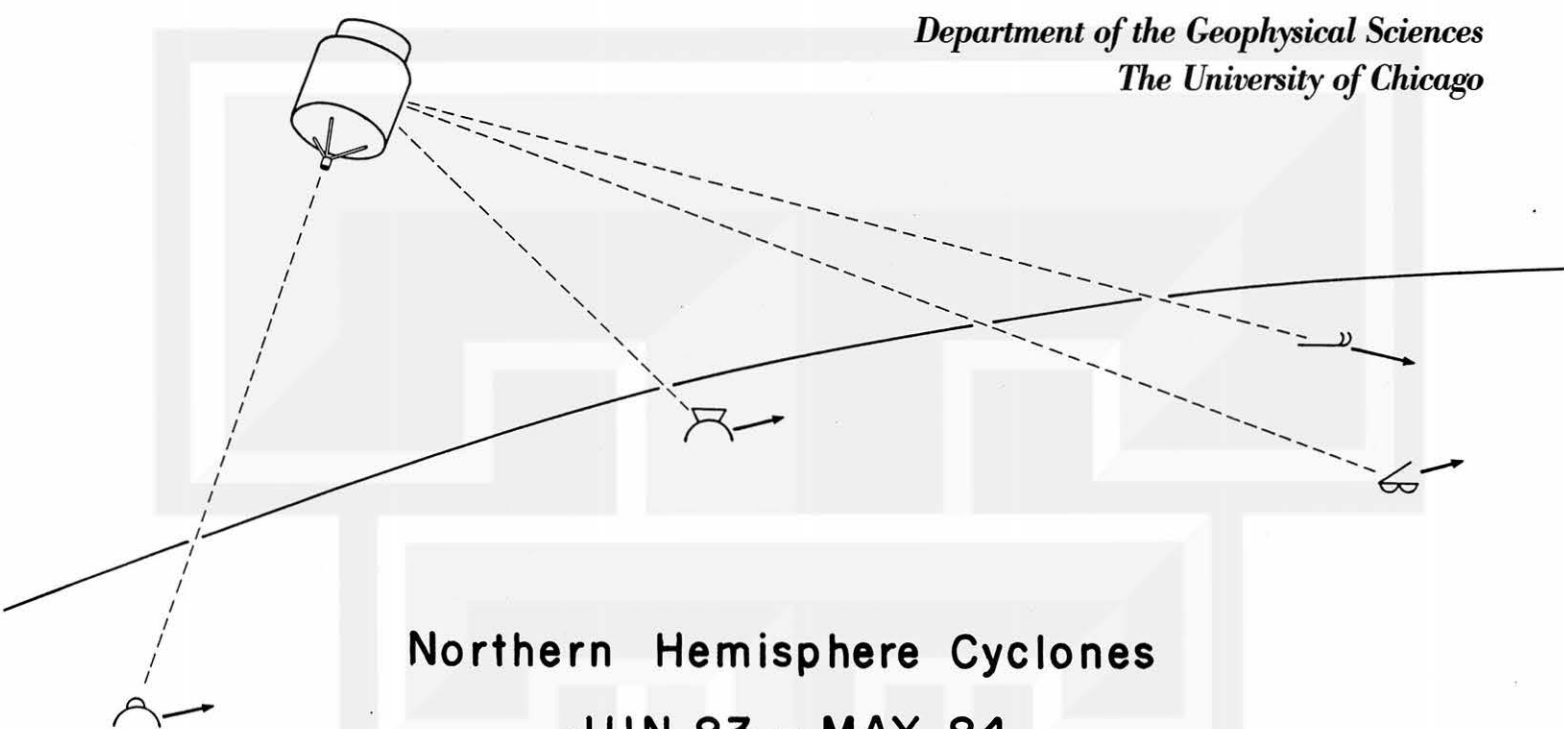


WIND RESEARCH LABORATORY

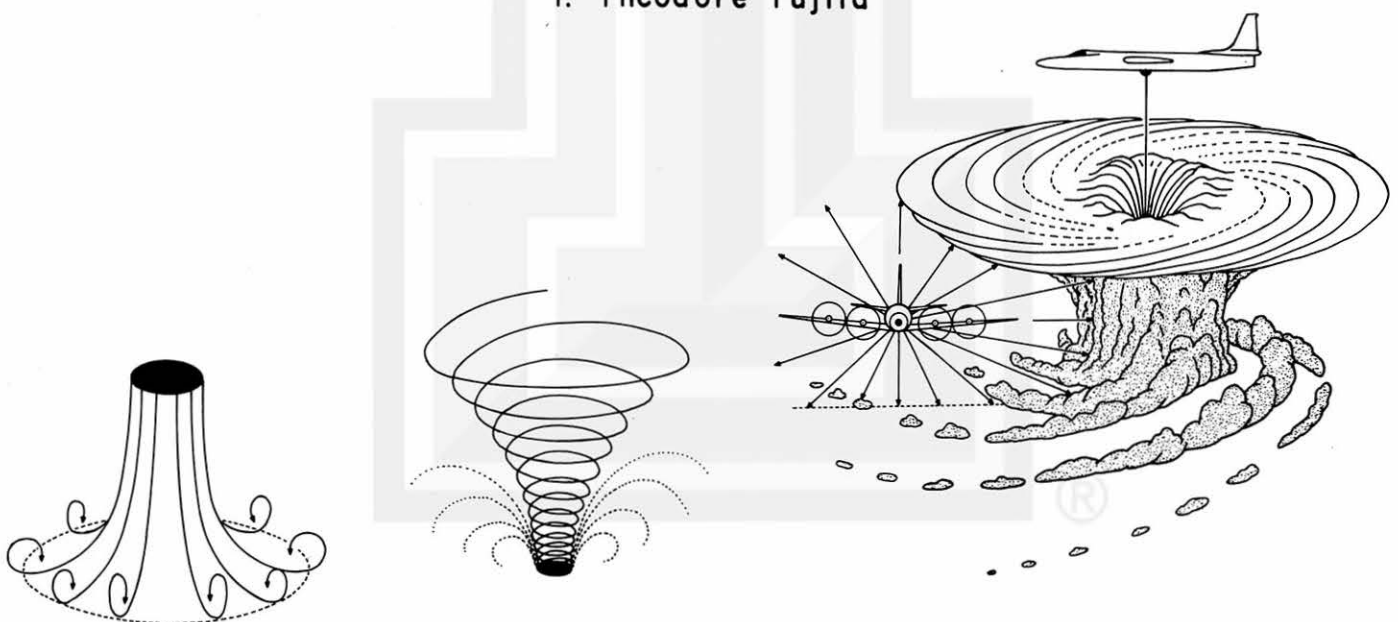
*Department of the Geophysical Sciences
The University of Chicago*



Northern Hemisphere Cyclones JUN 83 - MAY 84

by

T. Theodore Fujita



WRL Research Paper 225 JUN 1988

WRL was formerly SMRP (1961-1987)

W R L RESEARCH PAPER No. 225

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 1983 - May 1984

(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

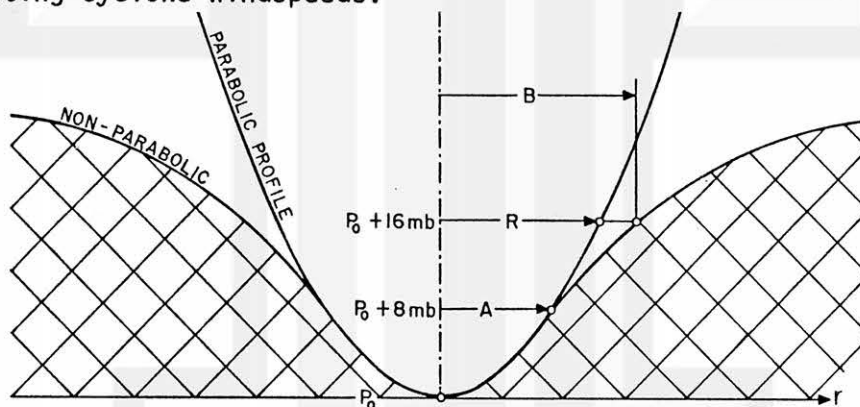
Example of Printout

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

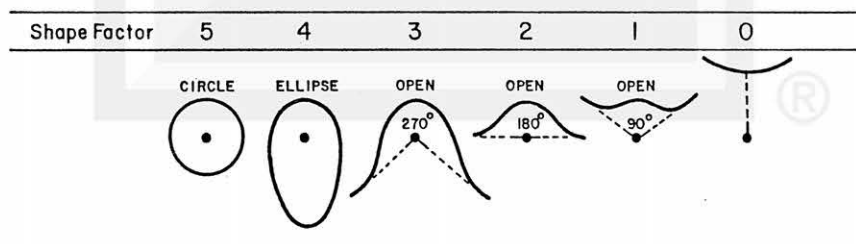
Schematic Pressure Field

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 1983

Autumn 1983

Winter 1983-84

Spring 1984

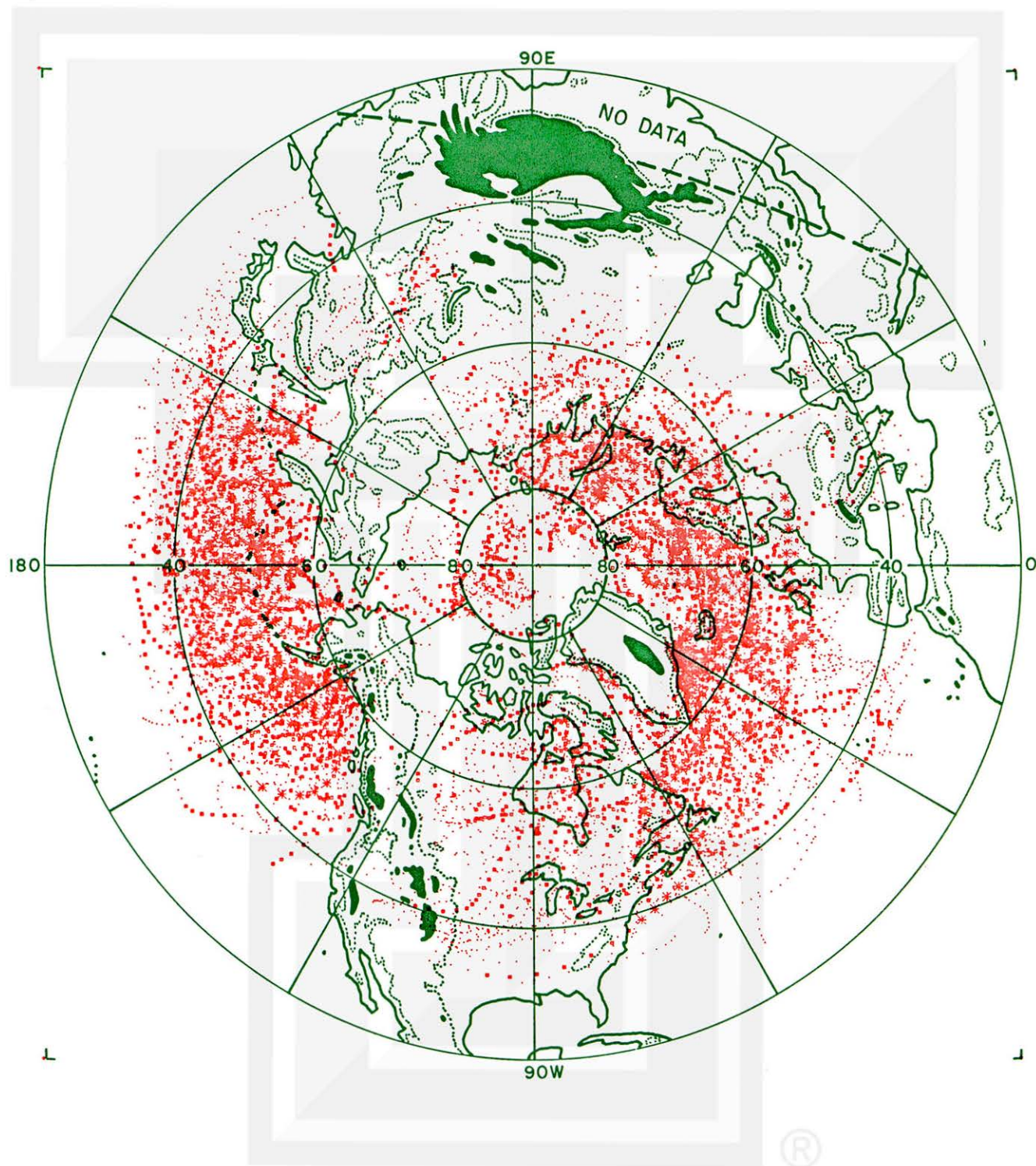
12 MONTHLY MAPS

June-December 1983

January-May 1984

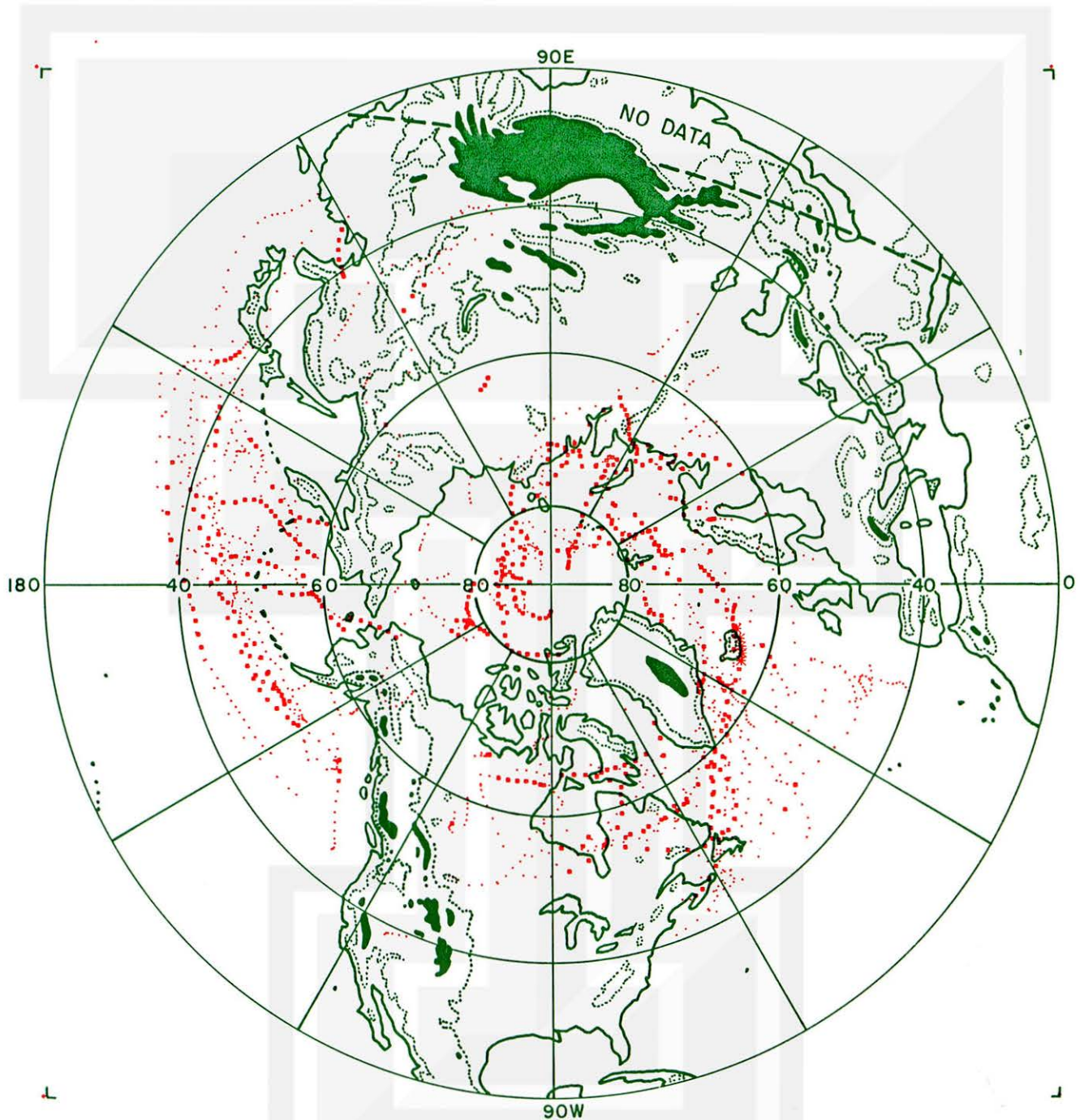


CENTRAL PRESSURE
12 MOS JUN 83 - MAY 84



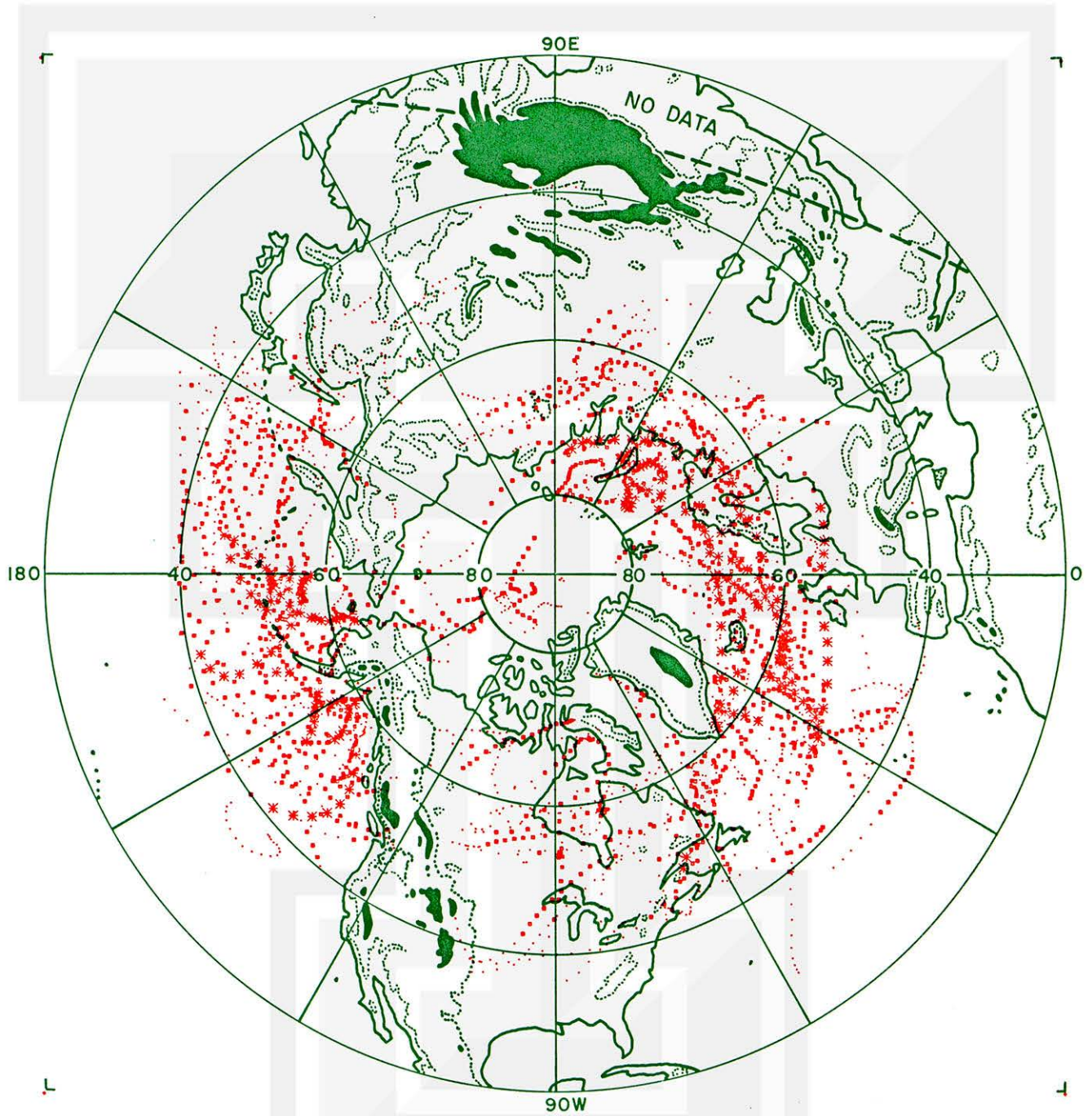
CENTRAL PRESSURE

SUMMER 1983



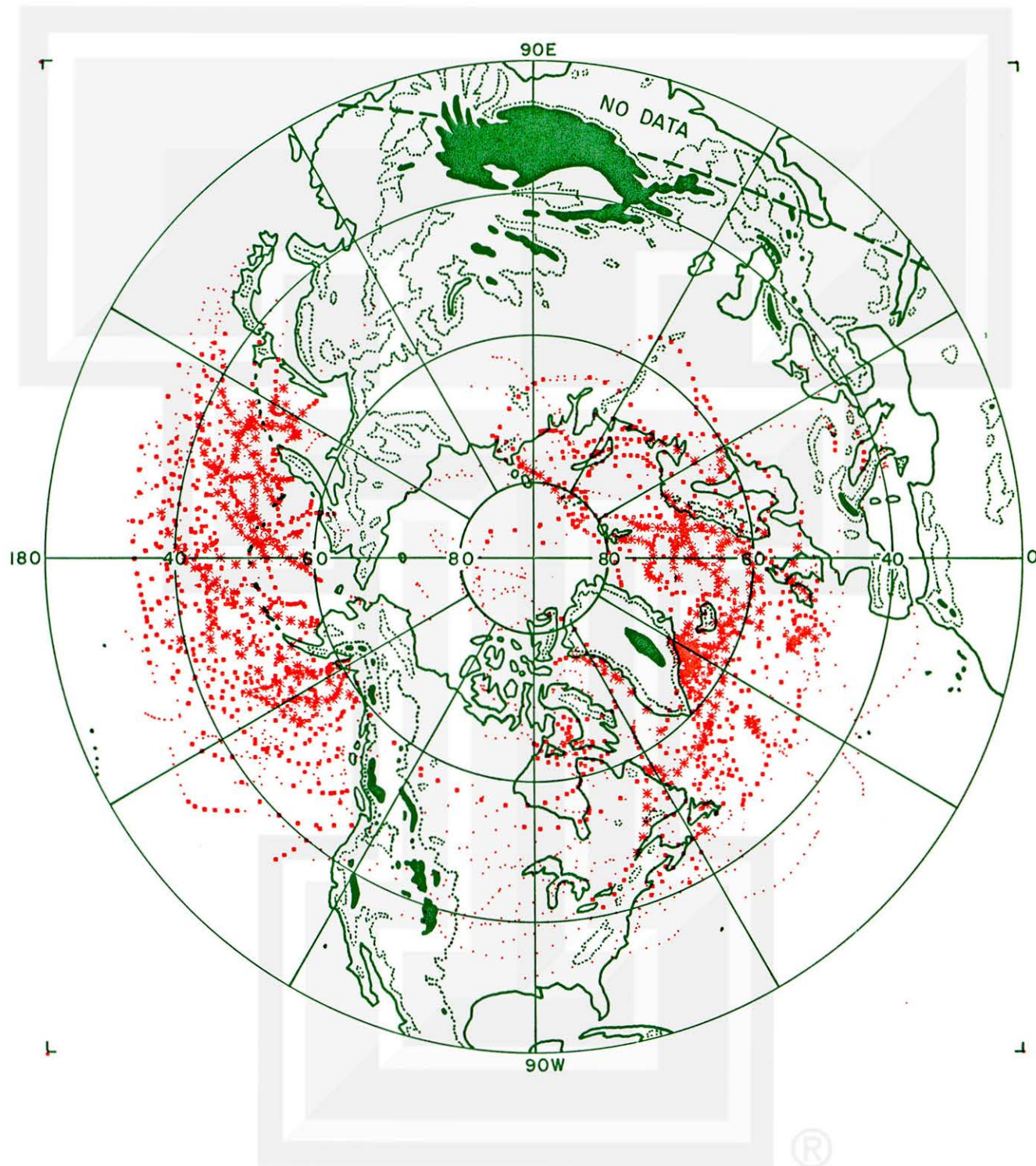
CENTRAL PRESSURE

AUTUMN 1983



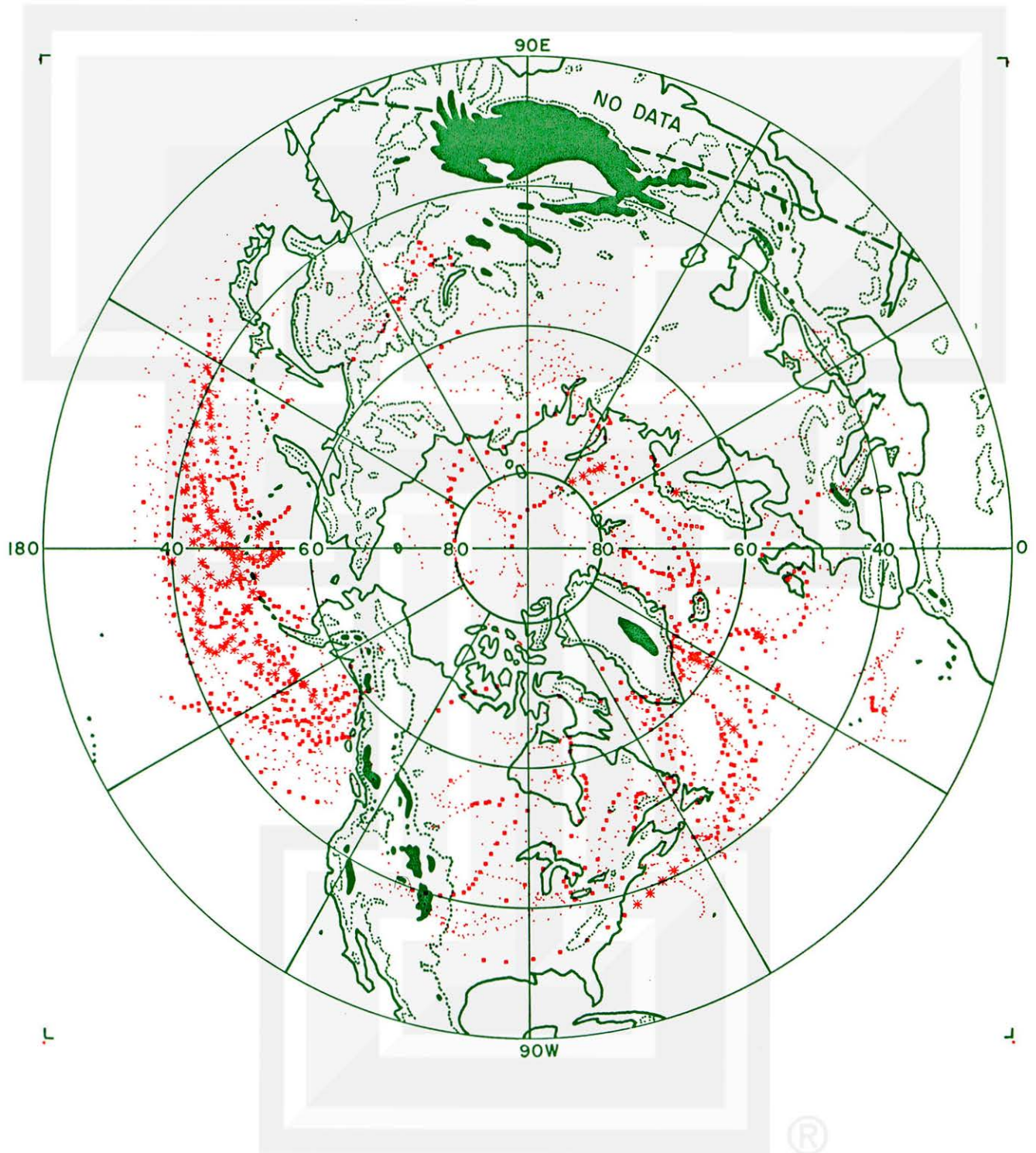
CENTRAL PRESSURE

WINTER 1983 - 84



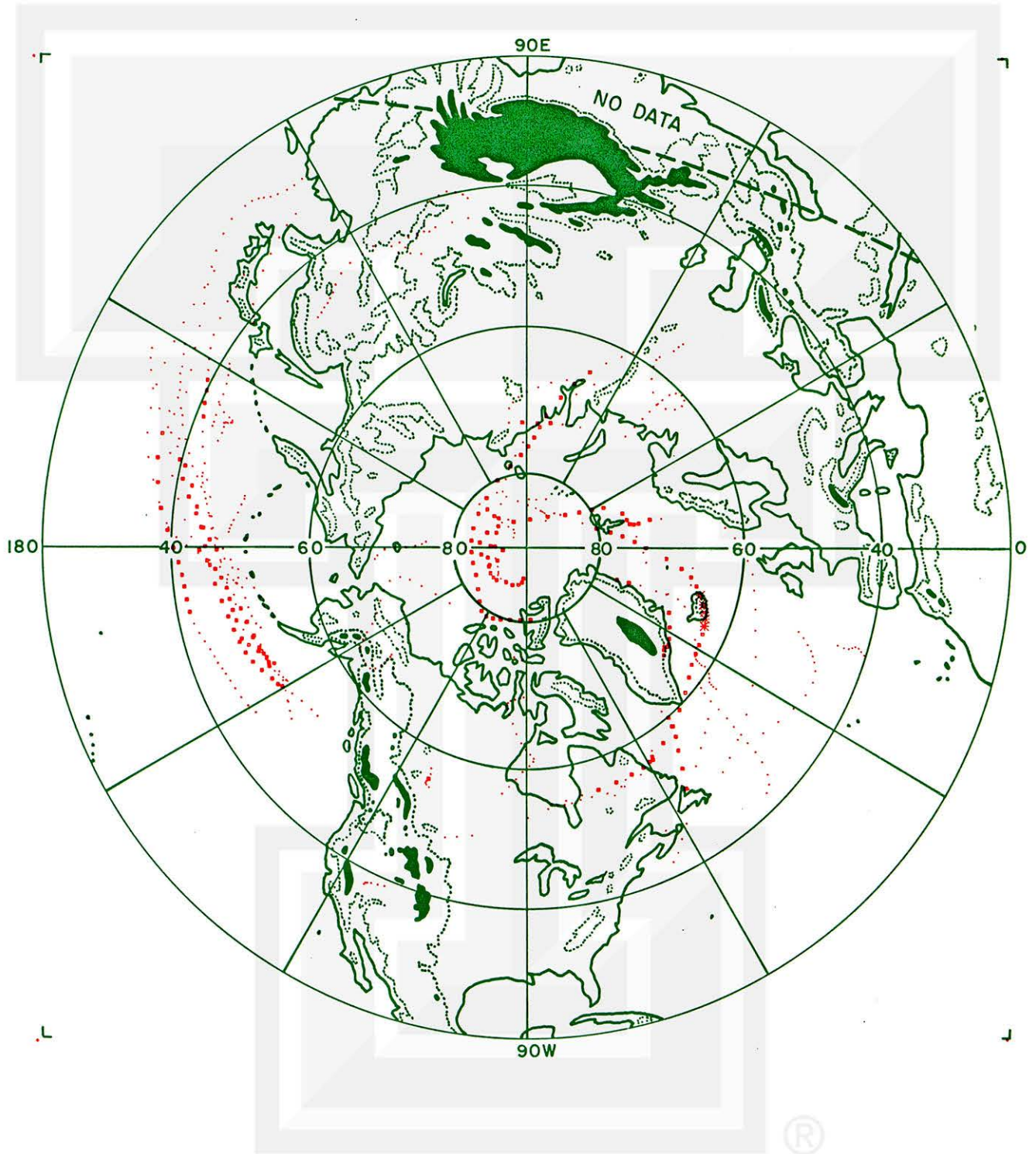
CENTRAL PRESSURE

SPRING 1984



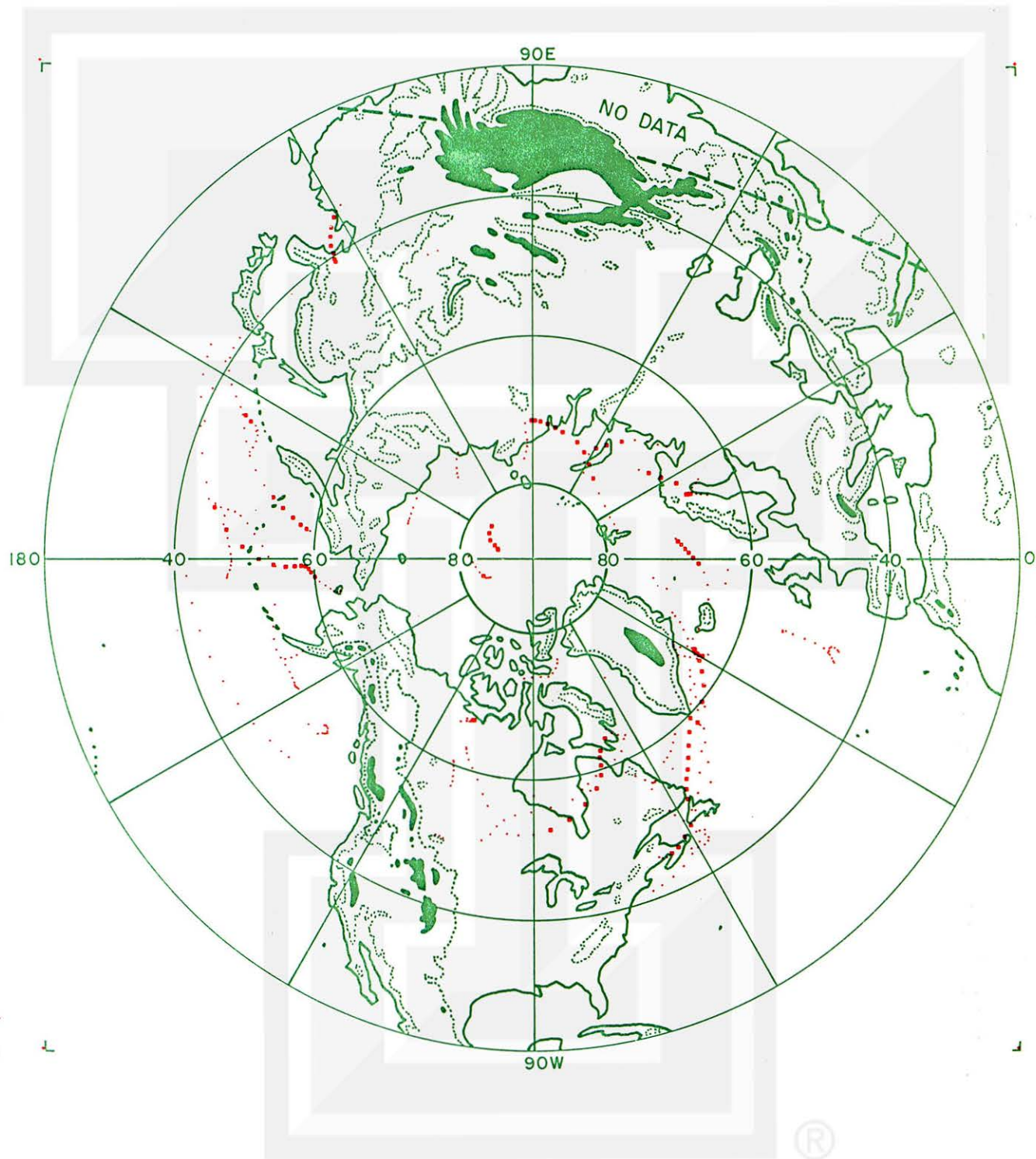
CENTRAL PRESSURE

JUN 83



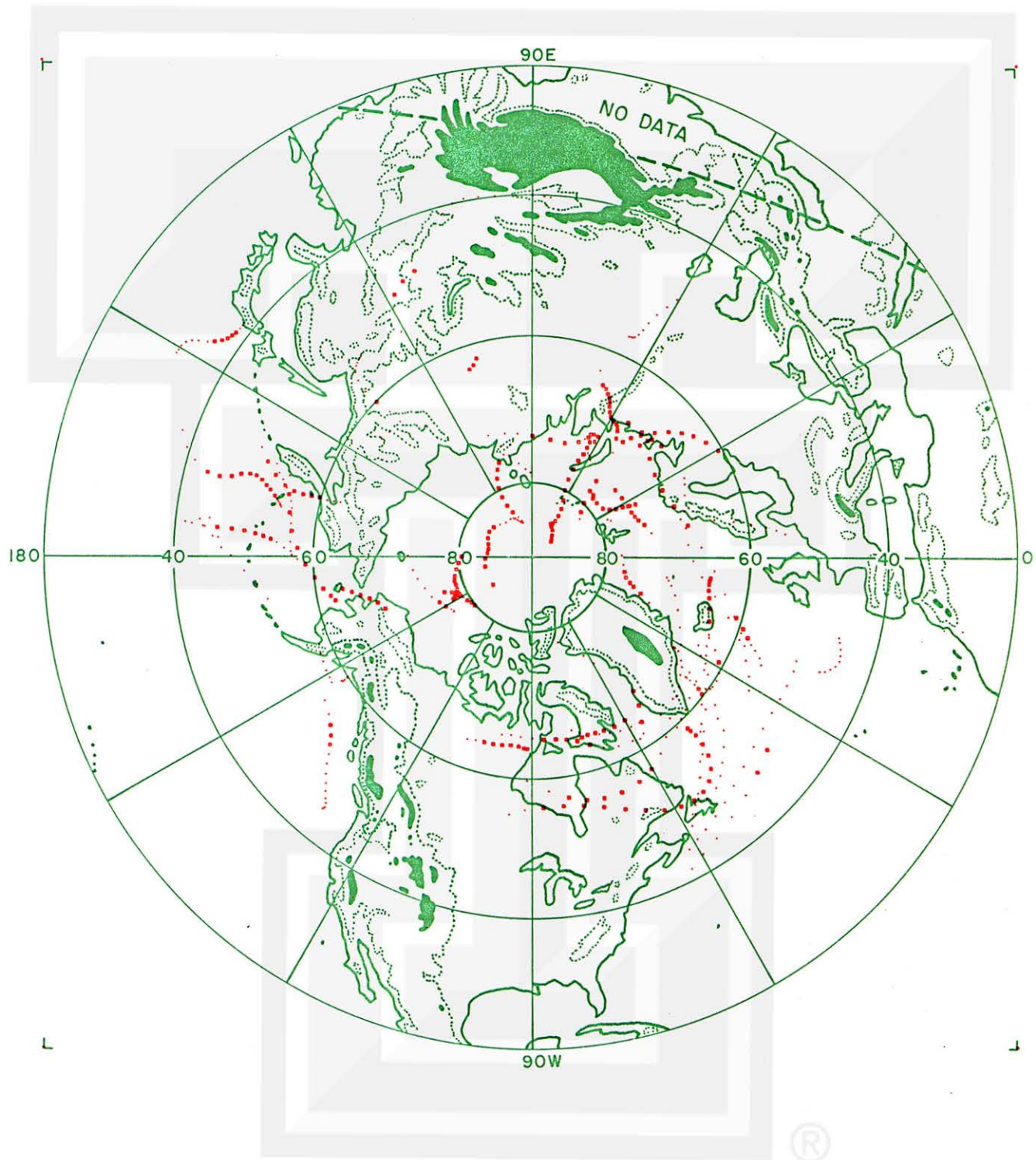
CENTRAL PRESSURE

JUL 83



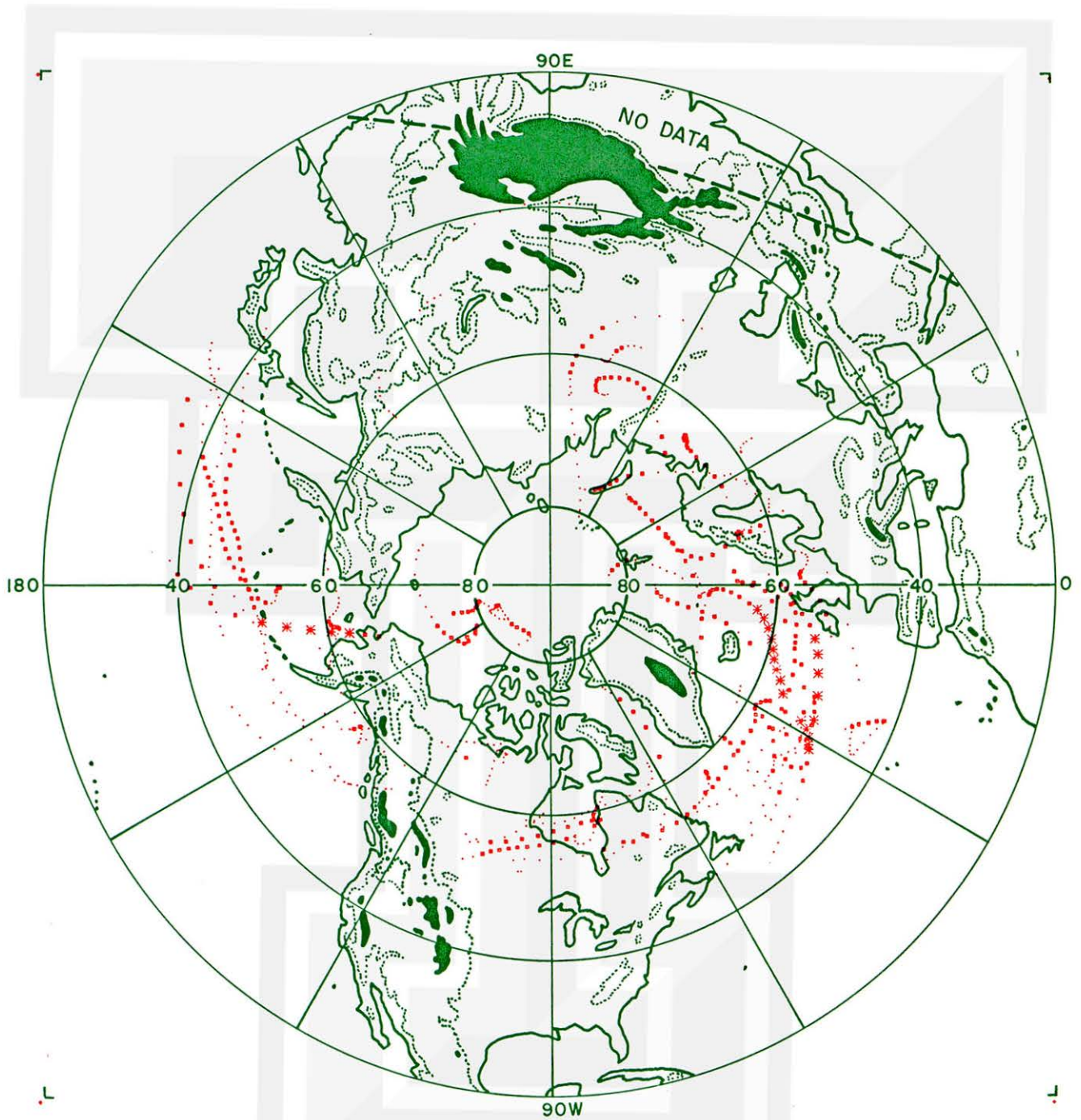
CENTRAL PRESSURE

AUG 83



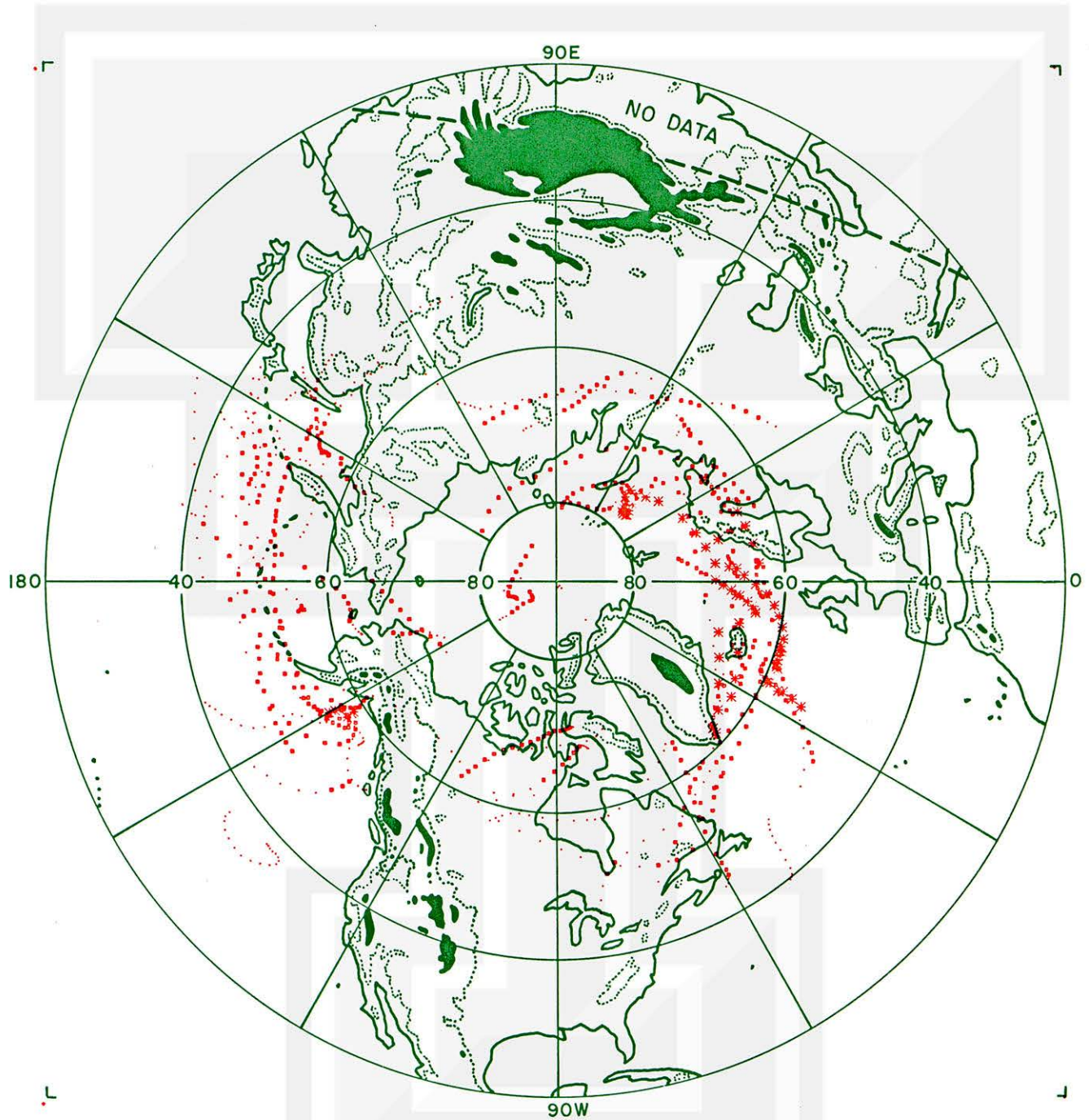
CENTRAL PRESSURE

SEP 83



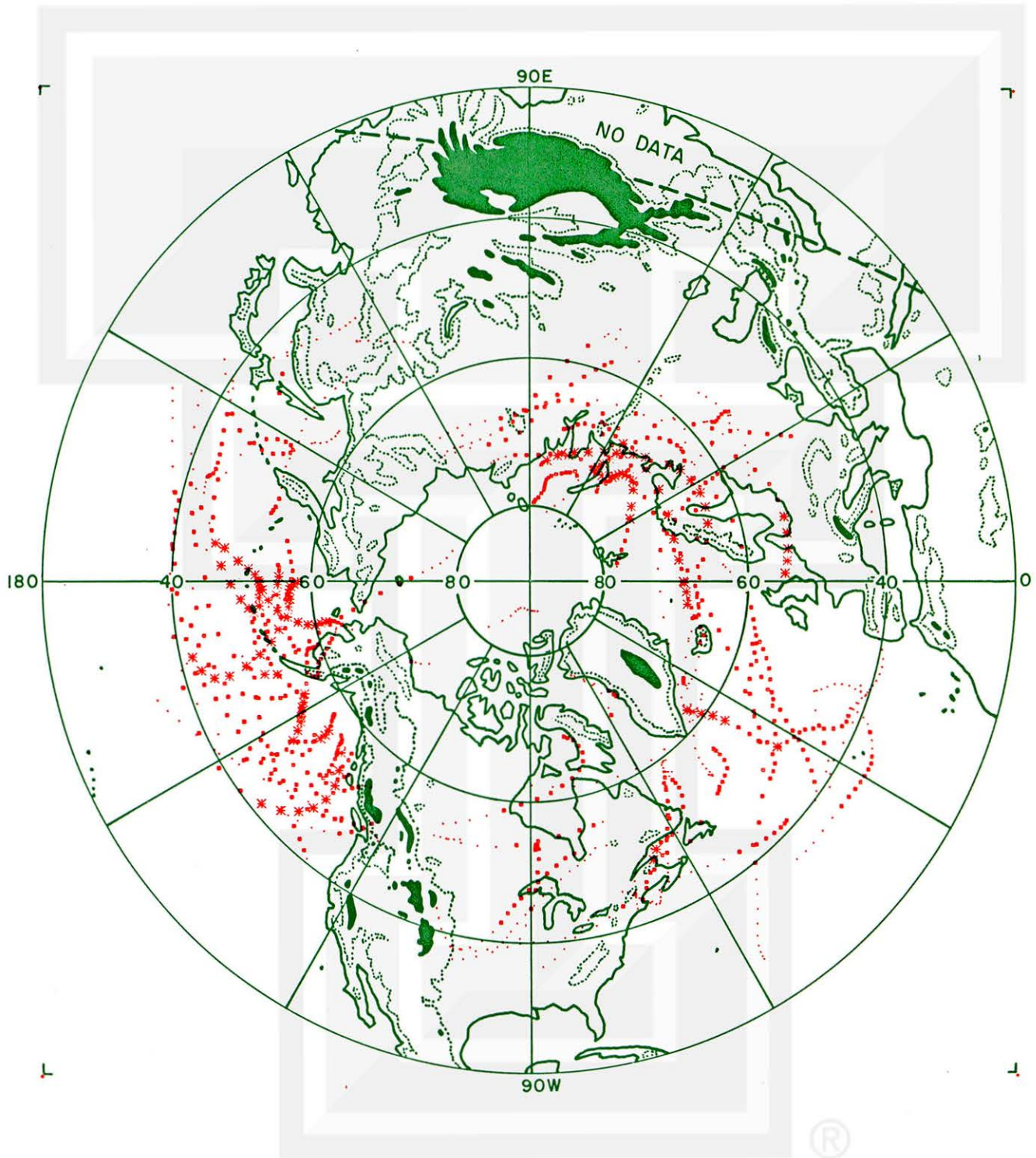
CENTRAL PRESSURE

OCT 83



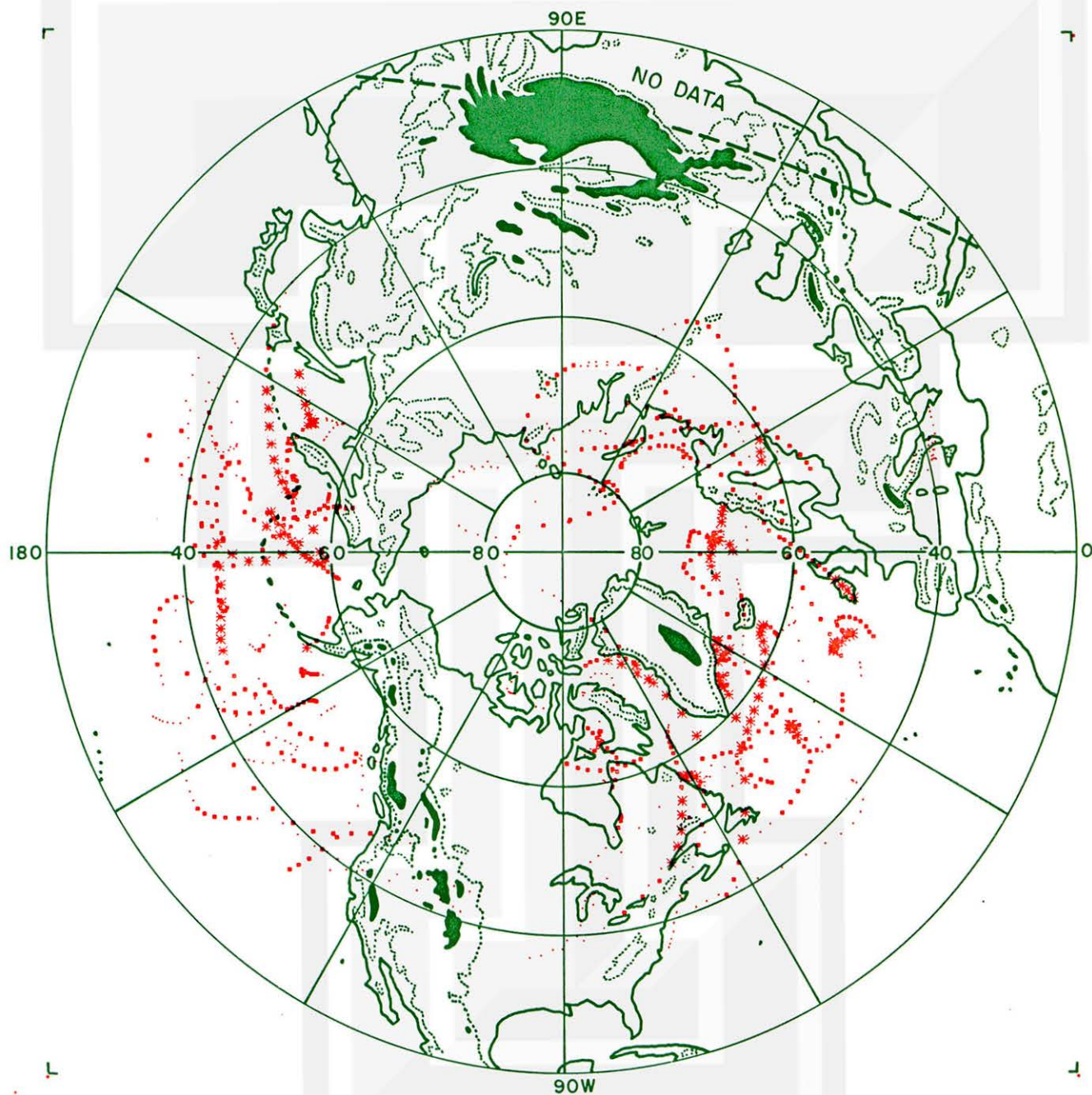
CENTRAL PRESSURE

NOV 83



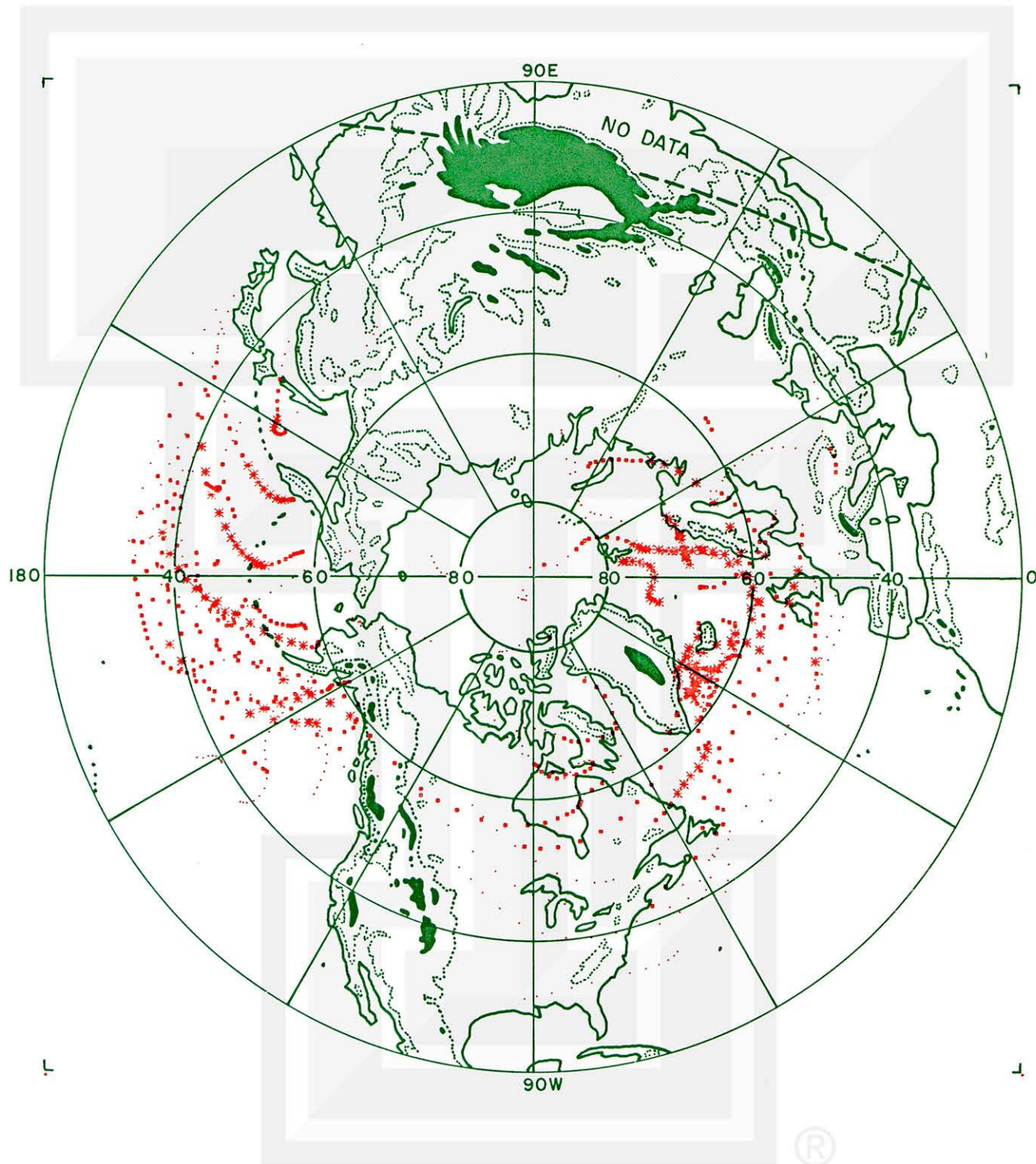
CENTRAL PRESSURE

DEC 83



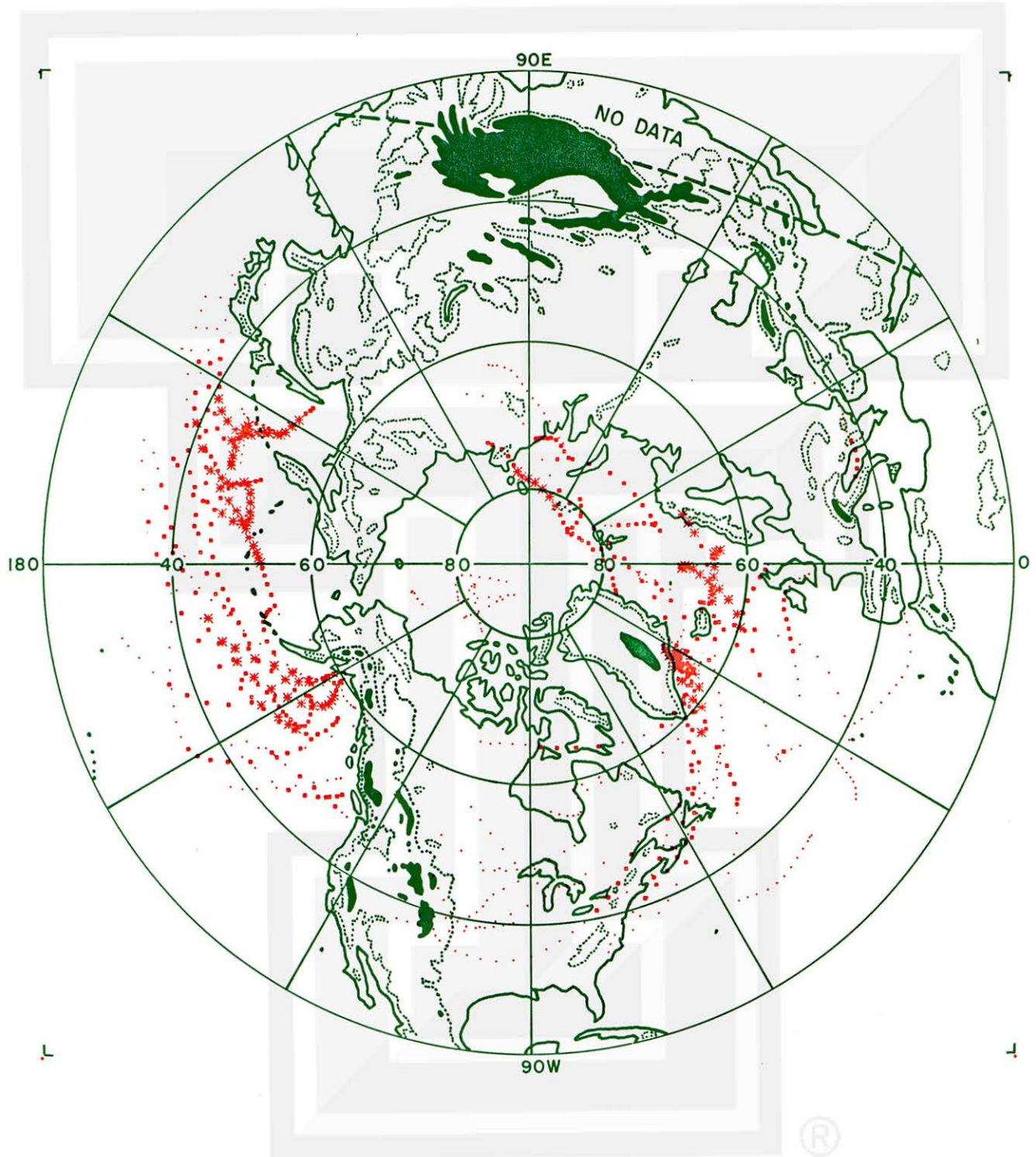
CENTRAL PRESSURE

JAN 84



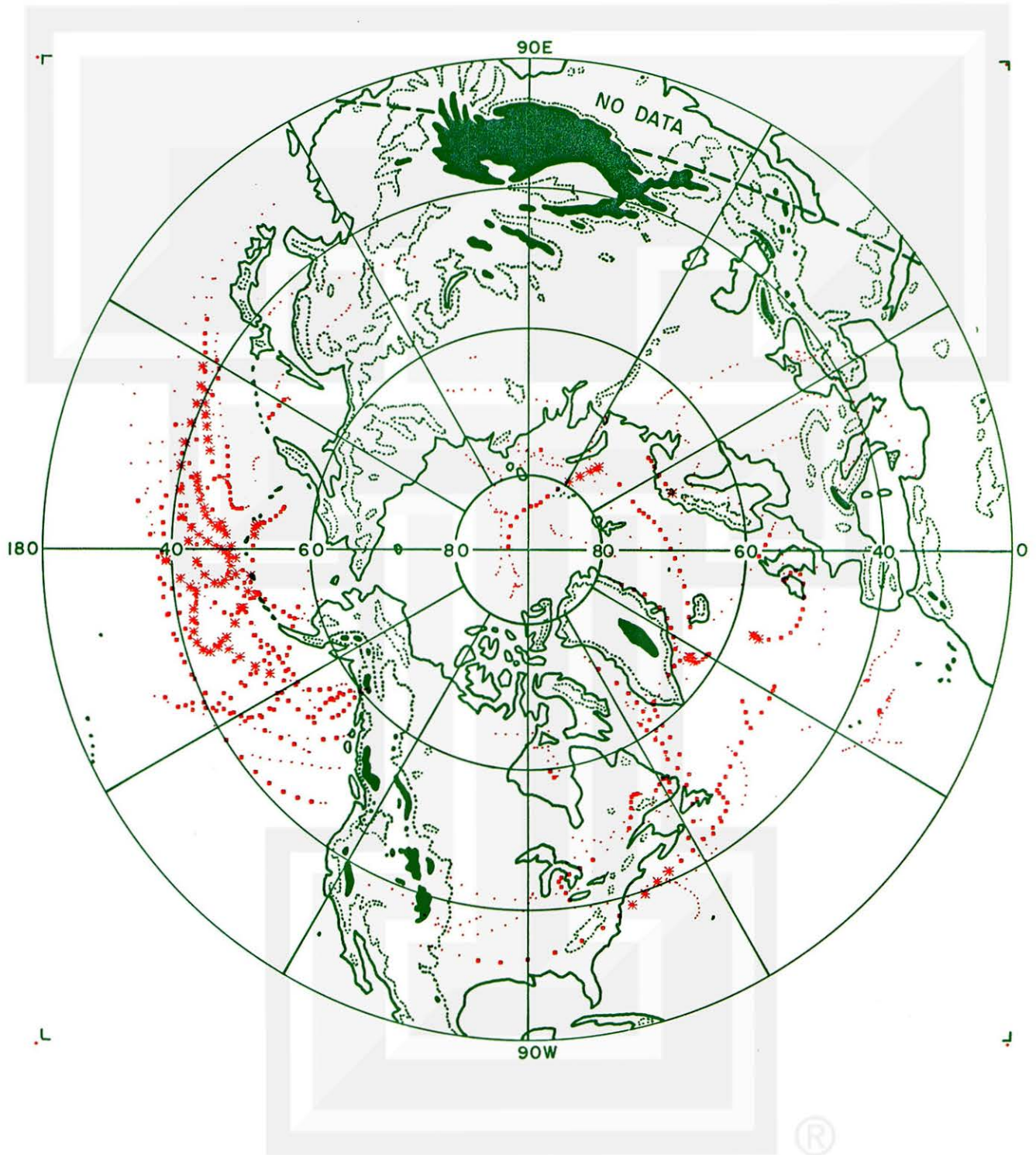
CENTRAL PRESSURE

FEB 84



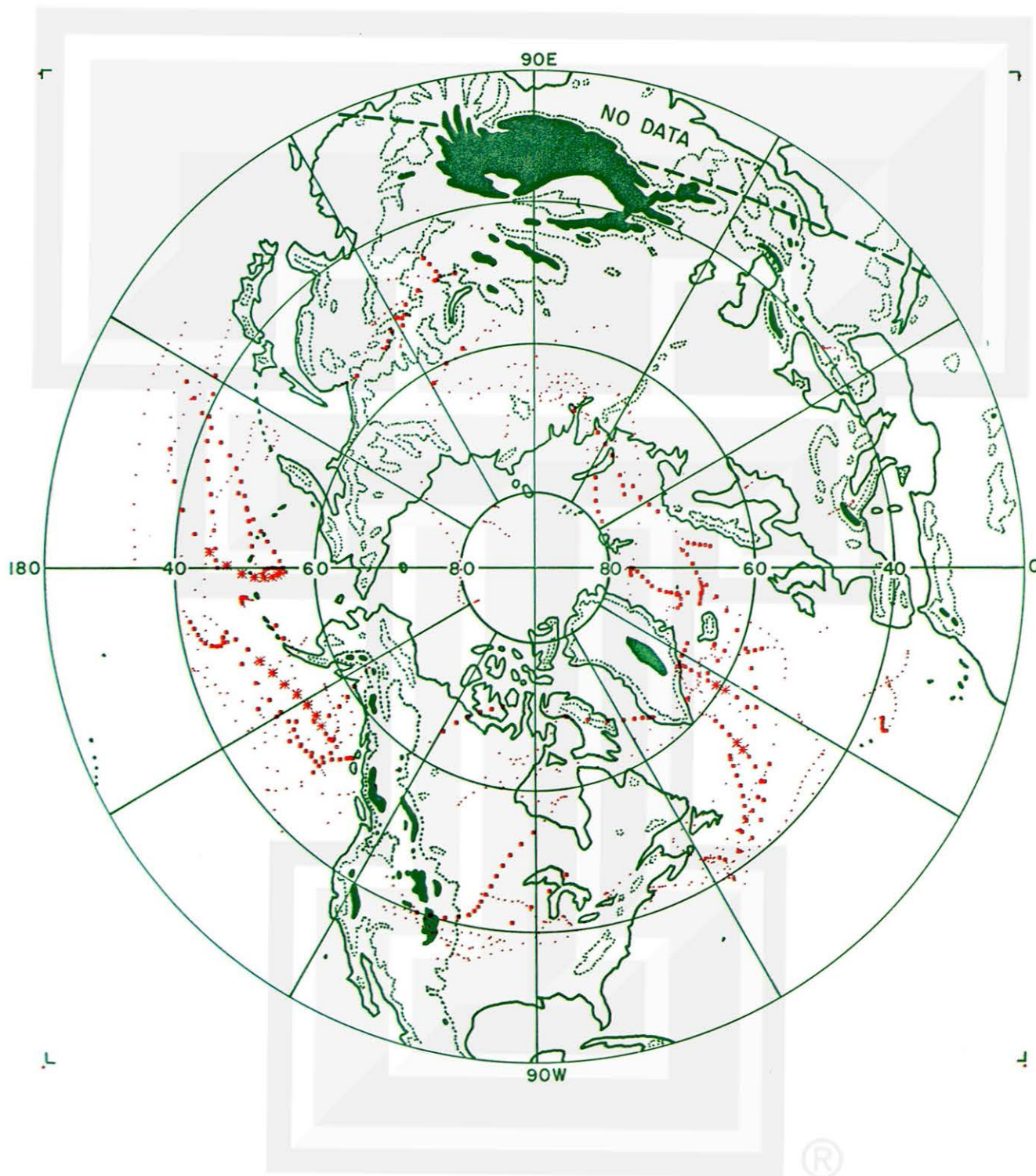
CENTRAL PRESSURE

MAR 84



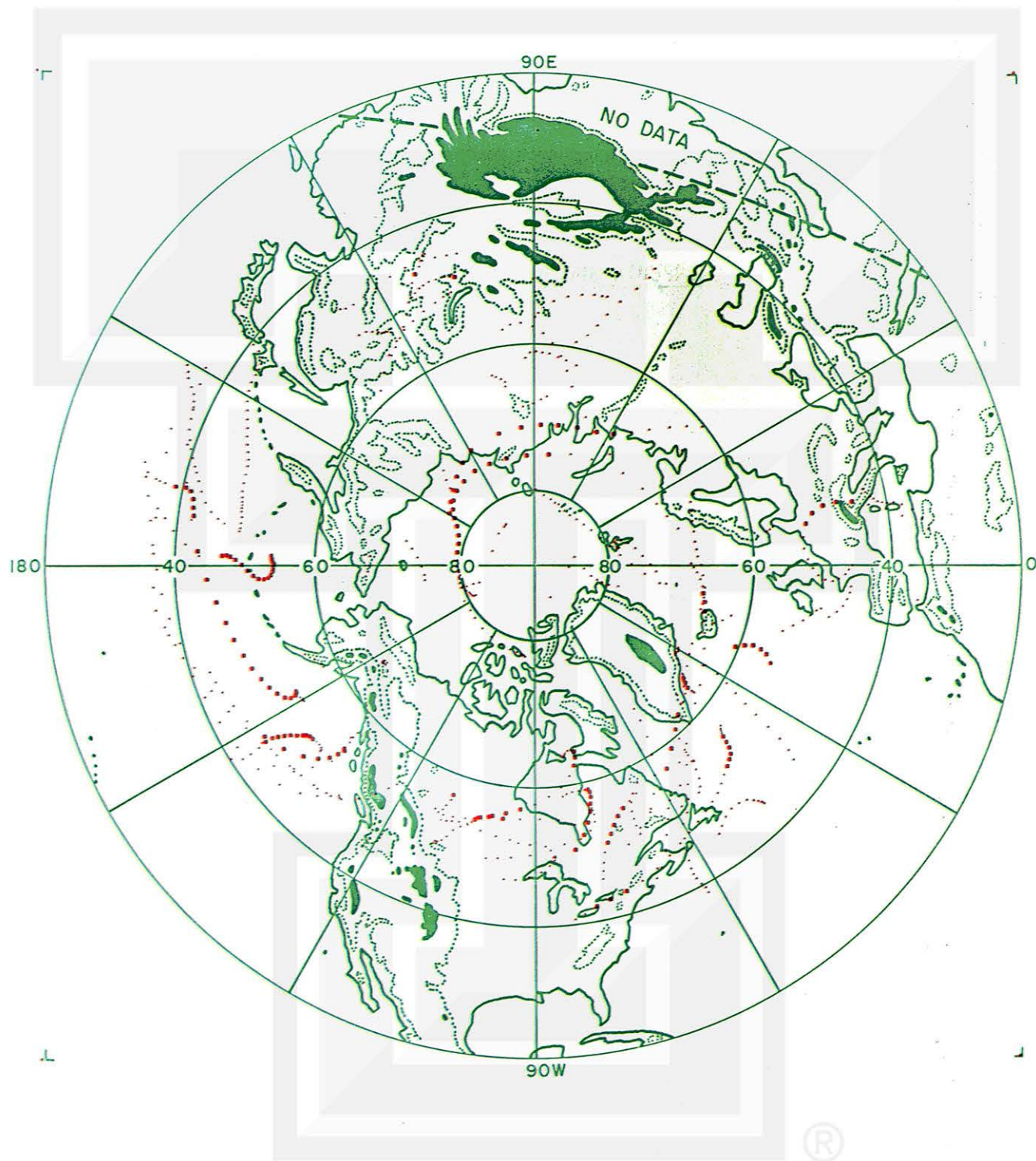
CENTRAL PRESSURE

APR 84



CENTRAL PRESSURE

MAY 84



..... 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

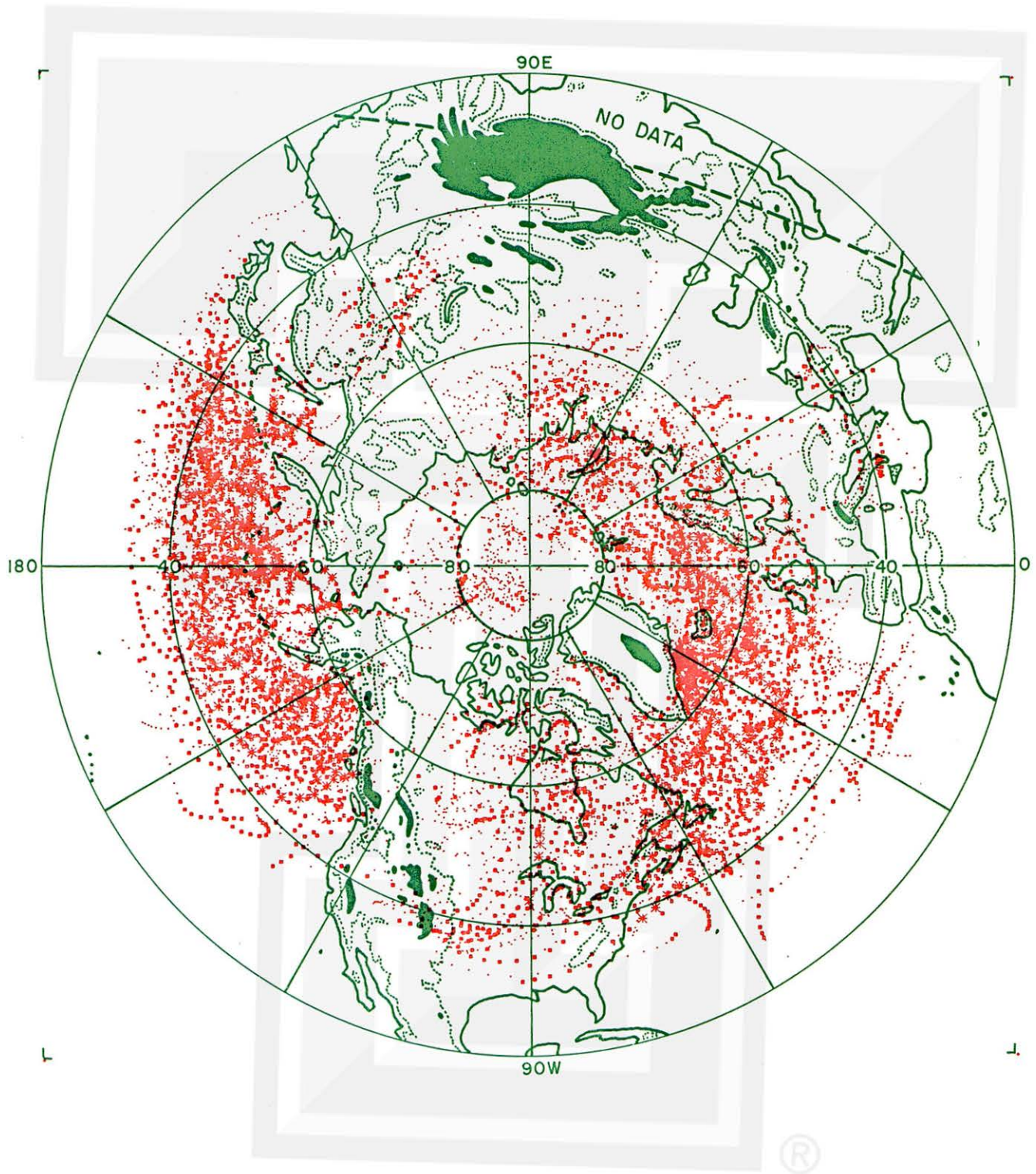
Summer 1983
Autumn 1983
Winter 1983-84
Spring 1984

12 MONTHLY MAPS

June-December 1983
January-May 1984

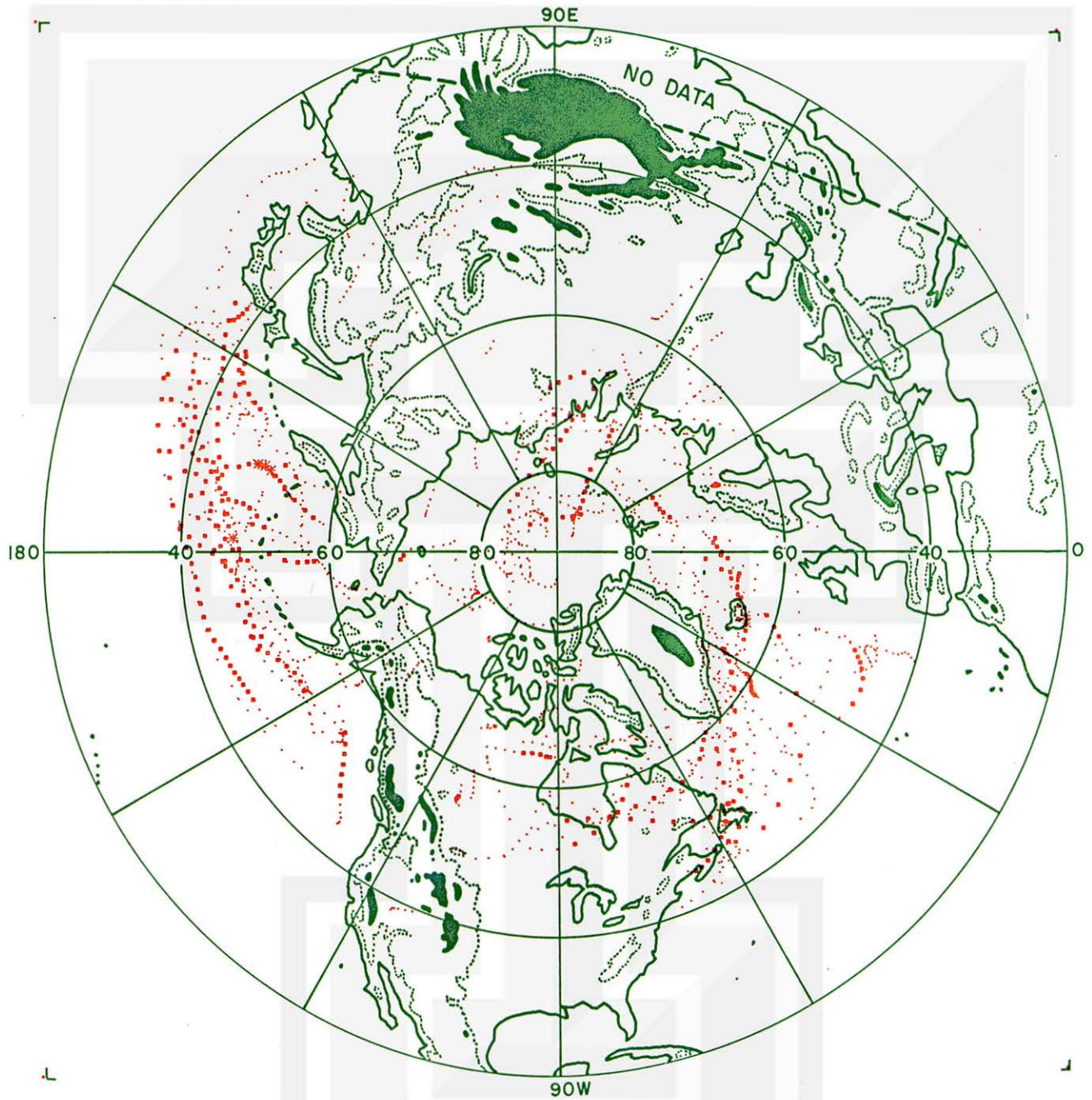


CYCLONE WINDSPEED
12 MOS JUN 83 - MAY 84



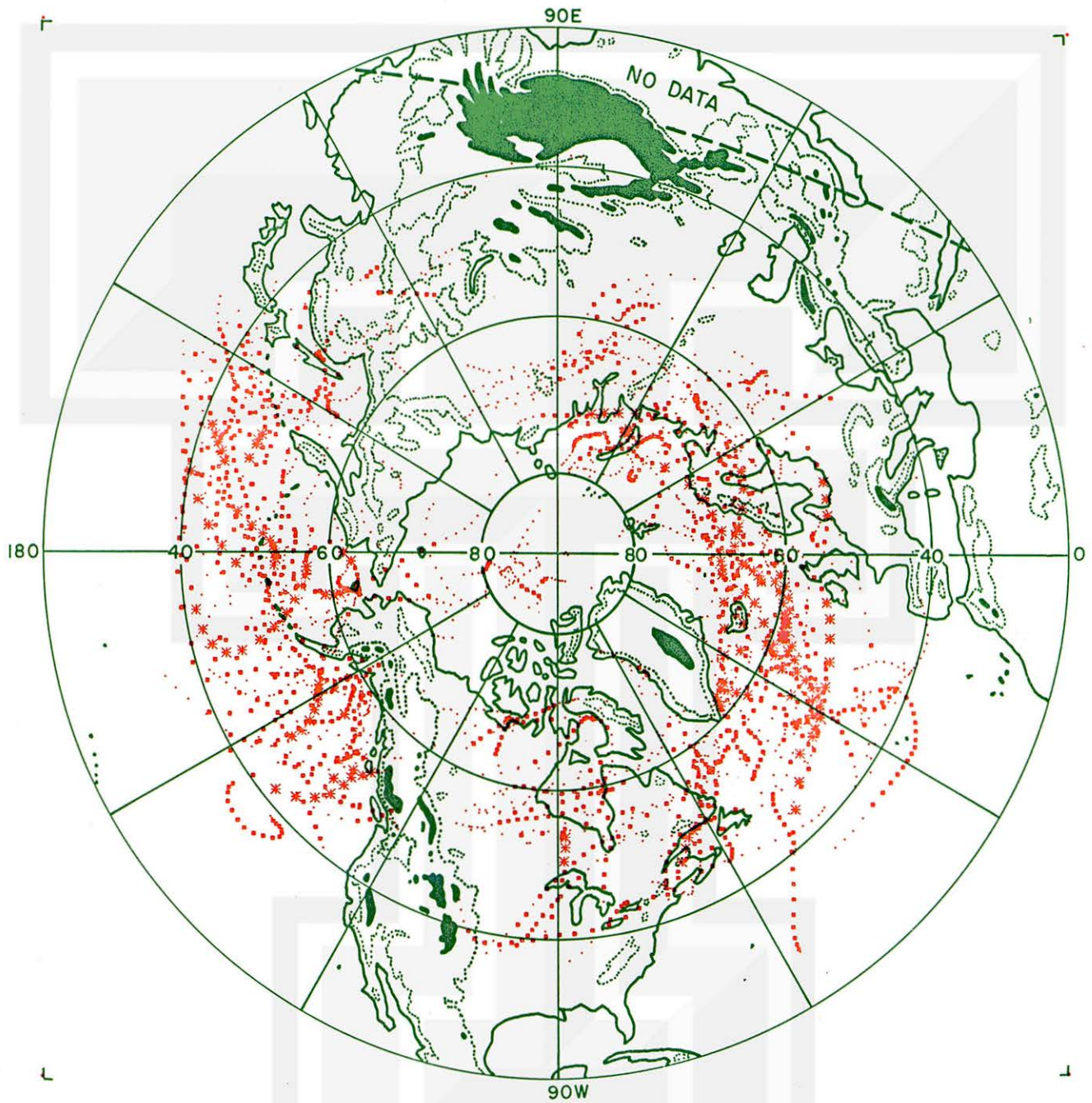
CYCLONE WINDSPEED

SUMMER 1983

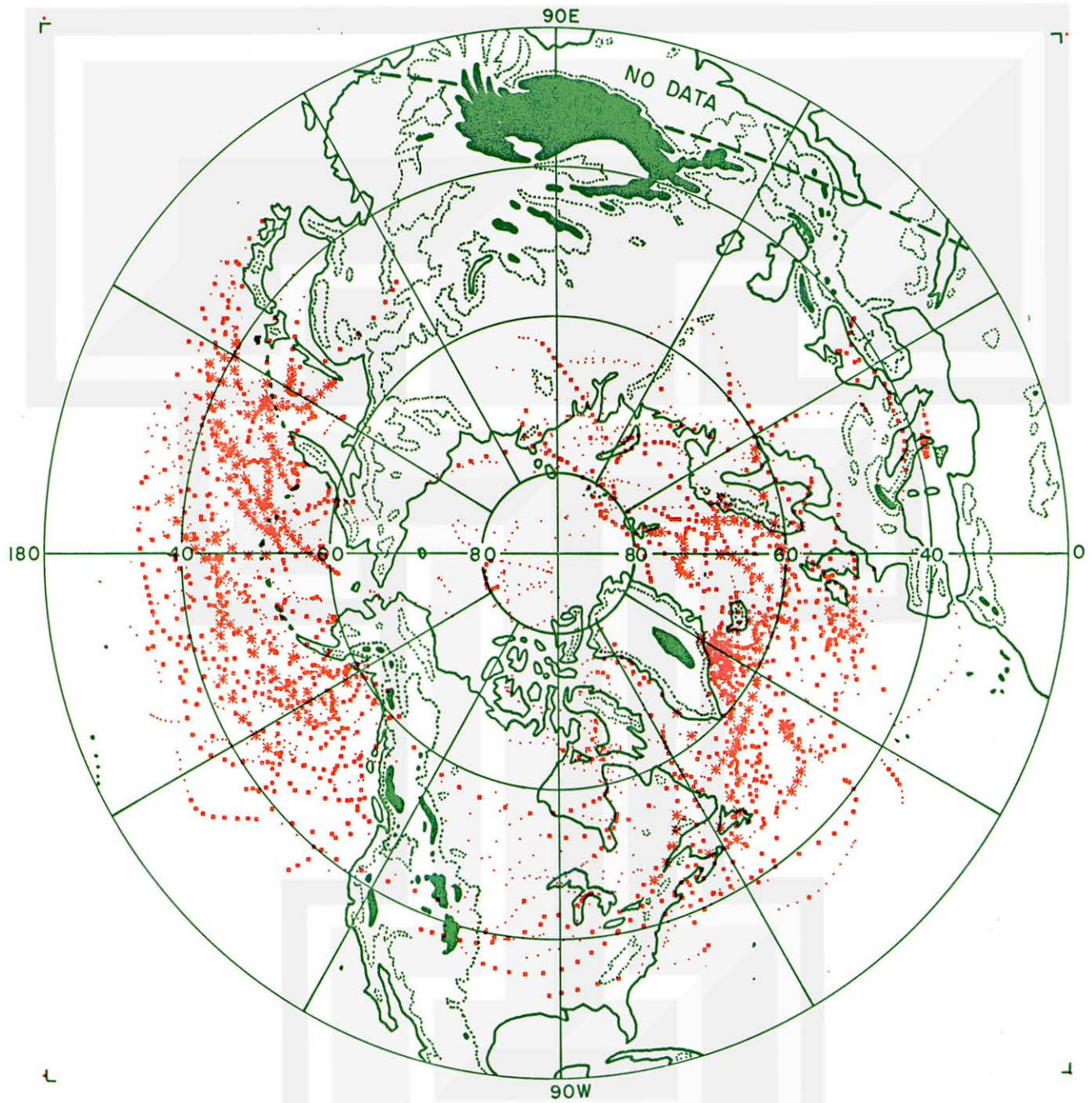


CYCLONE WINDSPEED

AUTUMN 1983

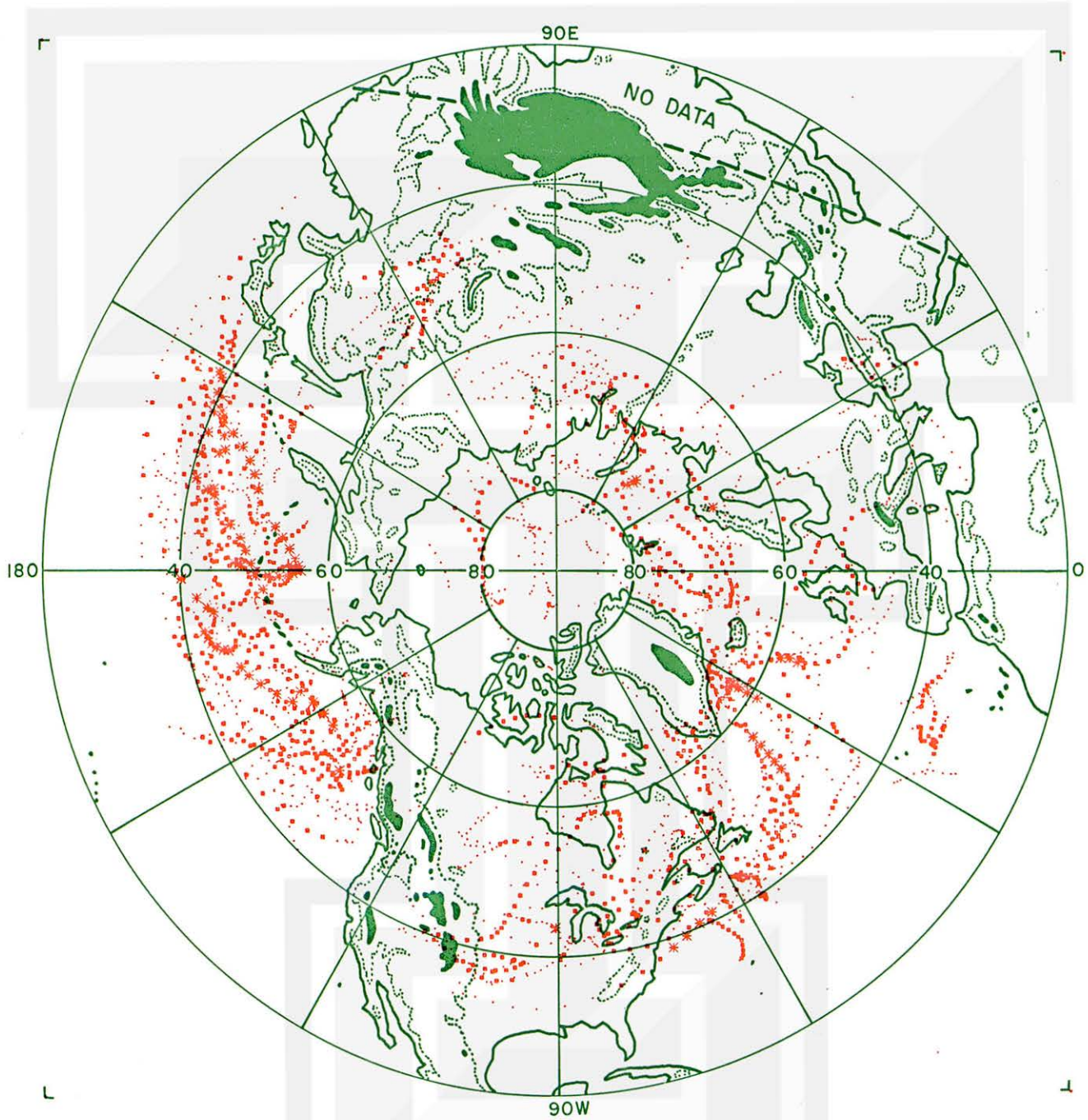


CYCLONE WINDSPEED
WINTER 1983 - 84



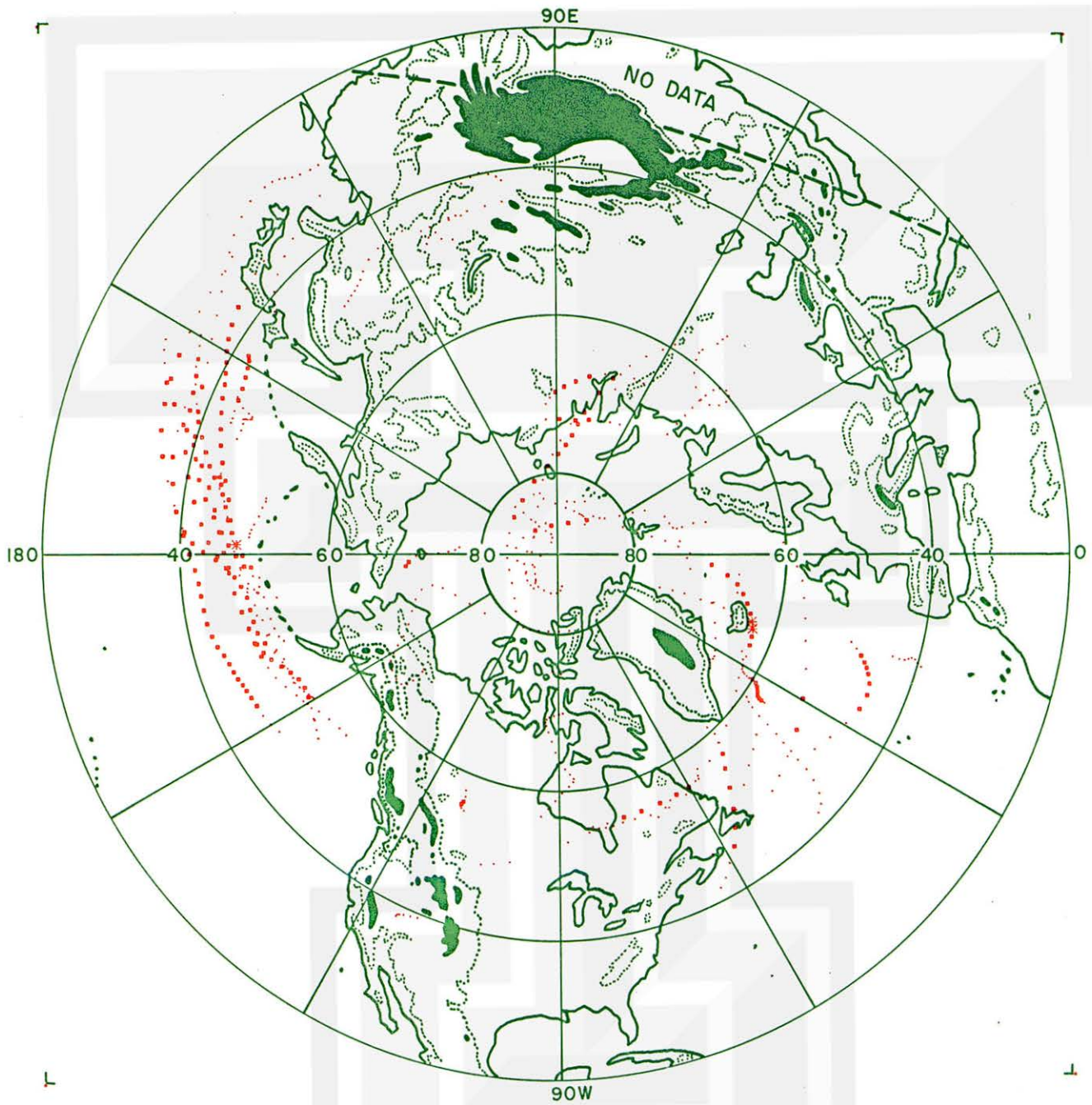
CYCLONE WINDSPEED

SPRING 1984



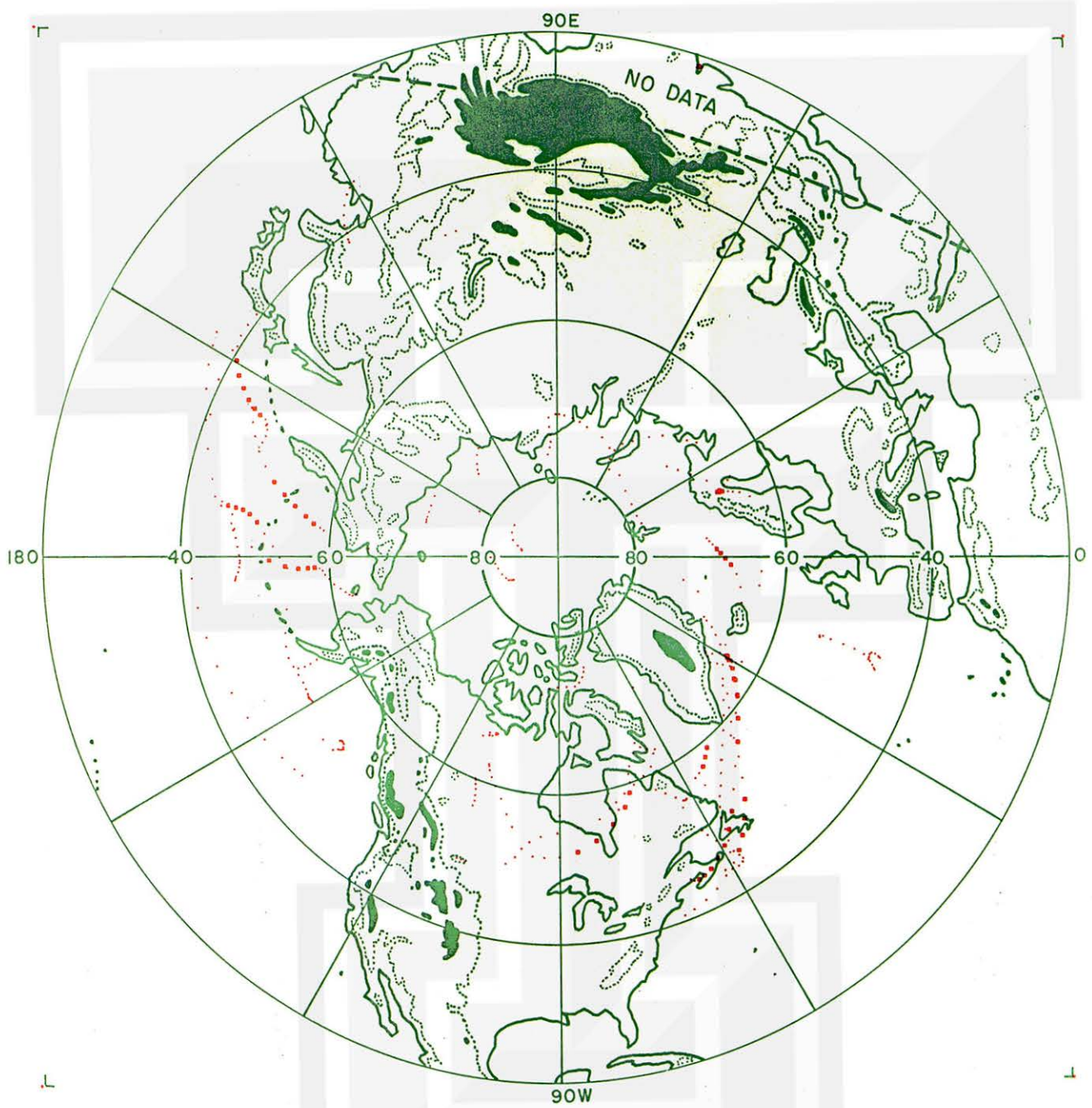
CYCLONE WINDSPEED

JUN 83



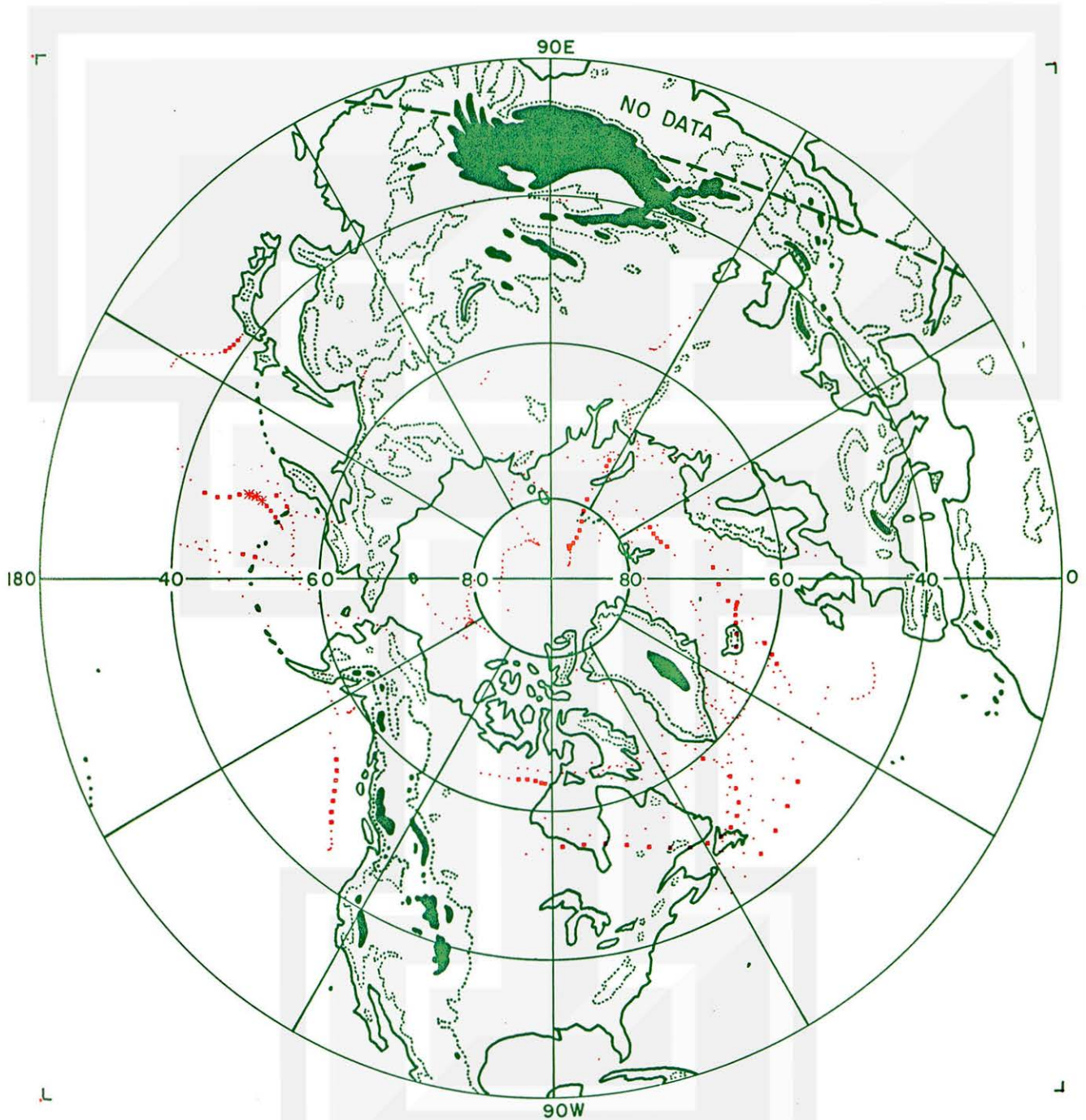
CYCLONE WINDSPEED

JUL 83



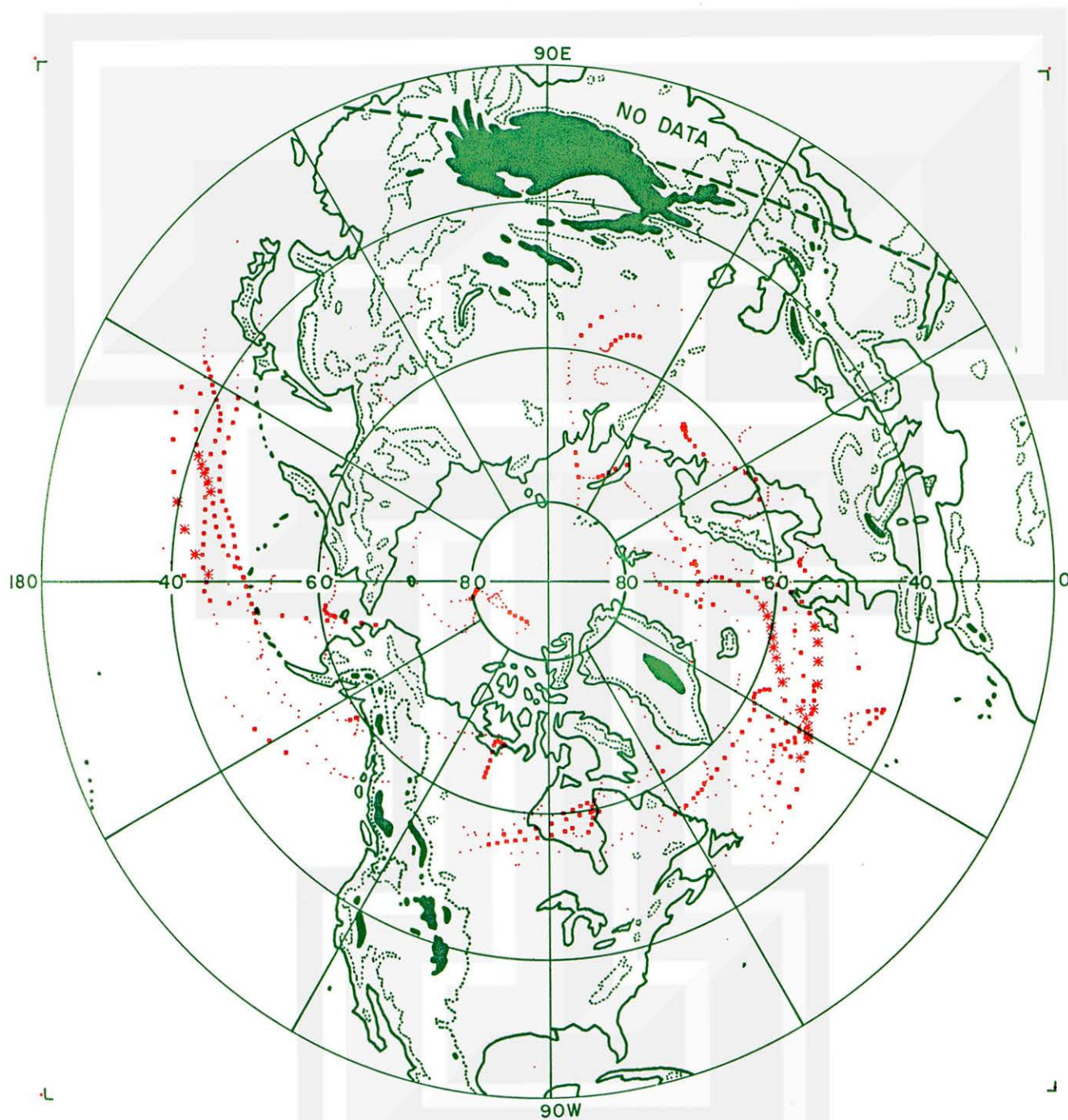
CYCLONE WINDSPEED

AUG 83



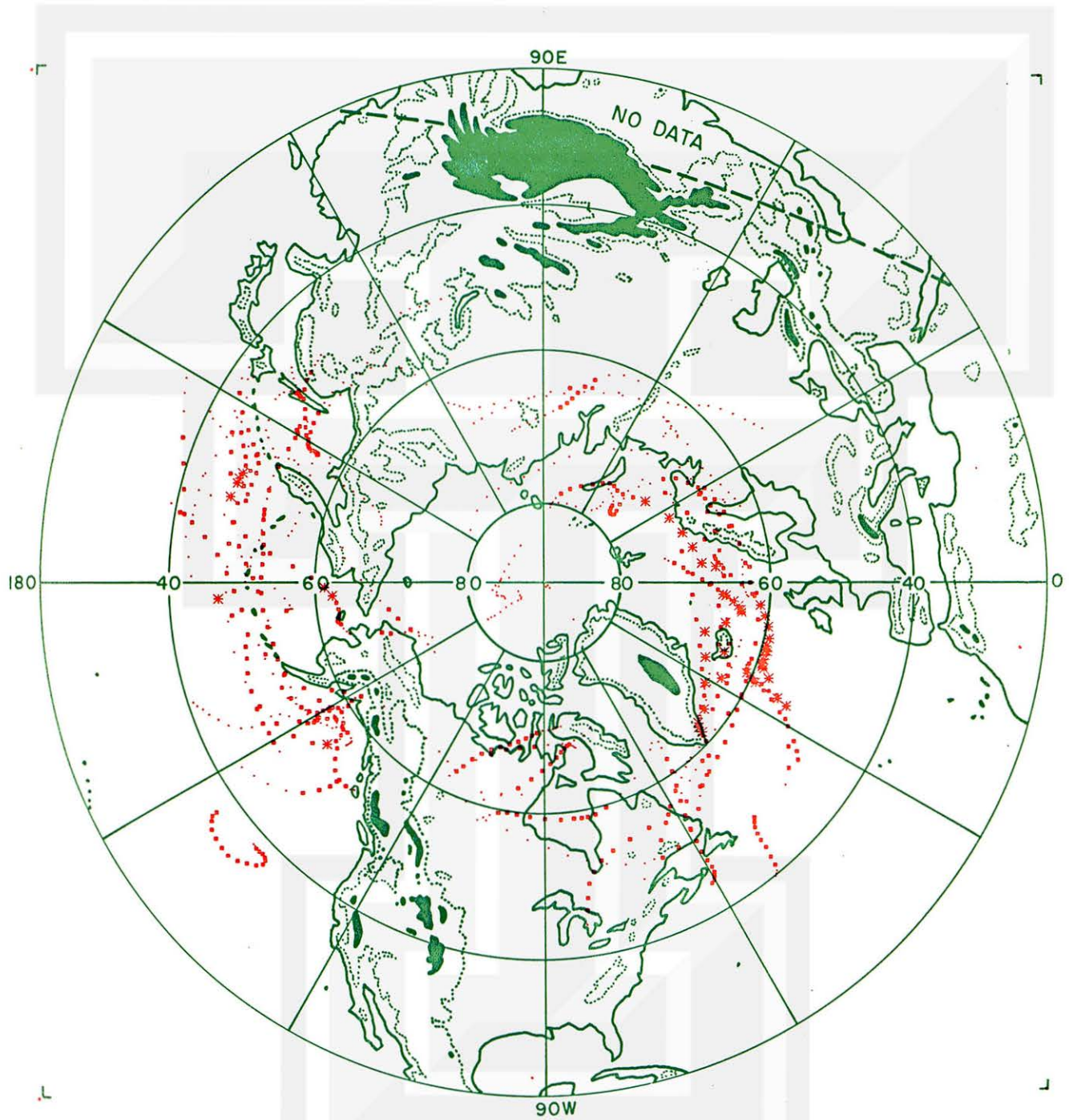
CYCLONE WINDSPEED

SEP 83



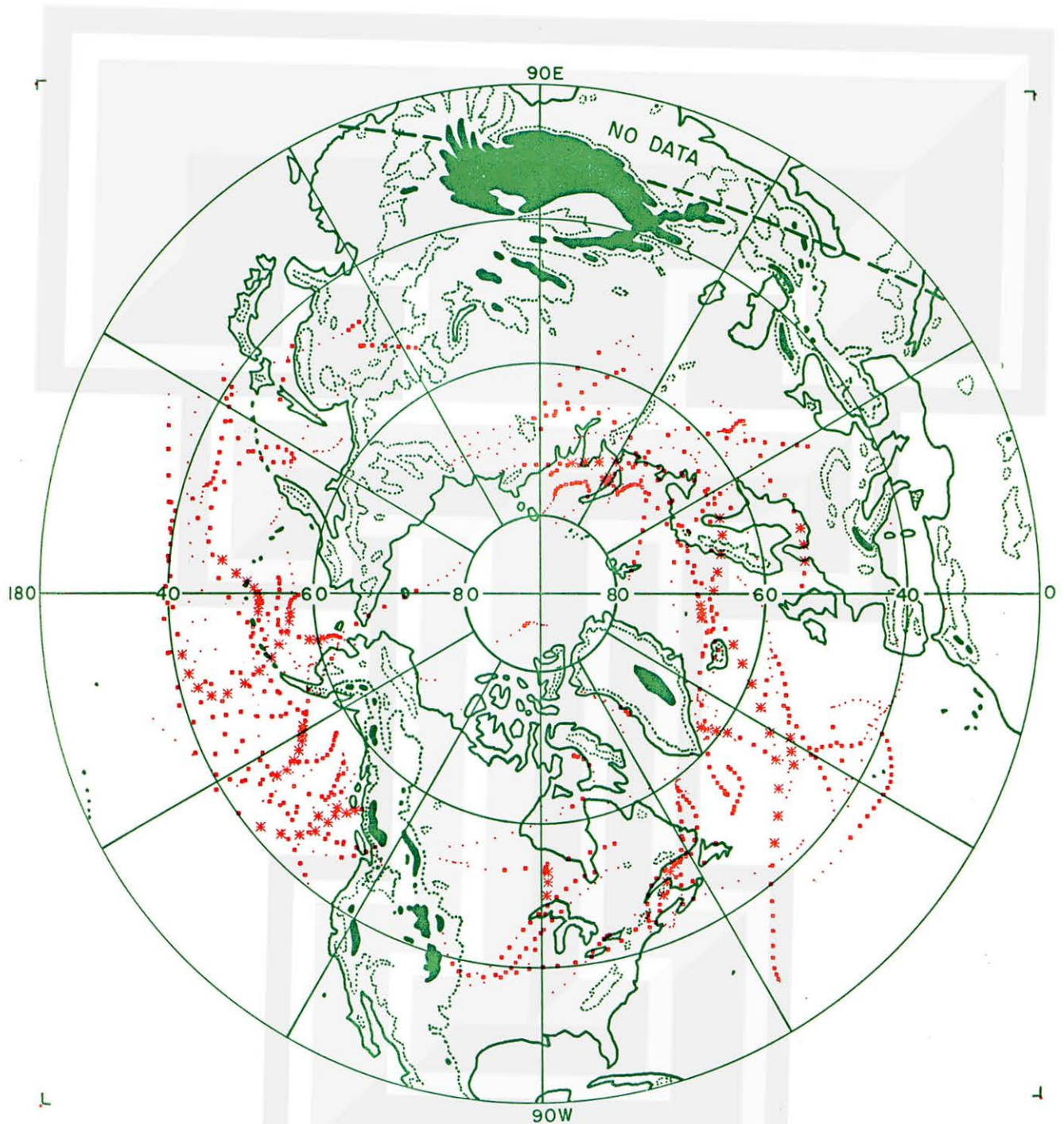
CYCLONE WINDSPEED

OCT 83



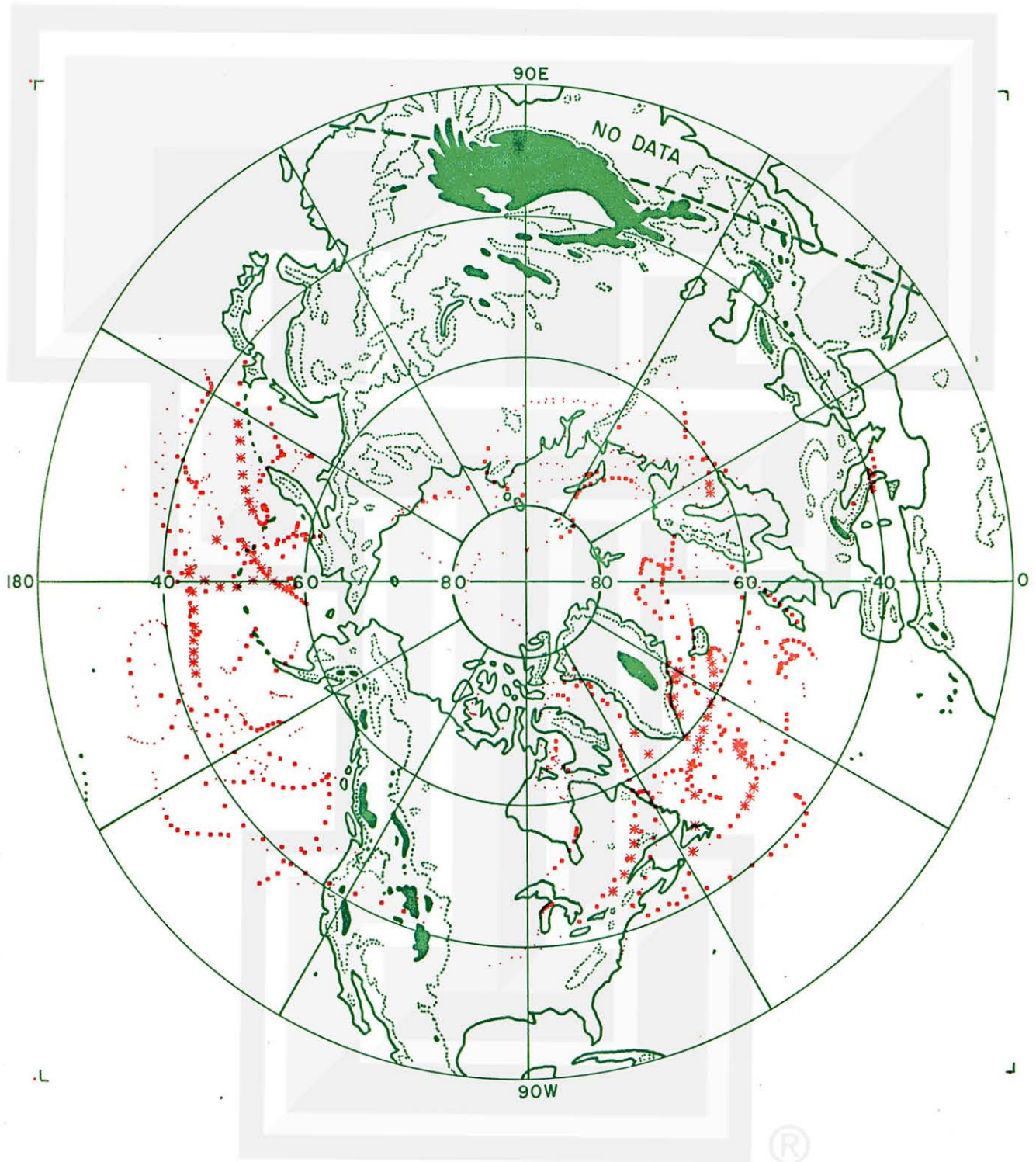
CYCLONE WINDSPEED

NOV 83



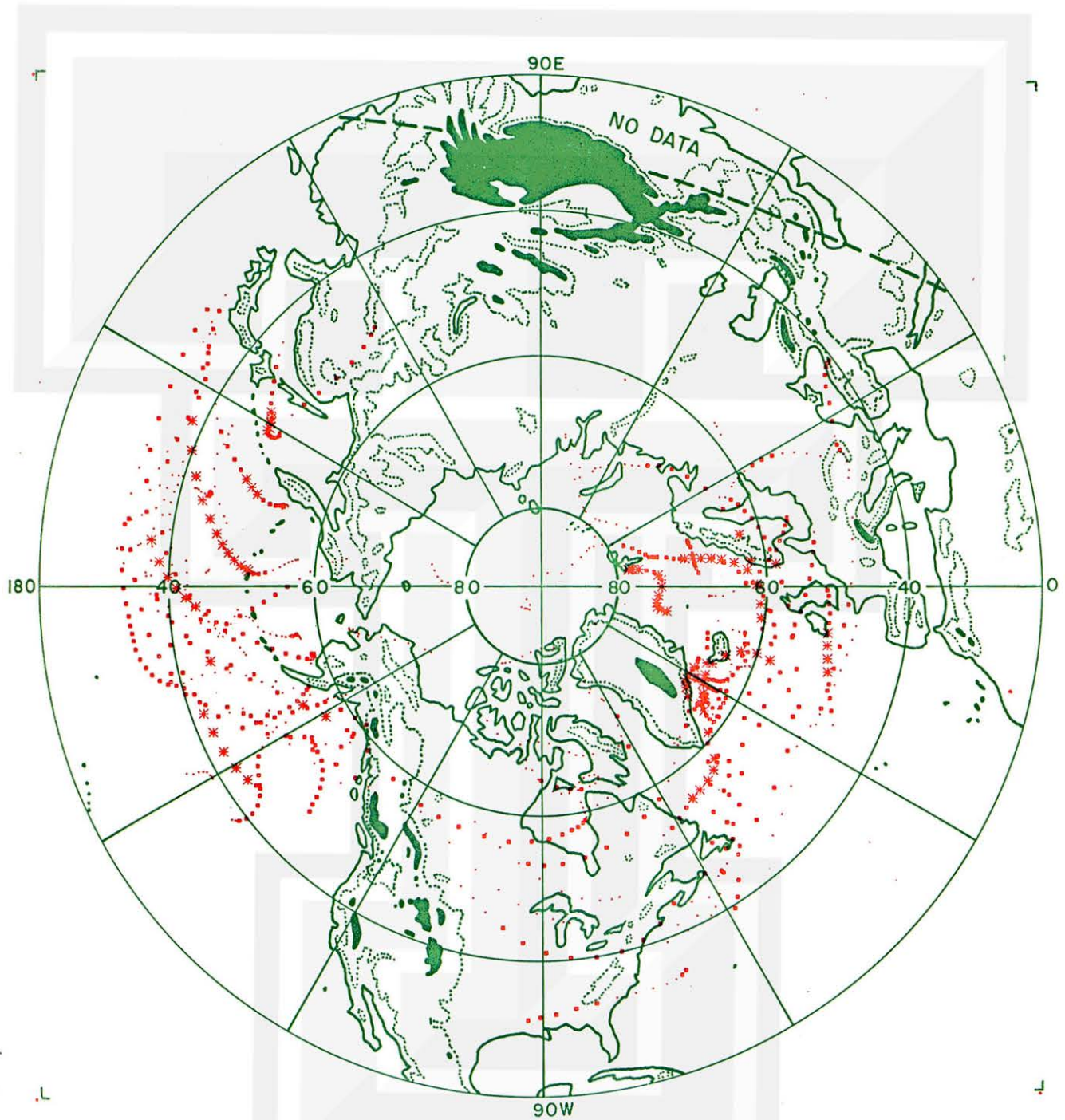
CYCLONE WINDSPEED

DEC 83



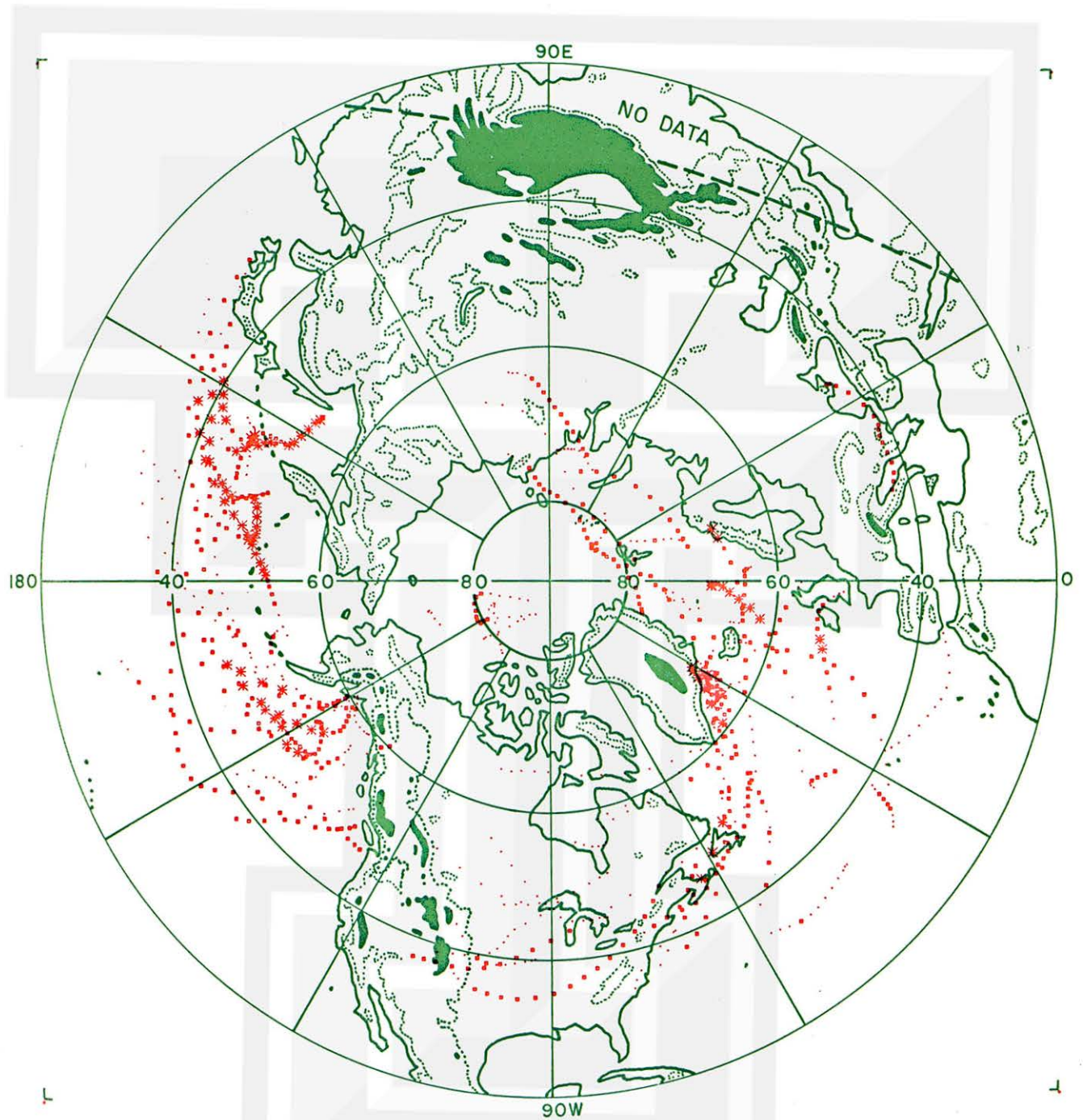
CYCLONE WINDSPEED

JAN 84



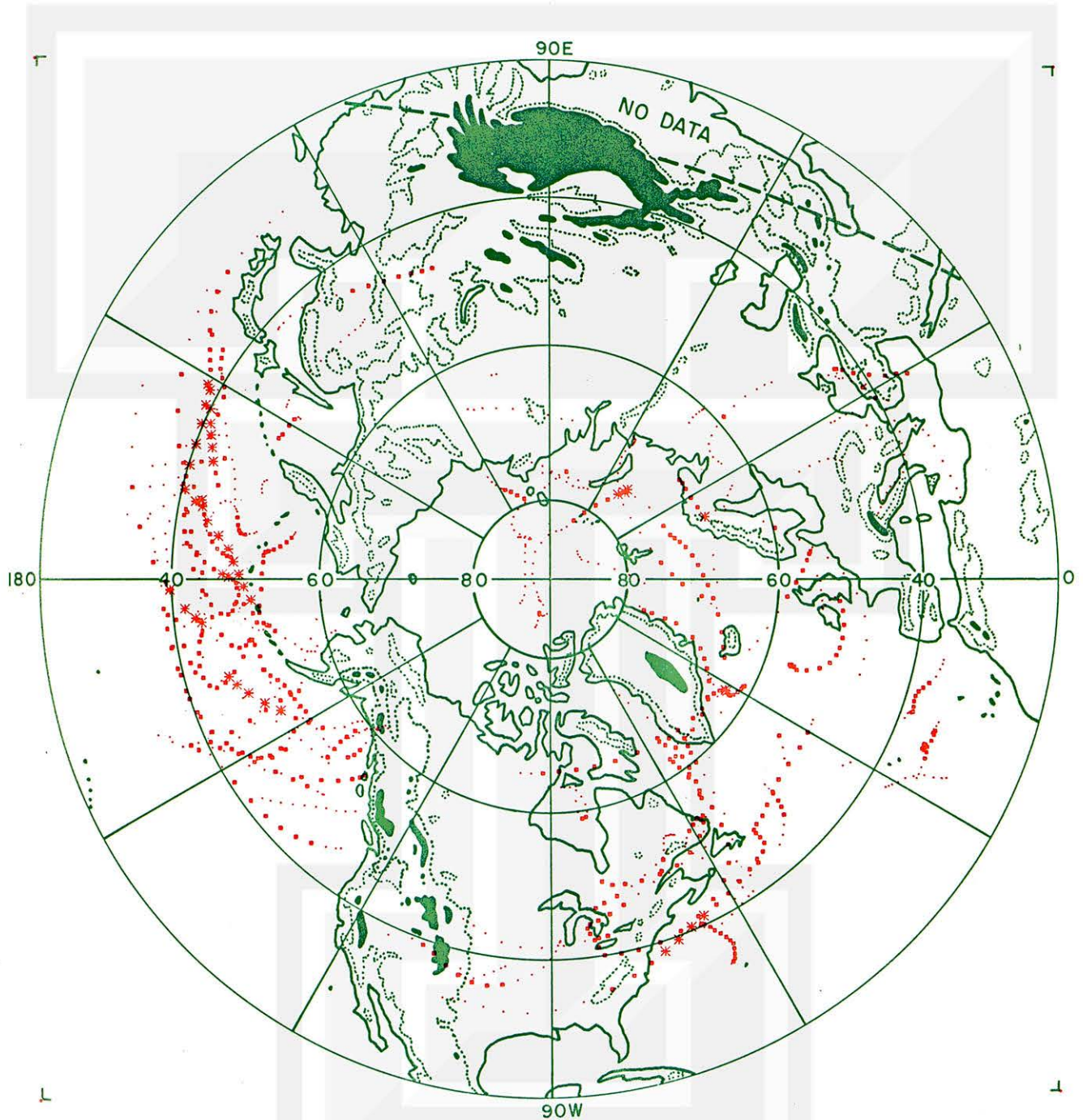
CYCLONE WINDSPEED

FEB 84



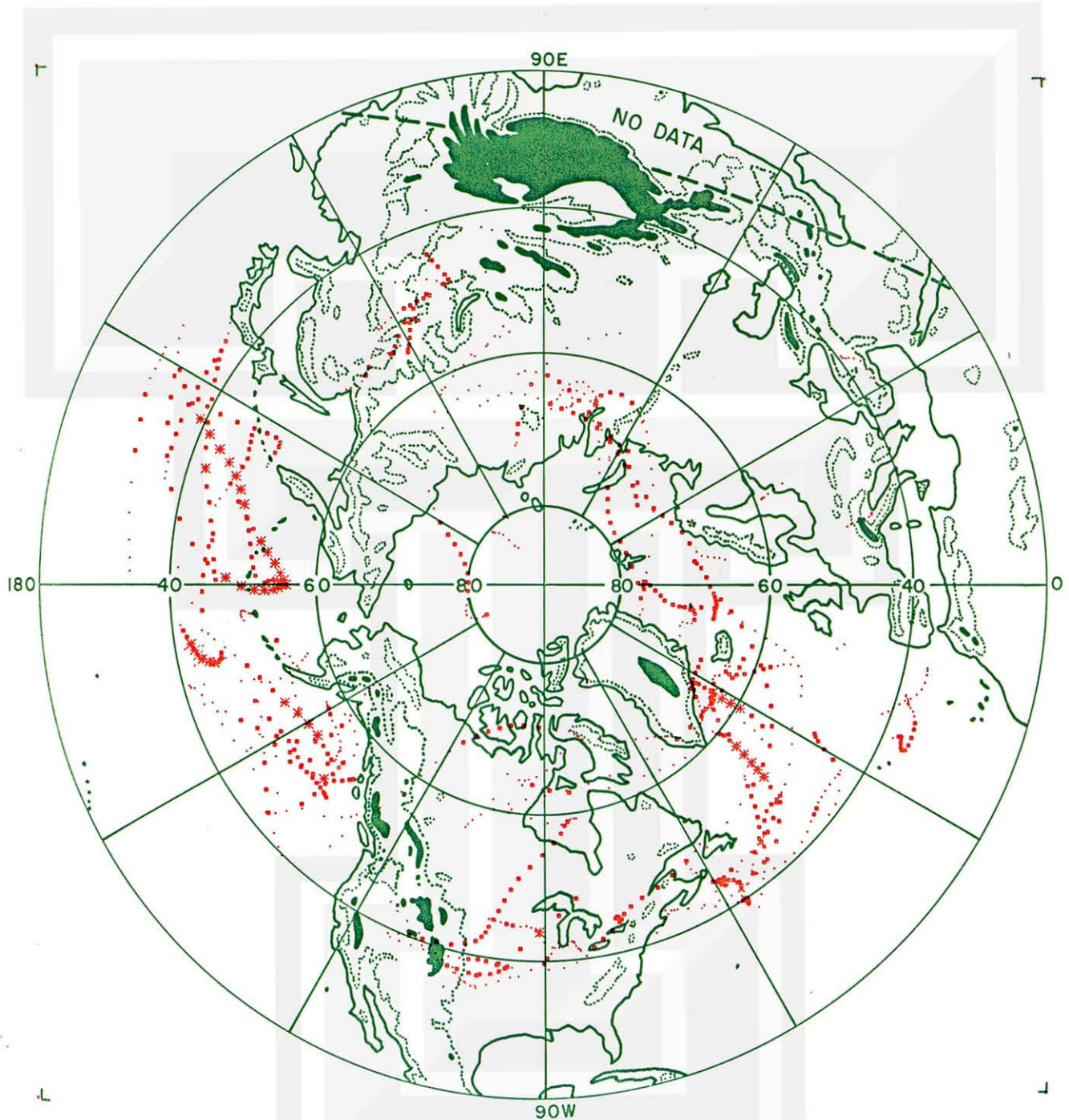
CYCLONE WINDSPEED

MAR 84



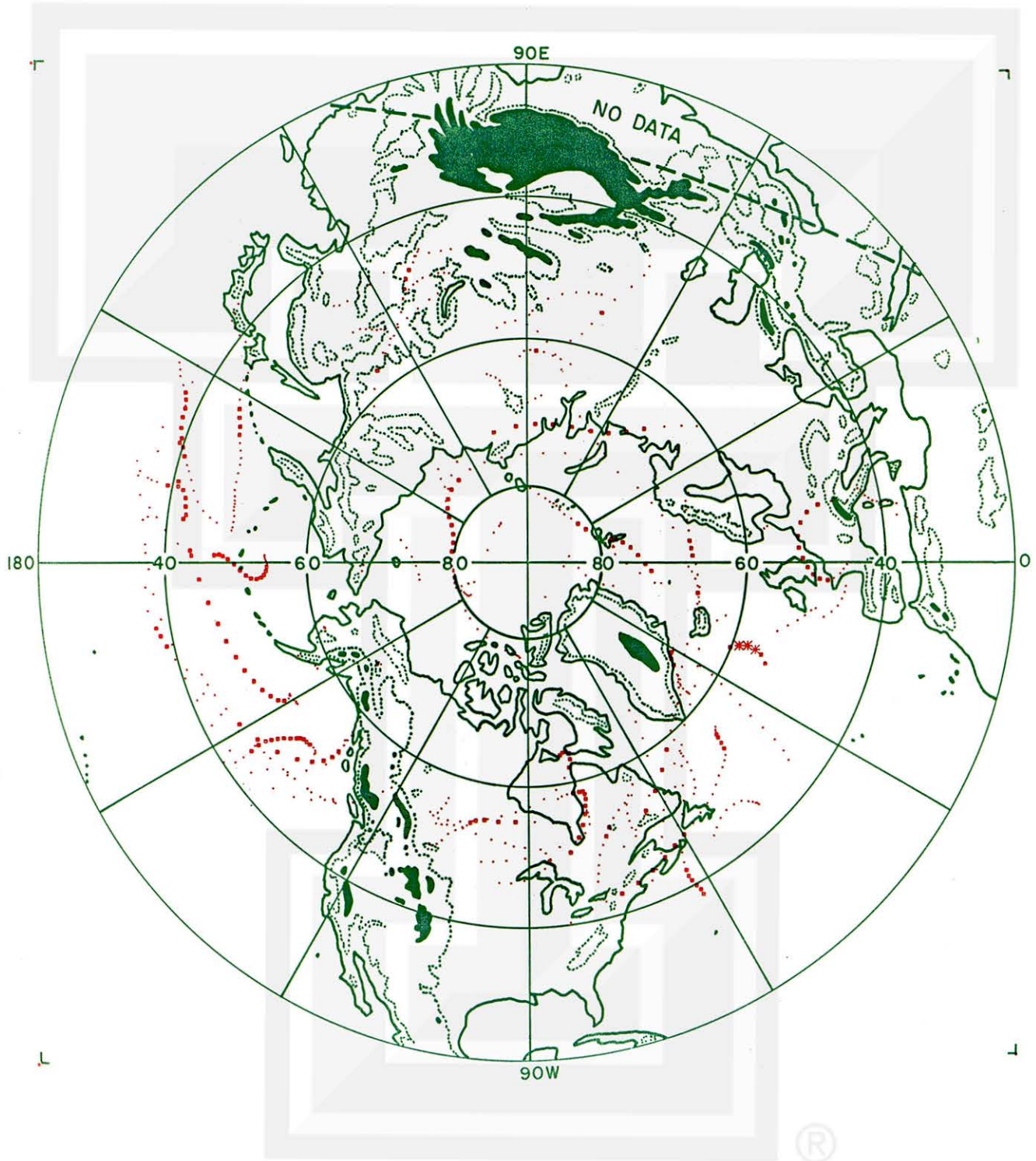
CYCLONE WINDSPEED

APR 84



CYCLONE WINDSPEED

MAY 84



..... 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 1983

Autumn 1983

Winter 1983-84

Spring 1984

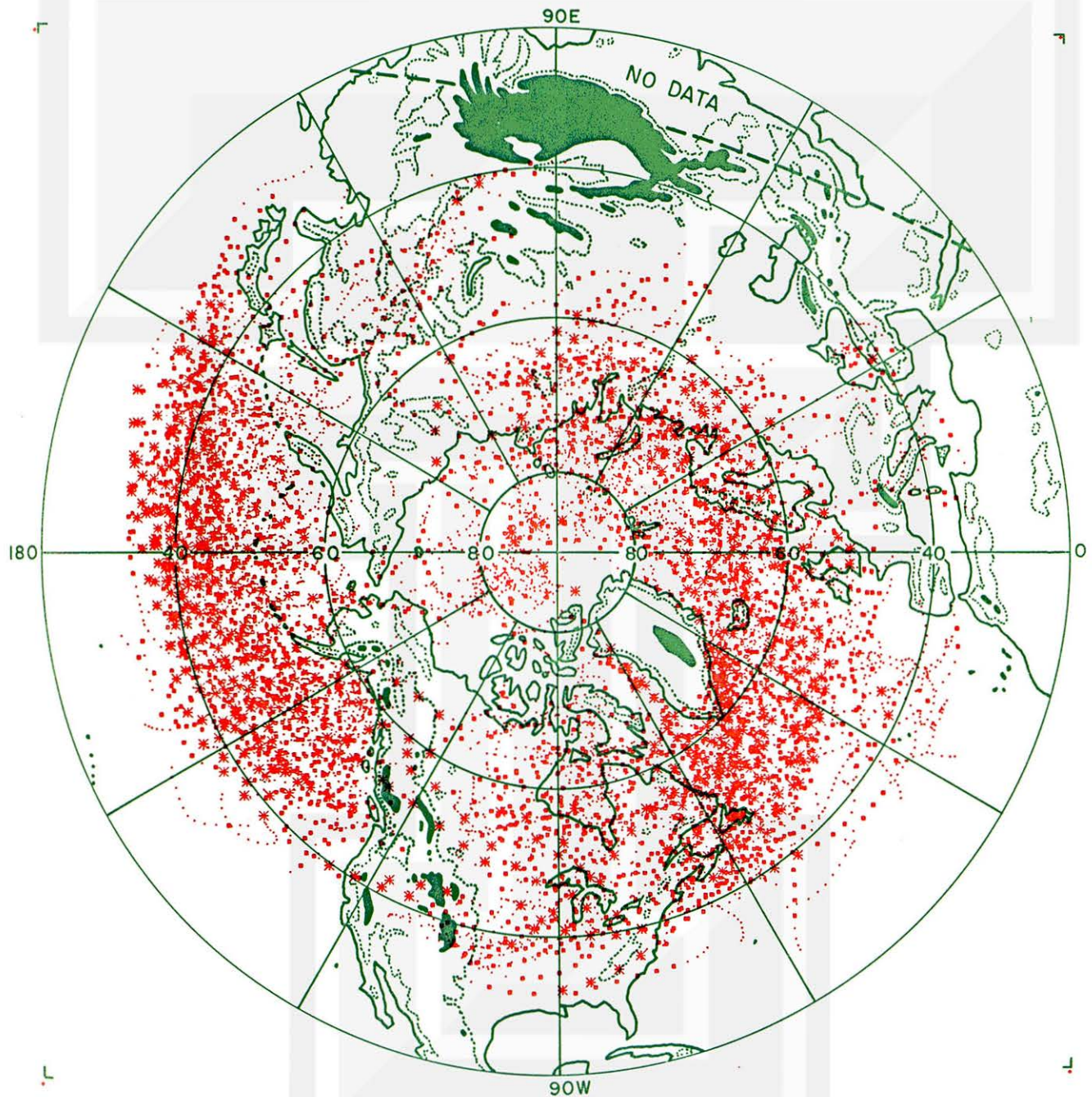
12 MONTHLY MAPS

June-December 1983

January-May 1984

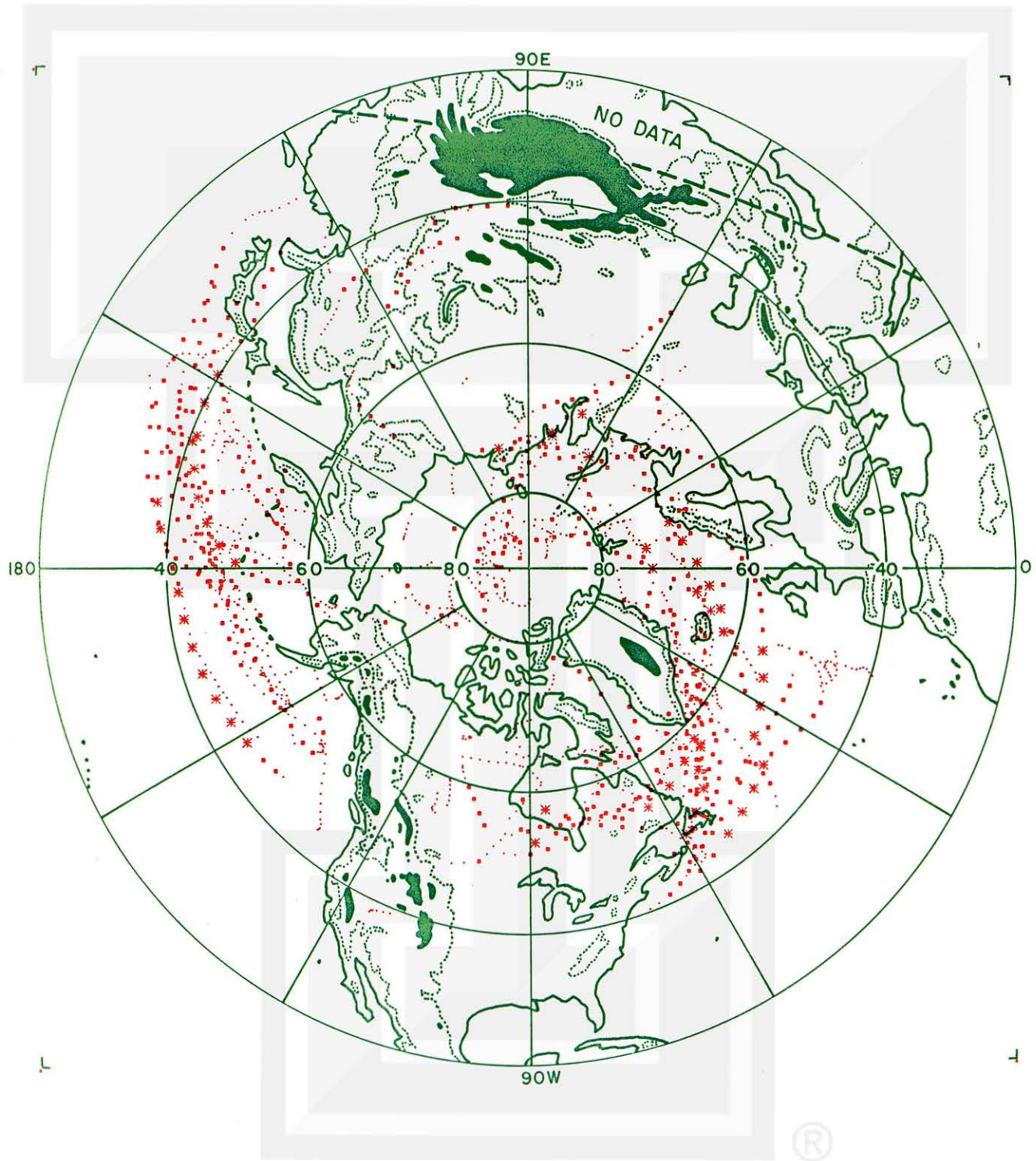


CYCLONE MOVEMENT
12 MOS JUN 83 - MAY 84



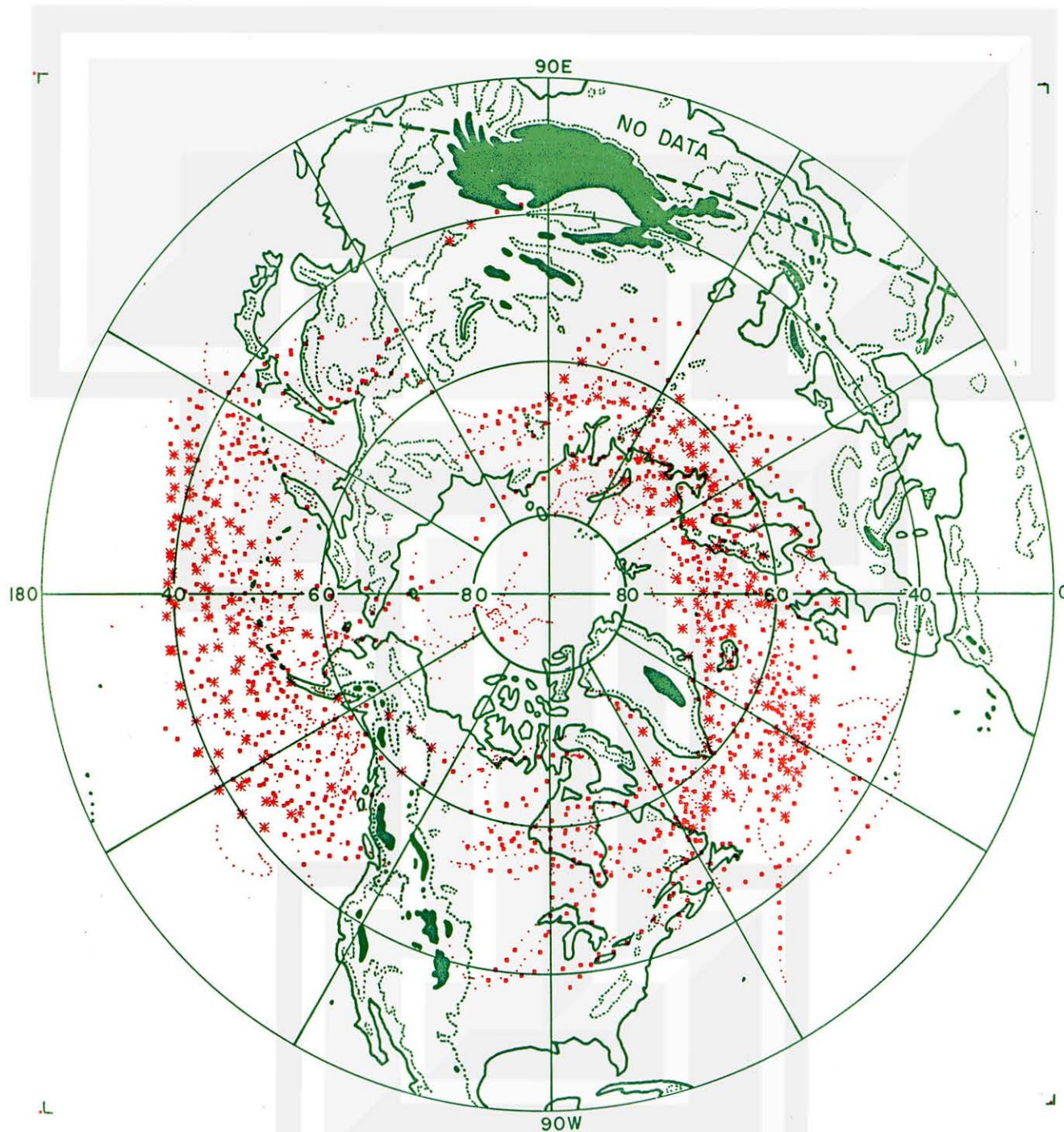
CYCLONE MOVEMENT

SUMMER 1983



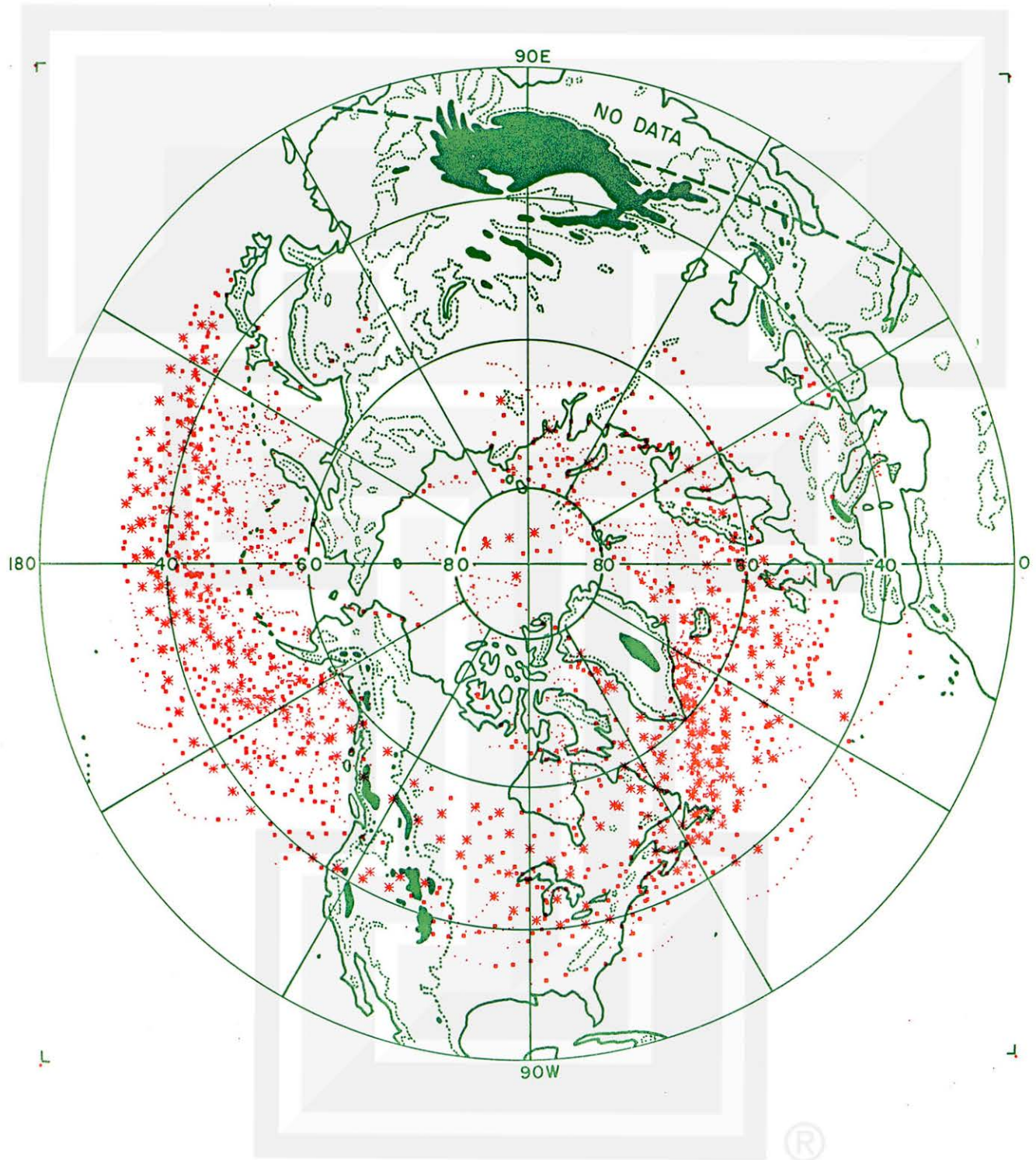
CYCLONE MOVEMENT

AUTUMN 1983



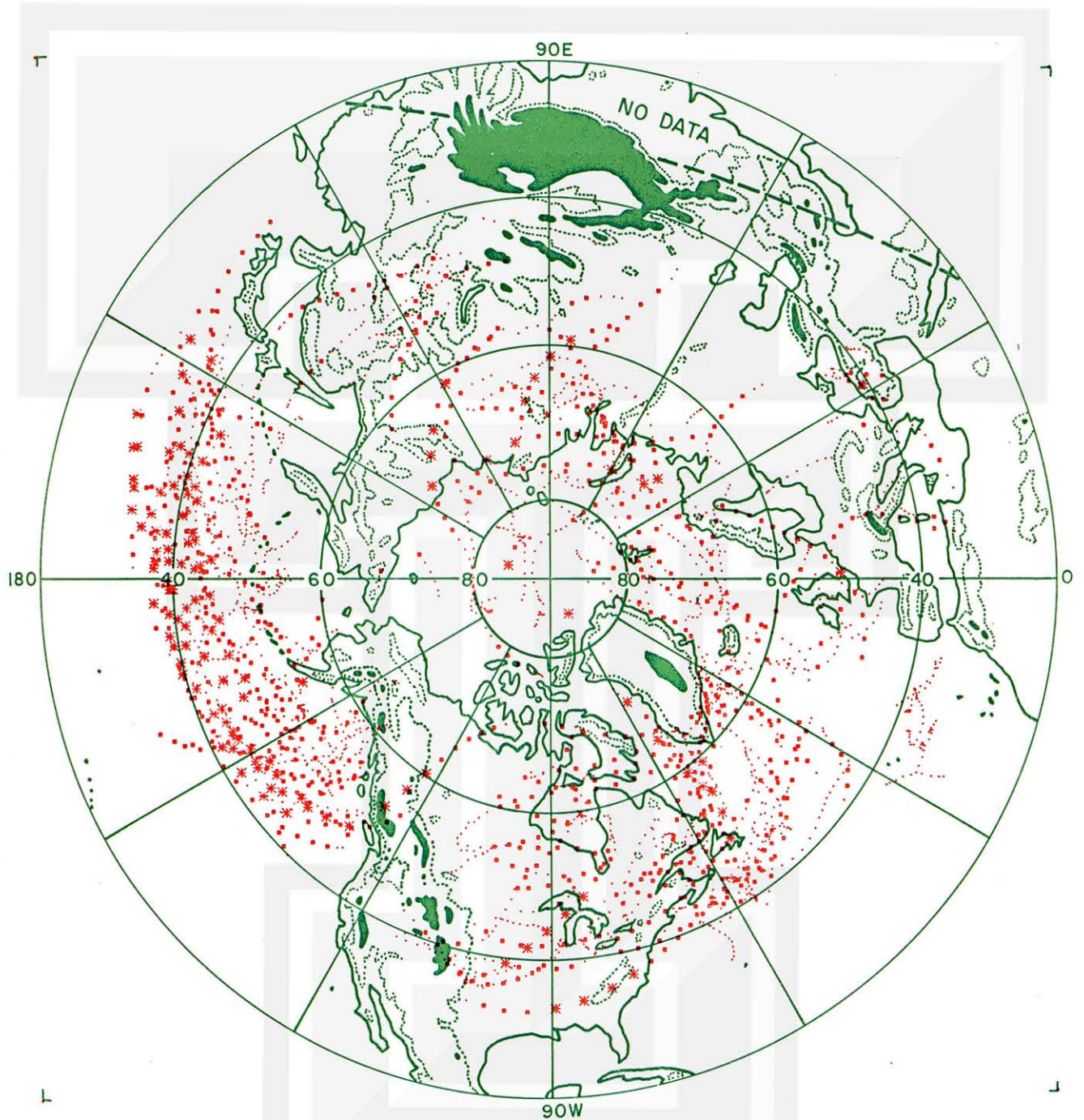
CYCLONE MOVEMENT

WINTER 1983 - 84



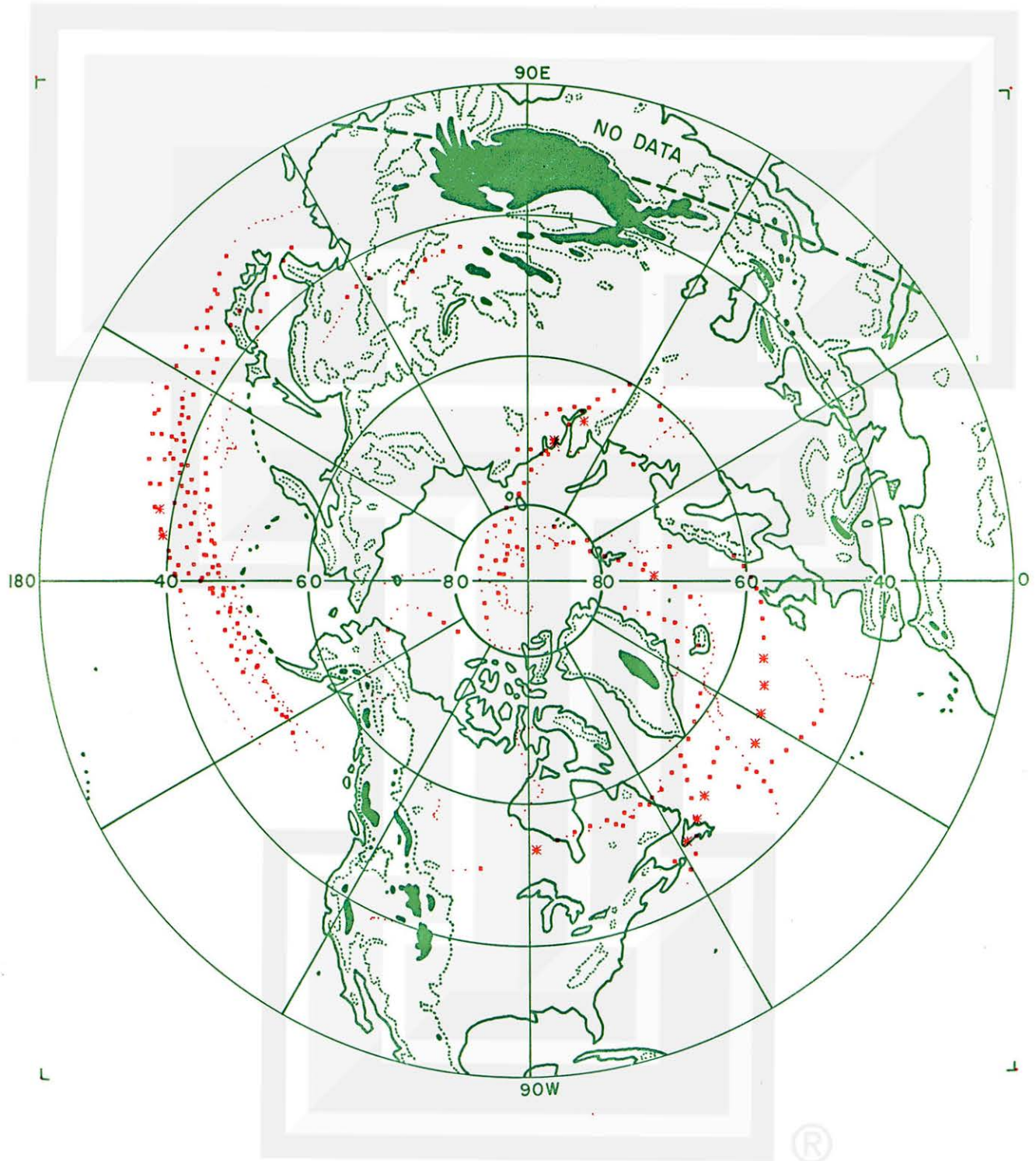
CYCLONE MOVEMENT

SPRING 1984



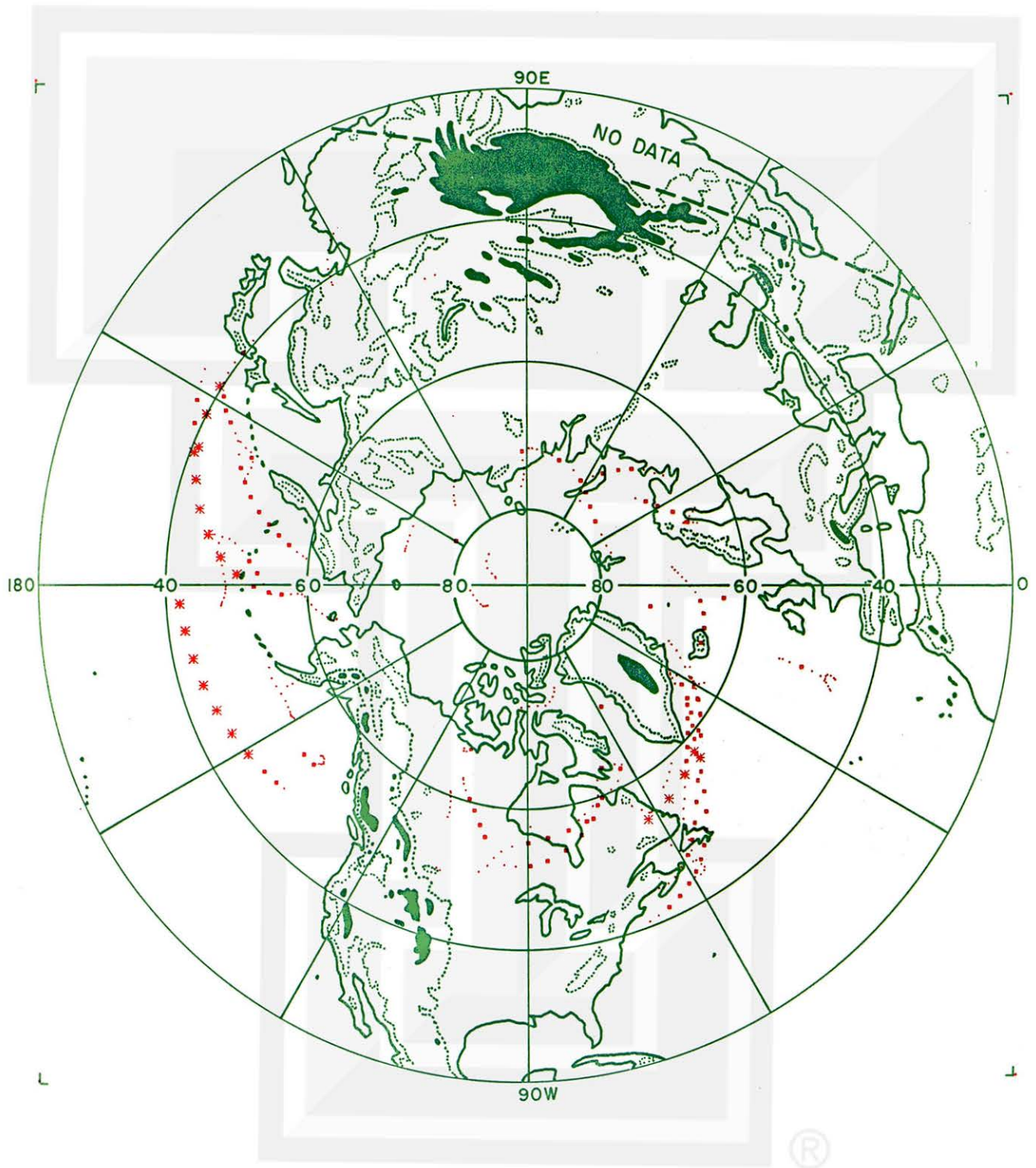
CYCLONE MOVEMENT

JUN 83



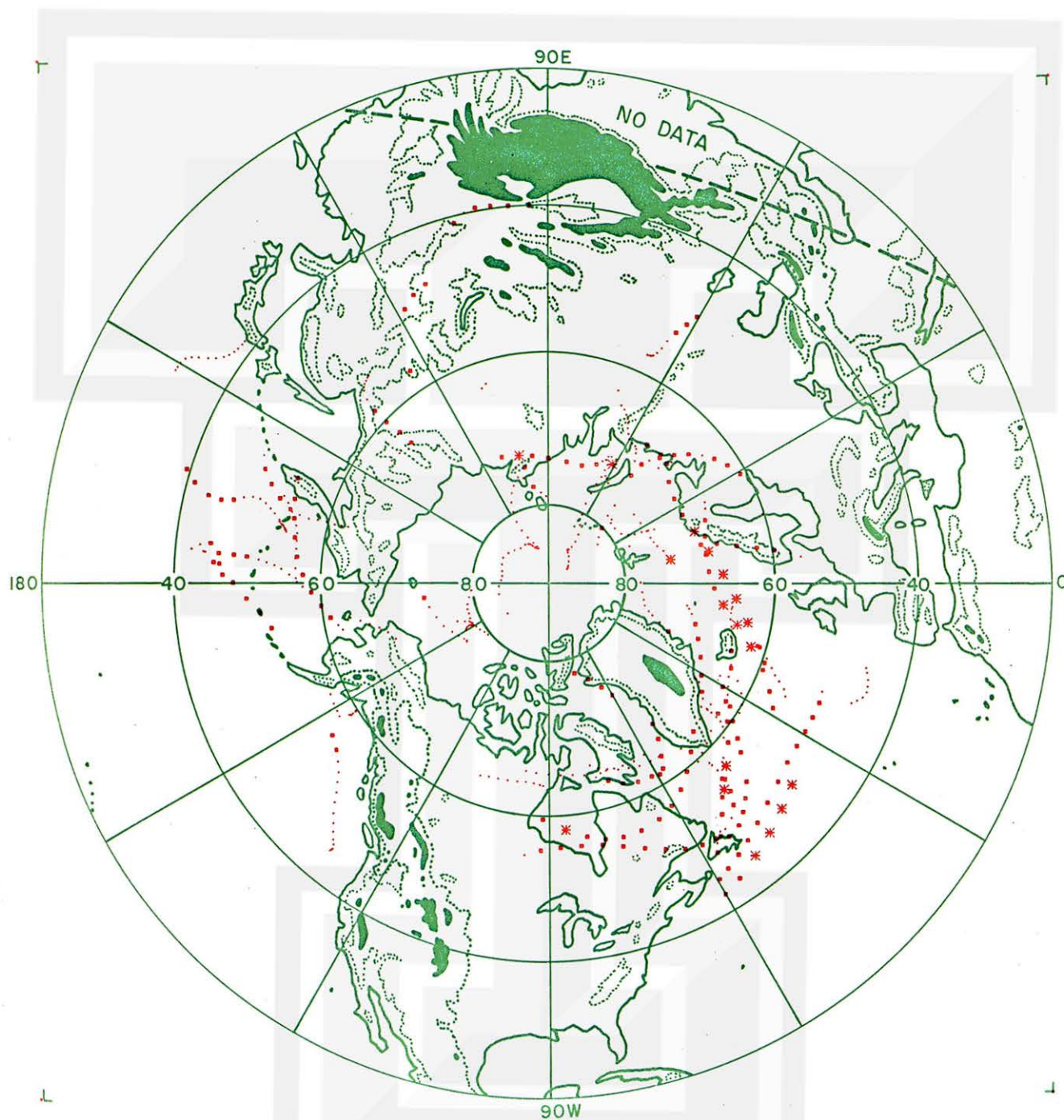
CYCLONE MOVEMENT

JUL 83



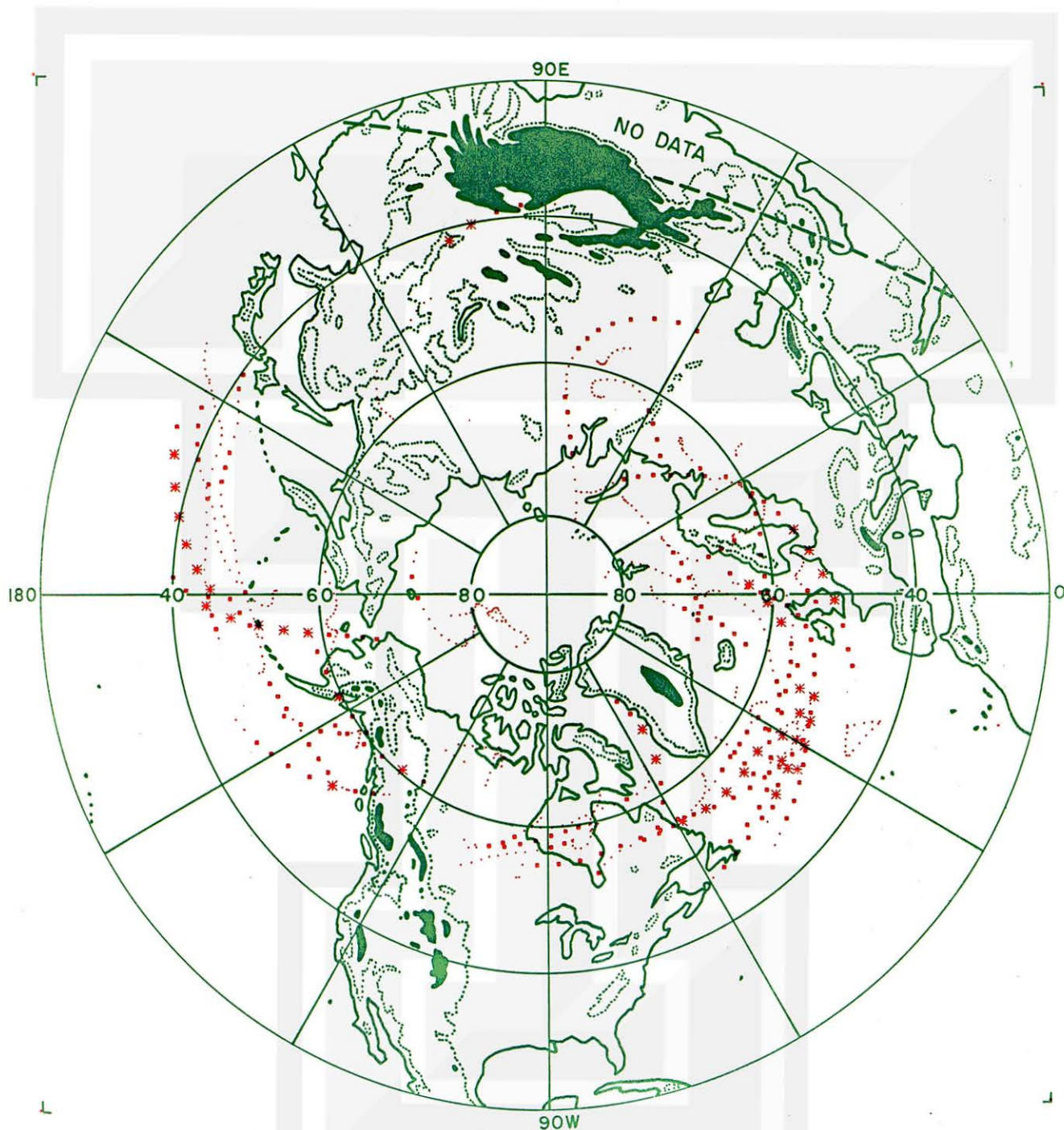
CYCLONE MOVEMENT

AUG 83



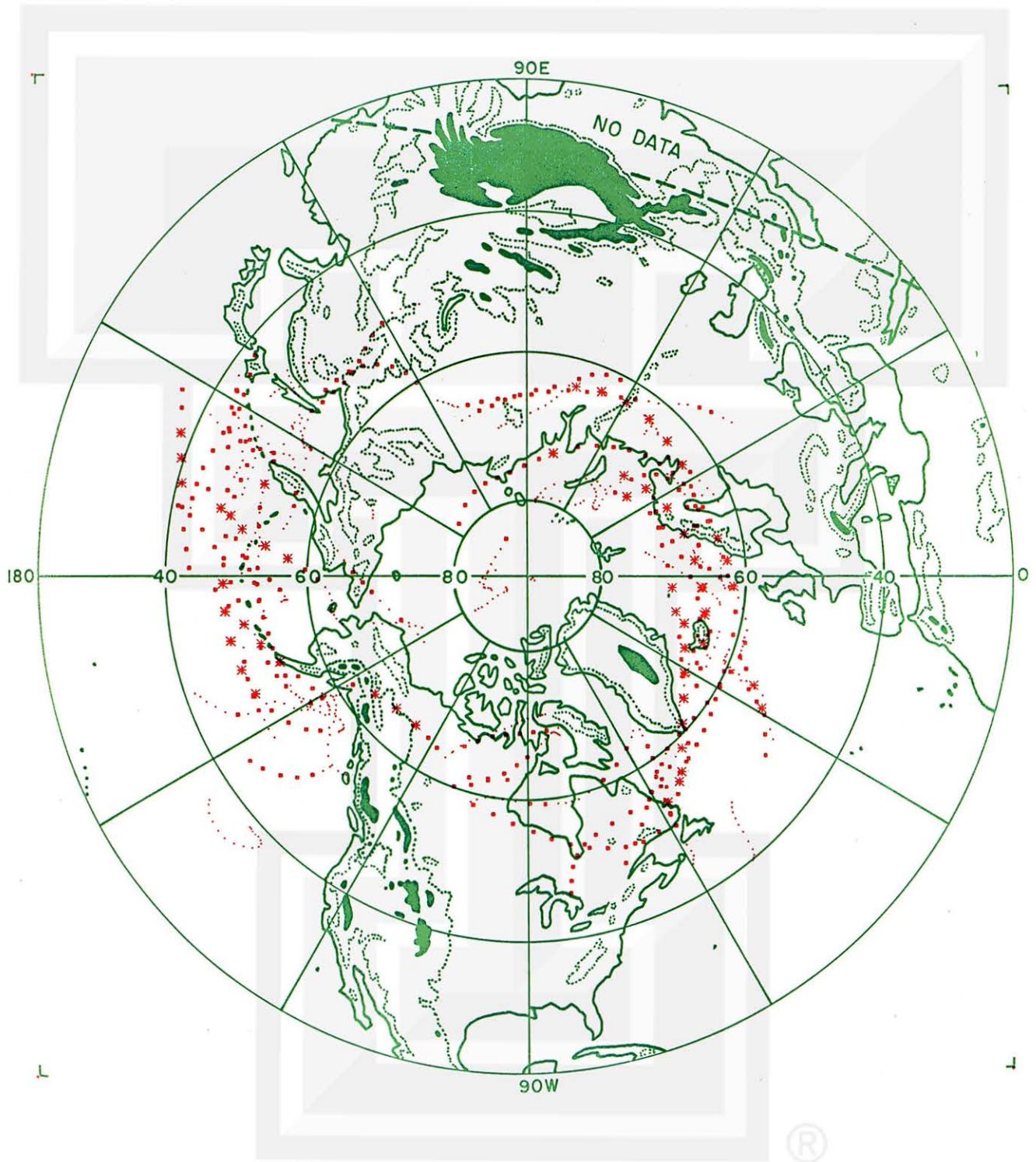
CYCLONE MOVEMENT

SEP 83



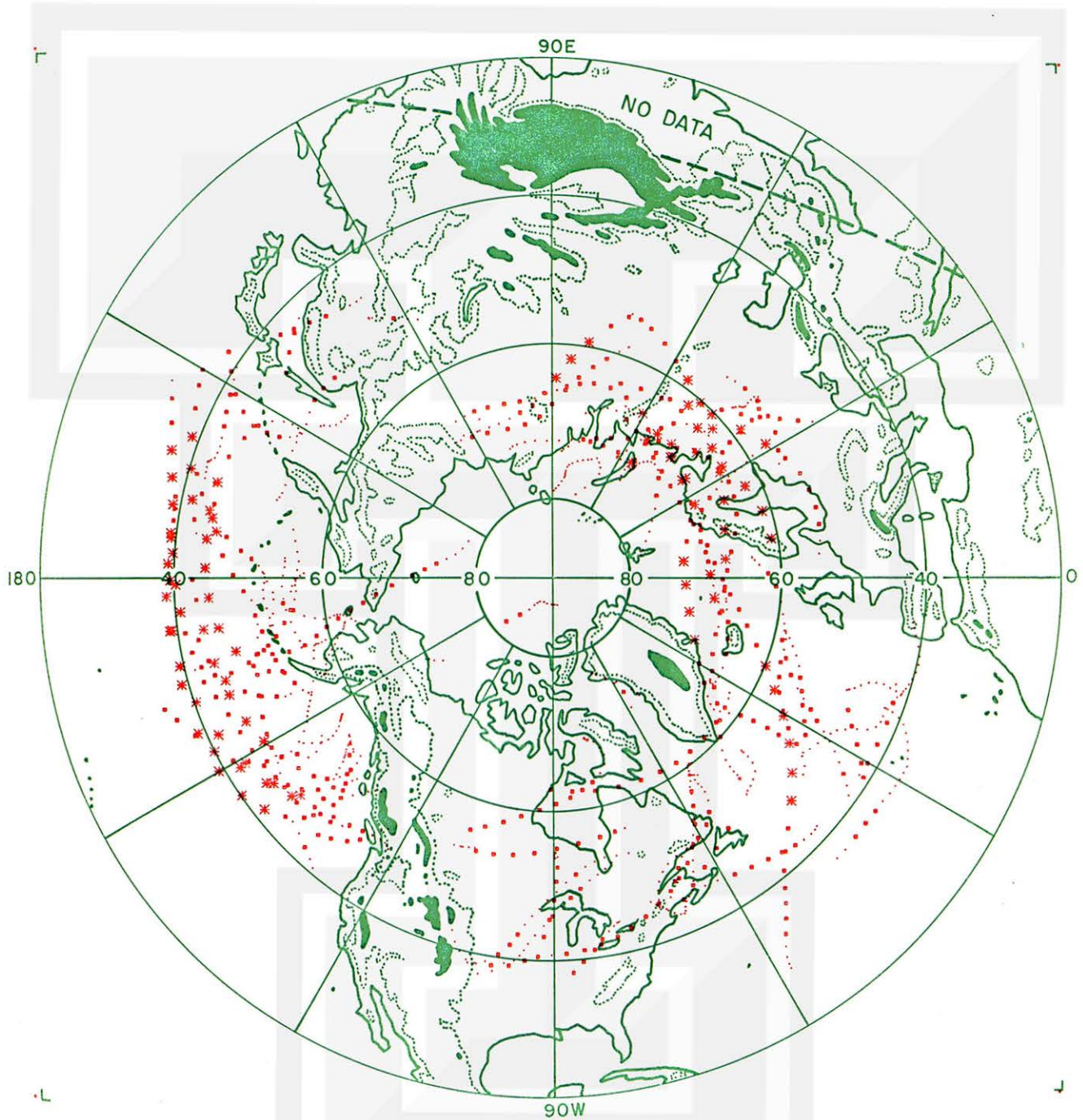
CYCLONE MOVEMENT

OCT 83



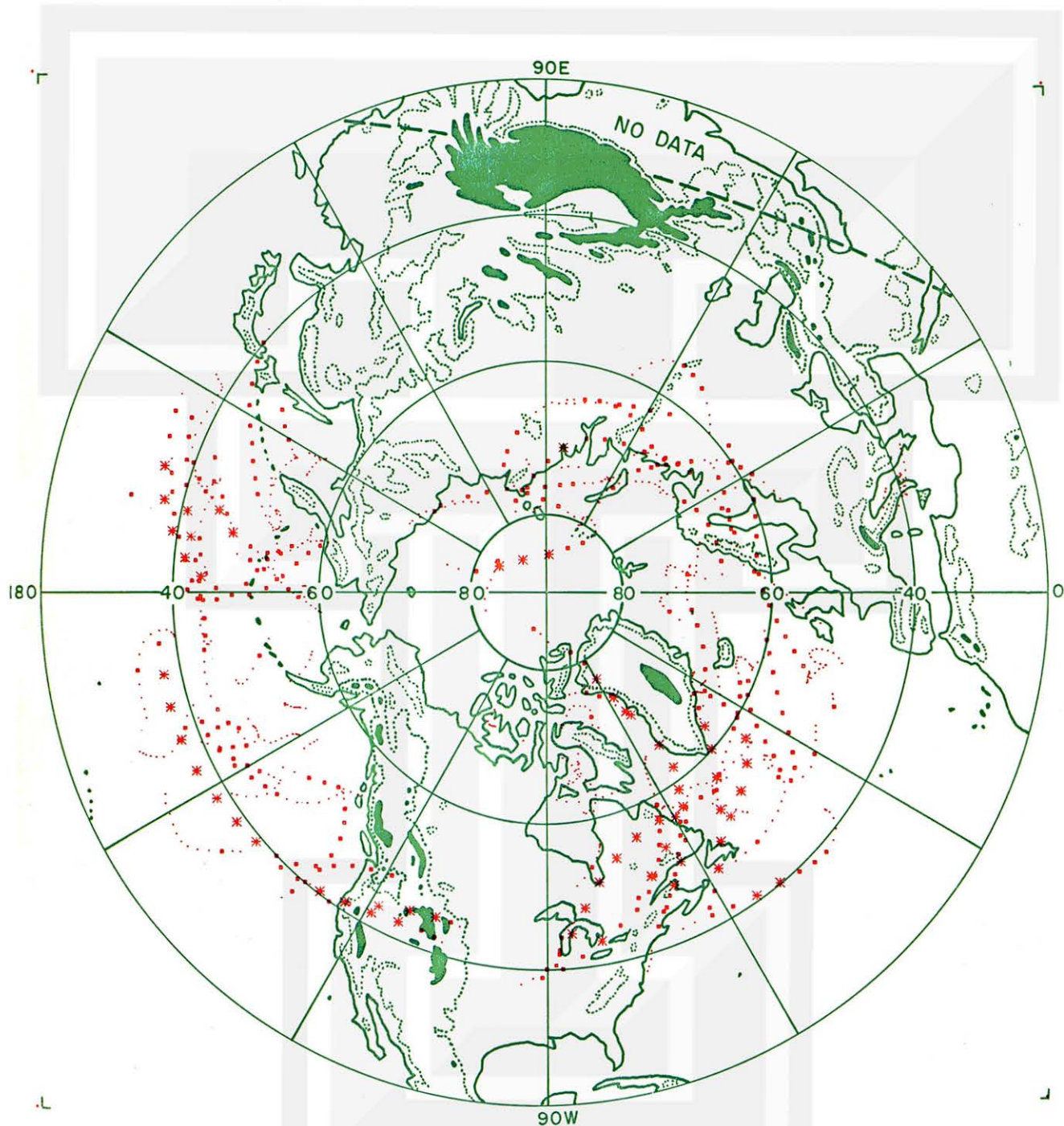
CYCLONE MOVEMENT

NOV 83



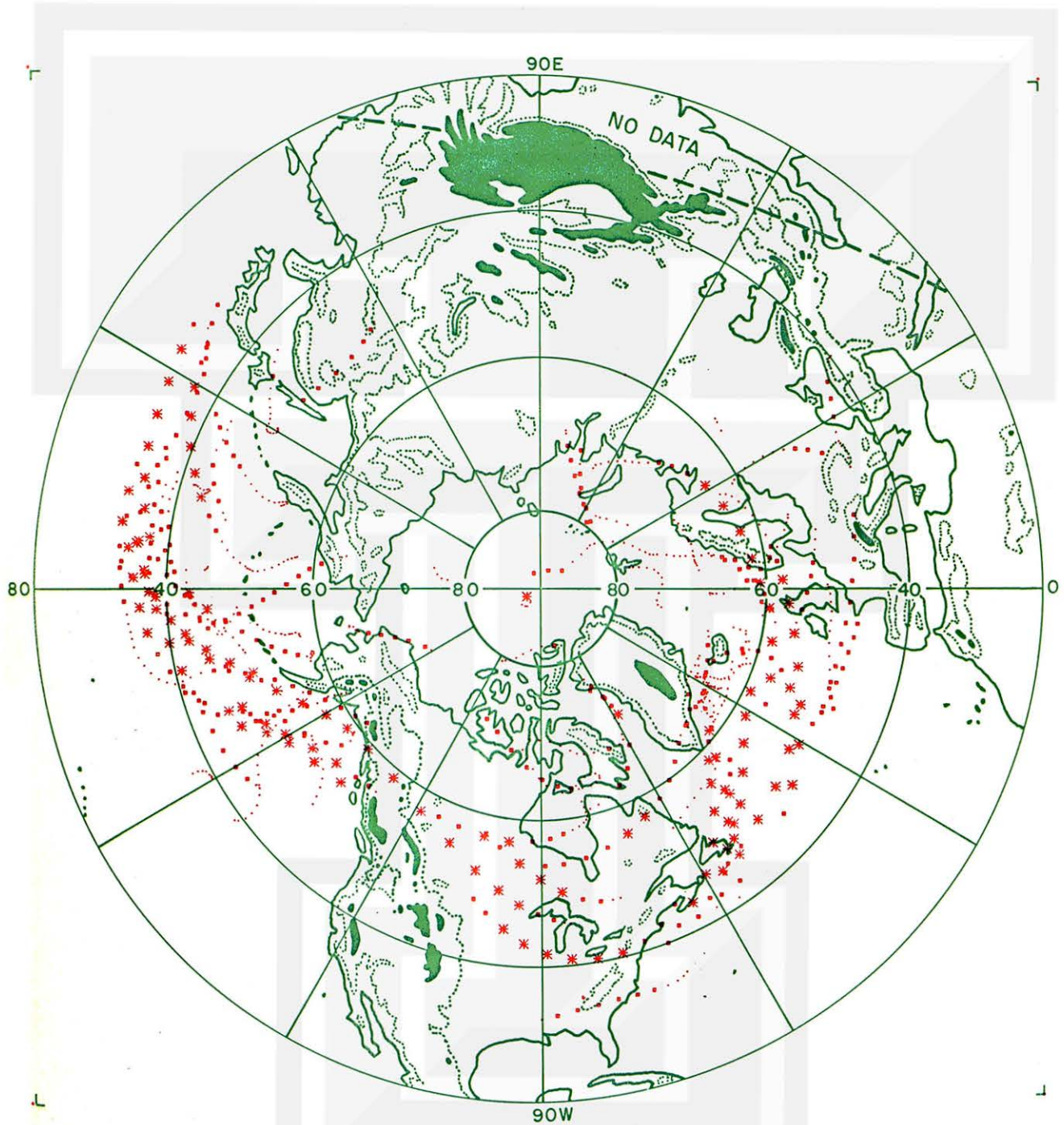
CYCLONE MOVEMENT

DEC 83



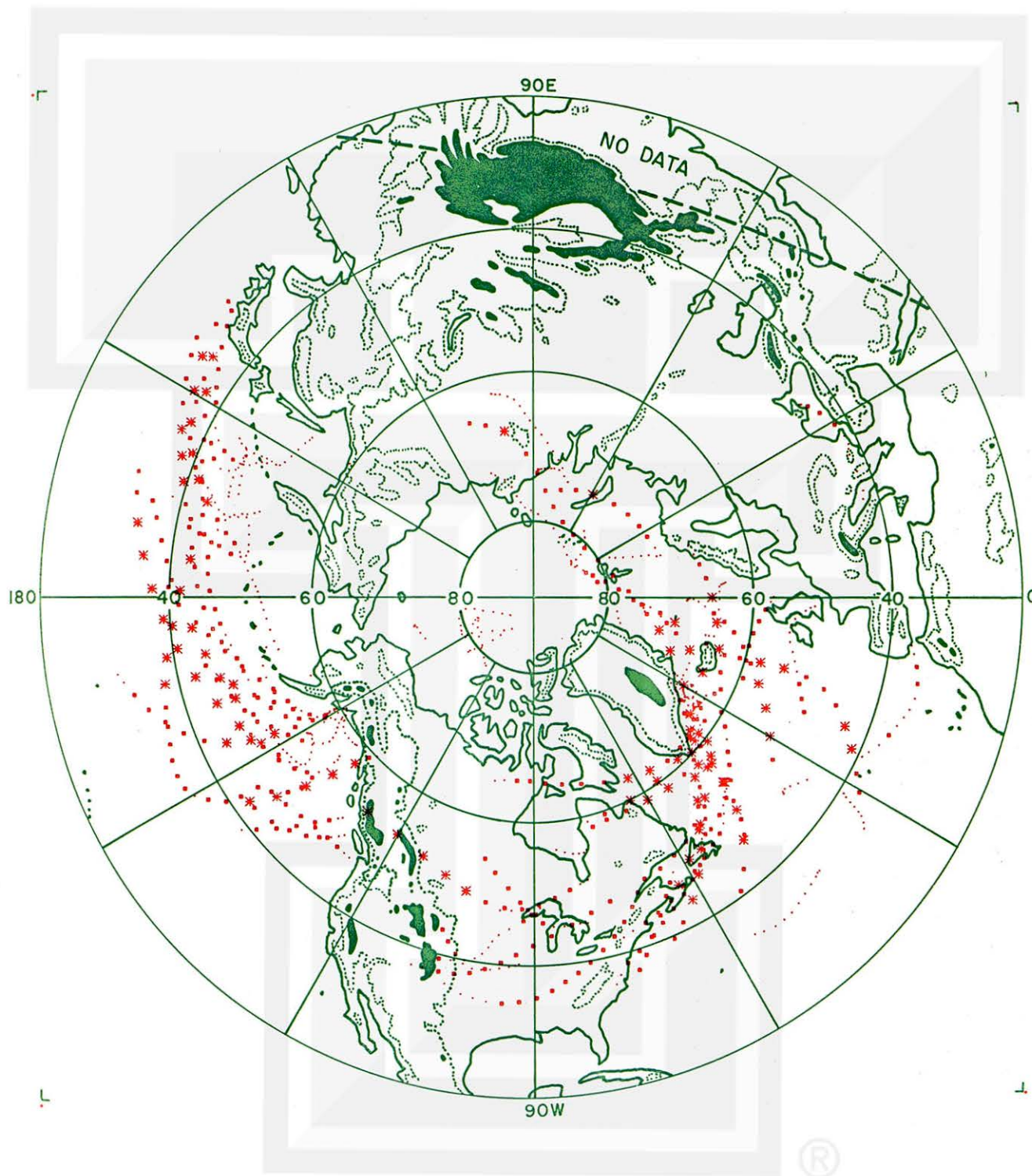
CYCLONE MOVEMENT

JAN 84



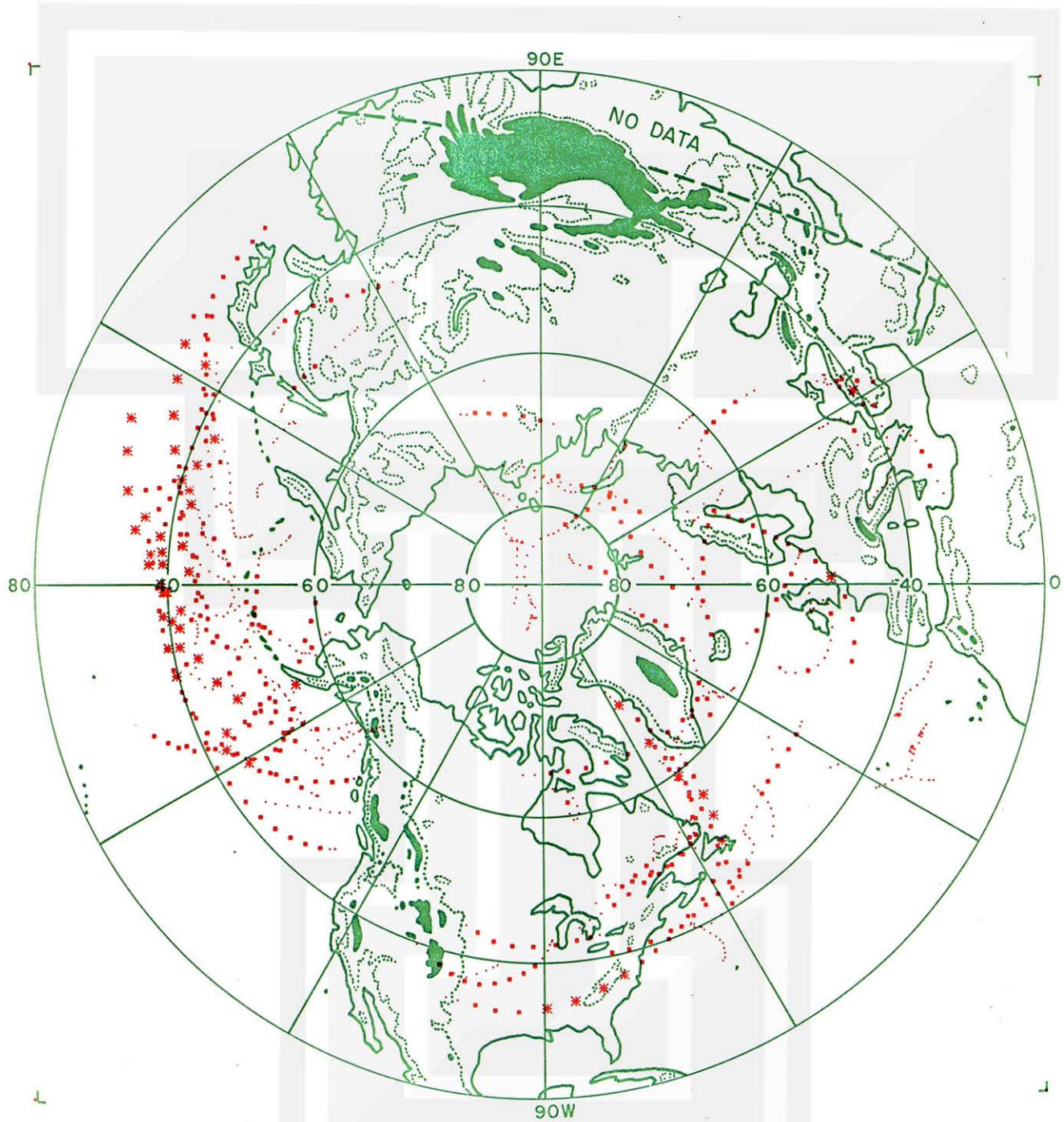
CYCLONE MOVEMENT

FEB 84



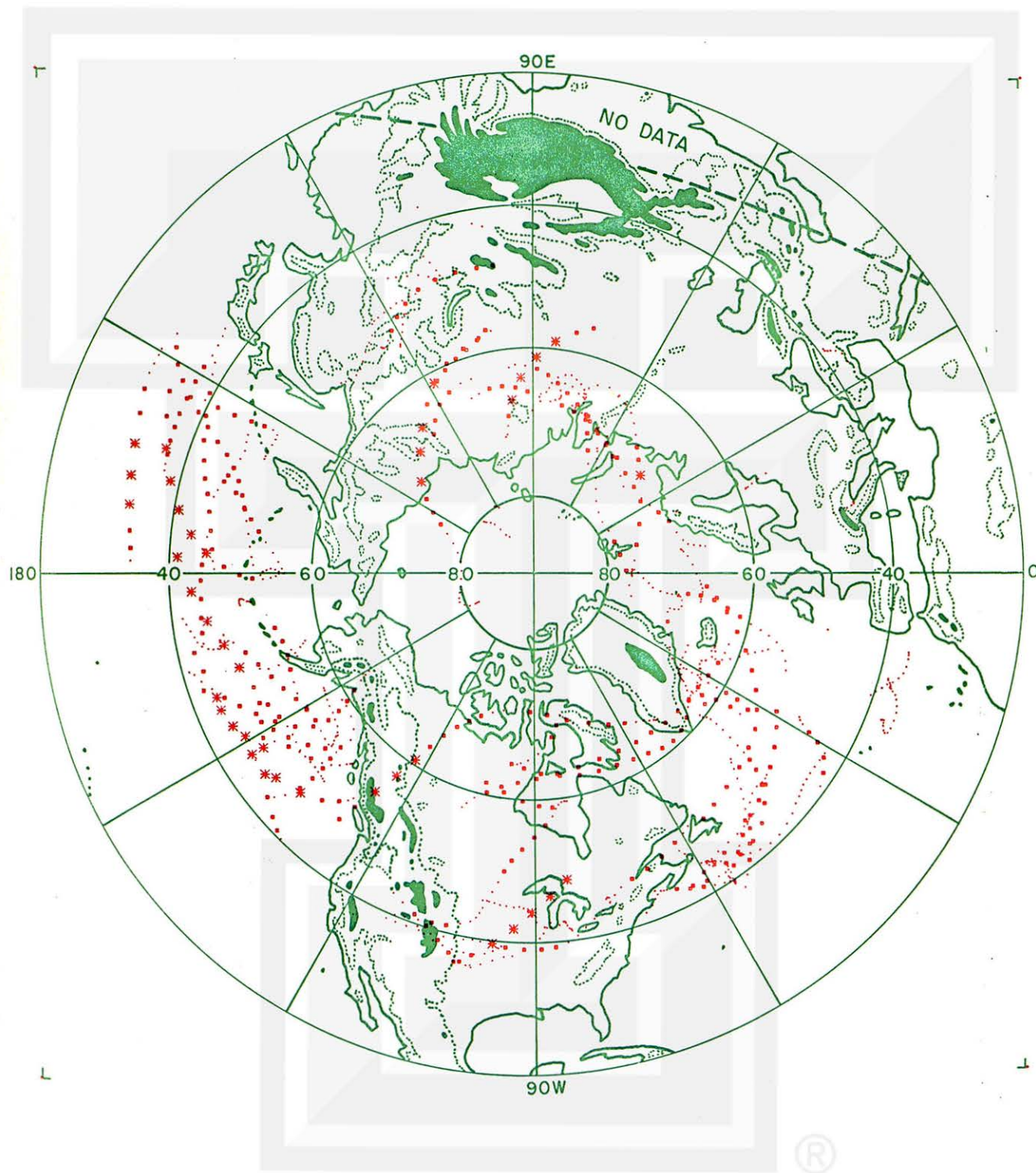
CYCLONE MOVEMENT

MAR 84



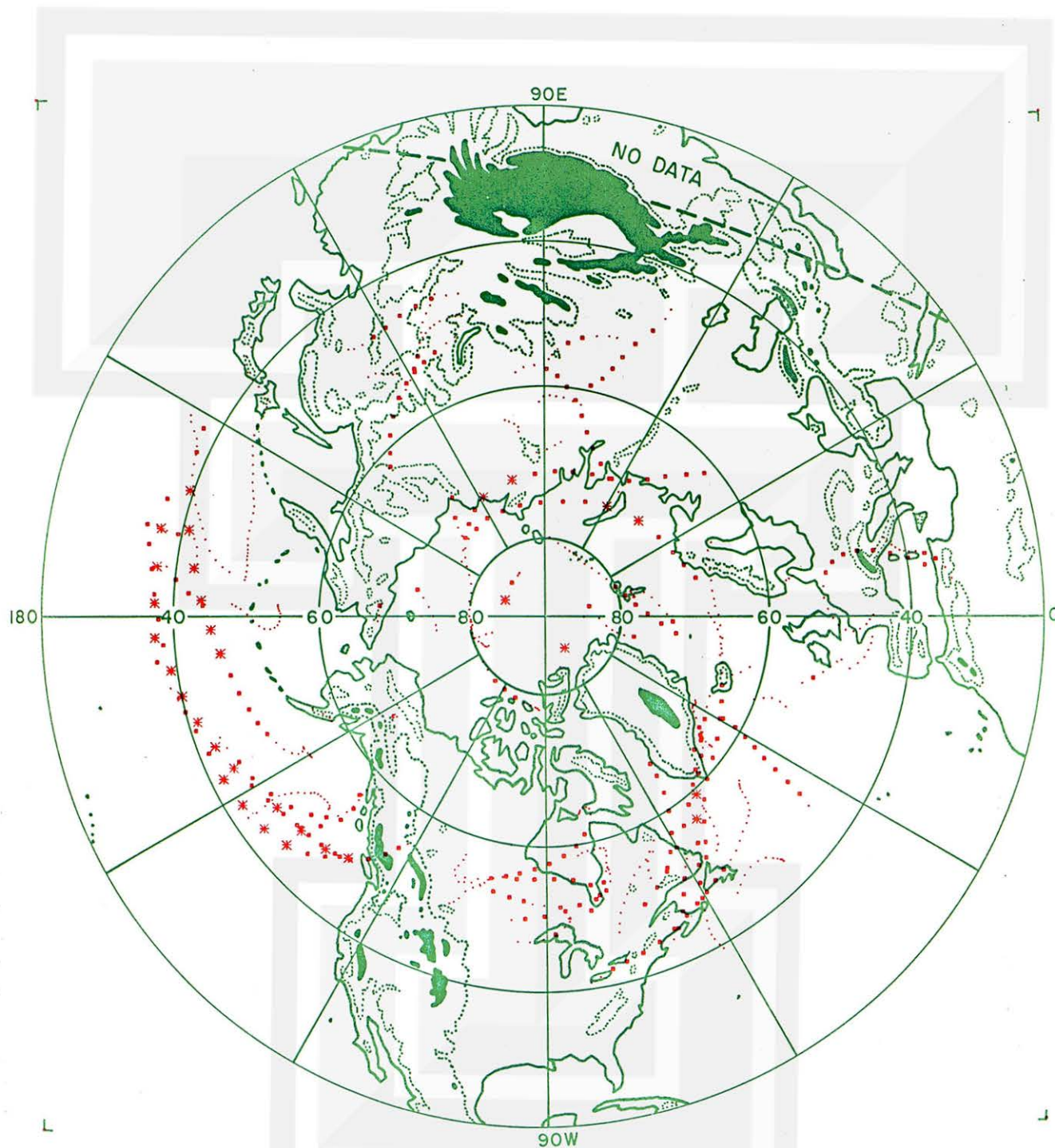
CYCLONE MOVEMENT

APR 84



CYCLONE MOVEMENT

MAY 84



..... 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 1983

Autumn 1983

Winter 1983-84

Spring 1984

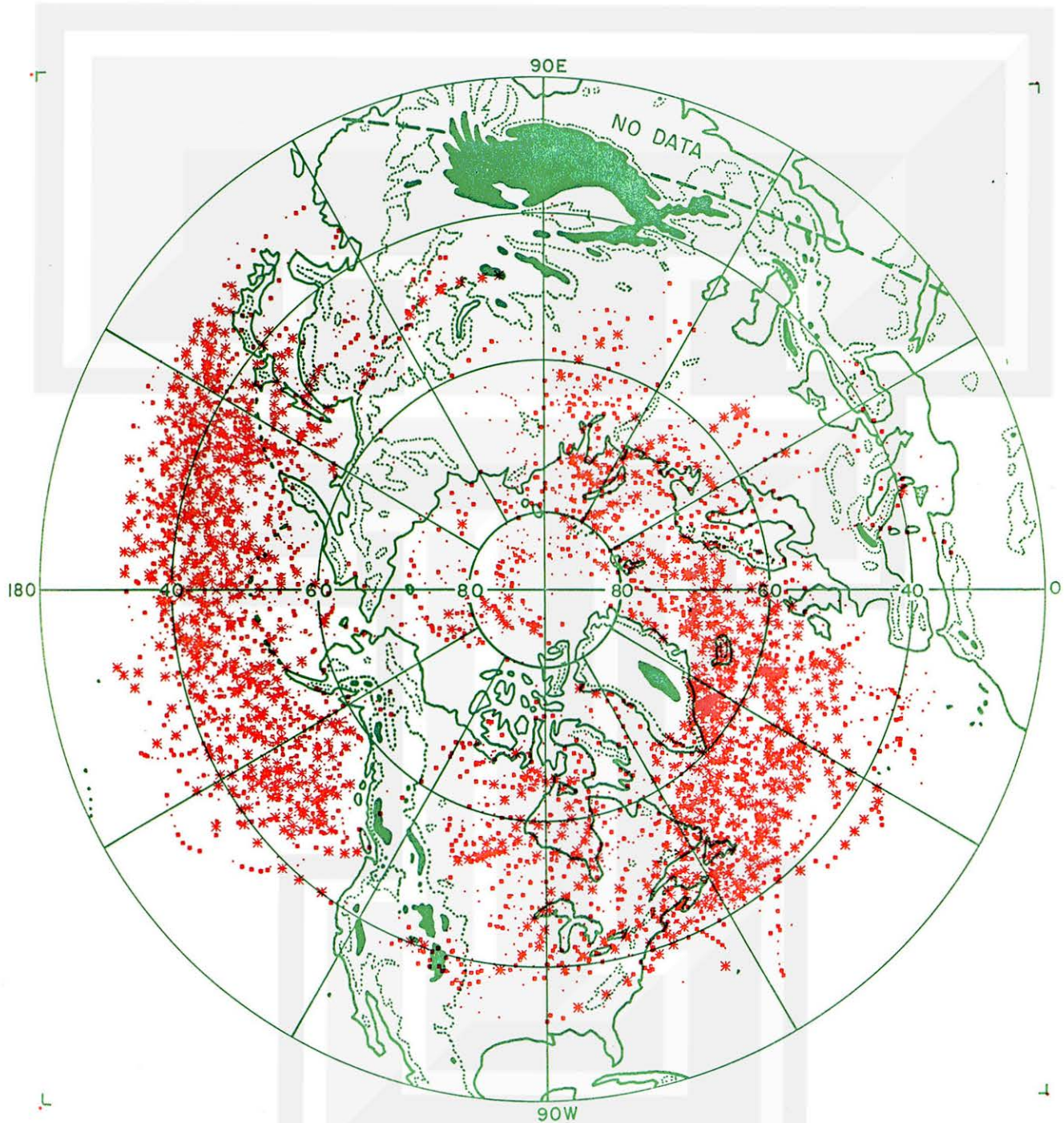
12 MONTHLY MAPS

June-December 1983

January-May 1984

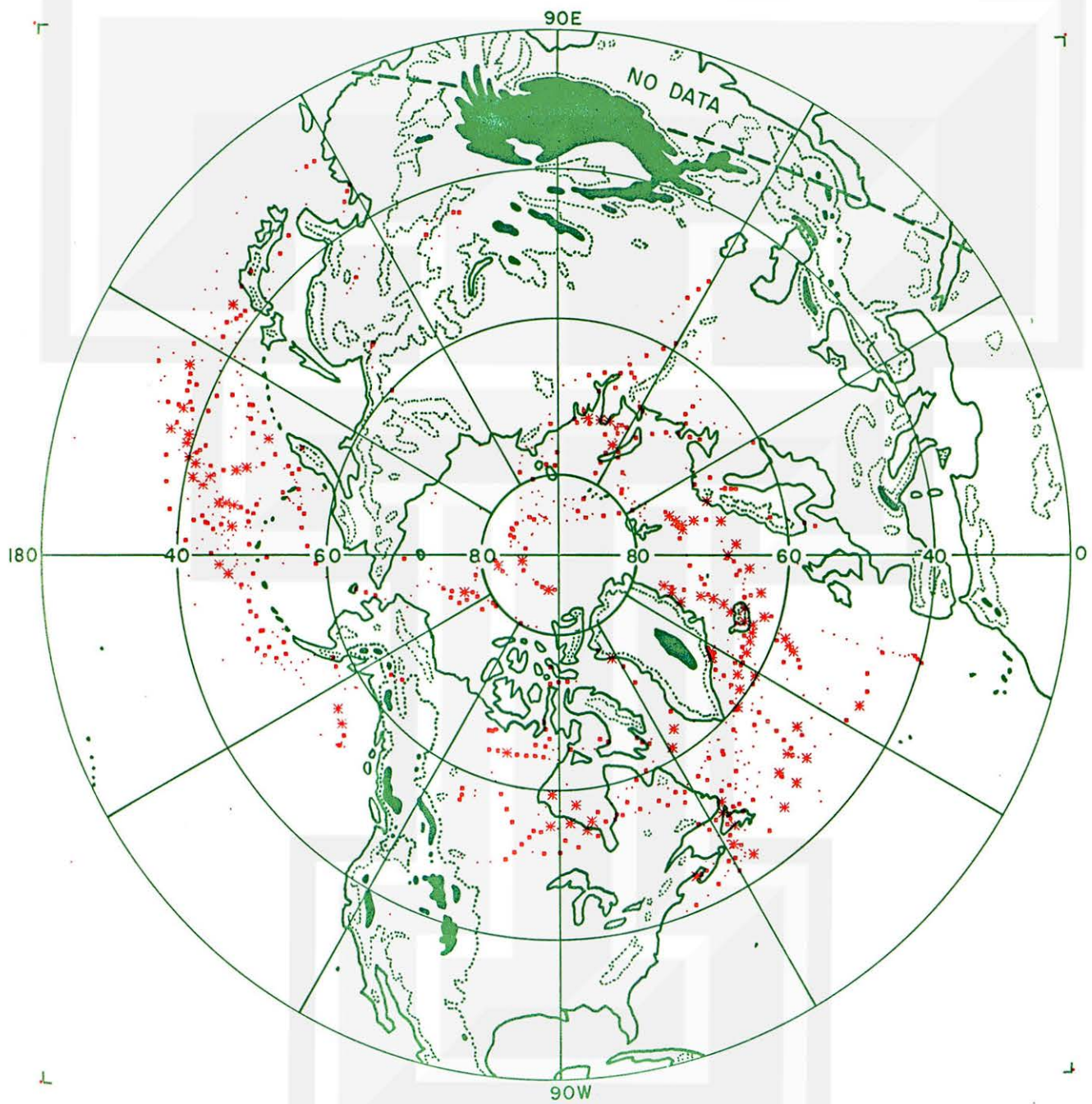


CYCLONE DEEPENING
12 MOS JUN 83 - MAY 84



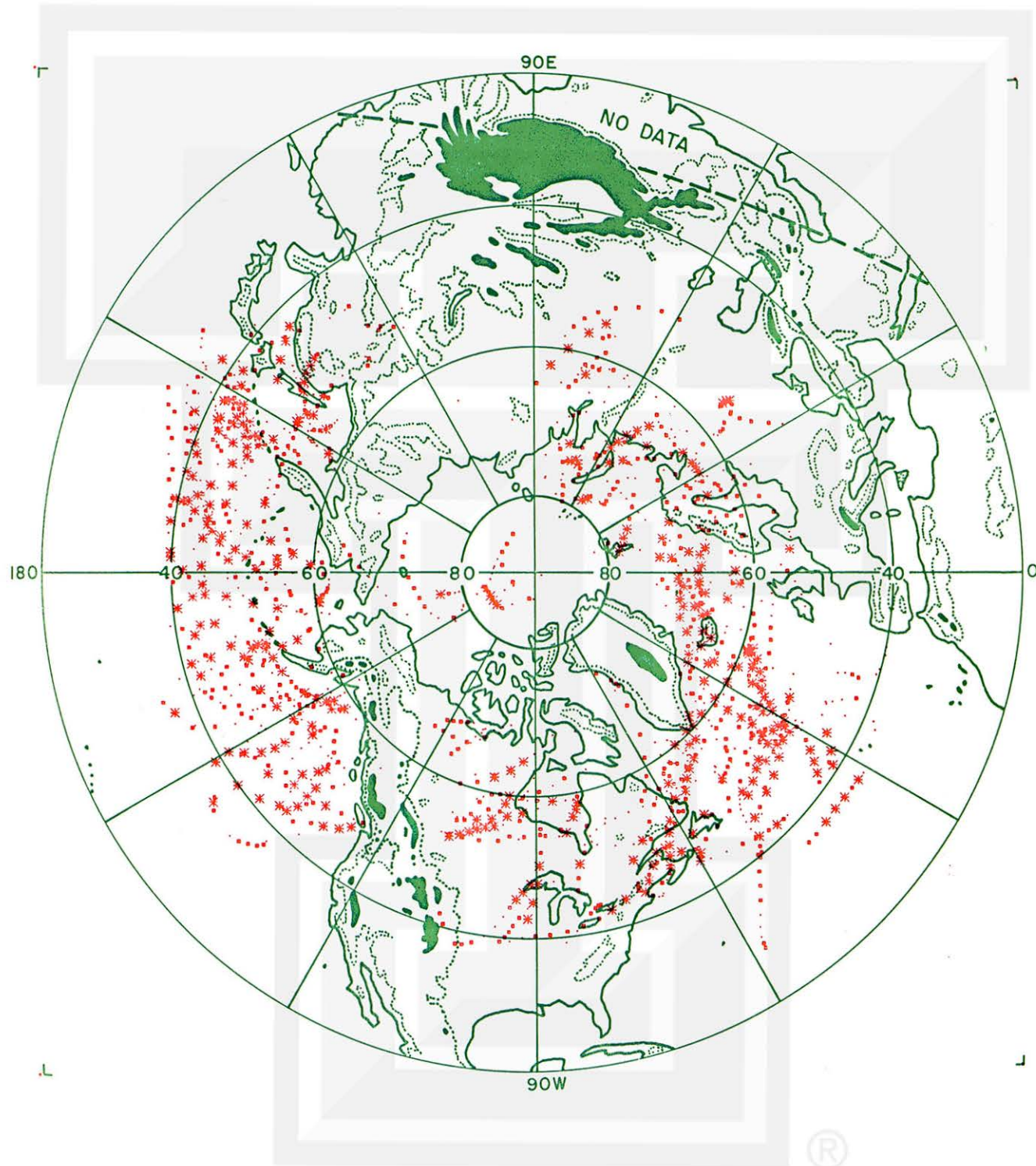
CYCLONE DEEPENING

SUMMER 1983



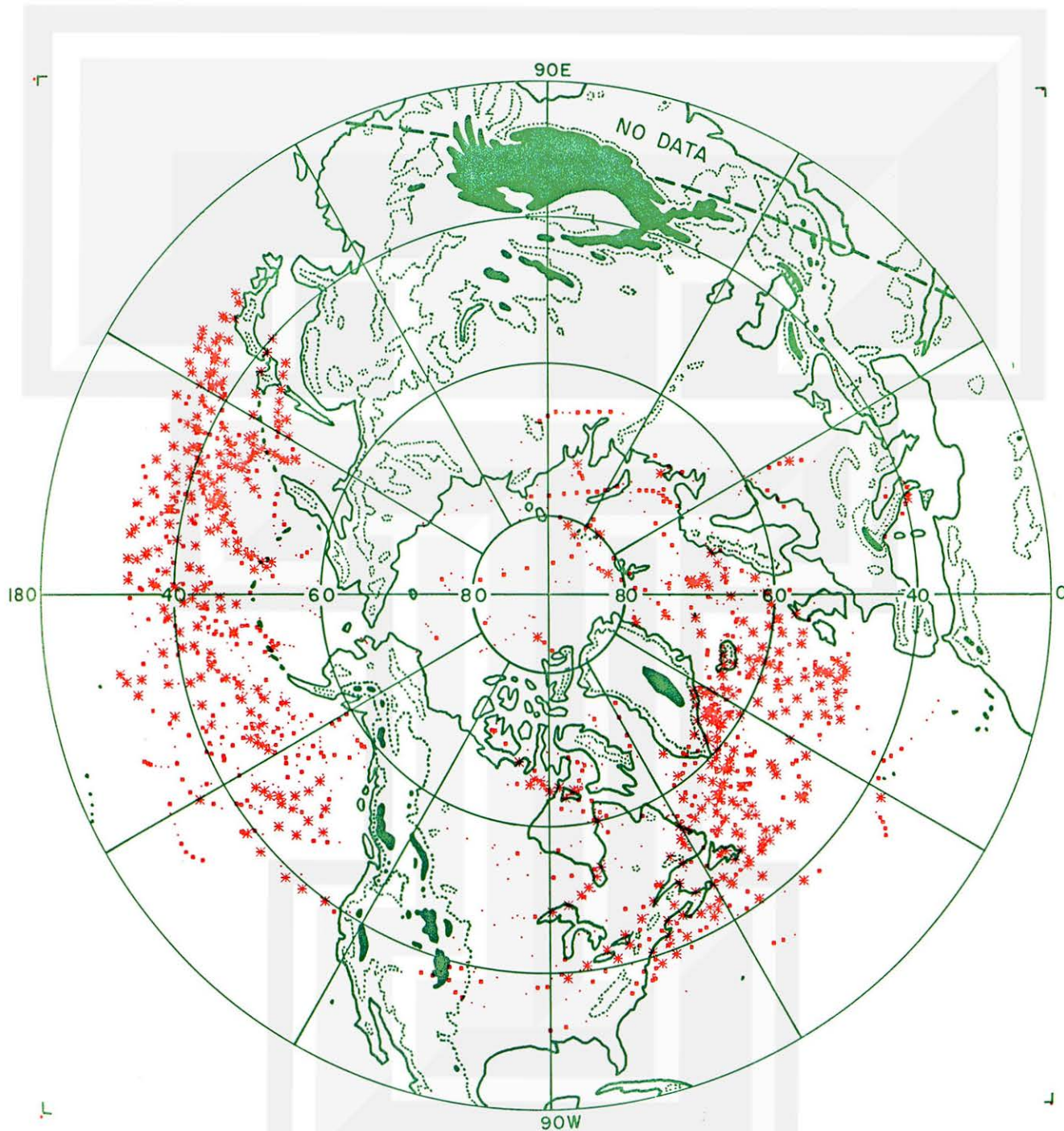
CYCLONE DEEPENING

AUTUMN 1983



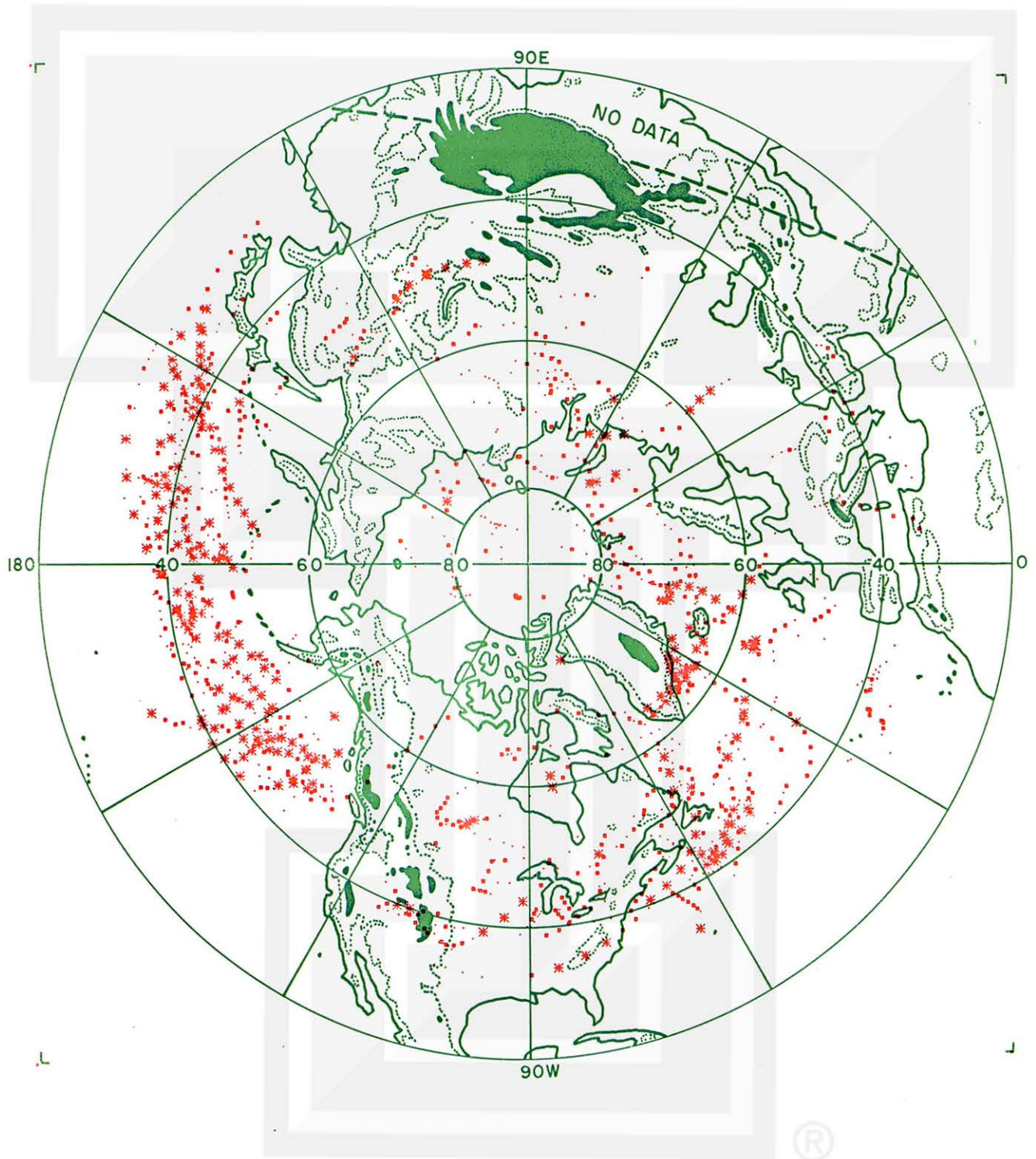
CYCLONE DEEPENING

WINTER 1983 - 84



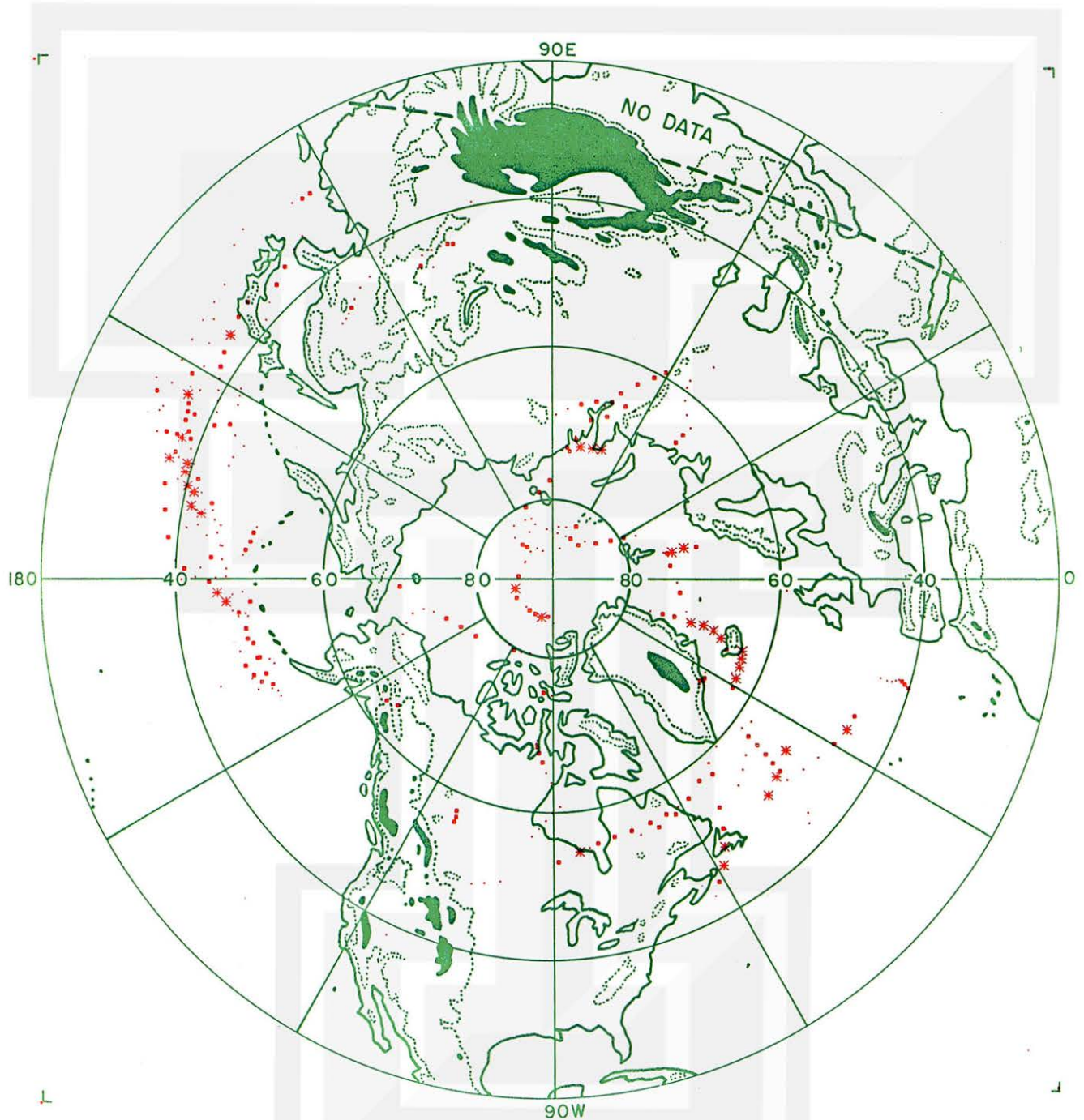
CYCLONE DEEPENING

SPRING 1984



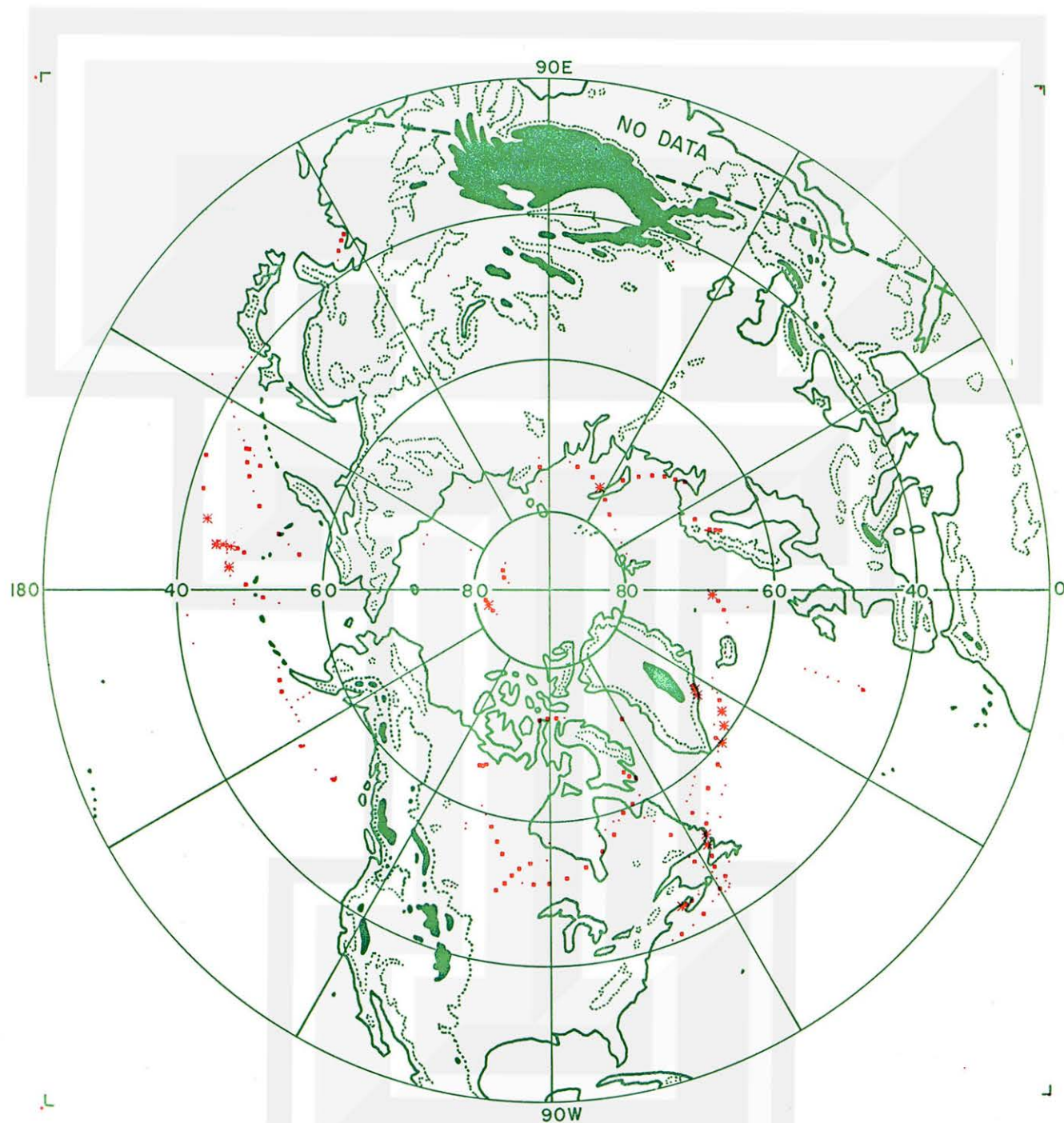
CYCLONE DEEPENING

JUN 83



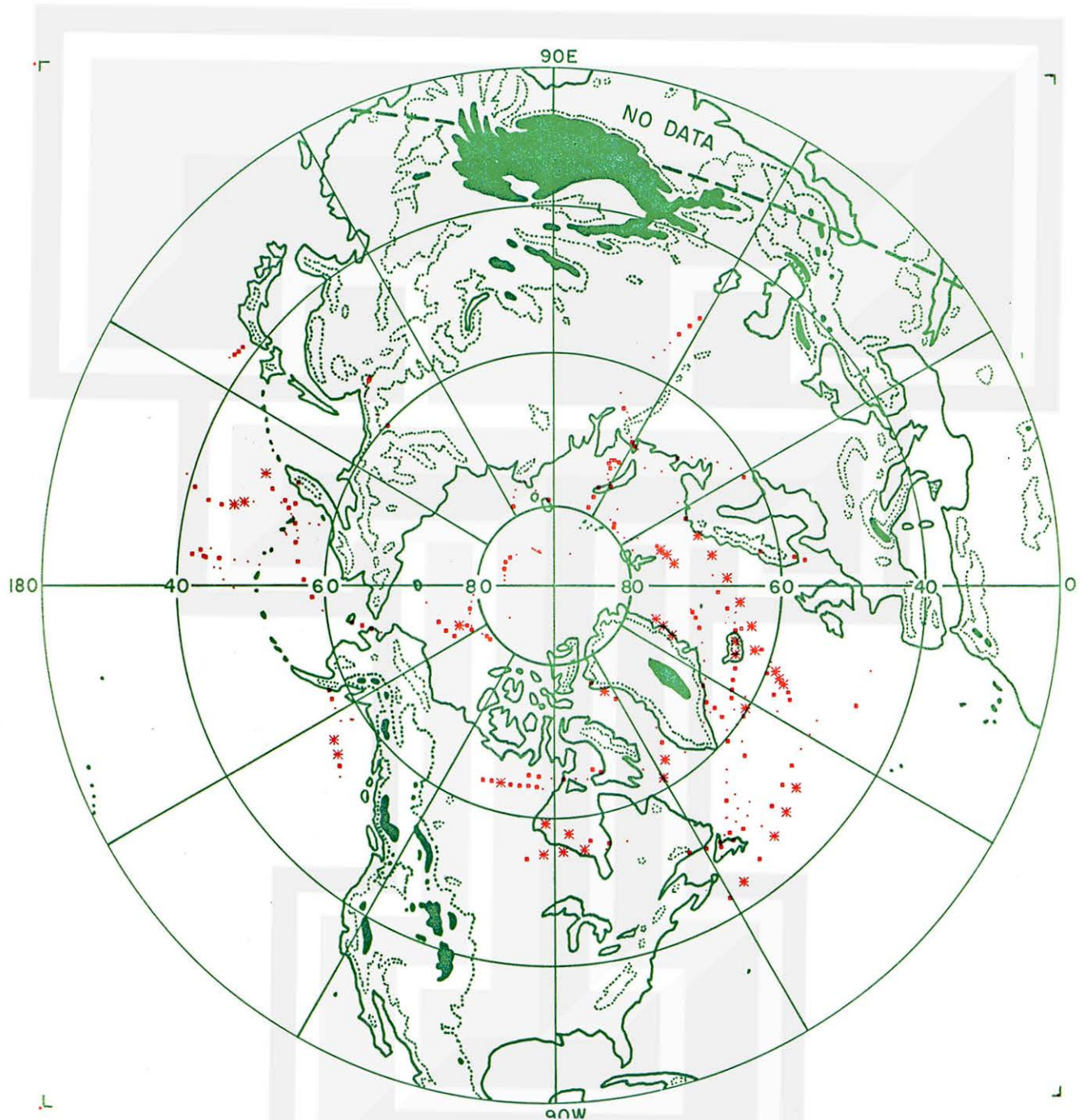
CYCLONE DEEPENING

JUL 83



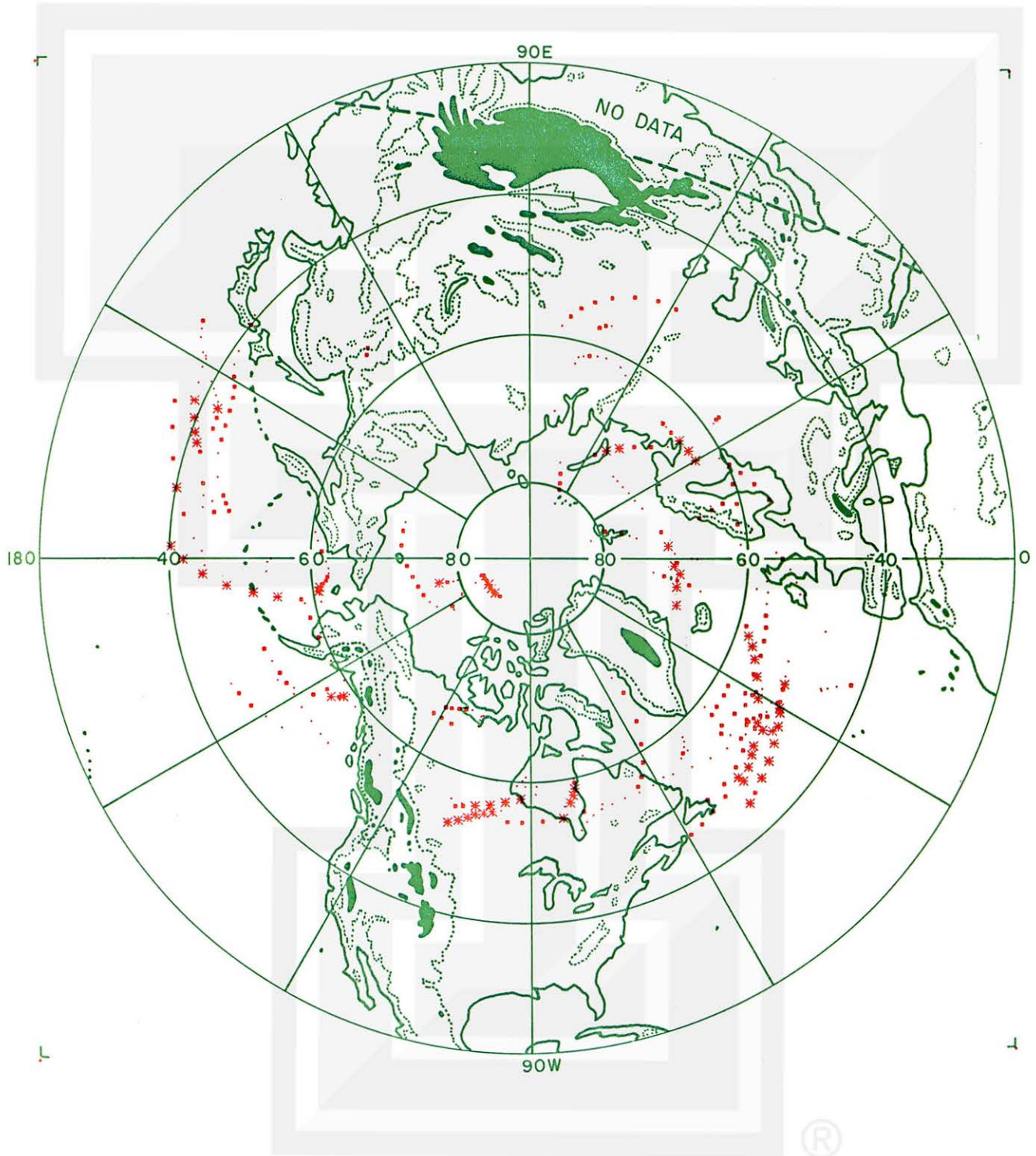
CYCLONE DEEPENING

AUG 83



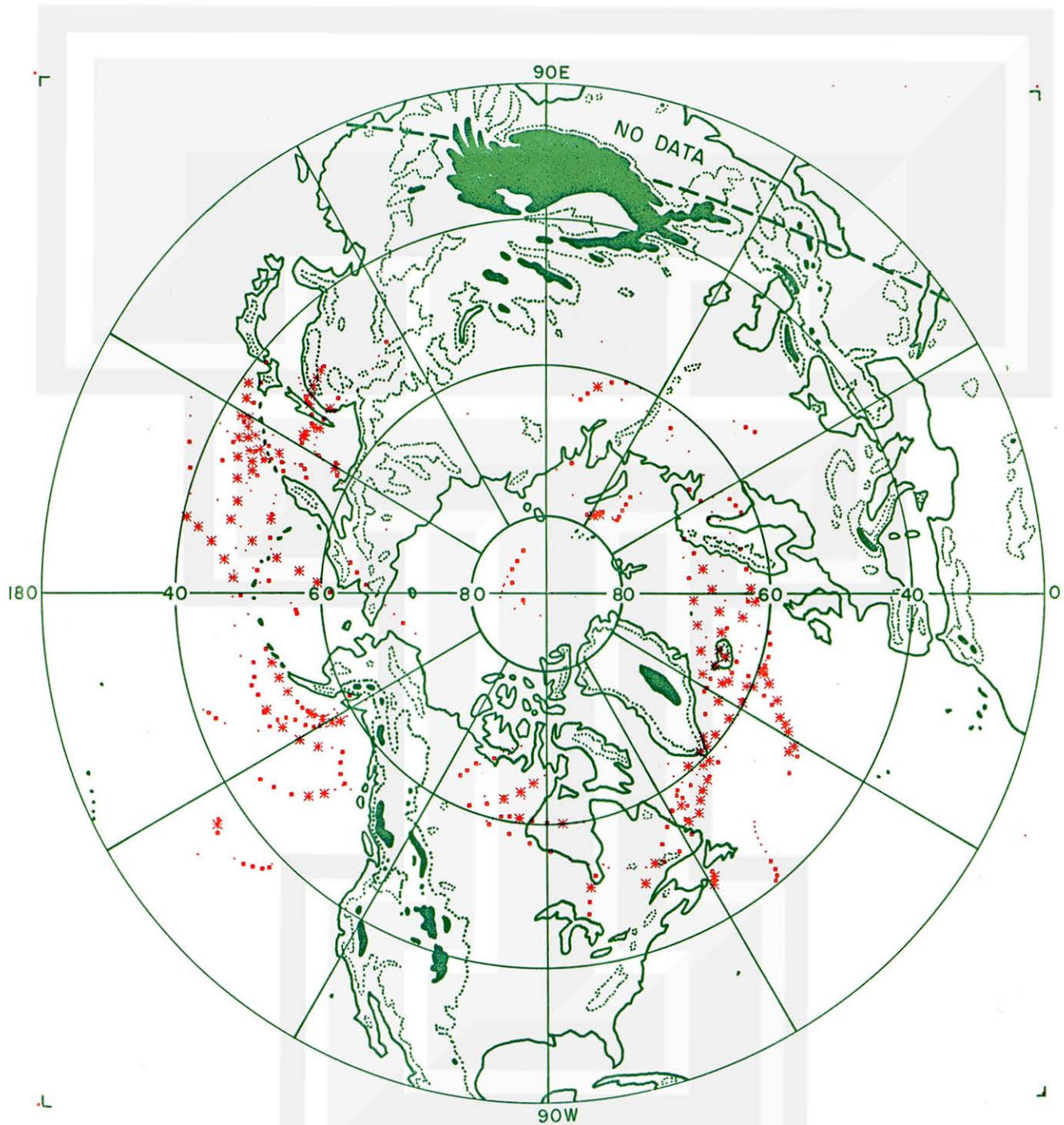
CYCLONE DEEPENING

SEP 83



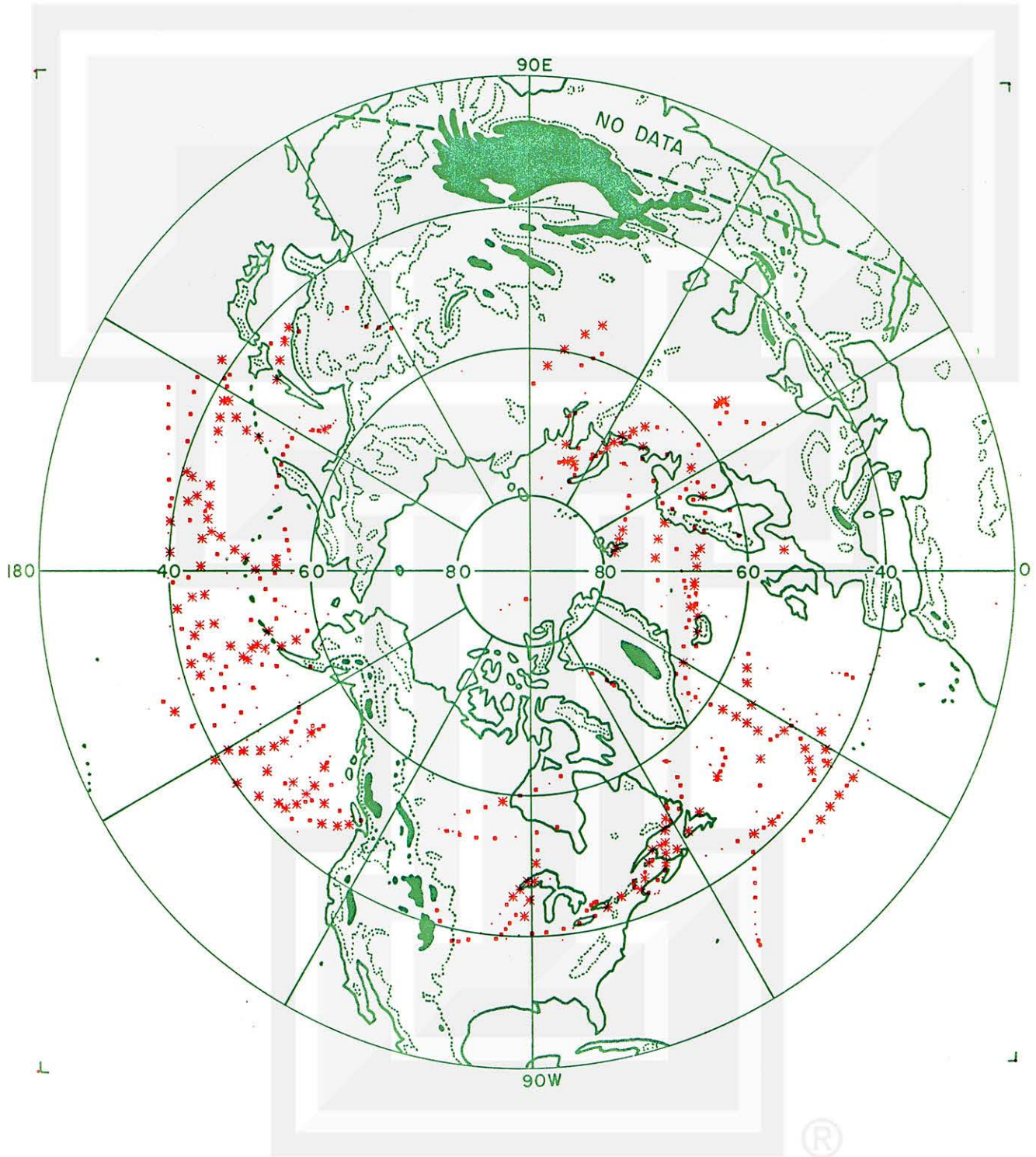
CYCLONE DEEPENING

OCT 83



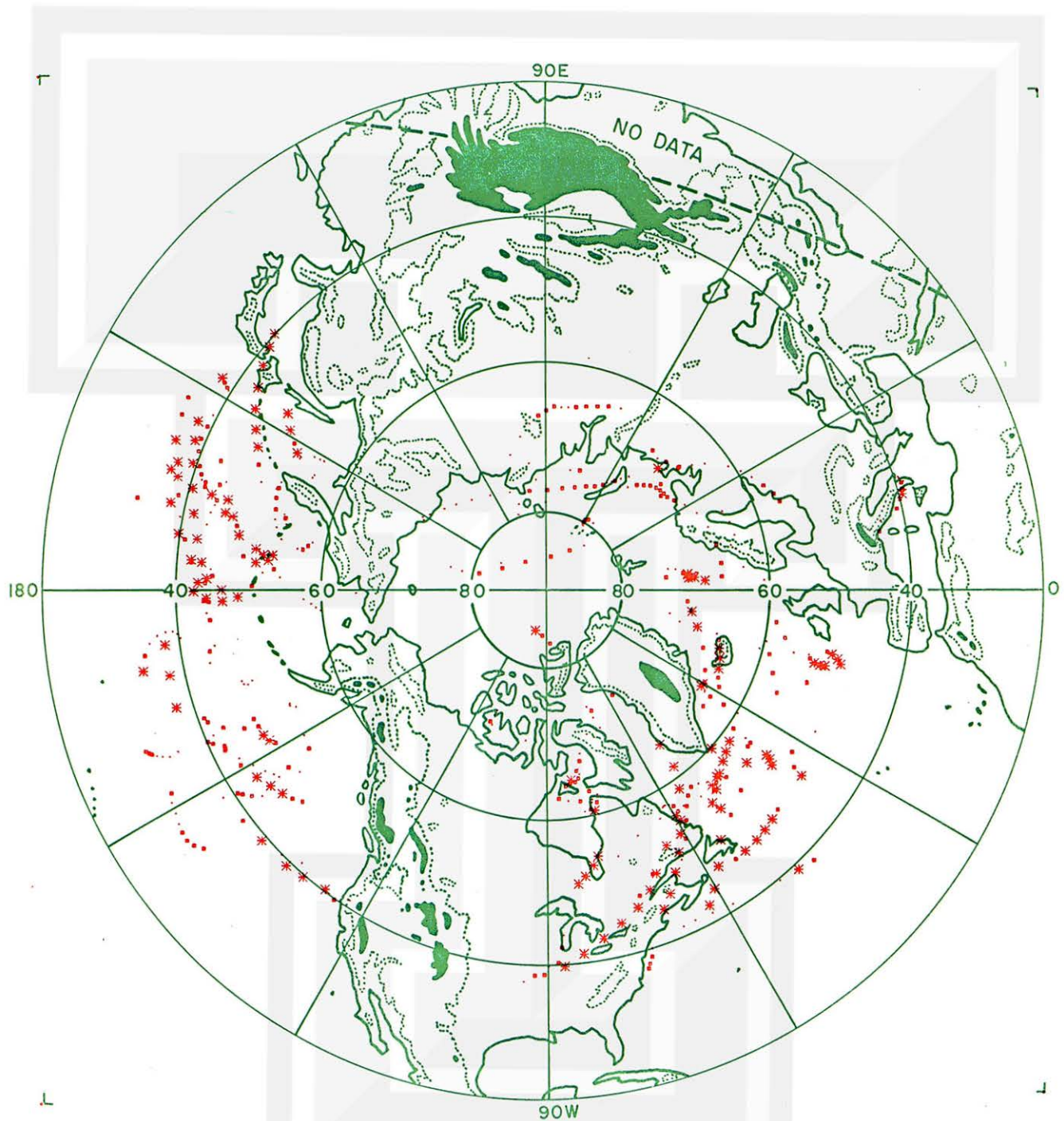
CYCLONE DEEPENING

NOV 83



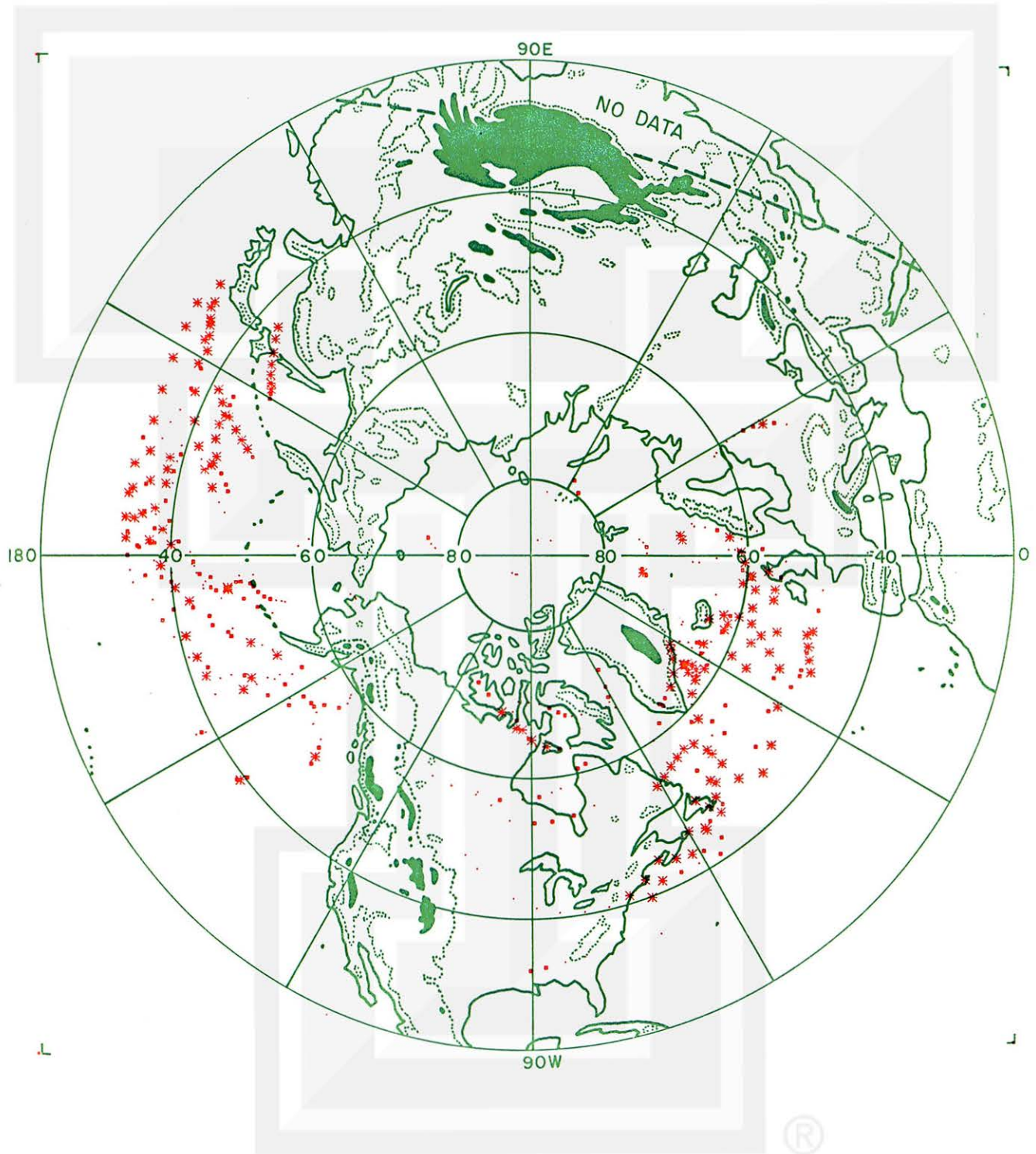
CYCLONE DEEPENING

DEC 83



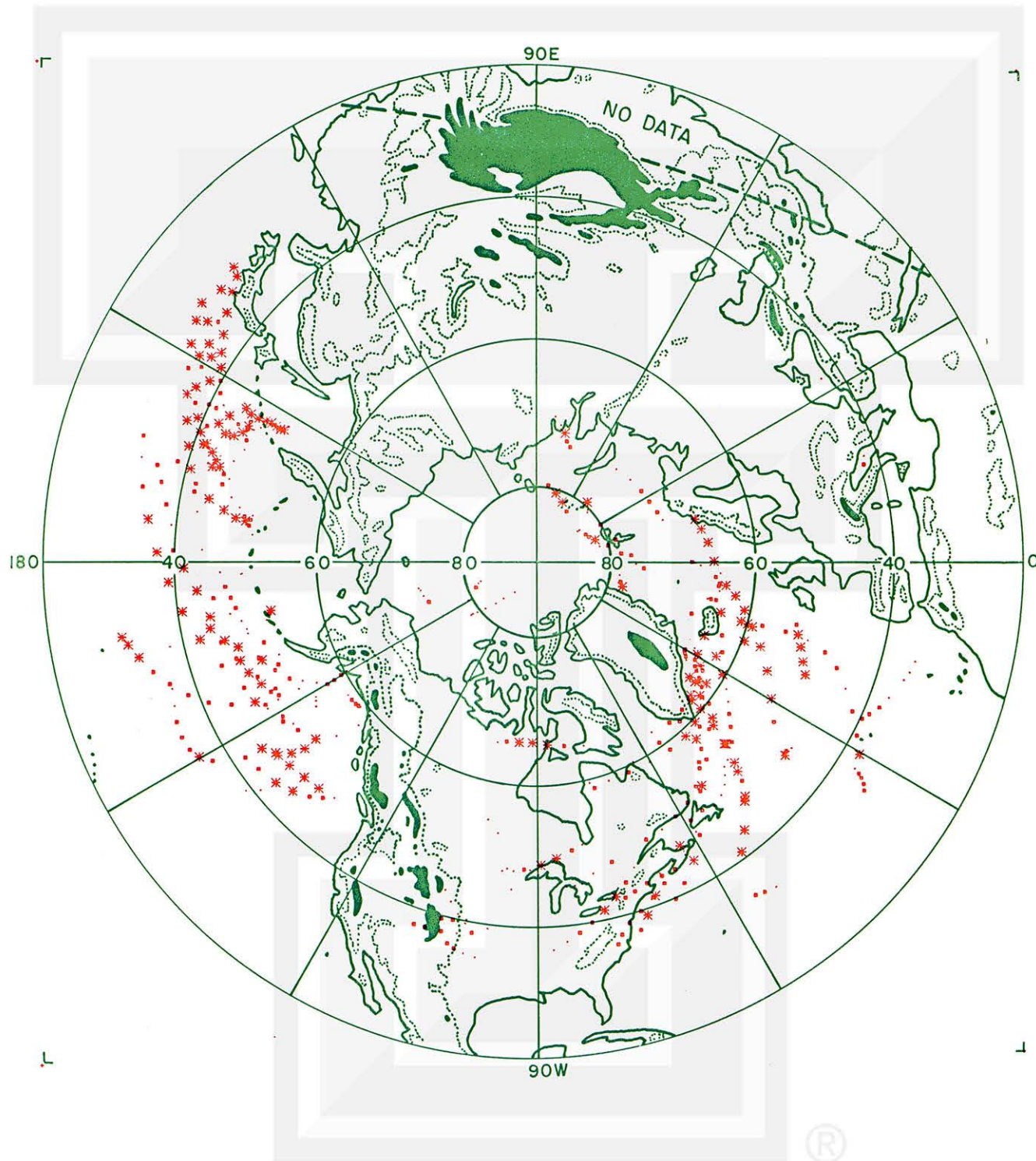
CYCLONE DEEPENING

JAN 84



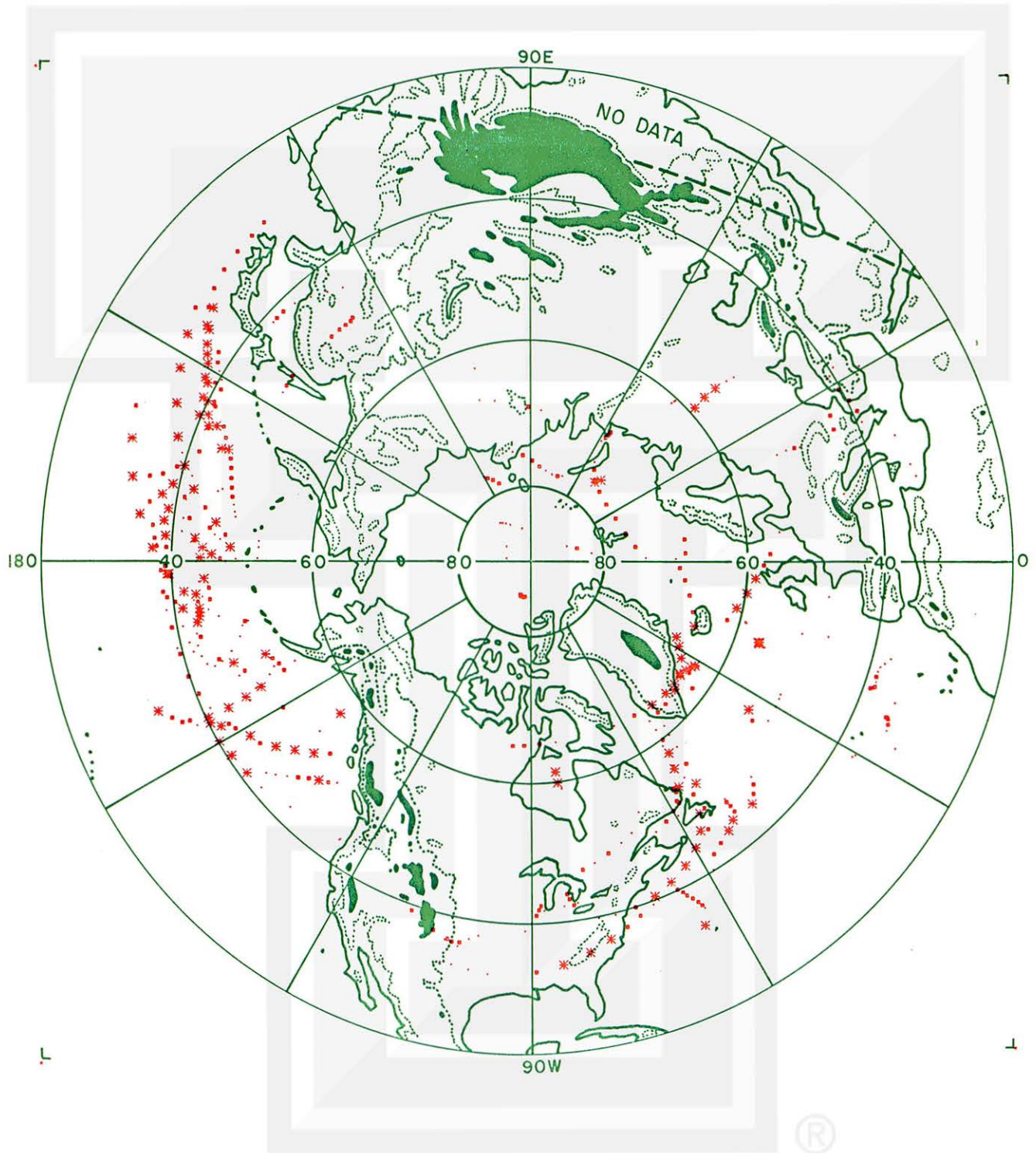
CYCLONE DEEPENING

FEB 84



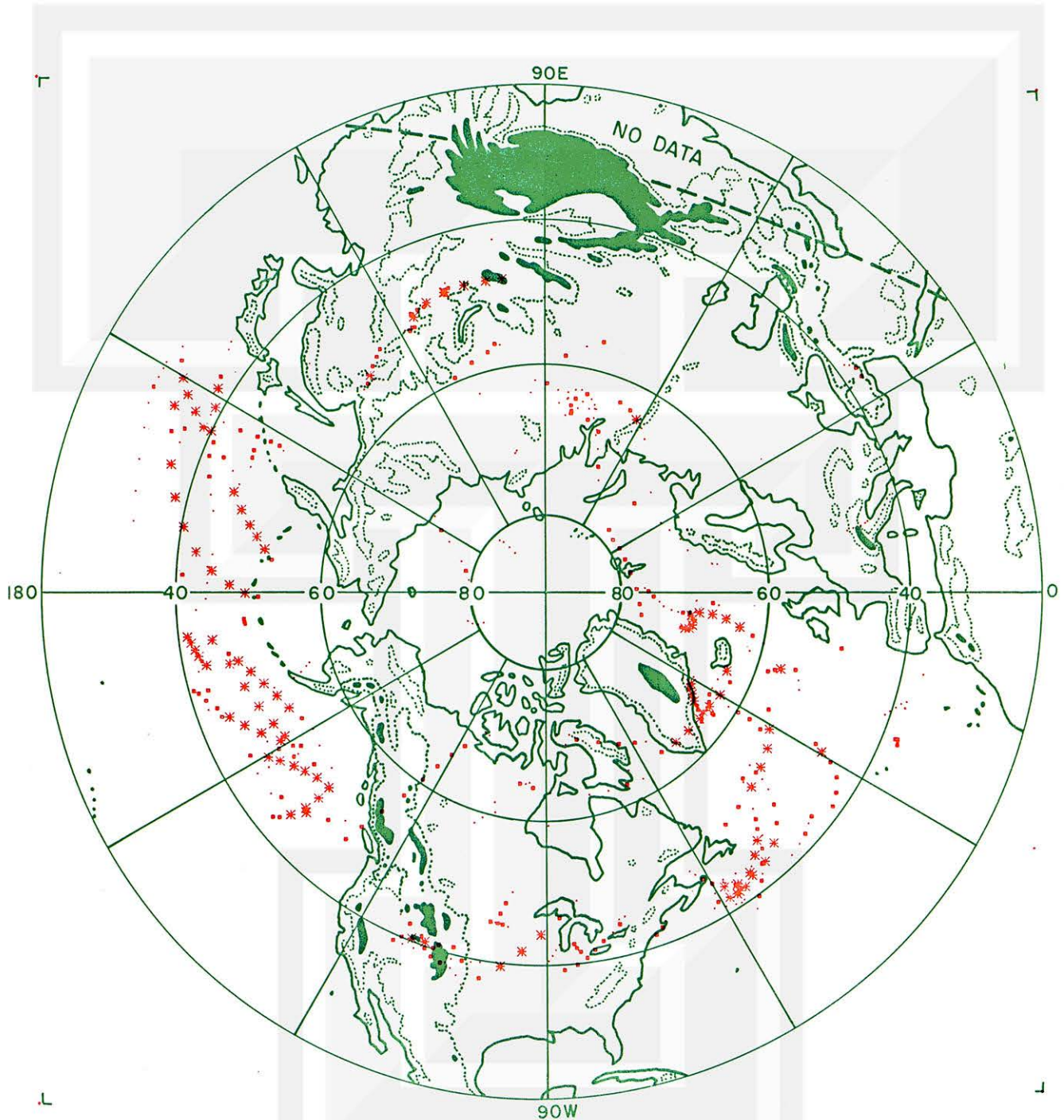
CYCLONE DEEPENING

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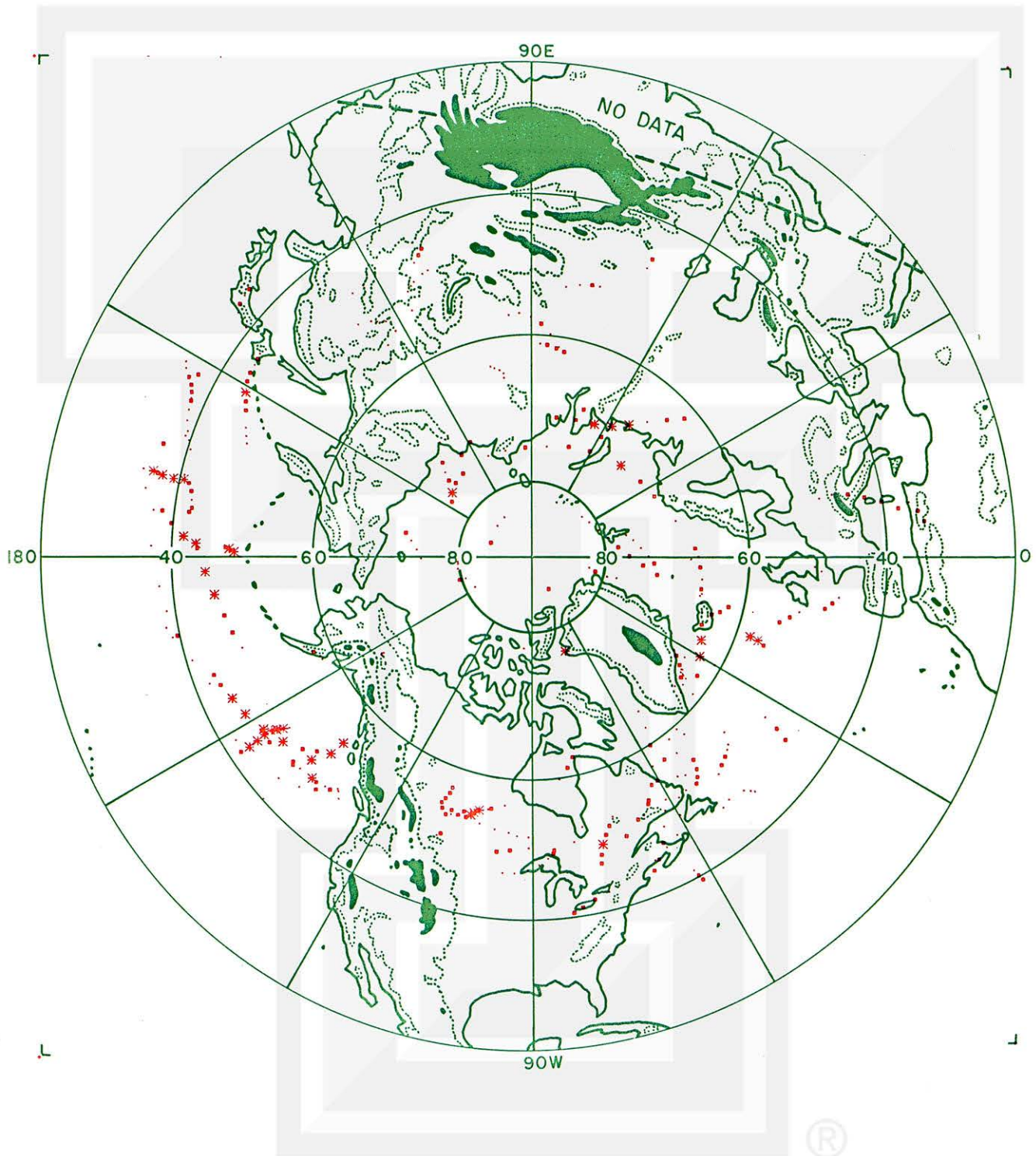
CYCLONE DEEPENING

APR 84



CYCLONE DEEPENING

MAY 84



..... 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 1983

Autumn 1983

Winter 1983-84

Spring 1984

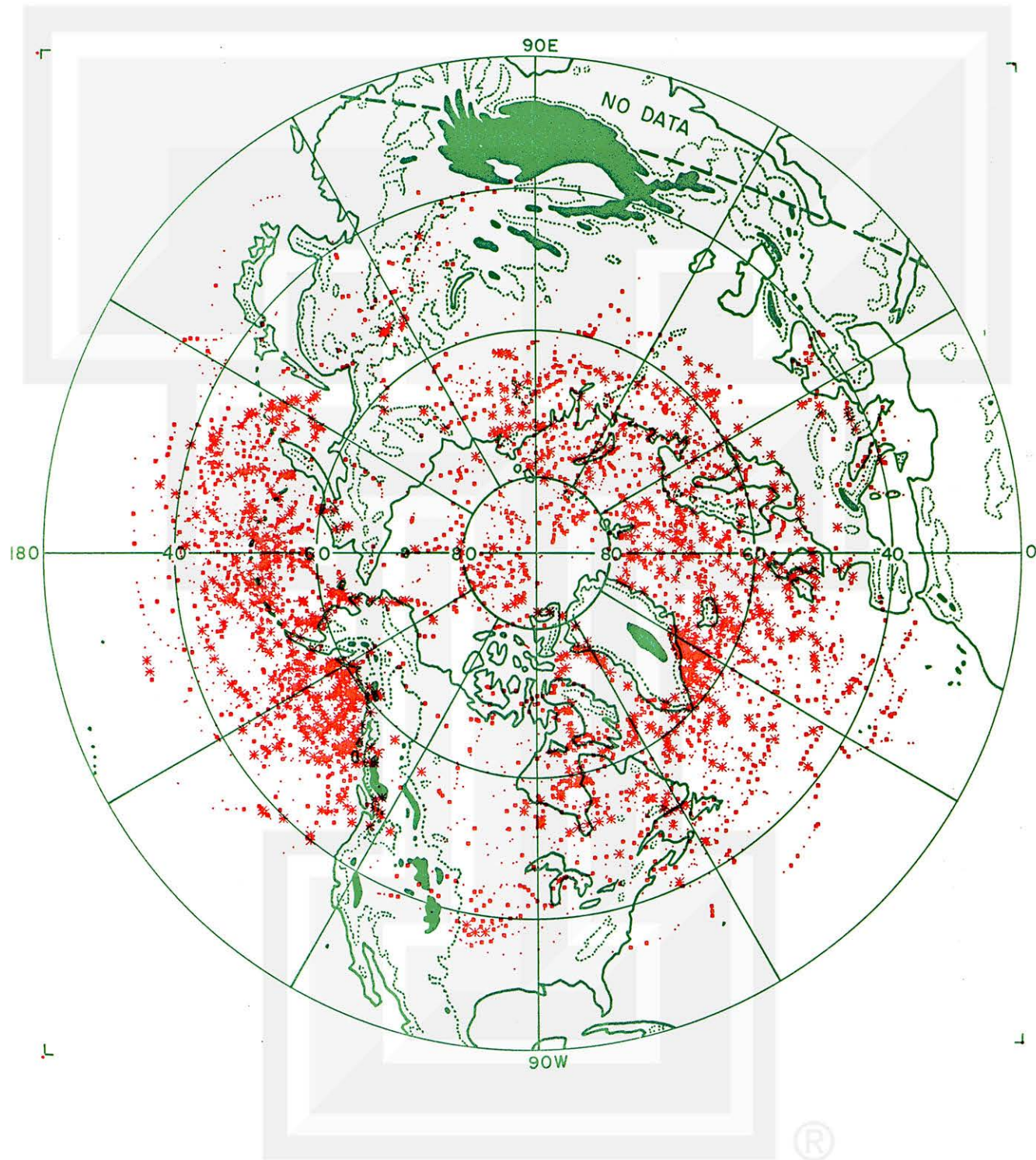
12 MONTHLY MAPS

June-December 1983

January-May 1984

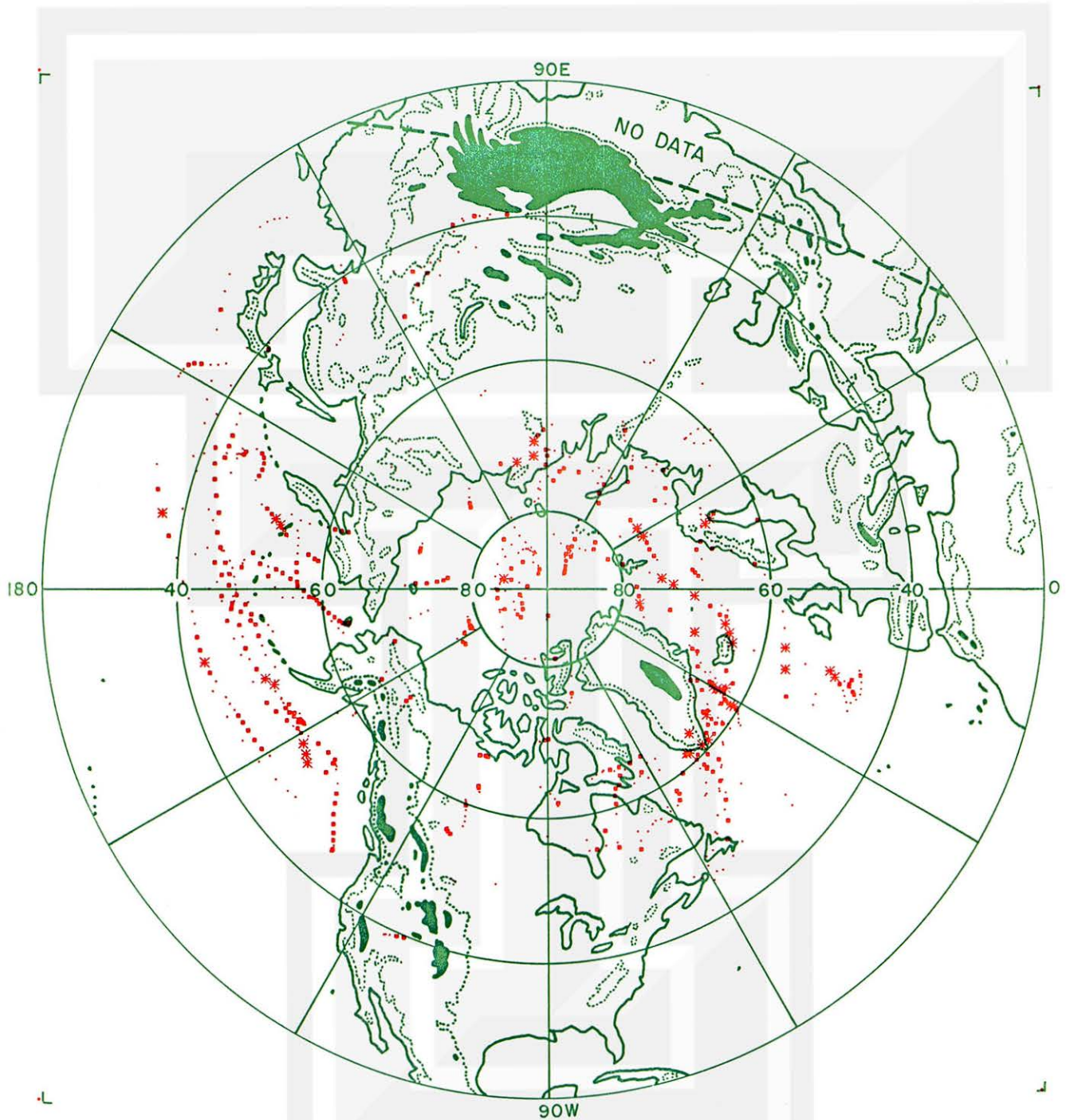


CYCLONE FILLING
12 MOS JUN 83 - MAY 84

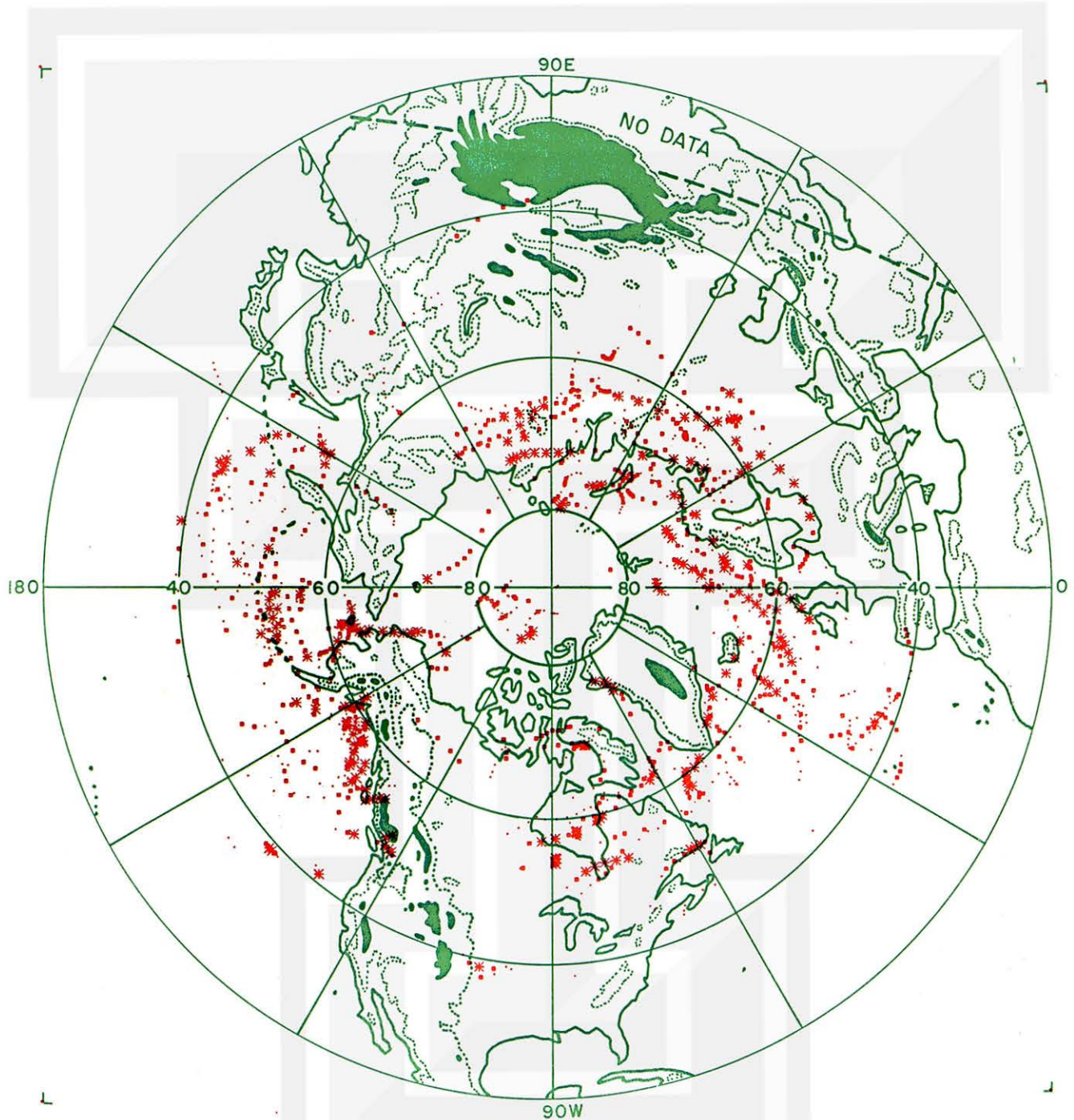


CYCLONE FILLING

SUMMER 1983

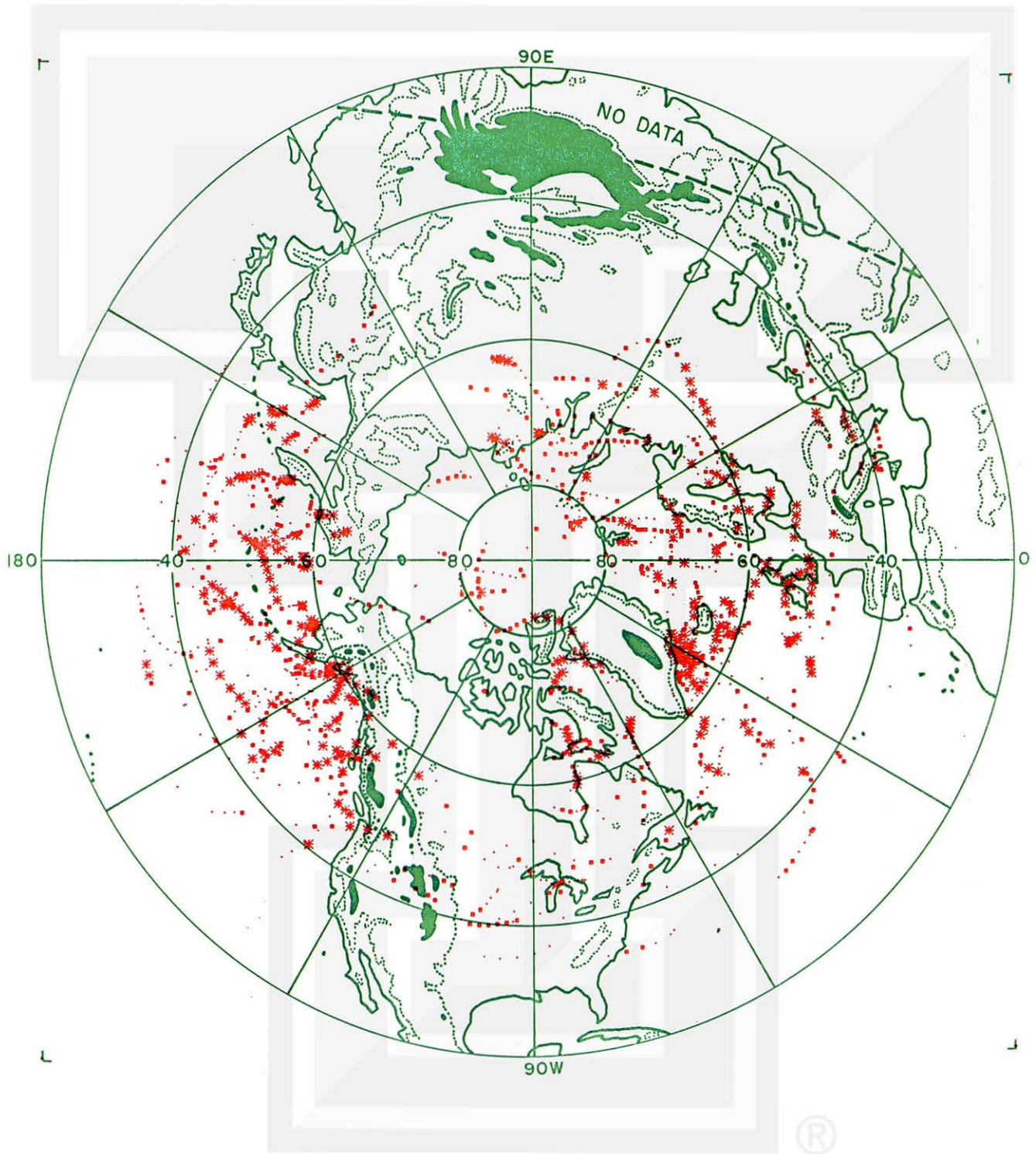


CYCLONE FILLING
AUTUMN 1983



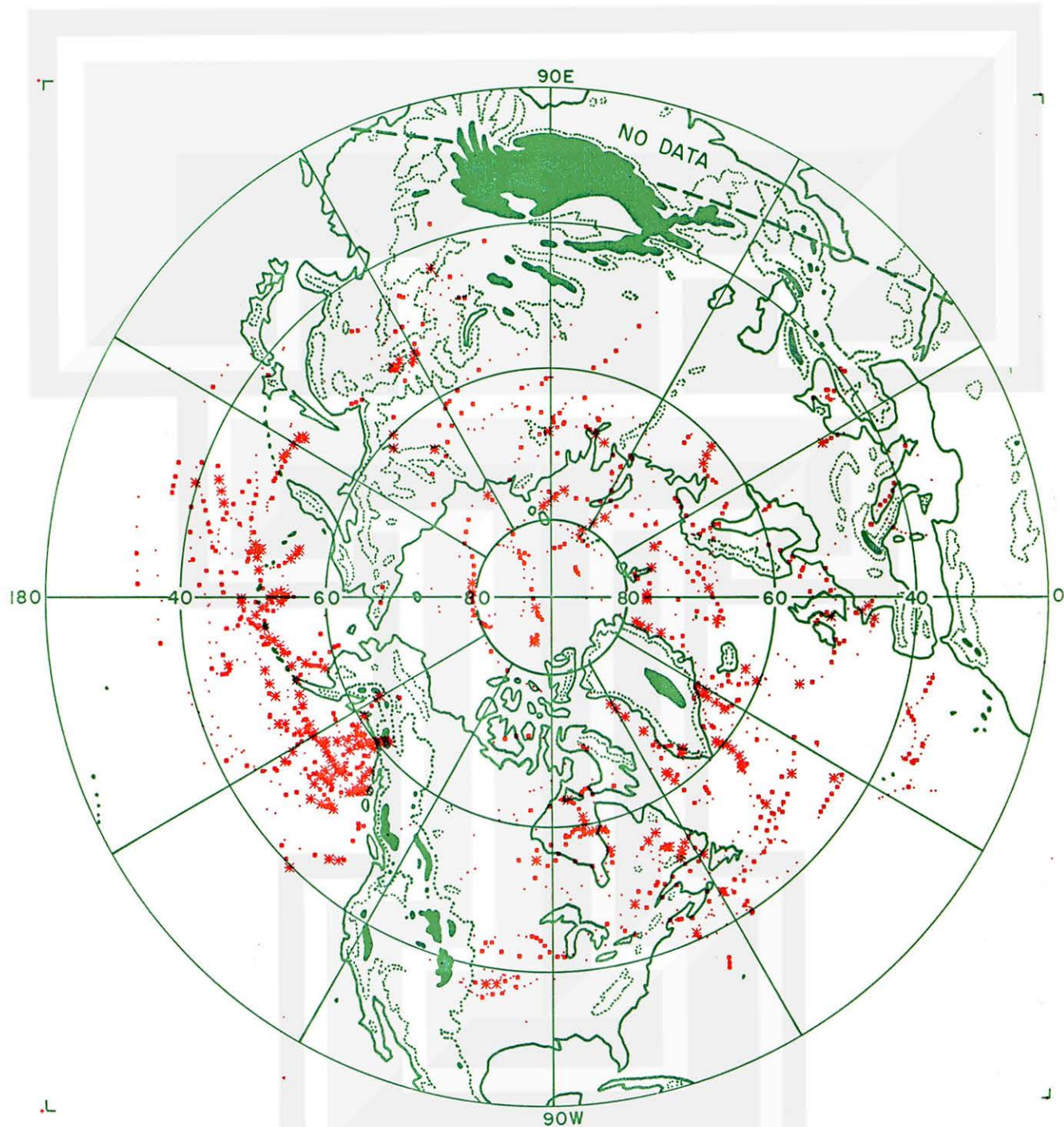
CYCLONE FILLING

WINTER 1983 - 84



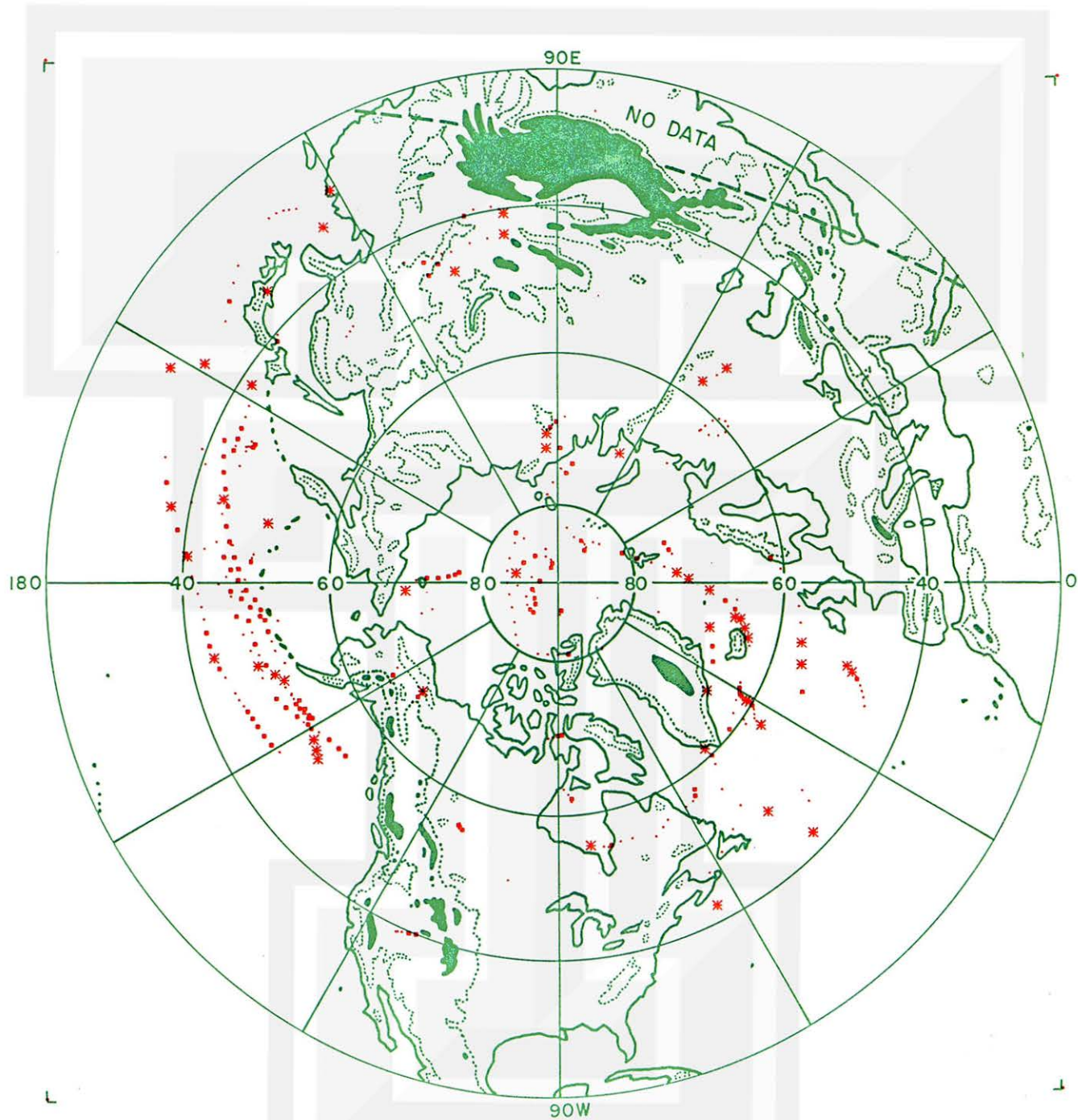
CYCLONE FILLING

SPRING 1984



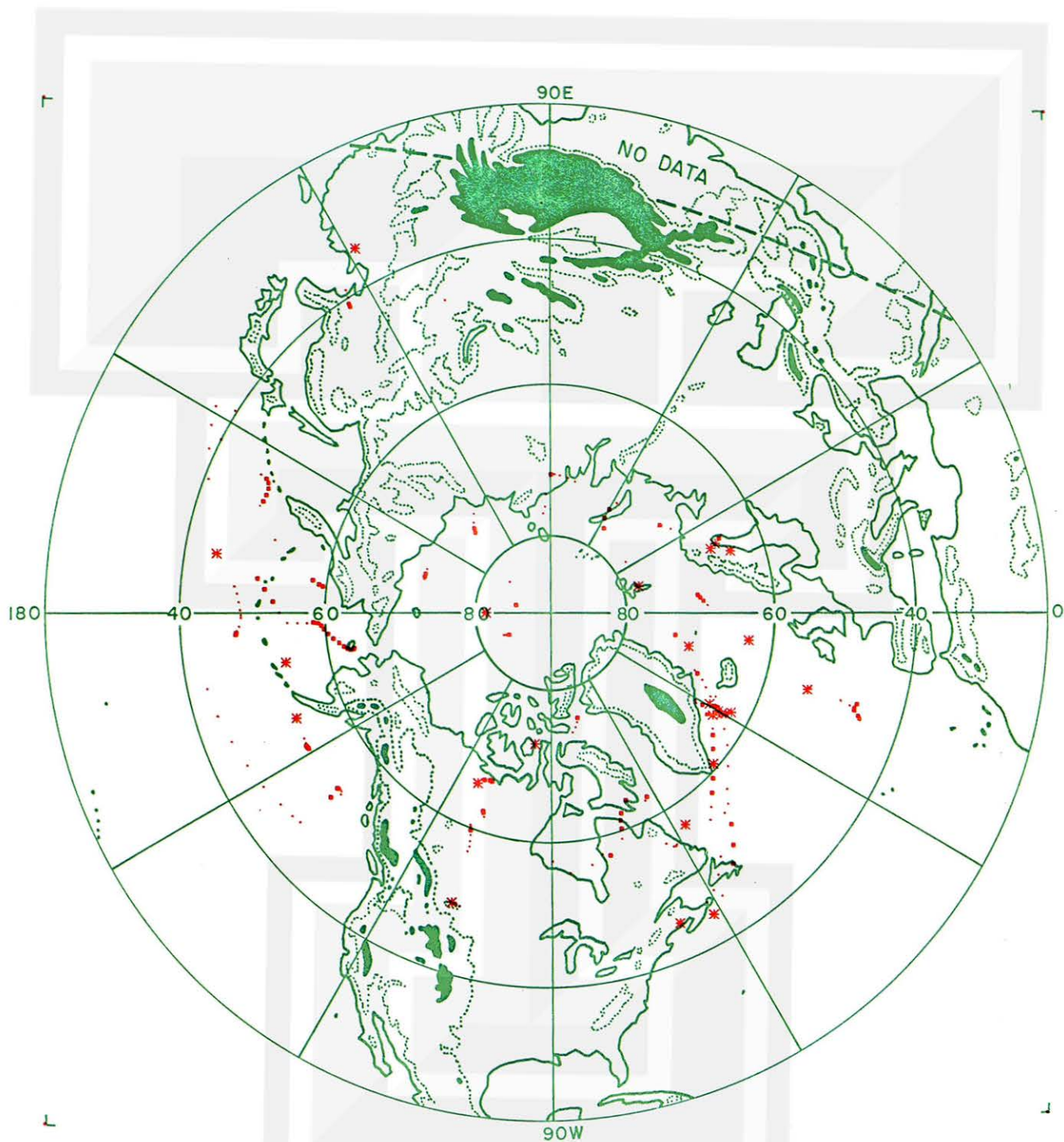
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JUN 83



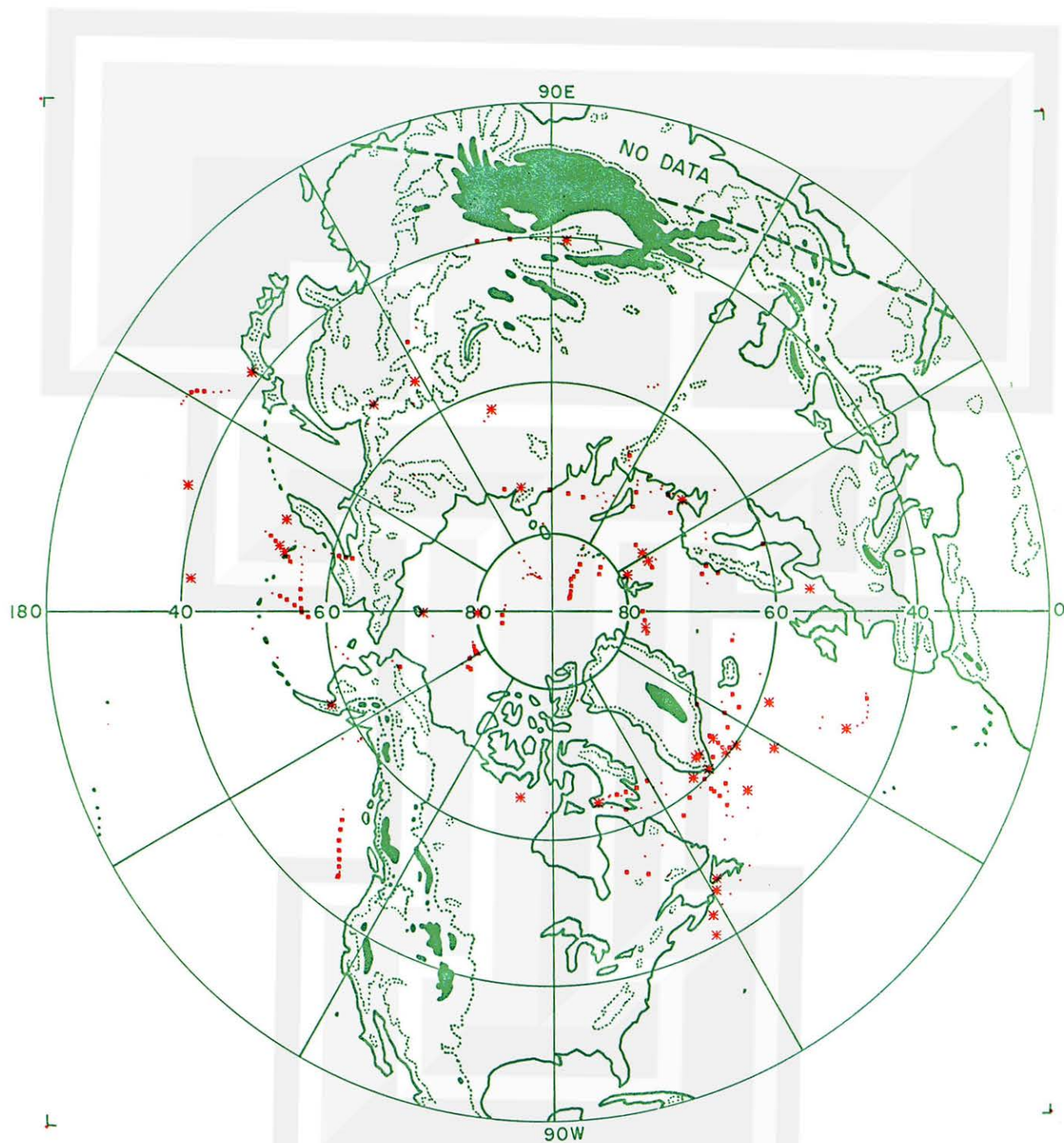
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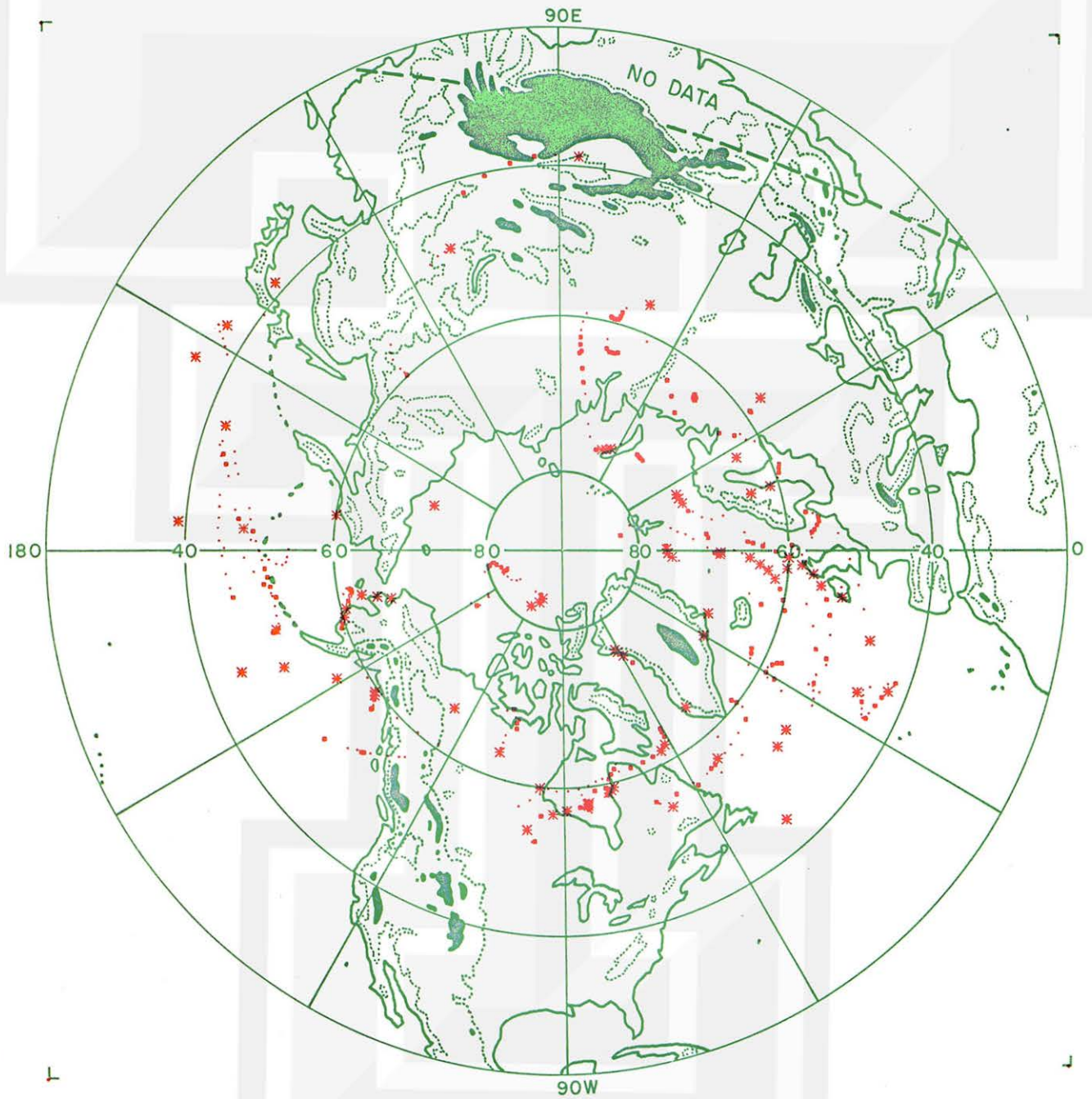
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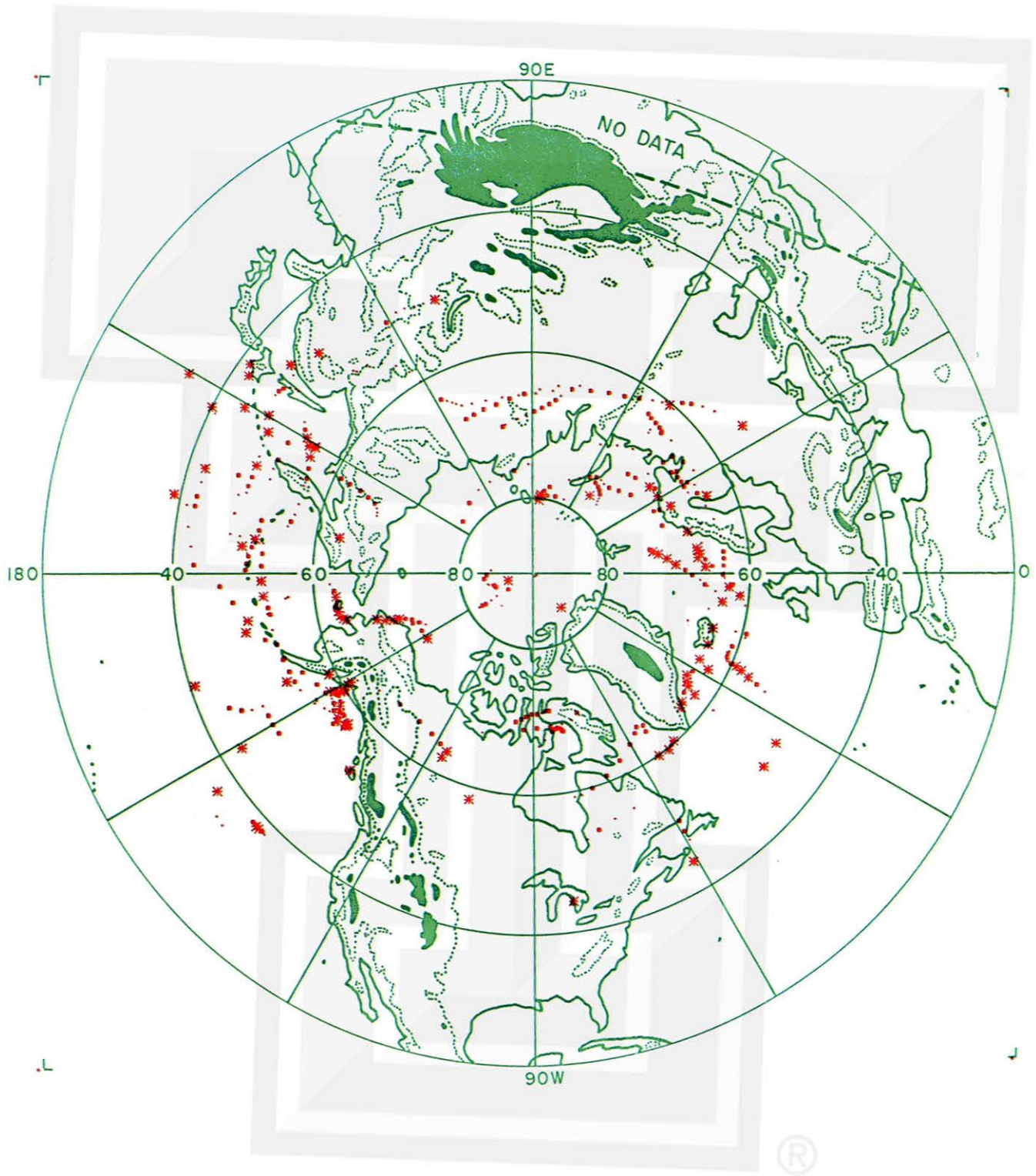
CYCLONE FILLING

SEP 83



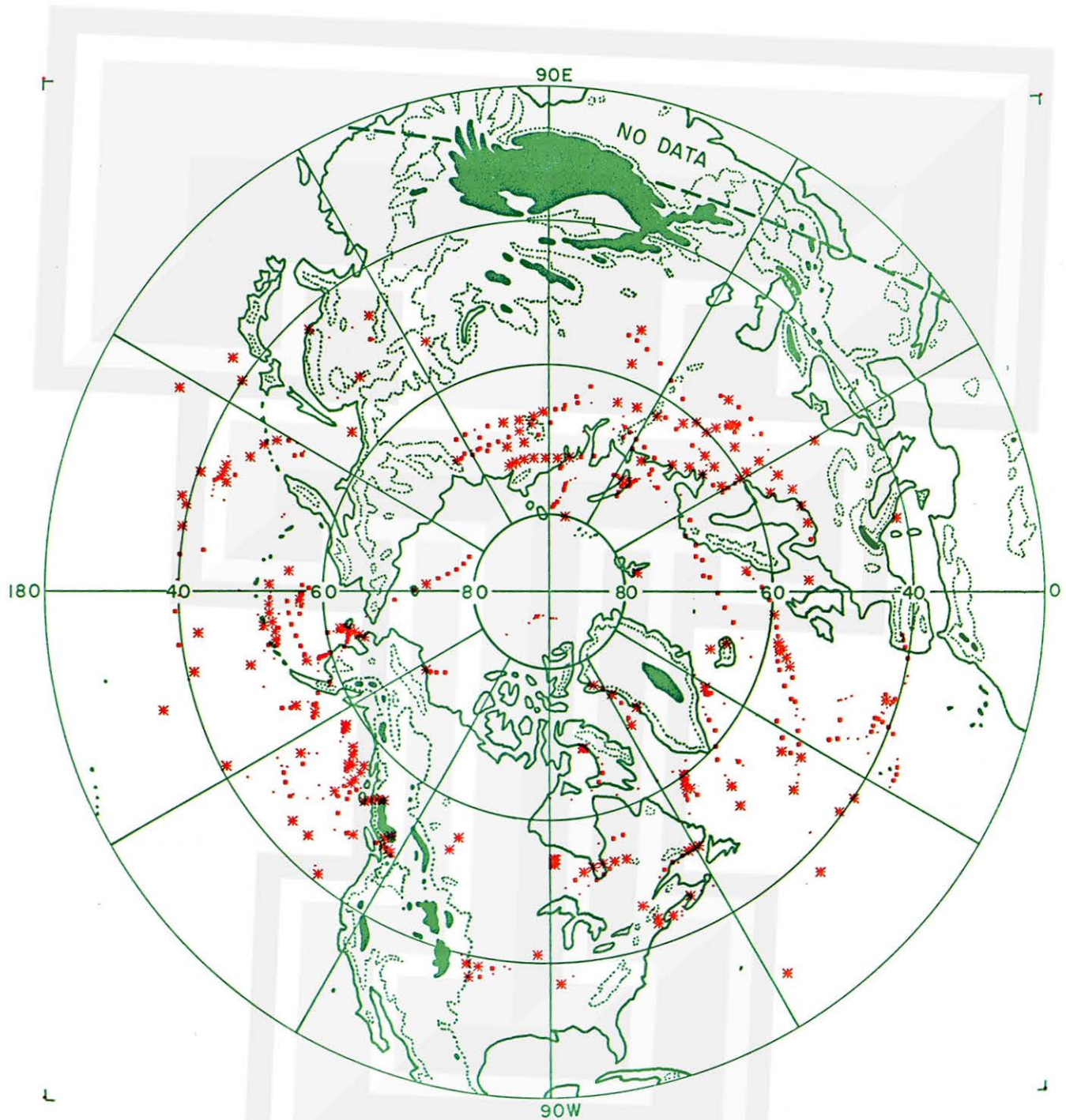
CYCLONE FILLING

OCT 83



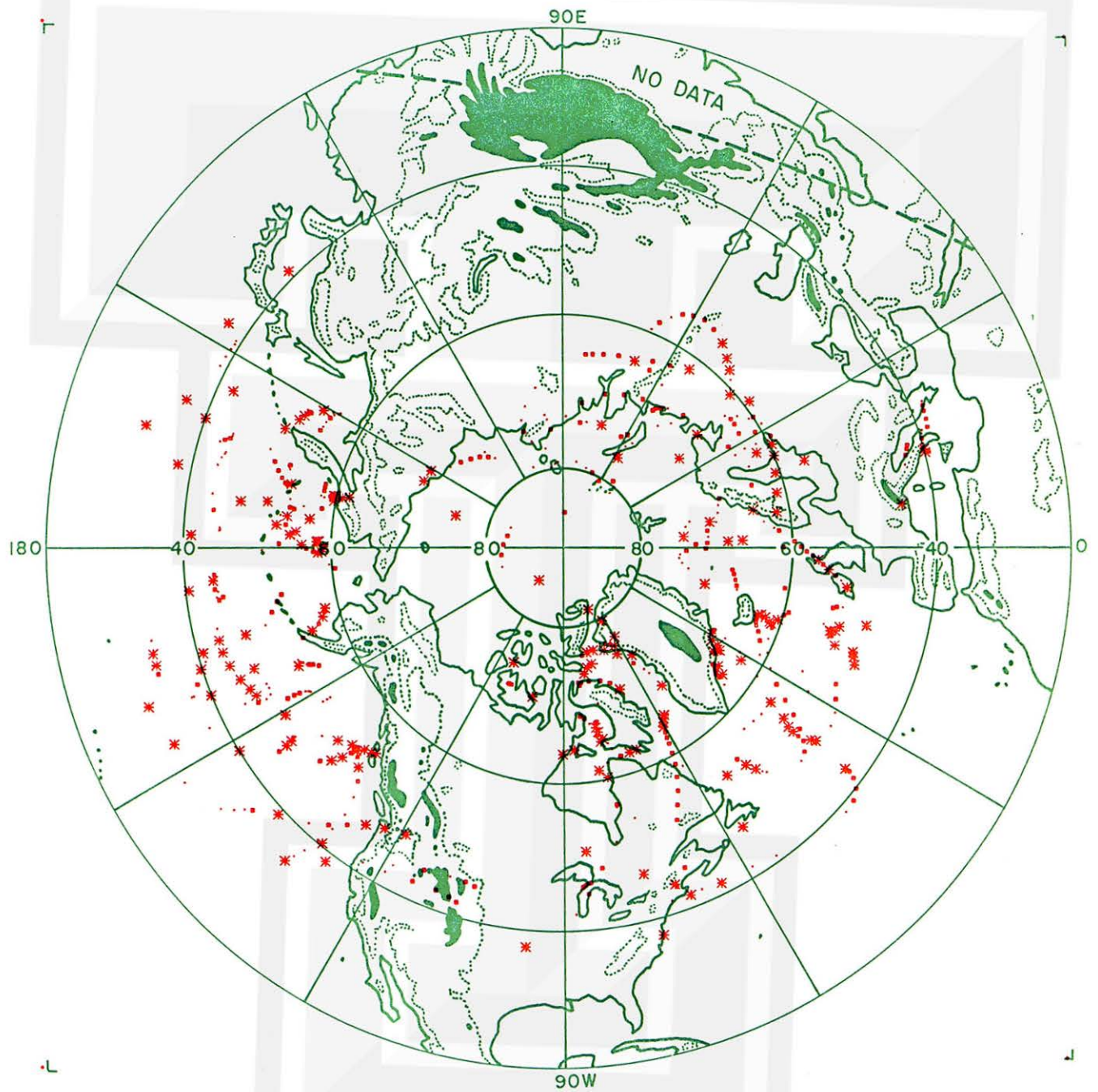
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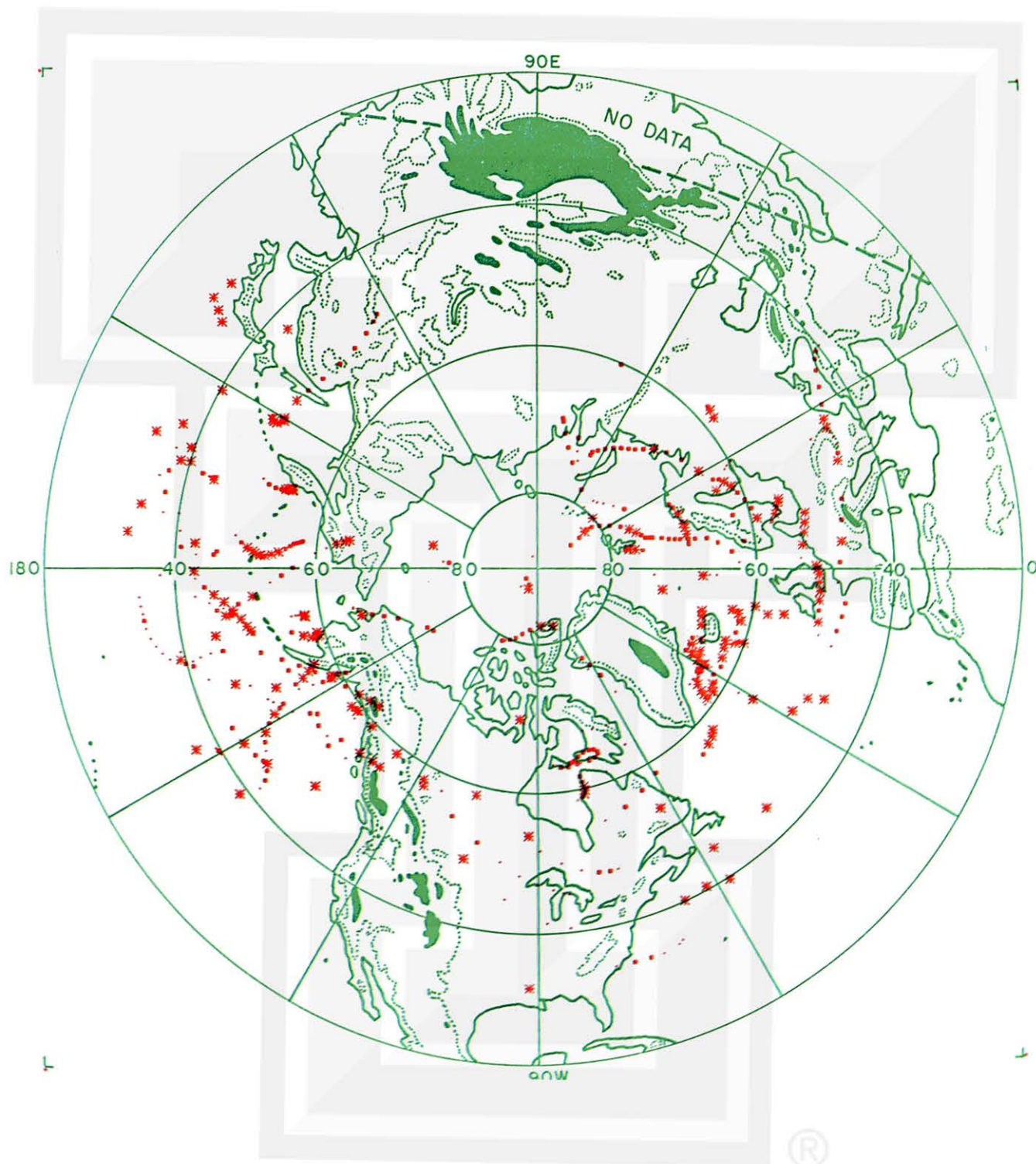
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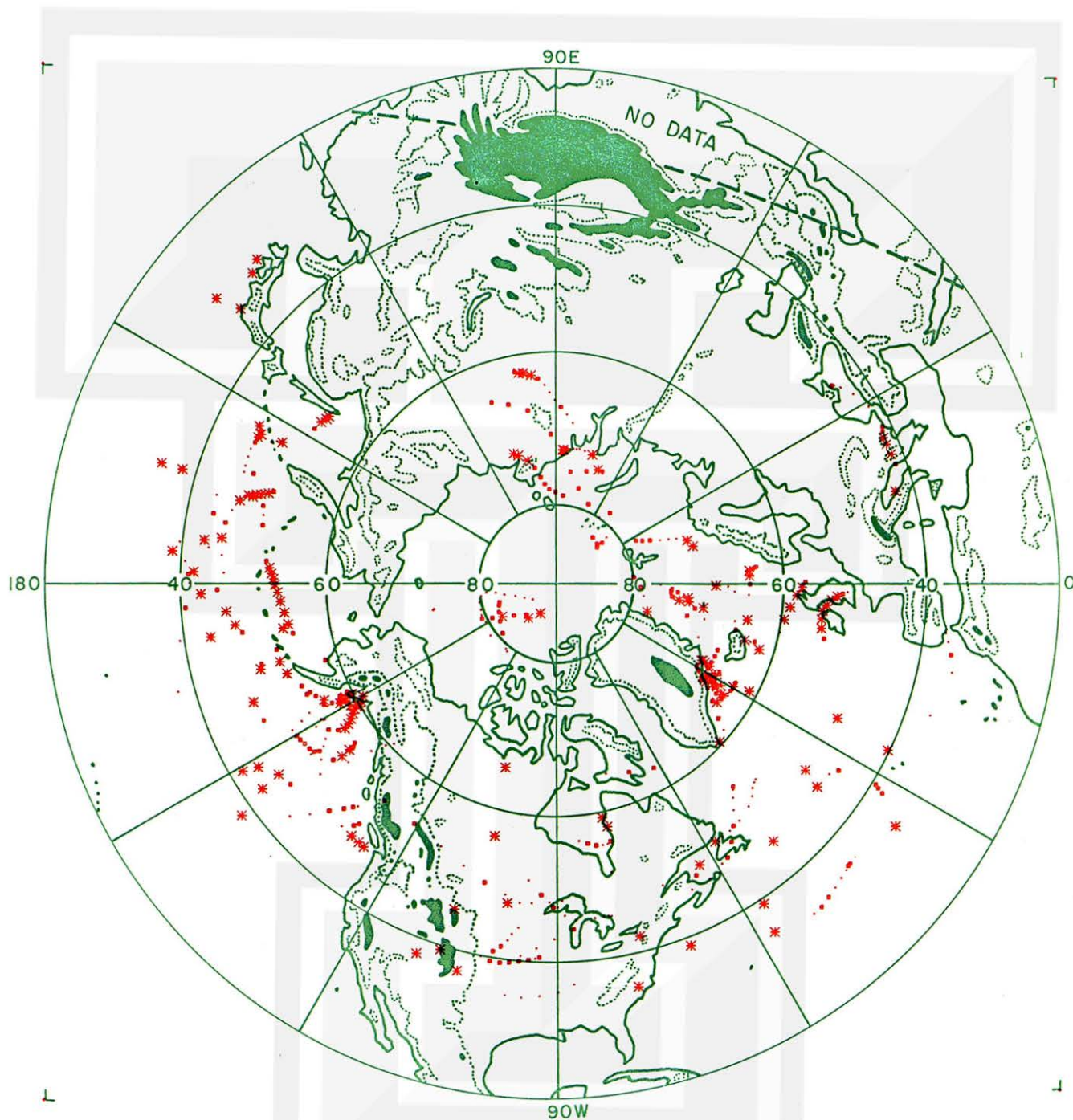
CYCLONE FILLING

JAN 84



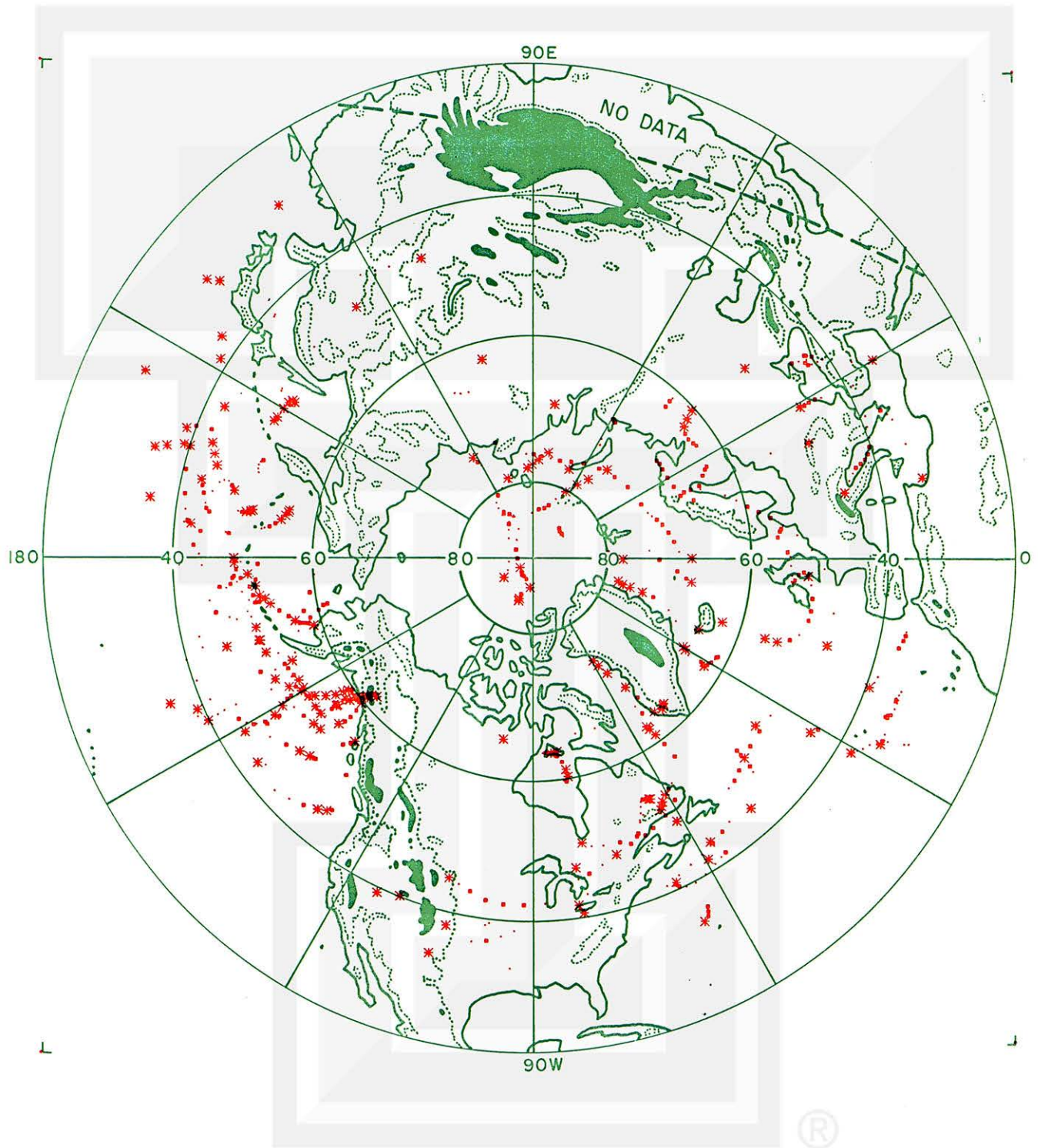
CYCLONE FILLING

FEB 84



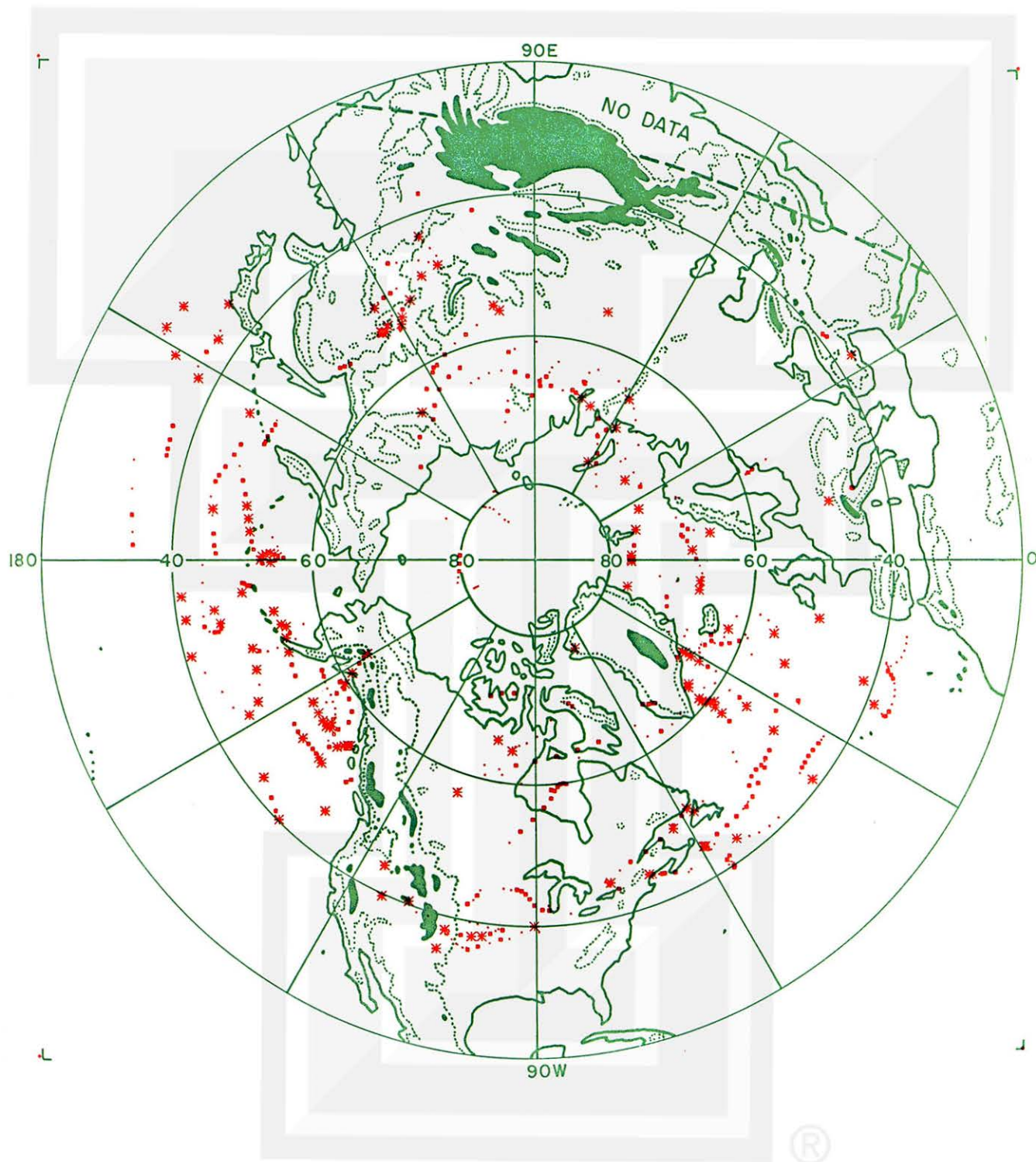
CYCLONE FILLING

MAR 84



CYCLONE FILLING

APR 84



CYCLONE FILLING

MAY 84

