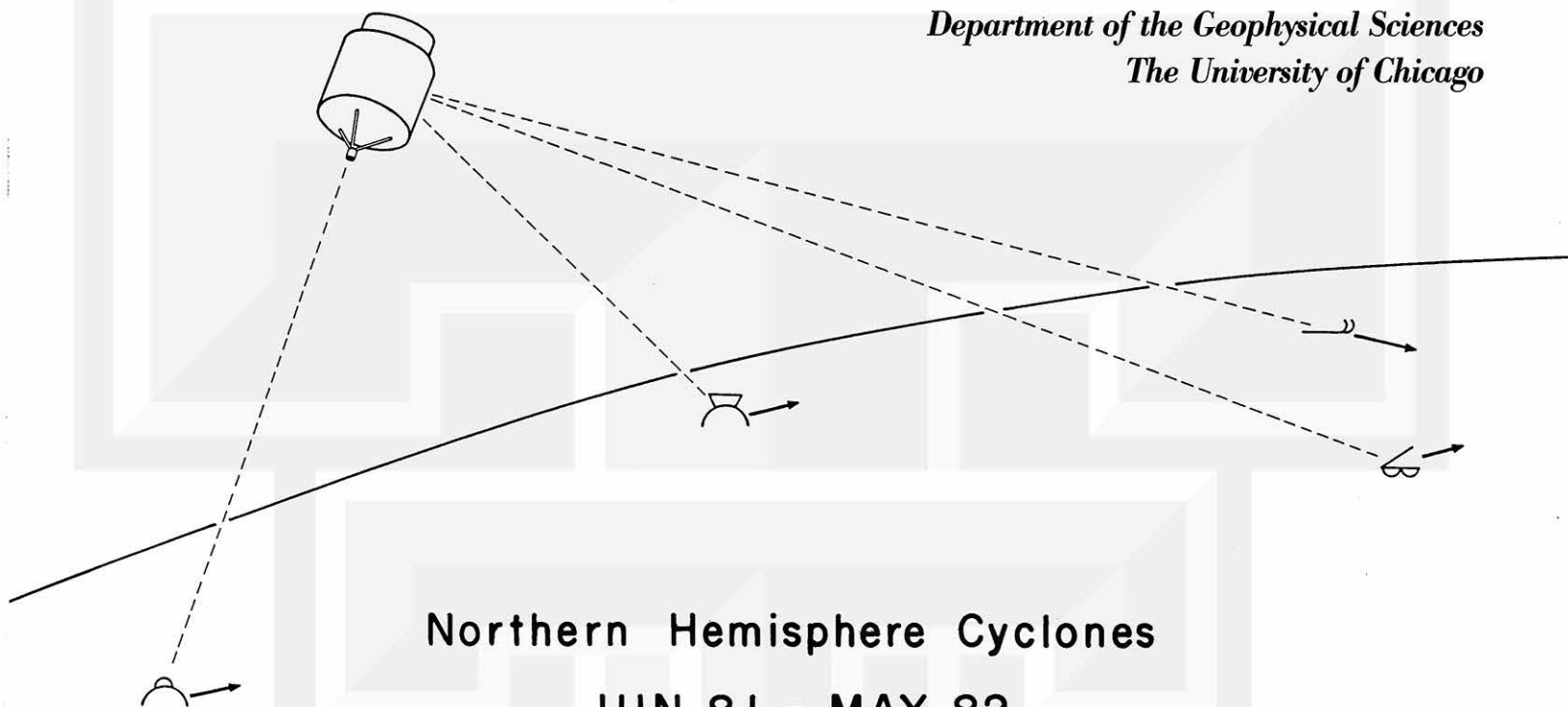


WIND RESEARCH LABORATORY

*Department of the Geophysical Sciences
The University of Chicago*

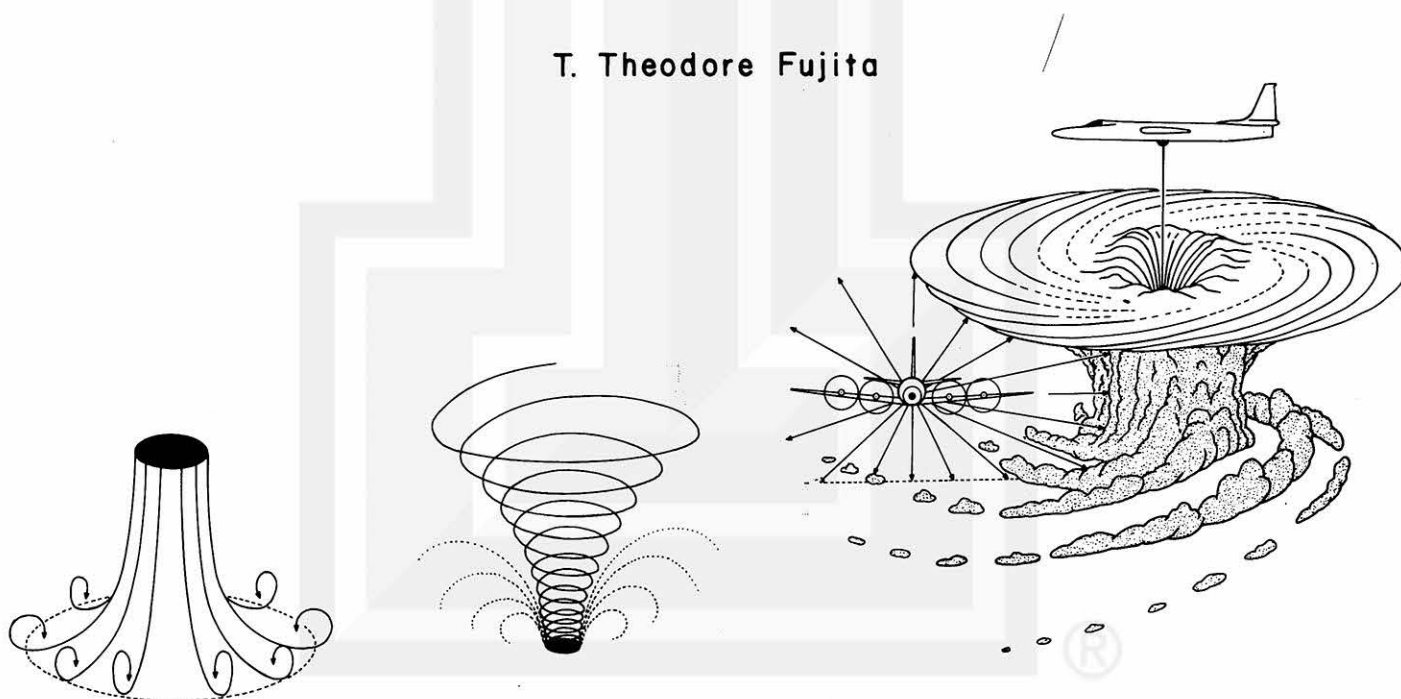


Northern Hemisphere Cyclones

JUN 81 - MAY 82

by

T. Theodore Fujita



WRL Research Paper 223 APR 1988

WRL was formerly SMRP (1961-1987)

W R L RESEARCH PAPER No. 223

N O R T H E R N H E M I S P H E R E C Y C L O N E S

June 1981 - May 1982

(Statistical Maps of Cyclone Distribution)

by
T. Theodore Fujita

Technical Report to Office of Naval Research
Marine Meteorology Program



TABLE OF CONTENTS

<u>Introduction</u>	<u>1</u>
<u>1. Distribution by Central Pressure (CP)</u>	<u>3</u>
1 ANNUAL MAP	
4 SEASONAL MAPS, Summer 1981, Autumn 1981 Winter 1981-82, Spring 1982	
12 MONTHLY MAPS, June-December 1981, January-May 1982	
<u>2. Distribution by Cyclone Windspeed (CW)</u>	<u>21</u>
1 ANNUAL MAP	
4 SEASONAL MAPS, Summer 1981, Autumn 1981 Winter 1981-82, Spring 1982	
12 MONTHLY MAPS, June-December 1981, January-May 1982	
<u>3. Distribution by Cyclone Movement (CM)</u>	<u>39</u>
1 ANNUAL MAP	
4 SEASONAL MAPS, Summer 1981, Autumn 1981 Winter 1981-82 Spring 1982	
12 MONTHLY MAPS, June-December 1981, January-May 1982	
<u>4. Distribution by Pressure Deepening (-PD)</u>	<u>57</u>
1 ANNUAL MAP	
4 SEASONAL MAPS, Summer 1981, Autumn 1981 Winter 1981-82, Spring 1982	
12 MONTHLY MAPS, June-December 1981, January-May 1982	
<u>5. Distribution by Pressure Filling (+PD)</u>	<u>75</u>
1 ANNUAL MAP	
4 SEASONAL MAPS, Summer 1981, Autumn 1981 Winter 1981-82, Spring 1982	
12 MONTHLY MAPS, June-December 1981, January-May 1982	

Introduction

Climatological maps presented in this paper were generated by computer and geographic features were added in color. The source of the data is The University of Chicago Cyclone Tape which has been updated. The tape includes the following parameters:

CYCLONE IDENTIFICATION

NO -- Cyclone identification number
 YR -- Year past 1900
 MO -- Calendar month in number
 GT -- GMT time in hours

COMPUTED VALUES

LA -- North latitude computed by 5-point weighted running means, repeated twice
 LO -- East longitude computed by 5-point weighted running means, repeated twice
 CD -- Direction of cyclone movement (from) in degrees
 CM -- Speed of cyclone movement in m/s
 CP -- Central pressure in mb computed by 5-point running means, applied only once
 PD -- Deepening of the central pressure in mb/6hrs: Negative value denotes deepening and positive value, filling.
 CW -- Cyclone windspeed in m/s.
 WI -- Intensification of cyclone windspeed in m/s in 6 hrs: positive value denotes weakening.

INPUT VALUES

LA* - North latitude of cyclone center in degrees
 LO* - East or west longitude of cyclone center in degrees
 A -- Minimum radius of curvature of $P_0 + 8$ mb isobar on map measured in mm
 A* -- Shape factor of $P_0 + 8$ mb isobar, 0 through 5
 B -- Minimum radius of curvature of $P_0 + 16$ mb isobar on map measured in mm
 B* -- Shape factor of $P_0 + 16$ mb, 0 through 5

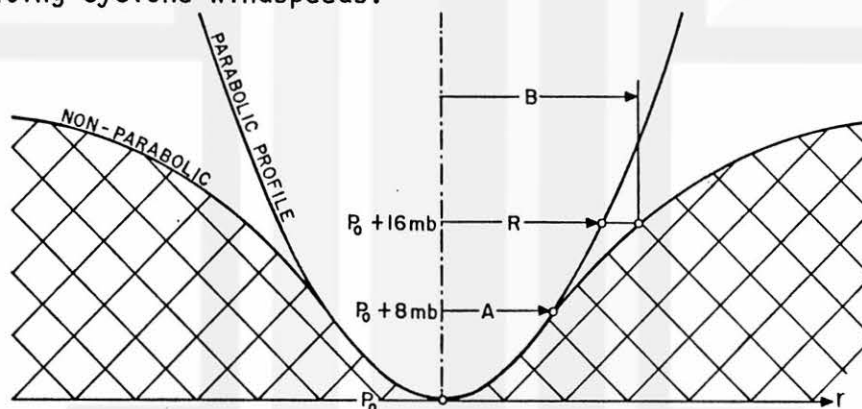
Example of Printout

Shown below is an example of a printout from the University of Chicago Cyclone Tape, showing parameters of Cyclone 2969.

NO	YR	MO	DY	GT	LA	LO	CD	CM	CP	PD	CW	WI	LA*	LO*	PC*	A	A*	B	B*
2969	84	4	3	0	55.5	342.6	*	*	995.1	*	12.3	*	53	17W	998	4.5	2	8.0	0
2969	84	4	3	6	56.4	342.1	160	5	992.0	-3.1	13.5	1.2	57	17W	992	3.0	2	6.5	1
2969	84	4	3	12	57.1	341.4	150	4	989.8	-2.2	15.0	1.5	57	18W	990	4.0	3	6.5	2
2969	84	4	3	18	58.0	340.5	150	5	987.4	-2.4	16.6	1.6	58	20W	984	3.0	5	4.5	3
2969	84	4	4	0	58.8	339.5	150	5	988.2	0.8	16.9	0.3	59	20W	988	3.0	4	5.5	4
2969	84	4	4	6	59.8	338.1	140	6	990.0	1.8	16.5	-0.4	59	21W	990	4.0	3	6.5	3
2969	84	4	4	12	60.9	336.6	150	7	992.0	2.0	15.9	-0.6	61	23W	992	3.5	4	6.5	1
2969	84	4	4	18	61.9	335.5	150	6	994.2	2.2	15.9	0.0	62	26W	996	5.0	4	8.0	4
2969	84	4	5	0	62.8	334.9	160	4	994.7	0.5	16.2	0.3	63	28W	992	3.5	5	6.0	3
2969	84	4	5	6	63.3	335.1	190	3	997.1	2.4	16.4	0.2	65	23W	1000	5.0	3	7.0	1

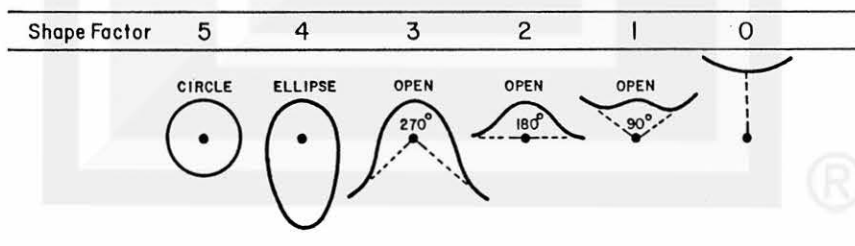
Schematic Pressure Field

A schematic figure showing the pressure field of a cyclone characterized by a parabolic profile surrounding the center and a non-parabolic profile in the outer area. Because NMC maps used in generating the input data are analyzed with isobars of 4-mb interval, $P_0 + 8$ and $P_0 + 16$ mb isobars were used as key isobars for computing cyclone windspeeds.



Shape Factor

Shape factors, 0-5, are applied to the shape of key isobars with their pressures, $P_0 + 8$ mb and $P_0 + 16$ mb around a cyclone center at a given time. Isobars with 4 and 5 shape factors are closed and those with 0-3 are open.



..... 990 mb or higher

.... 970 - 990 mb

* * * 970 mb or lower

1. DISTRIBUTION BY CENTRAL PRESSURE (CP)

1 ANNUAL MAP

4 SEASONAL MAPS

Summer 1981

Autumn 1981

Winter 1981-82

Spring 1982

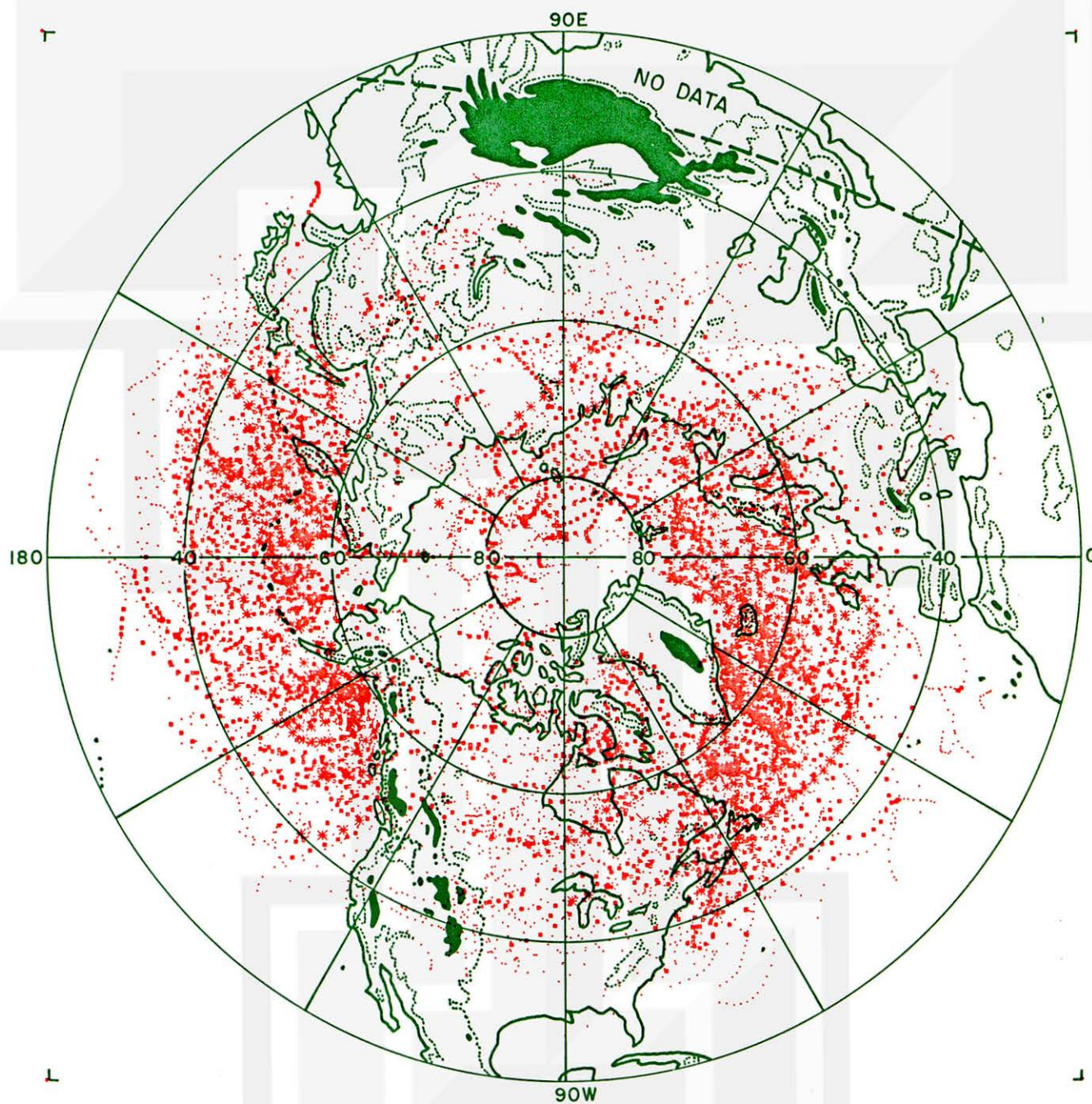
12 MONTHLY MAPS

June-December 1981

January-May 1982

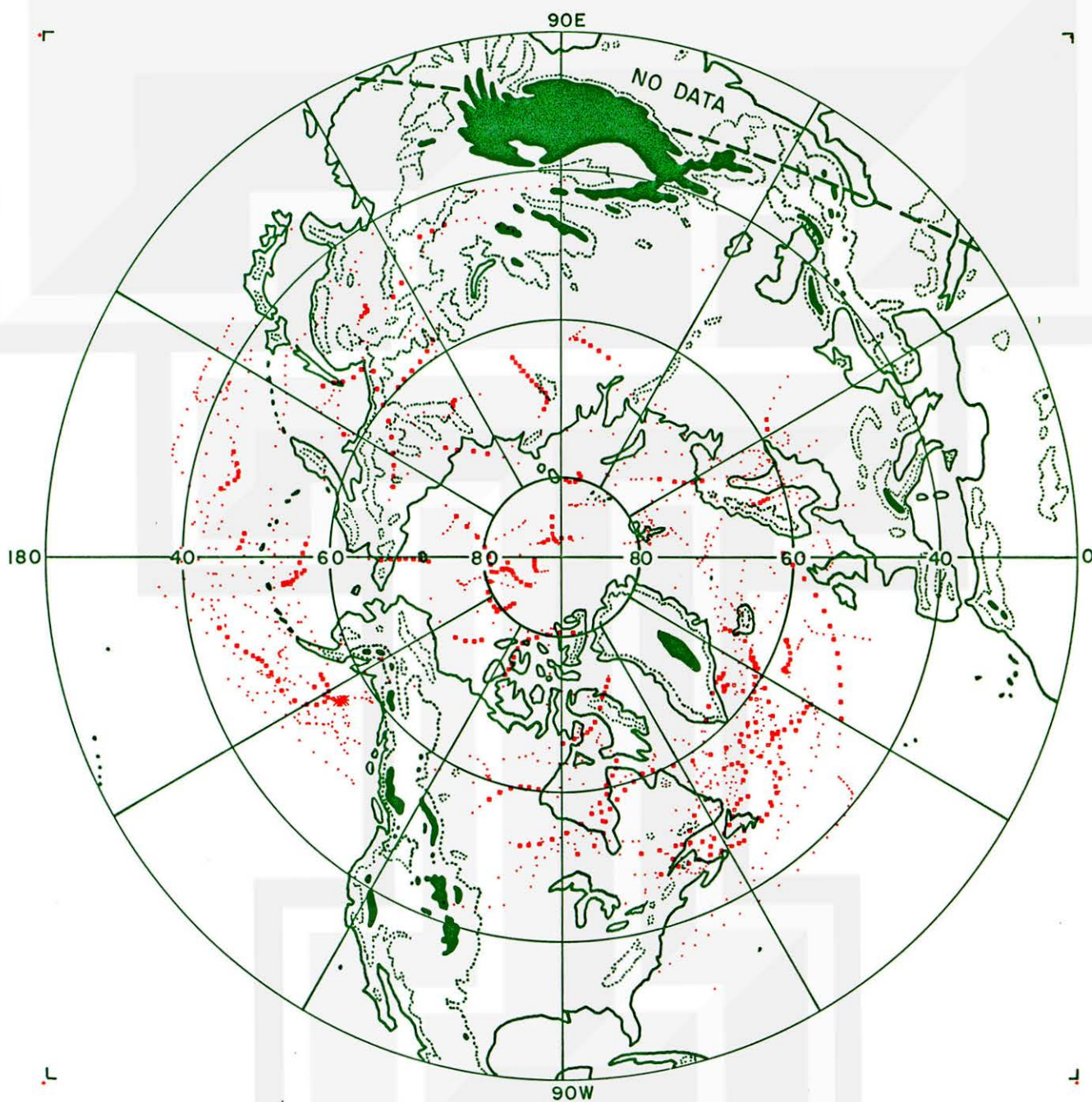


CENTRAL PRESSURE
12 MOS JUN 81 - MAY 82



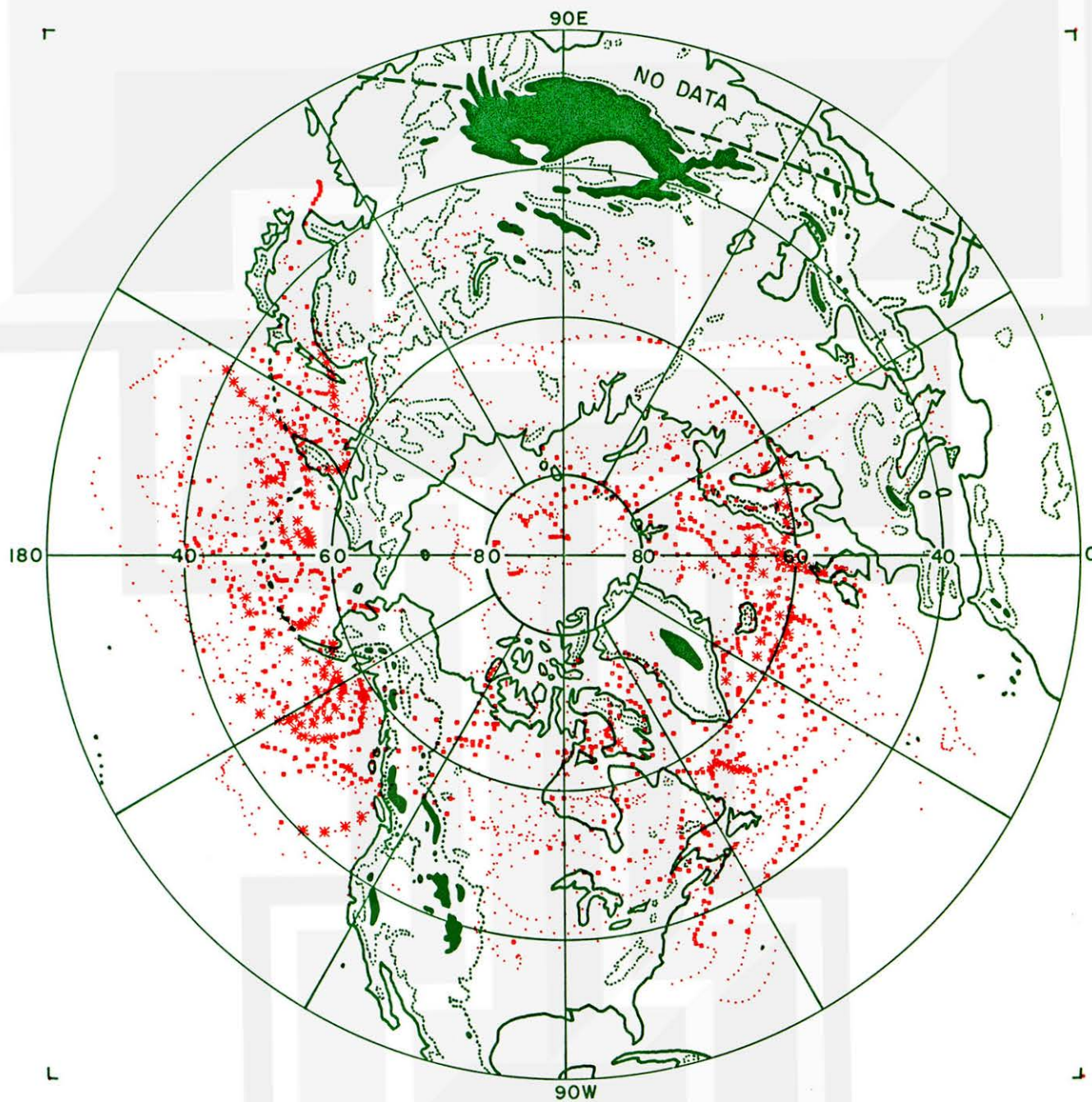
CENTRAL PRESSURE

SUMMER 1981

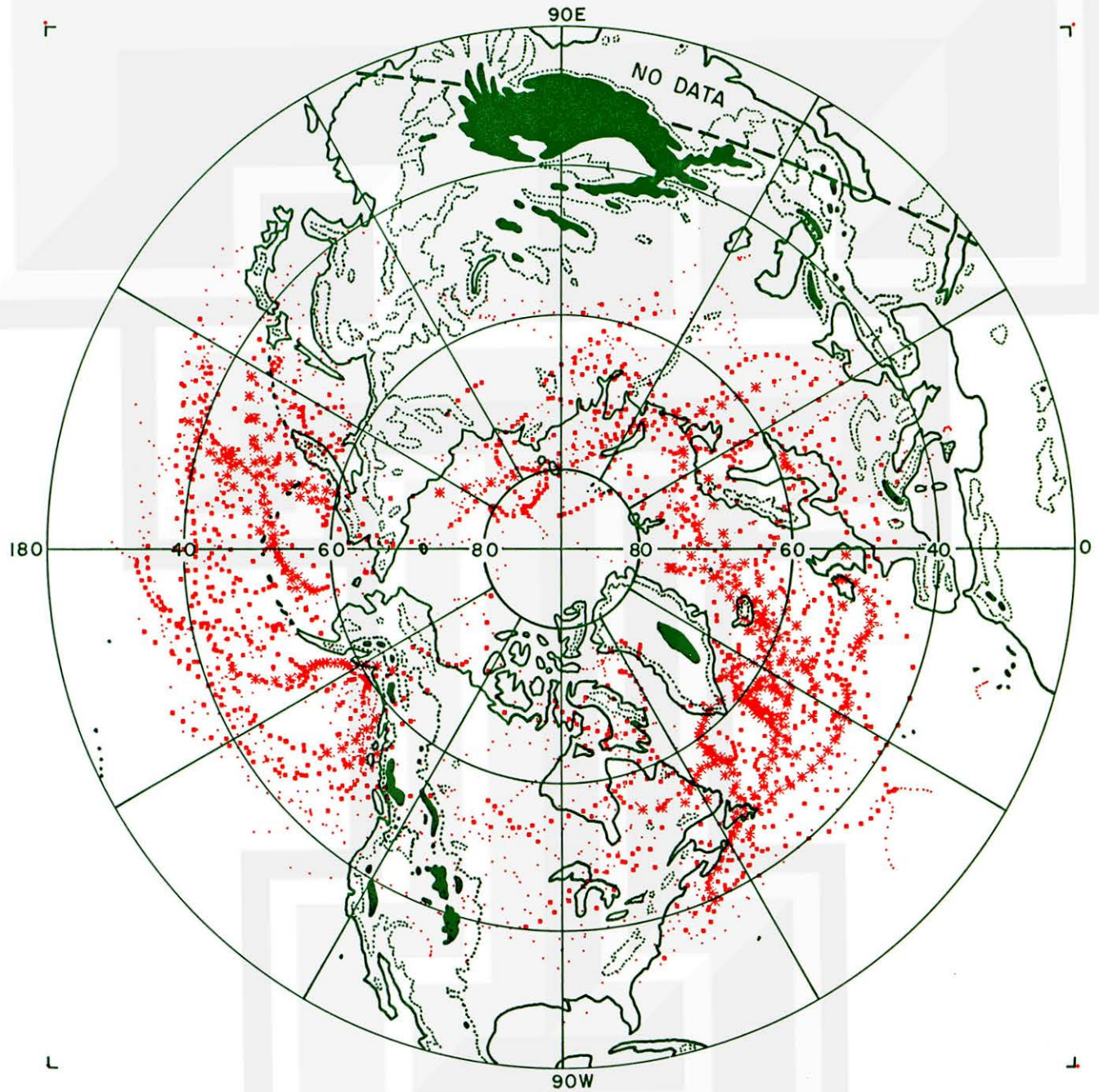


CENTRAL PRESSURE

AUTUMN 1981

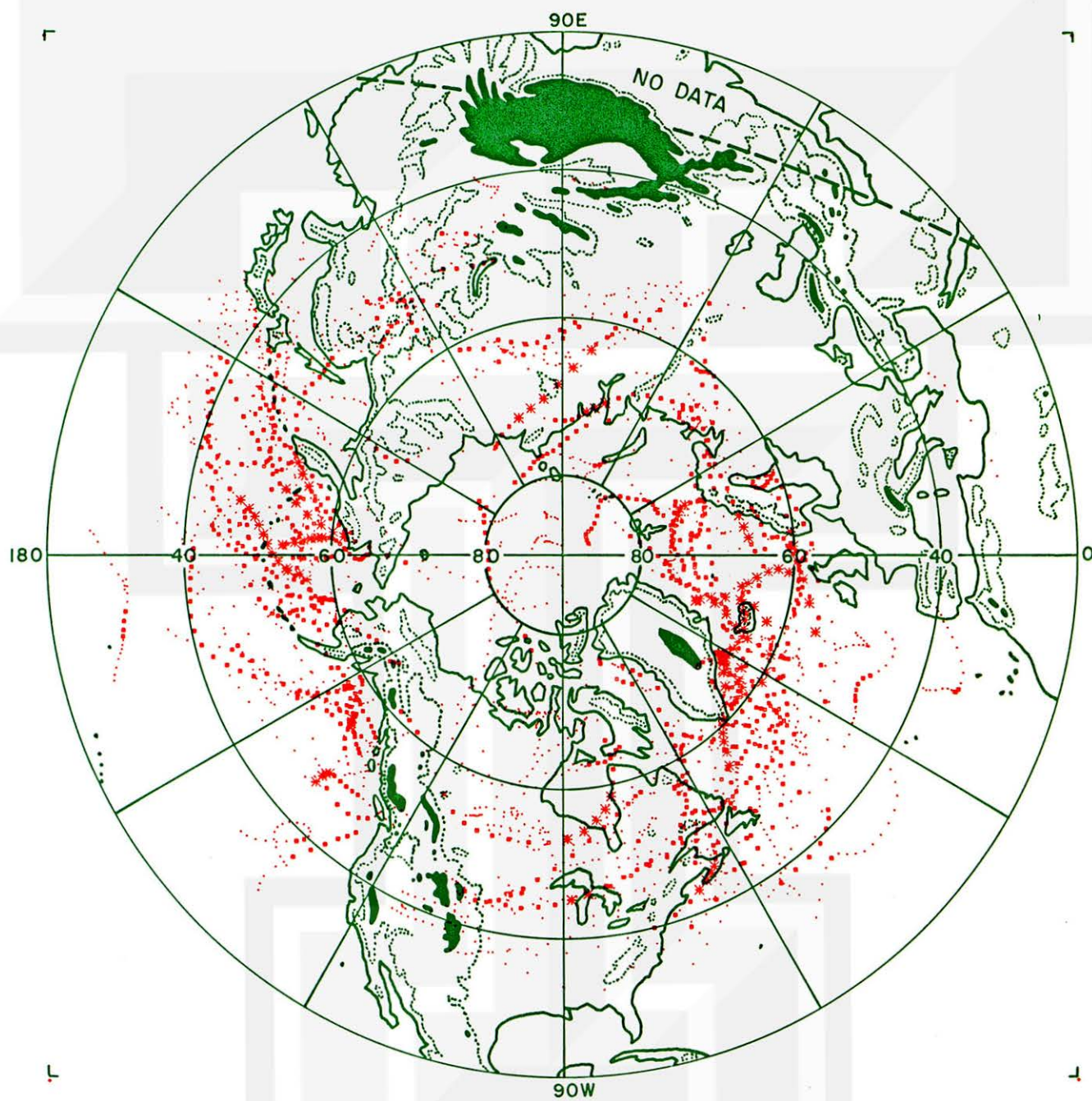


CENTRAL PRESSURE
WINTER 1981 - 82



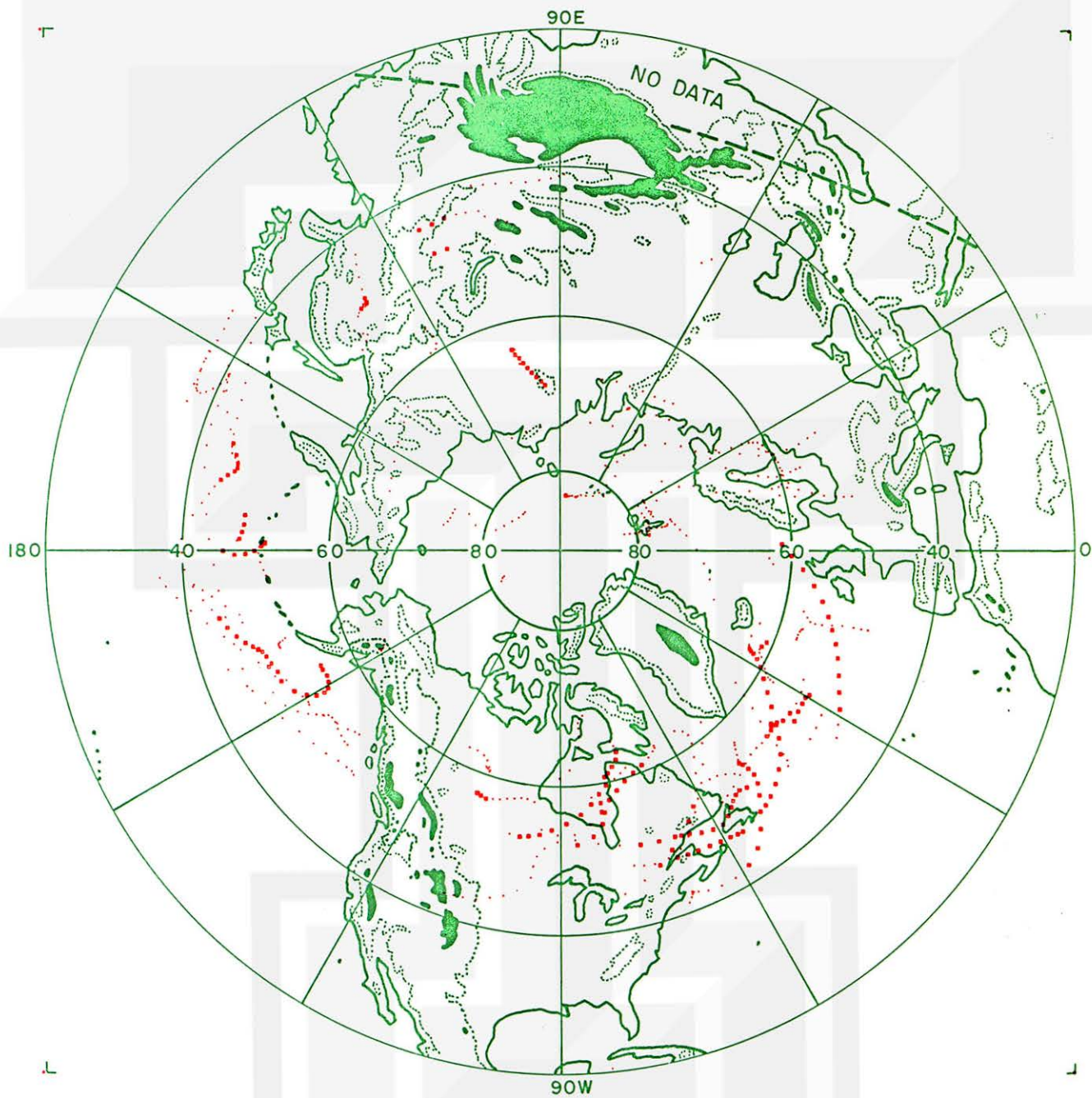
CENTRAL PRESSURE

SPRING 1982



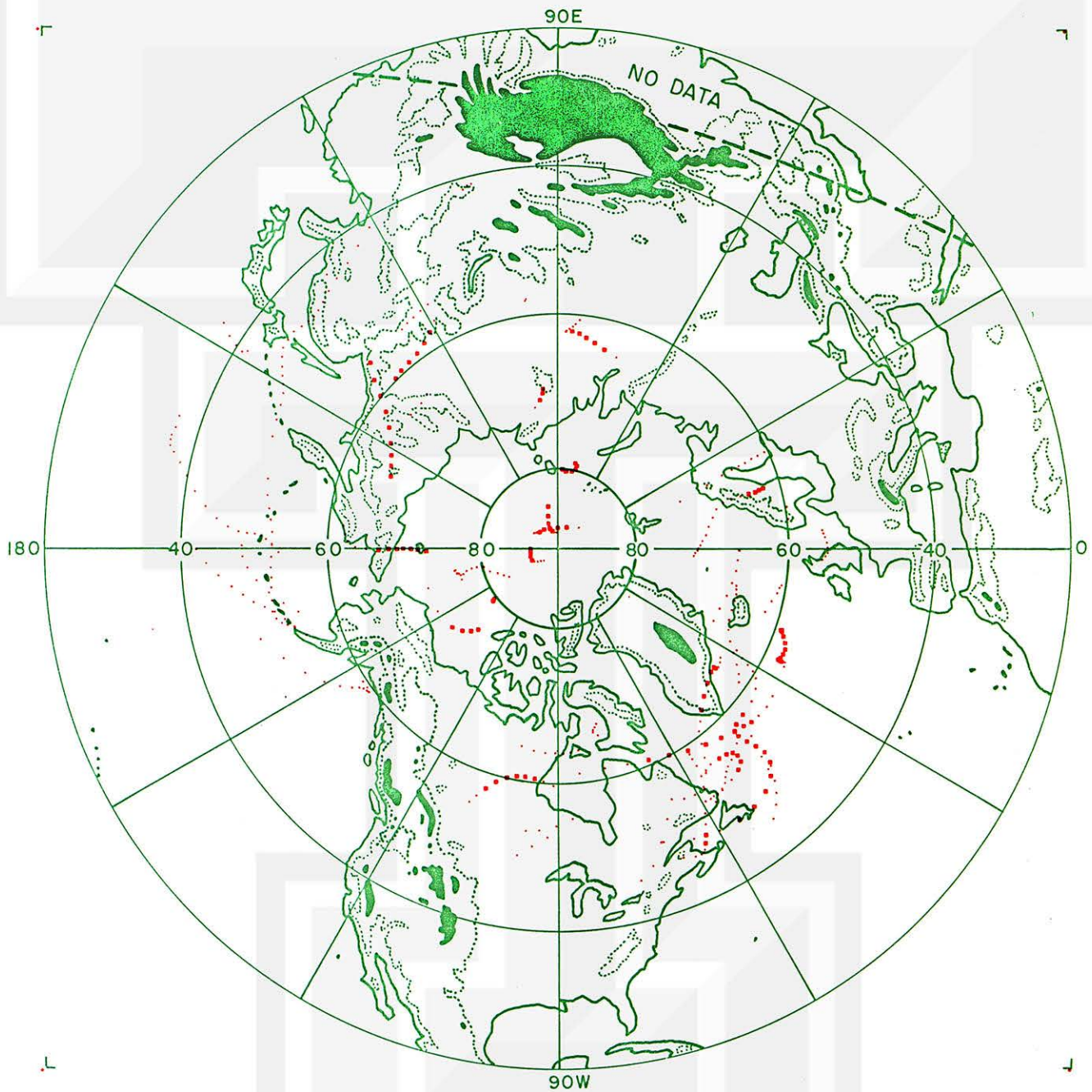
CENTRAL PRESSURE

JUN 81



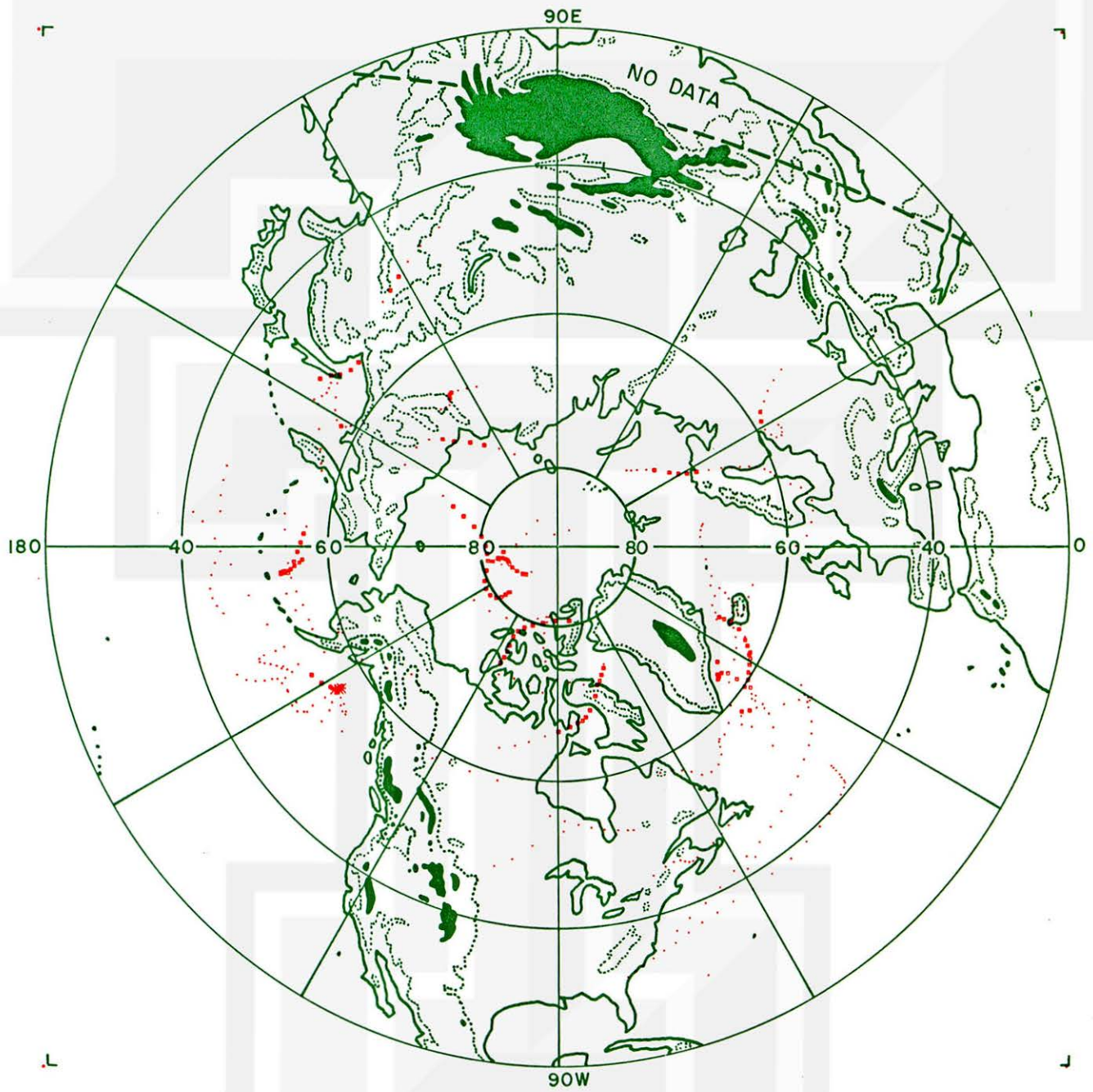
CENTRAL PRESSURE

JUL 81



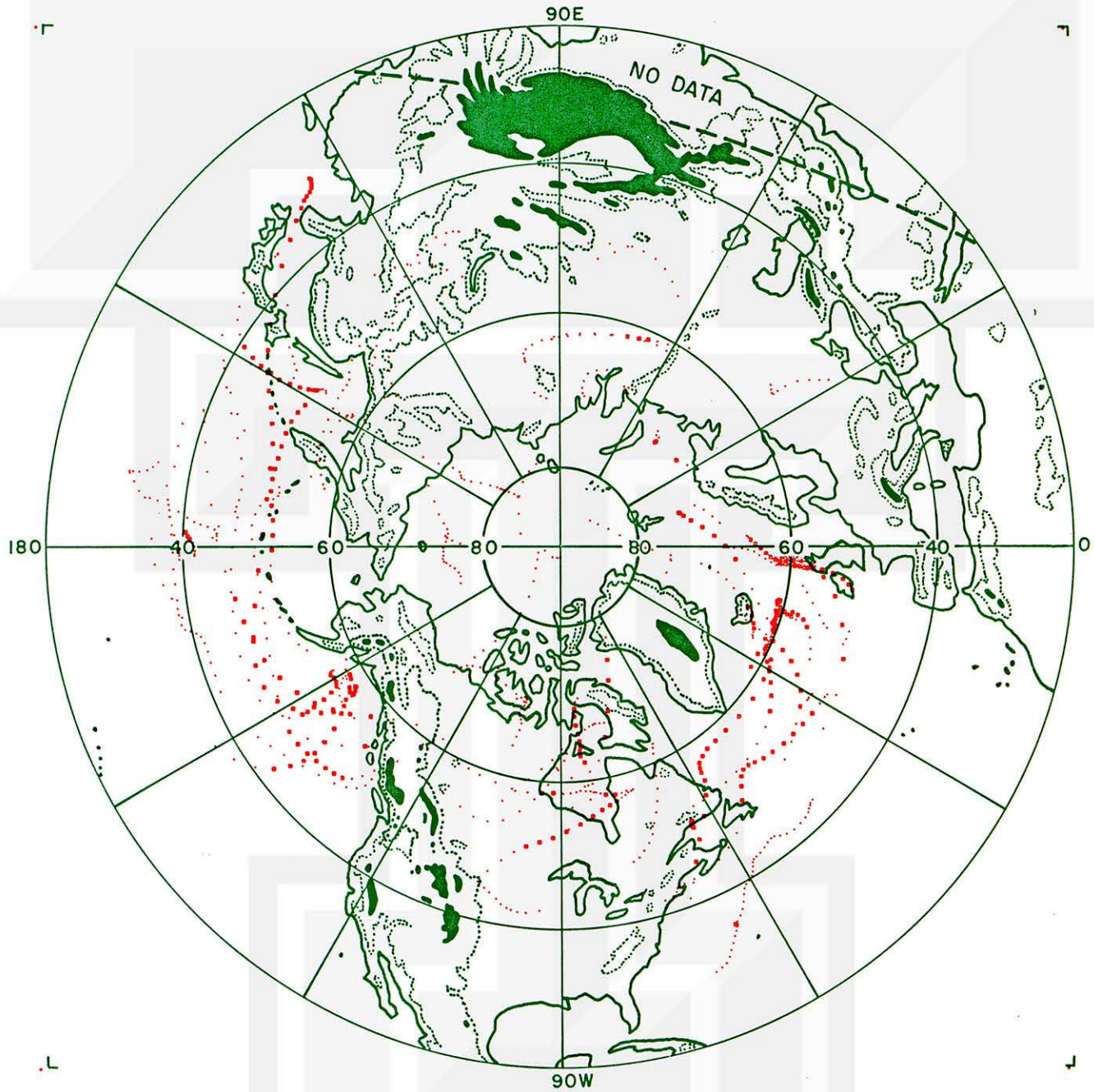
CENTRAL PRESSURE

AUG 81



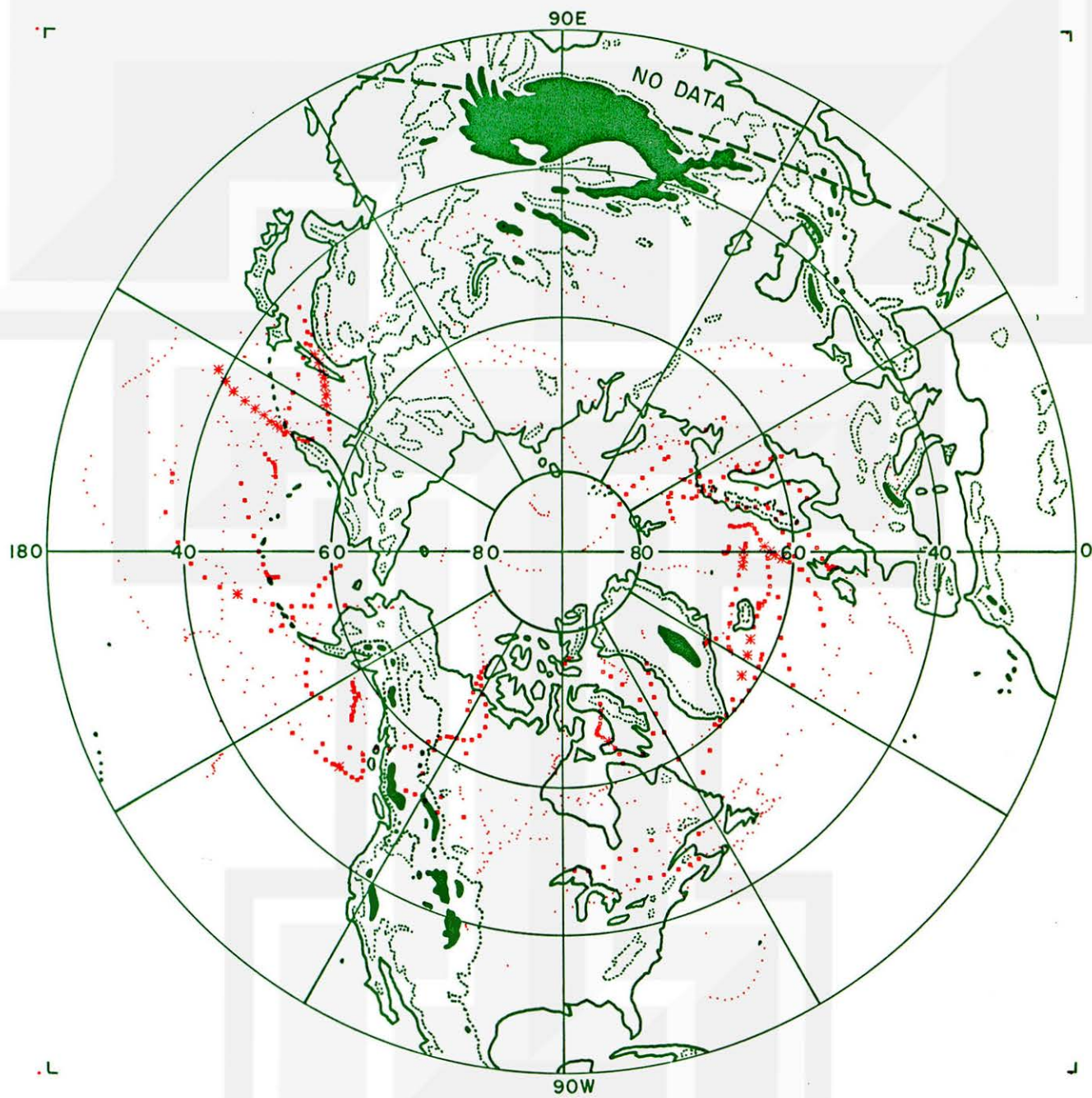
CENTRAL PRESSURE

SEP 81



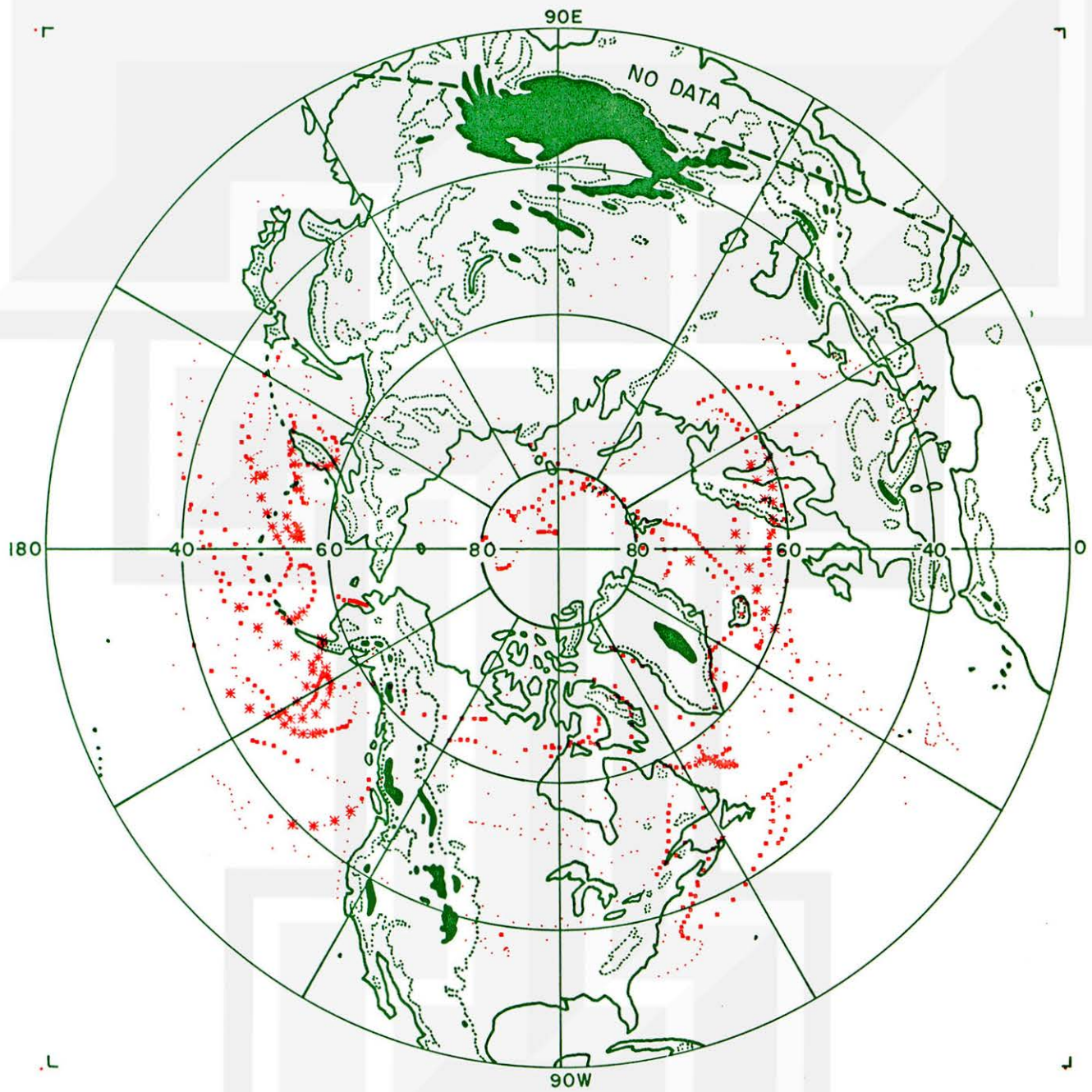
CENTRAL PRESSURE

OCT 81



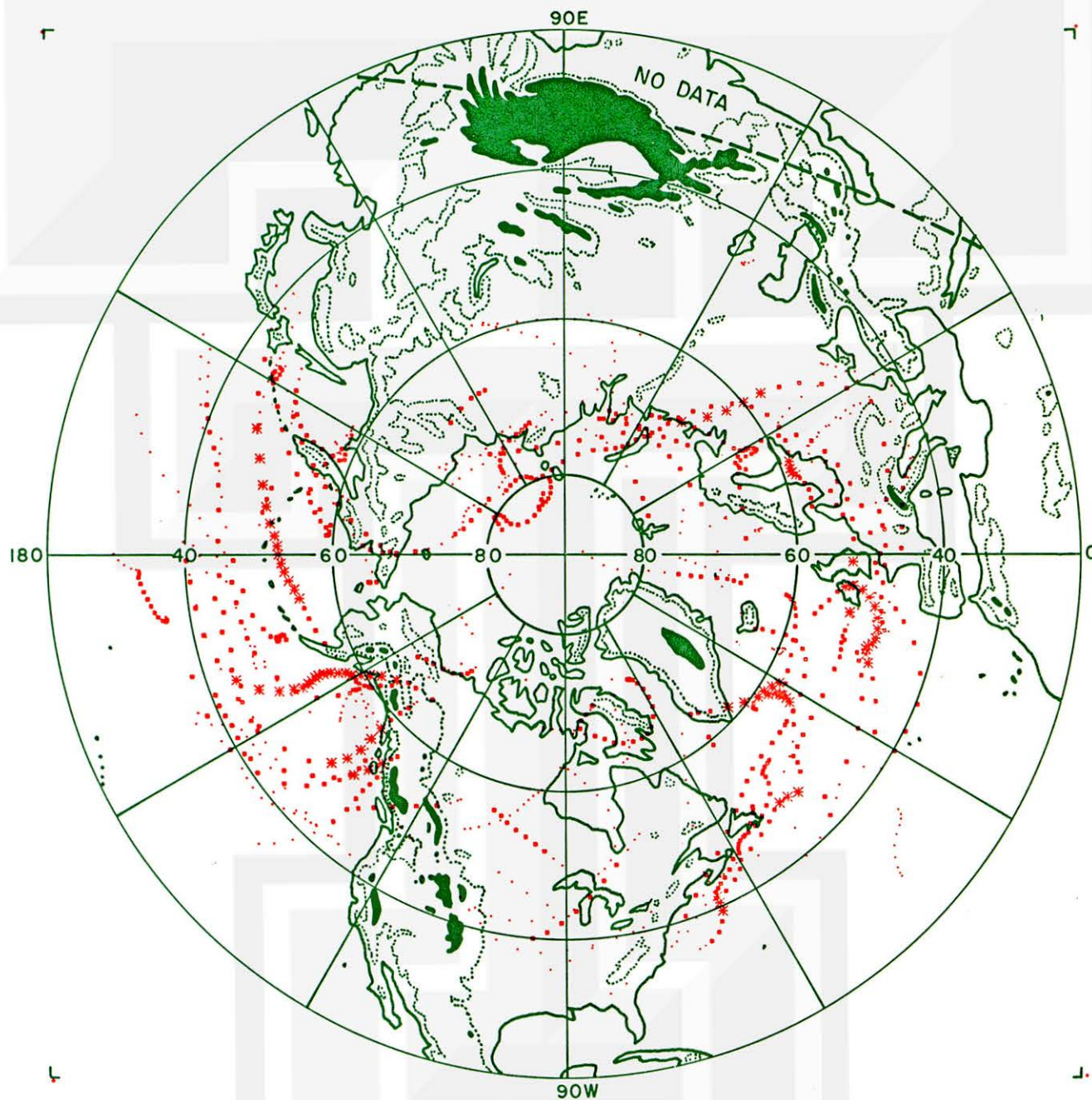
CENTRAL PRESSURE

NOV 81



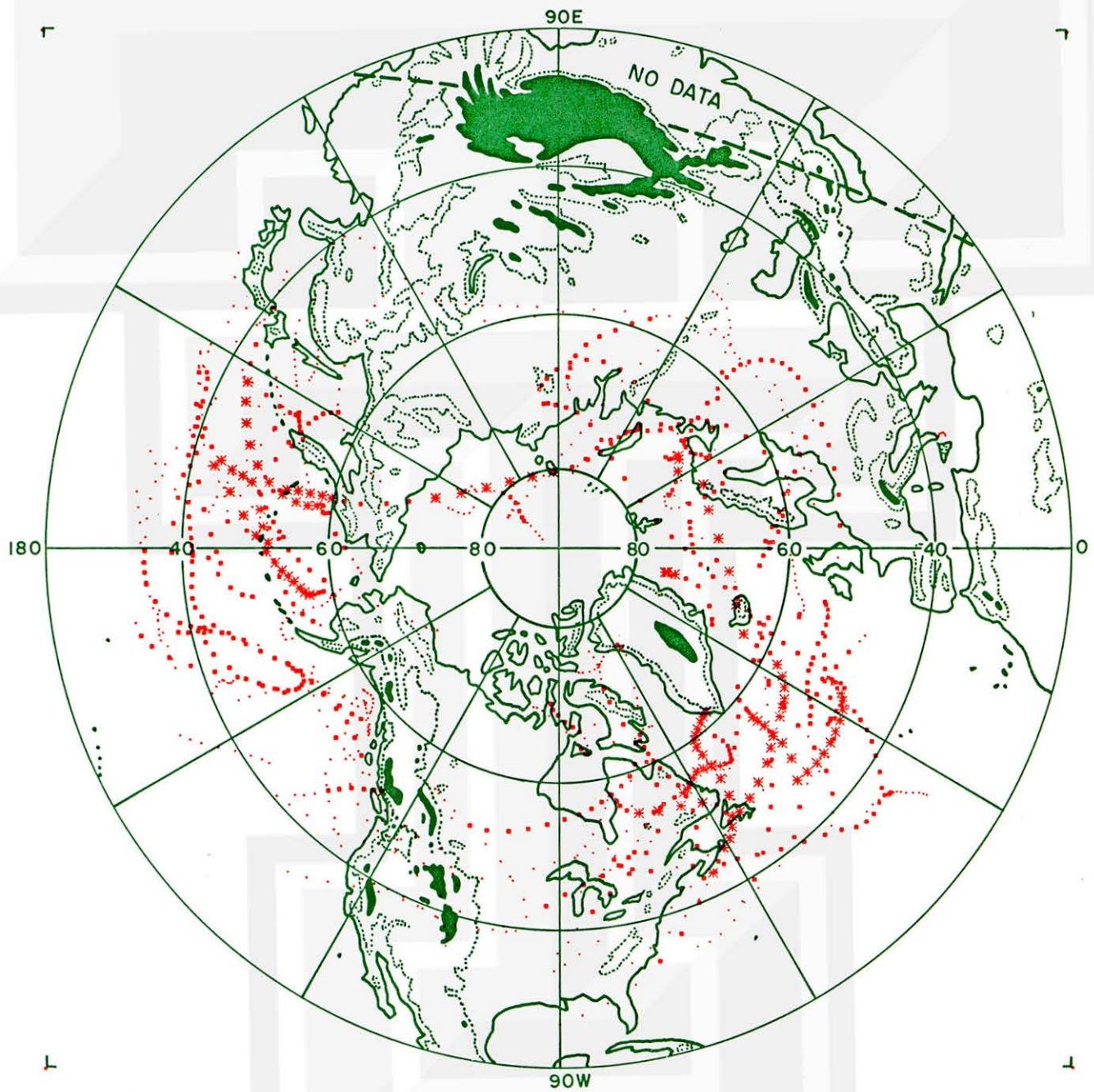
CENTRAL PRESSURE

DEC 81



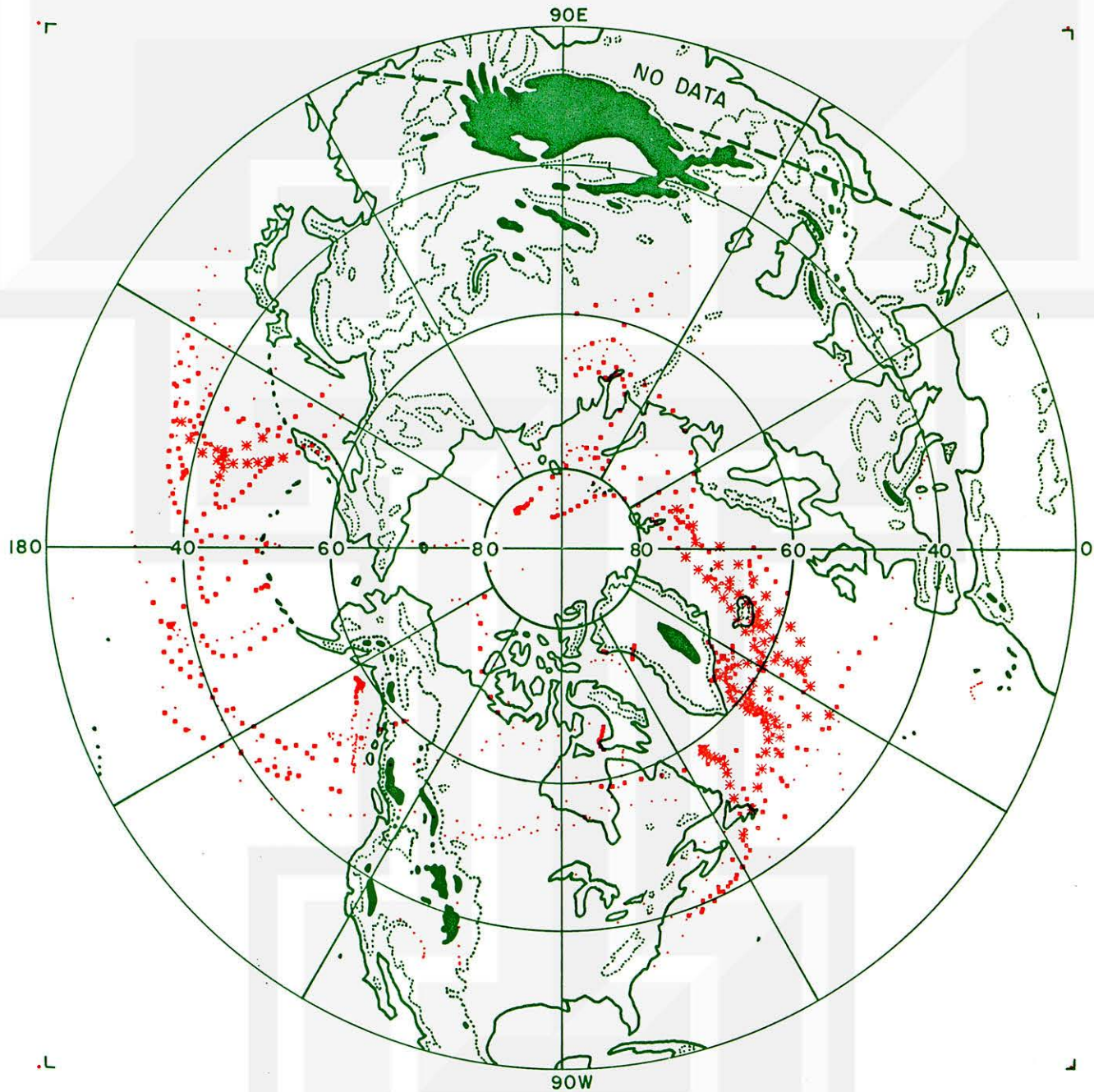
CENTRAL PRESSURE

JAN 82



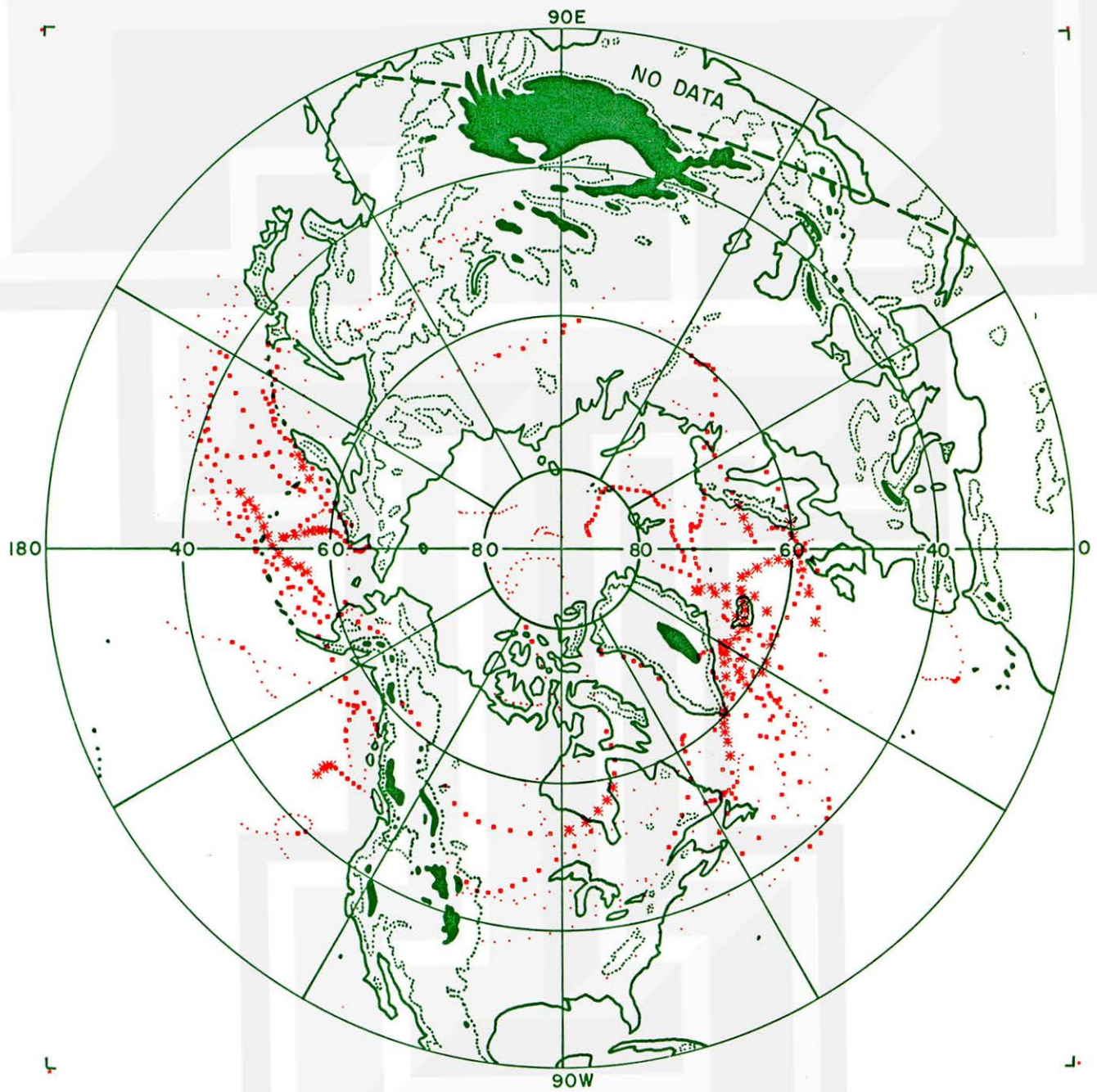
CENTRAL PRESSURE

FEB 82



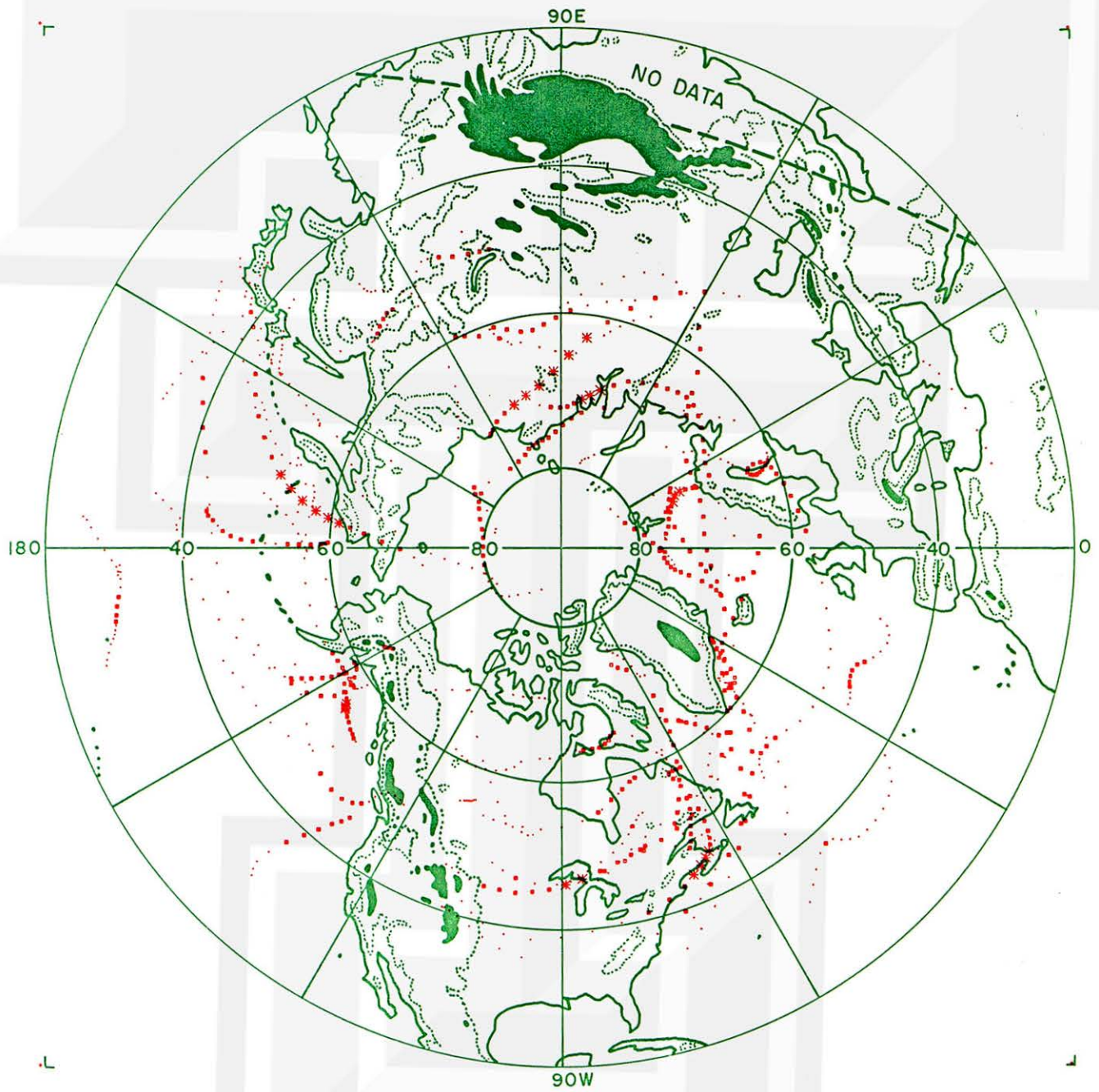
CENTRAL PRESSURE

MAR 82



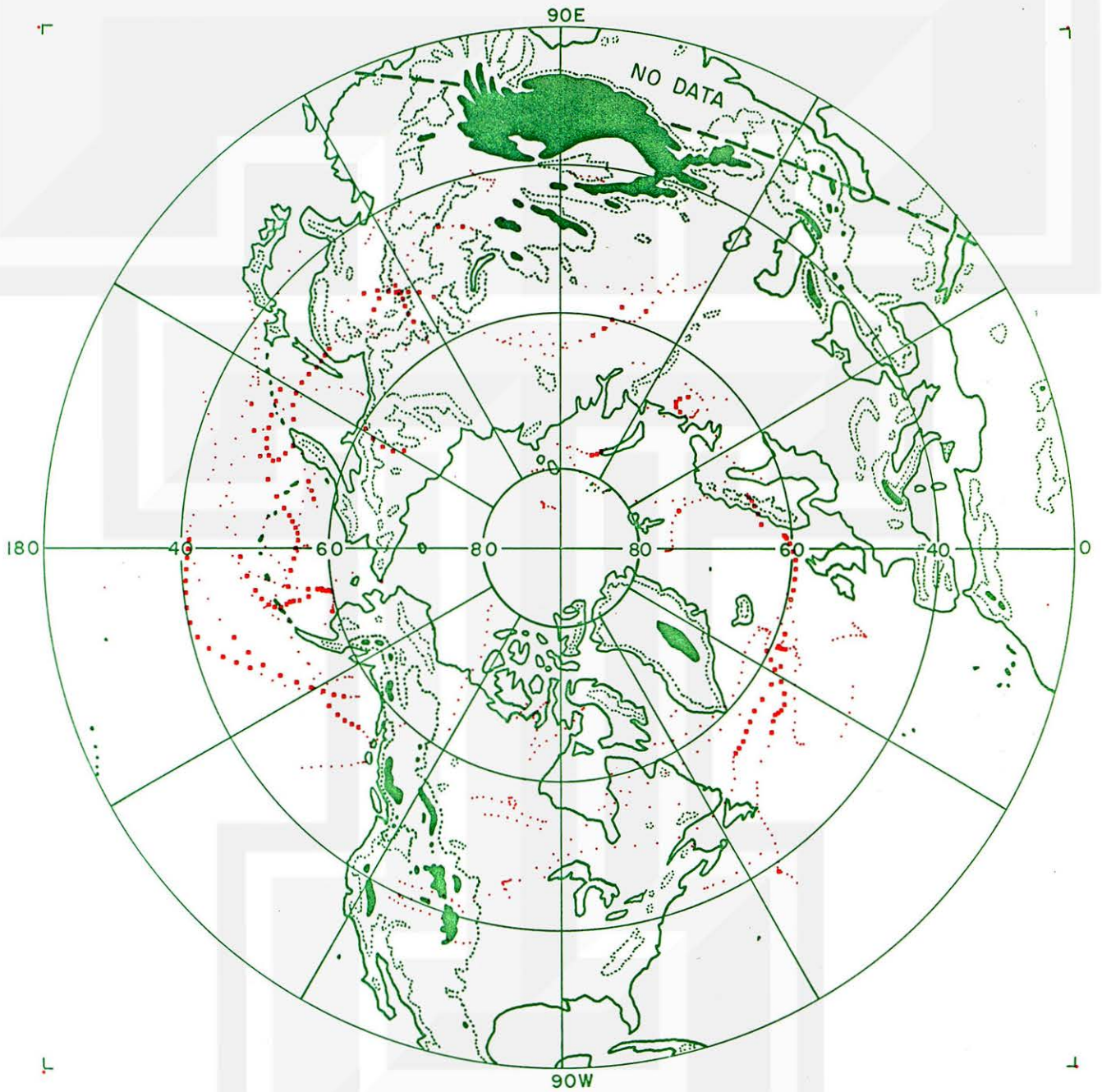
CENTRAL PRESSURE

APR 82



CENTRAL PRESSURE

MAY 82



..... 10-15 m/s
..... 15-25 m/s
* * * 25 m/s or faster

2. DISTRIBUTION BY CYCLONE WINDSPEED (CW)

1 ANNUAL MAP

4 SEASONAL MAPS

Summer 1981
Autumn 1981
Winter 1981-82
Spring 1982

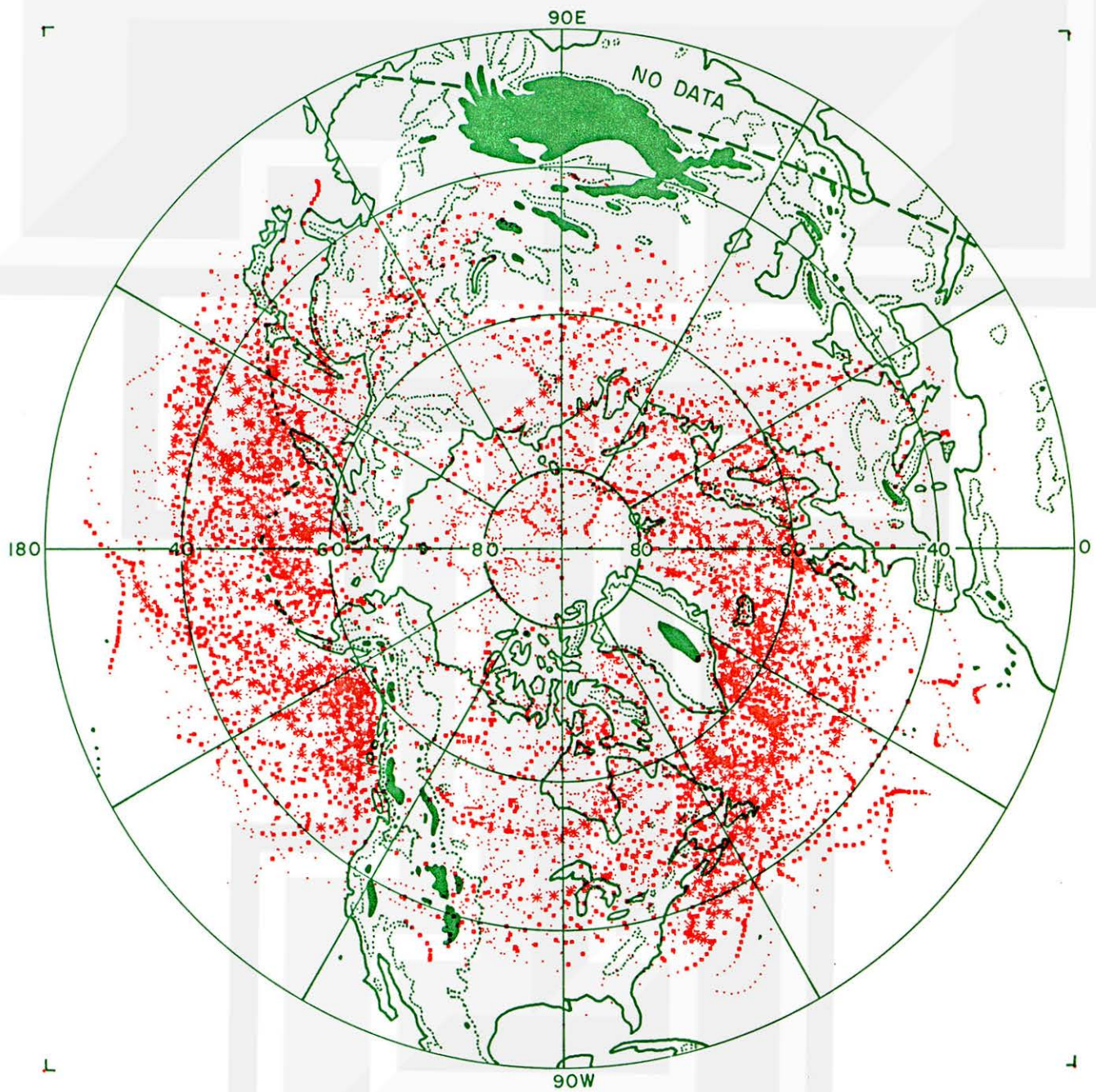
12 MONTHLY MAPS

June-December 1981
January-May 1982



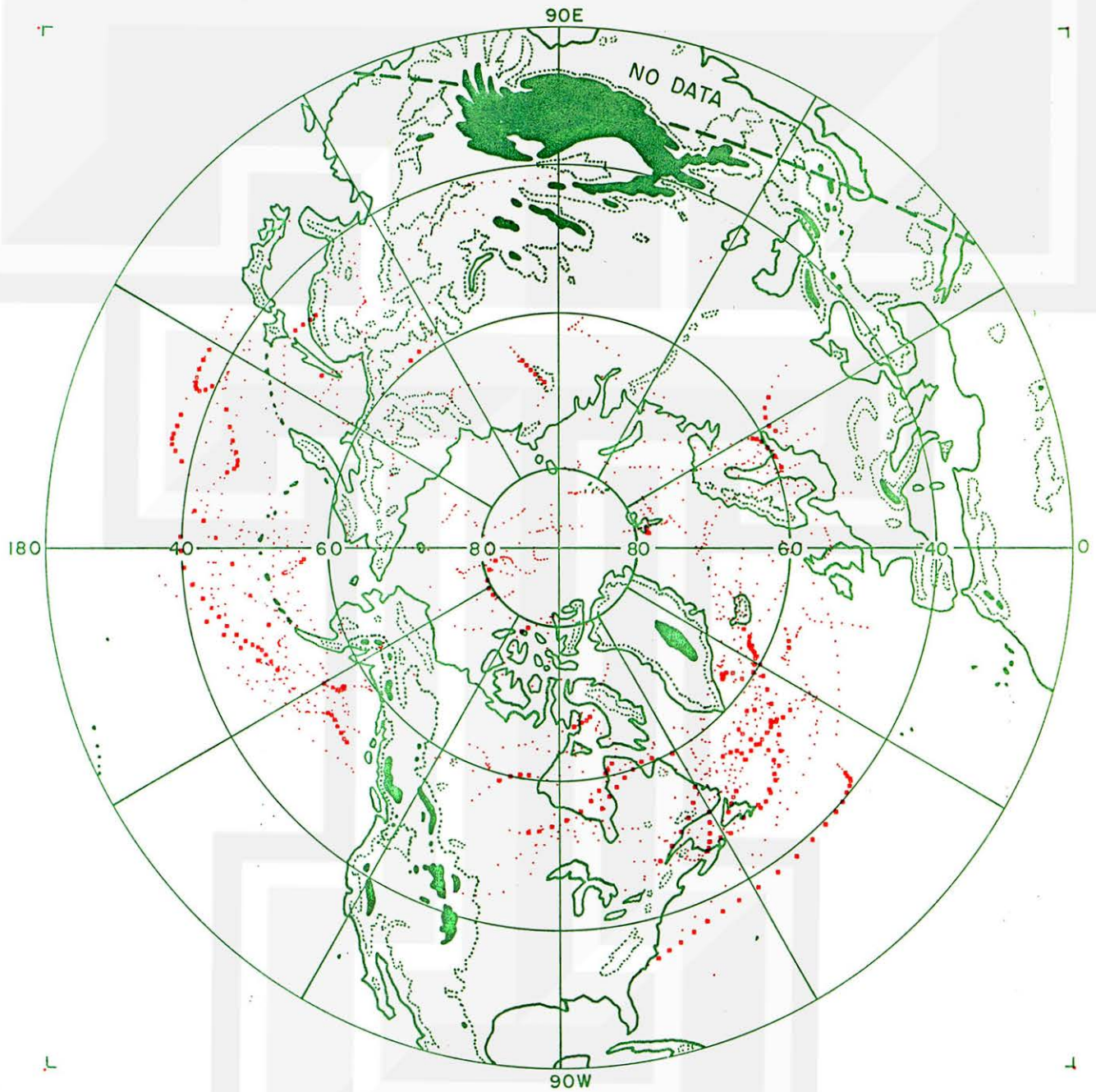
CYCLONE WINDSPEED

12 MOS JUN 81 - MAY 82



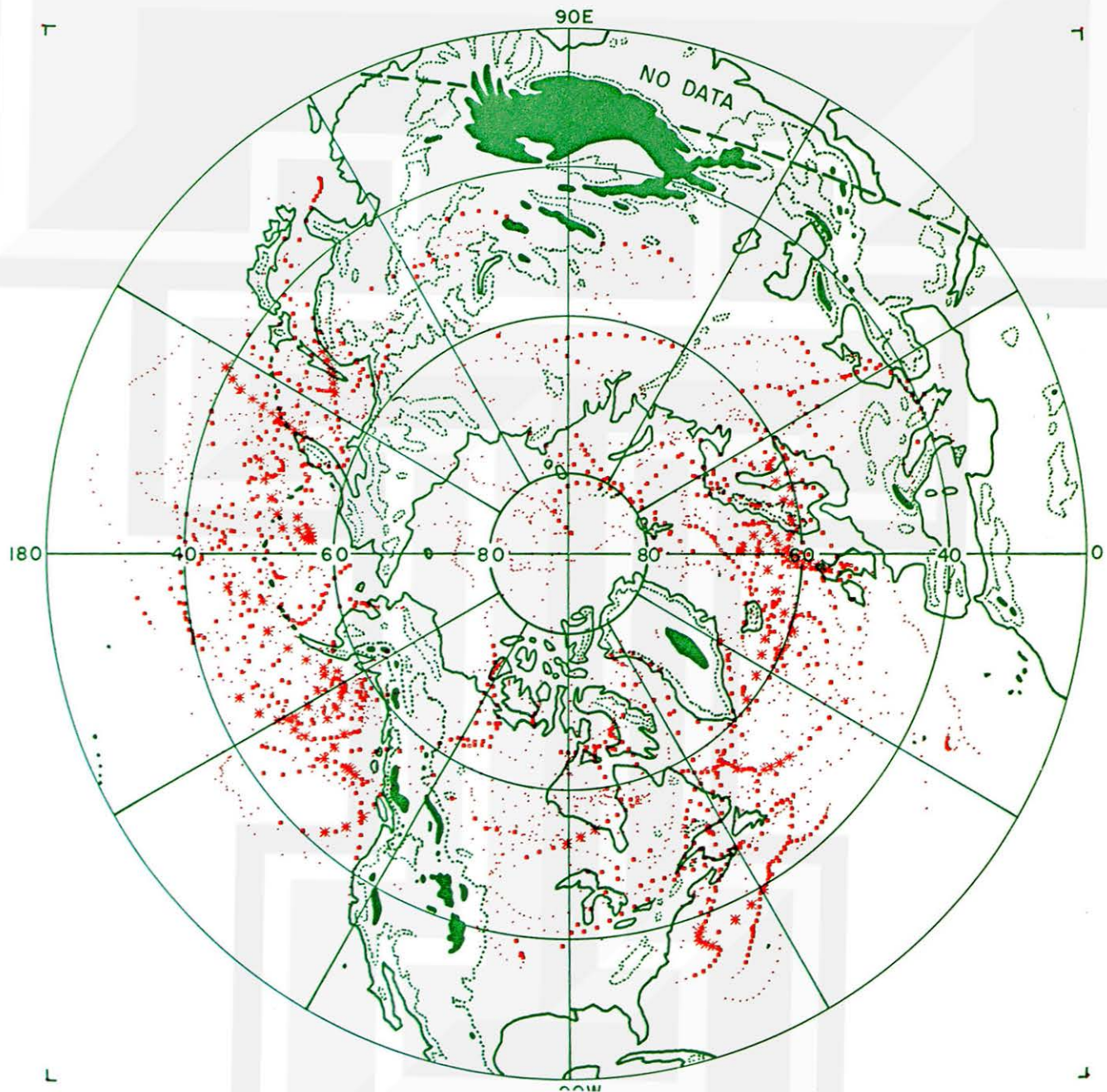
CYCLONE WINDSPEED

SUMMER 1981



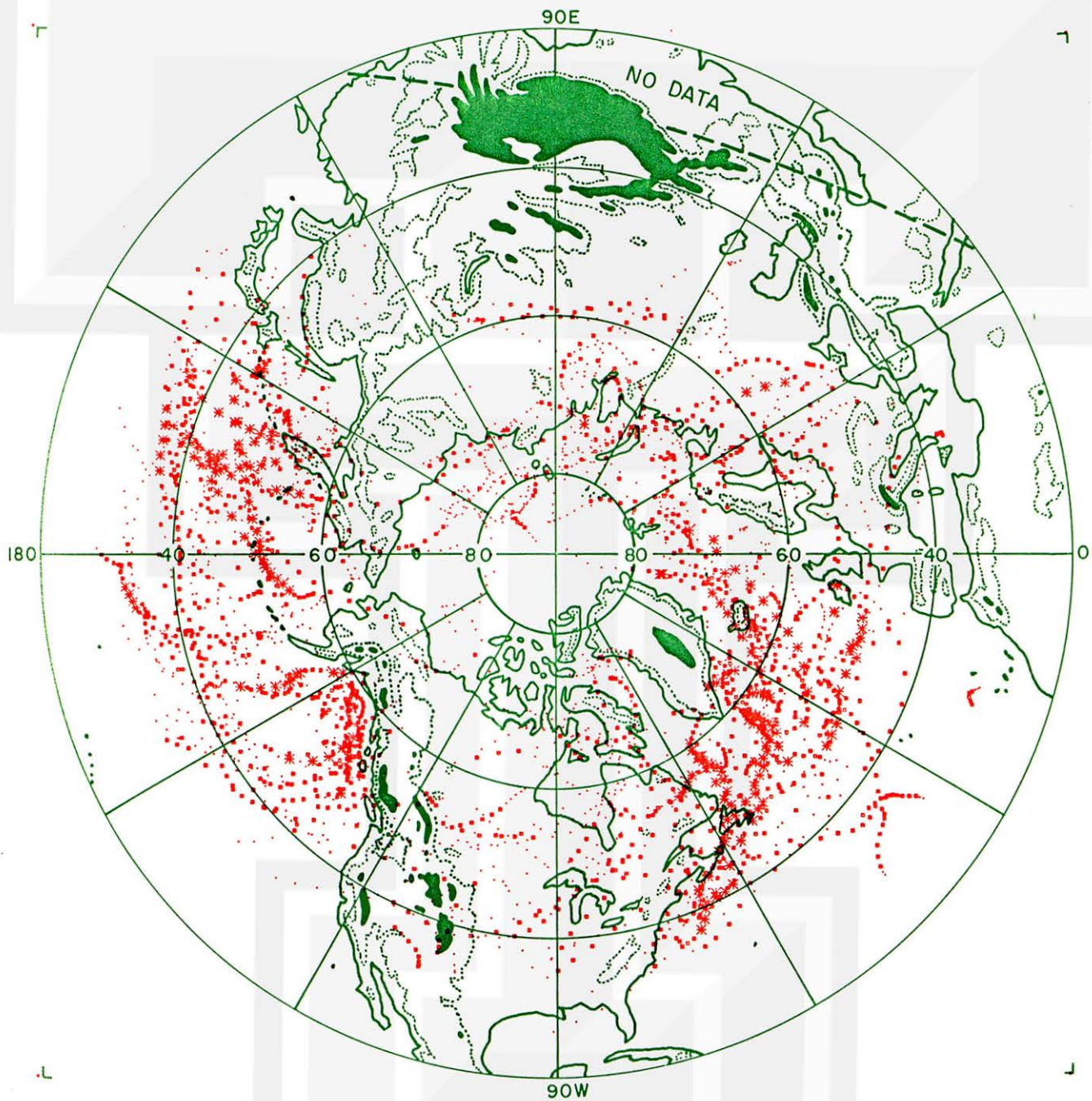
CYCLONE WINDSPEED

AUTUMN 1981



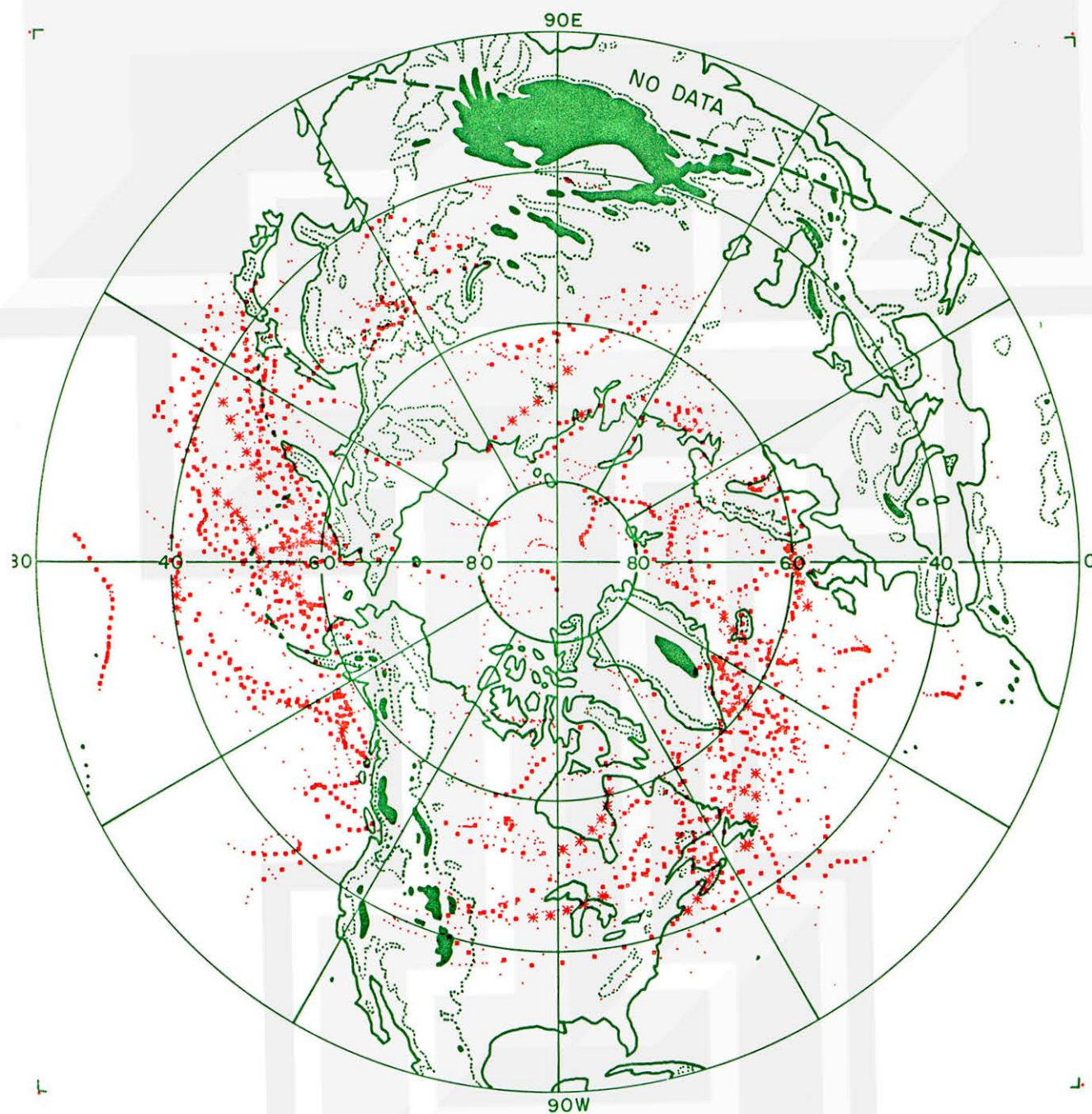
CYCLONE WINDSPEED

WINTER 1981 - 82



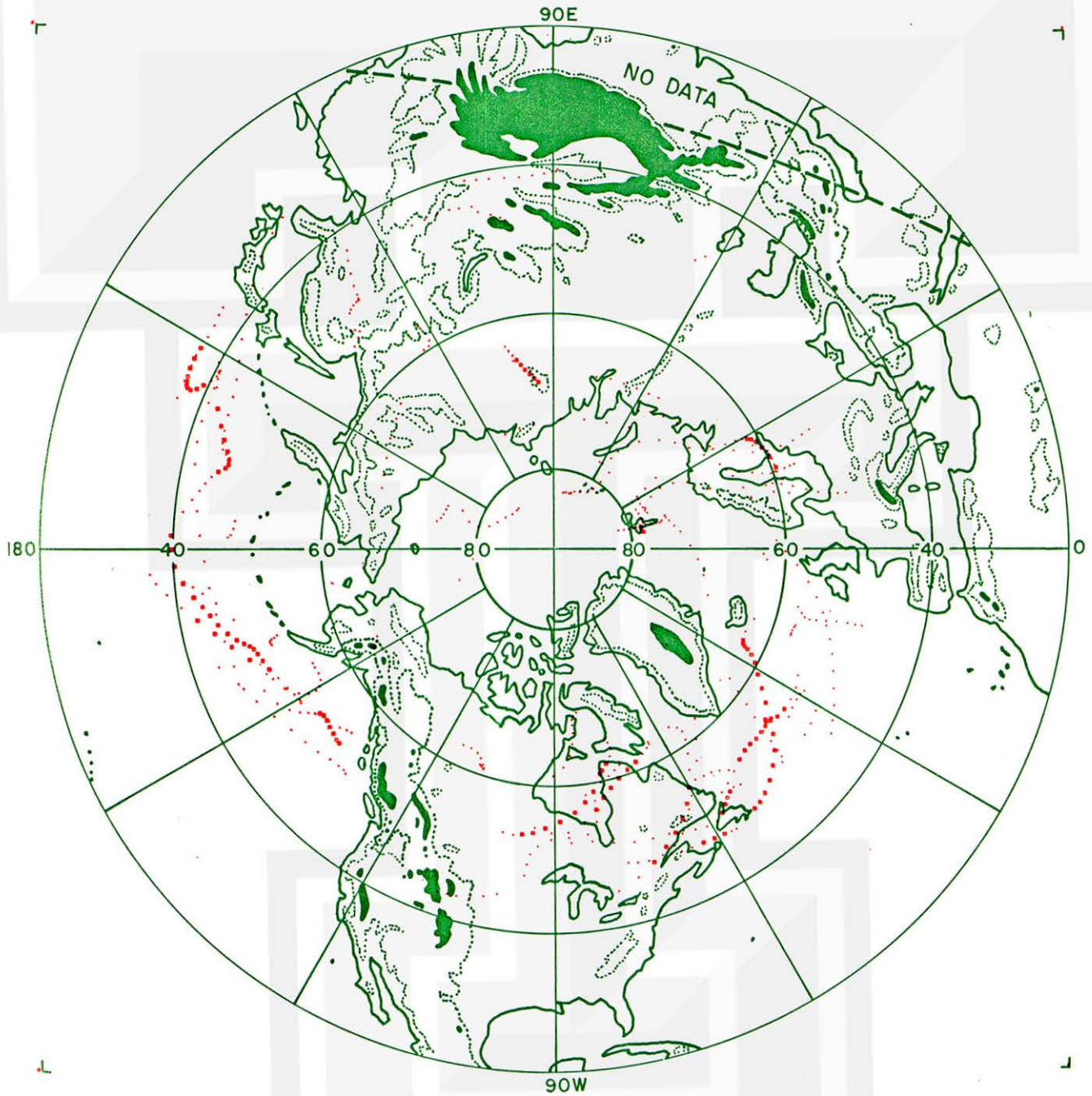
CYCLONE WINDSPEED

SPRING 1982



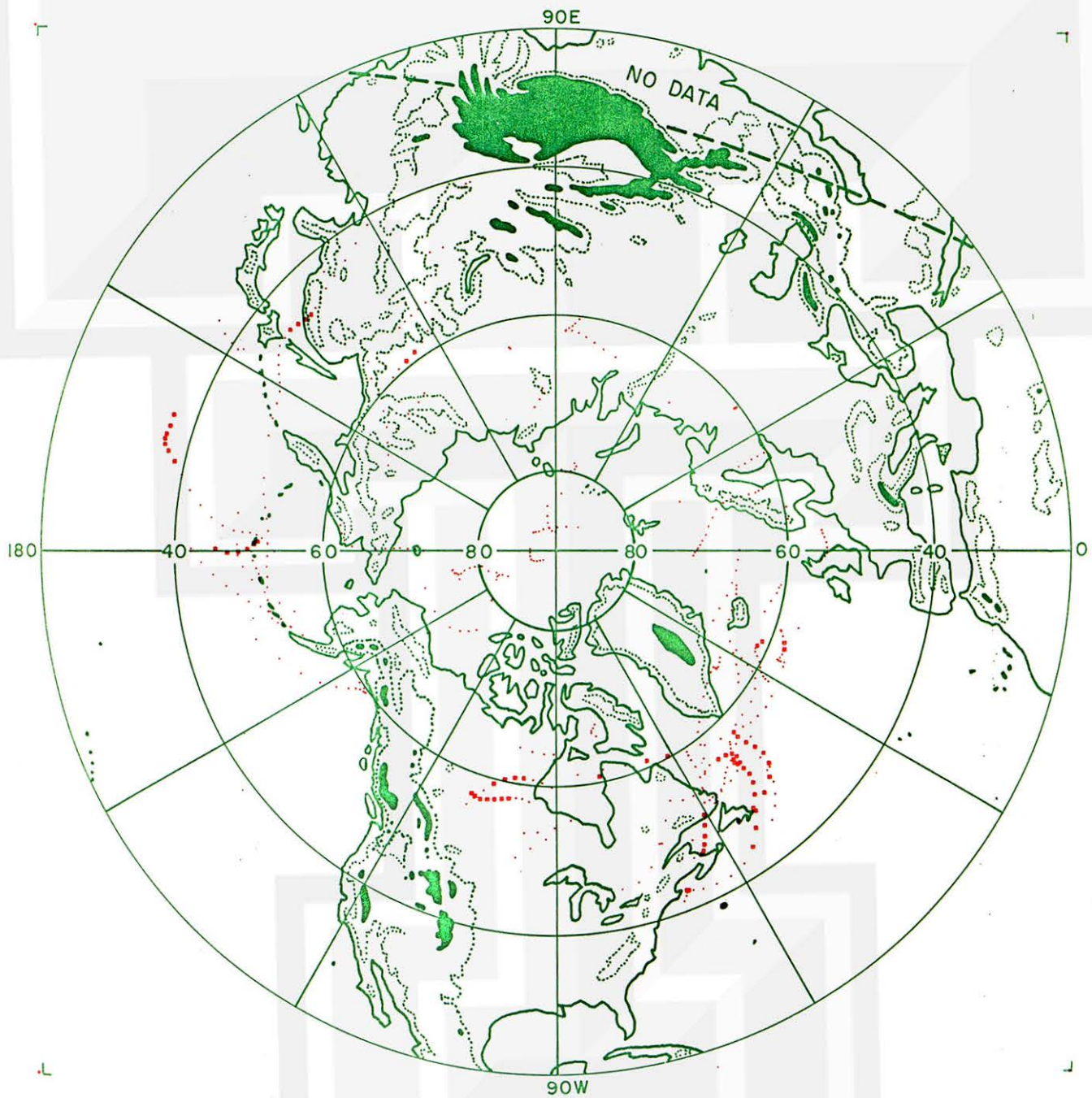
CYCLONE WINDSPEED

JUN 81



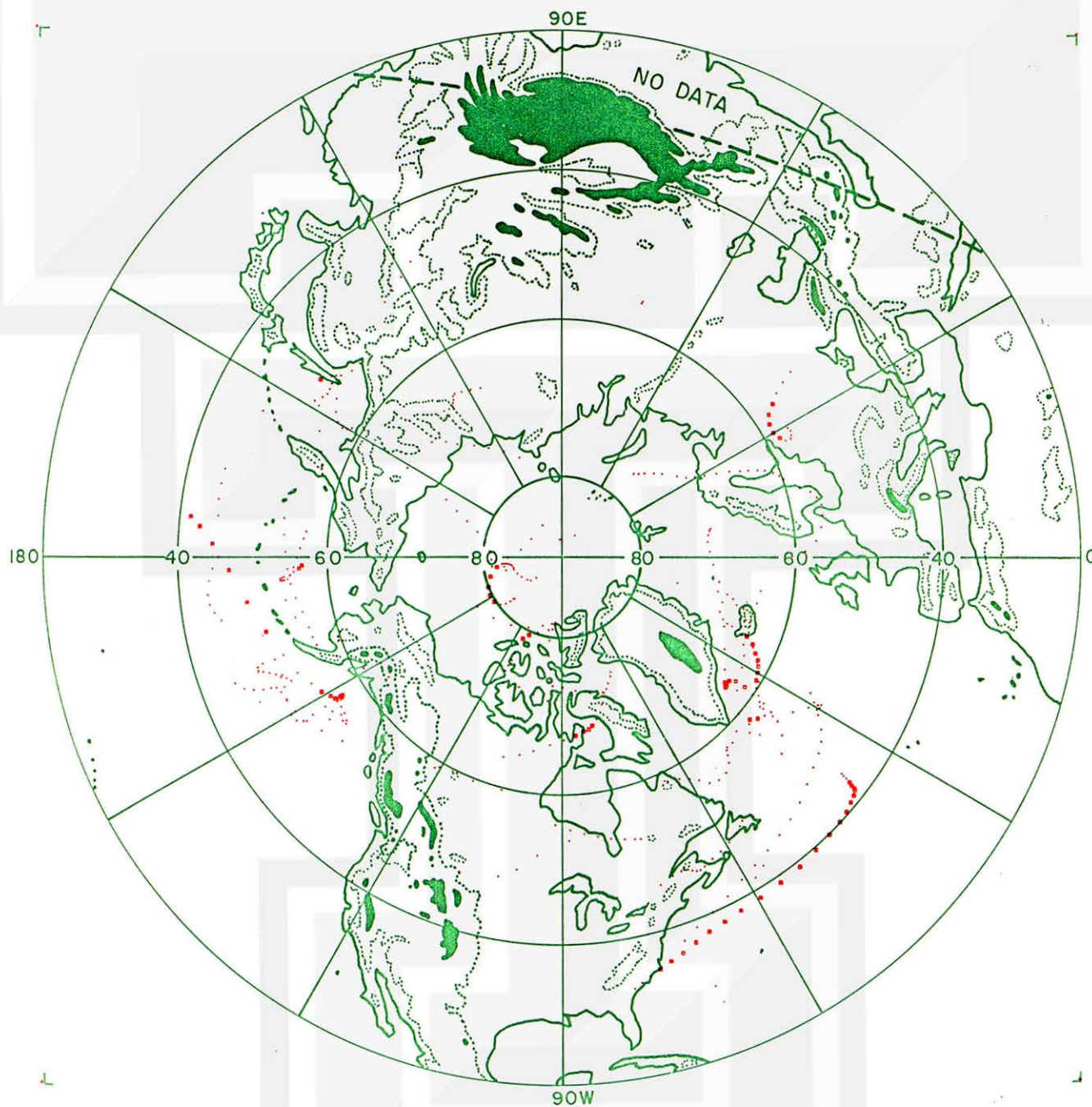
CYCLONE WINDSPEED

JUL 81



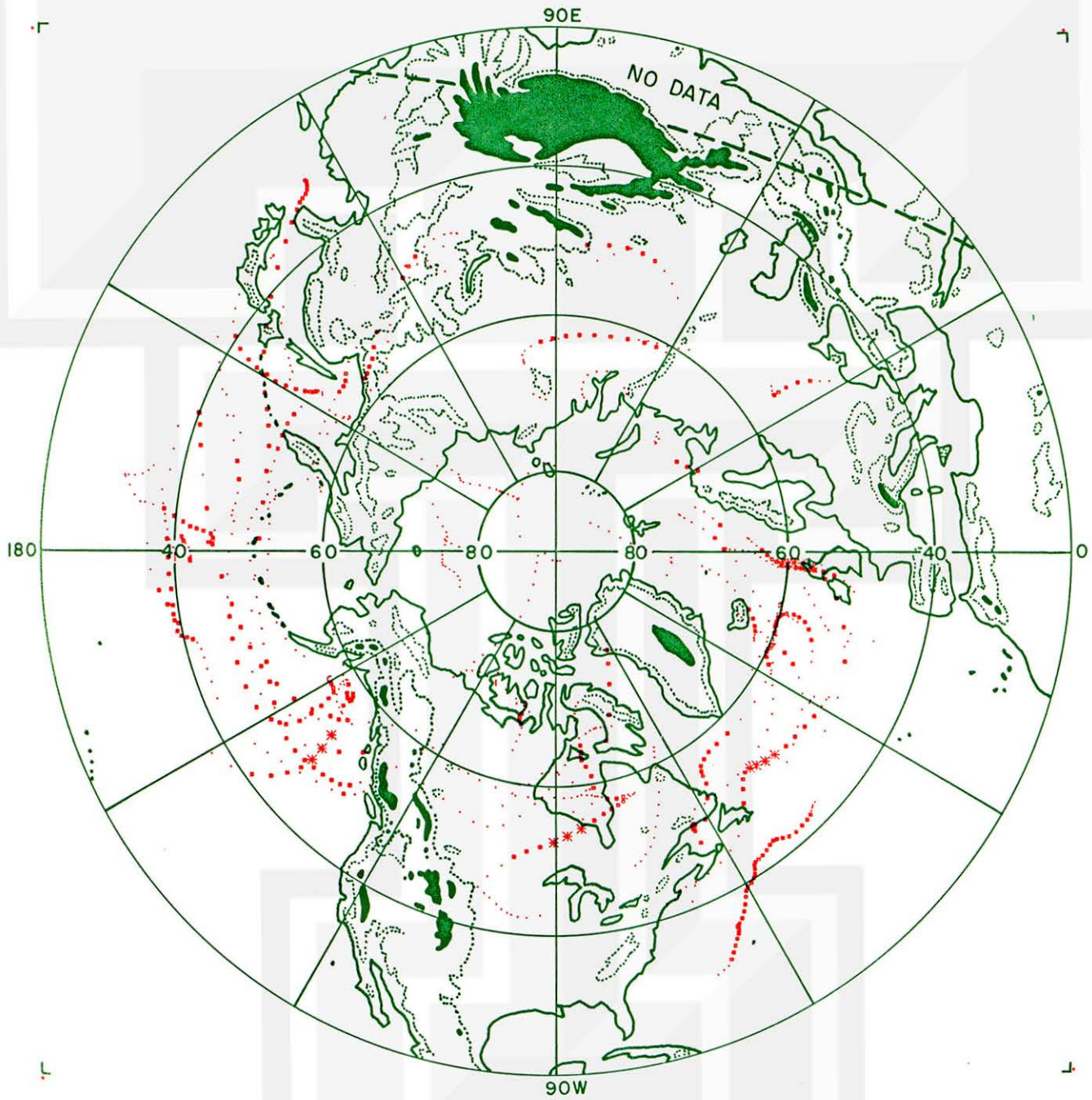
CYCLONE WINDSPEED

AUG 81



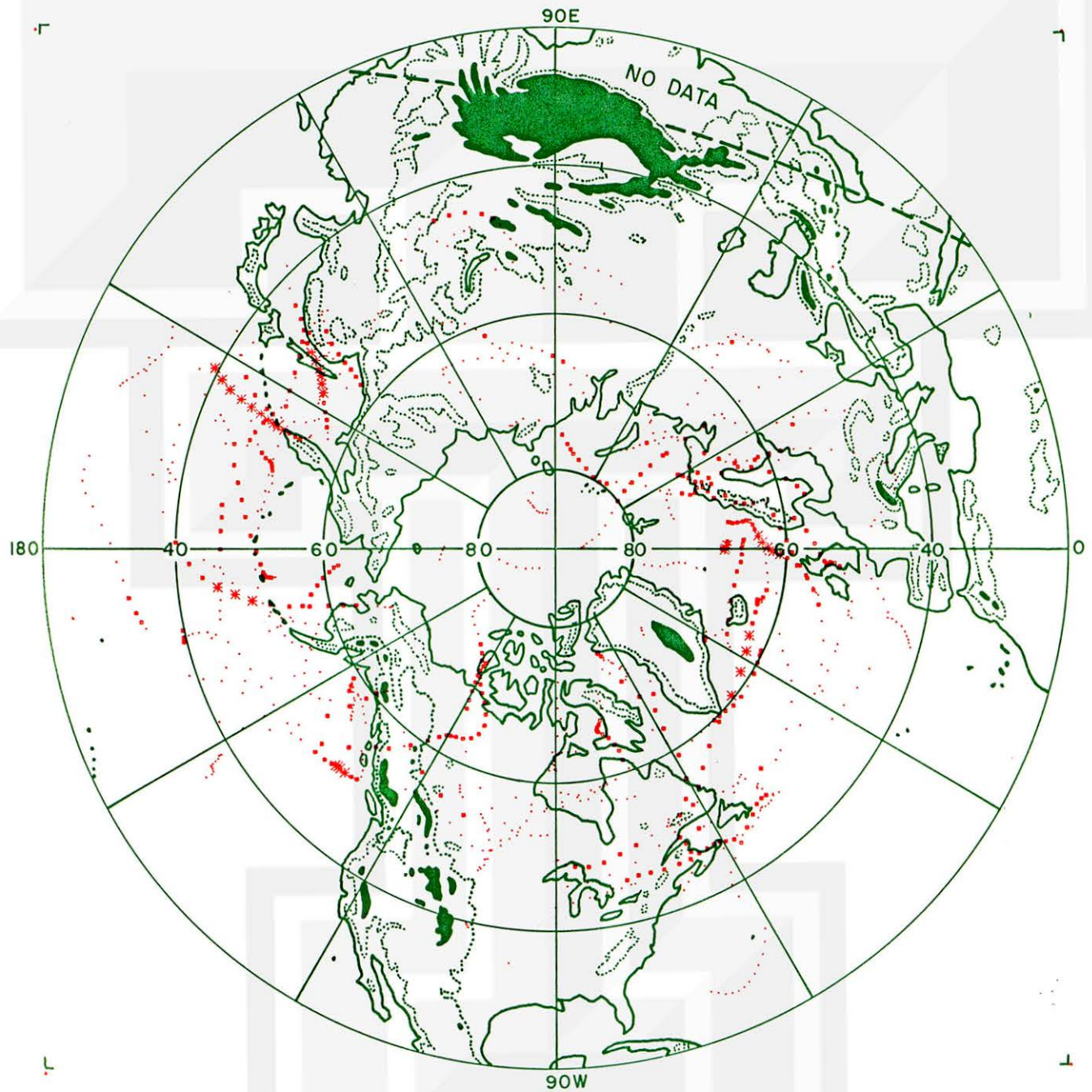
CYCLONE WINDSPEED

SEP 81



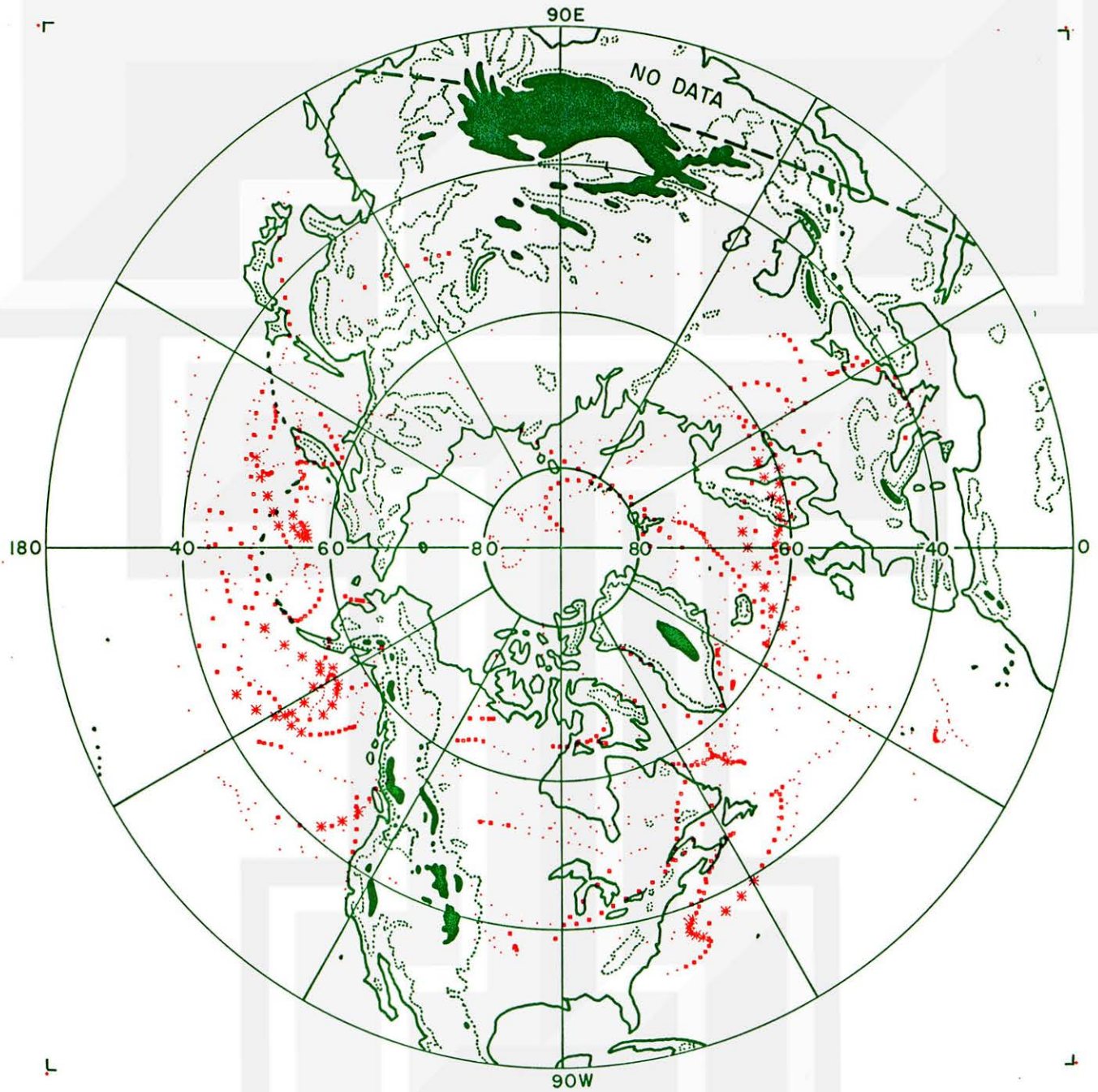
CYCLONE WINDSPEED

OCT 81



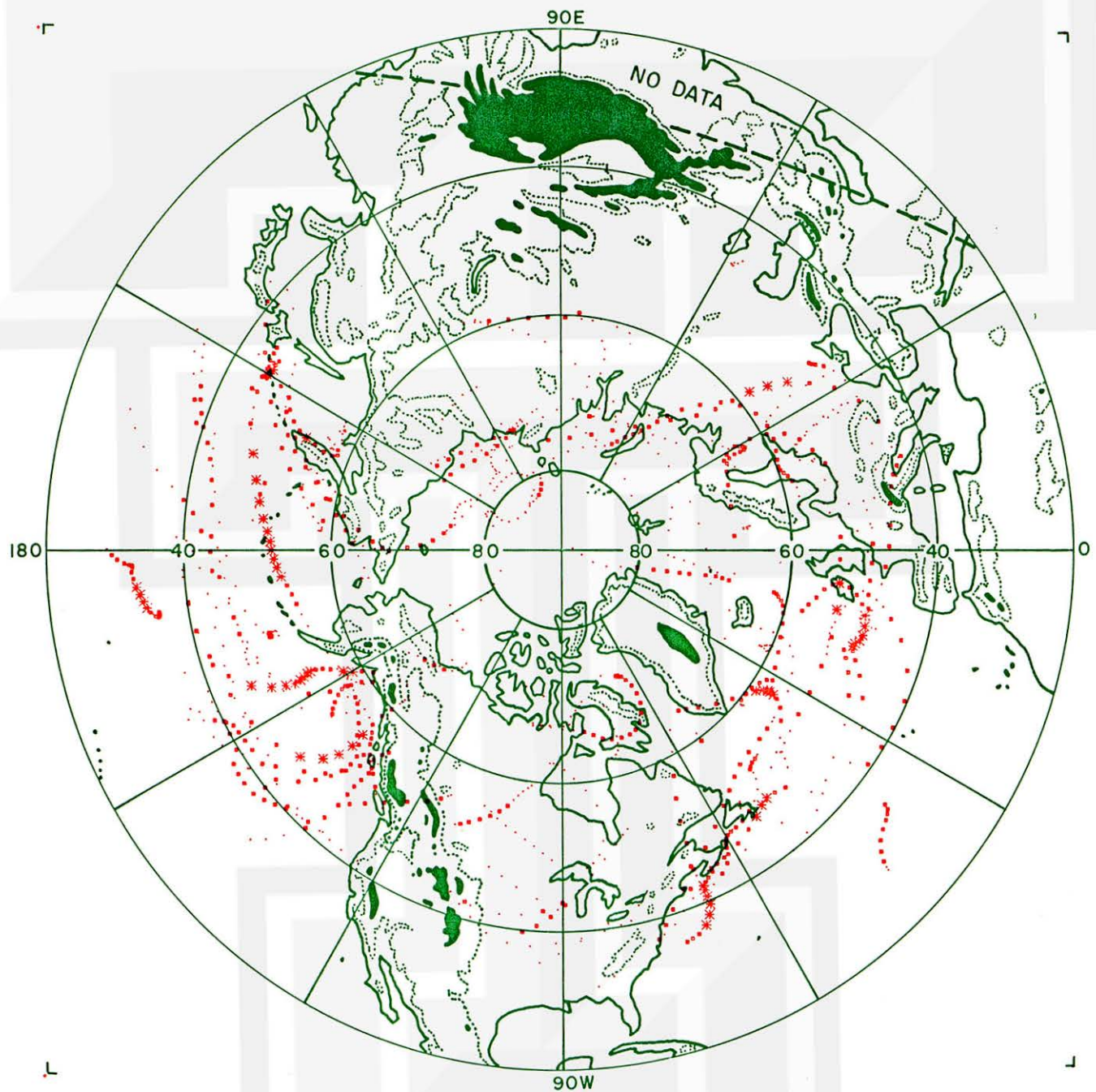
CYCLONE WINDSPEED

NOV 81



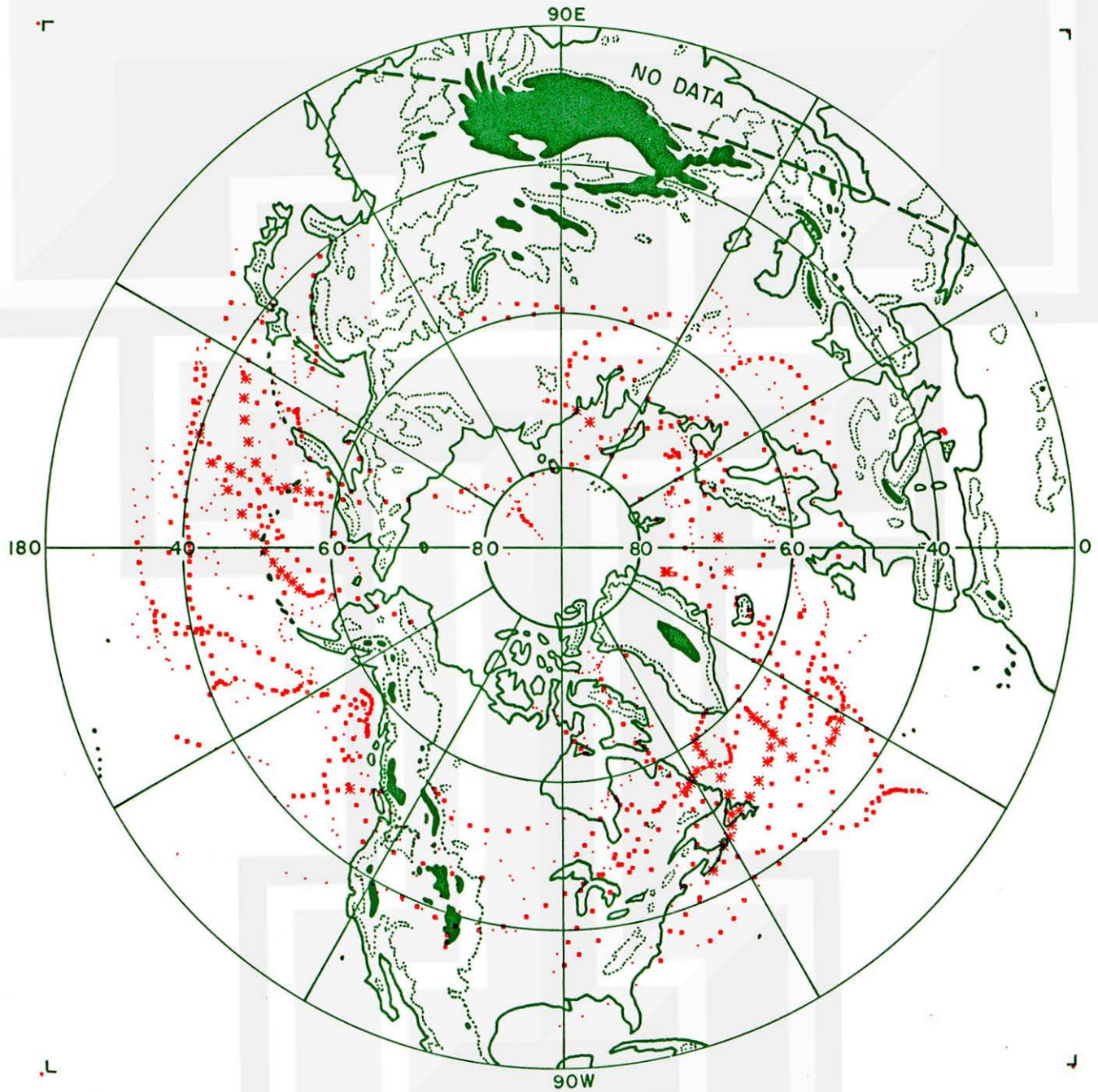
CYCLONE WINDSPEED

DEC 81



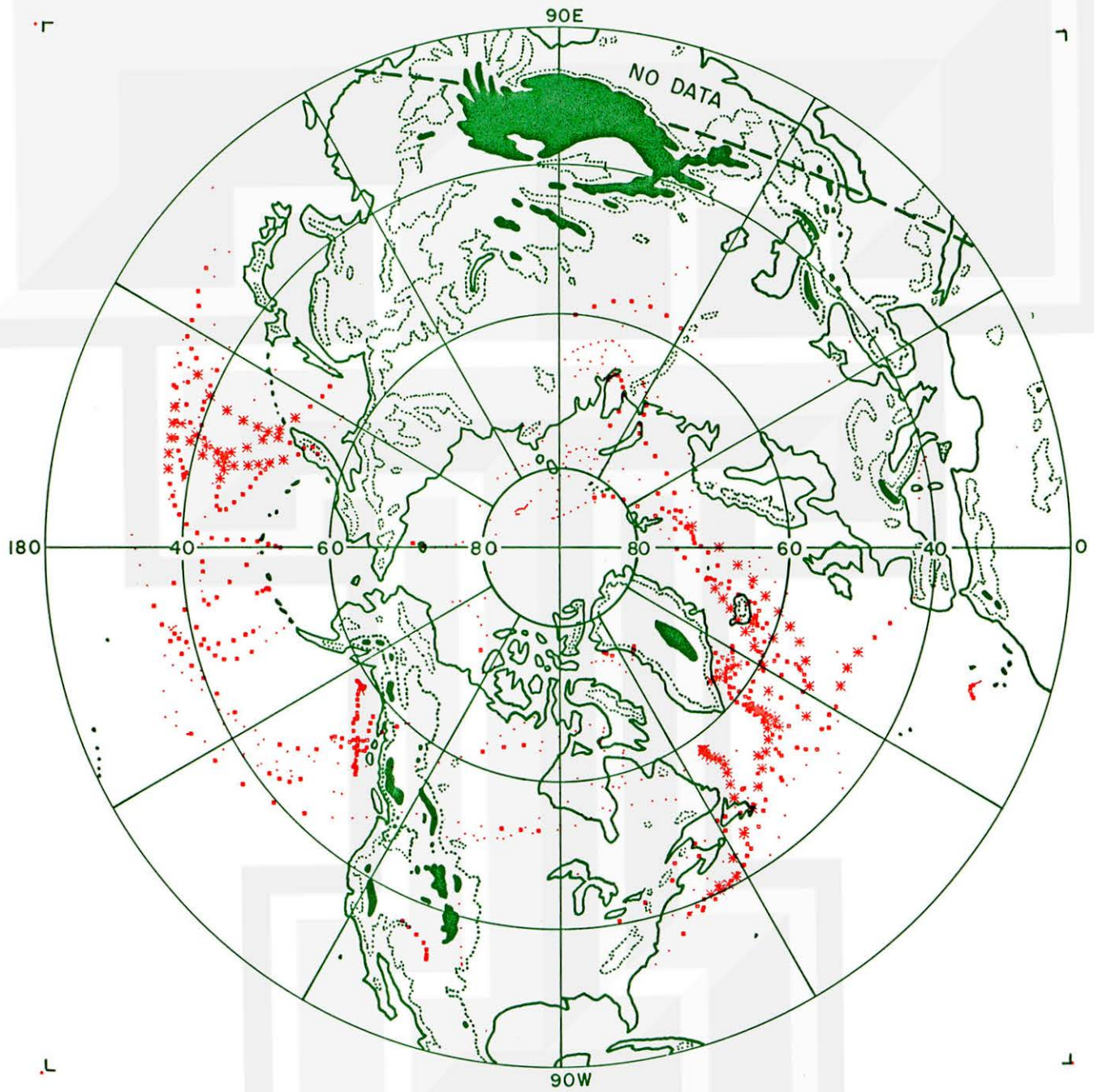
CYCLONE WINDSPEED

JAN 82



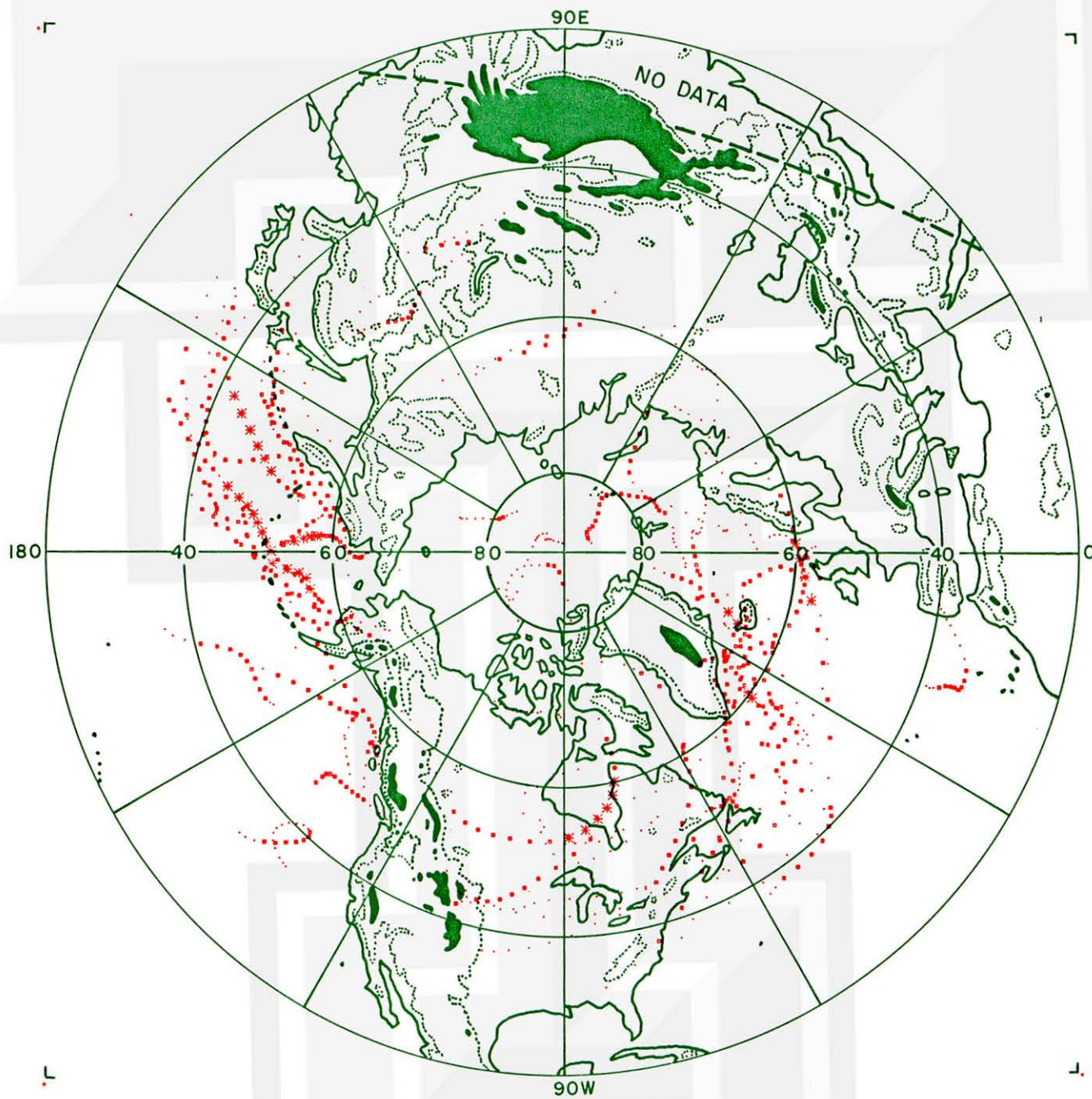
CYCLONE WINDSPEED

FEB 82



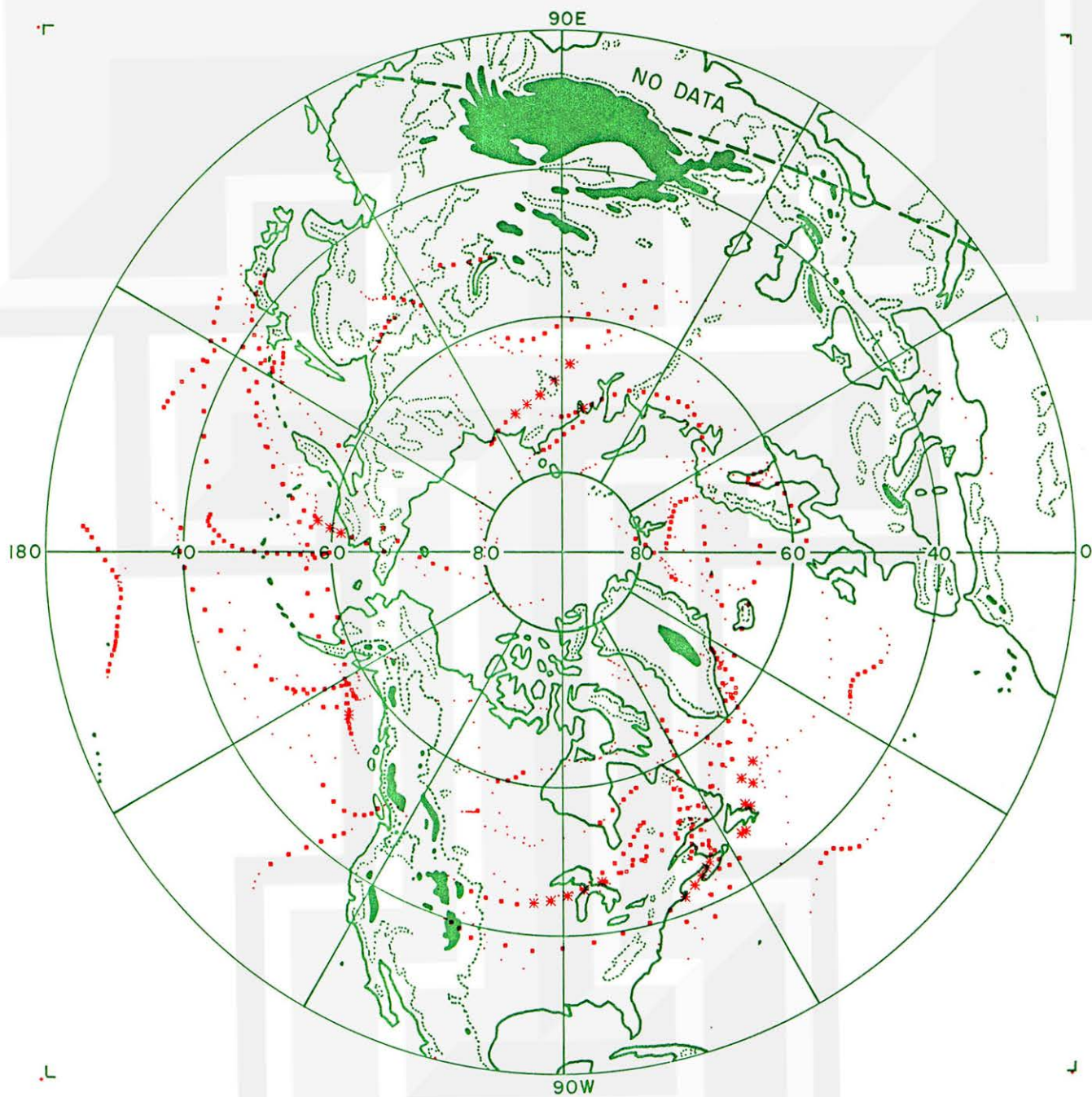
CYCLONE WINDSPEED

MAR 82



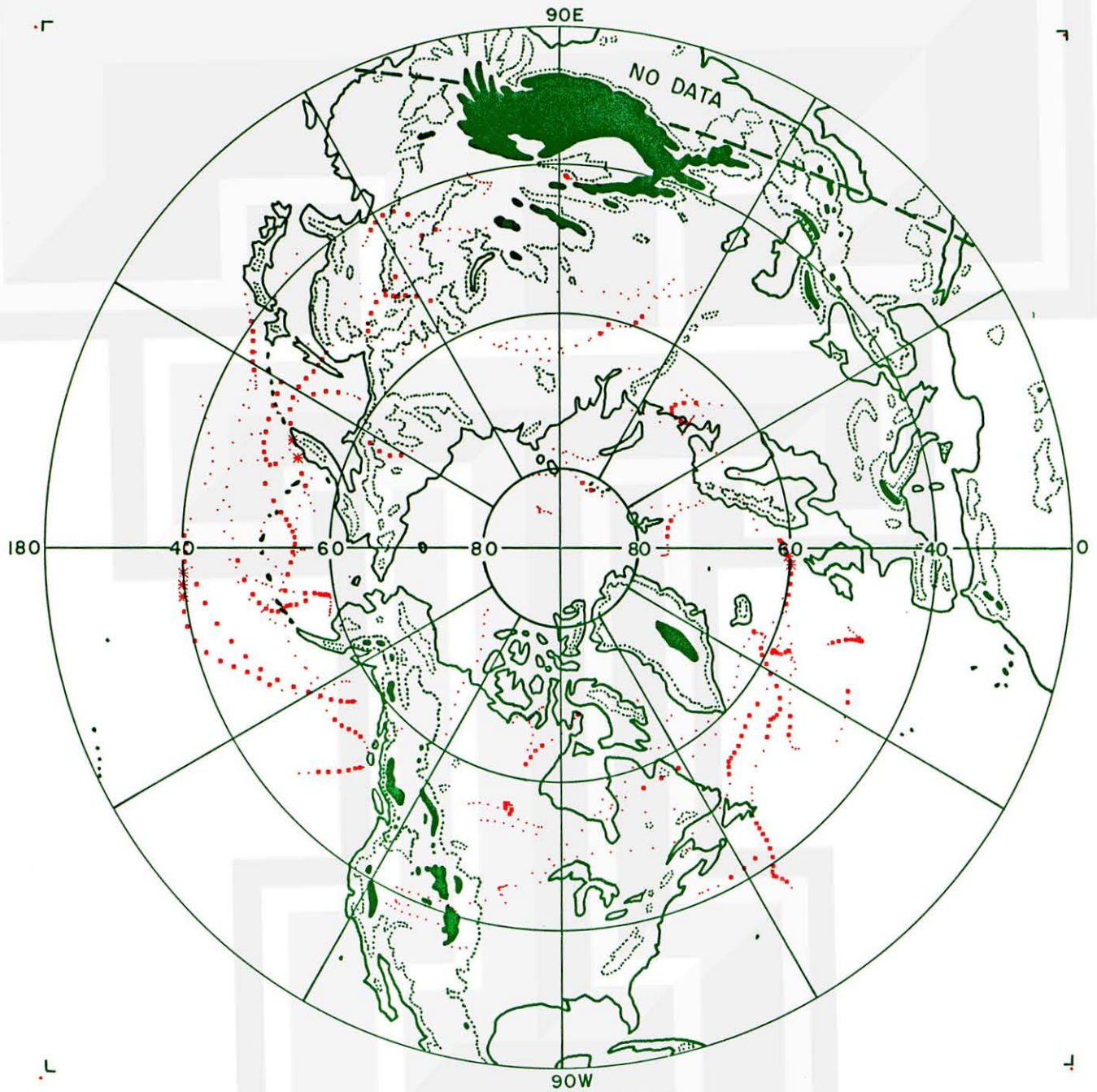
CYCLONE WINDSPEED

APR 82



CYCLONE WINDSPEED

MAY 82



..... 8 m/s or slower

.... 8 - 16 m/s

* * * 16 m/s or faster

3. DISTRIBUTION BY CYCLONE MOVEMENT (CM)

1 ANNUAL MAP

4 SEASONAL MAPS

Summer 1981

Autumn 1981

Winter 1981-82

Spring 1982

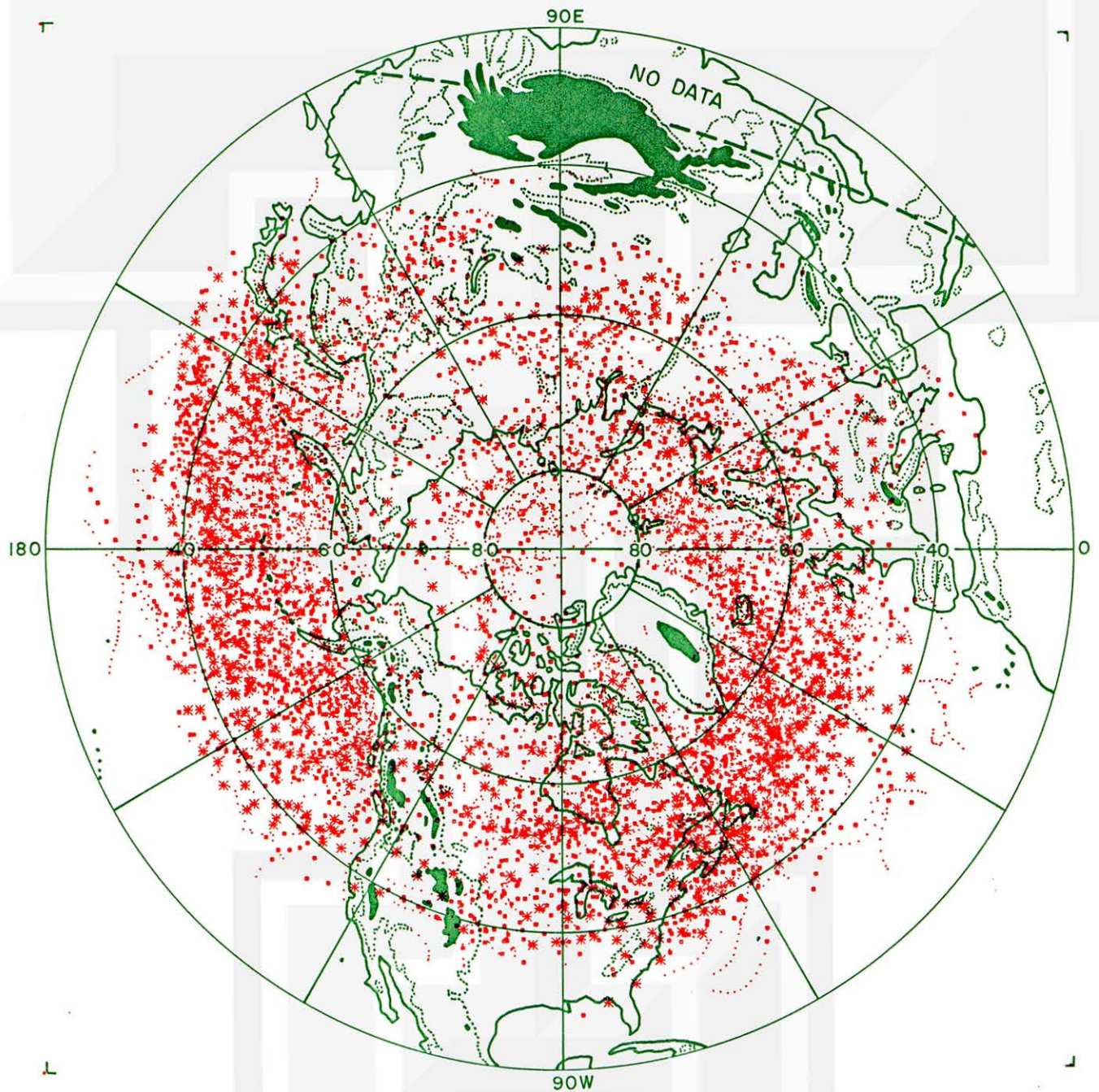
12 MONTHLY MAPS

June-December 1981

January-May 1982

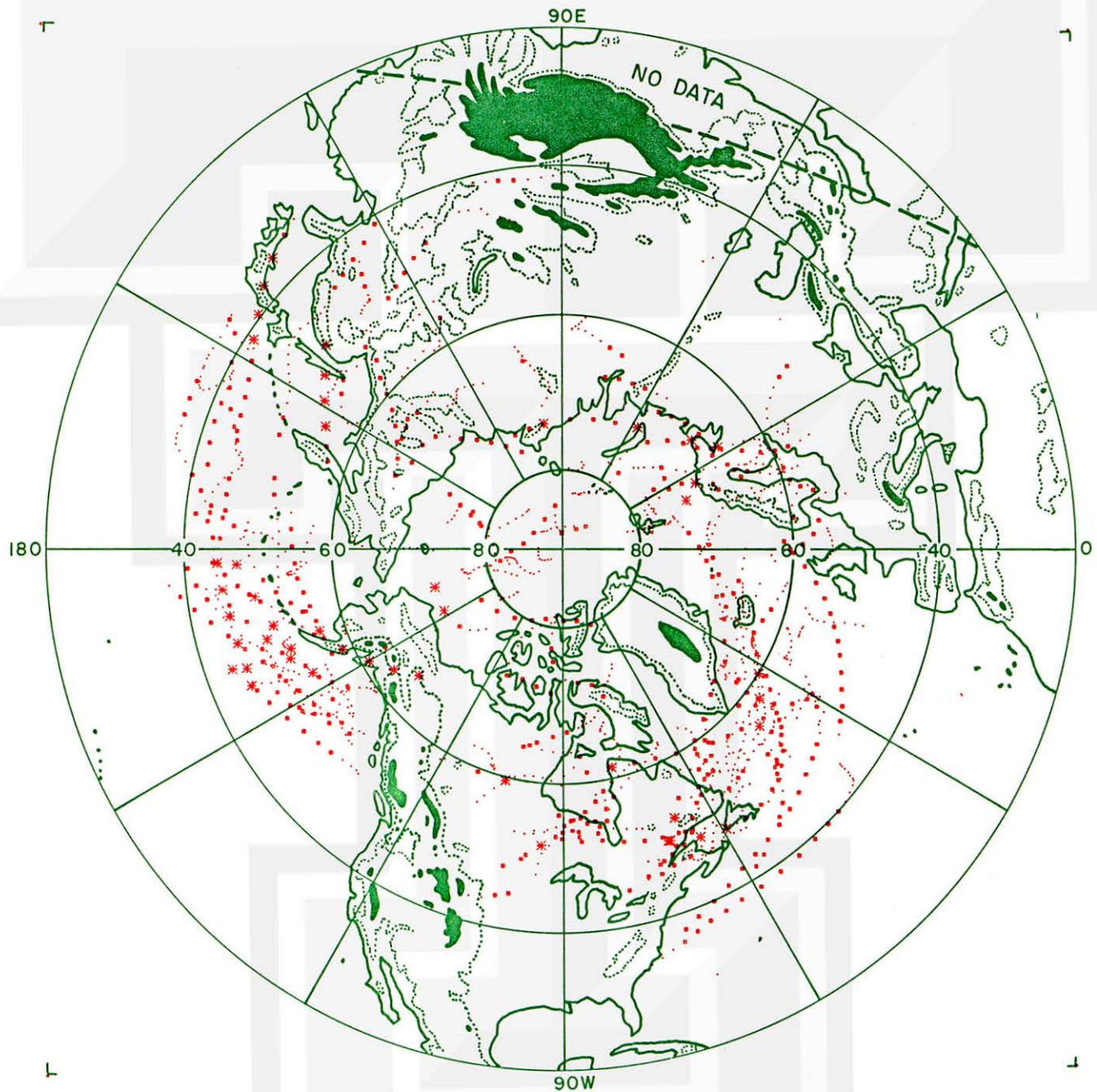


CYCLONE MOVEMENT
12 MOS JUN 81 - MAY 82



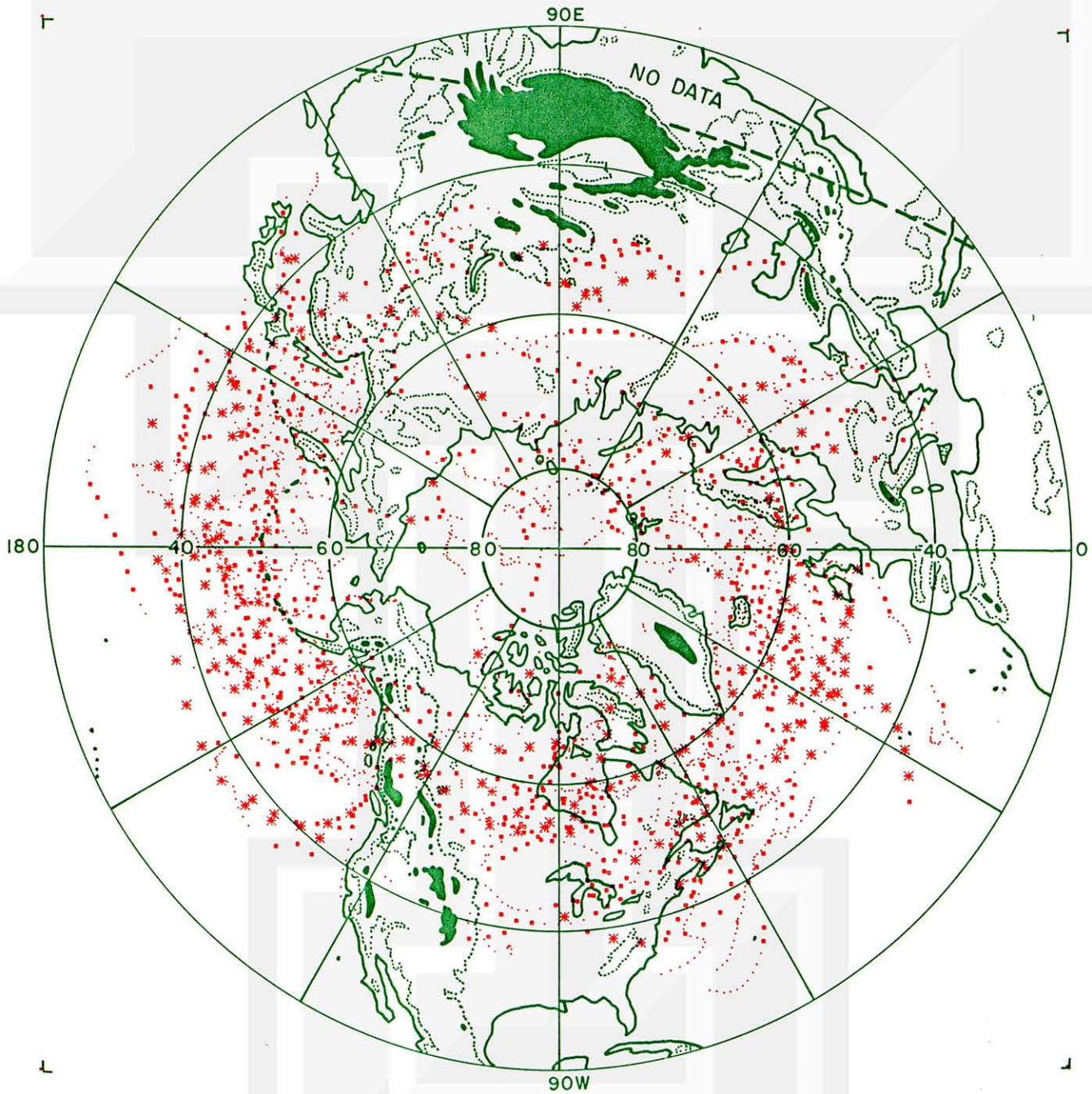
CYCLONE MOVEMENT

SUMMER 1981



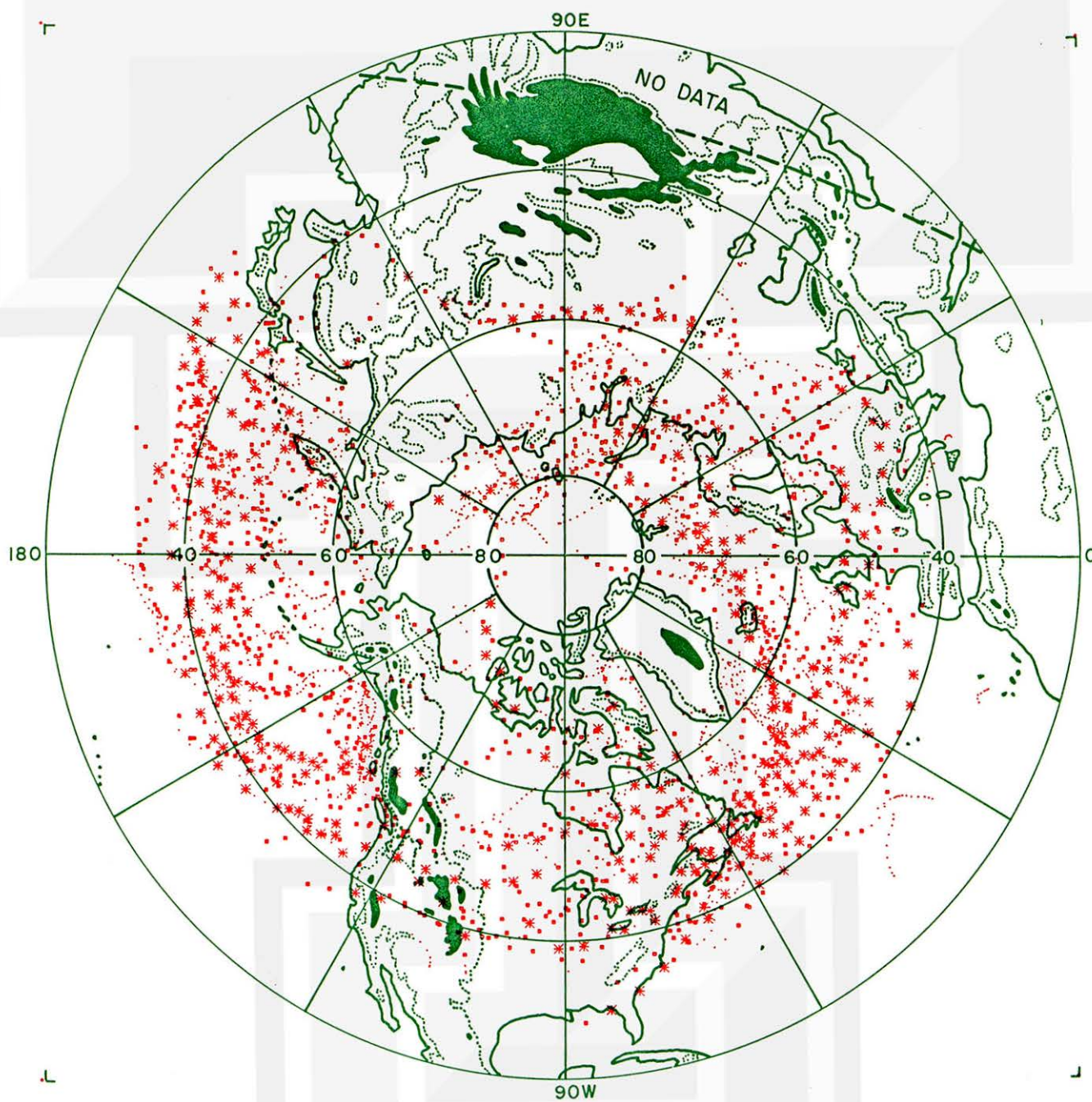
CYCLONE MOVEMENT

AUTUMN 1981



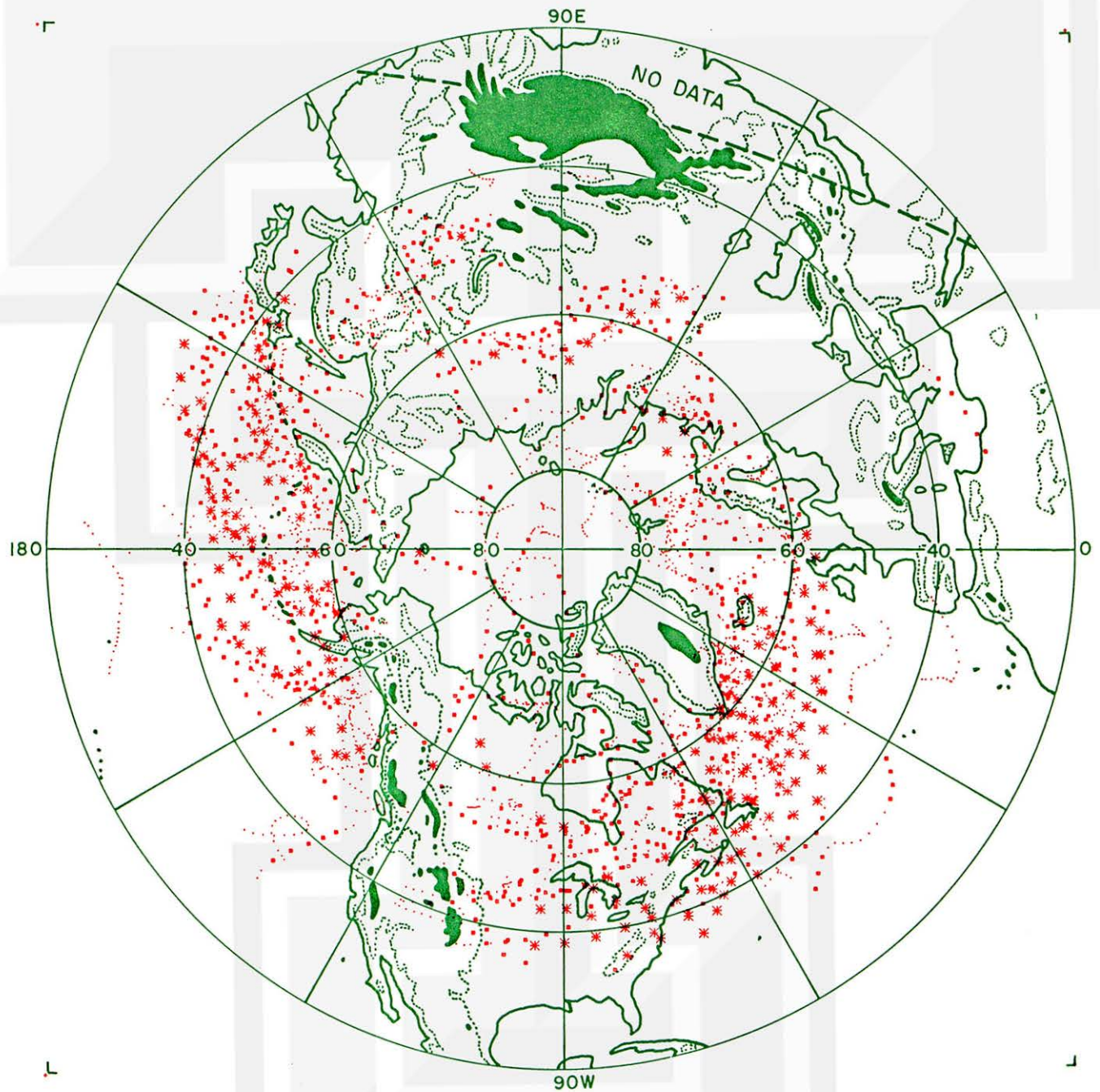
CYCLONE MOVEMENT

WINTER 1981 - 82



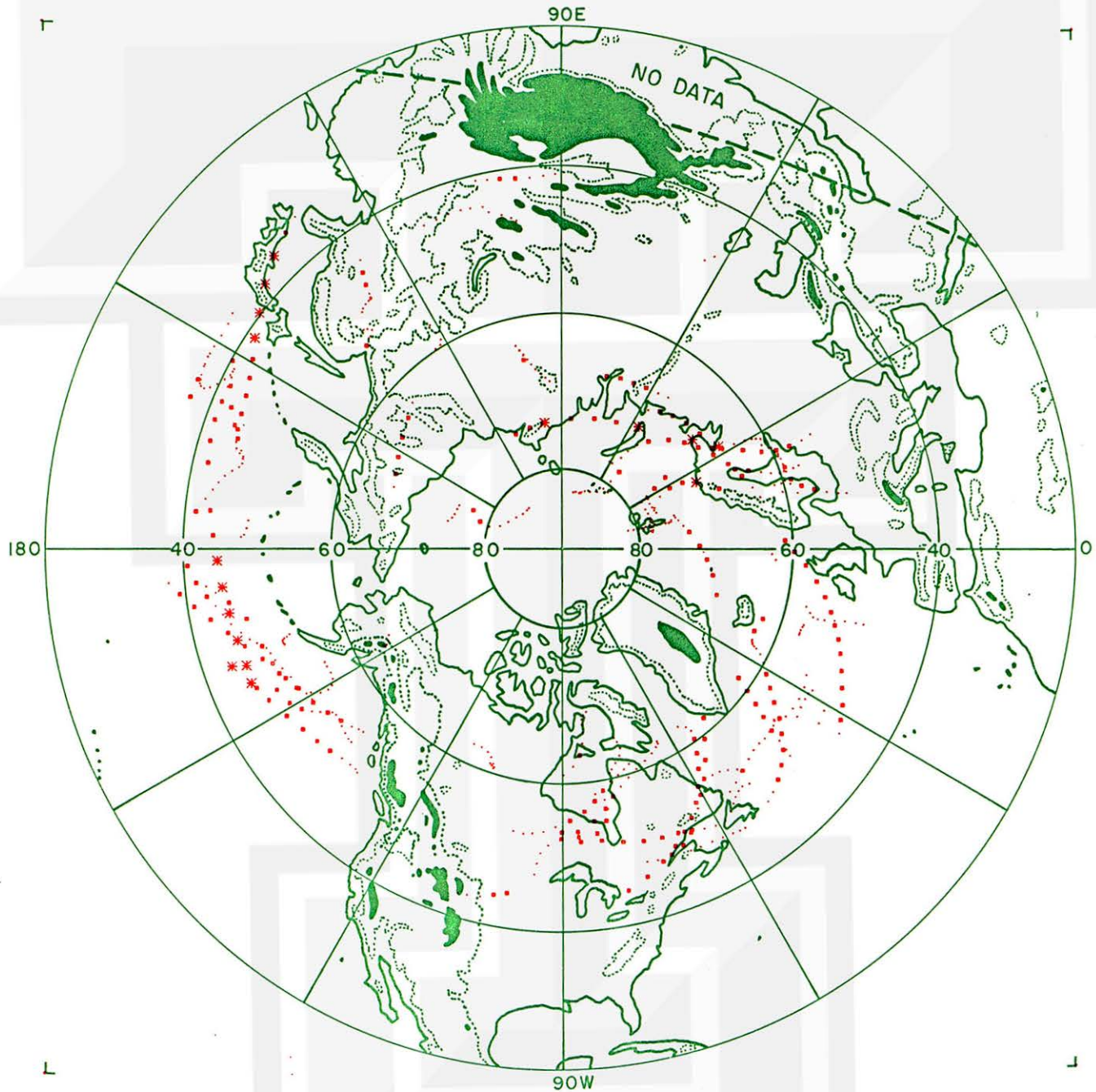
CYCLONE MOVEMENT

SPRING 1982



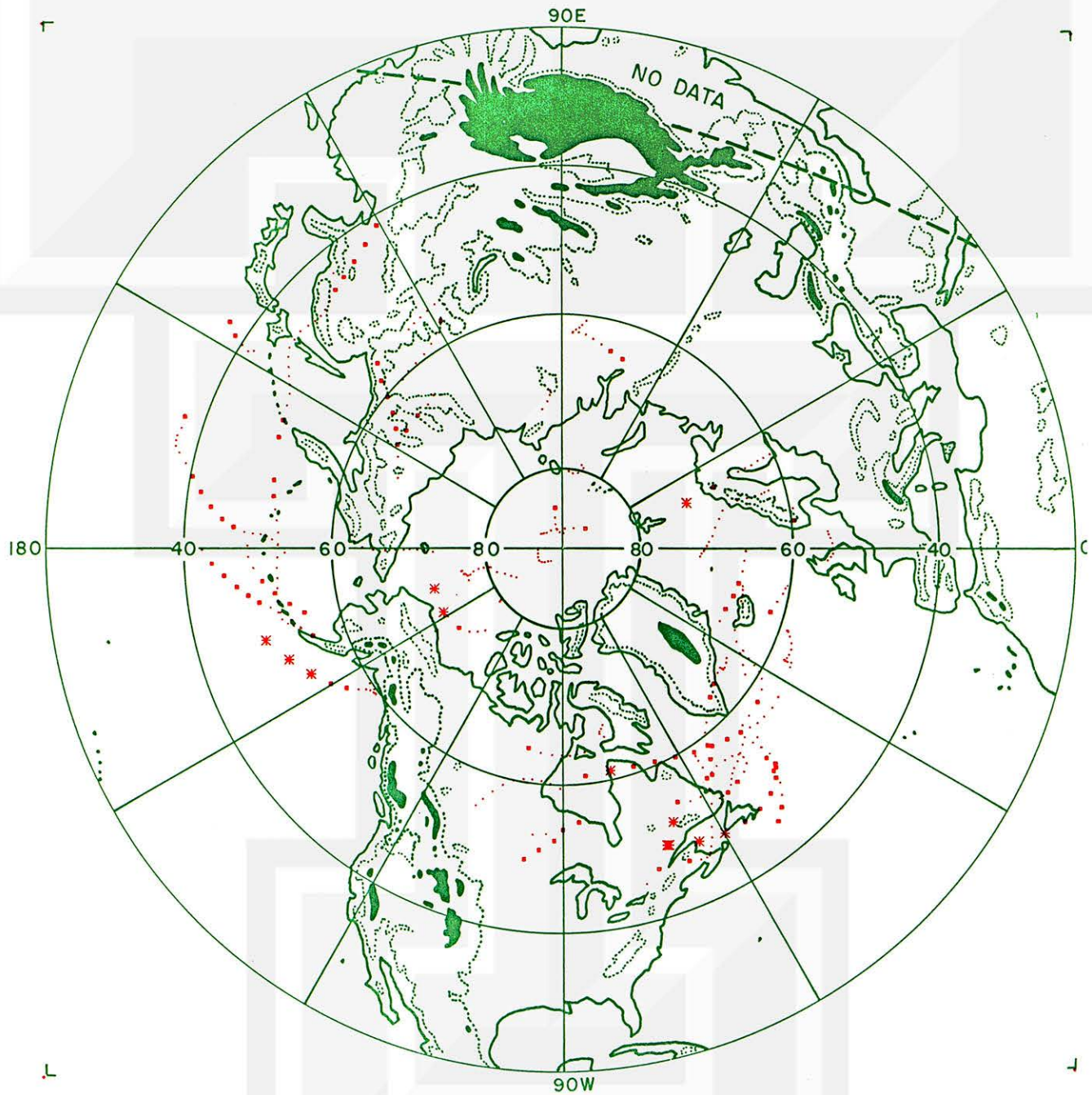
CYCLONE MOVEMENT

JUN 81



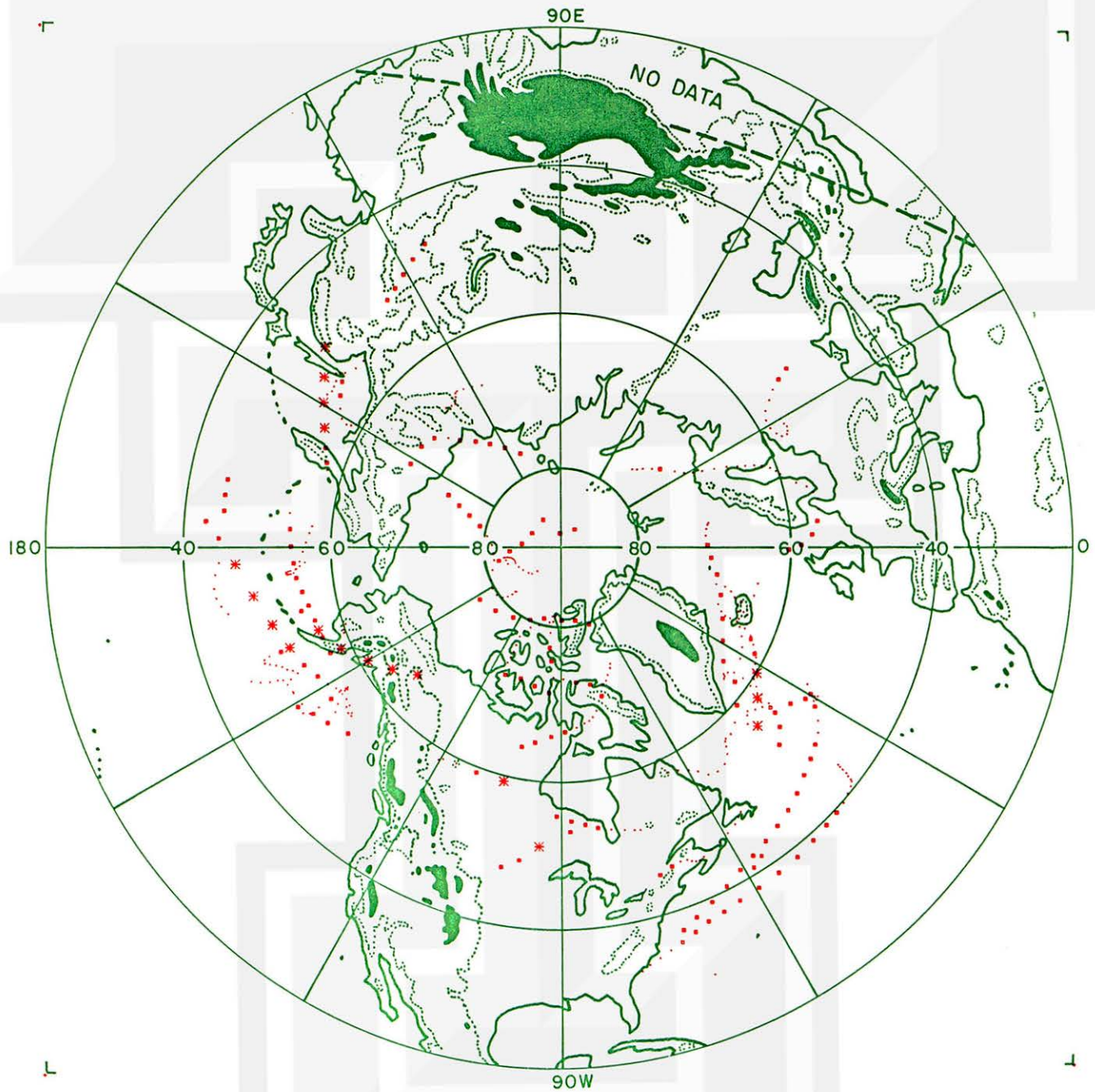
CYCLONE MOVEMENT

JUL 81



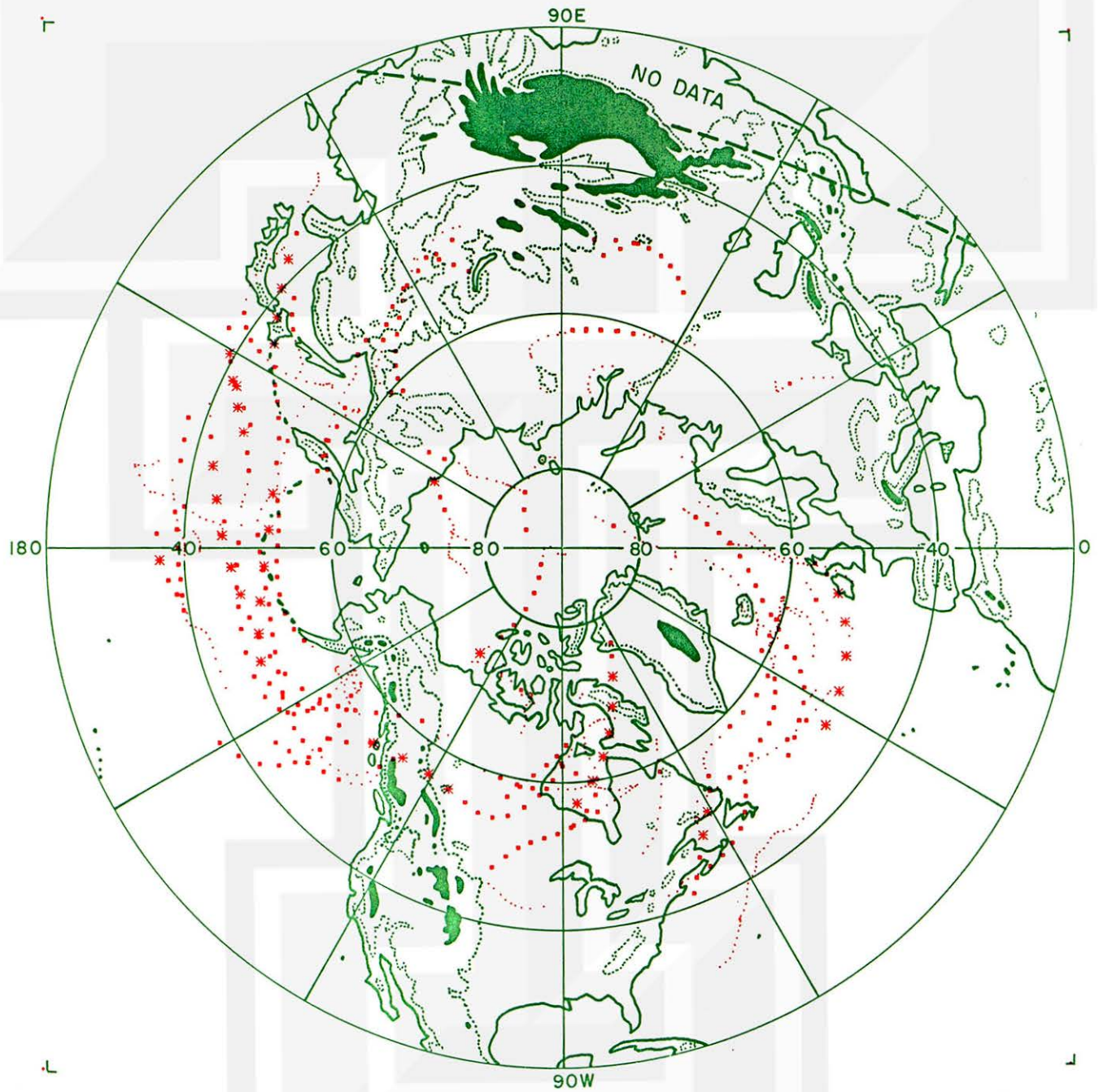
CYCLONE MOVEMENT

AUG 81



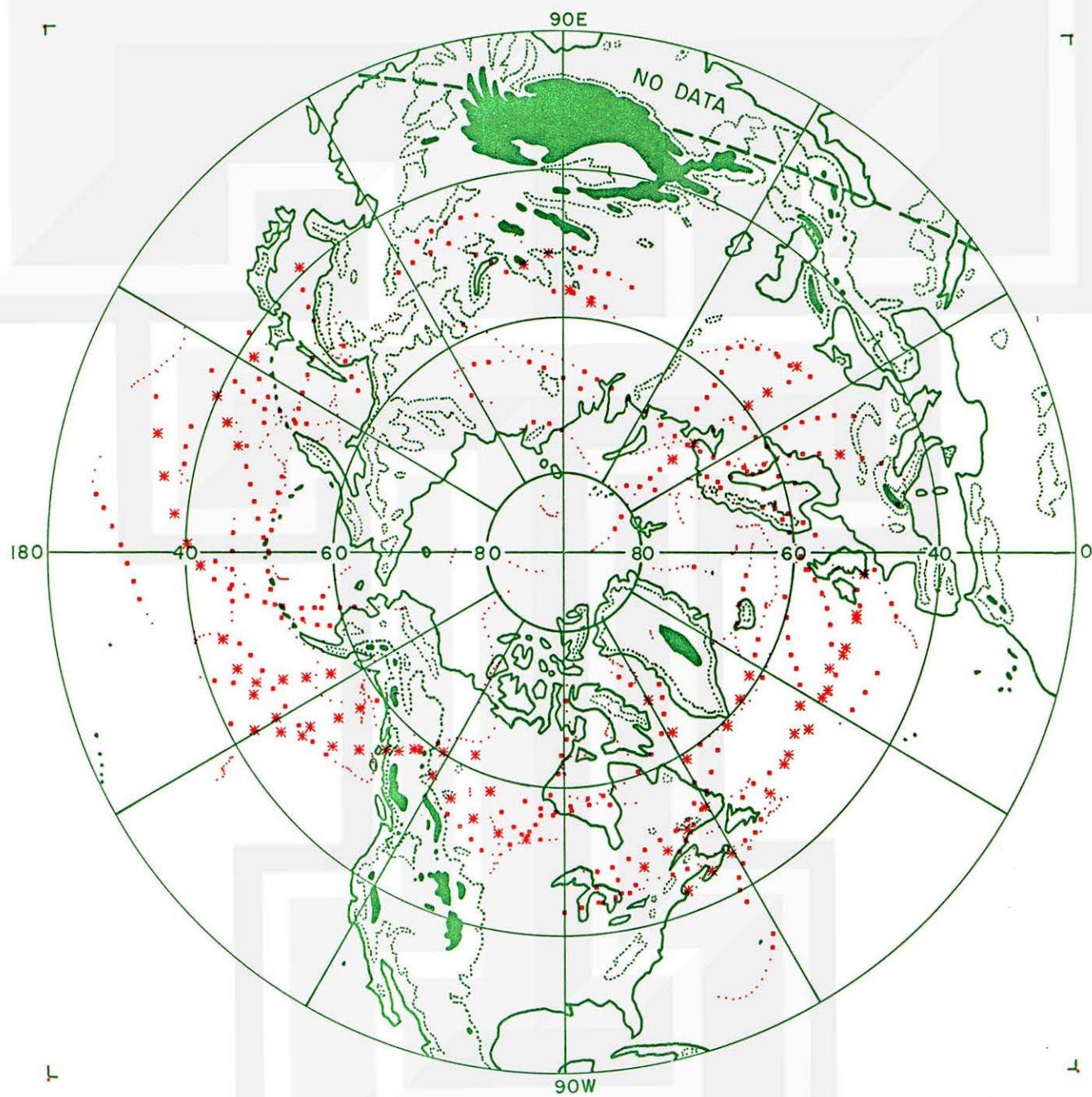
CYCLONE MOVEMENT

SEP 81



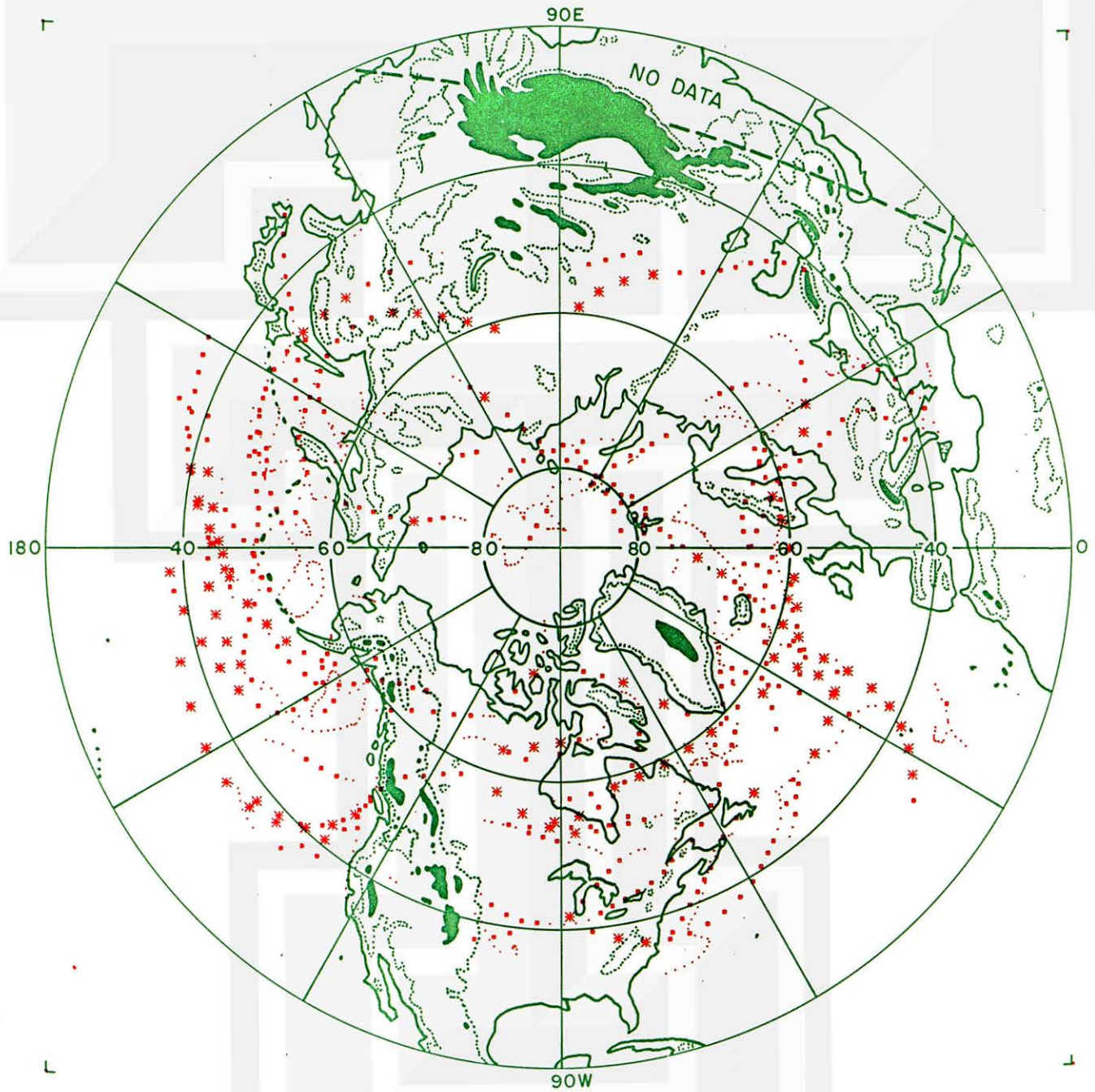
CYCLONE MOVEMENT

OCT 81



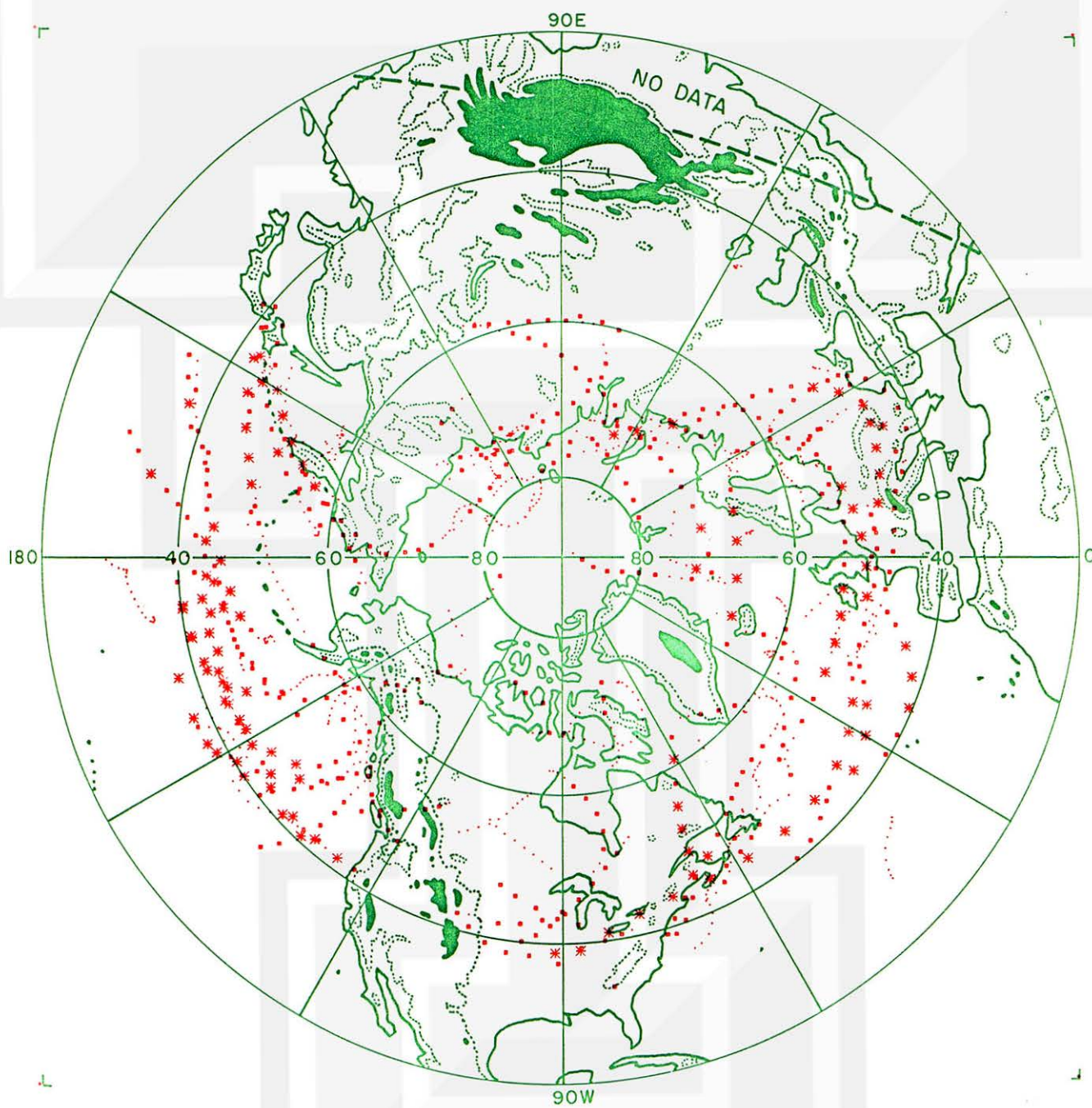
CYCLONE MOVEMENT

NOV 81



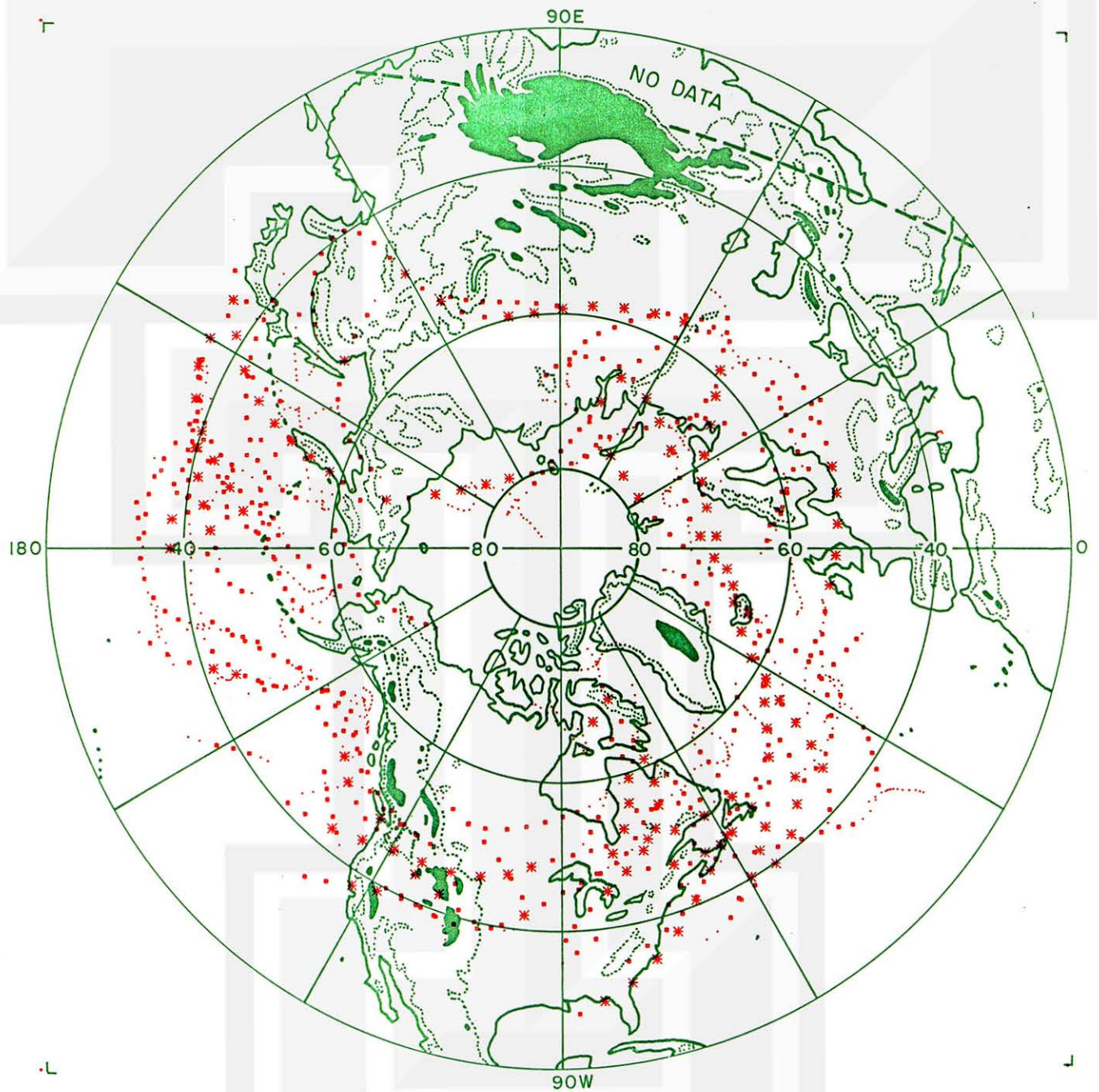
CYCLONE MOVEMENT

DEC 81



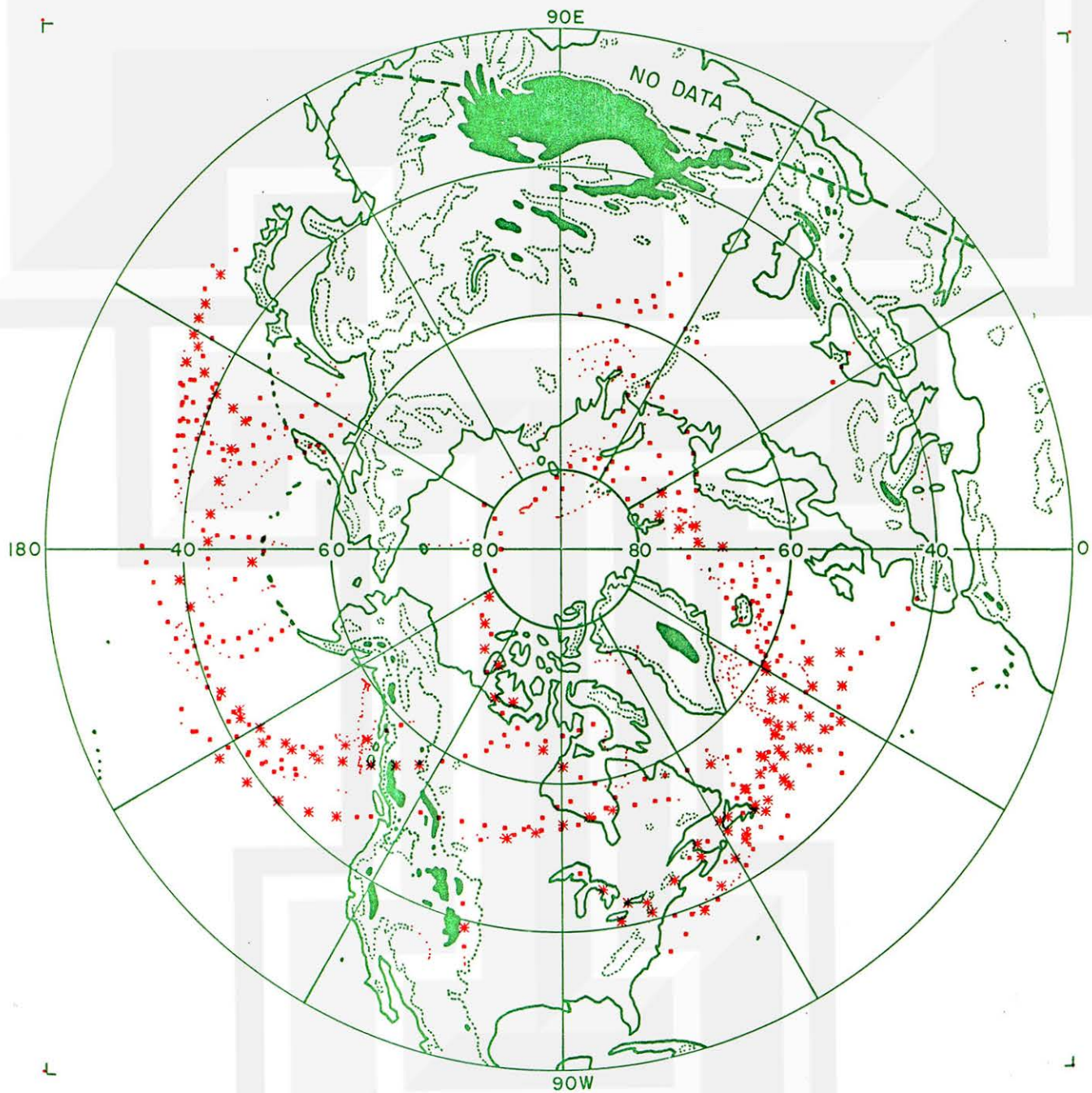
CYCLONE MOVEMENT

JAN 82



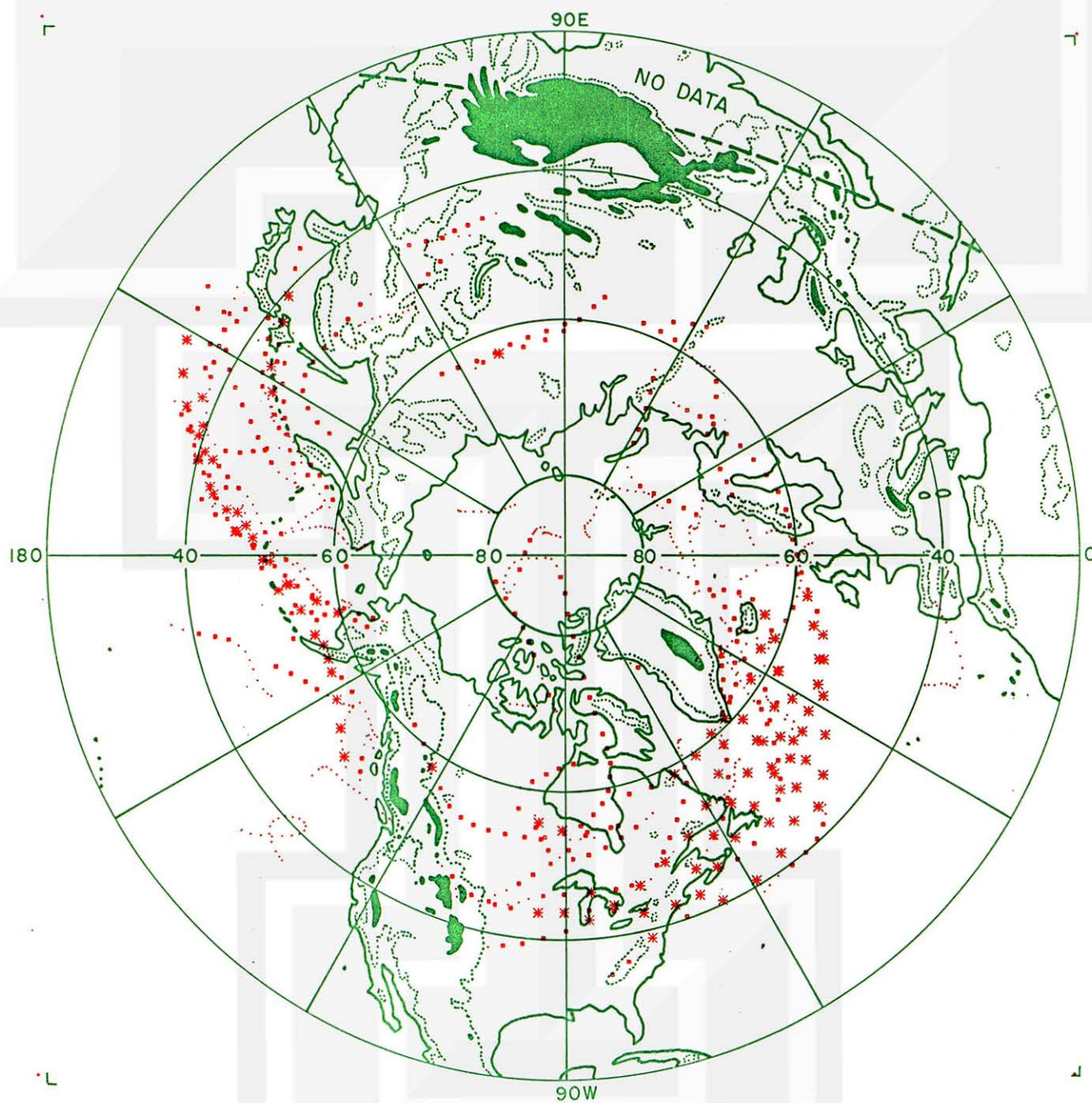
CYCLONE MOVEMENT

FEB 82



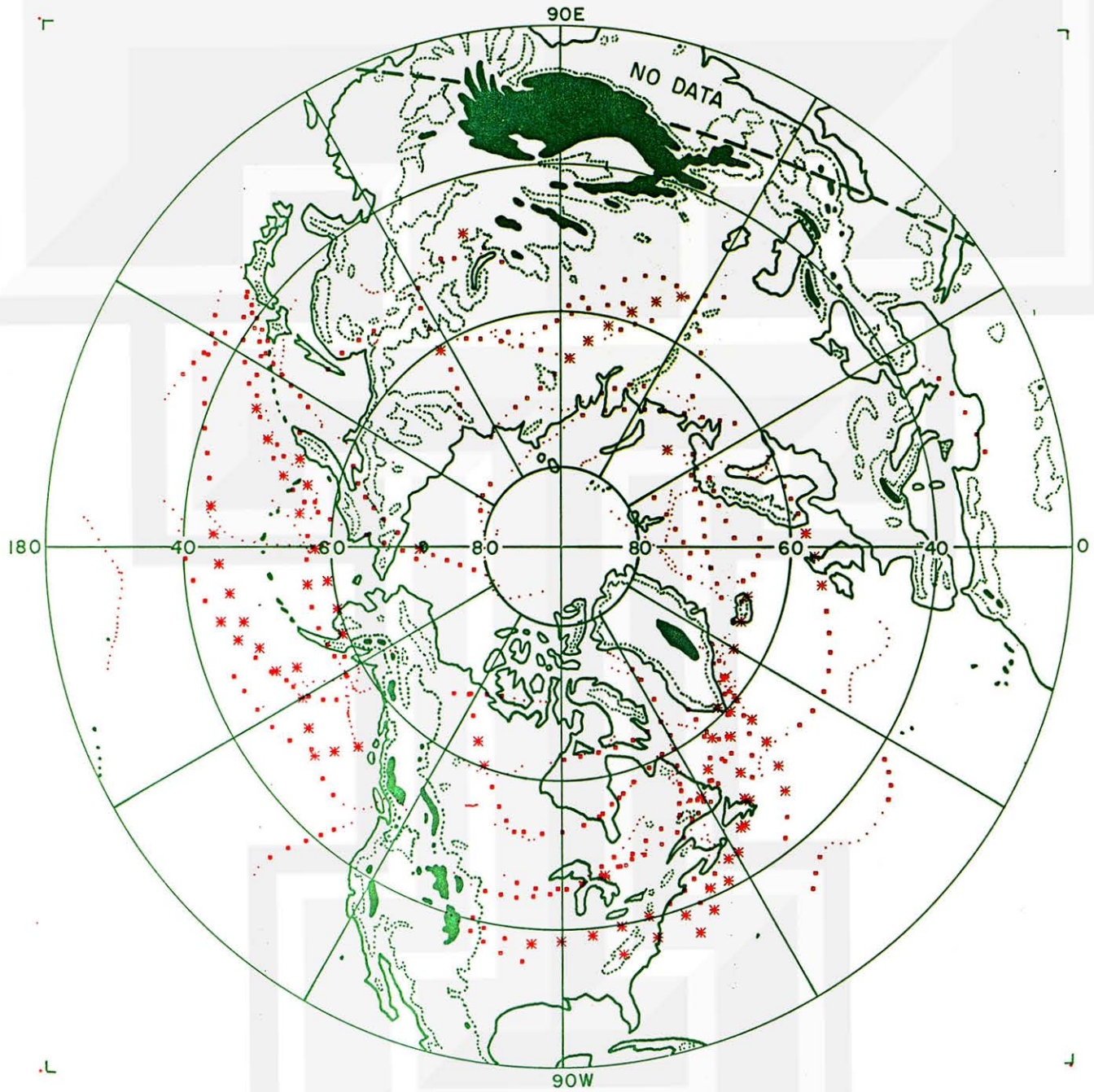
CYCLONE MOVEMENT

MAR 82



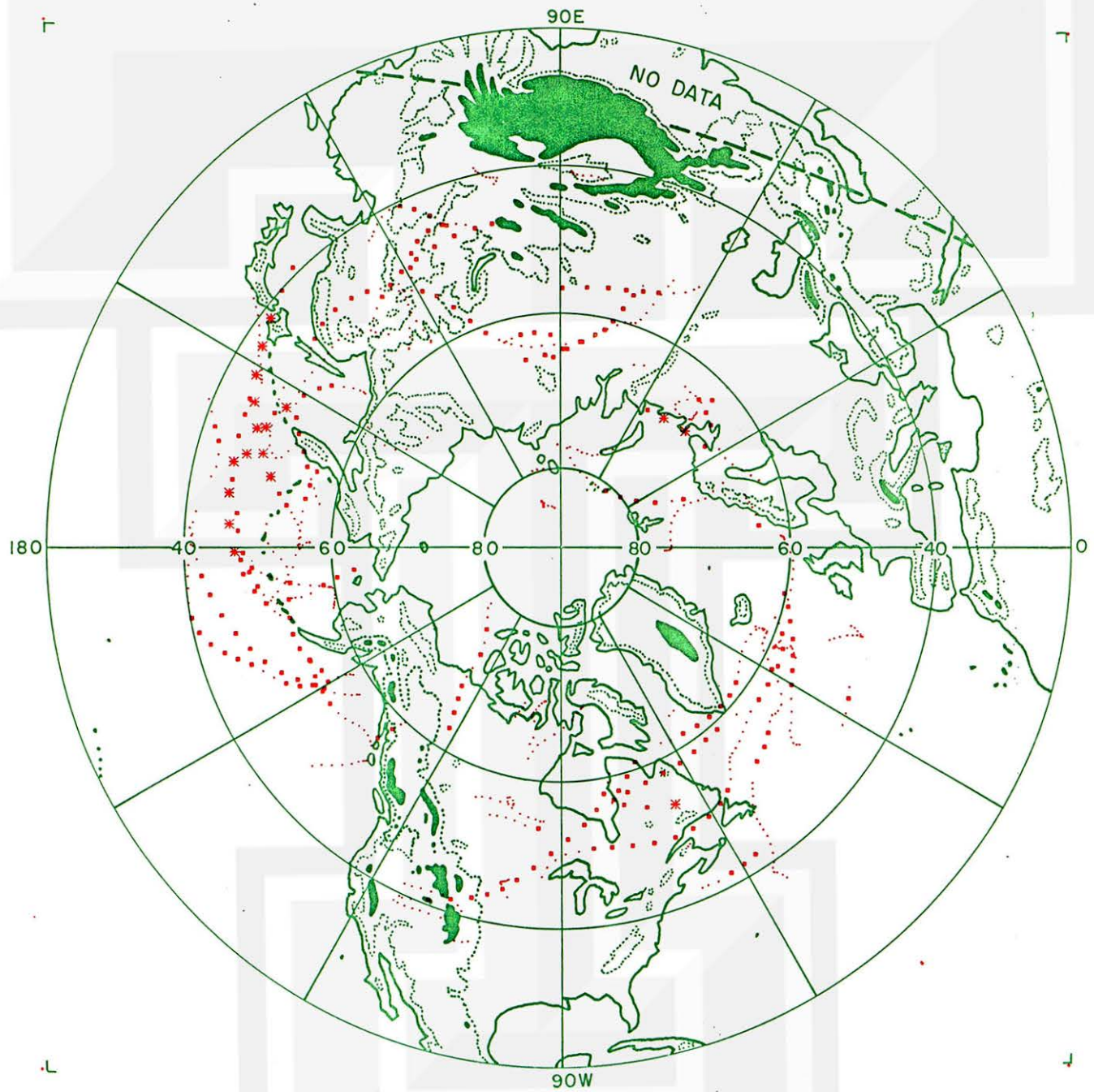
CYCLONE MOVEMENT

APR 82



CYCLONE MOVEMENT

MAY 82



..... 0 - 1 mb/6hrs
..... 1 - 3 mb/6hrs
* * * 3 mb/6hrs or larger

4. DISTRIBUTION BY PRESSURE DEEPENING (-PD)

1 ANNUAL MAP

4 SEASONAL MAPS

Summer 1981

Autumn 1981

Winter 1981-82

Spring 1982

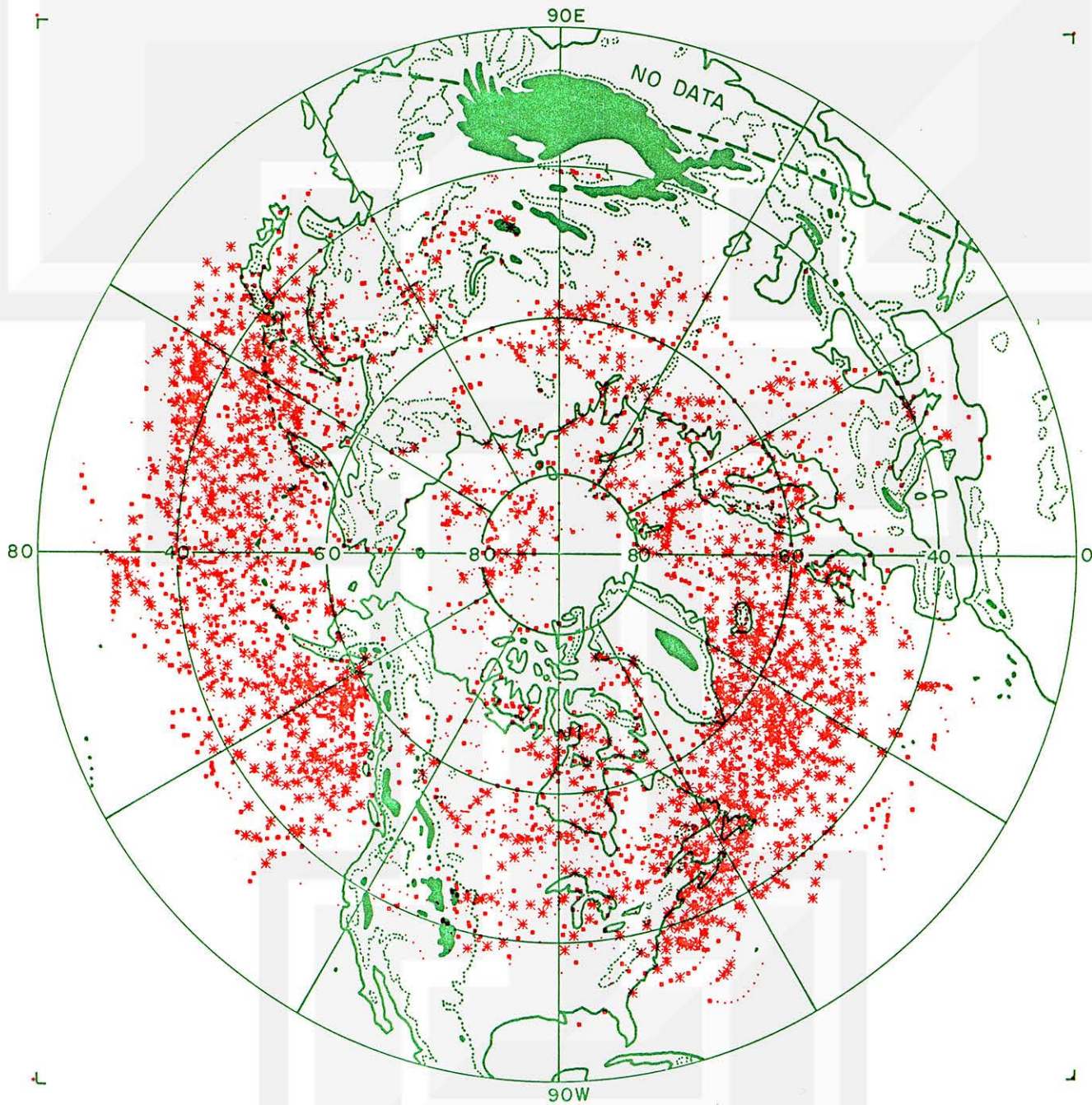
12 MONTHLY MAPS

June-December 1981

January-May 1982

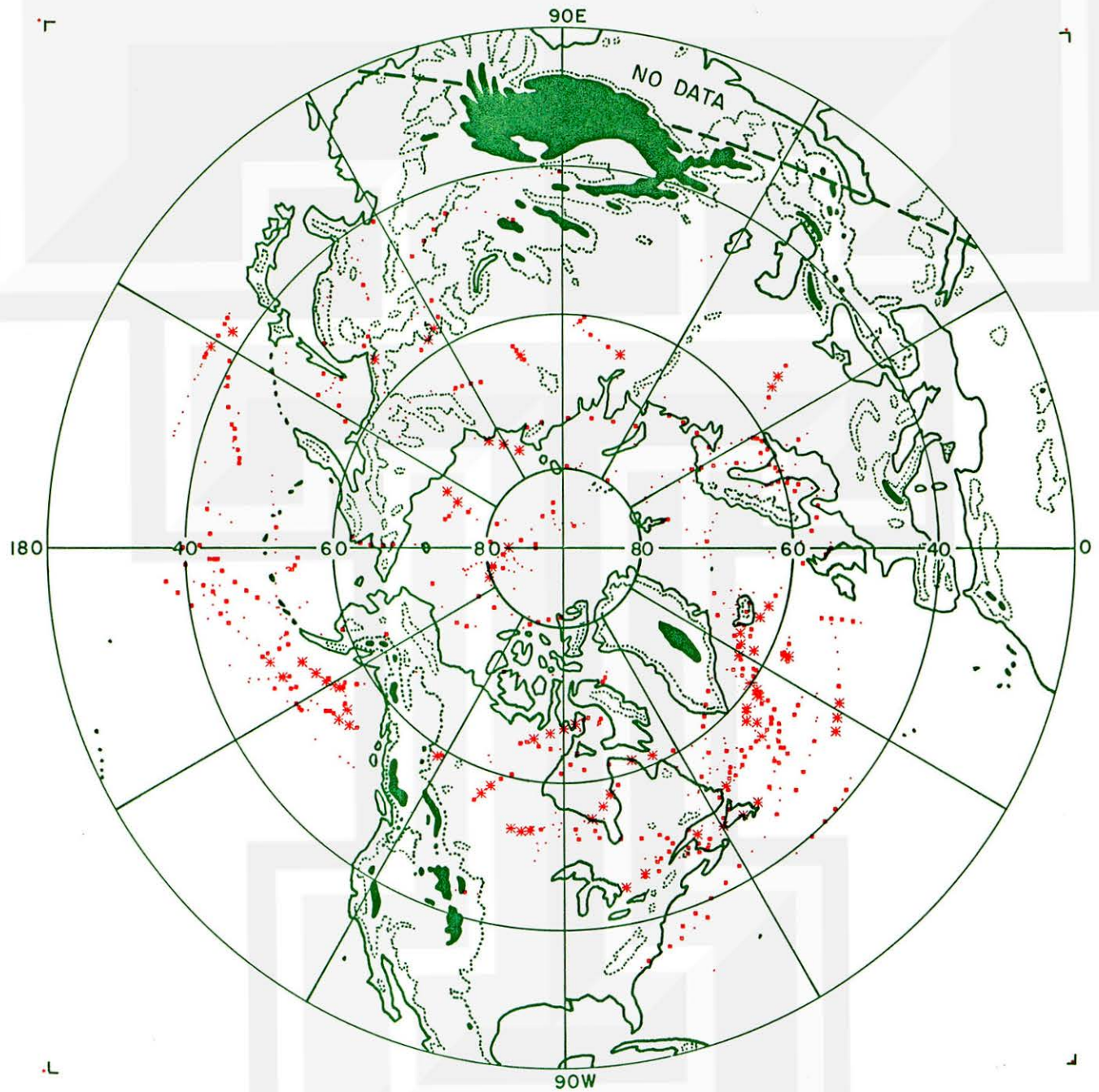


CYCLONE DEEPENING
12 MOS JUN 81 - MAY 82



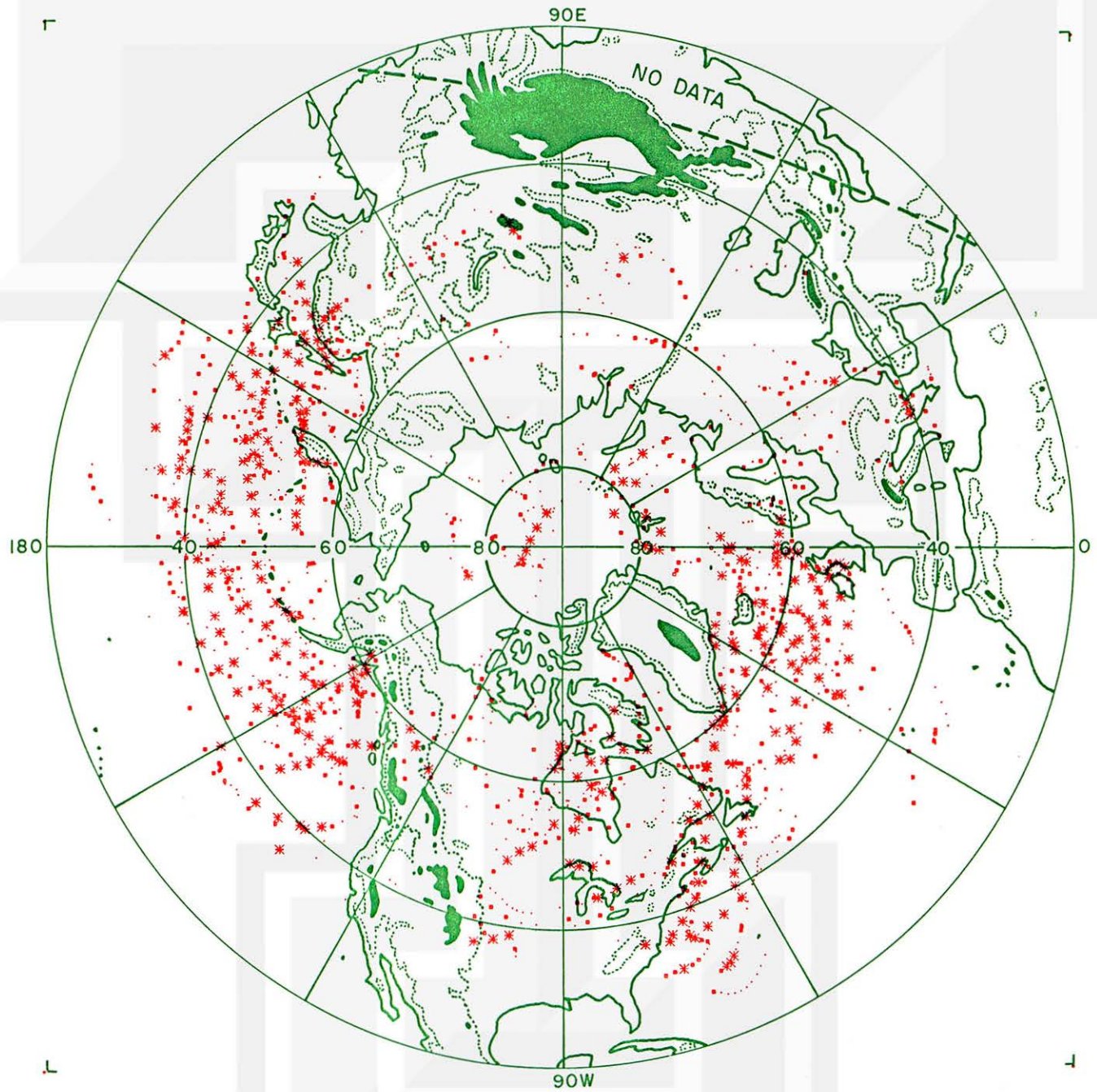
CYCLONE DEEPENING

SUMMER 1981



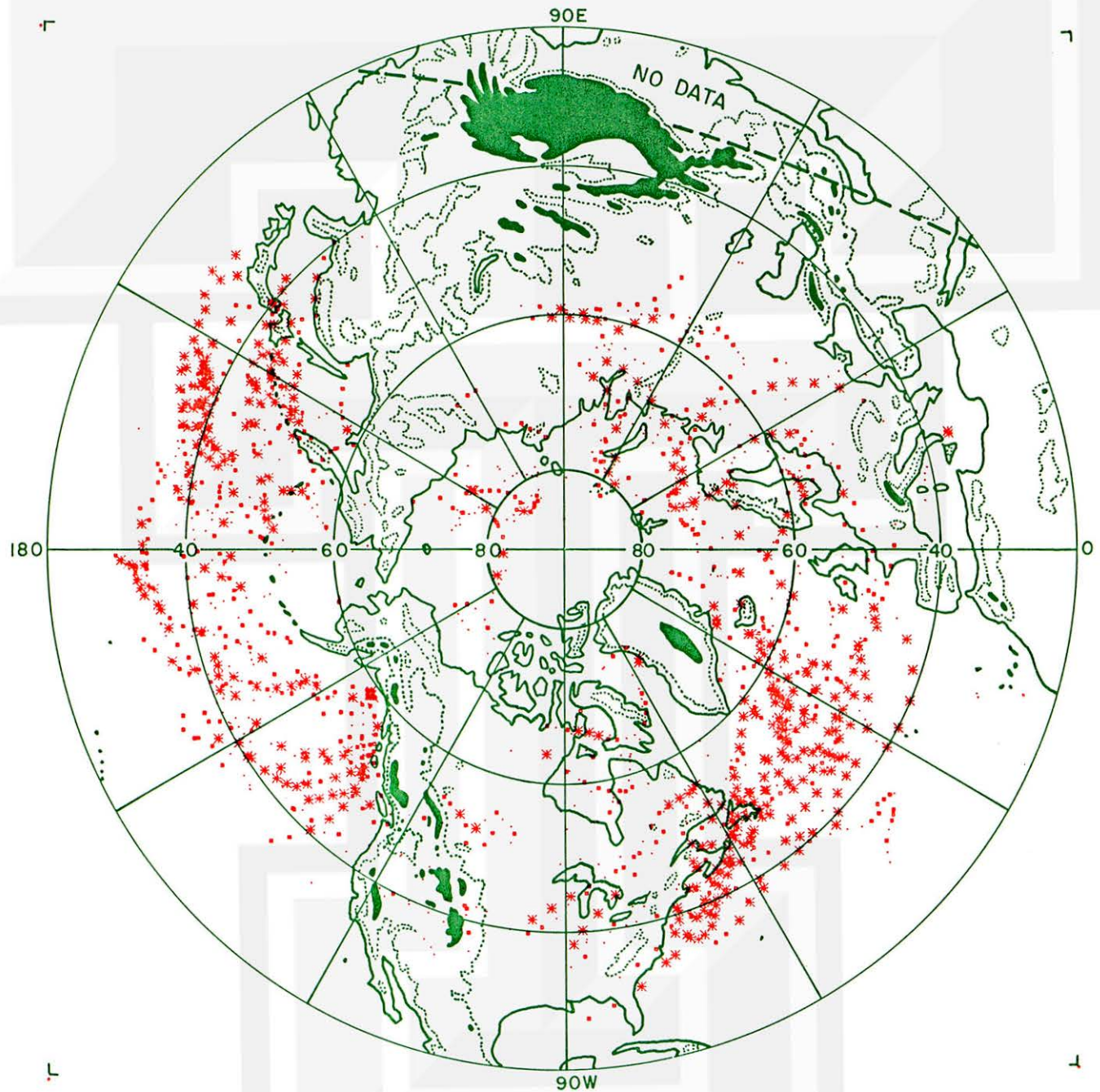
CYCLONE DEEPENING

AUTUMN 1981



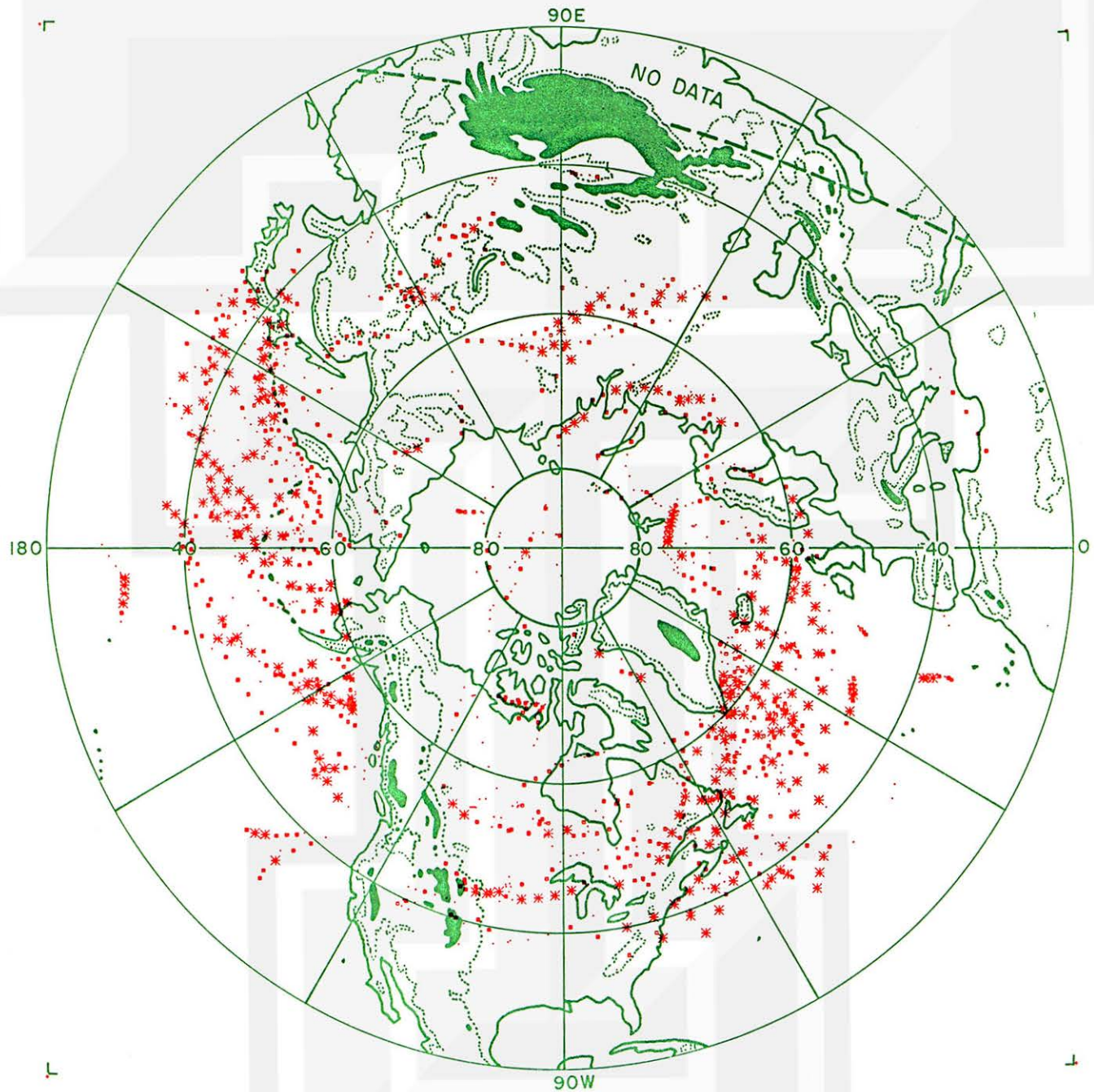
CYCLONE DEEPENING

WINTER 1981 - 82



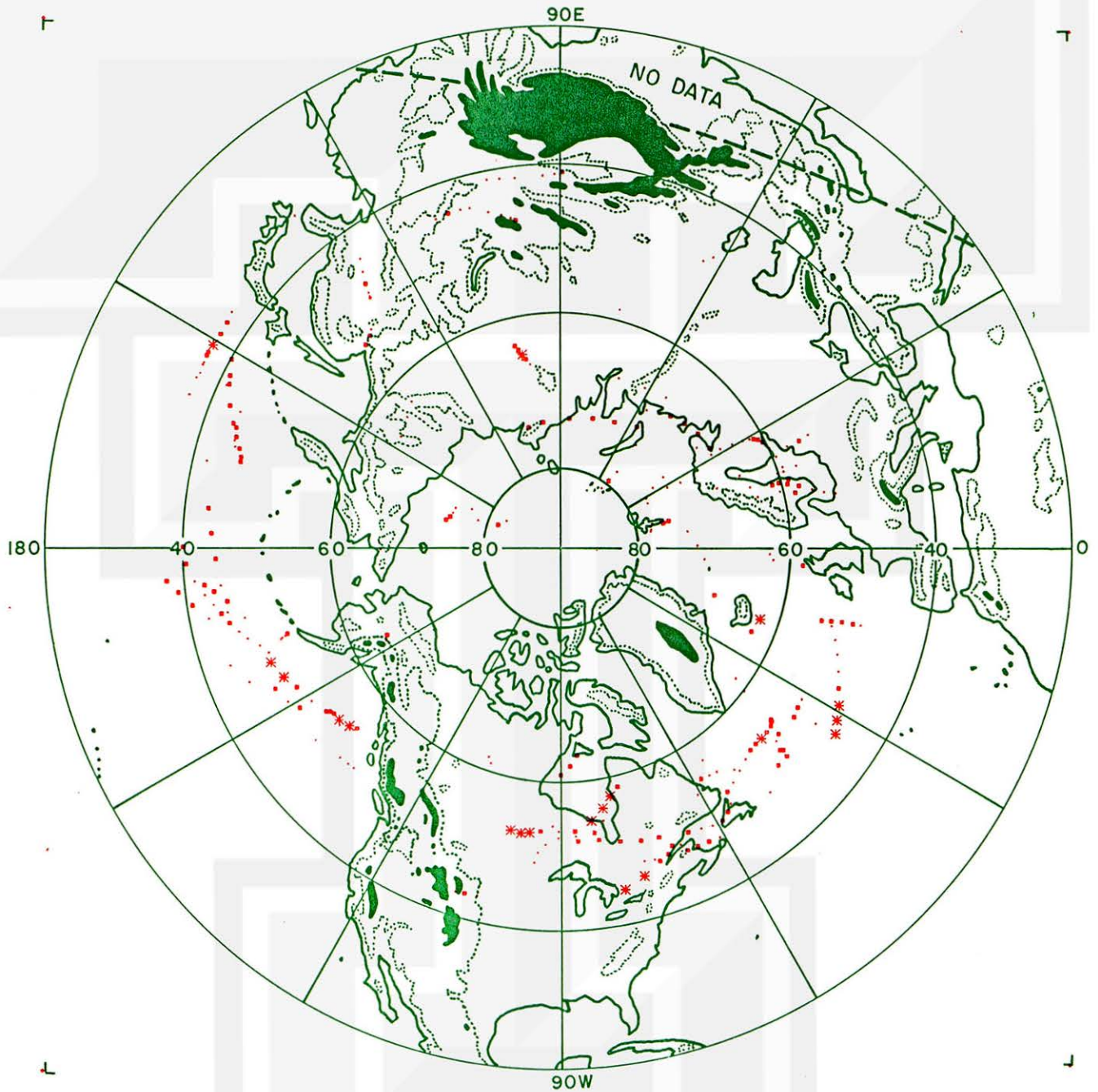
CYCLONE DEEPENING

SPRING 1982



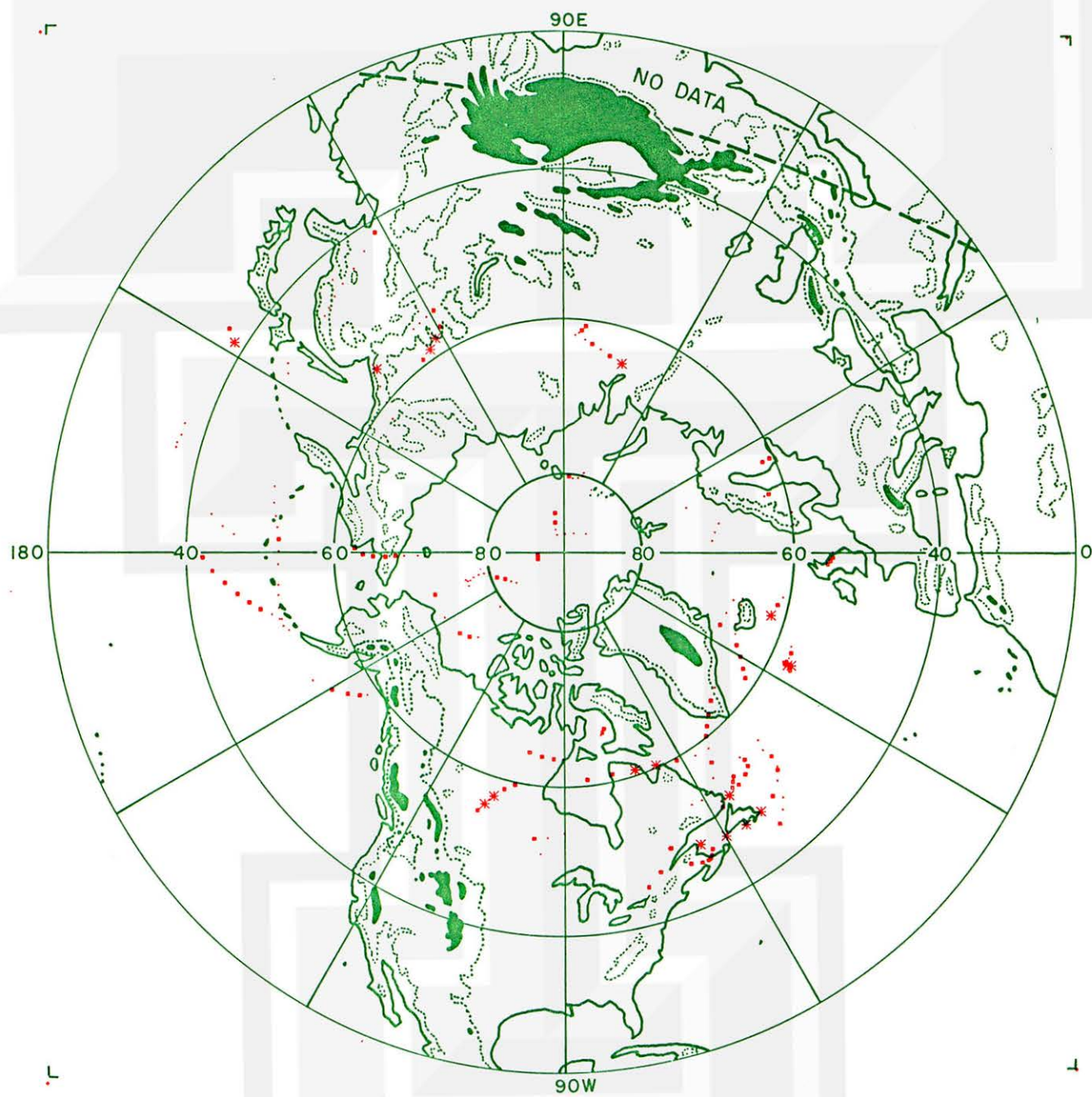
CYCLONE DEEPENING

JUN 81



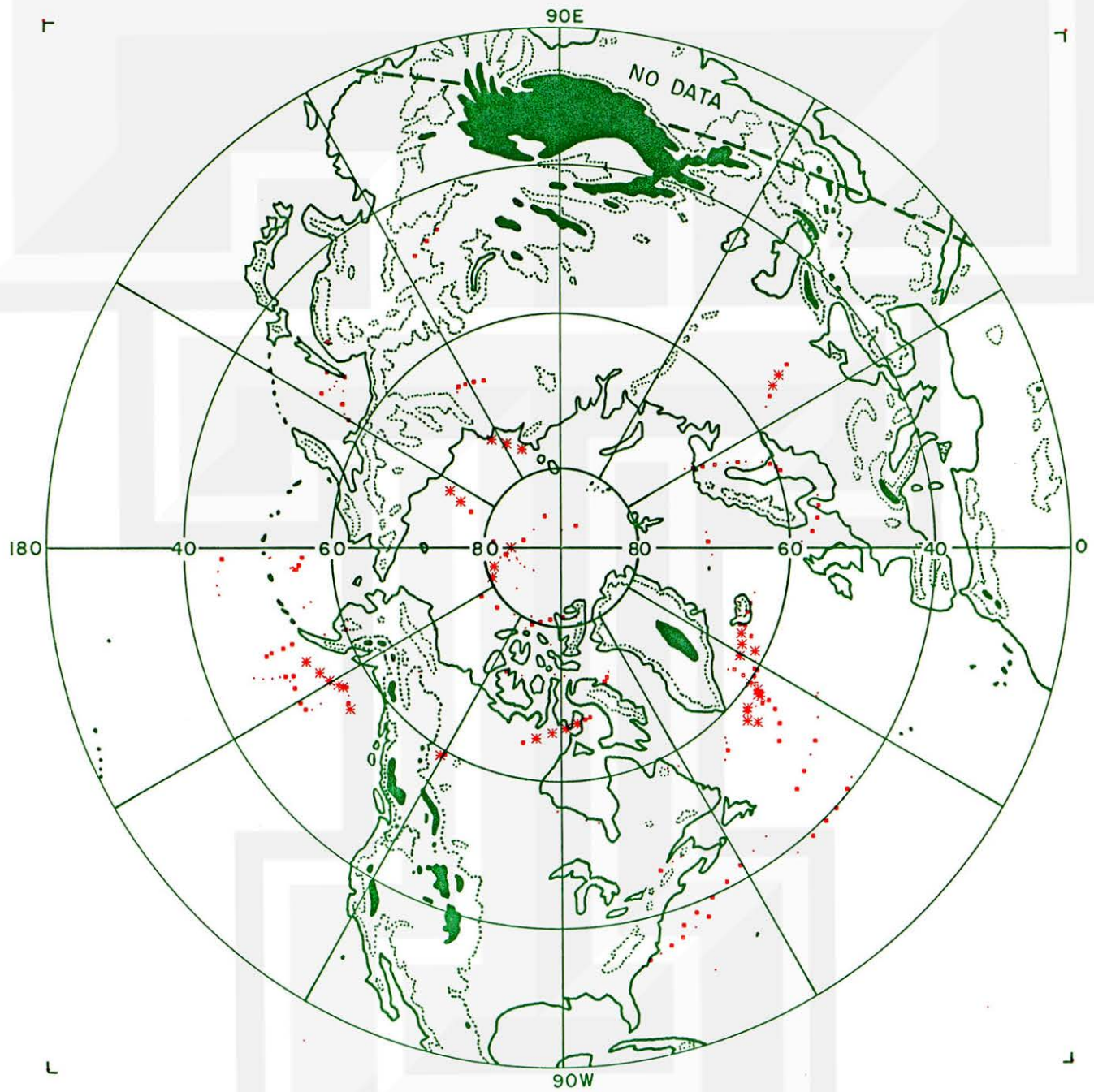
CYCLONE DEEPENING

JUL 81



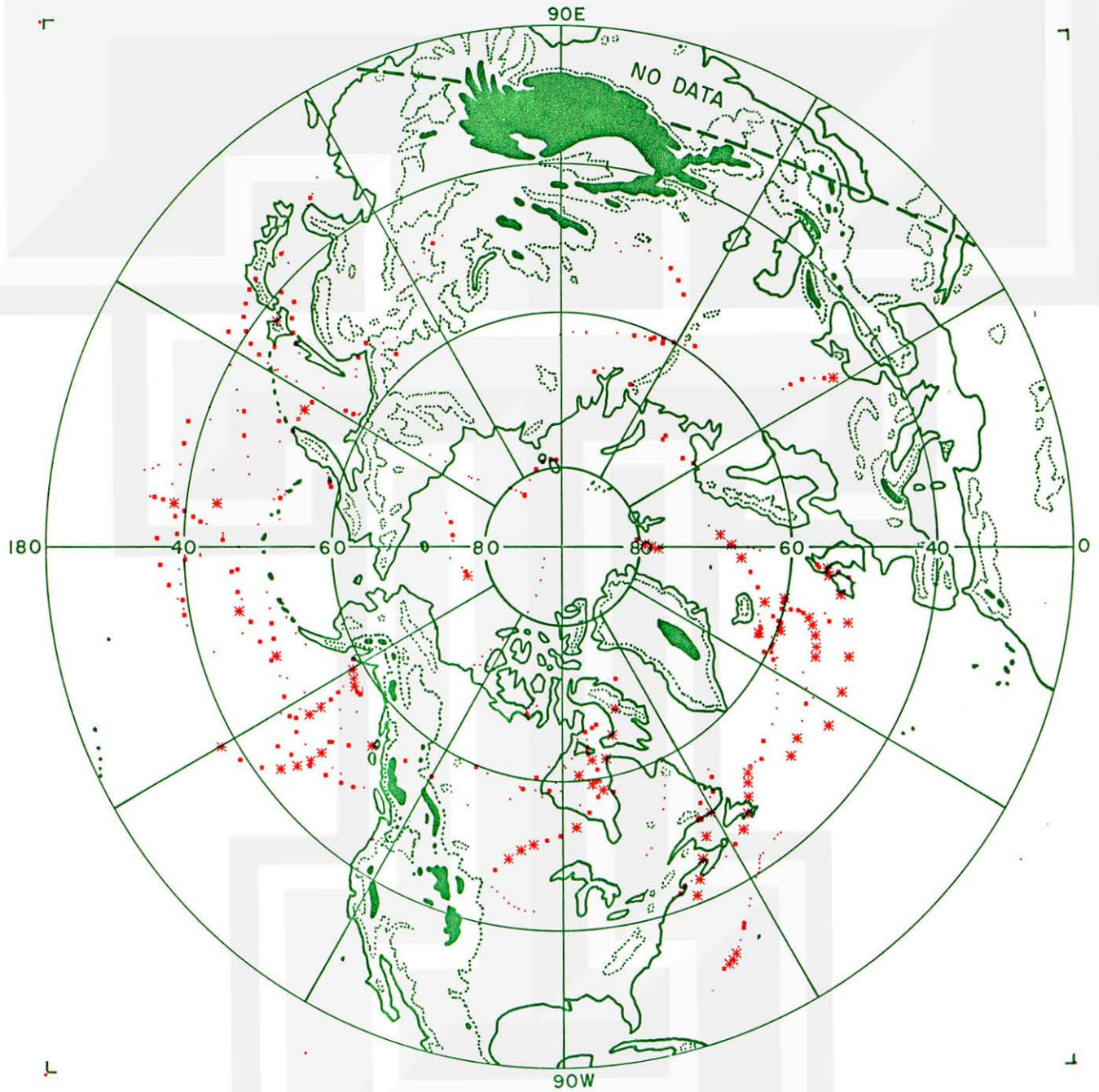
CYCLONE DEEPENING

AUG 81



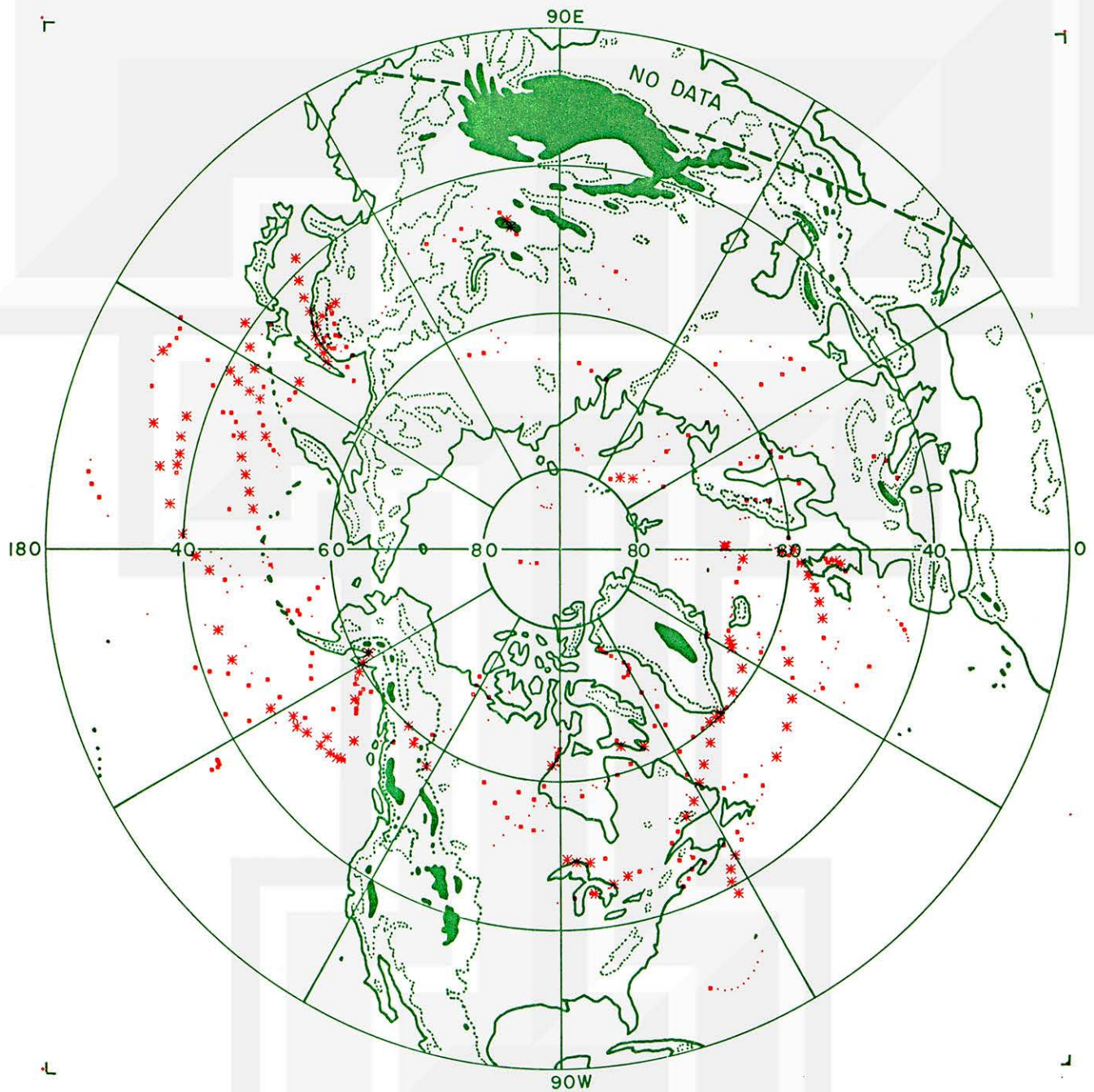
CYCLONE DEEPENING

SEP 81



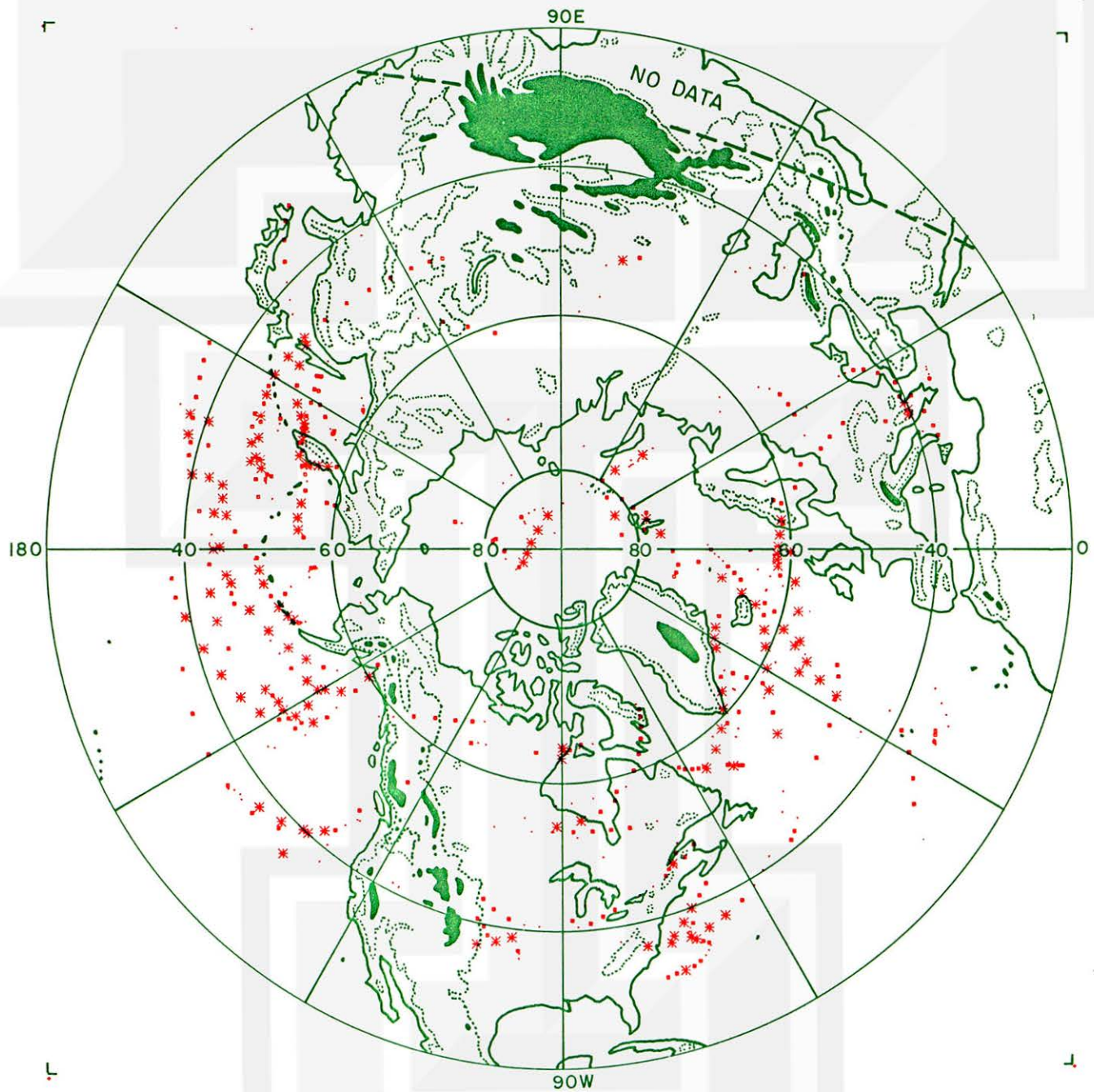
CYCLONE DEEPENING

OCT 81



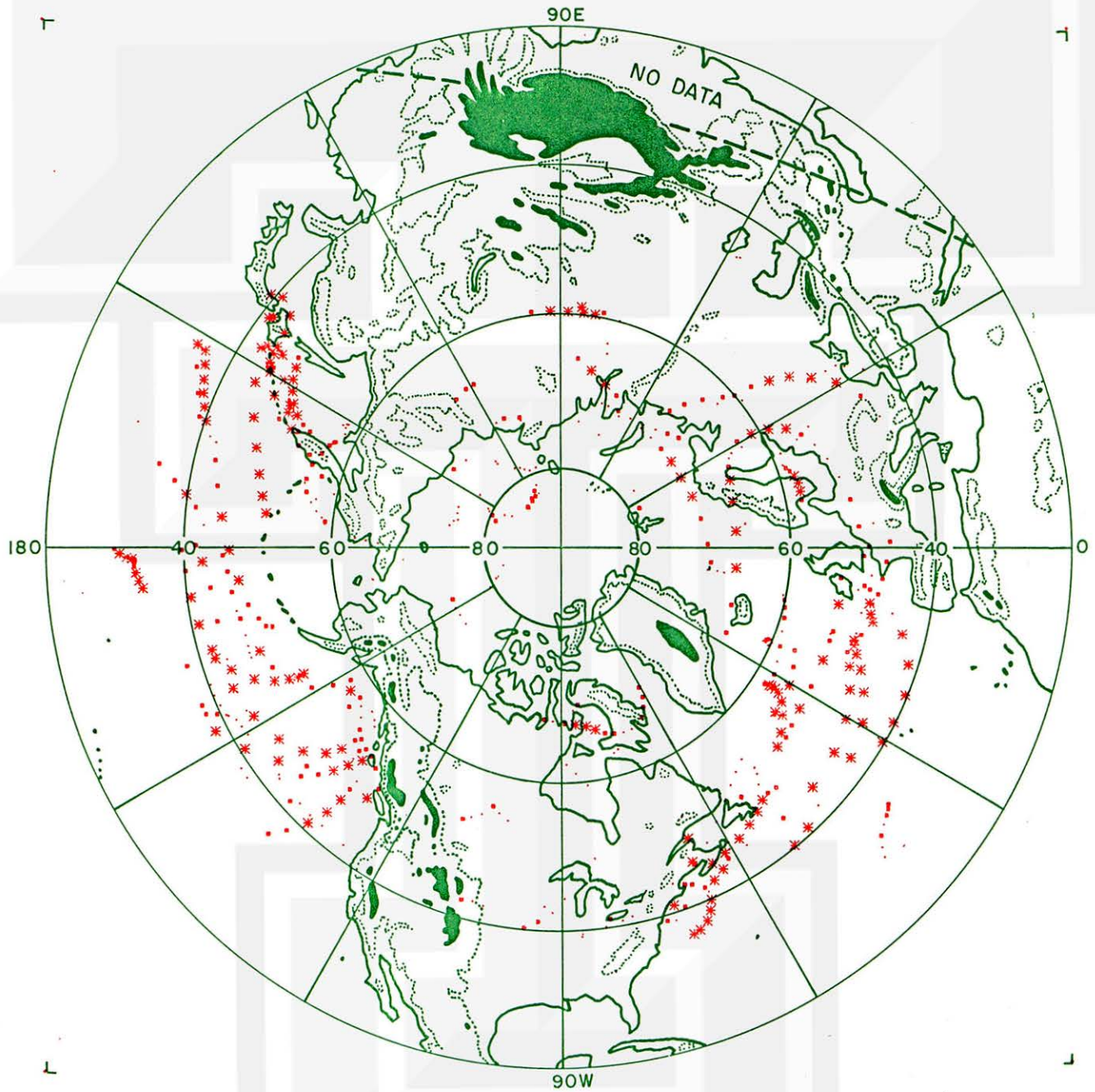
CYCLONE DEEPENING

NOV 81



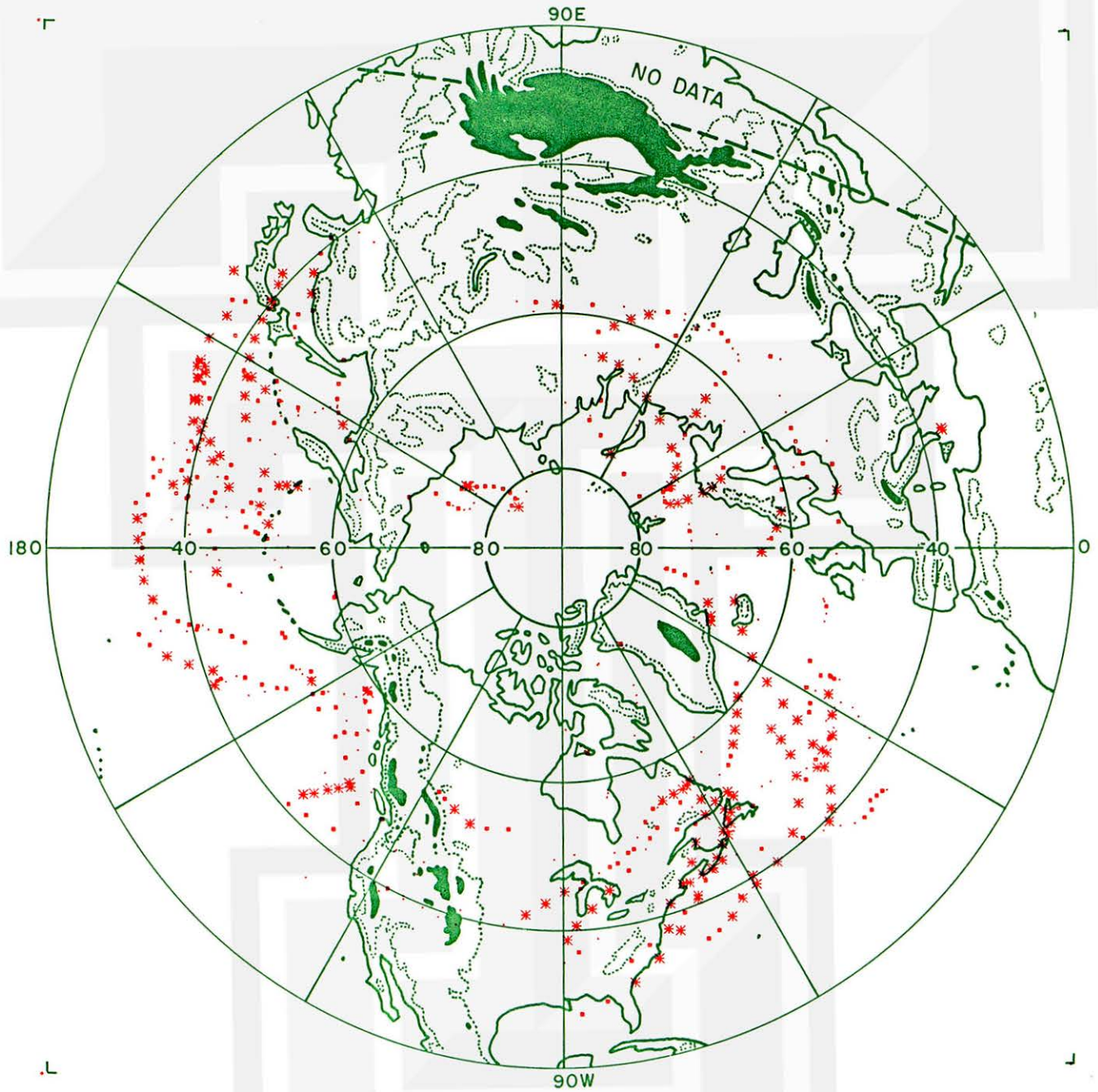
CYCLONE DEEPENING

DEC 81



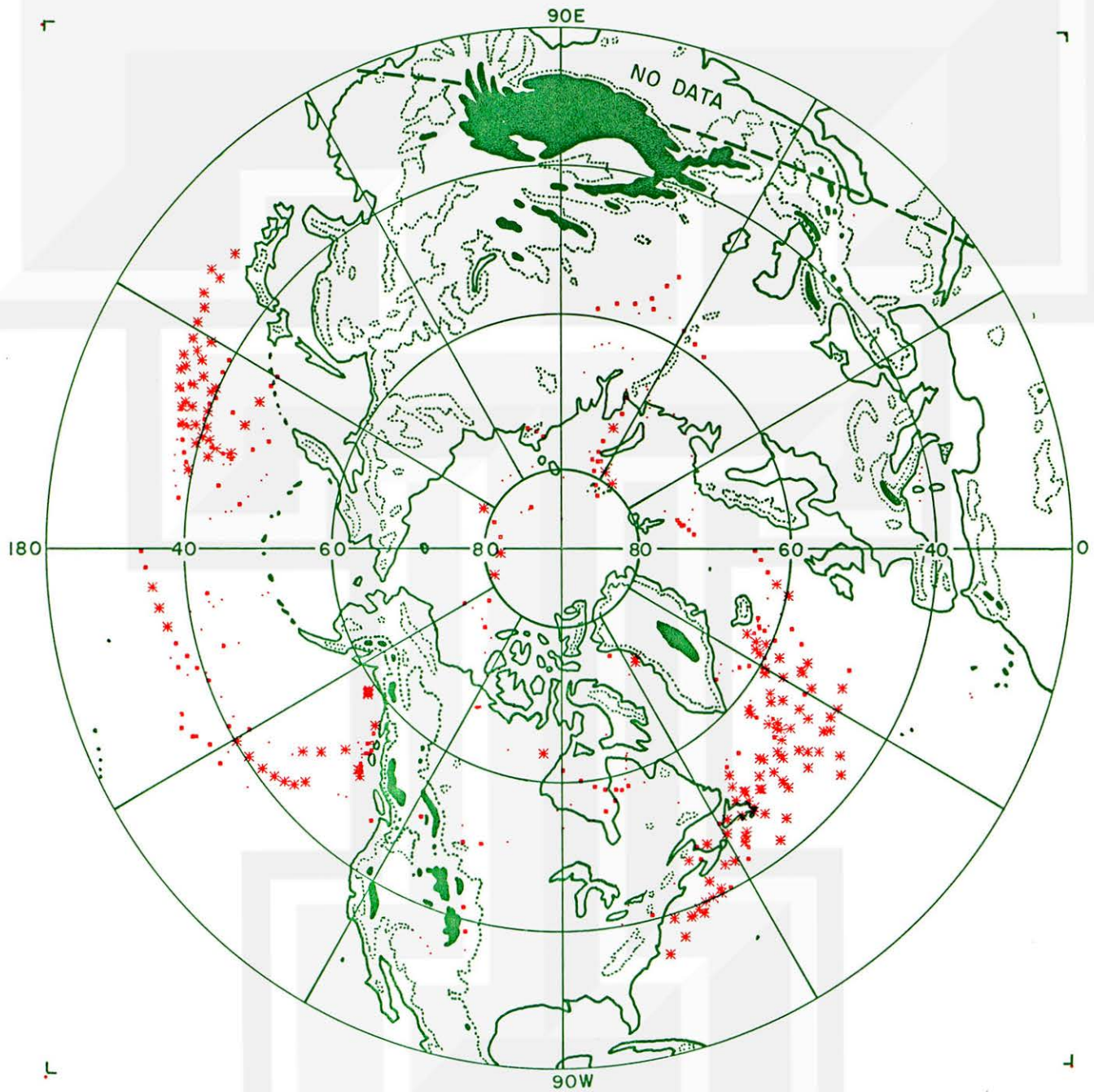
CYCLONE DEEPENING

JAN 82



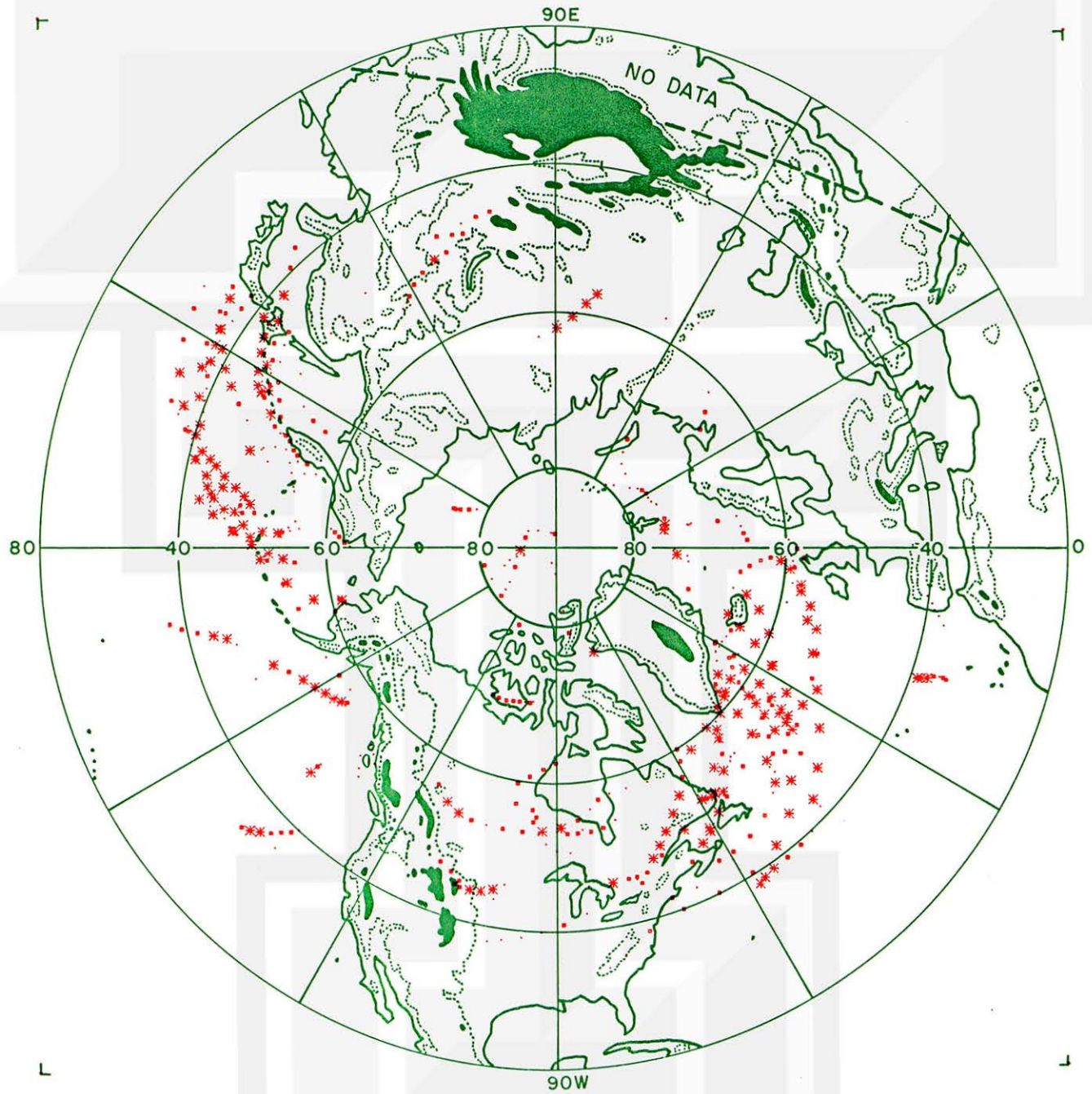
CYCLONE DEEPENING

FEB 82



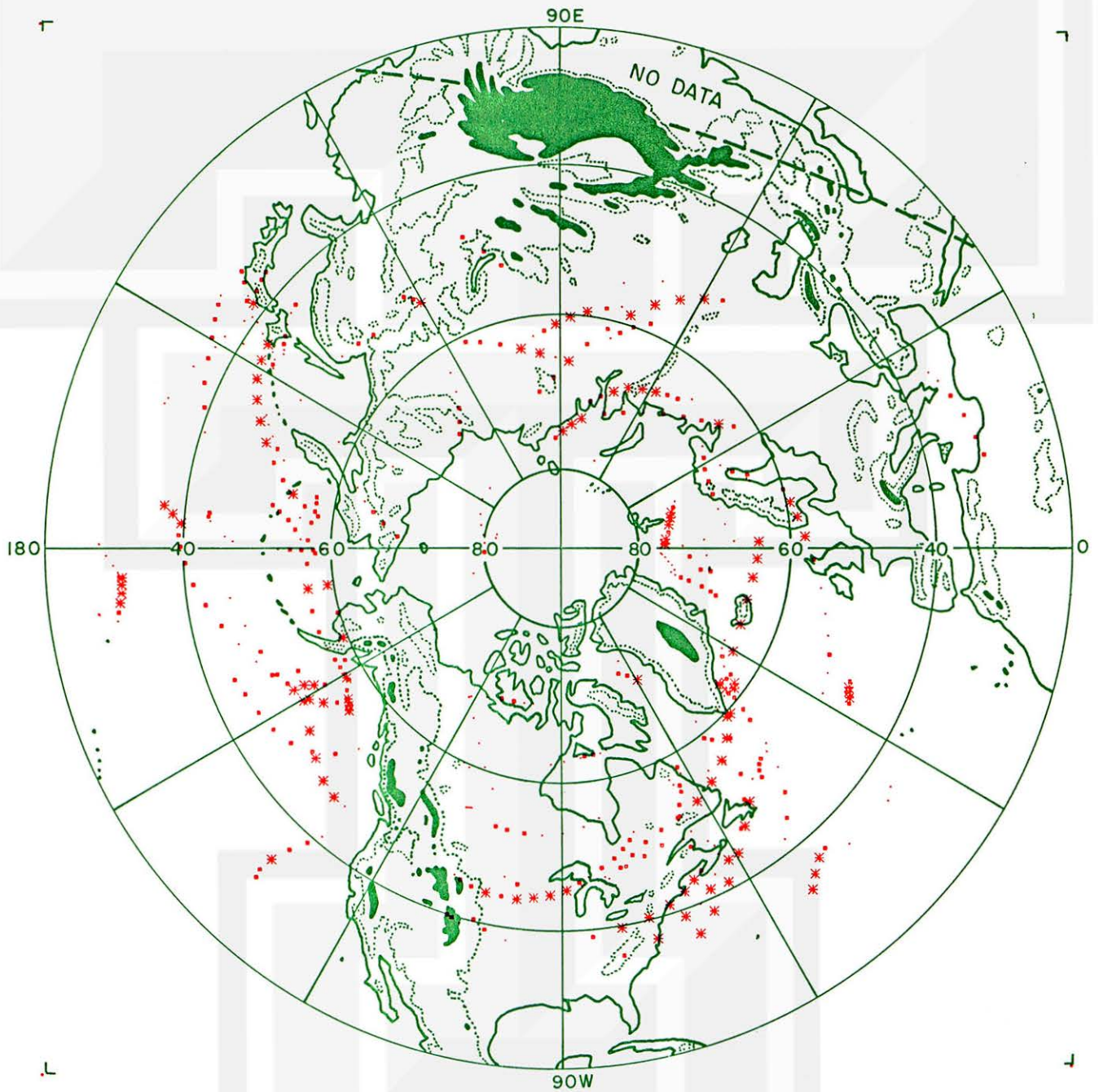
CYCLONE DEEPENING

MAR 82



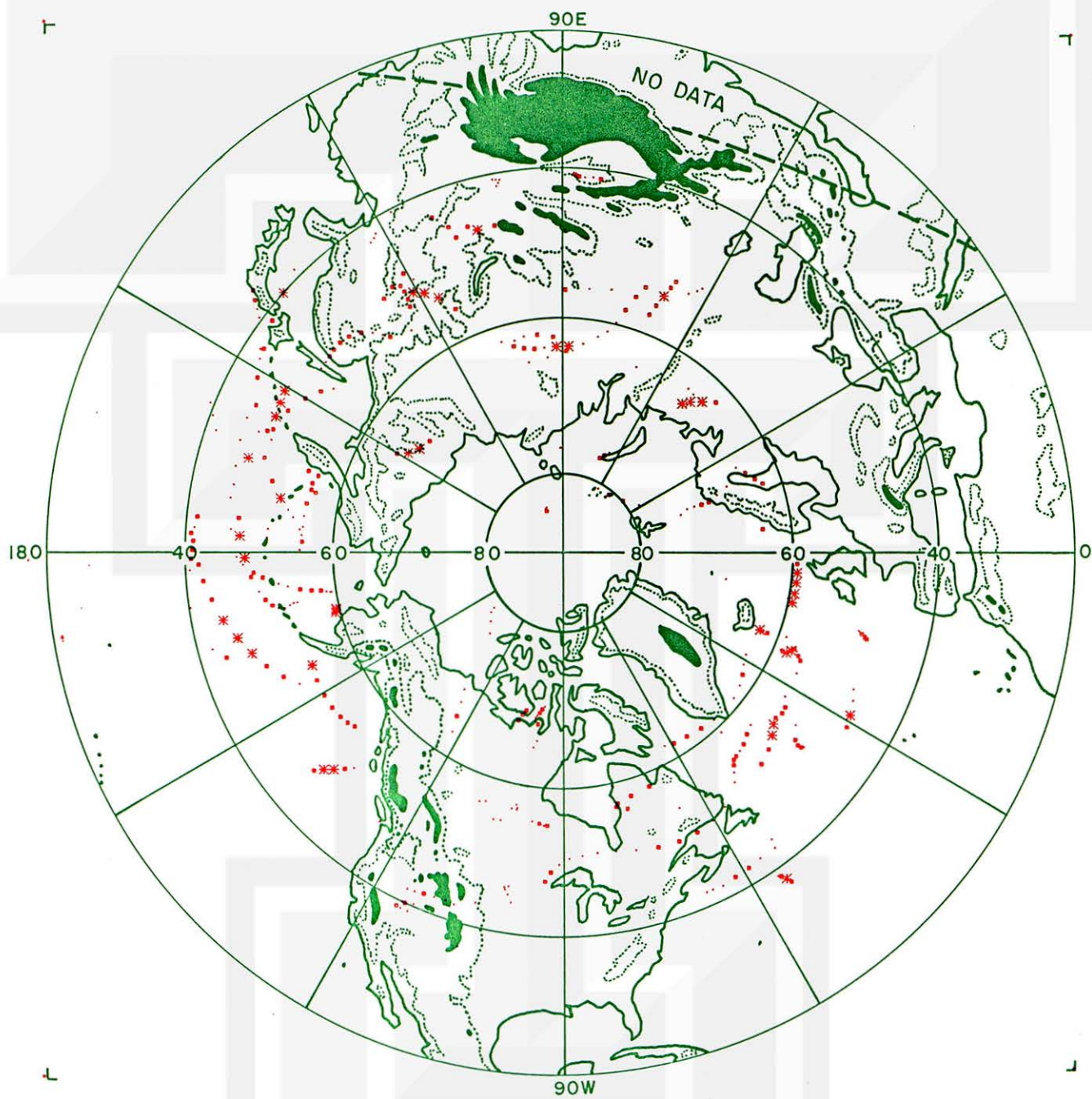
CYCLONE DEEPENING

APR 82



CYCLONE DEEPENING

MAY 82



..... 0 - 1 mb/6hrs
..... 1 - 3 mb/6hrs
* * * 3 mb/6hrs or larger

5. DISTRIBUTION BY PRESSURE FILLING (+PD)

1 ANNUAL MAP

4 SEASONAL MAPS

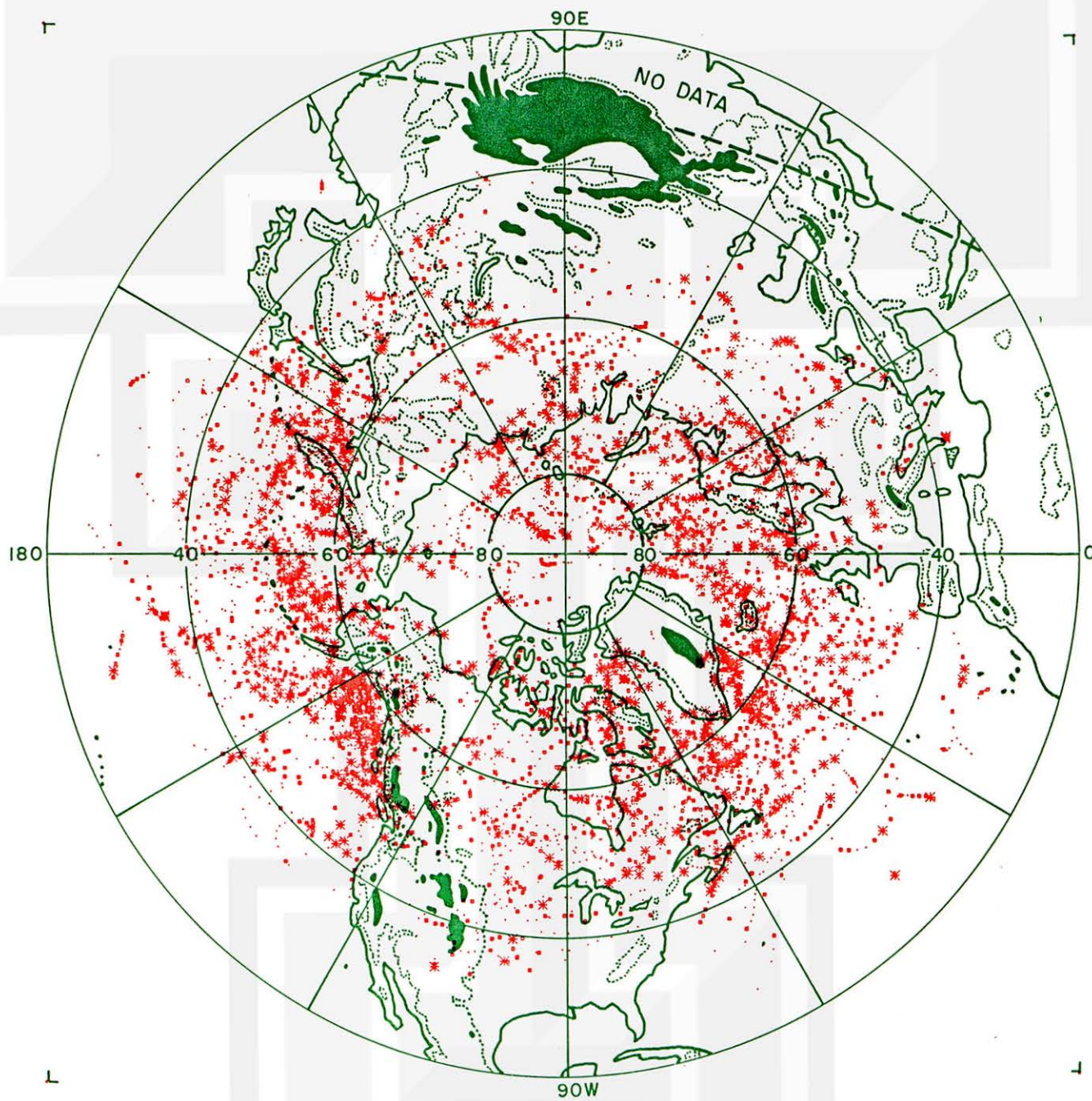
Summer 1981
Autumn 1981
Winter 1981-82
Spring 1982

12 MONTHLY MAPS

June-December 1981
January-May 1982

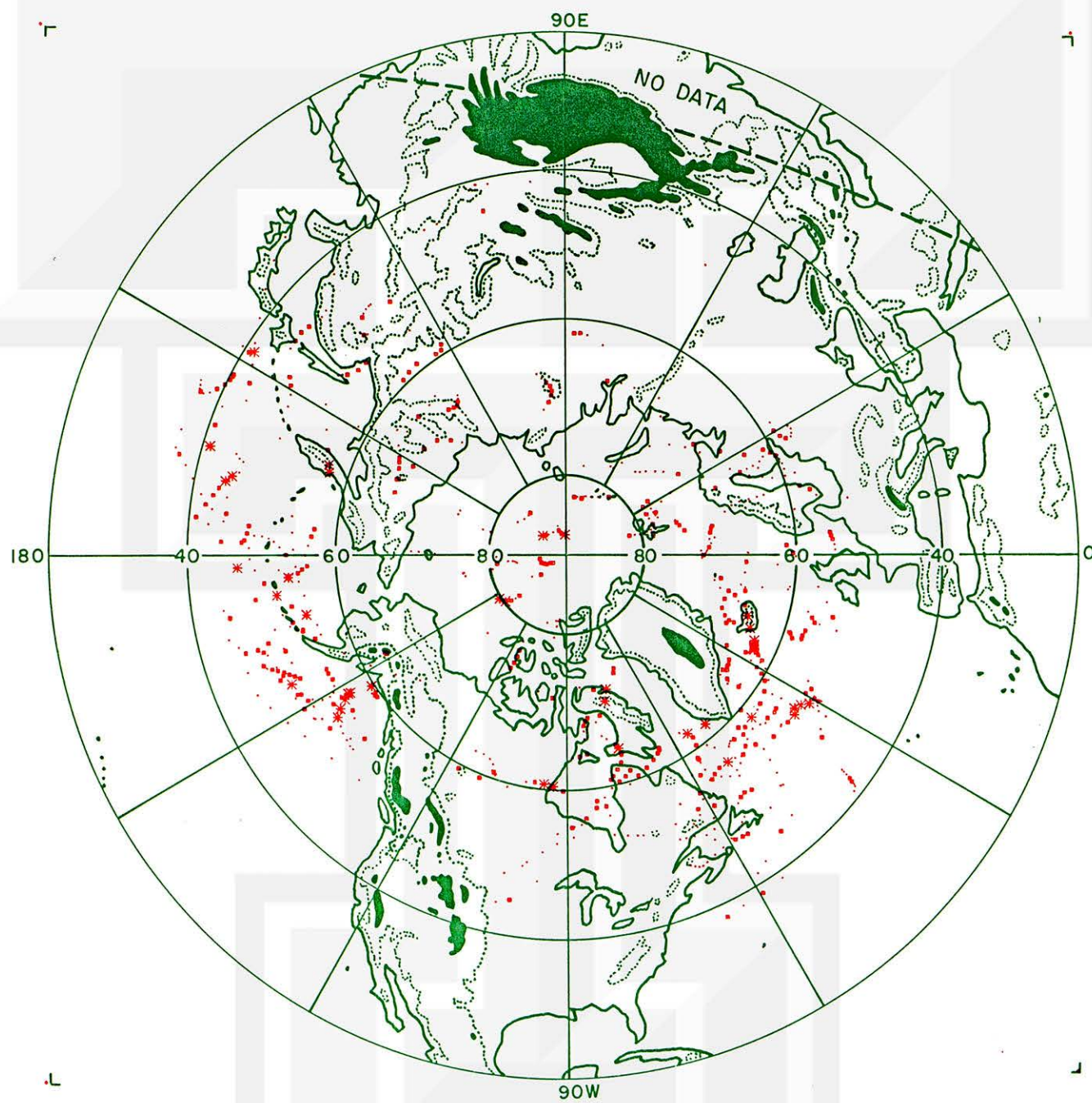


CYCLONE FILLING
12 MOS JUN 81 - MAY 82



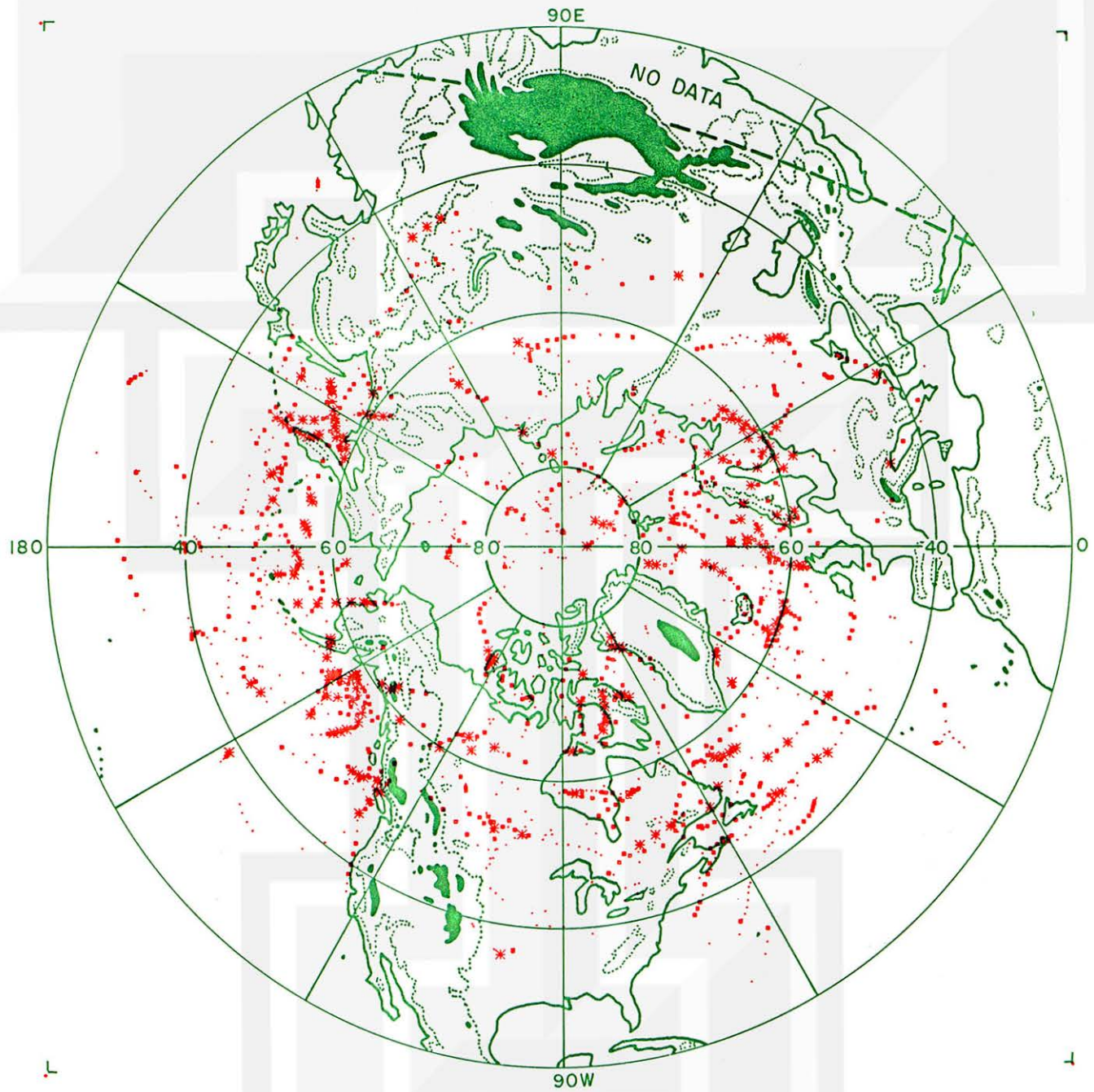
CYCLONE FILLING

SUMMER 1981

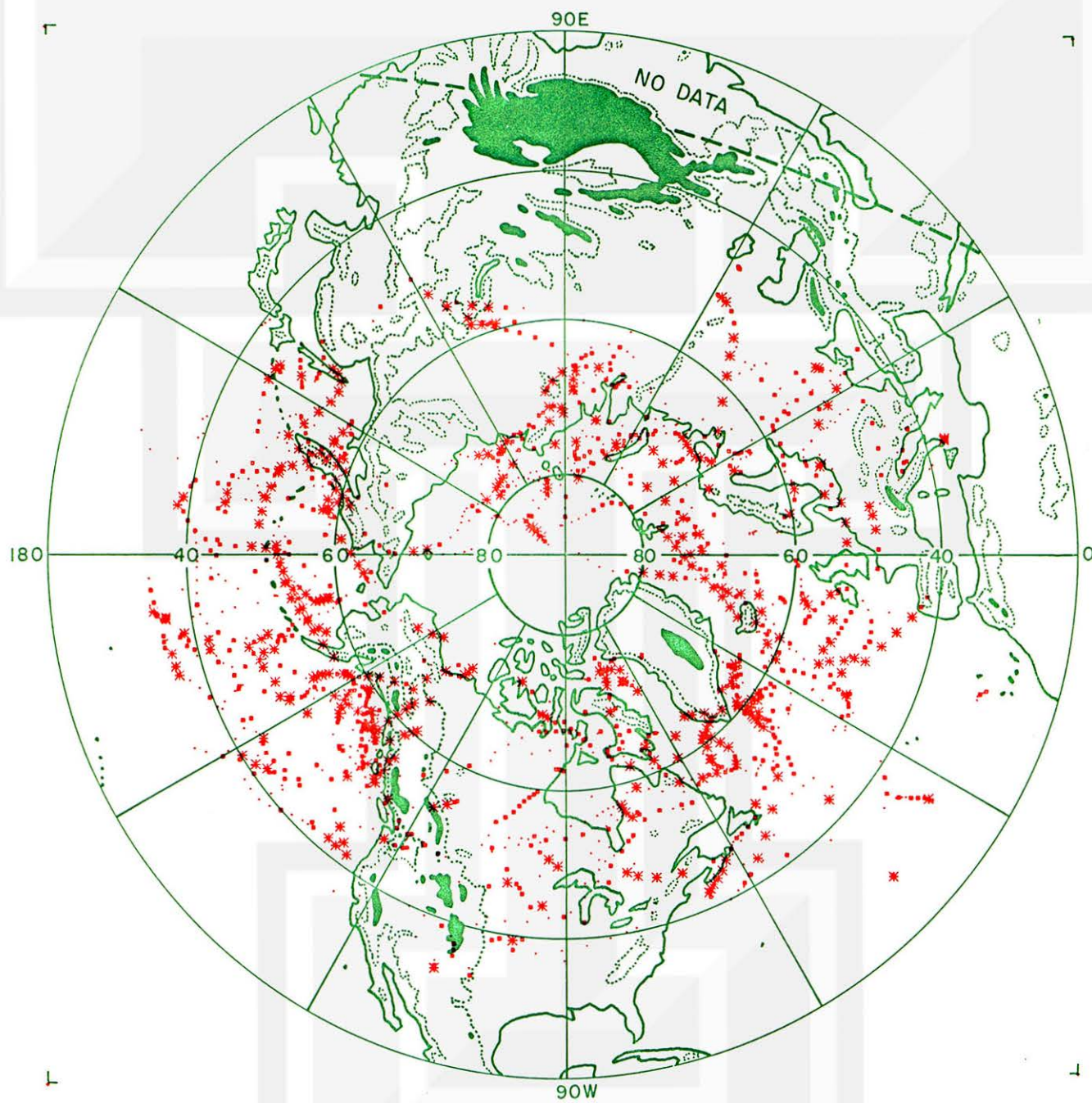


CYCLONE FILLING

AUTUMN 1981

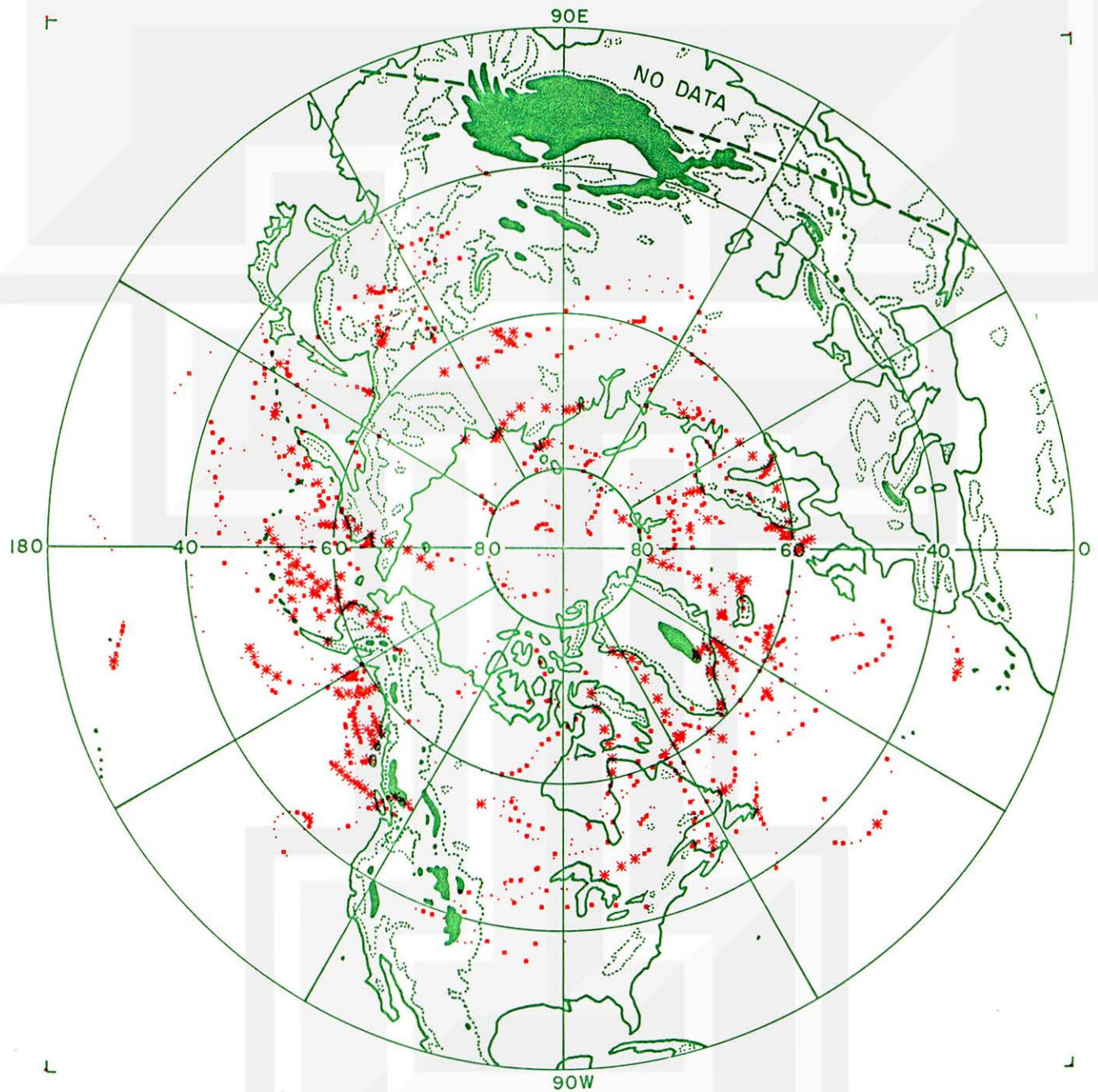


CYCLONE FILLING
WINTER 1981 - 82



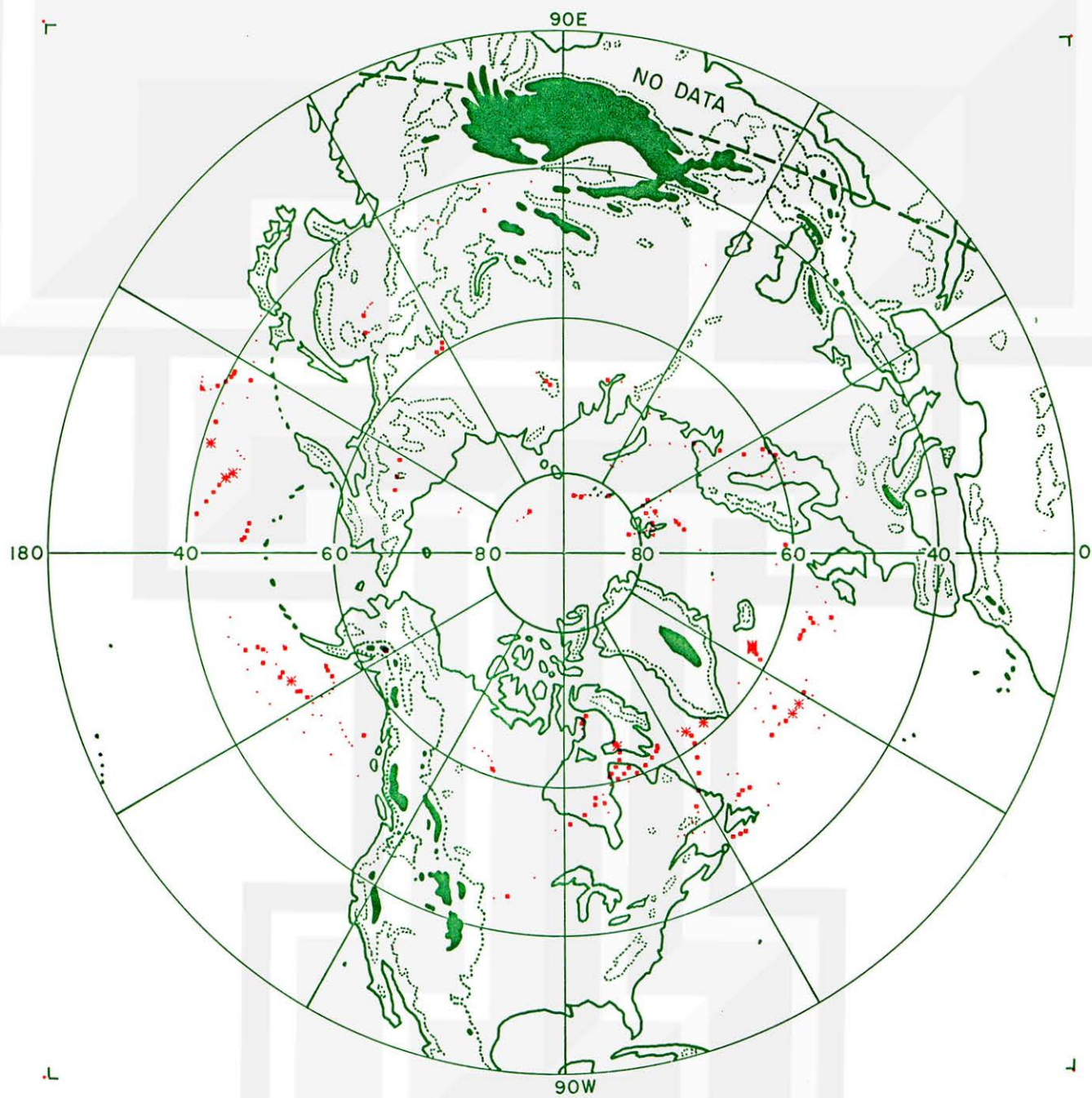
CYCLONE FILLING

SPRING 1982



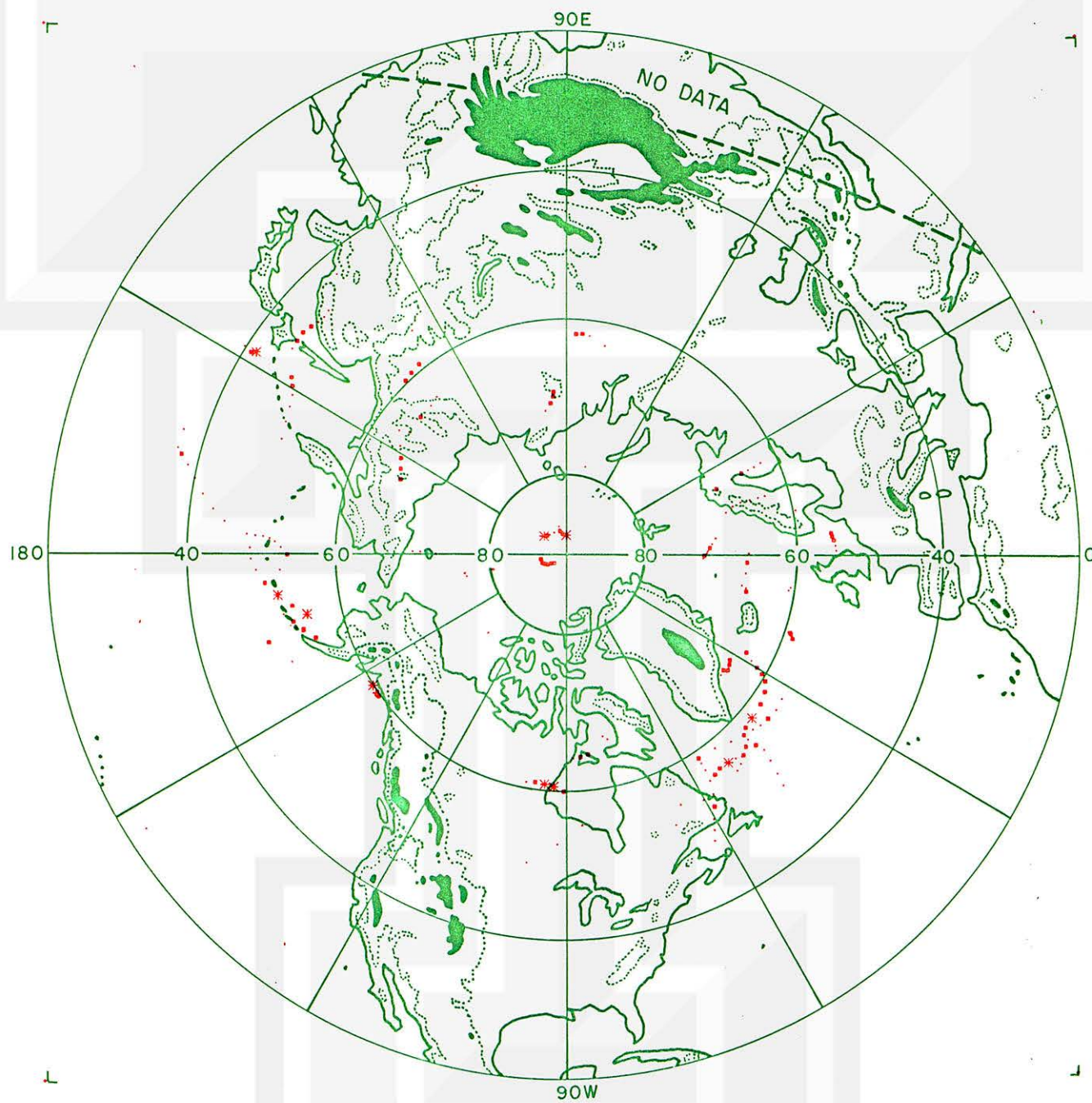
CYCLONE FILLING

JUN 81



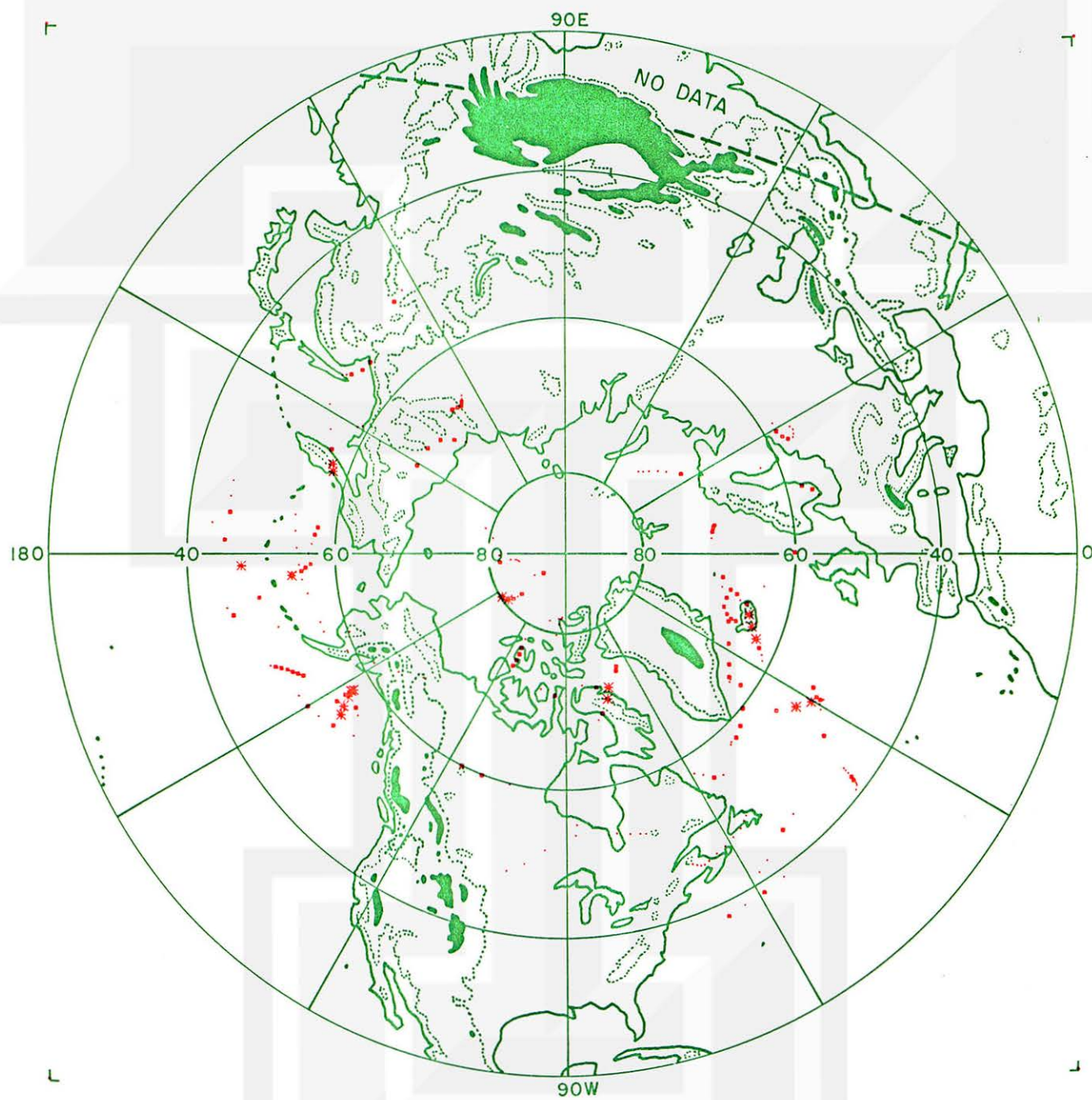
CYCLONE FILLING

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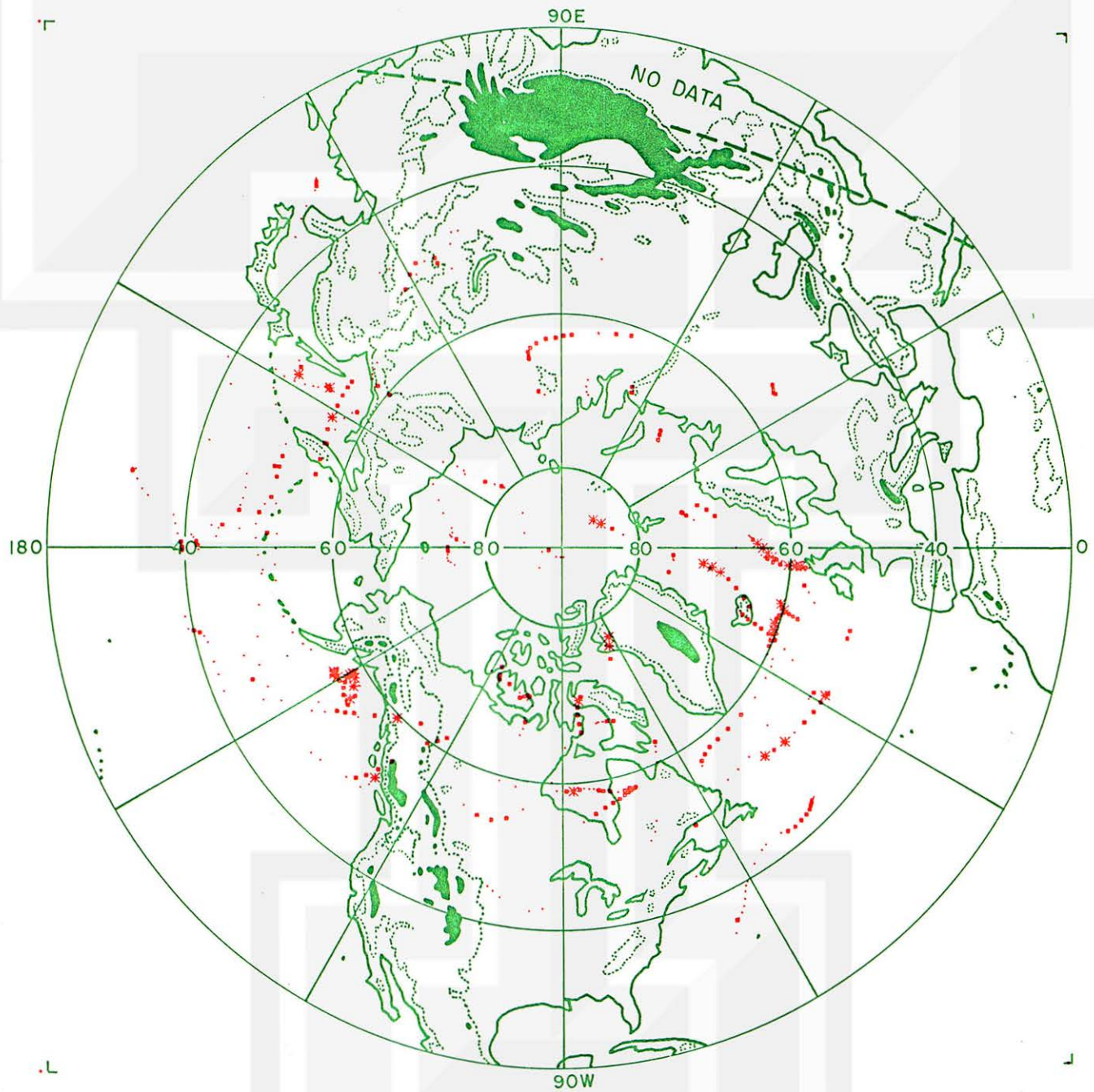
CYCLONE FILLING

AUG 81



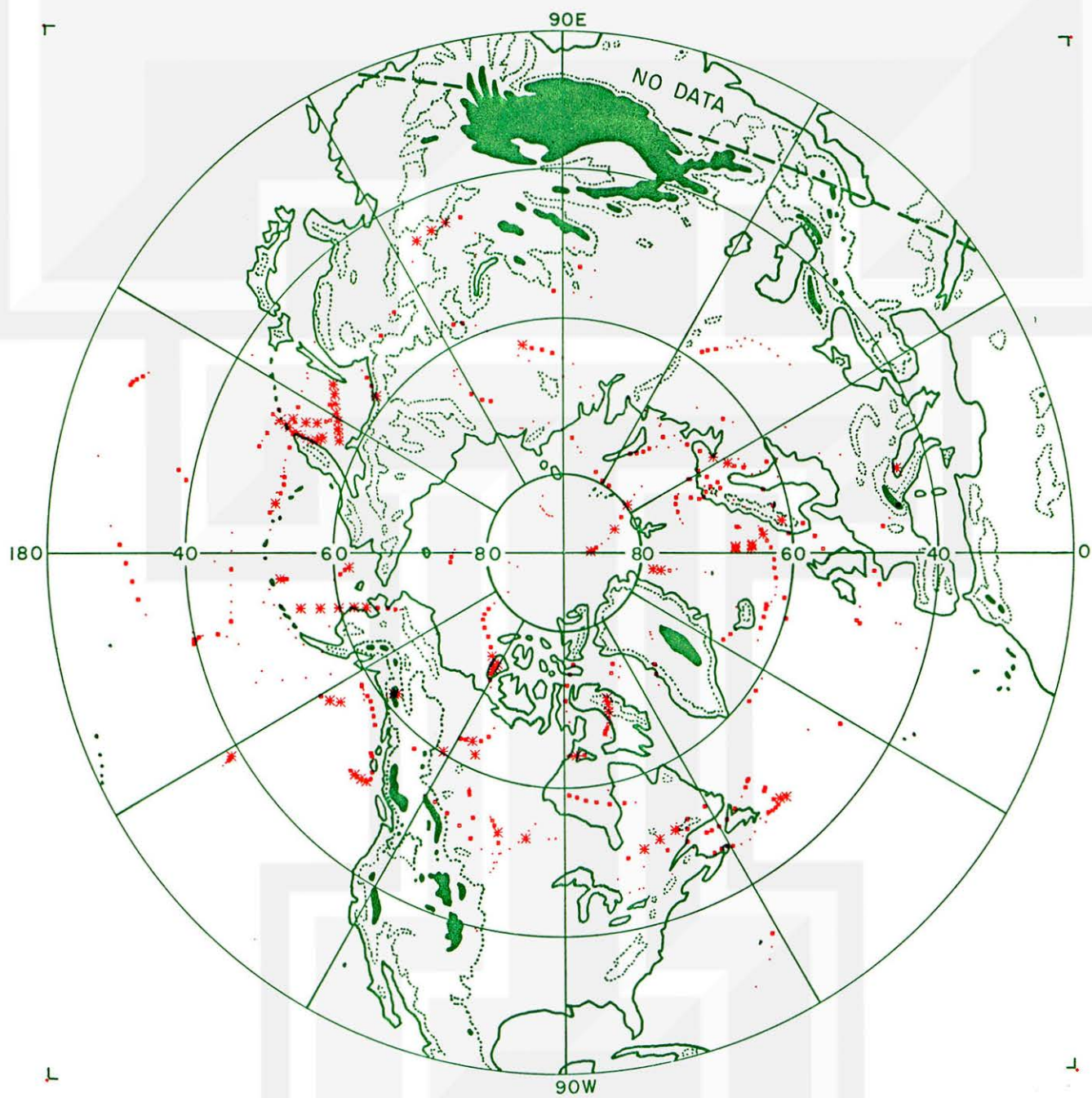
CYCLONE FILLING

SEP 81



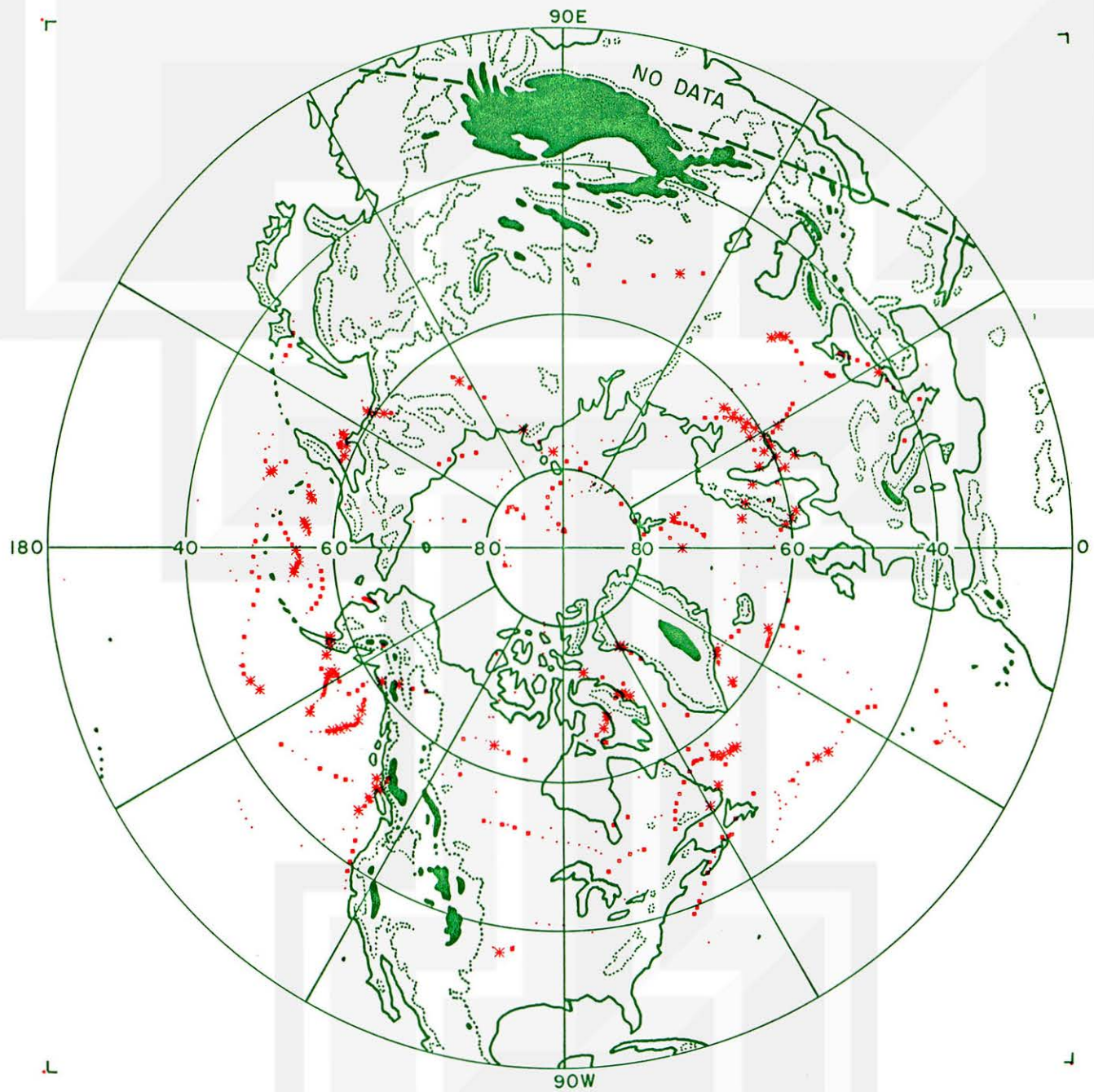
CYCLONE FILLING

OCT 81



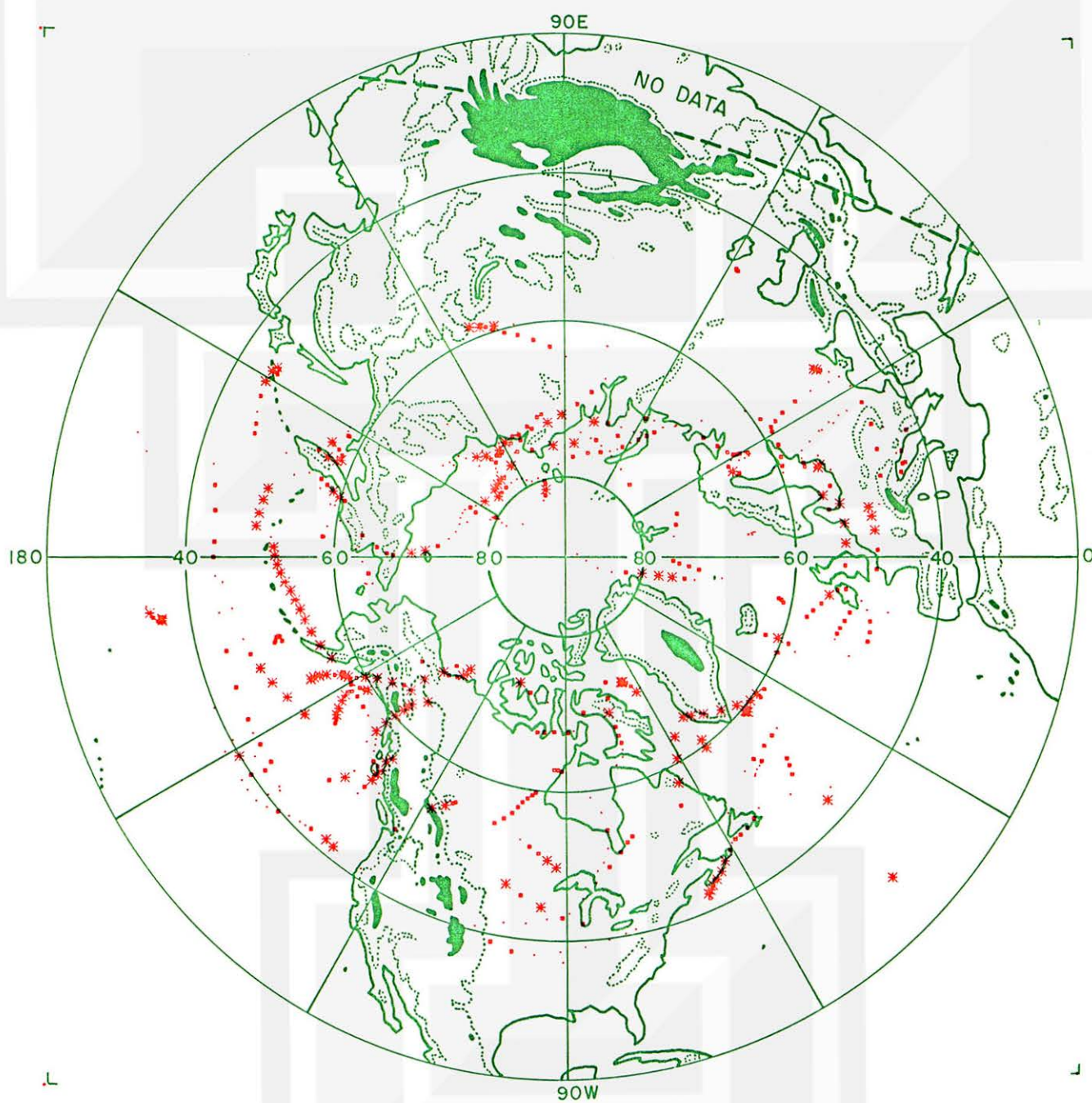
CYCLONE FILLING

NOV 81



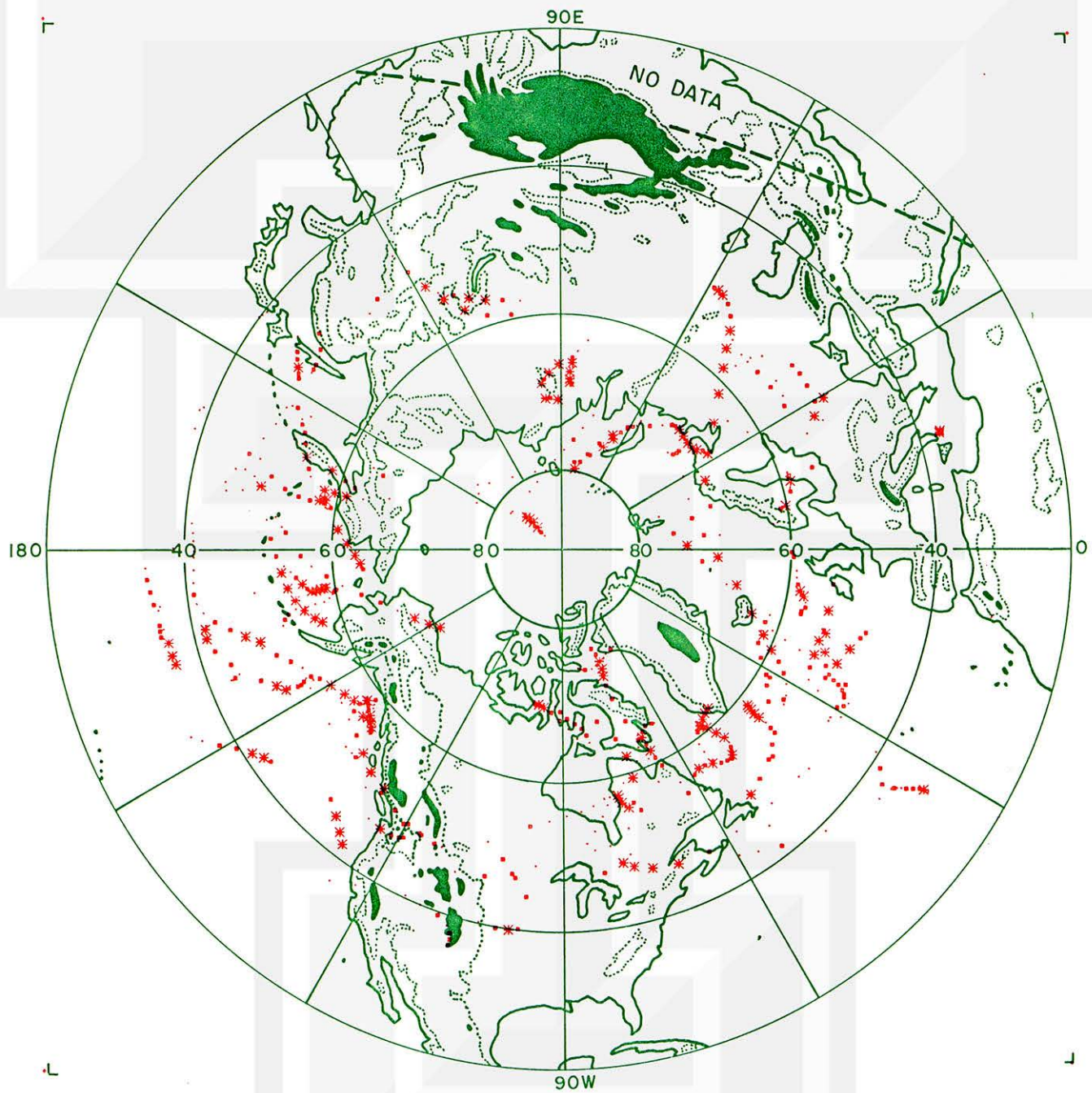
CYCLONE FILLING

DEC 81



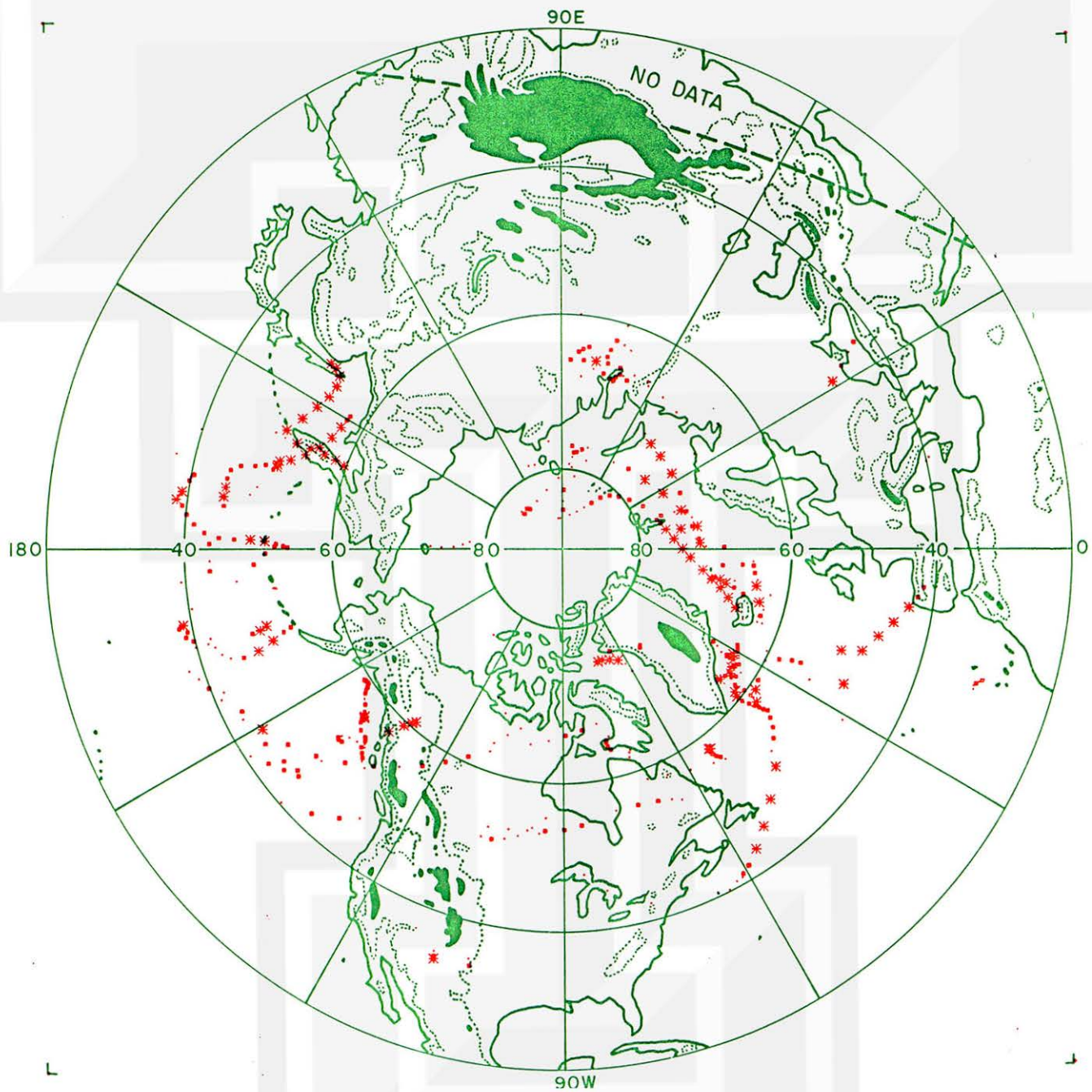
CYCLONE FILLING

JAN 82



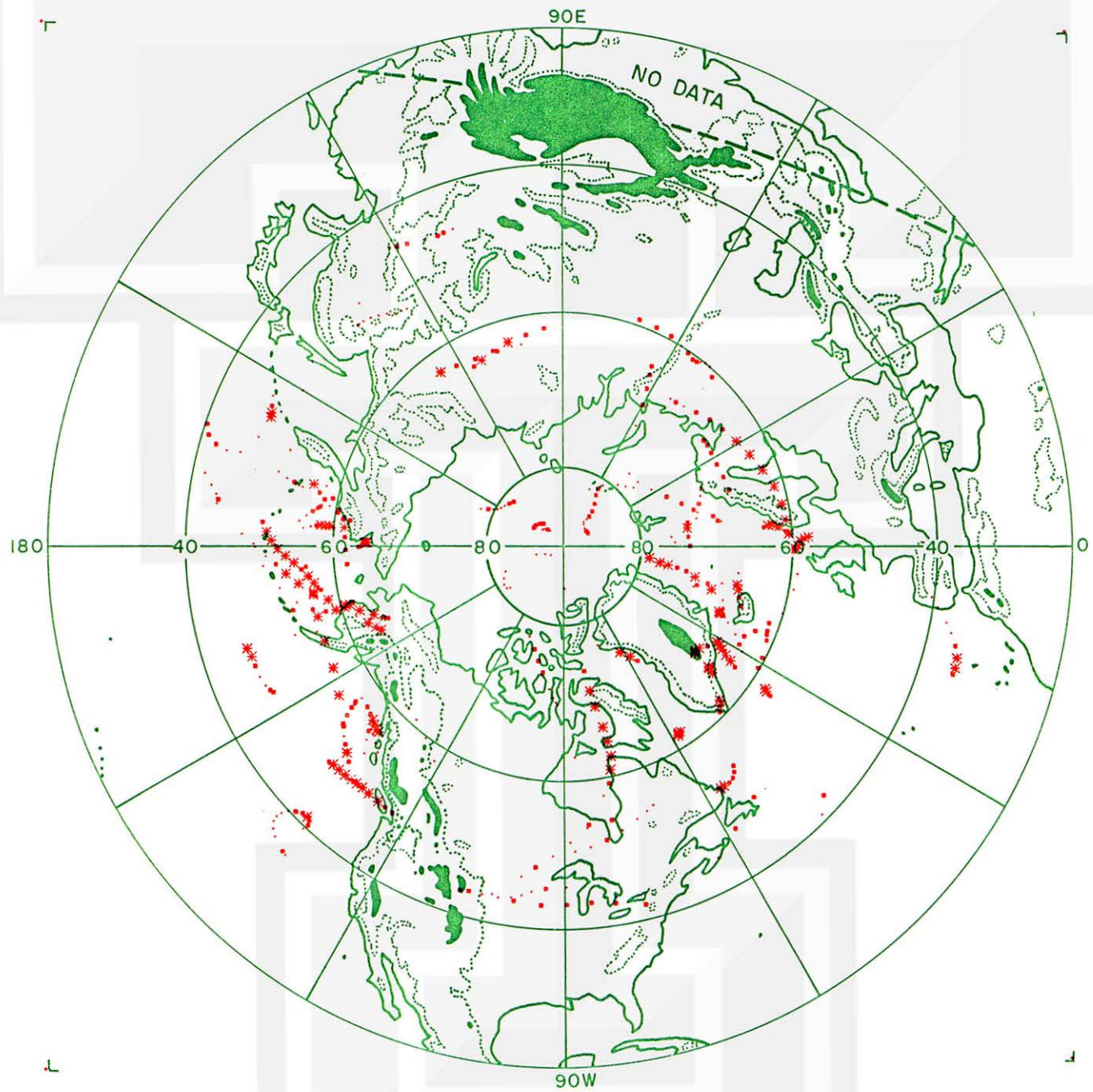
CYCLONE FILLING

FEB 82



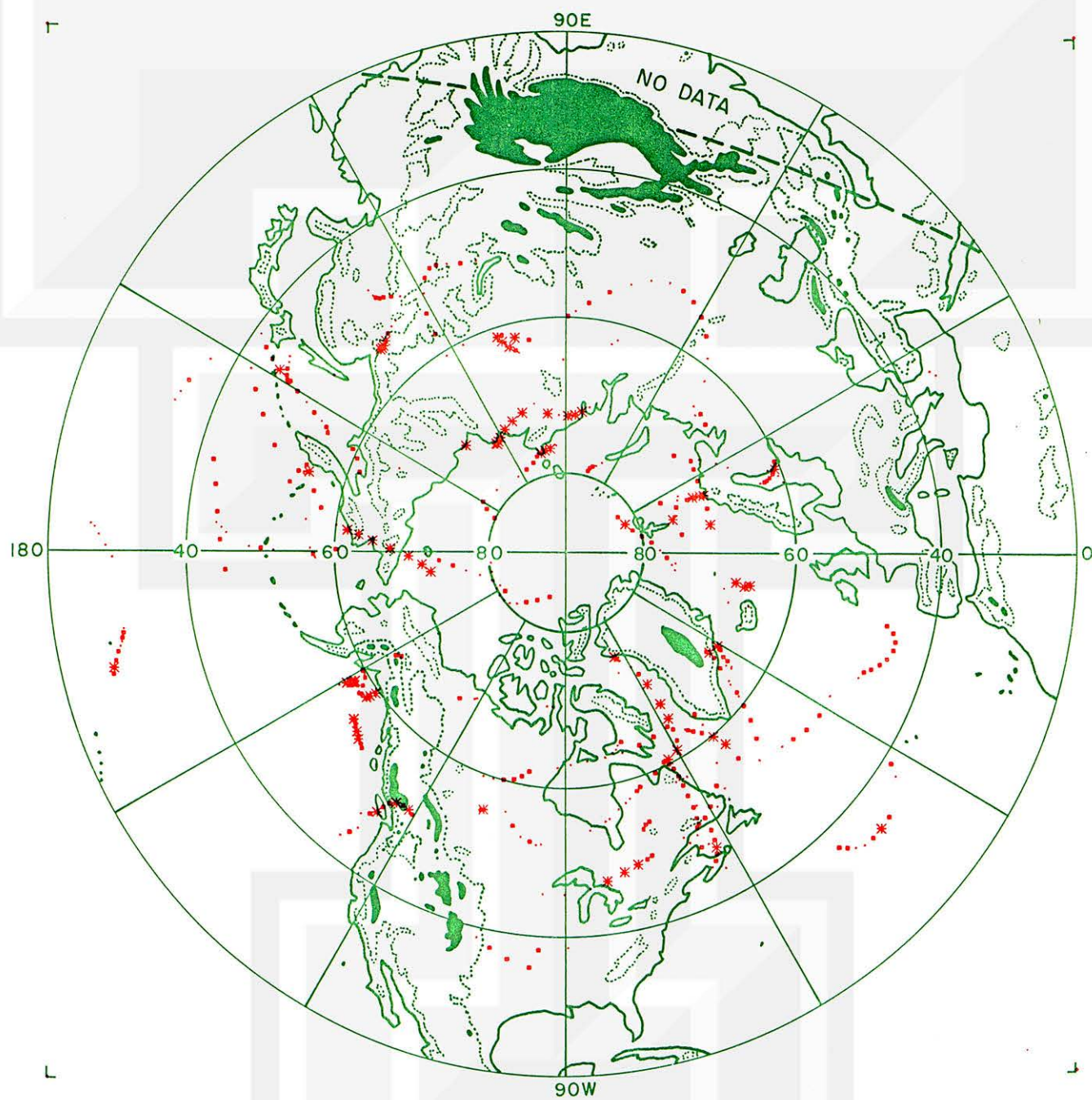
CYCLONE FILLING

MAR 82



CYCLONE FILLING

APR 82



CYCLONE FILLING

MAY 82

