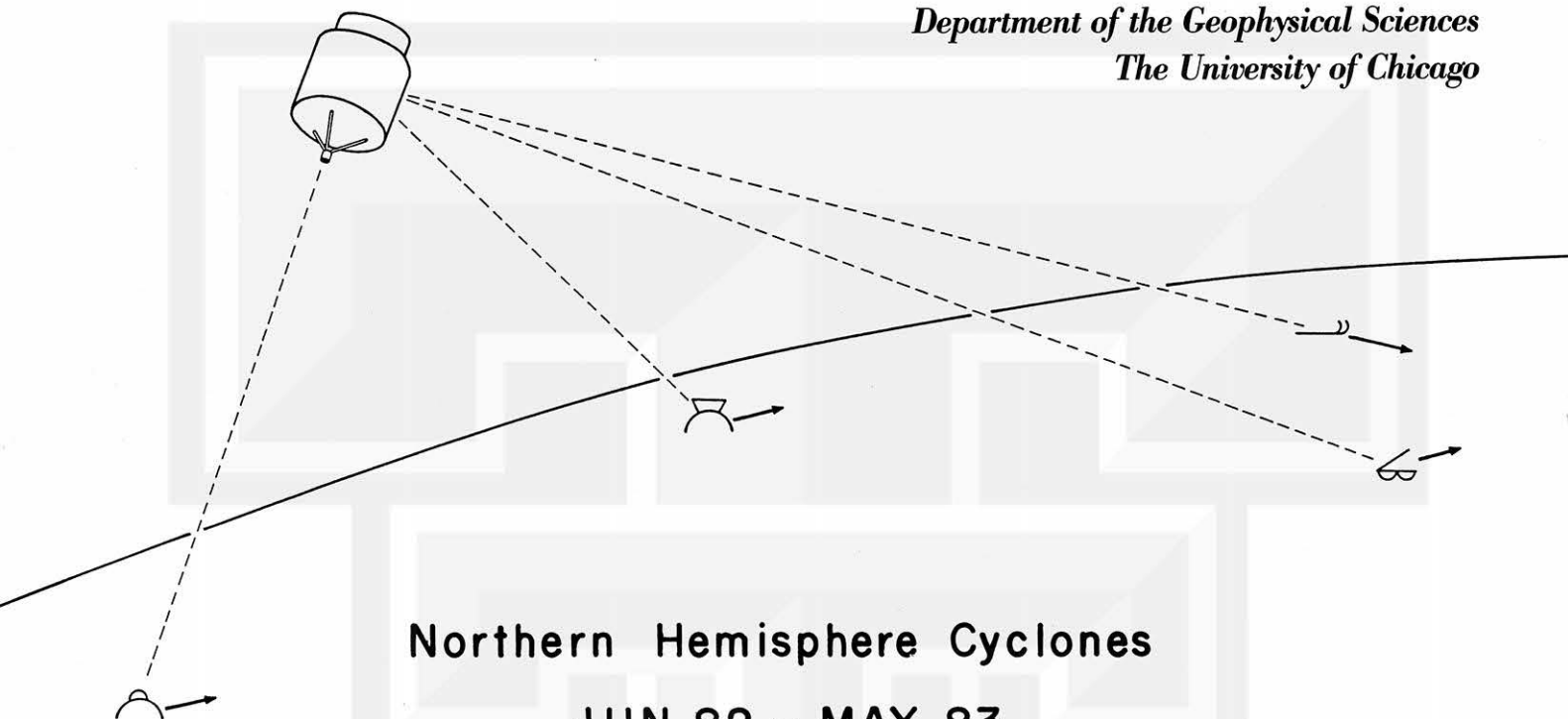


WIND RESEARCH LABORATORY

*Department of the Geophysical Sciences
The University of Chicago*

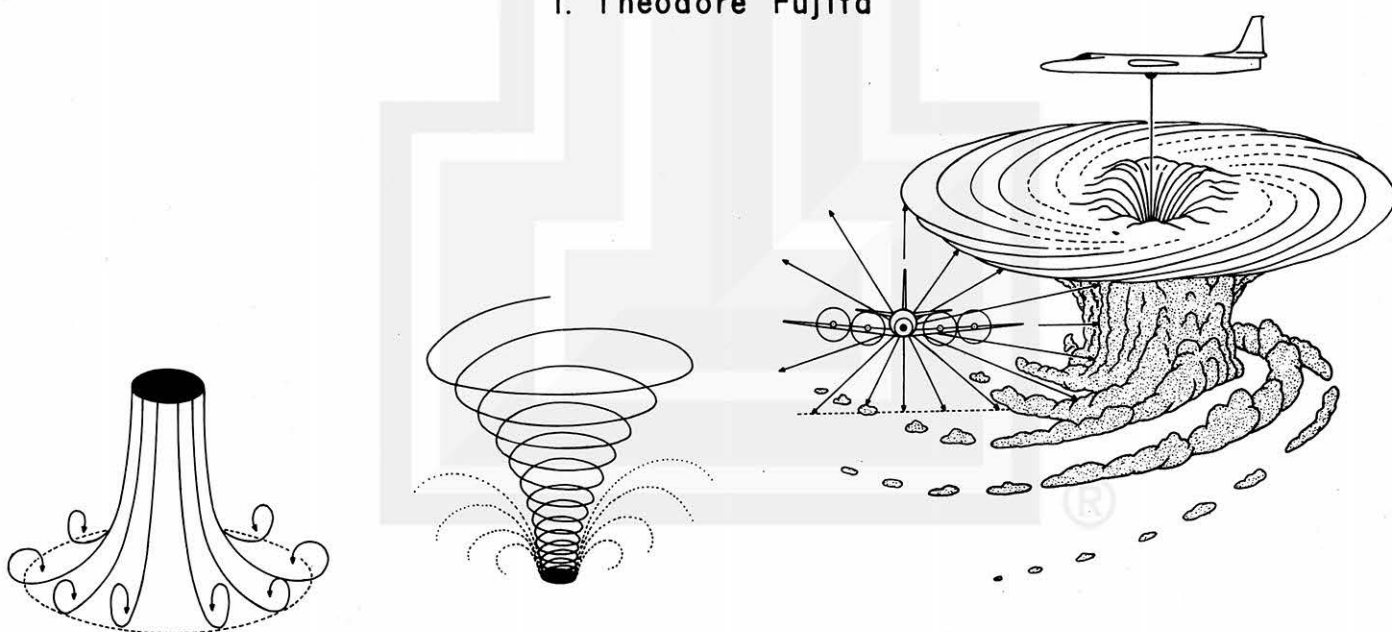


Northern Hemisphere Cyclones

JUN 82 - MAY 83

by

T. Theodore Fujita



WRL Research Paper 224 MAY 1988

WRL was formerly SMRP (1961-1987)

W R L RESEARCH PAPER No. 224

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 1982 - May 1983

(Statistical Maps of Cyclone Distribution)

by
T. Theodore Fujita

Technical Report to Office of Naval Research
Marine Meteorology Program



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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

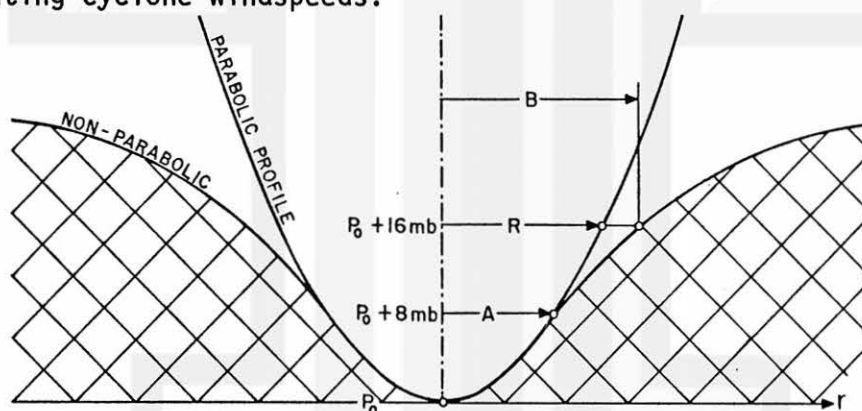
Example of Printout

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

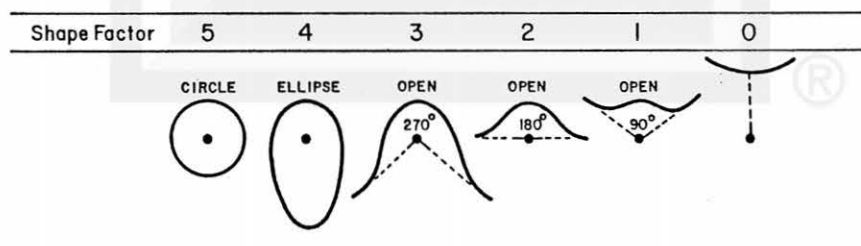
Schematic Pressure Field

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 1982

Autumn 1982

Winter 1982-83

Spring 1983

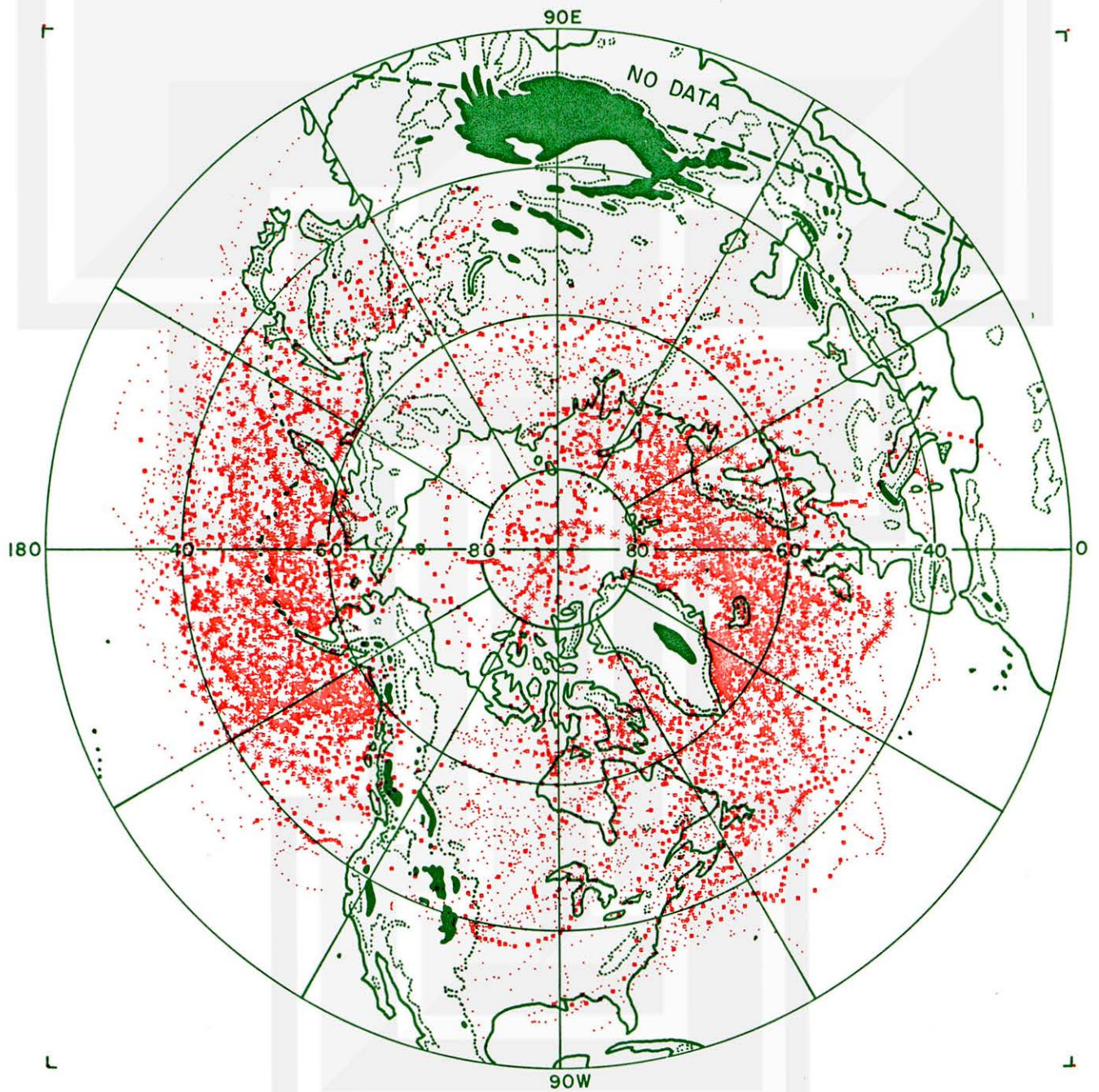
12 MONTHLY MAPS

June-December 1982

January-May 1983

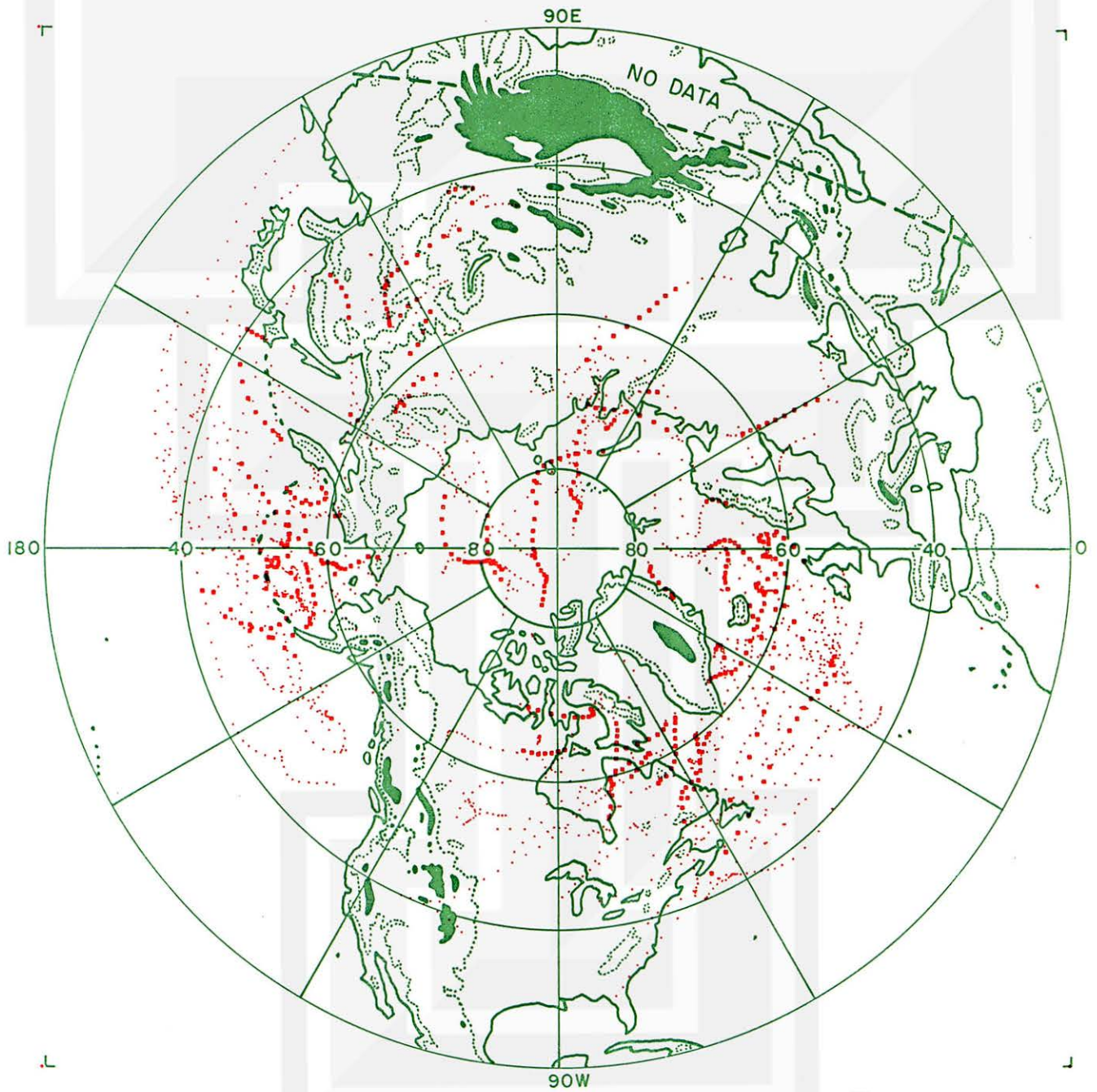


CENTRAL PRESSURE
12 MOS JUN 82 - MAY 83



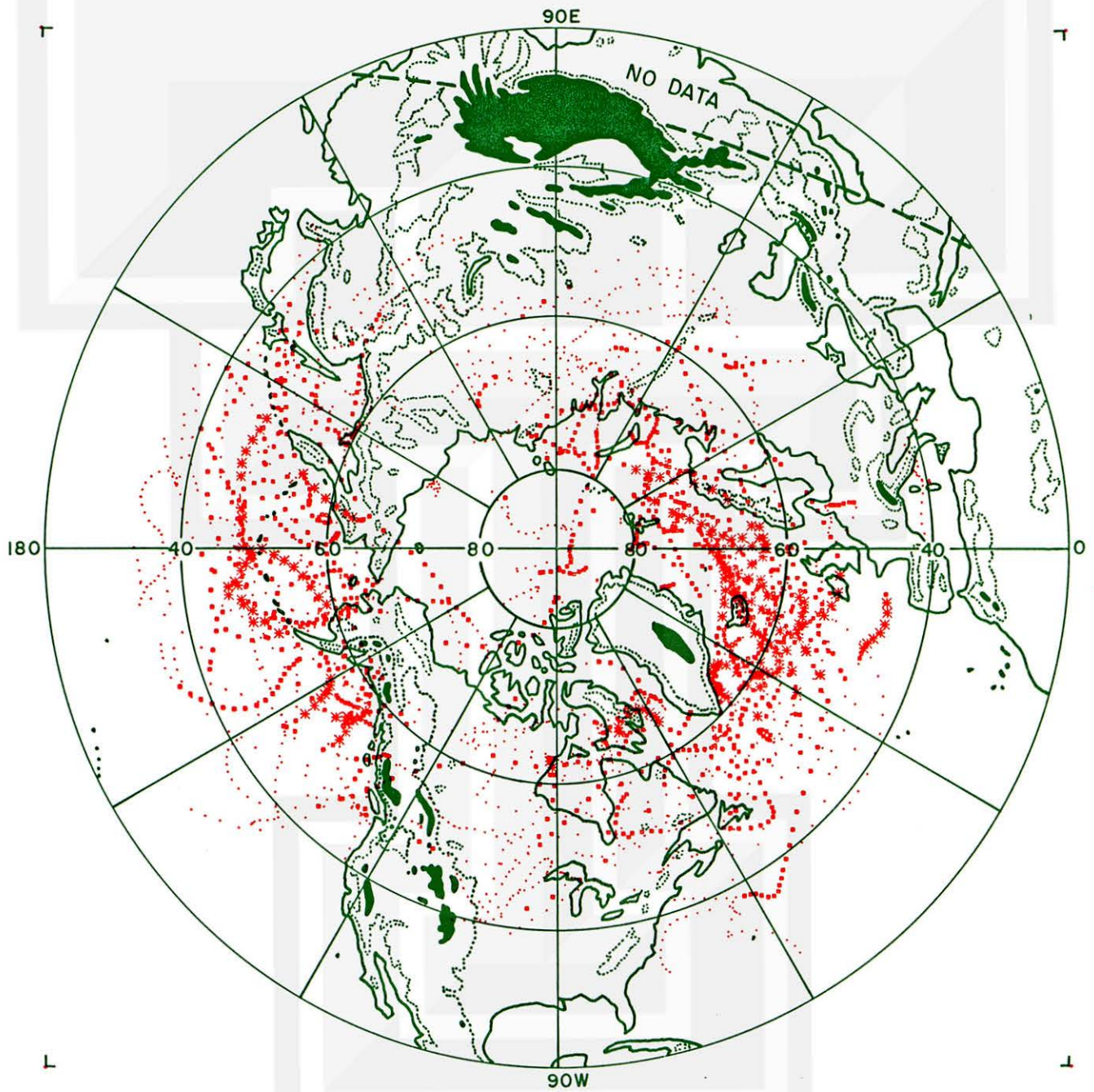
CENTRAL PRESSURE

SUMMER 1982



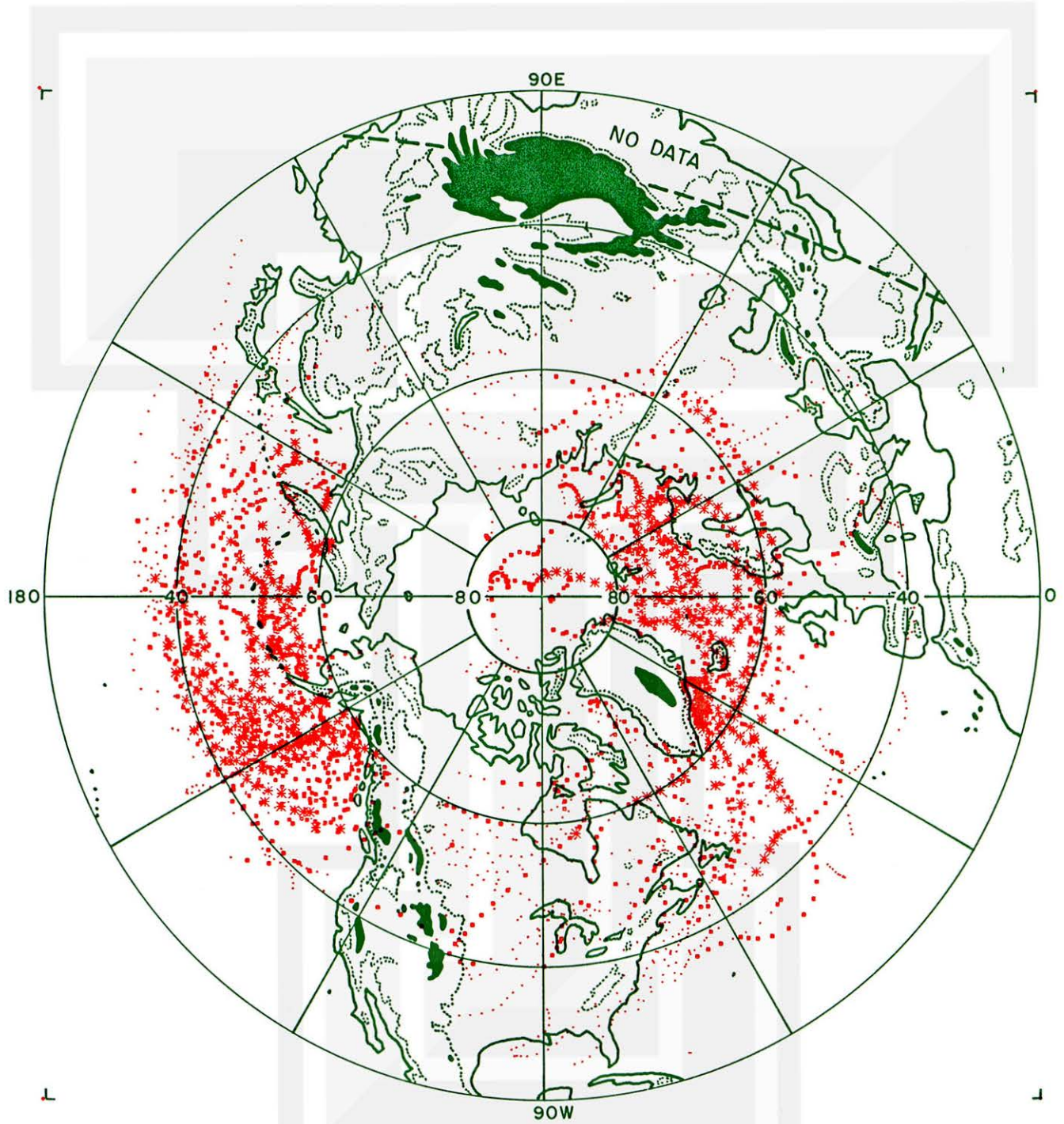
CENTRAL PRESSURE

AUTUMN 1982



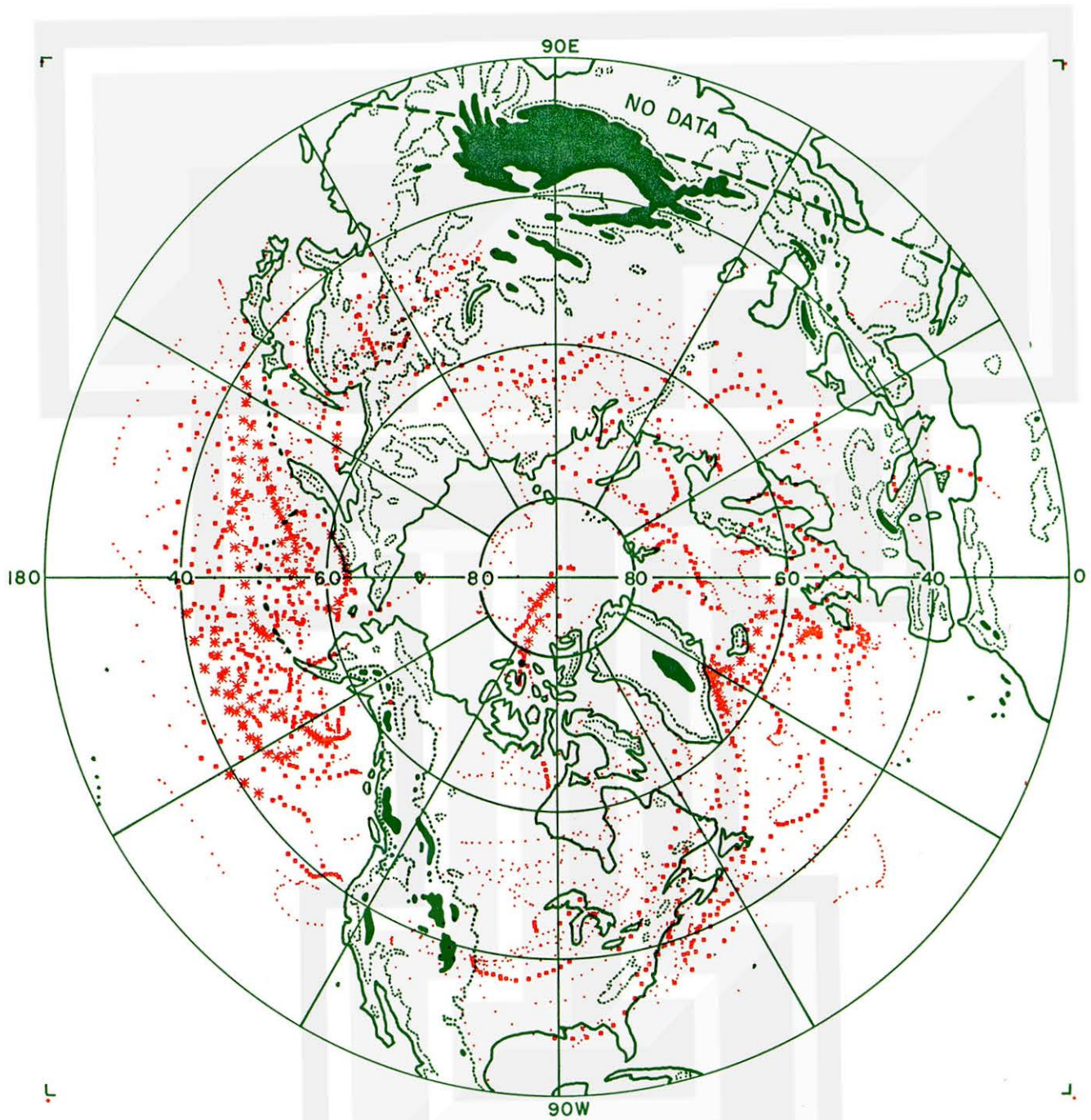
CENTRAL PRESSURE

WINTER 1982 - 83



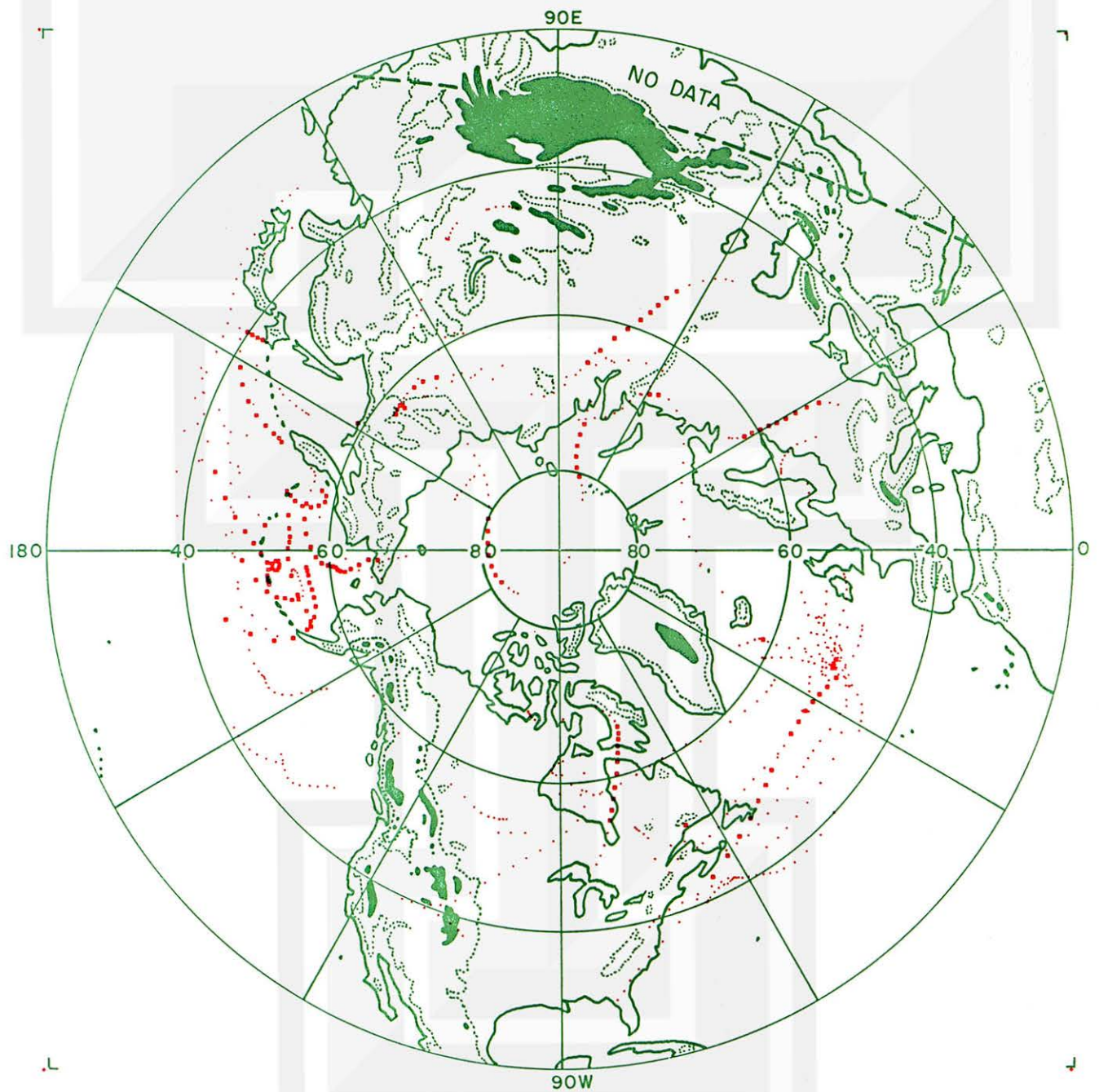
CENTRAL PRESSURE

SPRING 1983



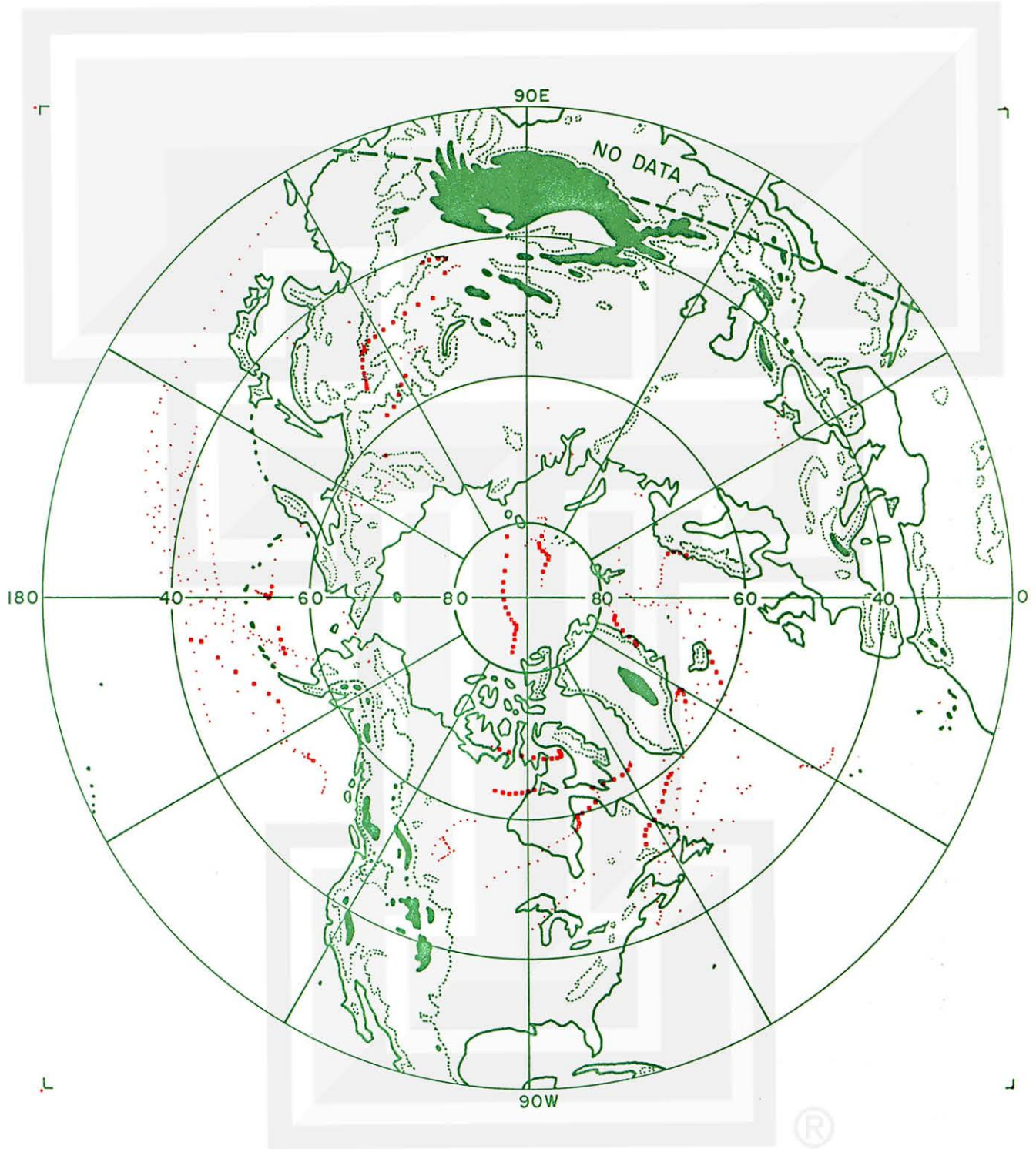
CENTRAL PRESSURE

JUN 82



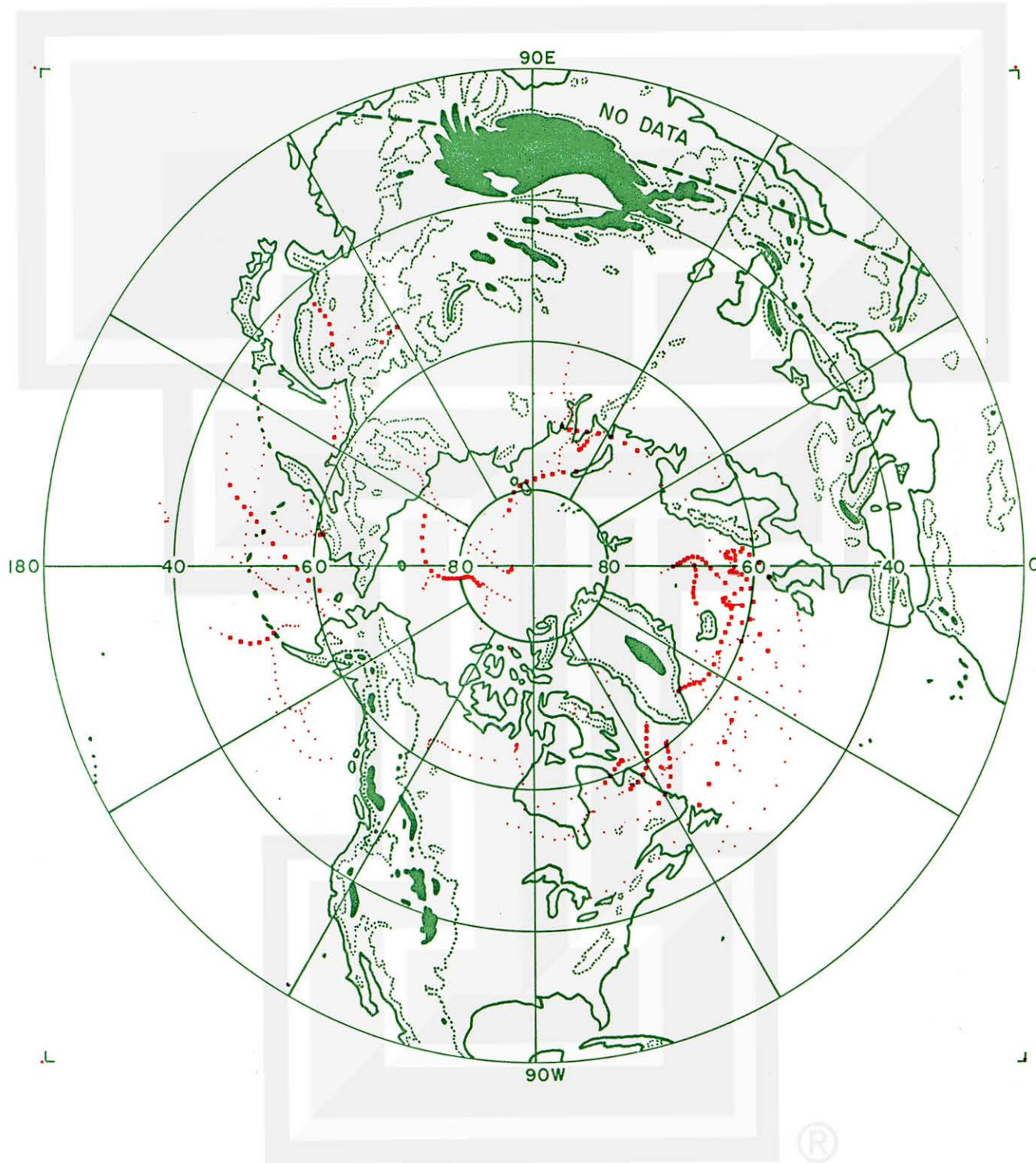
CENTRAL PRESSURE

JUL 82



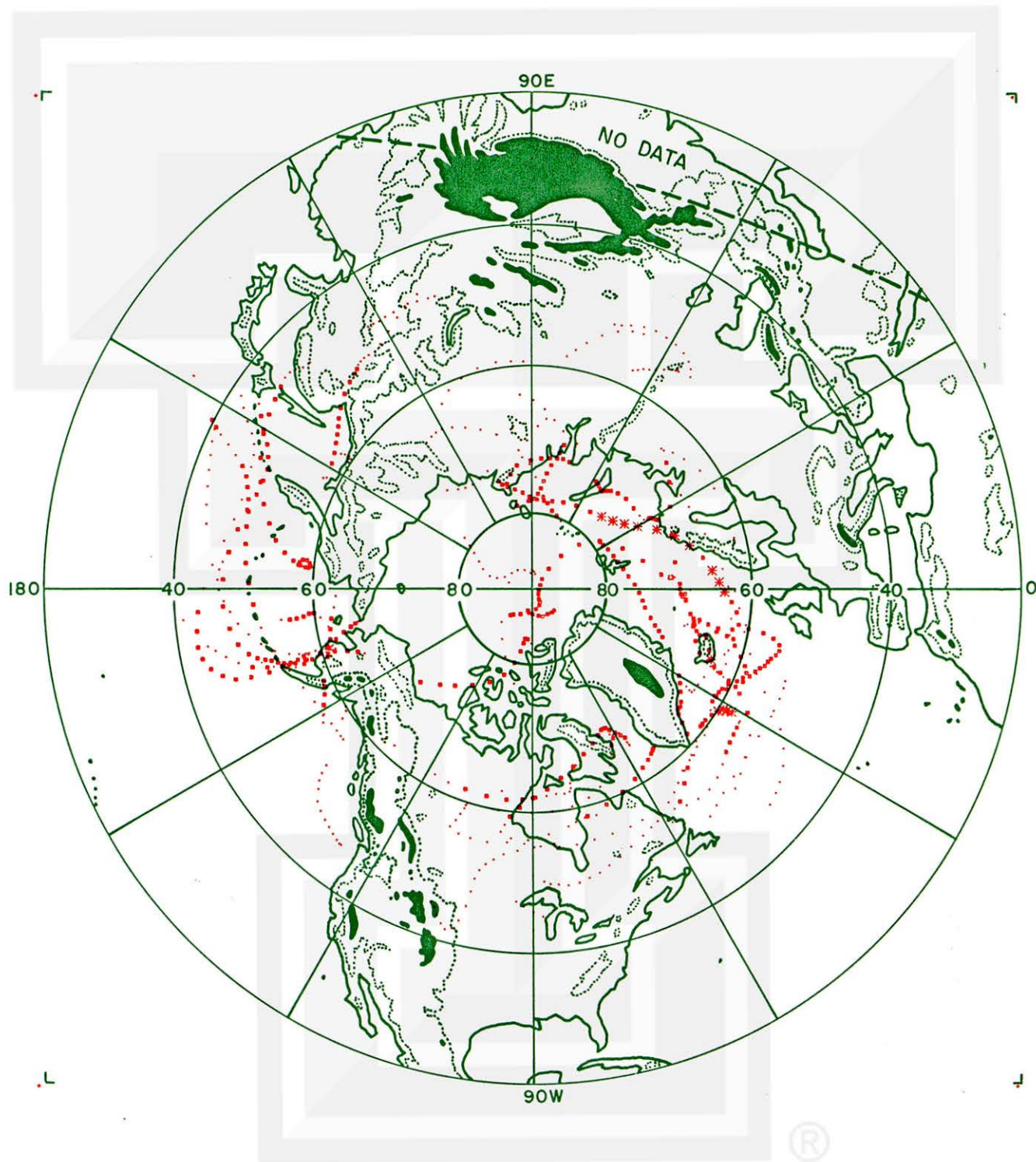
CENTRAL PRESSURE

AUG 82



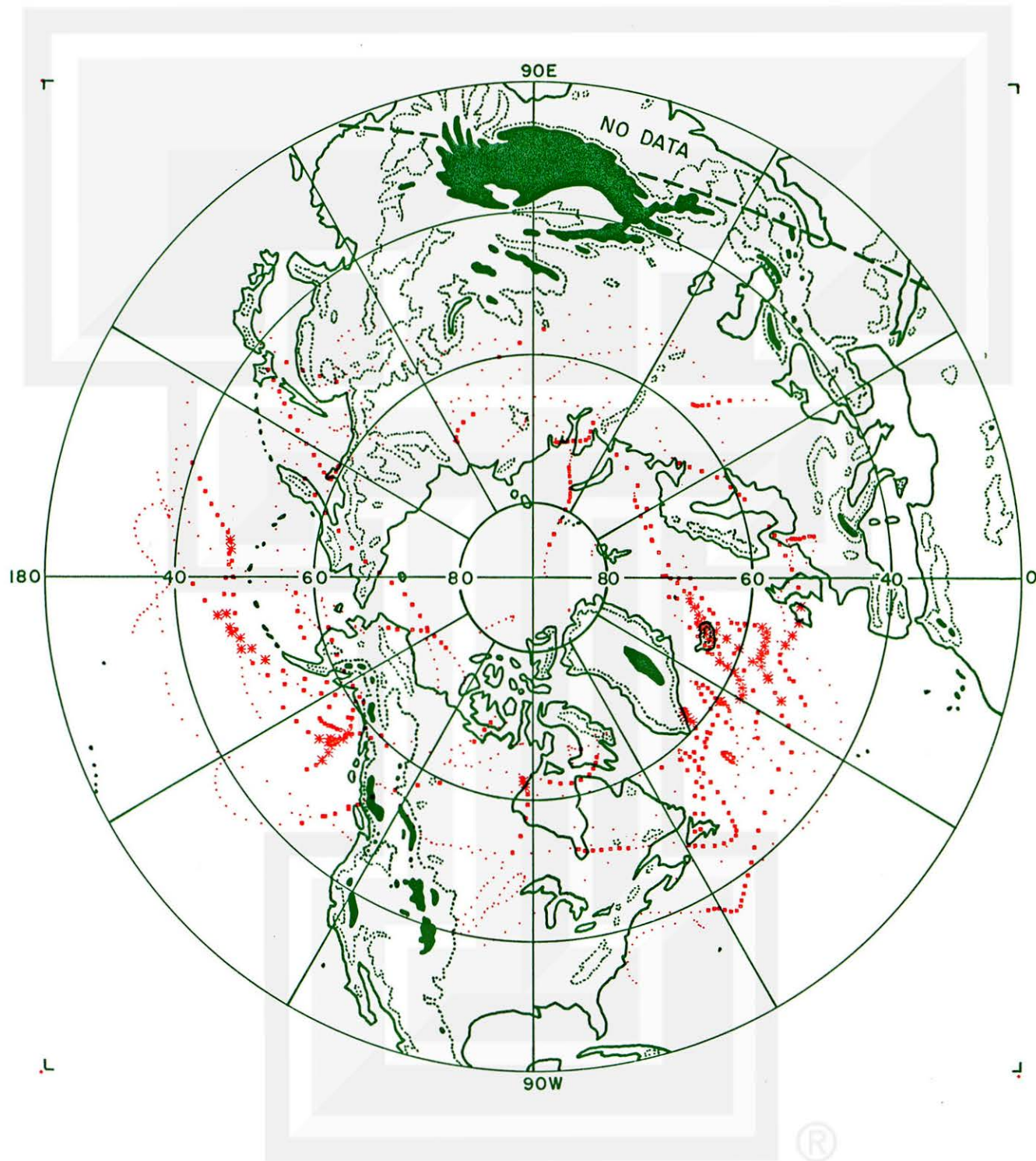
CENTRAL PRESSURE

SEP 82



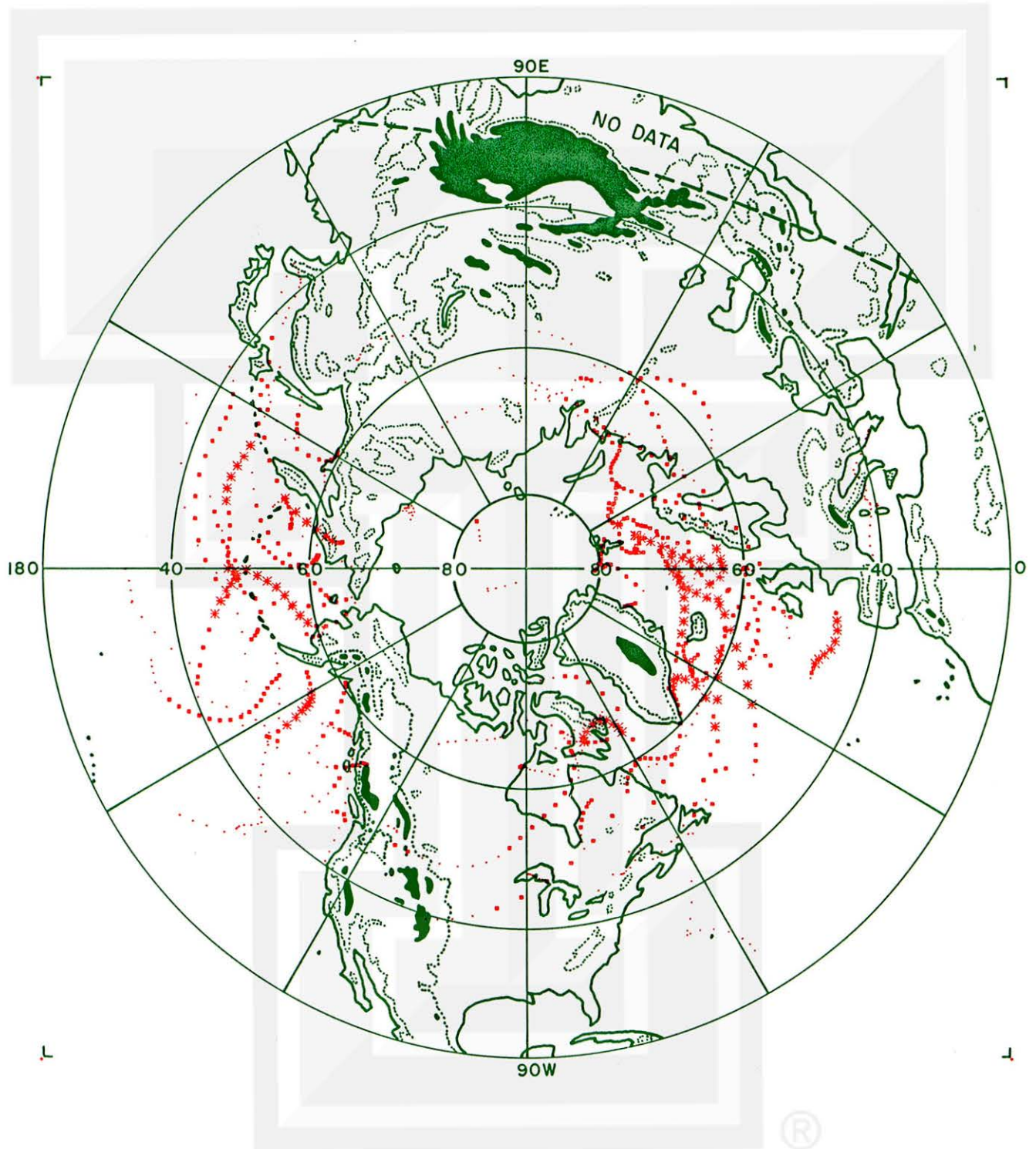
CENTRAL PRESSURE

OCT 82



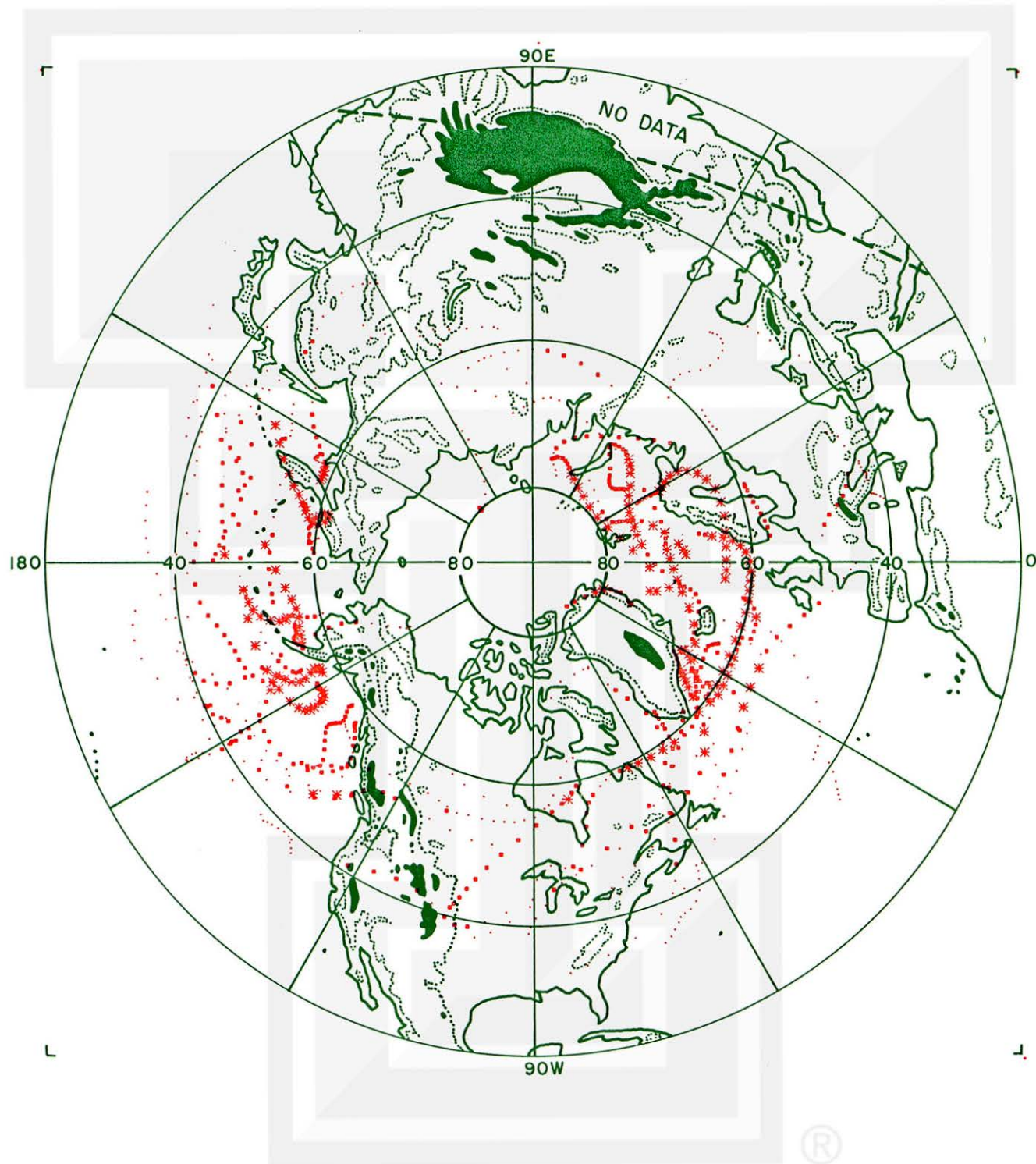
CENTRAL PRESSURE

NOV 82



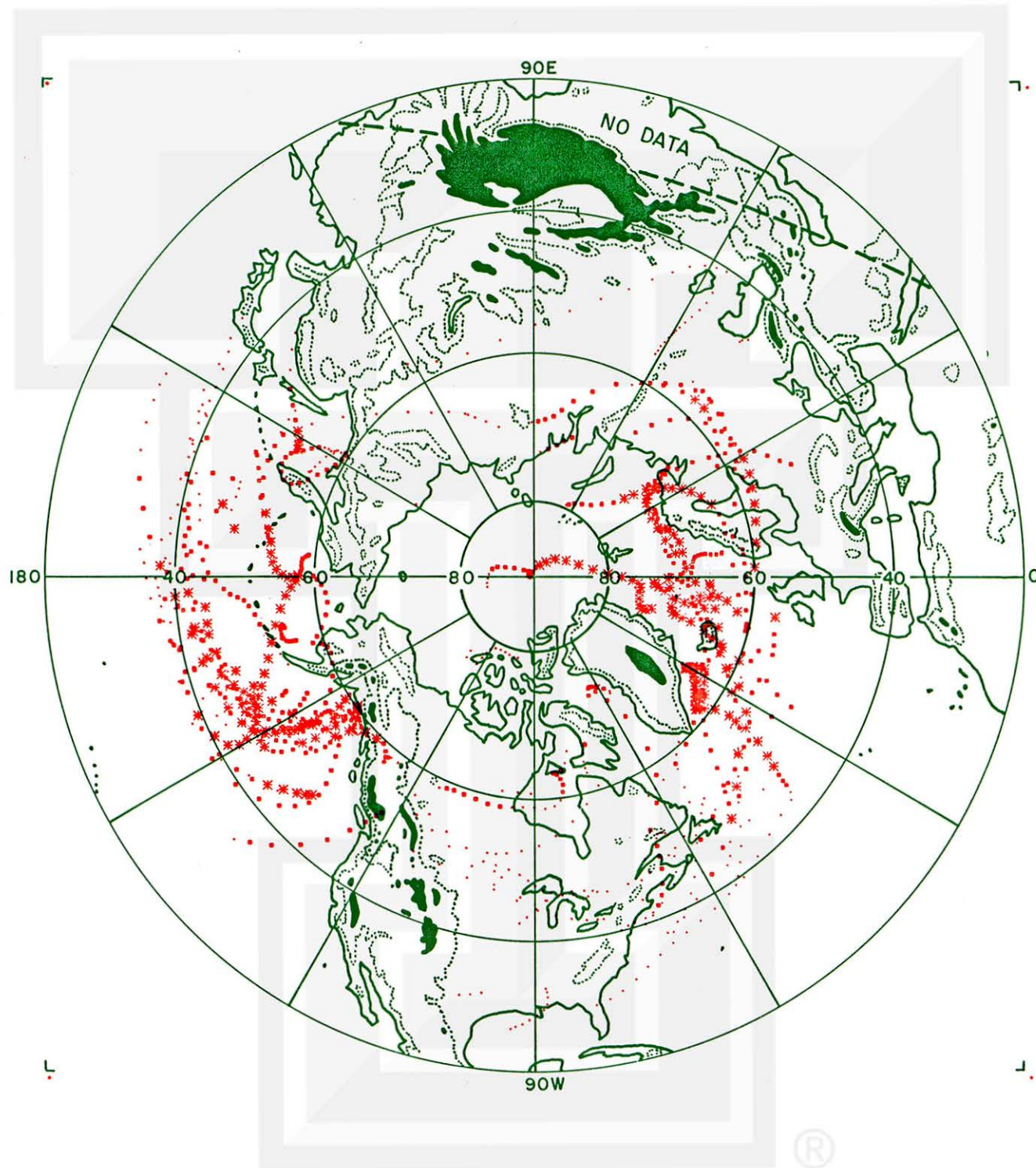
CENTRAL PRESSURE

DEC 82



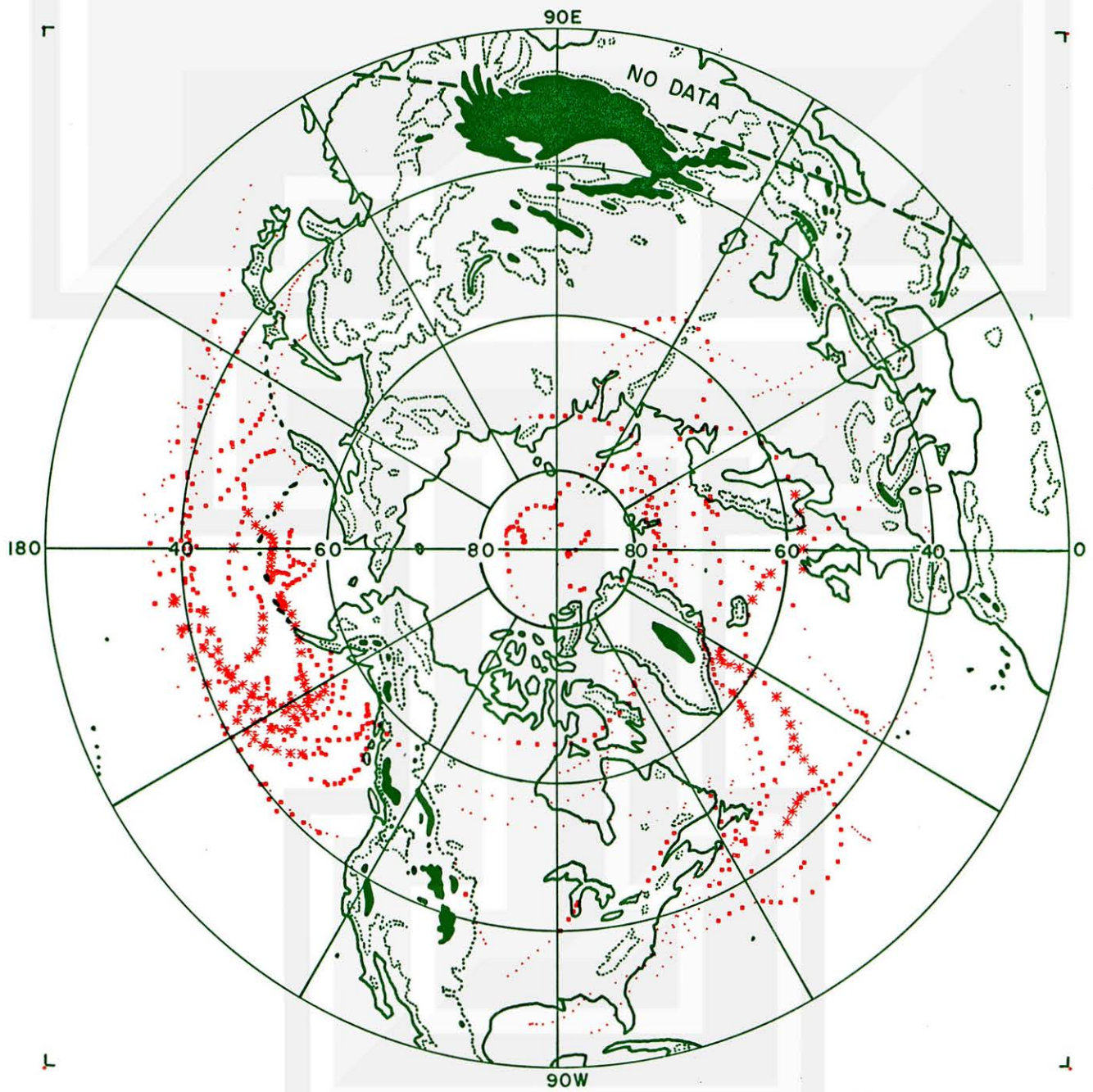
CENTRAL PRESSURE

JAN 83



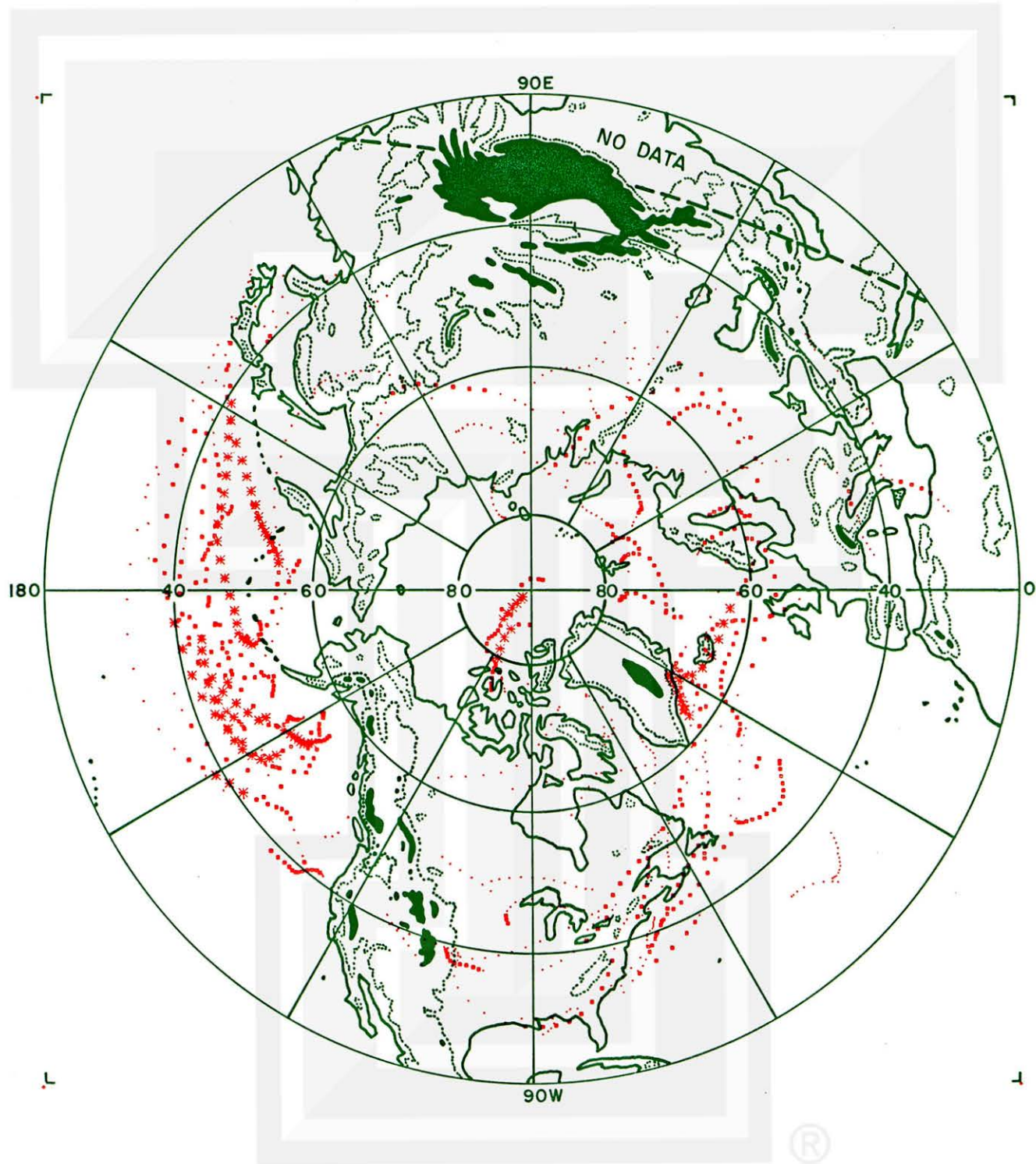
CENTRAL PRESSURE

FEB 83



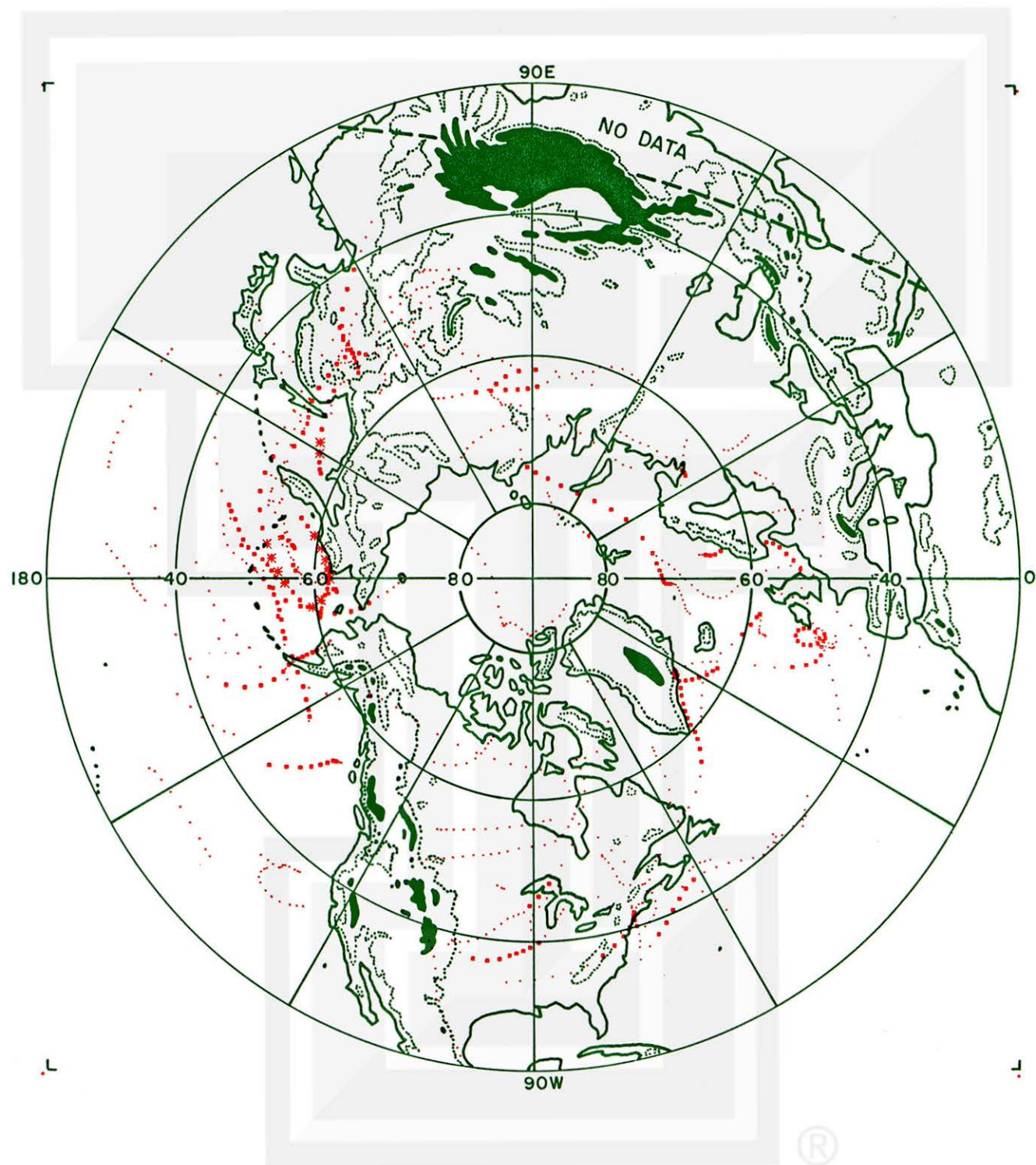
CENTRAL PRESSURE

MAR 83



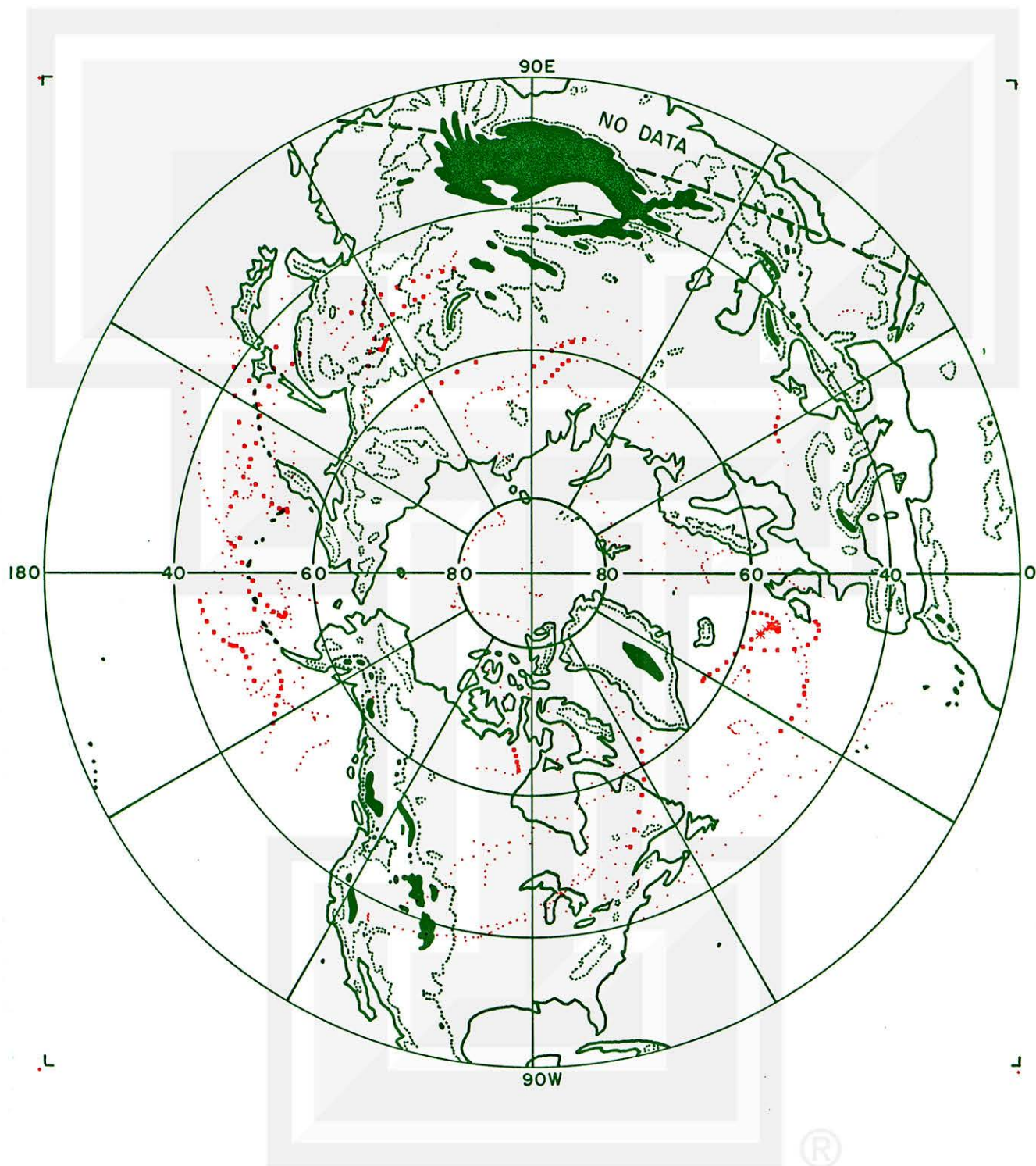
CENTRAL PRESSURE

APR 83



CENTRAL PRESSURE

MAY 83



..... 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 1982

Autumn 1982

Winter 1982-83

Spring 1983

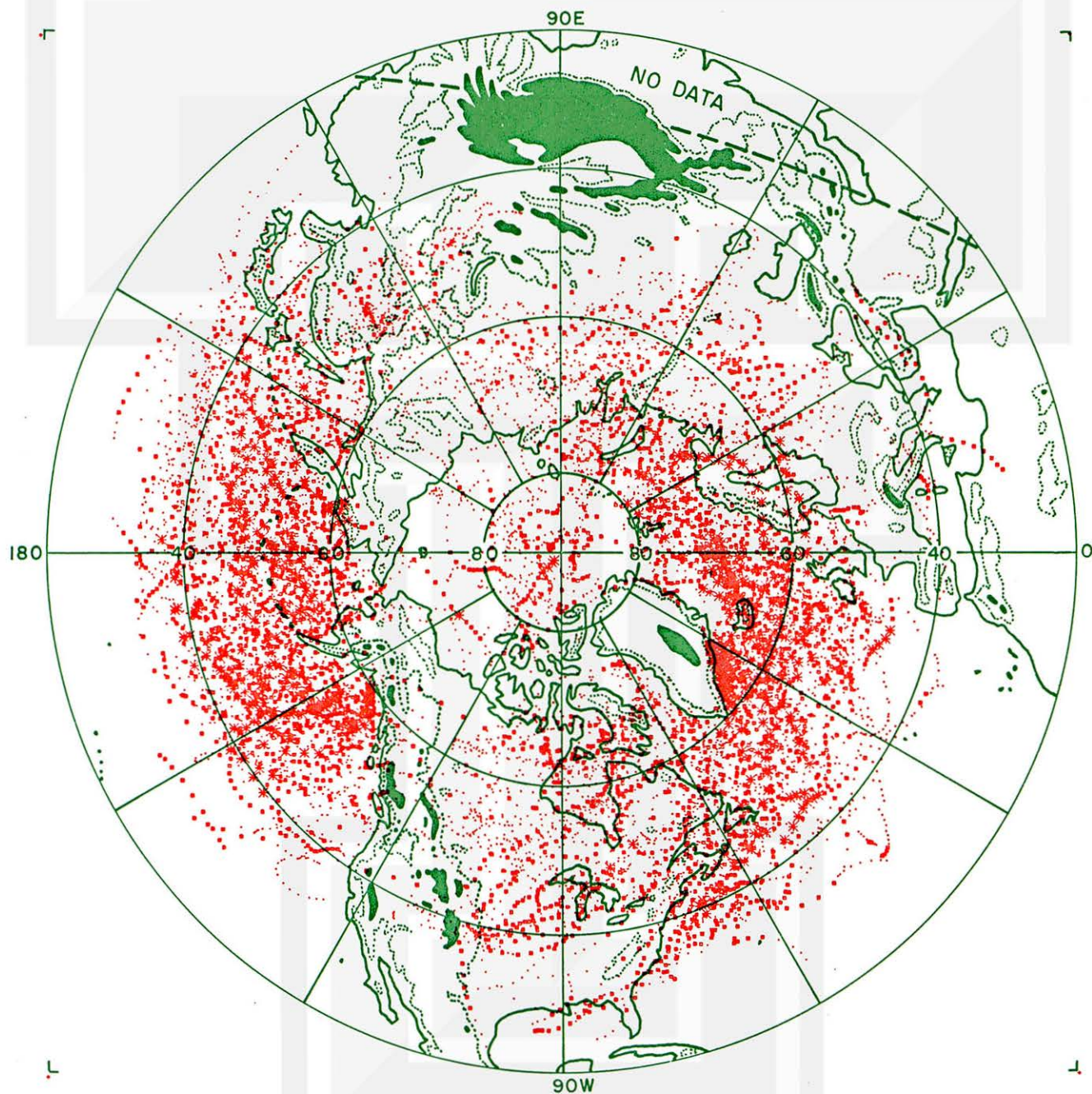
12 MONTHLY MAPS

June-December 1982

January-May 1983

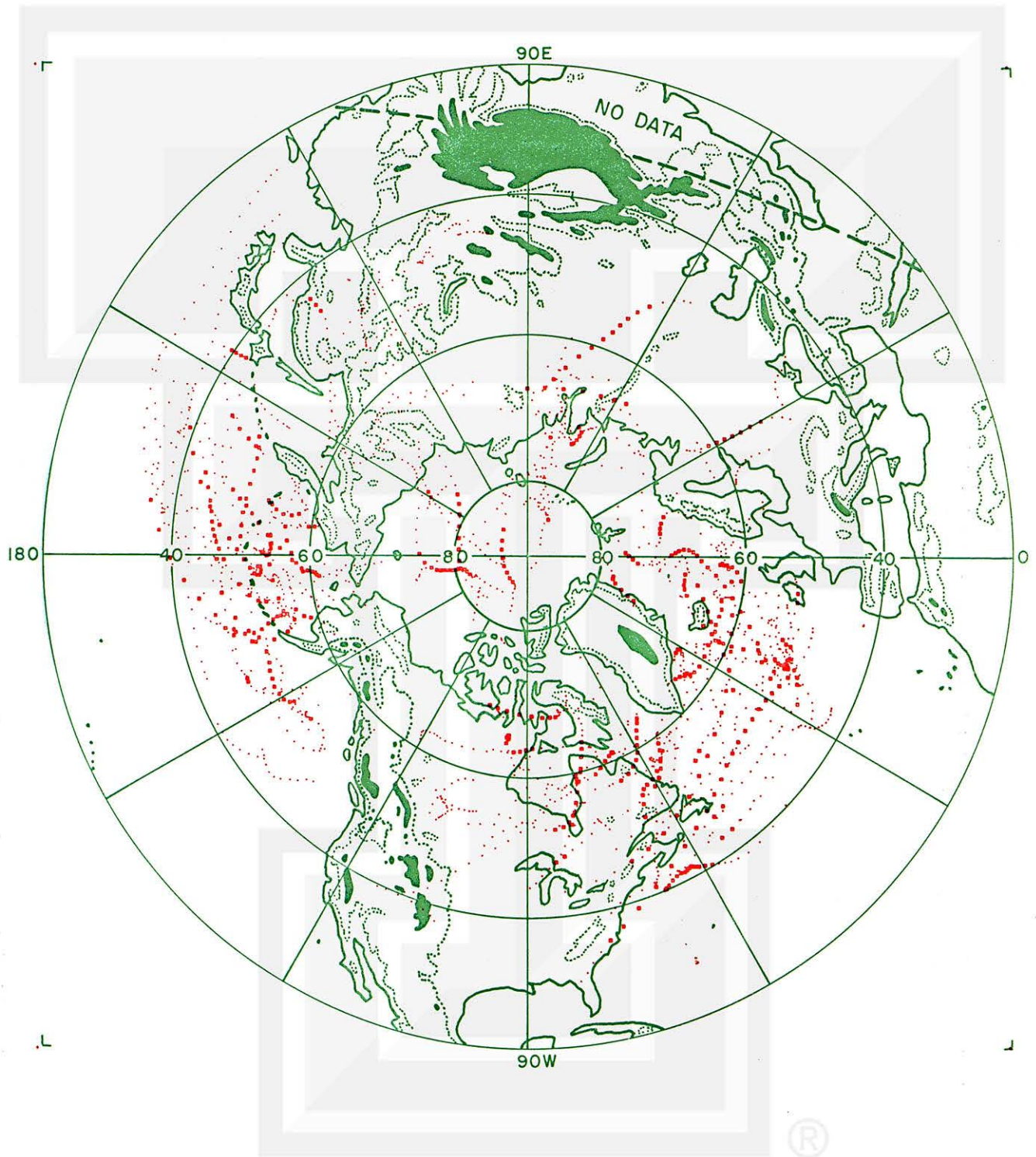


CYCLONE WINDSPEED
12 MOS JUN 82 - MAY 83



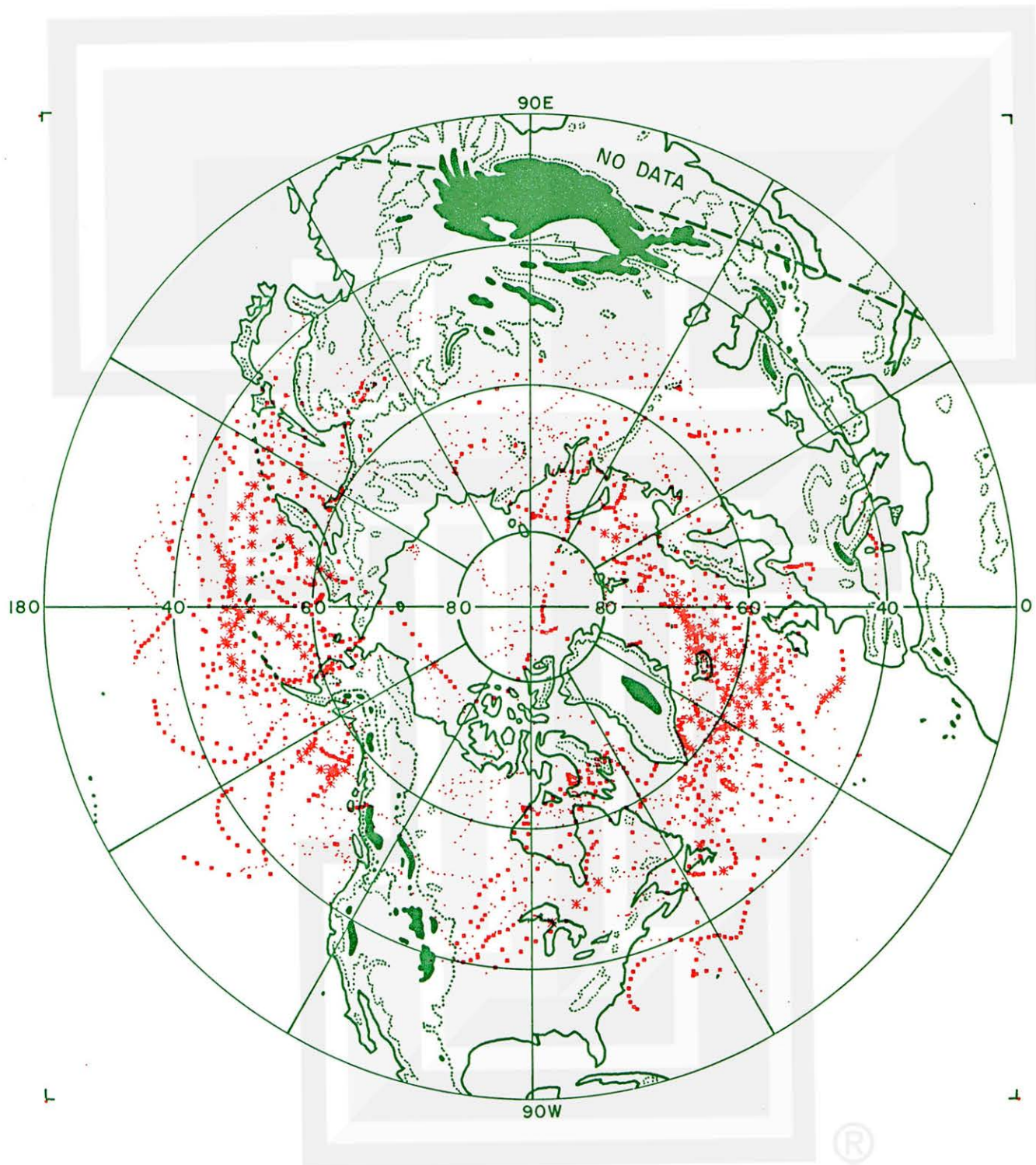
CYCLONE WINDSPEED

SUMMER 82



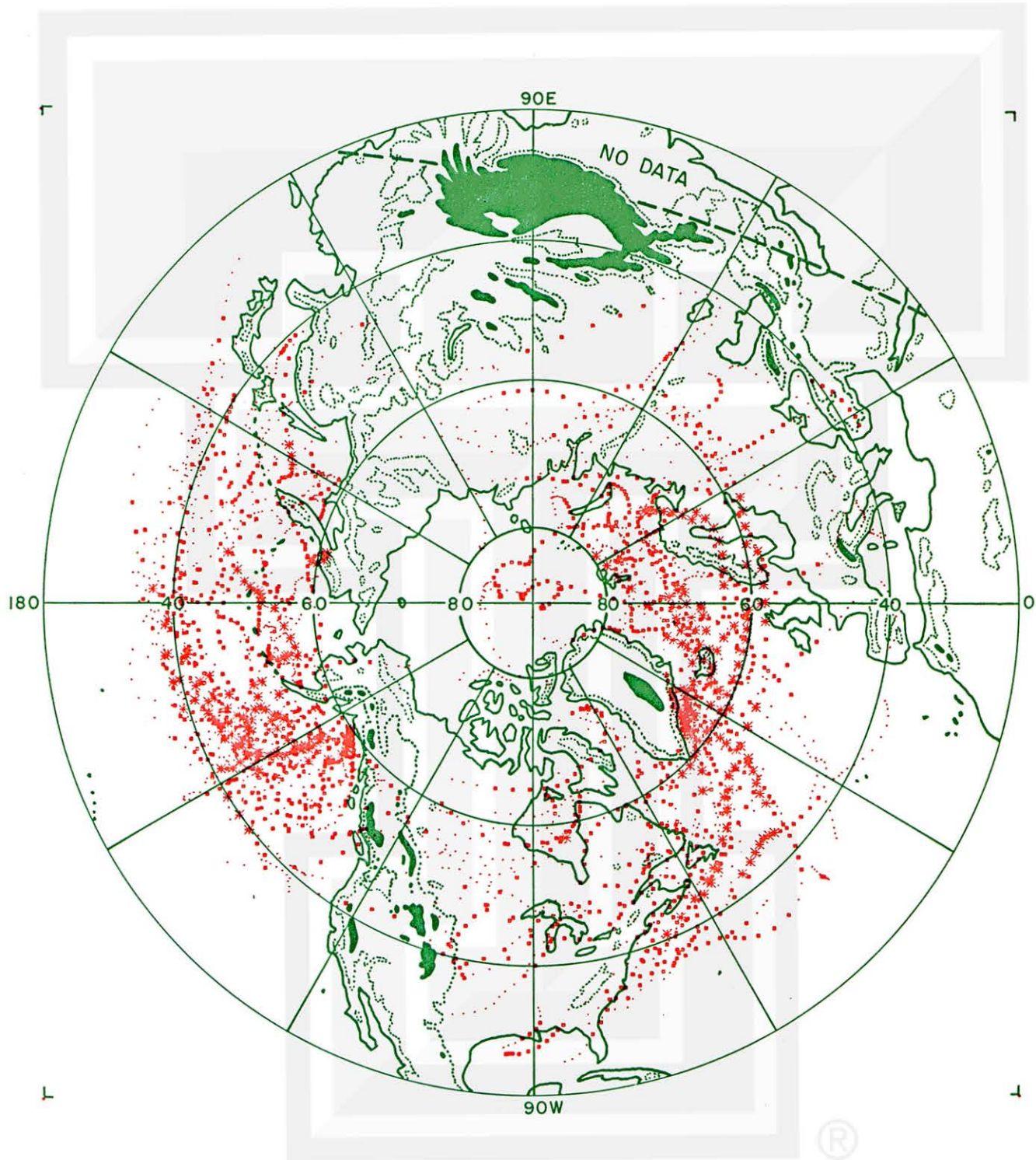
CYCLONE WINDSPEED

AUTUMN 1982



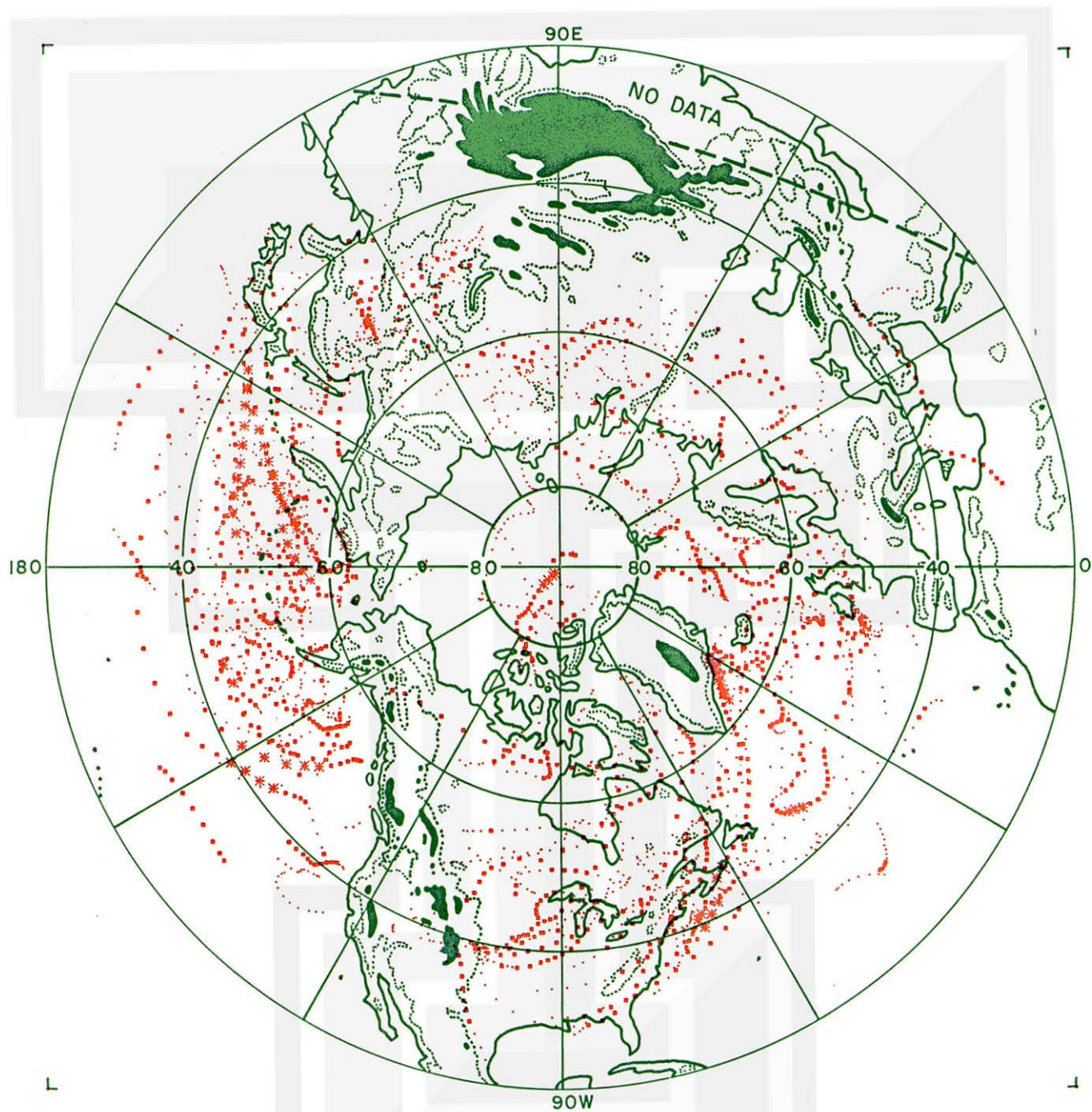
CYCLONE WINDSPEED

WINTER 1982 - 83



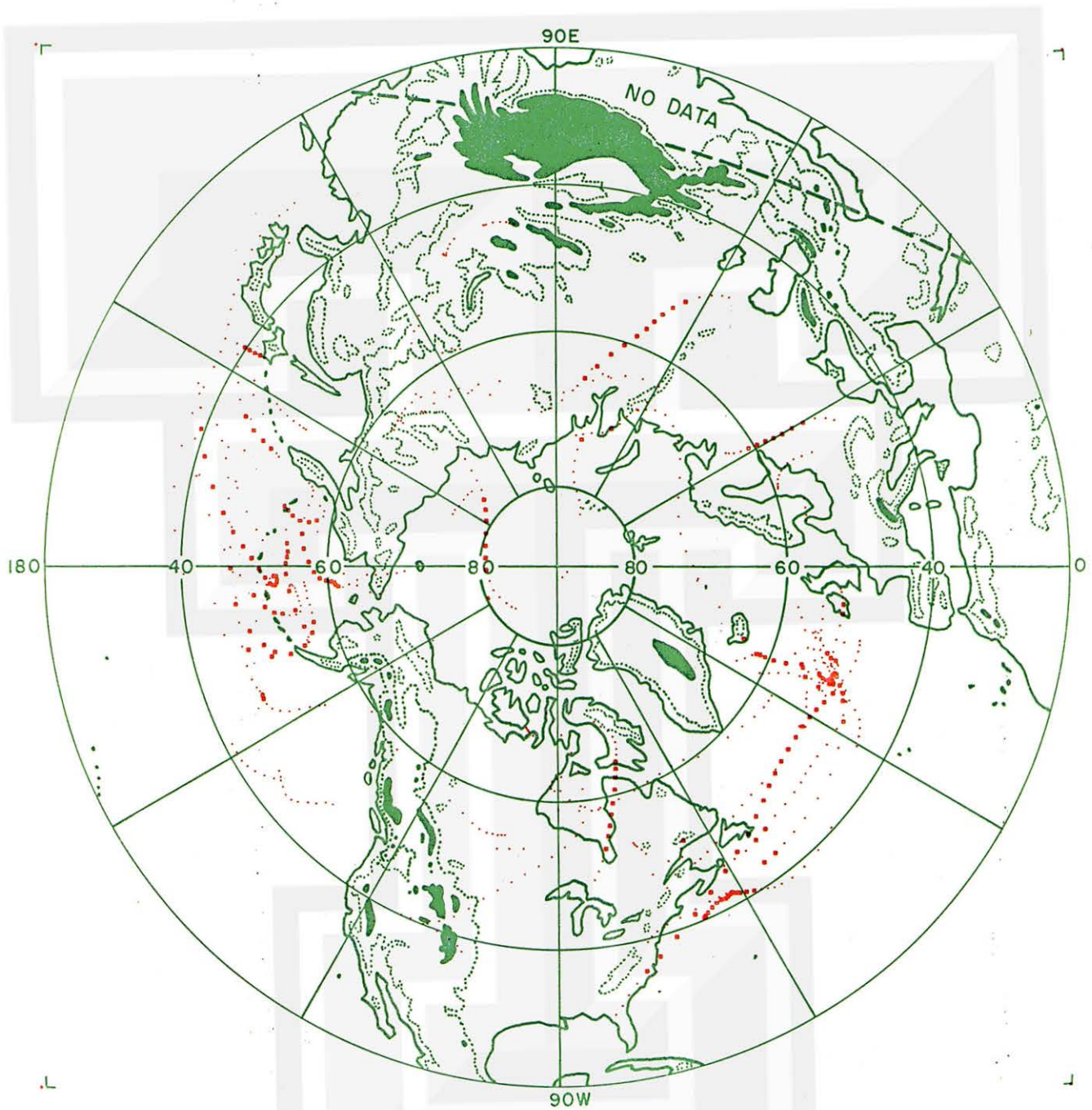
CYCLONE WINDSPEED

SPRING 1983



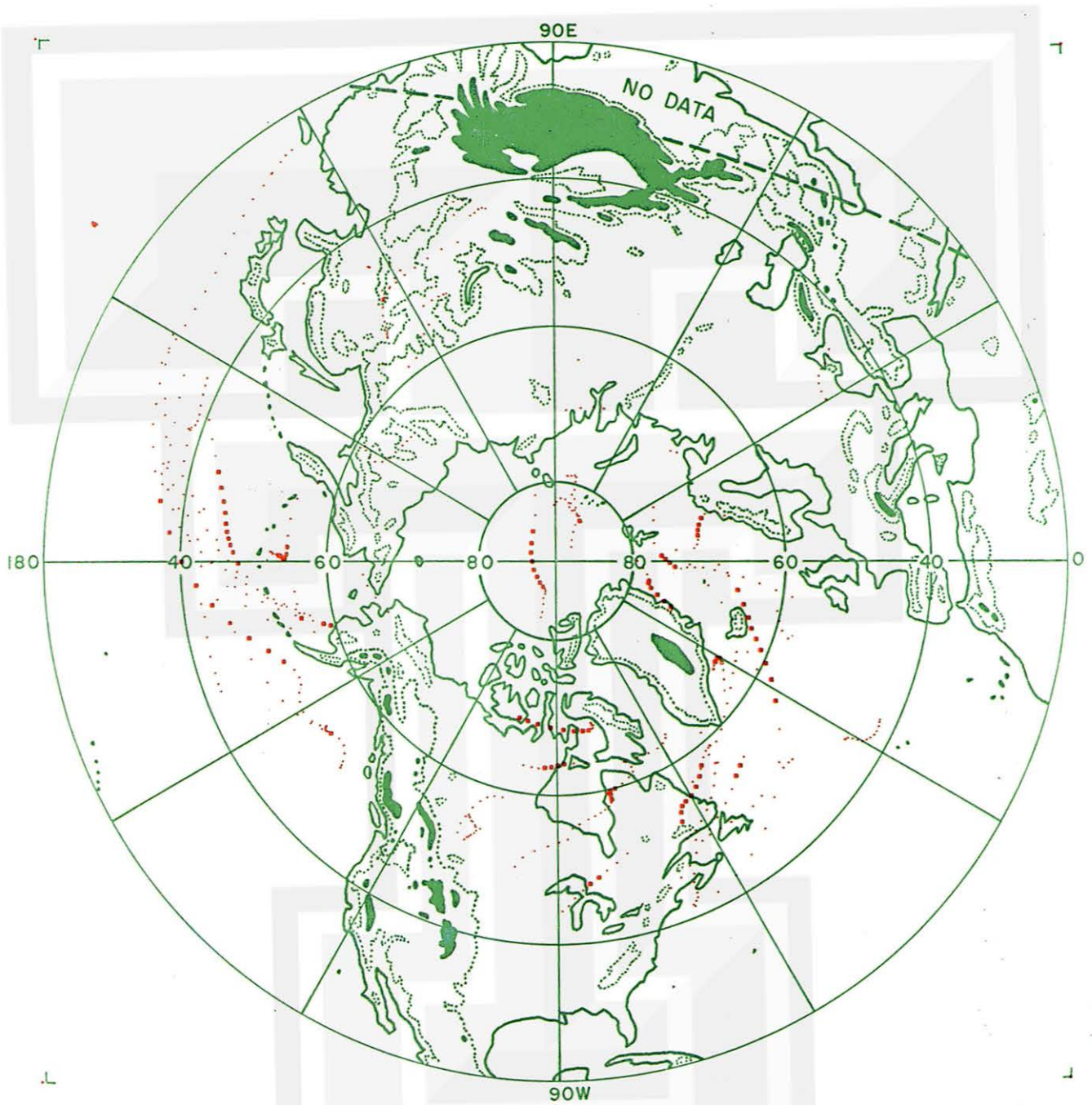
CYCLONE WINDSPEED

JUN 82



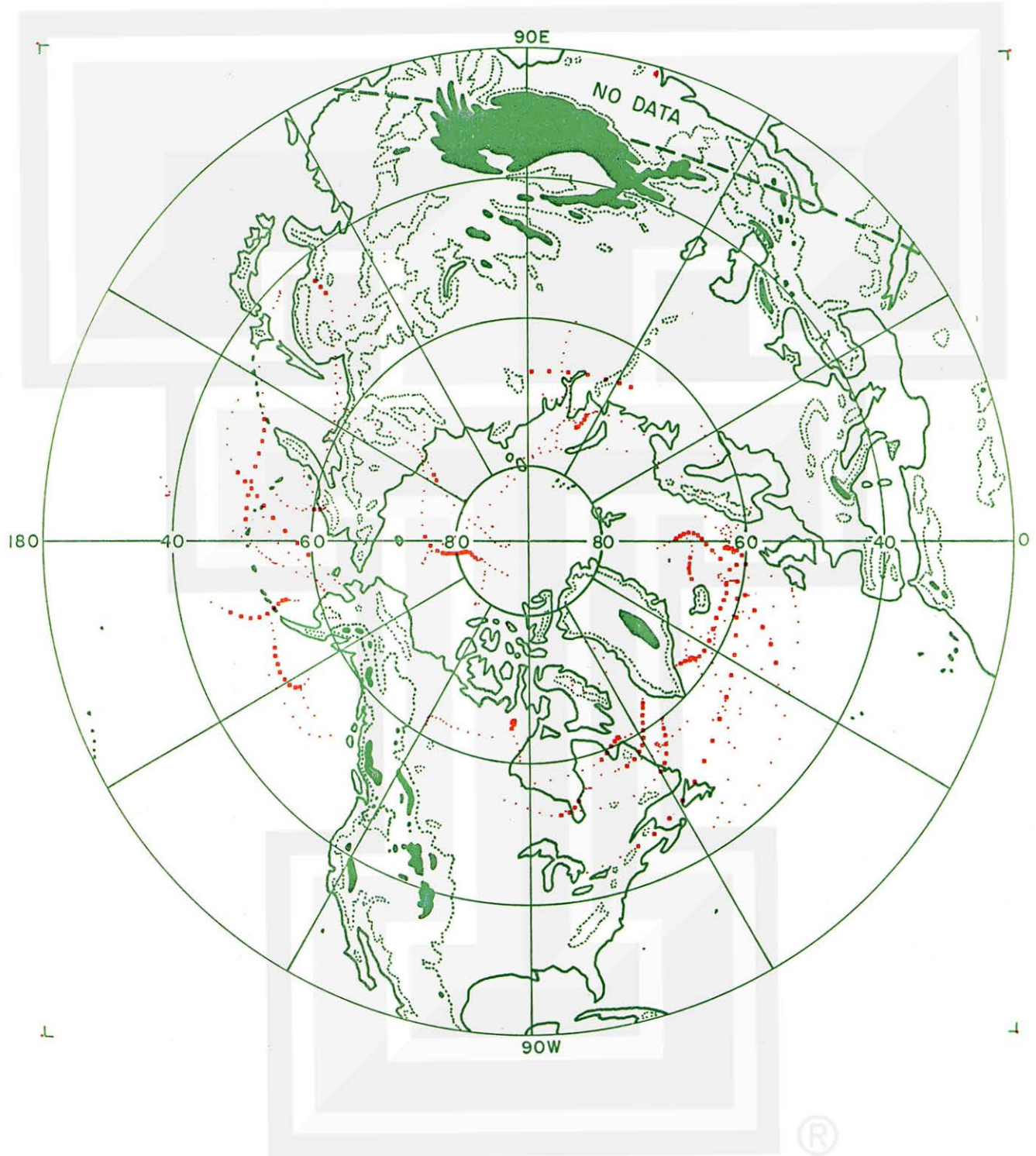
CYCLONE WINDSPEED

JUL 82



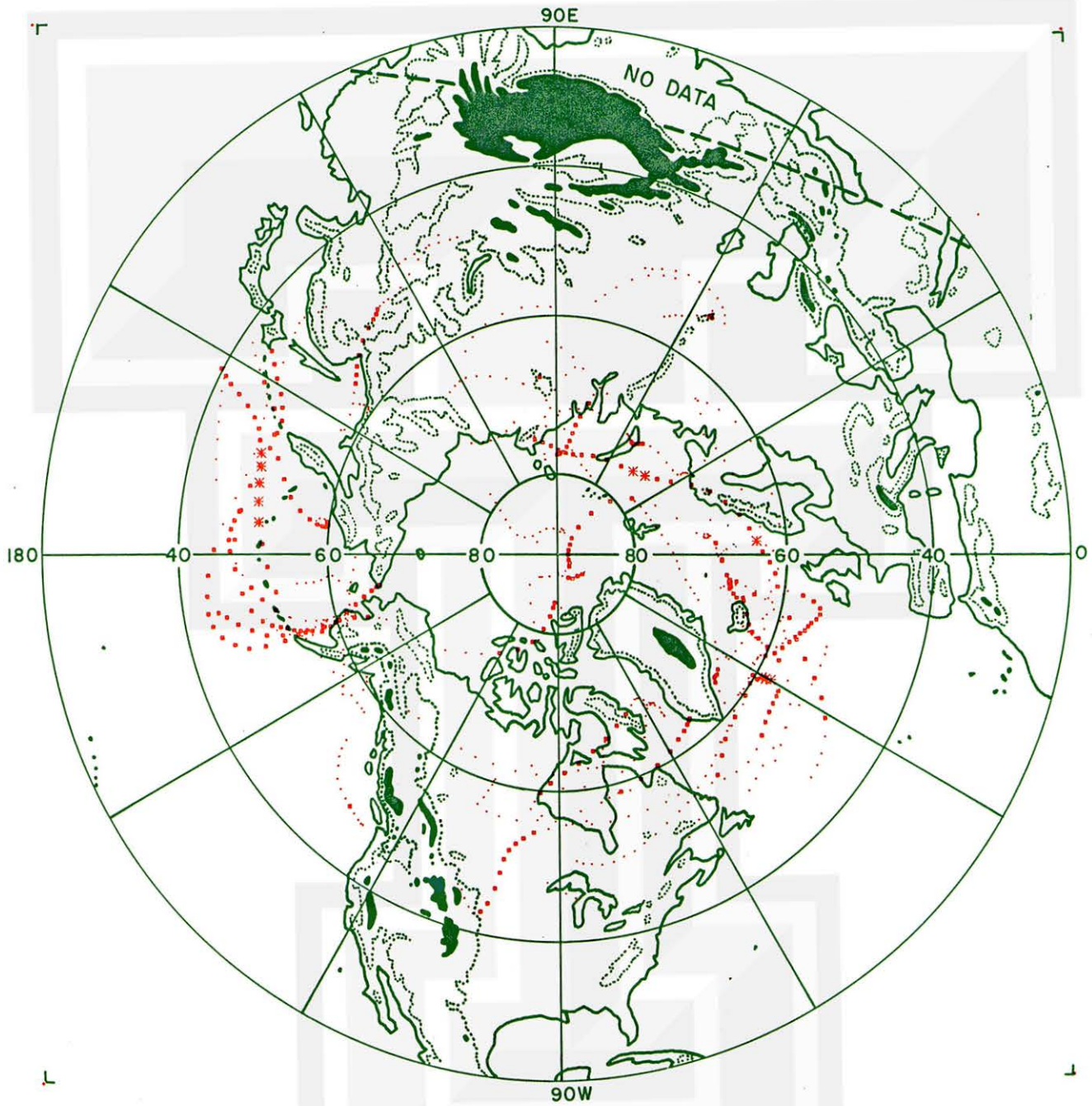
CYCLONE WINDSPEED

AUG 82



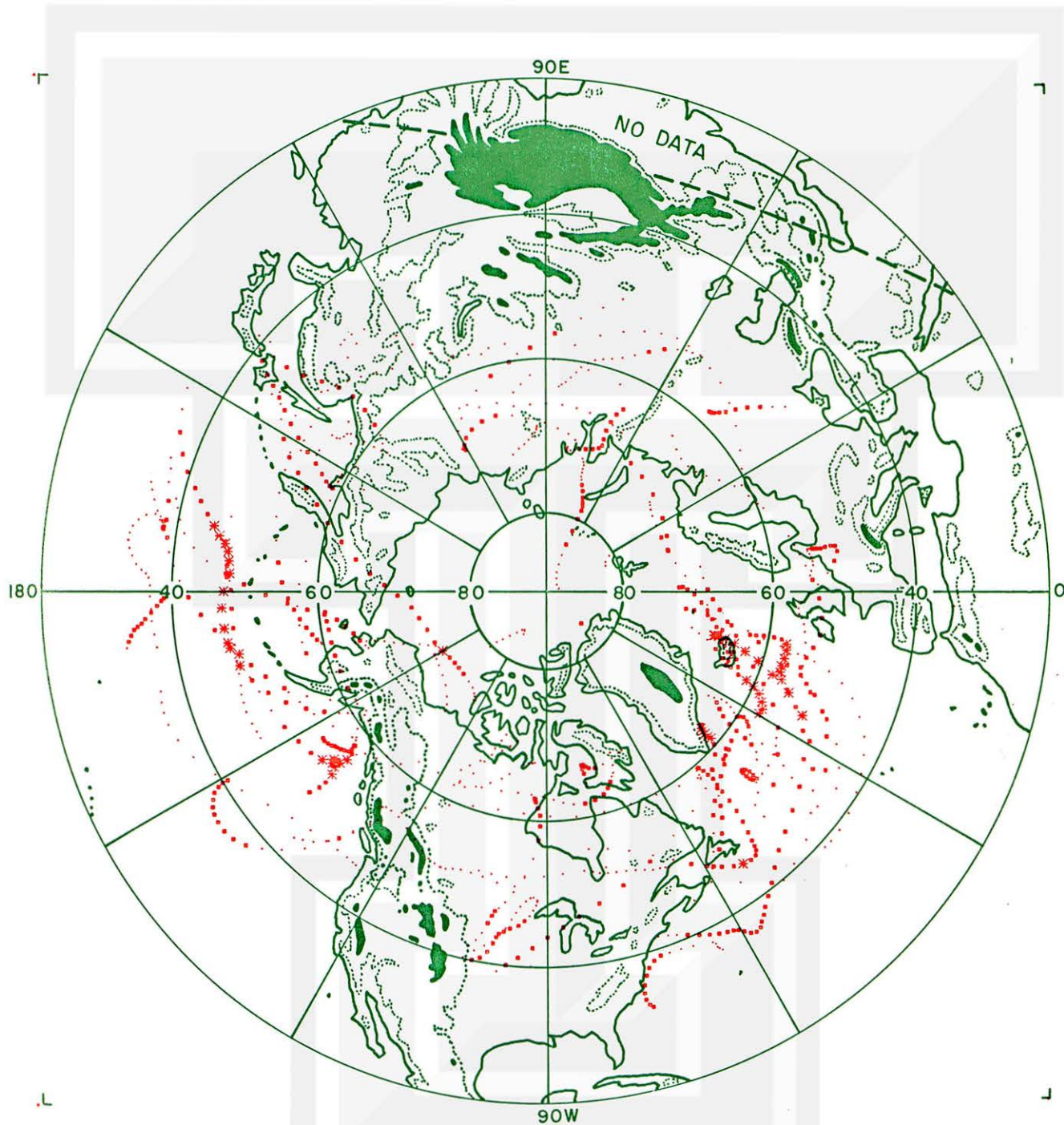
CYCLONE WINDSPEED

SEP 82



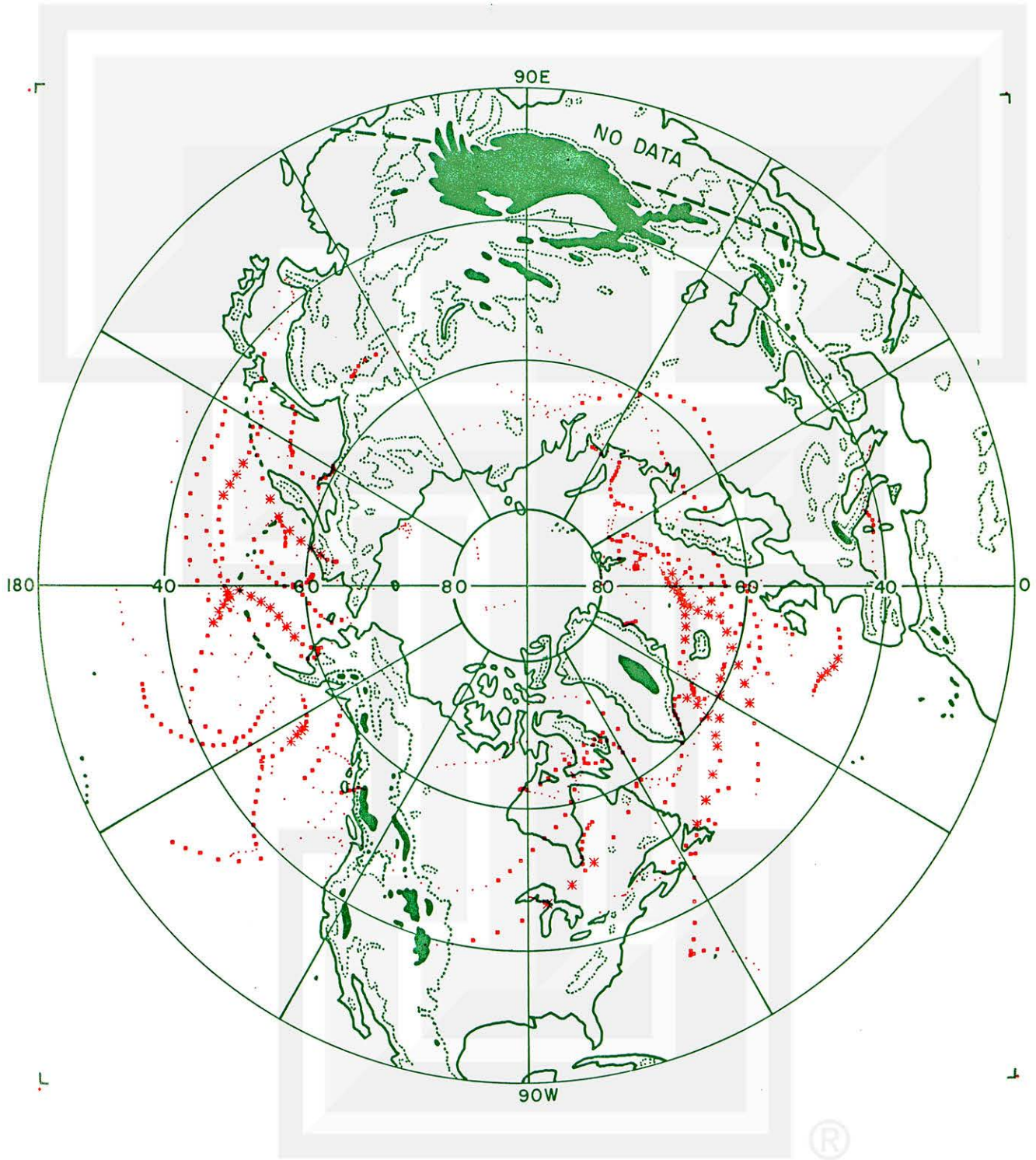
CYCLONE WINDSPEED

OCT 82



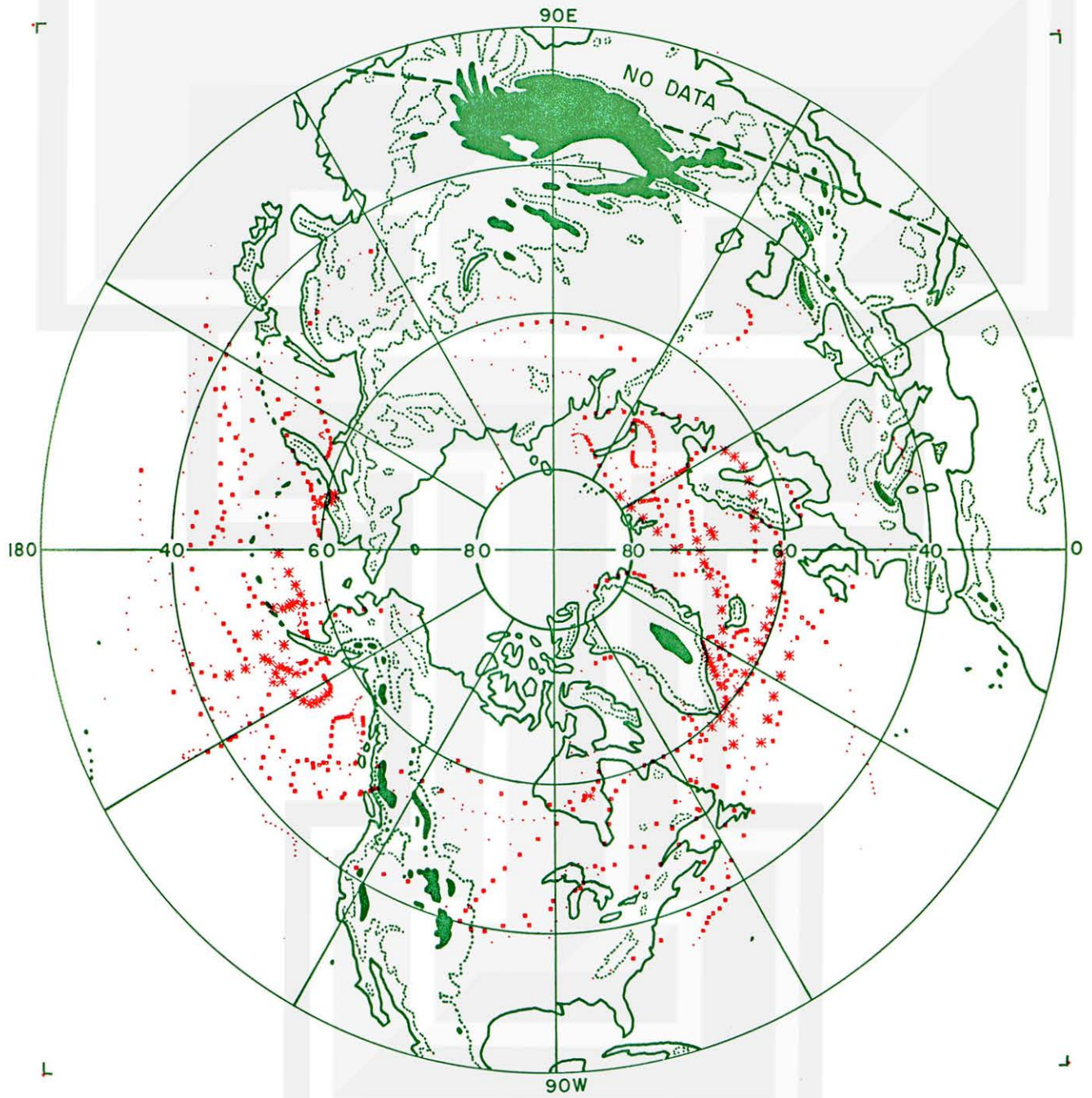
CYCLONE WINDSPEED

NOV 82



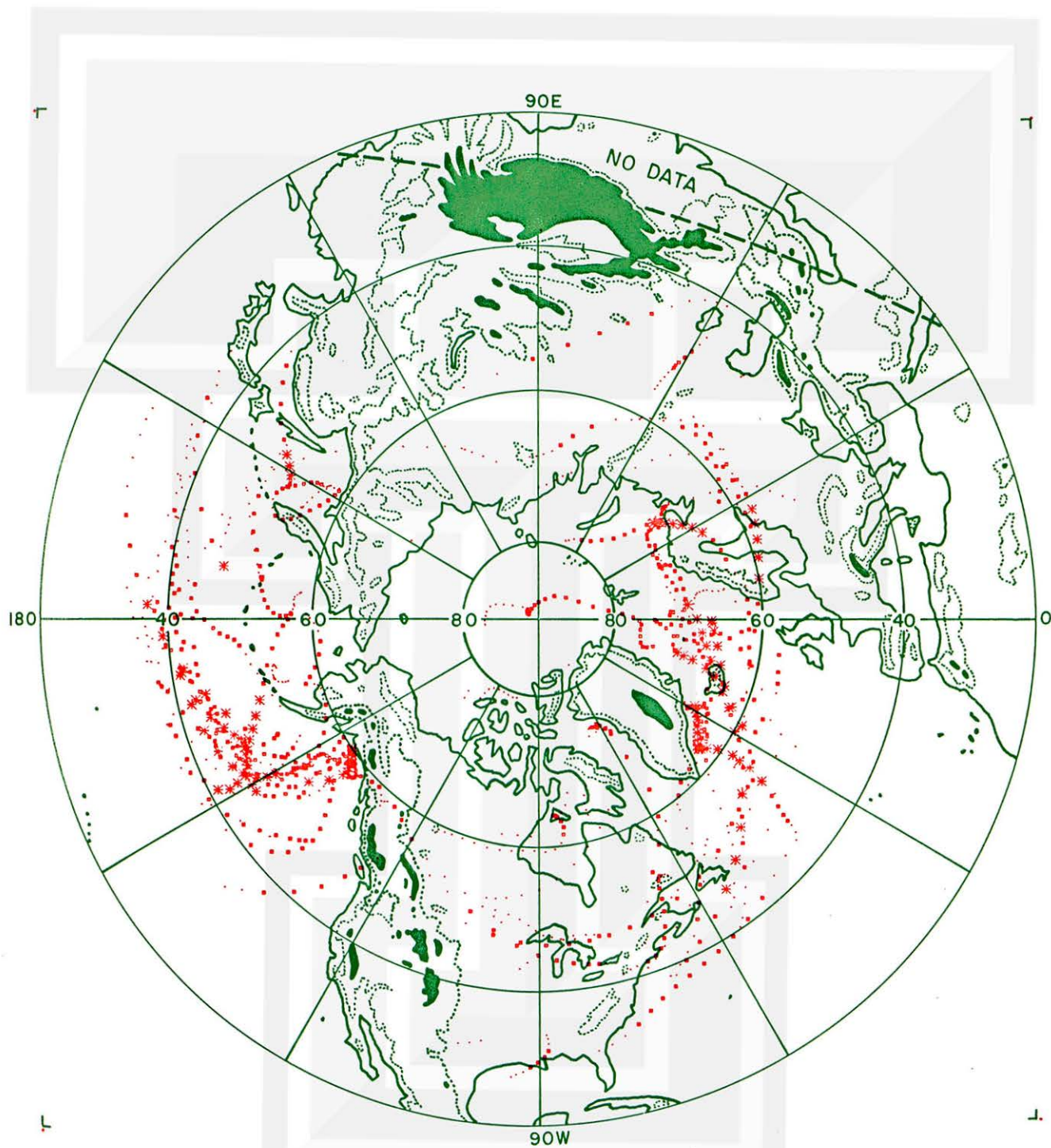
CYCLONE WINDSPEED

DEC 82



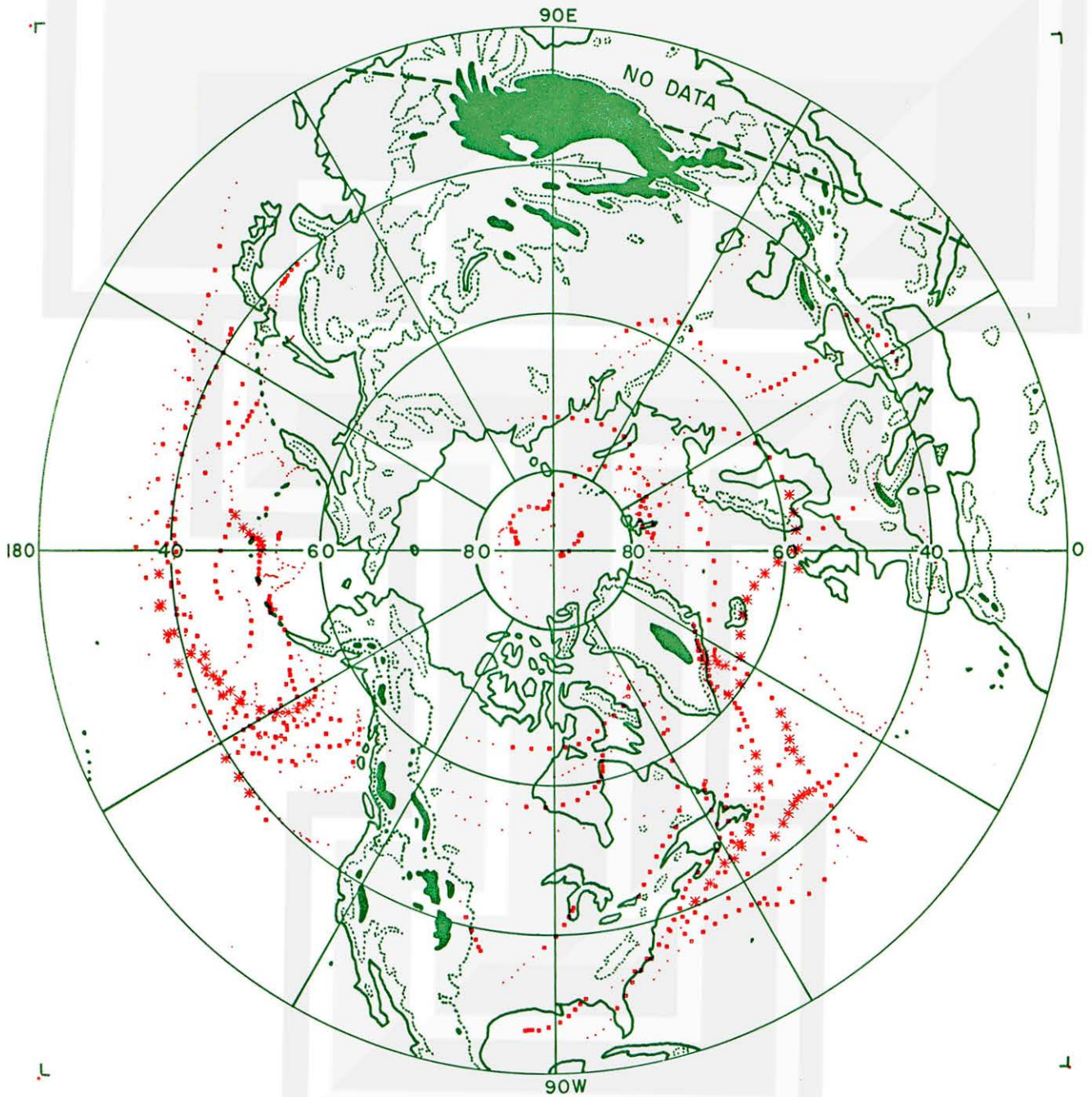
CYCLONE WINDSPEED

JAN 83

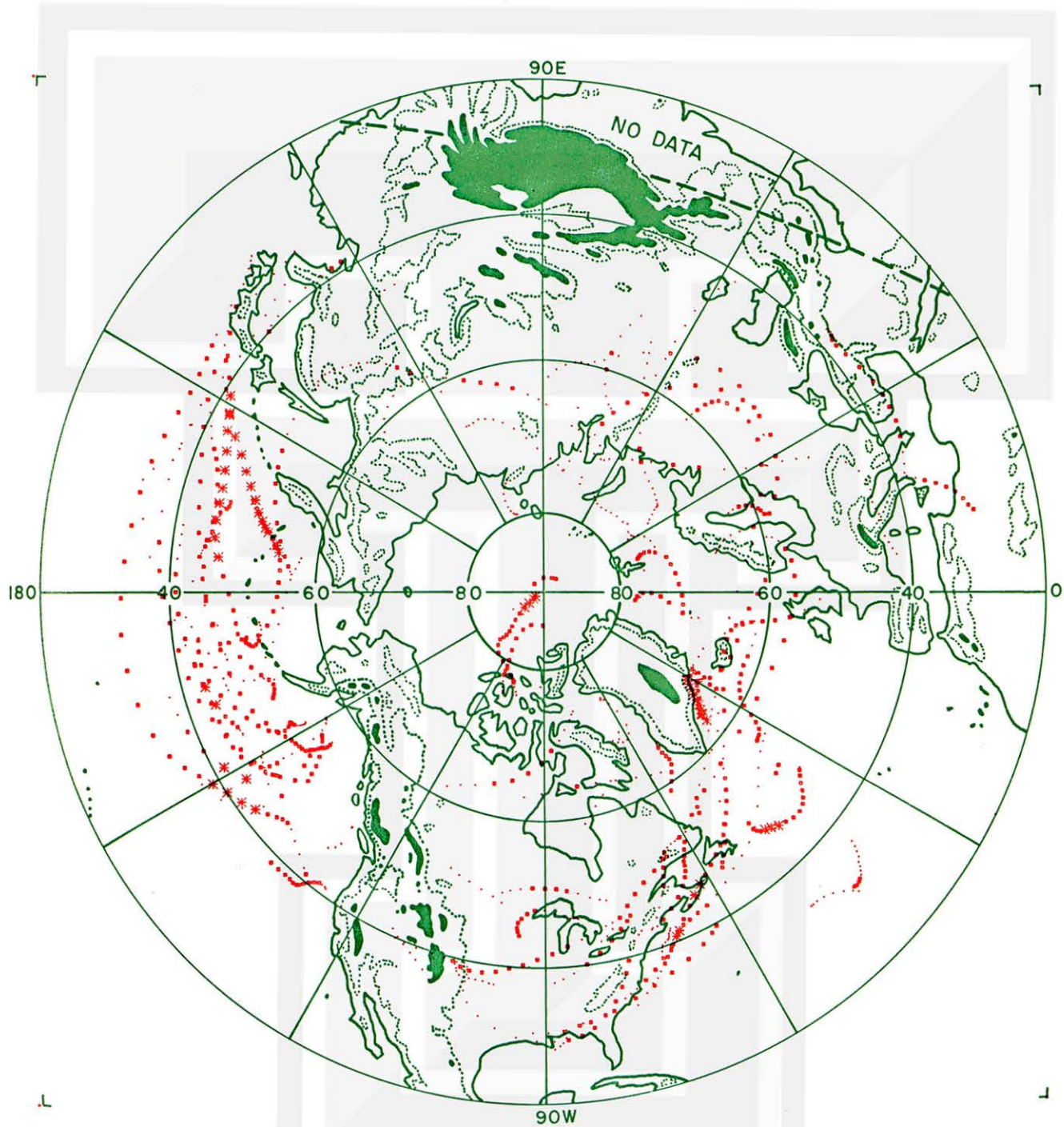


CYCLONE WINDSPEED

FEB 83

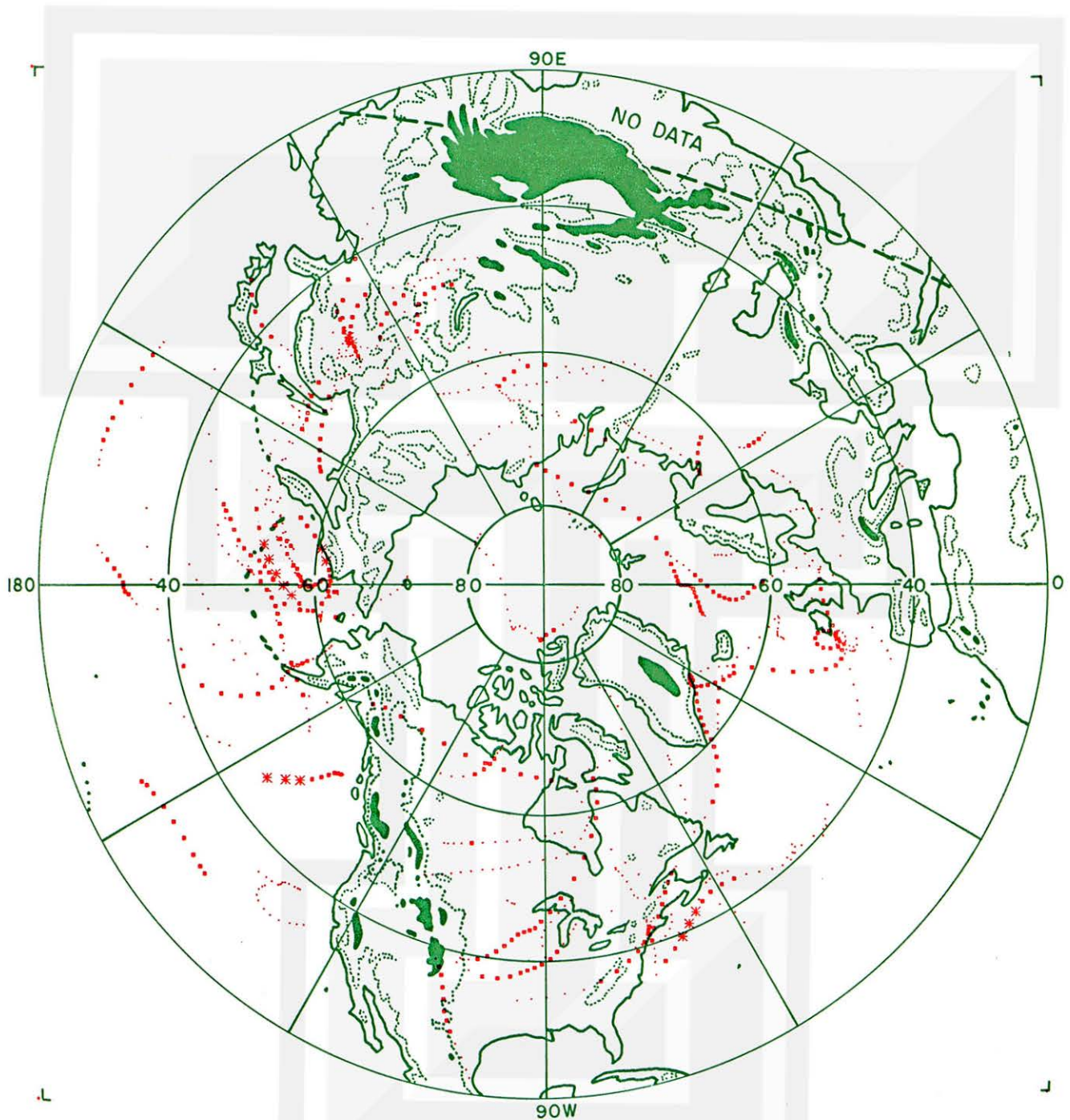


MAR 83



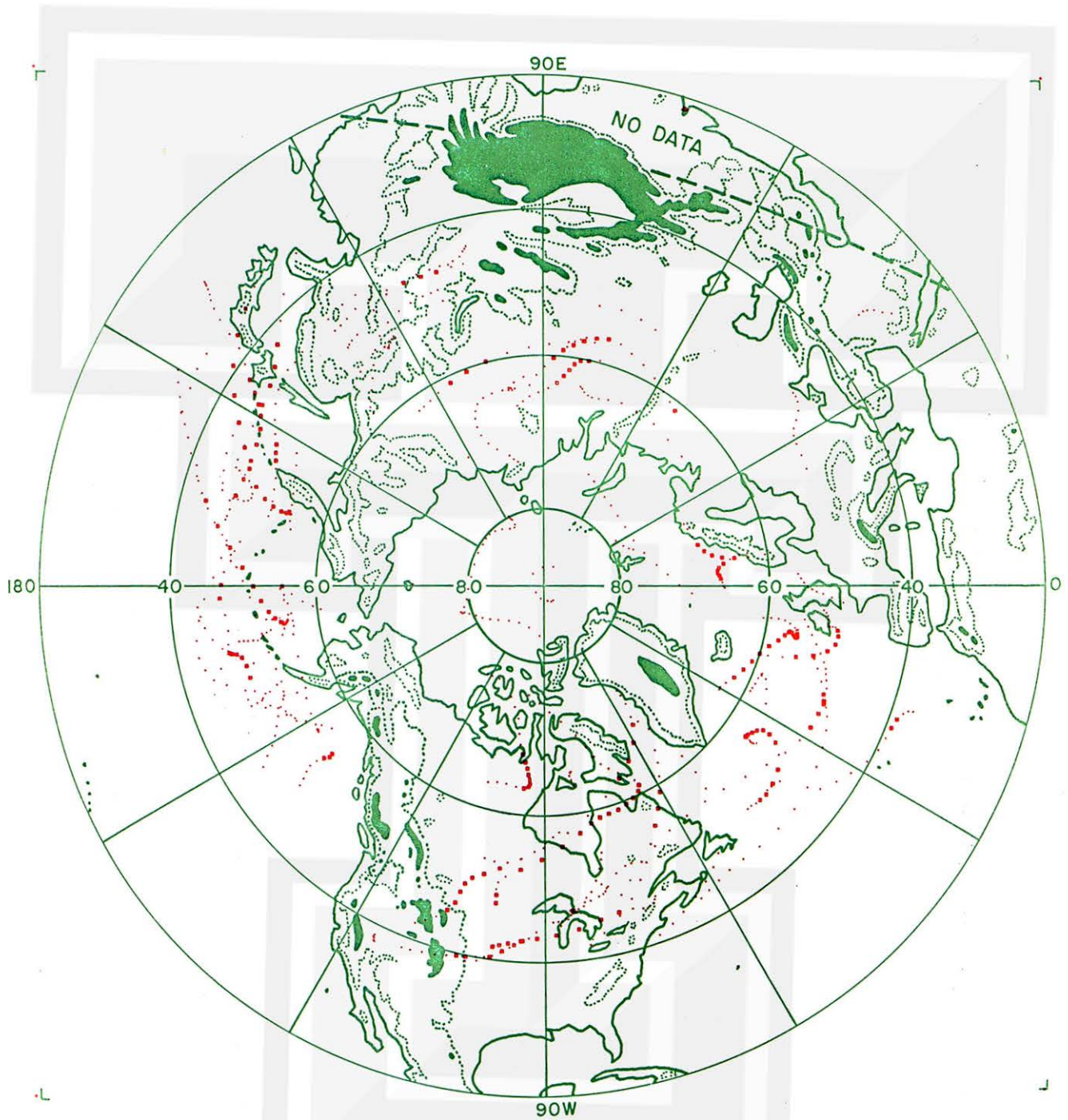
CYCLONE WINDSPEED

APR 83



CYCLONE WINDSPEED

MAY 83



..... 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 1982

Autumn 1982

Winter 1982-83

Spring 1983

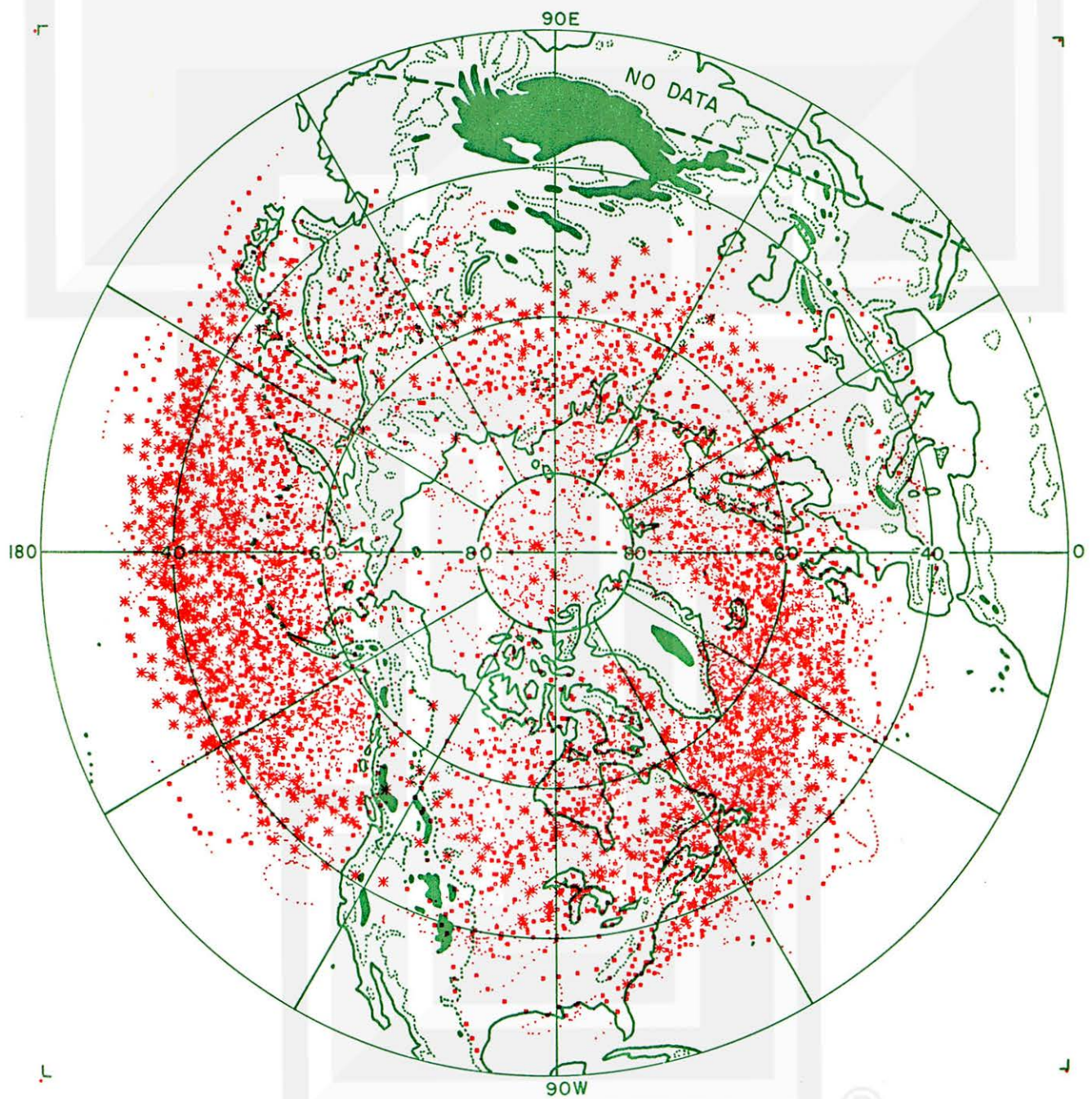
12 MONTHLY MAPS

June-December 1982

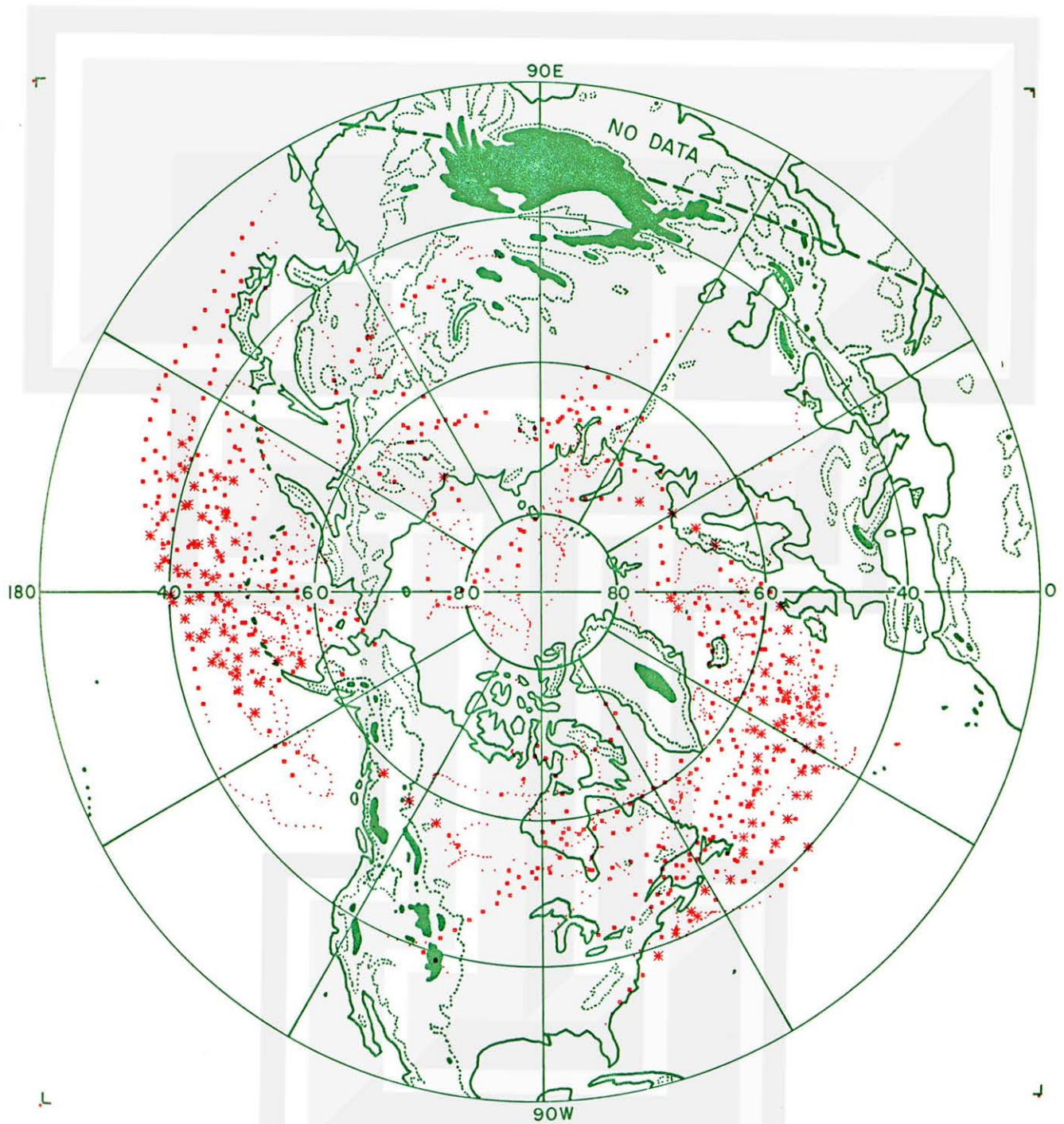
January-May 1983



CYCLONE MOVEMENT
12 MOS JUN 82 - MAY 83

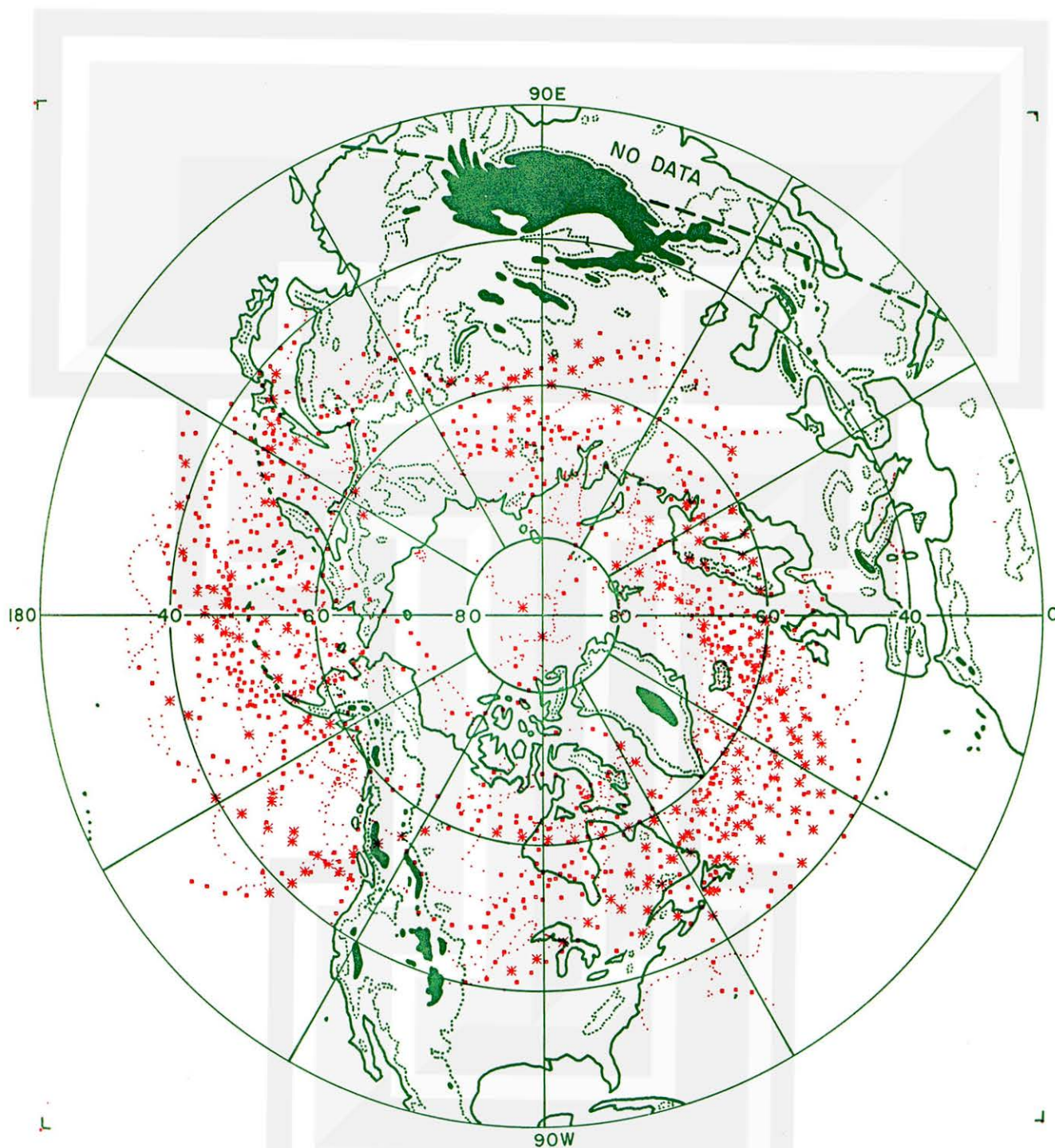


CYCLONE MOVEMENT
SUMMER 1982

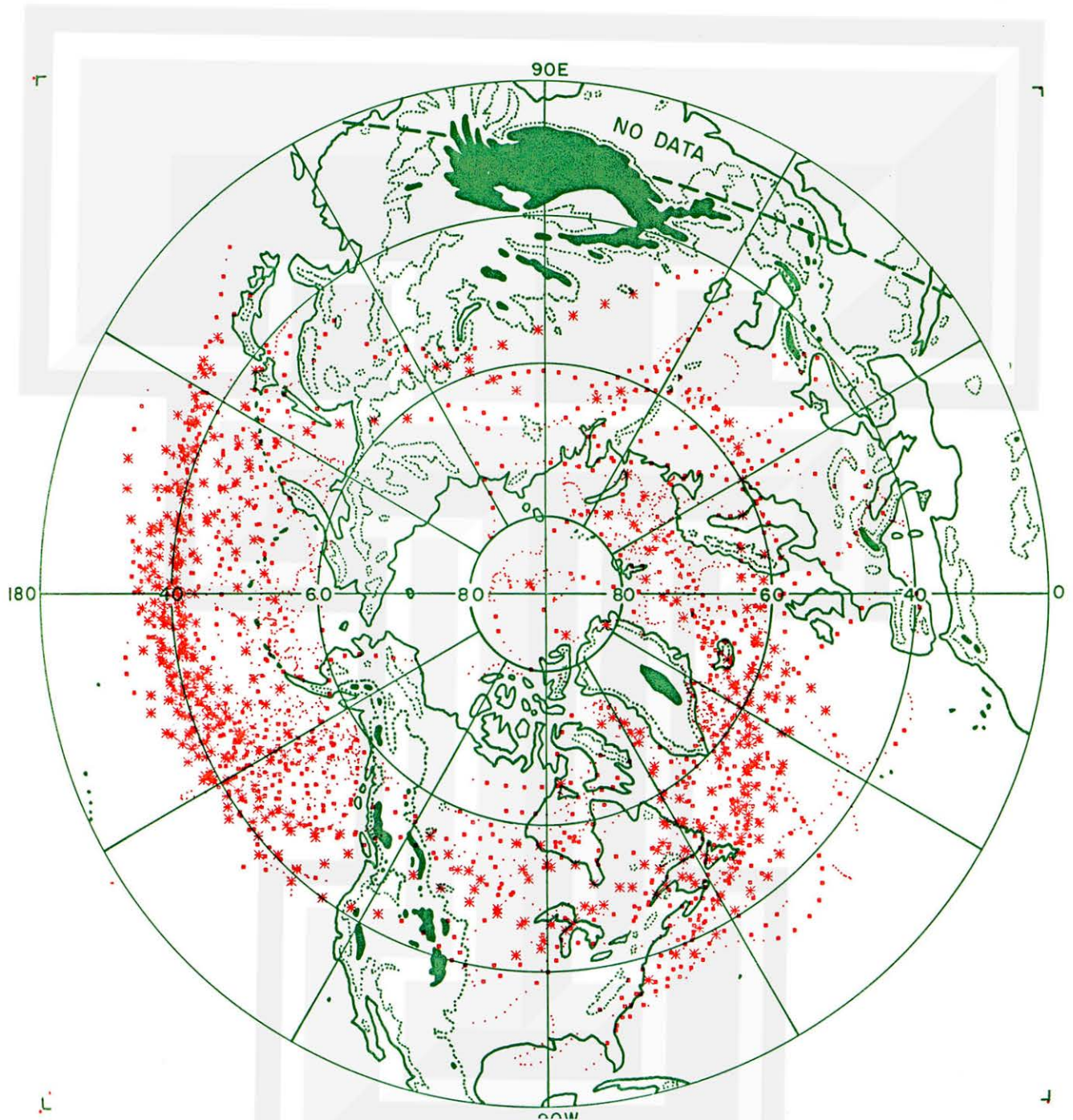


CYCLONE MOVEMENT

AUTUMN 1982

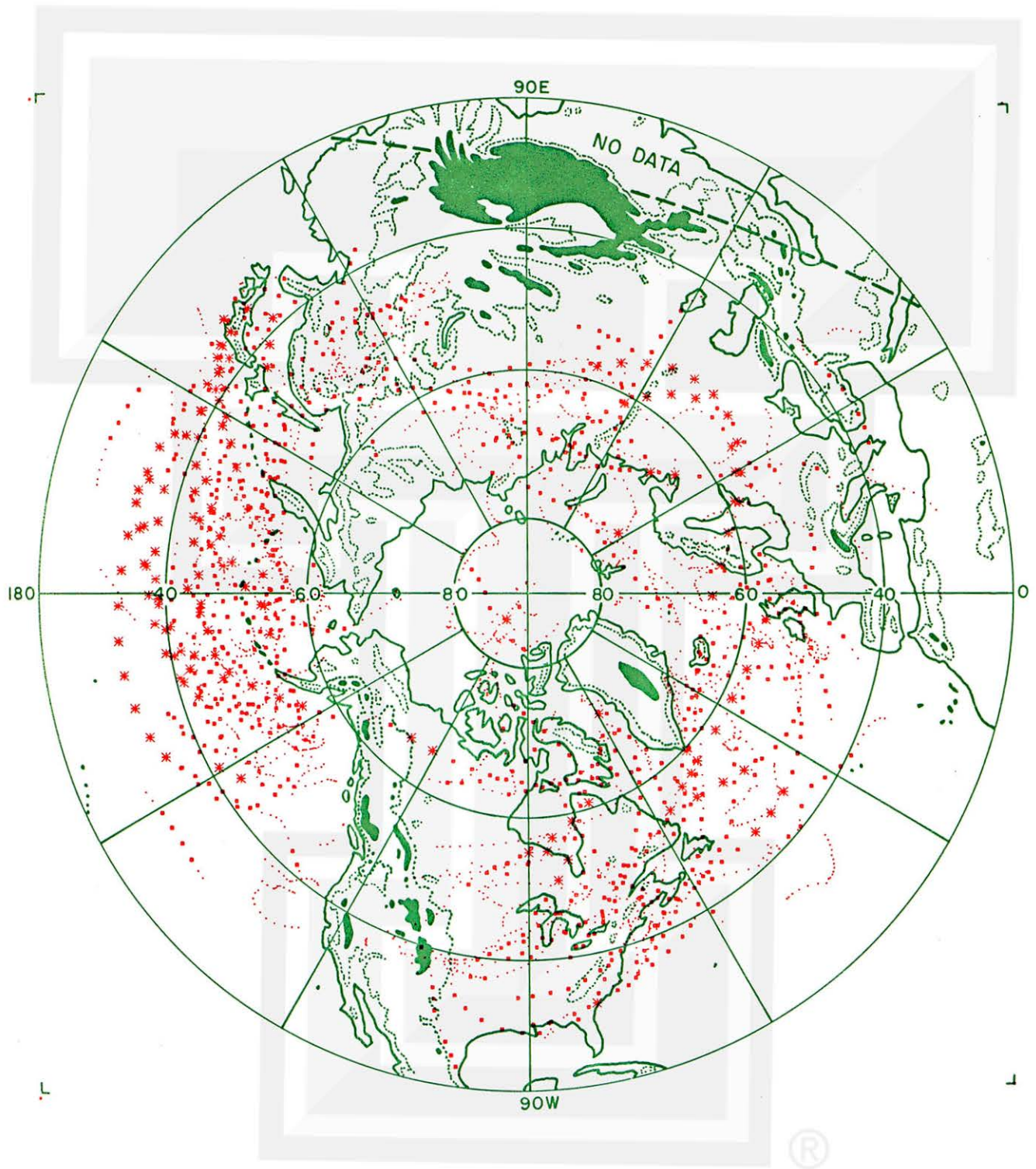


CYCLONE MOVEMENT
WINTER 1982 - 83



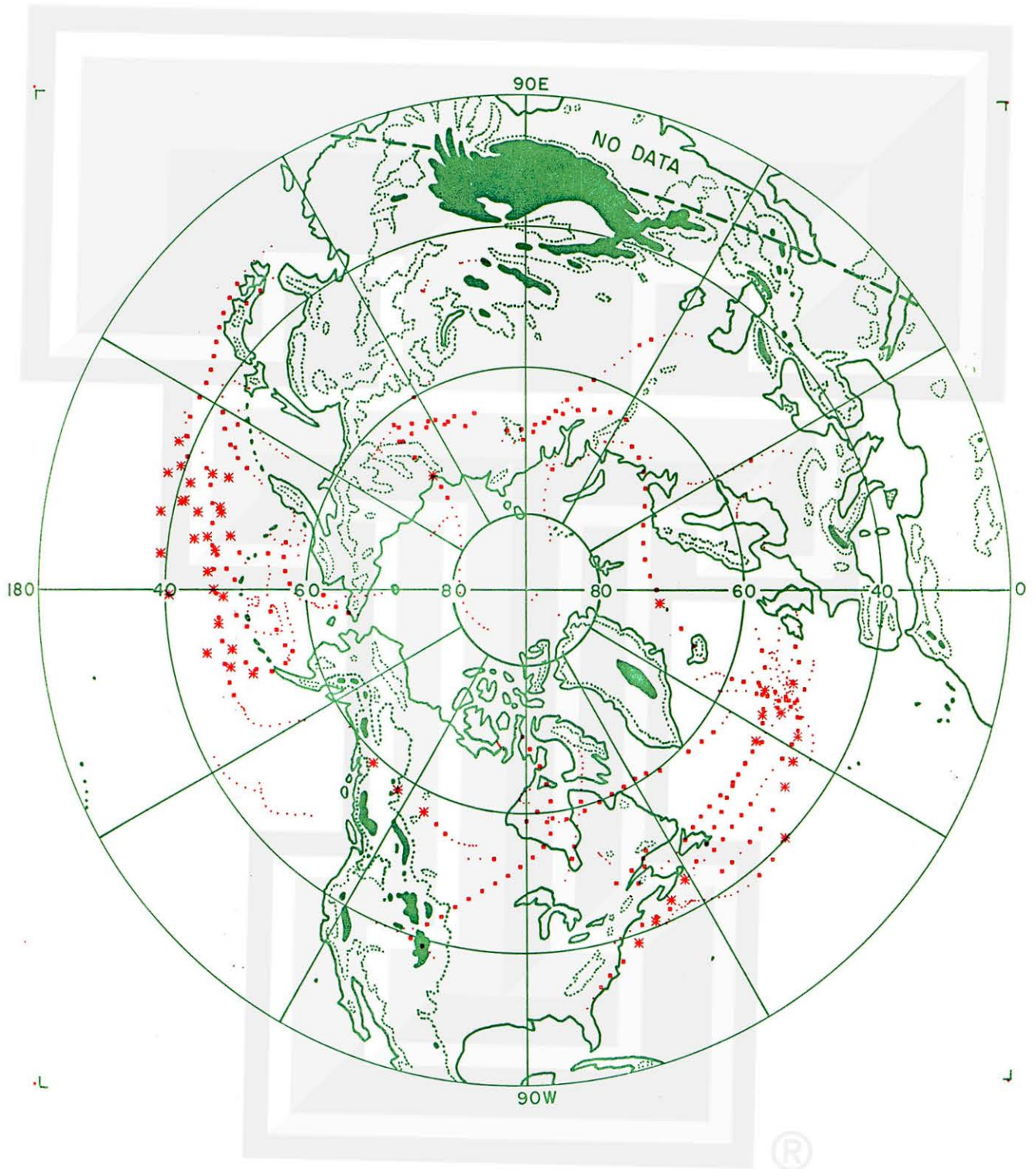
CYCLONE MOVEMENT

SPRING 1983



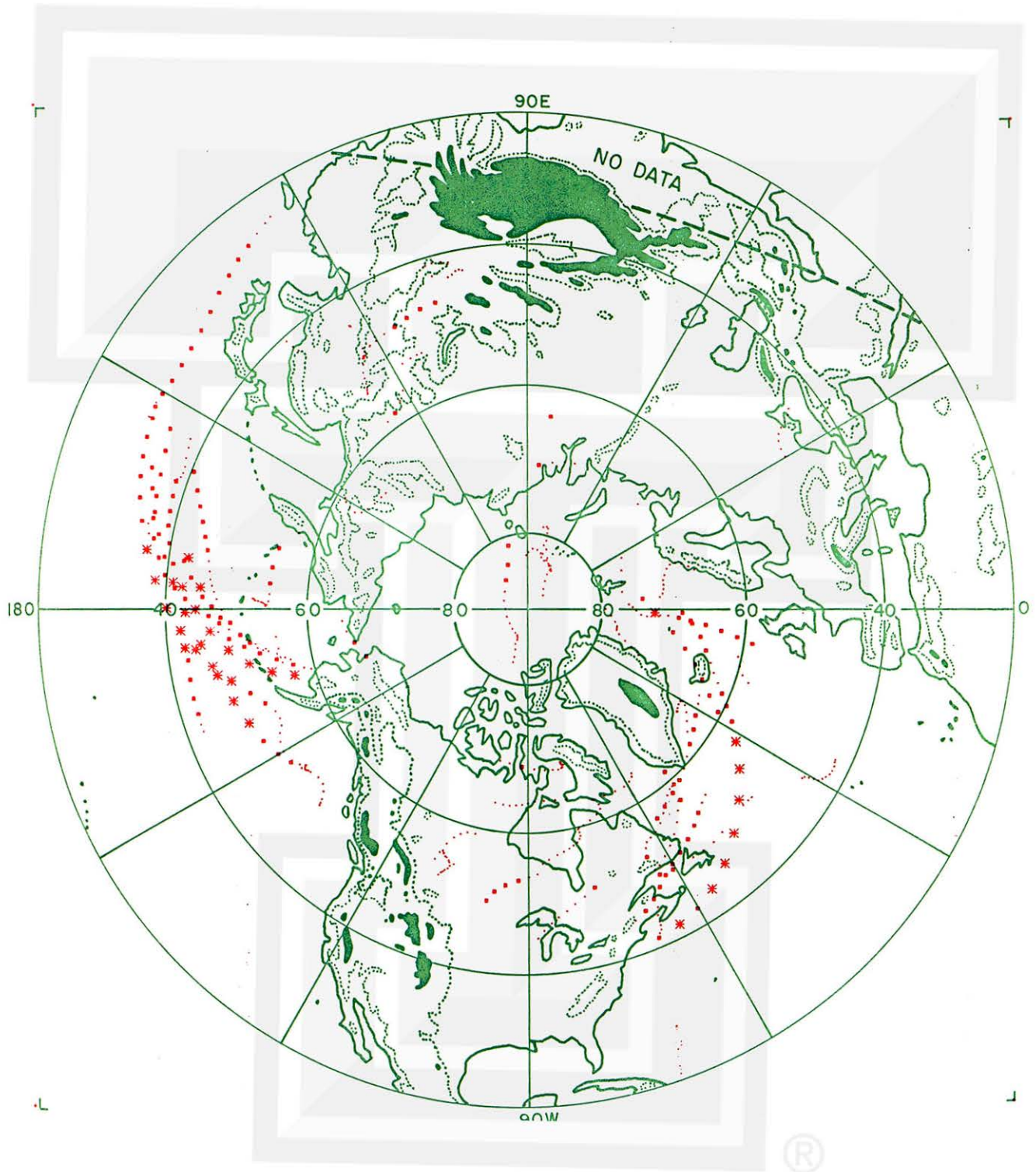
CYCLONE MOVEMENT

JUN 82



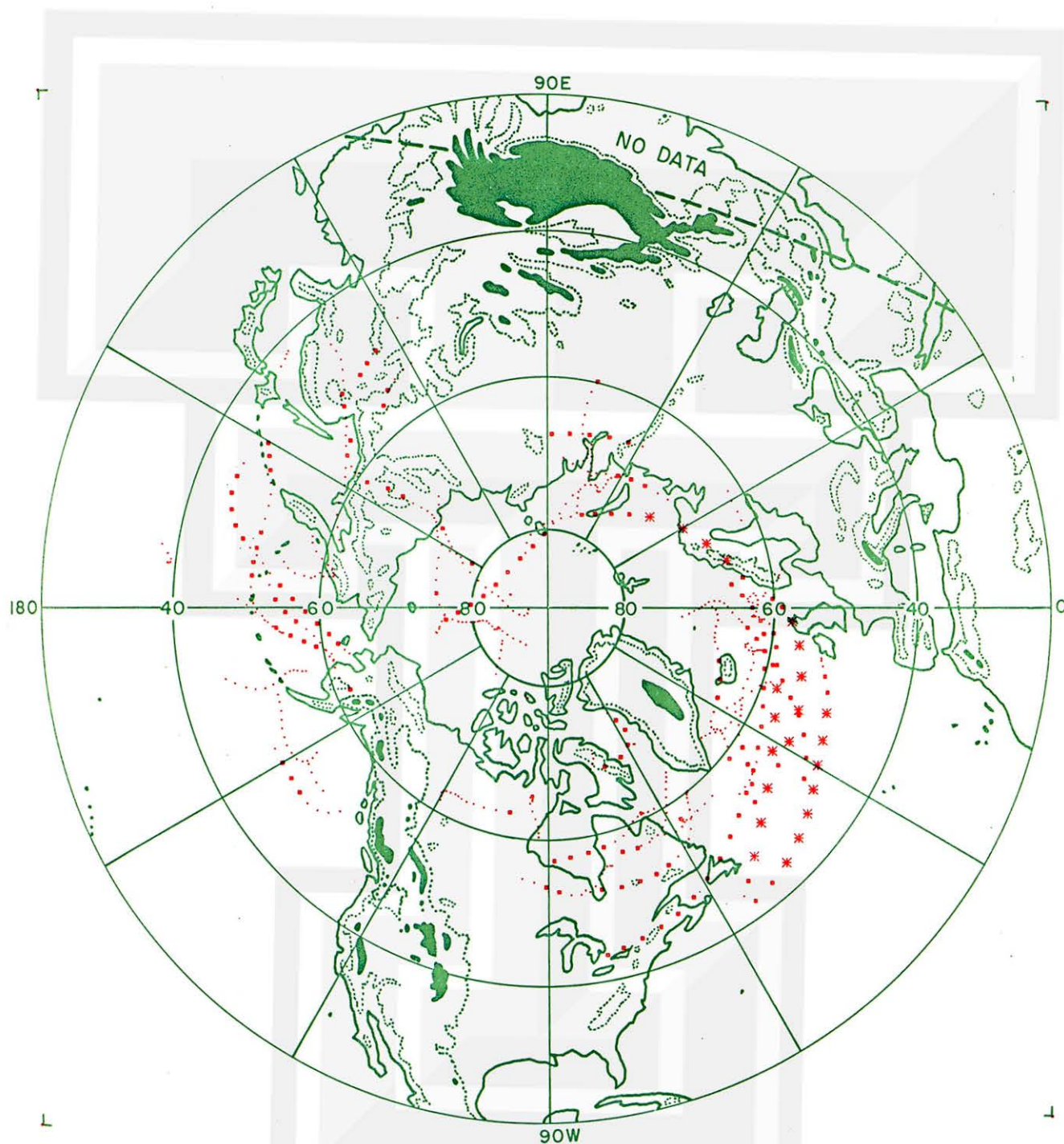
CYCLONE MOVEMENT

JUL 82



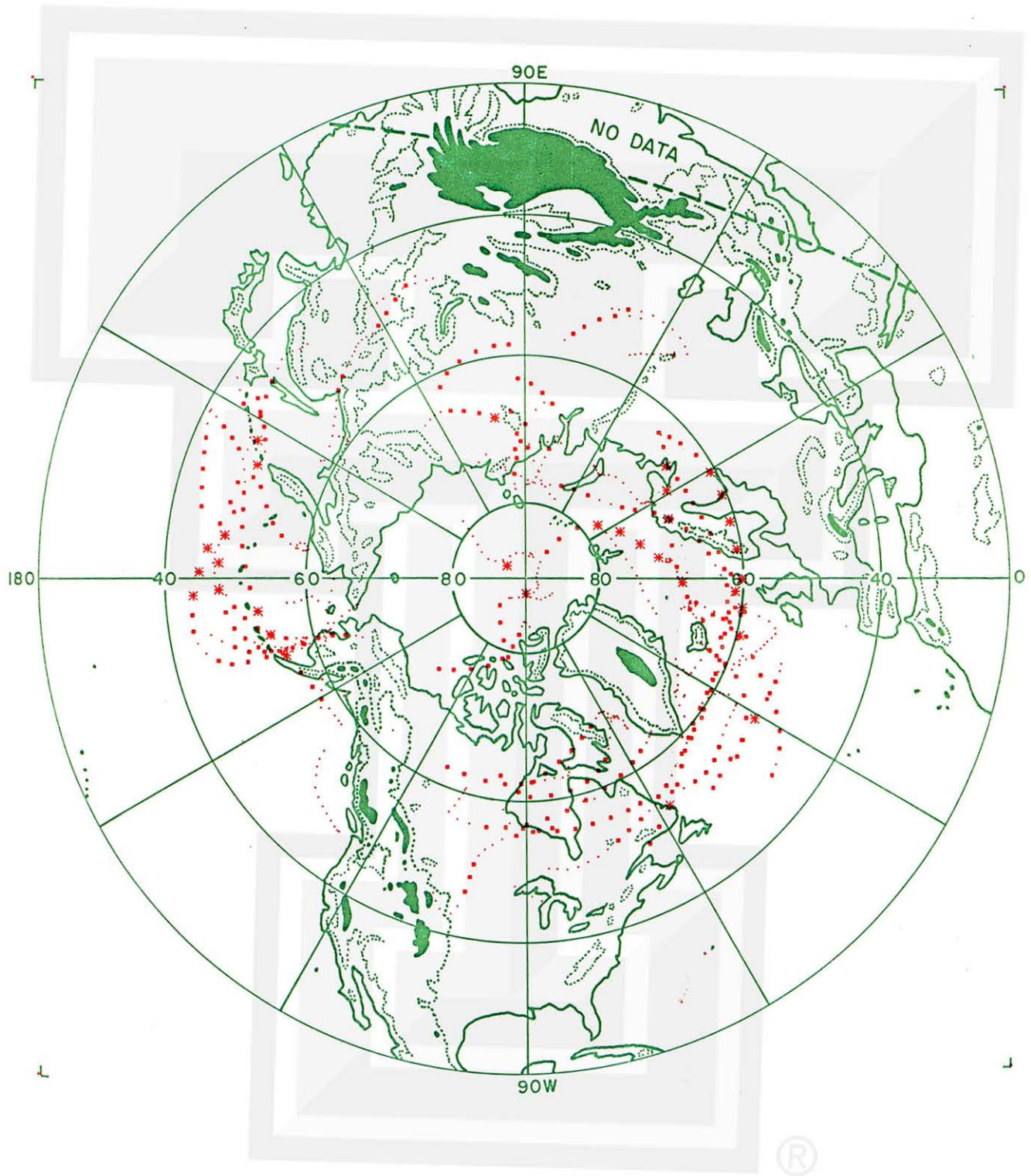
CYCLONE MOVEMENT

AUG 82



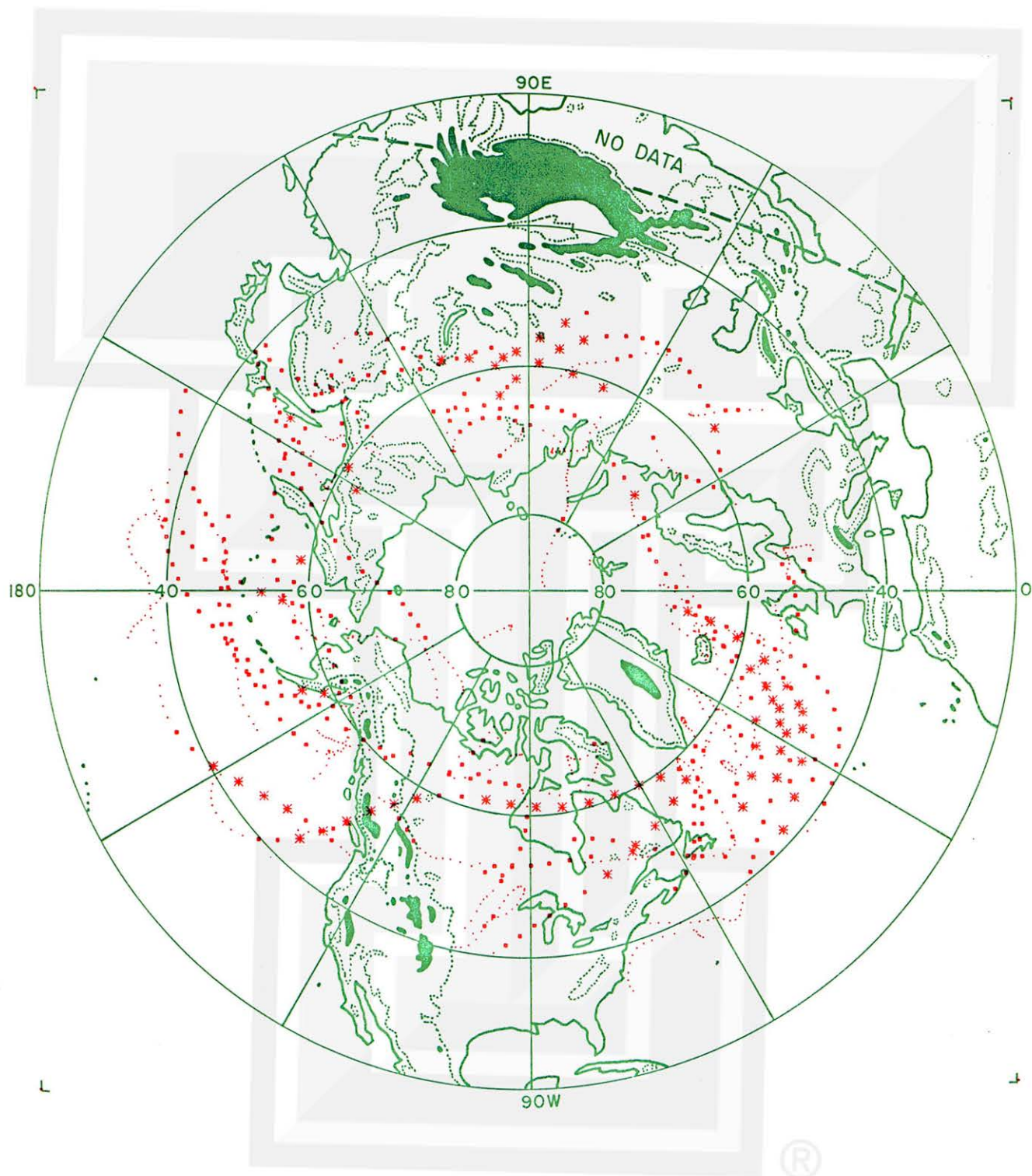
CYCLONE MOVEMENT

SEP 82



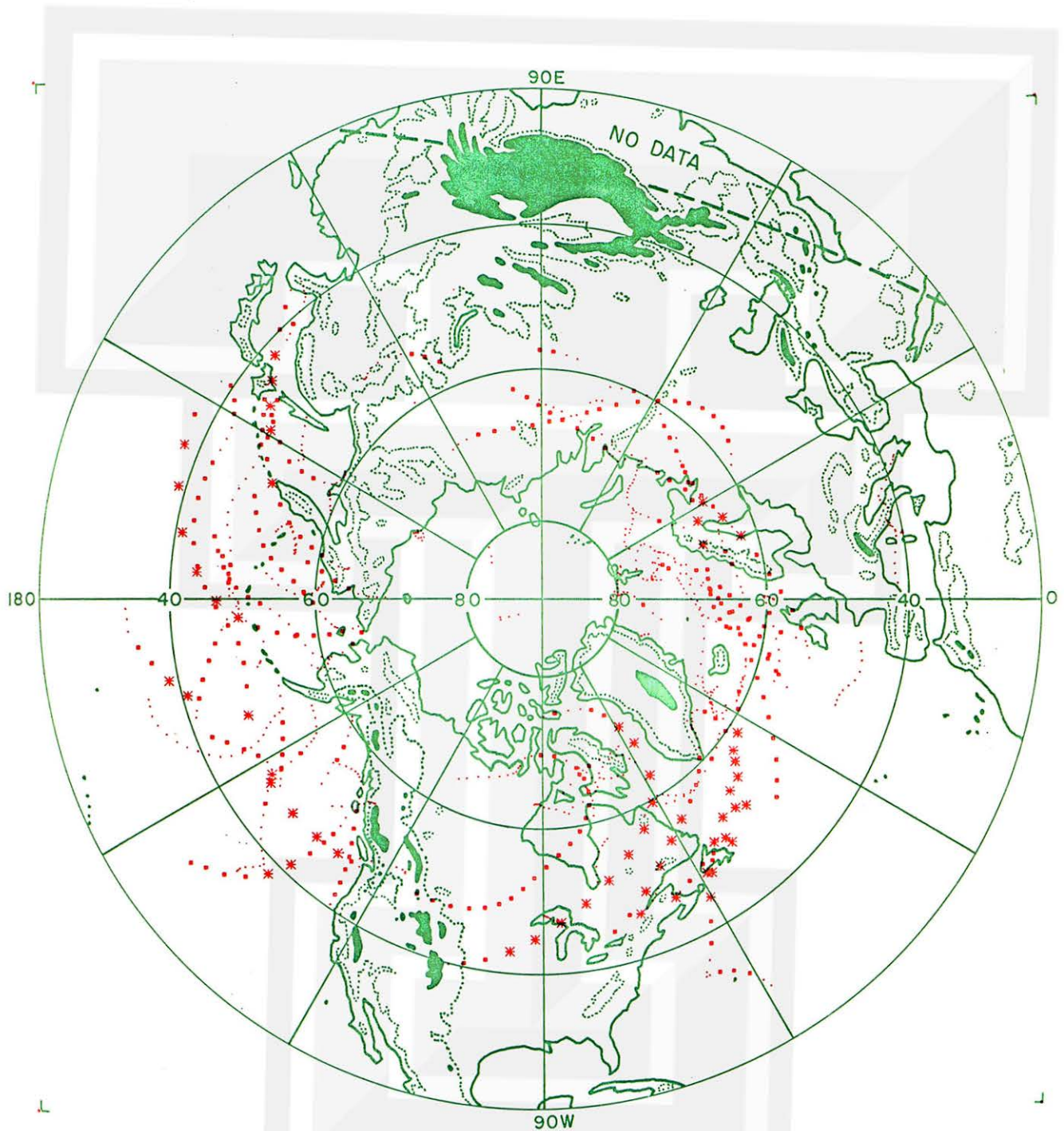
CYCLONE MOVEMENT

OCT 82



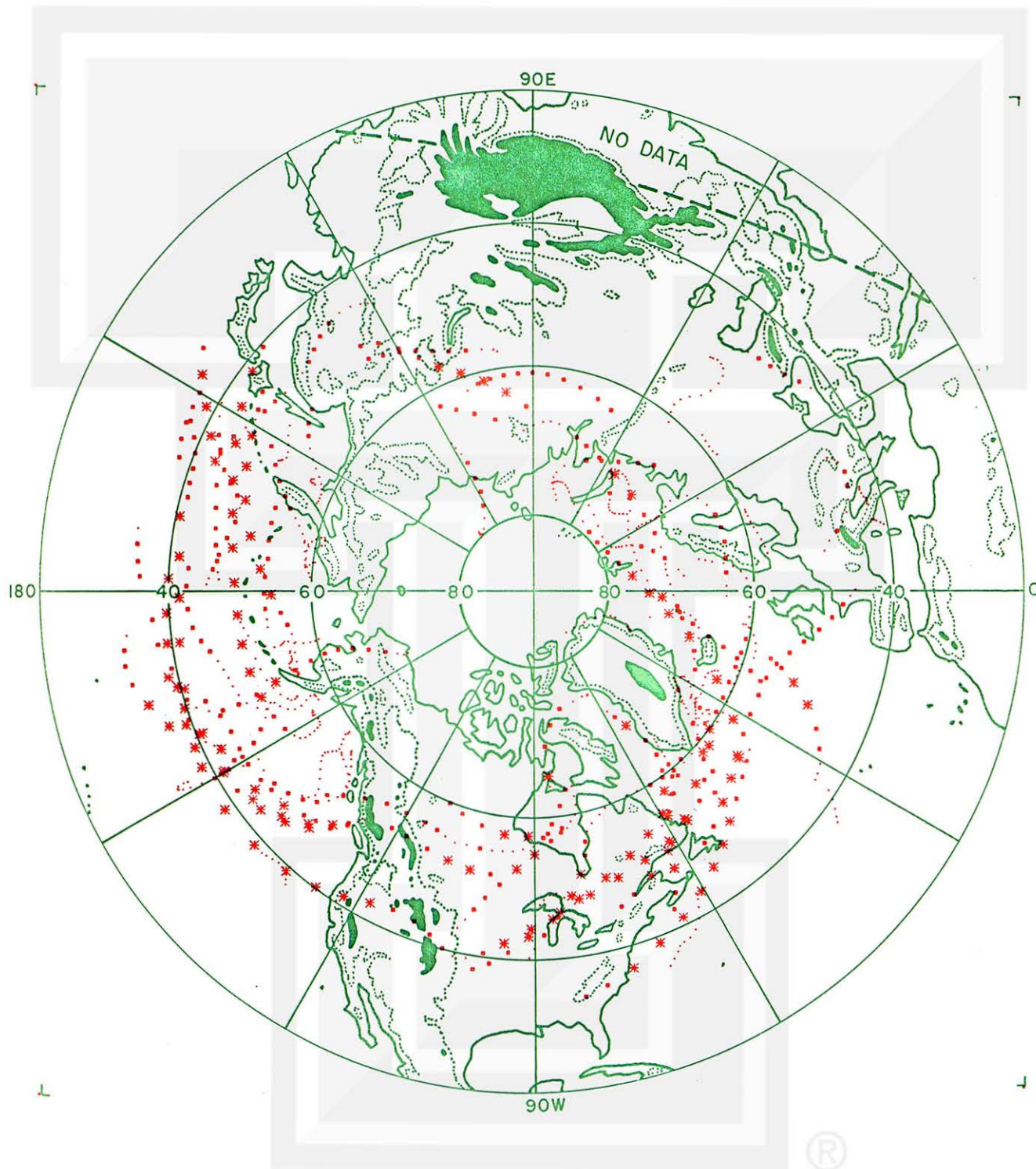
CYCLONE MOVEMENT

NOV 82



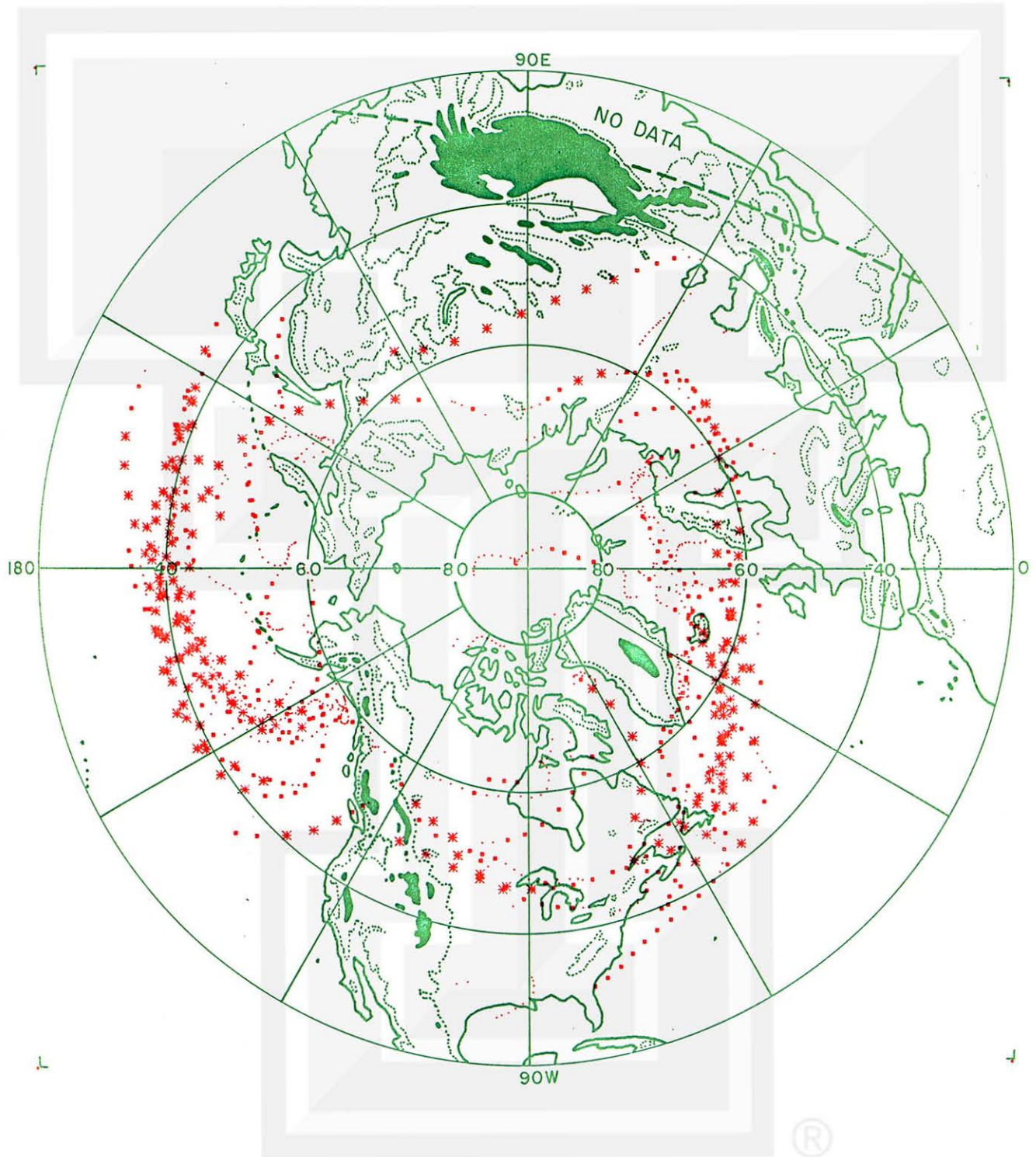
CYCLONE MOVEMENT

DEC 82



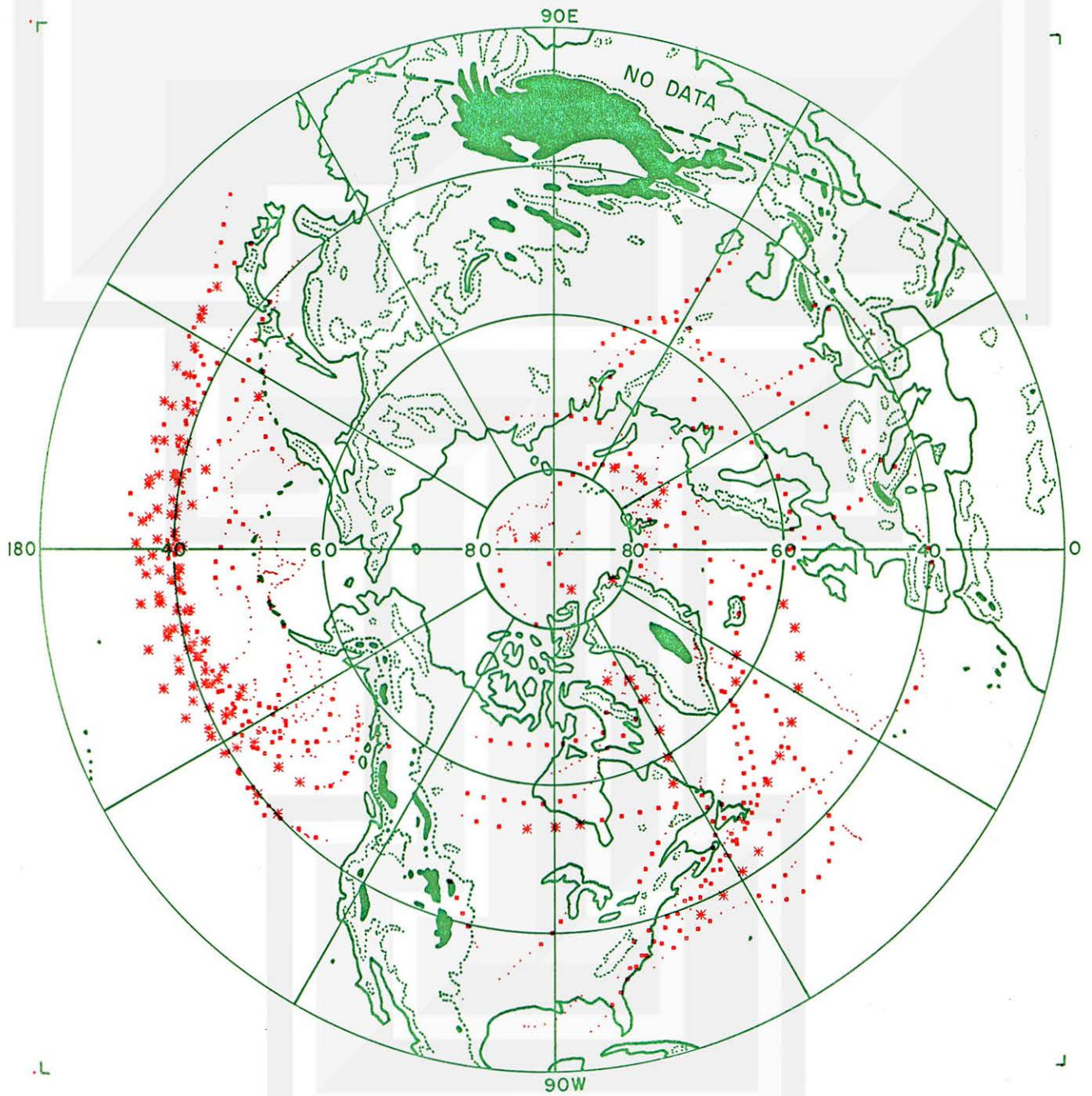
CYCLONE MOVEMENT

JAN 83



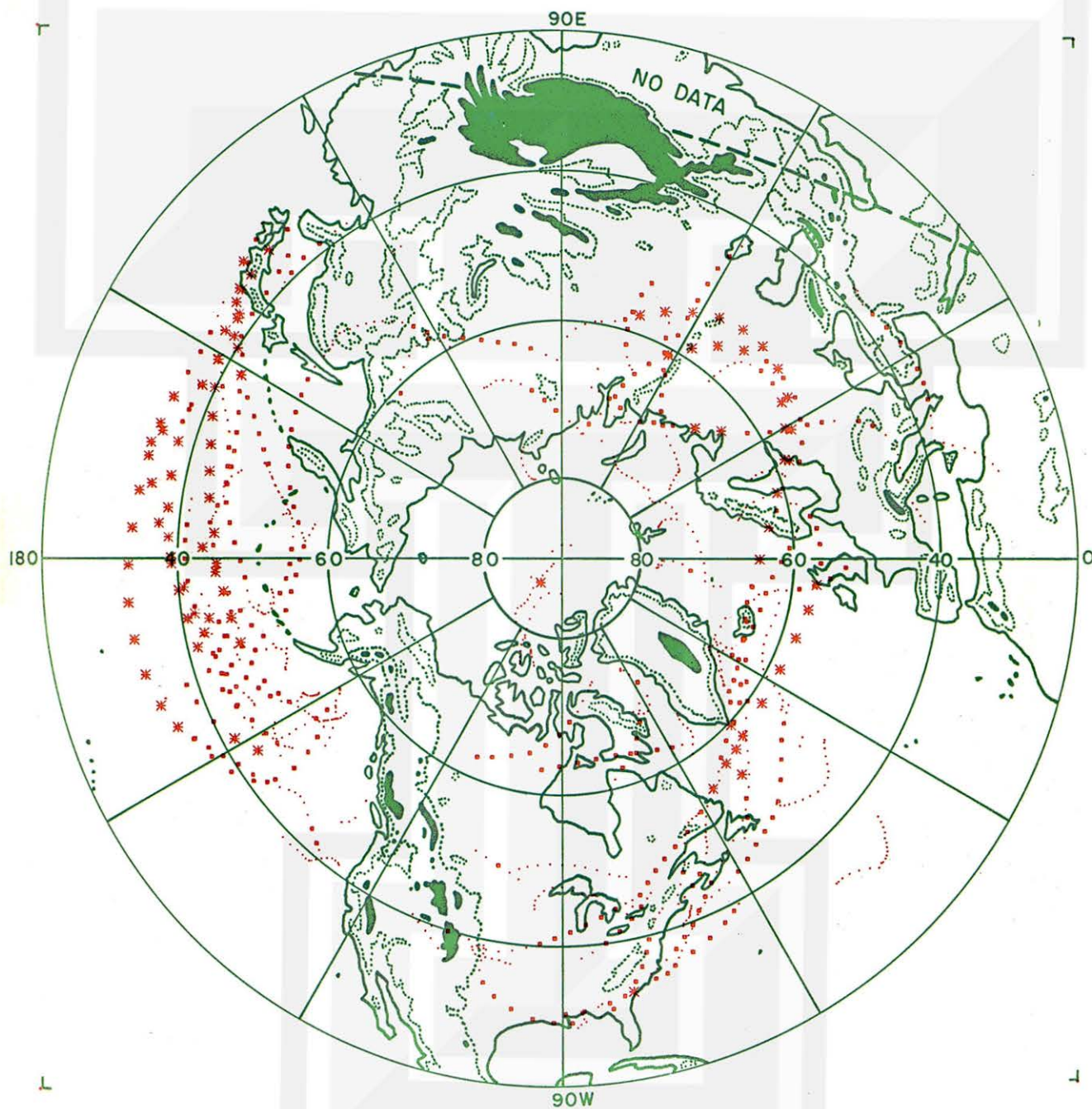
CYCLONE MOVEMENT

FEB 83



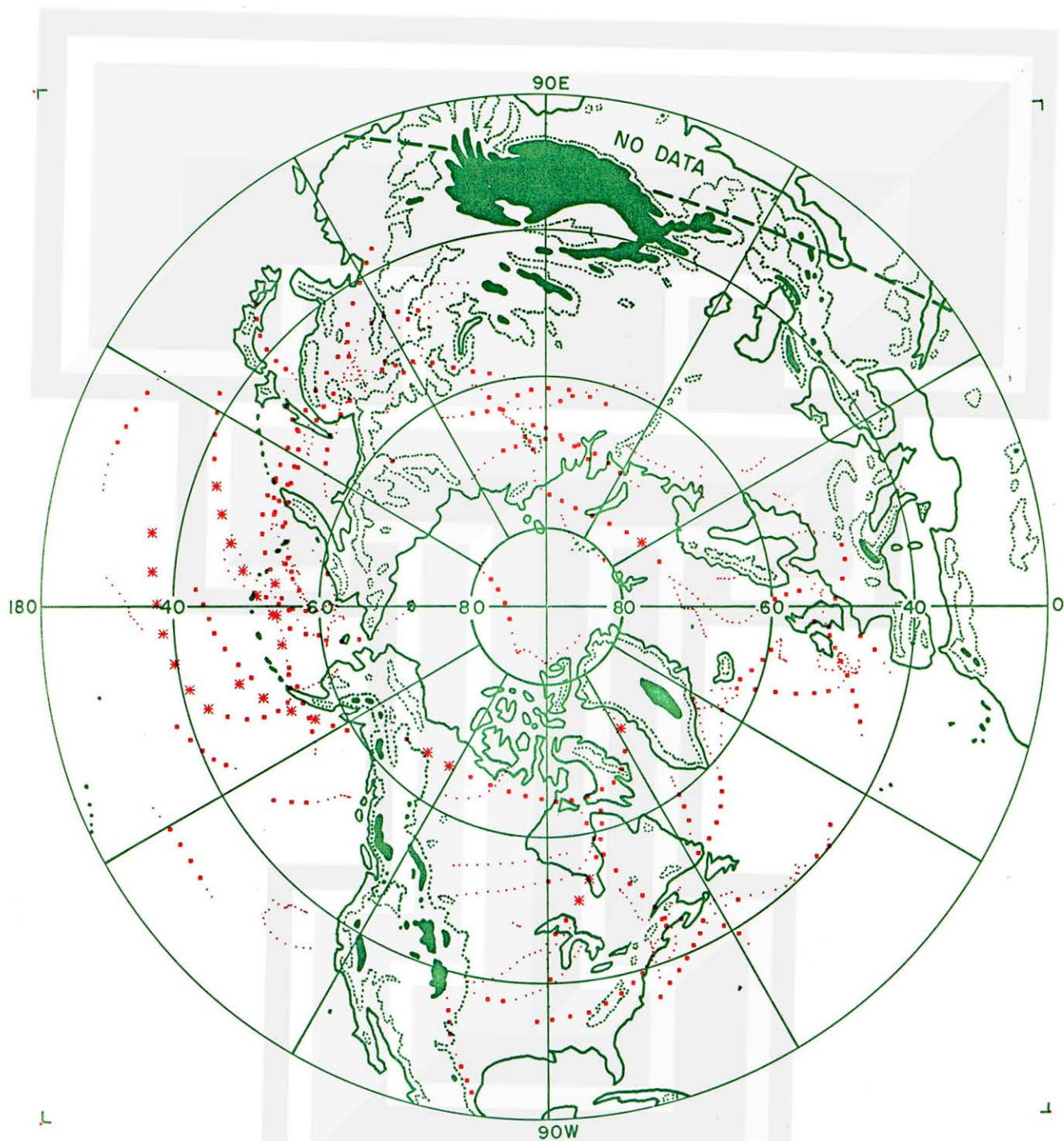
CYCLONE MOVEMENT

MAR 83



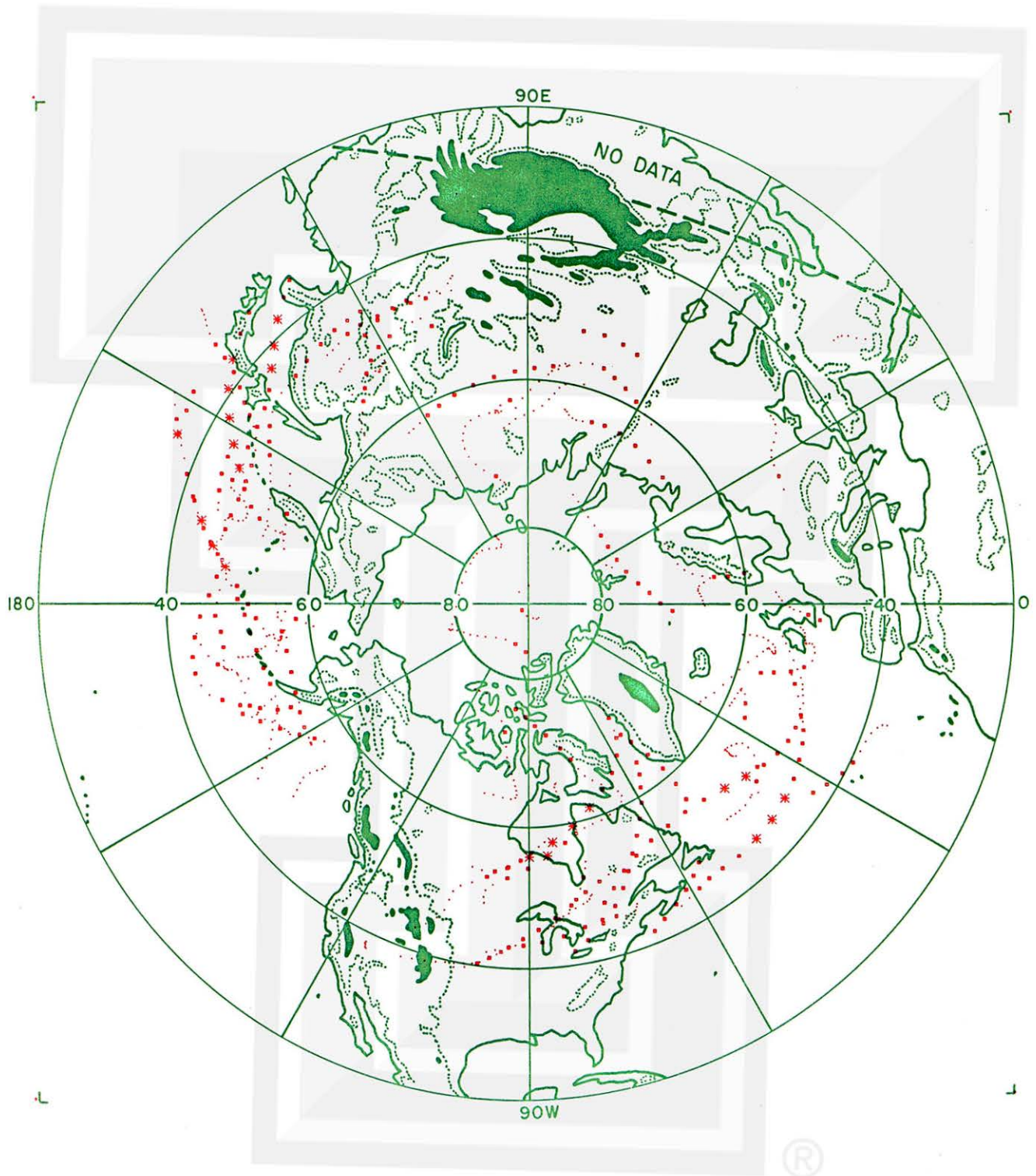
CYCLONE MOVEMENT

APR 83



CYCLONE MOVEMENT

MAY 83



..... 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

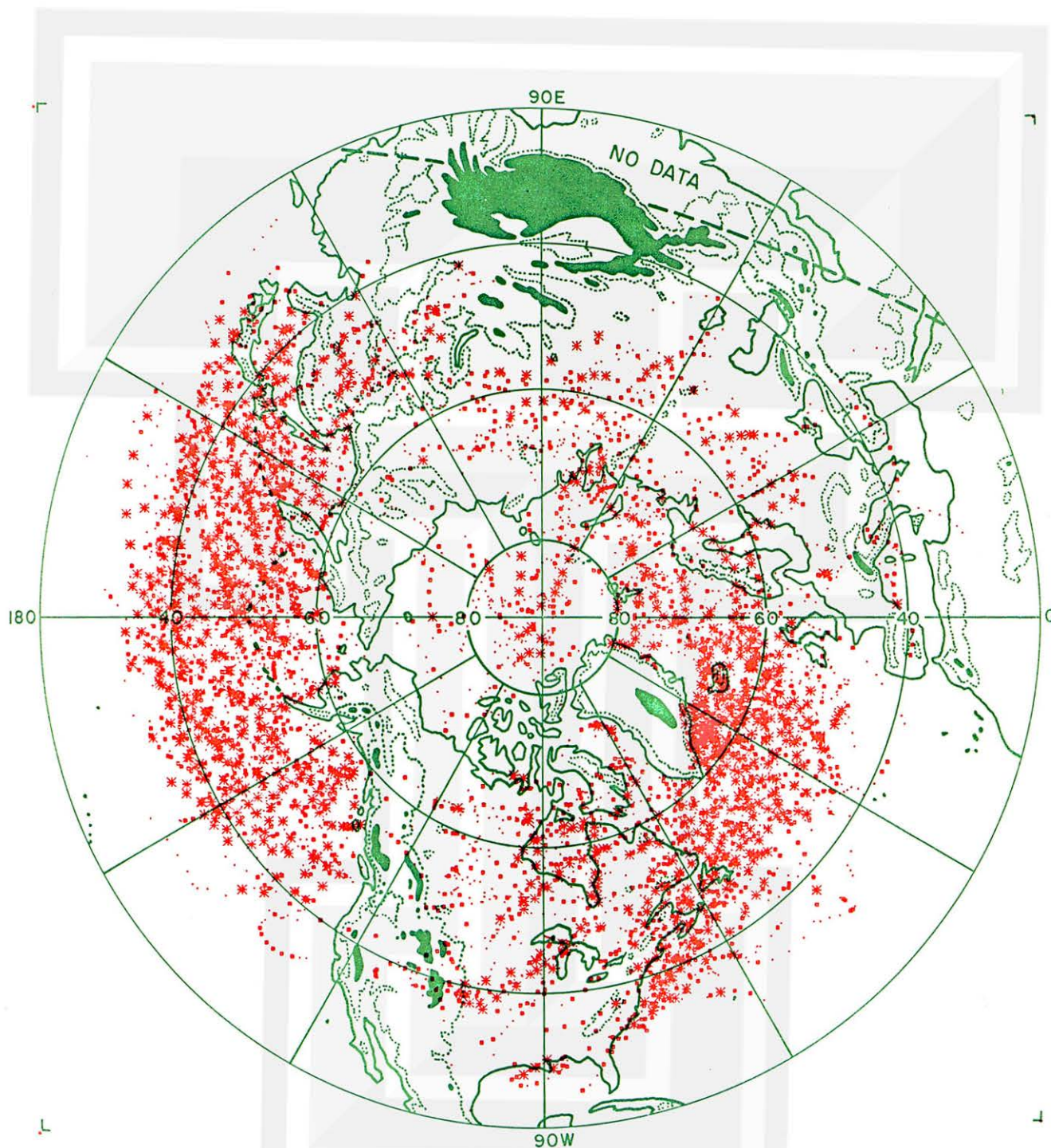
Summer 1982
Autumn 1982
Winter 1982-83
Spring 1983

12 MONTHLY MAPS

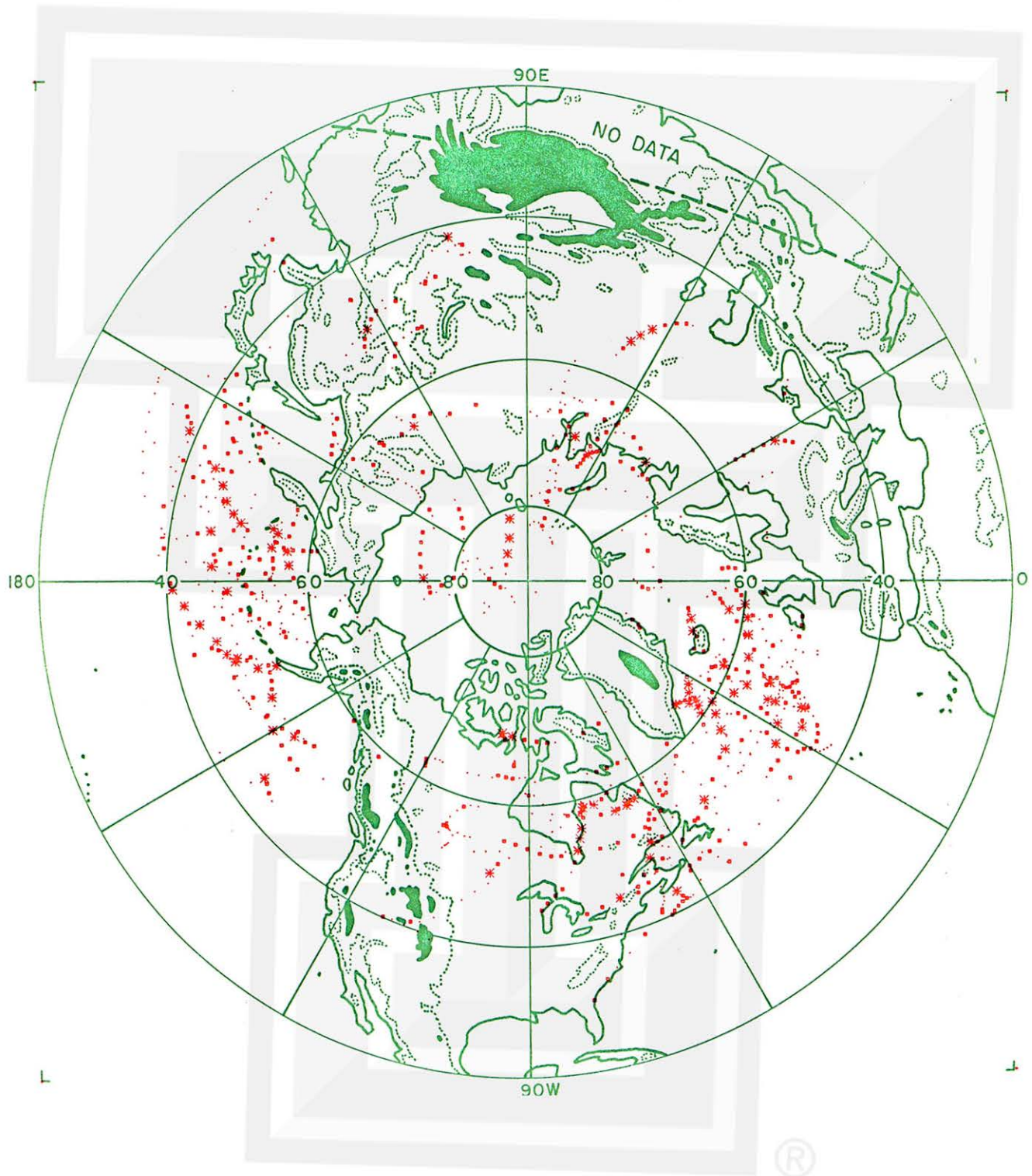
June-December 1982
January-May 1983



CYCLONE DEEPENING
12 MOS JUN 82 - MAY 83

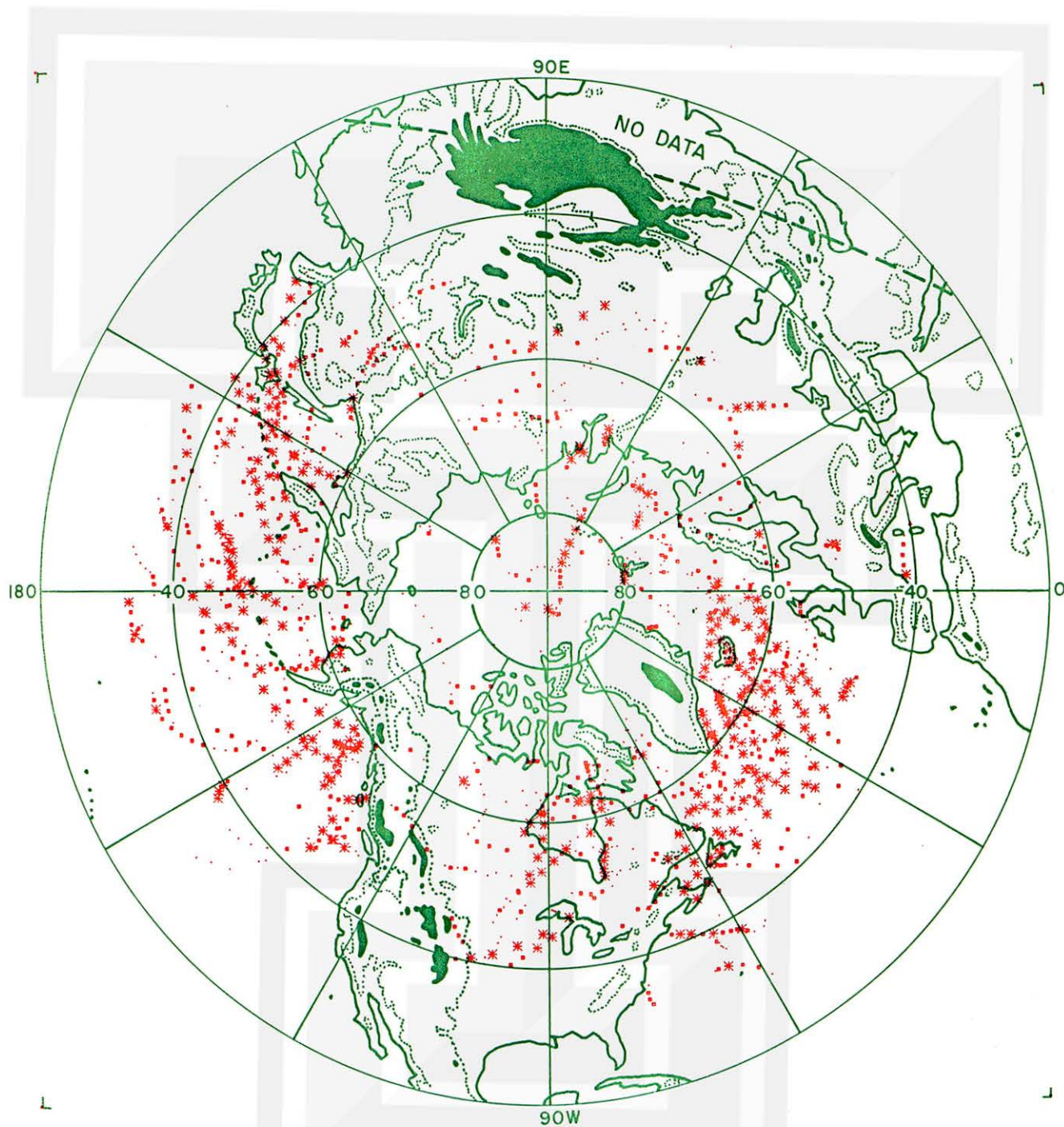


CYCLONE DEEPENING
SUMMER 1982



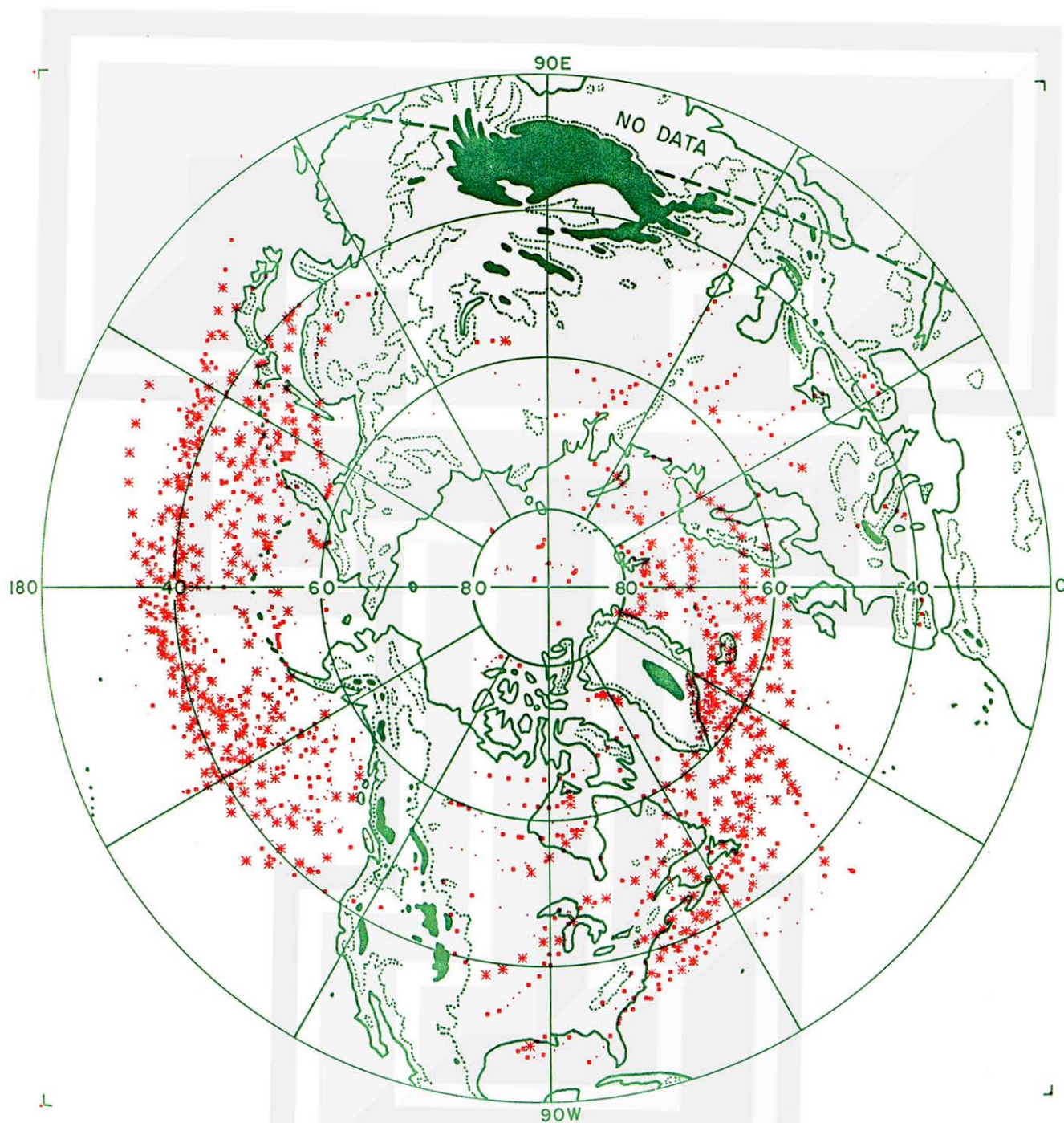
CYCLONE DEEPENING

AUTUMN 1982



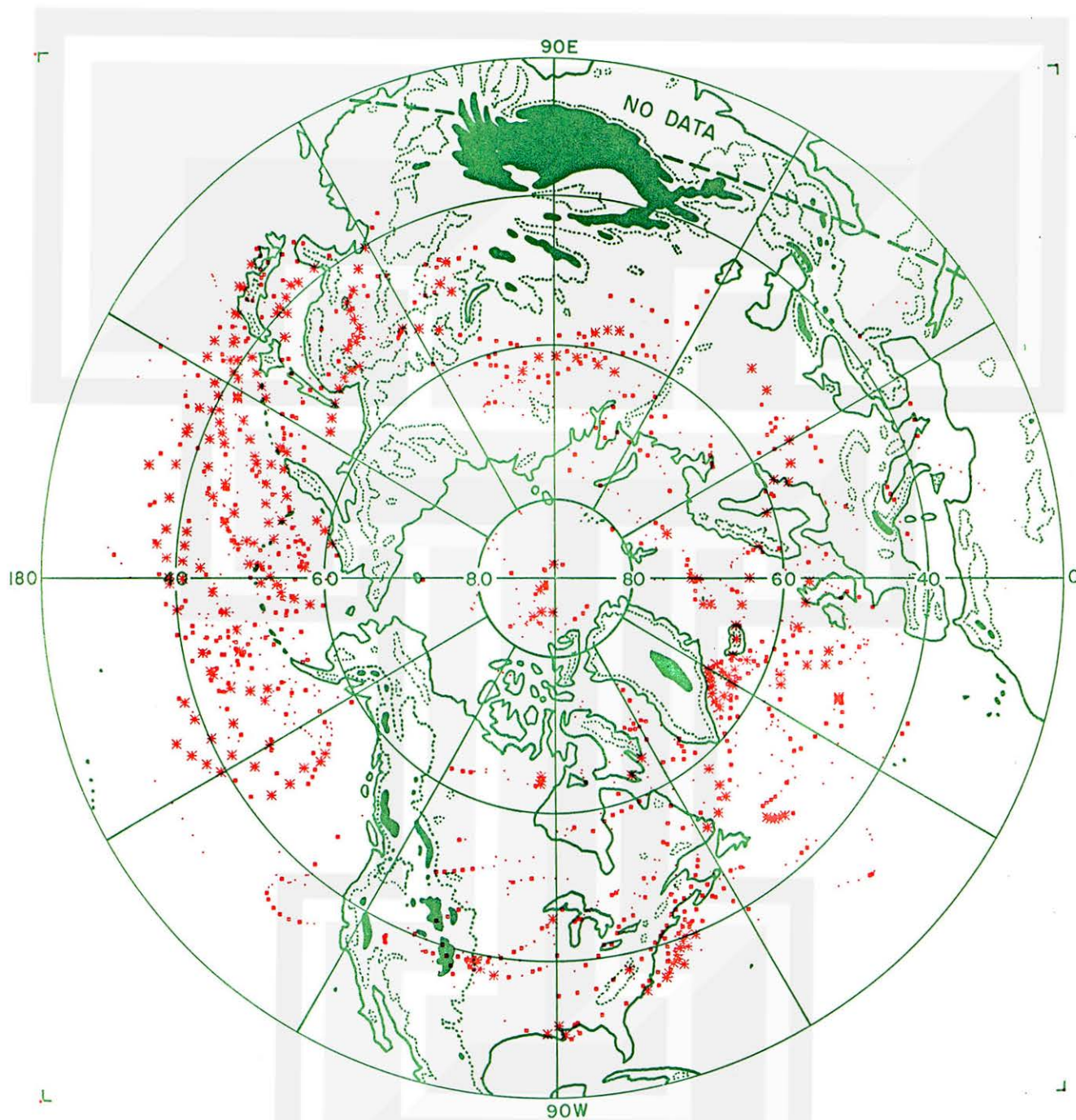
CYCLONE DEEPENING

WINTER 1982 - 83



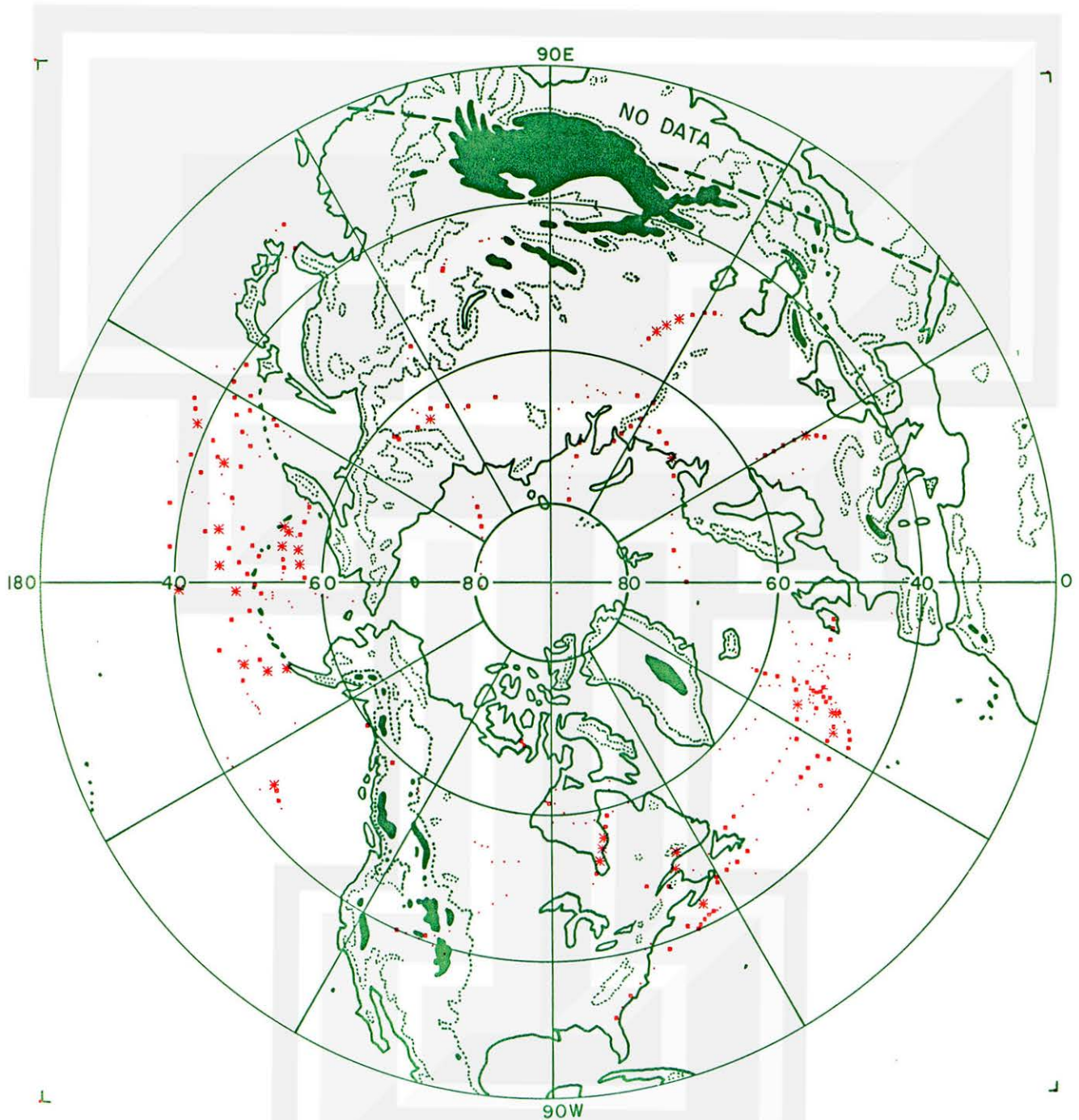
CYCLONE DEEPENING

SPRING 1983



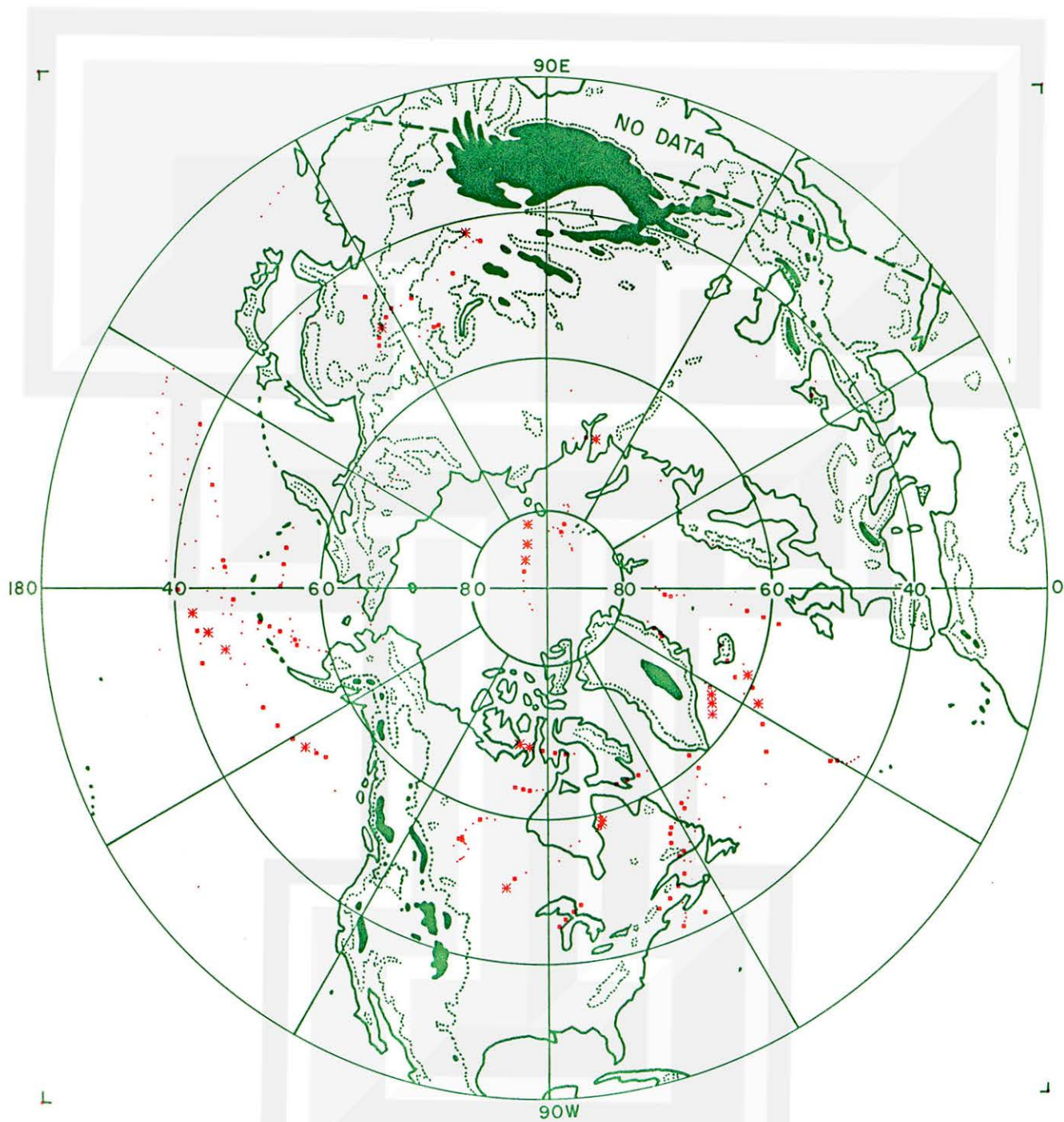
CYCLONE DEEPENING

JUN 82



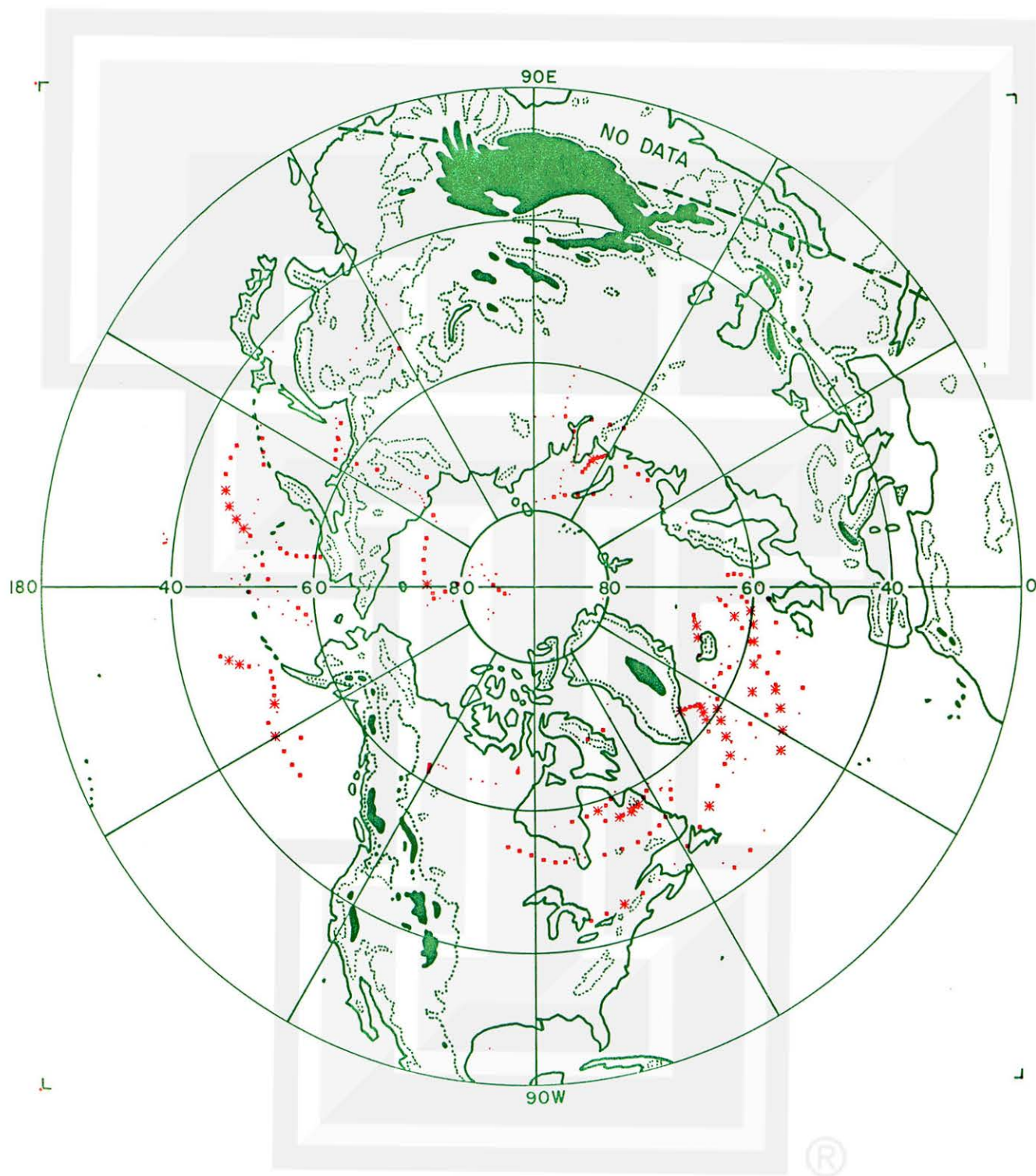
CYCLONE DEEPENING

JUL 82



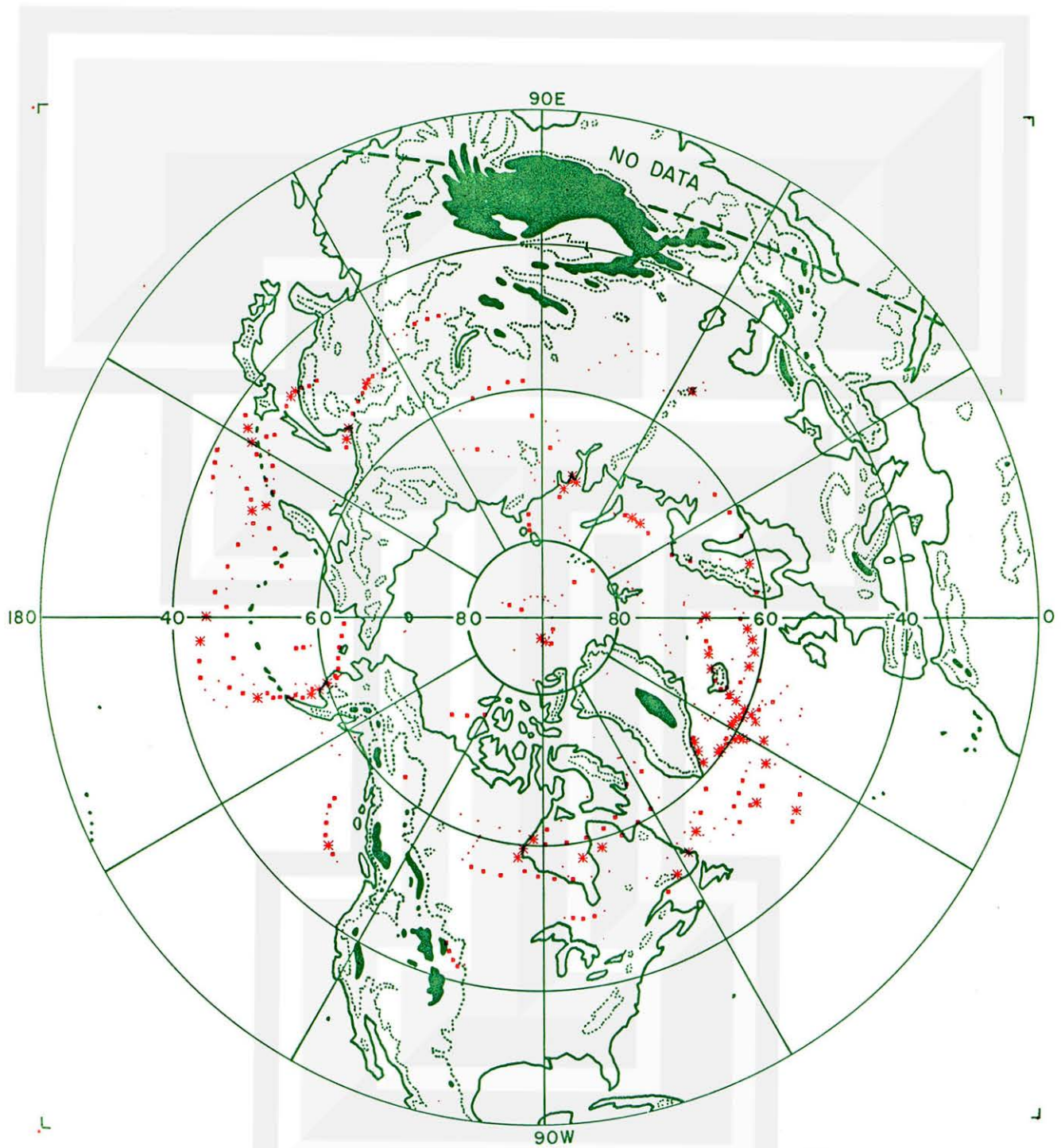
CYCLONE DEEPENING

AUG 82



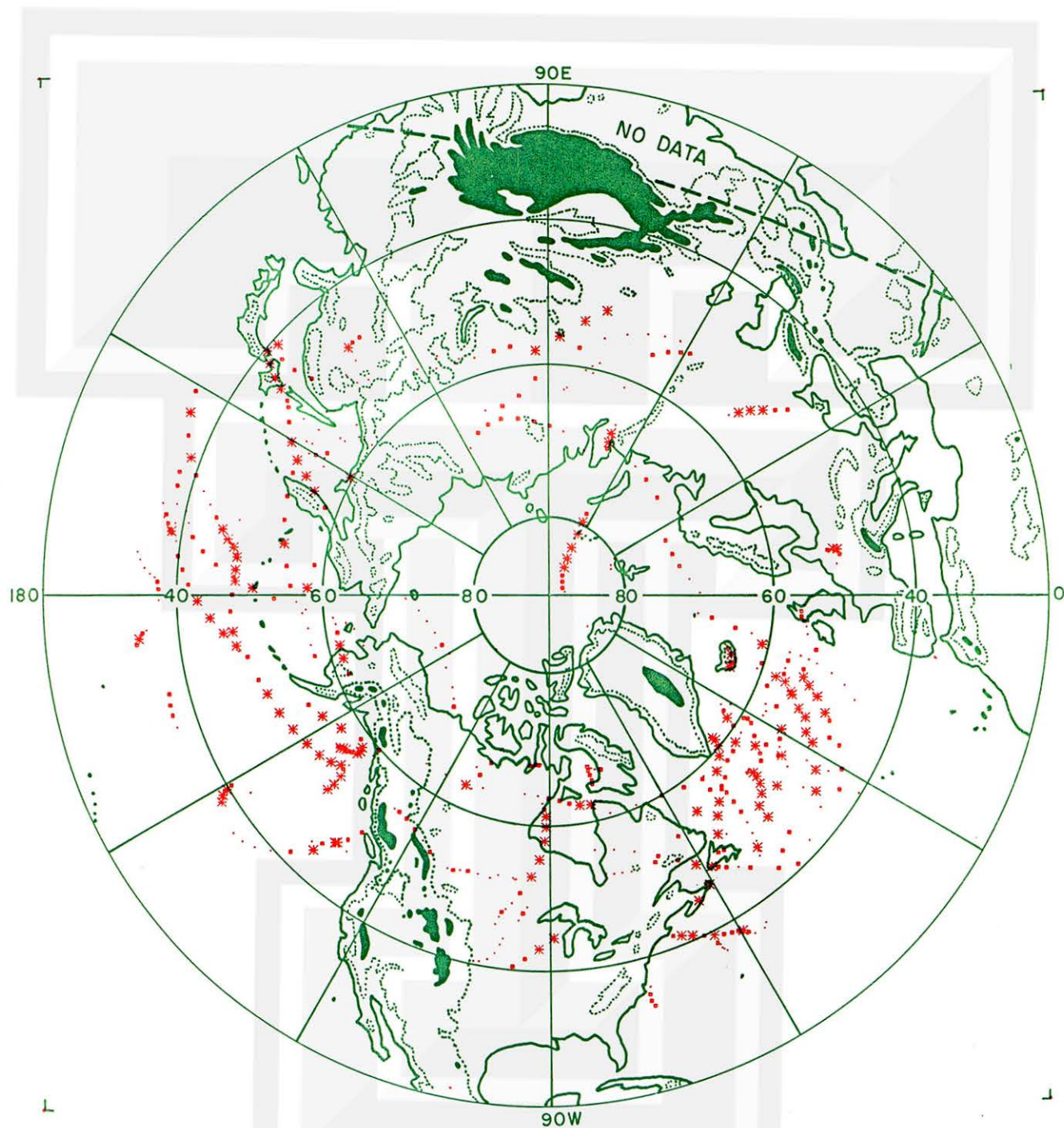
CYCLONE DEEPENING

SEP 82



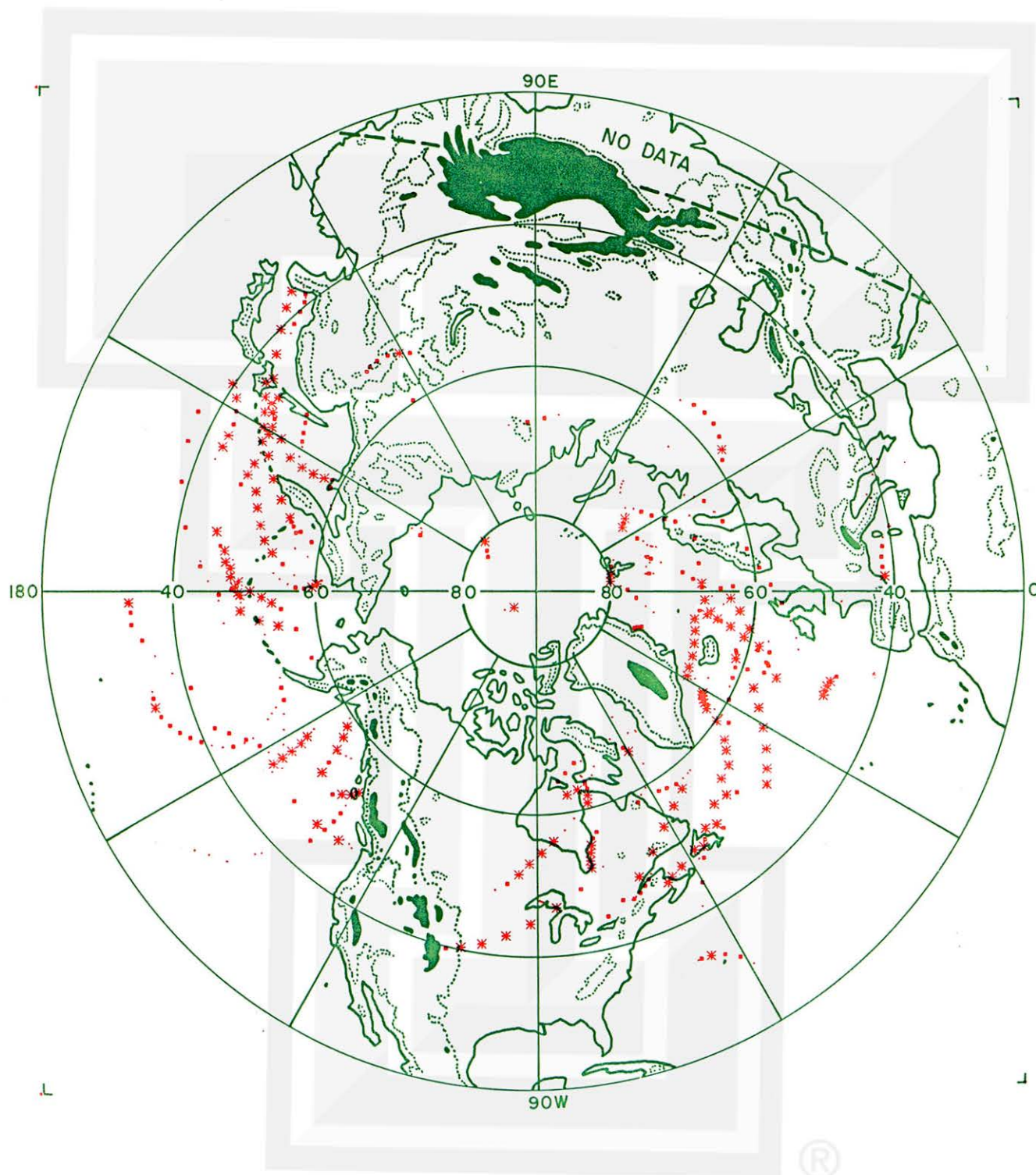
CYCLONE DEEPENING

OCT 82



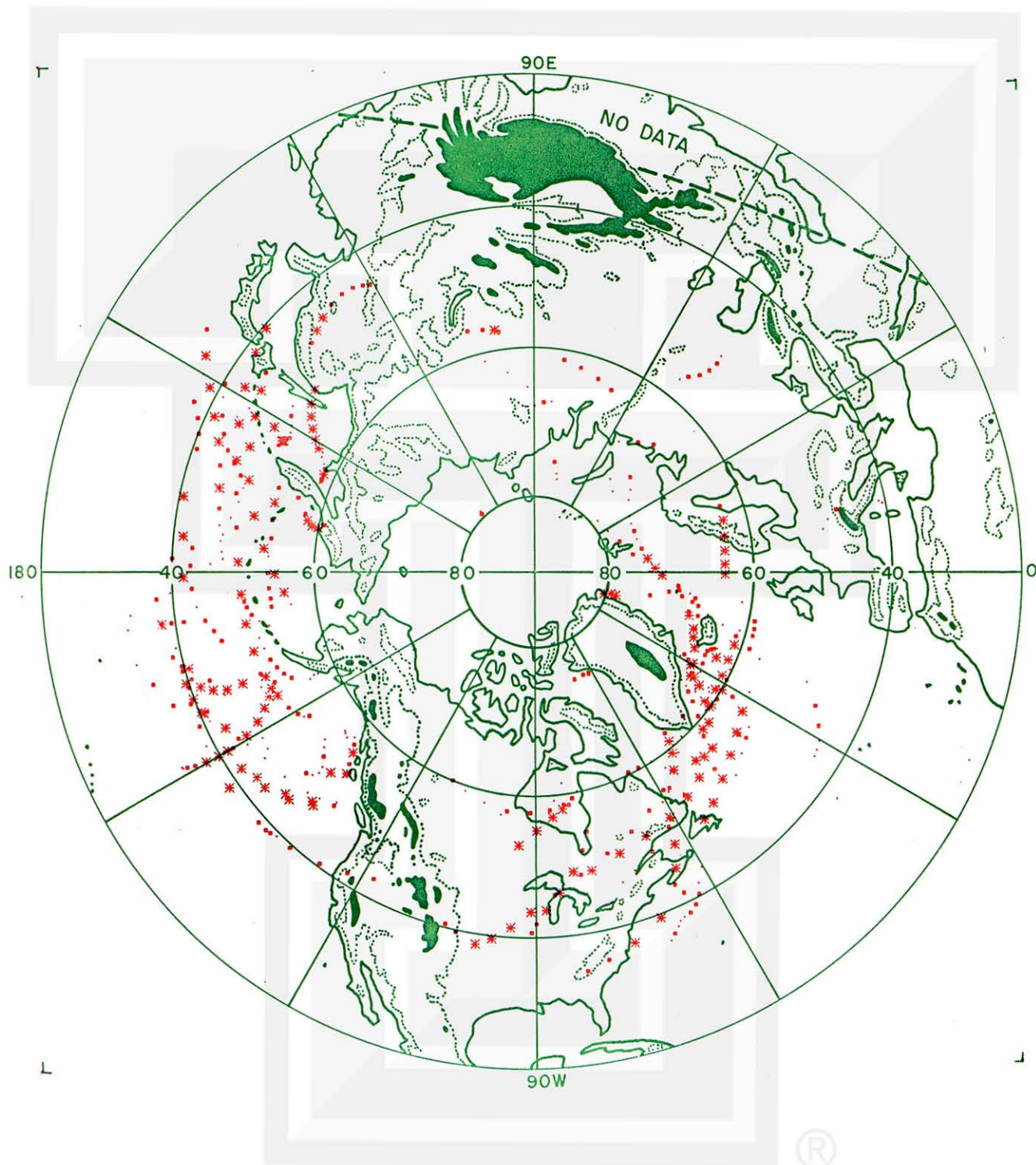
CYCLONE DEEPENING

NOV 82



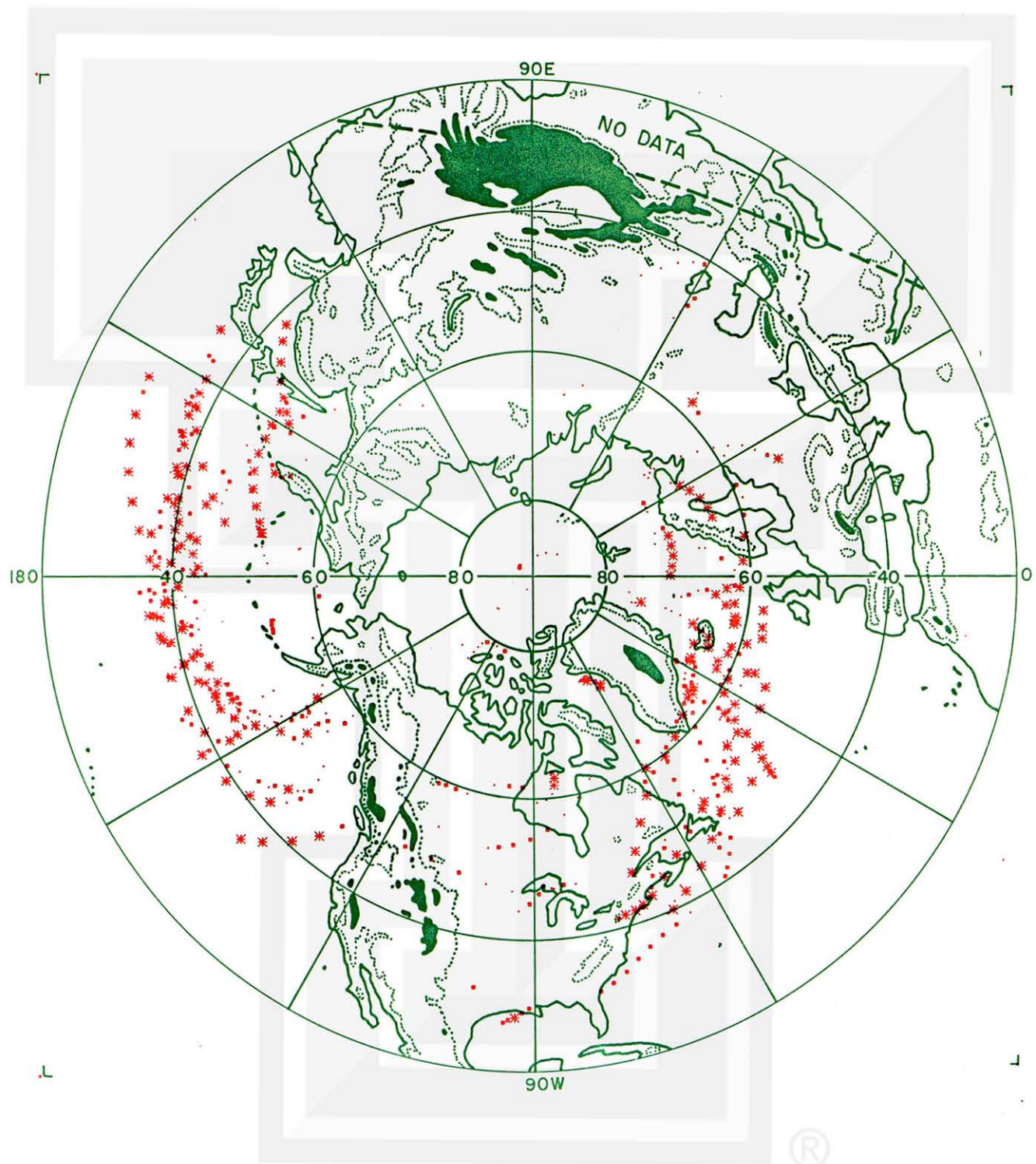
CYCLONE DEEPENING

DEC 82



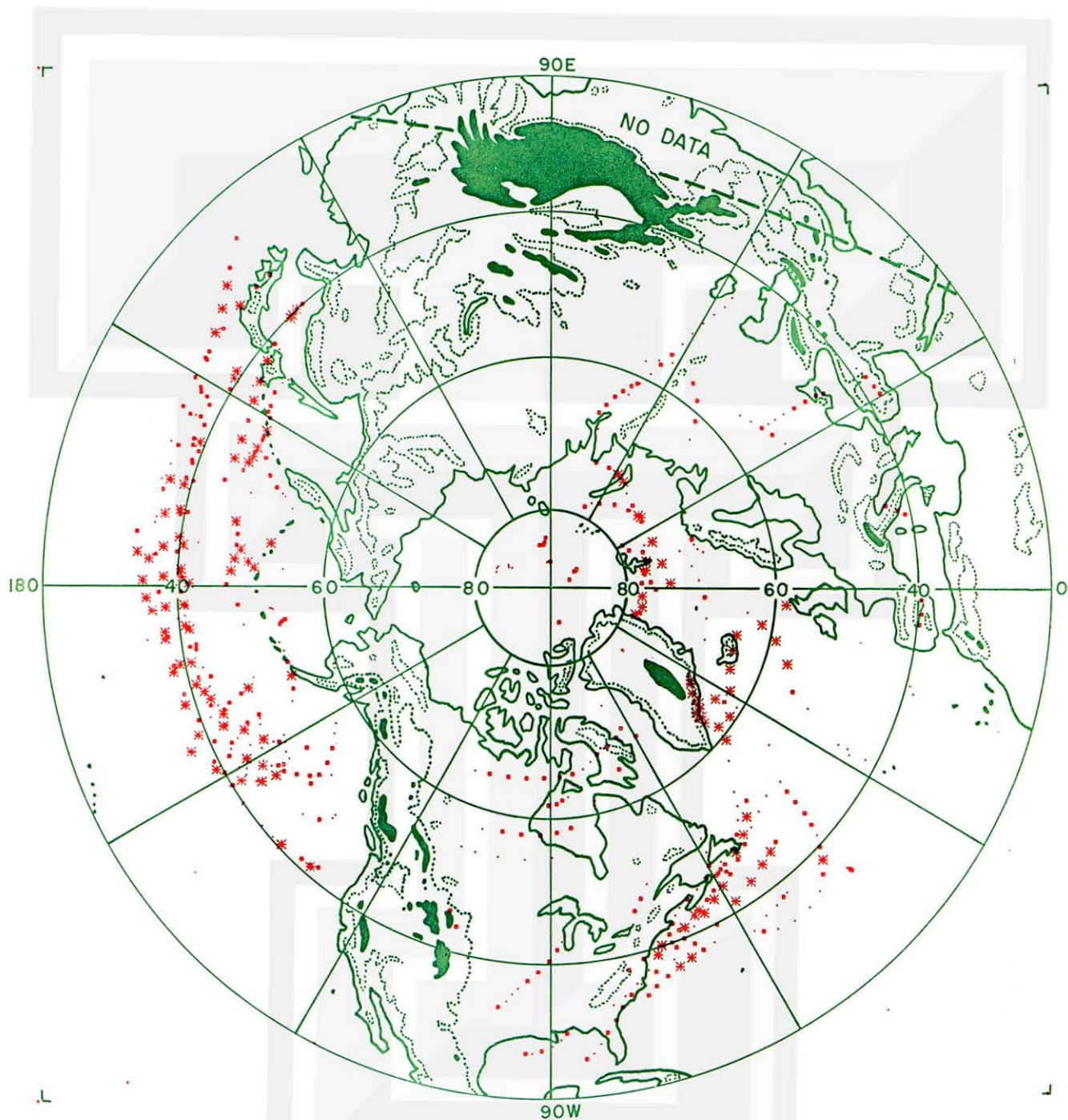
CYCLONE DEEPENING

JAN 83



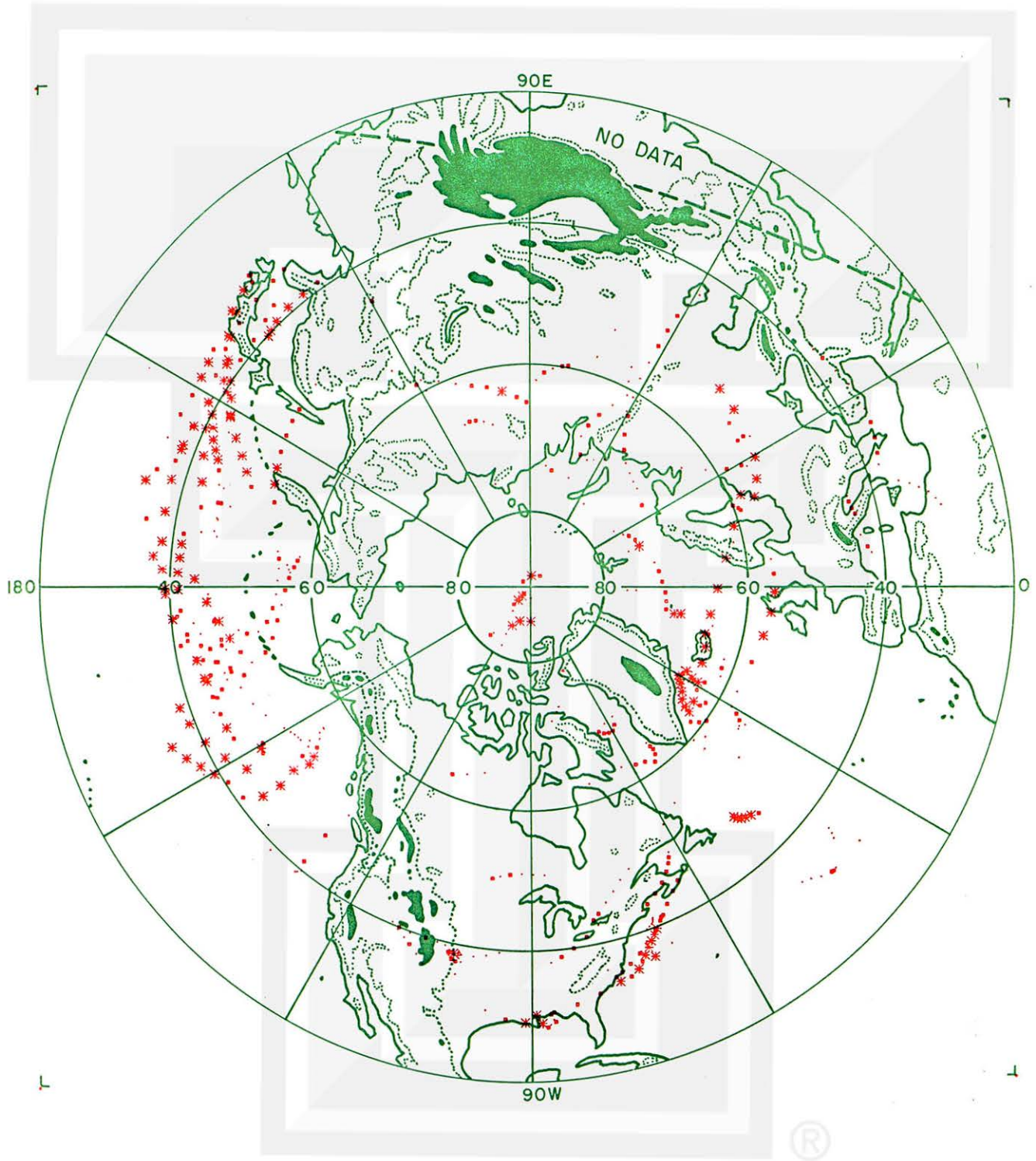
CYCLONE DEEPENING

FEB 83



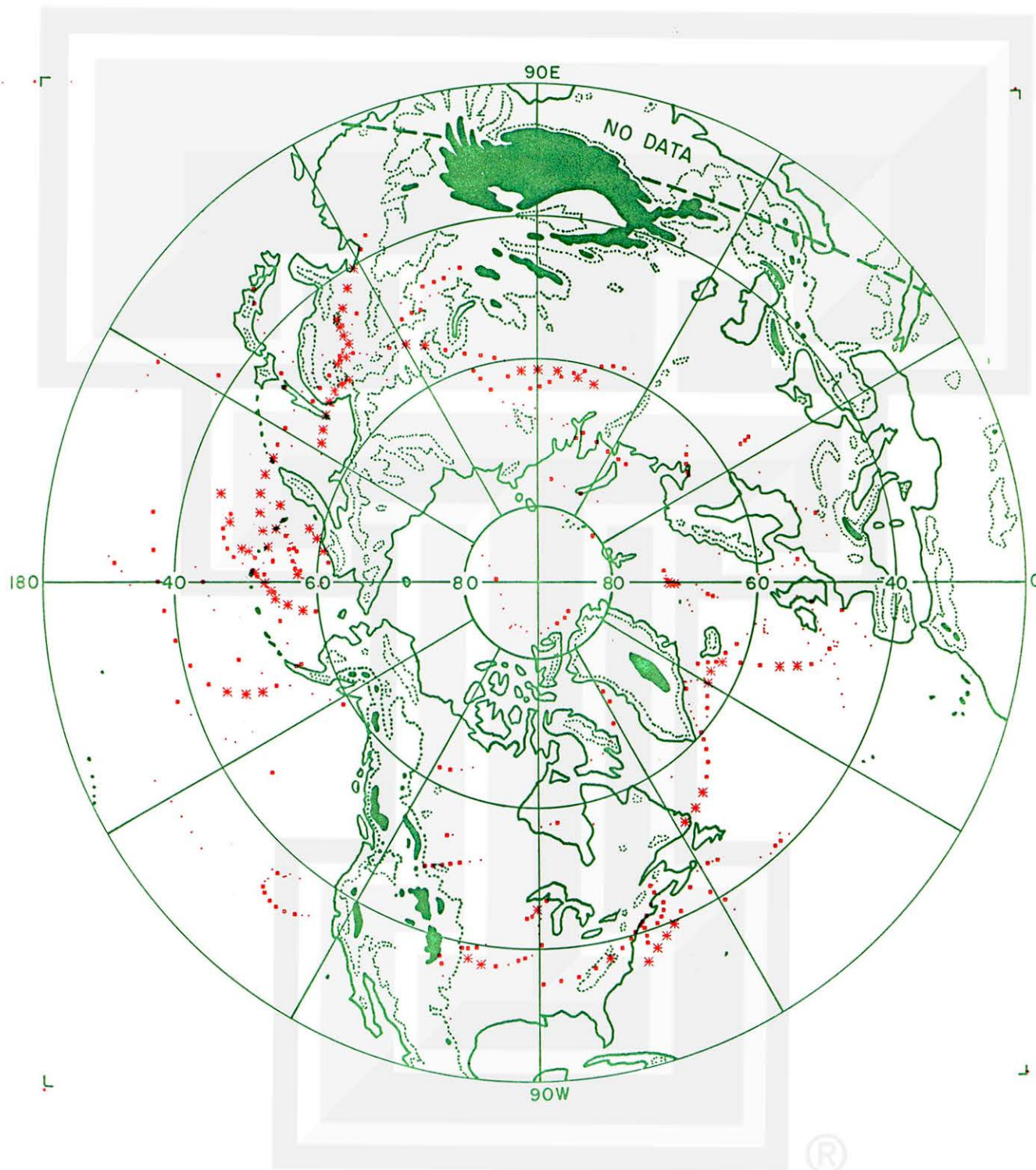
CYCLONE DEEPENING

MAR 83



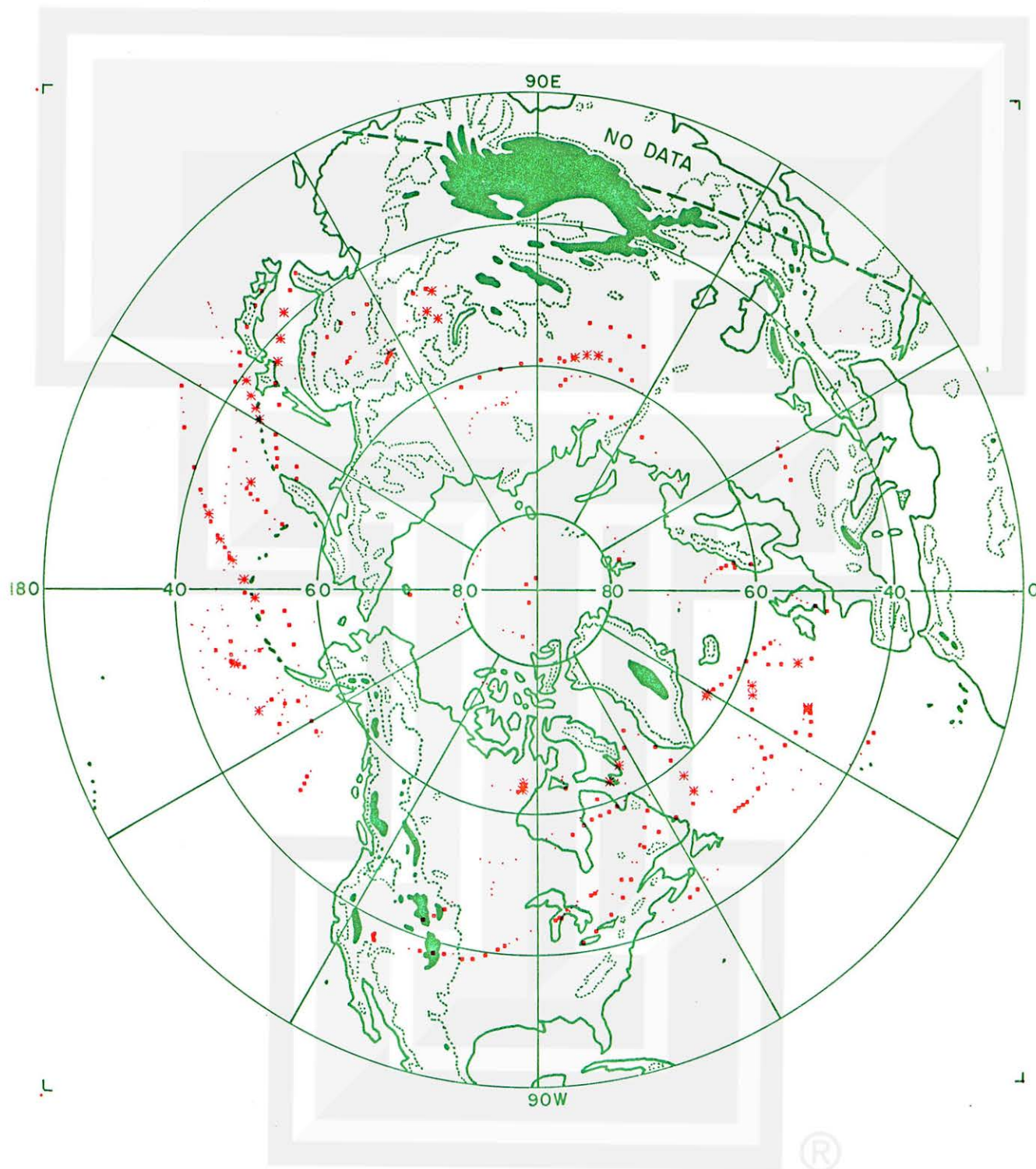
CYCLONE DEEPENING

APR 83



CYCLONE DEEPENING

MAY 83



..... 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 1982

Autumn 1982

Winter 1982-83

Spring 1983

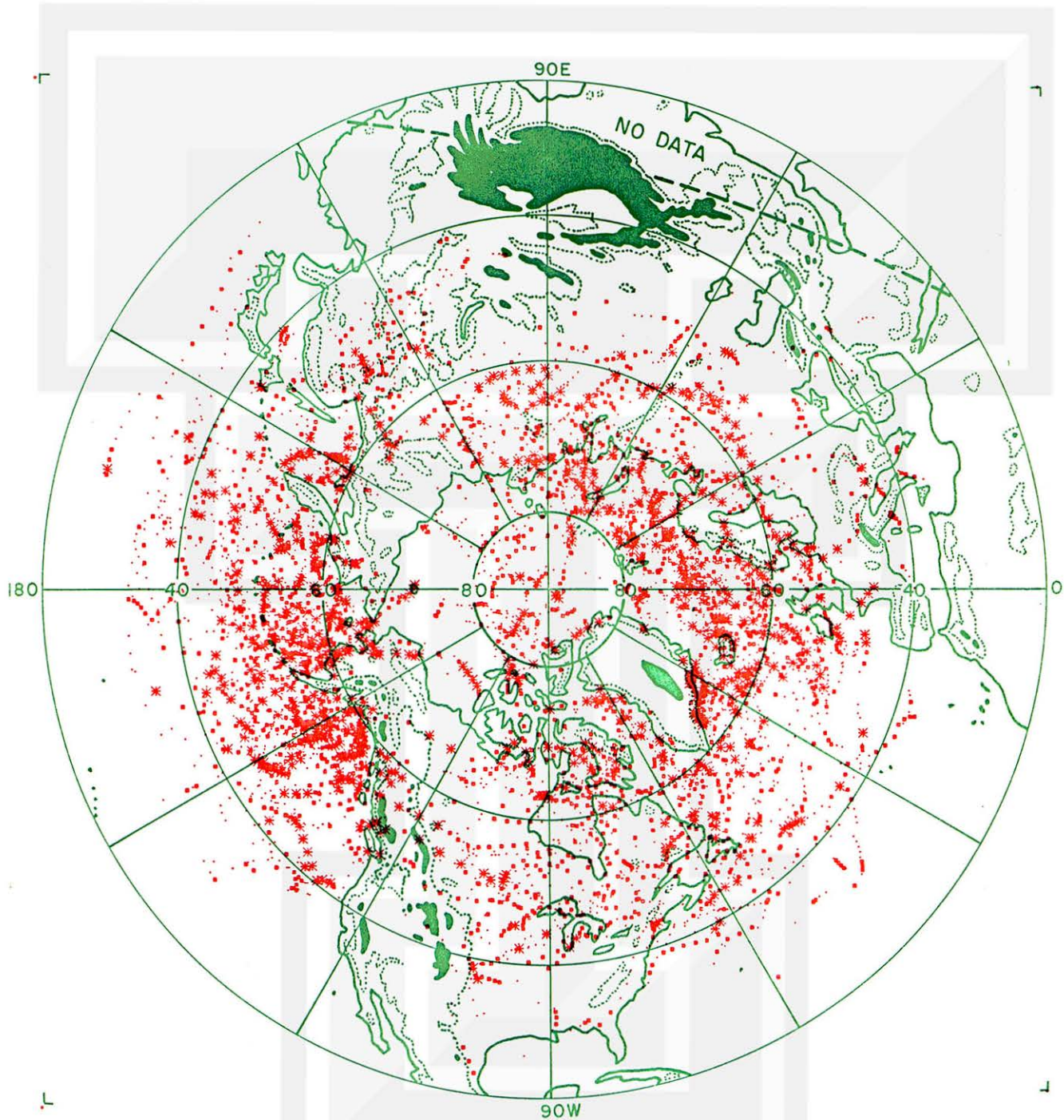
12 MONTHLY MAPS

June-December 1982

January-May 1983

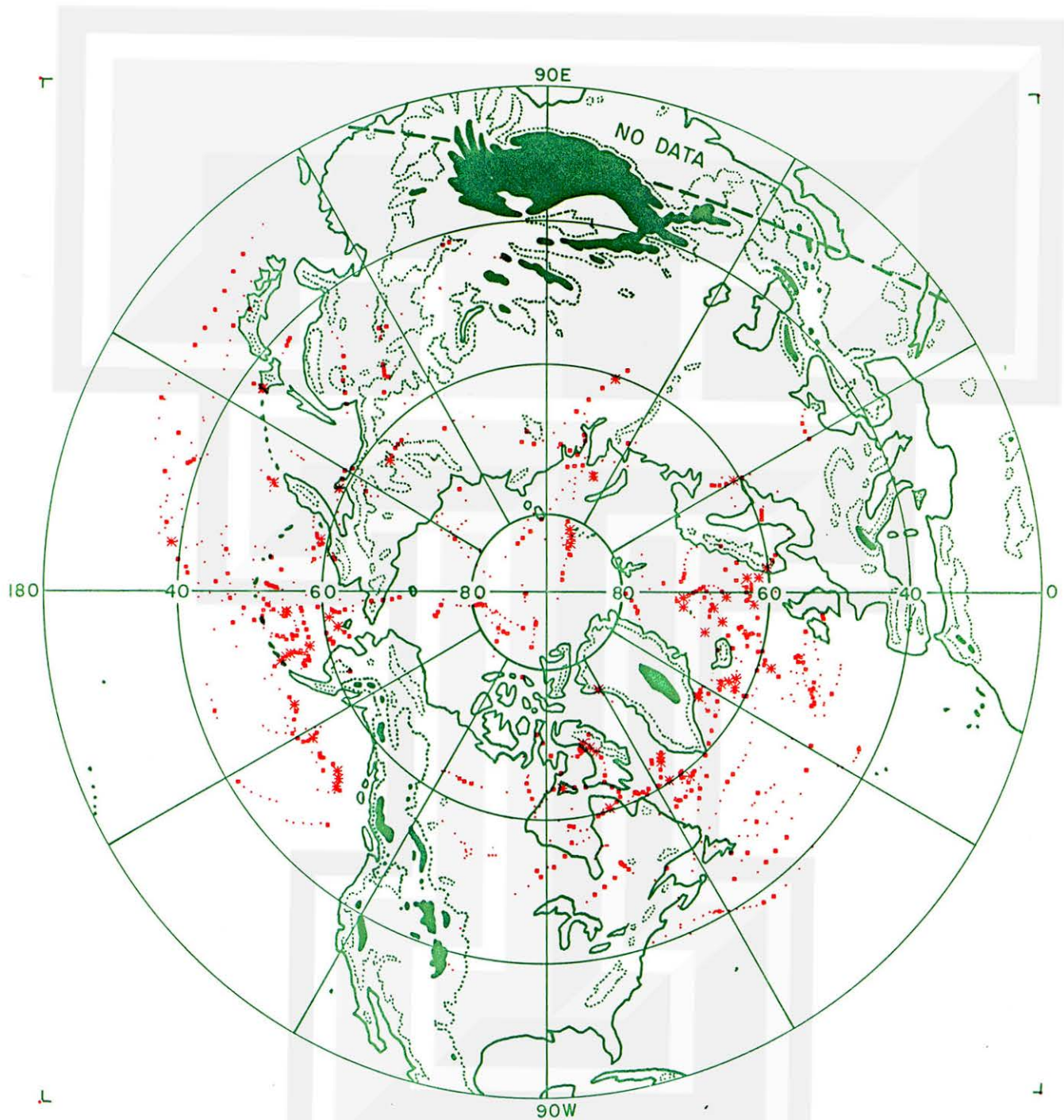


CYCLONE FILLING
12 MOS JUN 82 - MAY 83



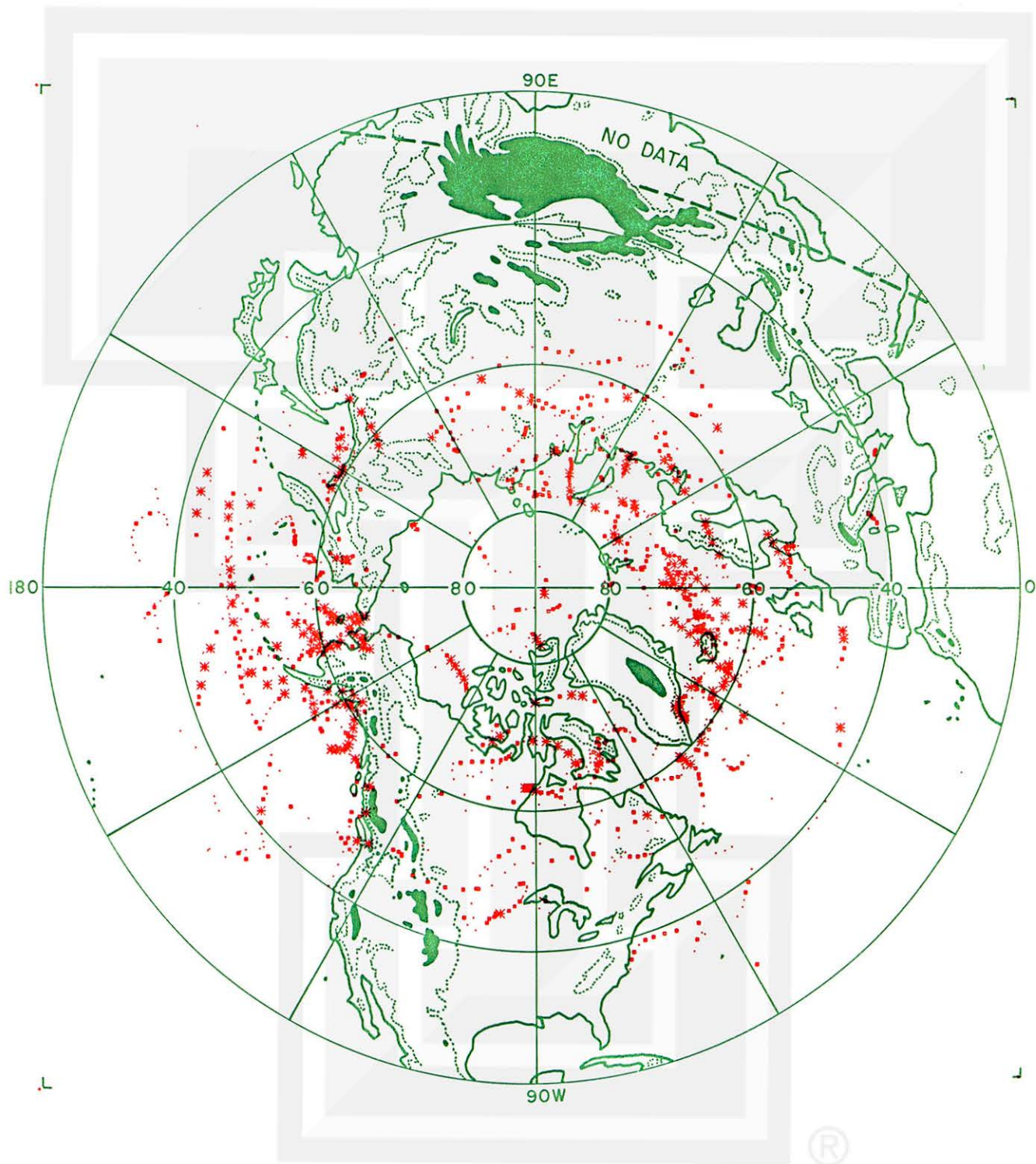
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SUMMER 1982

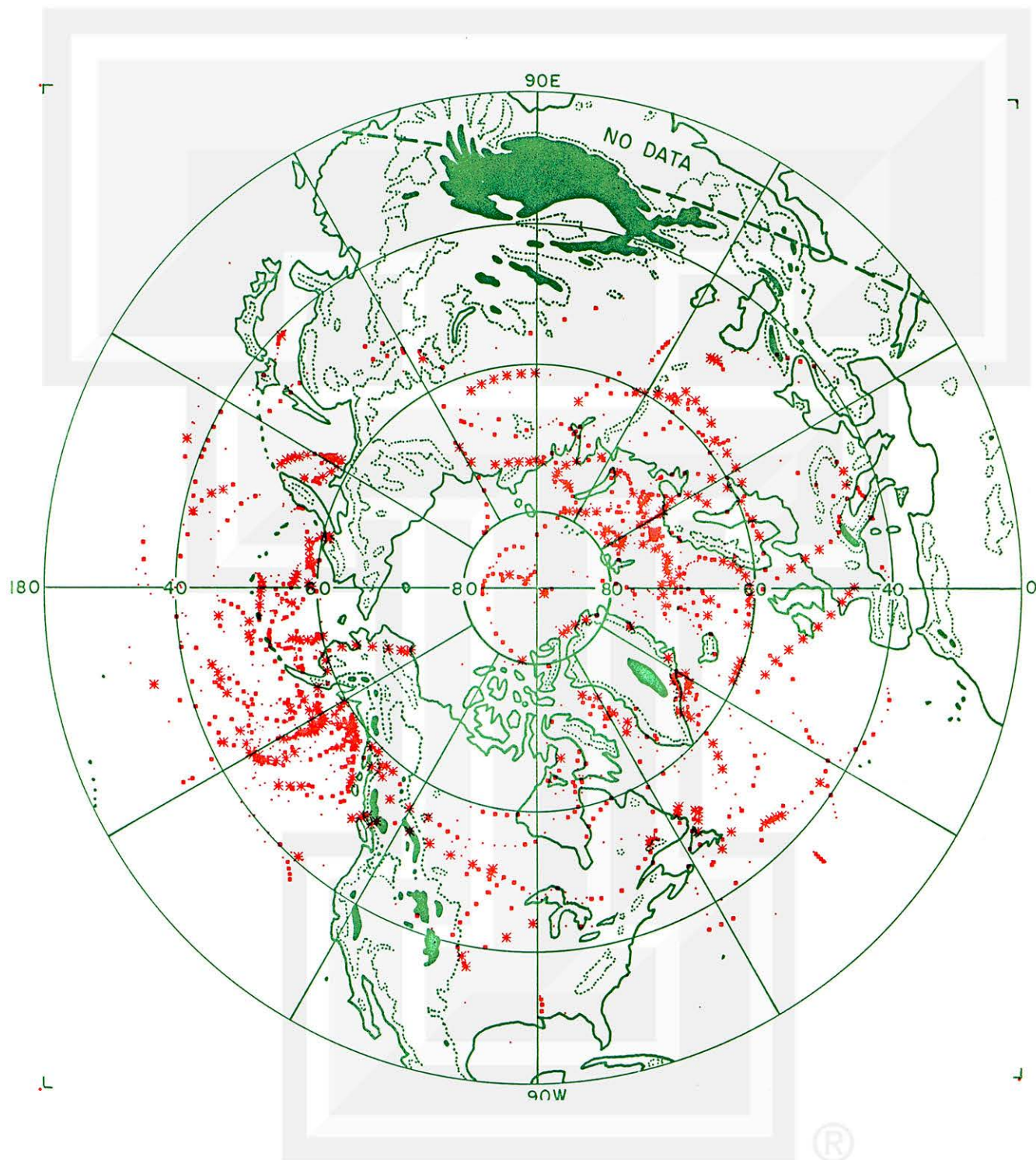


CYCLONE FILLING

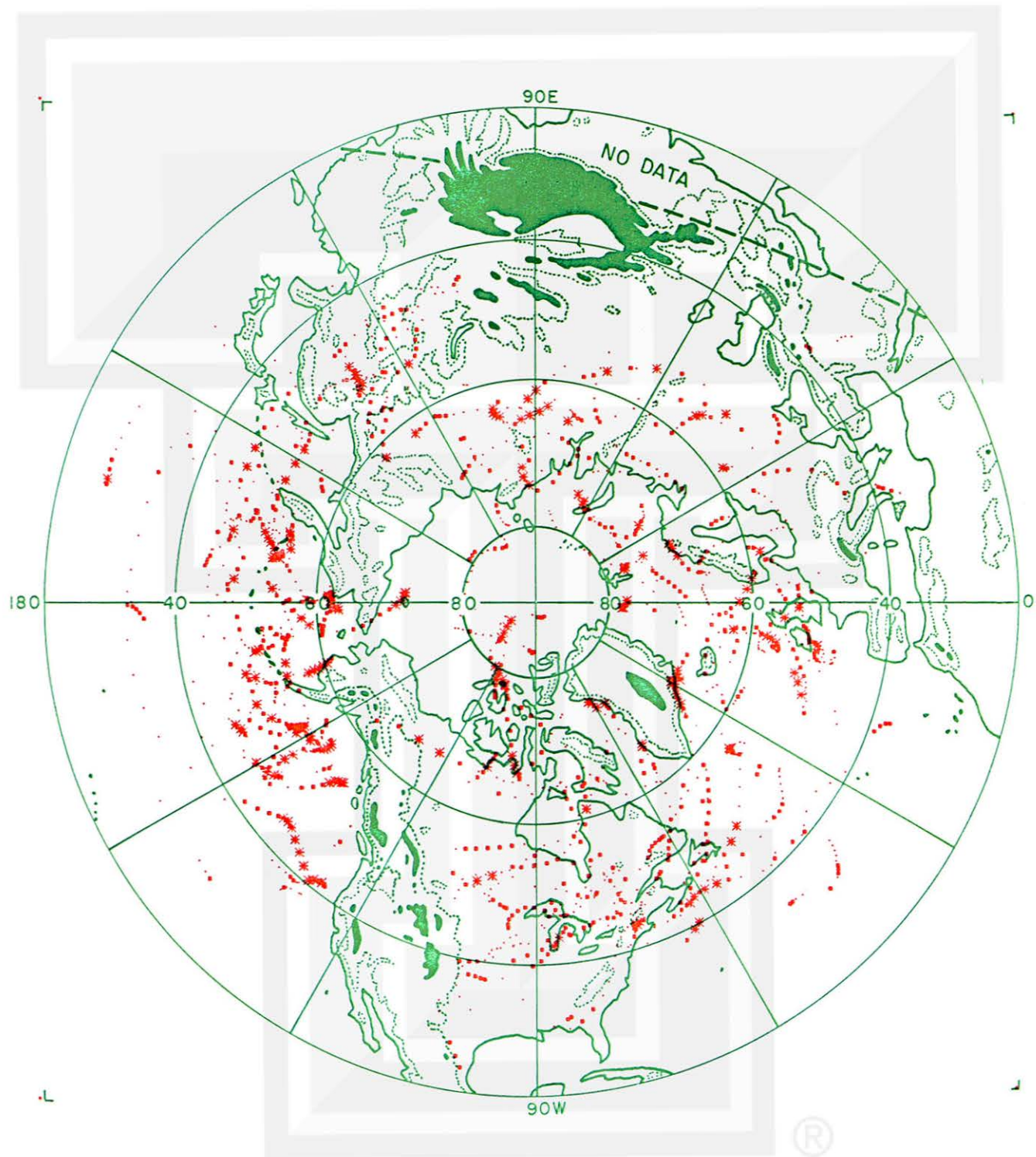
AUTUMN 1982



CYCLONE FILLING
WINTER 1982 - 83

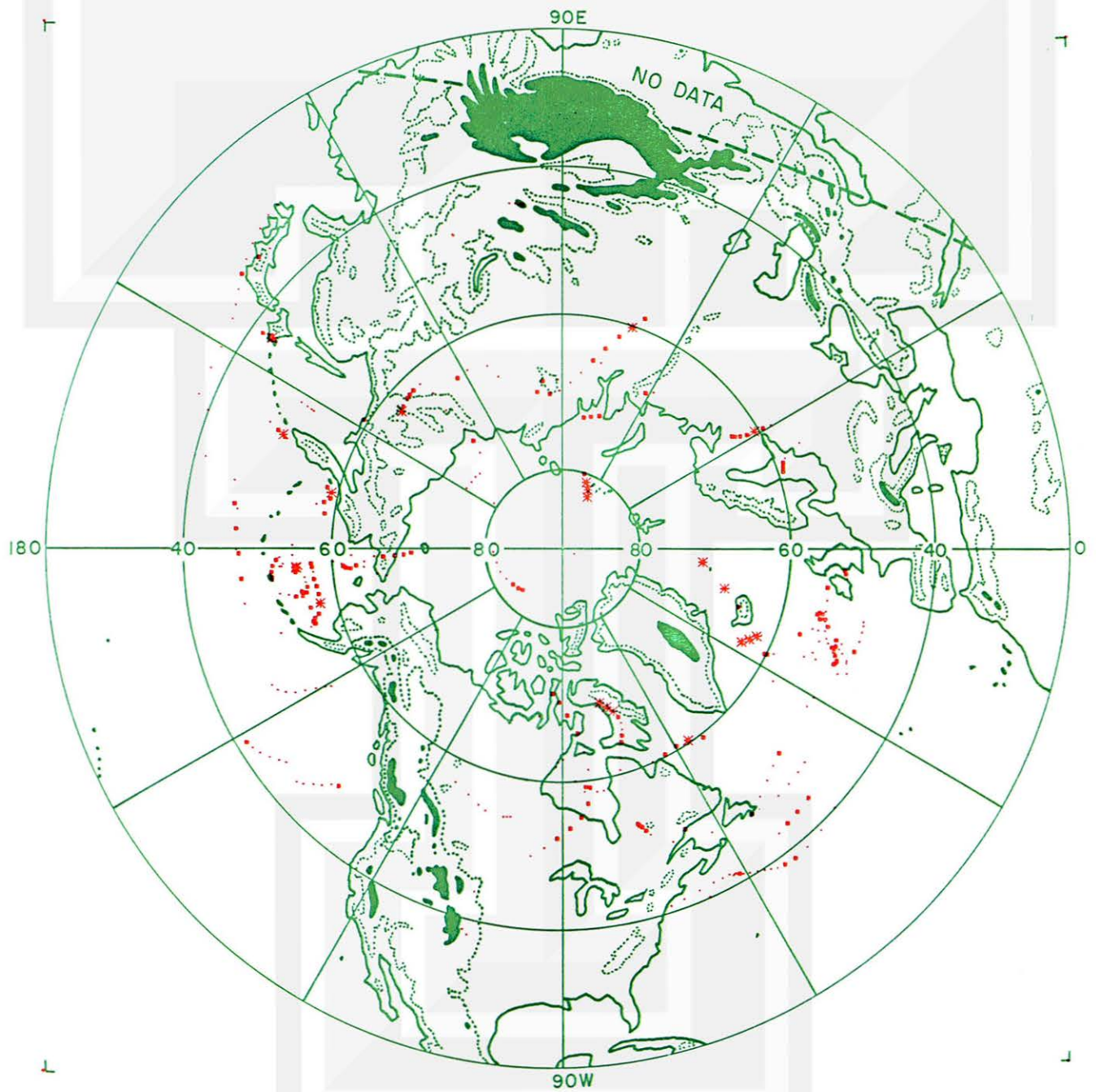


CYCLONE FILLING
SPRING 1983



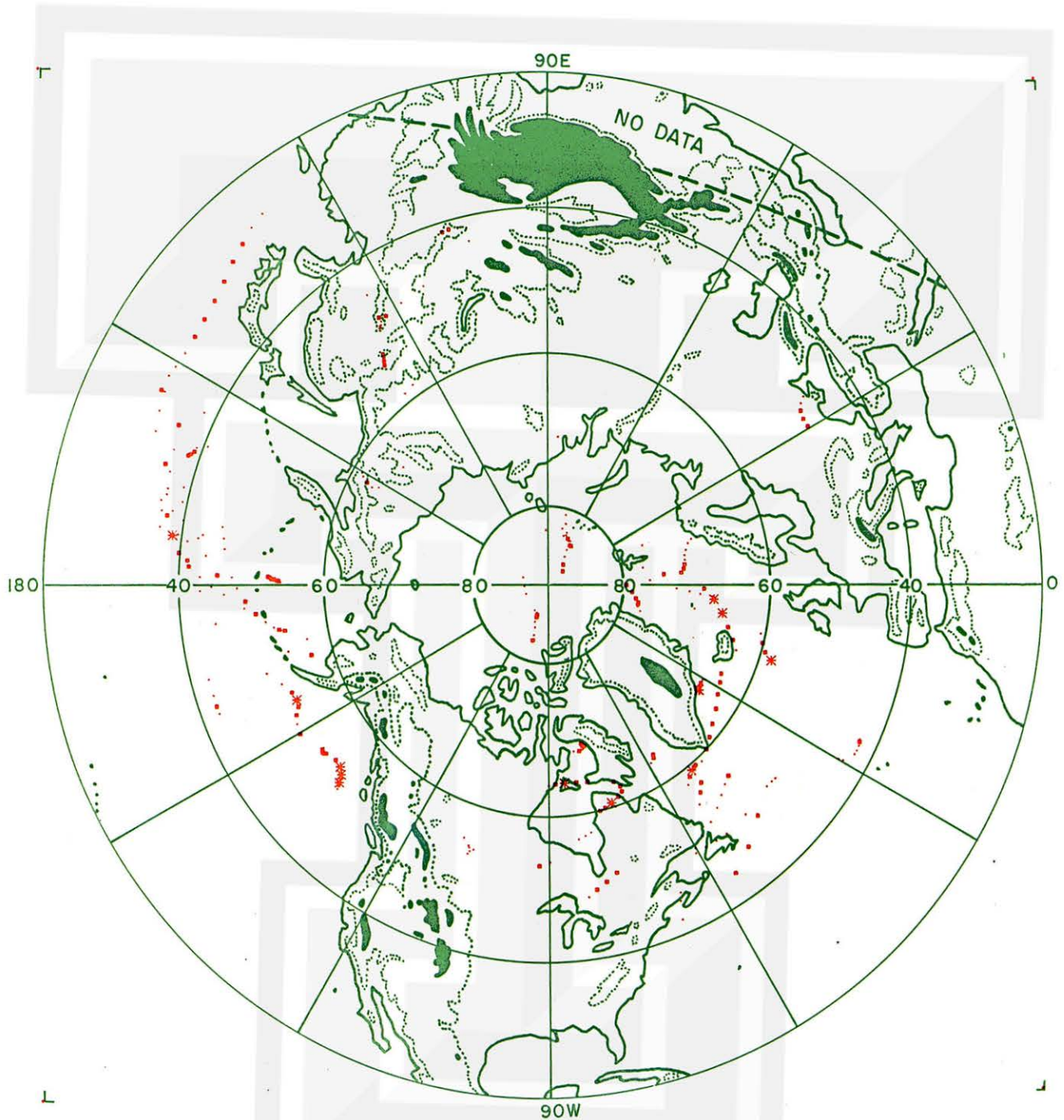
CYCLONE FILLING

JUN 82



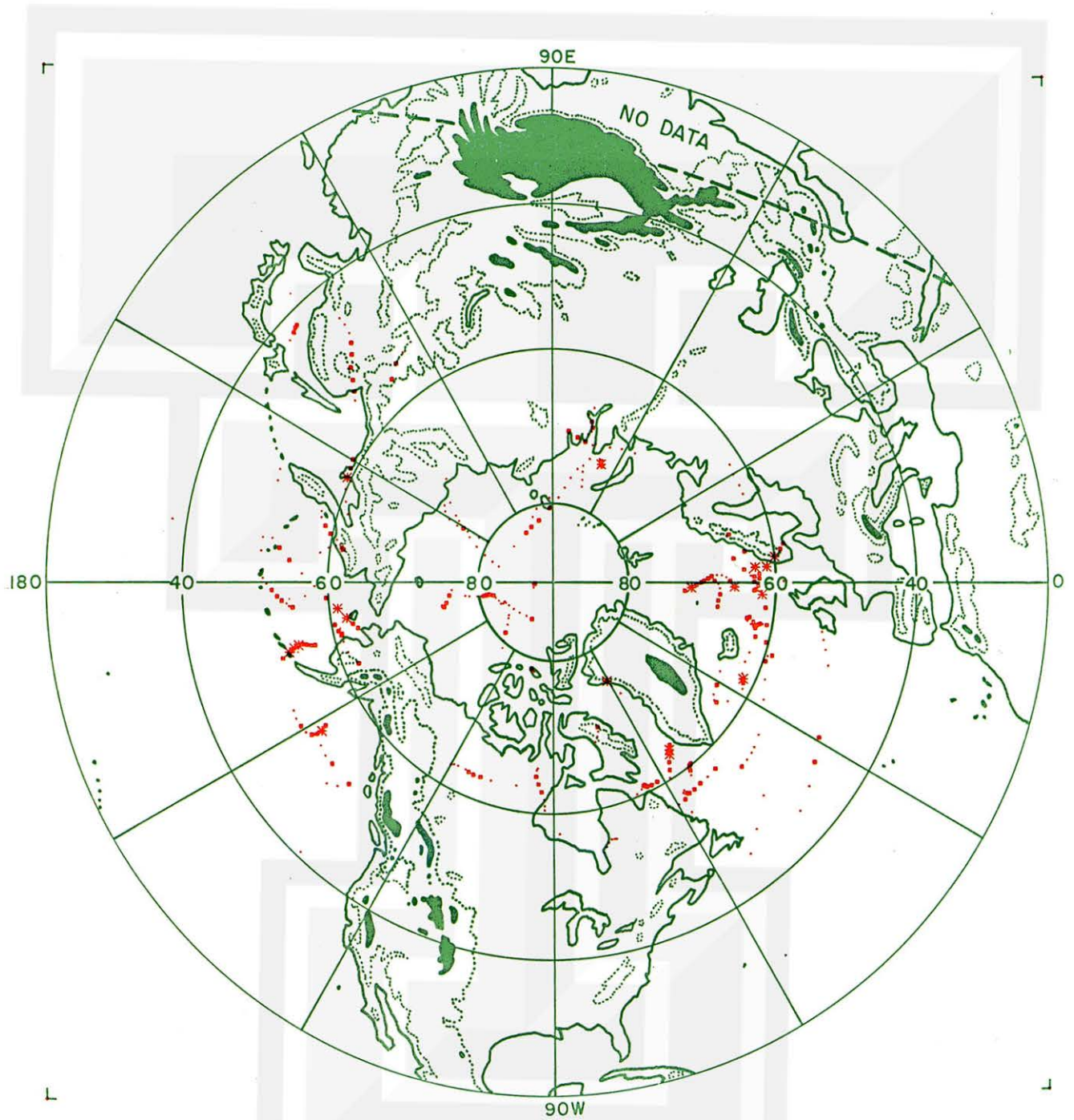
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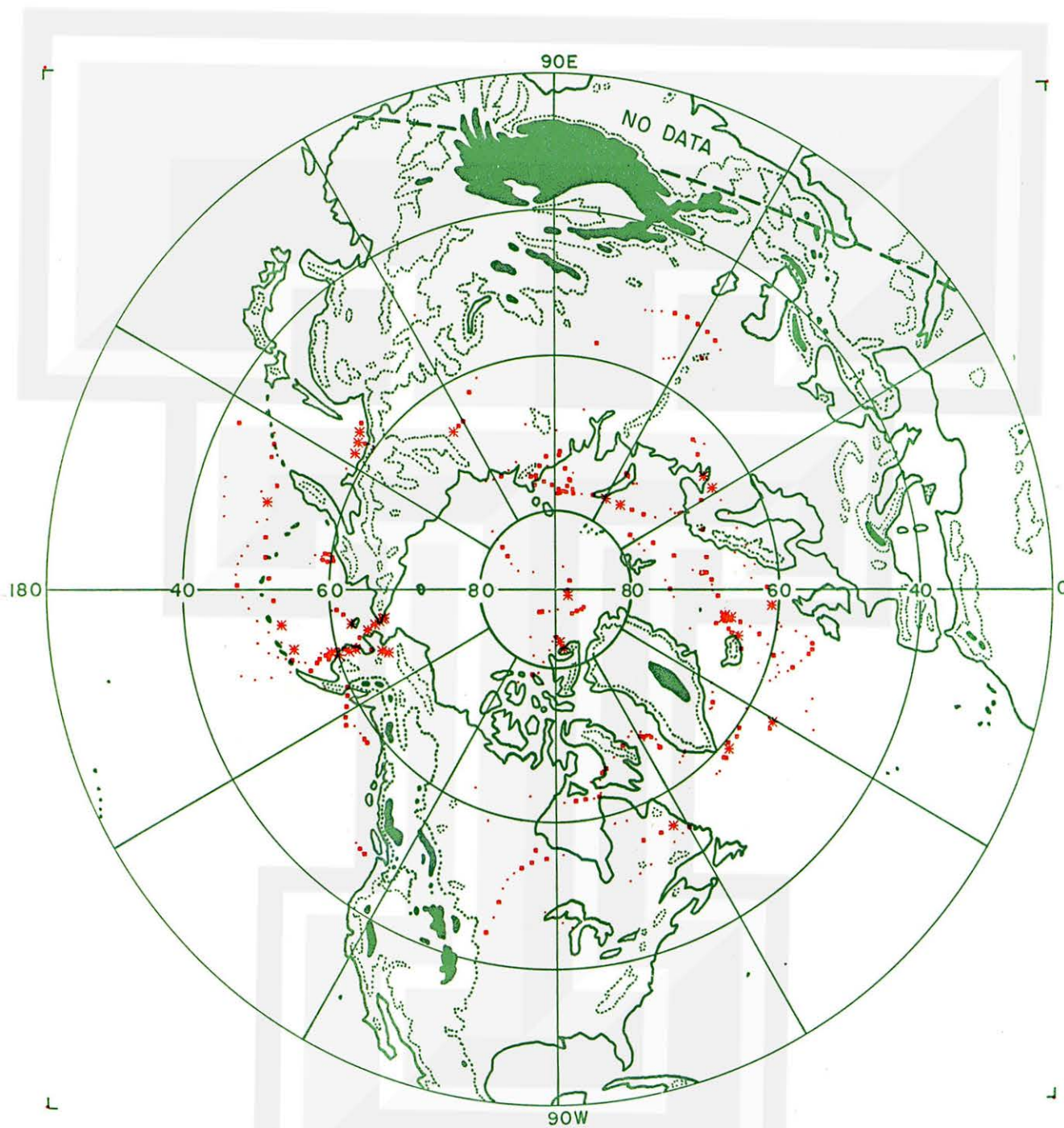
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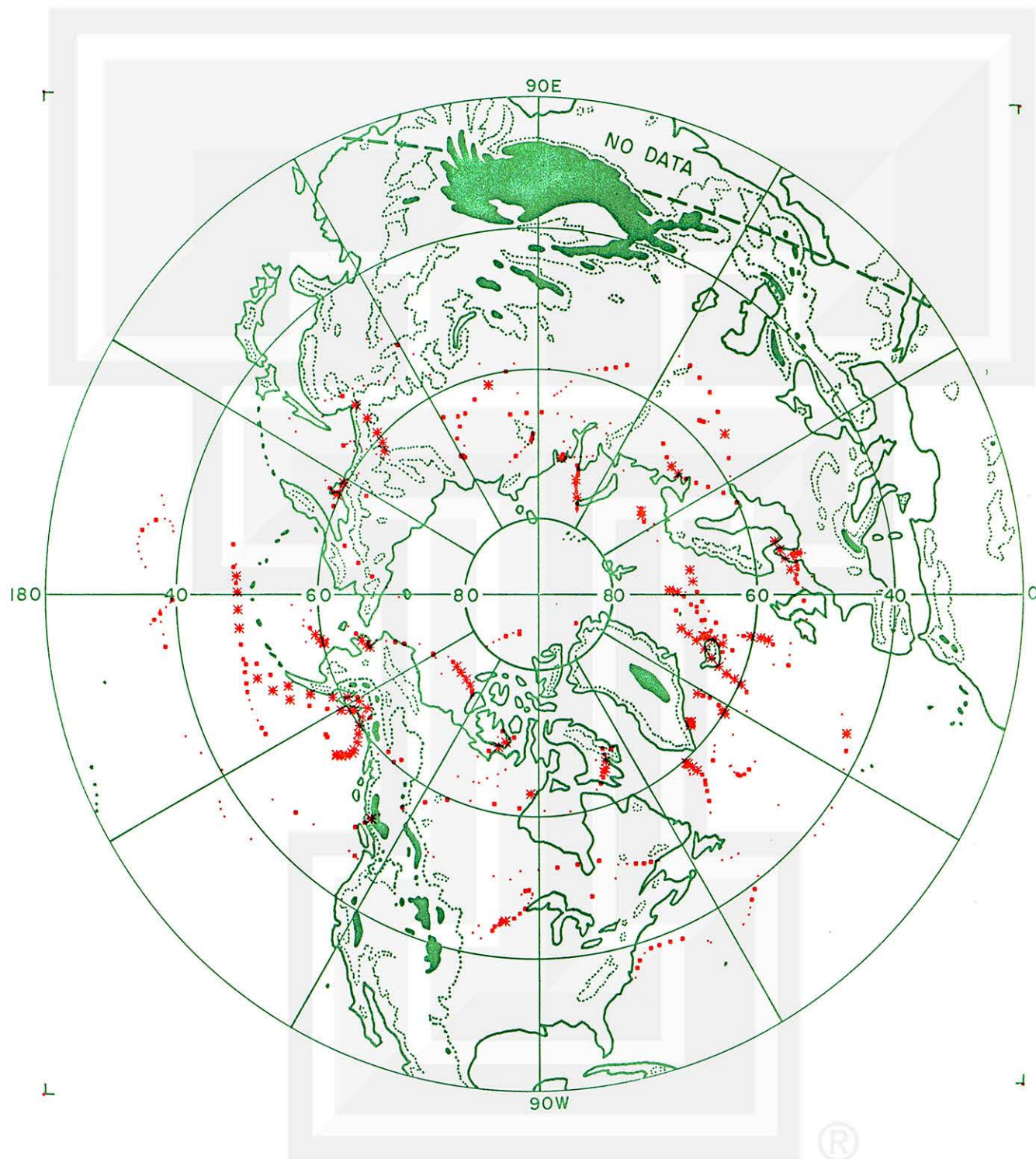
CYCLONE FILLING

SEP 82



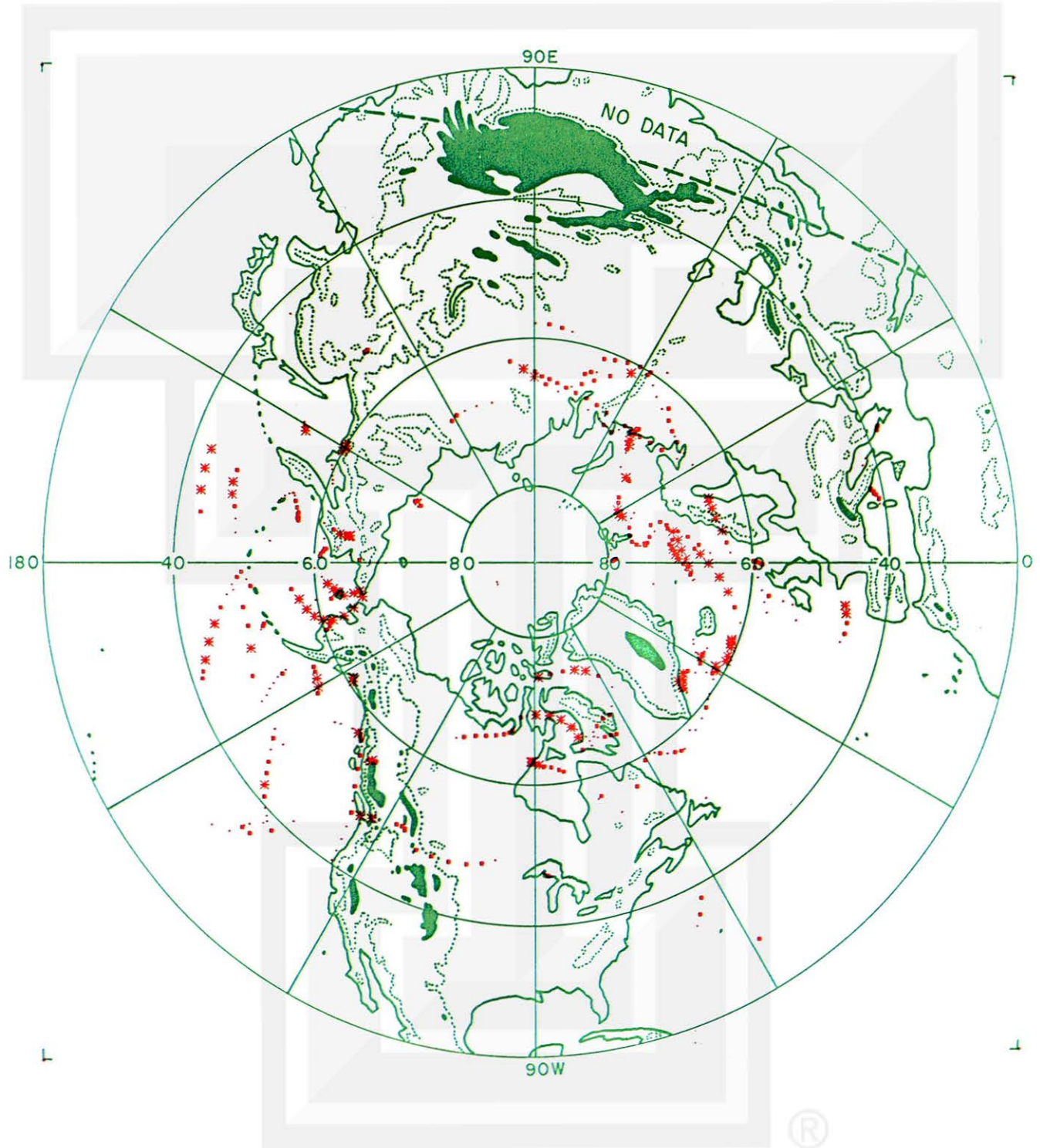
CYCLONE FILLING

OCT 82



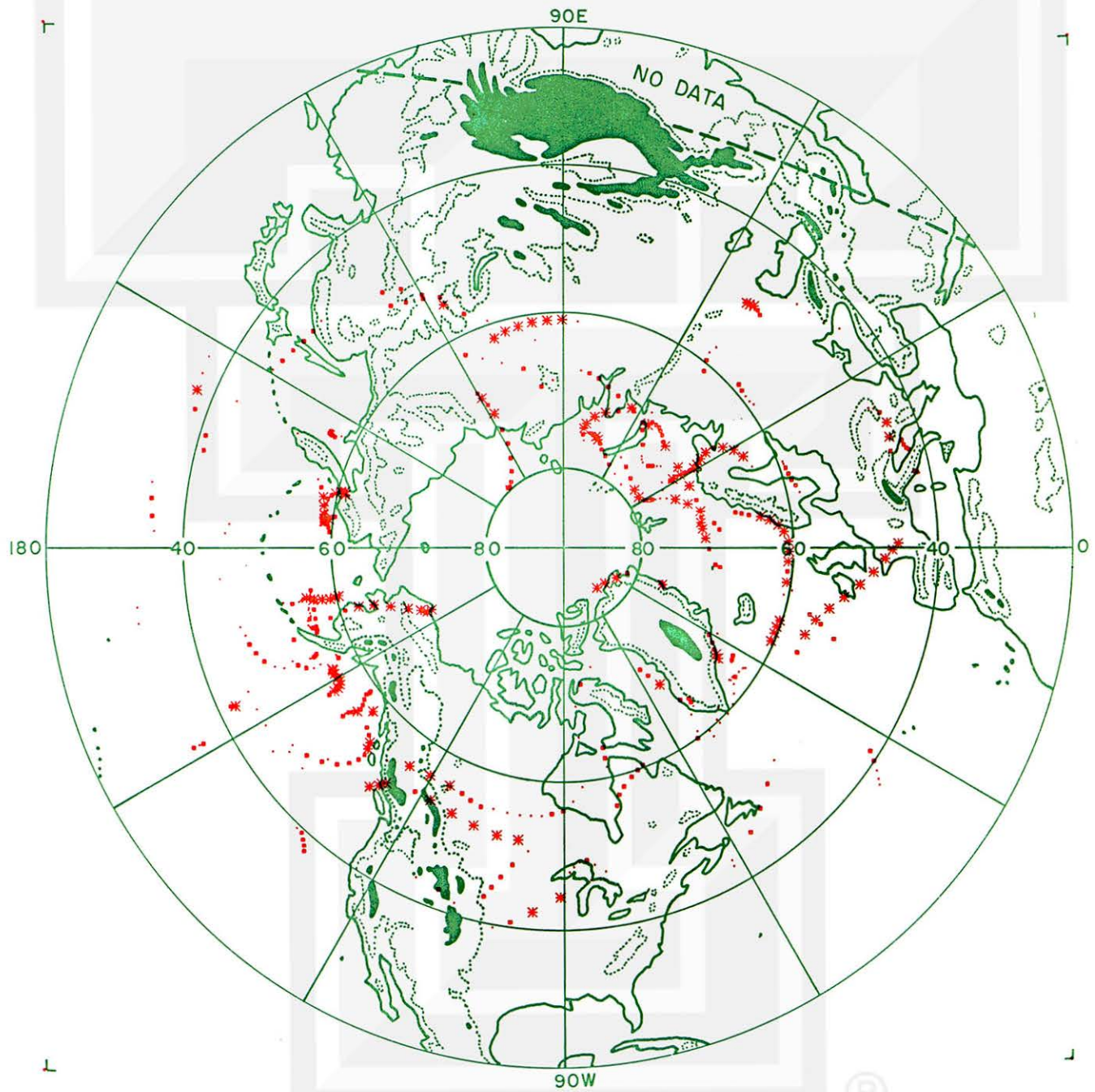
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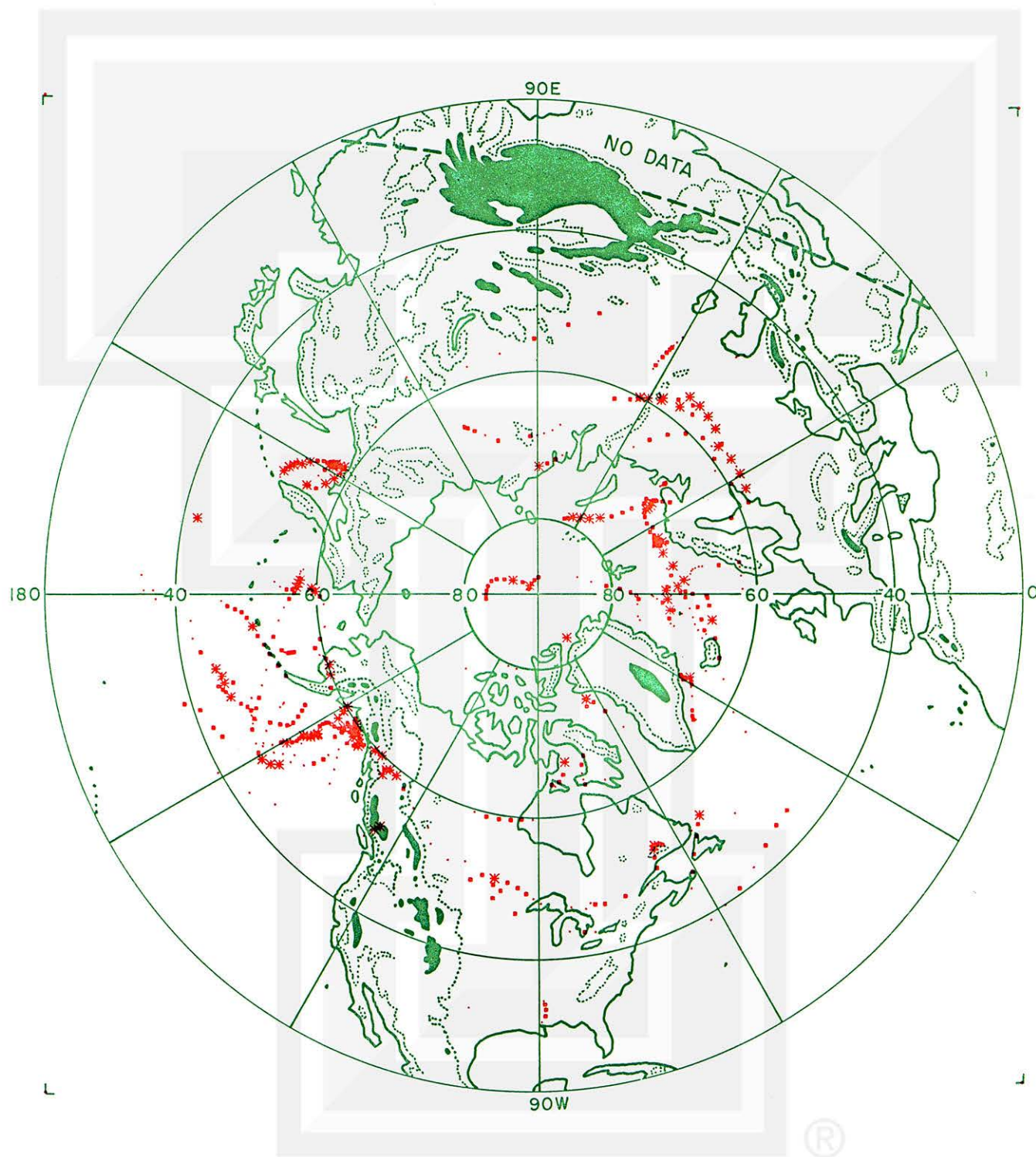
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DEC 82



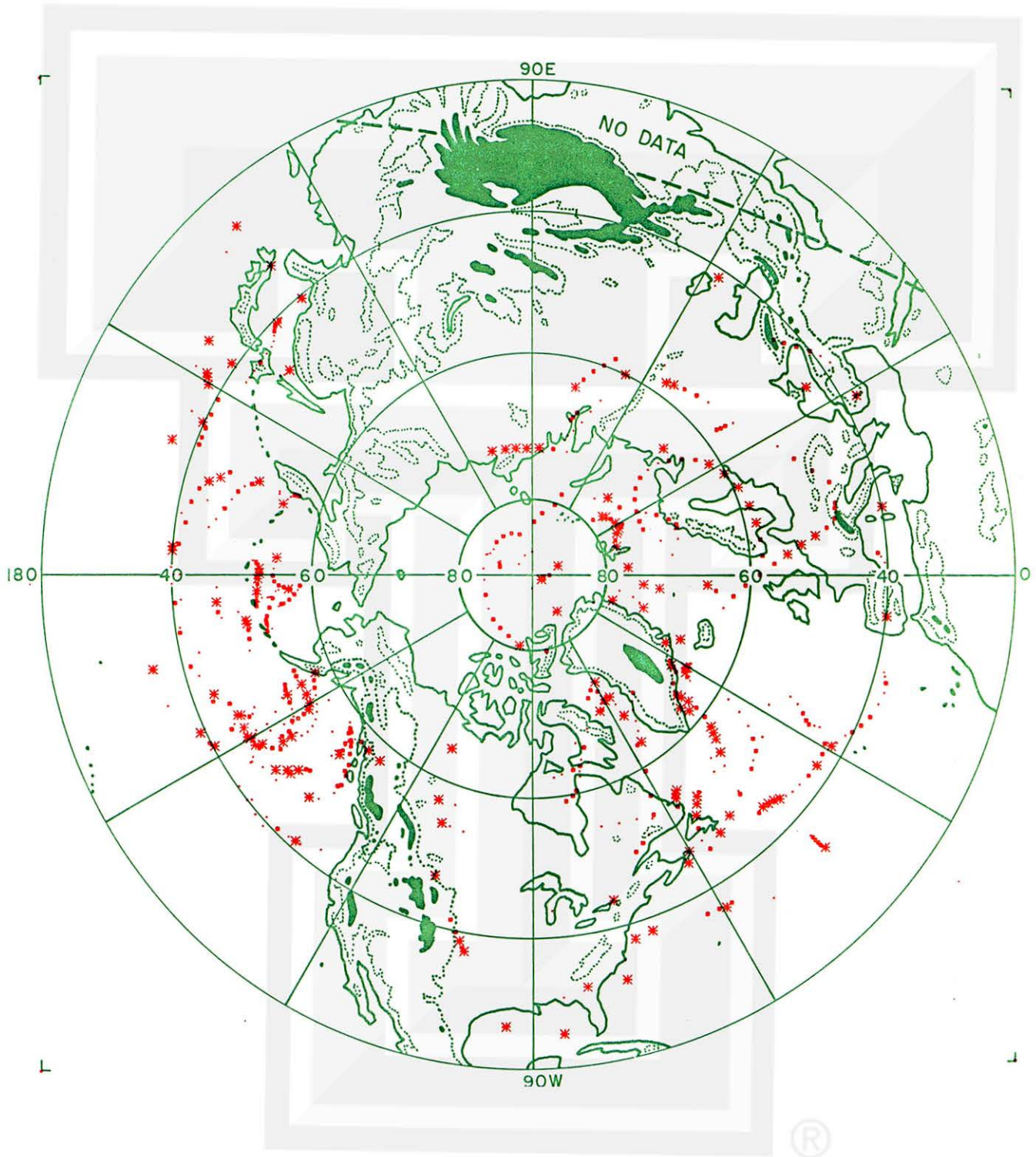
CYCLONE FILLING

JAN 83



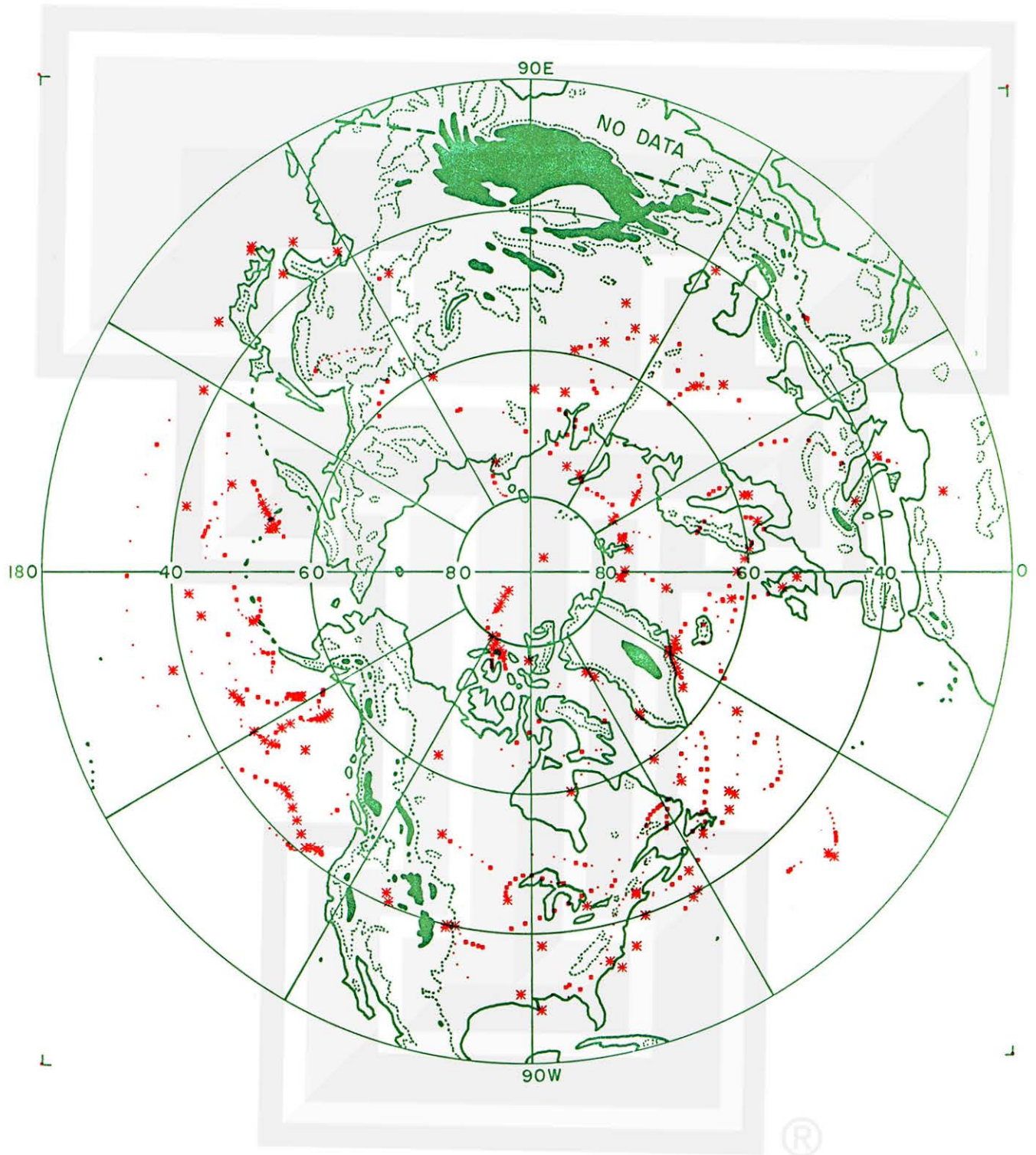
CYCLONE FILLING

FEB 83



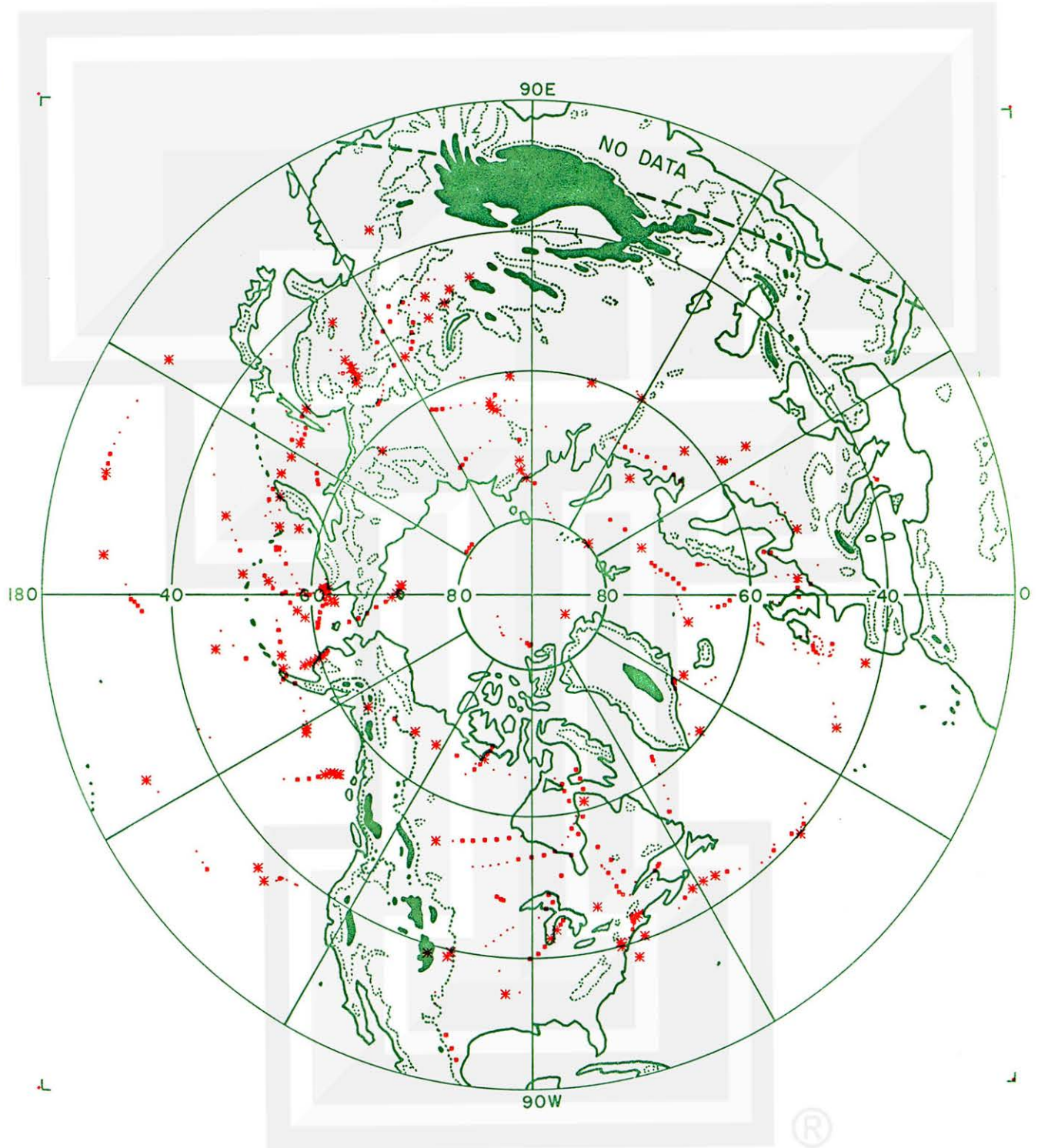
CYCLONE FILLING

MAR 83



CYCLONE FILLING

APR 83



CYCLONE FILLING

MAY 83

