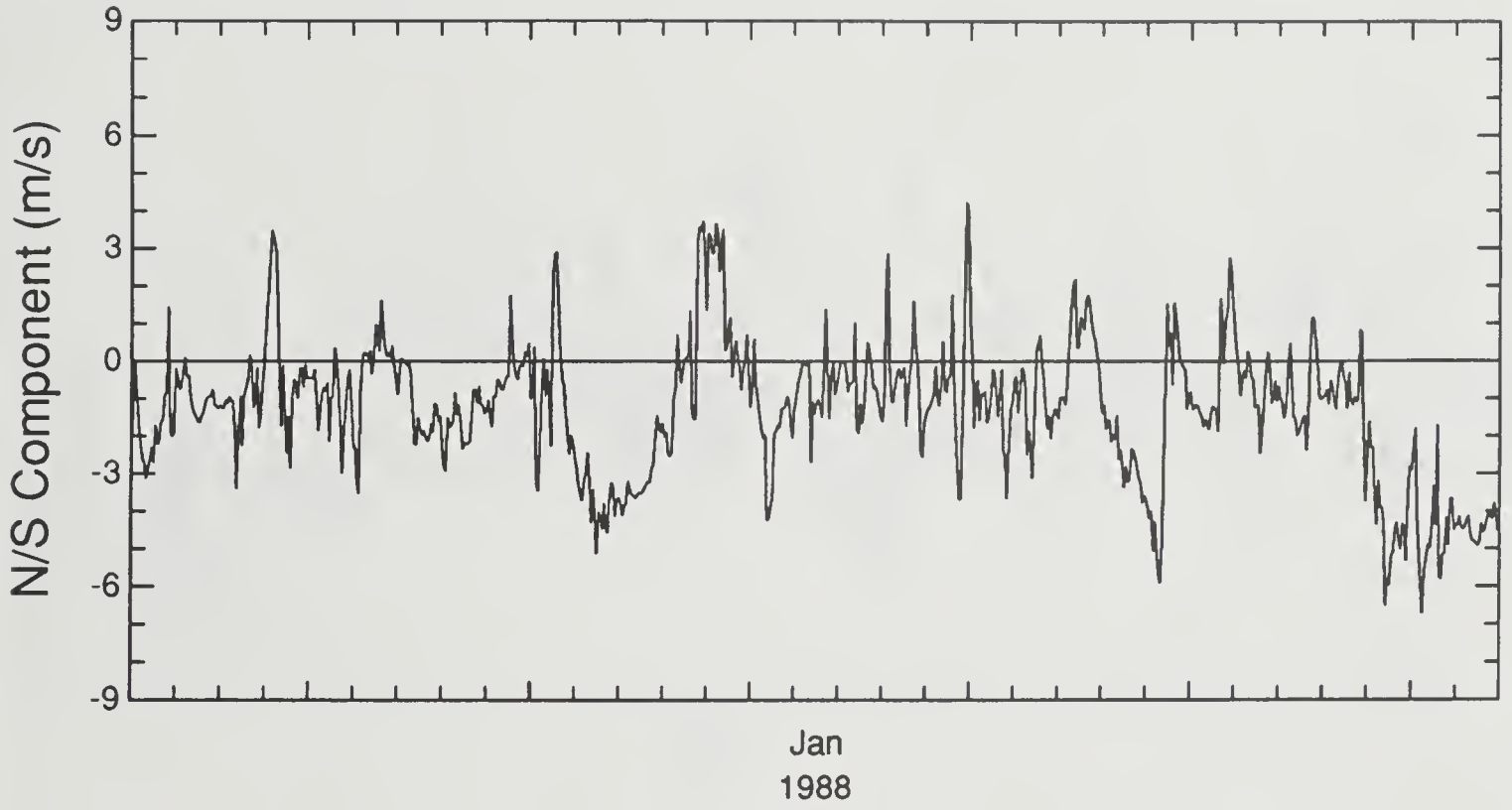
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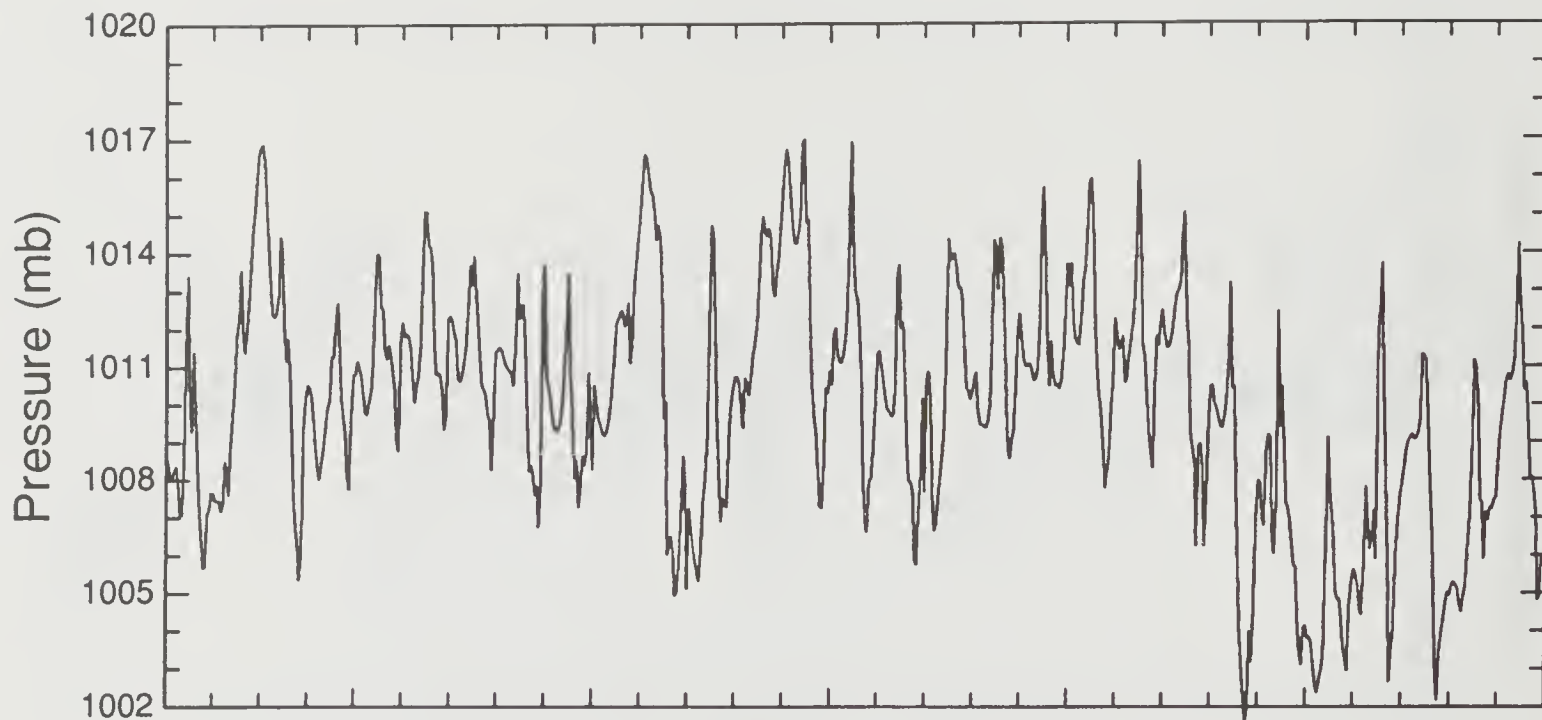
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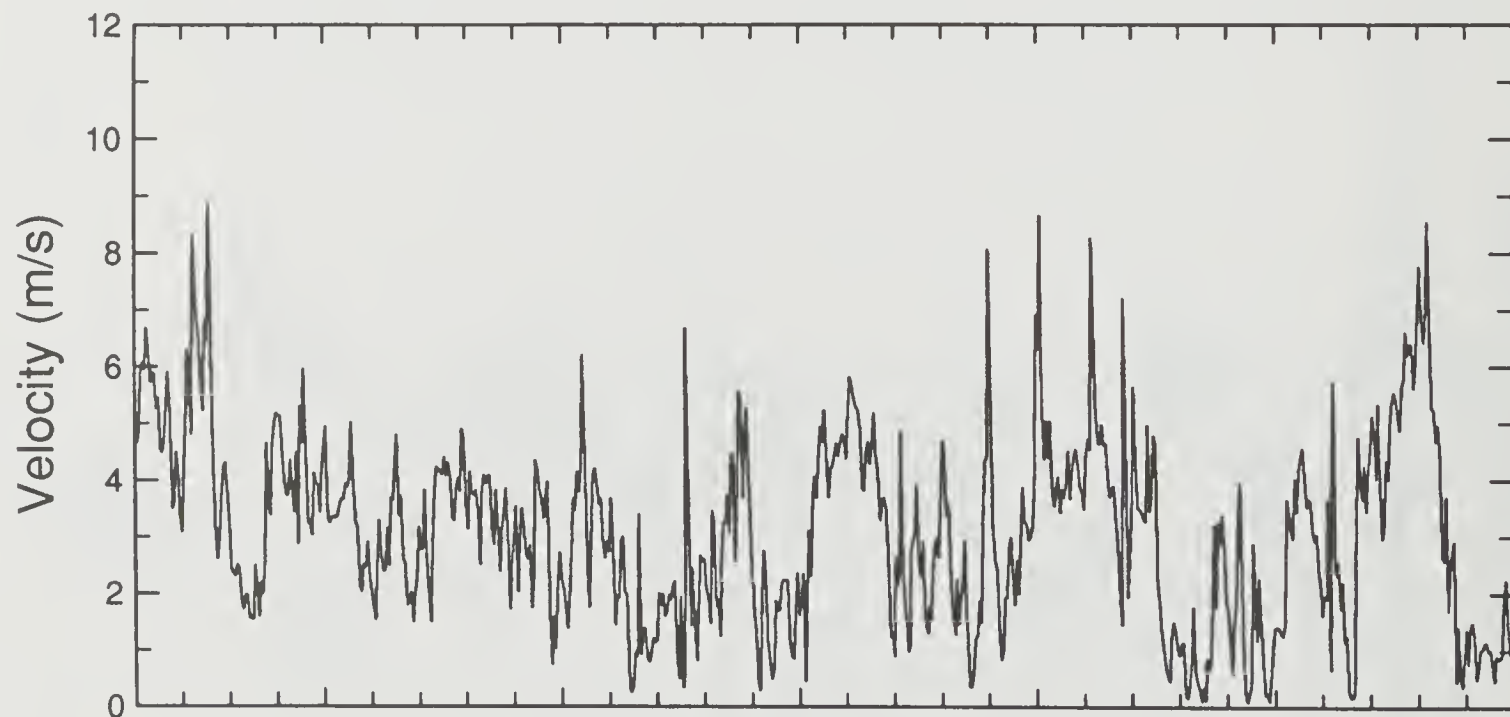
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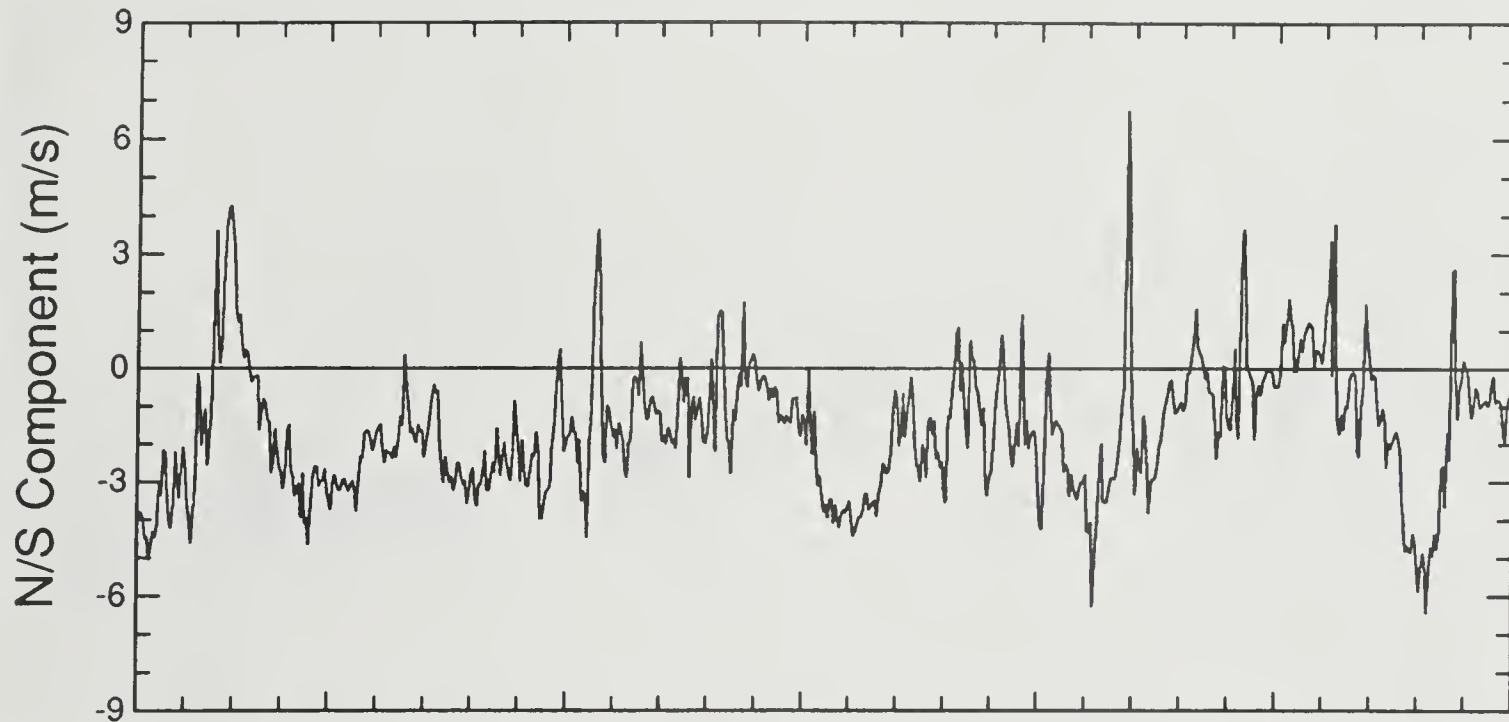
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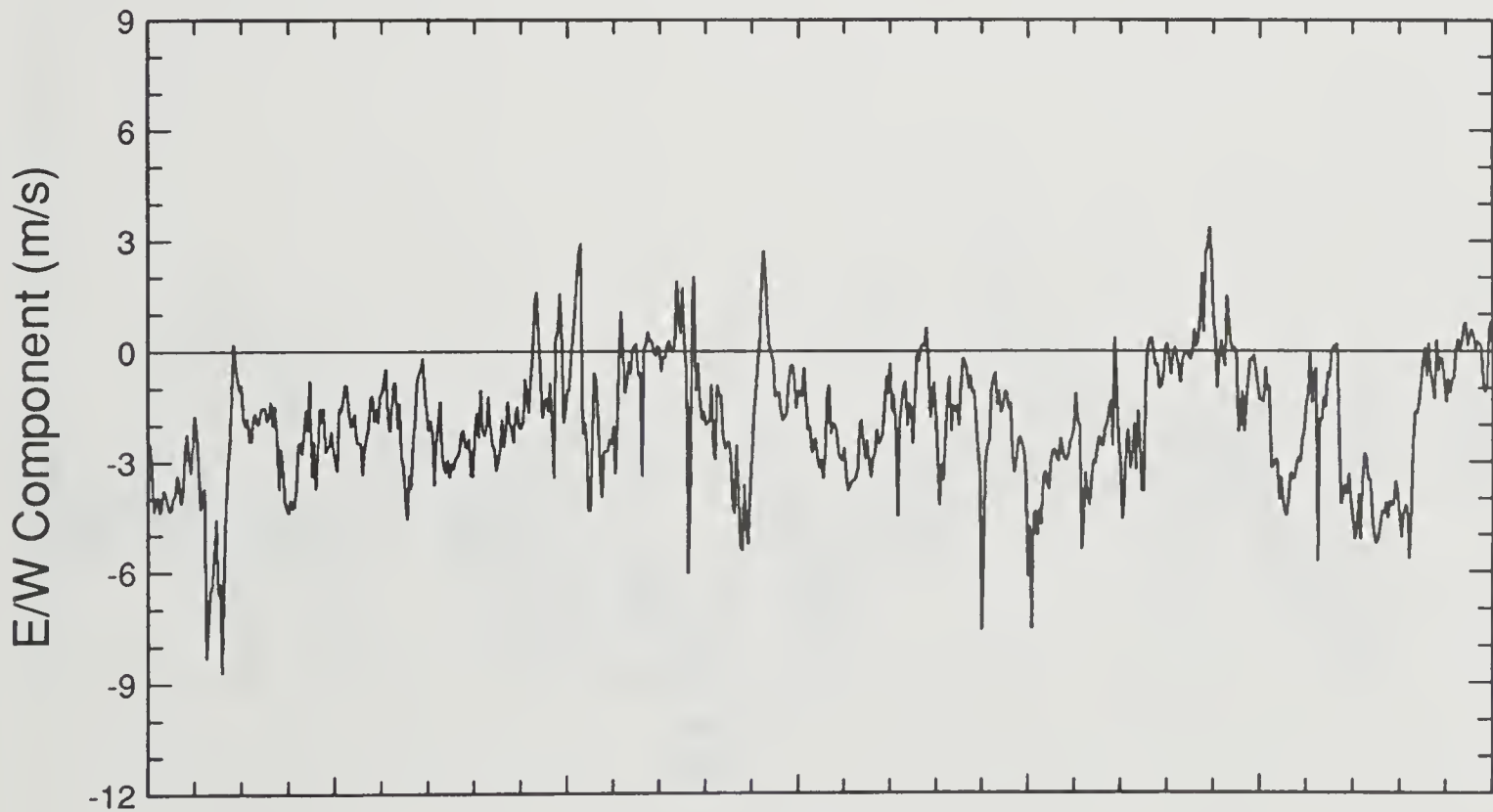
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1988



Feb
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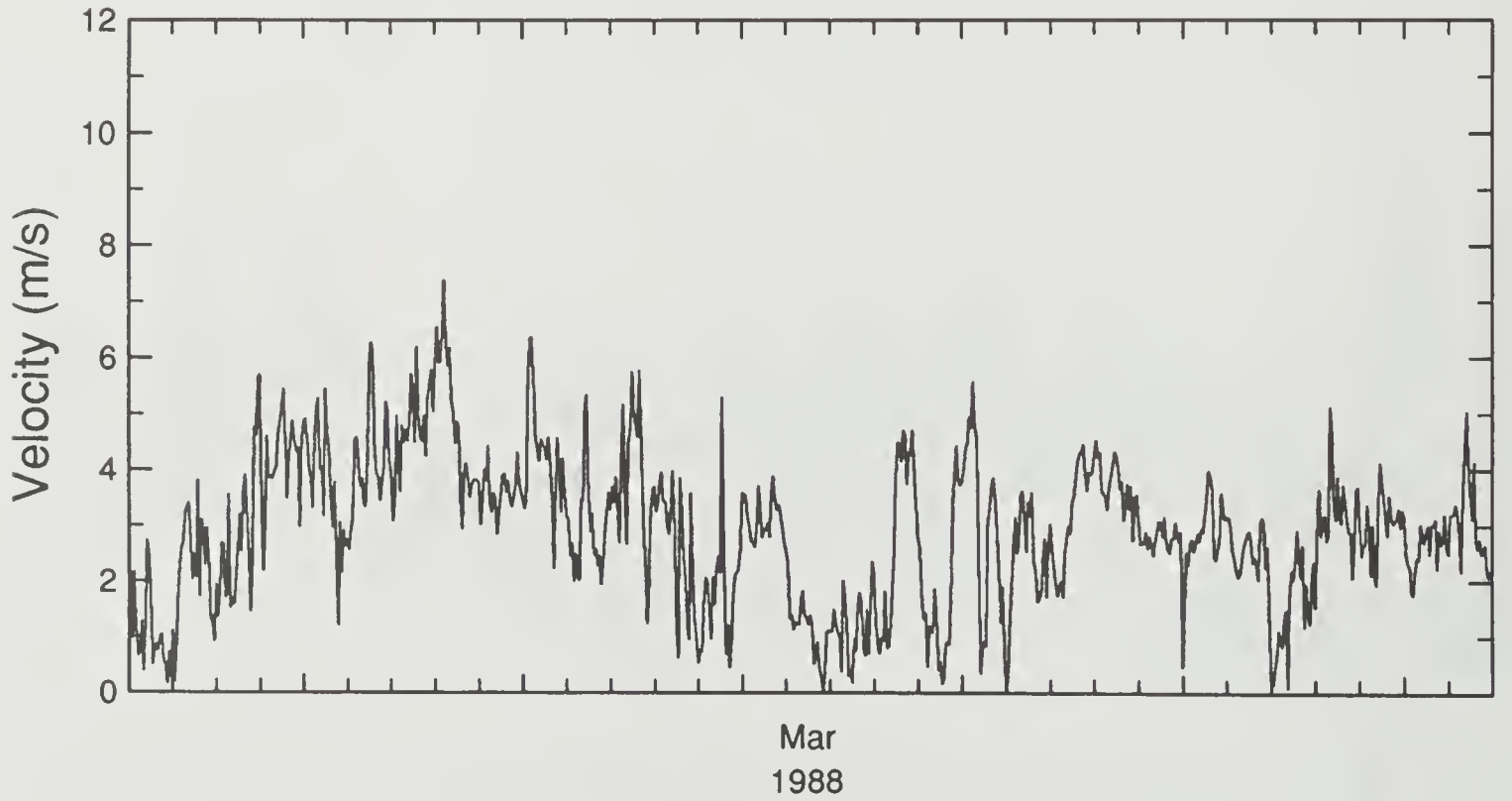
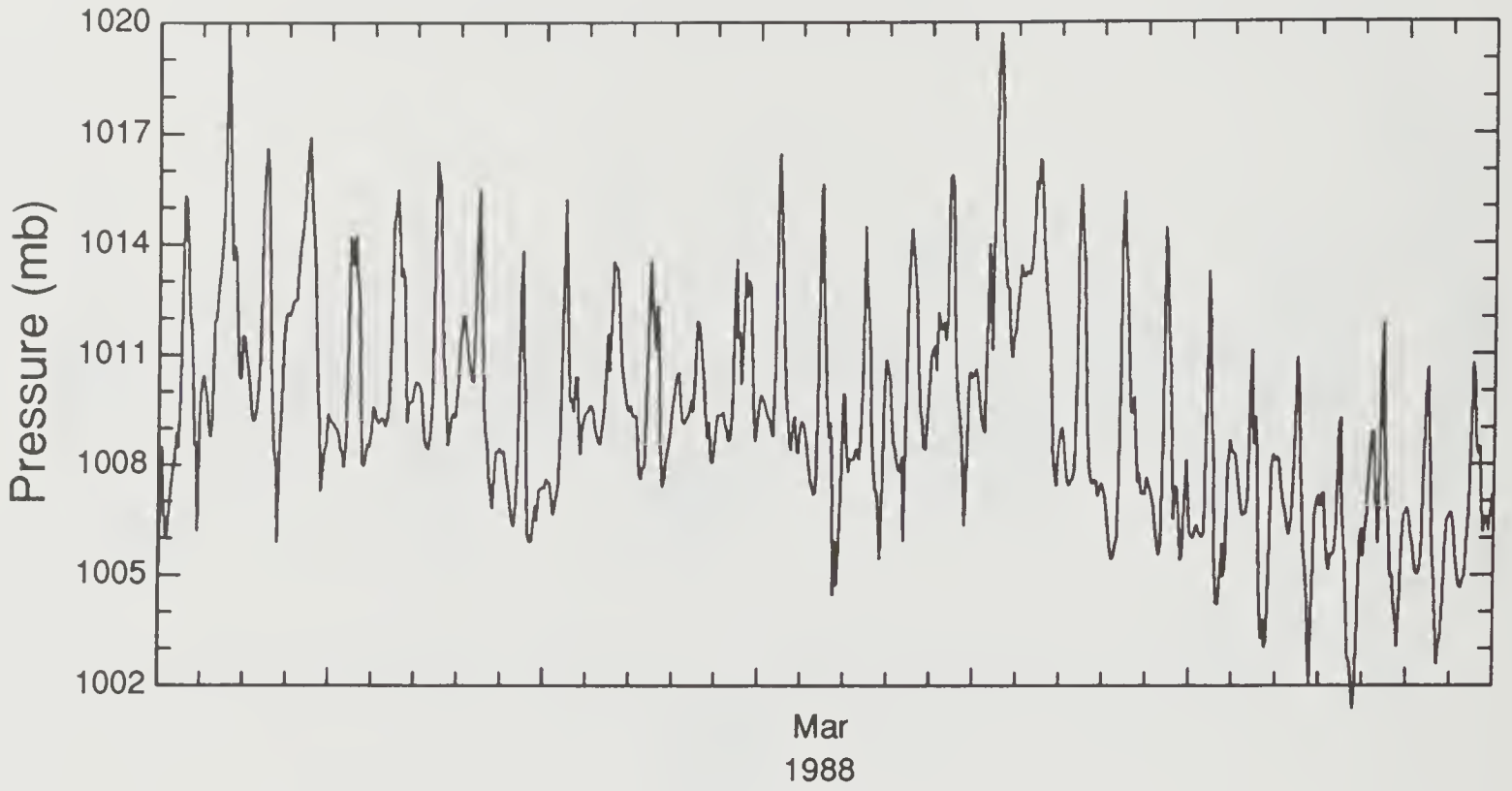


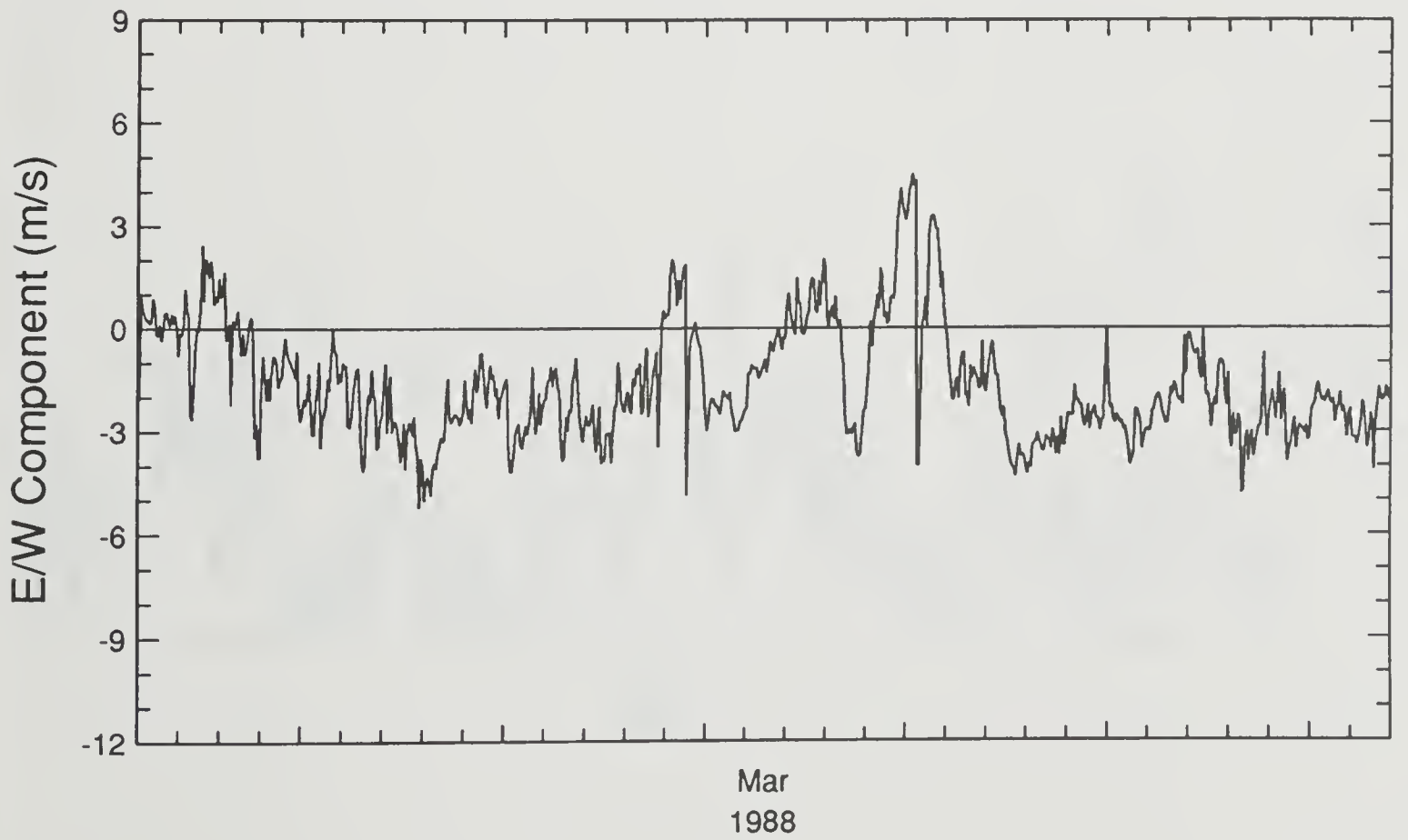
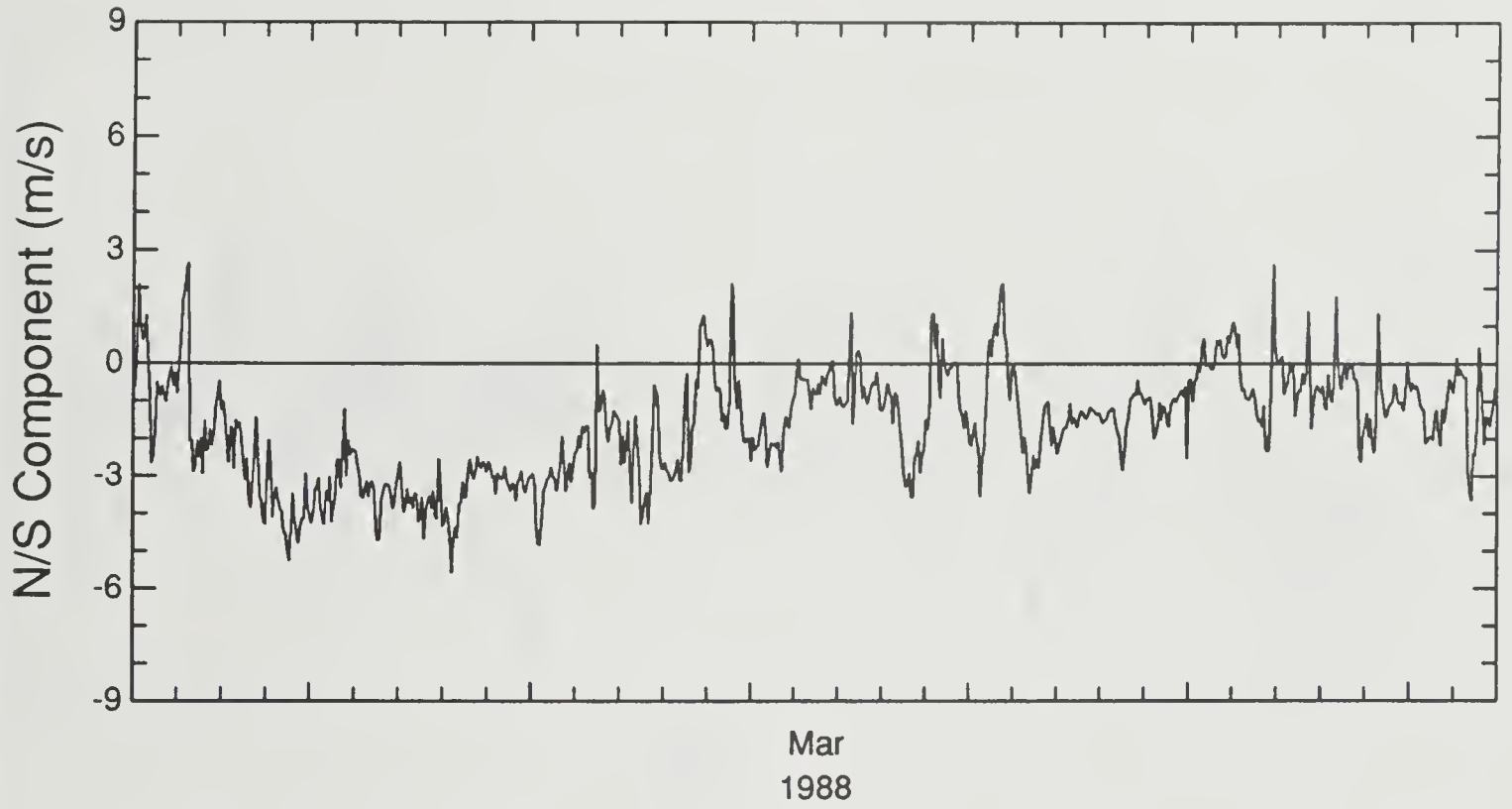
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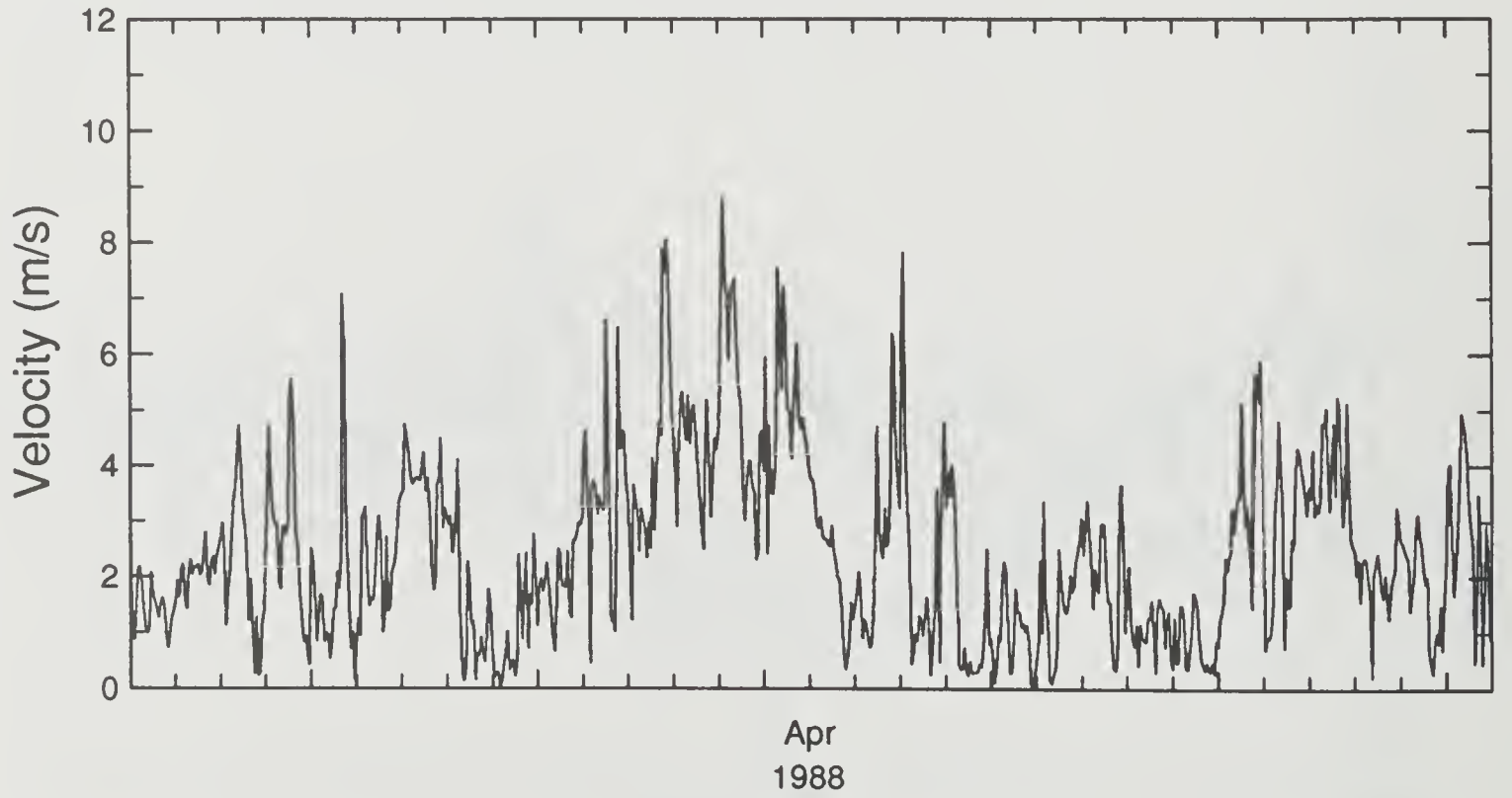
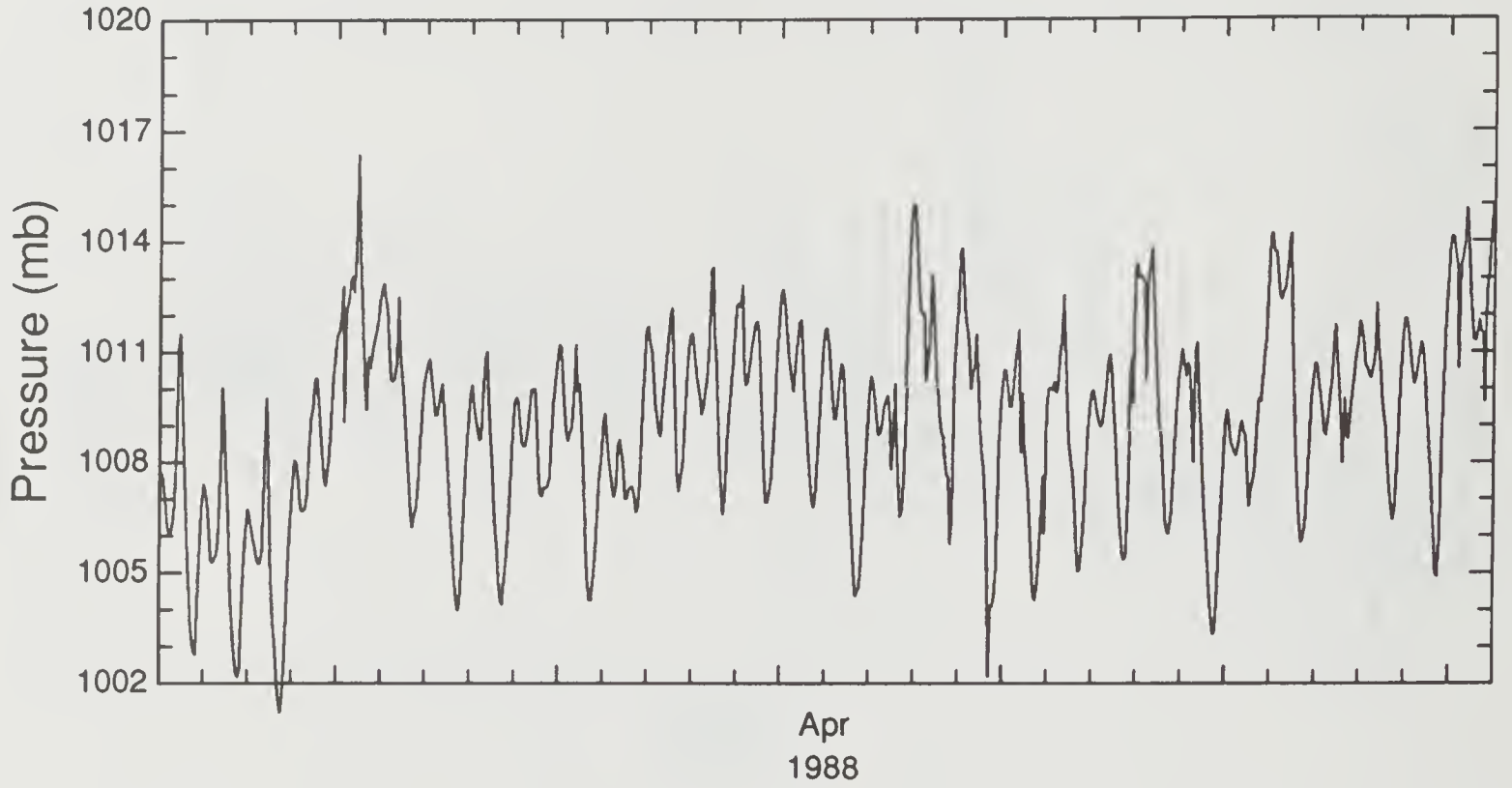
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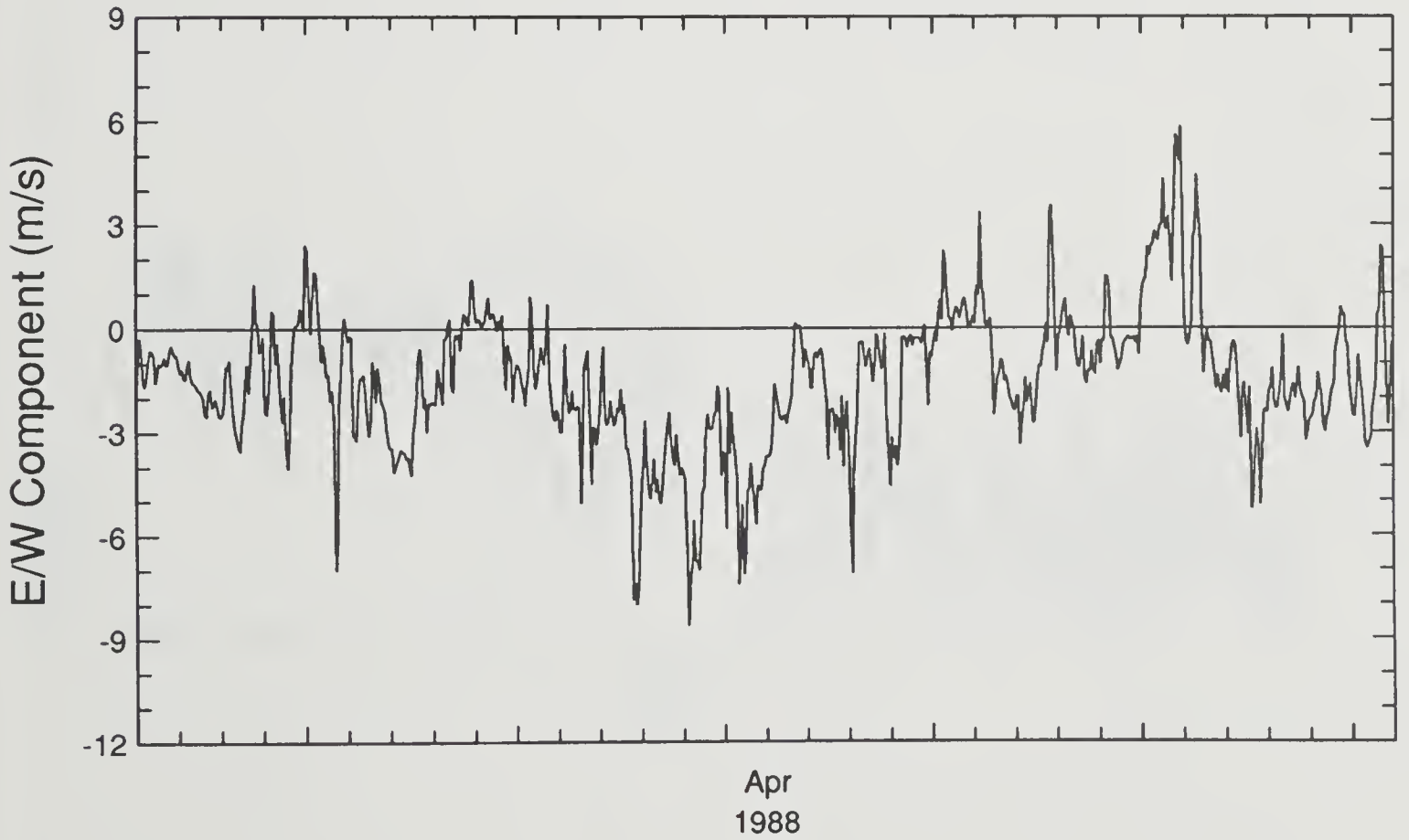
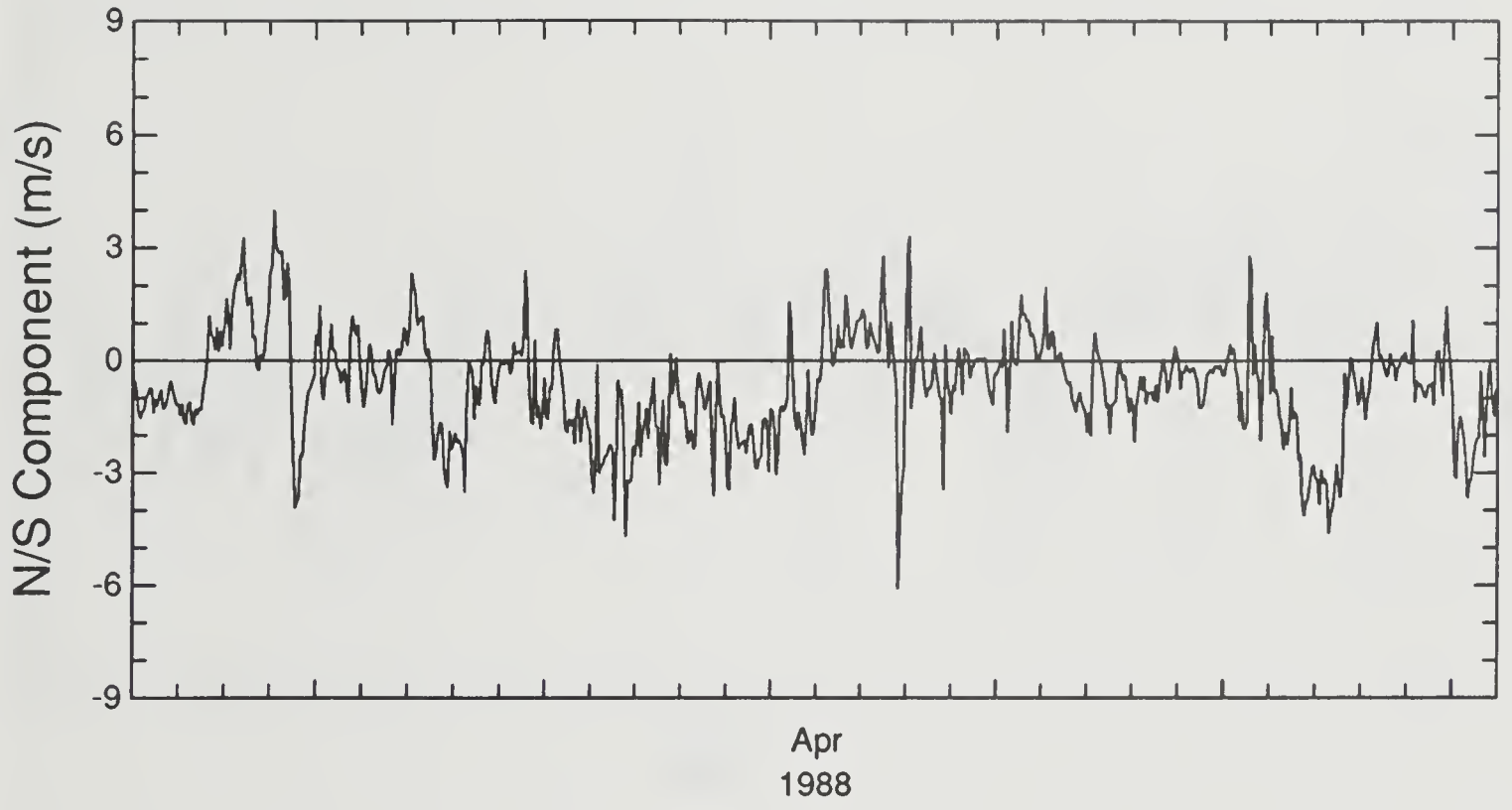
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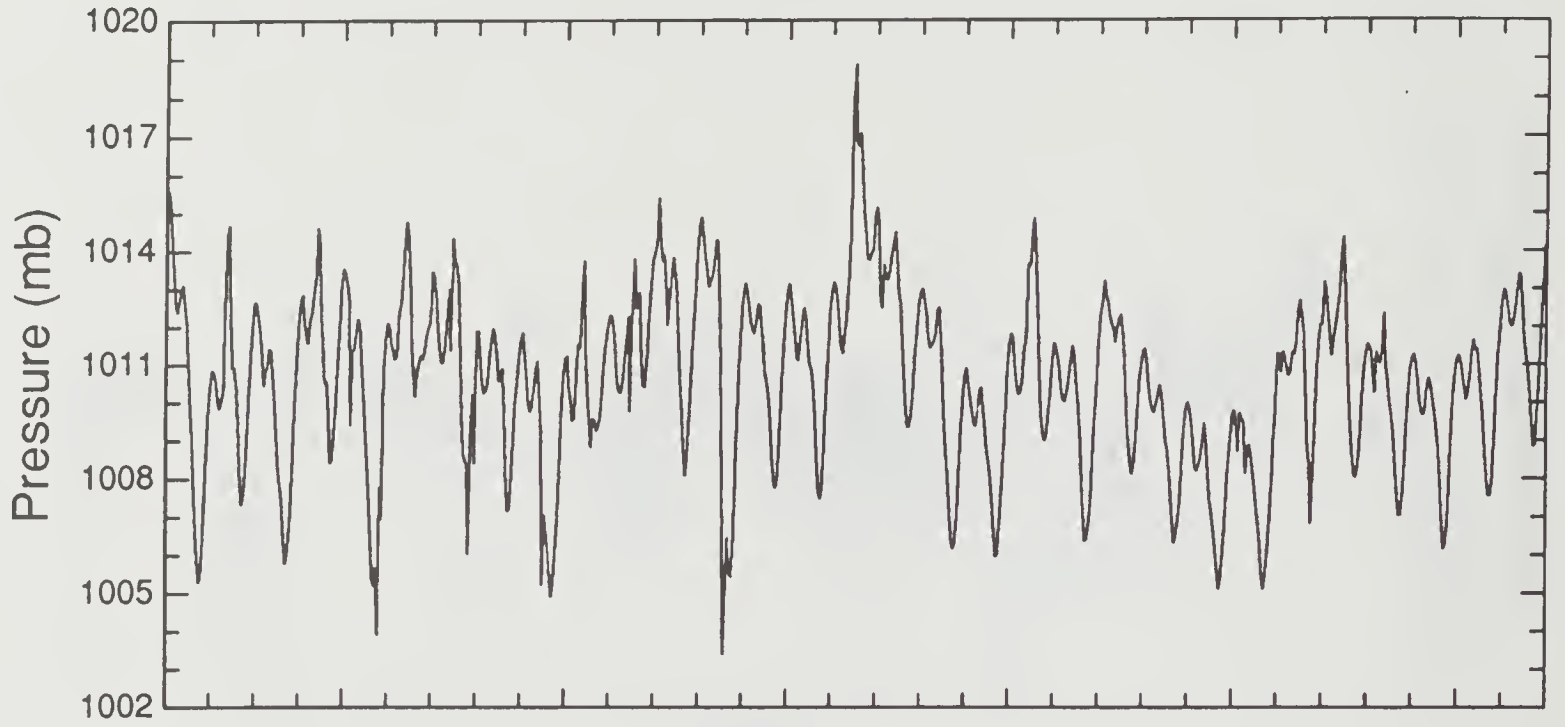


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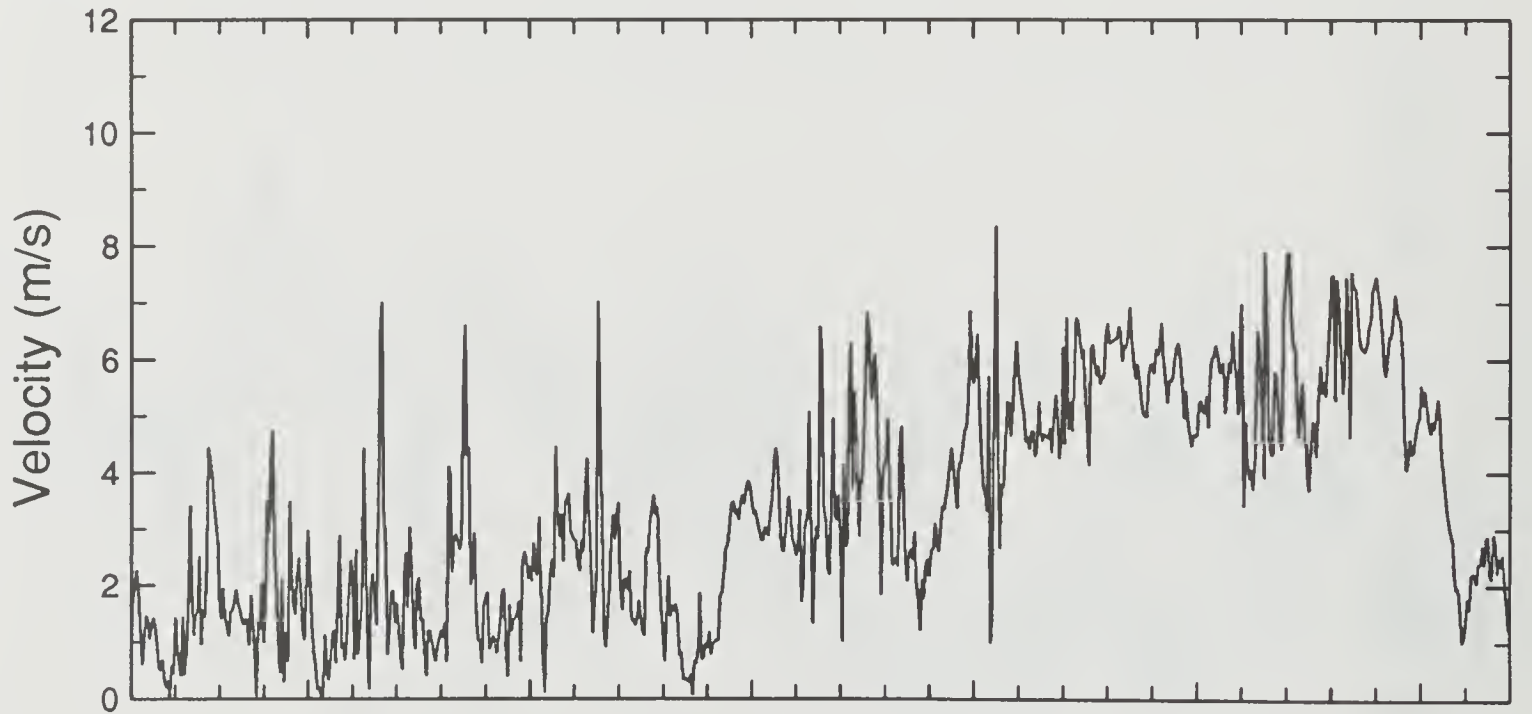




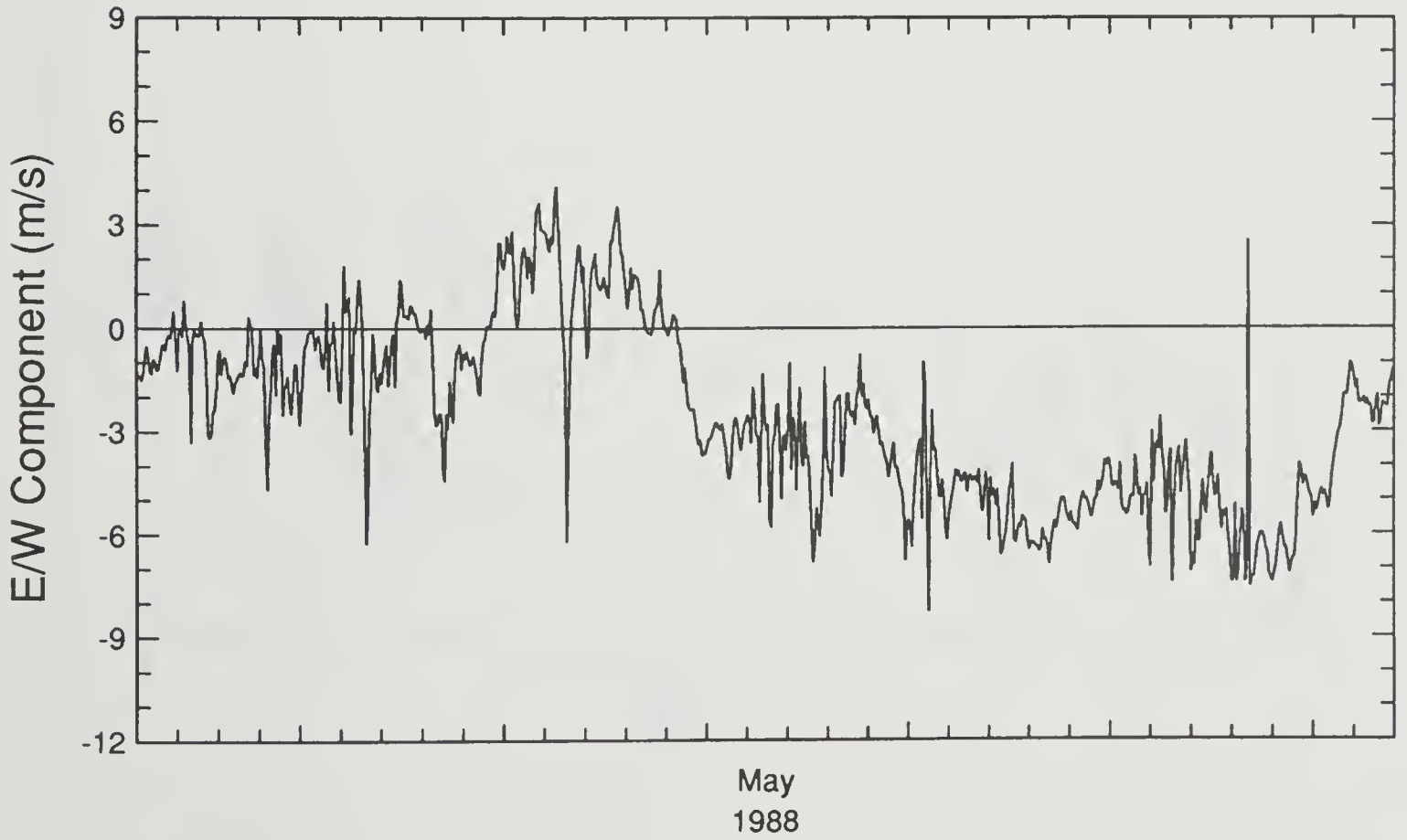
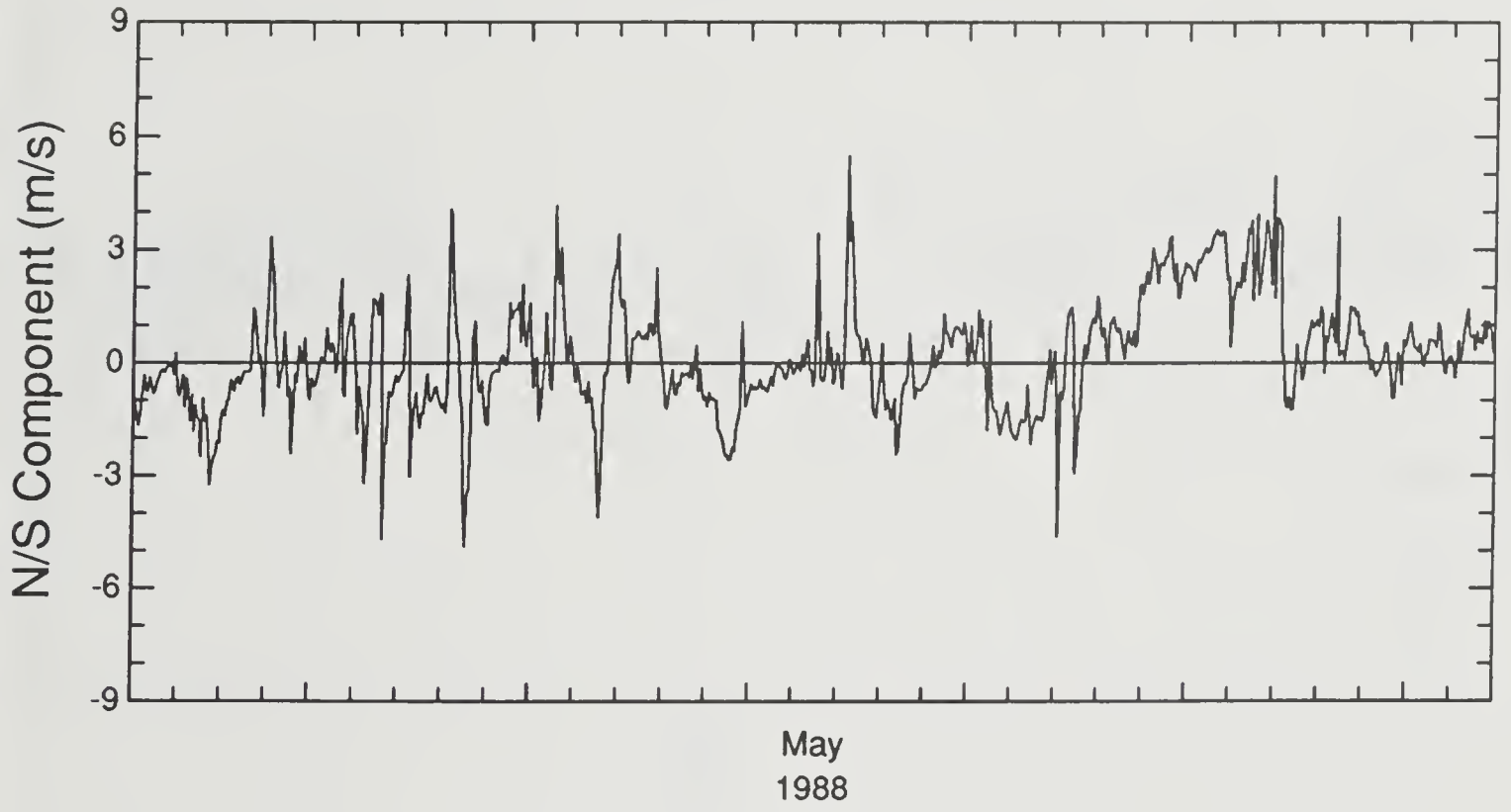
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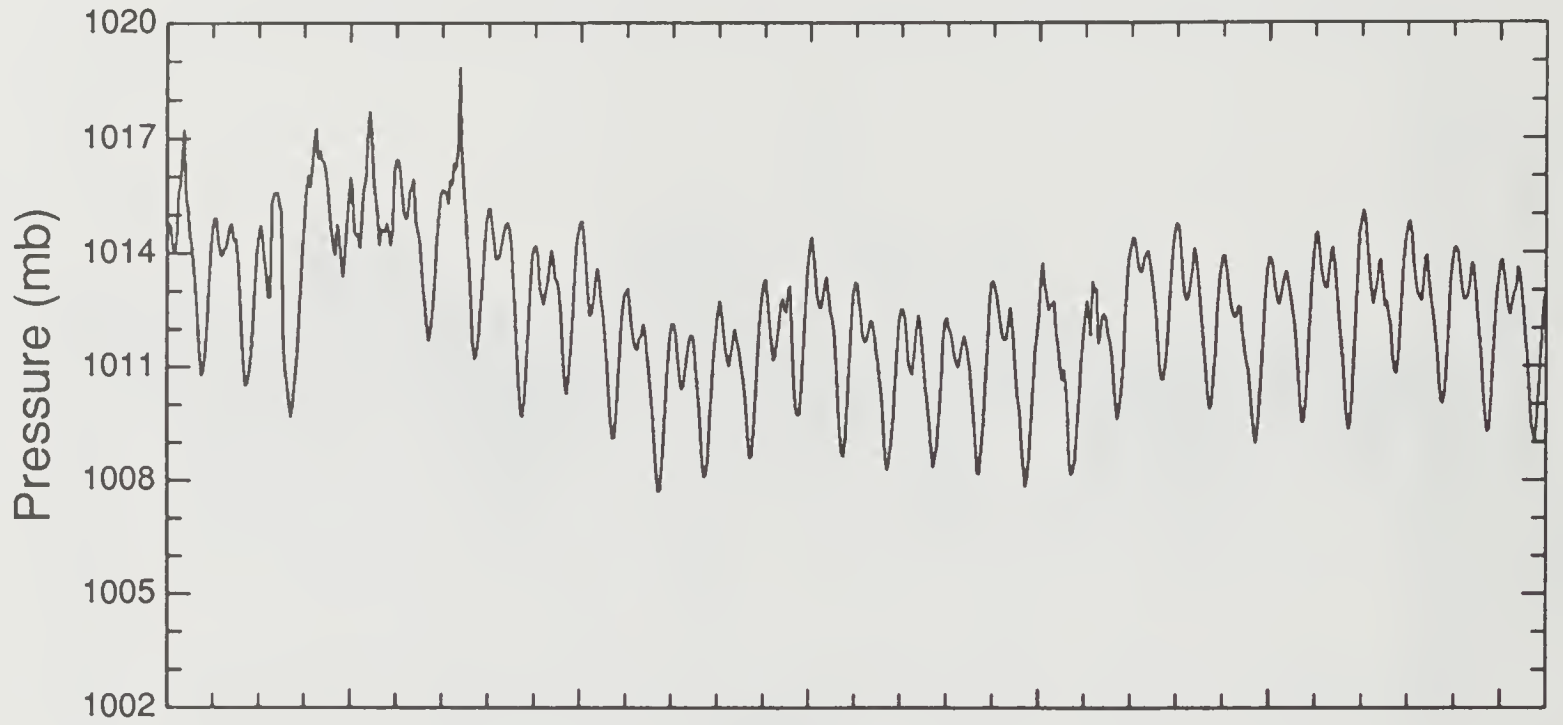
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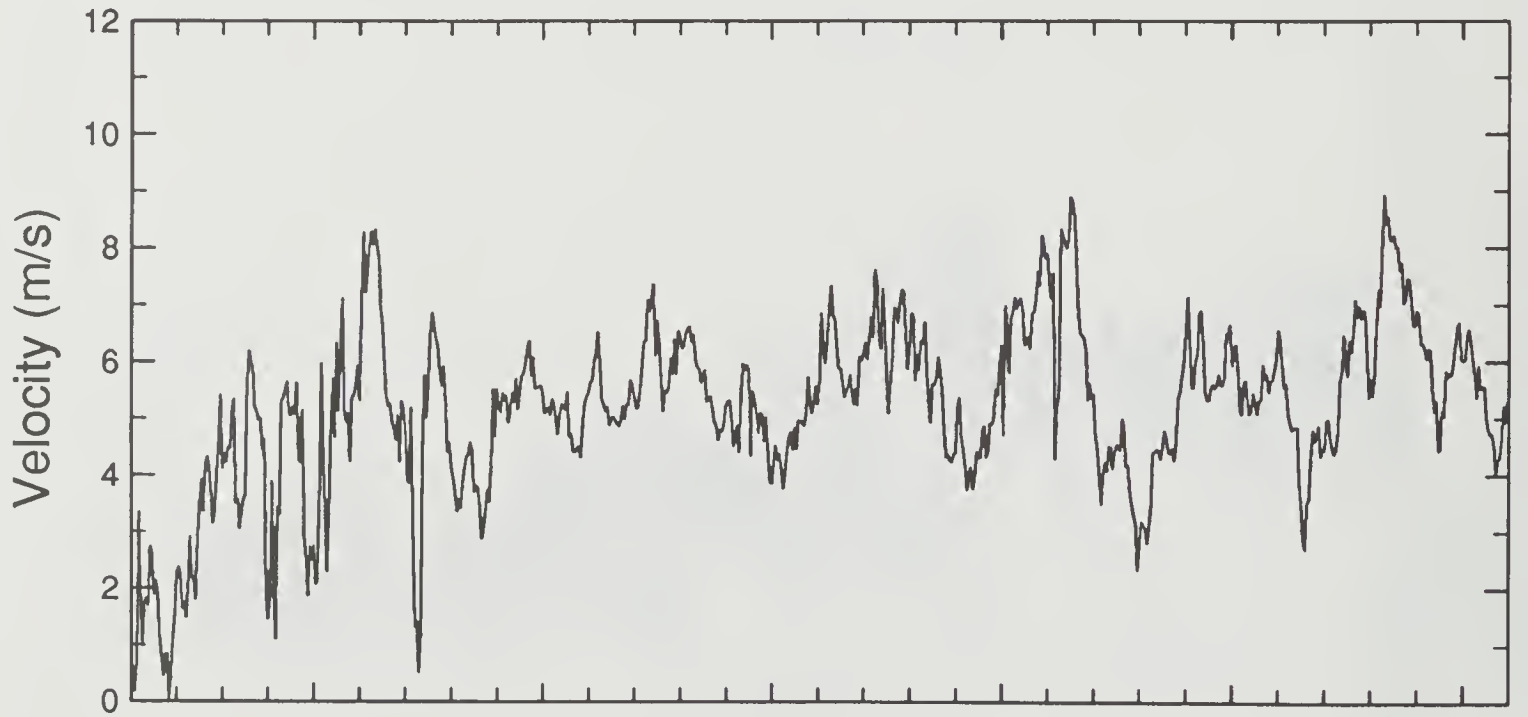
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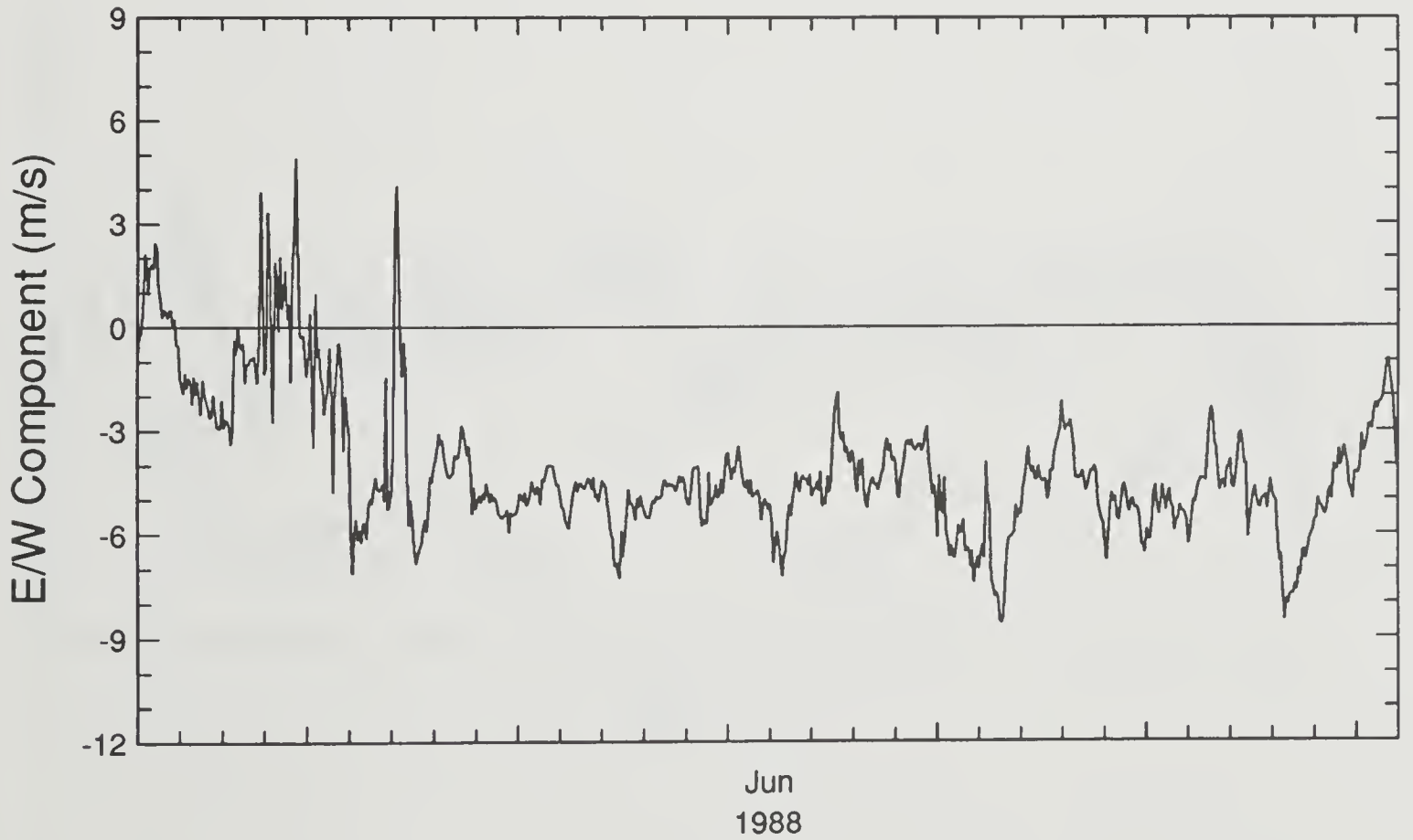
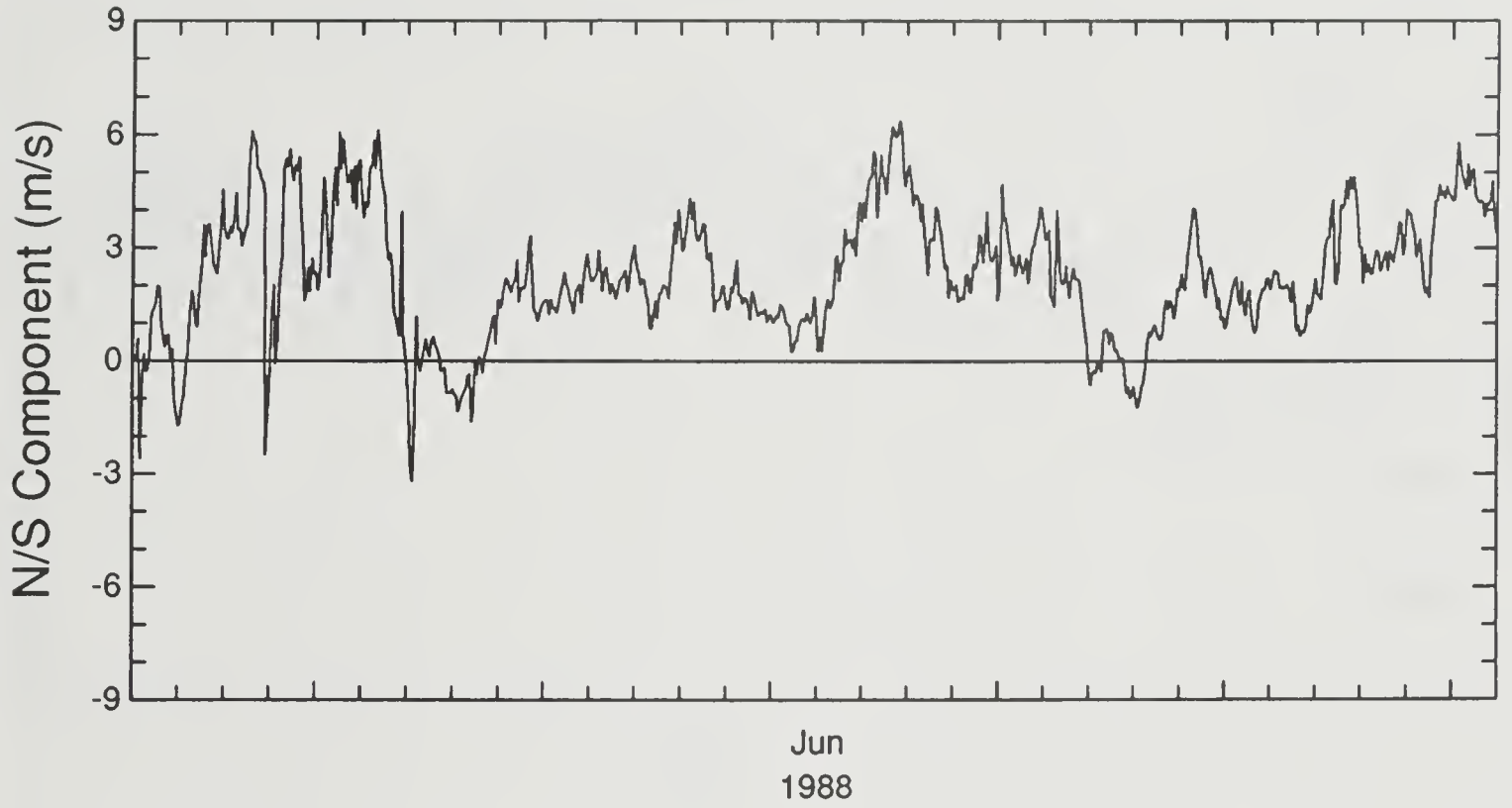
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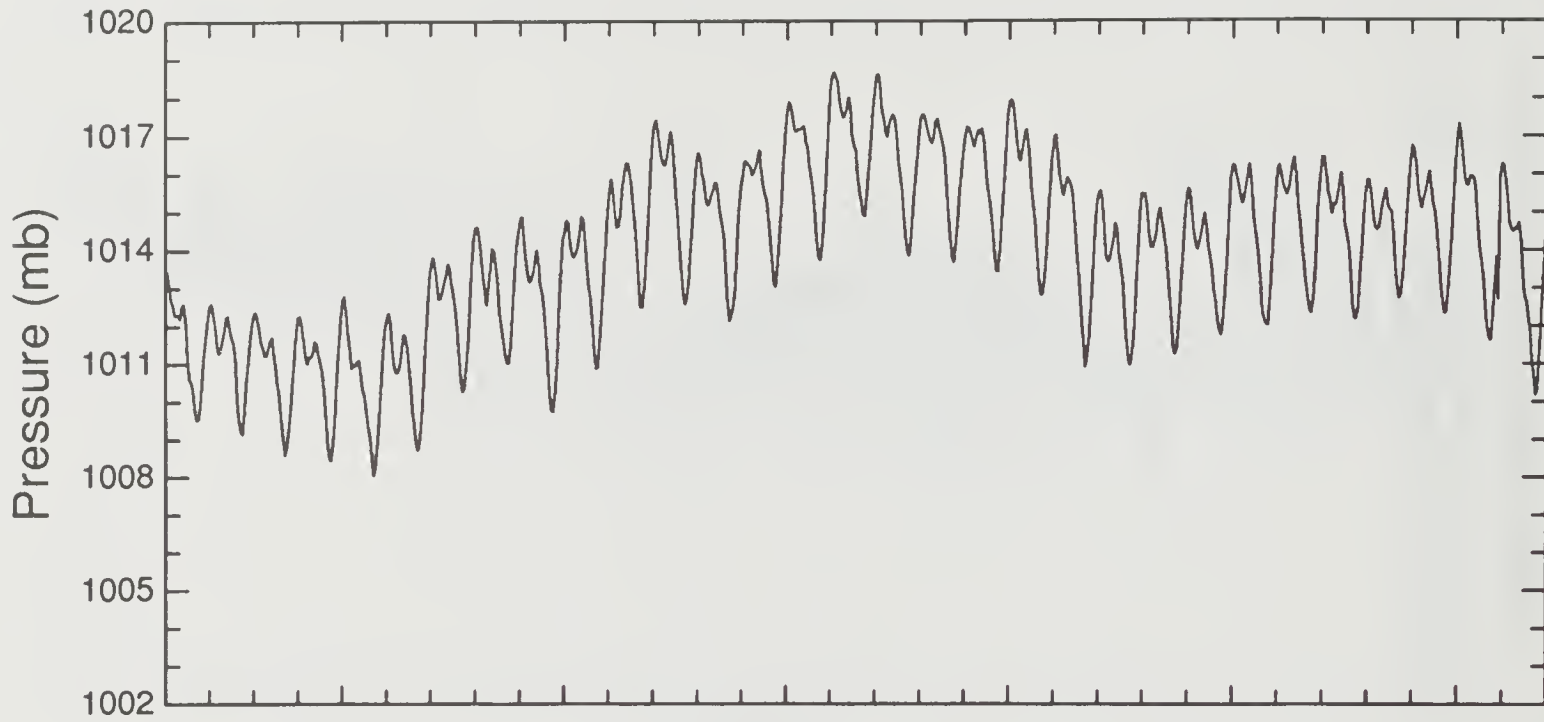
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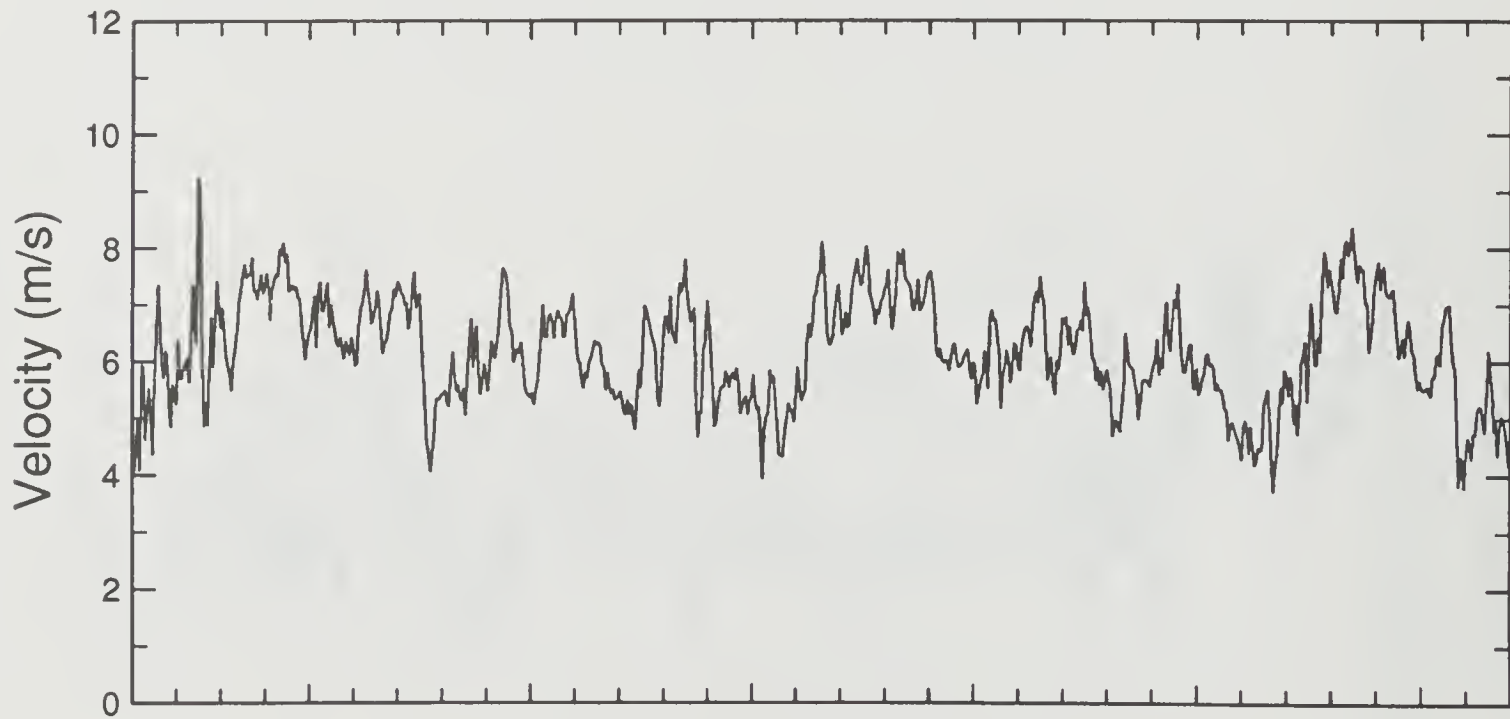
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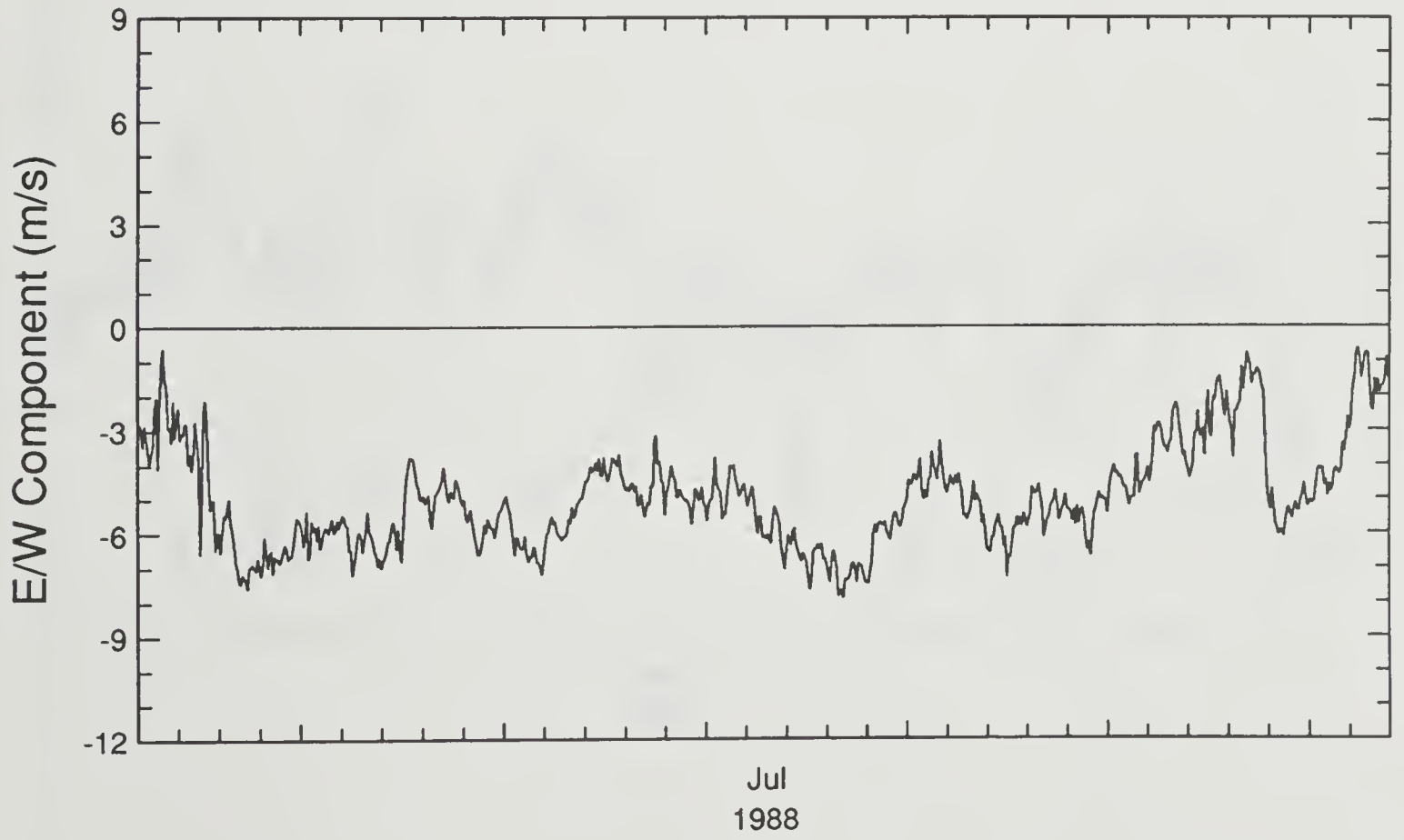
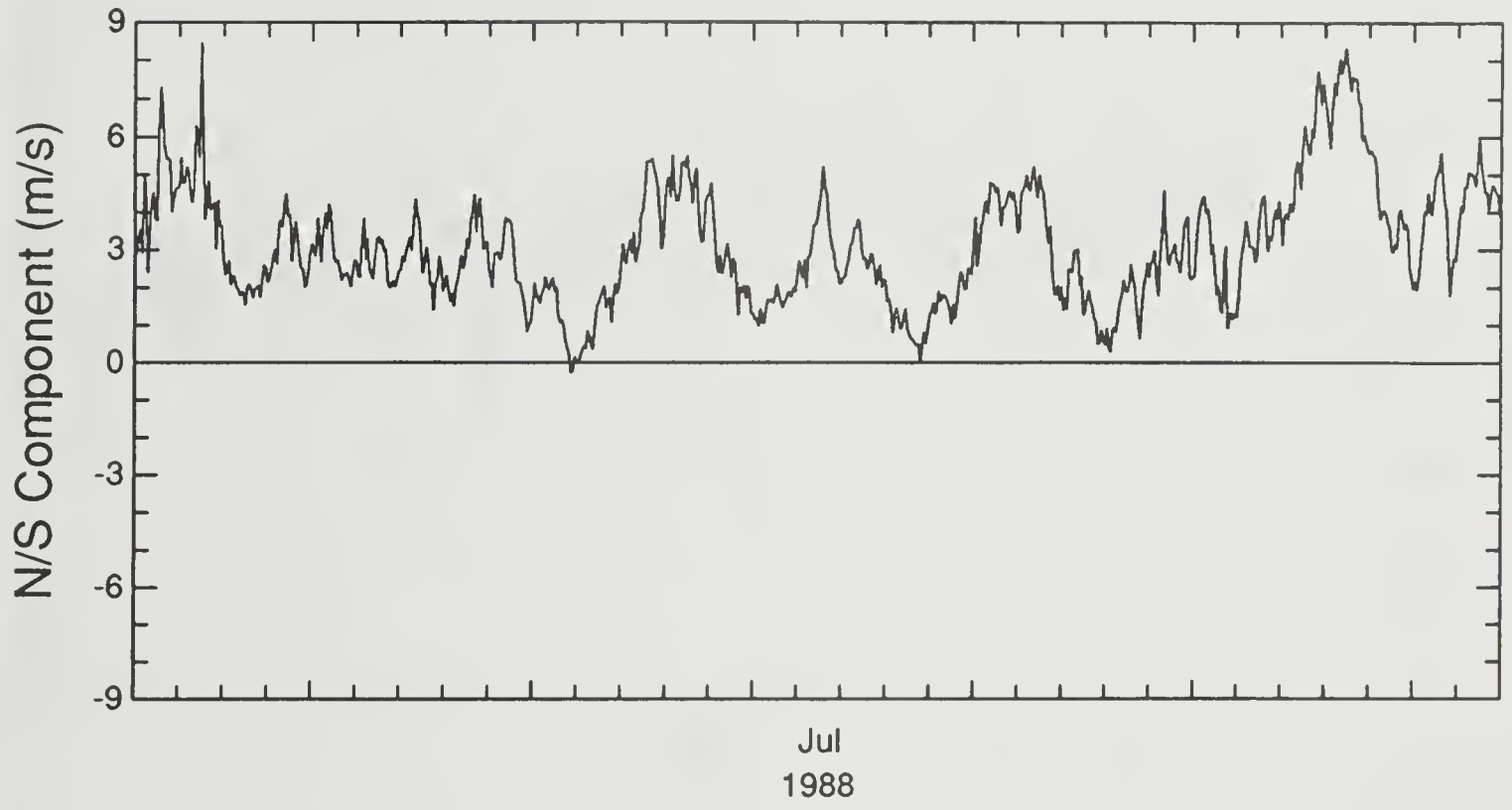
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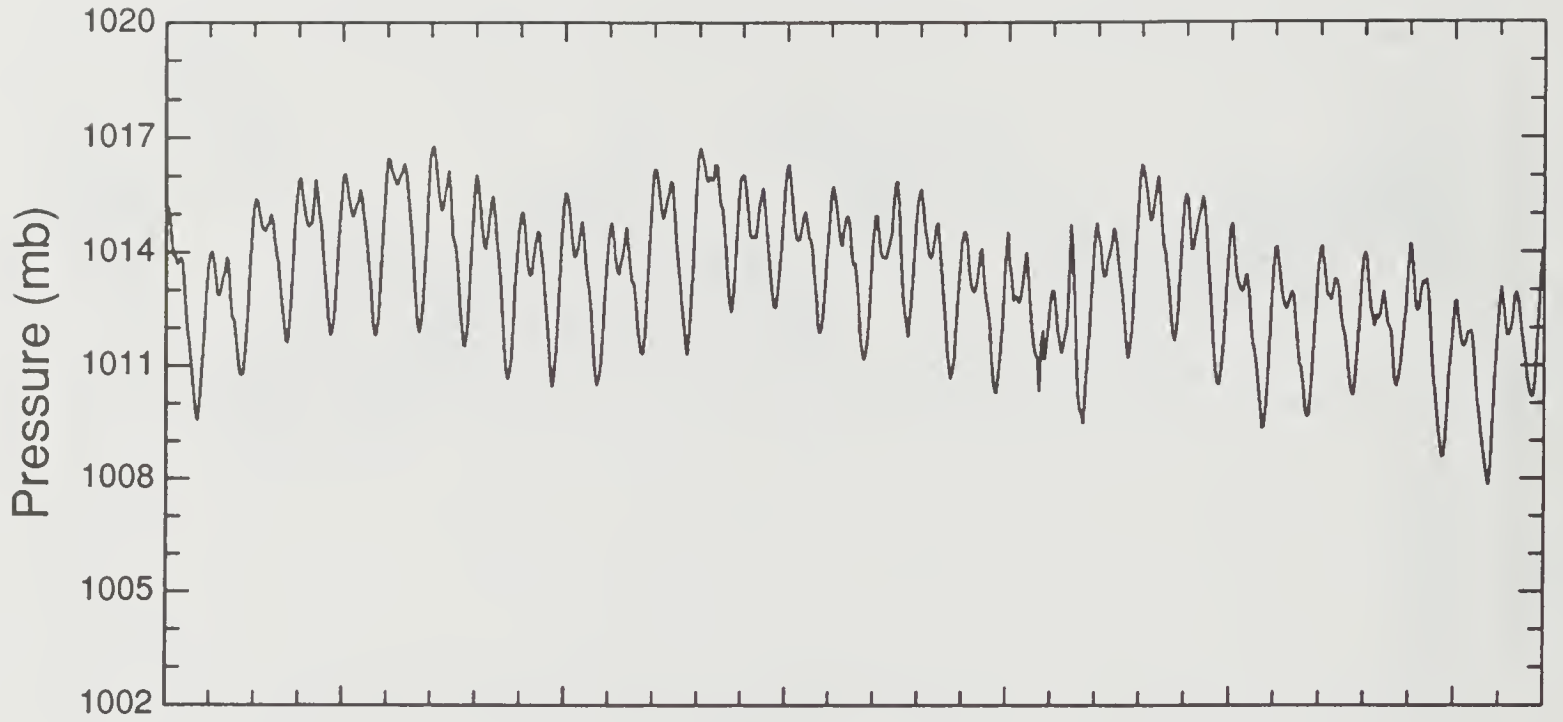
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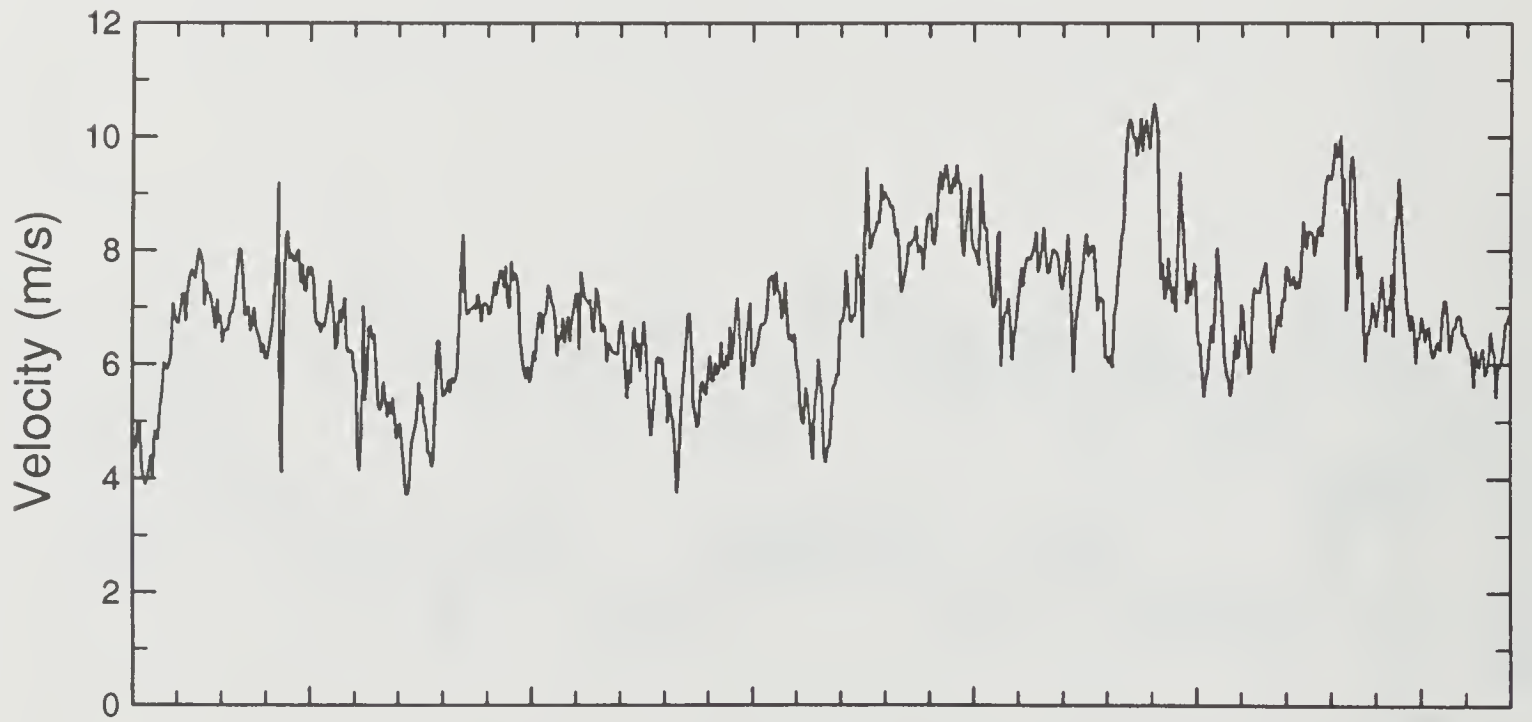
Jul
1988



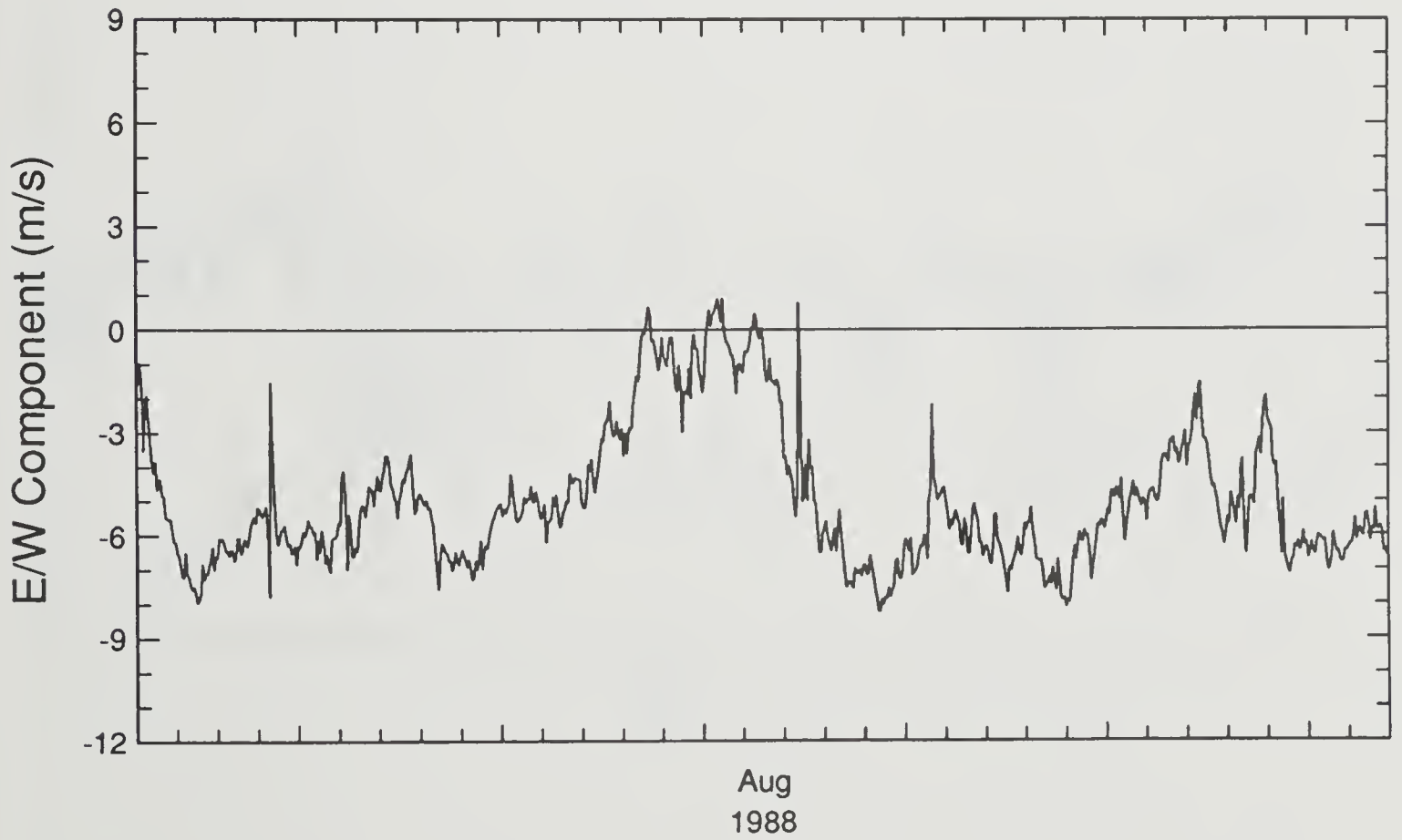
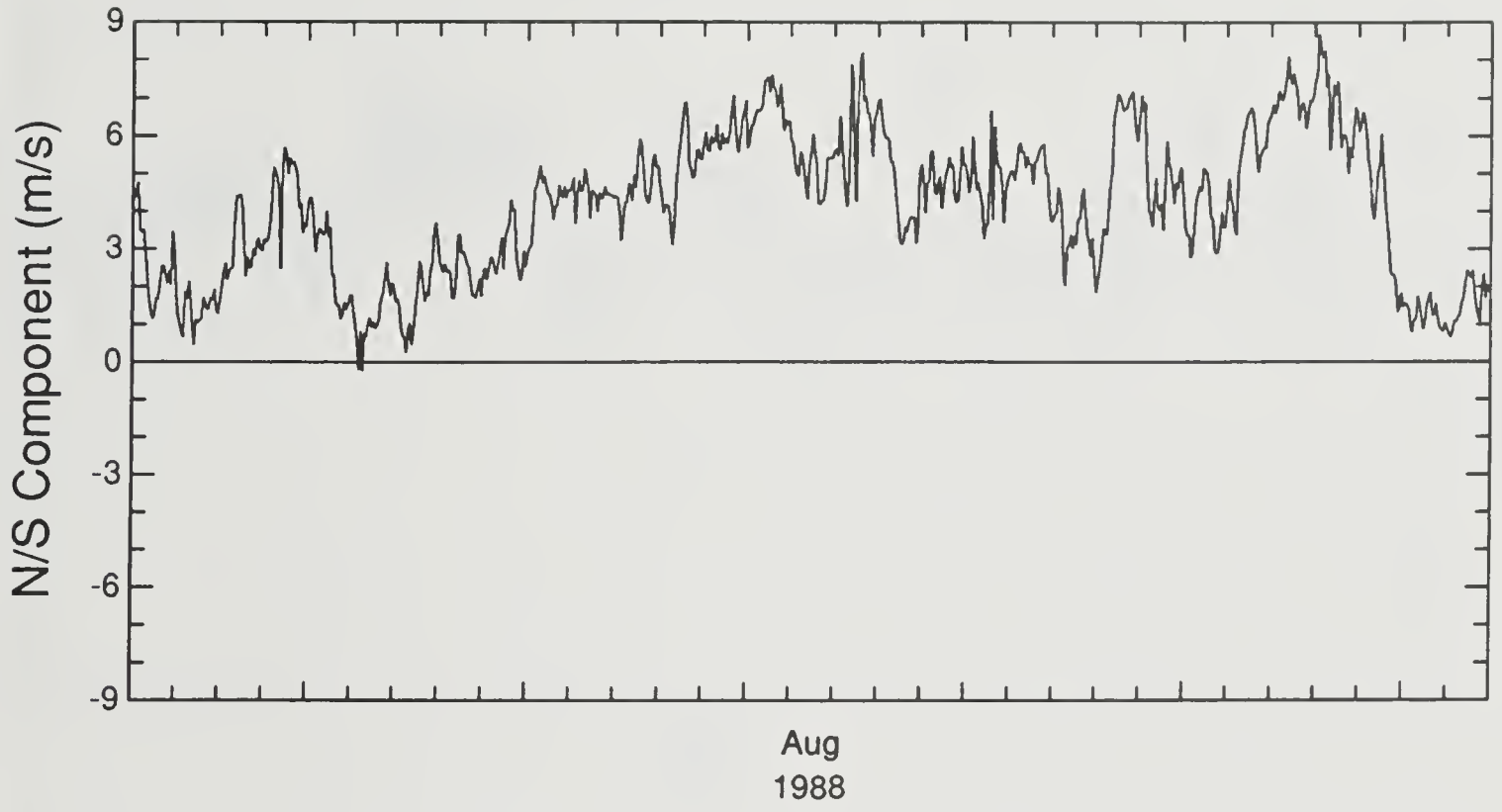
August



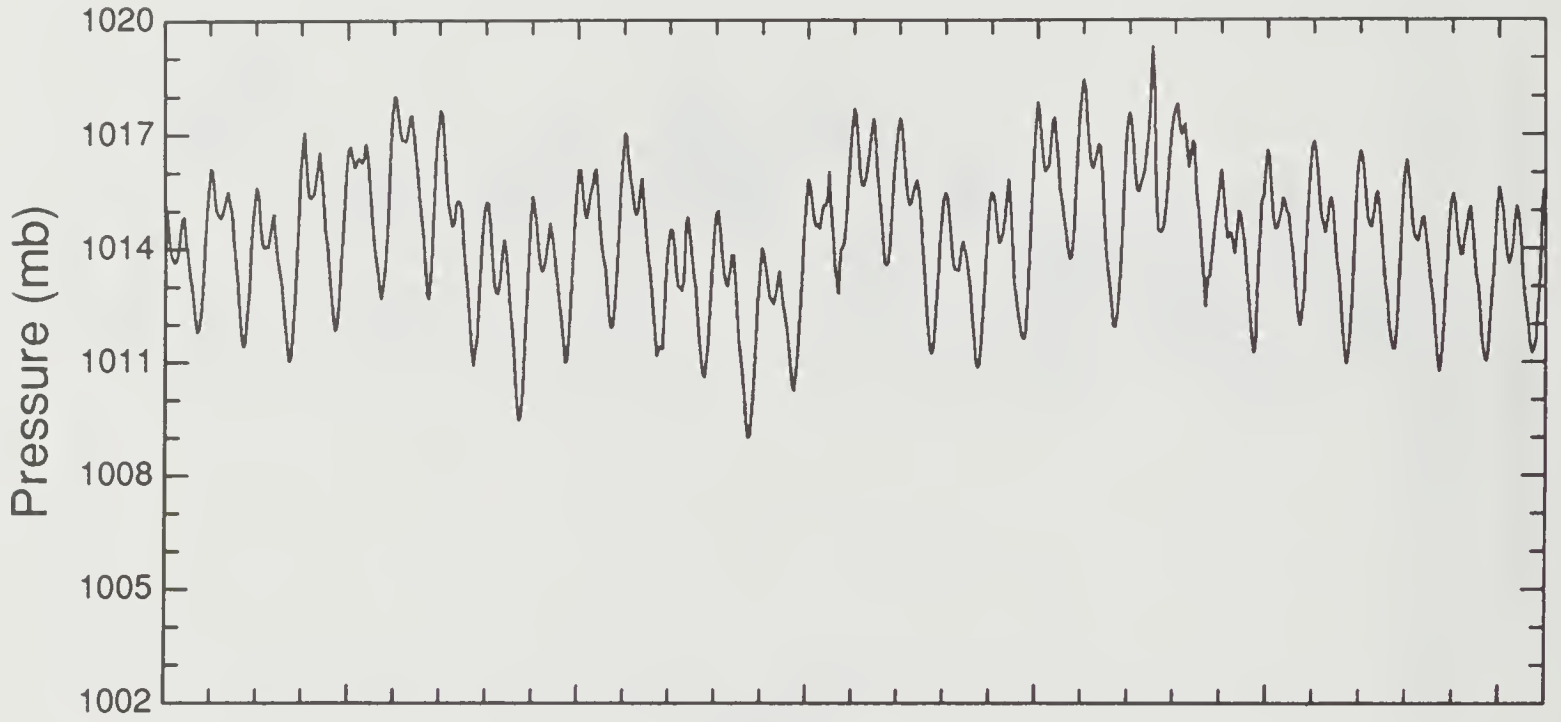
Aug
1988



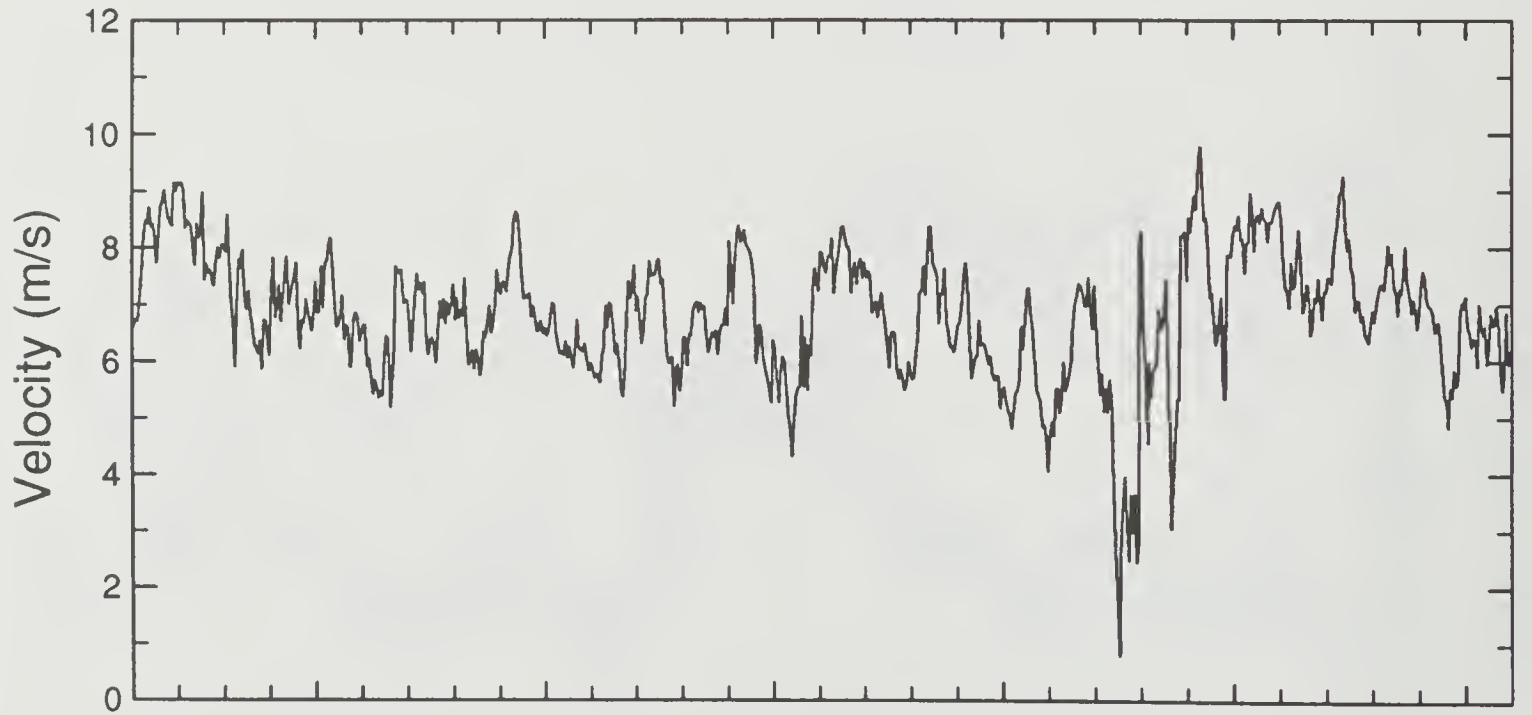
Aug
1988



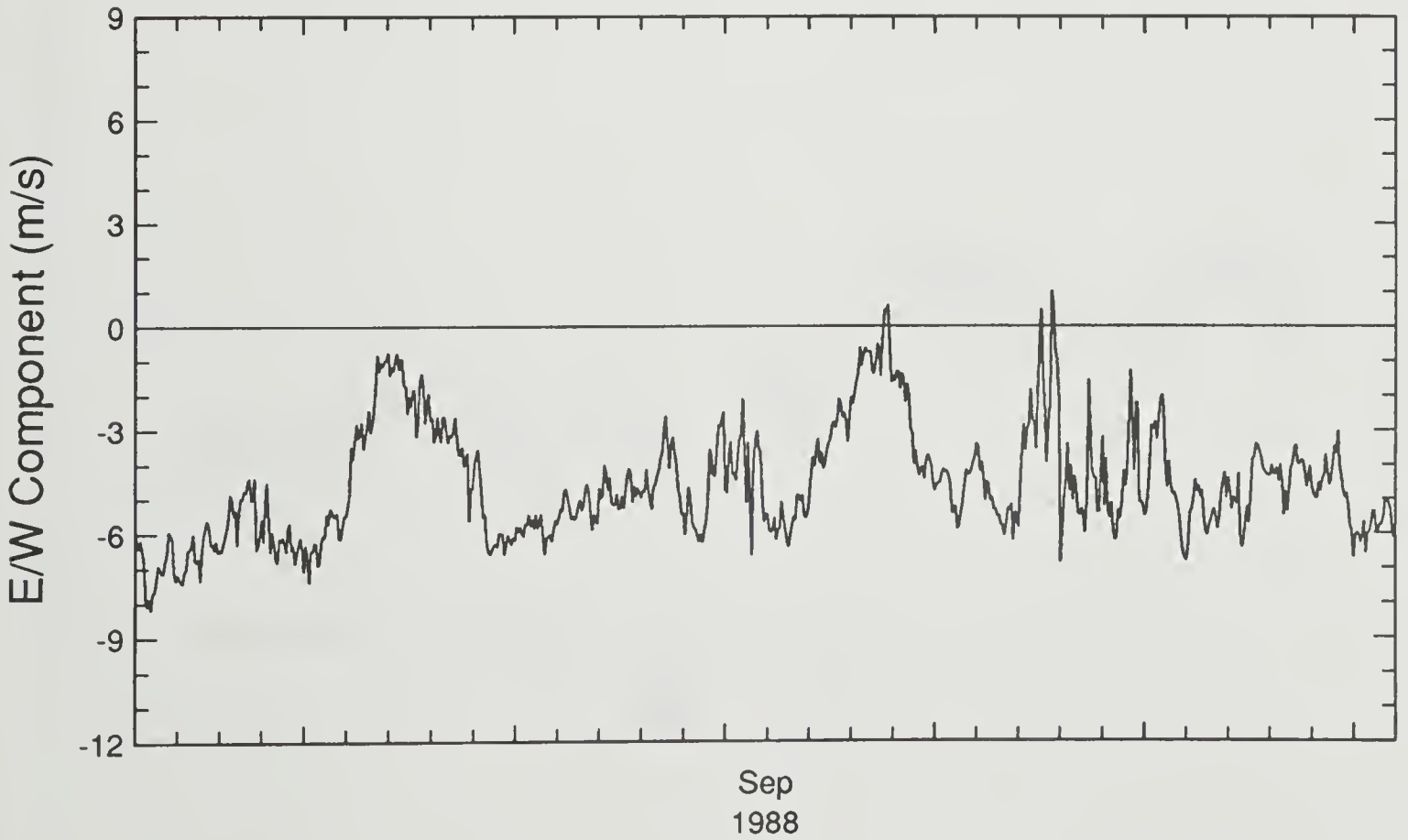
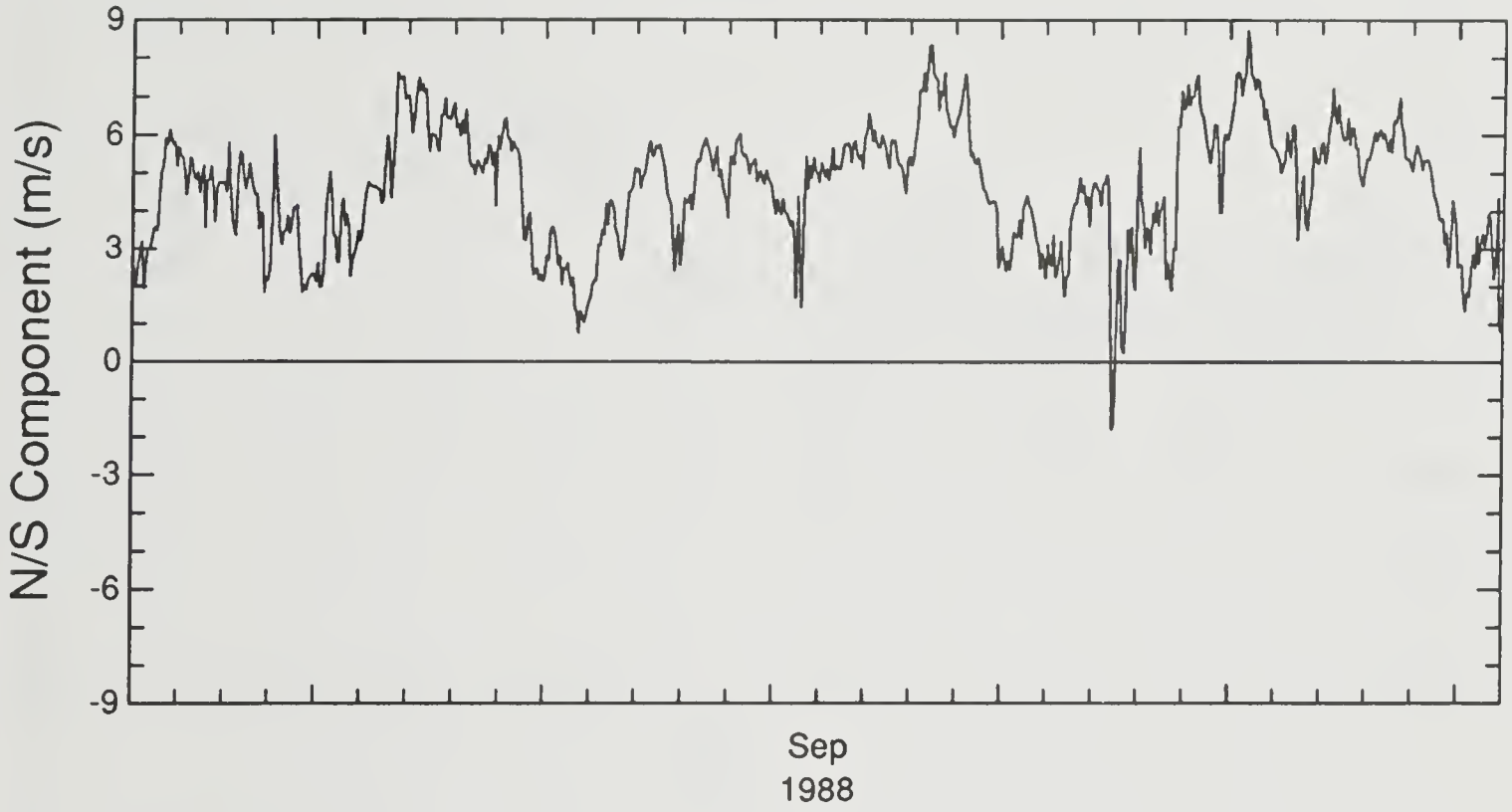
September



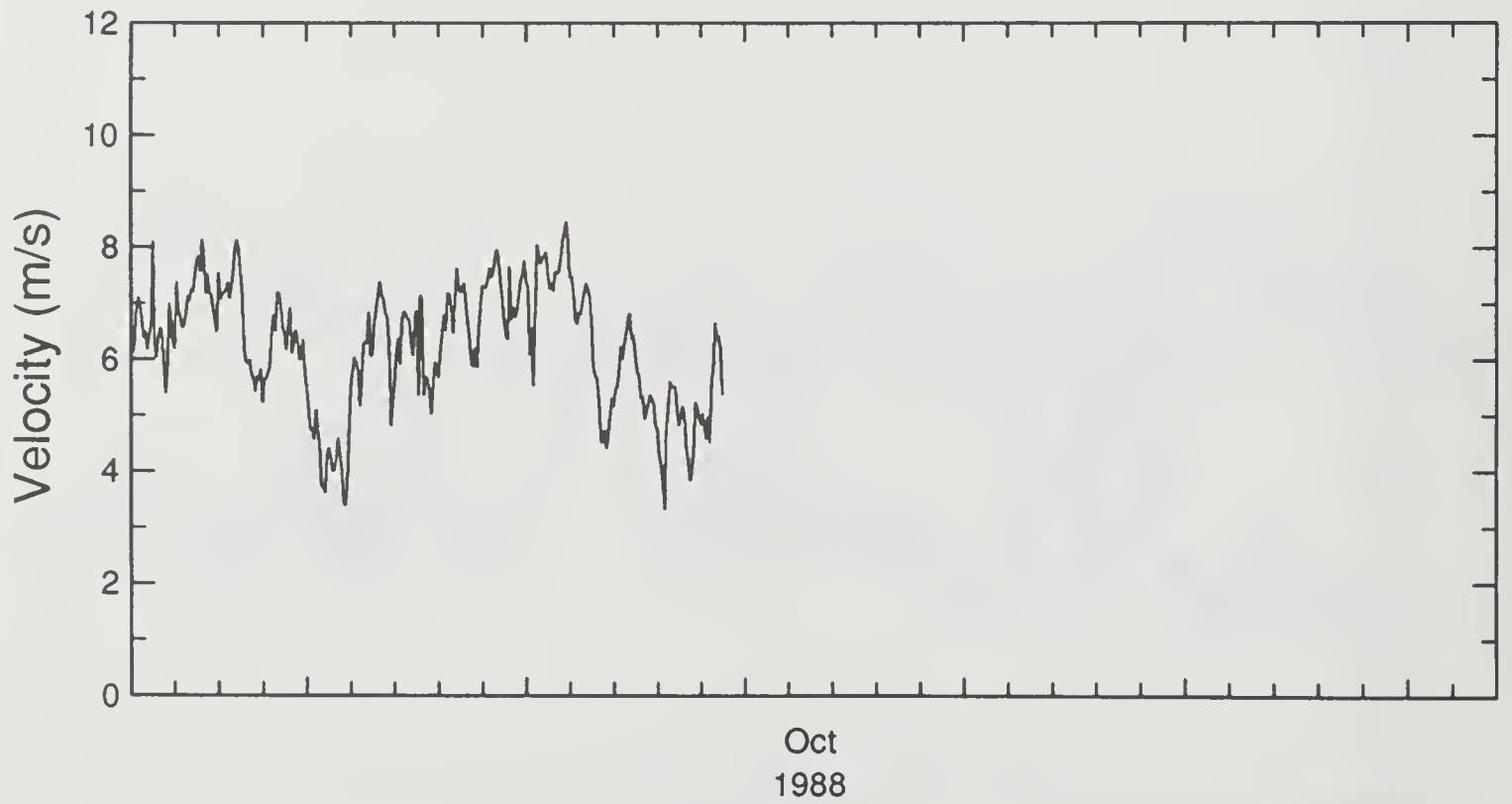
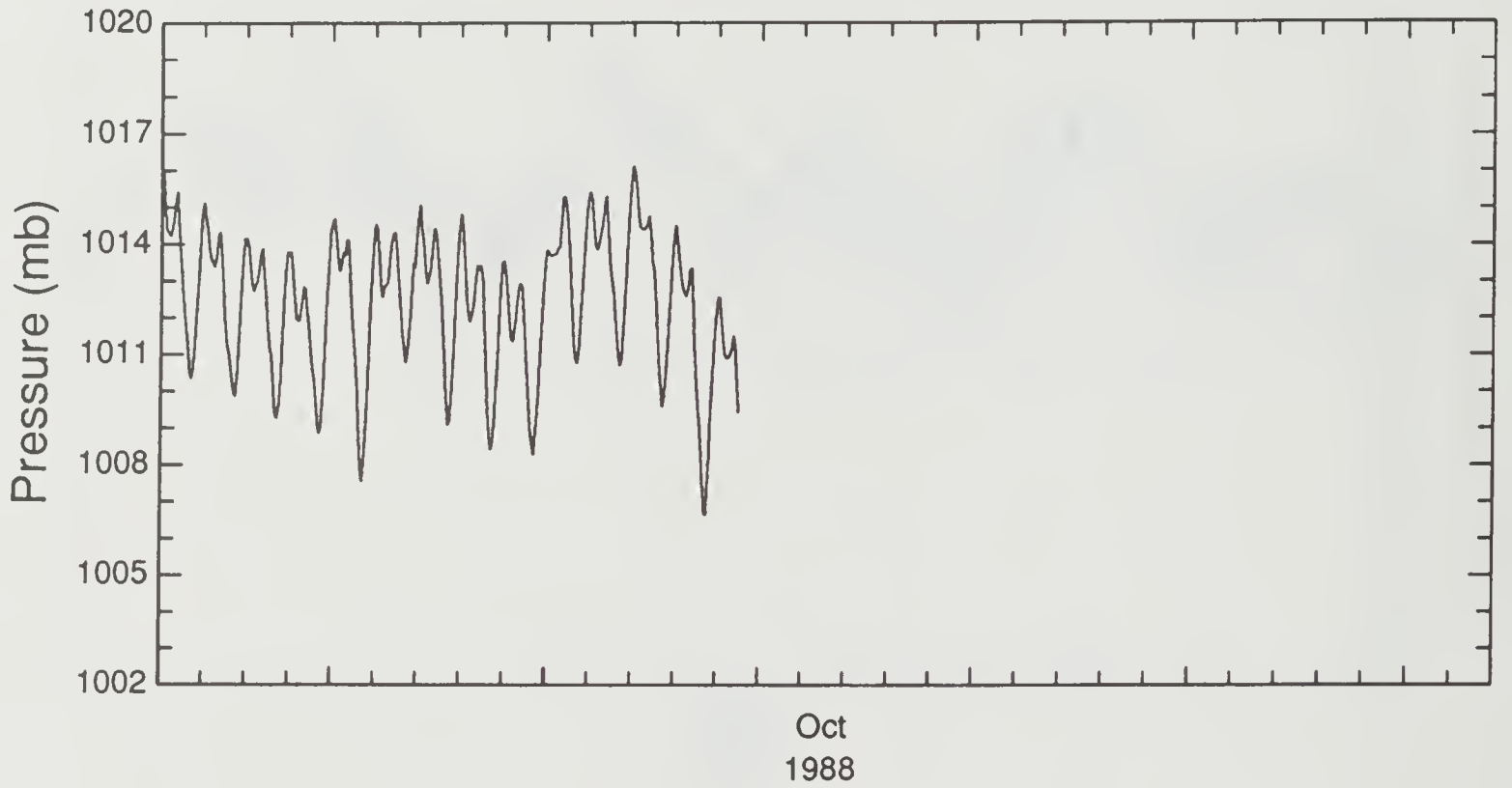
Sep
1988

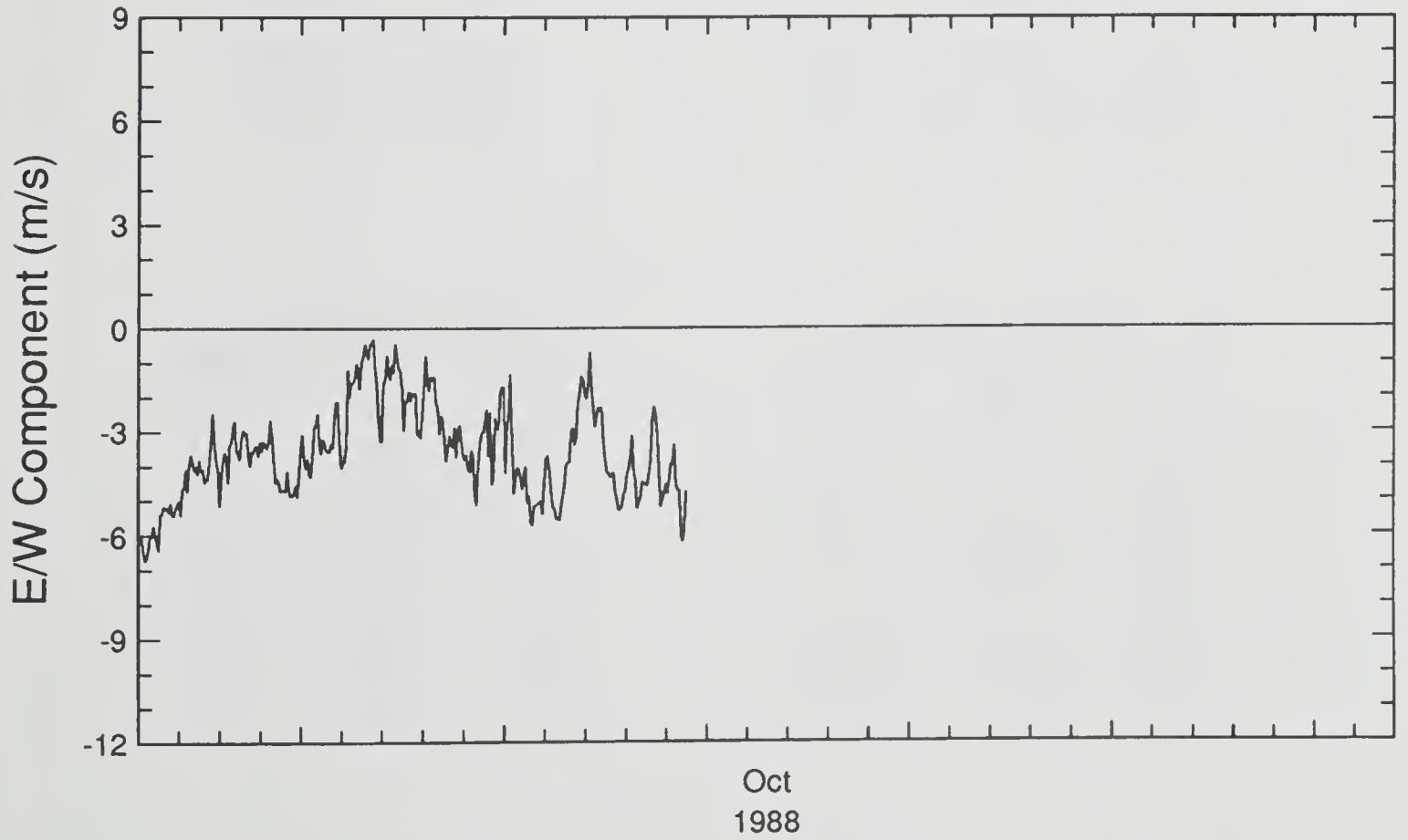
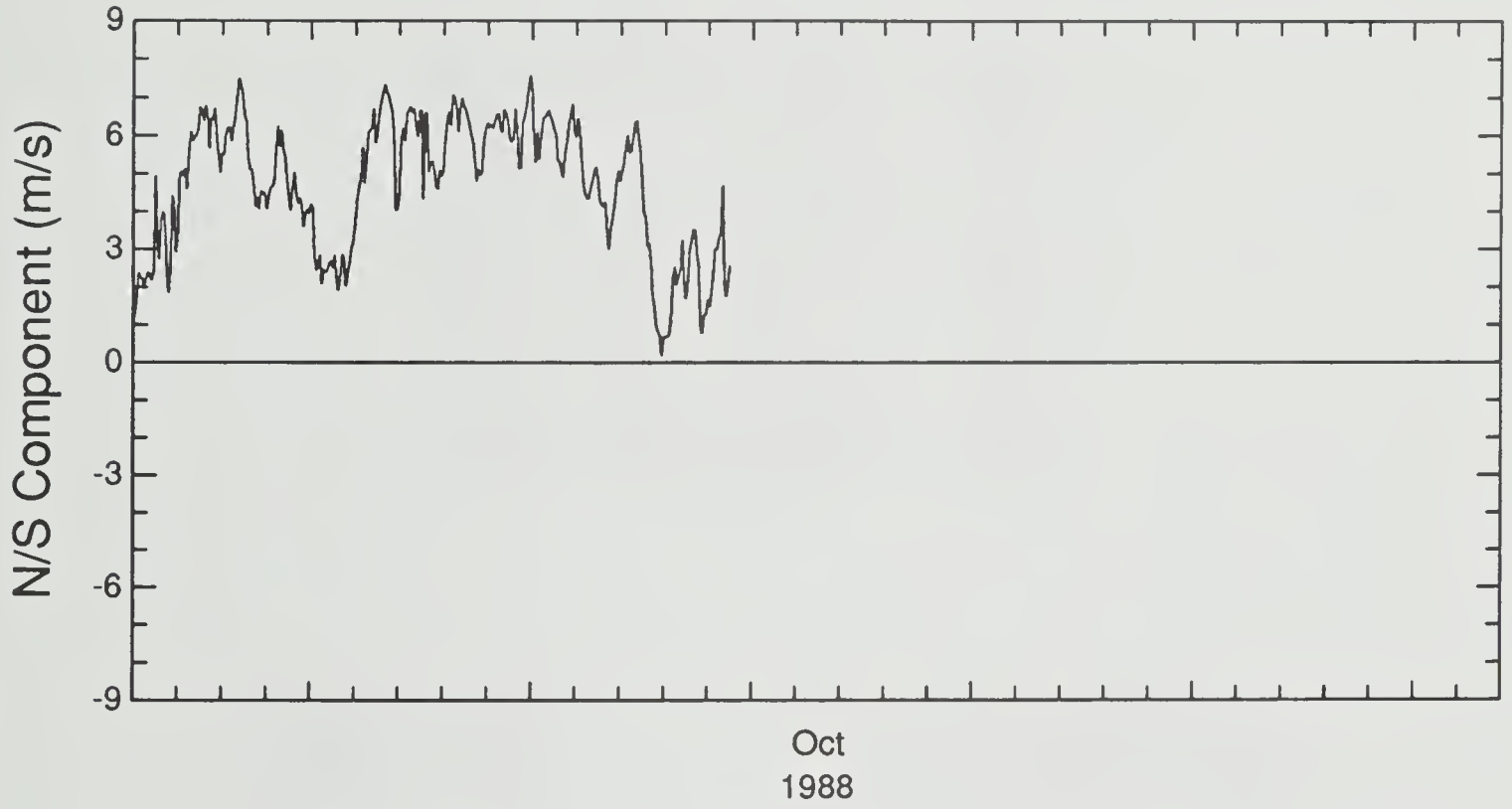


Sep
1988



October





1988 Pressure (mb)			
Month	Mean	Std Dev	# Pts
Jan	1011.56	2.16	744
Feb	1009.98	3.08	696
Mar	1009.35	3.02	744
Apr	1009.04	2.60	720
May	1010.58	2.32	744
Jun	1012.45	1.96	720
Jul	1013.98	2.26	744
Aug	1013.30	1.75	744
Sep	1014.27	1.82	720
Oct	1012.43	1.91	325

1988 Velocity		
Month	Mean	Std Dev
Jan	2.25	1.67
Feb	2.53	1.67
Mar	2.33	1.33
Apr	1.65	1.62
May	3.04	1.99
Jun	4.68	1.51
Jul	5.87	0.93
Aug	6.46	1.26
Sep	6.51	1.14
Oct	5.92	1.10

1988 Direction	
Month	Mean
Jan	-125.24
Feb	-129.86
Mar	-135.69
Apr	-114.56
May	-86.17
Jun	-60.80
Jul	-57.88
Aug	-50.08
Sep	-44.44
Oct	-37.45

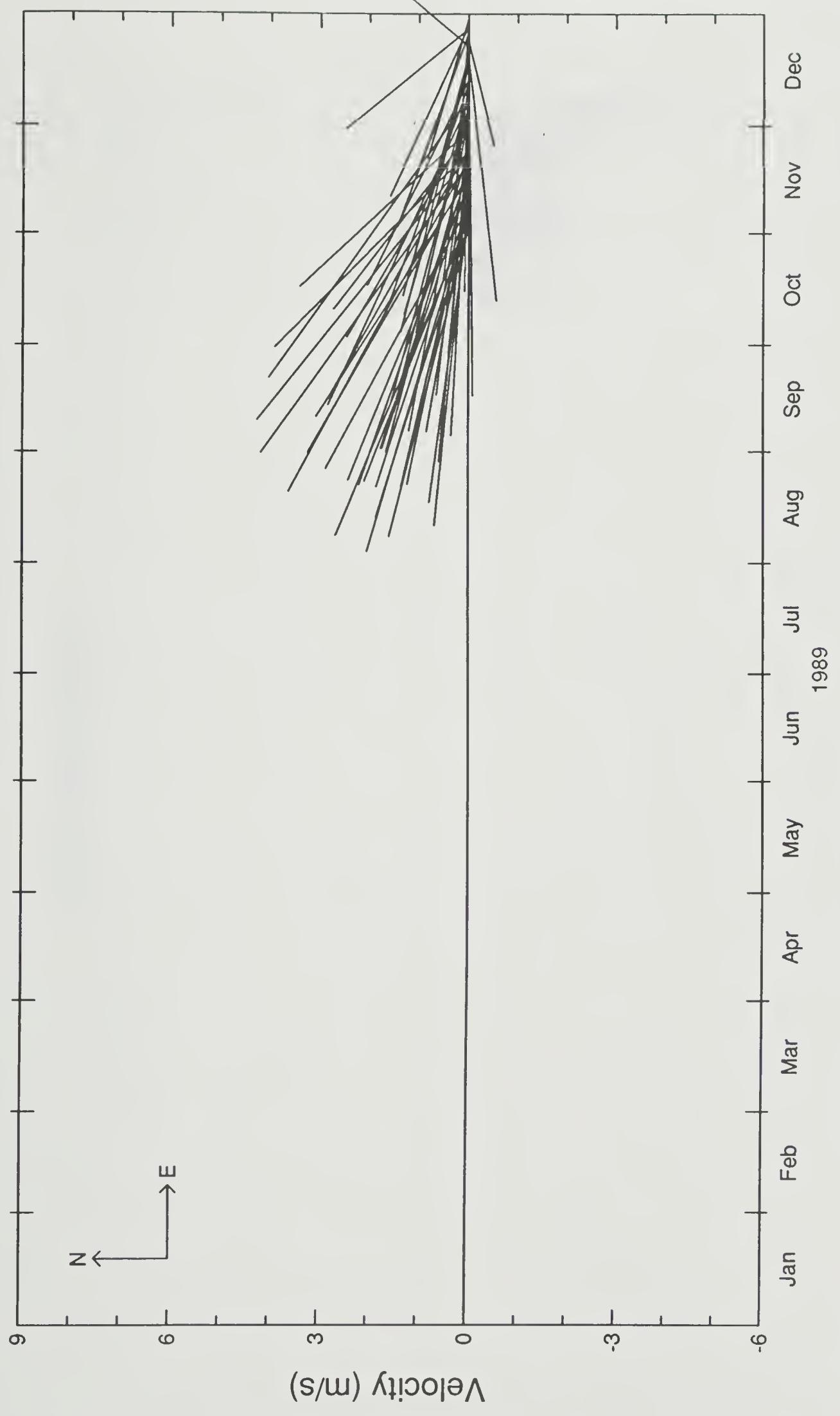
1988 N-S Component		
Month	Mean	Std Dev
Jan	-1.30	1.82
Feb	-1.62	1.73
Mar	-1.67	1.45
Apr	-0.69	1.40
May	0.17	1.47
Jun	2.28	1.69
Jul	3.12	1.57
Aug	4.15	1.88
Sep	4.65	1.59
Oct	4.70	1.76

1988 E-W Component		
Month	Mean	Std Dev
Jan	-1.84	1.81
Feb	-1.94	1.74
Mar	-1.63	1.68
Apr	-1.51	1.99
May	-2.54	2.62
Jun	-4.08	2.08
Jul	-4.97	1.49
Aug	-4.96	2.04
Sep	-4.56	1.64
Oct	-3.60	1.38

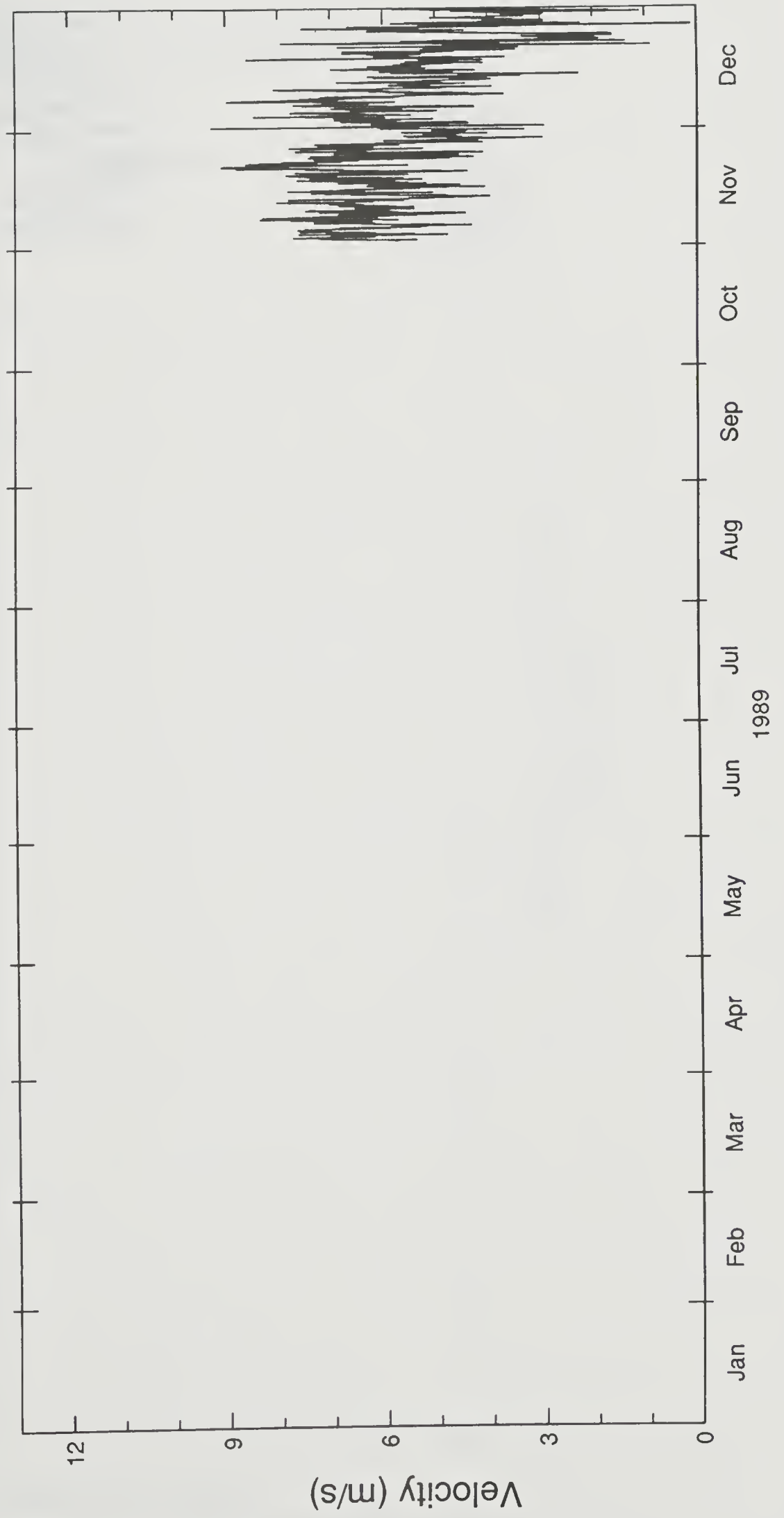
1989

November 2 - December 31

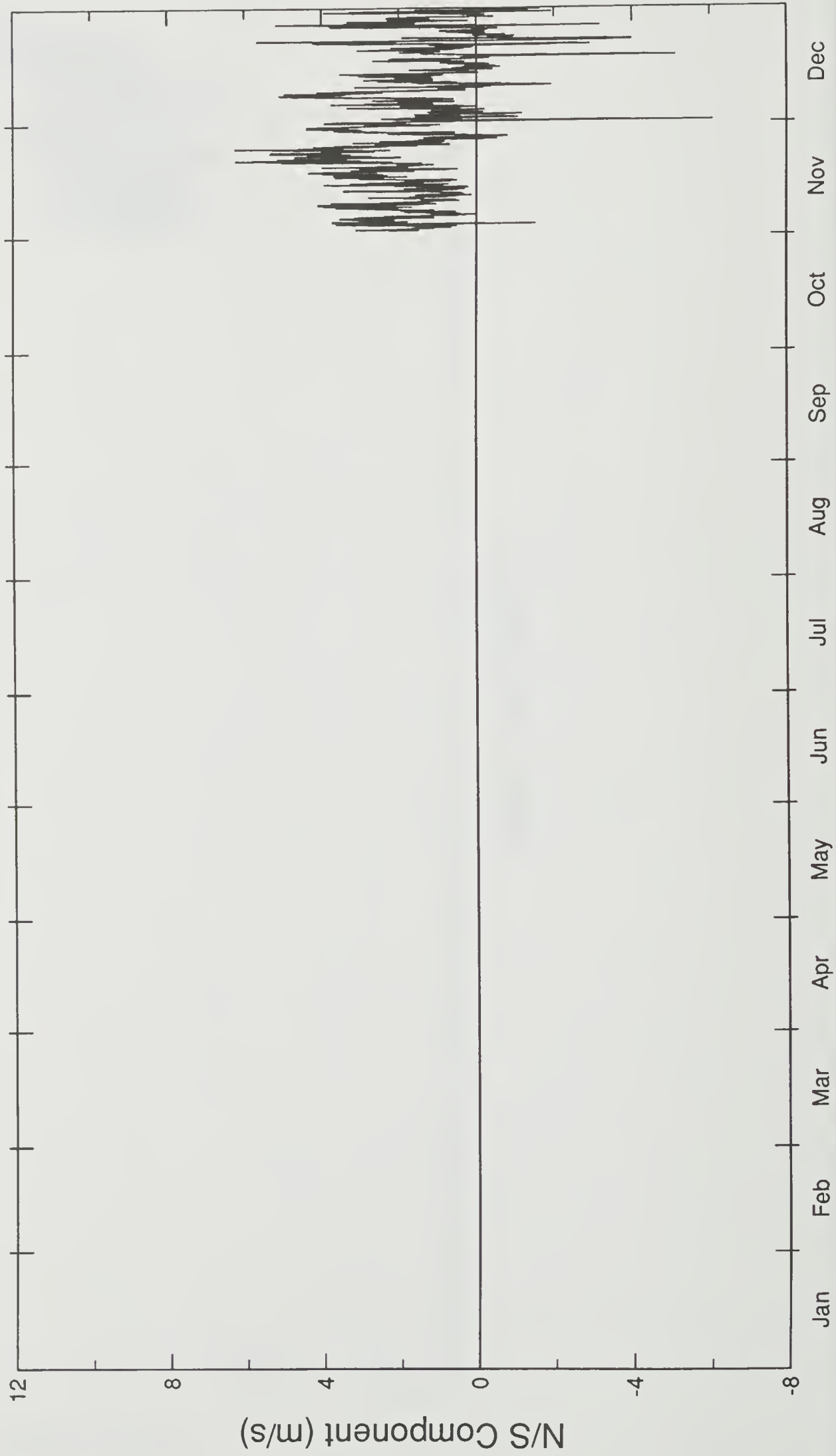
1989 Wind Speed (Daily Values)



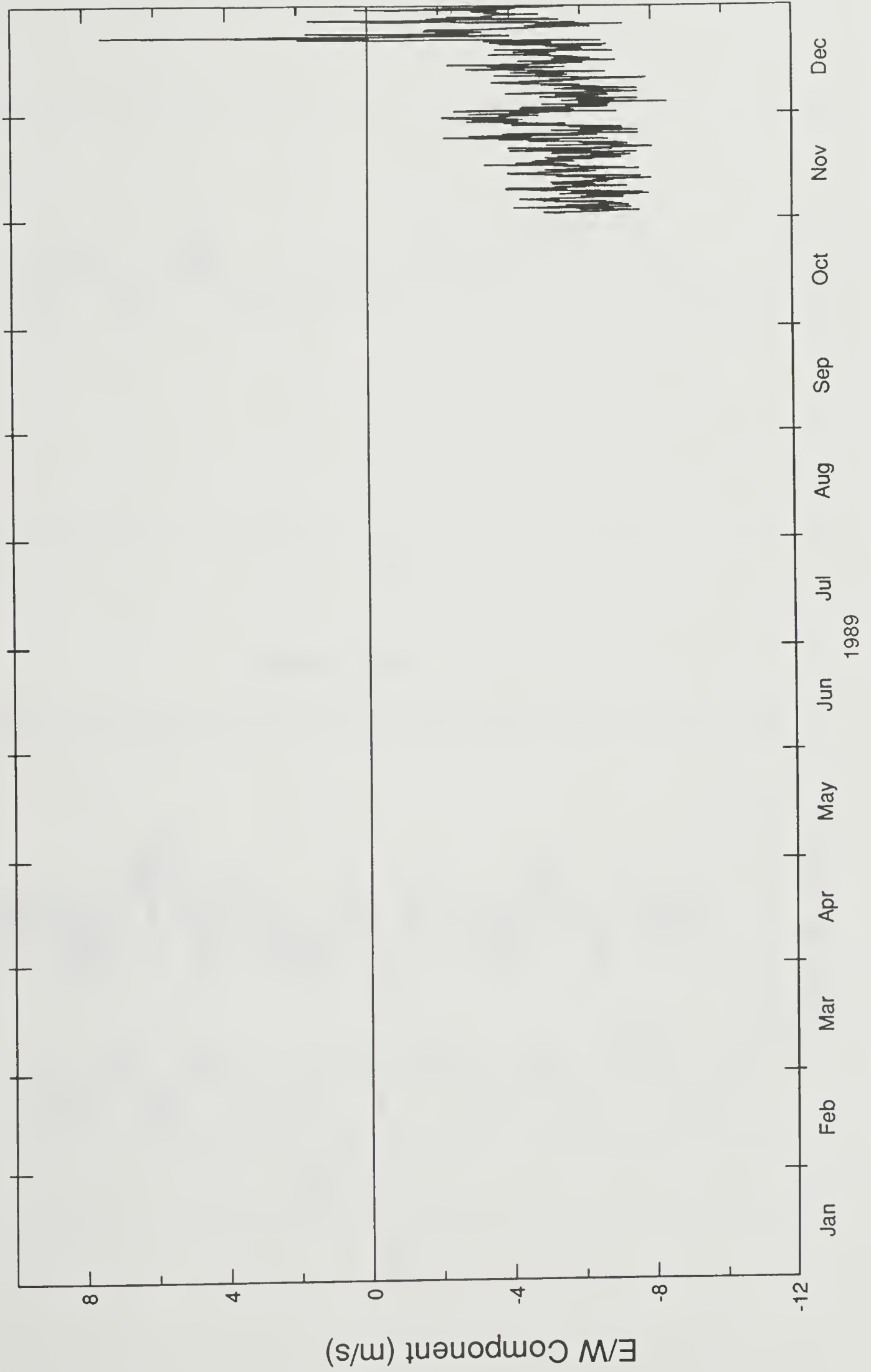
1989 Wind Speed



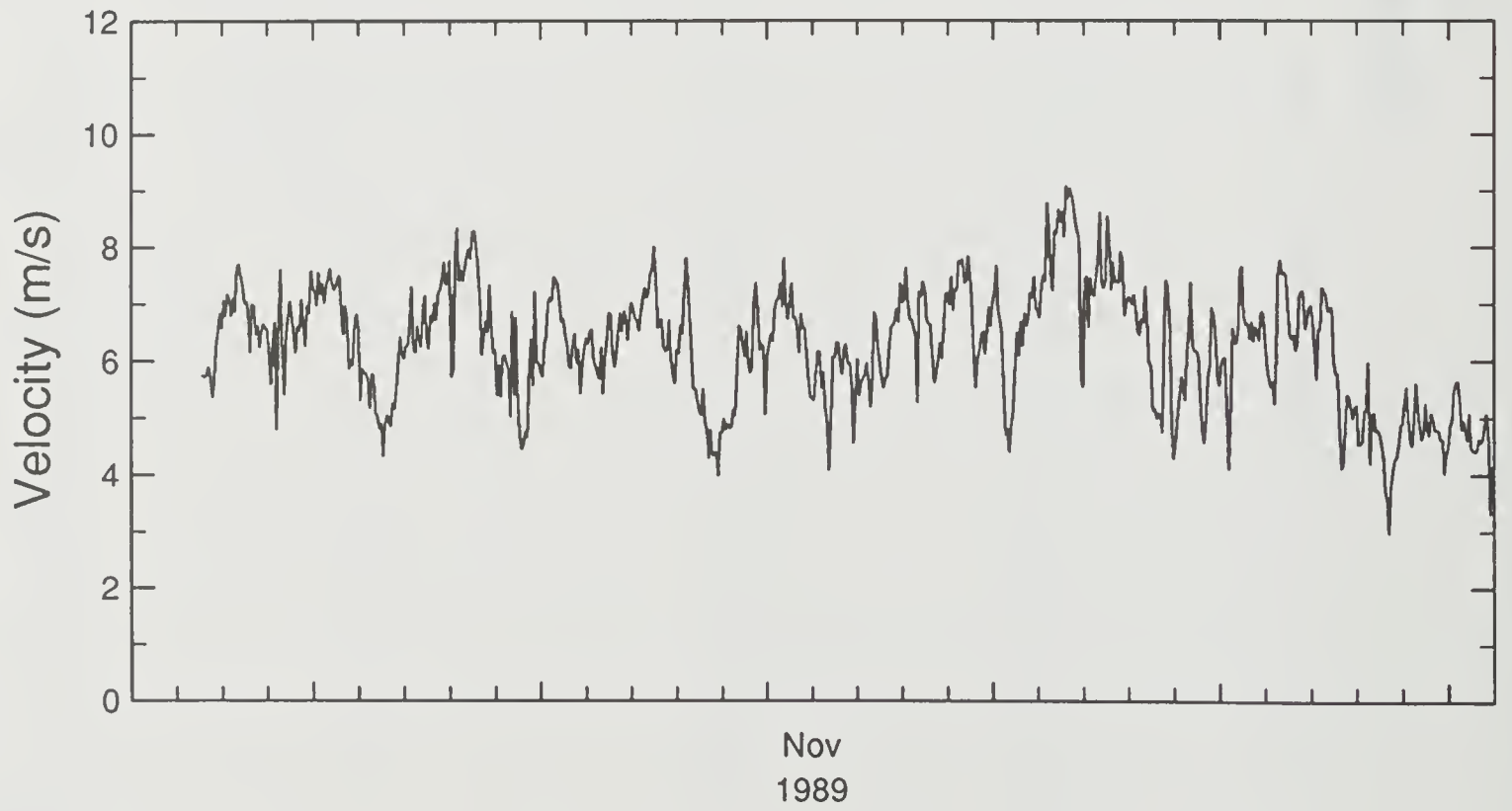
1989 Wind Meridional Component

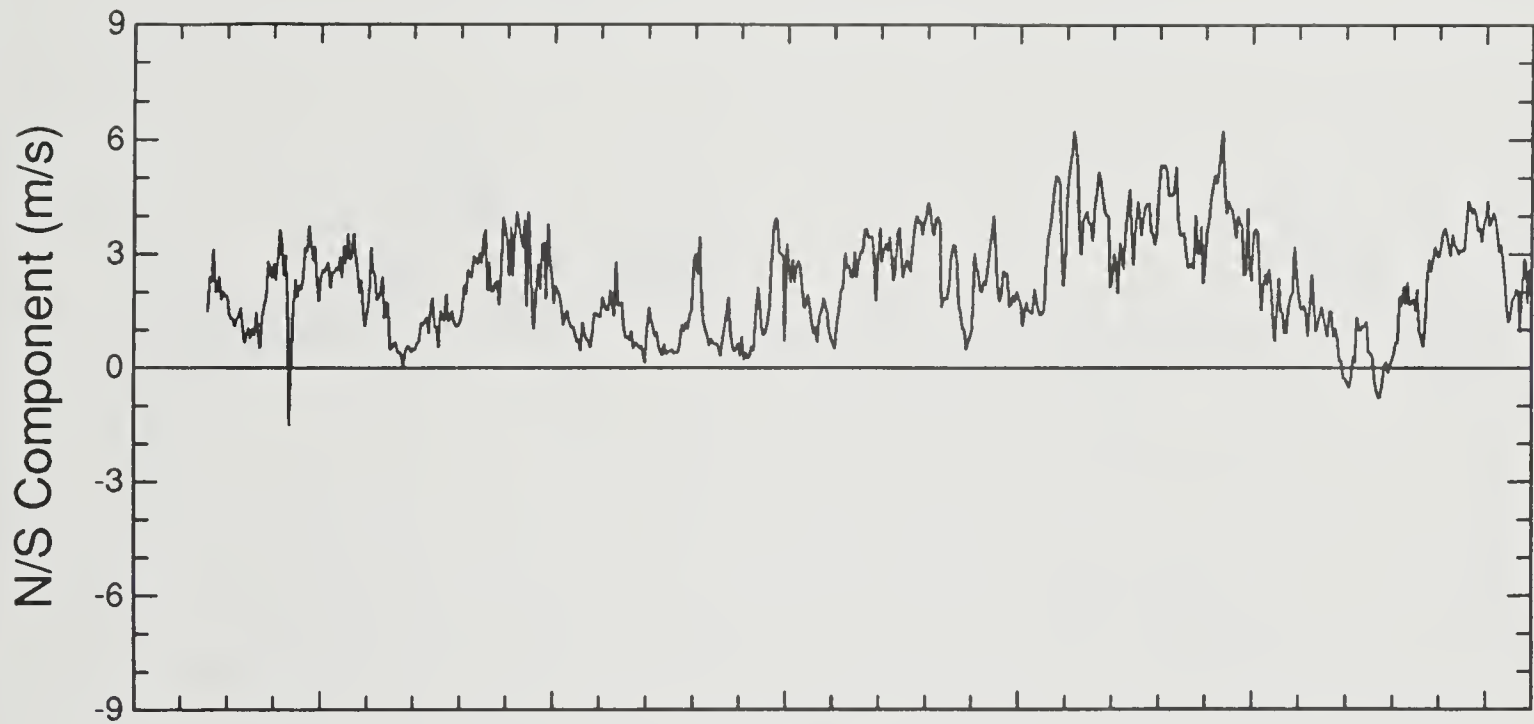


1989 Wind Zonal Component

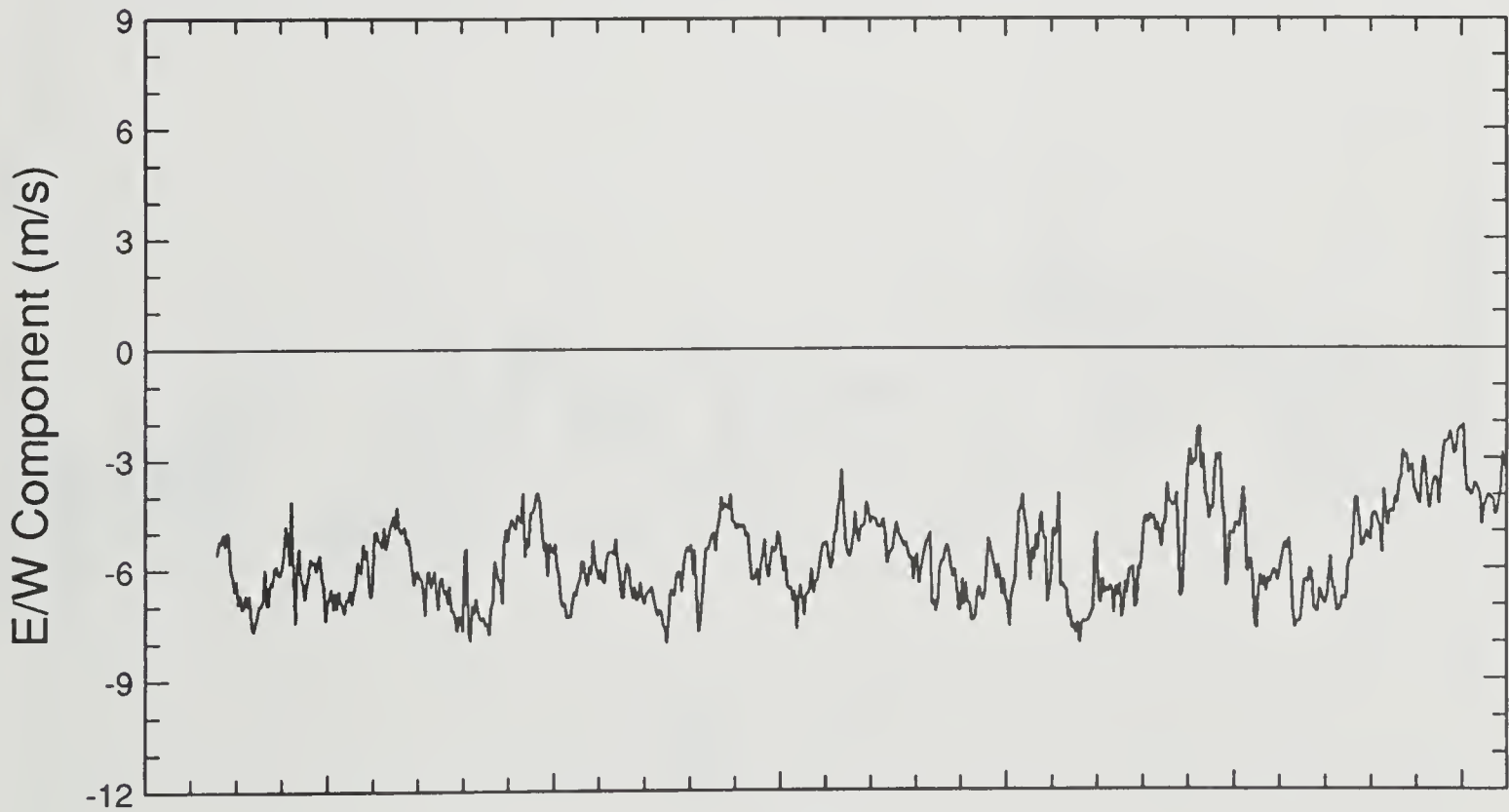


November



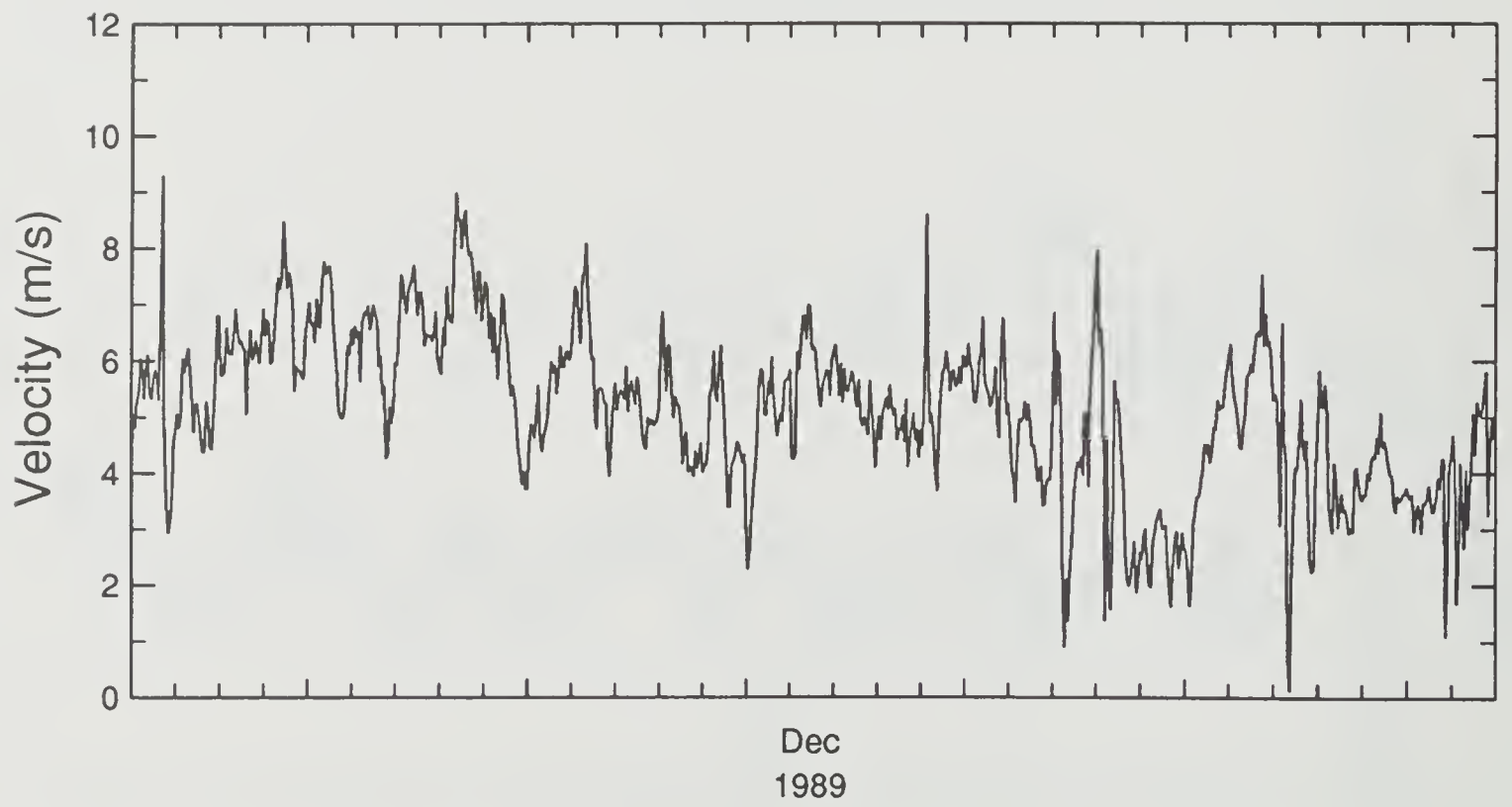


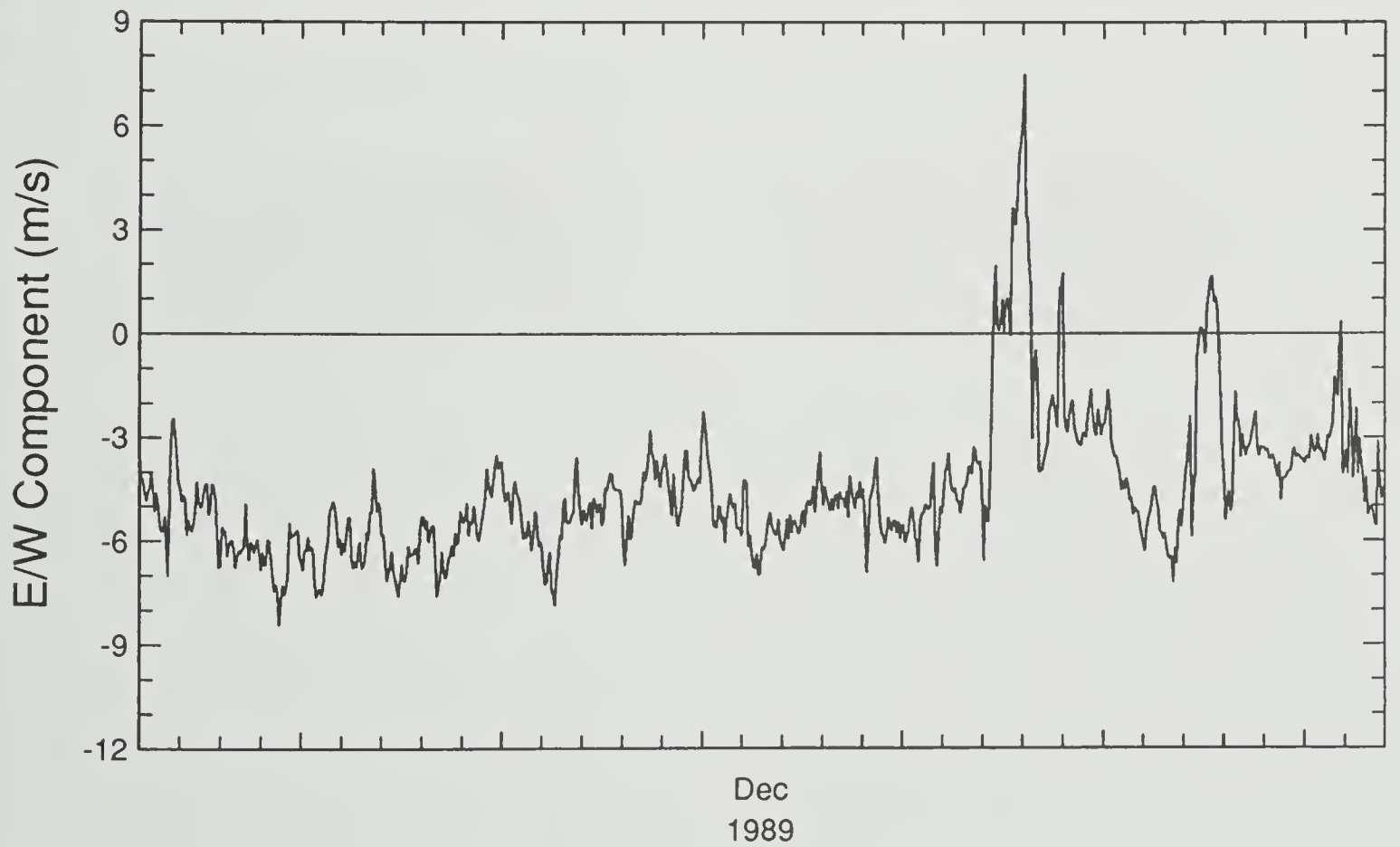
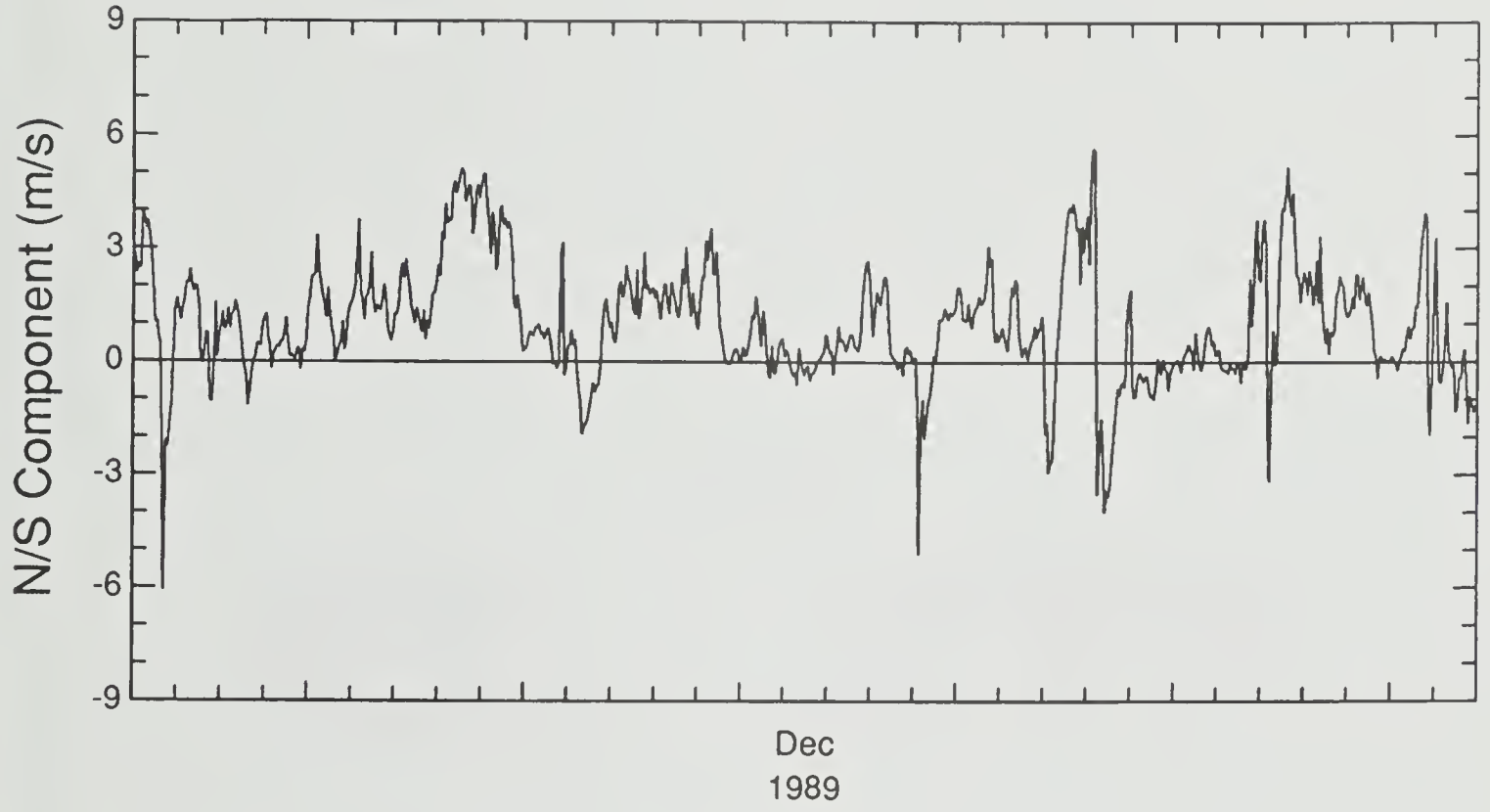
Nov
1989



Nov
1989

December





1989 Velocity		
Month	Mean	Std Dev
Nov	6.08	1.04
Dec	4.66	1.43

1989 Direction	
Month	Mean
Nov	-68.58
Dec	-77.24

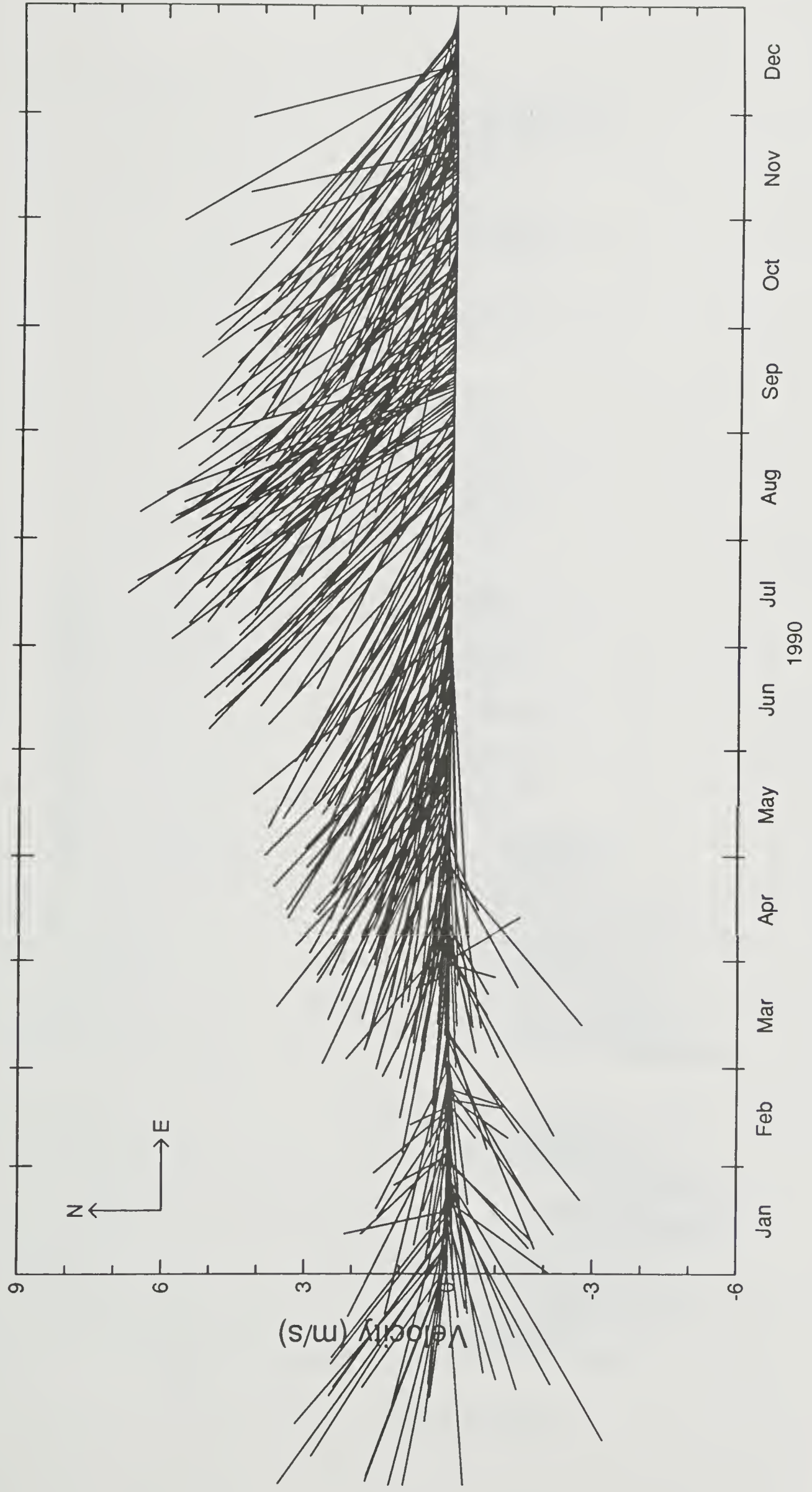
1989 N-S Component		
Month	Mean	Std Dev
Nov	2.22	1.32
Dec	1.03	1.55

1989 E-W Component		
Month	Mean	Std Dev
Nov	-5.66	1.22
Dec	-4.55	2.03

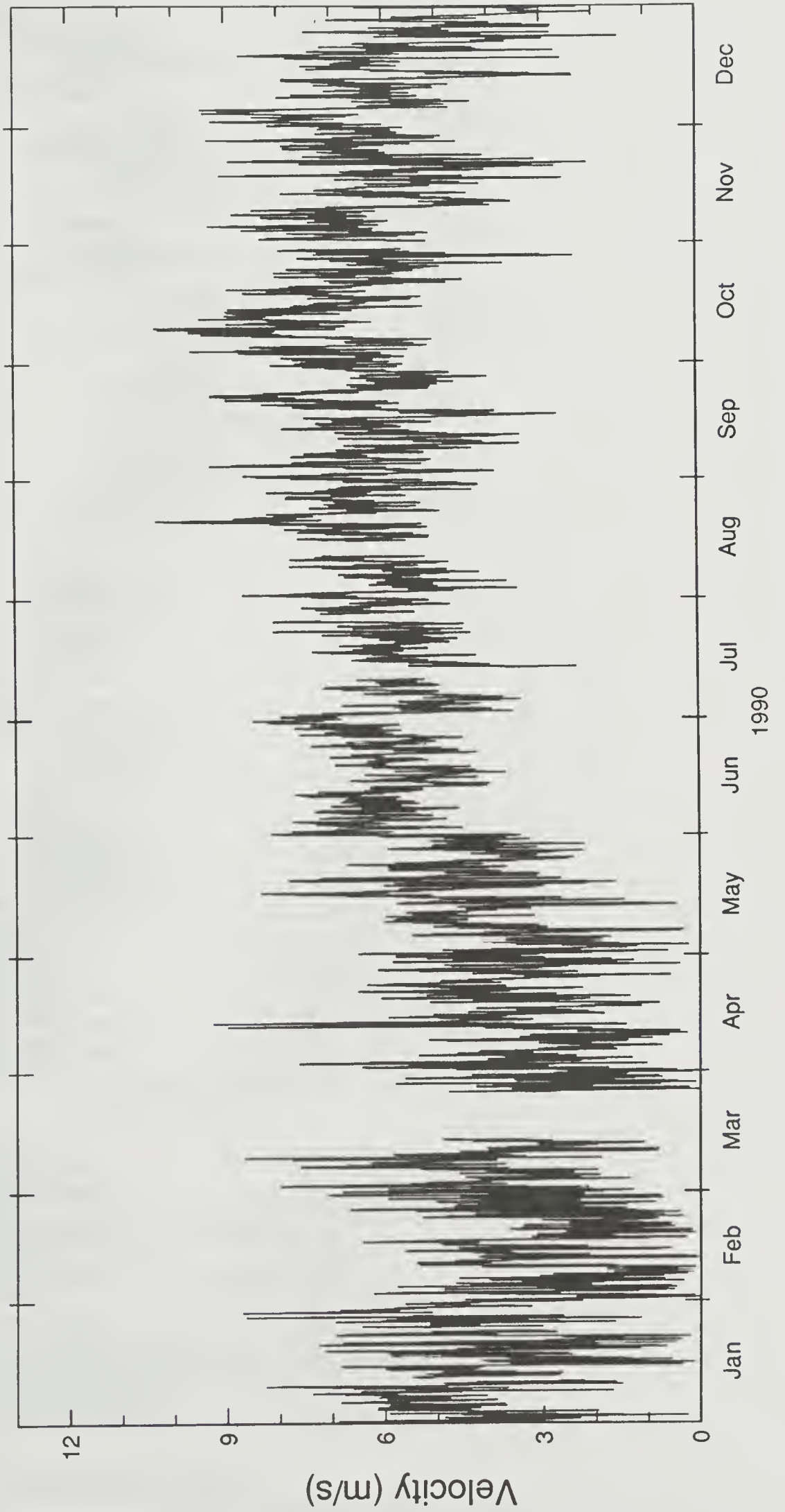
1990

January 1 - December 31

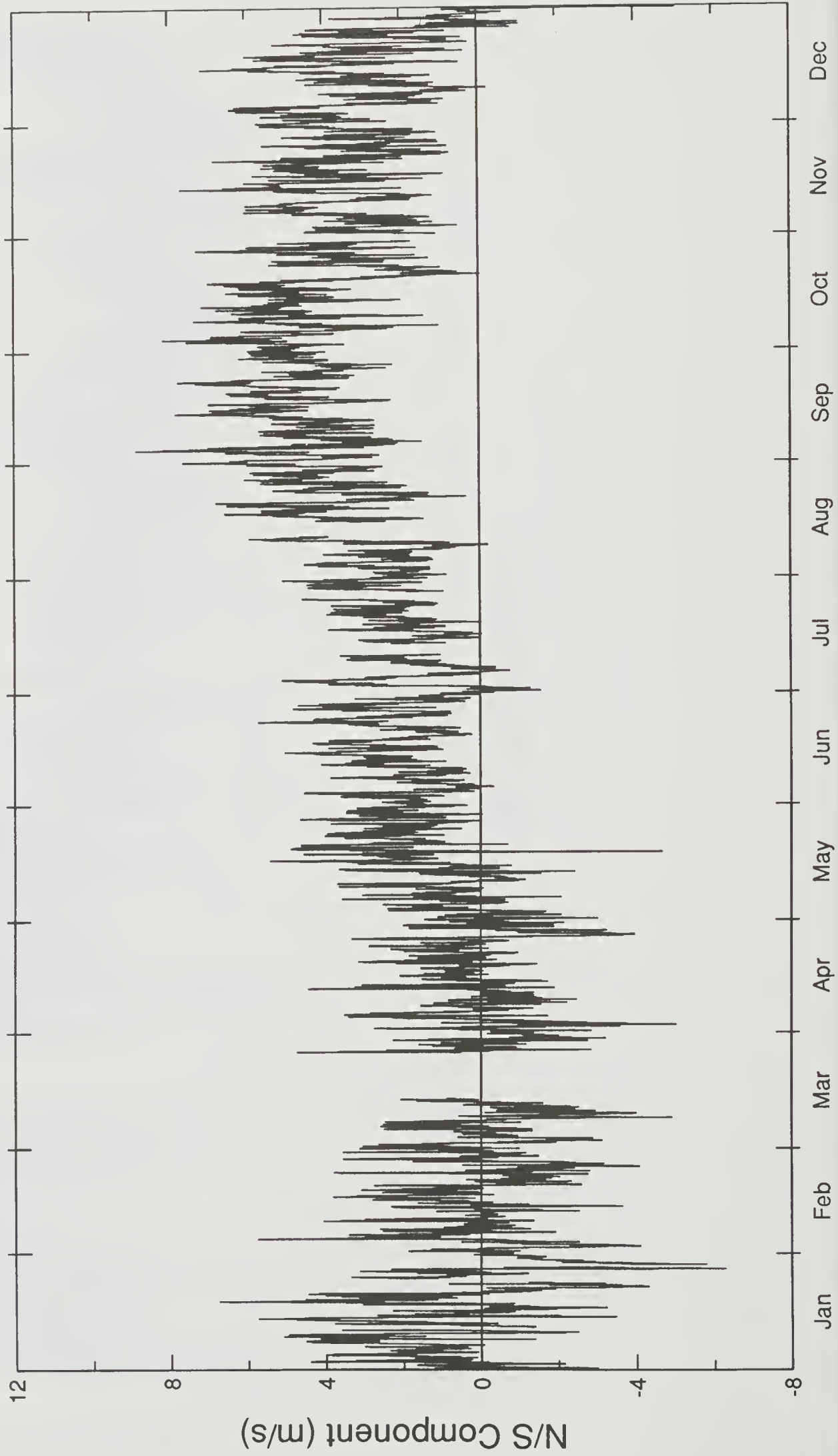
1990 Wind Speed (Daily Values)



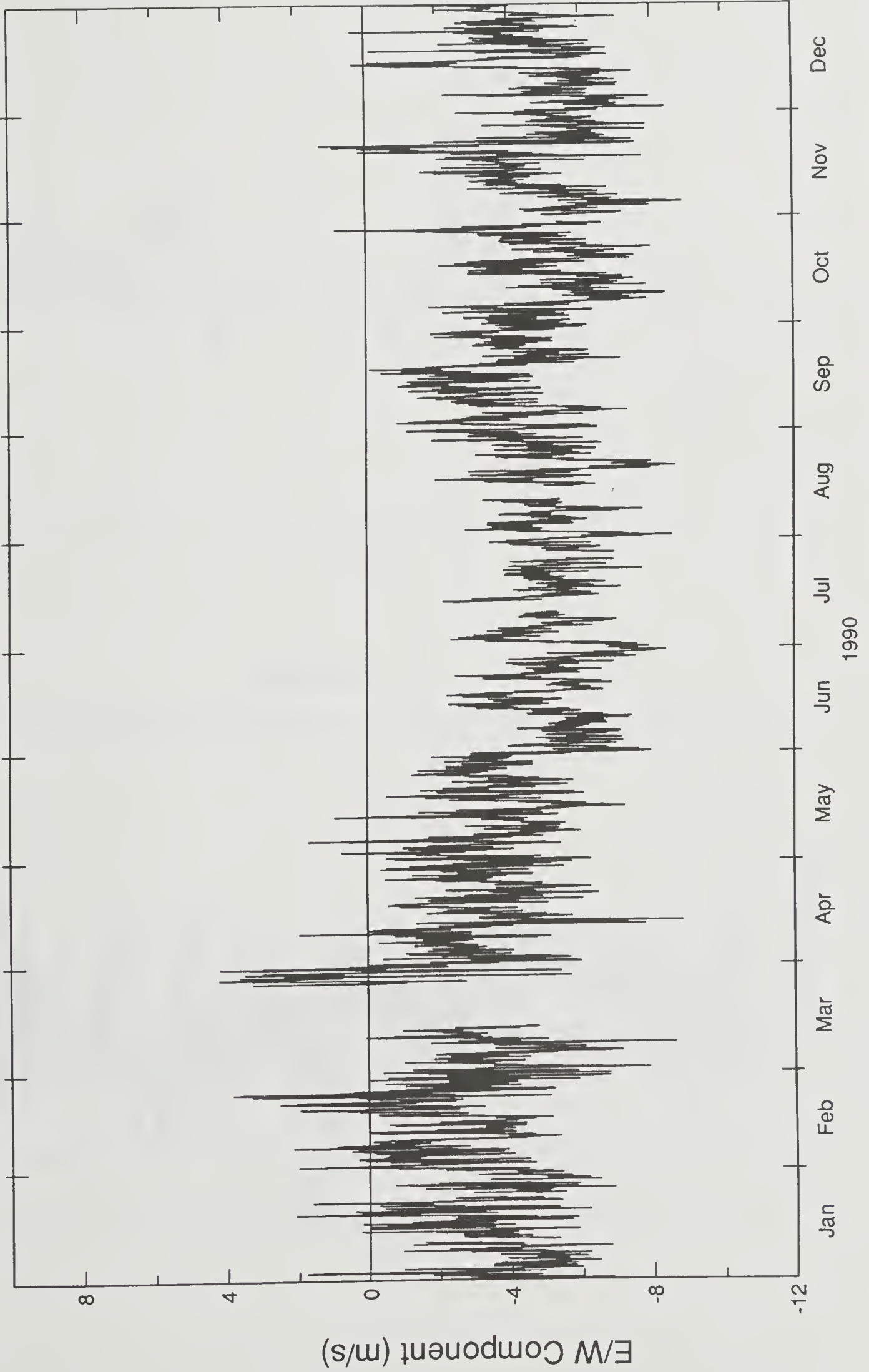
1990 Wind Speed



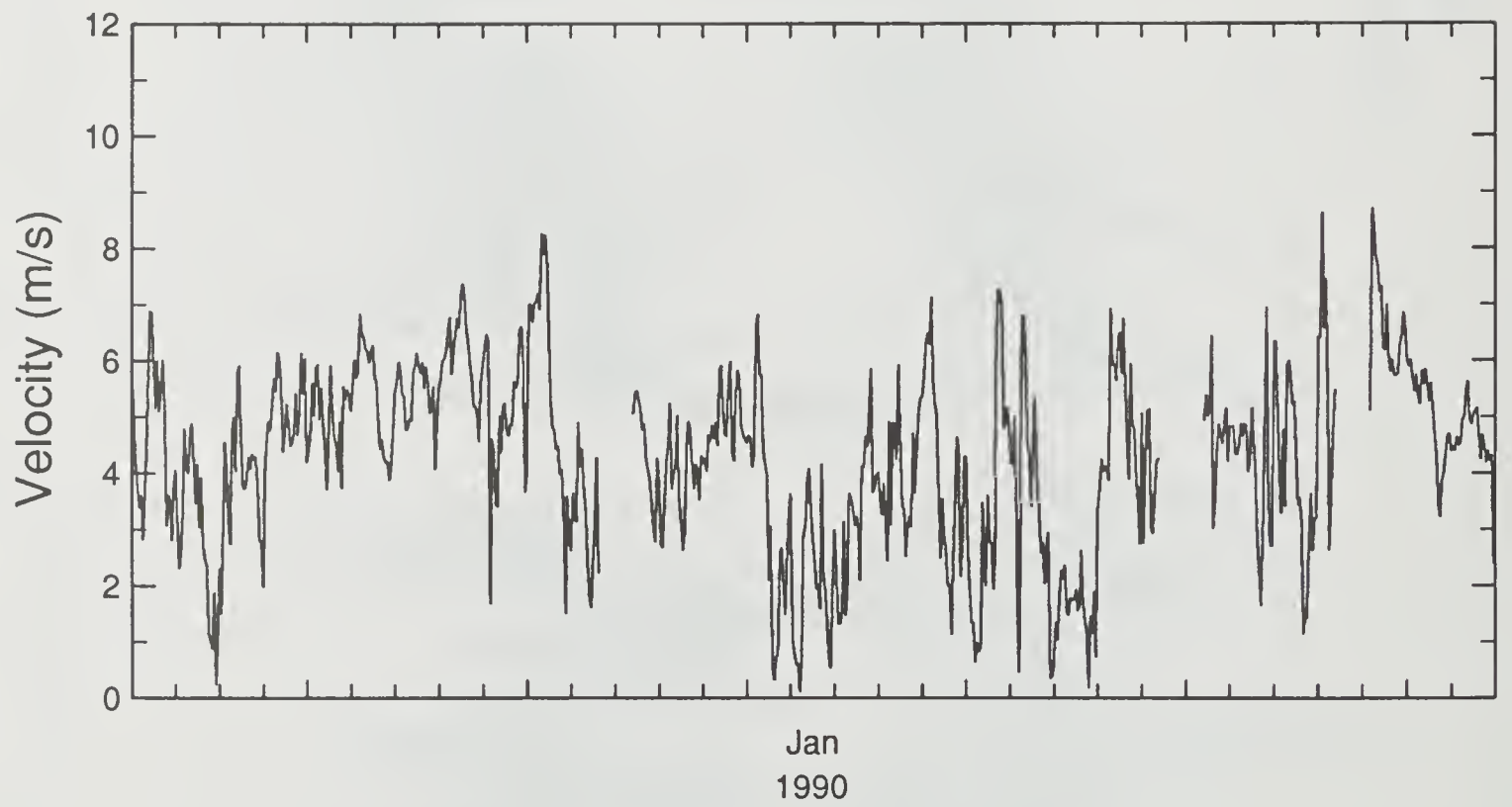
1990 Wind Meridional Component

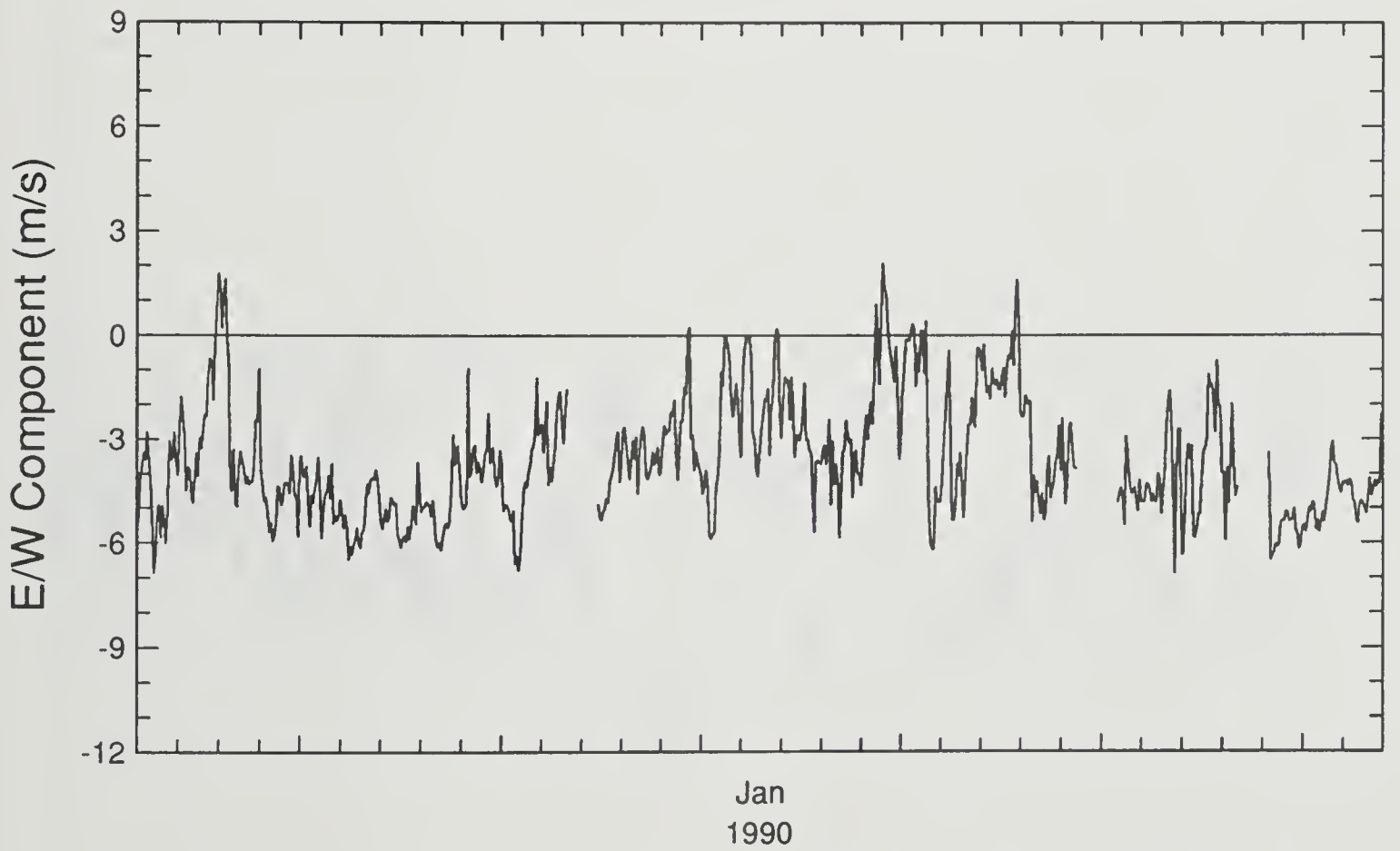
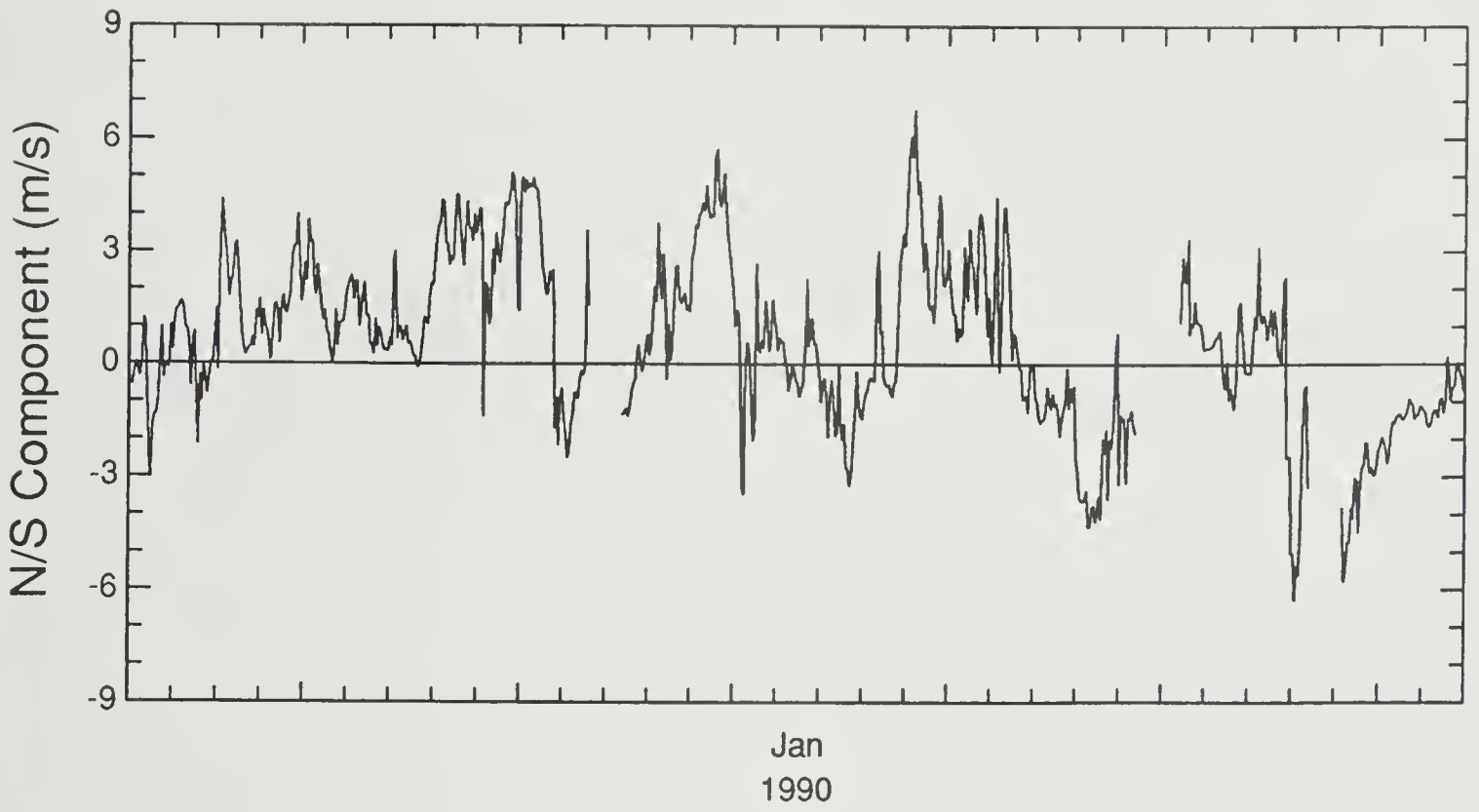


1990 Wind
Zonal Component

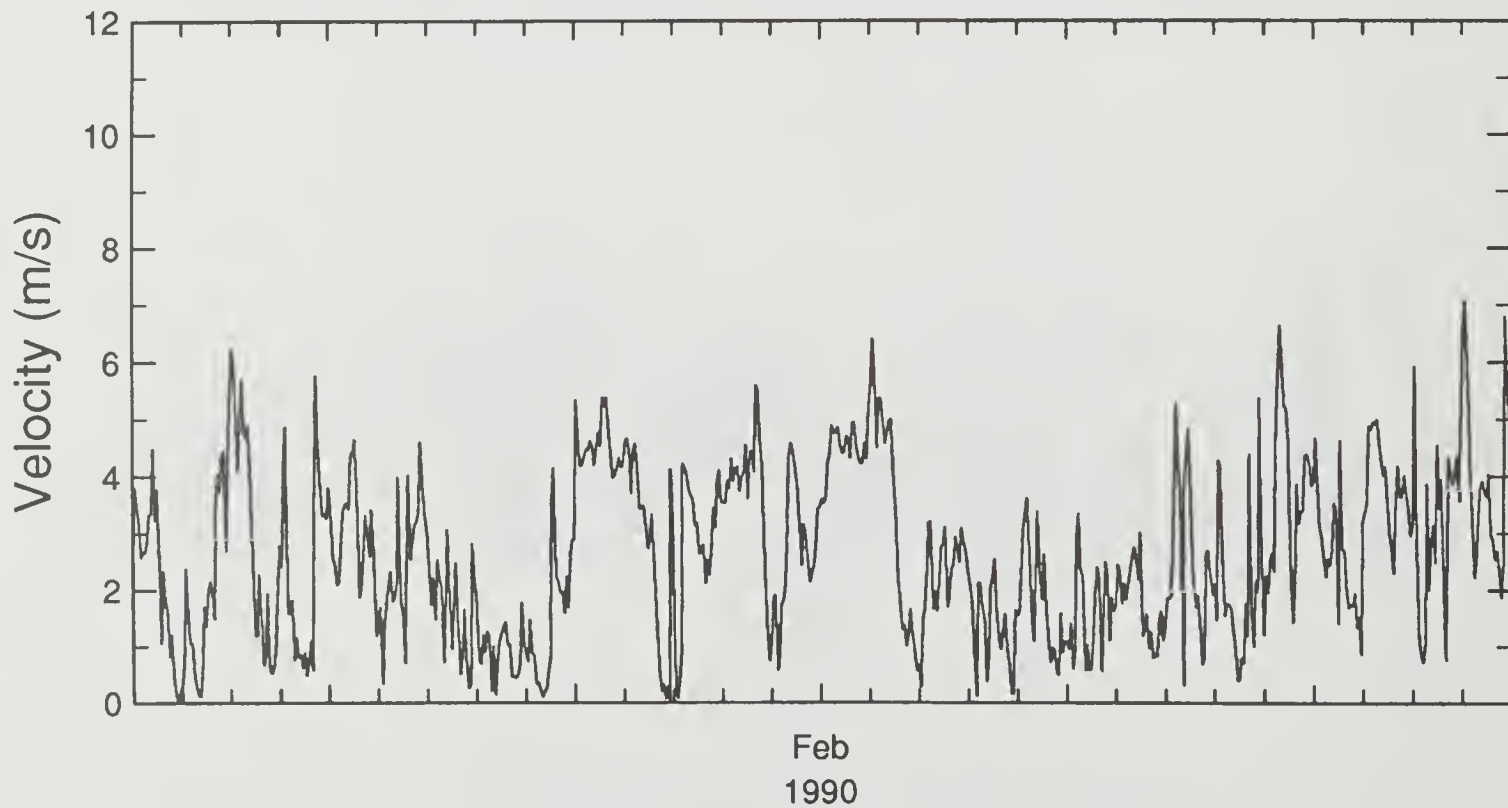


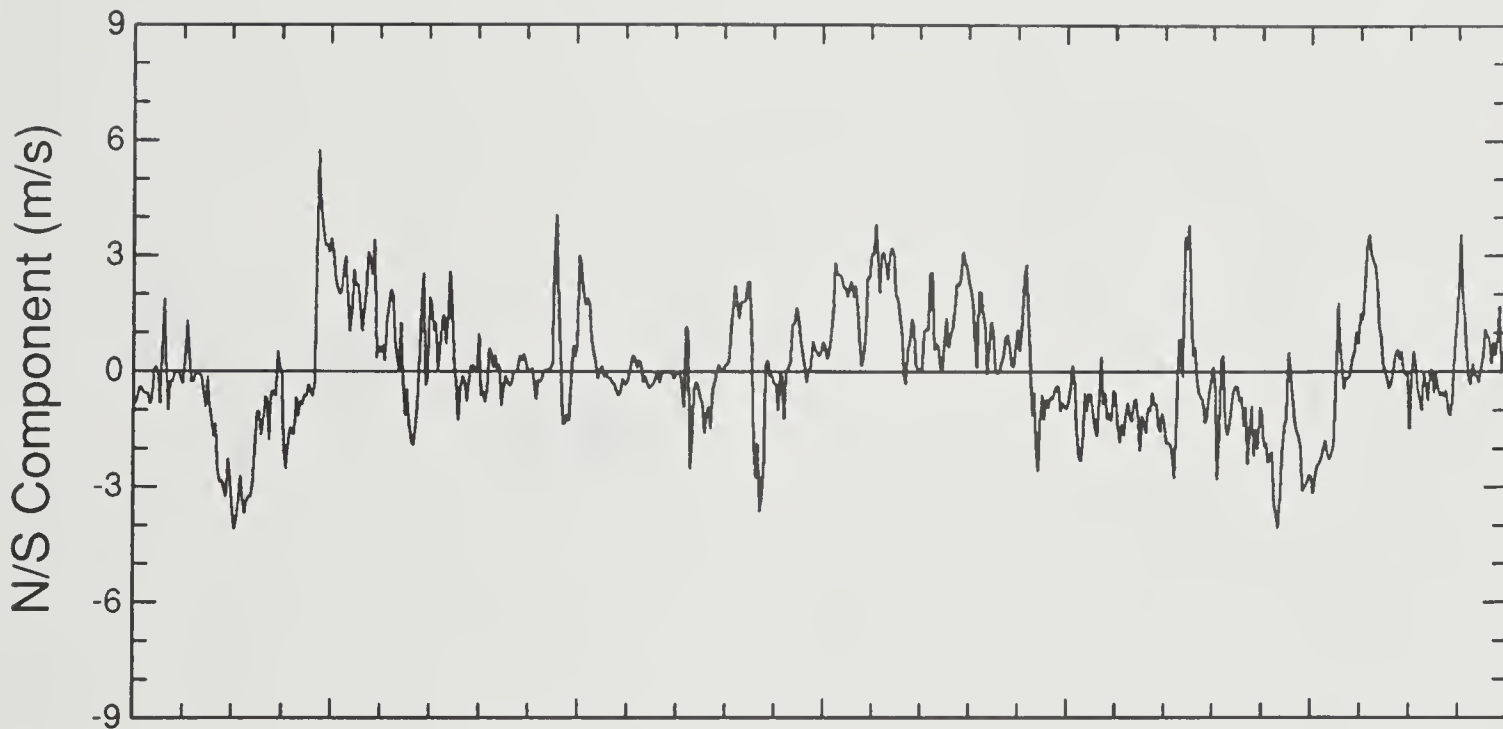
January



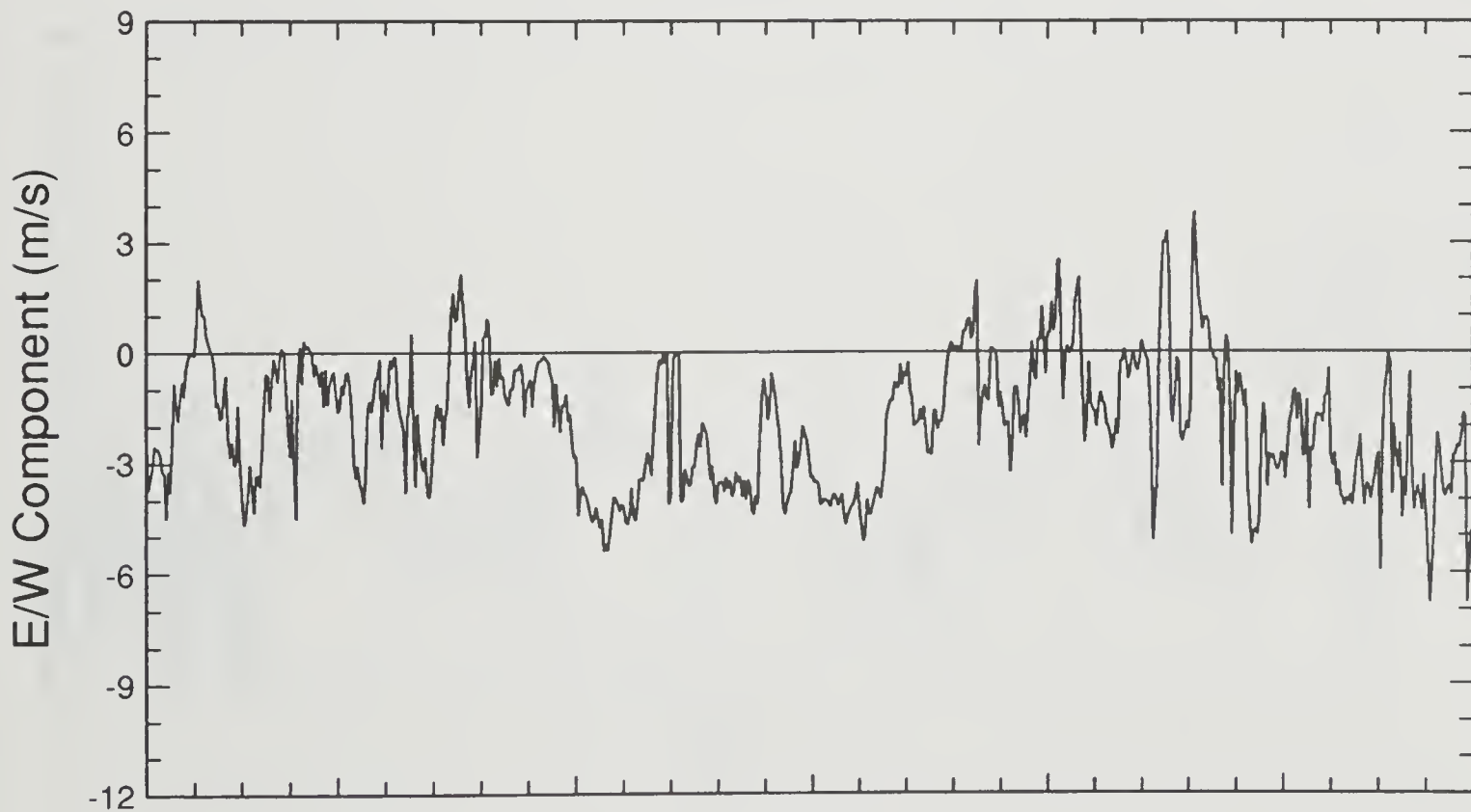


February

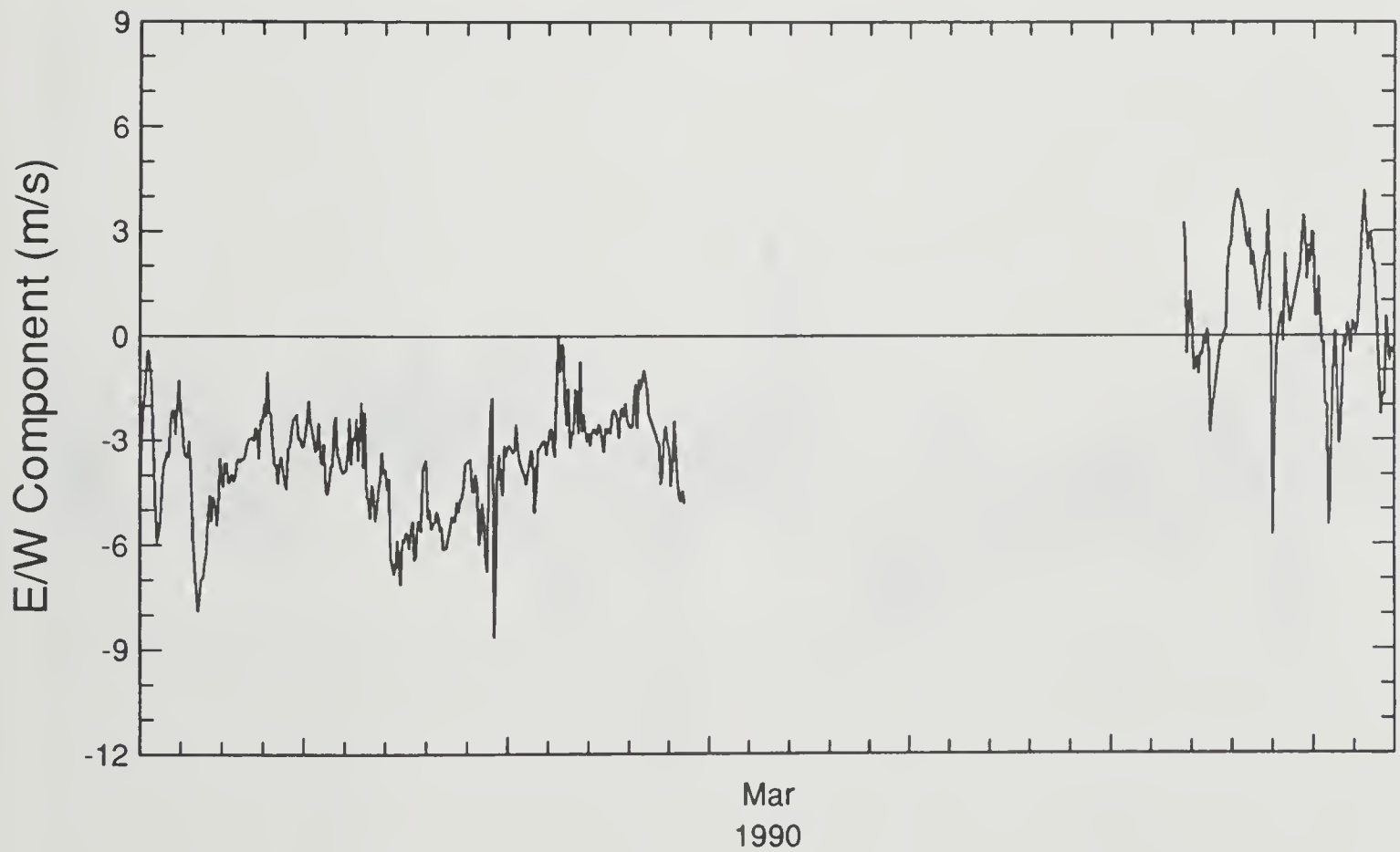
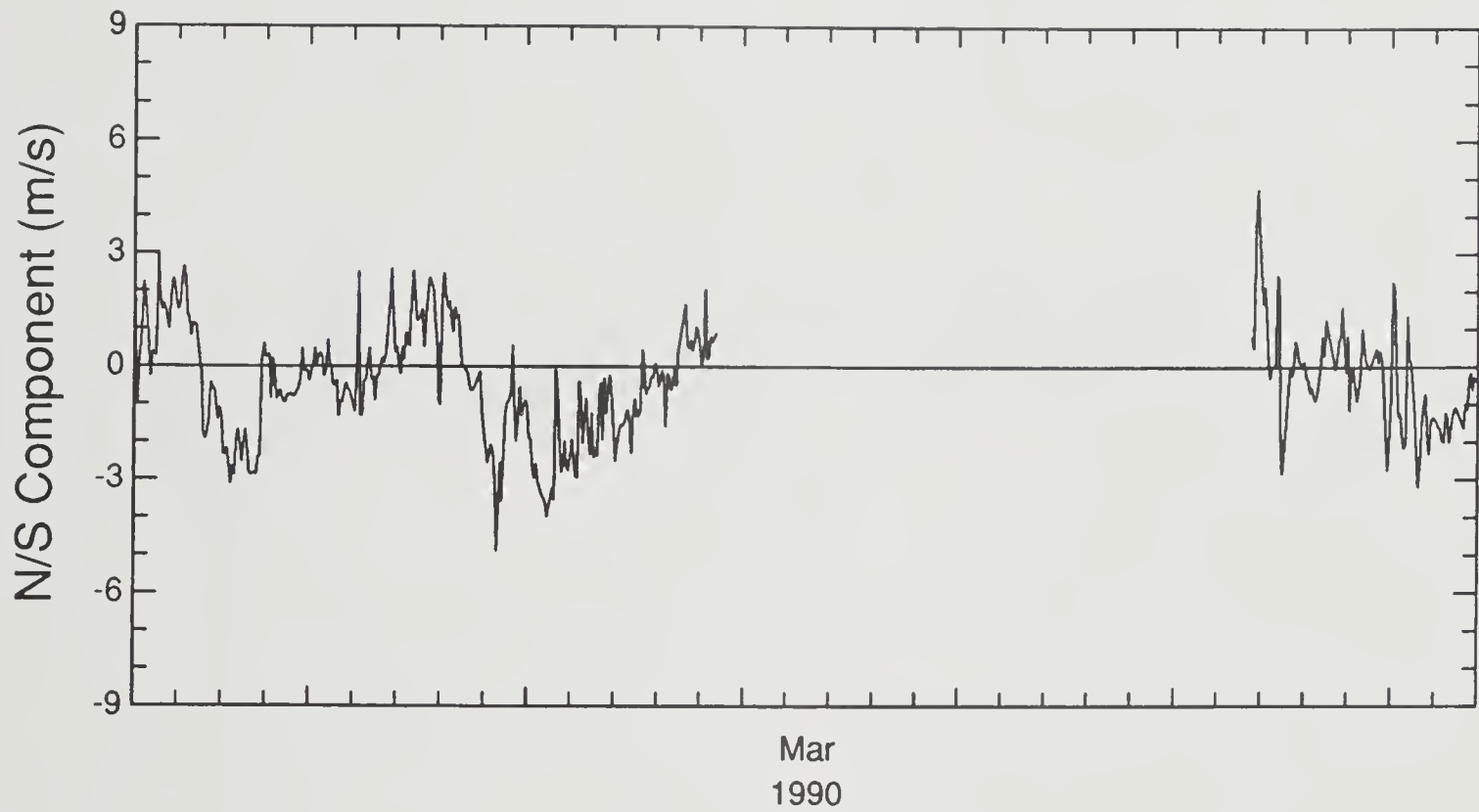




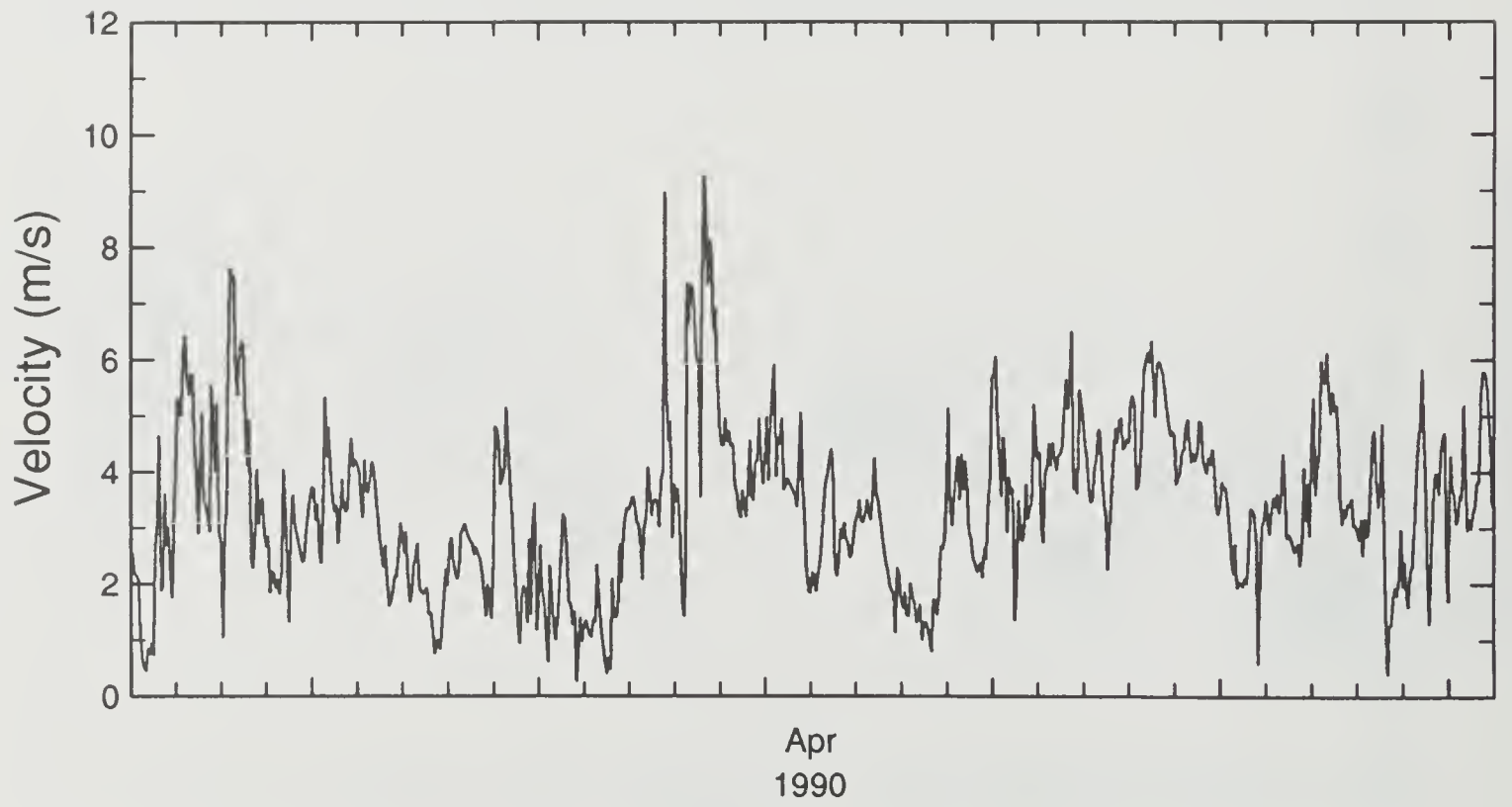
Feb
1990

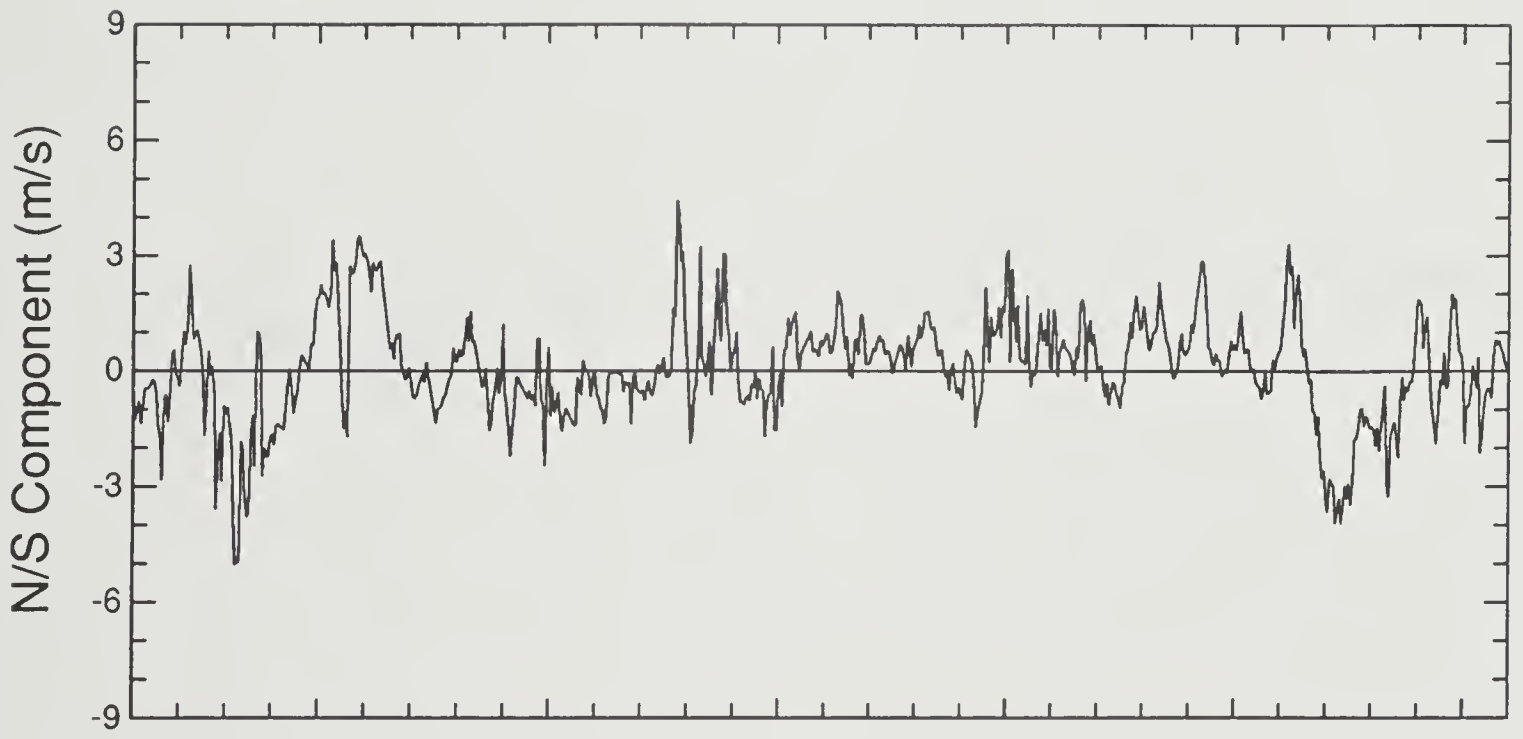


Feb
1990

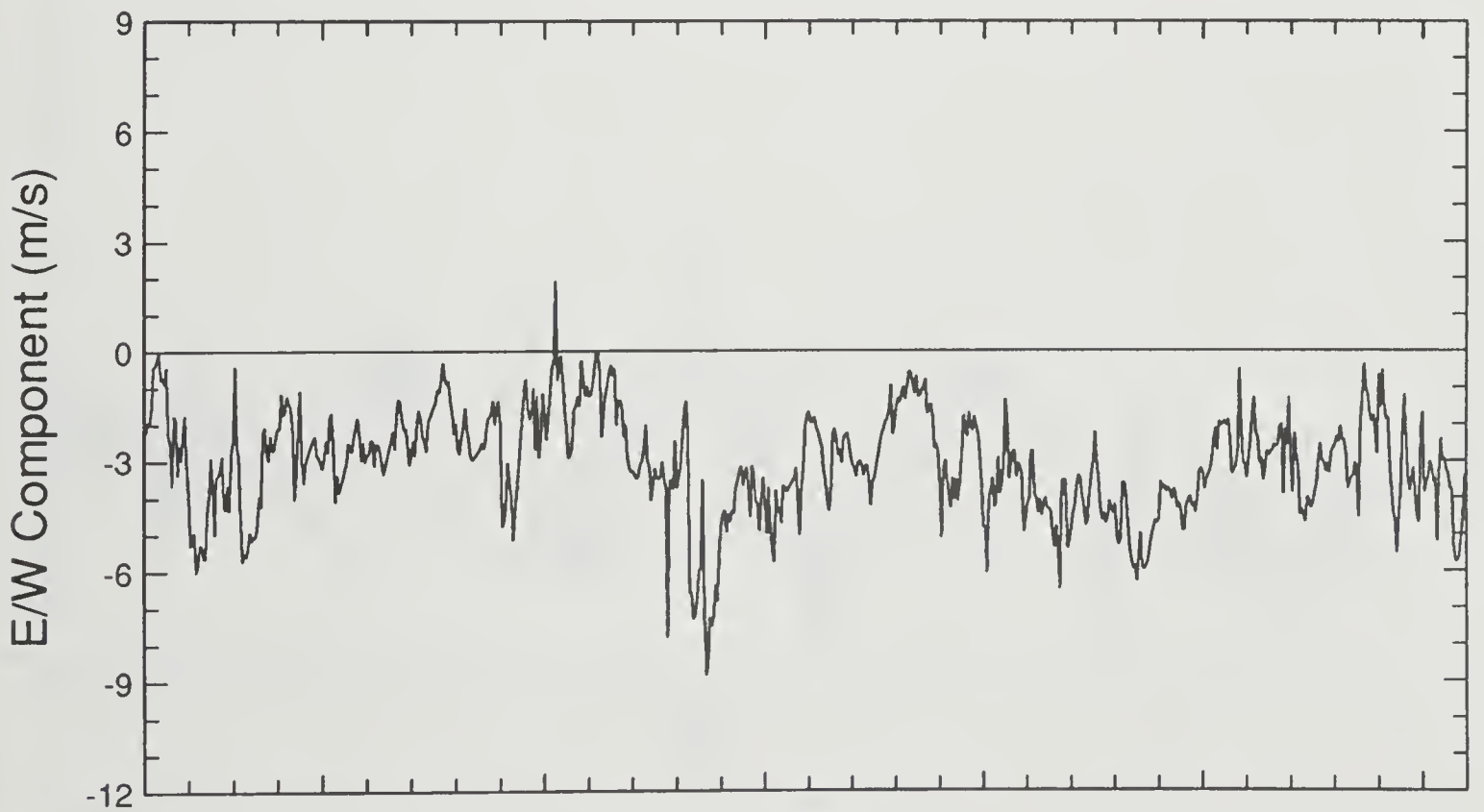


April



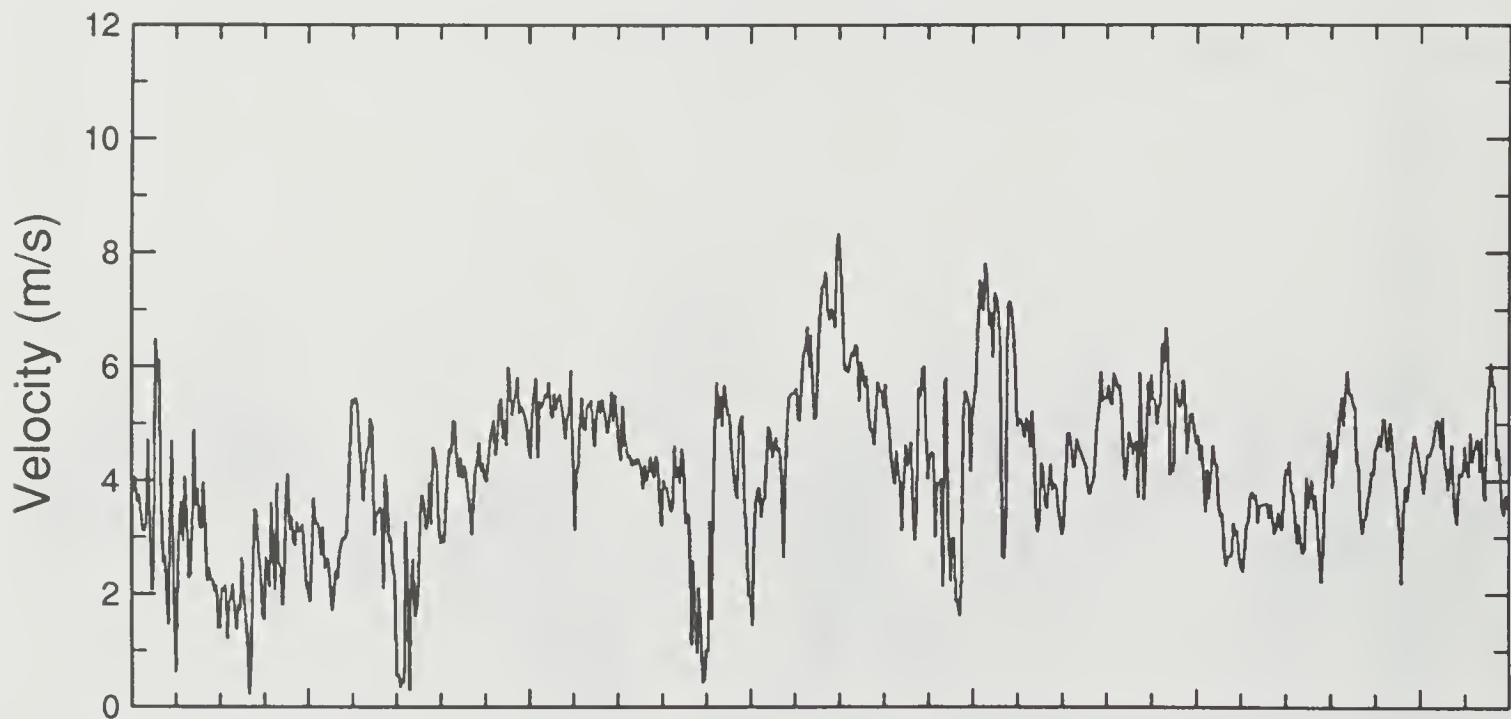


Apr
1990

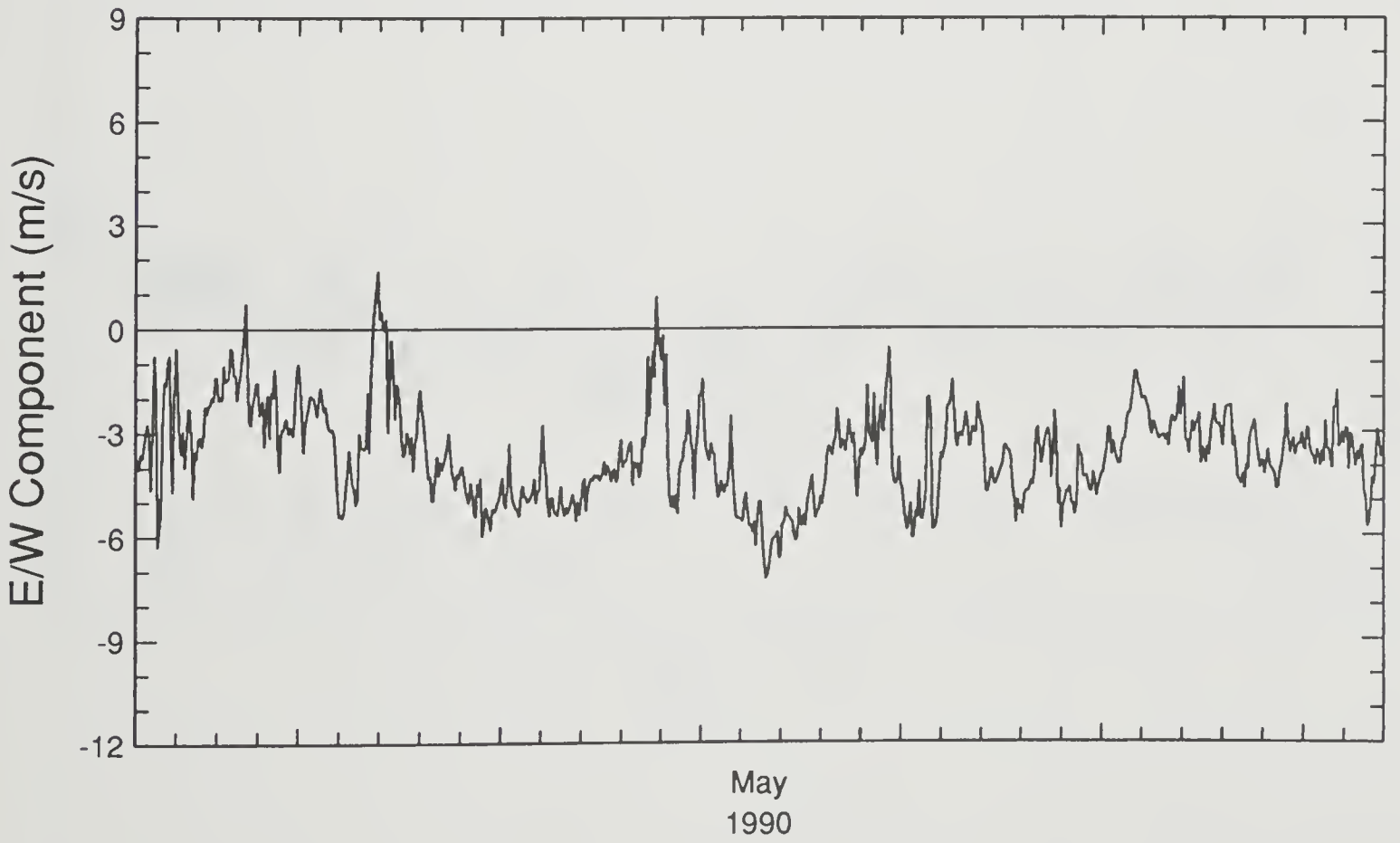
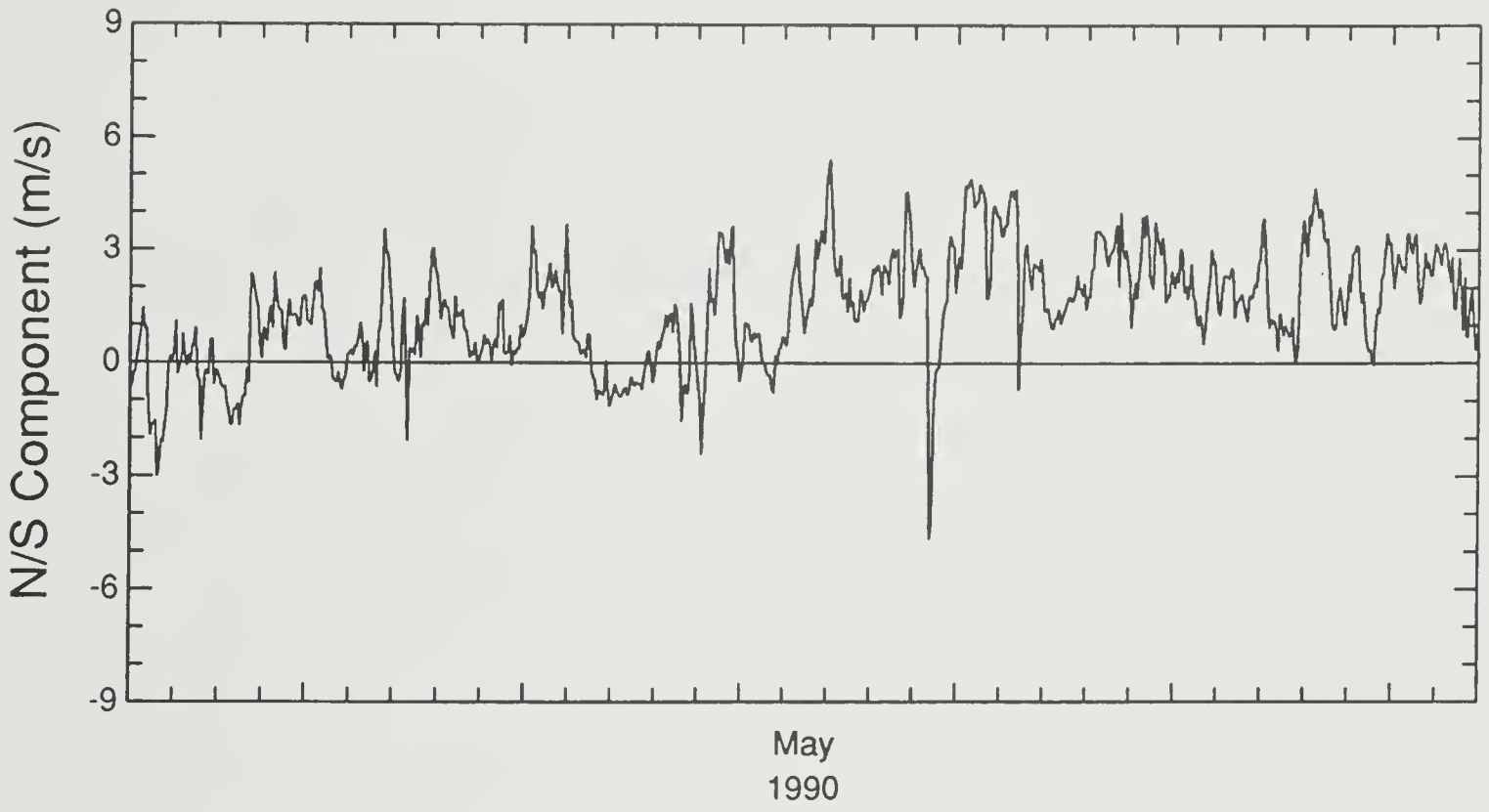


Apr
1990

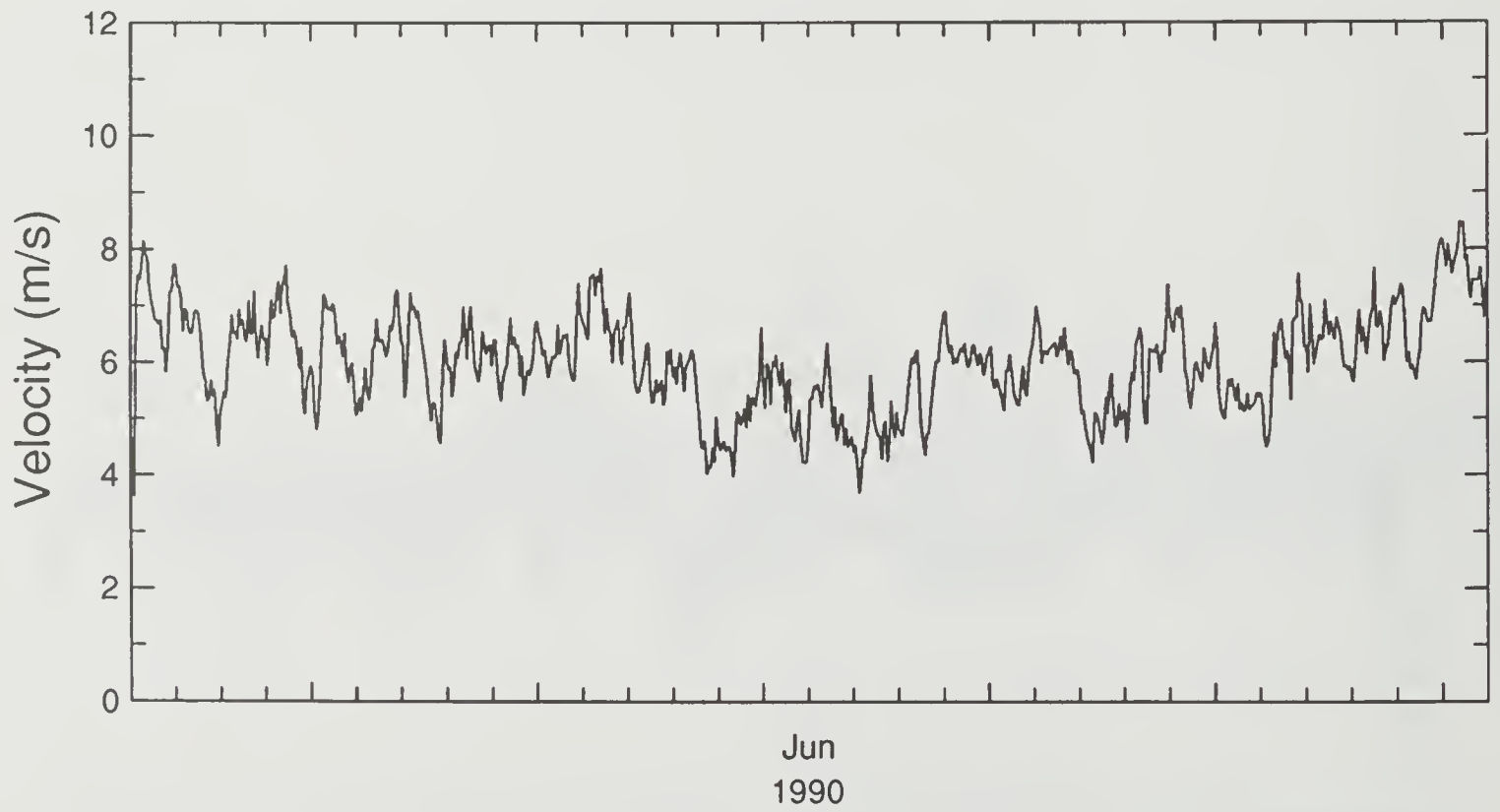
May

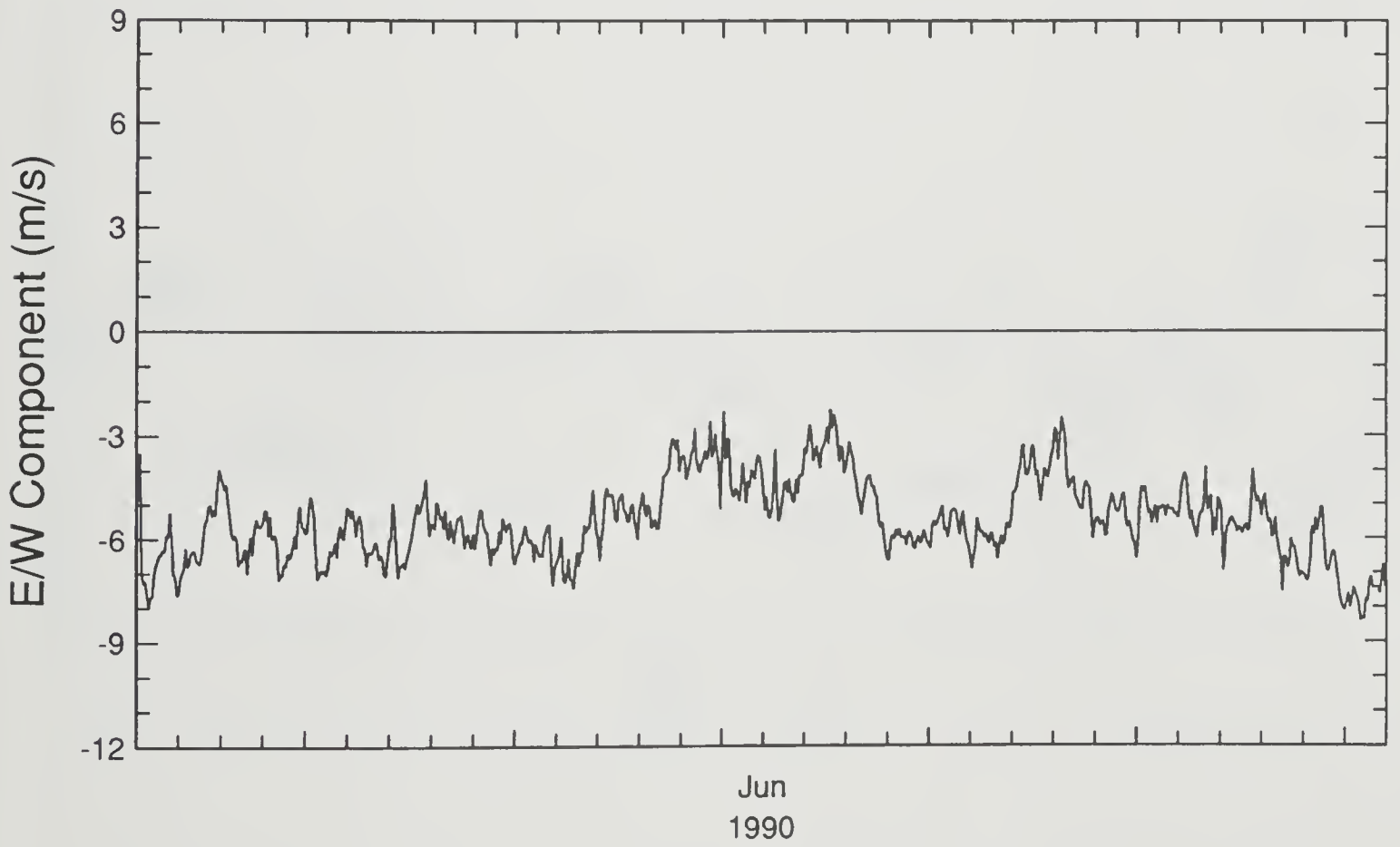
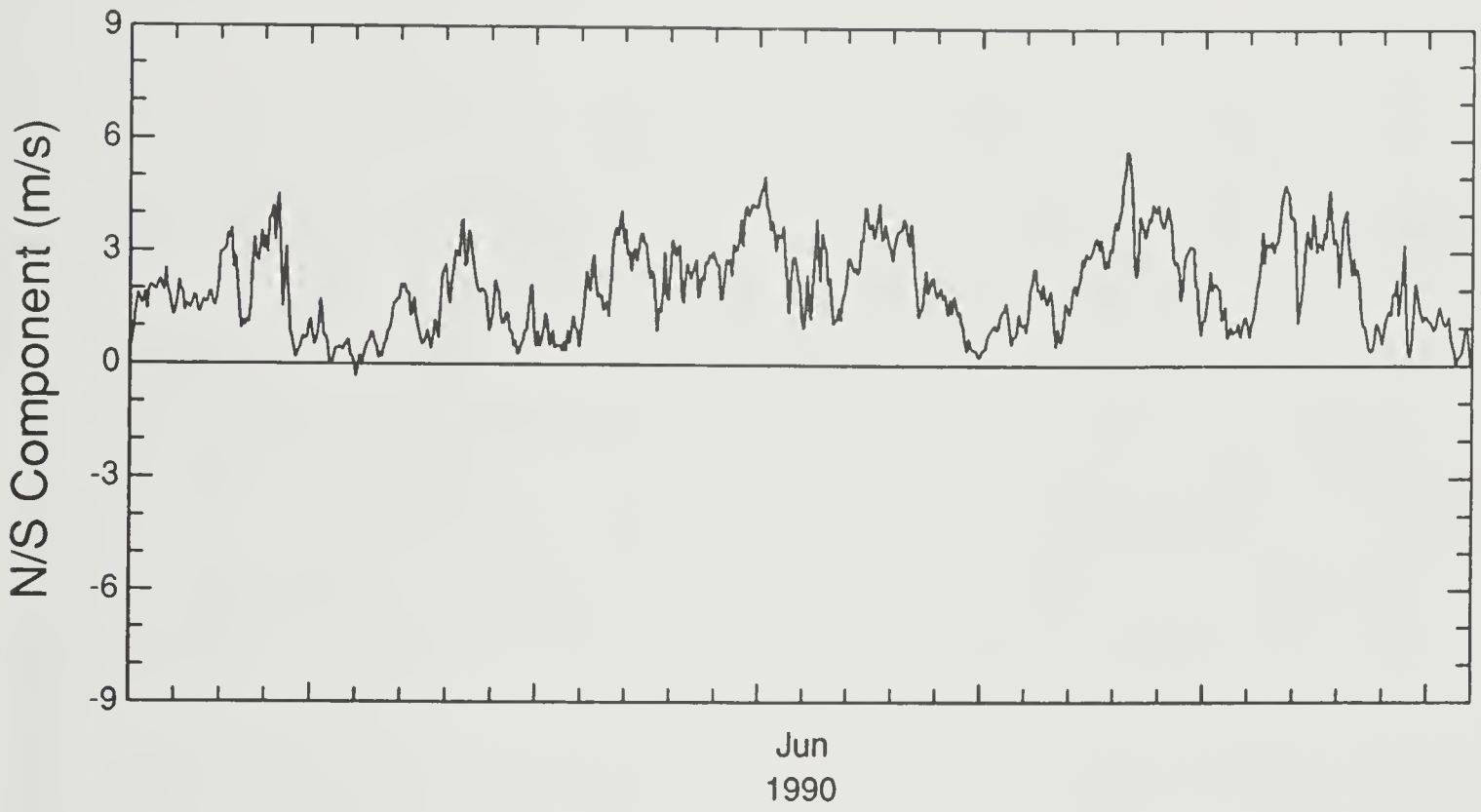


May
1990

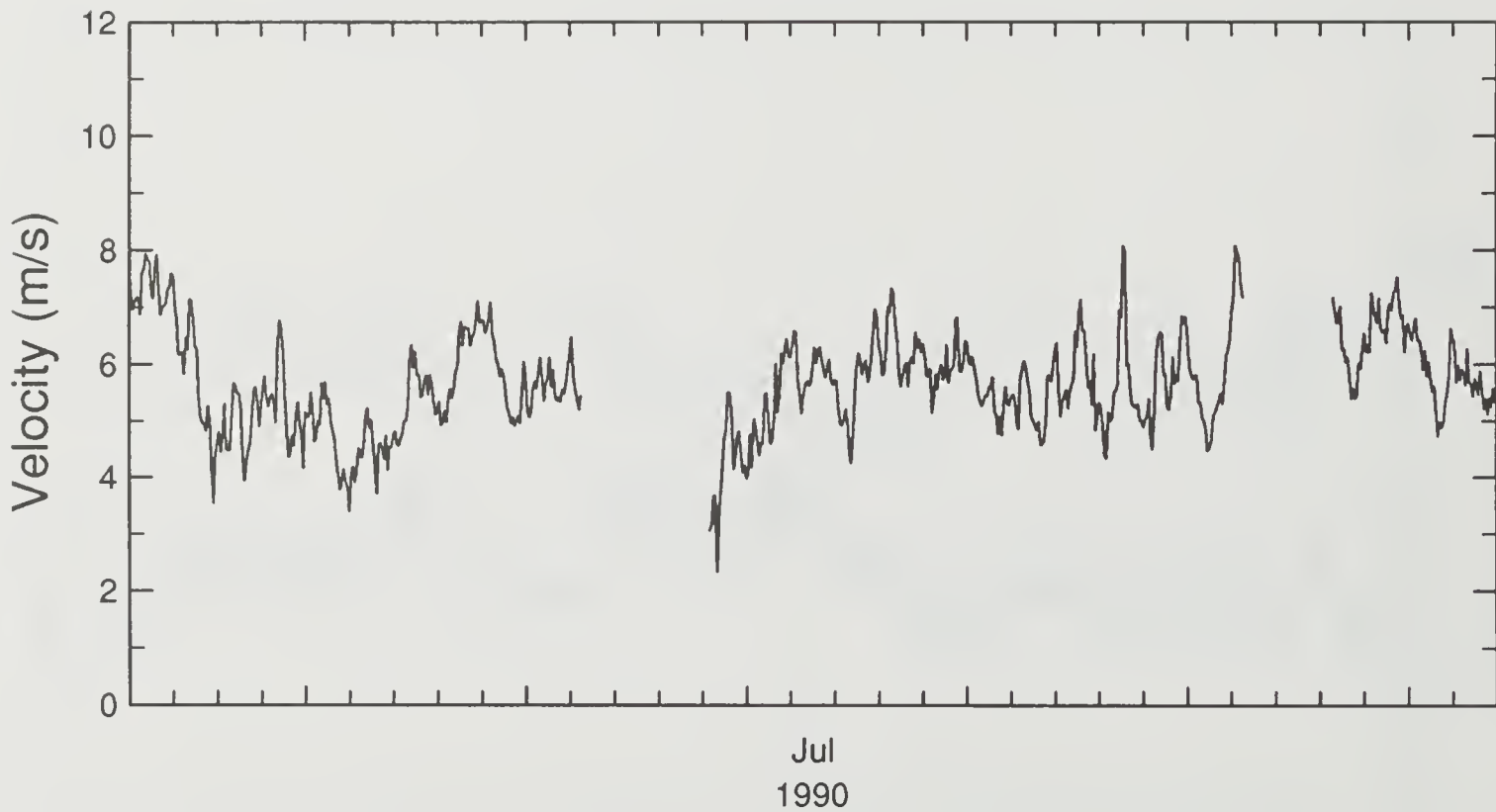


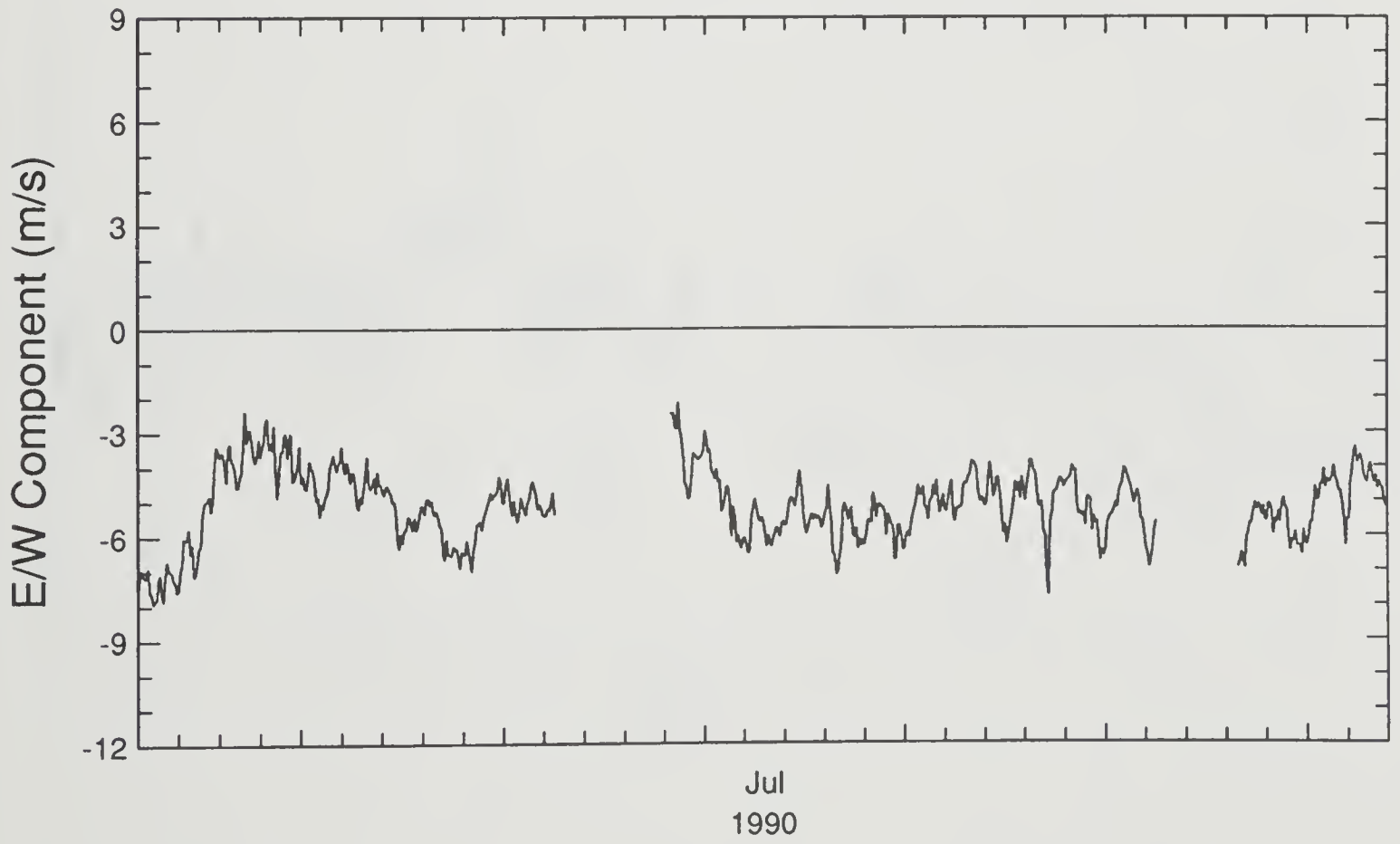
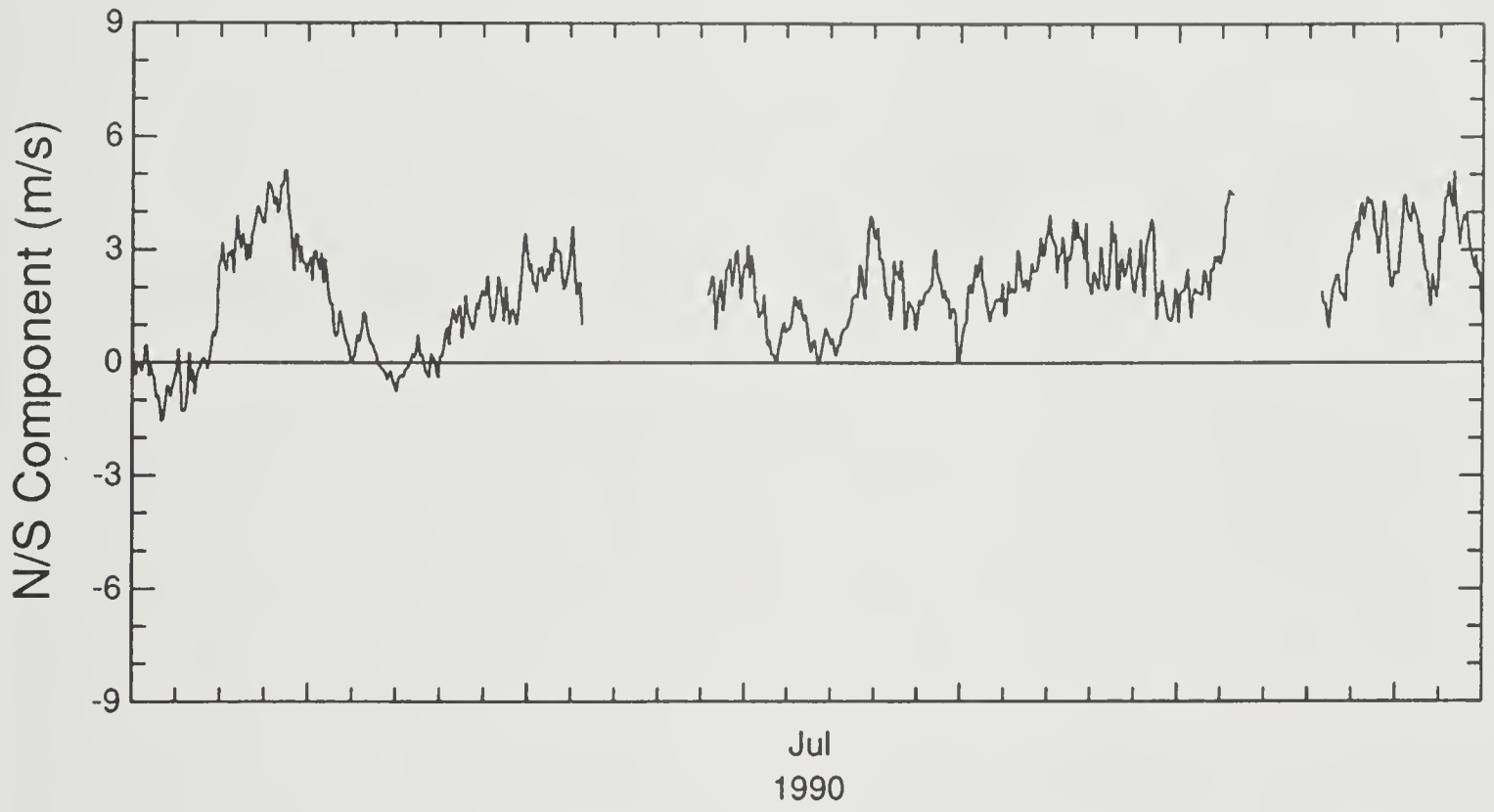
June



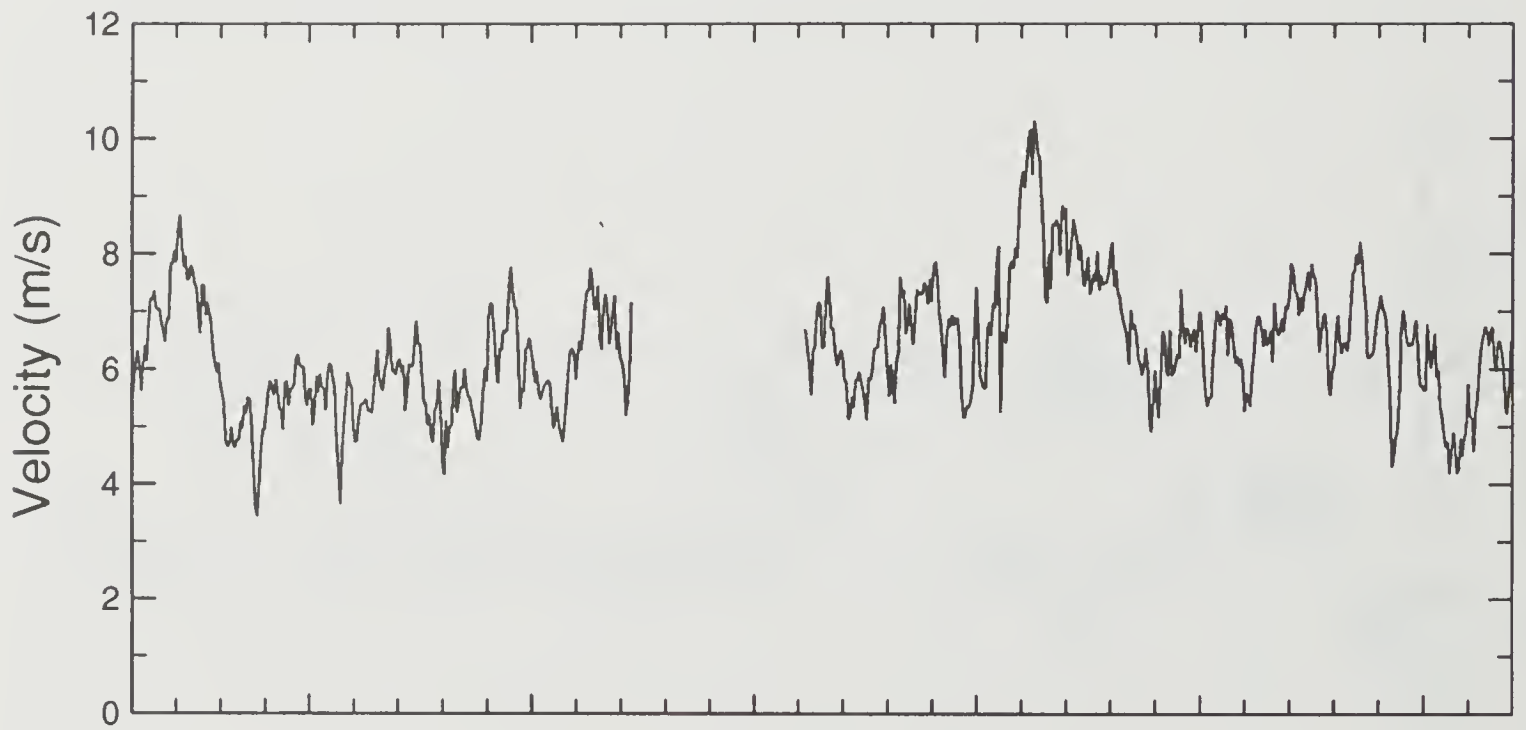


July

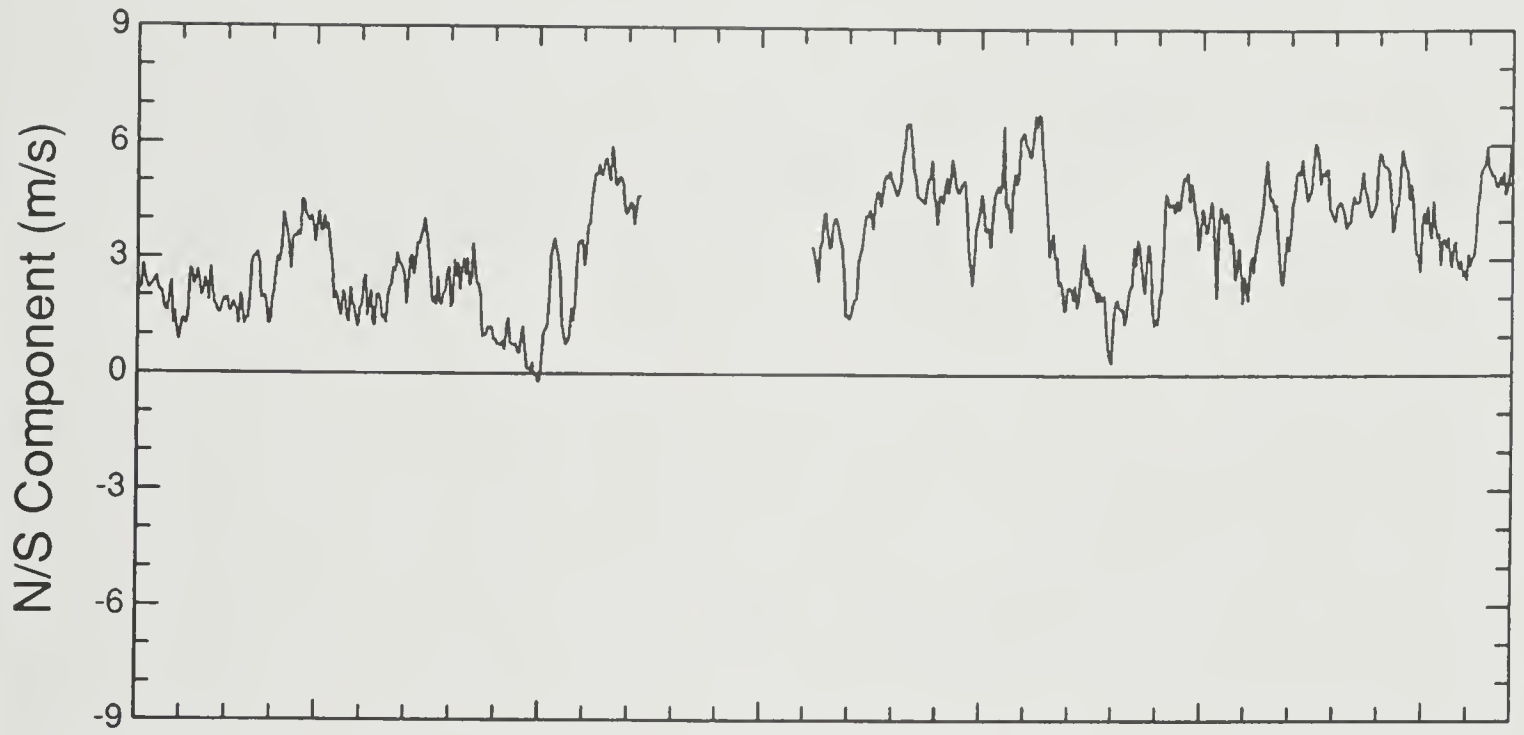




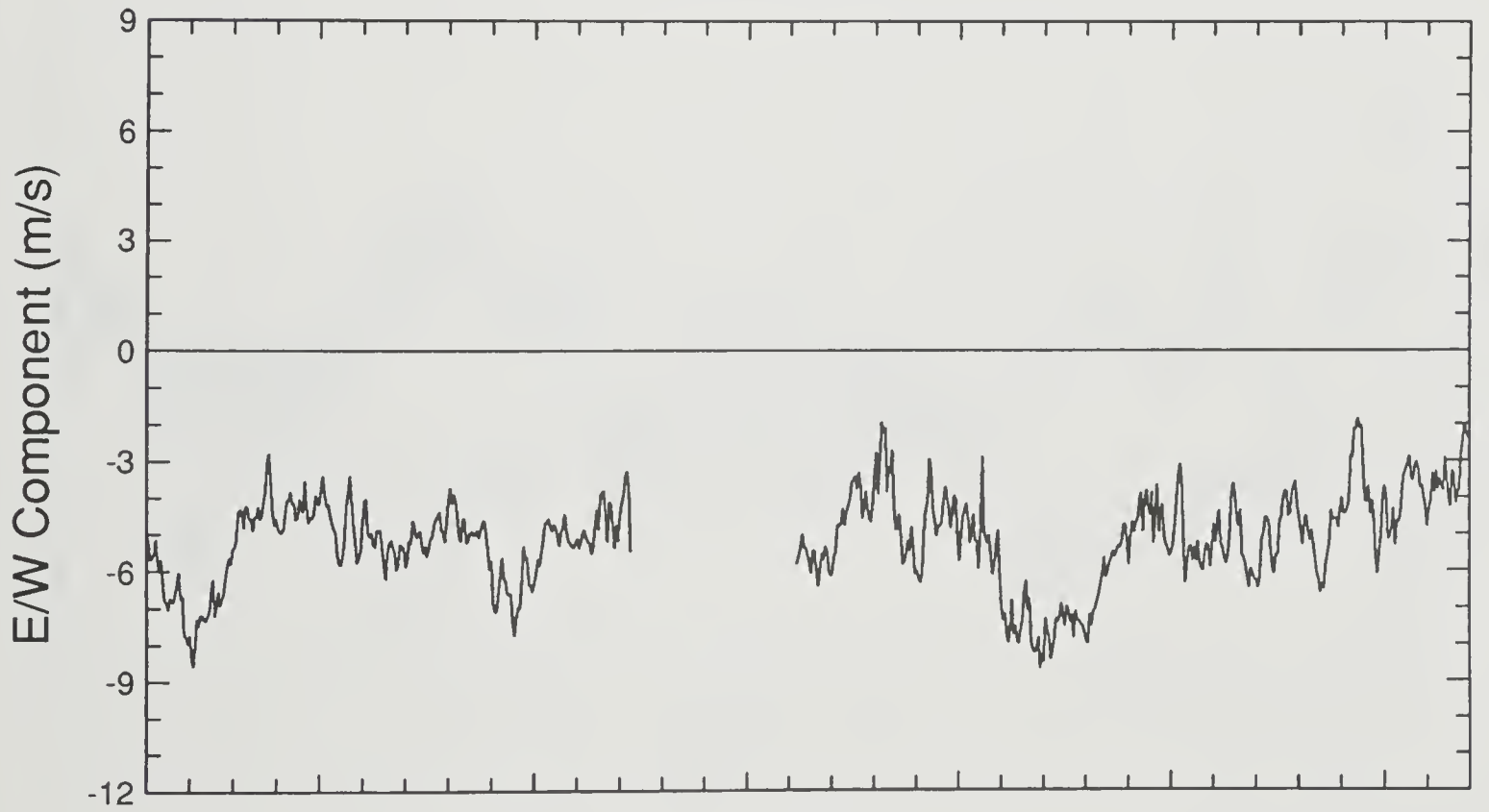
August



Aug
1990

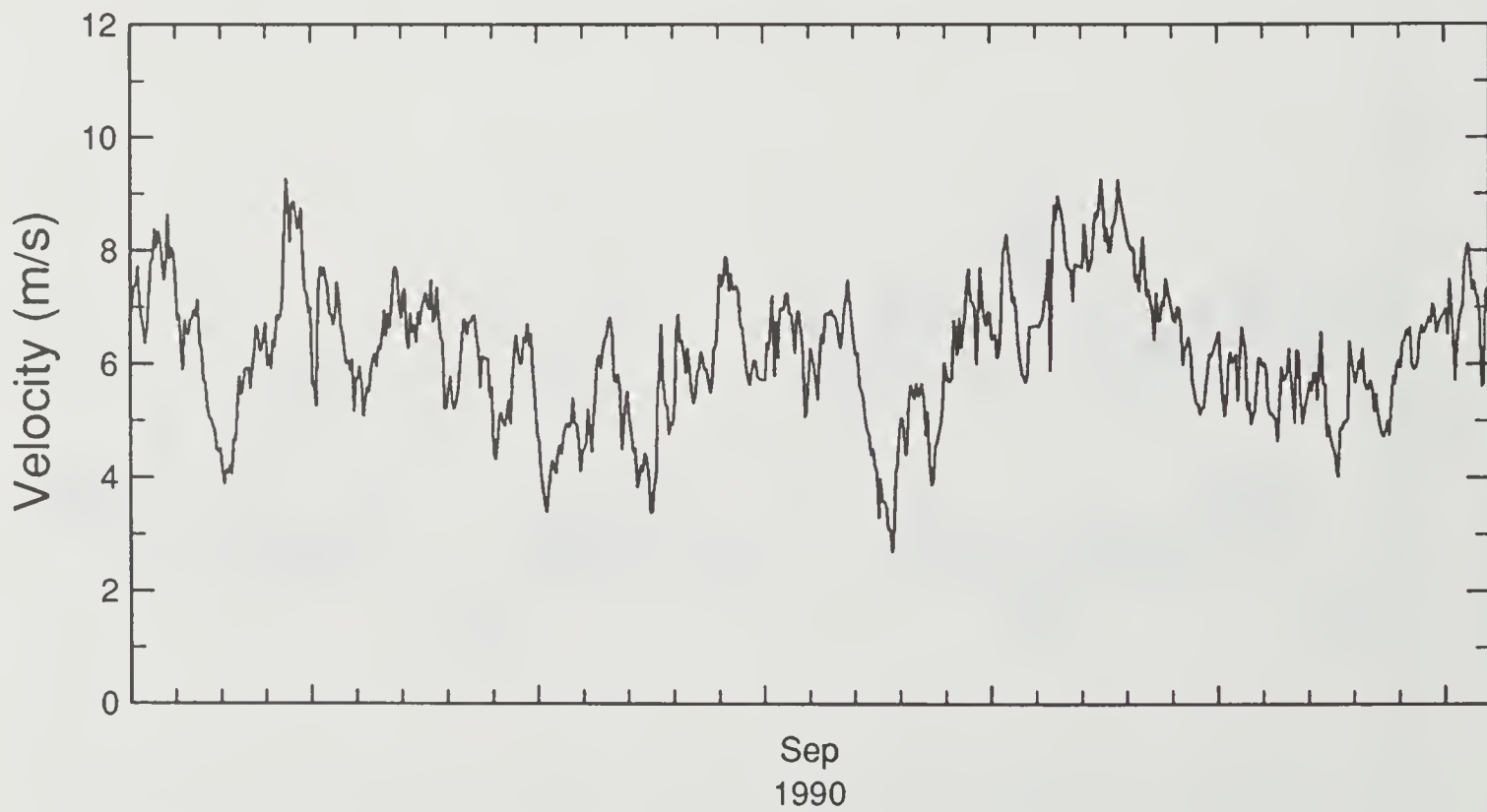


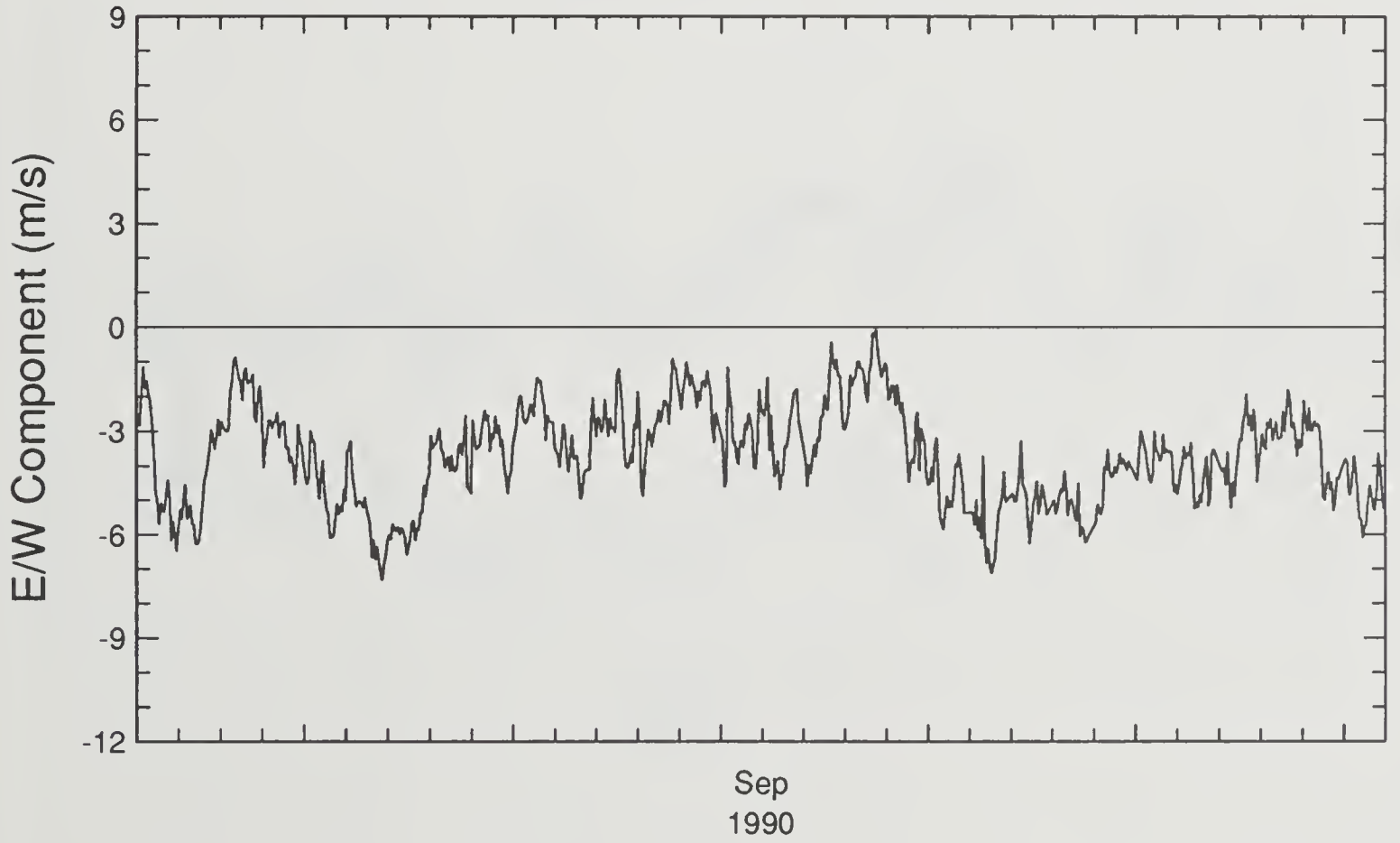
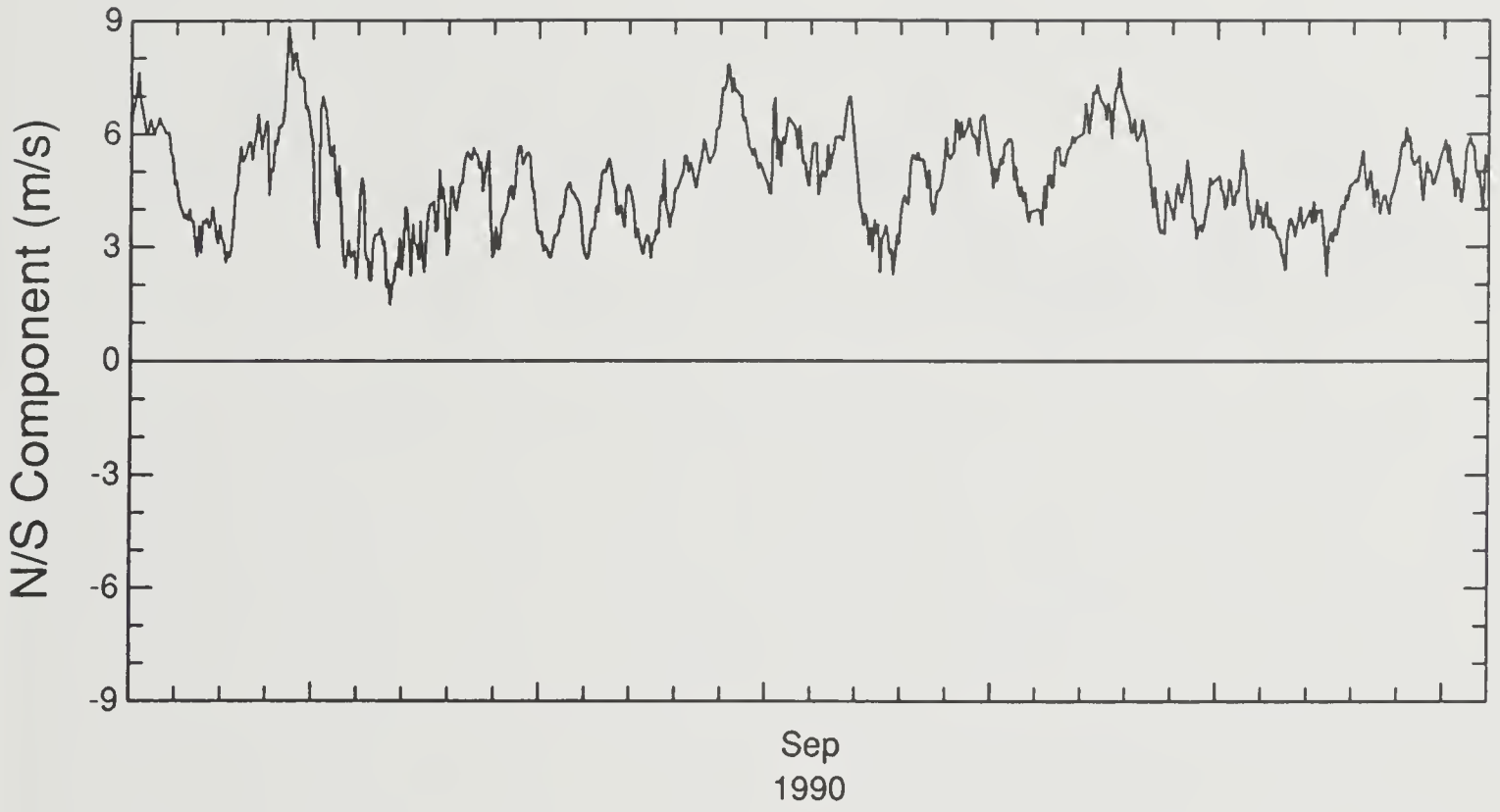
Aug
1990



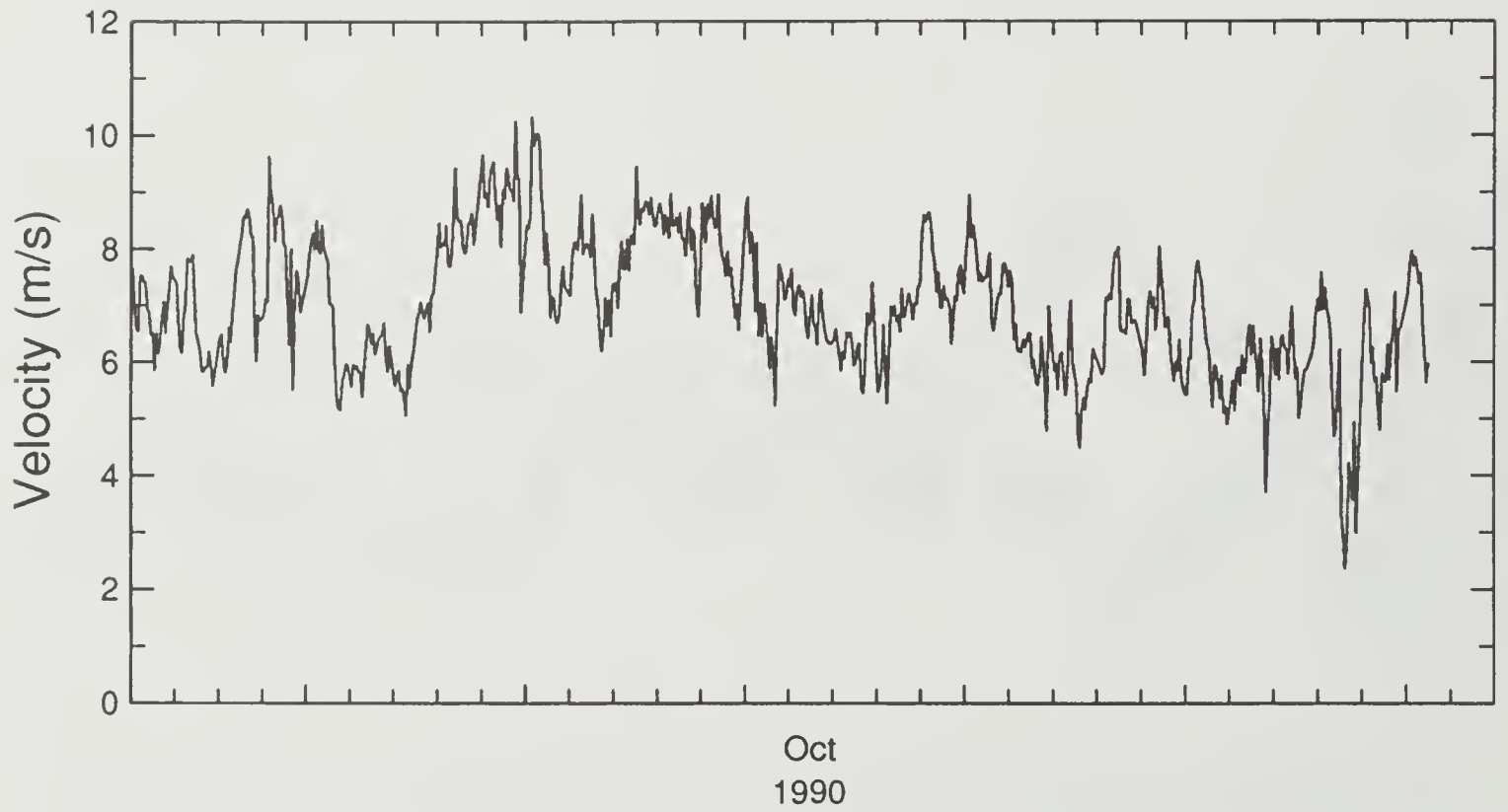
Aug
1990

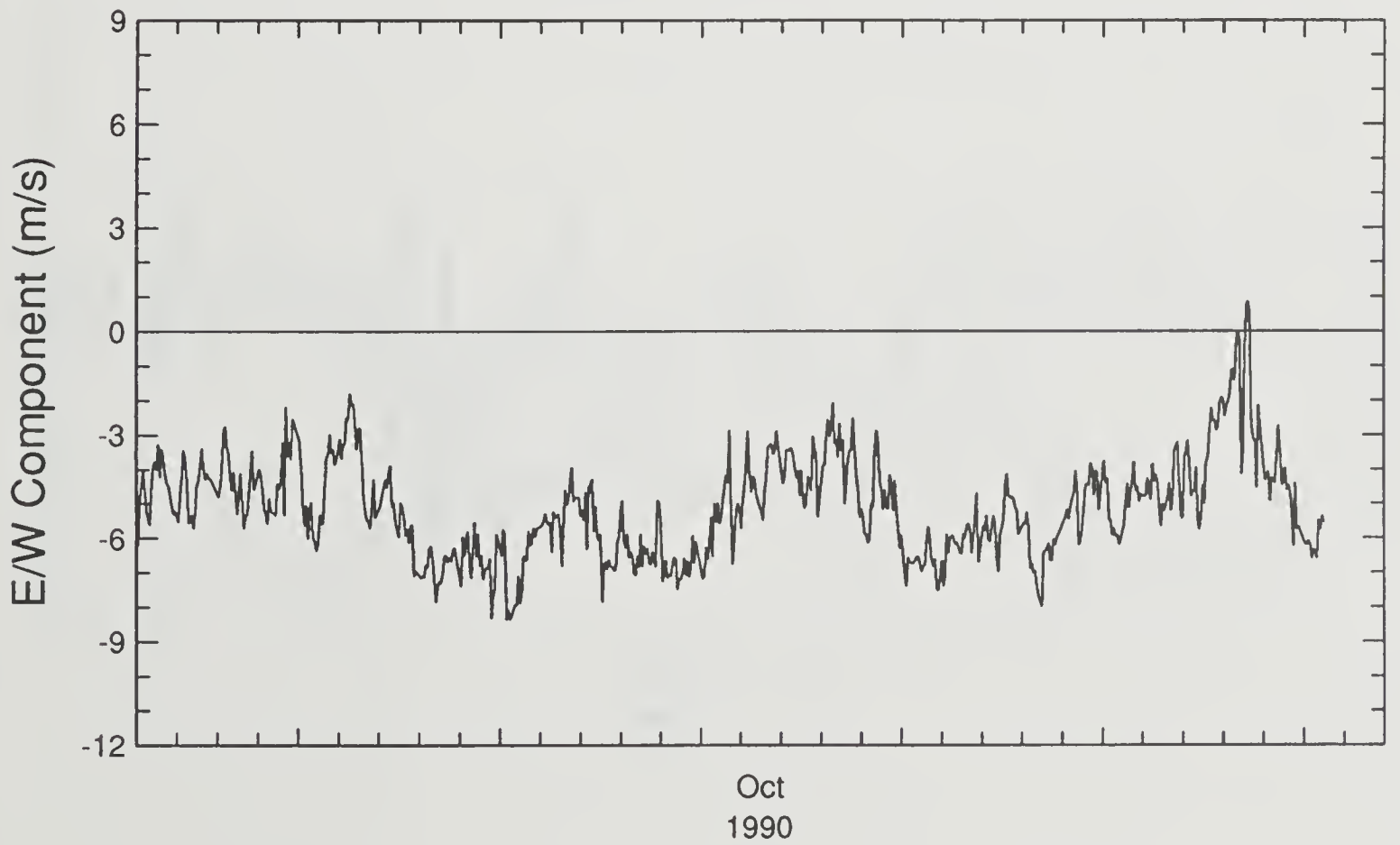
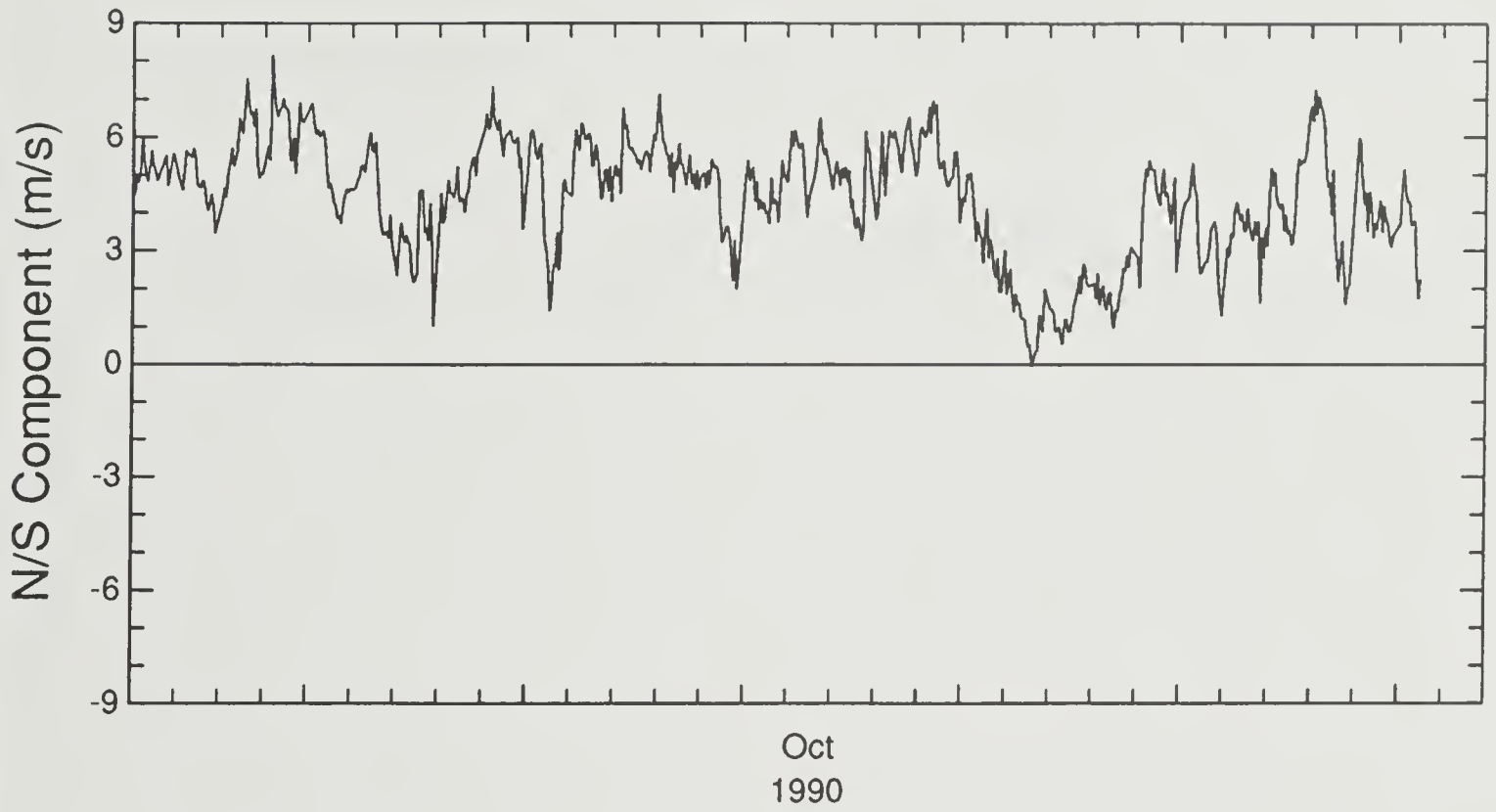
September



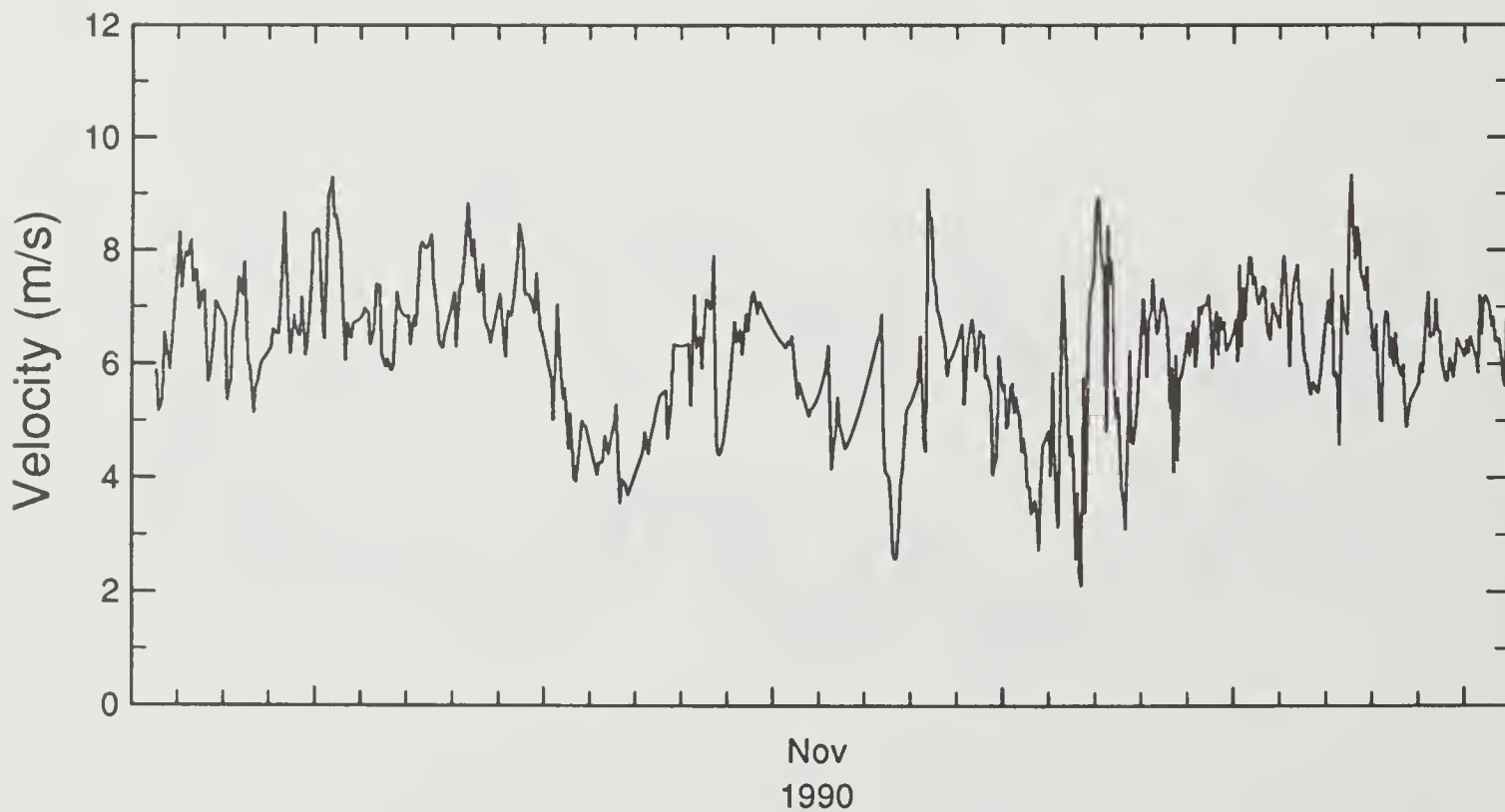


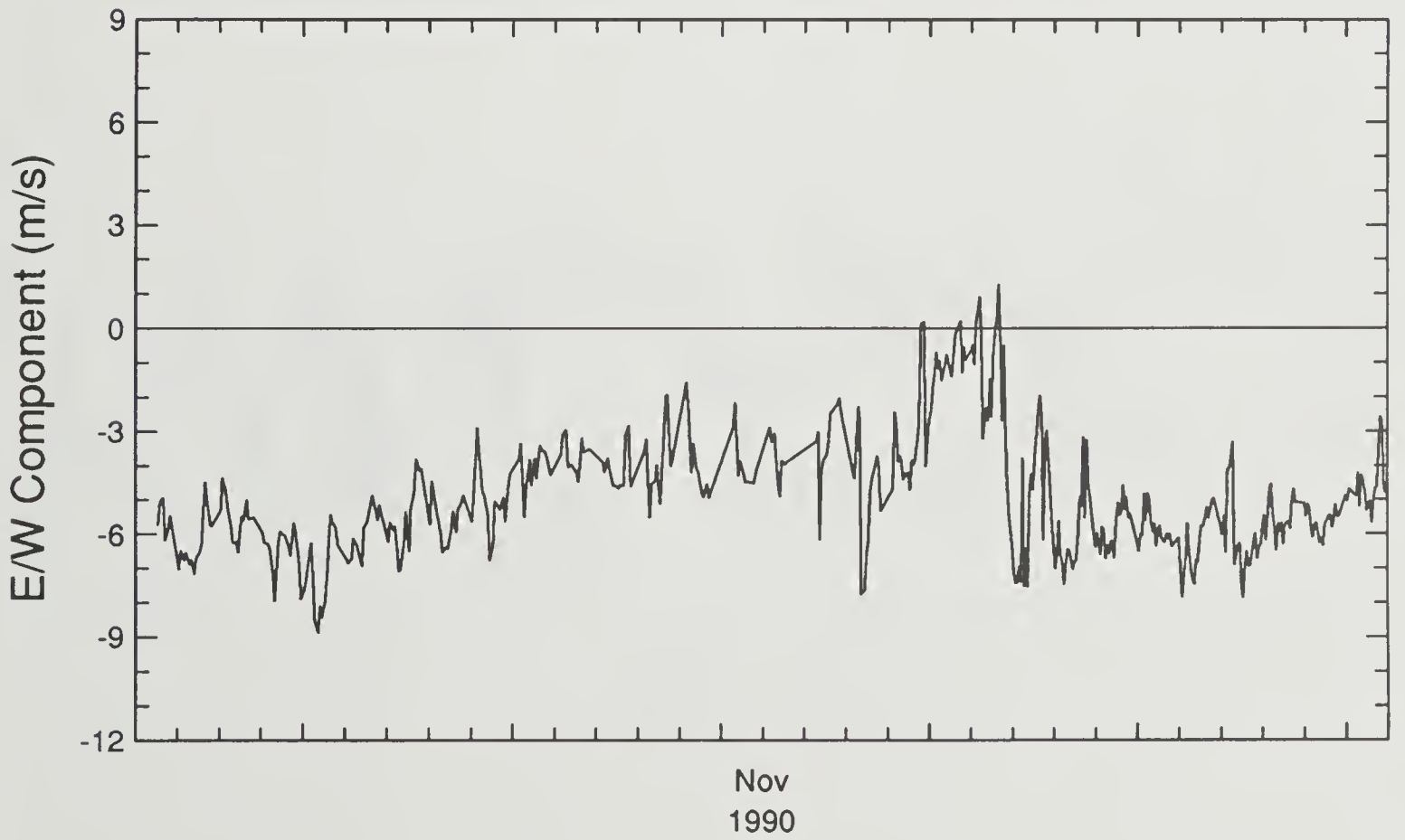
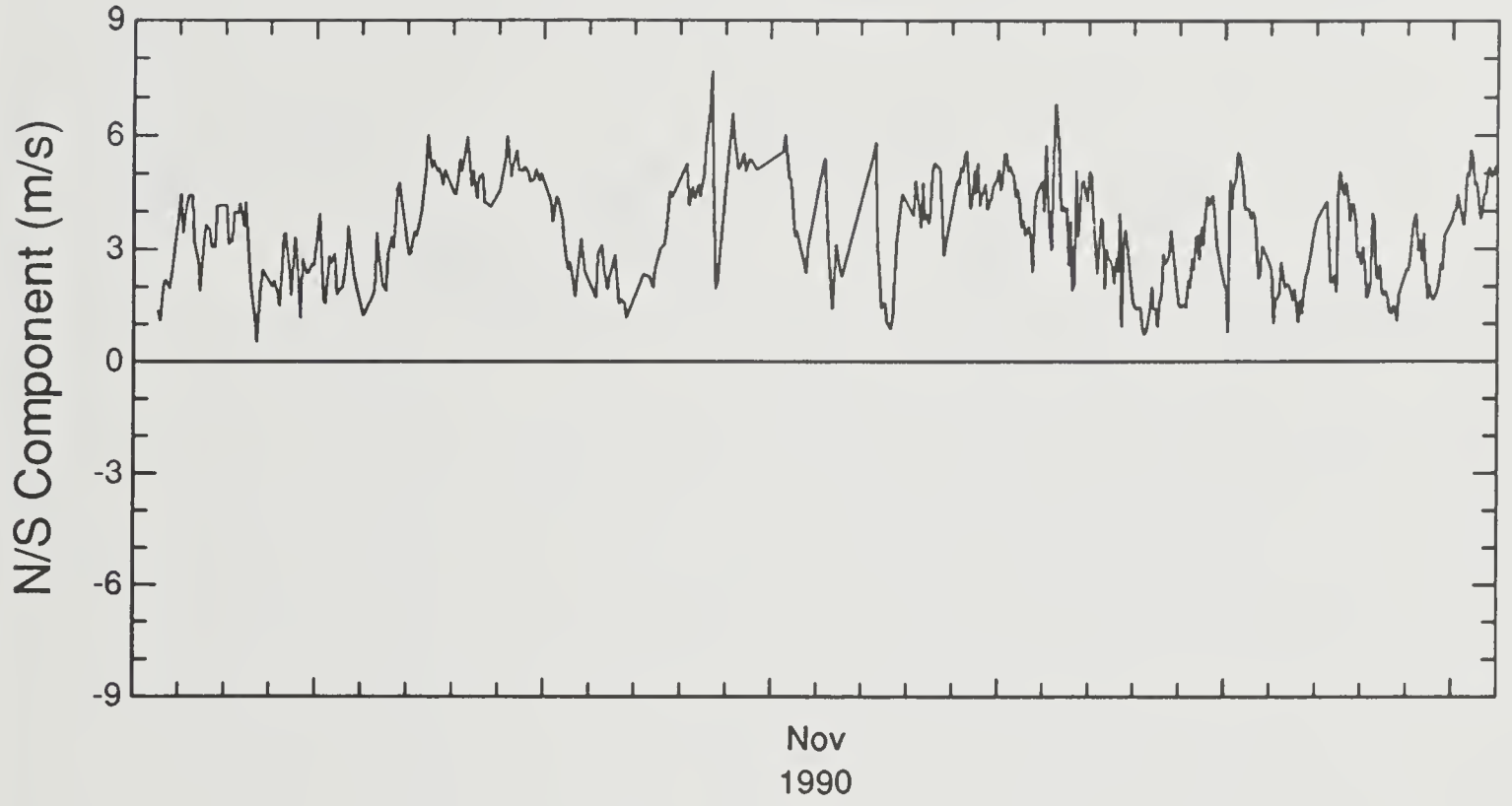
October



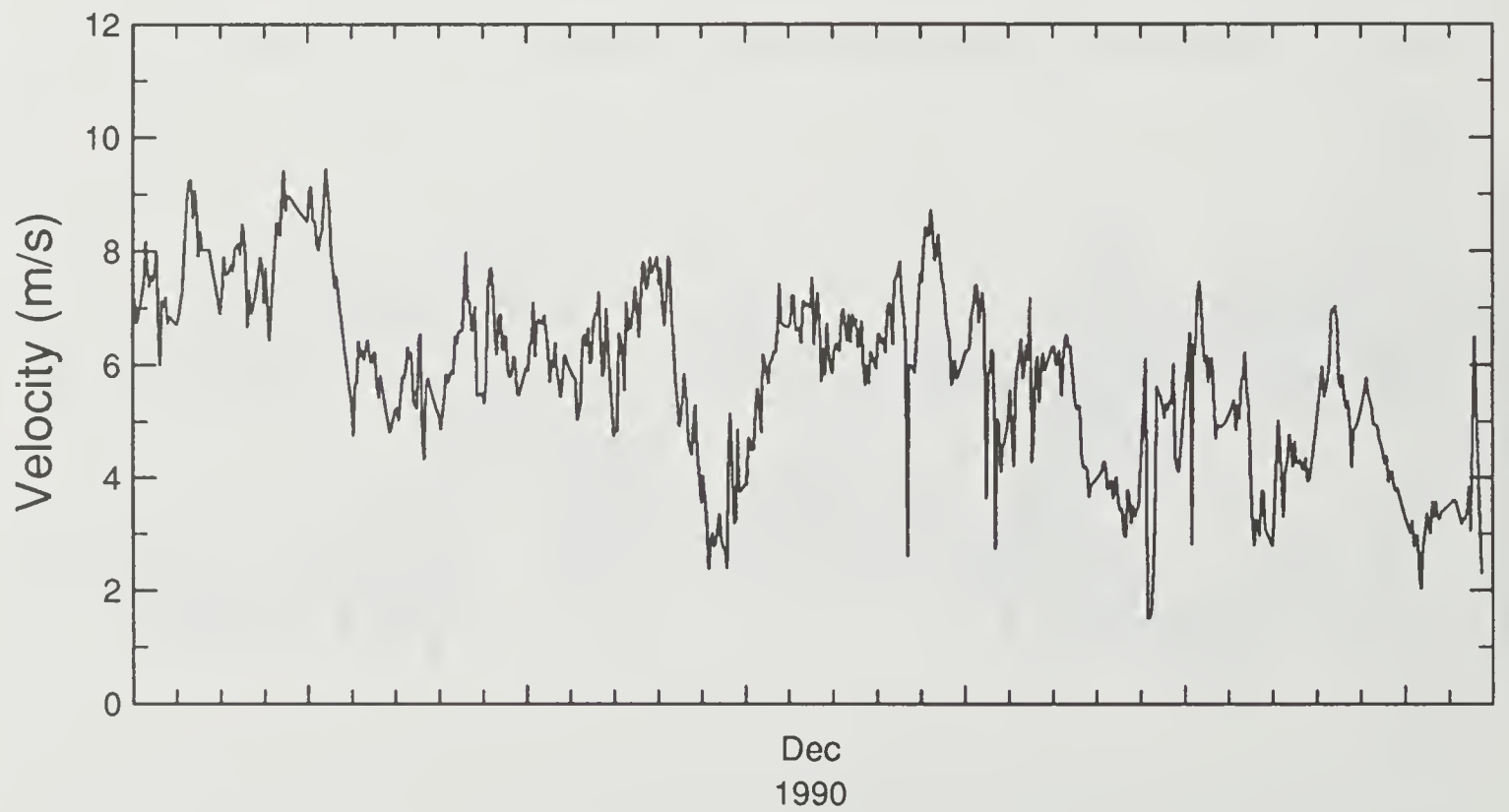


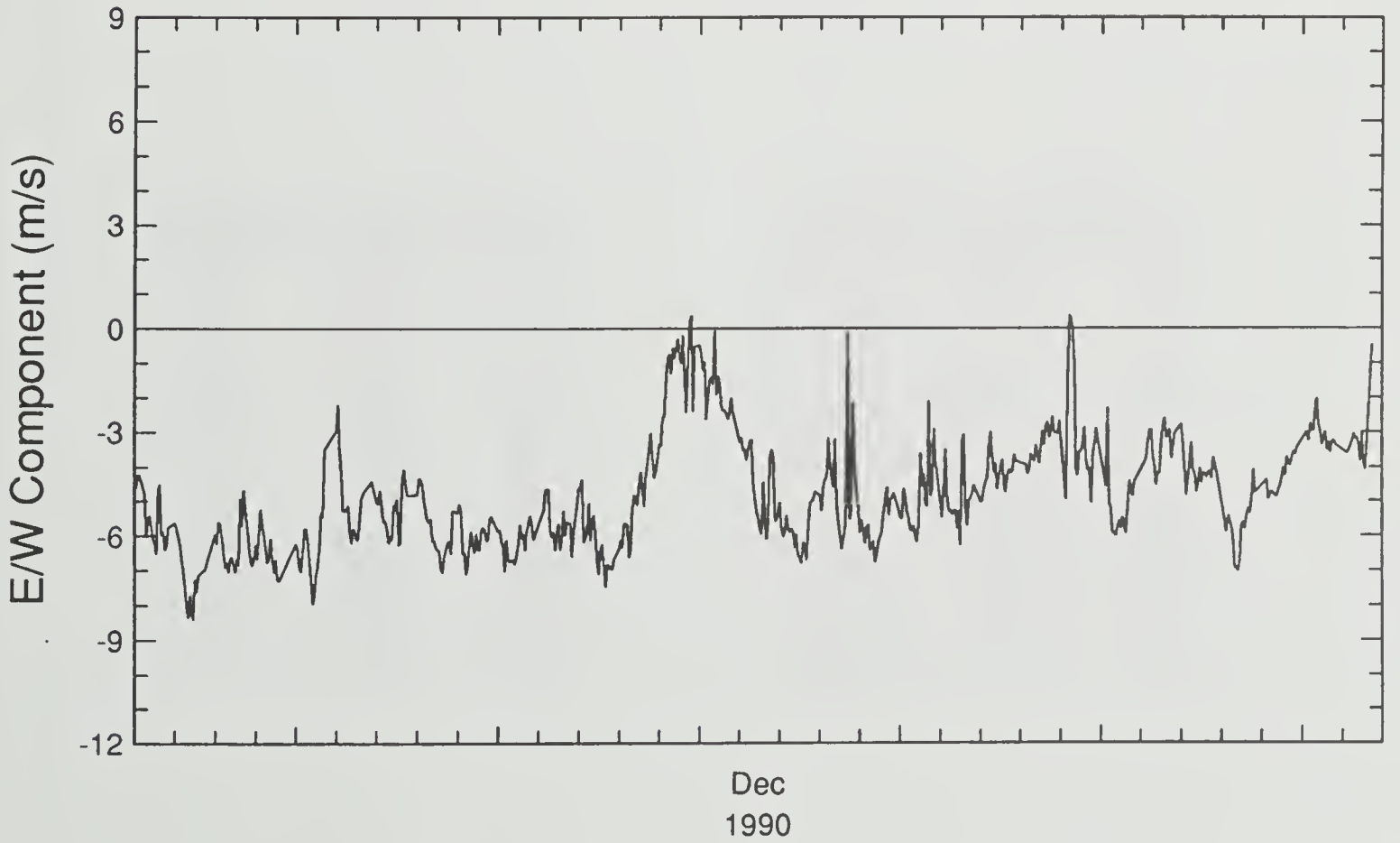
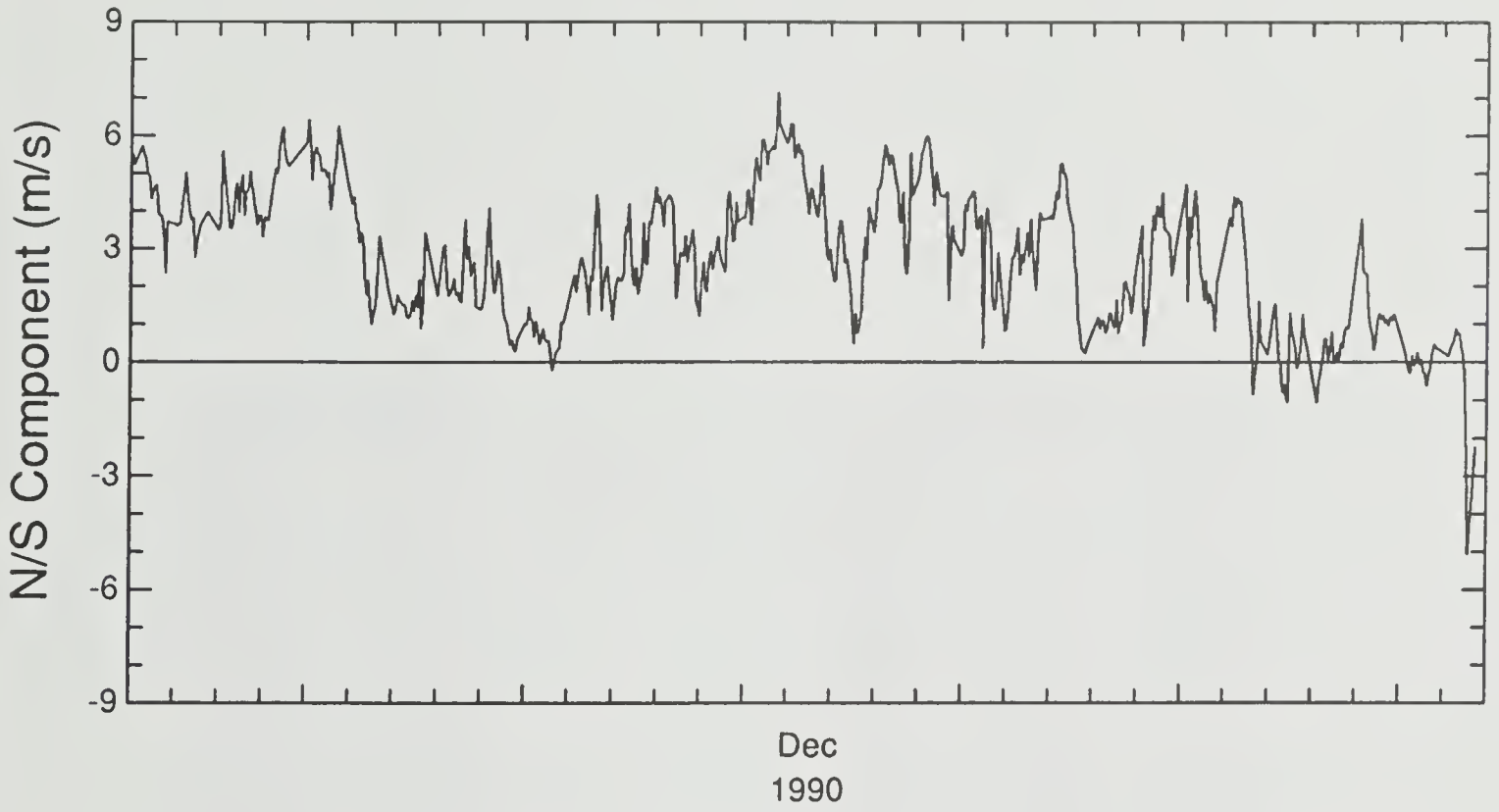
November





December





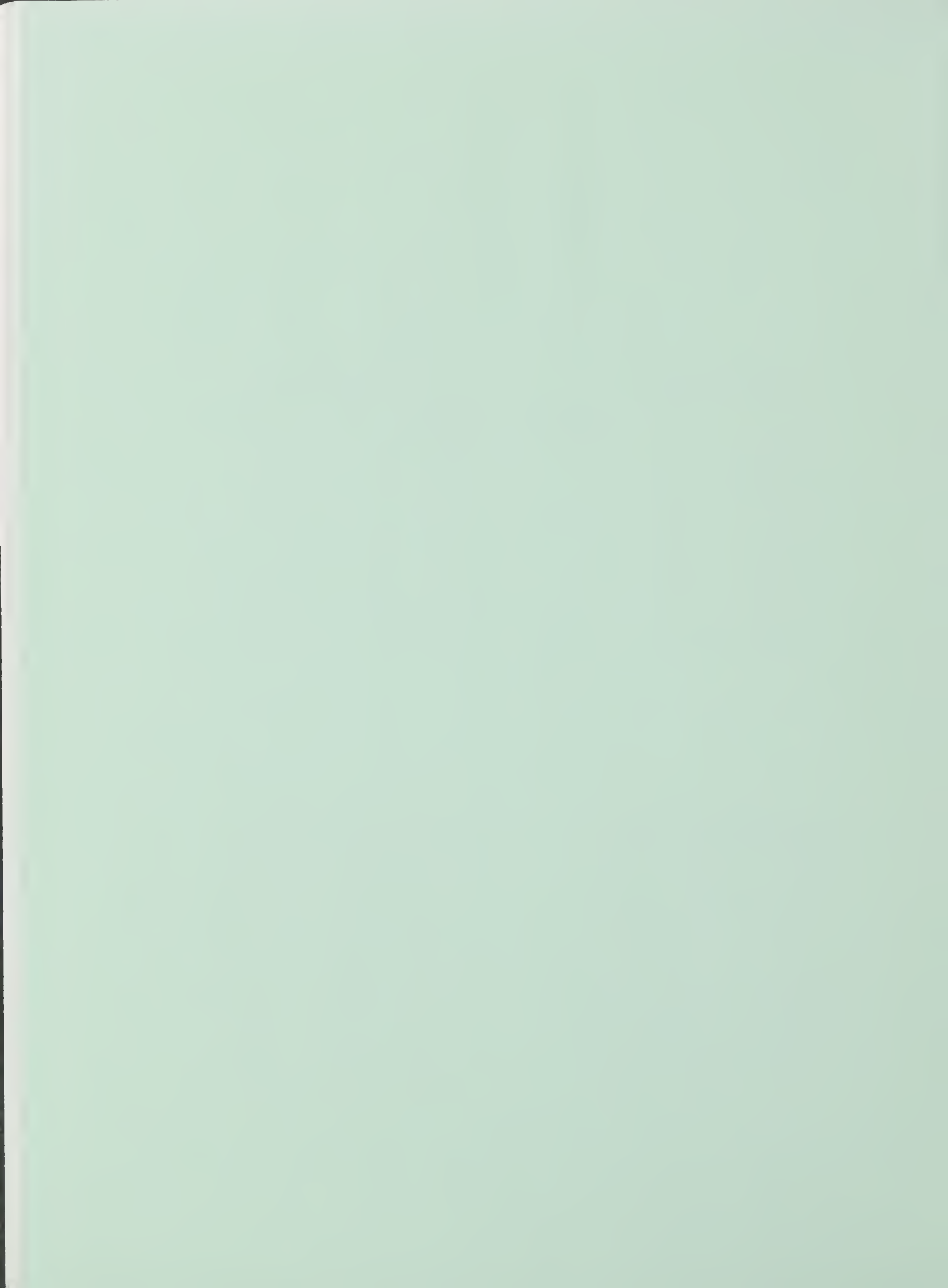
1990 Velocity		
Month	Mean	Std Dev
Jan	3.65	1.49
Feb	1.92	1.50
Mar	3.64	1.39
Apr	3.09	1.45
May	3.88	1.36
Jun	5.84	0.87
Jul	5.48	0.87
Aug	6.15	1.00
Sep	6.03	1.18
Oct	6.75	1.18
Nov	5.93	1.21
Dec	5.51	1.56

1990 Direction	
Month	Mean
Jan	-80.38
Feb	-89.10
Mar	-90.94
Apr	-88.70
May	-68.25
Jun	-69.15
Jul	-69.38
Aug	-57.01
Sep	-38.13
Oct	-49.33
Nov	-53.98
Dec	-60.08

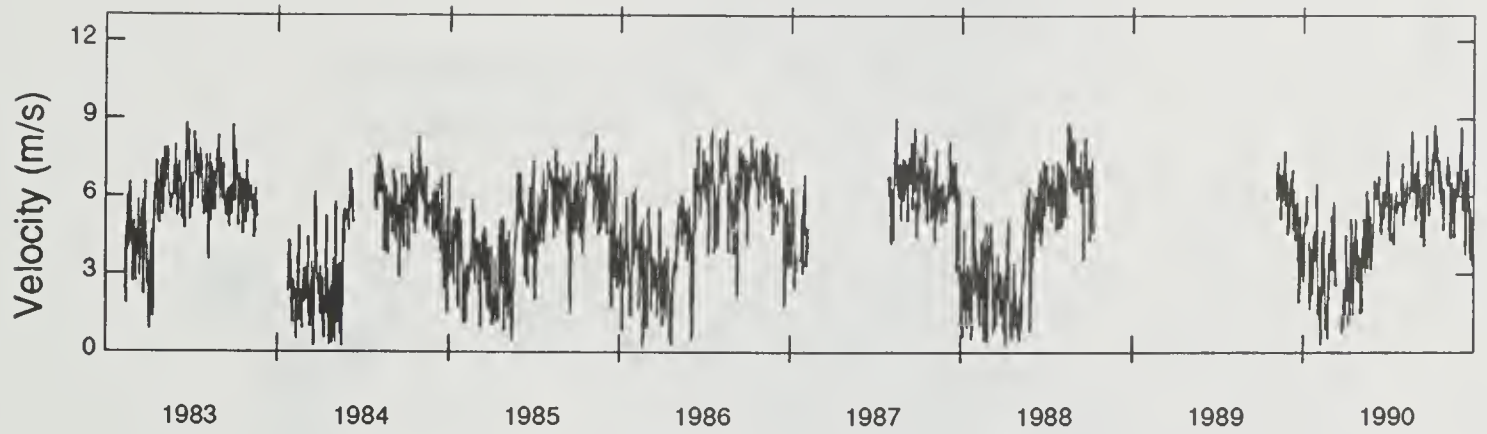
1990 N-S Component		
Month	Mean	Std Dev
Jan	0.61	1.95
Feb	0.03	1.53
Mar	-0.04	1.47
Apr	0.07	1.36
May	1.44	1.50
Jun	2.08	1.18
Jul	1.93	1.18
Aug	3.35	1.27
Sep	4.74	1.26
Oct	4.40	1.51
Nov	3.49	1.33
Dec	2.75	1.84

1990 E-W Component		
Month	Mean	Std Dev
Jan	-3.60	1.50
Feb	-1.93	1.78
Mar	-2.44	1.61
Apr	-3.09	1.44
May	-3.61	1.38
Jun	-5.46	1.15
Jul	-5.13	1.01
Aug	-5.16	1.25
Sep	-3.72	1.40
Oct	-5.12	1.45
Nov	-4.80	1.68
Dec	-4.78	1.57

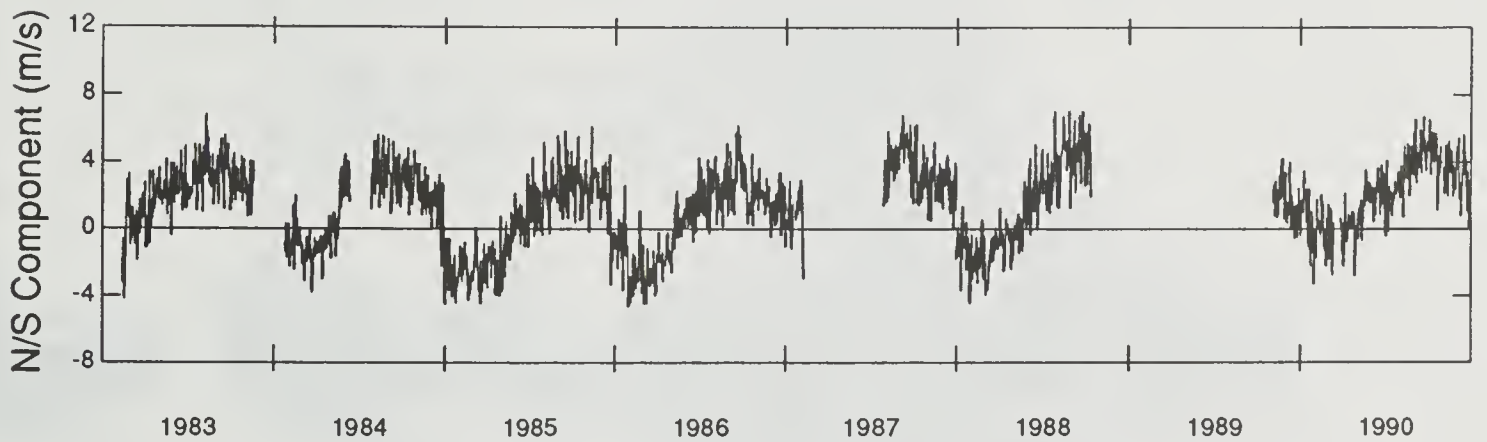
1983 - 1990



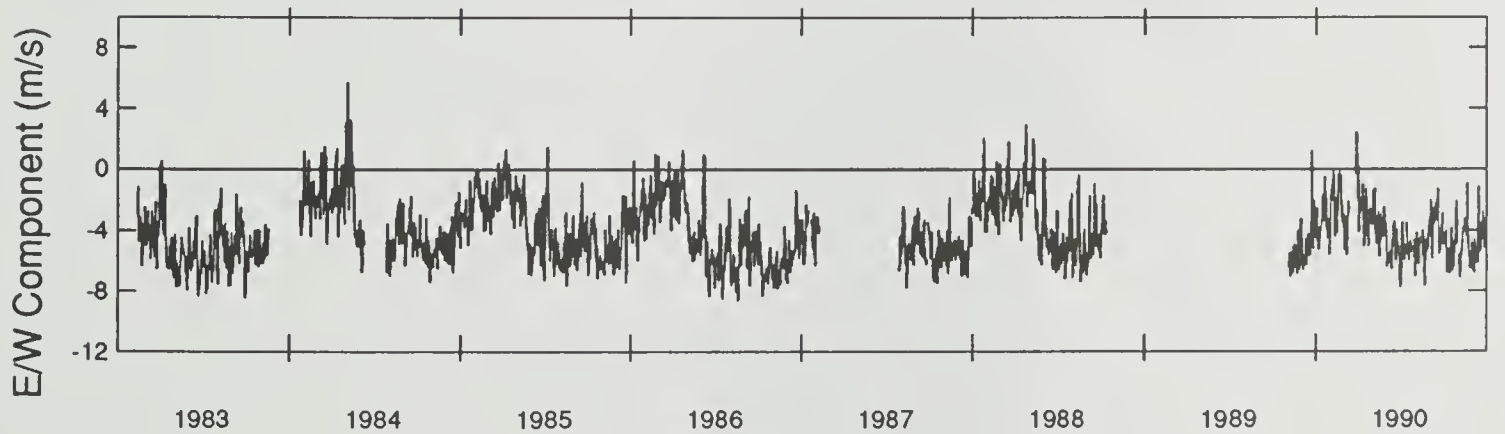
1983-90 Wind Speed (Daily Values)



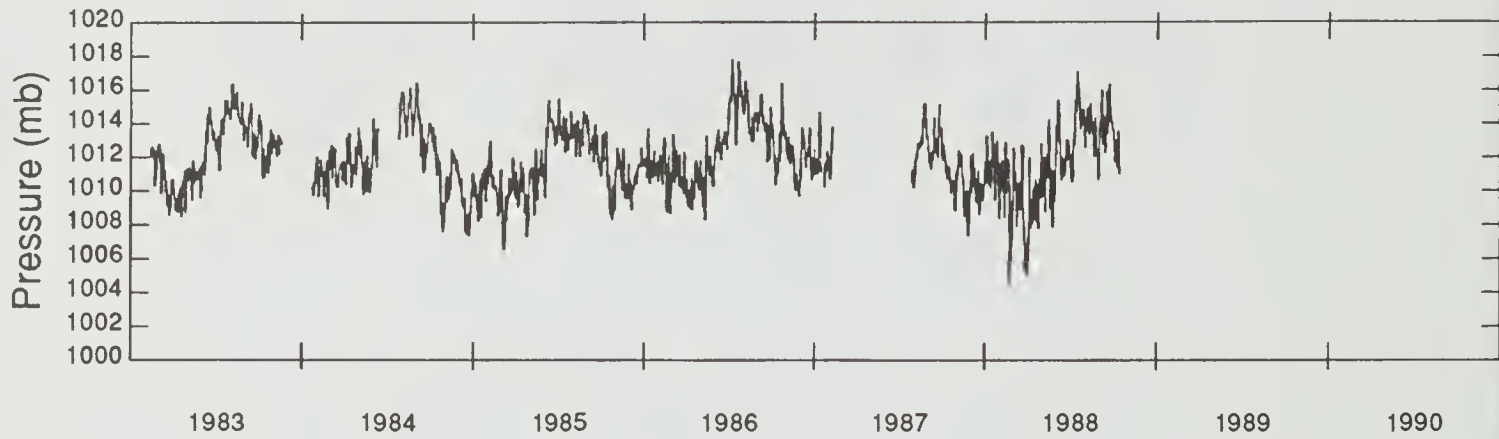
1983-90 Meridional Component



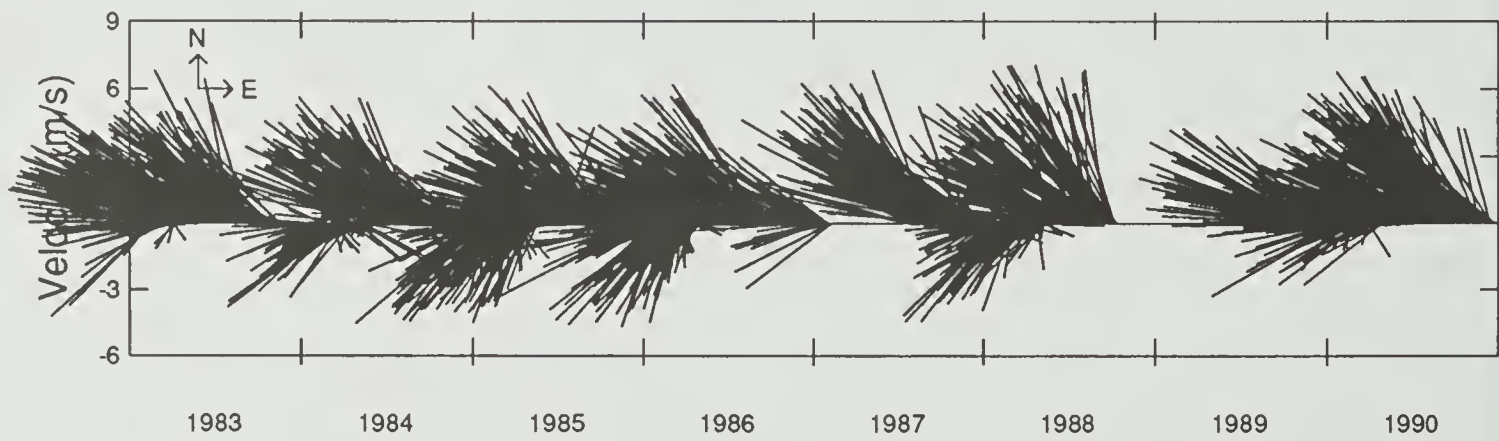
1983-90 Zonal Component



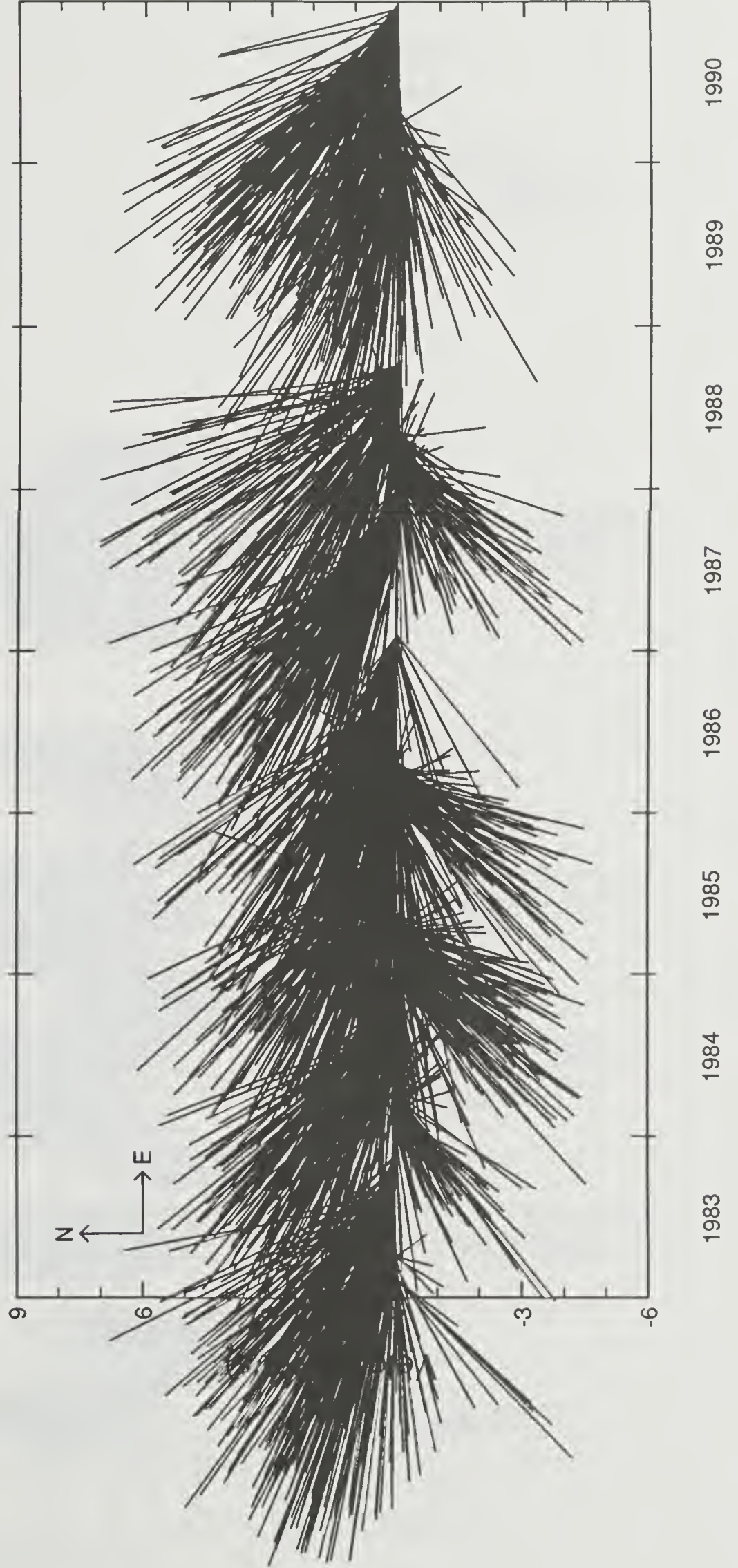
1983-90 Pressure
(Daily Values)



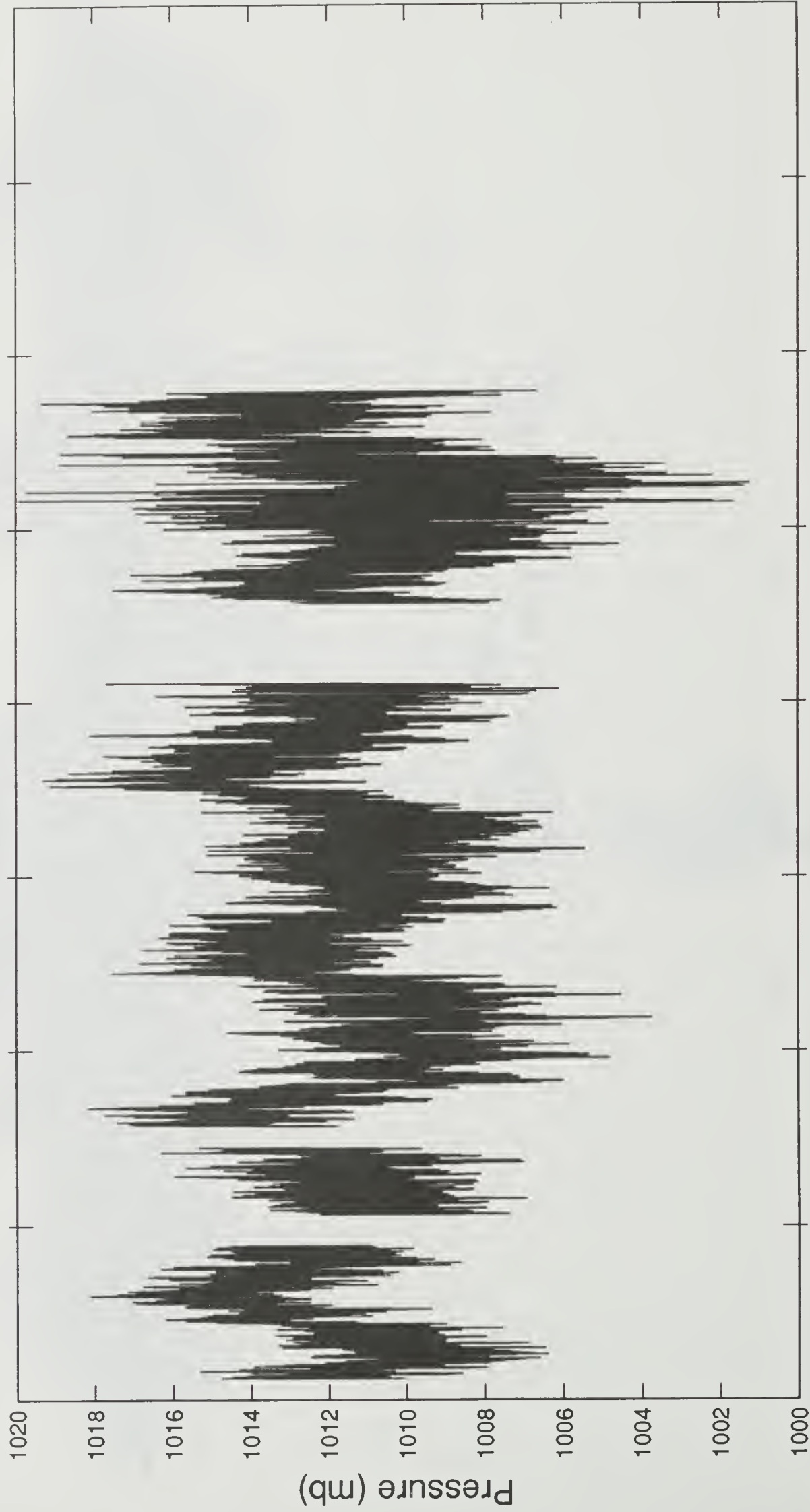
1983-90 Wind Speed
(Daily Values)



1983-90 Wind Speed (Daily Values)

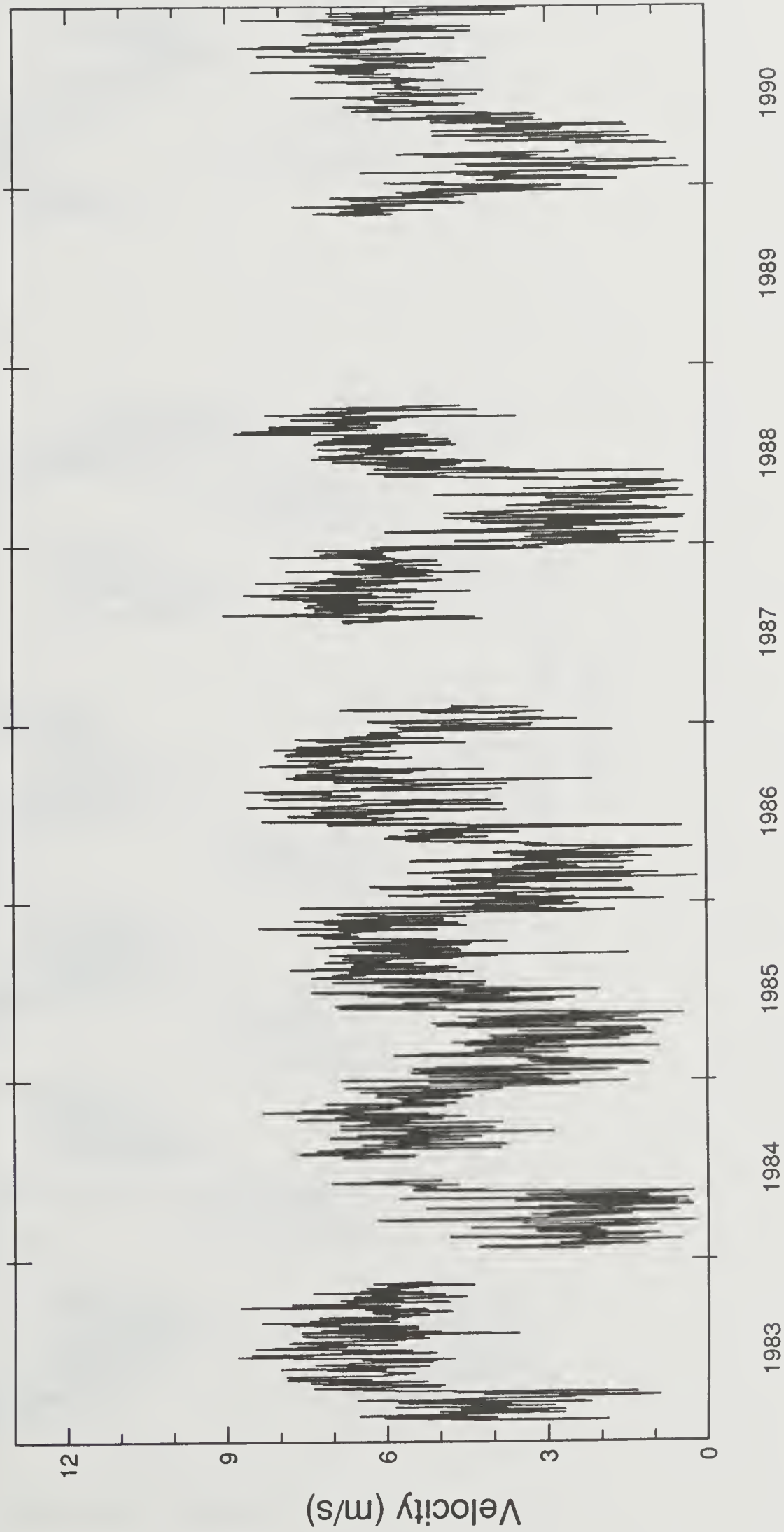


1983-90 Pressure

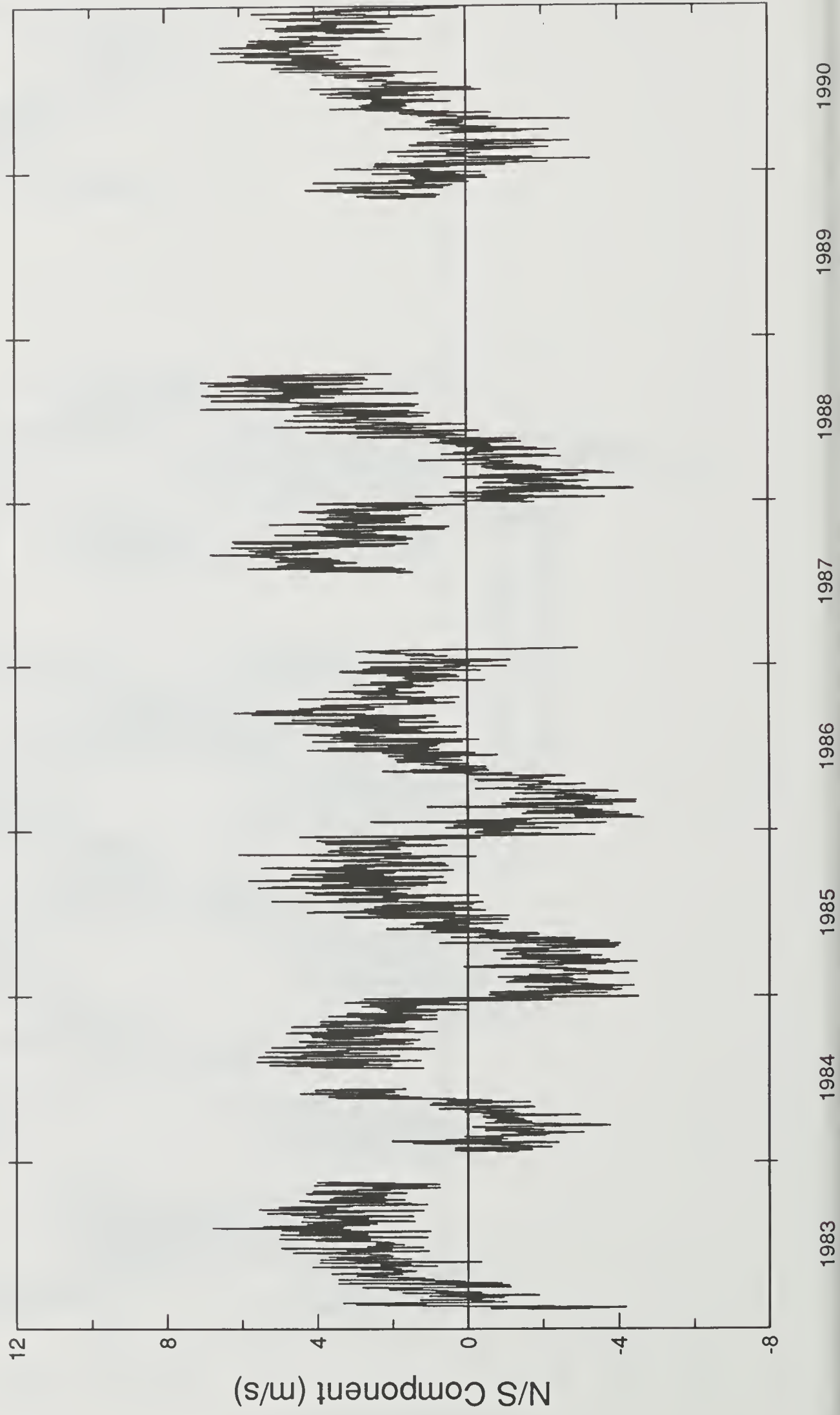


1983 1984 1985 1986 1987 1988 1989 1990

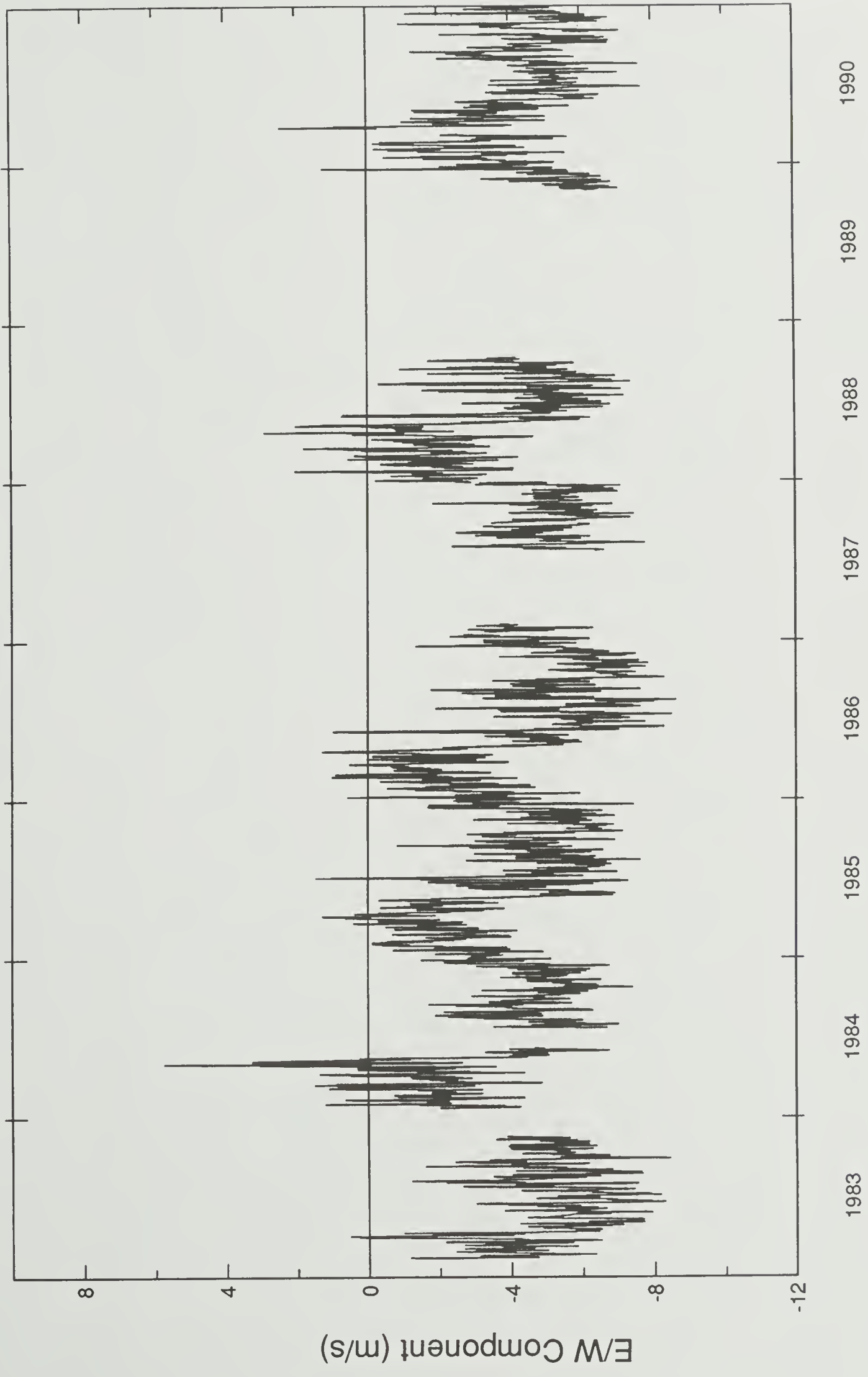
1983-90 Wind Speed (Daily Values)



1983-90
Meridional Component



1983-90
Zonal Component



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