

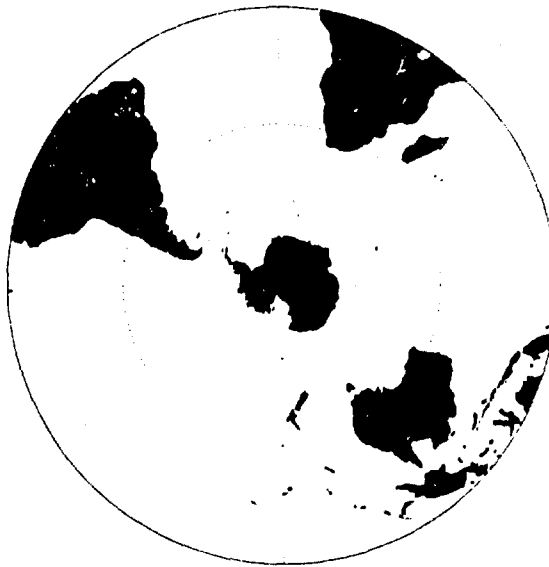


NAVAIR 50-1C-3
AWS/TR-89/003

JOINT U.S. NAVY/U.S. AIR FORCE CLIMATIC STUDY OF THE UPPER ATMOSPHERE VOLUME 3 - MARCH

NOVEMBER, 1989

AD-A227 124



PREPARED BY
NAVAL OCEANOGRAPHY COMMAND DETACHMENT
ASHEVILLE, N.C.

PREPARED UNDER THE AUTHORITY OF
COMMANDER, NAVAL OCEANOGRAPHY COMMAND
STENNIS SPACE CENTER, MS 39529-5000

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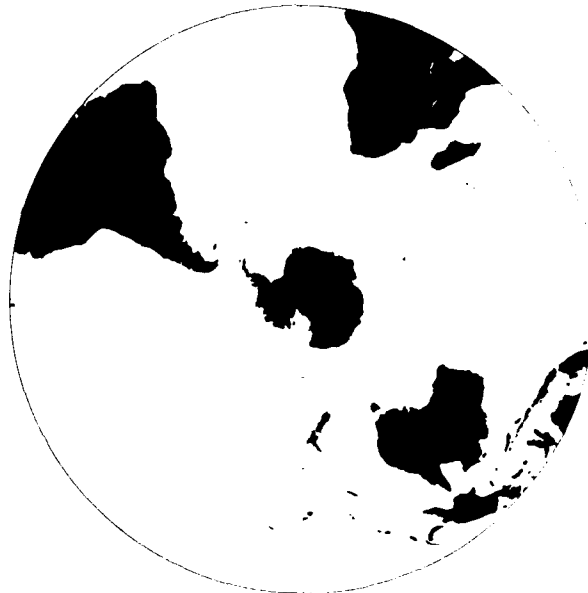


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The Joint U.S. Navy/U.S. Air Force Climatic Study of the Upper Atmosphere was prepared by the Officer in Charge, Naval Oceanography Command Detachment, Asheville, North Carolina under the authority of Commander, Naval Oceanography Command. Additional funding was provided by the Air Weather Service as a result of Tri-Services Climatology initiatives. The work was performed at the National Climatic Data Center (NCDC). Specific acknowledgement of the NCDC staff is made to Mr. M.J. Changery, project leader; Mr. C.N. Williams, Jr. for data processing and software development; and Messrs. M.G. Burgin and D.A. McKittrick for drafting skills. Special acknowledgement is made to the European Centre for Medium-range Weather Forecasts for providing the basic gridded analyses.

INTRODUCTION

During the past decade, improvements in the collection and assimilation of data required for more accurate representations of the atmosphere have resulted in data sets useful for developing a more definitive climatology of the global atmosphere. Such a climatology has uses in aircraft operations and planning, indirect assessments of atmospheric transport as well as a standard state from which atmospheric anomalies can be analyzed.

Prior climatologies, U.S. Navy (1959), U.S. Navy (1966), Naval Weather Service Command (1969), and Naval Weather Service Command (1970), were produced from individual station data with varying periods of record, and the resulting summarized data were analyzed. A serious deficiency was the lack of reporting locations in the major ocean basins. Analyses over the oceans were derived by extrapolating from known analyses over coastal regions as well as the few island or ocean vessels available. An additional complication was the manually intensive effort required to ensure horizontal and vertical consistency of the data.

With the advent, in the 1970s, of more powerful computers and data collection and assimilation systems, the initial analyses used for input into forecast models had a three-fold advantage over the station analyses utilized in the prior climatologies. First, the data assimilation system utilized a greater variety of information for production of an analysis. The normal array of land-based upper air reporting stations was supplemented by ship-based reporting stations, cloud reports, pilot reports and, most importantly, satellite-derived temperature, moisture and wind data. Consequent analyses more accurately represented the state of the atmosphere at a given observation time. Second, the assimilation system quality-controlled all incoming data and ensured the horizontal and vertical consistency of the resulting analyses. Finally, through the computer-based system, global data were available and archived in grid-point form.

A number of analysis sets produced by various national and international meteorological services were investigated. It is recognized that improvements to the data assimilation and analysis systems occurred within any analysis set produced, and that current analyses more accurately reflect the atmosphere's state than do the earlier analyses. It is also recognized that specific parameter or geographic-based deficiencies exist in all analysis sets. However, the intent of this upper-air climatology effort is the production of analyses to serve the needs of the operational meteorologist. A climatology derived from global analyses achieves this goal. Based on known capabilities and technical reviews of the various systems, as well as recommendations from the professional numerical modeling community, the analyses produced by the European Centre for Medium-range Forecasts were selected for processing.

ECMWF DATA

The European Centre for Medium-range Weather Forecasts (ECMWF) is an international organization established in 1973 and supported by 17 member states. It is responsible for providing global forecasts to the European community. Their data assimilation system consists of multivariate optimal interpolation analysis allowing the incorporation of a variety of observations with differing error characteristics and spatial distributions. A relatively comprehensive coverage of global data is ensured through the data collection schedule. A unique feature of the ECMWF system is the method of grid point analysis. Rather than analyzing individual grid points, varying sized boxes (depending on data density) are created containing groups of grid points. Grid point analysis uses data from within the box as well as adjacent boxes, thereby assuring a consistent analysis between all the grid points.

The system also includes internal quality control which examines the climatological reasonability of incoming data as well as the internal consistency of the data.

In addition, the system utilizes a model initialization process which ensures that harmful gravity waves, caused by imbalances in the analysis, with the potential to create problems in subsequent forecast fields, are suppressed. Through the initialization process, the atmosphere's mass and wind fields are adjusted so that only a portion of the gravity wave balanced by dynamic and physical processes is retained. Further information on the ECMWF system is available in Lorenc (1981), Shaw, et al. (1984), Lonnberg, et al. (1986), and ECMWF (1988).

The resulting initialized analyses are vertically interpolated to these 13 standard pressure levels: 1000, 850, 700, 500, 400, 300, 250, 200, 150, 100, 70, 50, and 30 mb, and include the geopotential height, temperature, and wind for all levels with moisture included for the 1000 through 300 mb levels.

Six years (1980-1985) of individual analysis were obtained from ECMWF on a 2.5° global grid. Although the analyses were permanently archived as spherical harmonic coefficients, ECMWF reconstituted the analyses for use in the data processing. Synoptic analyses at six-hour intervals were received for the six-year period, but only the 00 and 12Z analyses were re-sorted into a grid point sort. Given the quality control performed by ECMWF on collected data and the requirements for horizontal and vertical data consistency imposed by the assimilation system, minimal quality control was performed prior to summarization. Primary quality control was limited to comparison of level data against known/estimated climatological extremes.

The summarized grid point data were objectively analyzed, machine-contoured by parameter and level on polar stereographic (0°-90°N and S) and cylindrical equidistant (0°-60°N and S) projections with resulting contours machine-labeled. In addition, individual wind observations were consolidated into eight 45° segments centered on directions north, northeast, ... through northwest for display as wind roses on a series of cylindrical equidistant projections.

Since the ECMWF analyses were archived as spectral harmonic coefficients, the grid point reconstitution process provides data for all global 2.5° grid points. This naturally includes (for the 1000 through 700 mb levels) selected grid points at which the land elevations exceed the height of the pressure surface. For these grid points, a blanking program was used to eliminate both contours and grid point wind roses.

ANALYSES

1. Pressure-Height

Grid point geopotential height values (in dekameters) are summarized by month for 13 levels from 1000 mb to 30 mb with solid and dashed contours of mean values presented on pressure height charts. Standard deviation of height is calculated from the individual daily values with contours presented on a separate chart series including the standard deviation of vector mean wind. Local points of highest and lowest pressure are designated with H's and L's on the analyzed charts. Not all pressure centers are enclosed by closed contours. Vector mean wind in 5-knot increments are calculated for selected grid points considered adequate to depict flow for the hemisphere with wind shaft orientation related to specific latitude/longitude lines. Vector mean winds less than 2.5 knots are depicted as a shaft with no barbs. Contours of mean geopotential height and vector mean wind barbs are presented for the northern/southern hemispheres on polar stereographic projection and for 0° to 60° north and south on cylindrical equidistant projections with blanking for appropriate high elevation land areas on the 1000 through 700 mb charts.

2. Wind Roses

Wind roses for 10° grid points from 5° to 85° north and south are presented by month for all levels from 1000 mb to 30 mb. Each hemisphere is divided into three longitudinal zones: 60°W to 60°E, 60°E to 180°E, and 180°W to 60°W. Each rose presents:

- a) Scalar mean speed
- b) Percent frequency of occurrence from each of 8 cardinal point wind directions proportional to shaft length with dots on the shafts representing 5 percentile intervals.
- c) Mean speed for each of the 8 cardinal wind directions rounded to the nearest 5 knots.

Roses for grid points on the 1000 mb through 700 mb level charts are blanked whenever the land elevation exceeds the mean geopotential height of the specified level.

3. Temperature

Grid point temperature data (in °C) are summarized by month for 13 levels from 1000 mb to 30 mb with solid and dashed contours of mean values presented on pressure height charts. Temperature standard deviation derived from the individual observations are shown on the same charts with dotted contours. Contours are presented for both the northern and southern hemispheres on a polar stereographic projection and for the zone from 0° to 60° north and south on cylindrical equidistant projections with blanking for appropriate high elevation land areas on the 1000 through 700 mb charts.

4. Dew Point

Grid point moisture data were received as mixing ratios for the period through April 19, 1982 and as relative humidity thereafter for the 1000 through 300 mb levels. All moisture data were converted to dew point values. These are summarized by month with solid and dashed contours of mean values presented on pressure height charts. Dew point standard deviation derived from the individual observations are shown on the same charts with dotted contours. Contours are presented for both the northern and southern hemispheres on a polar stereographic projection and for the zone from 0° to 60° north and south on cylindrical equidistant projections with blanking for appropriate high elevation land areas on the 1000 through 700 mb charts.

5. Density

Grid point density data were computed from the daily values of temperature and pressure from the equation of state in the form

$$\rho = \frac{P}{RT}$$

where ρ is the density, P is the pressure, T is the temperature, and R is the gas constant. Density was computed for moist air through 300 mb and for dry air from 250 mb to 30 mb. Density data (in Kg/m³) are summarized by month for all 13 levels with solid and dashed contours of mean values presented on pressure height charts. Density standard deviation derived from individual observations are shown on the same charts with dotted contours. Contours are presented for both the northern and southern hemispheres on a polar stereographic projection and for the zone from 0° to 60° north and south on cylindrical equidistant projections with blanking for appropriate high elevation land areas on the 1000 through 700 mb charts.

6. Standard Deviation of Height and Vector Mean Wind

Standard deviation of the height and vector mean wind data presented on the pressure height charts are presented on monthly charts for the 1000 through 30 mb levels. Height standard deviations (in dekameters) are presented as solid contours and vector wind standard deviations (in knots) as dashed contours. Contours are presented for both the northern and southern hemispheres on a polar stereographic projection and for the zone from 0° to 60° north and south on cylindrical equidistant projections with blanking for appropriate high elevation land areas on the 1000 through 700 mb charts.

7. Jet Stream

Grid point scalar mean wind speed (in knots), as presented by the value in the center of the wind rose octagons, are summarized by month and analyzed for 500 through 30 mb. All speeds exceeding 50 knots are shaded with shading intensity increasing by 25-knot increments. Contours are presented for both the northern and southern hemispheres on a polar stereographic projection and for the zone from 0° to 60° north and south on cylindrical equidistant projections.

DATA AVAILABILITY

Monthly summarized grid point data for the period of record for all levels from 1000 through 30 mb have been retained on magnetic tape. Data available, per level, include:

- Number of observations
- Mean zonal wind component and standard deviation
- Mean meridional wind component and standard deviation
- Vector mean wind and standard deviation
- Mean temperature and standard deviation
- Mean dew point (through 300 mb) and standard deviation
- Mean geopotential height and standard deviation
- Mean density and standard deviation
- Mean scalar wind speed and percentage of observations for each designated direction

Similarly summarized data for each half-month of the 1980-85 period are also available on magnetic tape. Summaries can be provided on magnetic media or in listing form by the National Climatic Data Center.

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Shaw, D.B., P. Lonnberg, and A. Hollingsworth, 1984: The 1984 revision of the ECMWF Analysis System. ECMWF Technical Memorandum, No. 92.

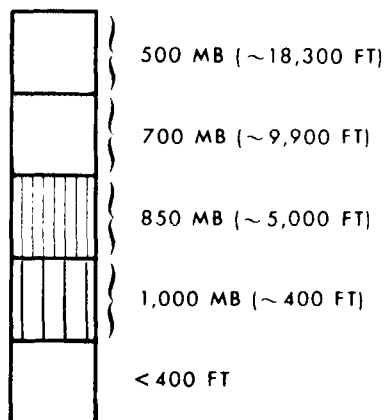
U.S. Navy, 1959: Upper Wind Statistics Charts of the Northern Hemisphere, VOL I-III, NAVAIR 50-1C-535.

U.S. Navy, 1966: Components of the 1000 mb Winds of the Northern Hemisphere, NAVAIR 50-1C-51.

PRESSURE - HEIGHT
(13 LEVELS, 1000 TO 30 MB)

- Contours of mean height (solid and dashed lines) in geopotential dekameters;
example: 580 is 5800 geopotential meters; solids labeled, dashed intermediates unlabeled
- Height labeled interval:
 - 6 dekameters (60 meters) - 1000 MB to 400 MB
 - 12 dekameters (120 meters) - 300 MB to 200 MB
 - 8 dekameters (80 meters) - 150 MB to 30 MB
- Vector mean wind in knots
- Contours blanked for geographic areas with elevations exceeding specified geopotential heights

ELEVATION SCALE



Mean Geopotential Height (dgm)

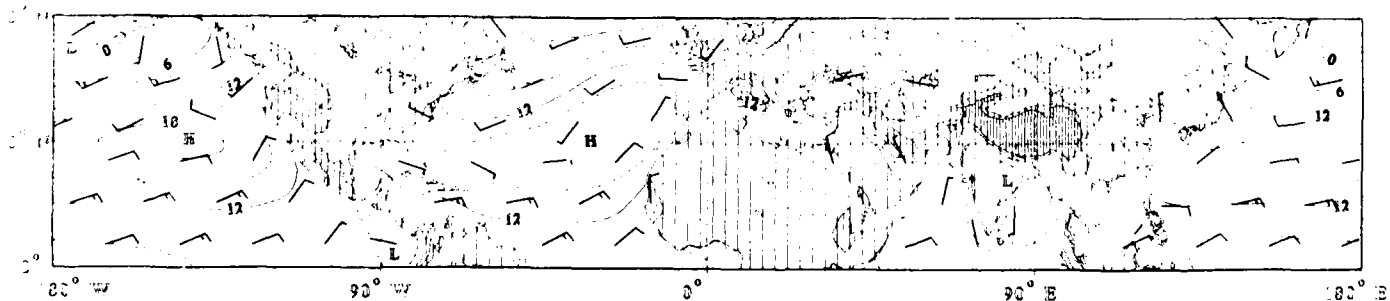
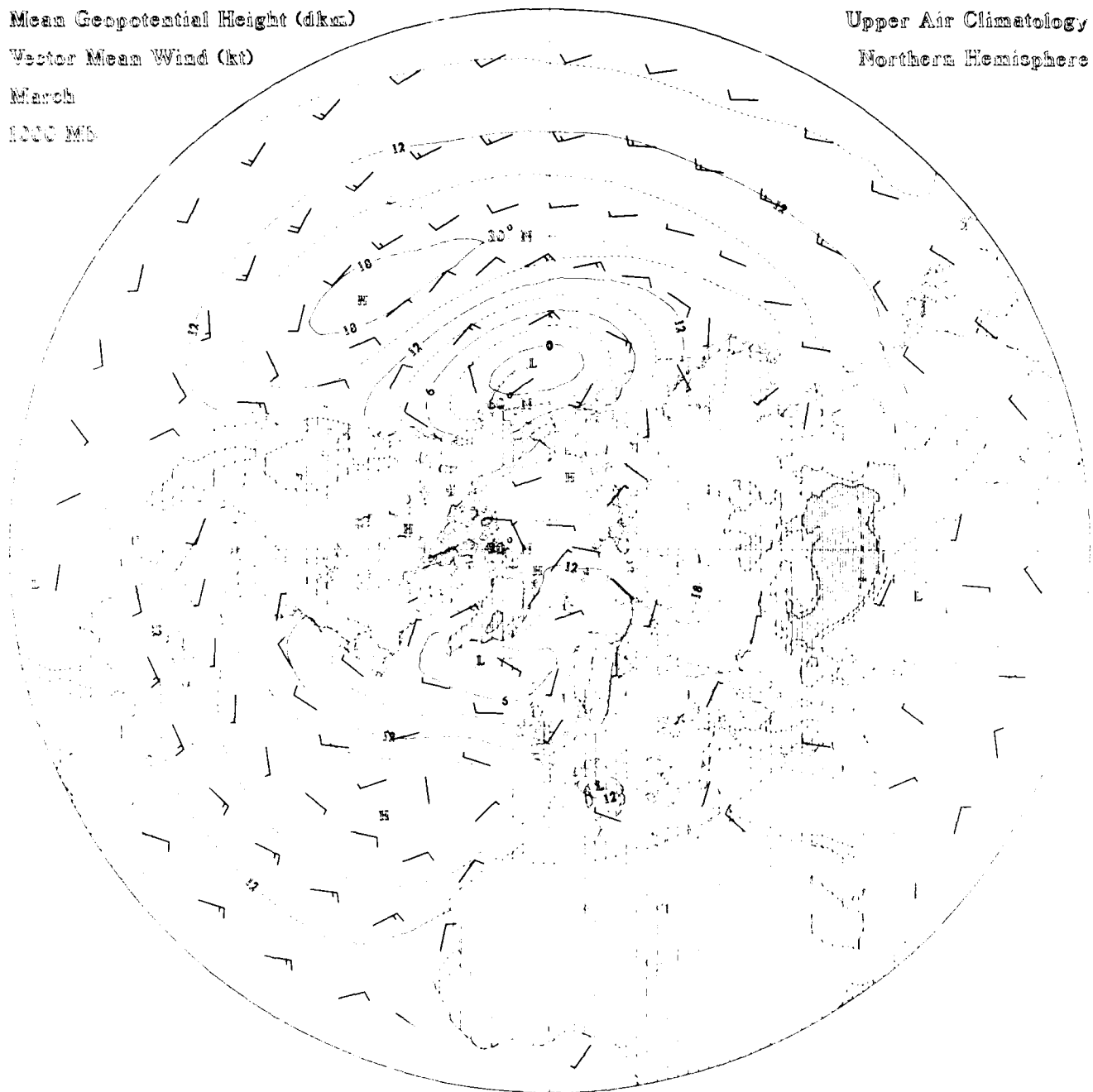
Vector Mean Wind (kt)

March

1000 MB

Upper Air Climatology

Northern Hemisphere



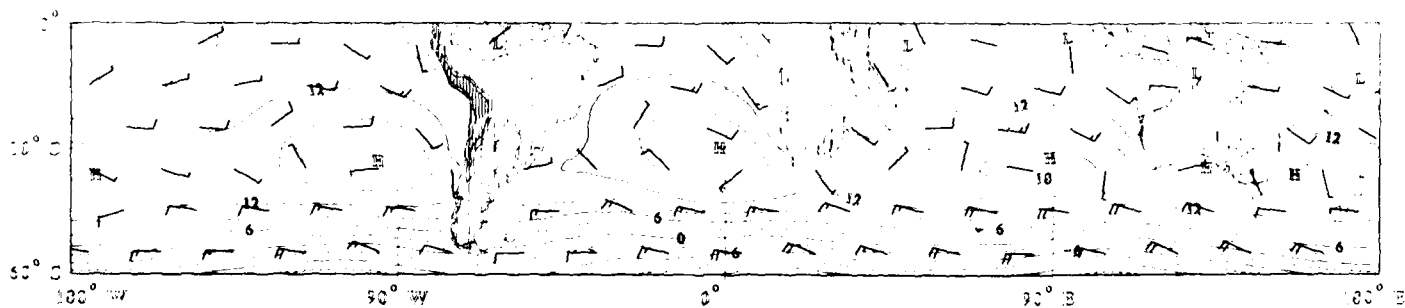
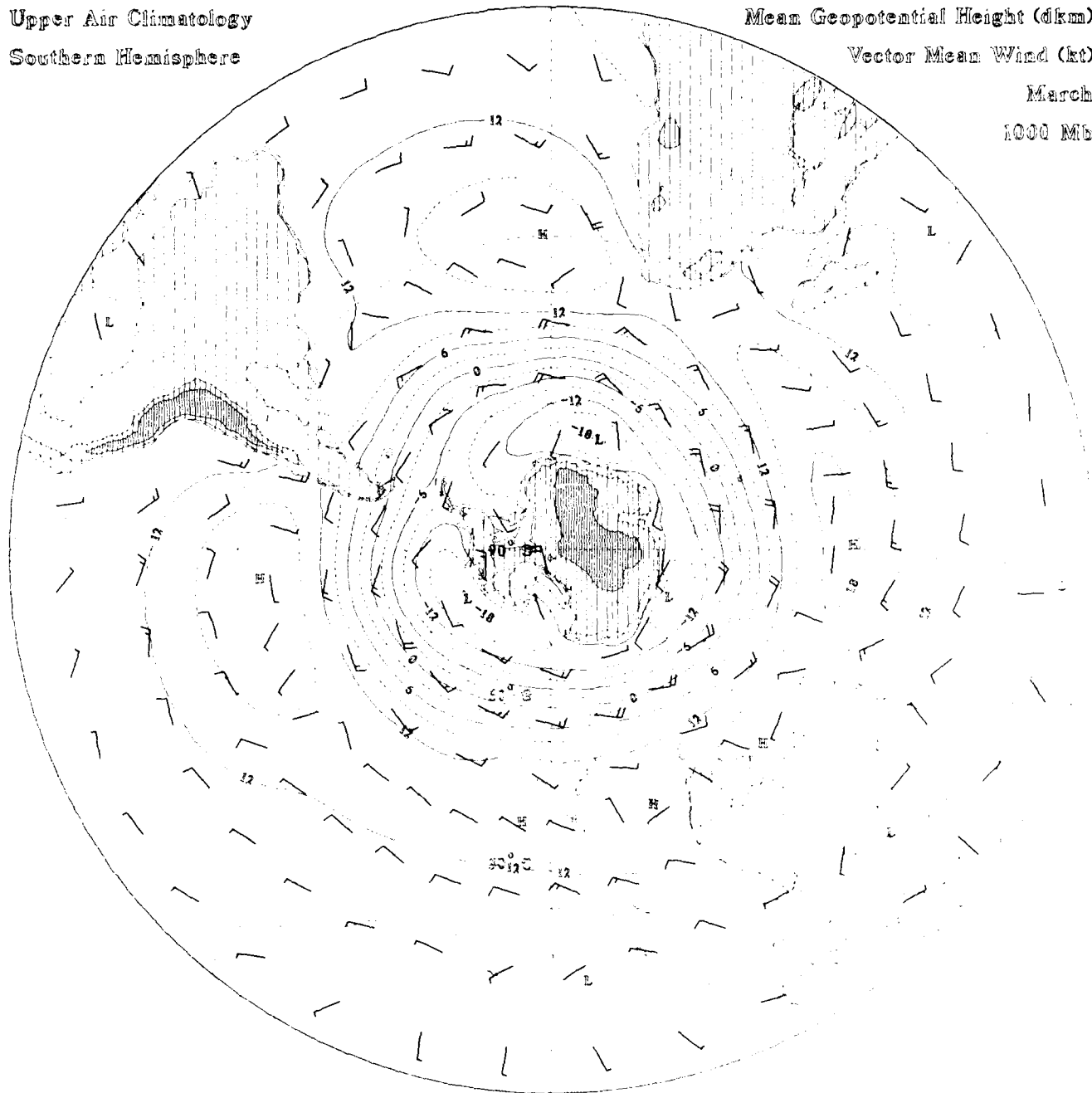
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dkm)

Vector Mean Wind (kt)

March

1000 Mb



Mean Geopotential Height (dkm)

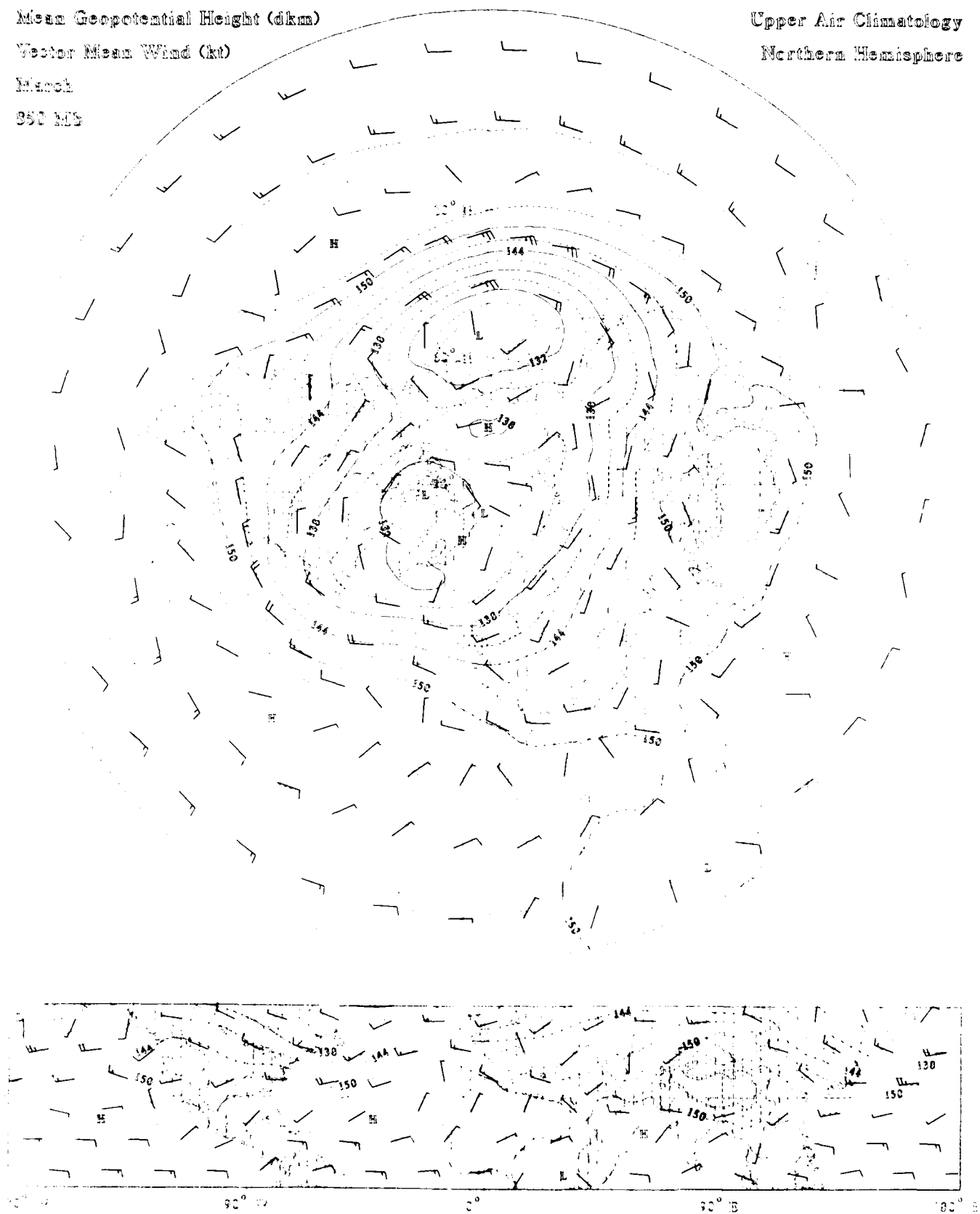
Vector Mean Wind (kt)

March

850 mb

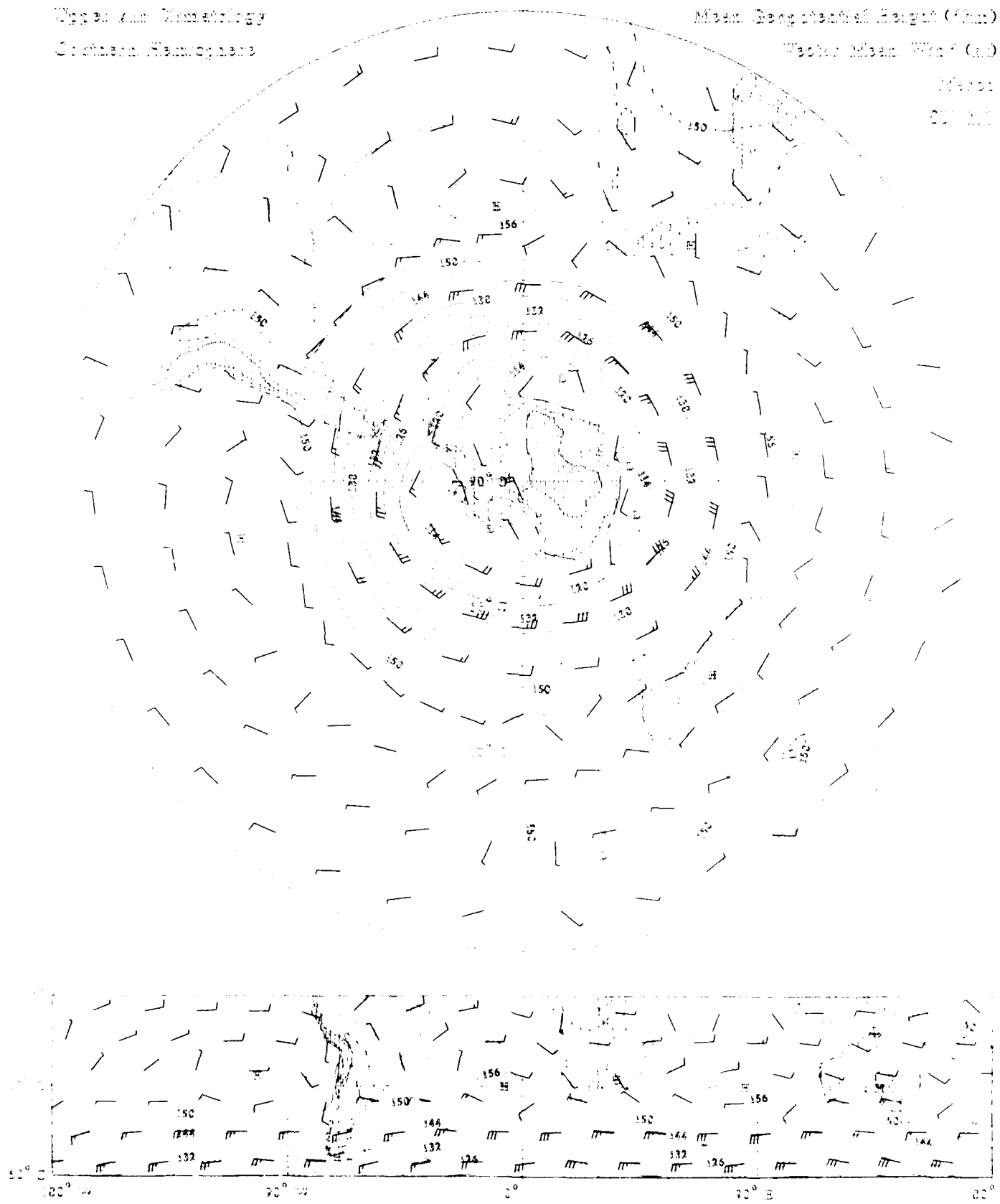
Upper Air Climatology

Northern Hemisphere



Upper Air Chartology
 Surface Hemispheric

Mean Sea Level Height (ftm)
 Vector Mean Wind (kt)
 Month:
 Day:



Mean Geopotential Height (dkm)

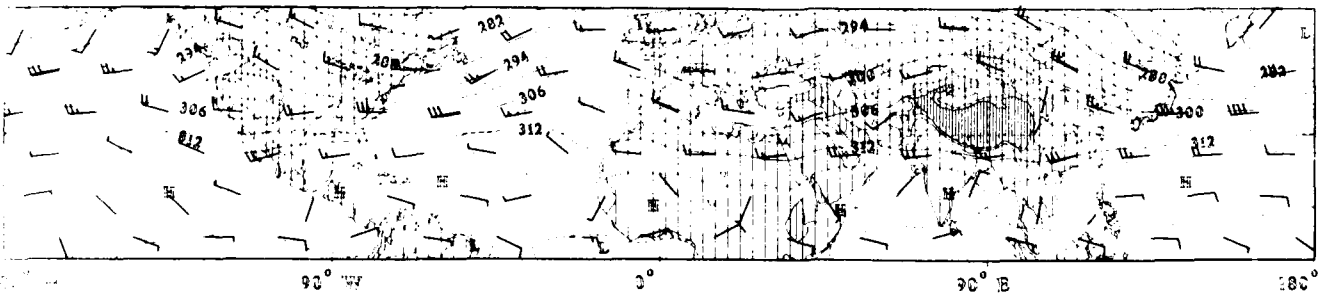
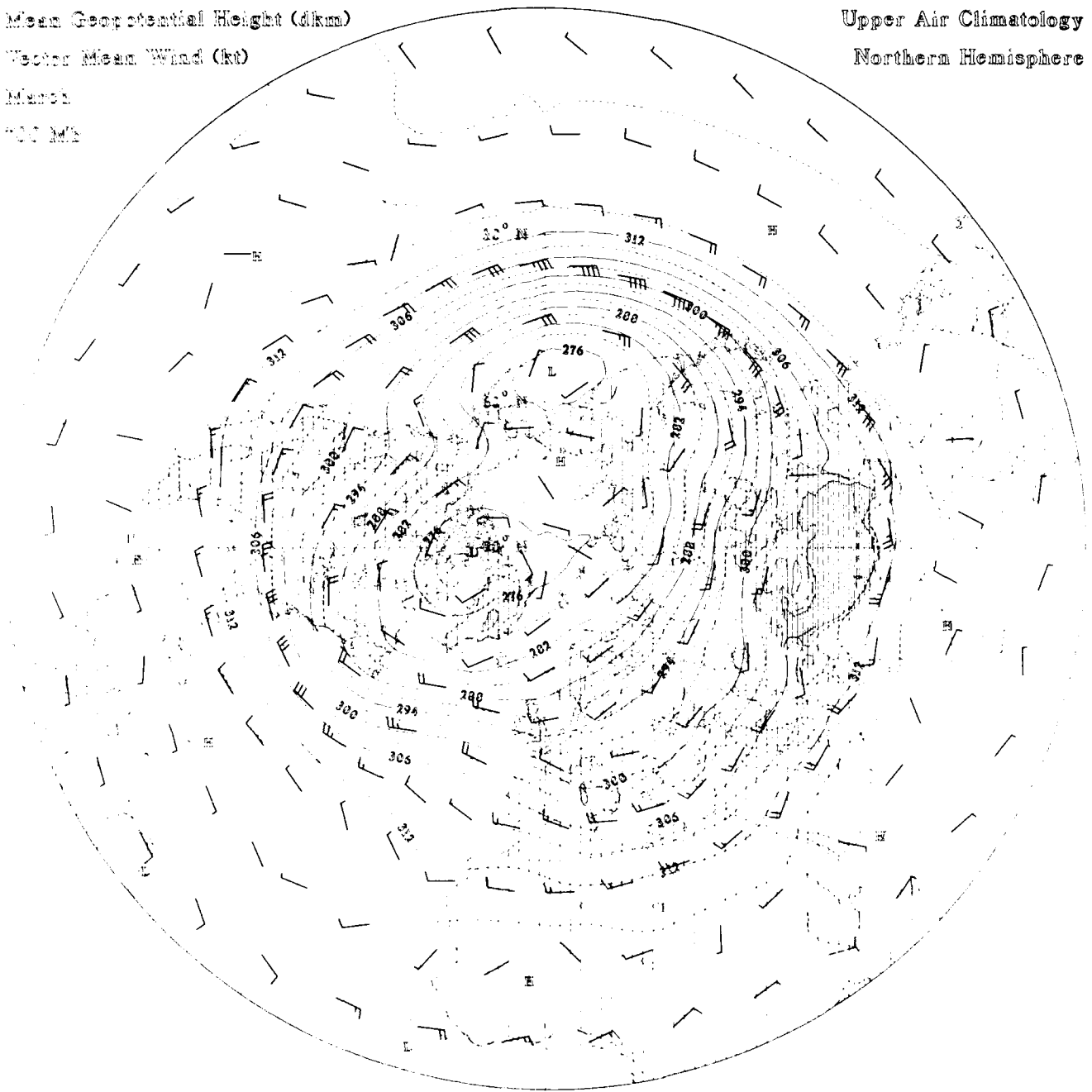
Vector Mean Wind (kt)

March

700 mb

Upper Air Climatology

Northern Hemisphere



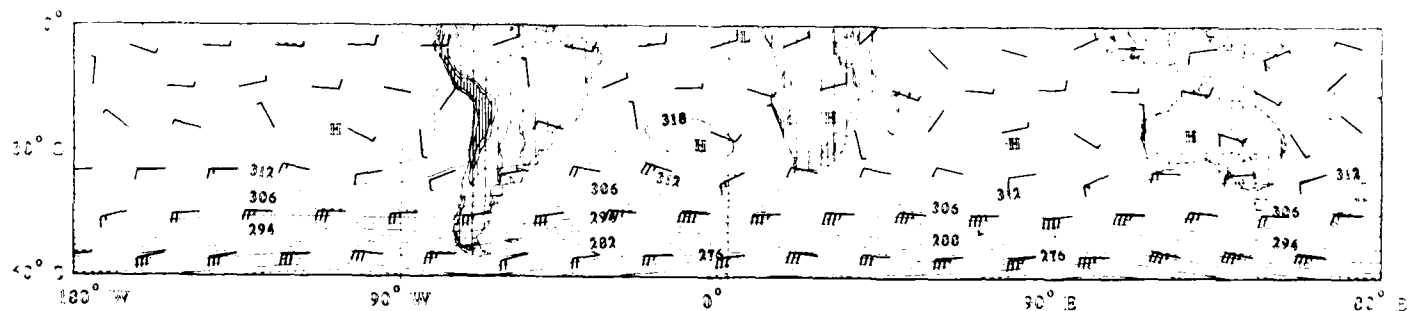
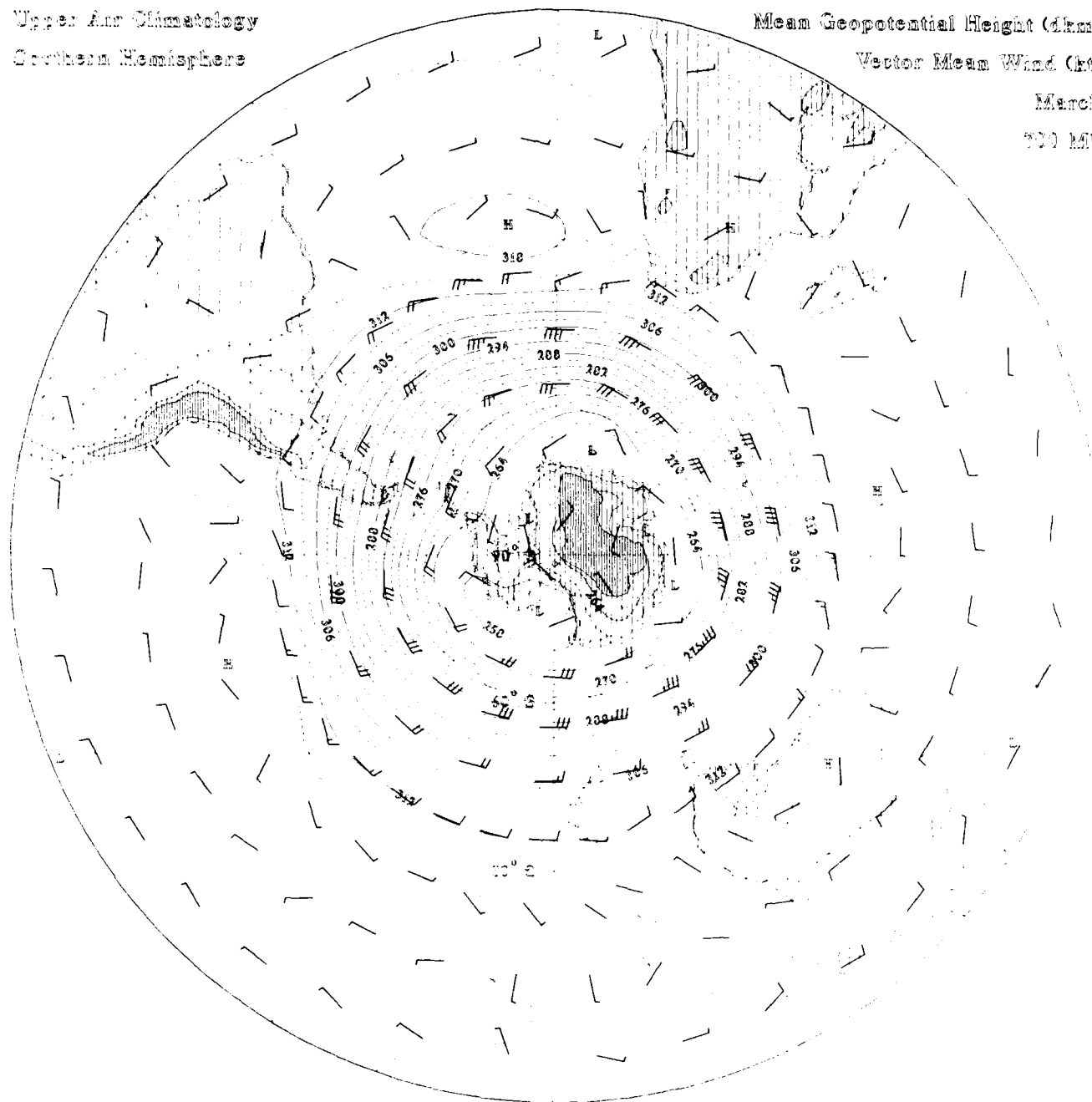
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (d.km)

Vector Mean Wind (kt)

March

700 mb



Mean Geopotential Height (dkm)

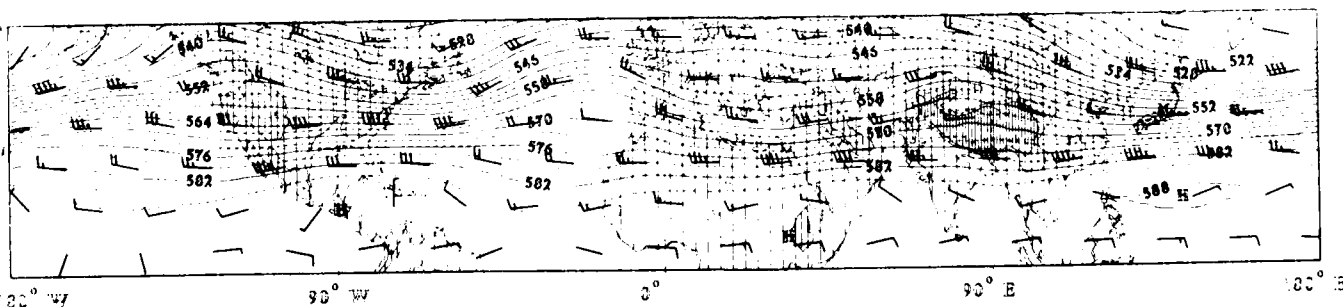
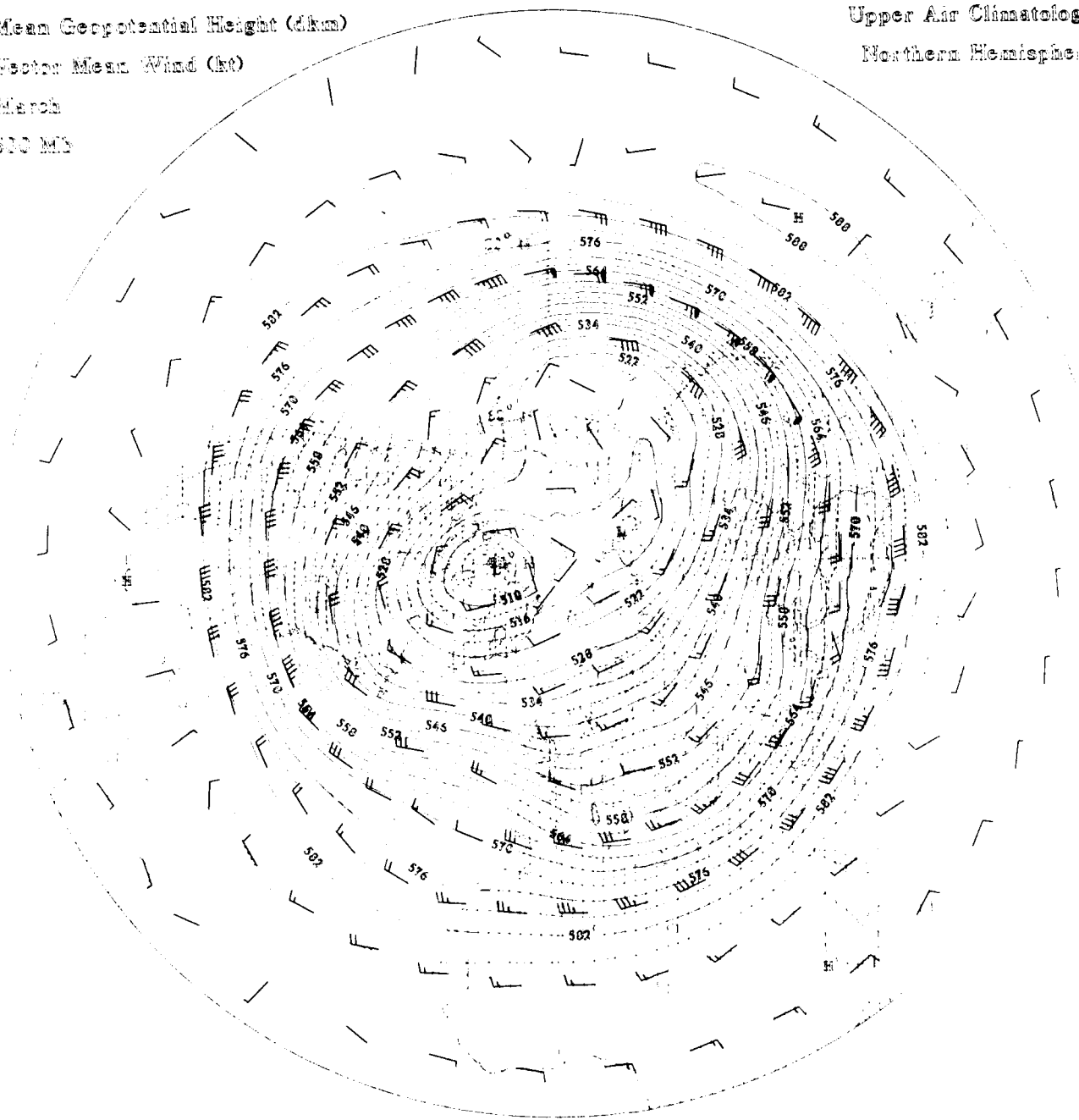
Vector Mean Wind (kt)

March

500 MB

Upper Air Climatology

Northern Hemisphere



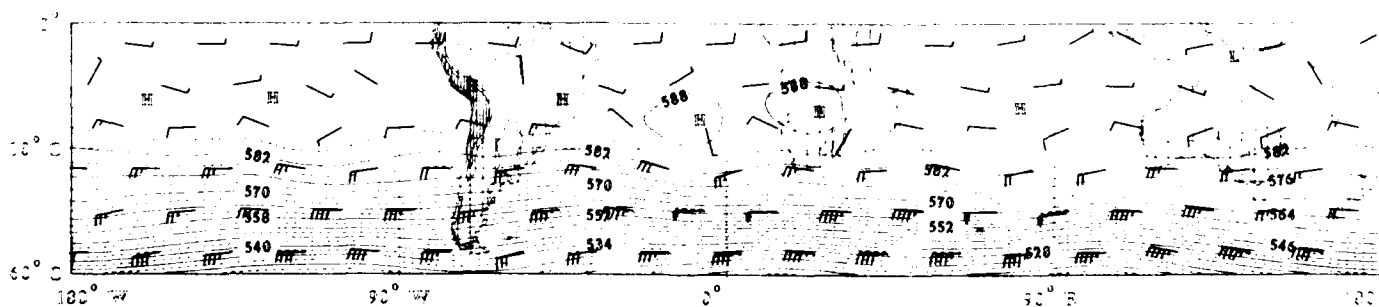
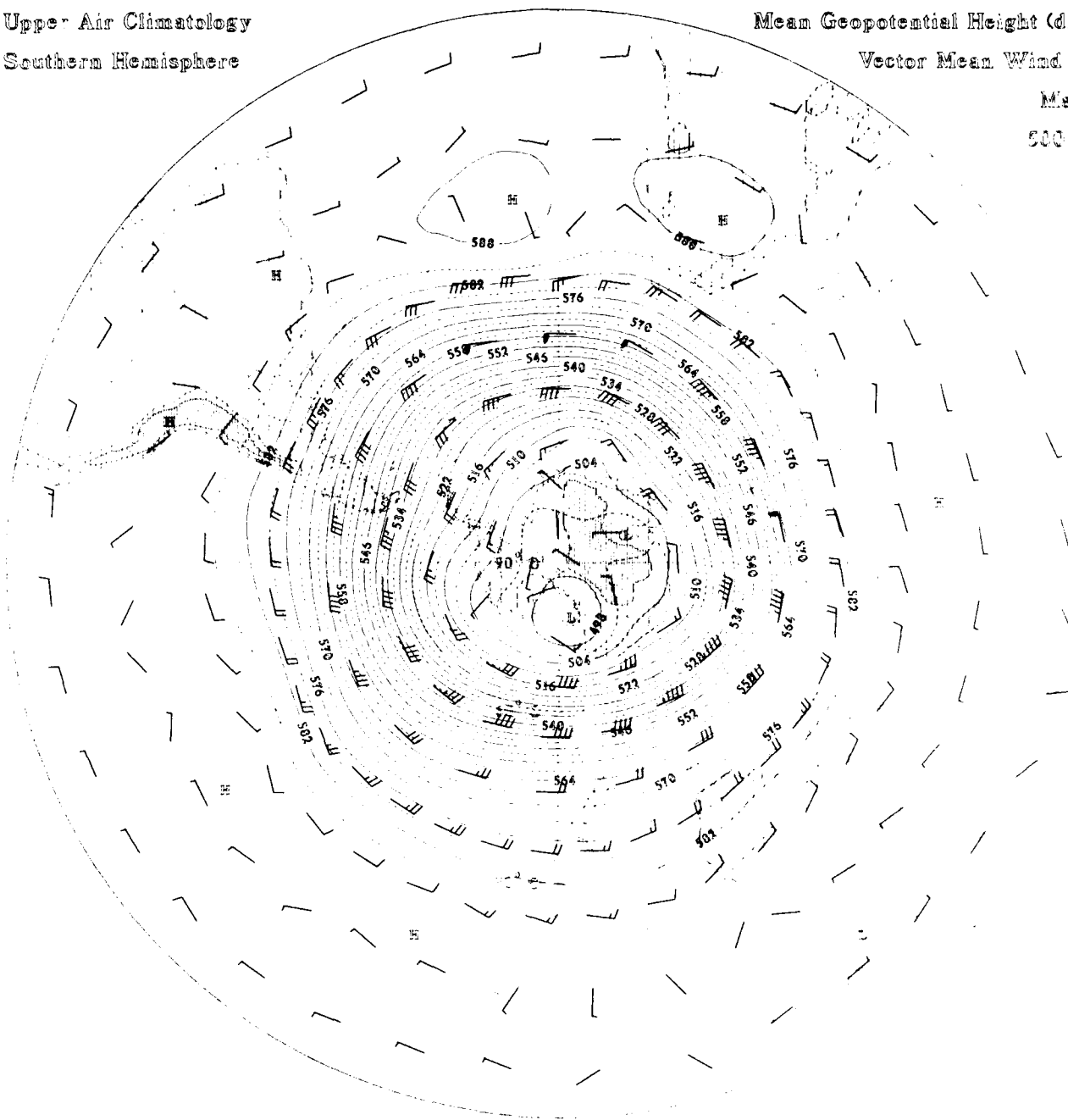
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dkm)

Vector Mean Wind (kt)

March

500 MB



Mean Geopotential Height (dkm)

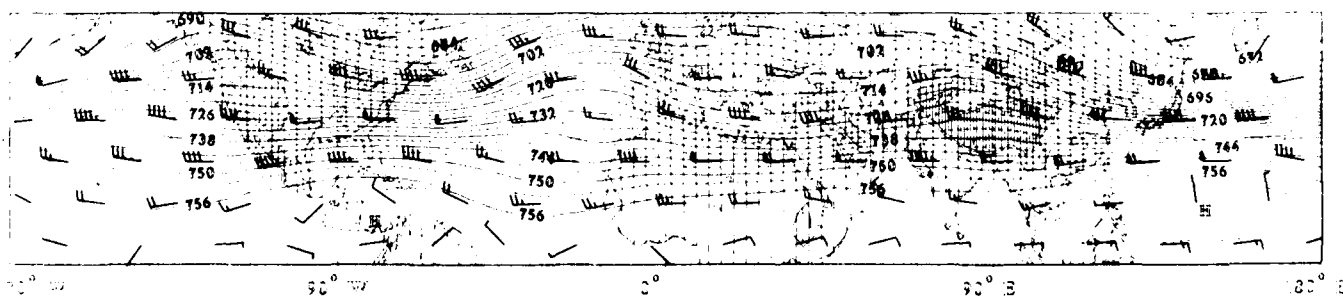
Vector Mean Wind (kt)

March

4:00 MS

Upper Air Climatology

Northern Hemisphere



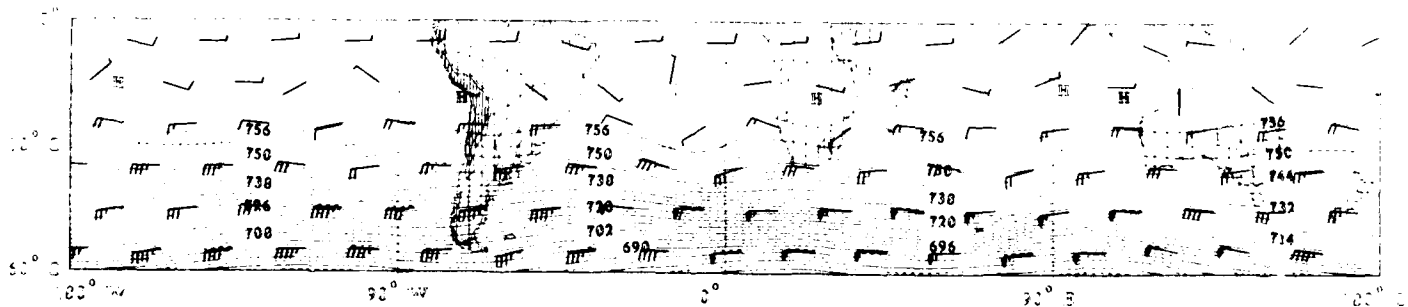
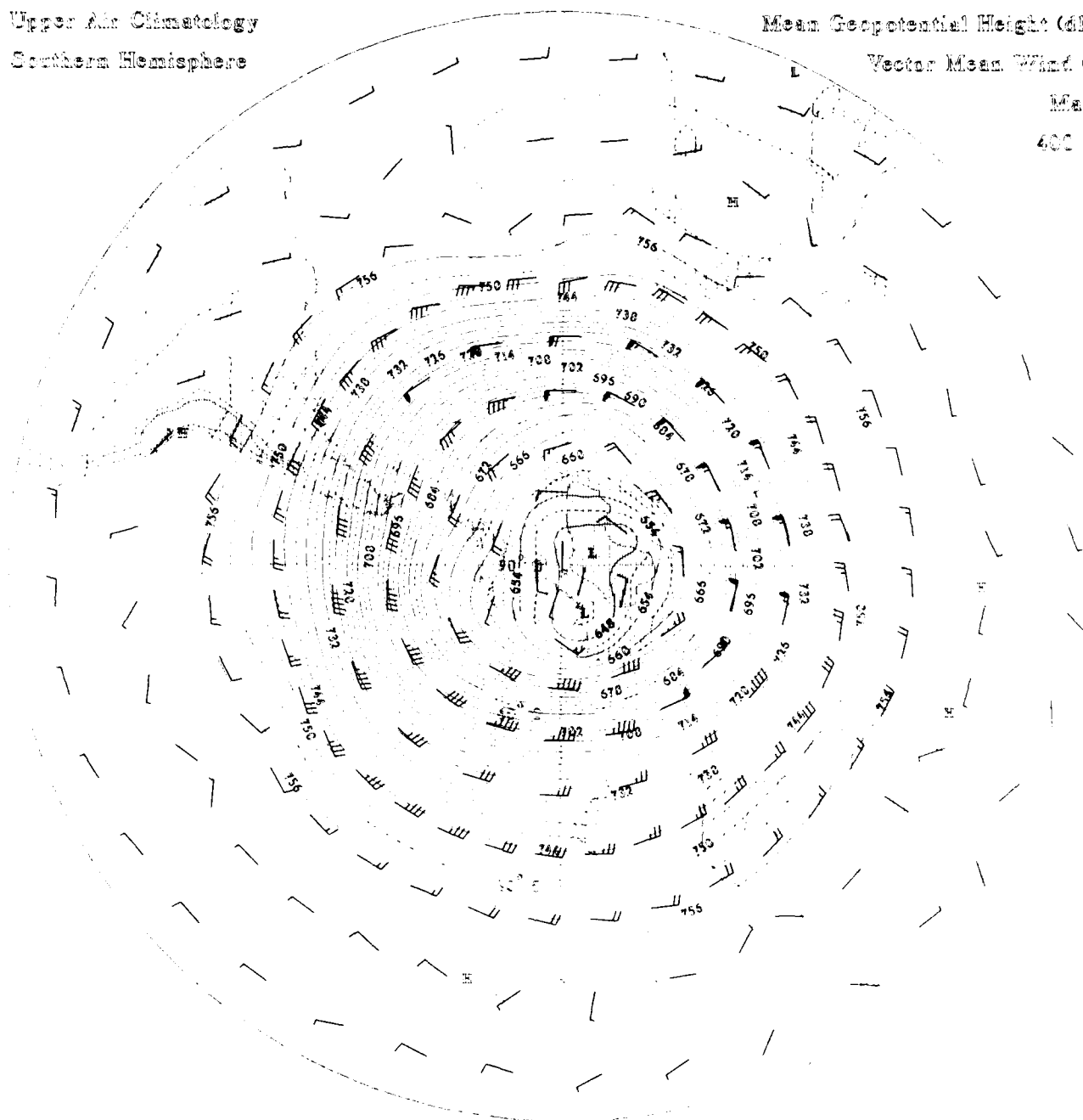
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dkm)

Vector Mean Wind (kt)

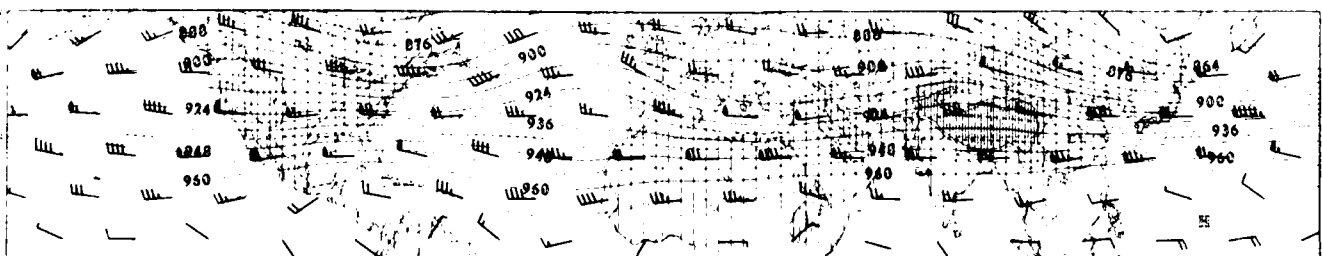
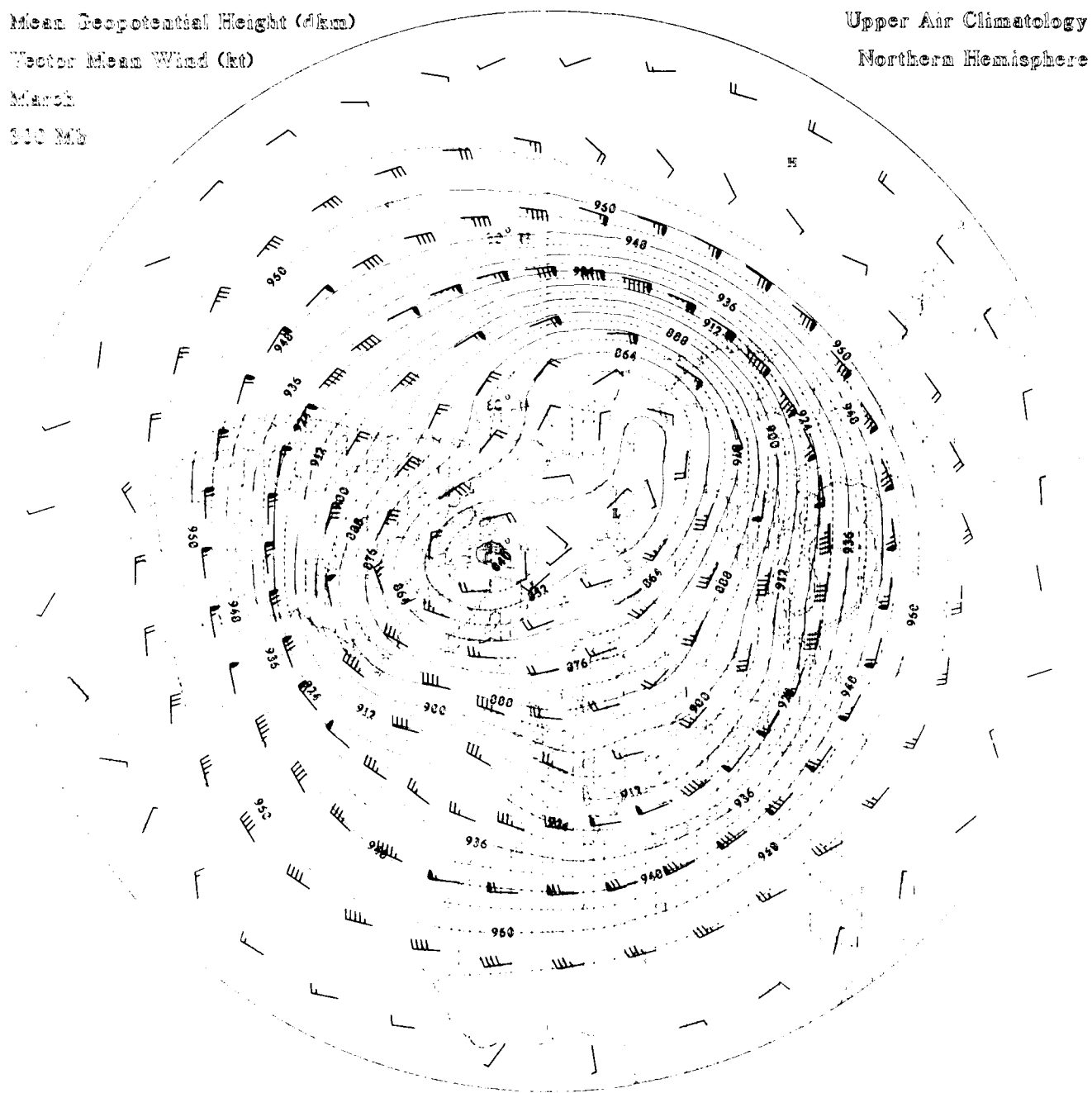
March

400 mb



310 MB

Northern Hemisphere

[illegible]

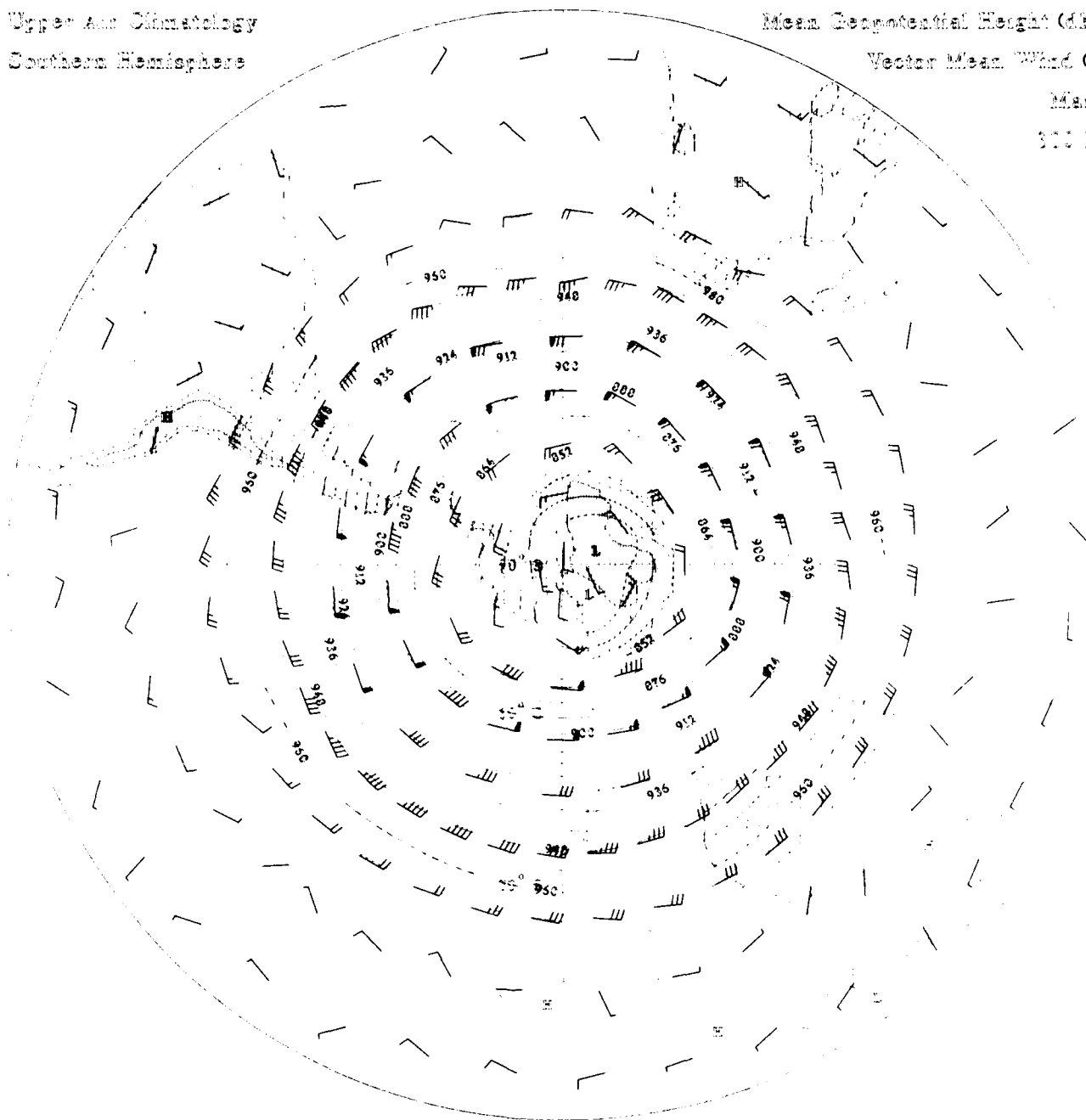
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dm)

Vector Mean Wind (m)

March

1950-1959



Mean Geopotential Height (gkm)

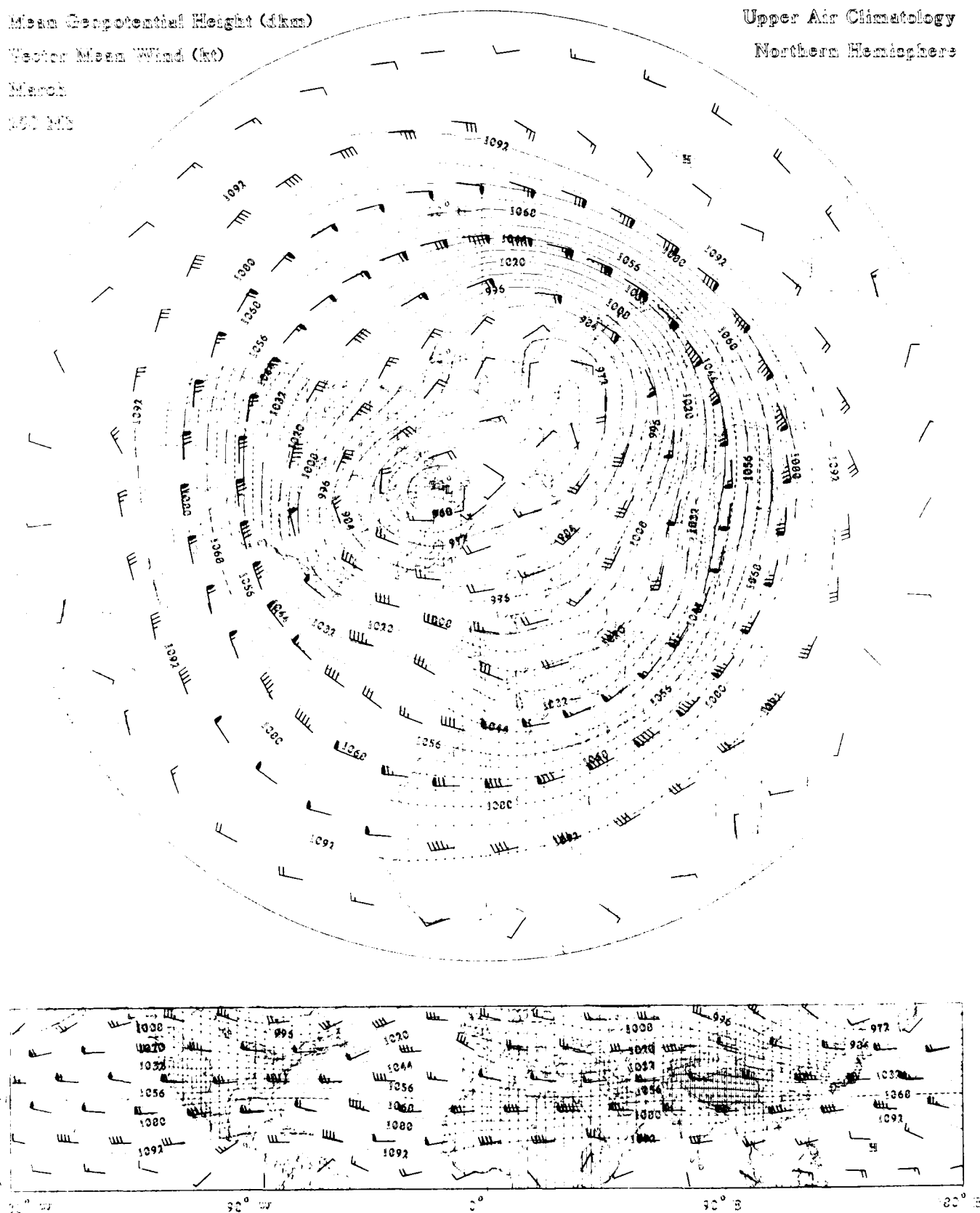
Vector Mean Wind (m)

March

1951-1952

Upper Air Climatology

Northern Hemisphere



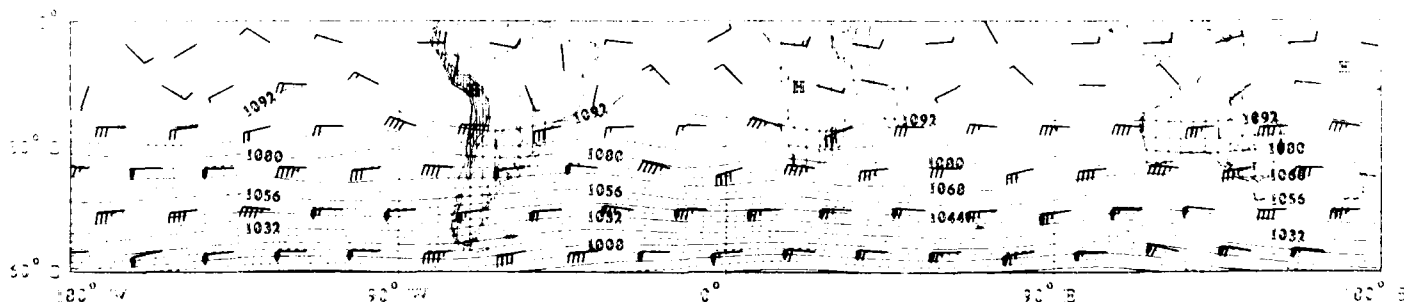
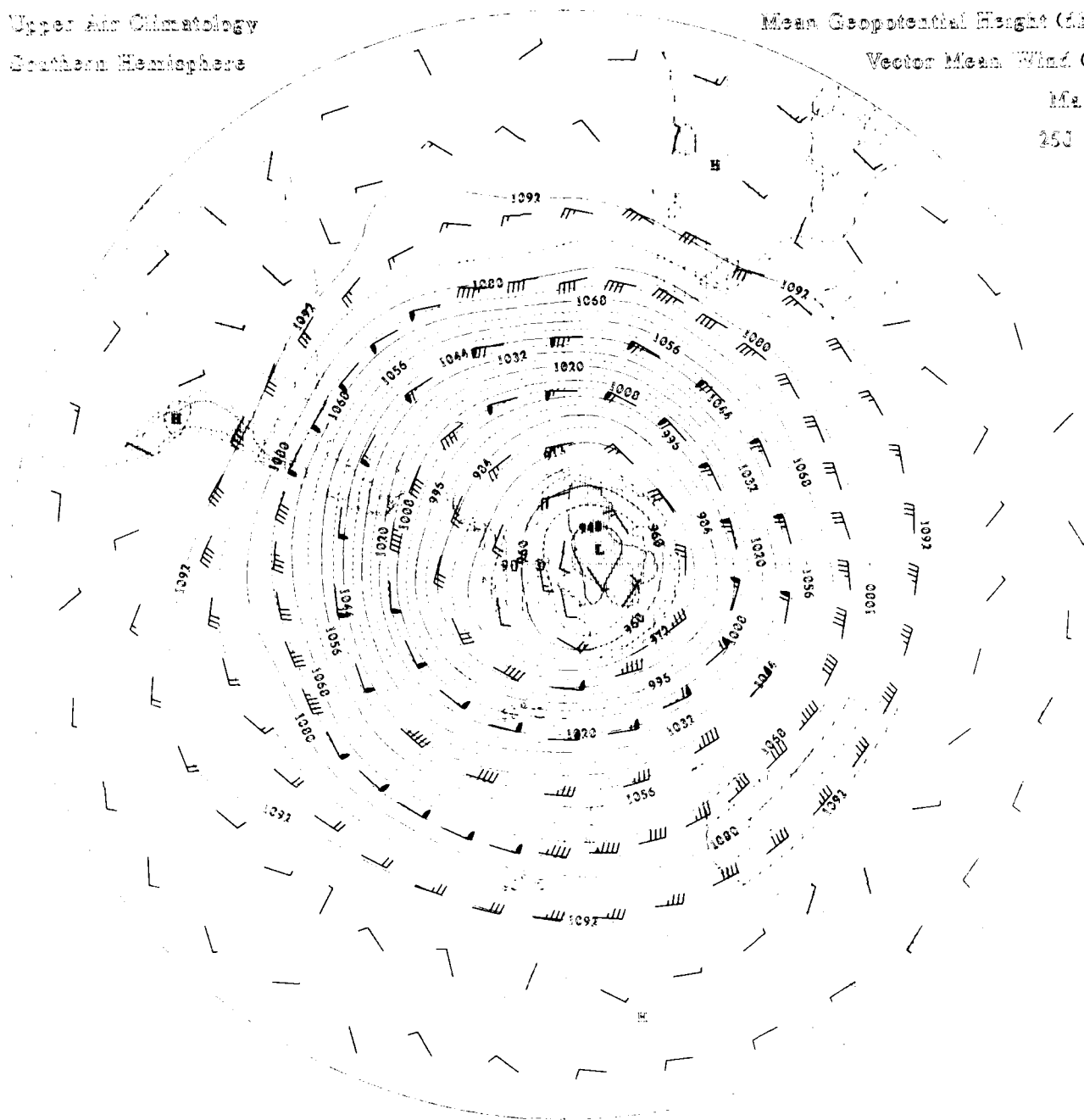
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dam)

Vector Mean Wind (m/s)

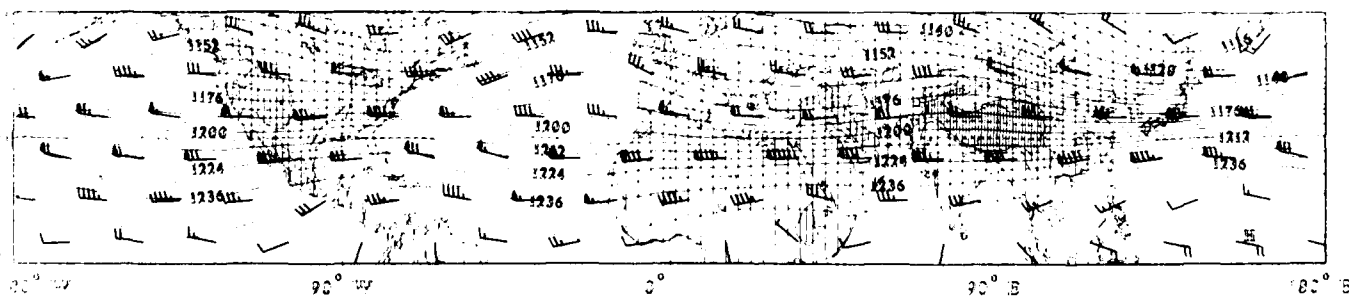
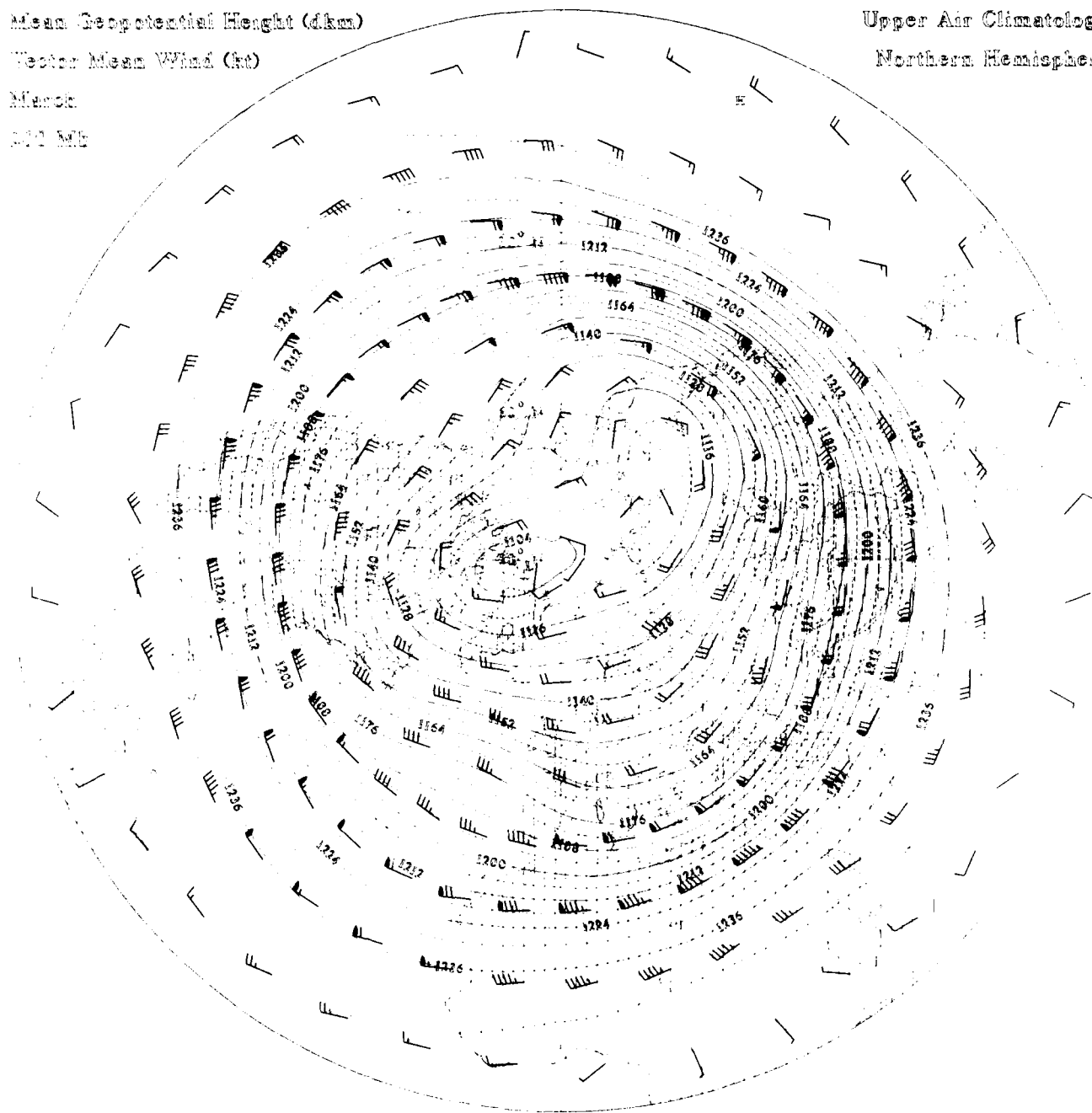
March

250 MB



Mean Geopotential Height (dkm)
 Vector Mean Wind (kt)
 March
 000 ME

Upper Air Climatology
 Northern Hemisphere



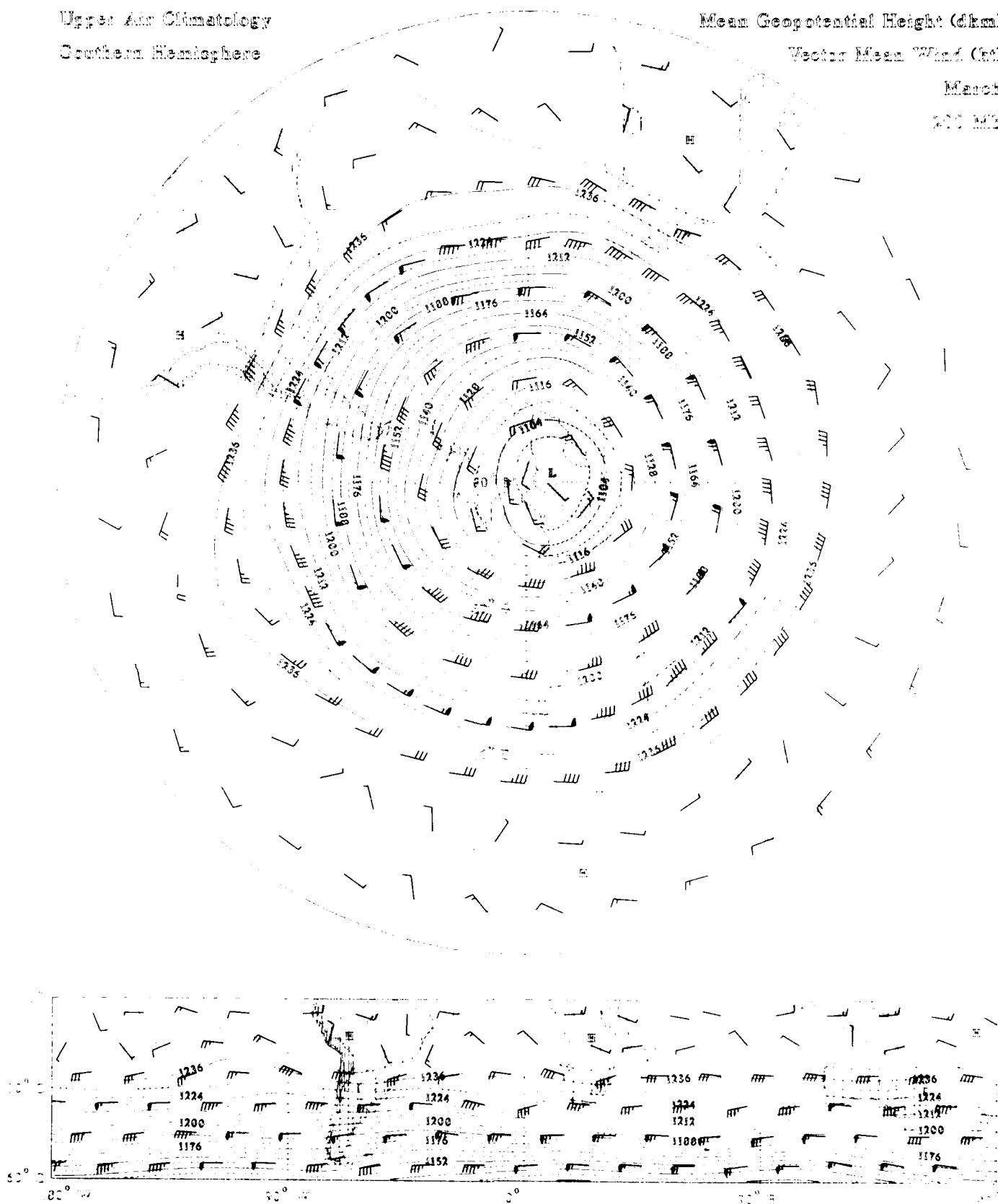
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dkm)

Vector Mean Wind (kt)

March

200 mb



Mean Sea Level Height (dkm)

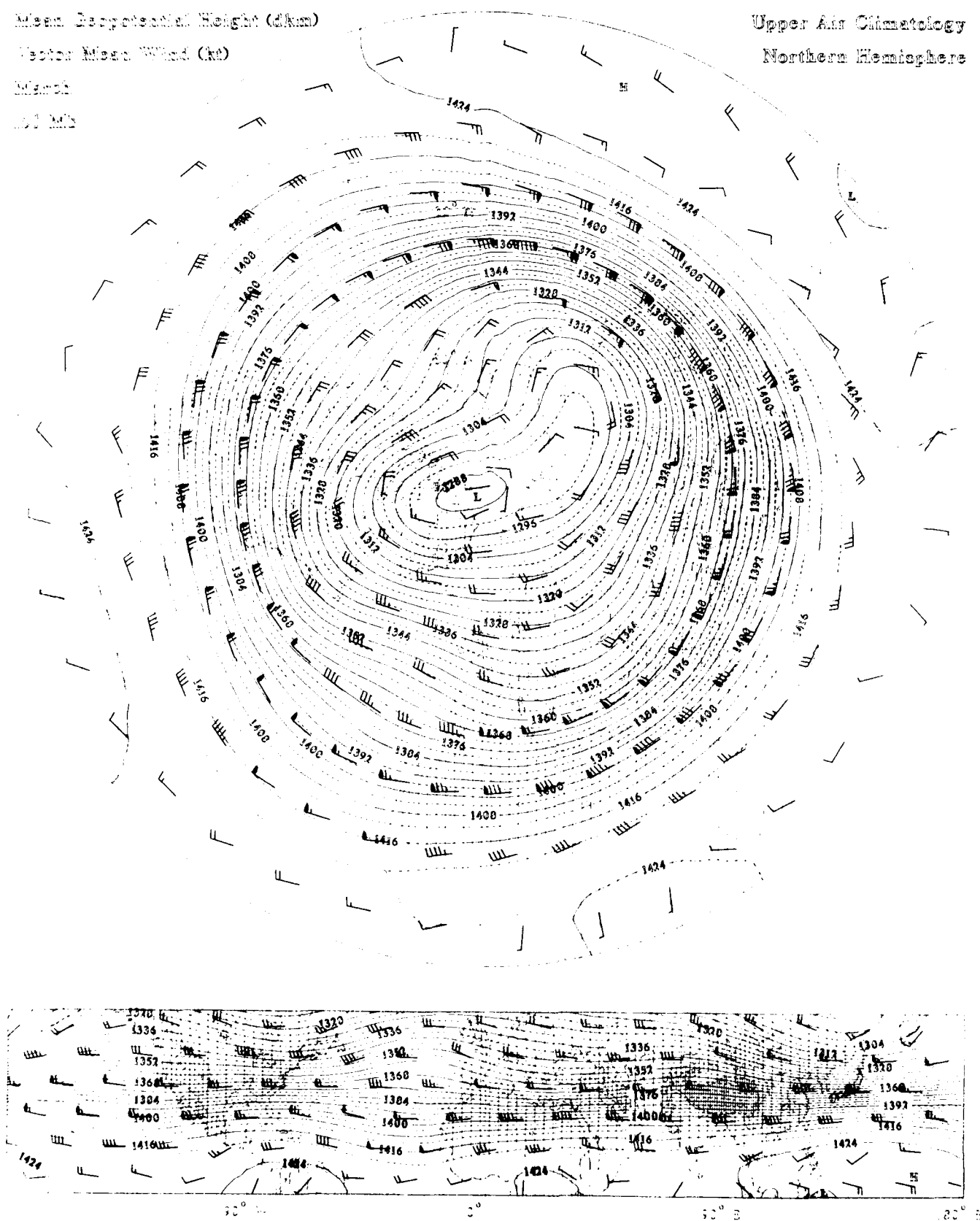
Vector Mean Wind (kt)

March

1971

Upper Air Climatology

Northern Hemisphere



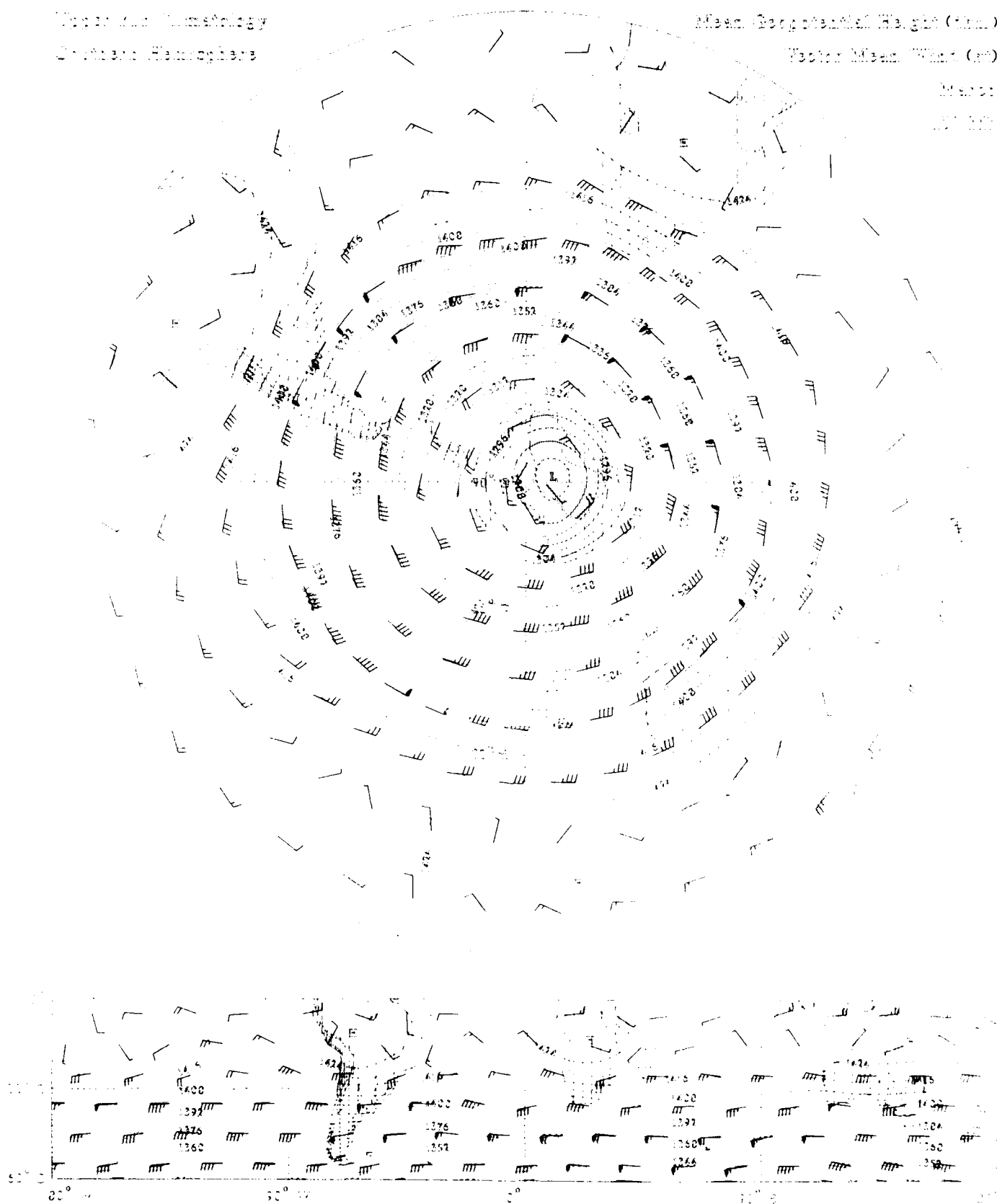
Wind and Temperature
 Southern Hemisphere

Mean Sea Level Height (mm)

Vector Mean Wind (m/s)

Map:

1:1000



Mean Geopotential Height (dkm)

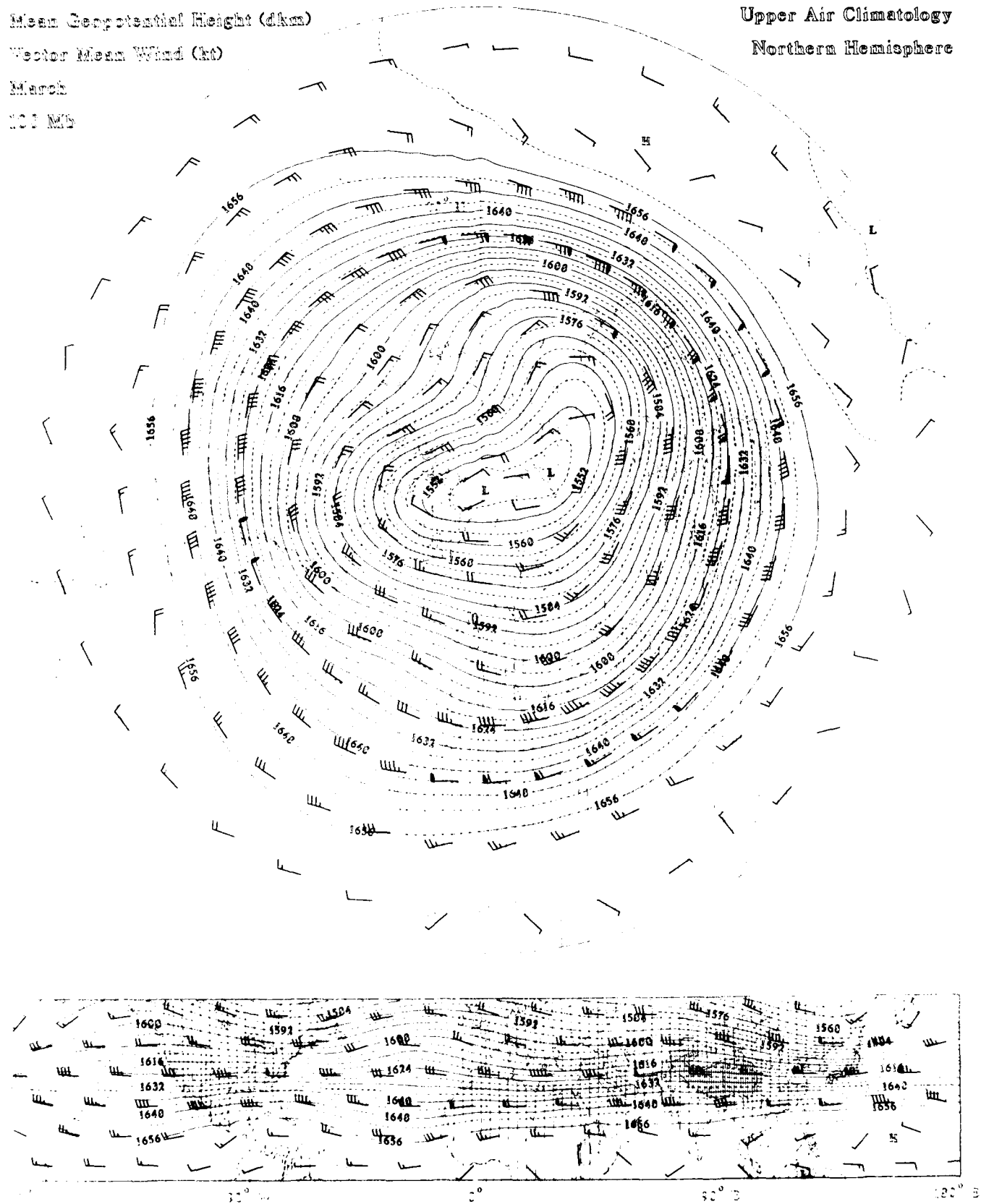
Vector Mean Wind (kt)

March

101 MB

Upper Air Climatology

Northern Hemisphere



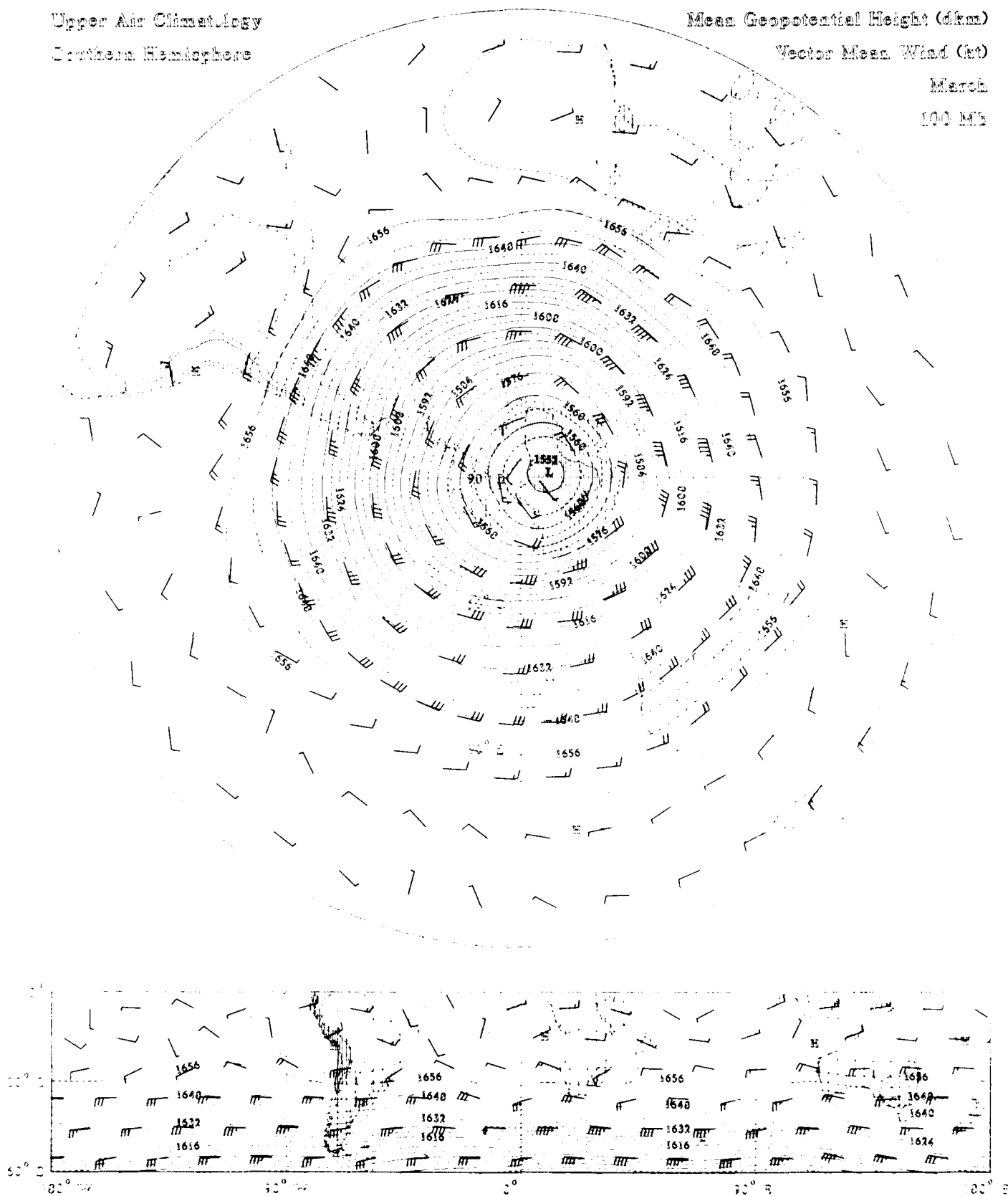
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dkm)

Vector Mean Wind (kt)

March

100 mb



Mean Geopotential Height (dkm)

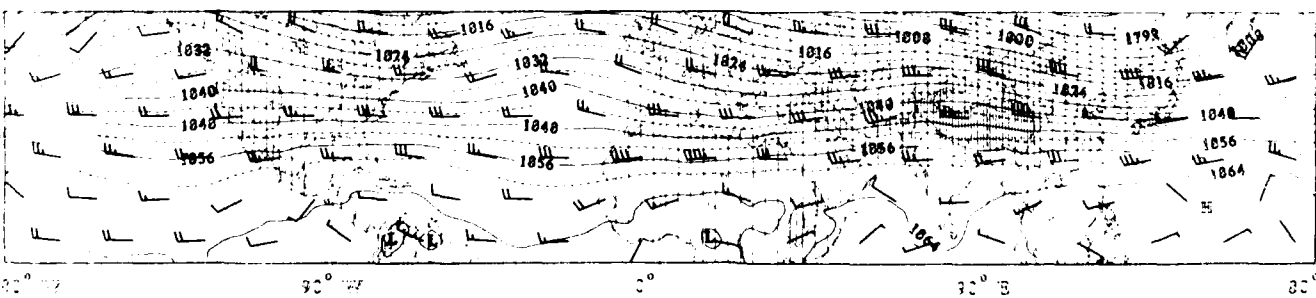
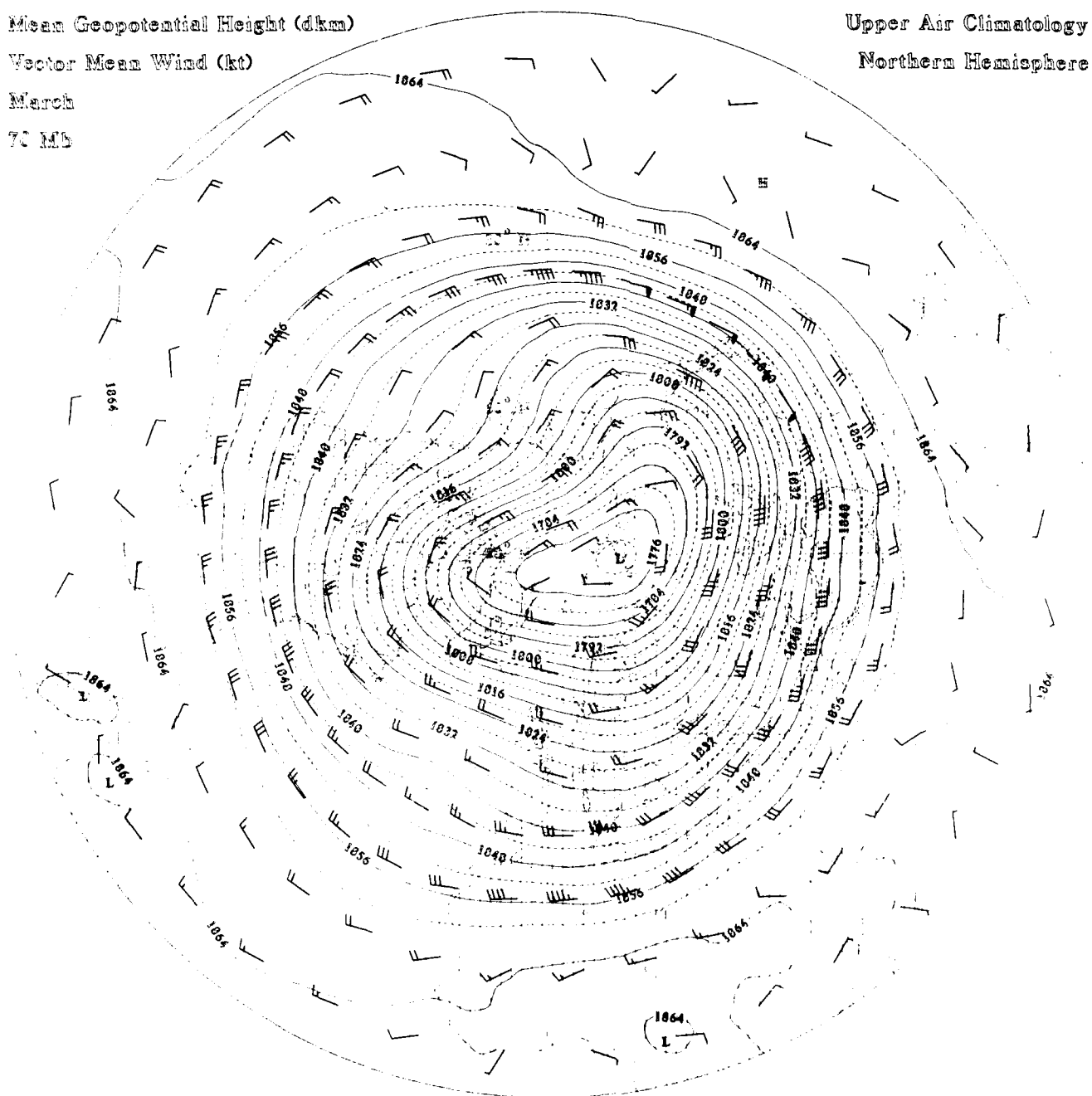
Vector Mean Wind (kt)

March

70 MB

Upper Air Climatology

Northern Hemisphere



70 MS



Mean Geopotential Height (dkm)

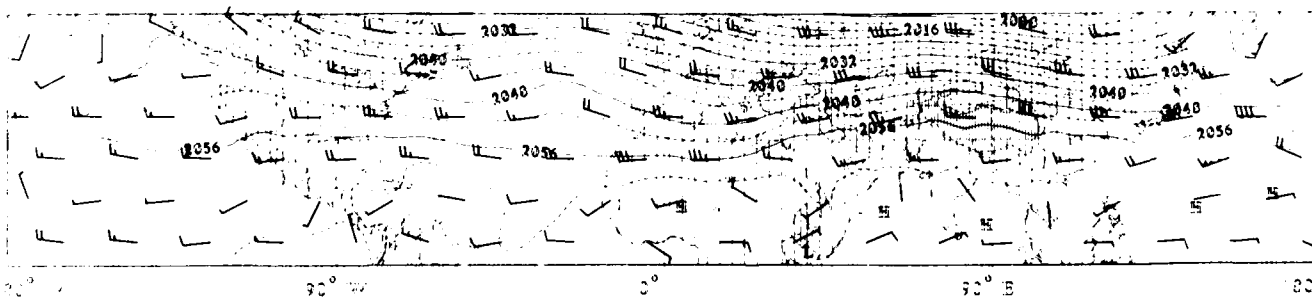
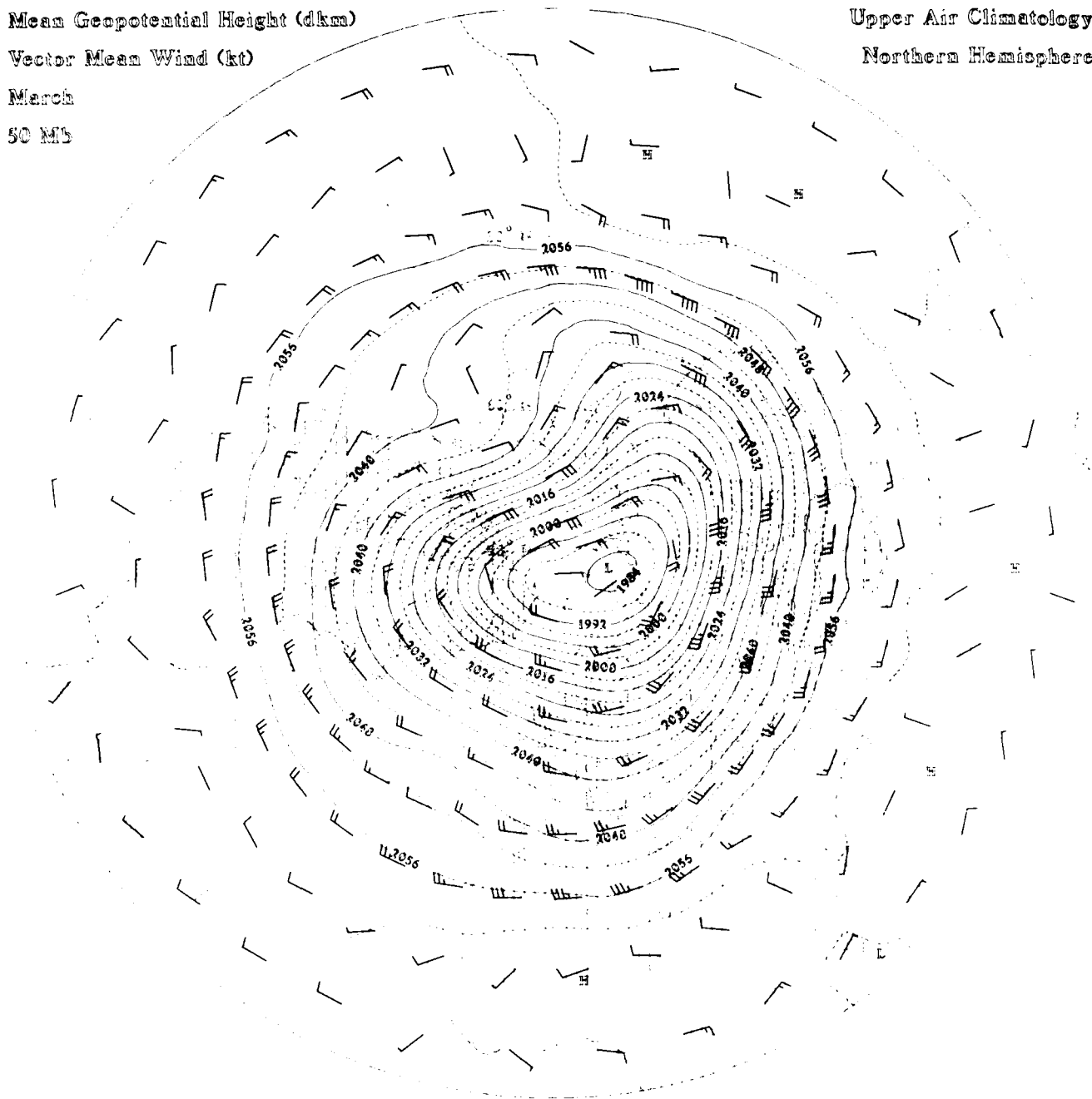
Vector Mean Wind (kt)

March

50 MB

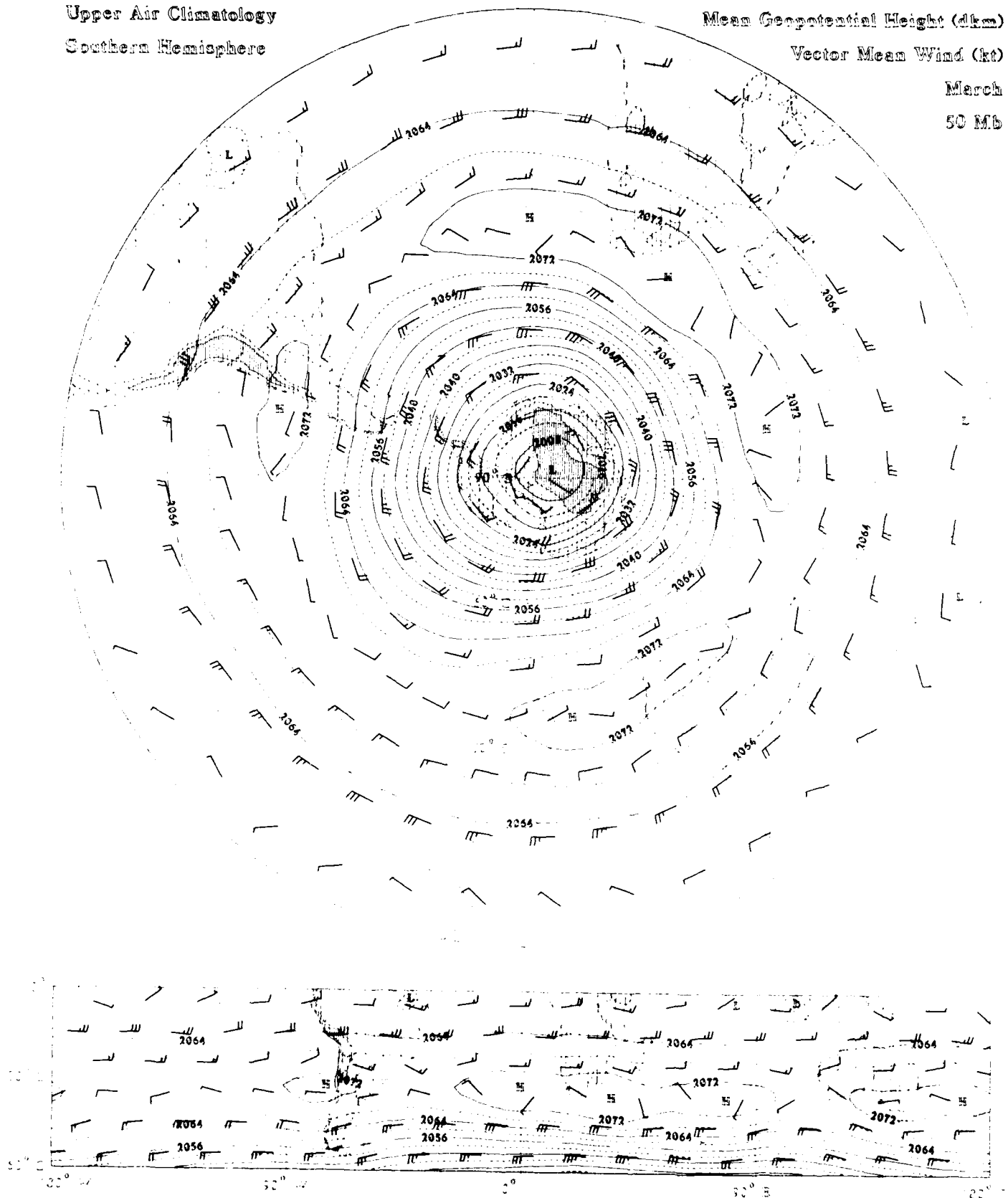
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dkm)
Vector Mean Wind (kt)
March
50 Mb



Mean Geopotential Height (dam)

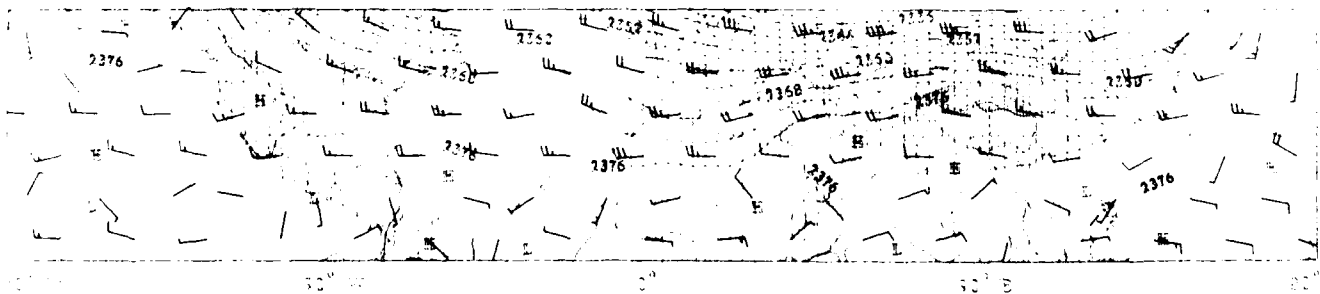
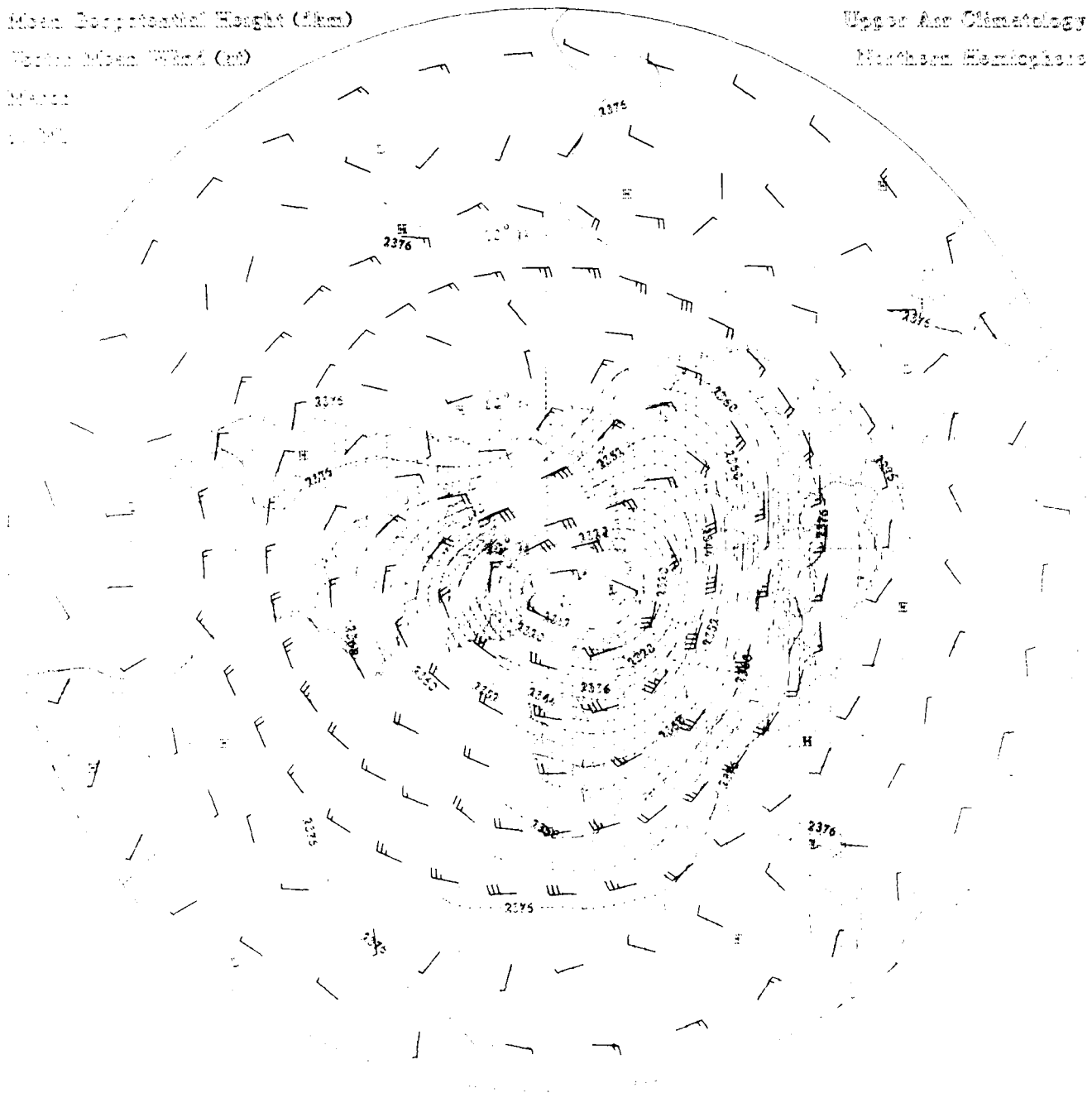
Mean Wind (m/s)

Date:

Time:

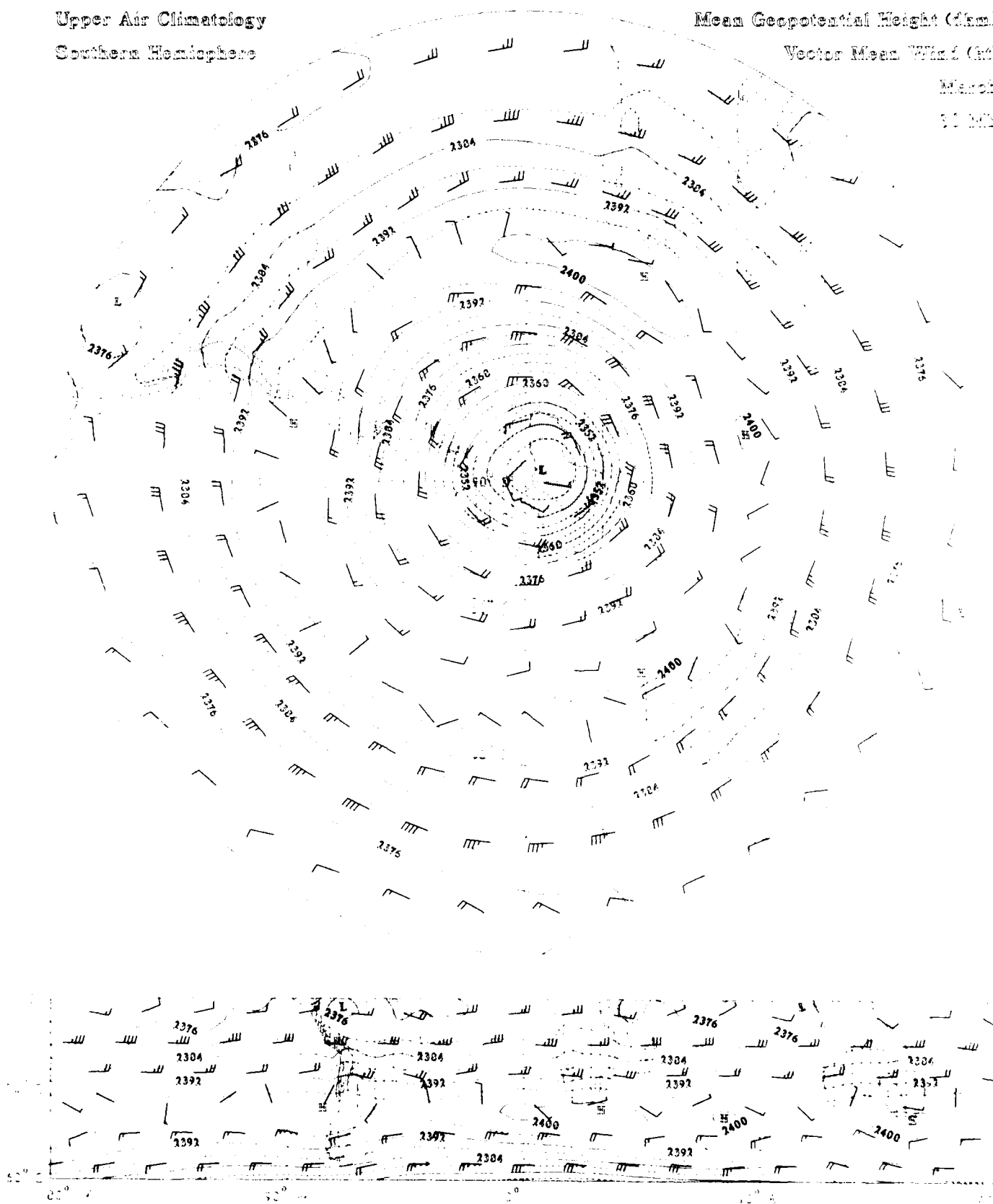
Upper Air Climatology

Northern Hemisphere



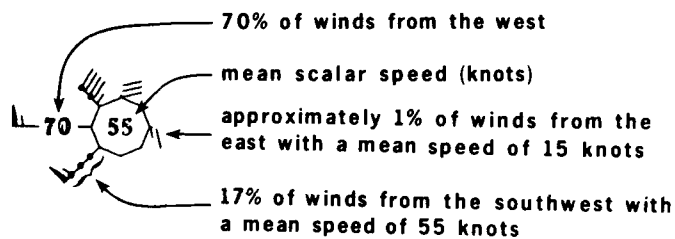
Upper Air Climatology
Southern Hemisphere

Mean Geopotential Height (dam)
Vector Mean Wind (m/s)
March
1960

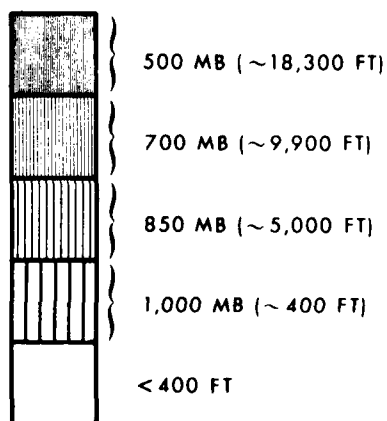


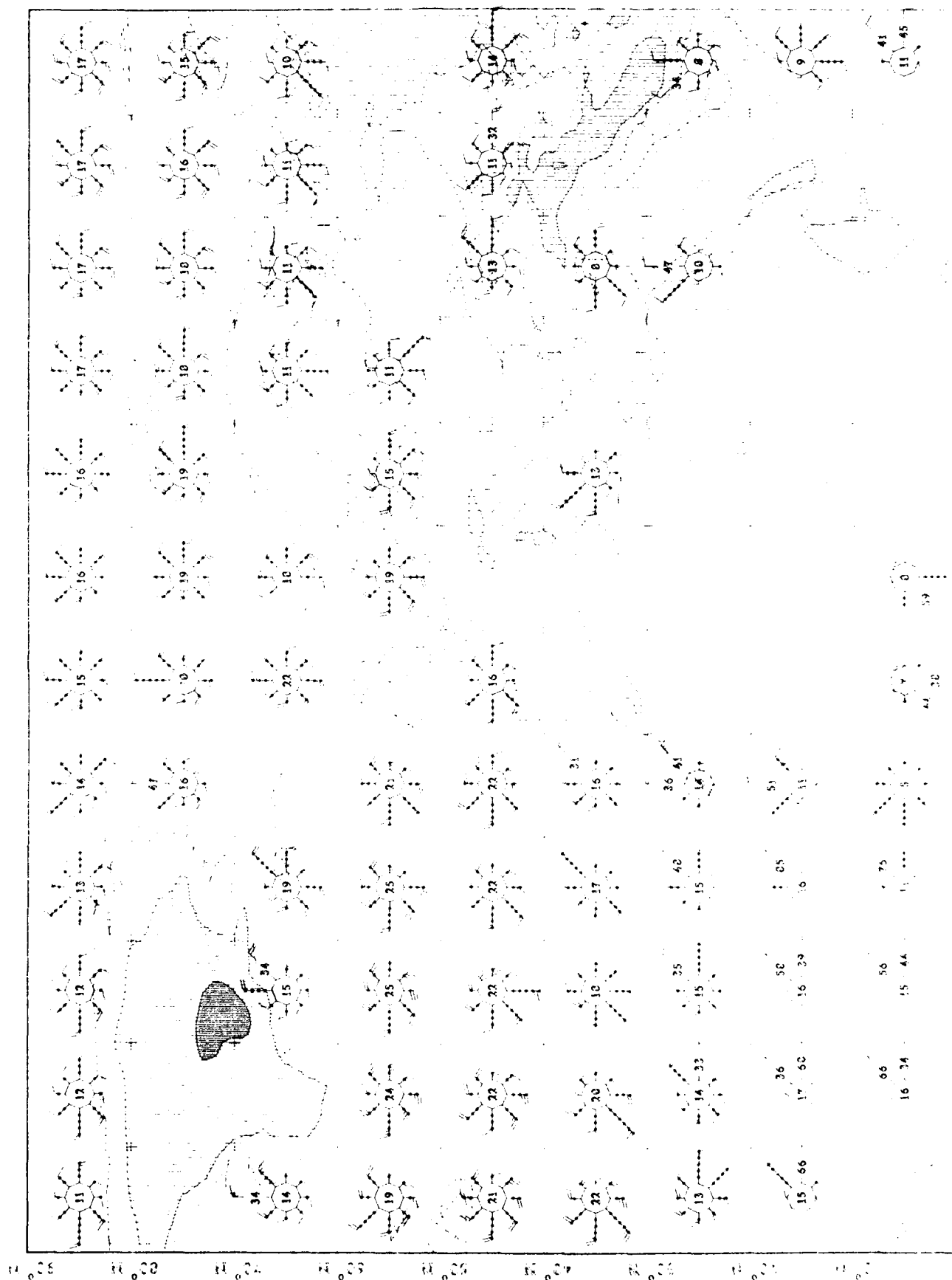
WIND ROSES **(13 LEVELS, 1000 TO 30 MB)**

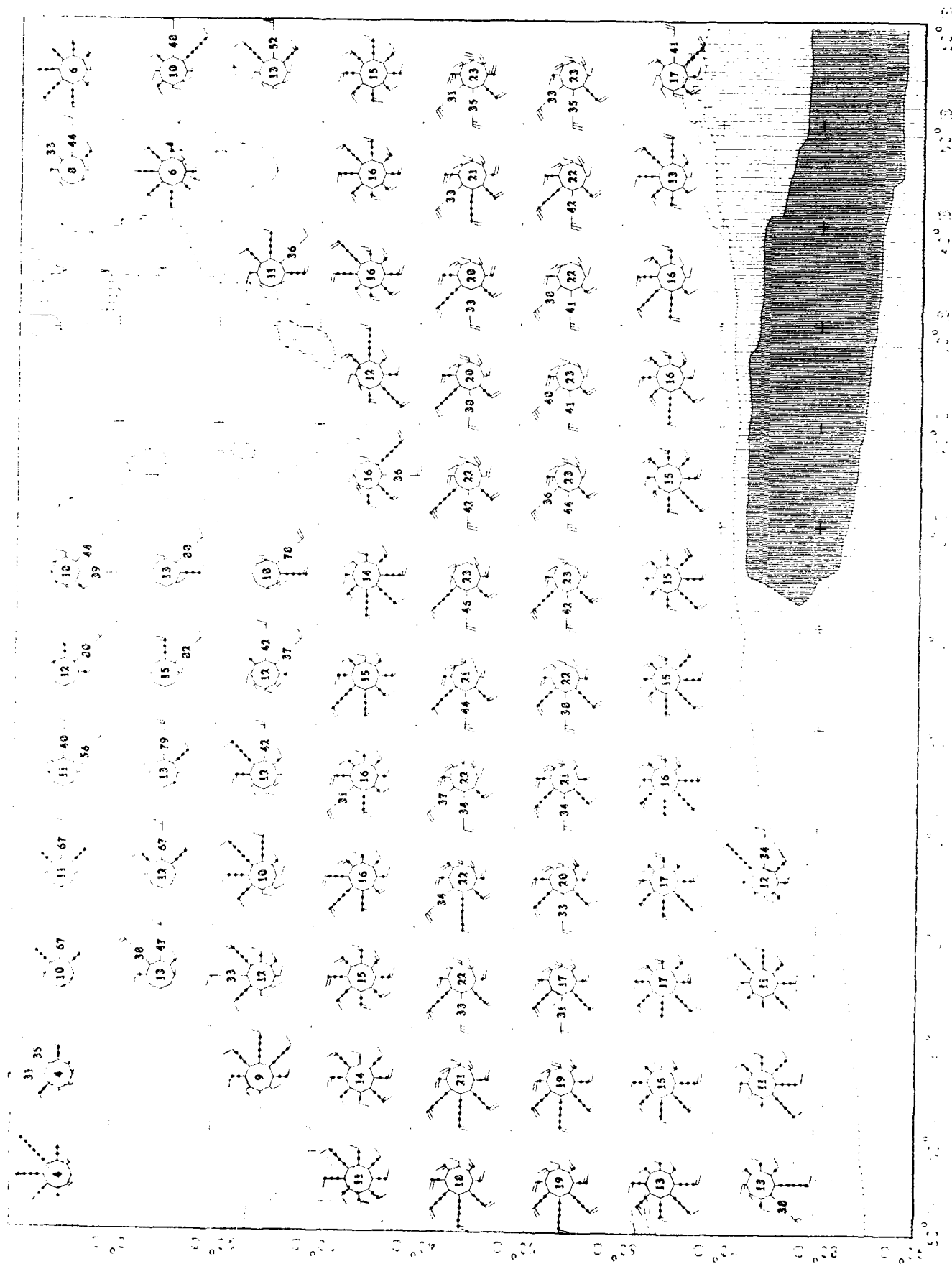
- Wind roses at 10 degree latitude/longitude grid points
- Directional mean wind speed in 5 knot increments
- Frequency proportional to barb length with individual dots representing 5% increments. Values greater than 30% are plotted directly on the barb.
- Roses blanked at grid points with elevations exceeding specified geopotential heights.
- Sample rose explanation:



ELEVATION SCALE



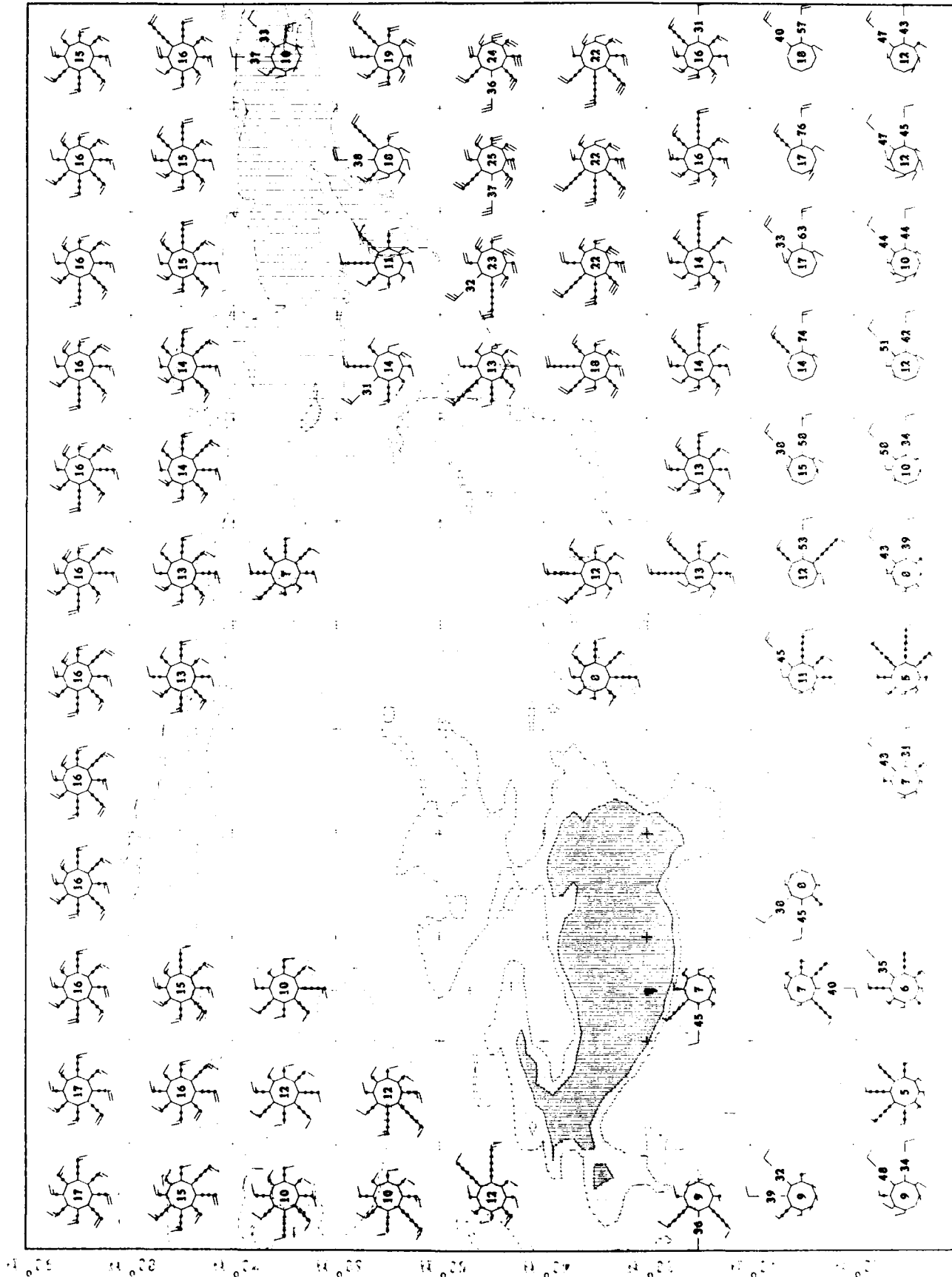


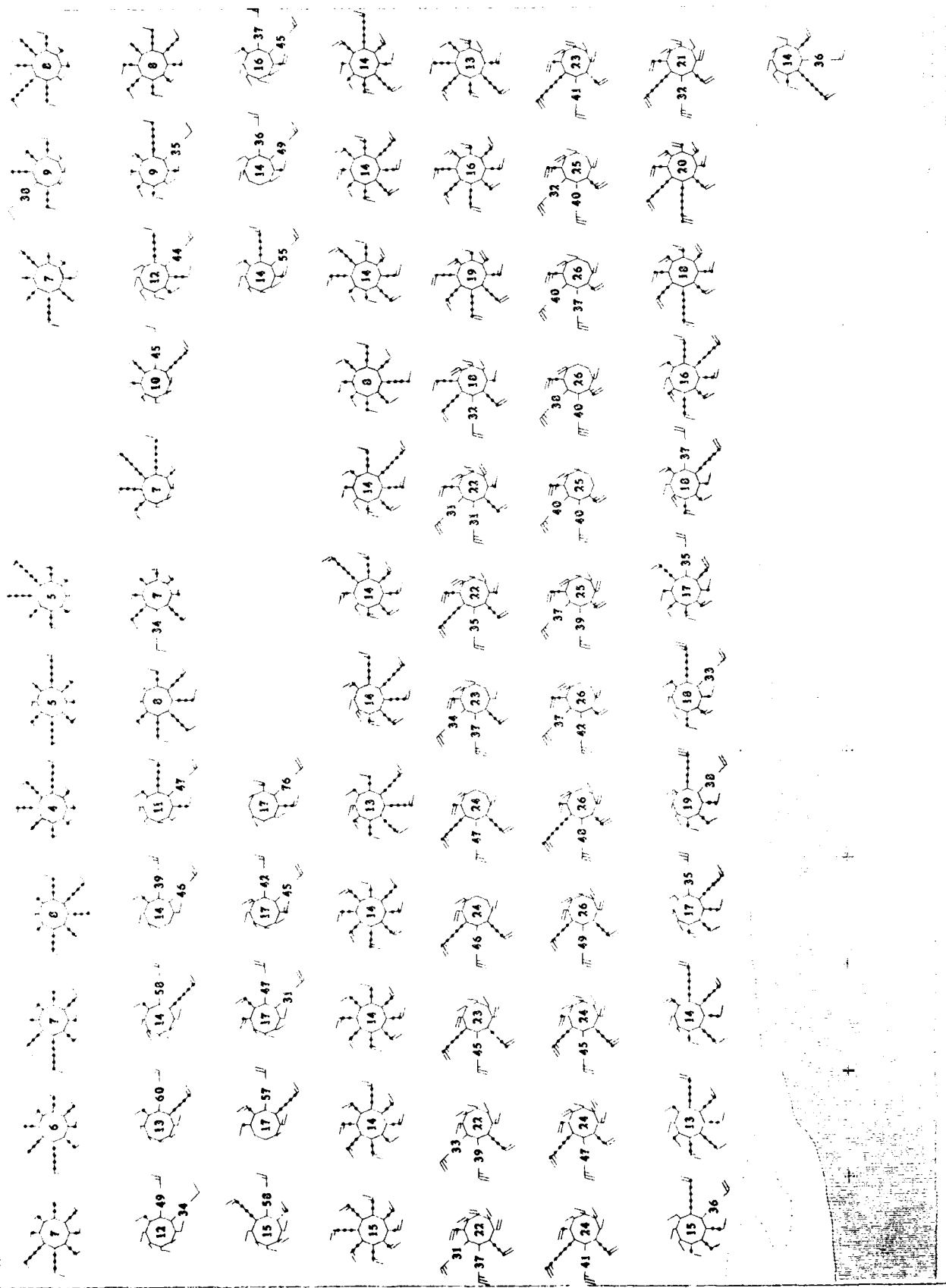


Upper Air Climatology
 1000 mb
 1000 mb

1000 mb
 1000 mb

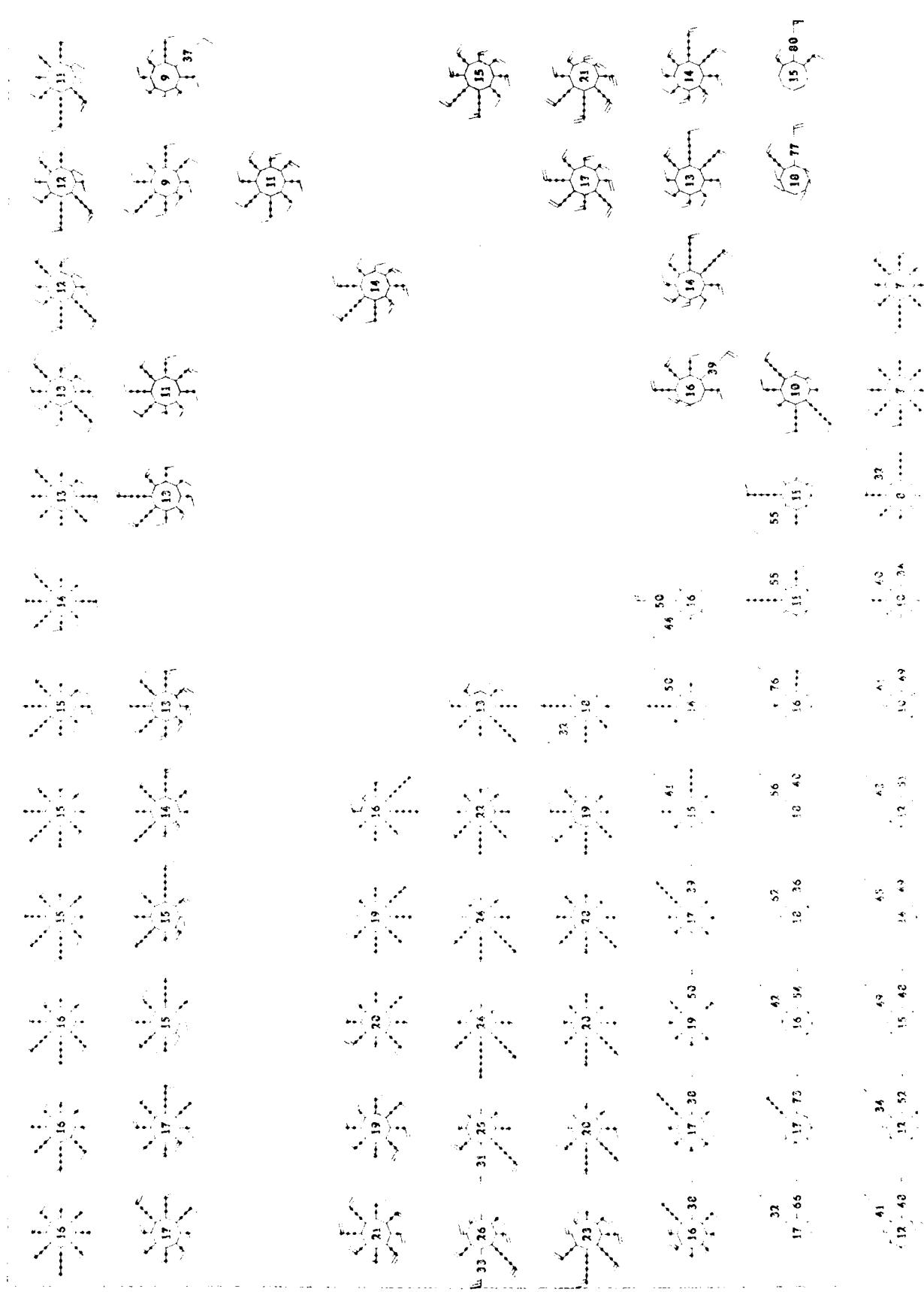
March
 1000 mb





Typical Climatology
 of the Western Hemisphere

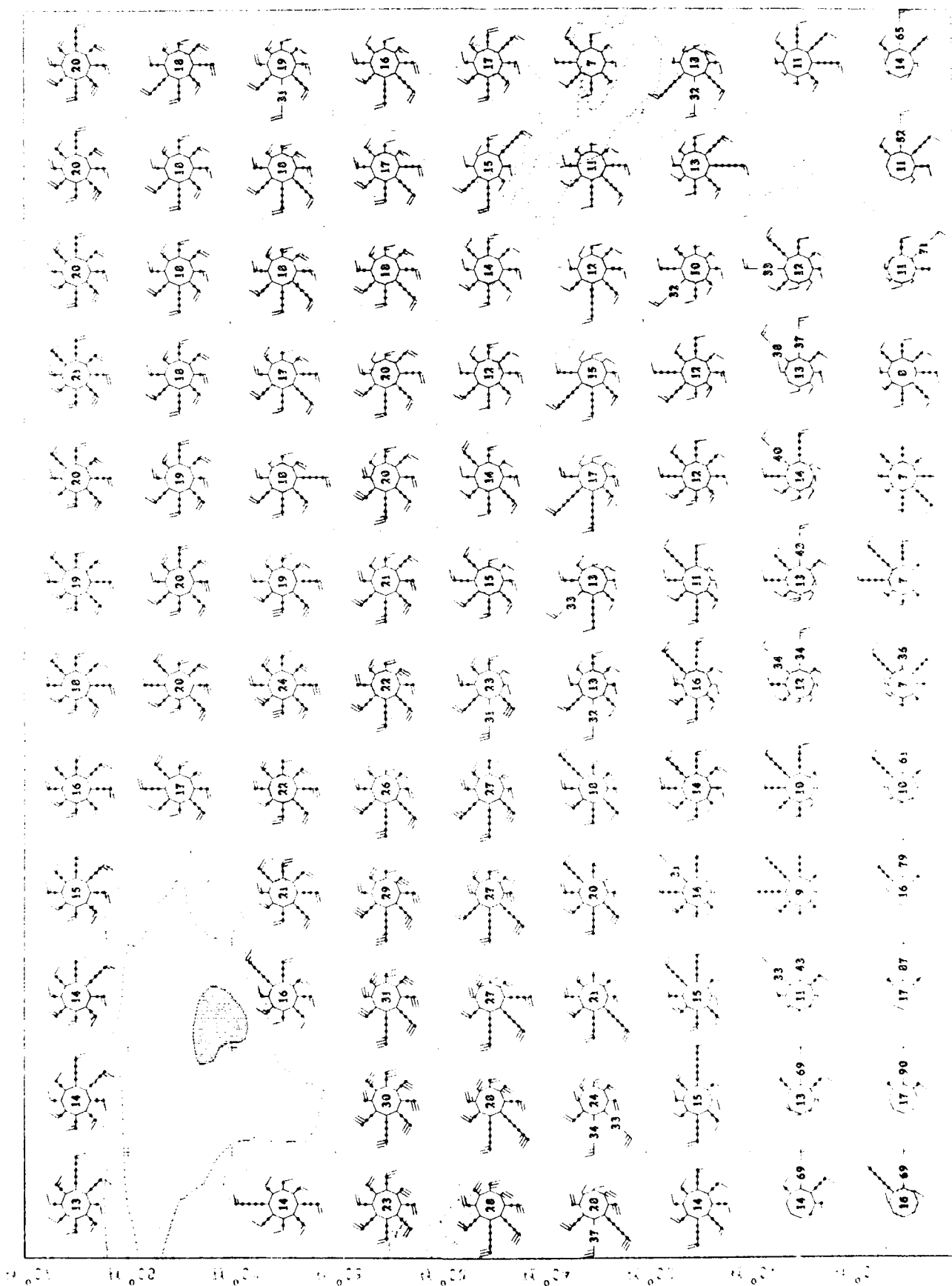
March 1913
 1000 M.C.

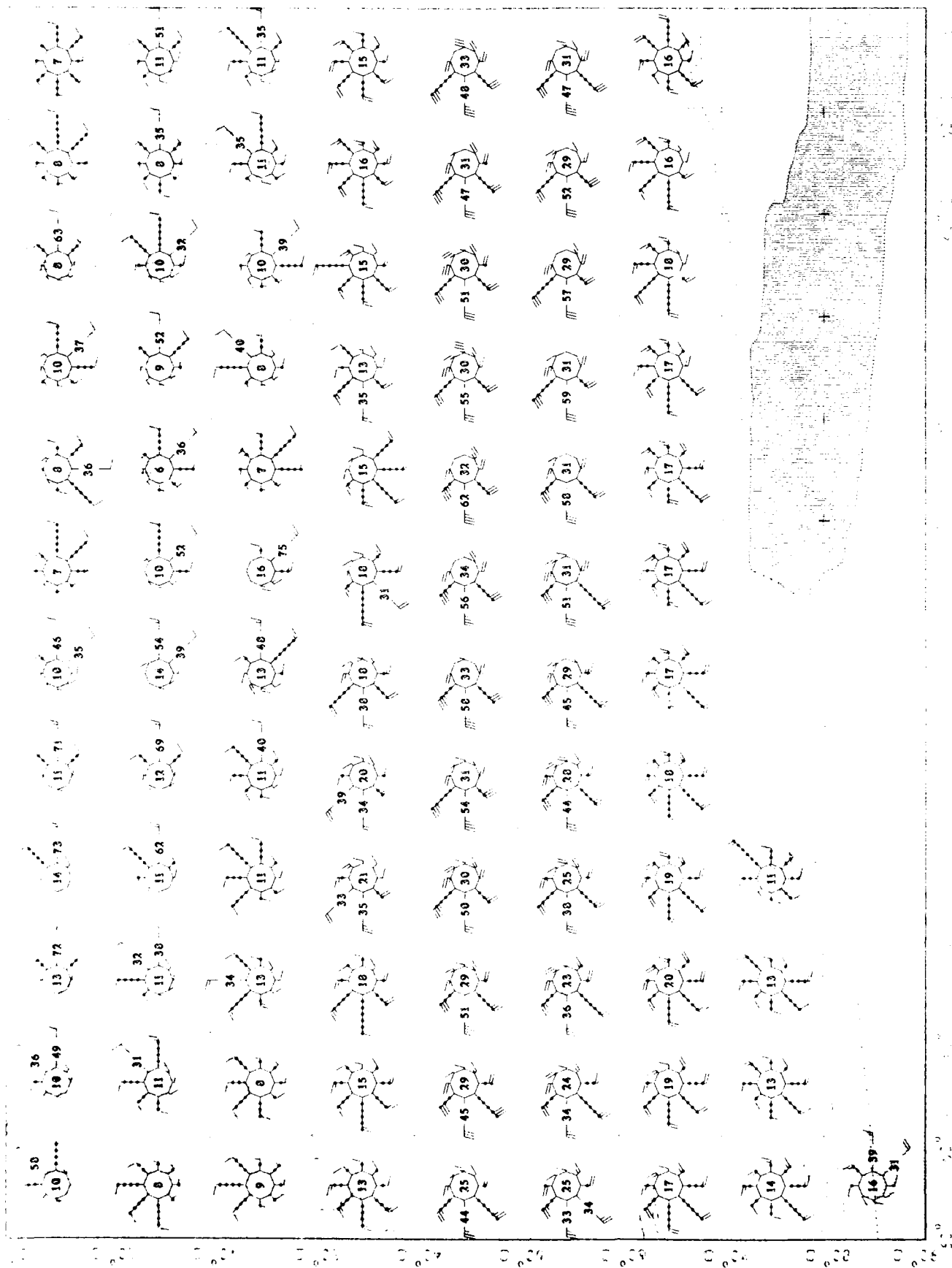


Chapman and Whitehead, 1992

This image contains 100 numbered spider-like figures arranged in a grid. The figures are used for a counting exercise. The numbers on the figures are as follows:

Figure Number	Figure Number	Figure Number	Figure Number	Figure Number
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

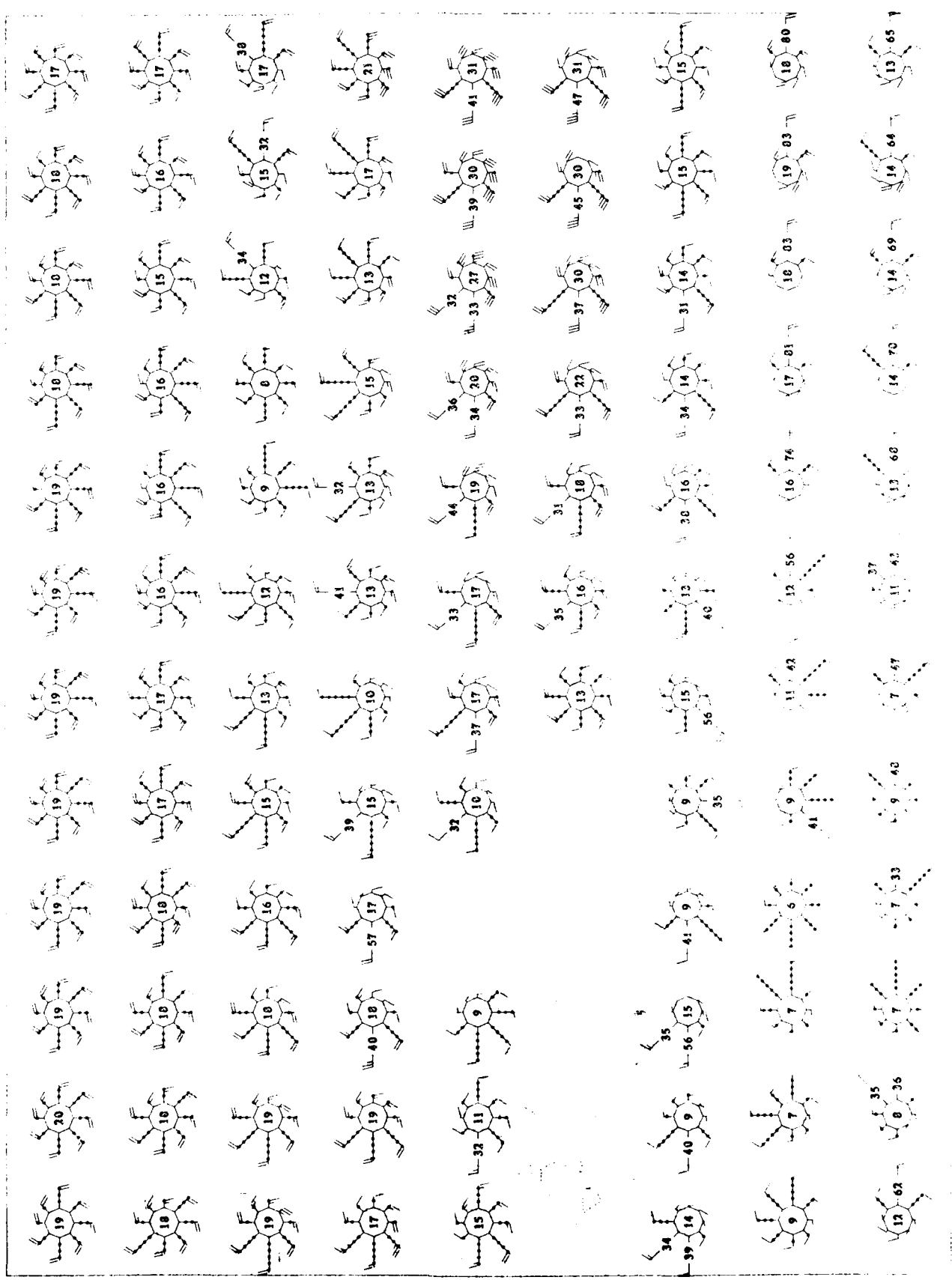


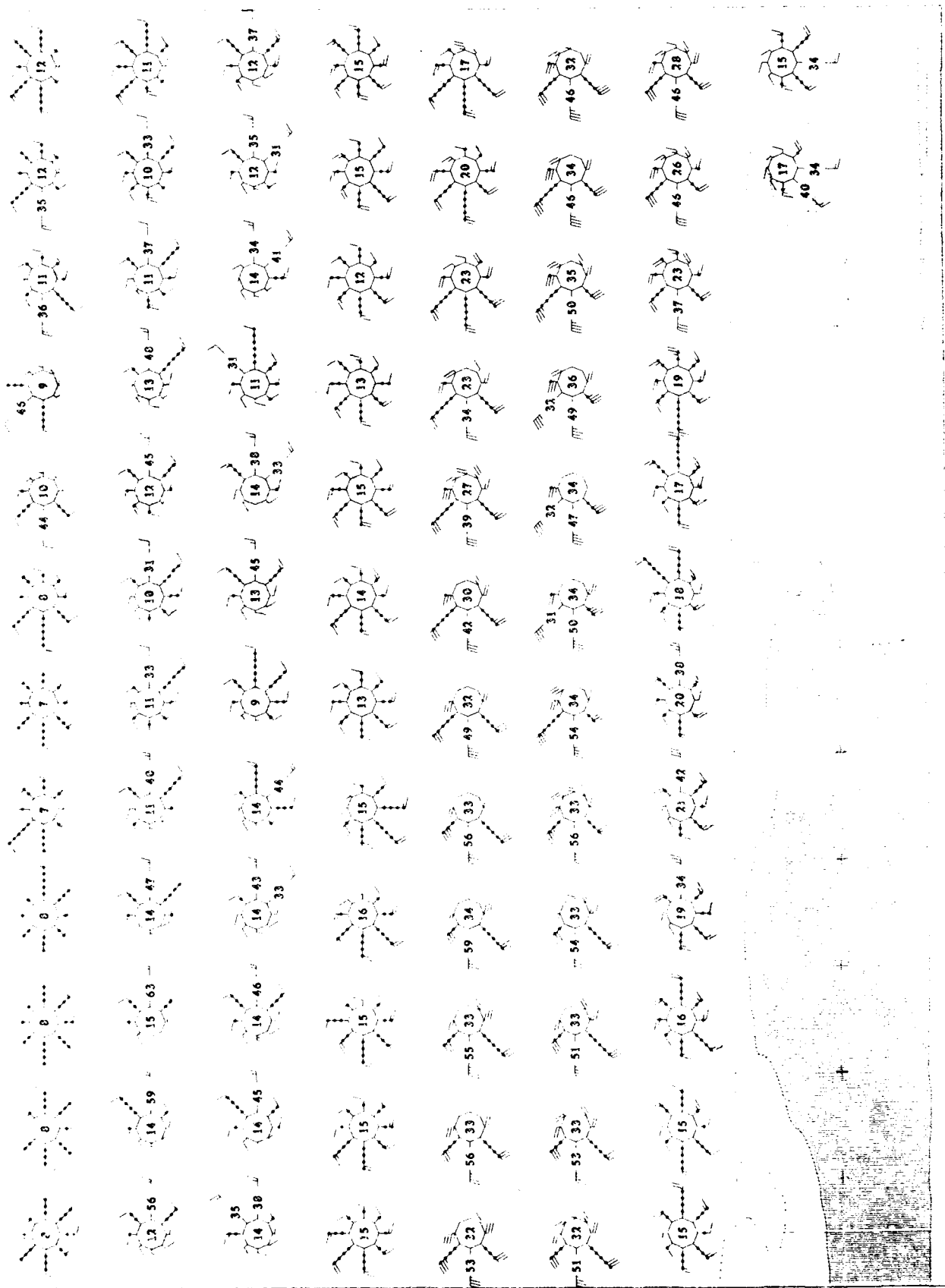


March
850 MG

50°N 17°E
March 15 1960

Upper Air Climatology
Northern Hemisphere





Upper Air Climatology
Southern Hemisphere

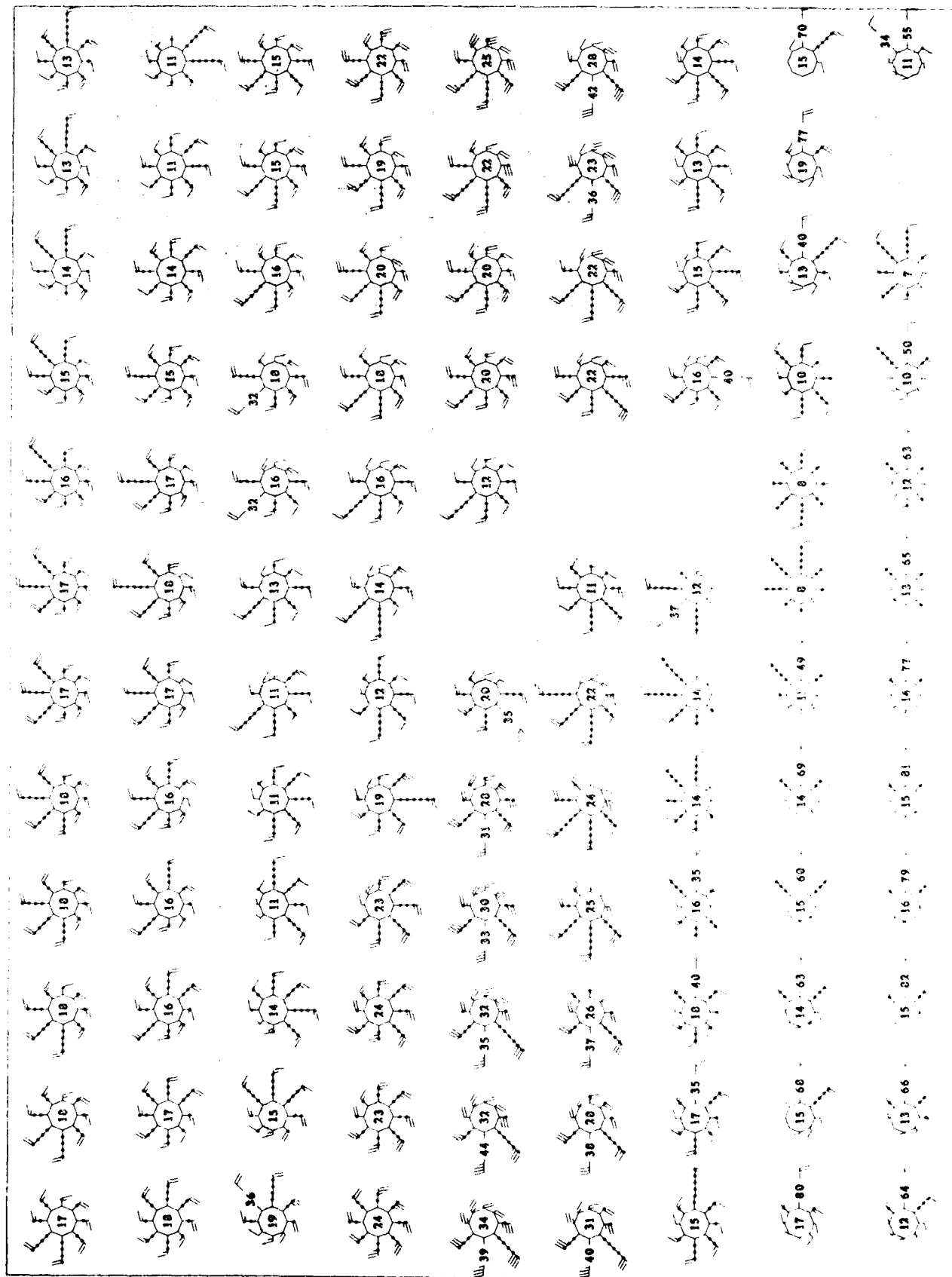
1950-1952
1953-1955

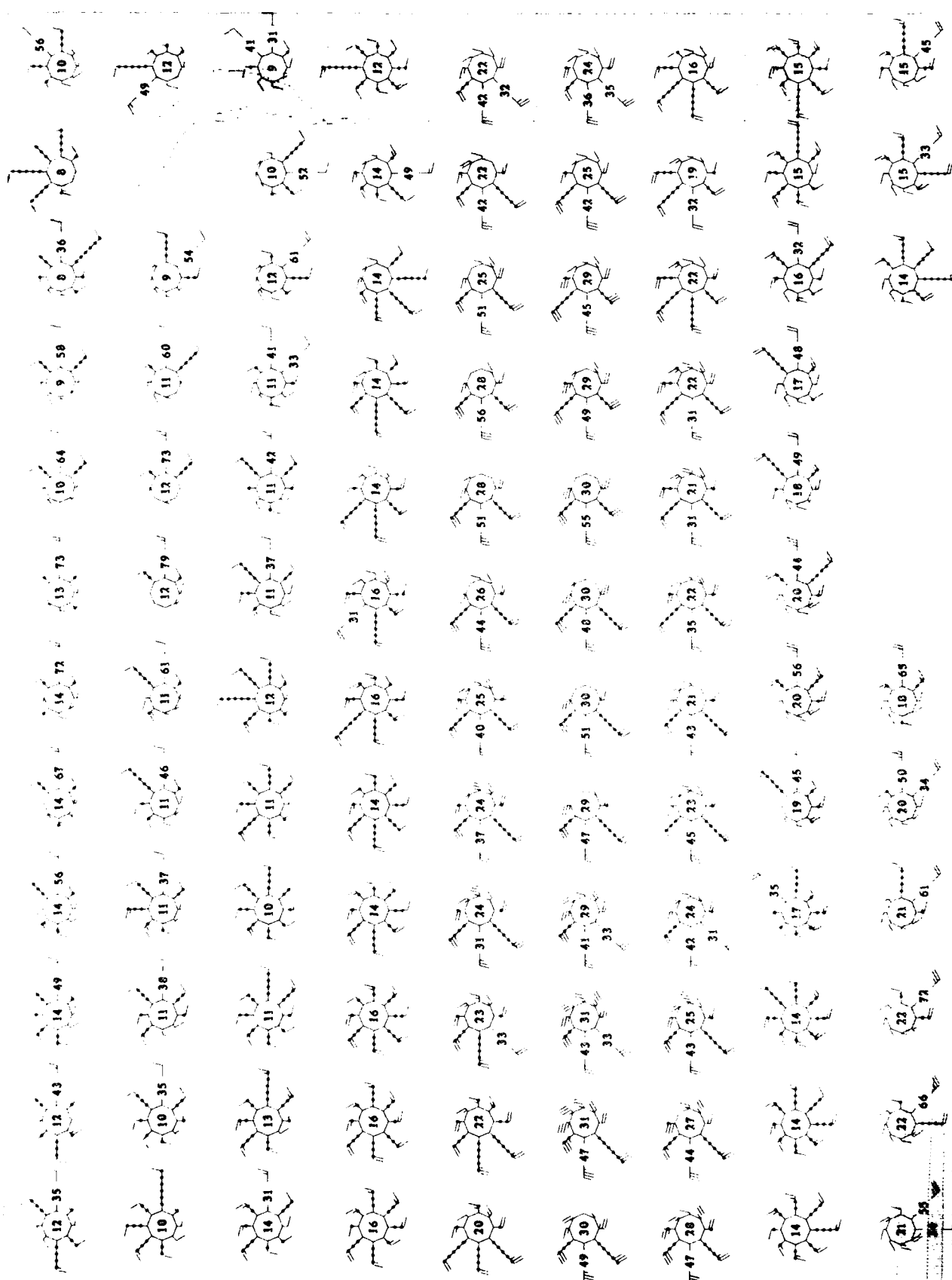
1956-1958
1959-1961

March
85° N

1000 to 500
Wind Speed

Upper Air Climatology
Northern Hemisphere





Upper Air Circulation
 Oklahoma Mesonet

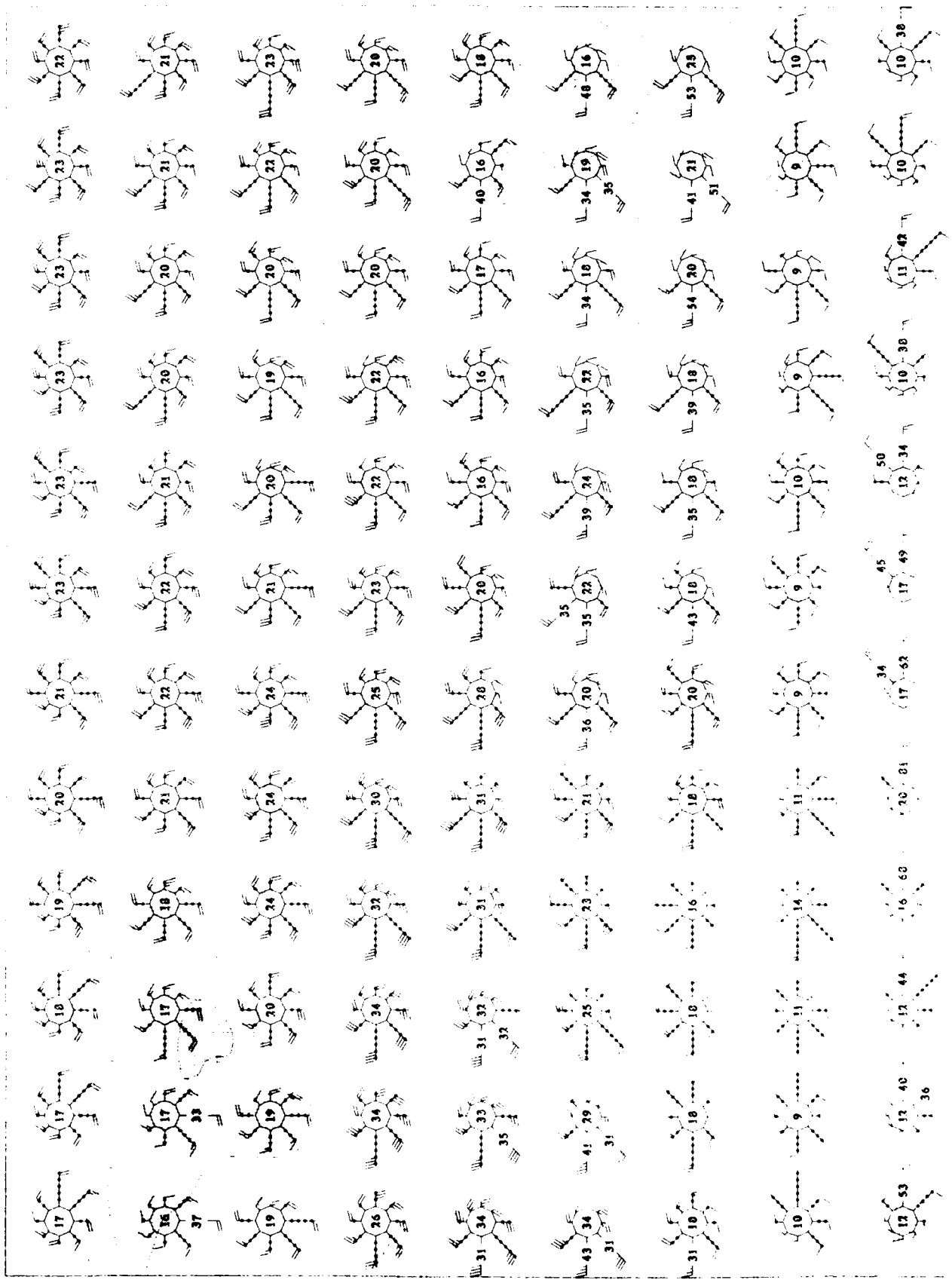
2000-2001
 2000-2001

March
 850 MB

4537 7000 7000000000
 70000000000000000000

7000 70000000000000000000

7000 70000000000000000000



1. 1990	1991
2. 1992	1993
3. 1994	1995
4. 1996	1997
5. 1998	1999
6. 2000	2001
7. 2002	2003
8. 2004	2005
9. 2006	2007
10. 2008	2009
11. 2010	2011
12. 2012	2013
13. 2014	2015
14. 2016	2017
15. 2018	2019
16. 2020	2021
17. 2022	2023
18. 2024	2025
19. 2026	2027
20. 2028	2029
21. 2030	2031
22. 2032	2033
23. 2034	2035
24. 2036	2037
25. 2038	2039
26. 2040	2041
27. 2042	2043
28. 2044	2045
29. 2046	2047
30. 2048	2049
31. 2050	2051
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33. 2054	2055
34. 2056	2057
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37. 2062	2063
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39. 2066	2067
40. 2068	2069
41. 2070	2071
42. 2072	2073
43. 2074	2075
44. 2076	2077
45. 2078	2079
46. 2080	2081
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65. 2118	2119
66. 2120	2121
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68. 2124	2125
69. 2126	2127
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72. 2132	2133
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82. 2152	2153
83. 2154	2155
84. 2156	2157
85. 2158	2159
86. 2160	2161
87. 2162	2163
88. 2164	2165
89. 2166	2167
90. 2168	2169
91. 2170	2171
92. 2172	2173
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99. 2186	2187
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101. 2190	2191
102. 2192	2193
103. 2194	2195
104. 2196	2197
105. 2198	2199
106. 2200	2201
107. 2202	2203
108. 2204	2205
109. 2206	2207
110. 2208	2209
111. 2210	2211
112. 2212	2213
113. 2214	2215
114. 2216	2217
115. 2218	2219
116. 2220	2221
117. 2222	2223
118. 2224	2225
119. 2226	2227
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122. 2232	2233
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124. 2236	2237
125. 2238	2239
126. 2240	2241
127. 2242	2243
128. 2244	2245
129. 2246	2247
130. 2248	2249
131. 2250	2251
1	

1. 1990	1991
2. 1992	1993
3. 1994	1995
4. 1996	1997
5. 1998	1999
6. 2000	2001
7. 2002	2003
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9. 2006	2007
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30. 2048	2049
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36. 2060	2061
37. 2062	2063
38. 2064	2065
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40. 2068	2069
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43. 2074	2075
44. 2076	2077
45. 2078	2079
46. 2080	2081
47. 2082	2083
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49. 2086	2087
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57. 2102	2103
58. 2104	2105
59. 2106	2107
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61. 2110	2111
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64. 2116	2117
65. 2118	2119
66. 2120	2121
67. 2122	2123
68. 2124	2125
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86. 2160	2161
87. 2162	2163
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89. 2166	2167
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103. 2194	2195
104. 2196	2197
105. 2198	2199
106. 2200	2201
107. 2202	2203
108. 2204	2205
109. 2206	2207
110. 2208	2209
111. 2210	2211
112. 2212	2213
113. 2214	2215
114. 2216	2217
115. 2218	2219
116. 2220	2221
117. 2222	2223
118. 2224	2225
119. 2226	2227
120. 2228	2229
121. 2230	2231
122. 2232	2233
123. 2234	2235
124. 2236	2237
125. 2238	2239
126. 2240	2241
127. 2242	2243
128. 2244	2245
129. 2246	2247
130. 2248	2249
131. 2250	2251
1	

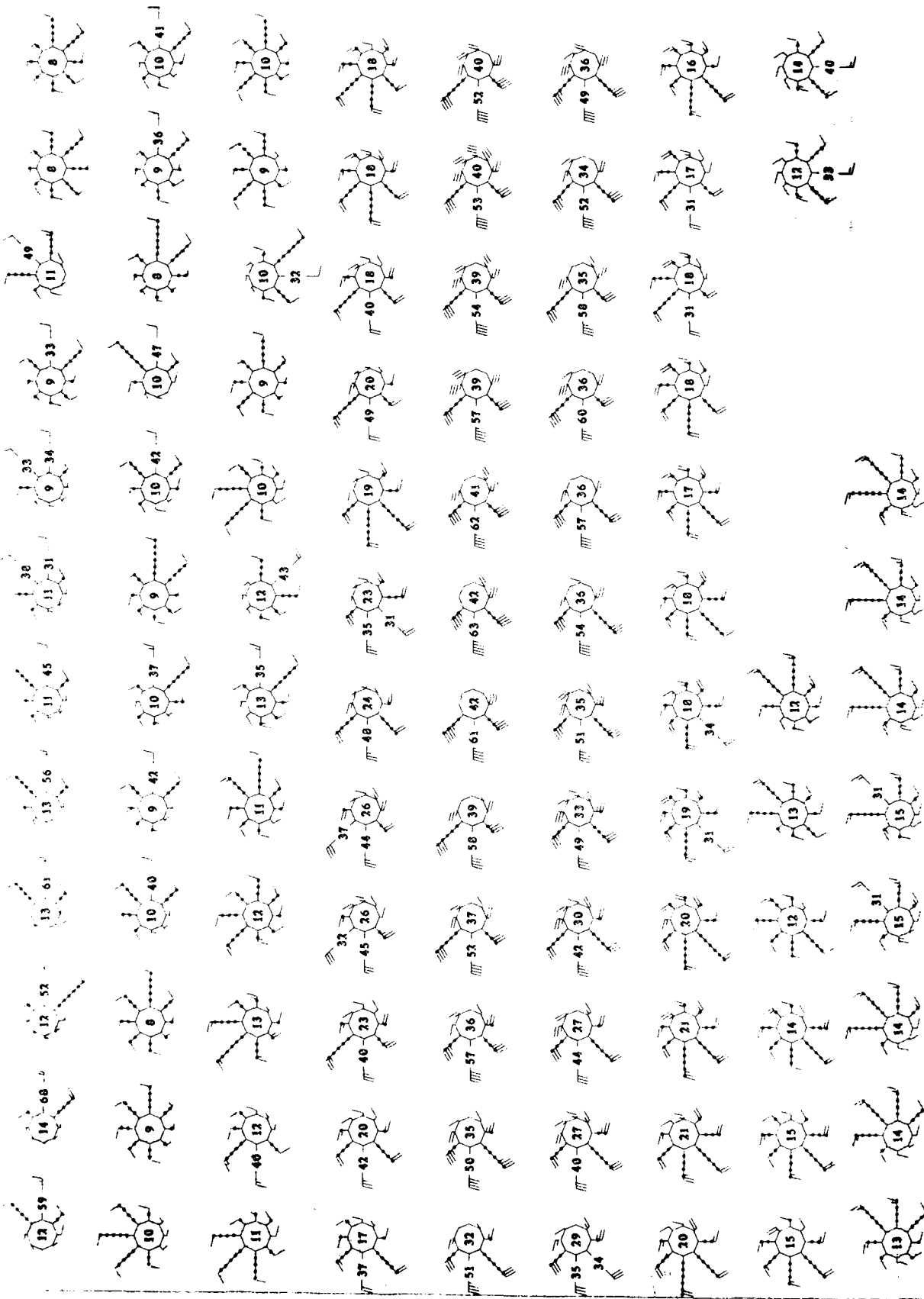
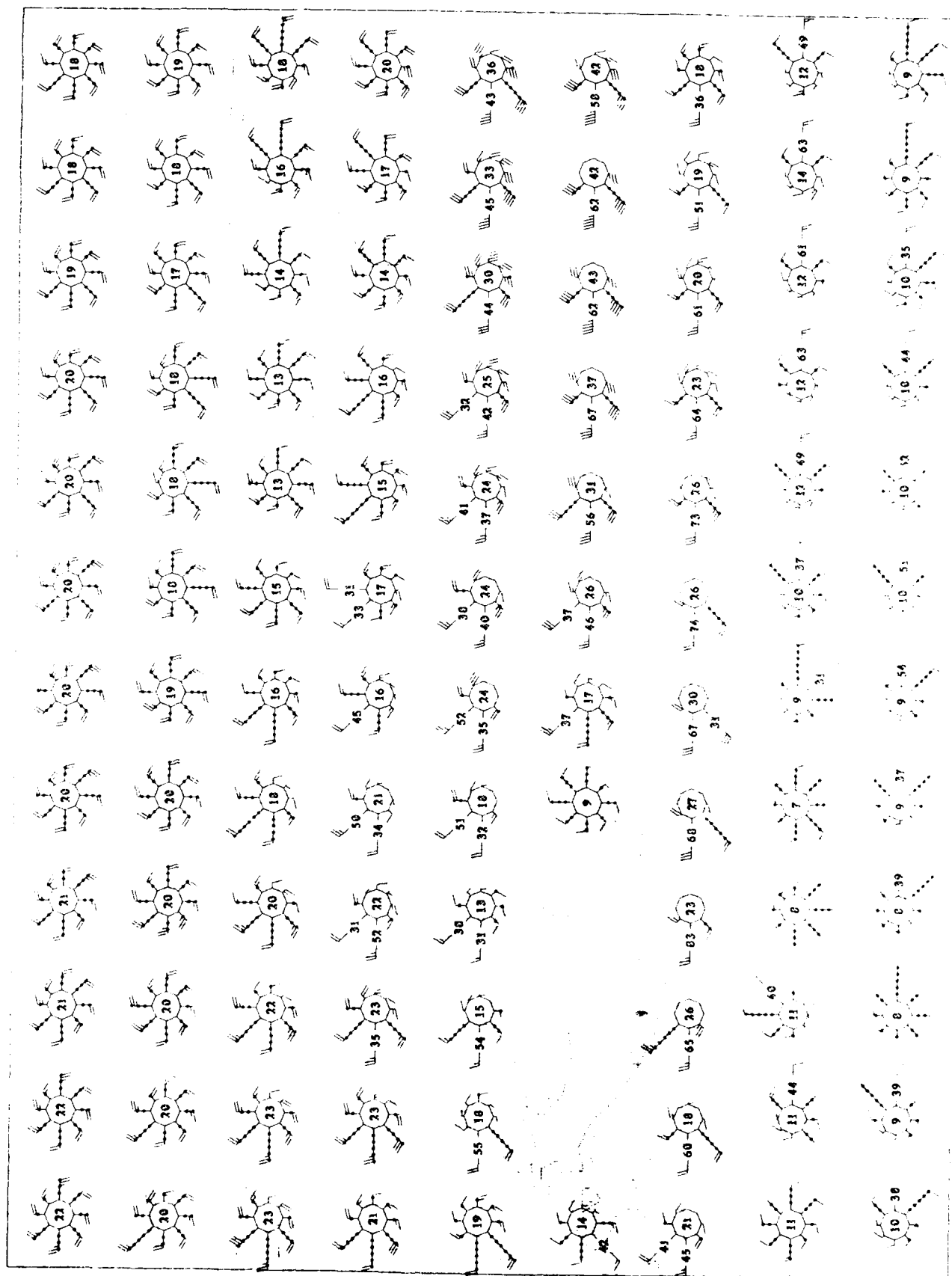
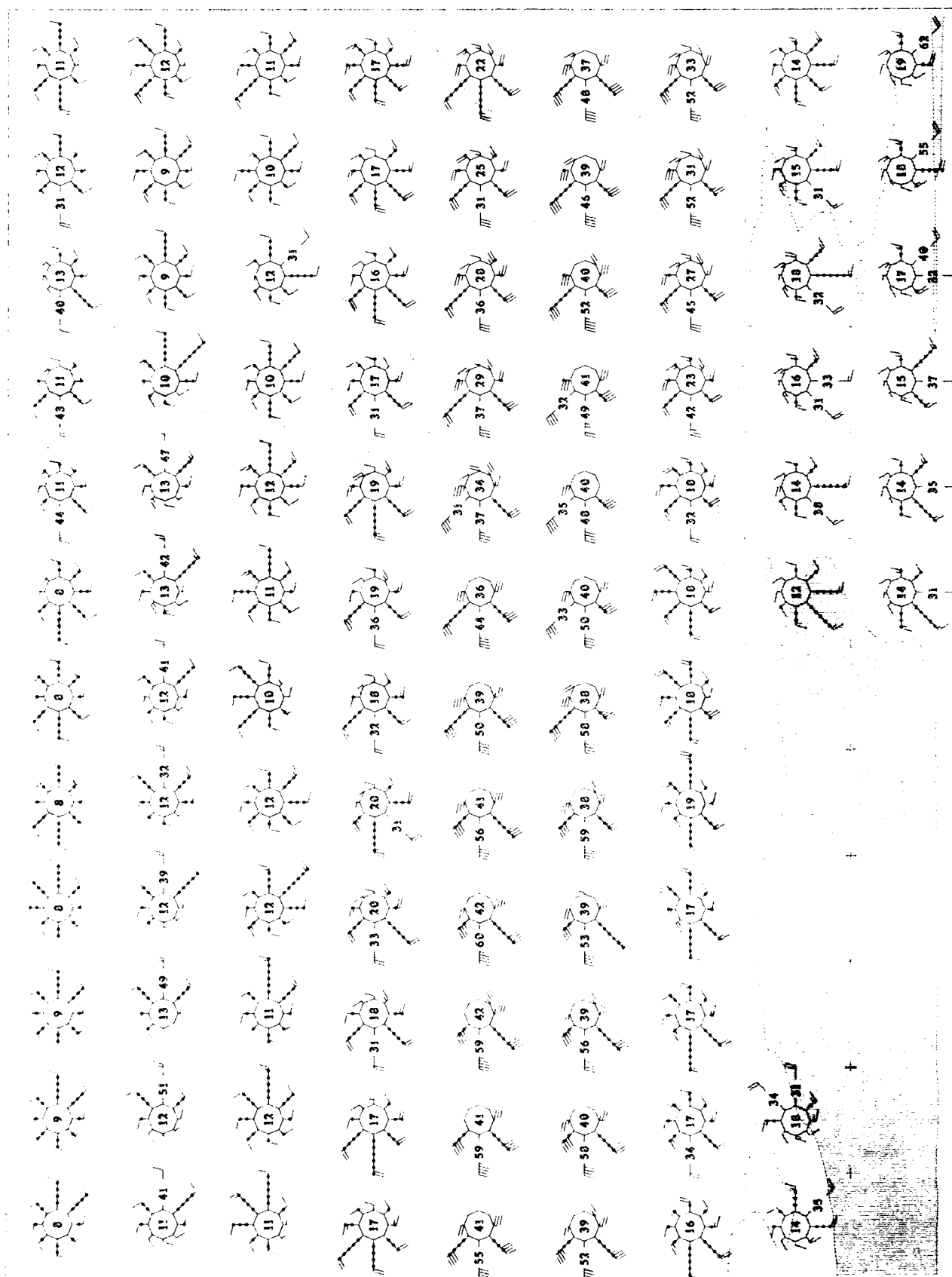


Figure 1
P-20 and P-21

Figure 2
P-20 and P-21

Figure 3
P-20 and P-21

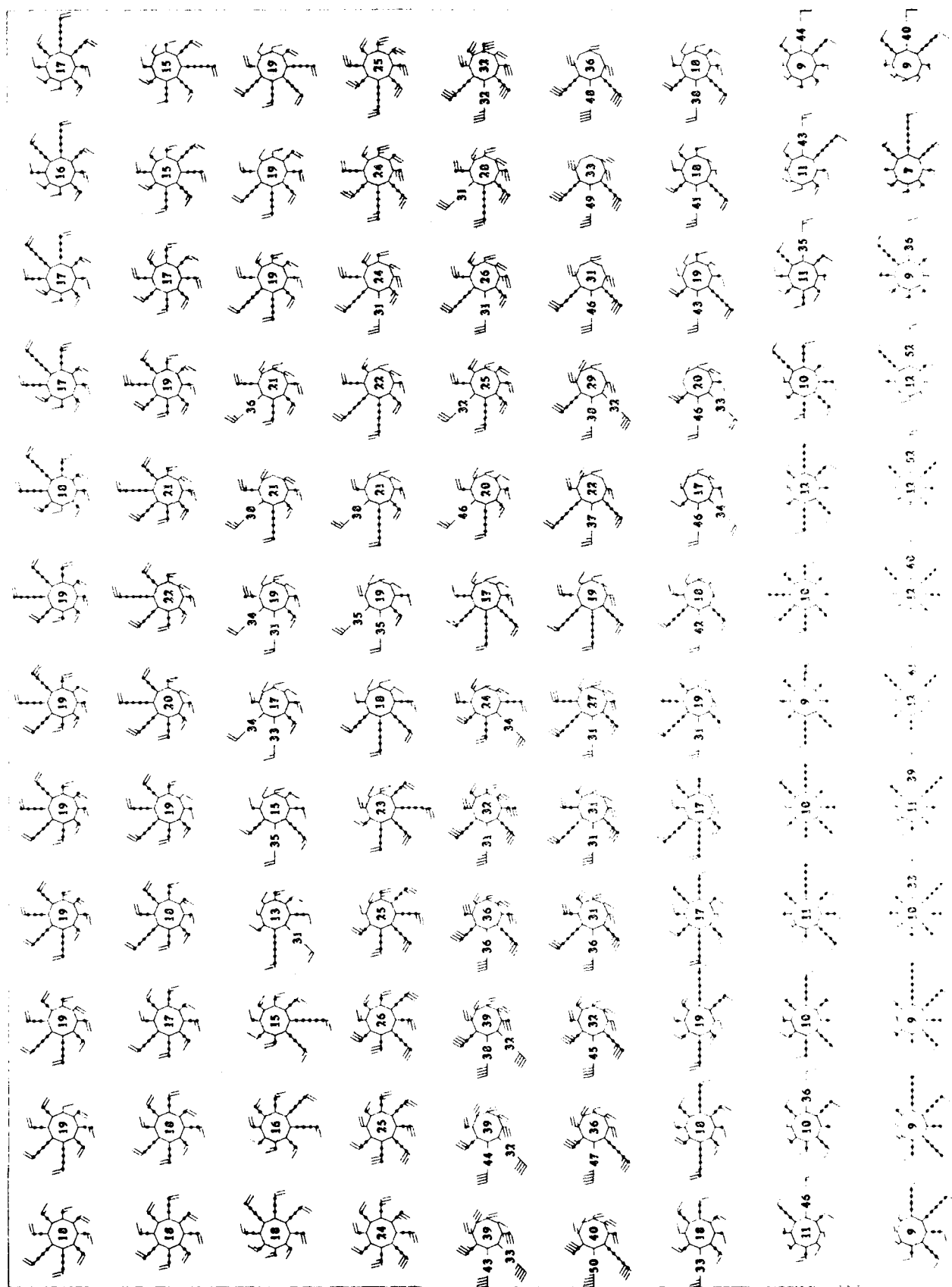


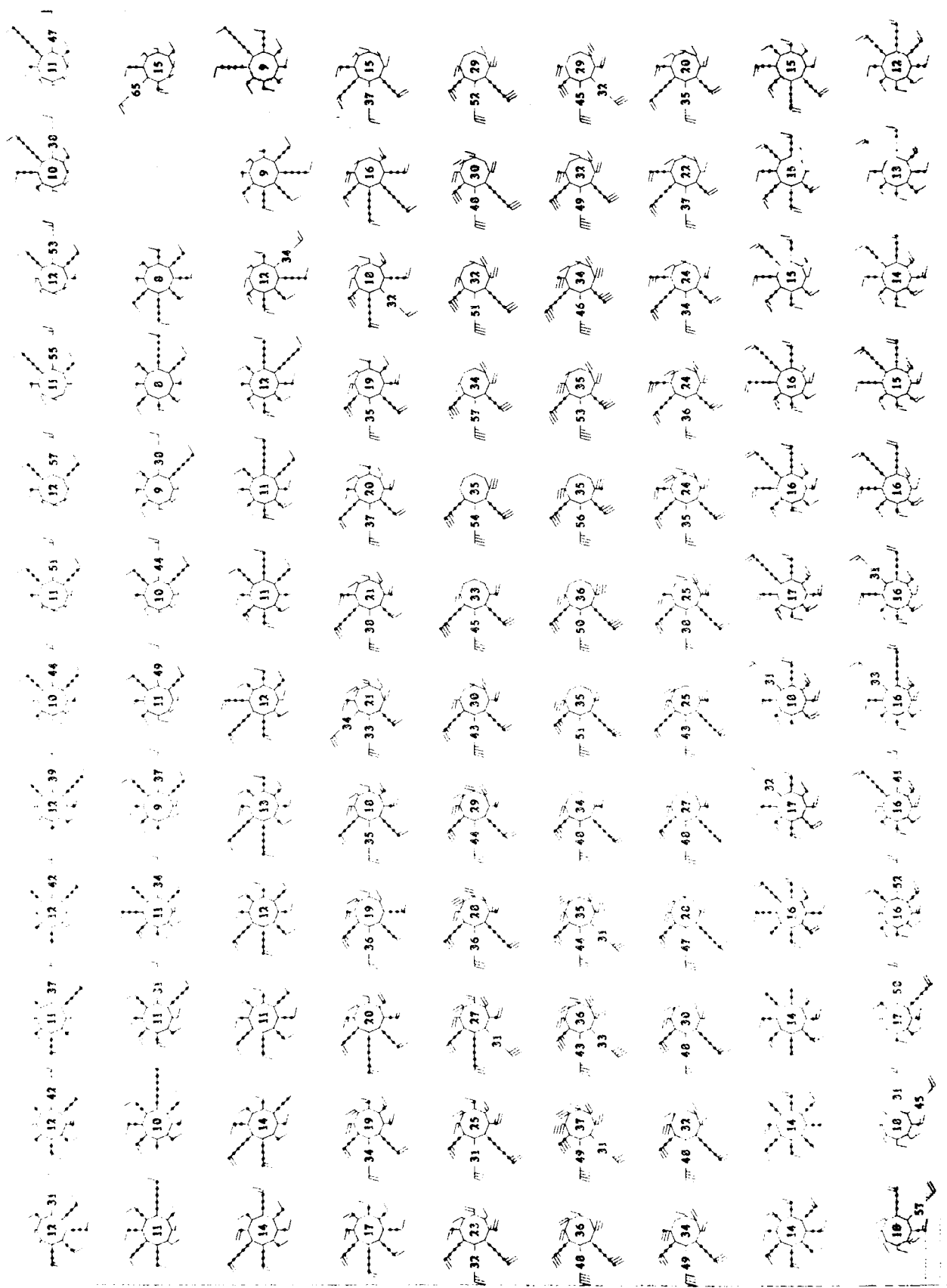


Upper Air Climatology
Southern Hemisphere

1970-1971
1970-1971

March
7:00 AM



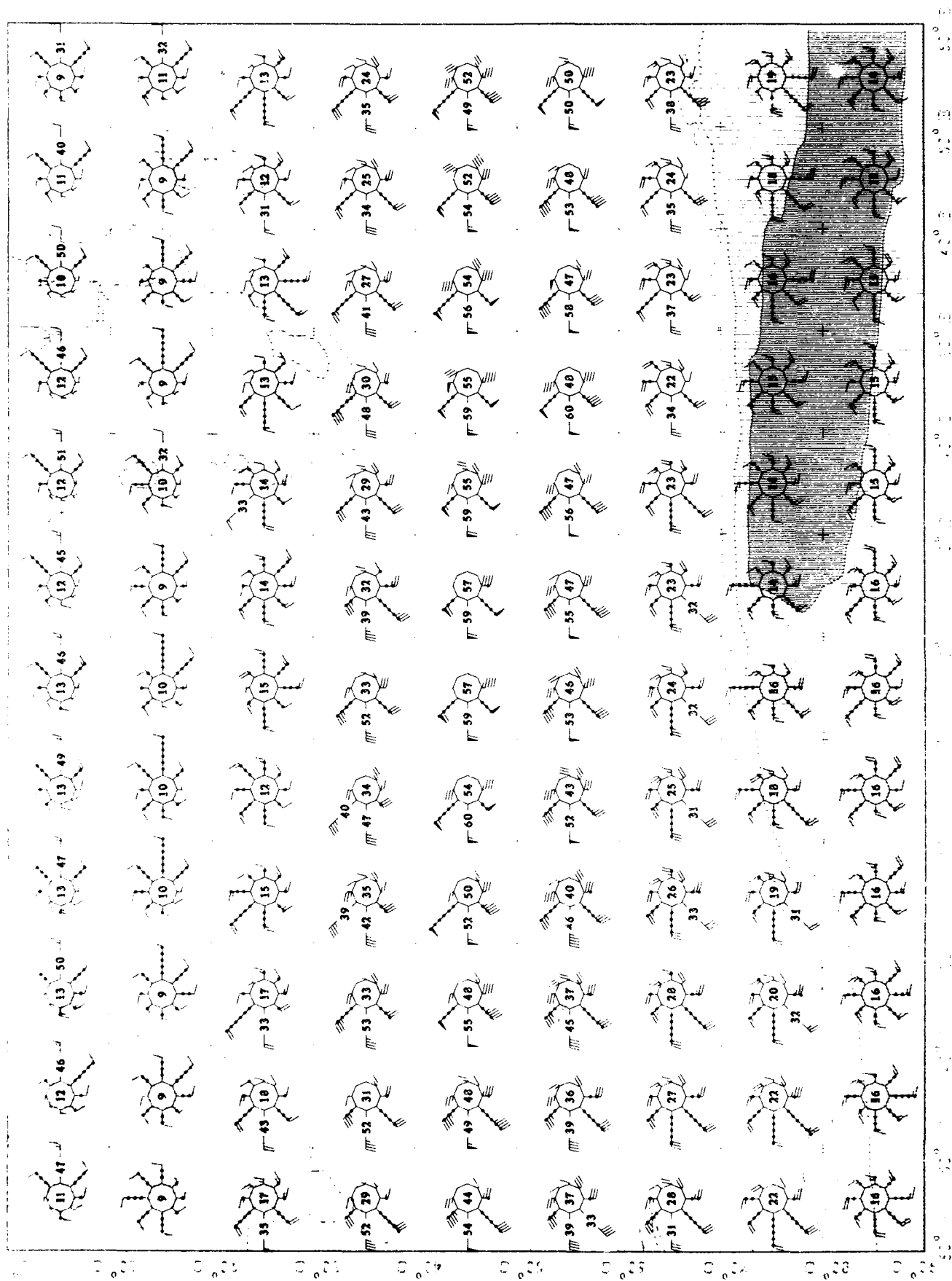


Upper Air Climatology
Southern Hemisphere

1950-1951
1952-1953

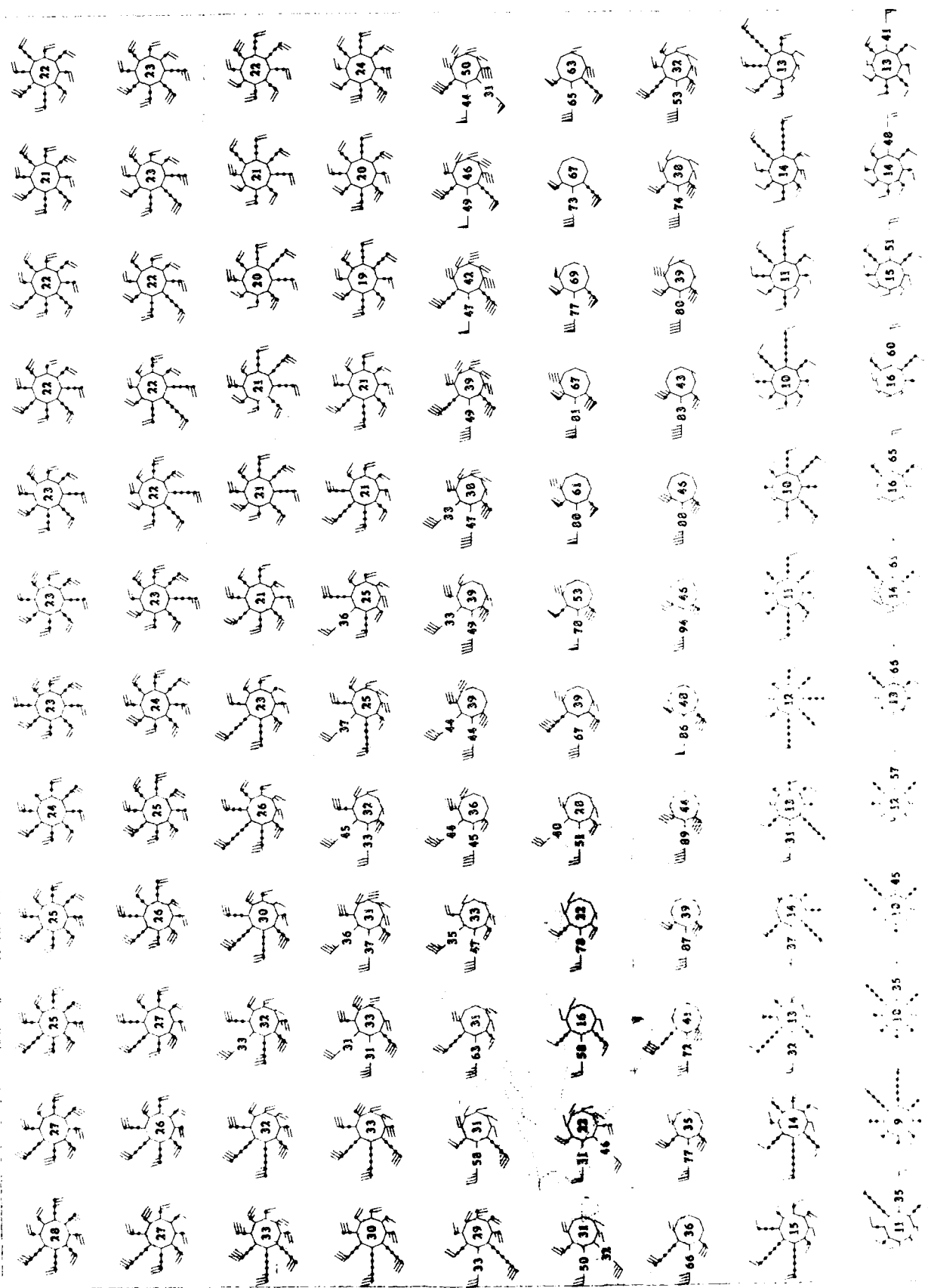
March
700 M.C.

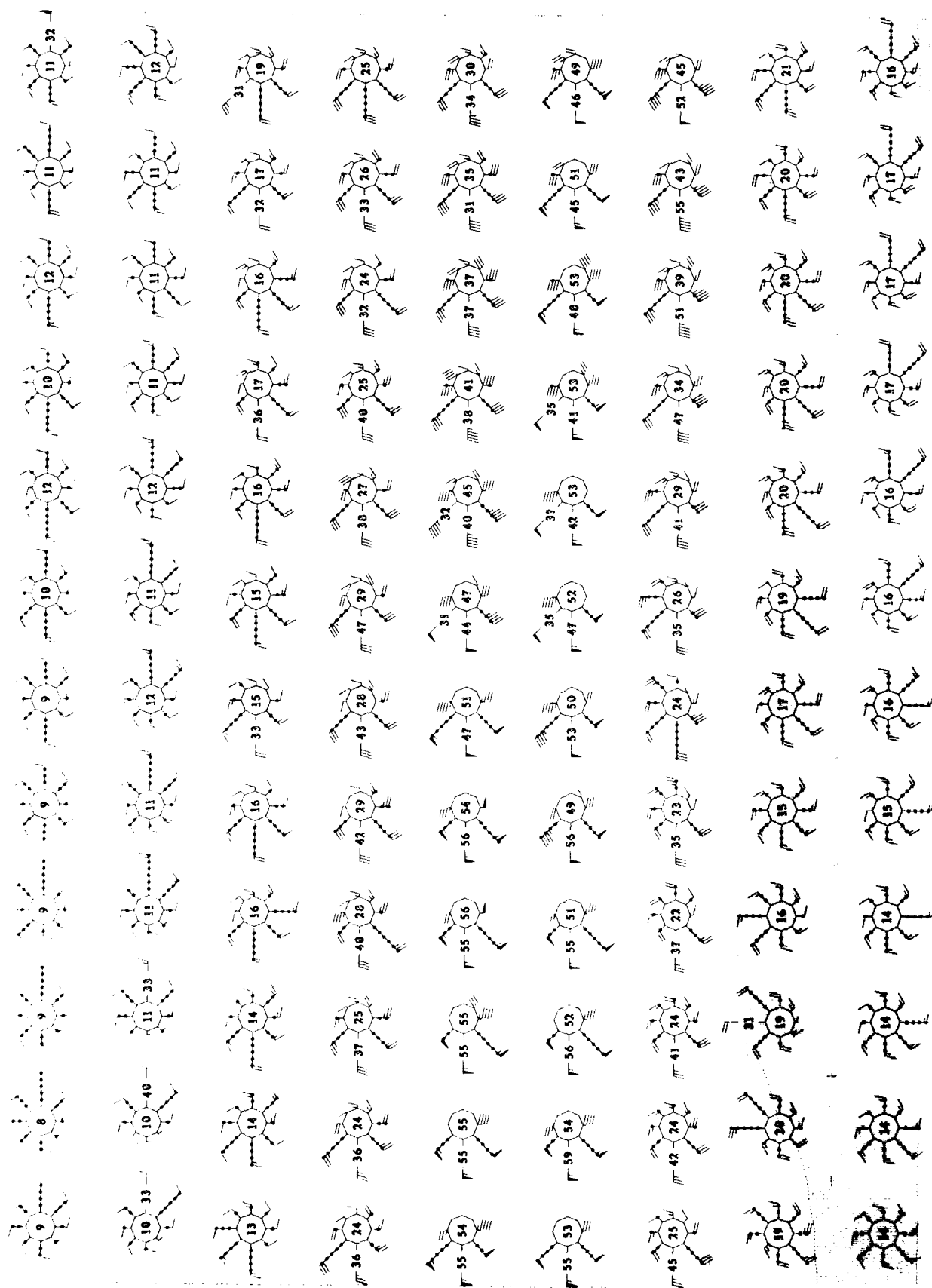




March
500 MB

Upper Air Climatology
Southern Hemisphere

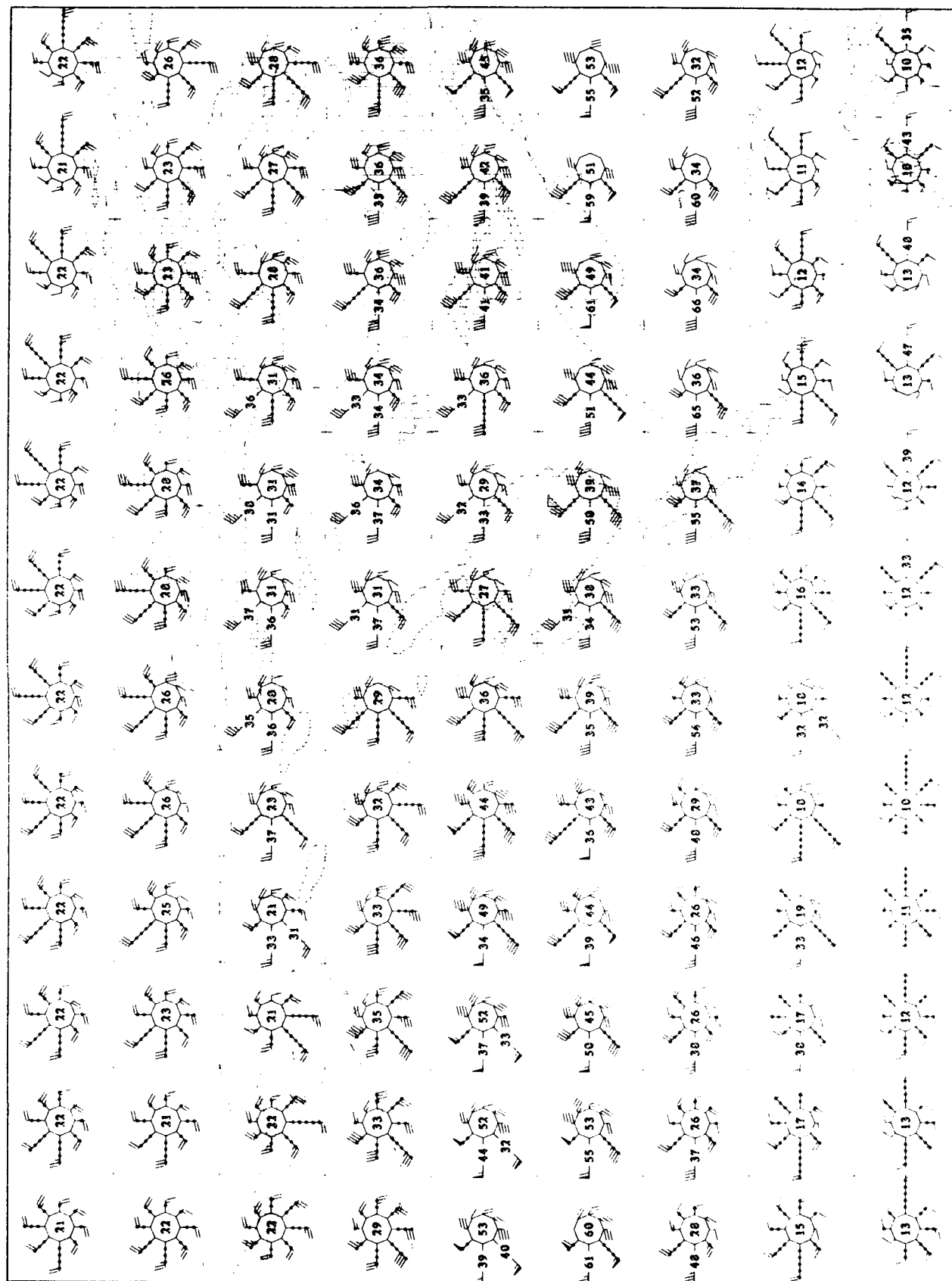


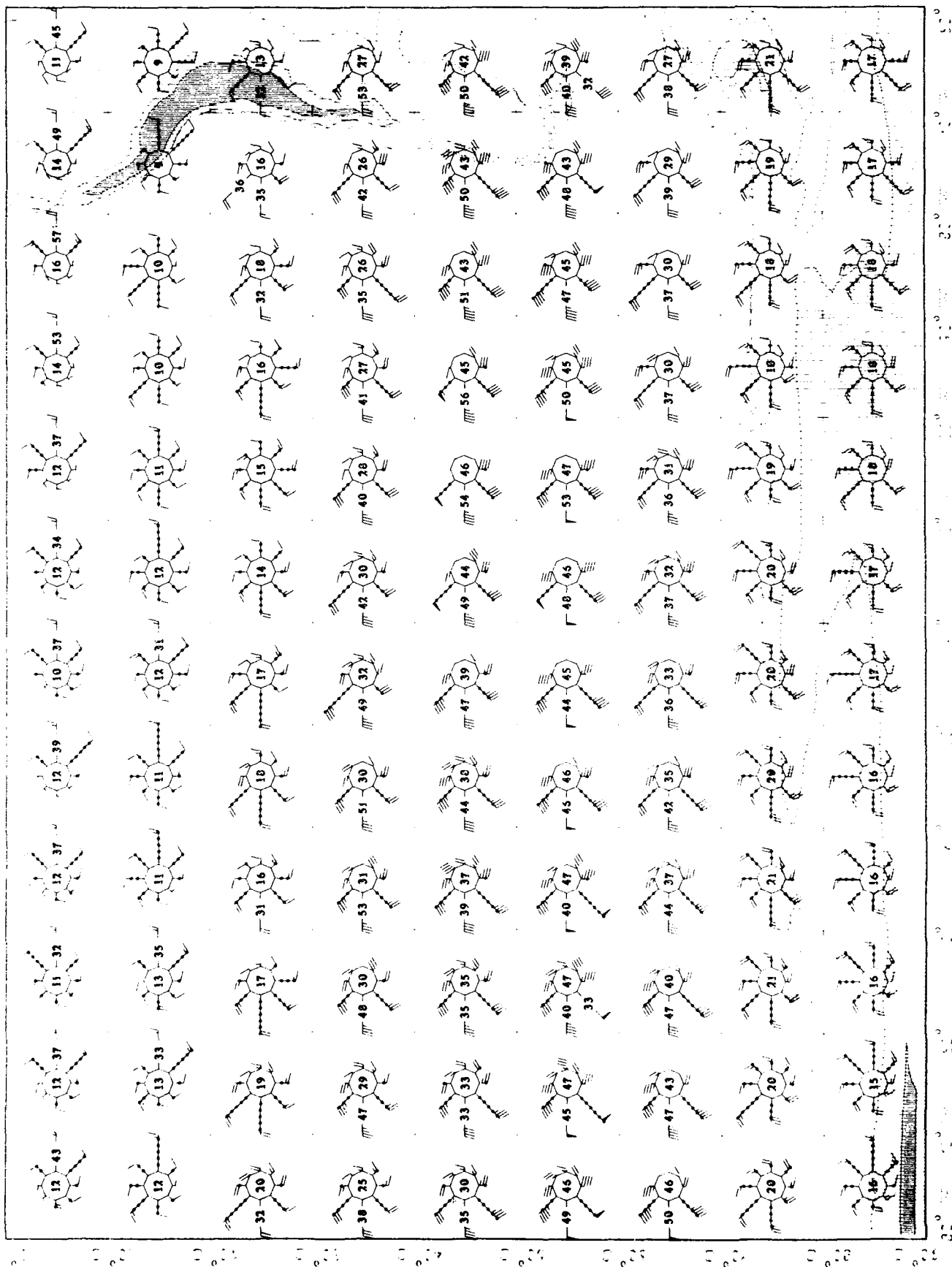


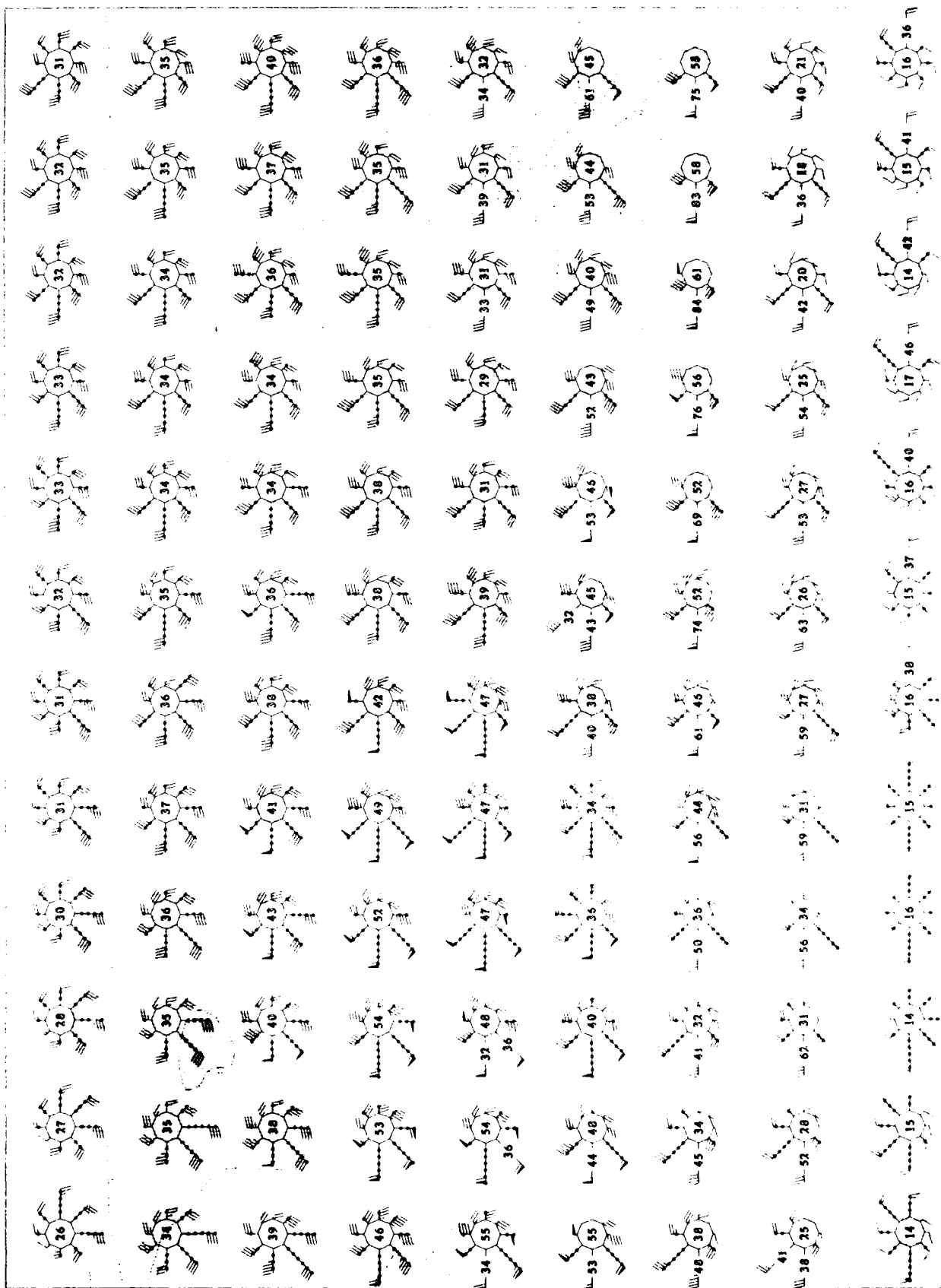
March
500 MB

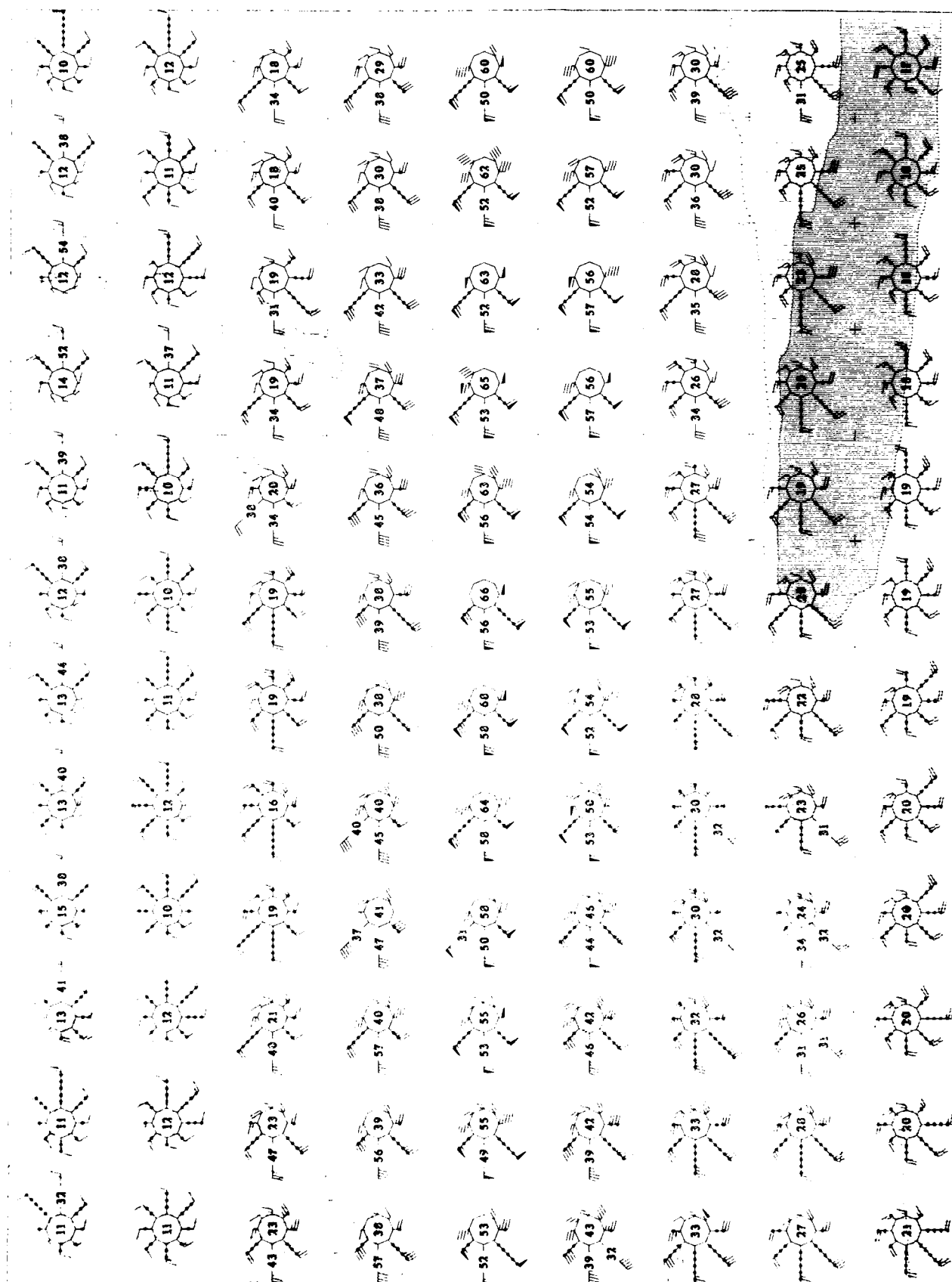
500 mb - 1000
1000 - 1000

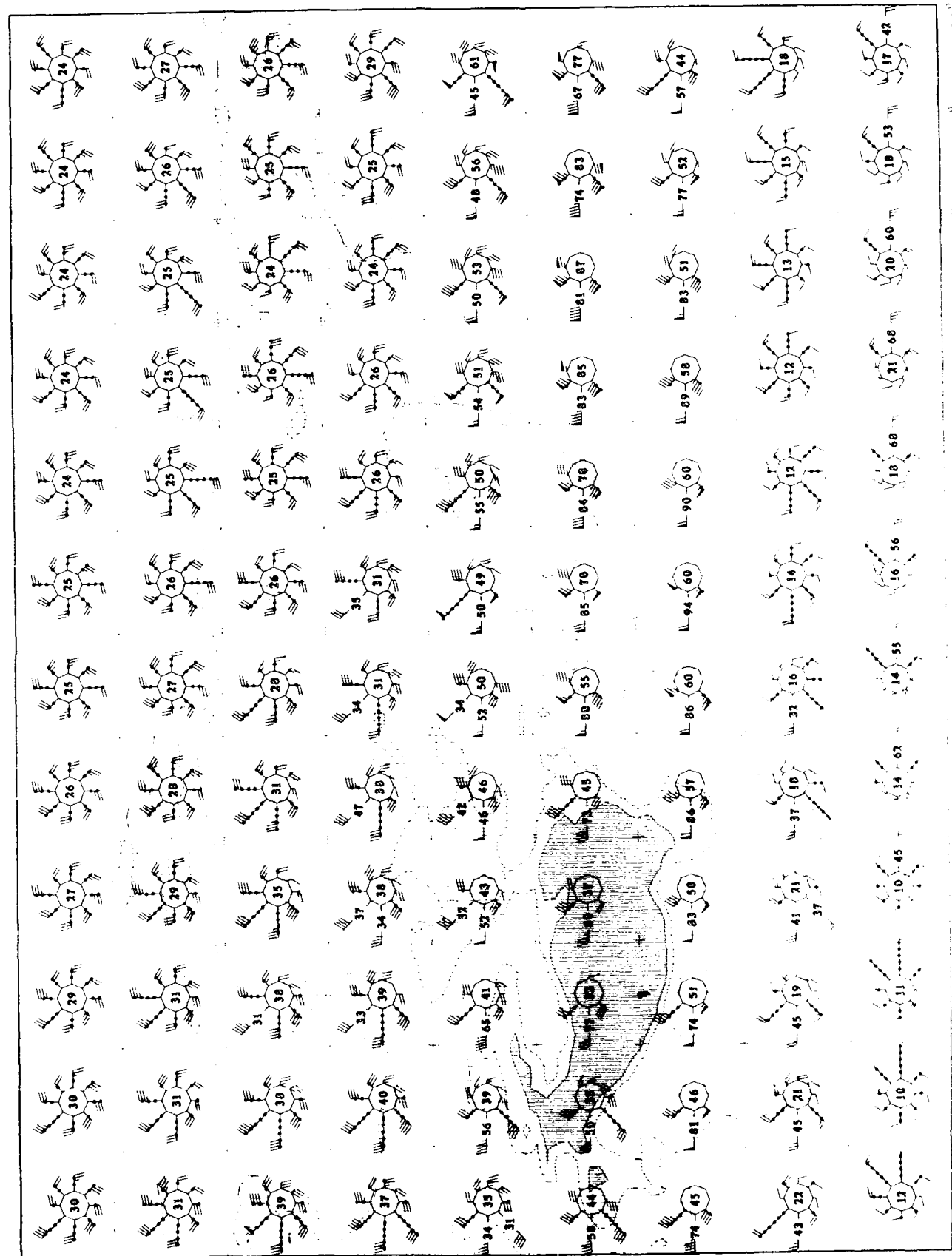
Upper Air Climatology
Southern Hemisphere

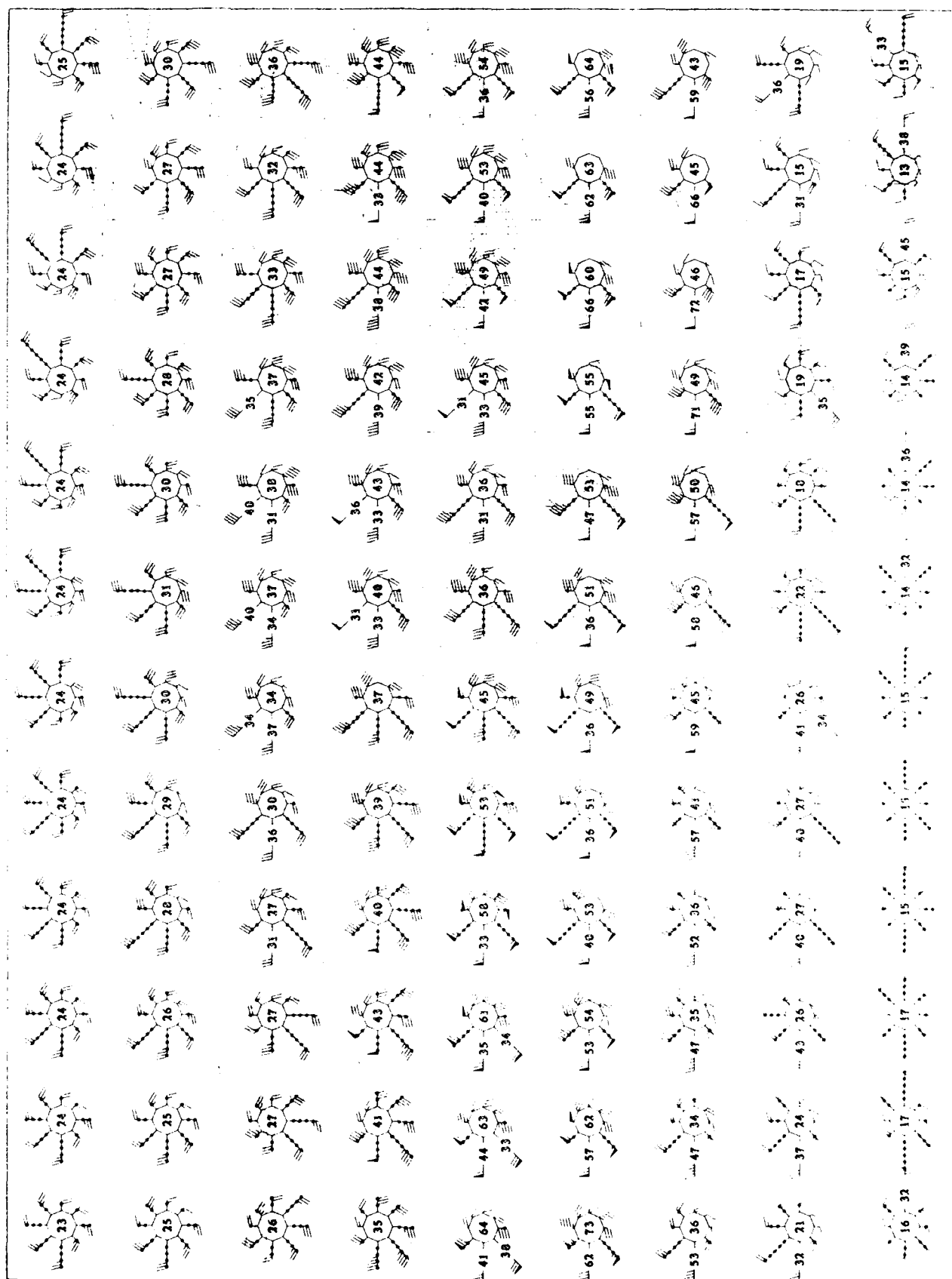


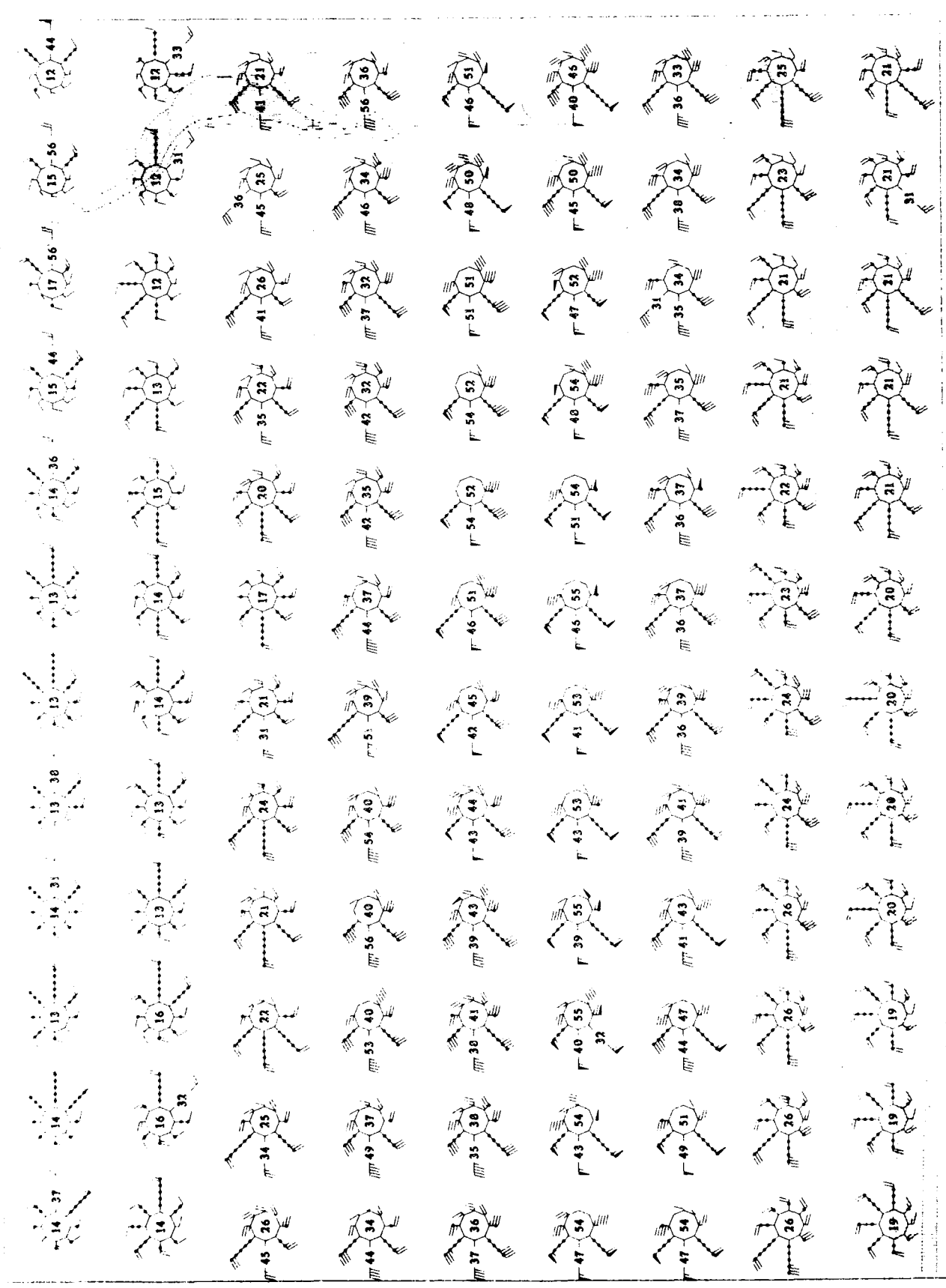


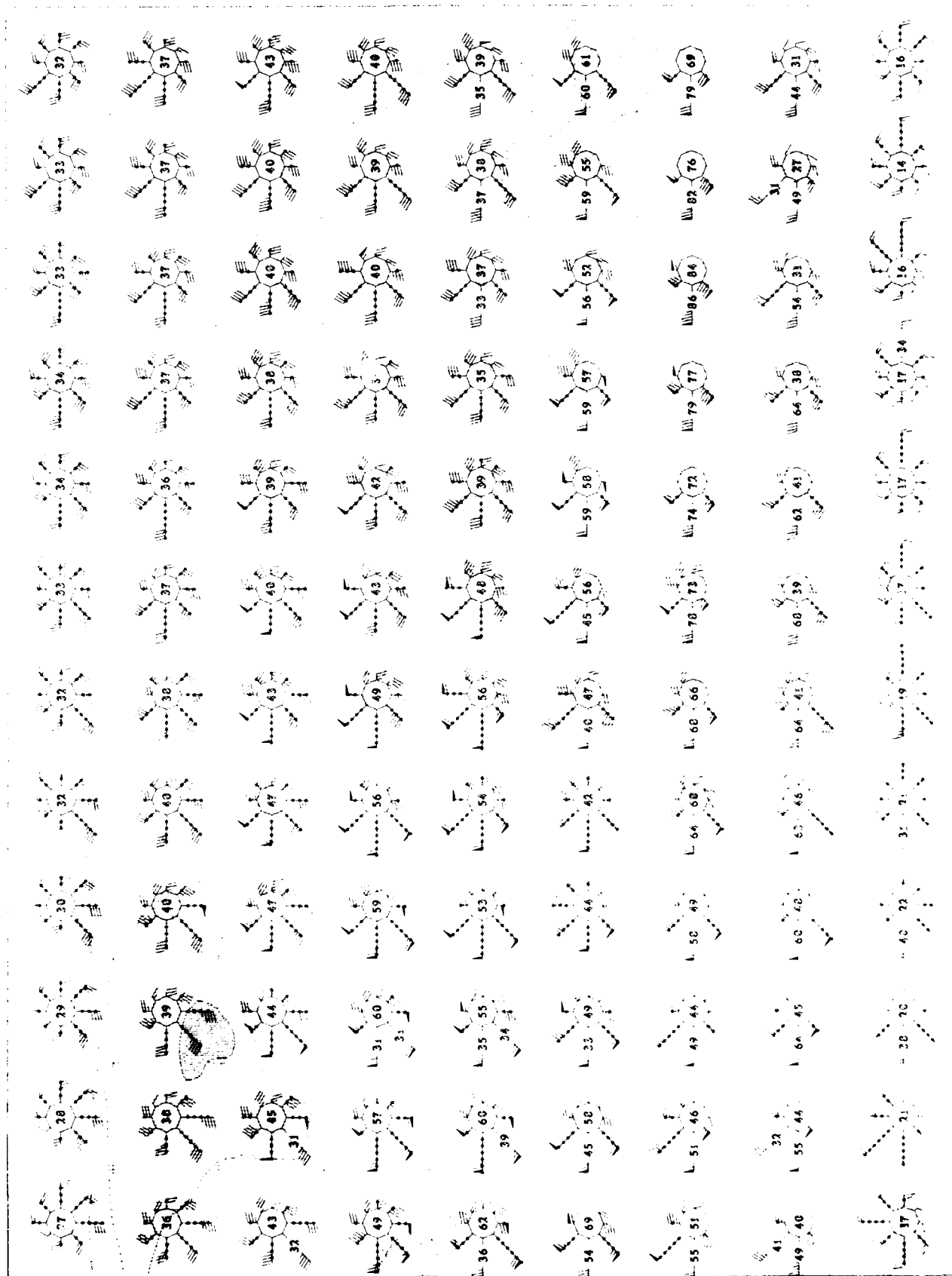


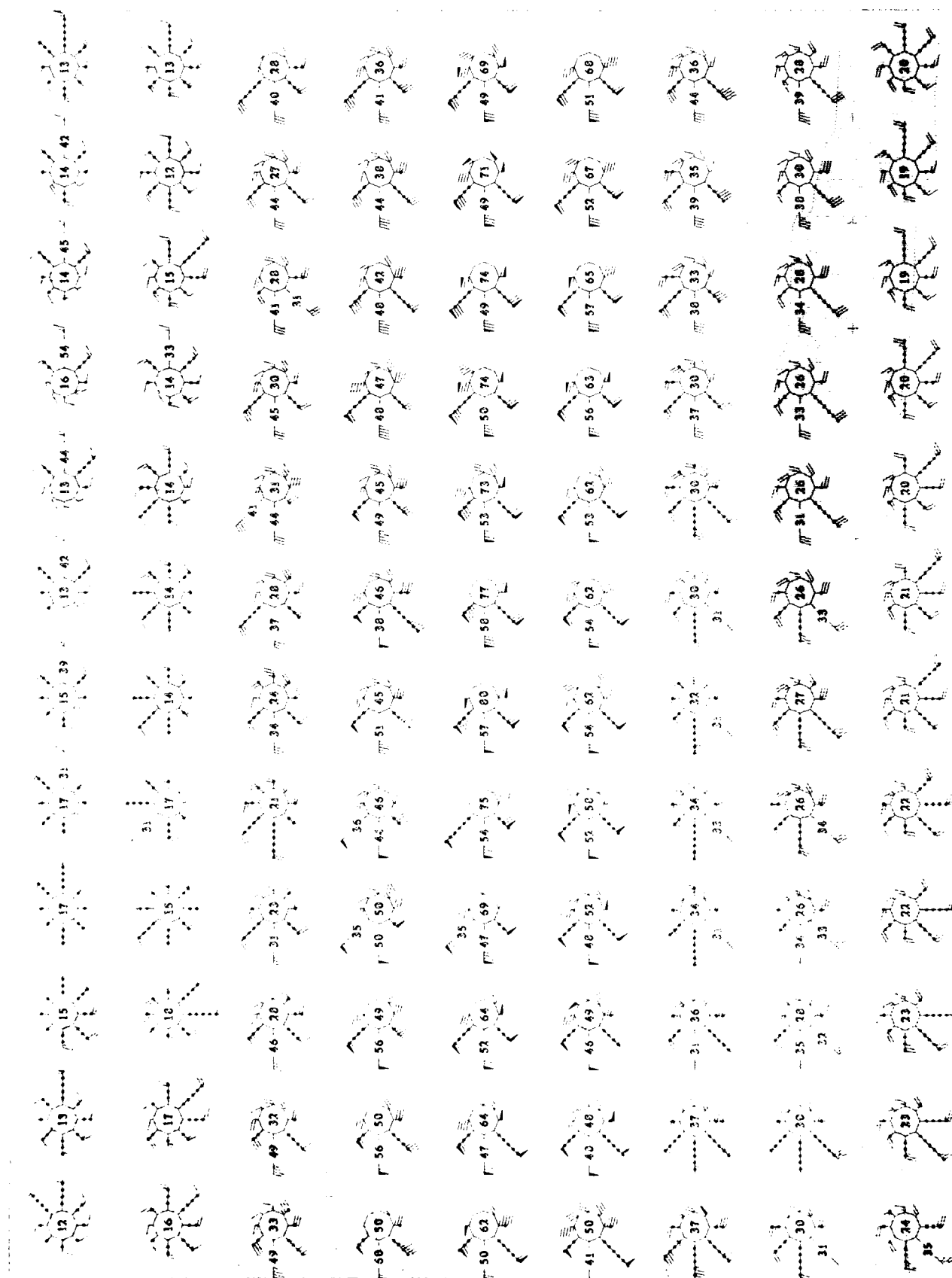


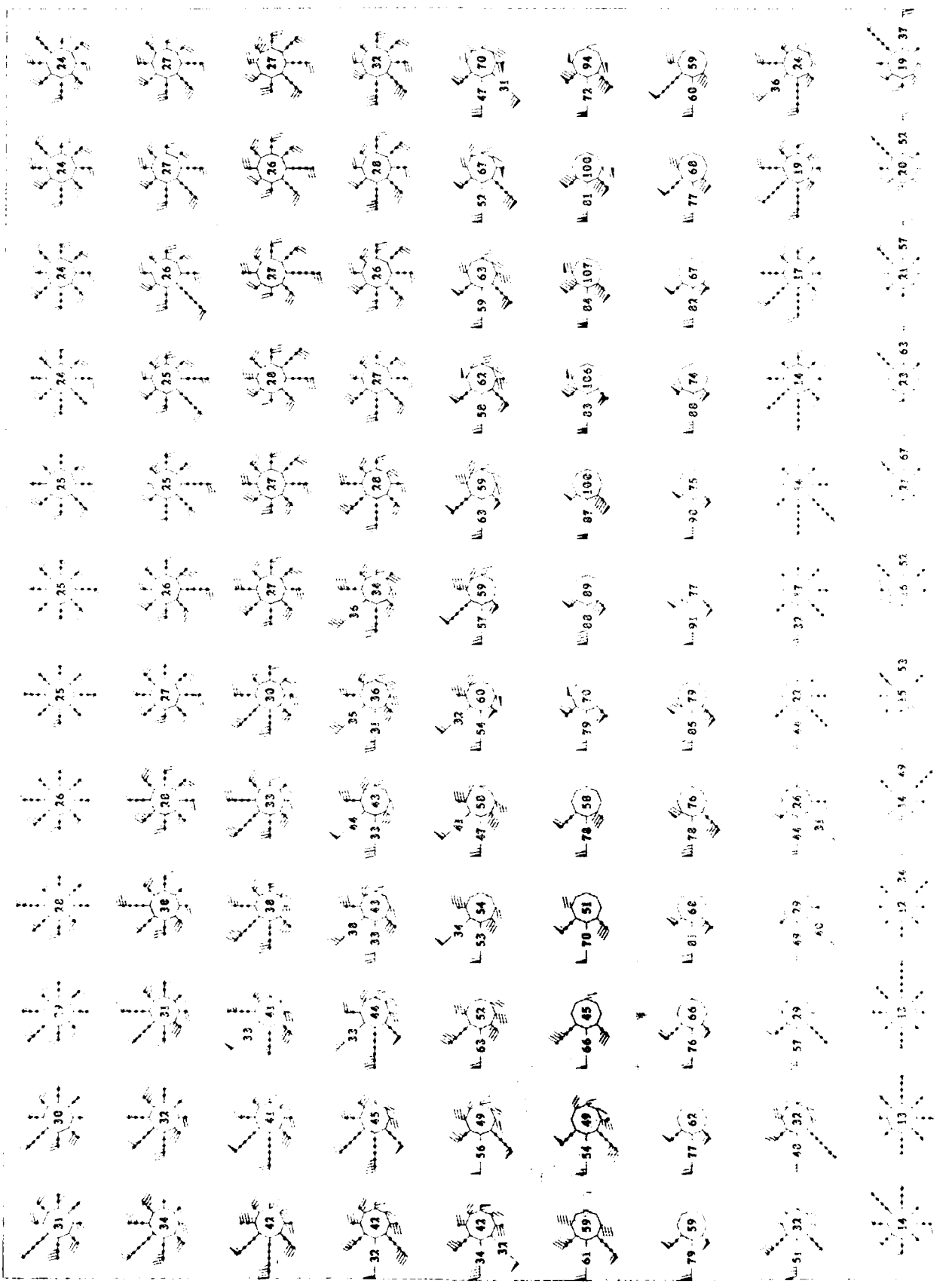


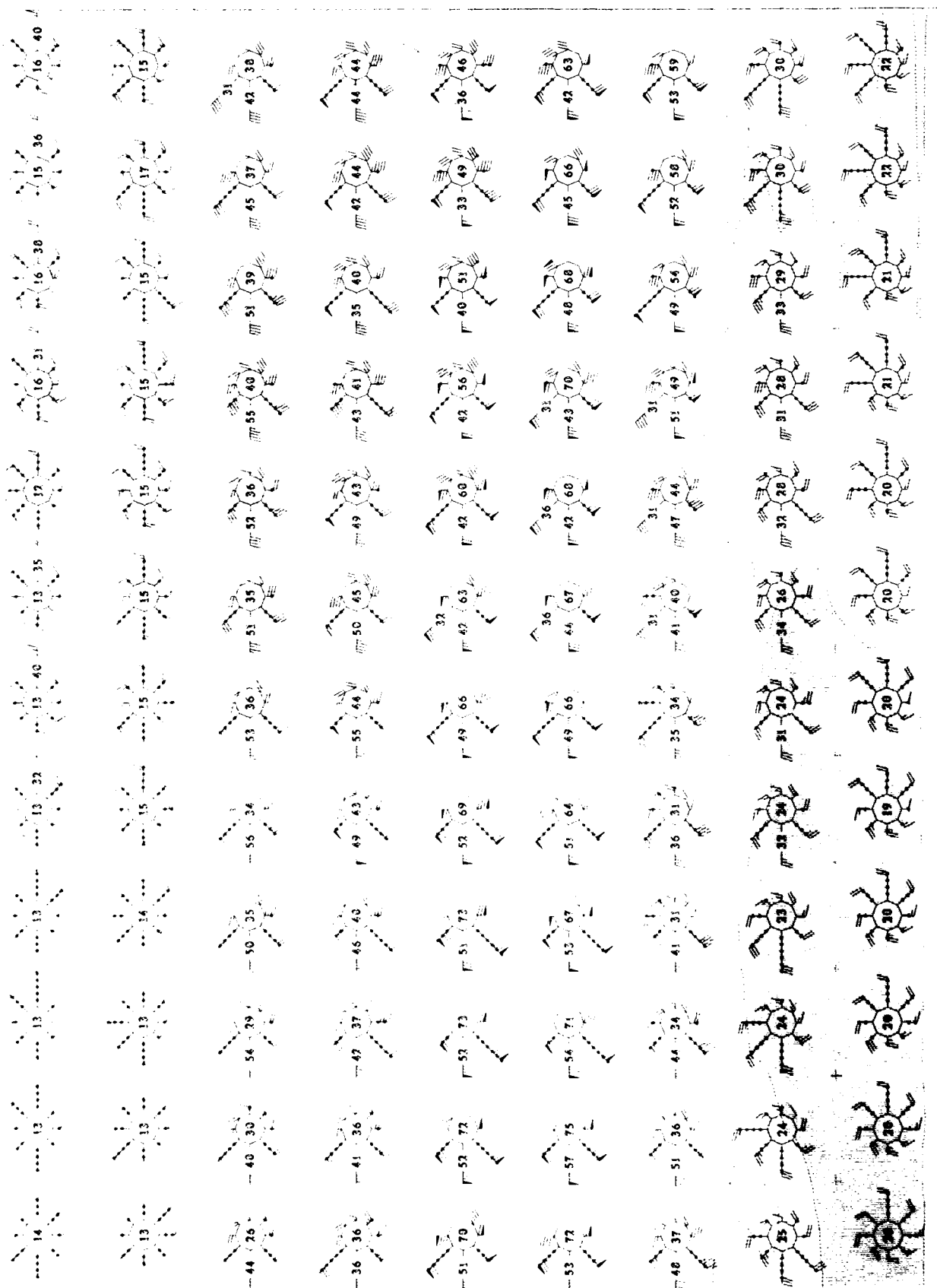










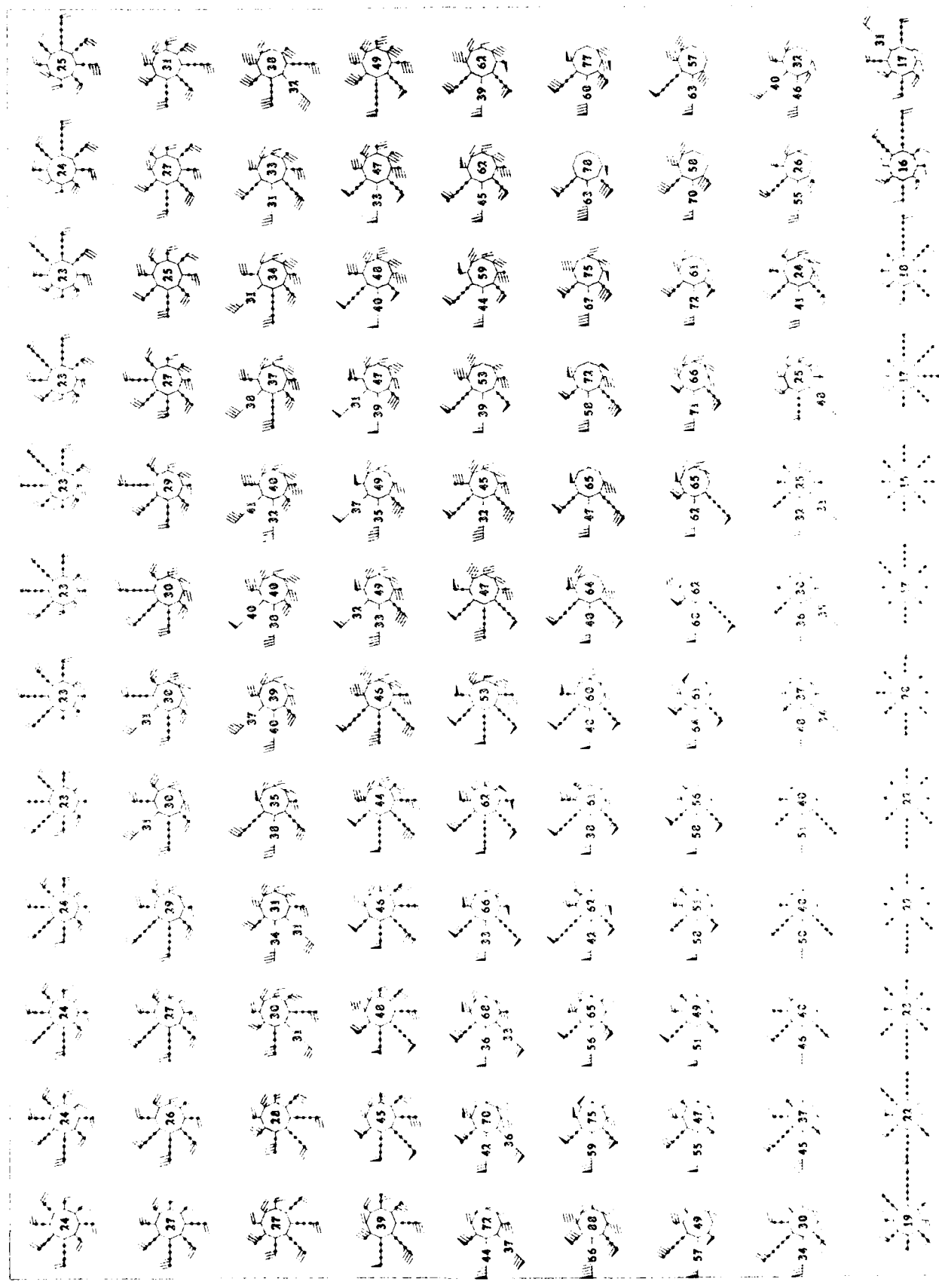


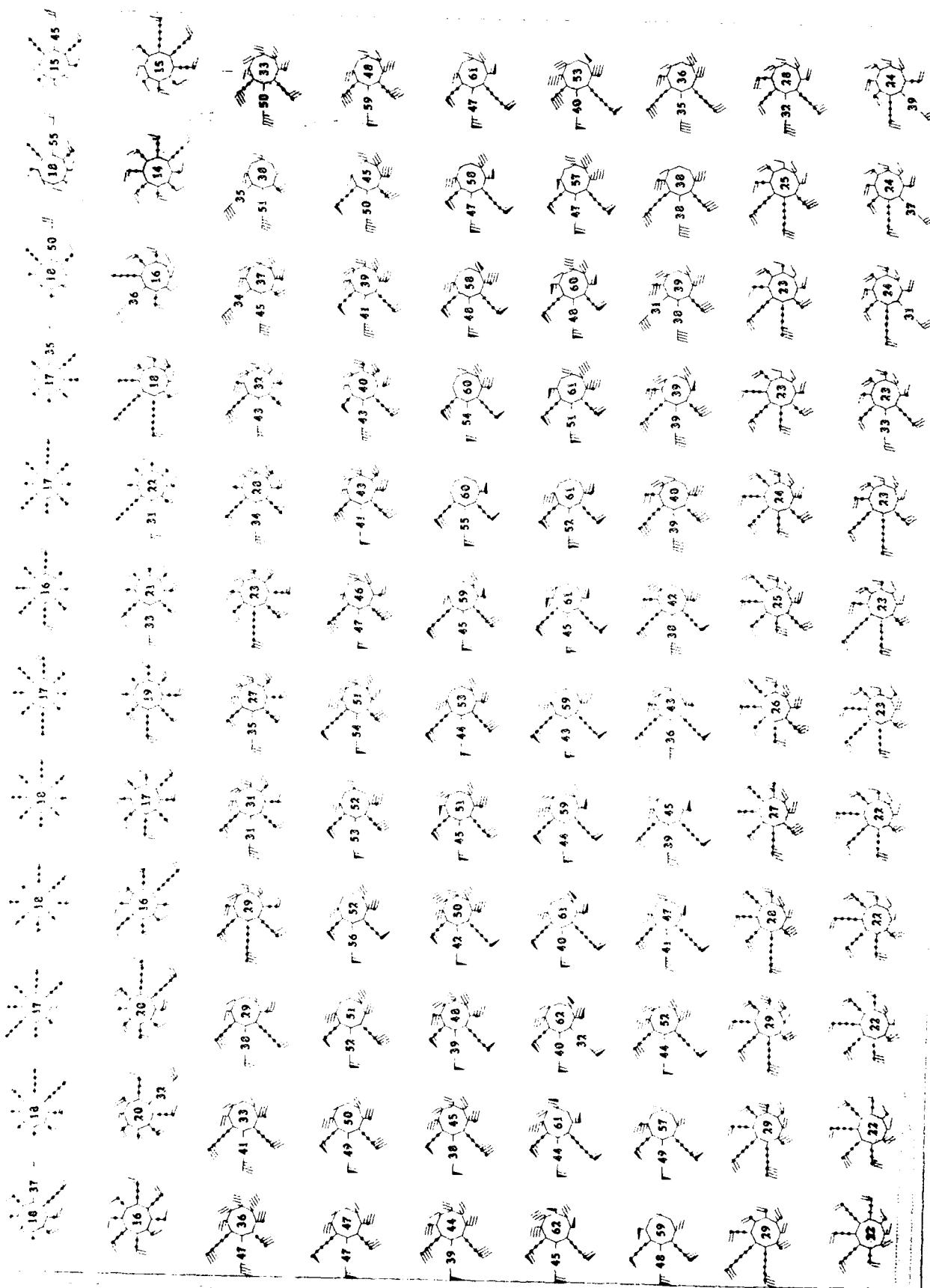
Upper Airway
Circulation Monitoring

24 30 40 50 60 70 80 90 100
 110 120 130 140 150 160 170 180 190 200
 210 220 230 240 250 260 270 280 290 300

310 320 330 340 350 360 370 380 390 400
 410 420 430 440 450 460 470 480 490 500
 510 520 530 540 550 560 570 580 590 600

610 620 630 640 650 660 670 680 690 700
 710 720 730 740 750 760 770 780 790 800
 810 820 830 840 850 860 870 880 890 900



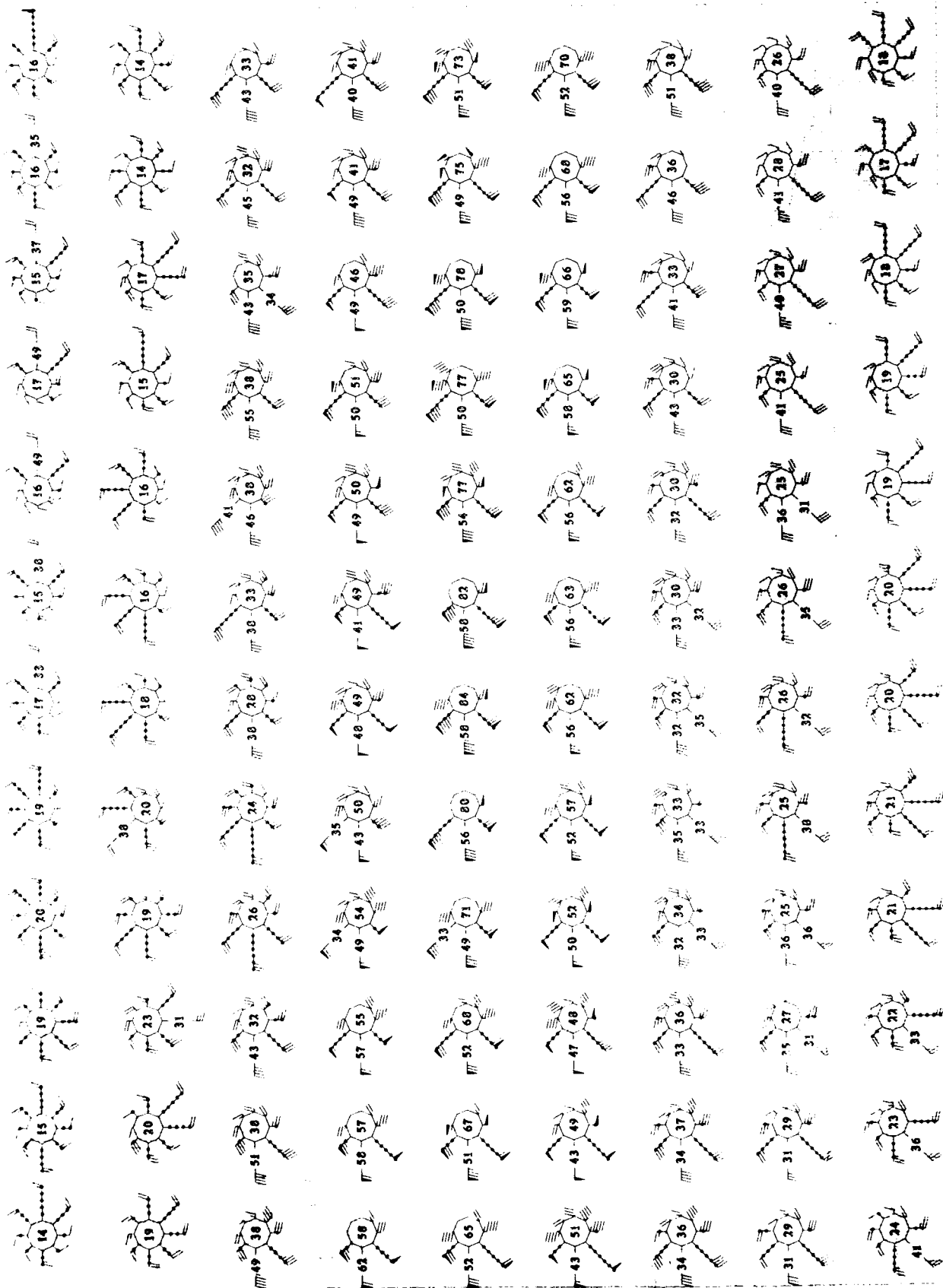


March
201 MG

March 2011

March 2011
March 2011
March 2011

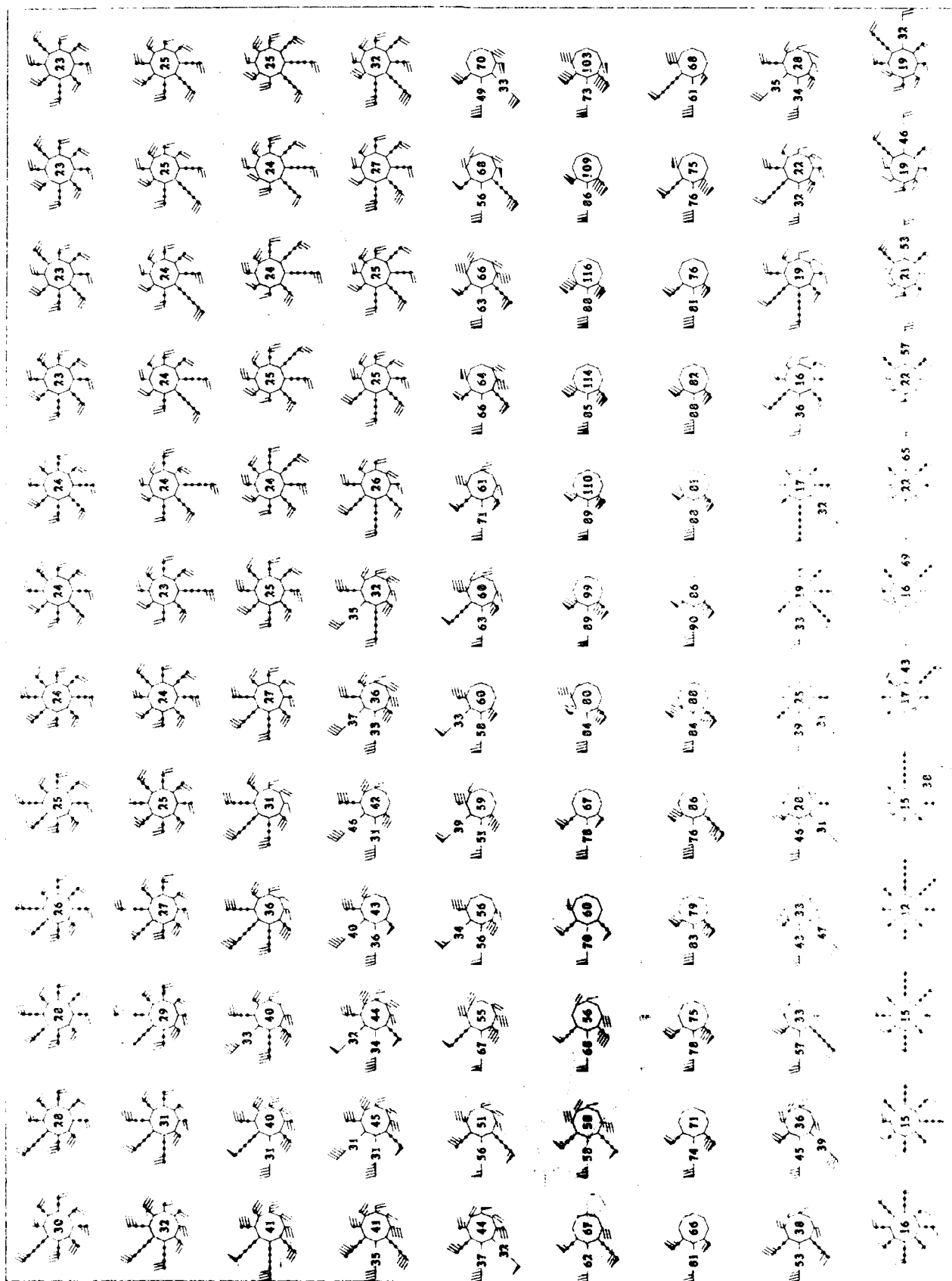




Upper and Lower
Cervical Heterophoria

Figure 100

March
2000



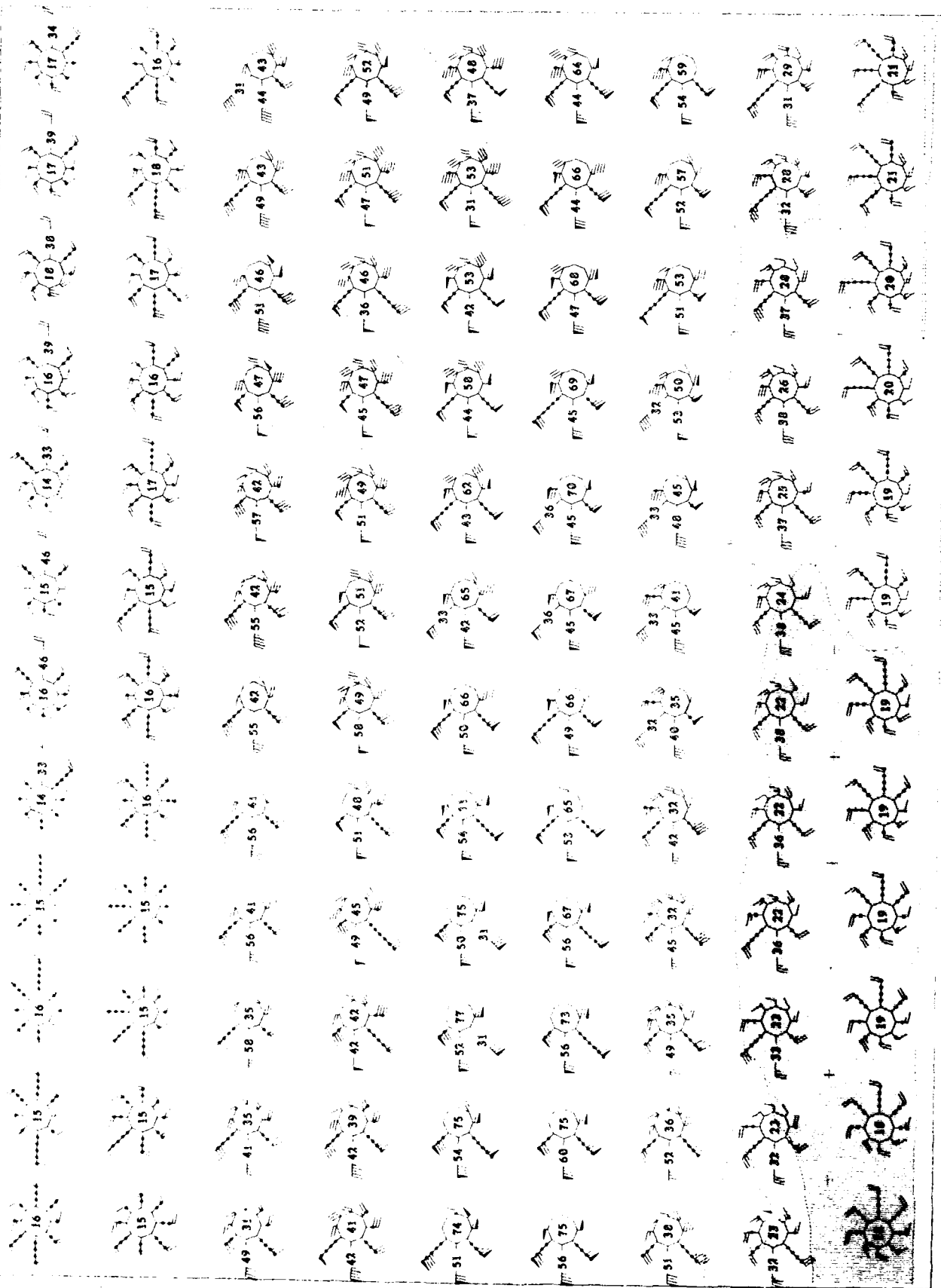
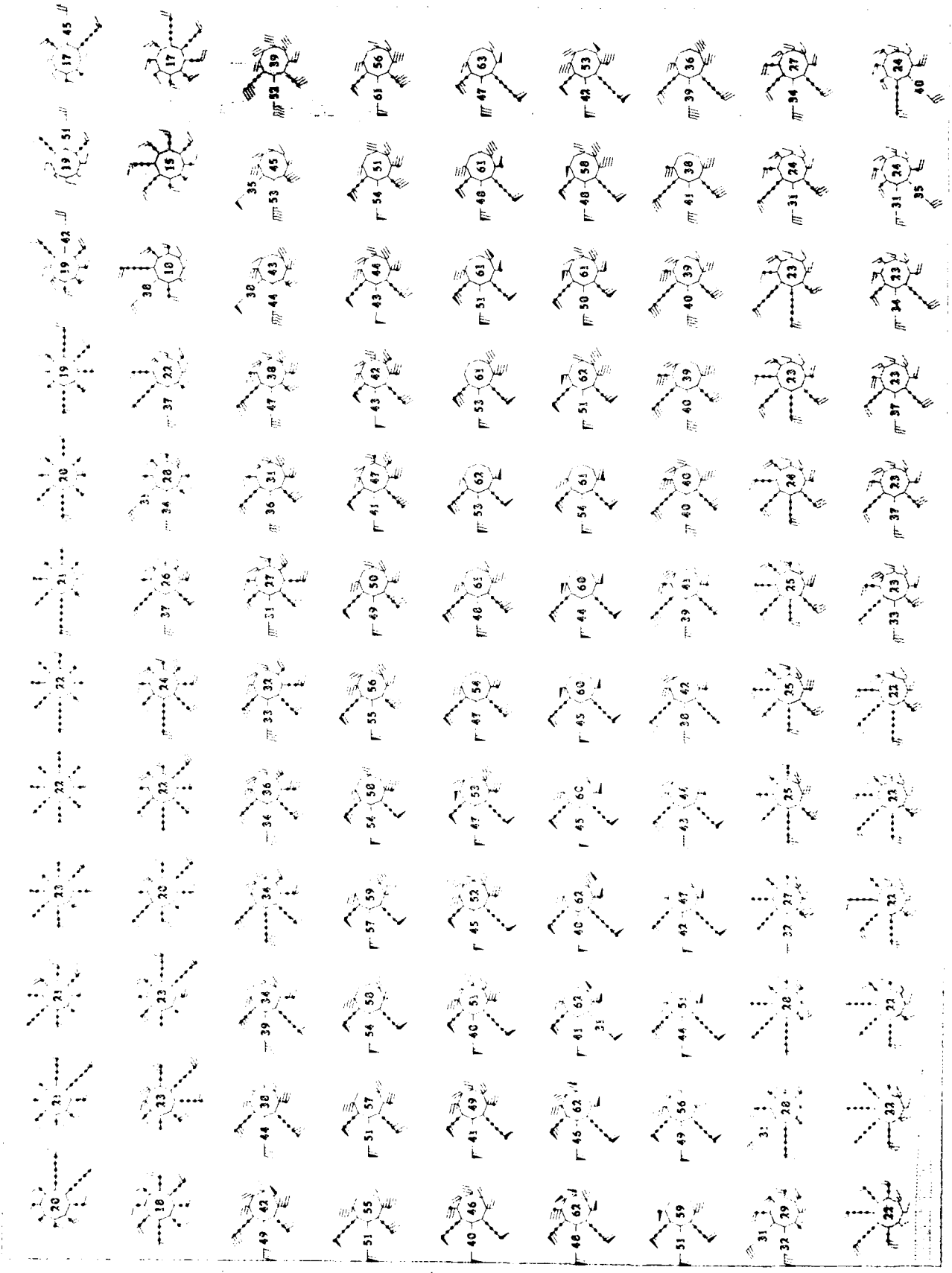


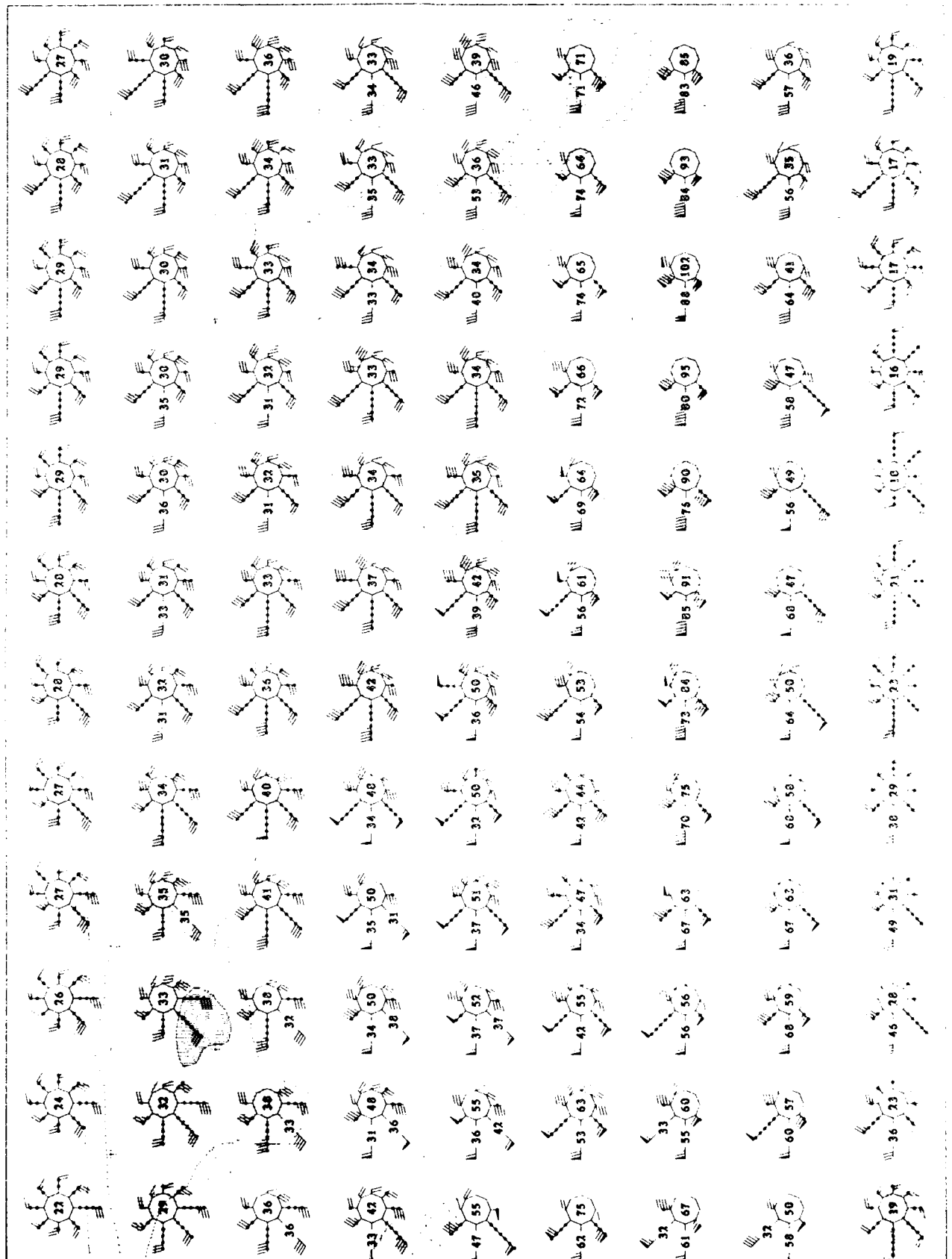
Figure 100: A grid of 100 stylized figures, each with a central circle and radiating lines, arranged in 10 rows and 10 columns. Each figure has a unique number and a specific pose. The numbers range from 1 to 100, with some figures having multiple numbers. The figures are arranged in a grid that is 10 rows high and 10 columns wide. The first row contains figures with numbers 16, 15, 16, 15, 14, 14, 16, 17, 17, 17. The second row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The third row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The fourth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The fifth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The sixth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The seventh row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The eighth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The ninth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The tenth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15.

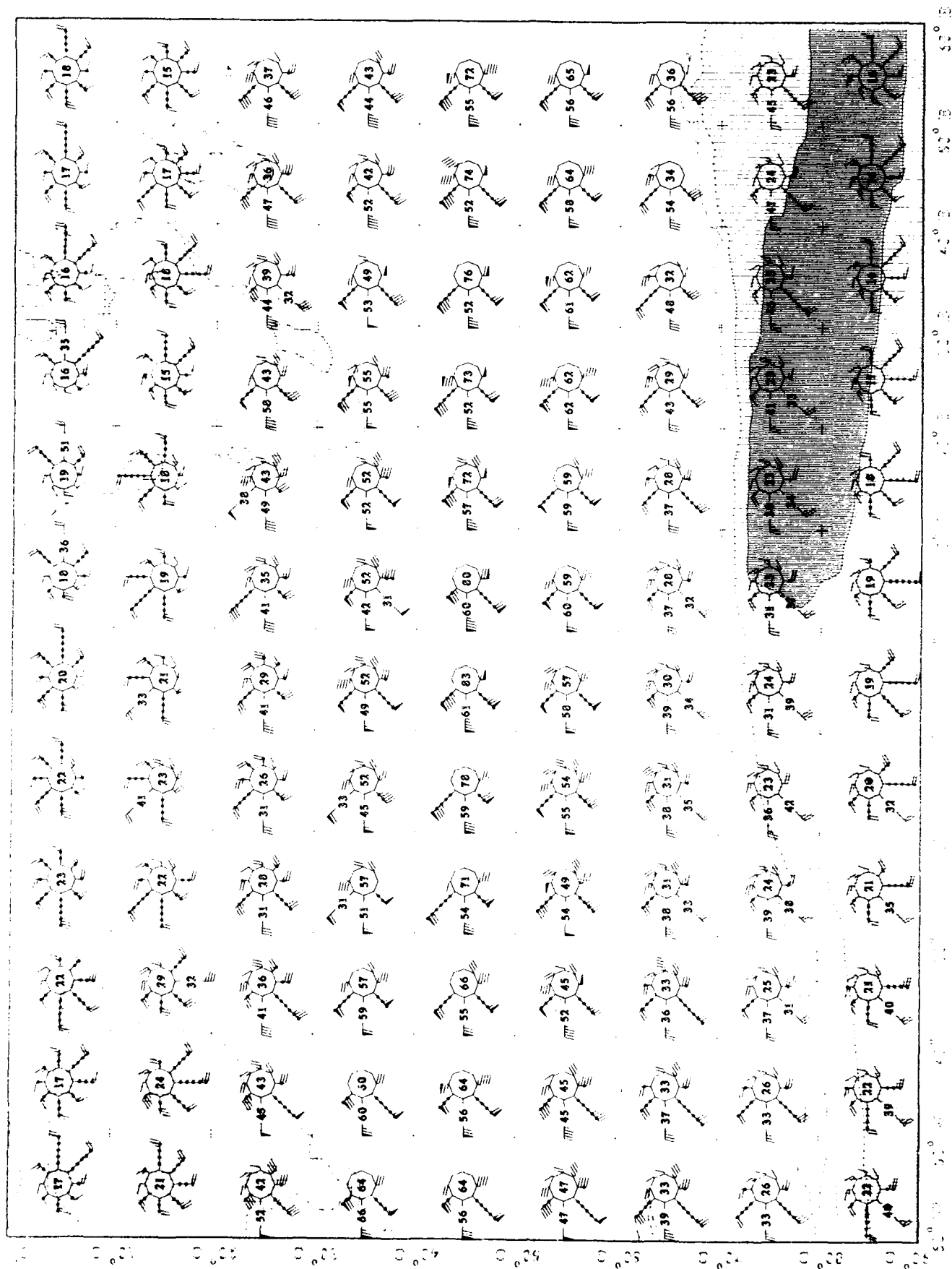
Figure 100: A grid of 100 stylized figures, each with a central circle and radiating lines, arranged in 10 rows and 10 columns. Each figure has a unique number and a specific pose. The numbers range from 1 to 100, with some figures having multiple numbers. The figures are arranged in a grid that is 10 rows high and 10 columns wide. The first row contains figures with numbers 16, 15, 16, 15, 14, 14, 16, 17, 17, 17. The second row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The third row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The fourth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The fifth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The sixth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The seventh row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The eighth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The ninth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The tenth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15.

Figure 100: A grid of 100 stylized figures, each with a central circle and radiating lines, arranged in 10 rows and 10 columns. Each figure has a unique number and a specific pose. The numbers range from 1 to 100, with some figures having multiple numbers. The figures are arranged in a grid that is 10 rows high and 10 columns wide. The first row contains figures with numbers 16, 15, 16, 15, 14, 14, 16, 17, 17, 17. The second row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The third row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The fourth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The fifth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The sixth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The seventh row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The eighth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The ninth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15. The tenth row contains figures with numbers 15, 15, 15, 15, 15, 15, 15, 15, 15, 15.









Upper Air Climatology
Southern Hemisphere

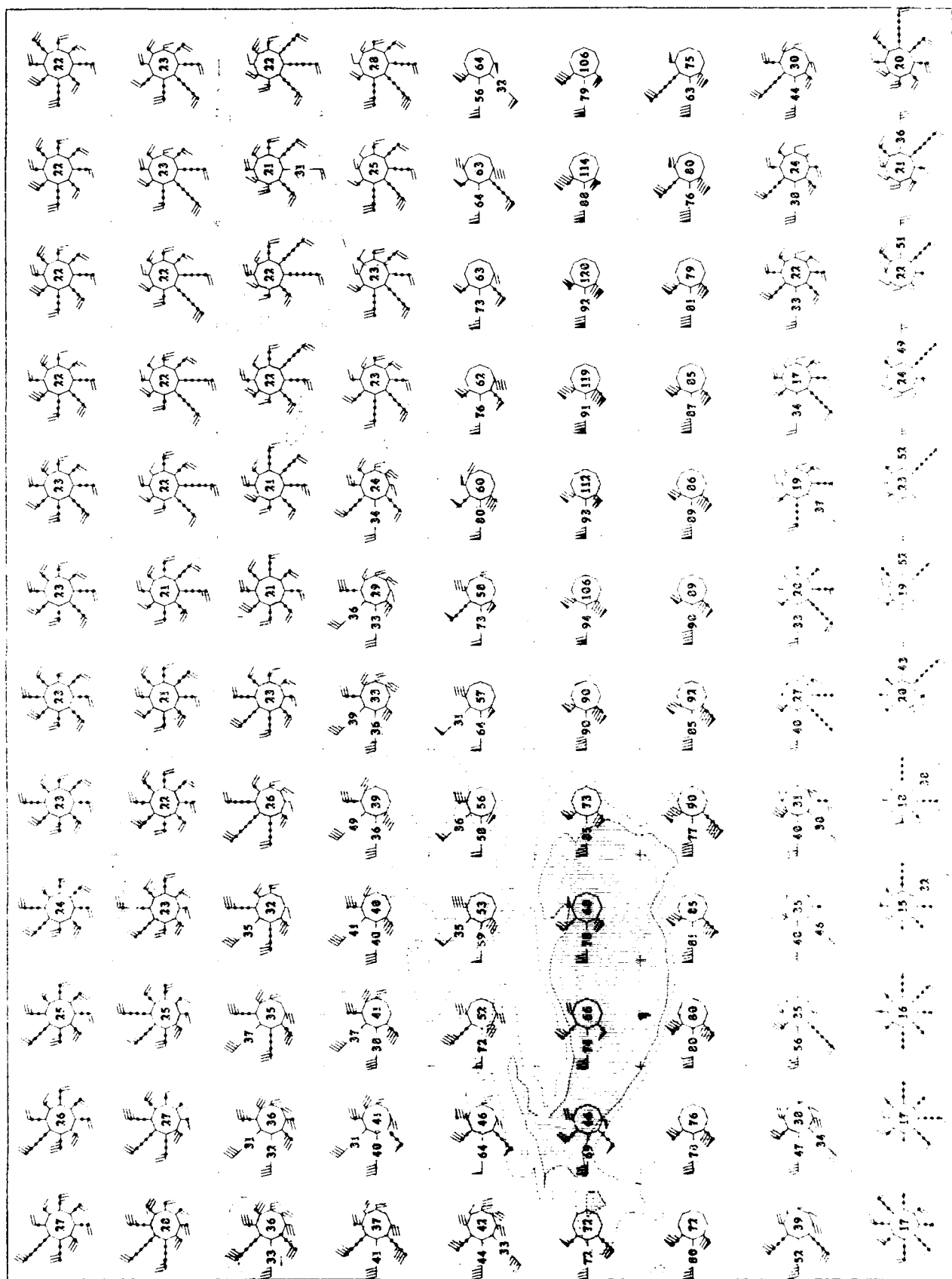
1950-51
1951-52

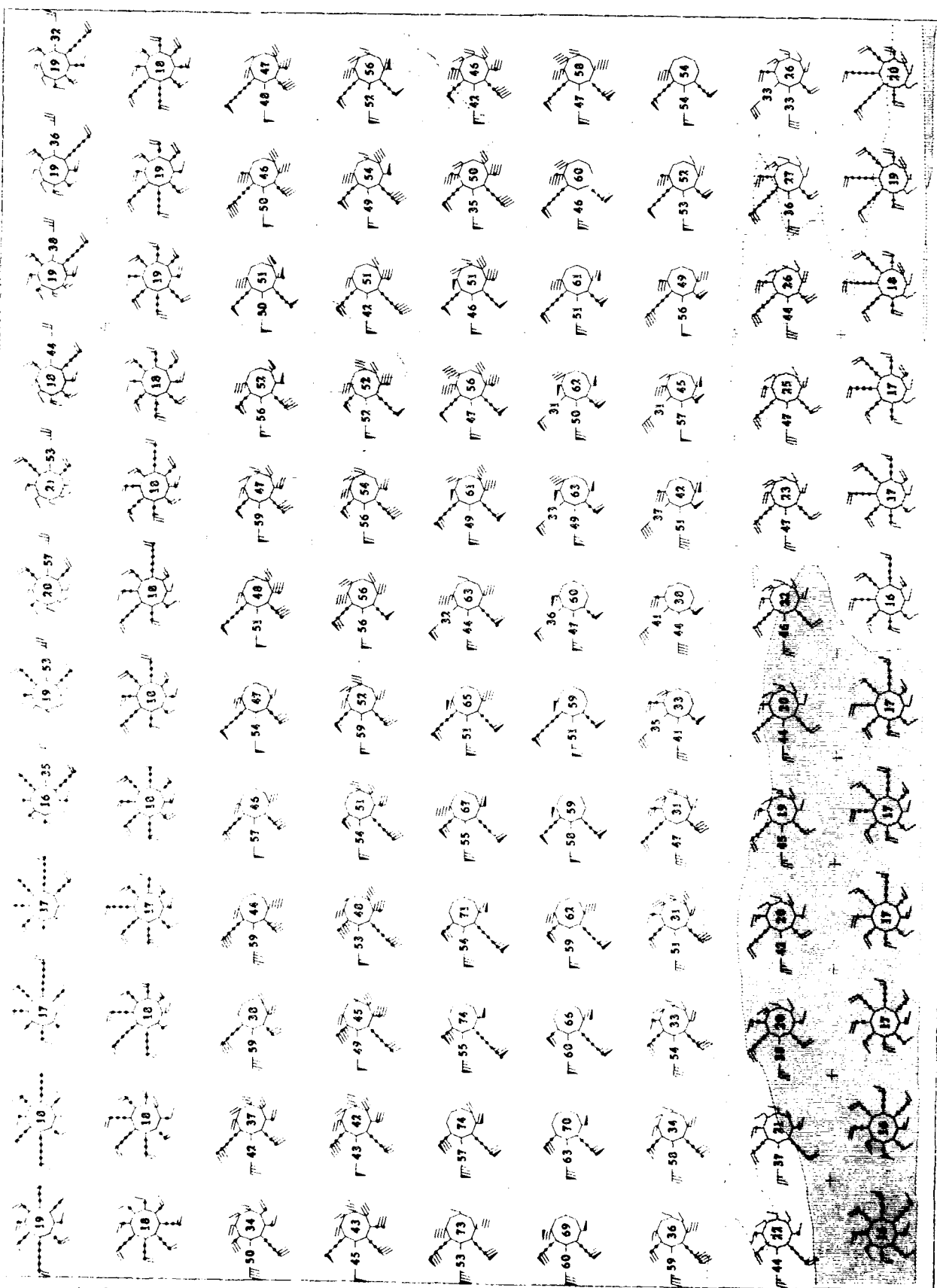
March
200 hrs

1900-1901
1902-1903

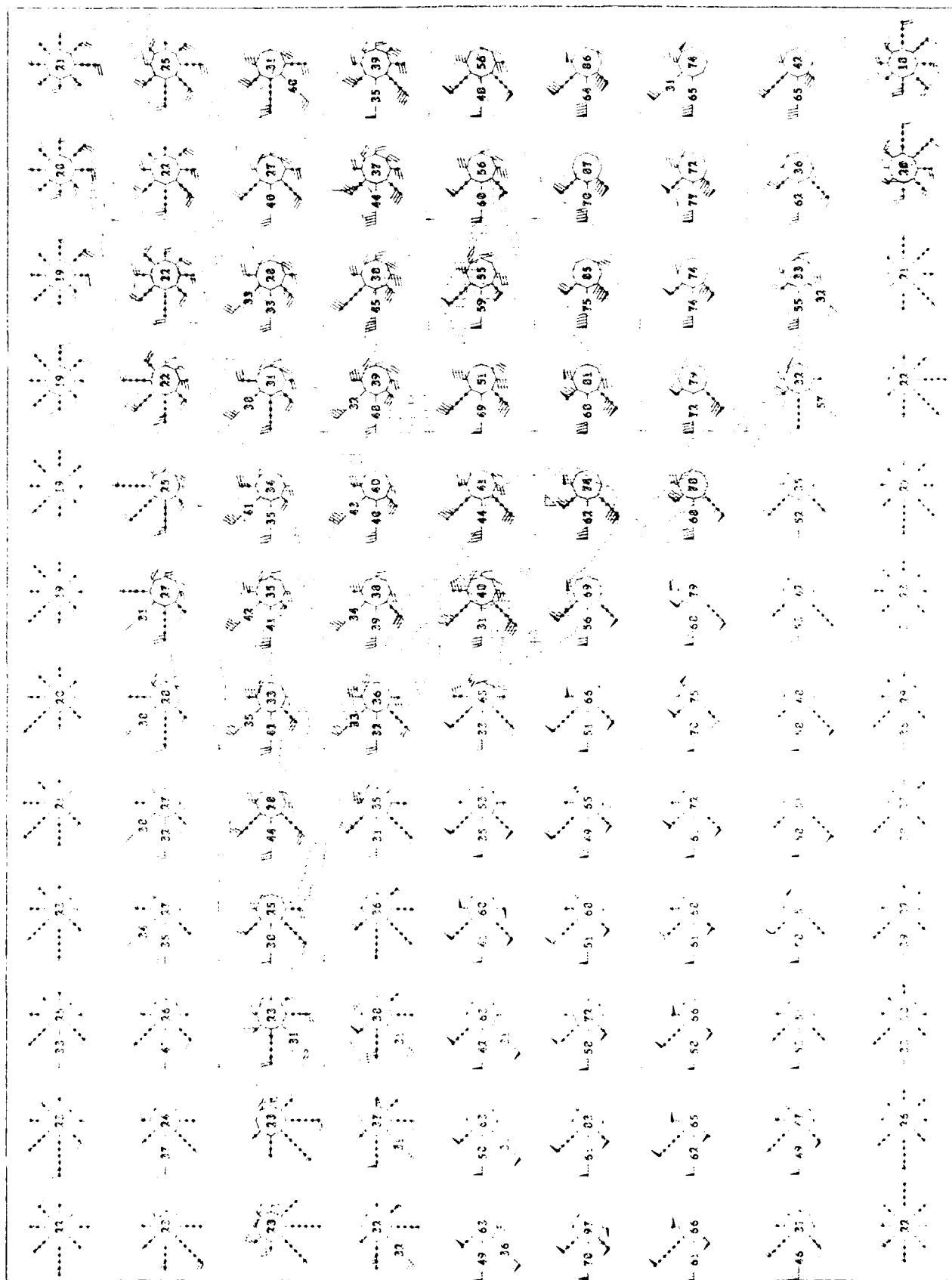
1903-1904
1904-1905

Upper Air Climatology
Northern Hemisphere



Upper Air Climatology
Southern Hemisphere[illegible]

INDEX



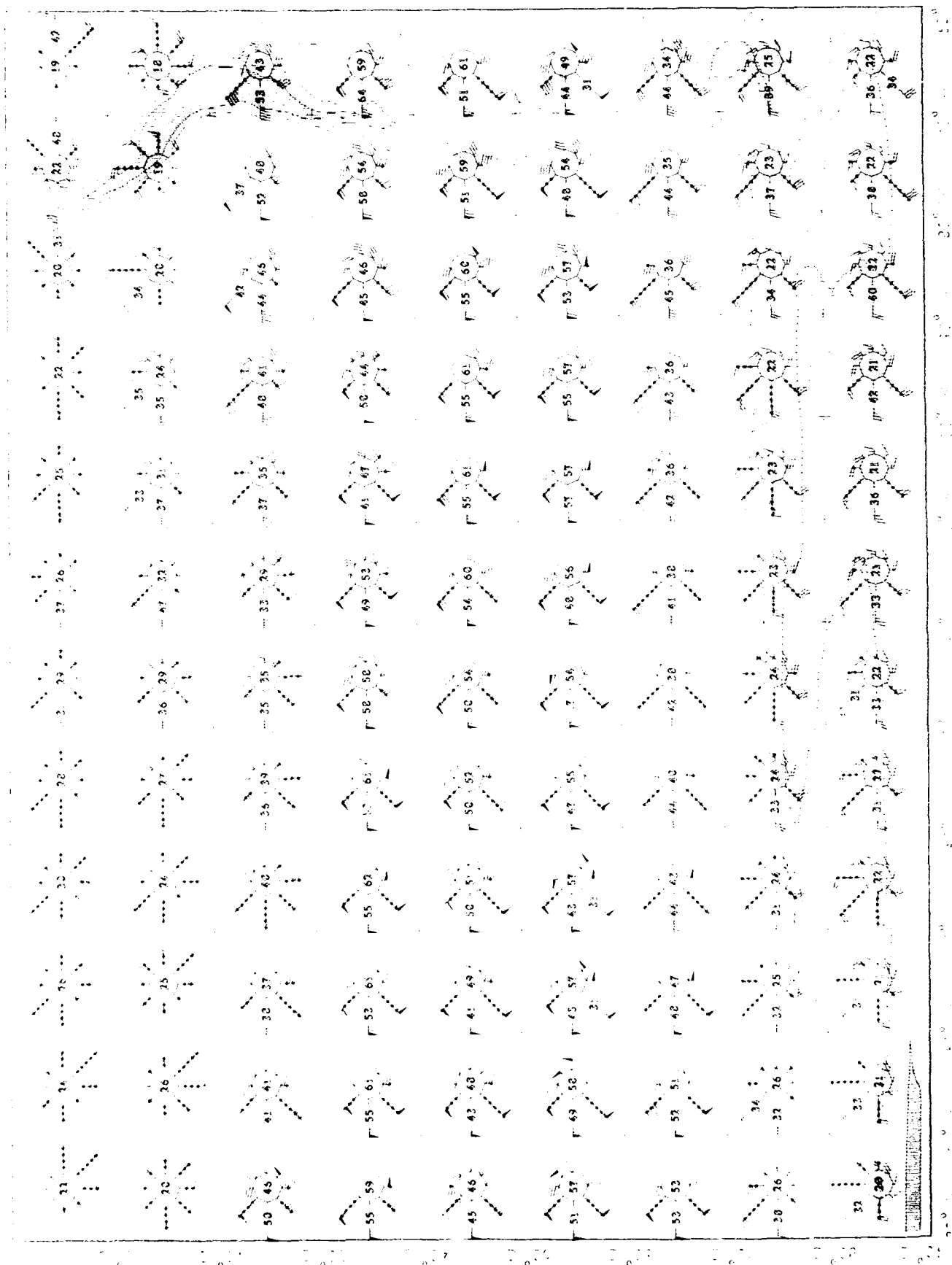
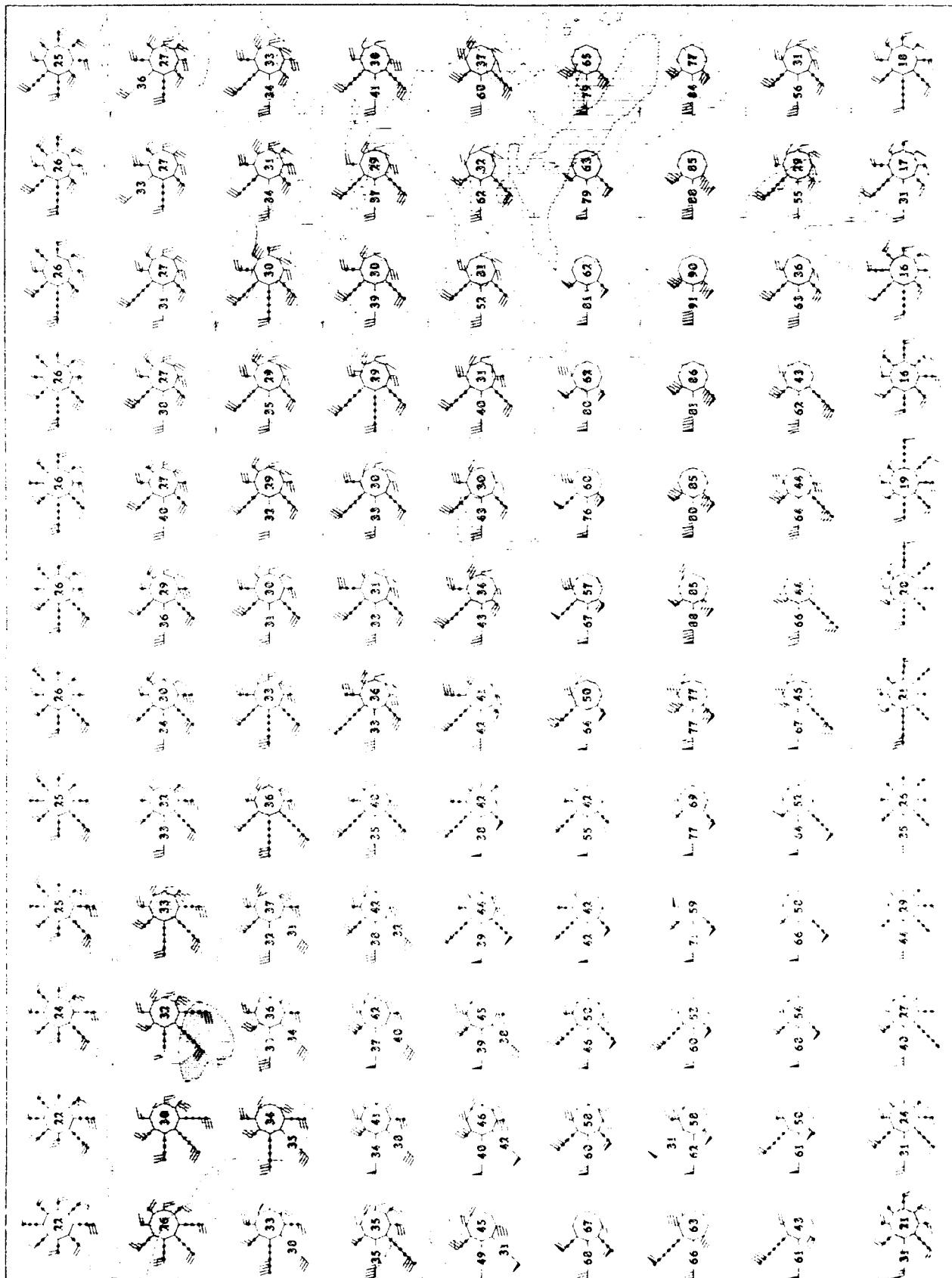
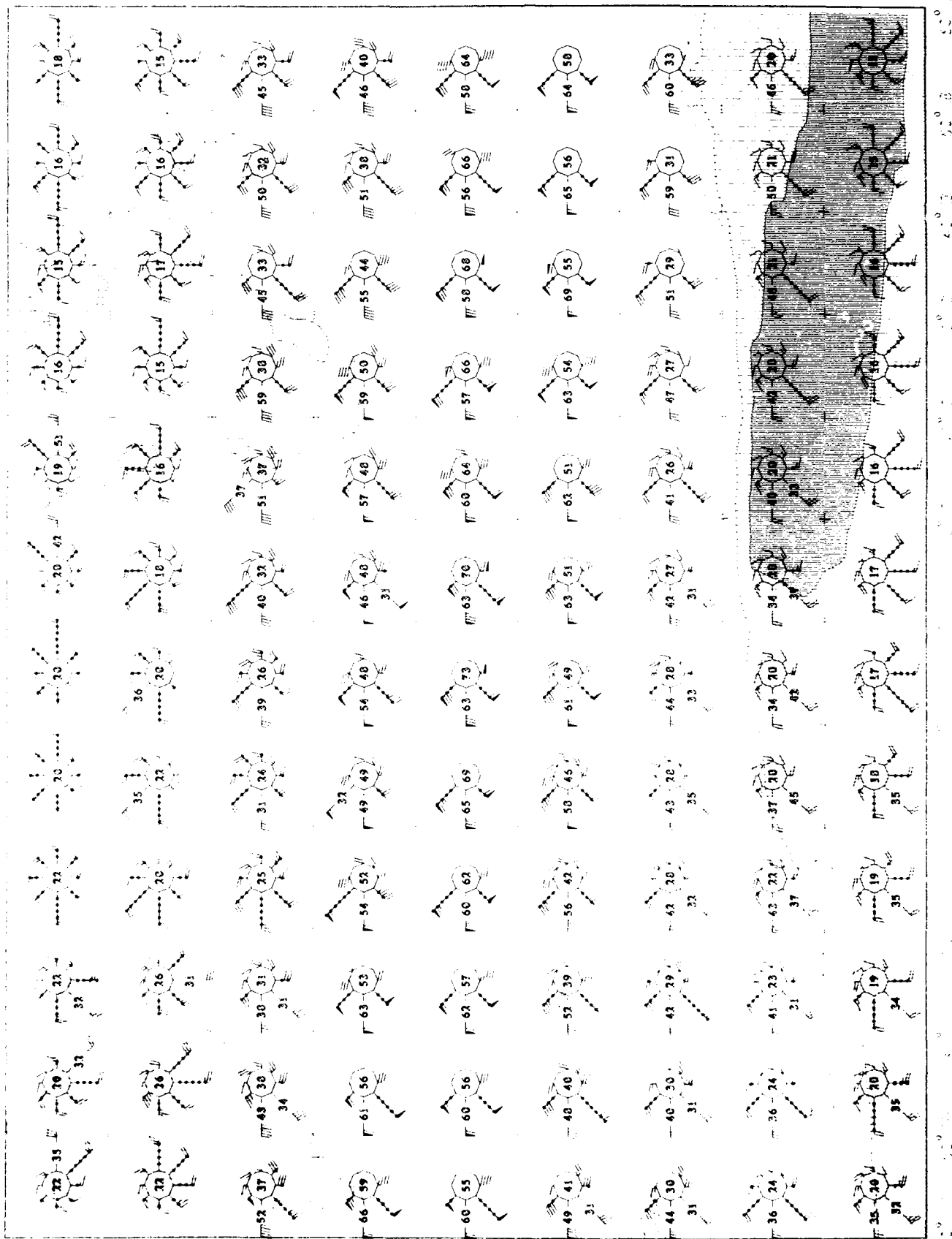


Fig. 2. Stick figures for the purpose of the experiment.

100

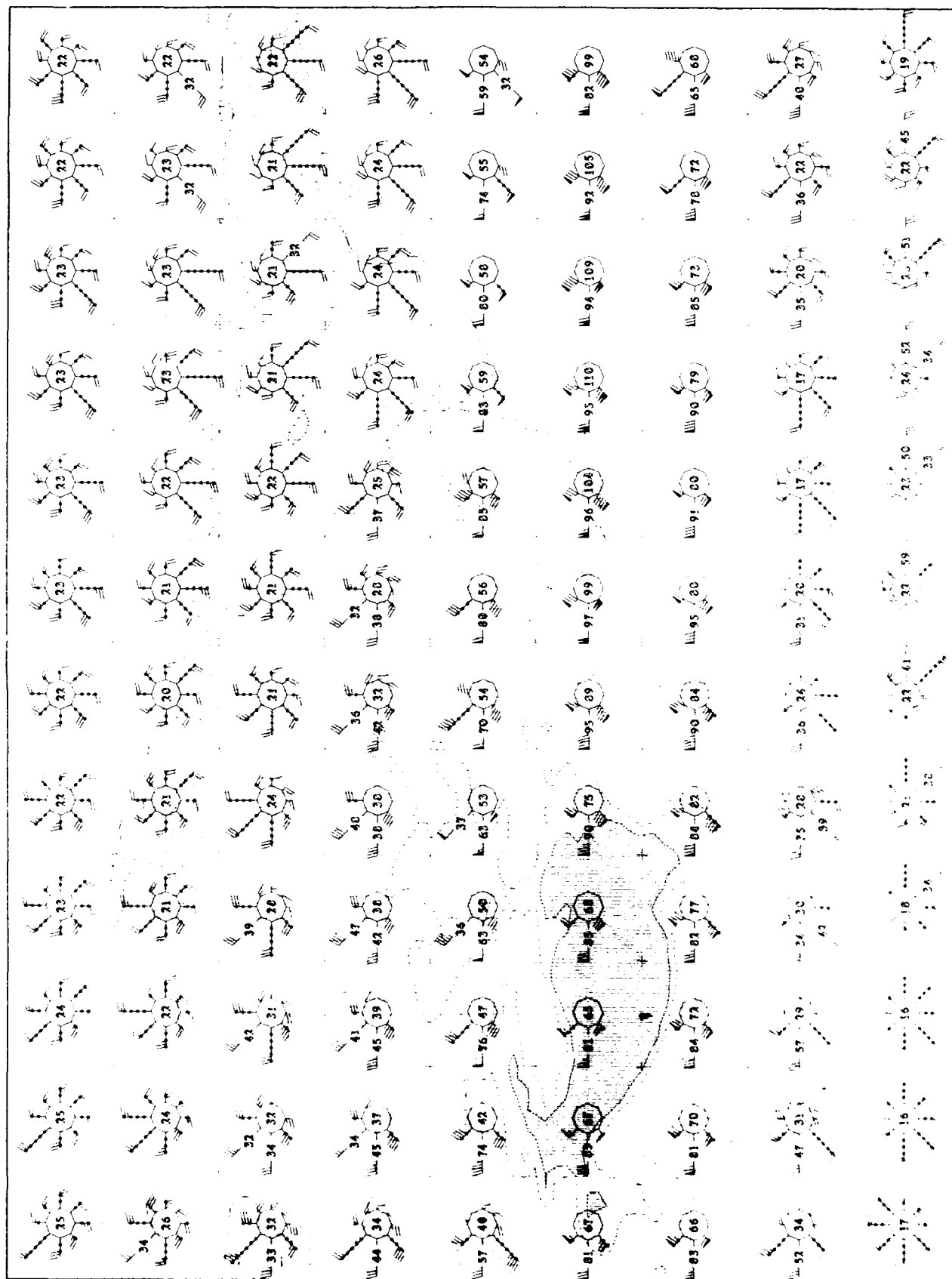


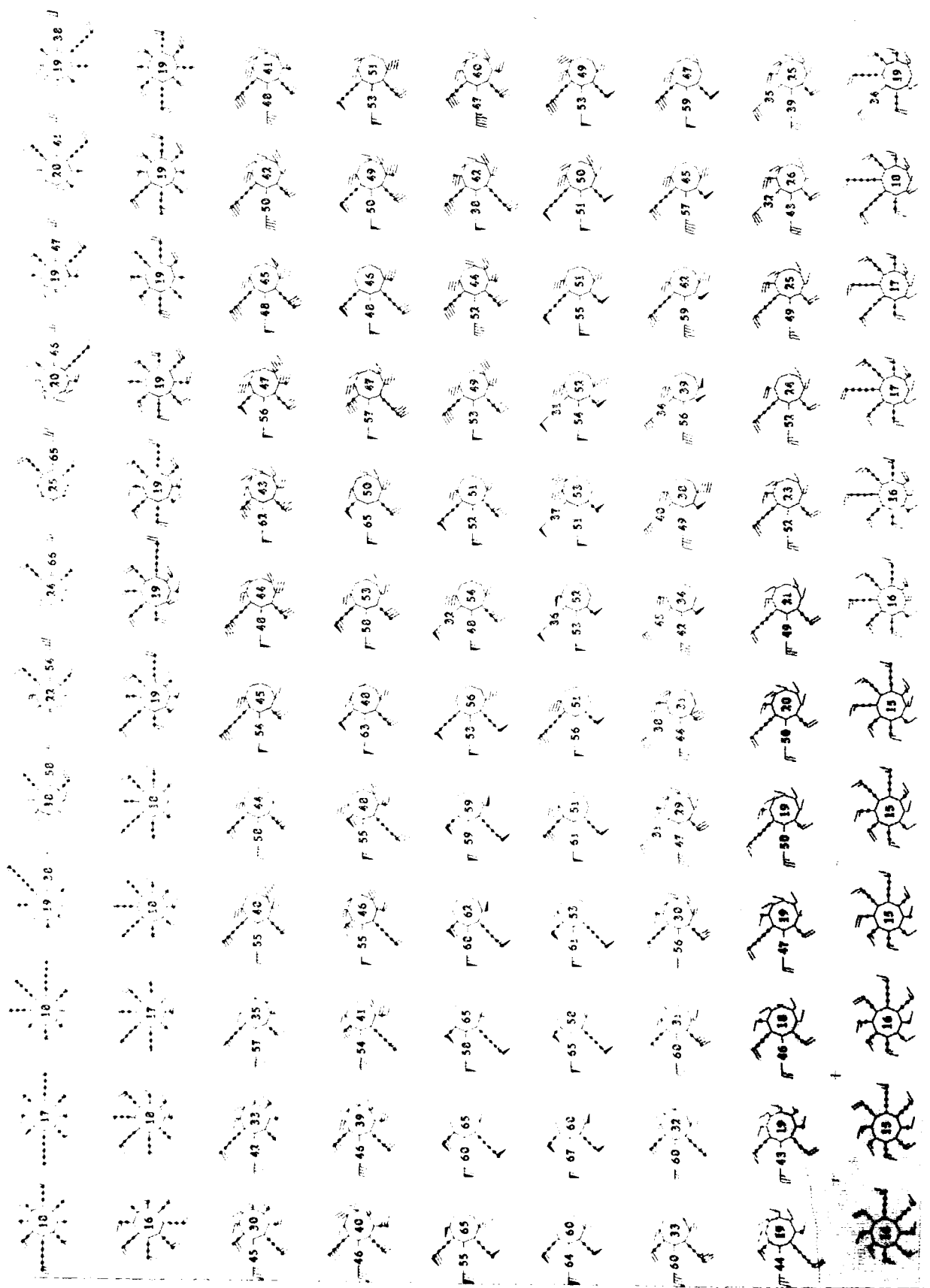


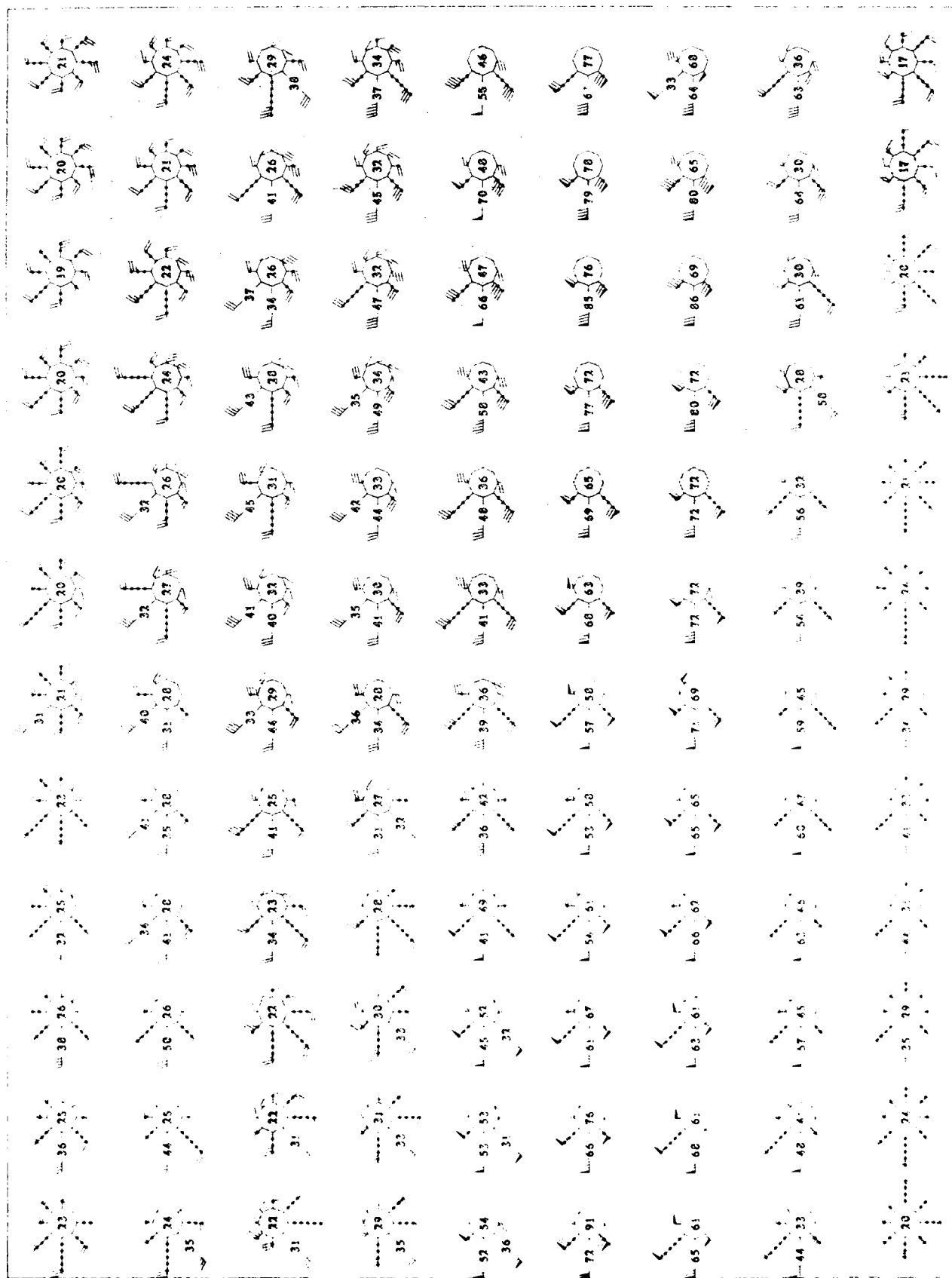
Upper Air Climatology
 Northern Hemisphere

Climate of the
 Northern Hemisphere

March
 1950-1959







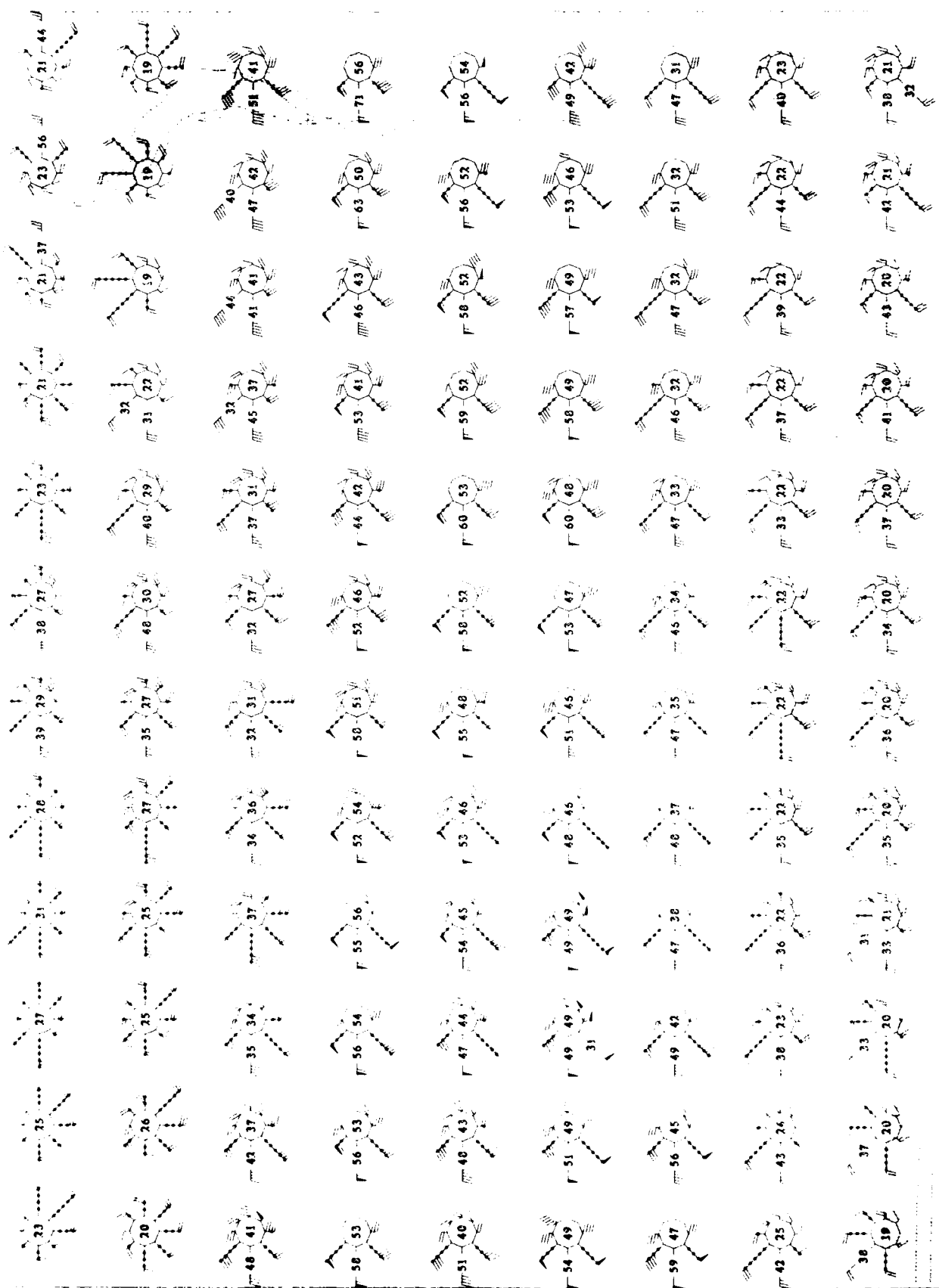
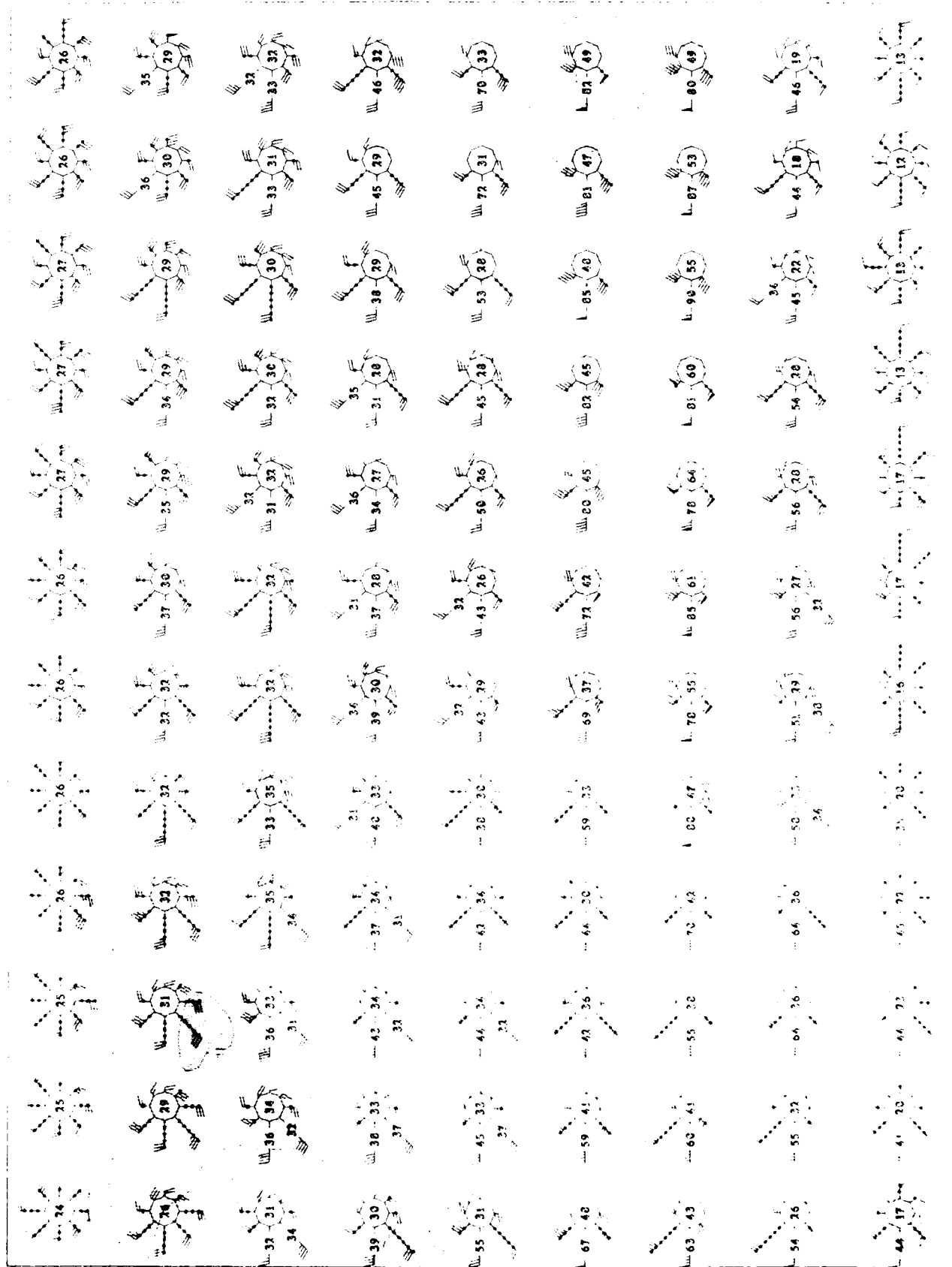


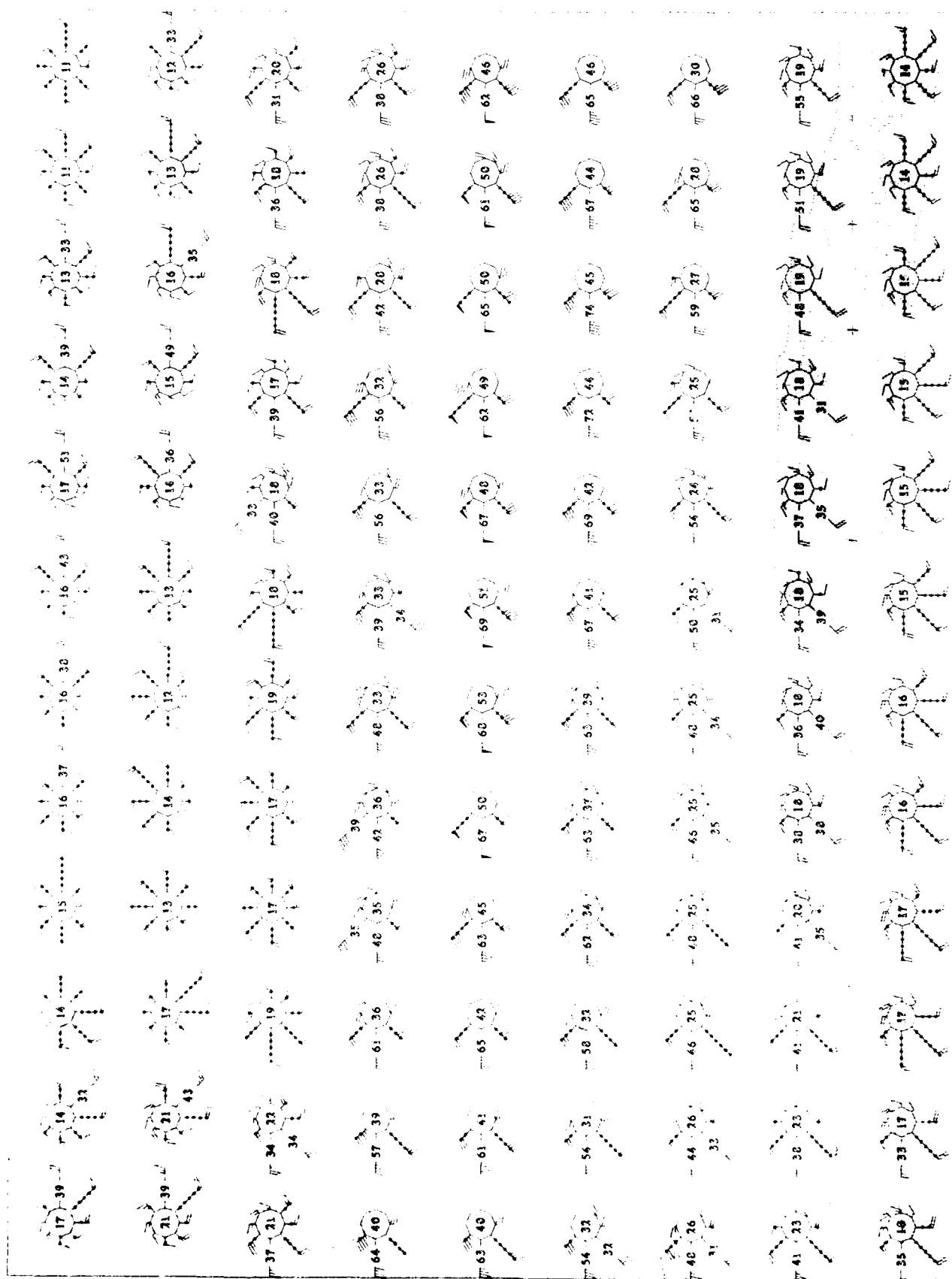
Figure 1: A 10x10 grid of 100 stick figures, each with a unique number and pose.

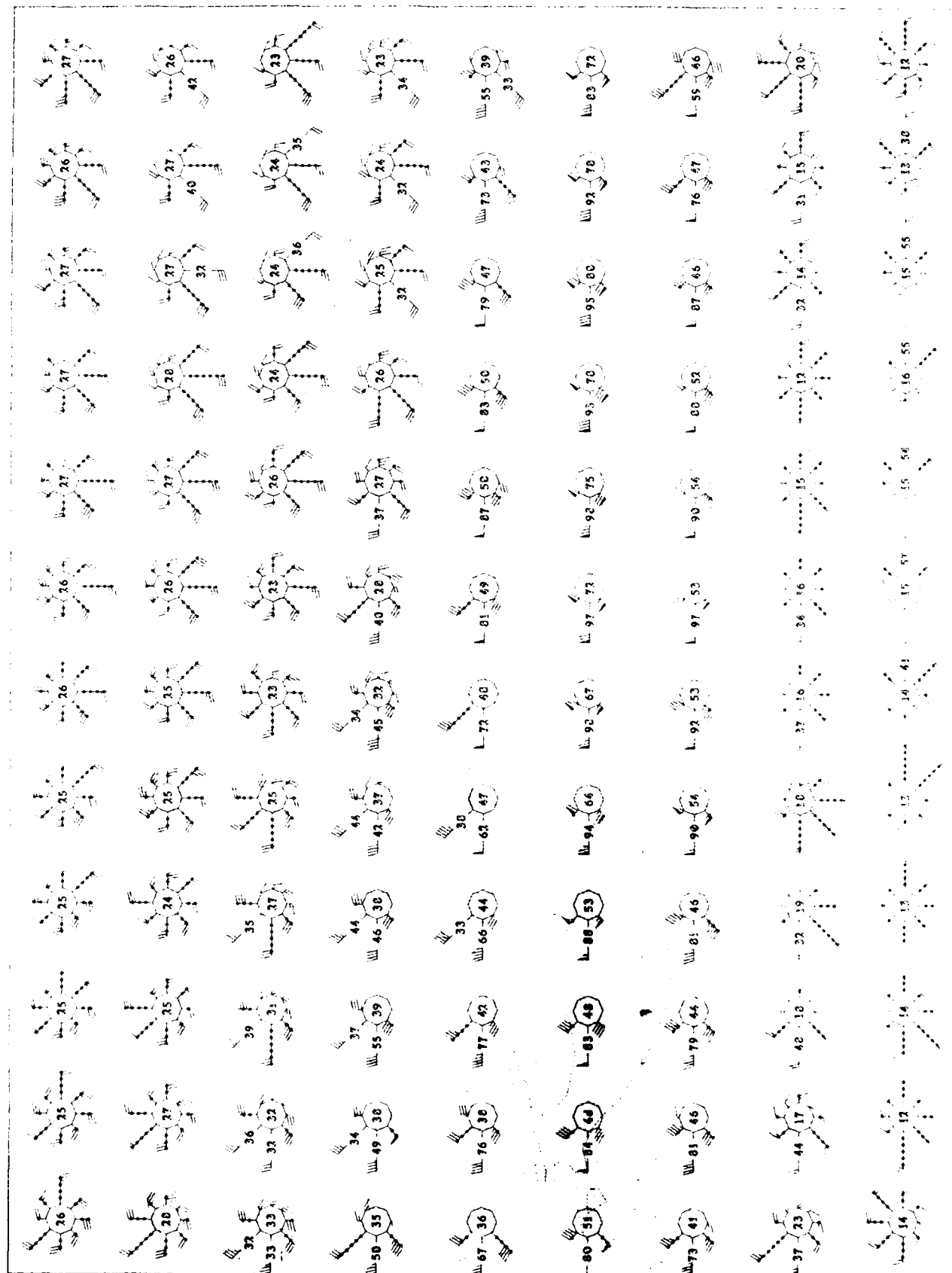
Figure 1: A 10x10 grid of 100 stick figures, each with a unique number and pose.

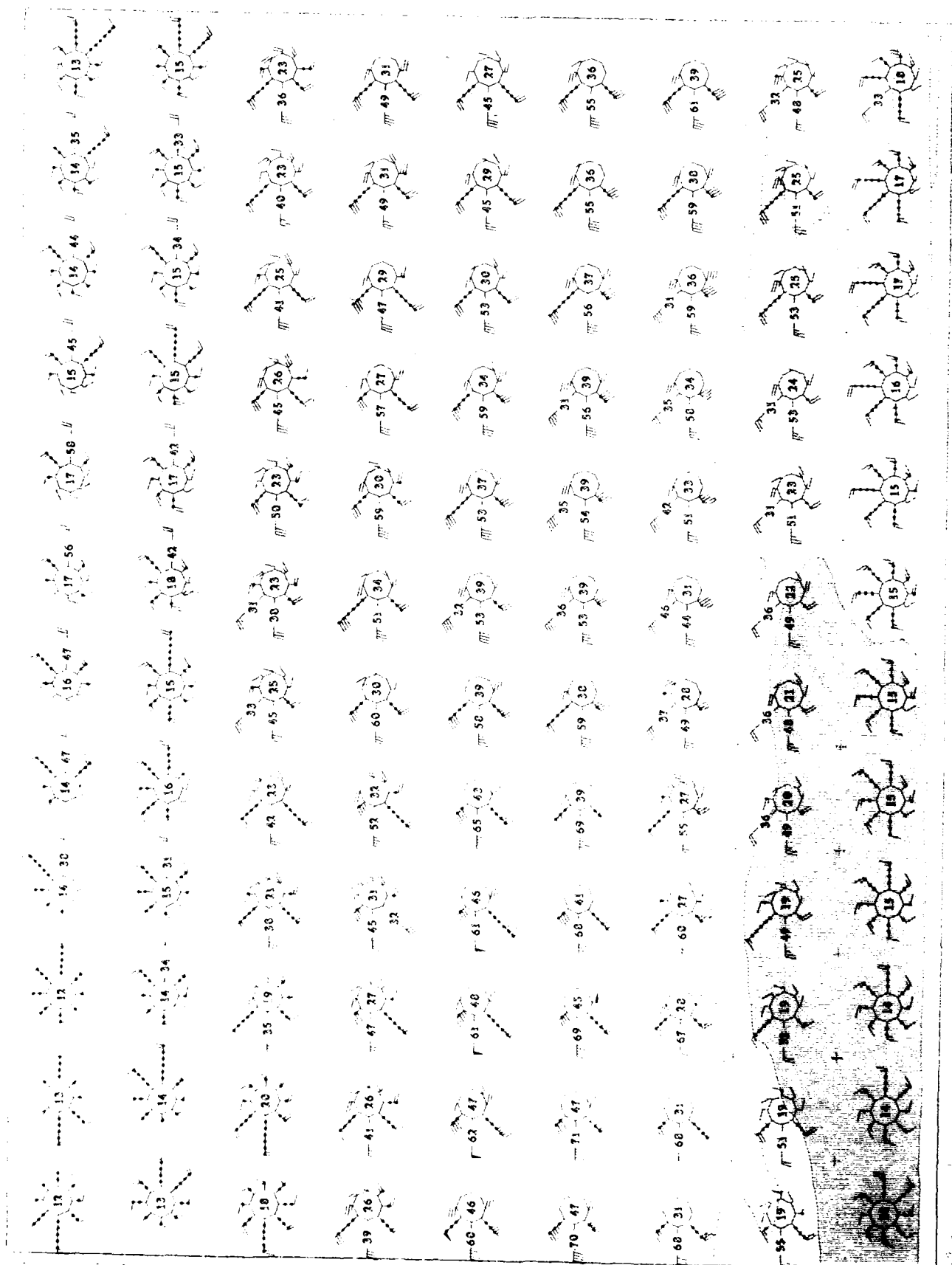
Figure 1: A 10x10 grid of 100 stick figures, each with a unique number and pose.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.





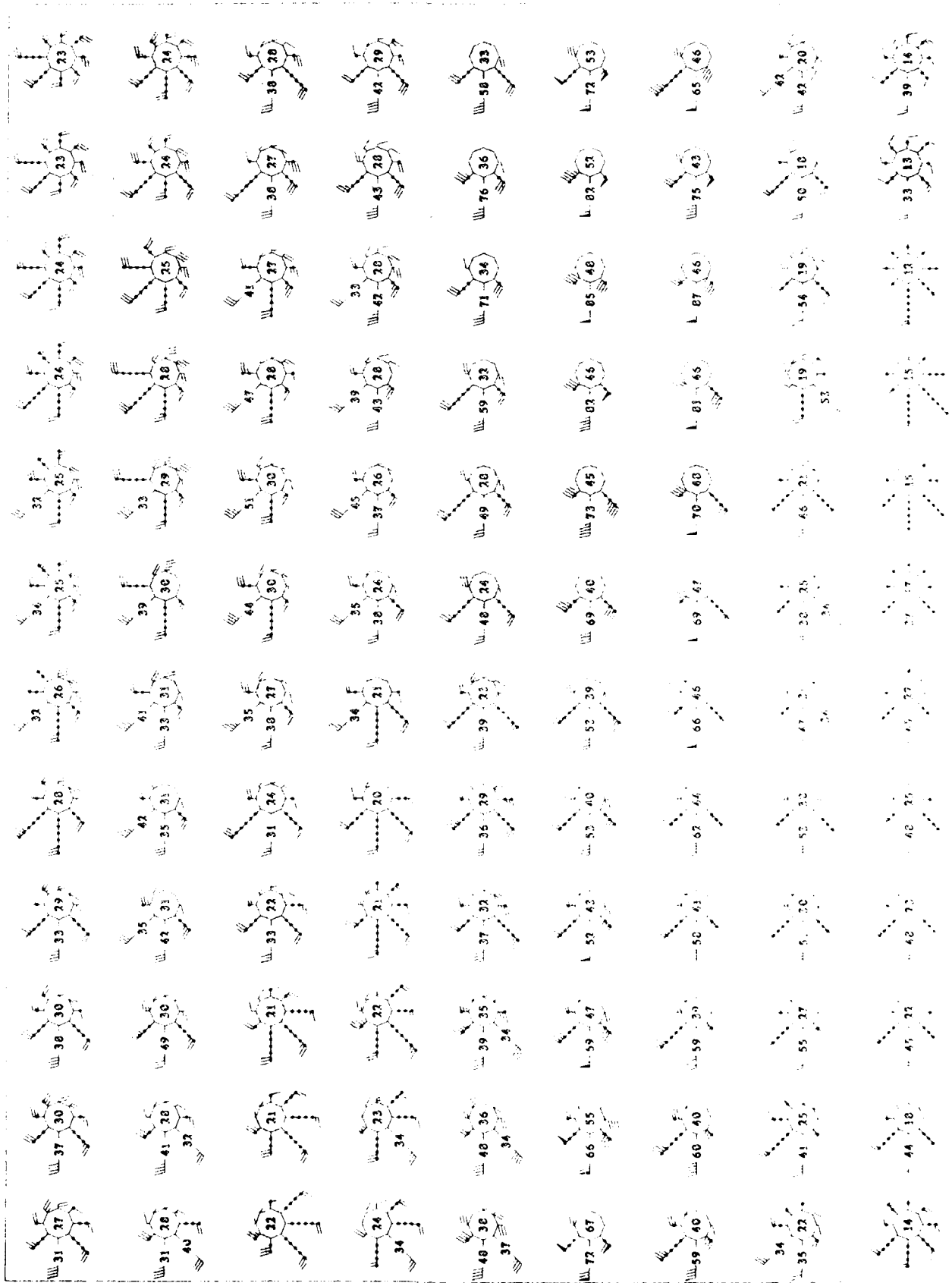


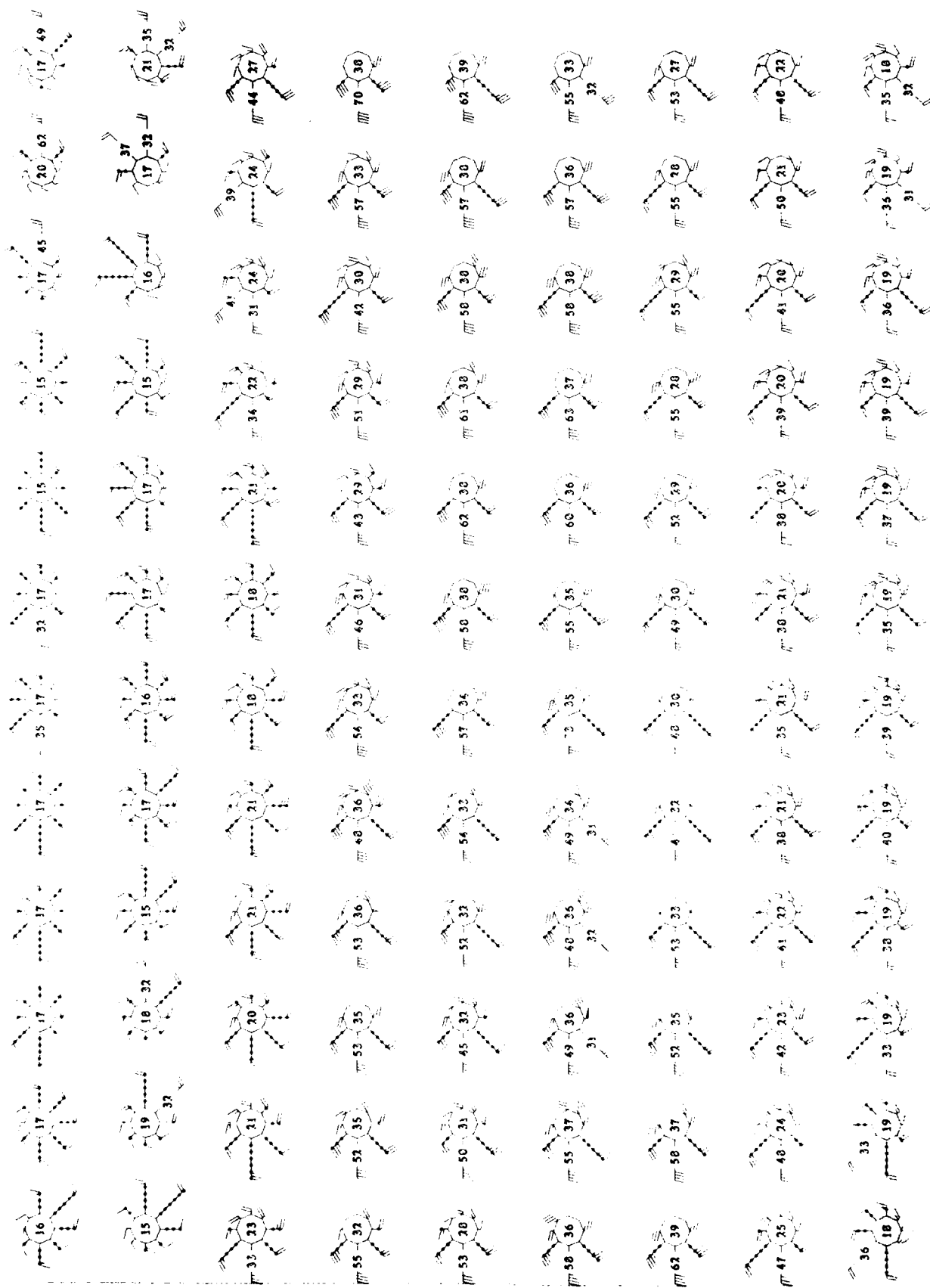


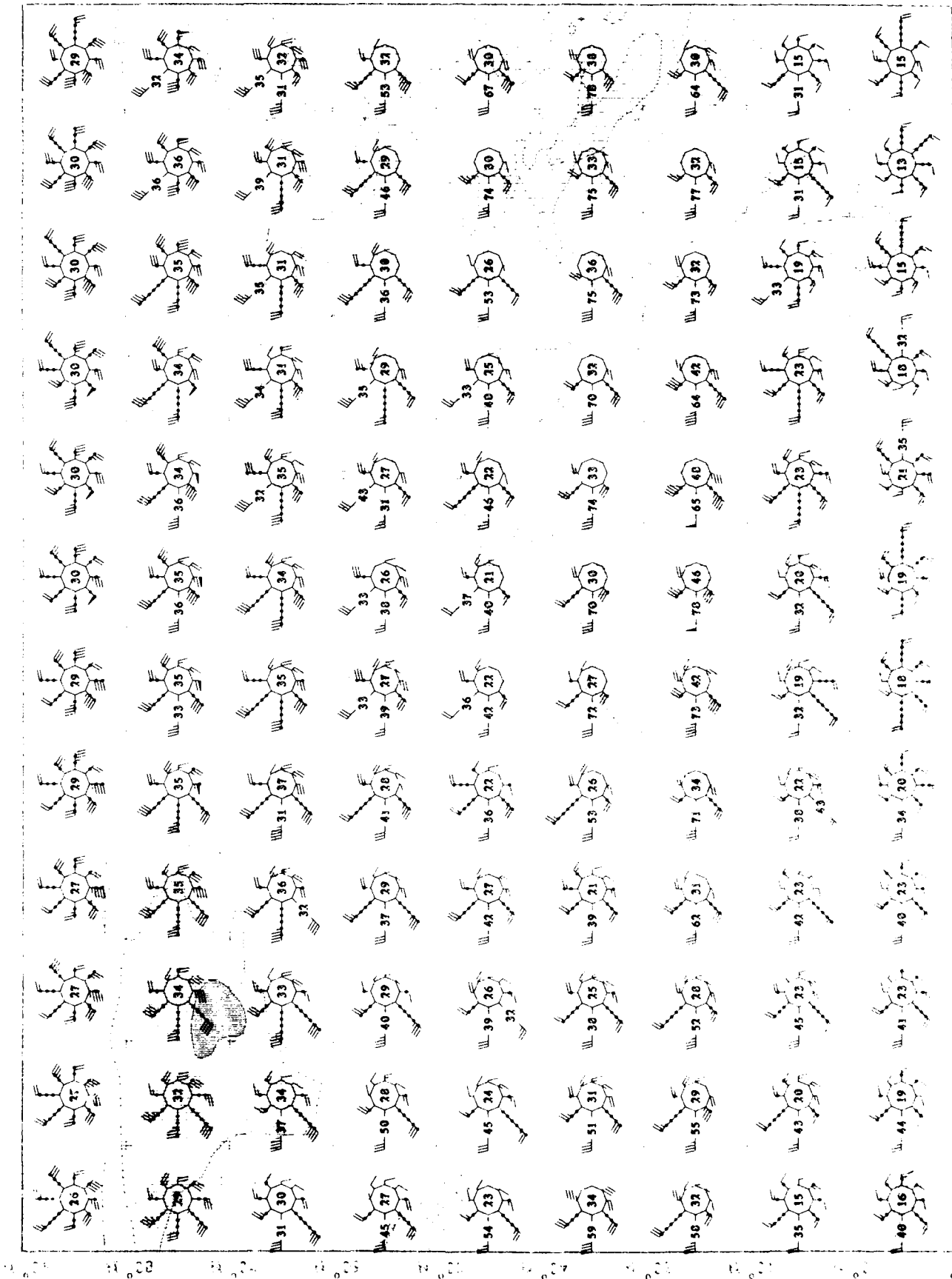
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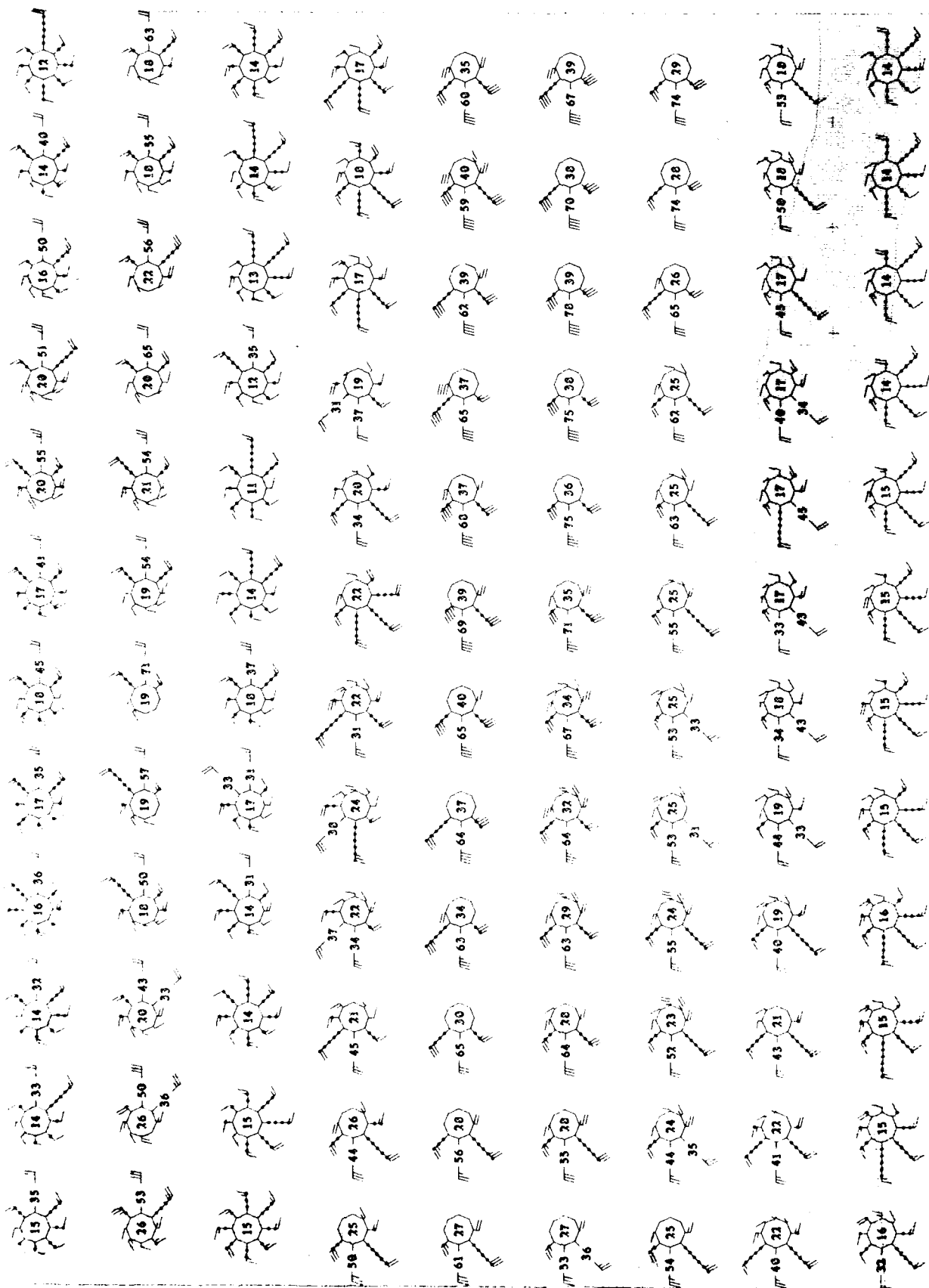
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Handwritten notes at the bottom left of the page.





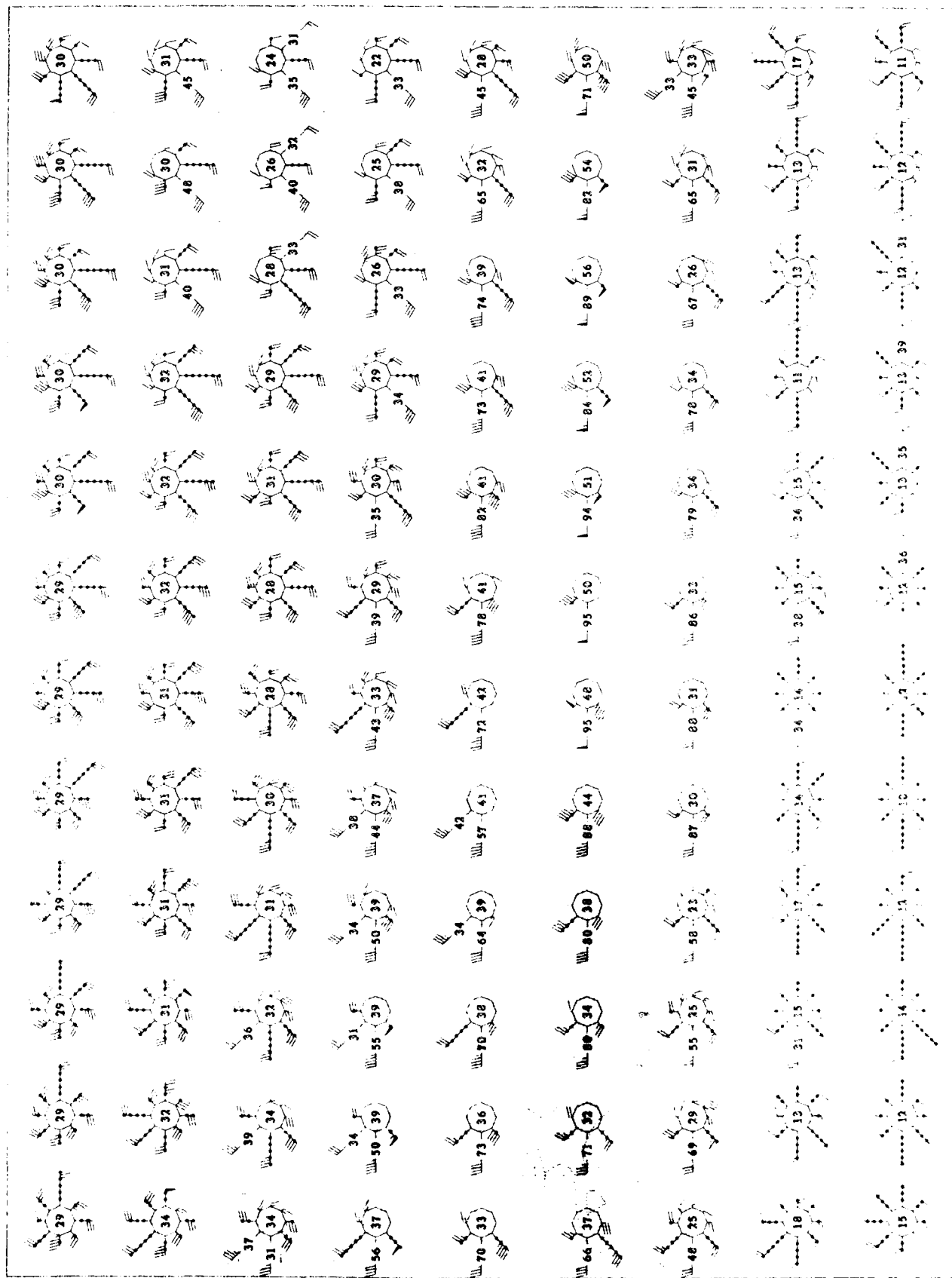


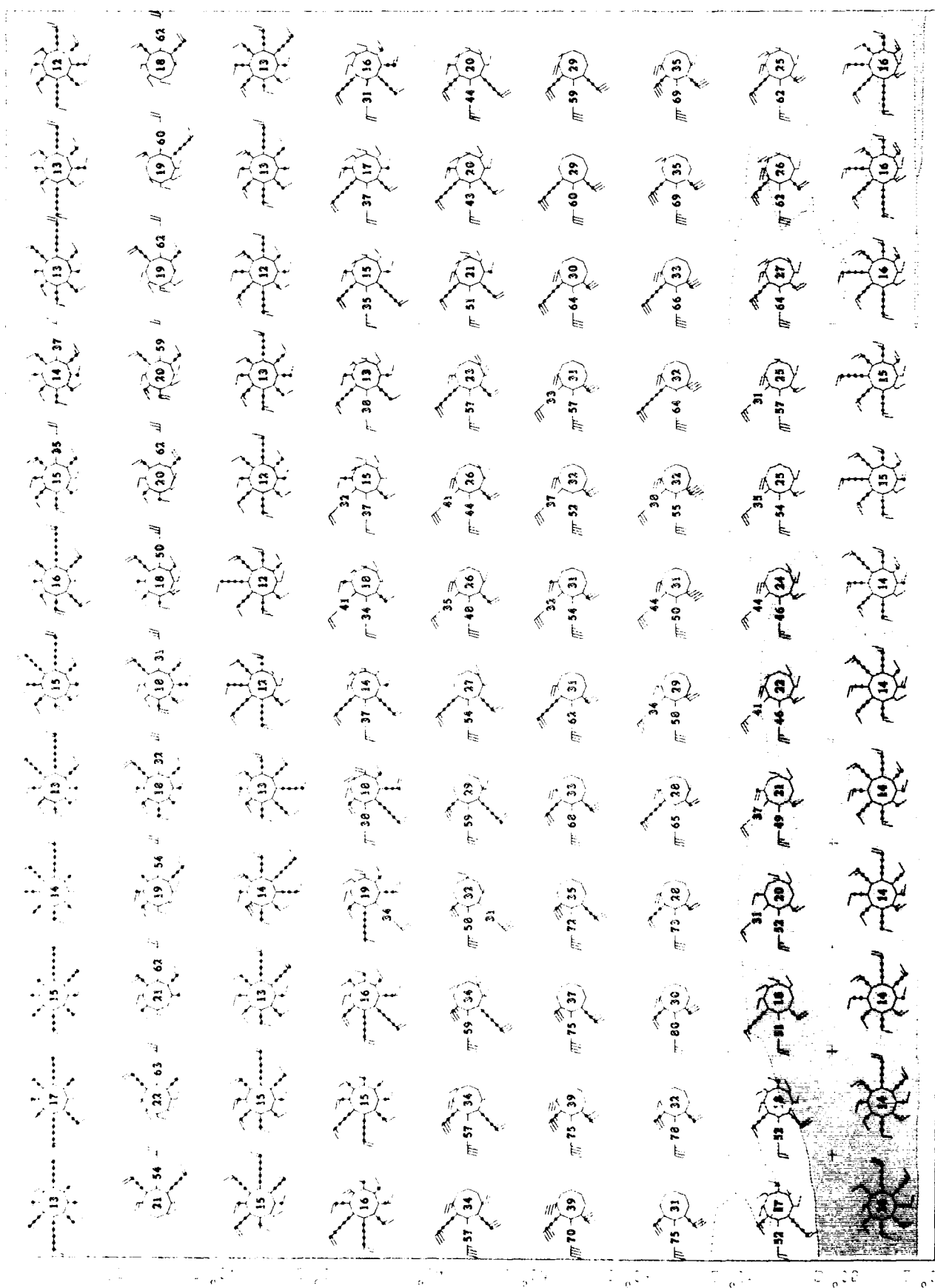


March
70 MB

1970-71
1971-72

Upper Air Climatology
Northern Hemisphere

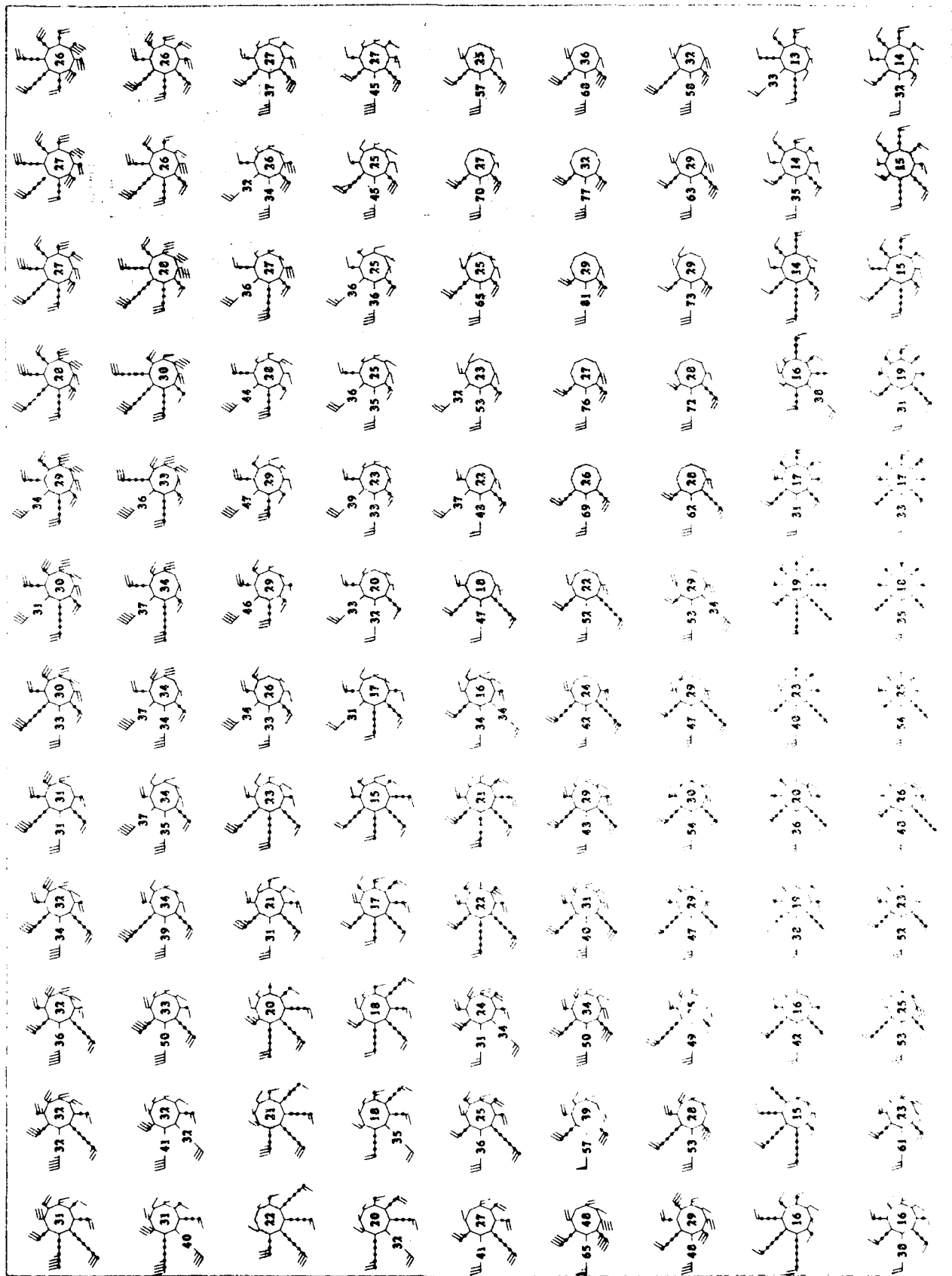


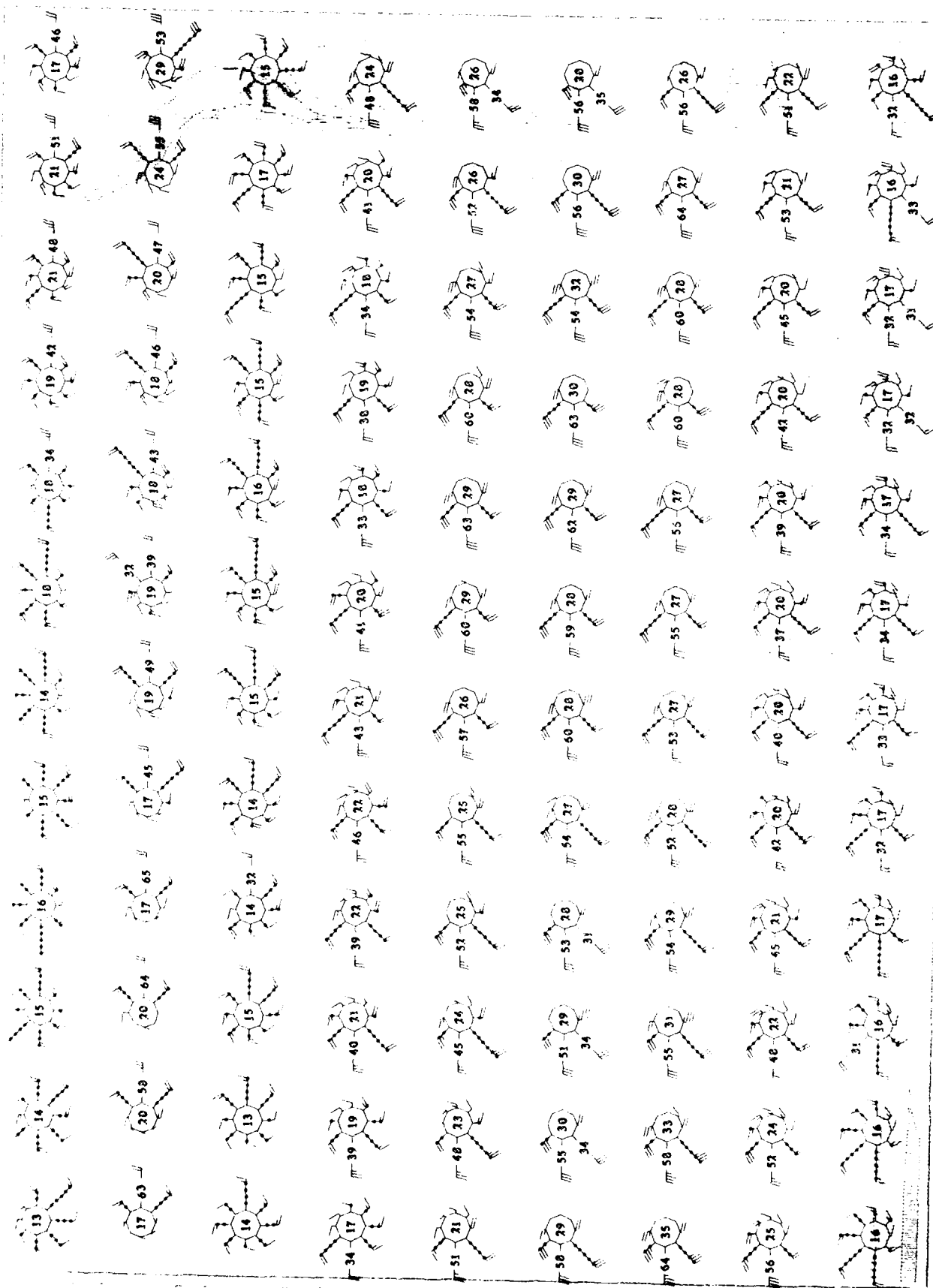


Upper Air Climatology
Southern Hemisphere

1970-1971
1971-1972

March
70-71





Upper Air Climatology
Southern Hemisphere

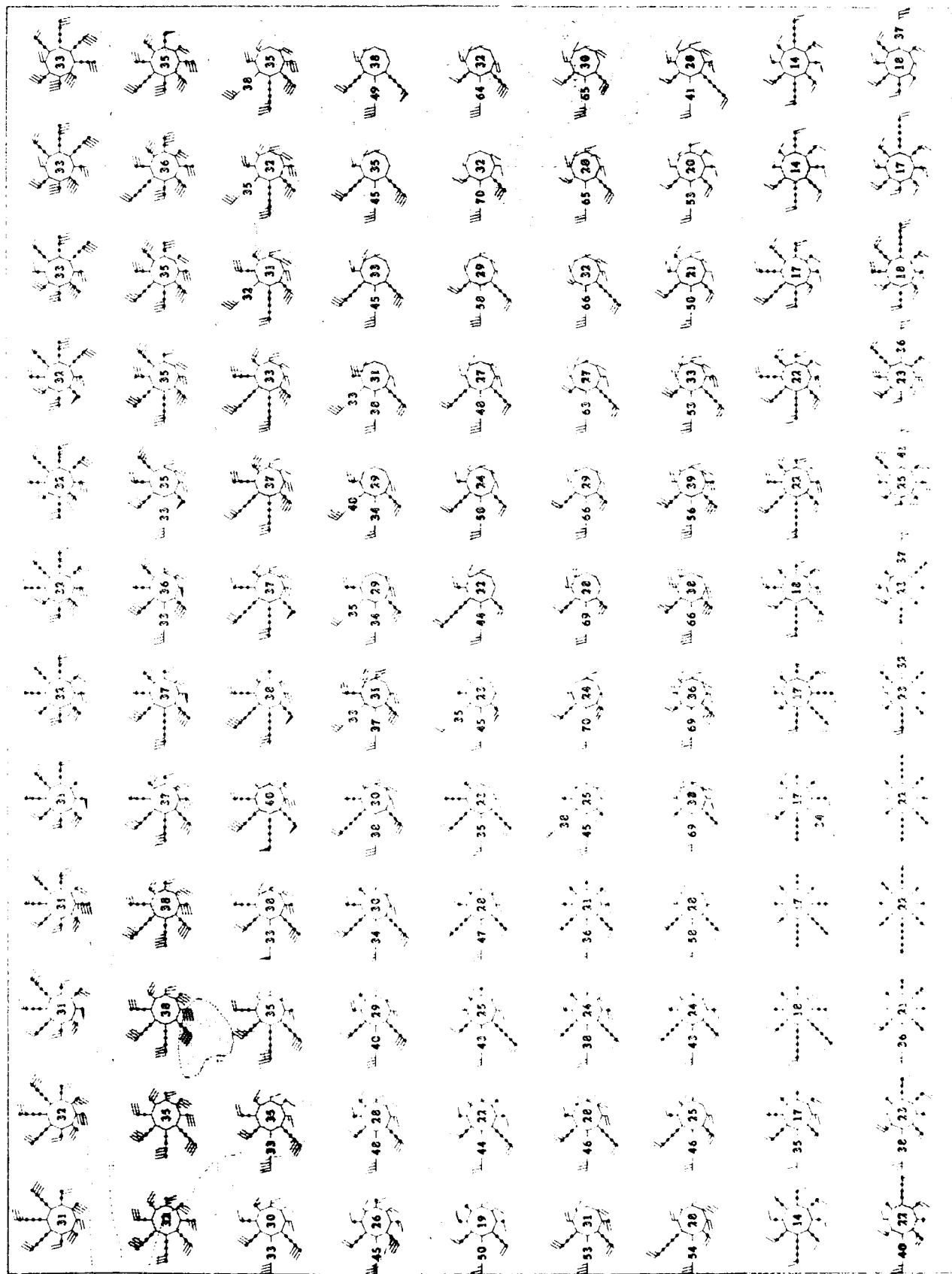
2000-2001
1000-1000

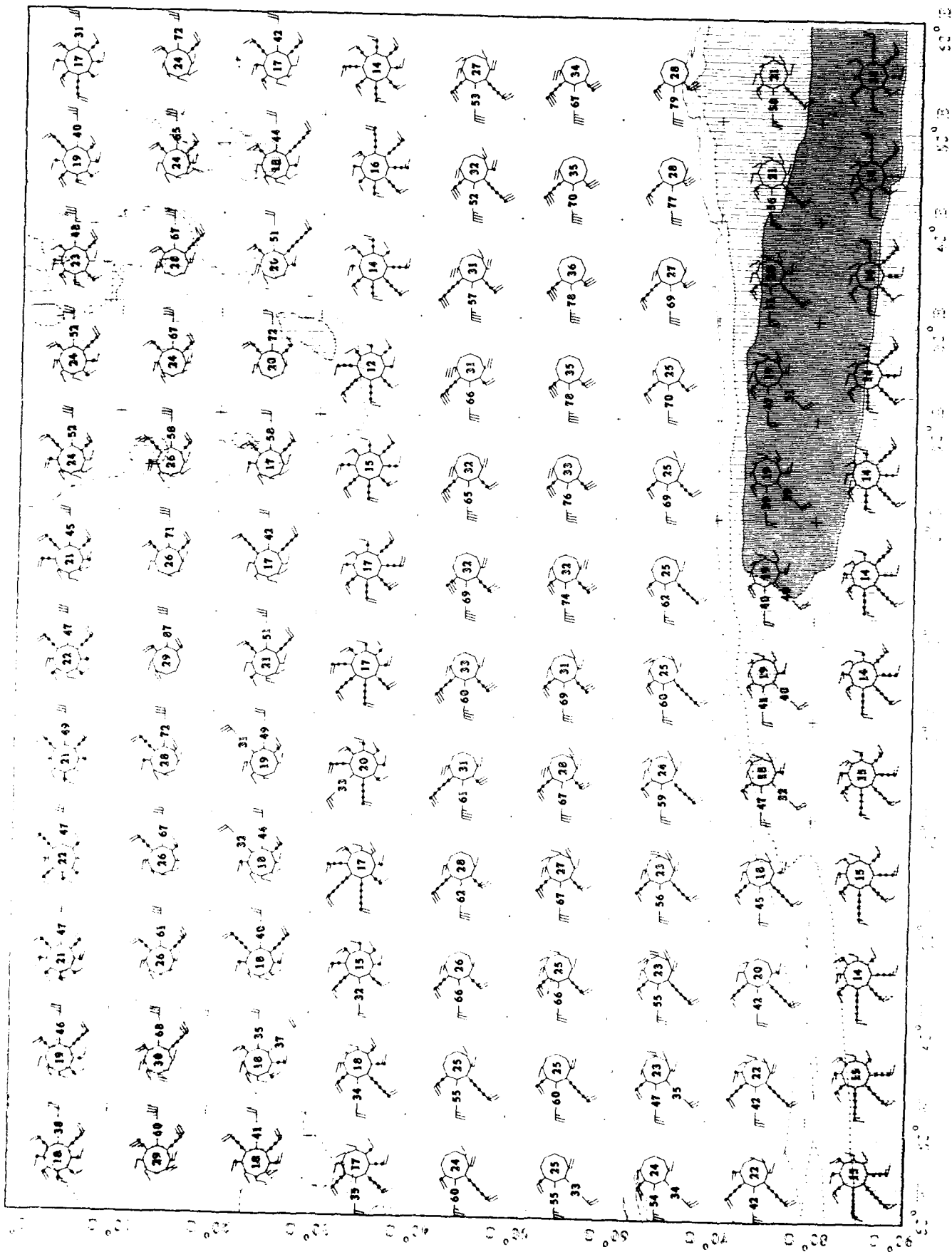
March
70 MS

MEAD
SC ME

1000000
1000000

1000000
1000000





March
50 MT

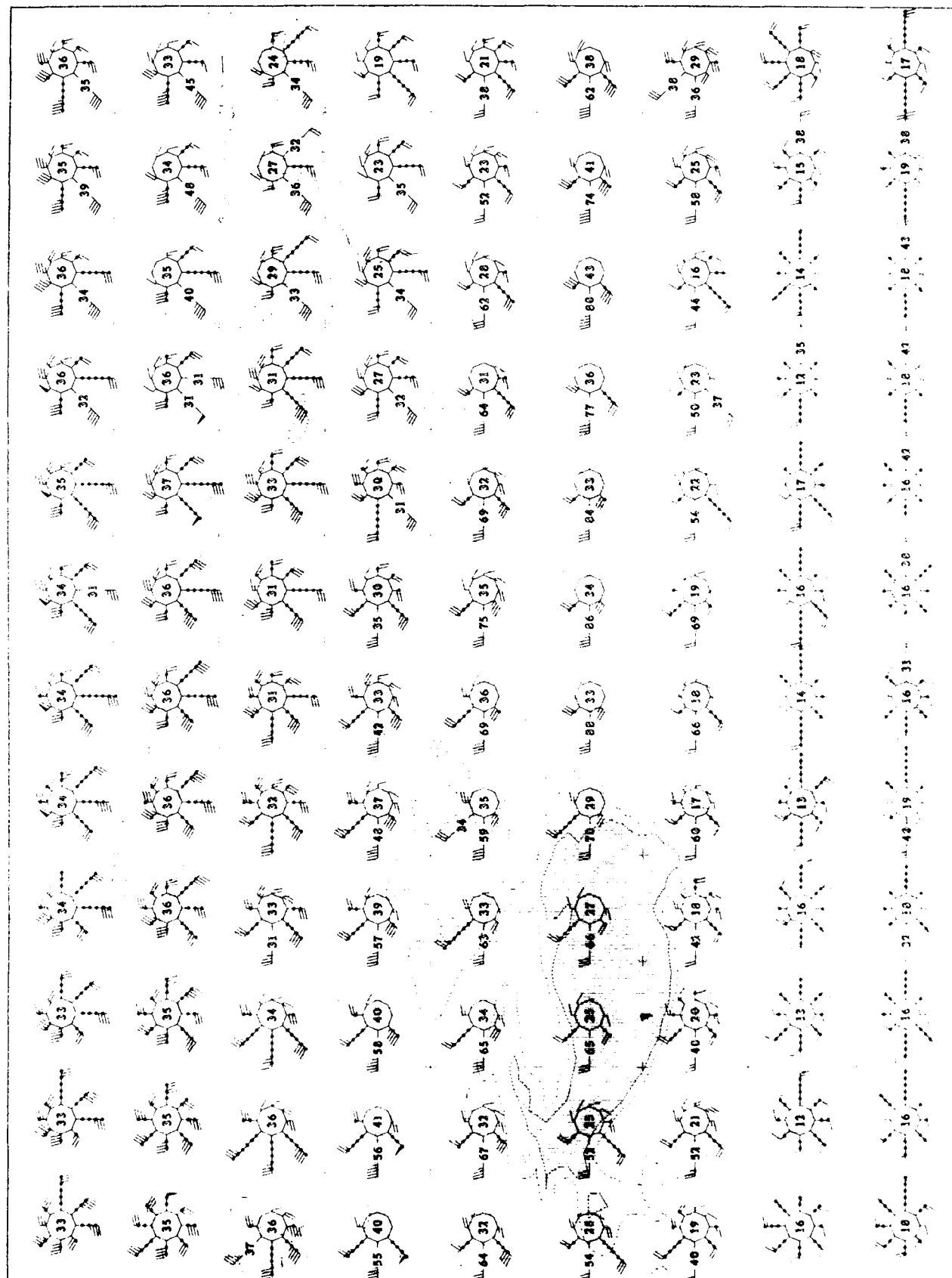
1947
1948

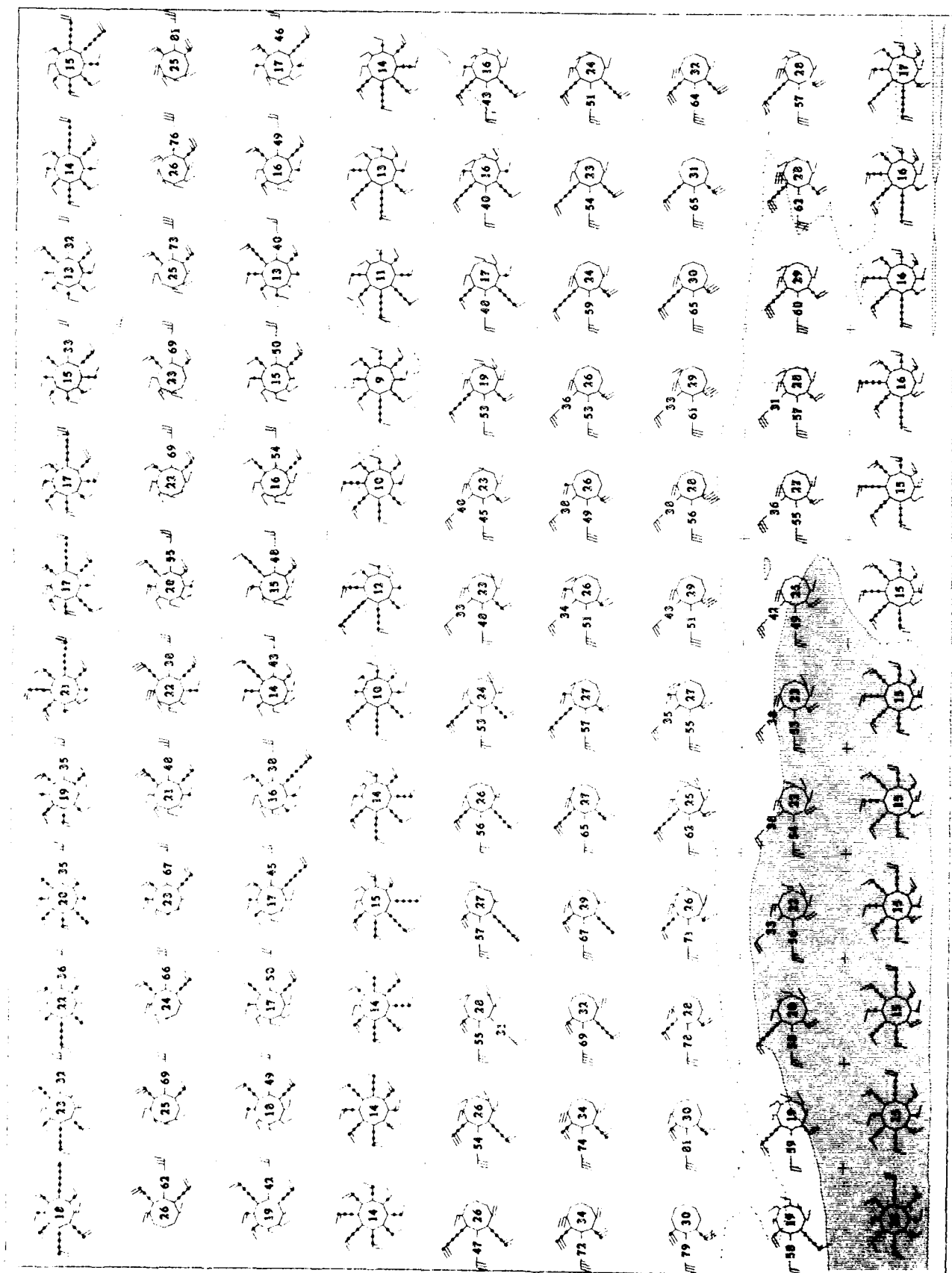
Upper Air Climatology
Southern Hemisphere

Map
50 Mm

1000
Wind Roses

Types and Climatology
Northern Hemisphere





Upper and Lower
Cretaceous

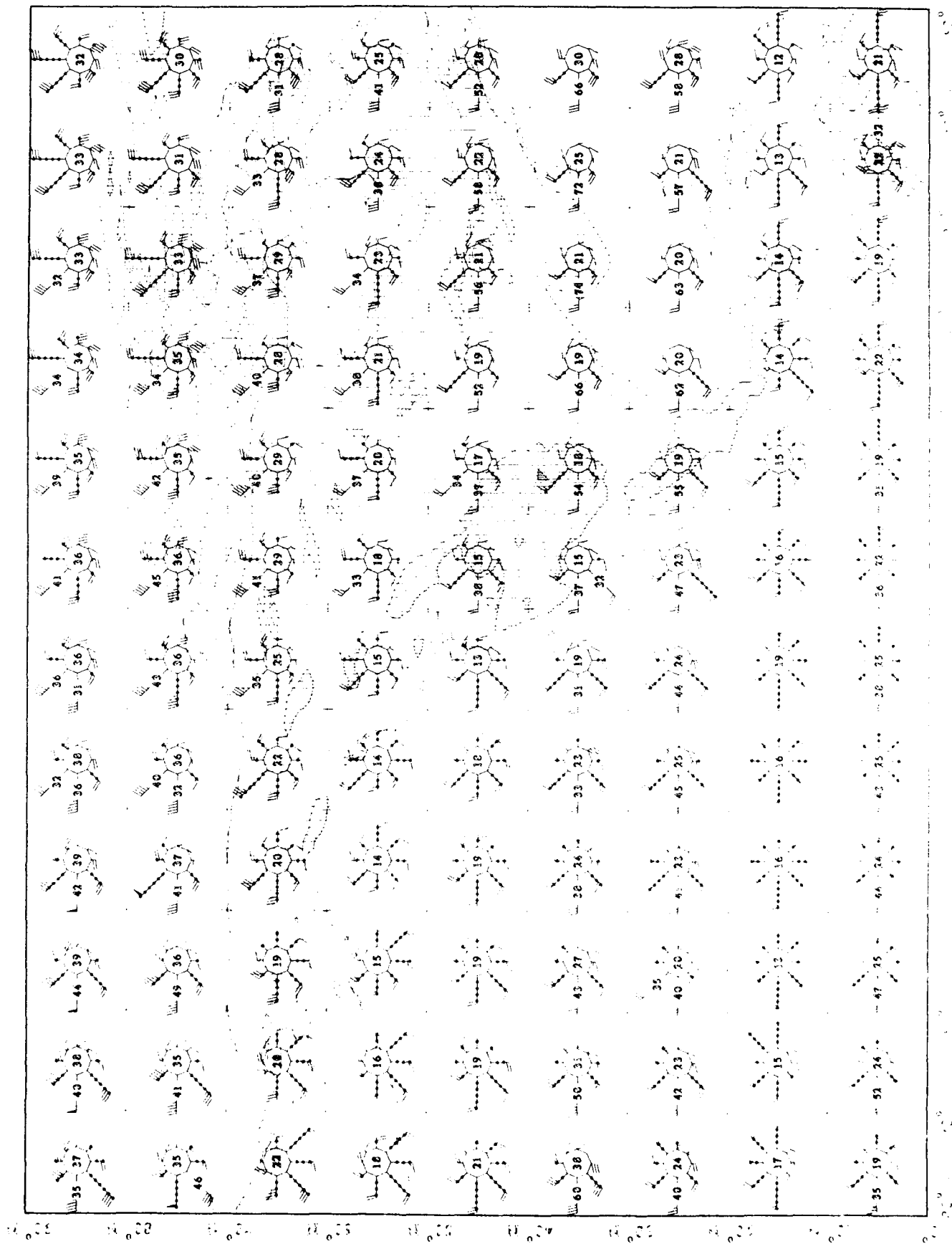
1880-1885

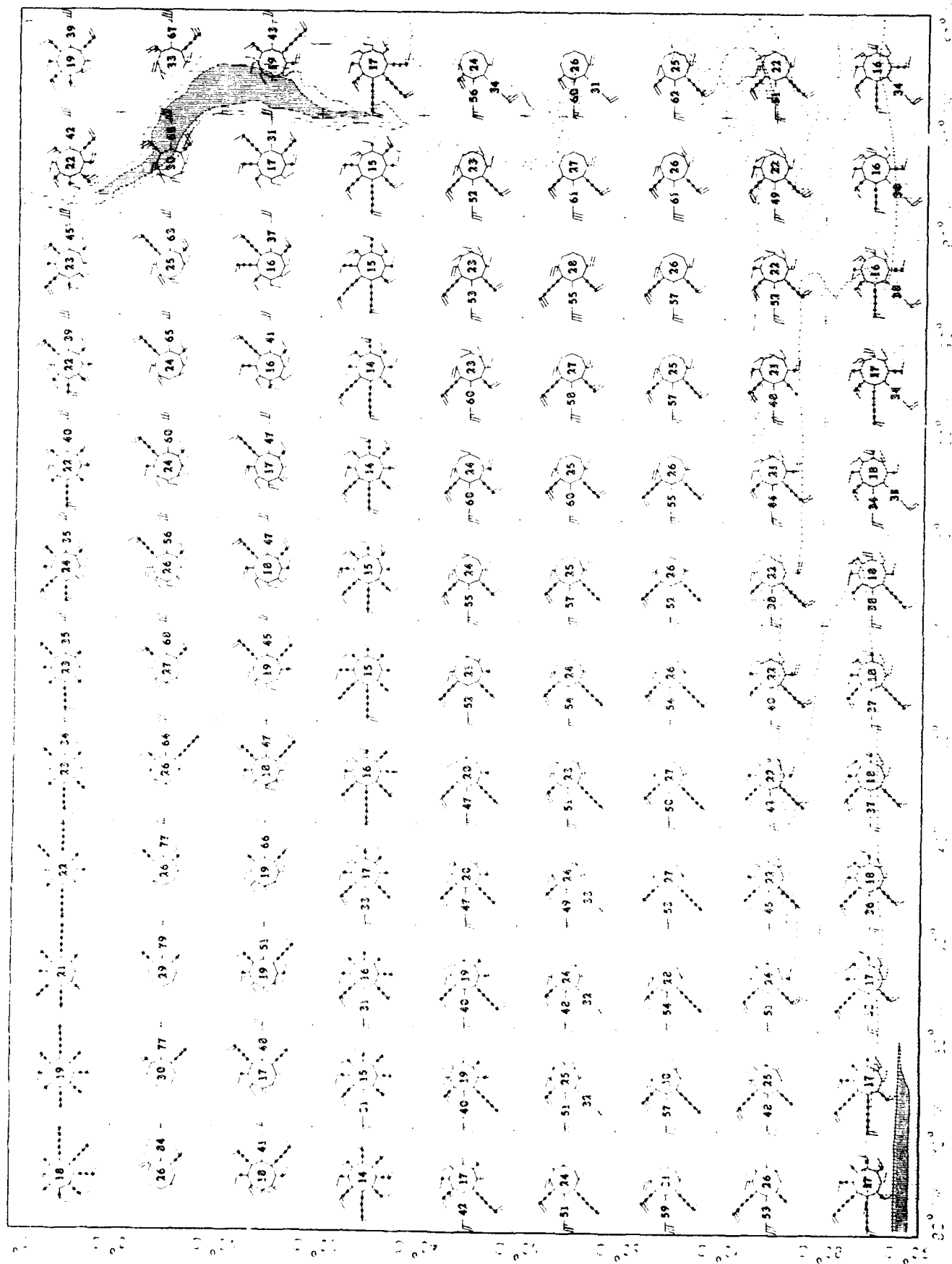
1886-1890

Types and Climatology Northern Hemisphere

1000 hPa

1000 hPa

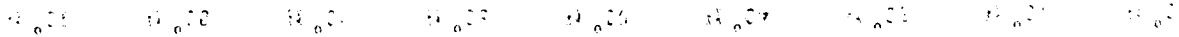


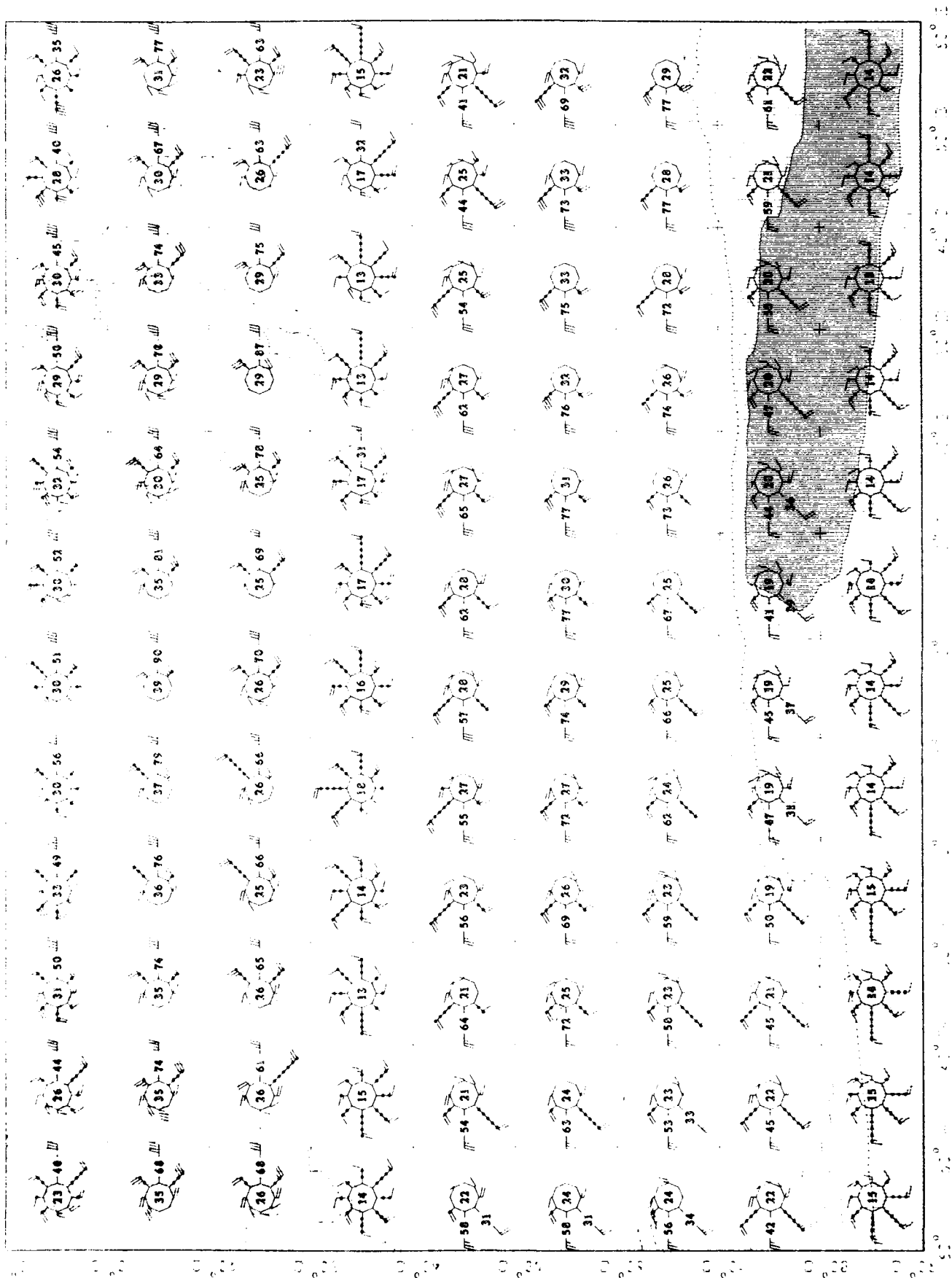


14.6.22
5.5.22

14.6.22
5.5.22

Upper Air Climatology
Continental Hemisphere

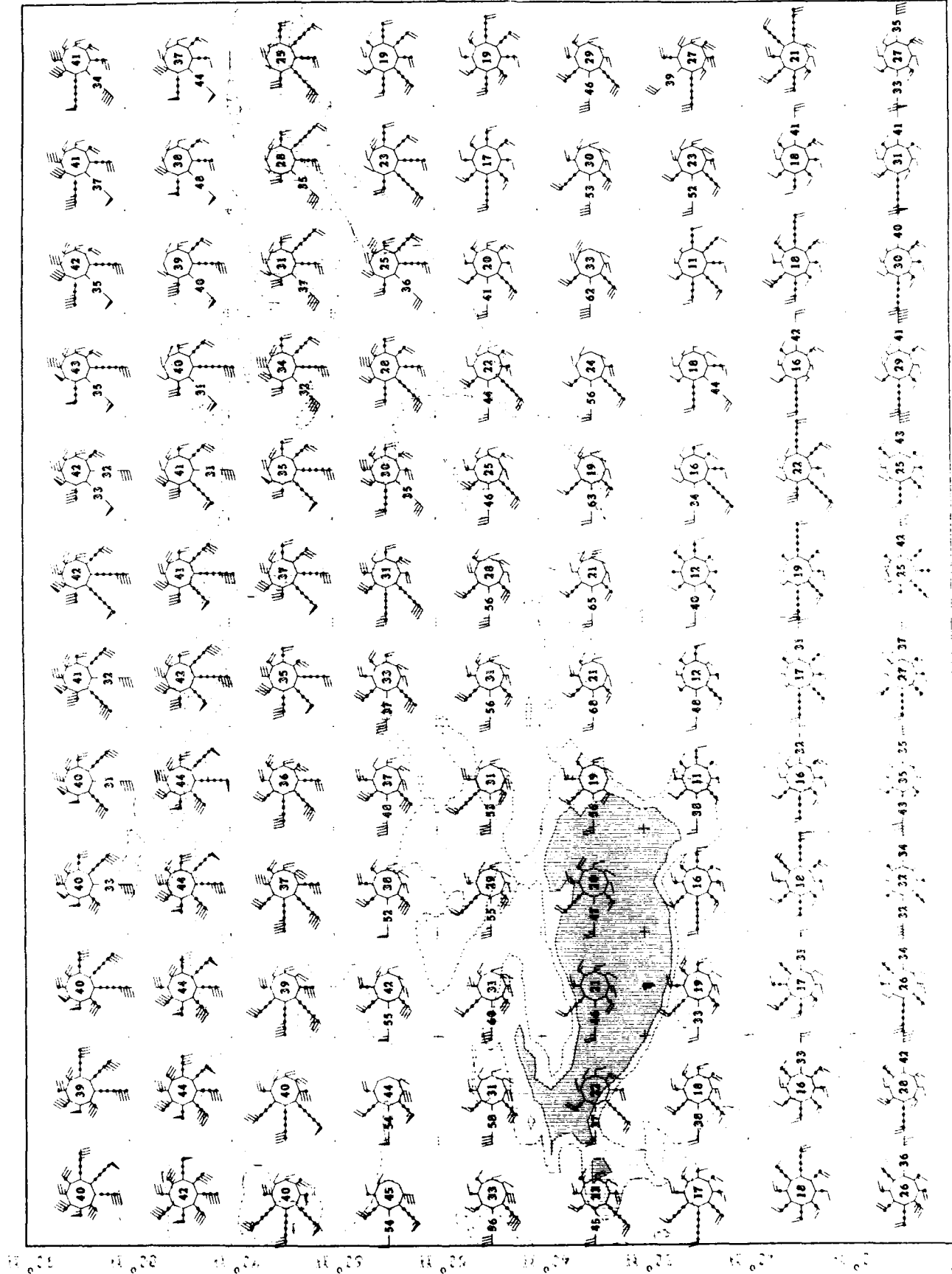


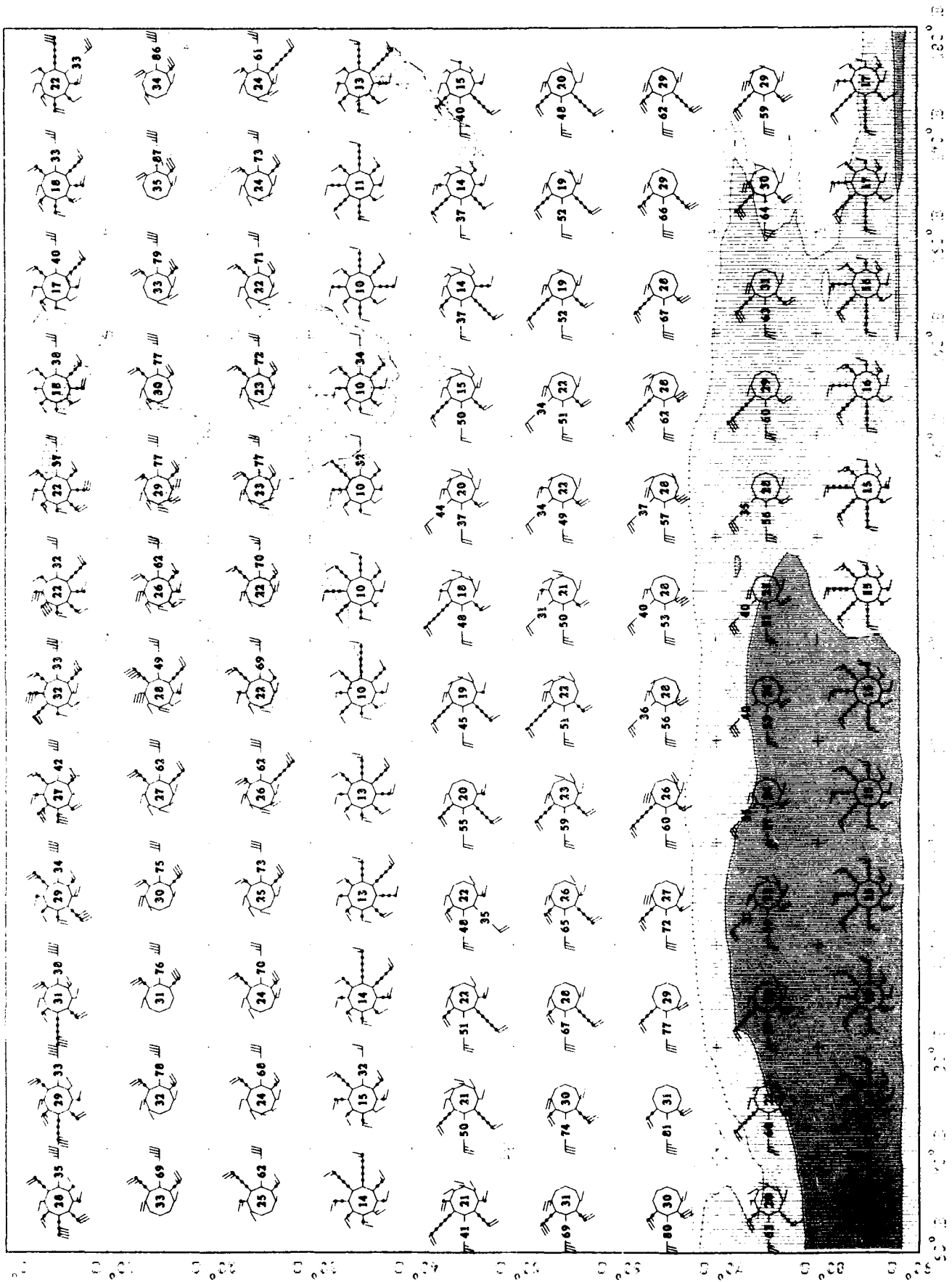


Upper Air Climatology
Southern Hemisphere

1000 mb
500 mb

March
1950





Upper Air Climatology
Southern Hemisphere

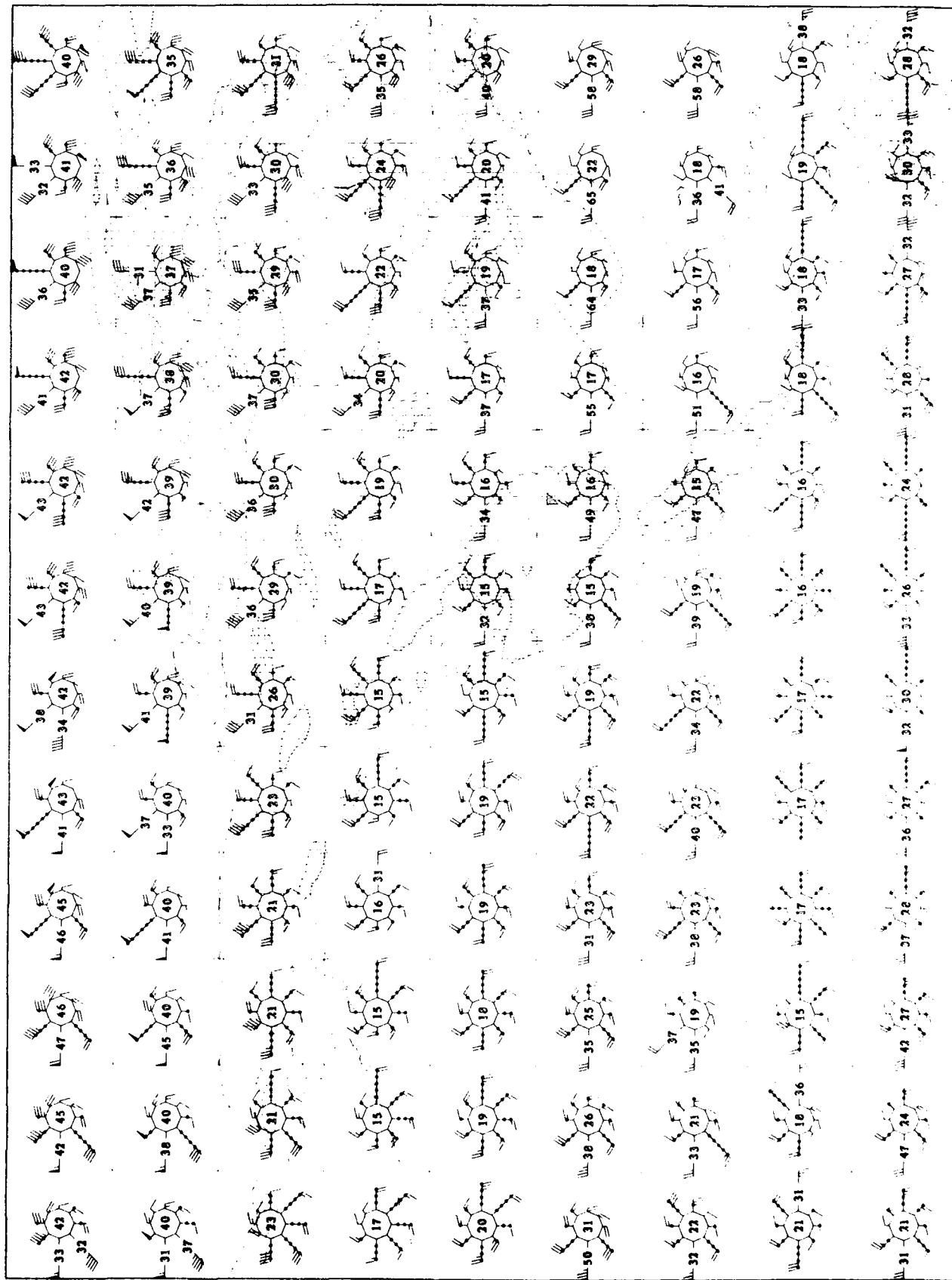
1902 TO 1903
Wind Roses

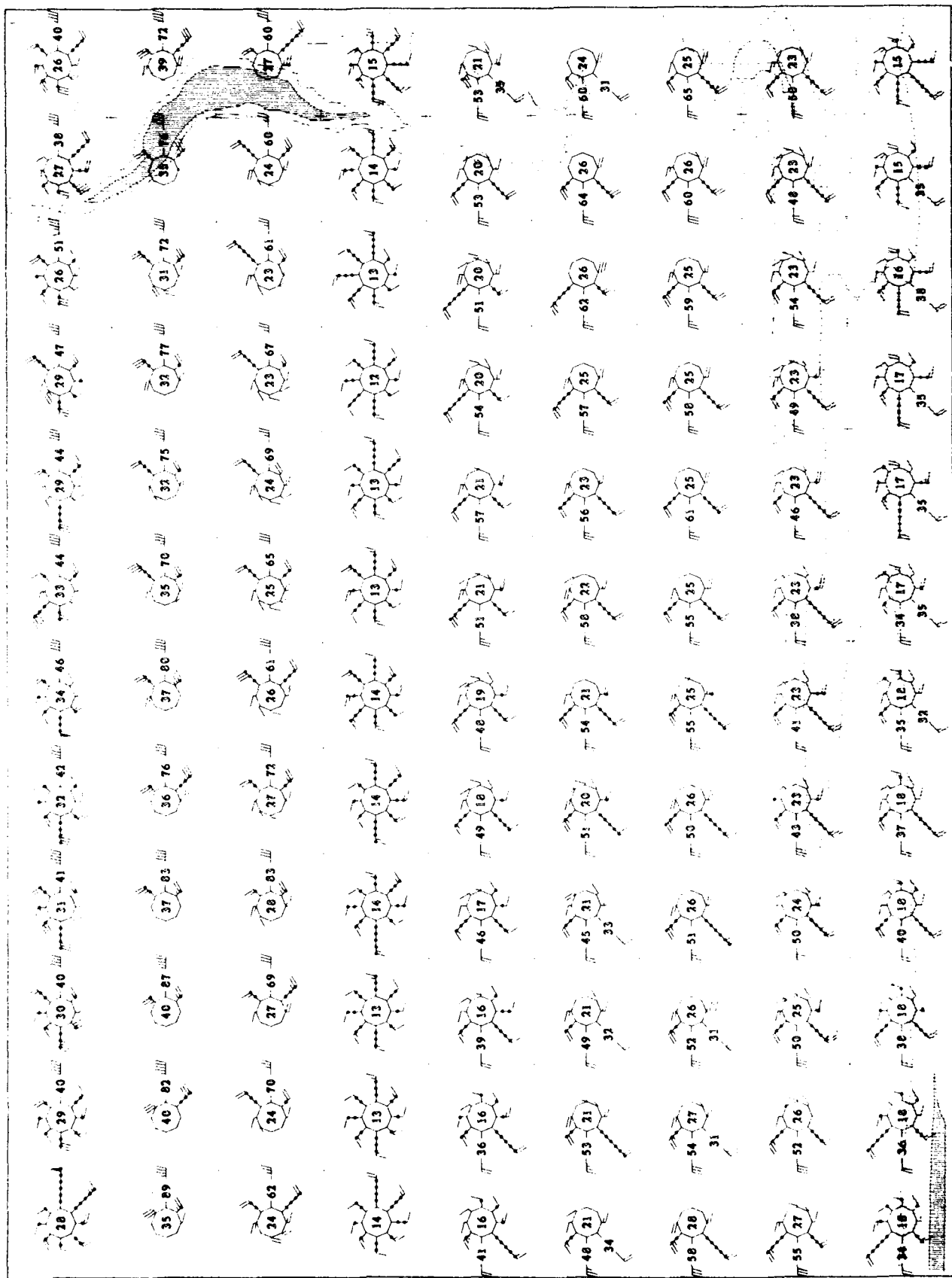
March
30 Mb

Mean
30 ME

LOW 10 6 PM
Wind Roses

Upper Air Meteorology
Northern Hemisphere





Upper Air Ctenostoma
Ctenostoma Hemisphaera

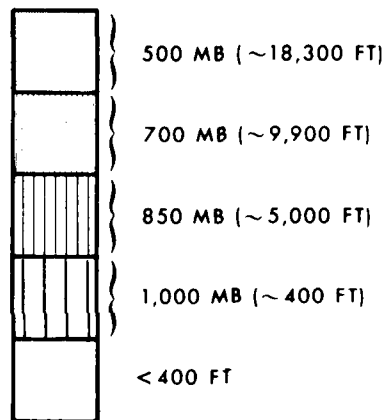
March 20, 1930
March 20, 1930

March
20, 1930

JET STREAM
(10 LEVELS, 500 TO 30 MB)

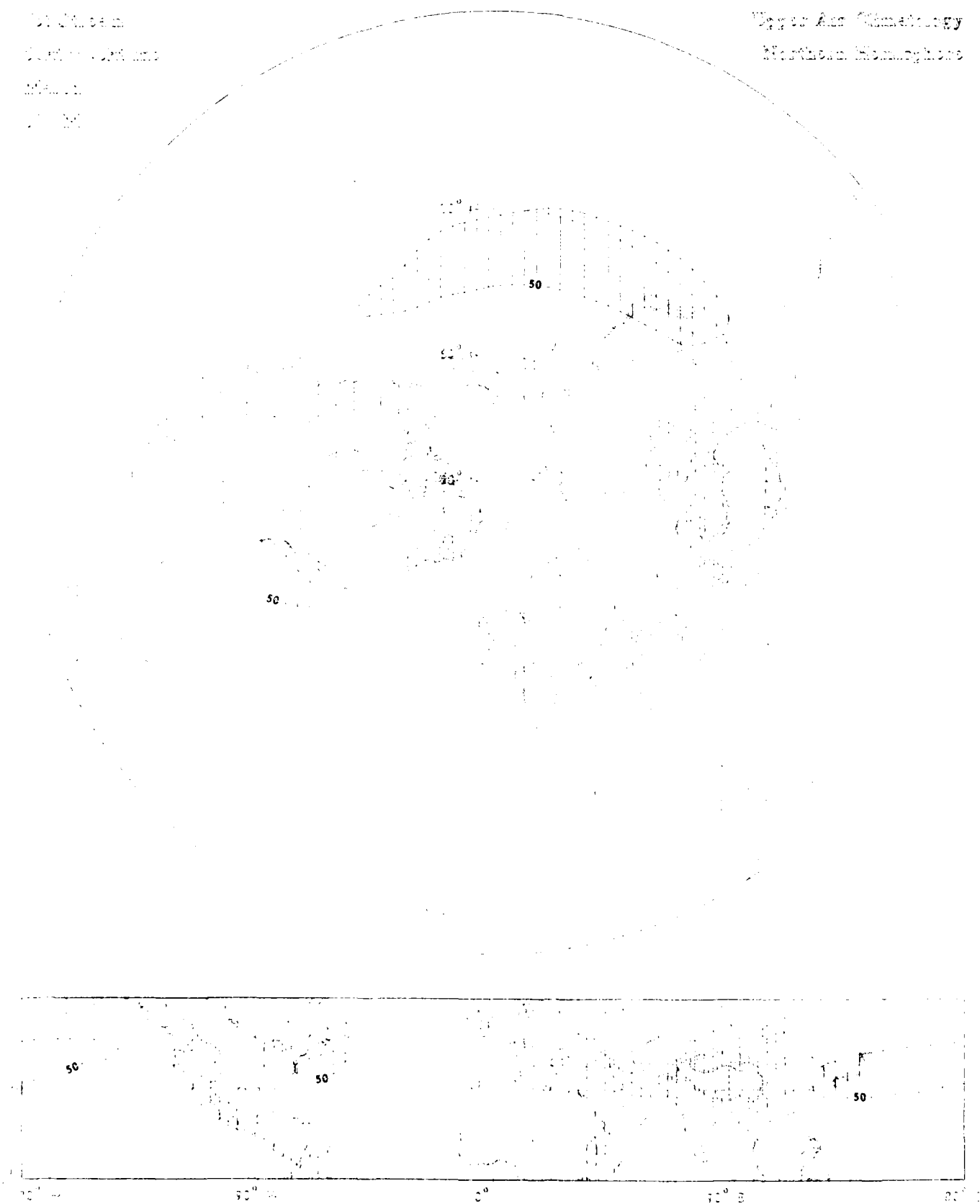
- Contours of mean scalar wind speed in knots
- Minimum mean scalar speed: 50 knots
- Contour interval of mean scalar speed: 25 knots

ELEVATION SCALE



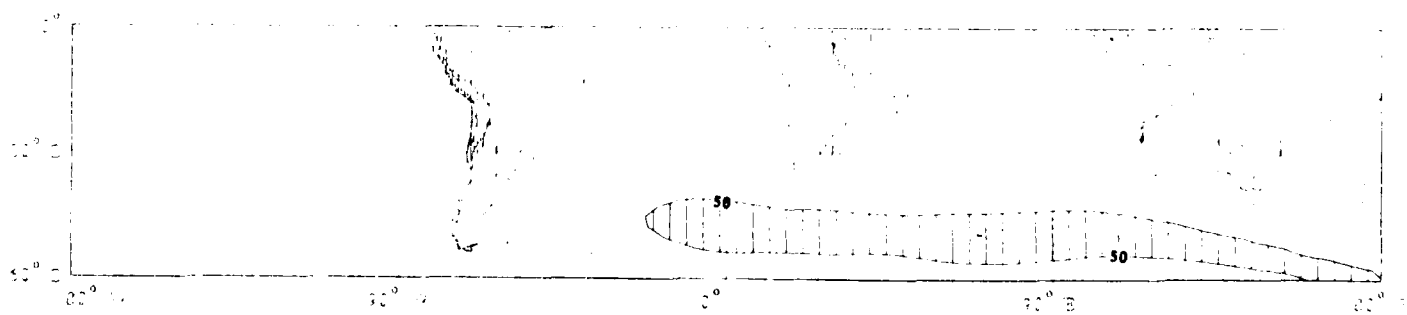
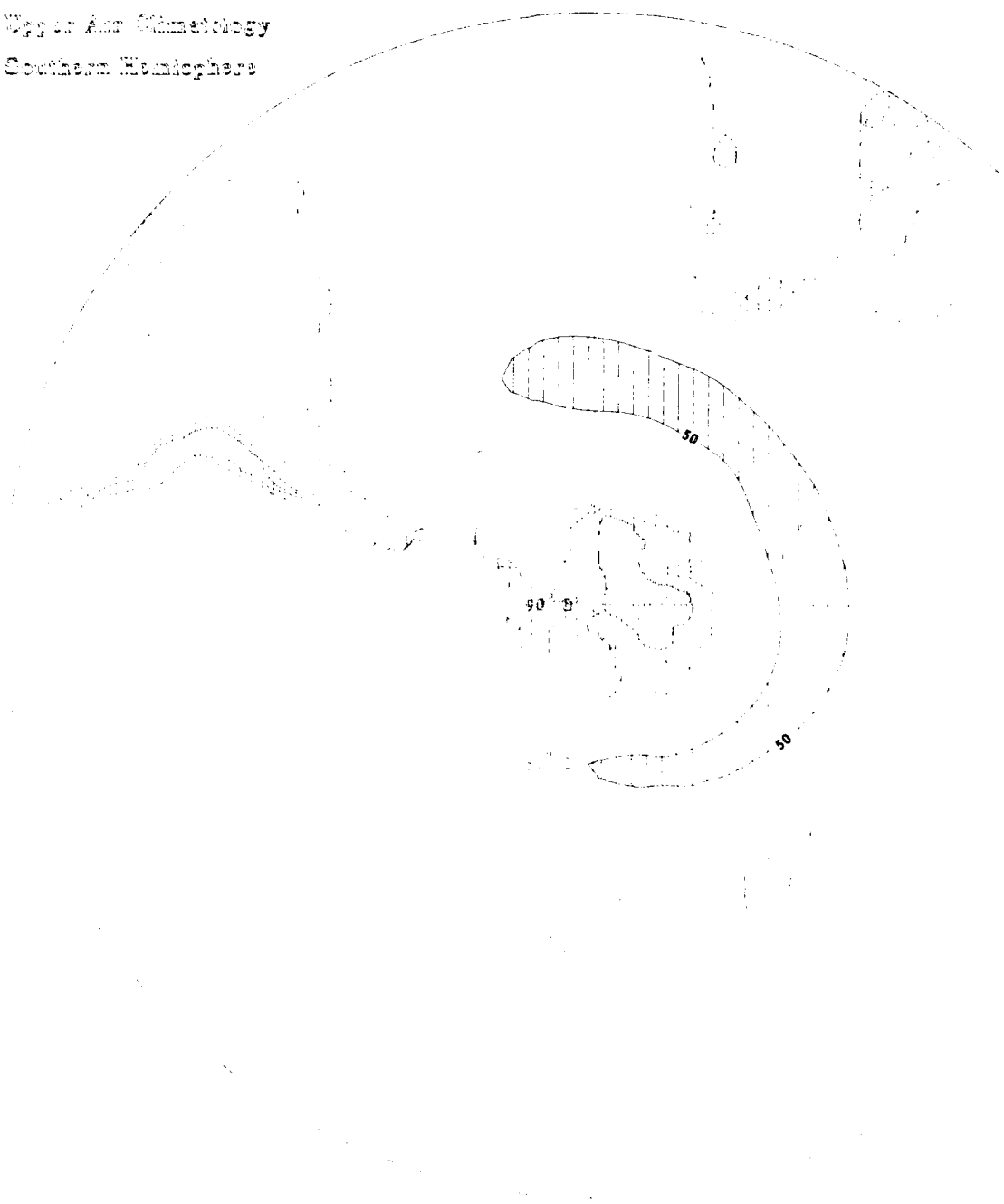
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 0.00000000

Upper Air Climatology
 Northern Hemisphere



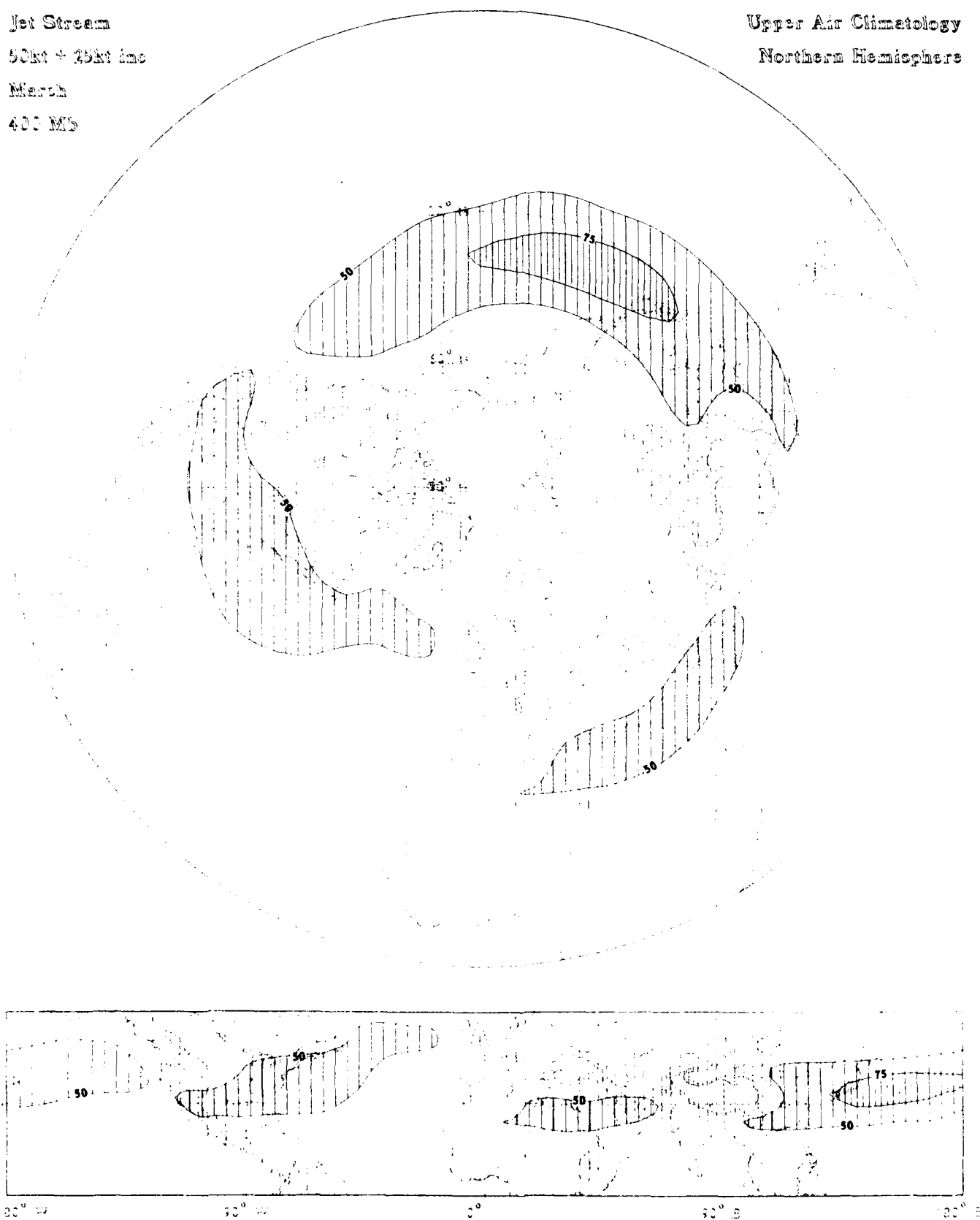
Upper Air Climatology
Southern Hemisphere

Jet Stream
51m + 30m hPa
March
500 MB



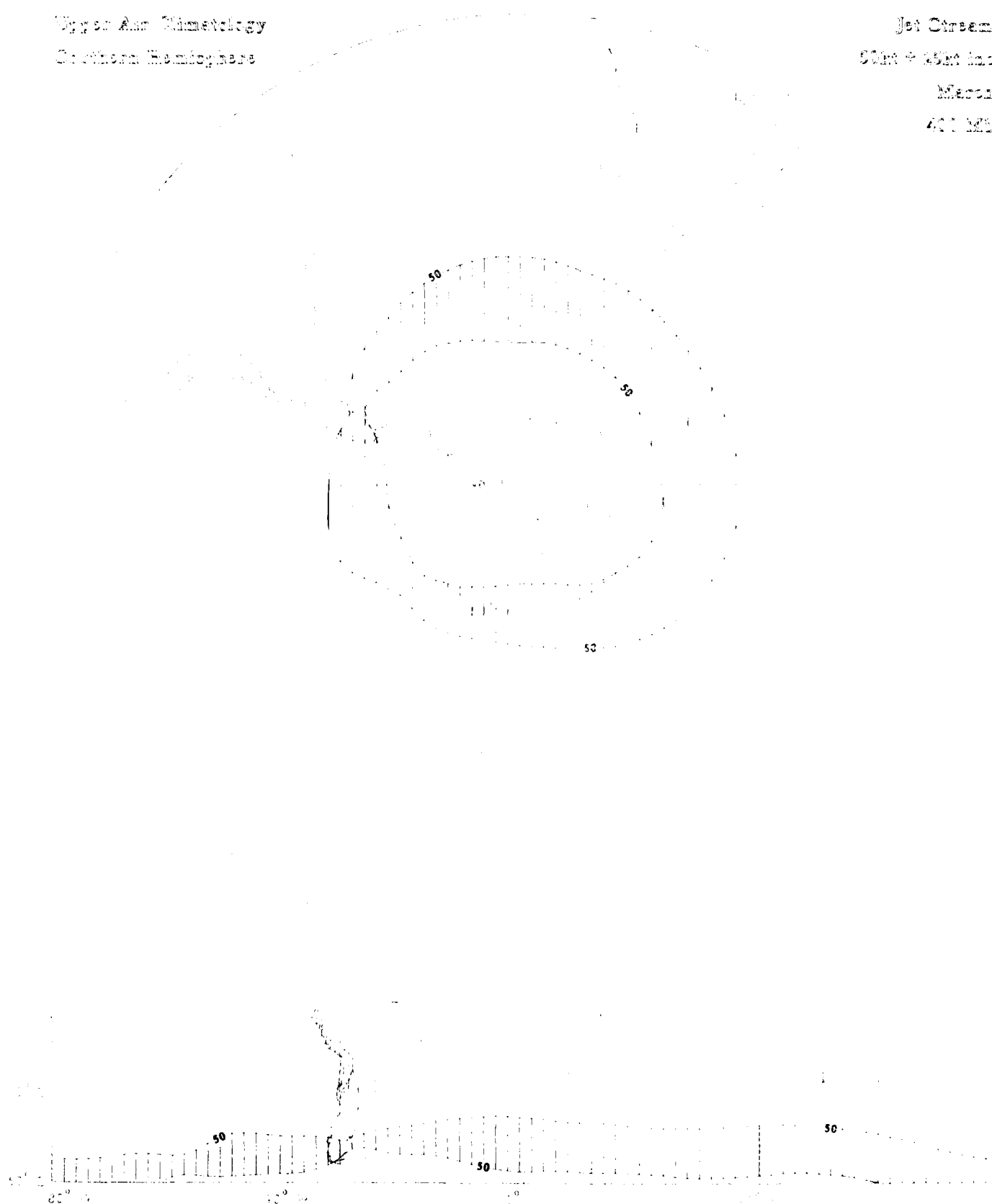
Jet Stream
50kt + 25kt inc
March
400 MB

Upper Air Climatology
Northern Hemisphere



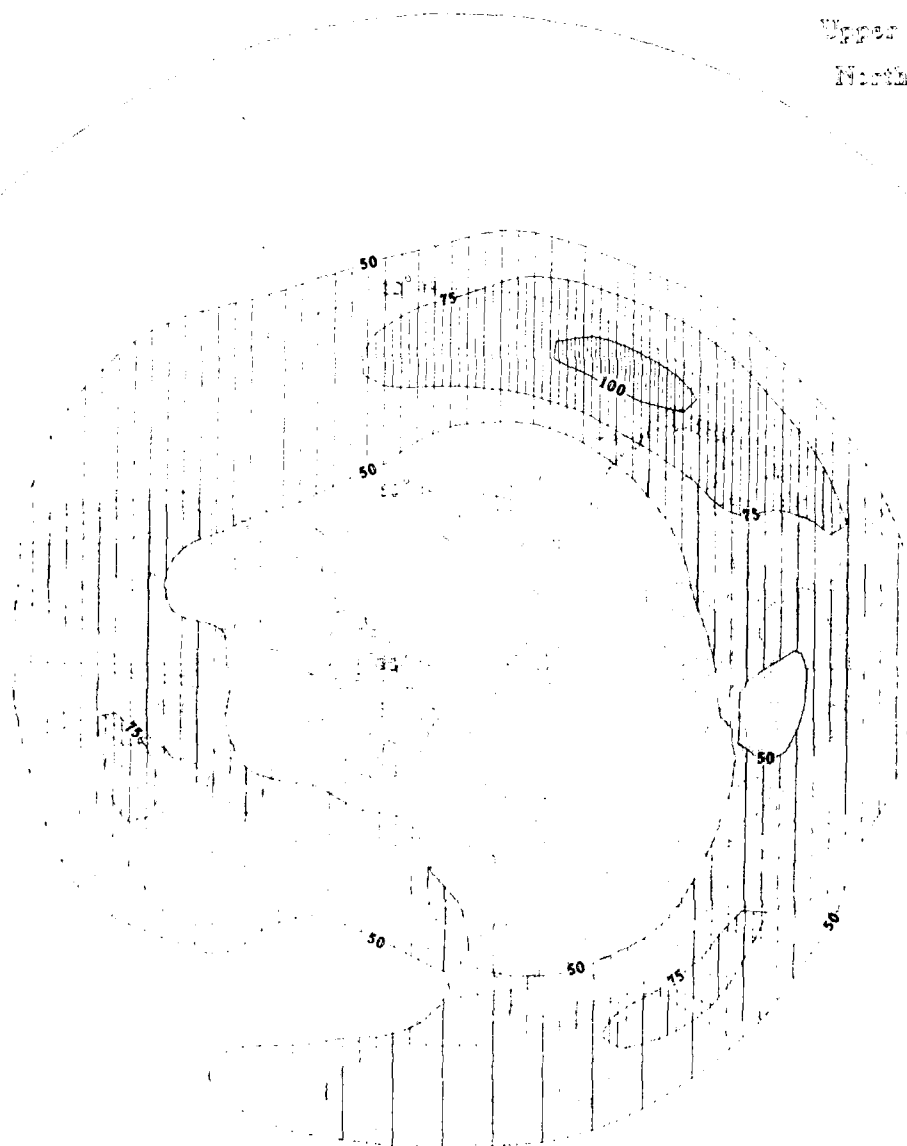
Upper Air Climatology
Northern Hemisphere

Jet Stream
50mb + 45mb line
March
401 MB



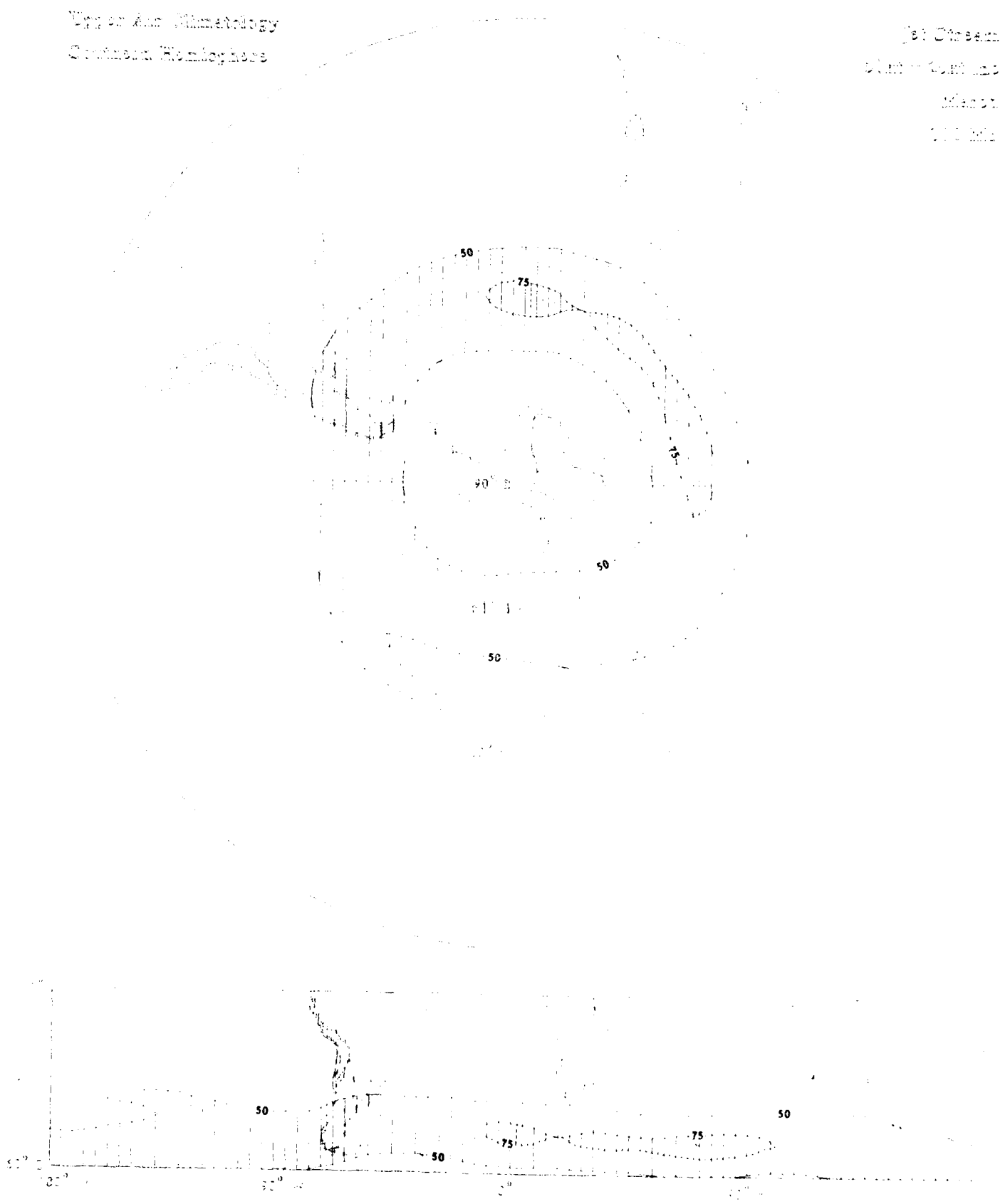
Jet Stream
 500 mb level
 March
 1950

Upper Air Climatology
 Northern Hemisphere



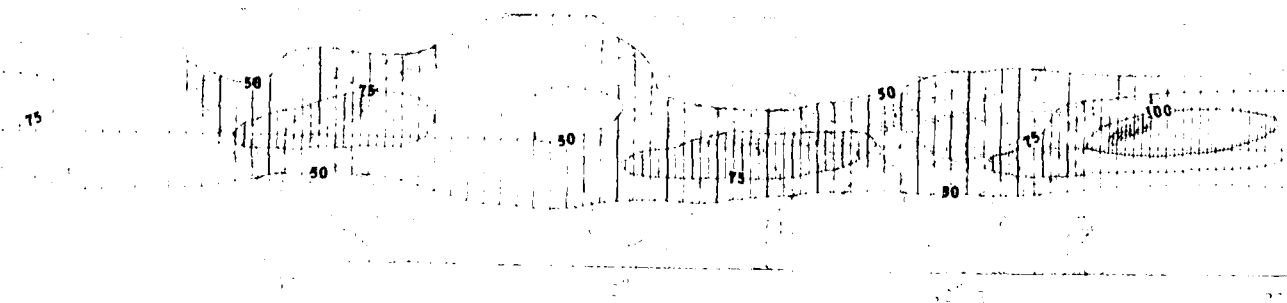
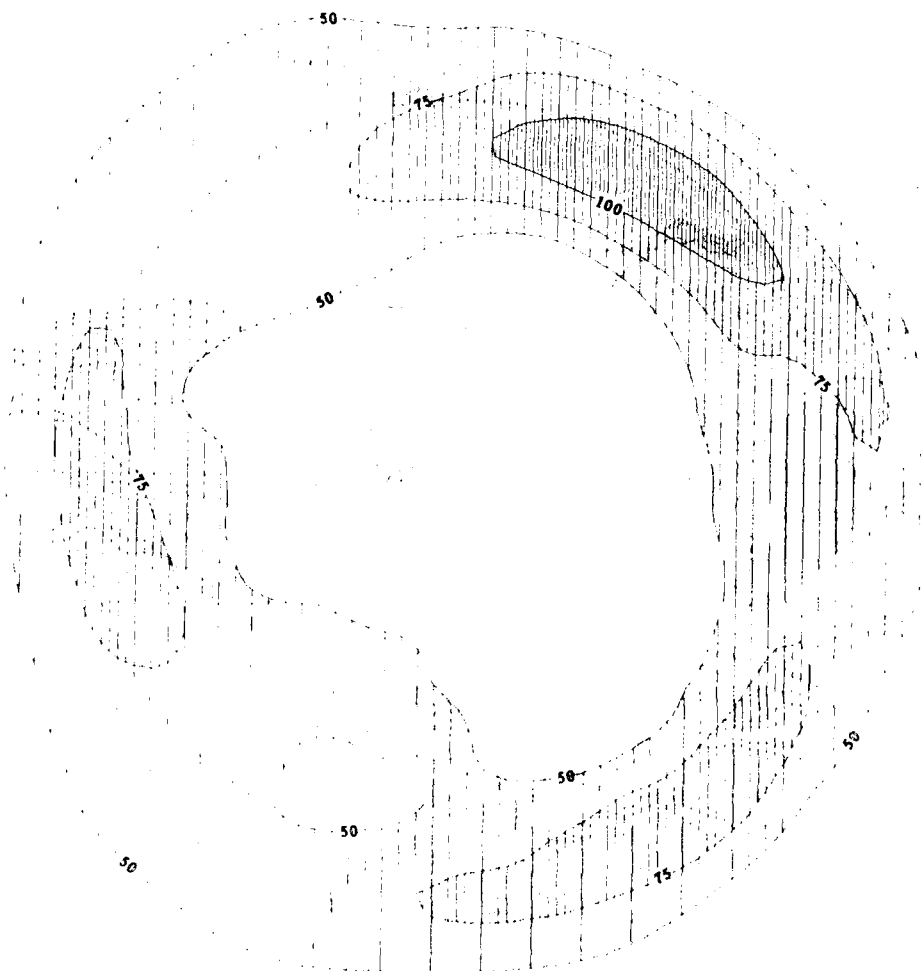
Upper Air Climatology
 Southern Hemisphere

Jet Stream
 500 mb - 600 mb
 1000 mb



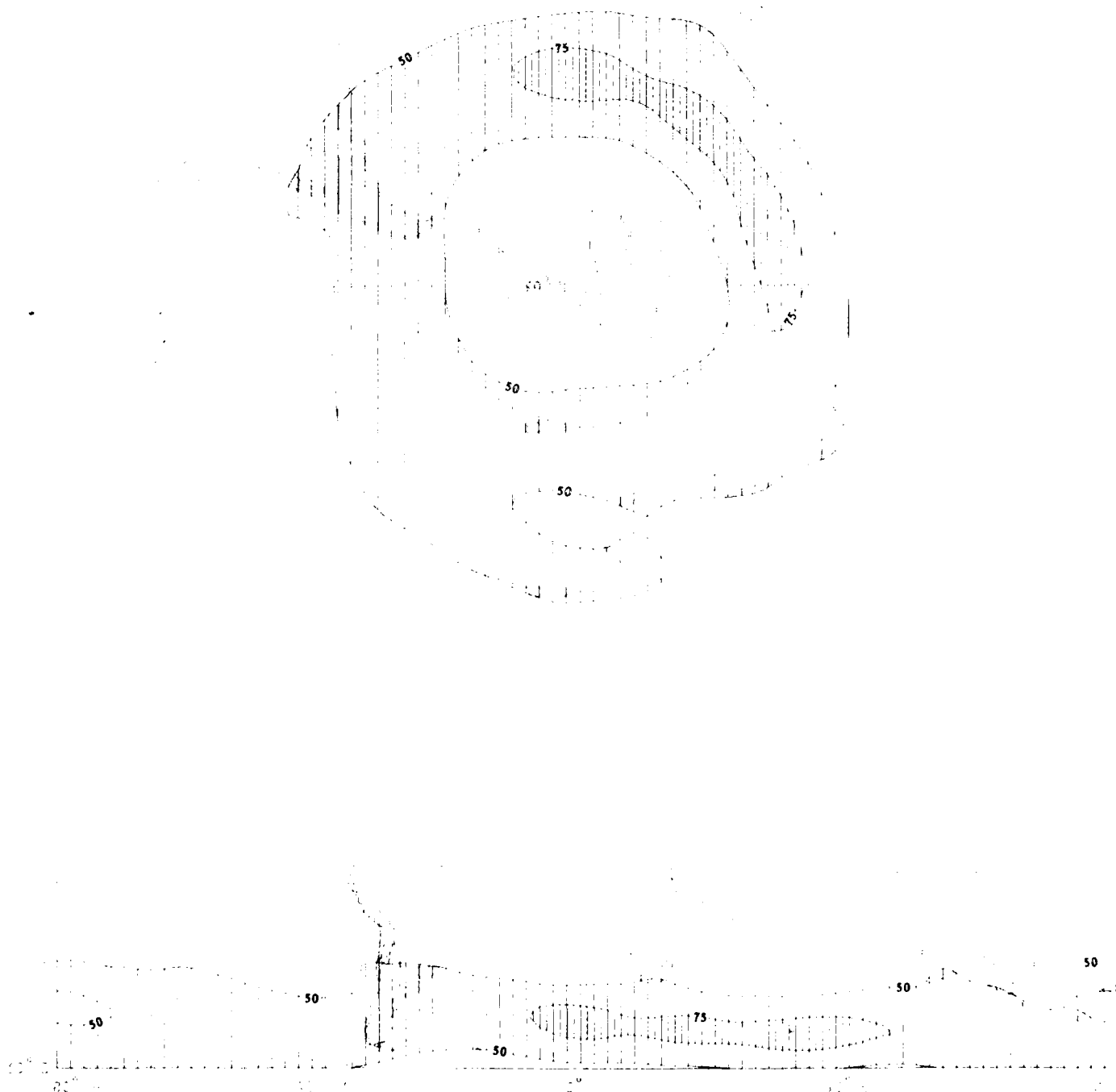
1000 mb
1000 mb
1000 mb
1000 mb

Upper Air Climatology
Northern Hemisphere



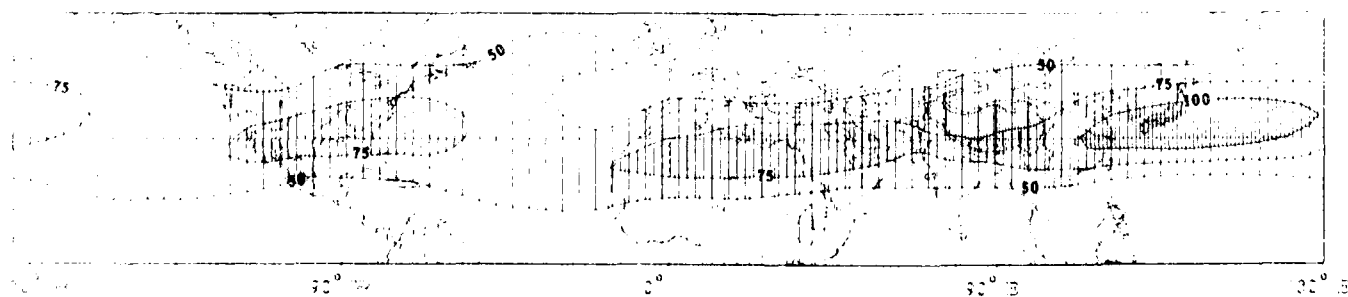
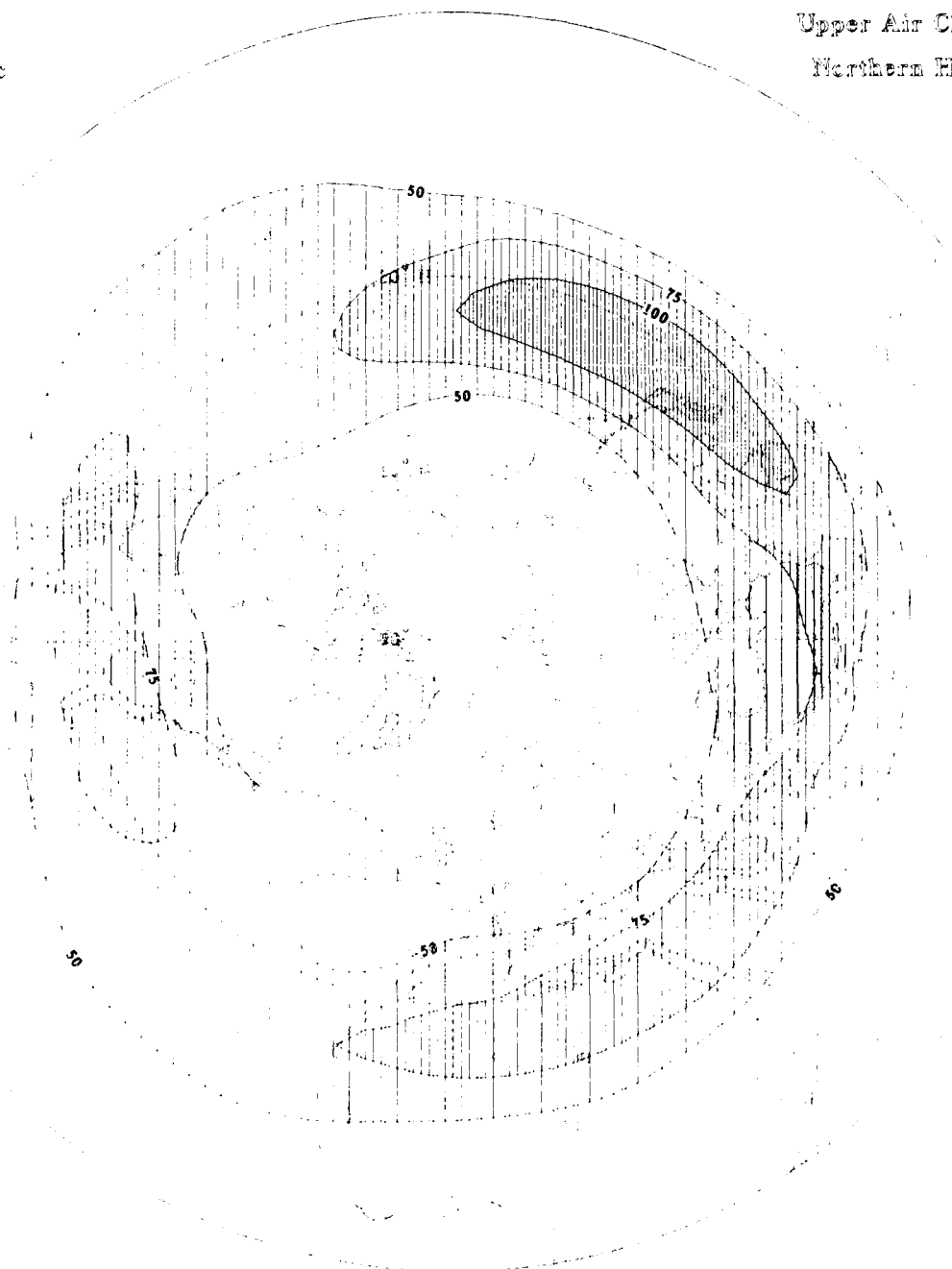
Upper Air Climatology
 Southern Hemisphere

Jet Stream
 500 + 250 mb
 1950-1959
 1960-1969



Jet Stream
 Contour Interval
 100 mb
 1000 mb

Upper Air Climatology
 Northern Hemisphere



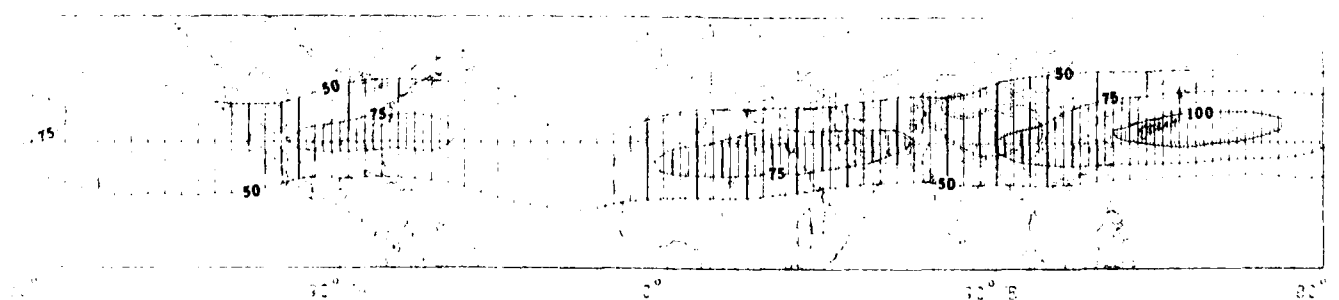
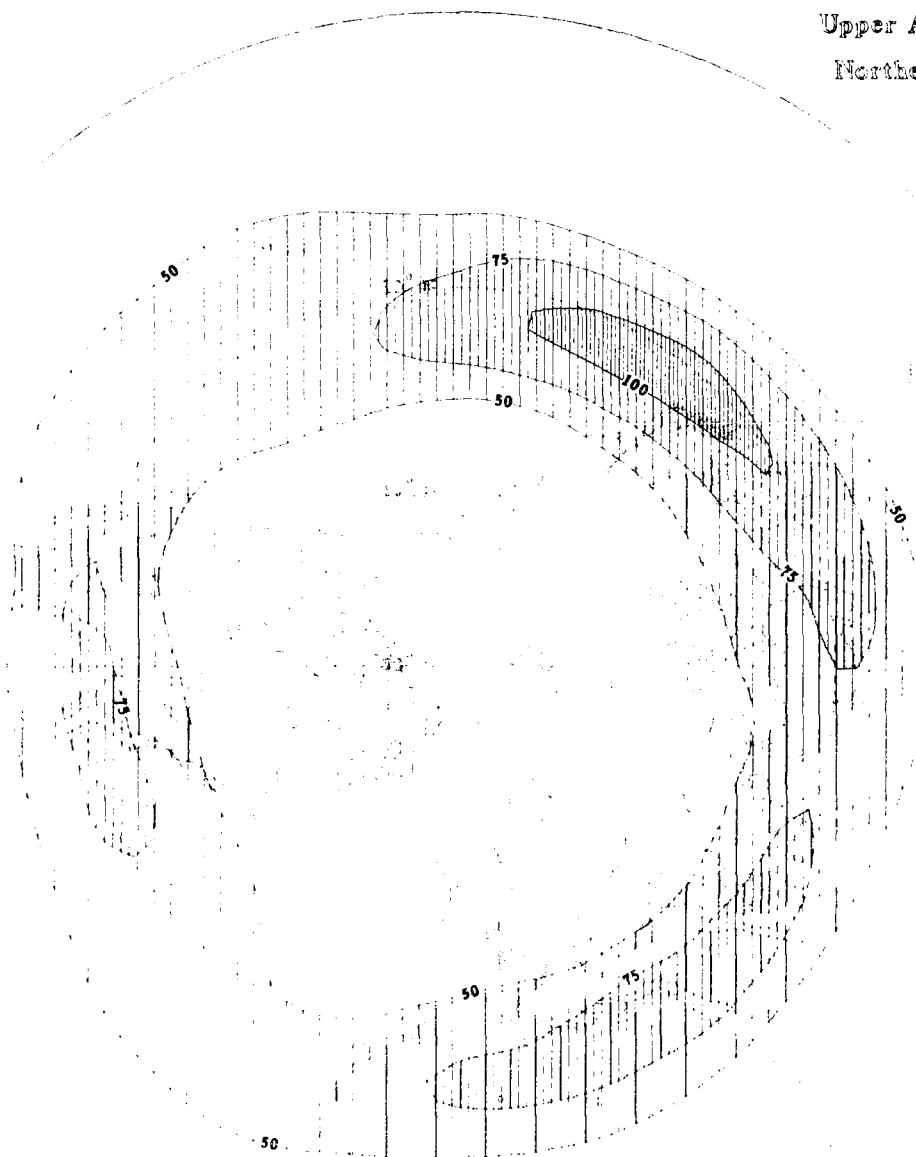
Upper Air Climatology
Southern Hemisphere

Jet Stream
500m + 1000m and
March
1971-1972



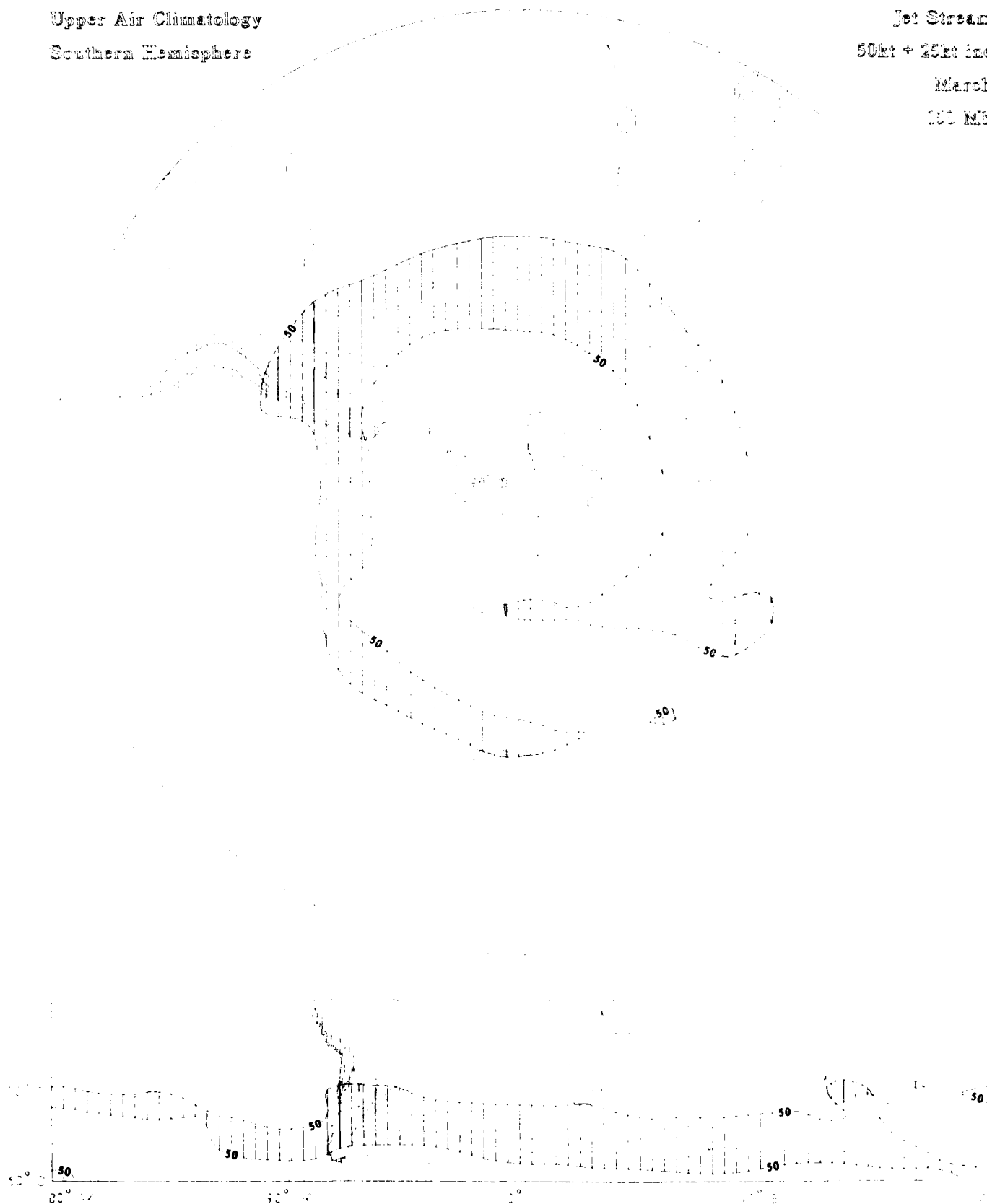
Jet Stream
 50mb - 100mb
 March
 1951-1952

Upper Air Climatology
 Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

Jet Stream
50kt + 25kt inc
March
500 MB



Northern Hemisphere



Types and Characteristics of Common Reactions

THE CHAIRMAN
 SENATE COMMITTEE ON
 EDUCATION
 WASHINGTON, D. C.
 20540

10:00 AM
10:00 AM
10:00 AM
10:00 AM

Upper Air Climatology
Northern Hemisphere

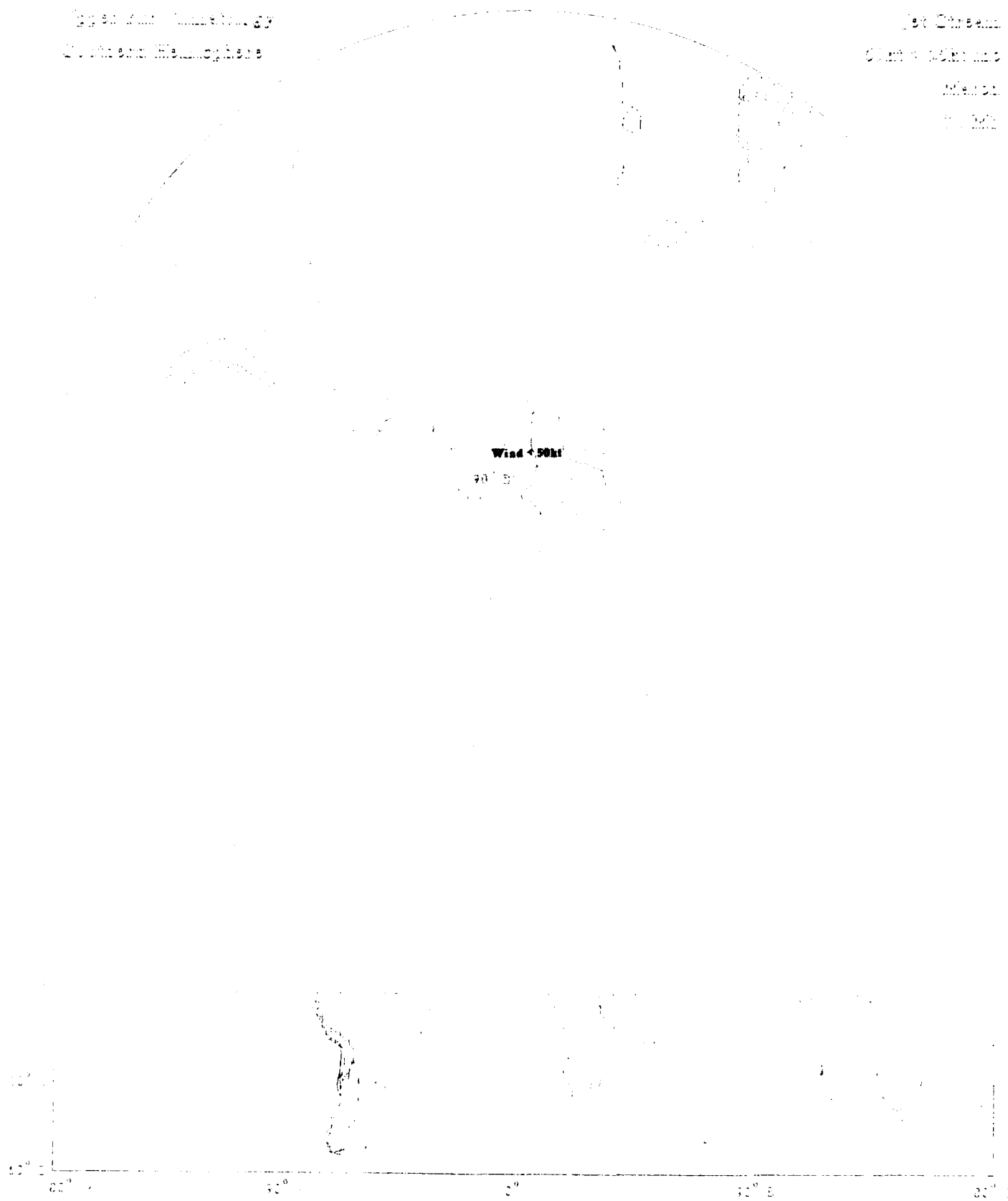


50

50

Open and Unsettled
Circulation Hemisphere

1st Stream
2nd Stream
3rd Stream
4th Stream



Jet Stream
500 mb and
Mean
500 mb

Upper Air Climatology
Northern Hemisphere

10° N

10° N

Wind < 50kt

10° N

10° N

10° N

10° N

10° N

10° N

10° N

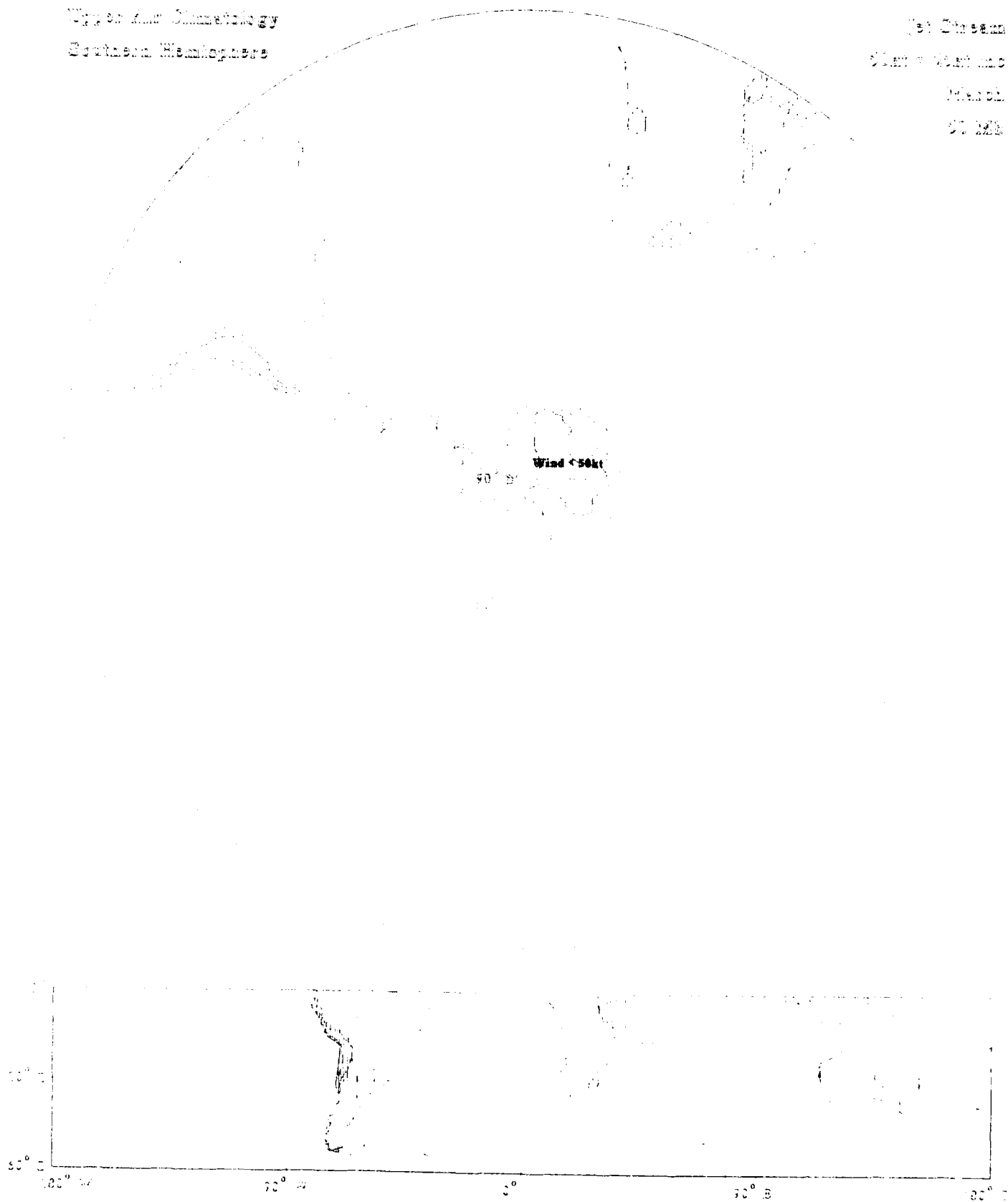
10° N

10° N

10° N

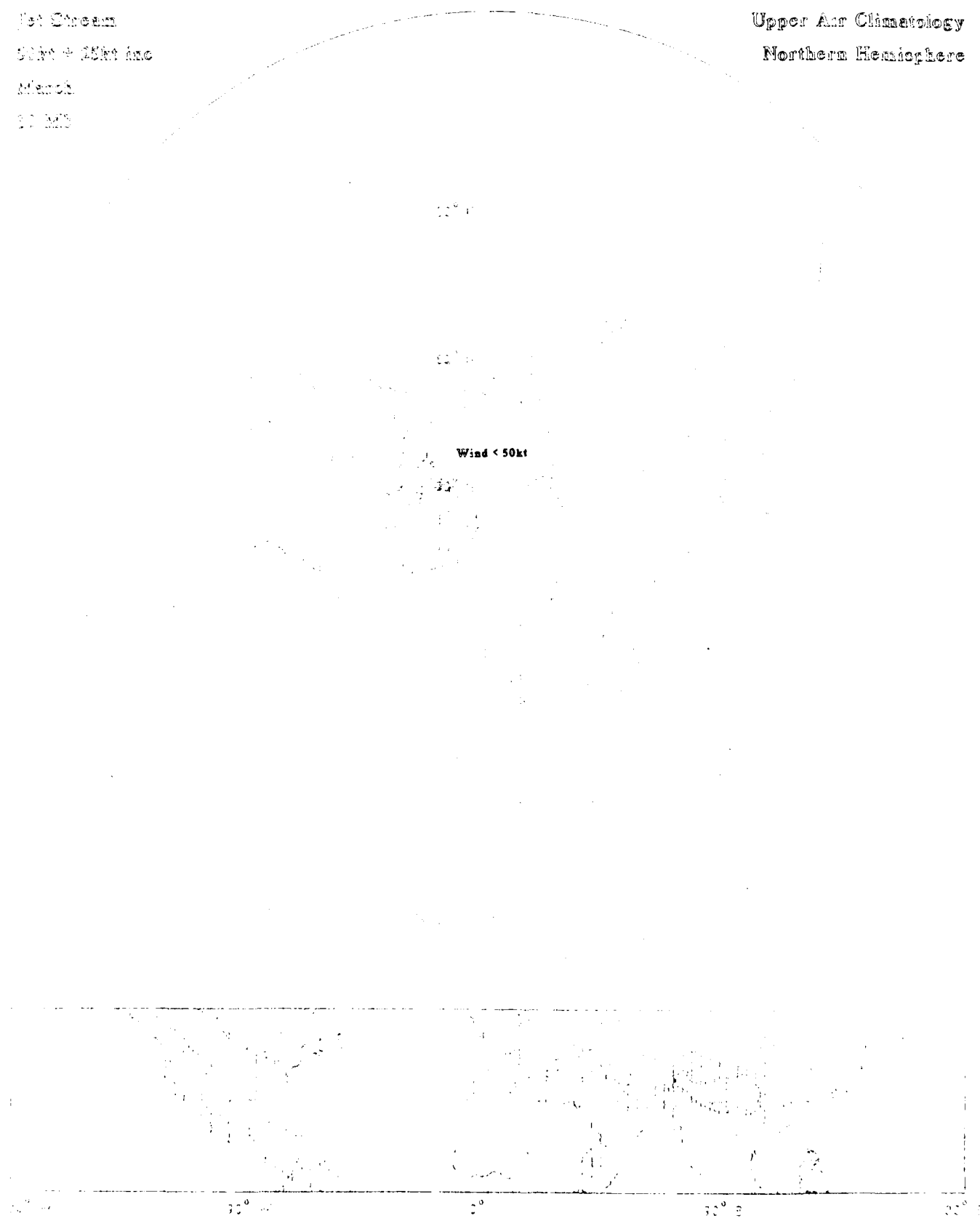
Types and Climatology
Southern Hemisphere

Get Oceanic
Wind + Clouds
March
1971



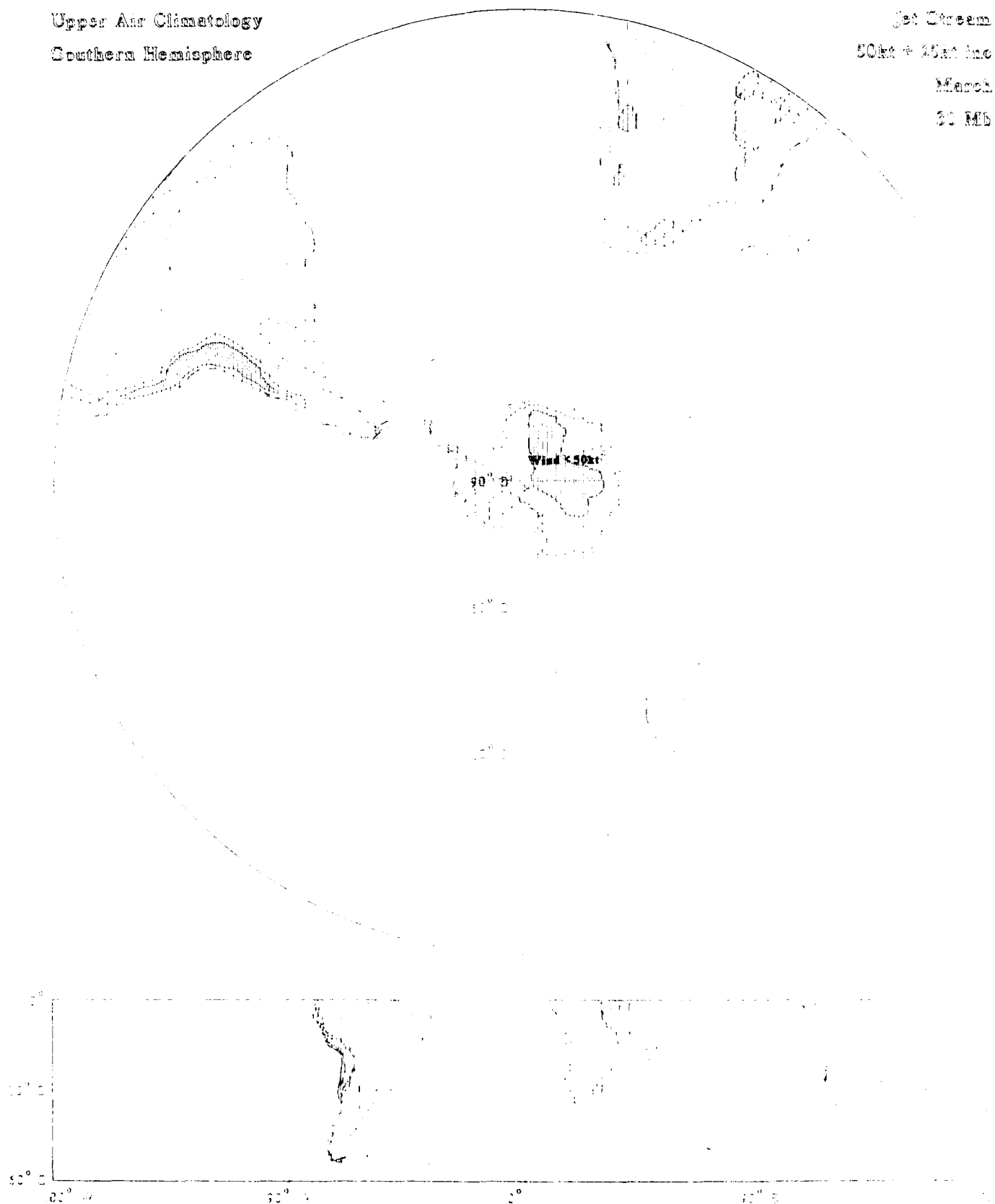
Jet Stream
50kt + 10kt inc
March
1950

Upper Air Climatology
Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

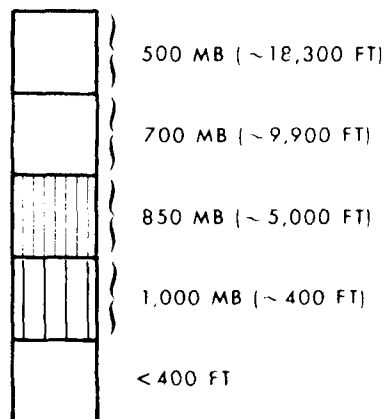
Jet Stream
50kt + 25kt inc
March
20 MB



TEMPERATURE
(13 LEVELS, 1000 TO 30 MB)

- Contours of mean temperature (solid and dashed lines) in °C; solids labeled, dashed intermediates unlabeled
- Temperature labeled interval: 5°C
- Contours of standard deviation of temperature (dotted lines) in °C
- Standard deviation of temperature labeled interval: 2.5°C
- Contours blanked for geographic areas with elevations exceeding specified geopotential heights

ELEVATION SCALE



Mean Temperature (c)

Old Day (Dotted)

March

1000 MB

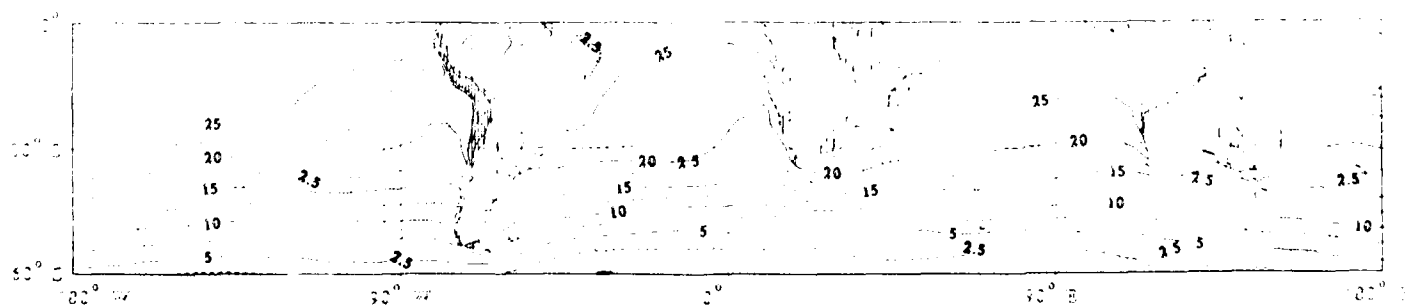
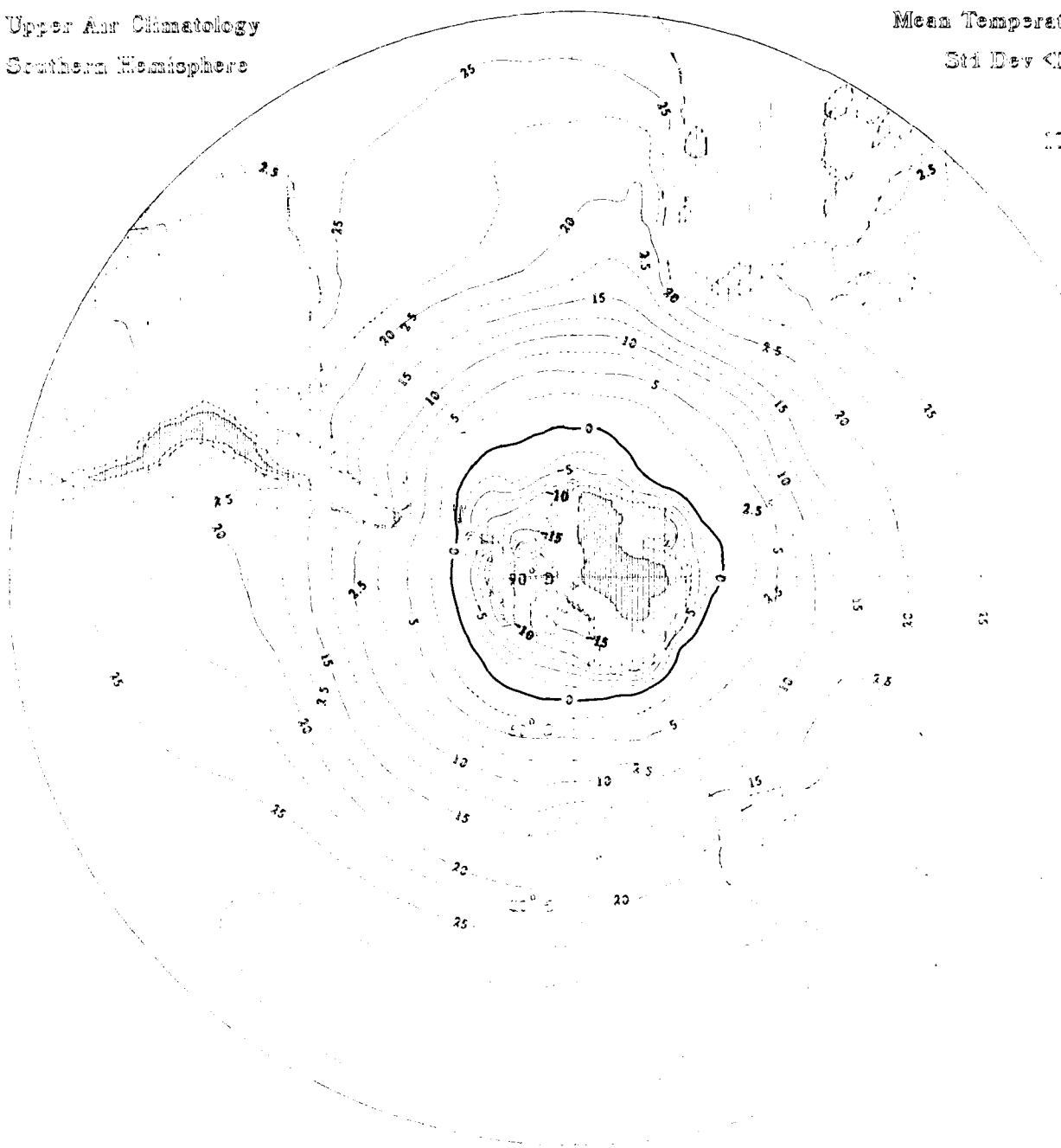
Upper Air Climatology

Northern Hemisphere



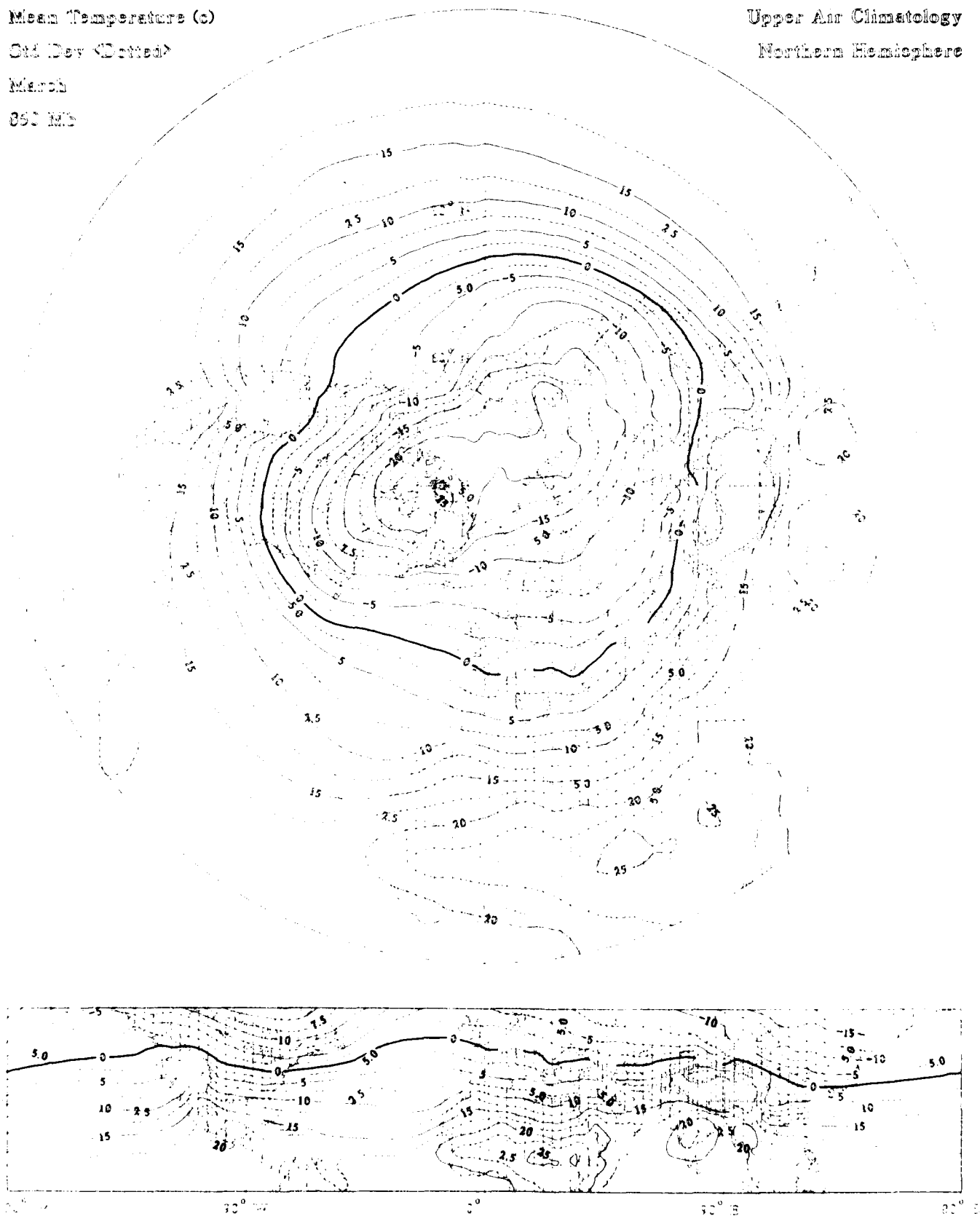
Upper Air Climatology
Southern Hemisphere

Mean Temperature (c)
Std Dev (Dotted)
March
1000 MB



Mean Temperature (c)
 Std Dev <Dotted>
 March
 850 mb

Upper Air Climatology
 Northern Hemisphere



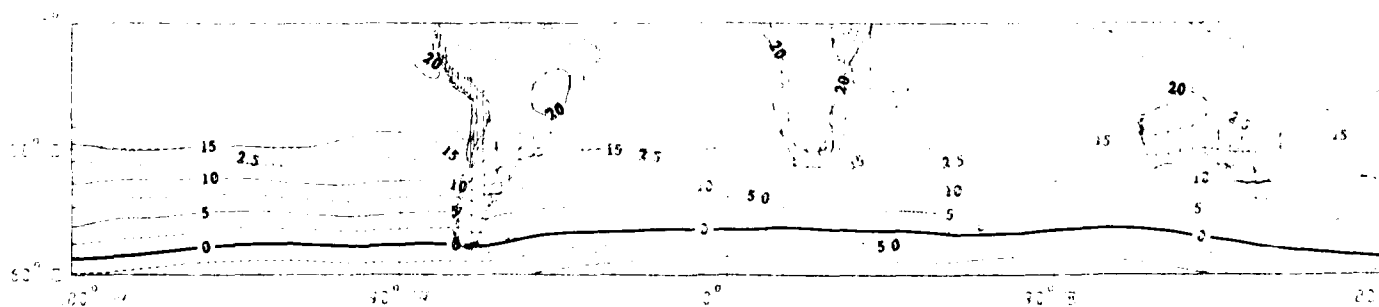
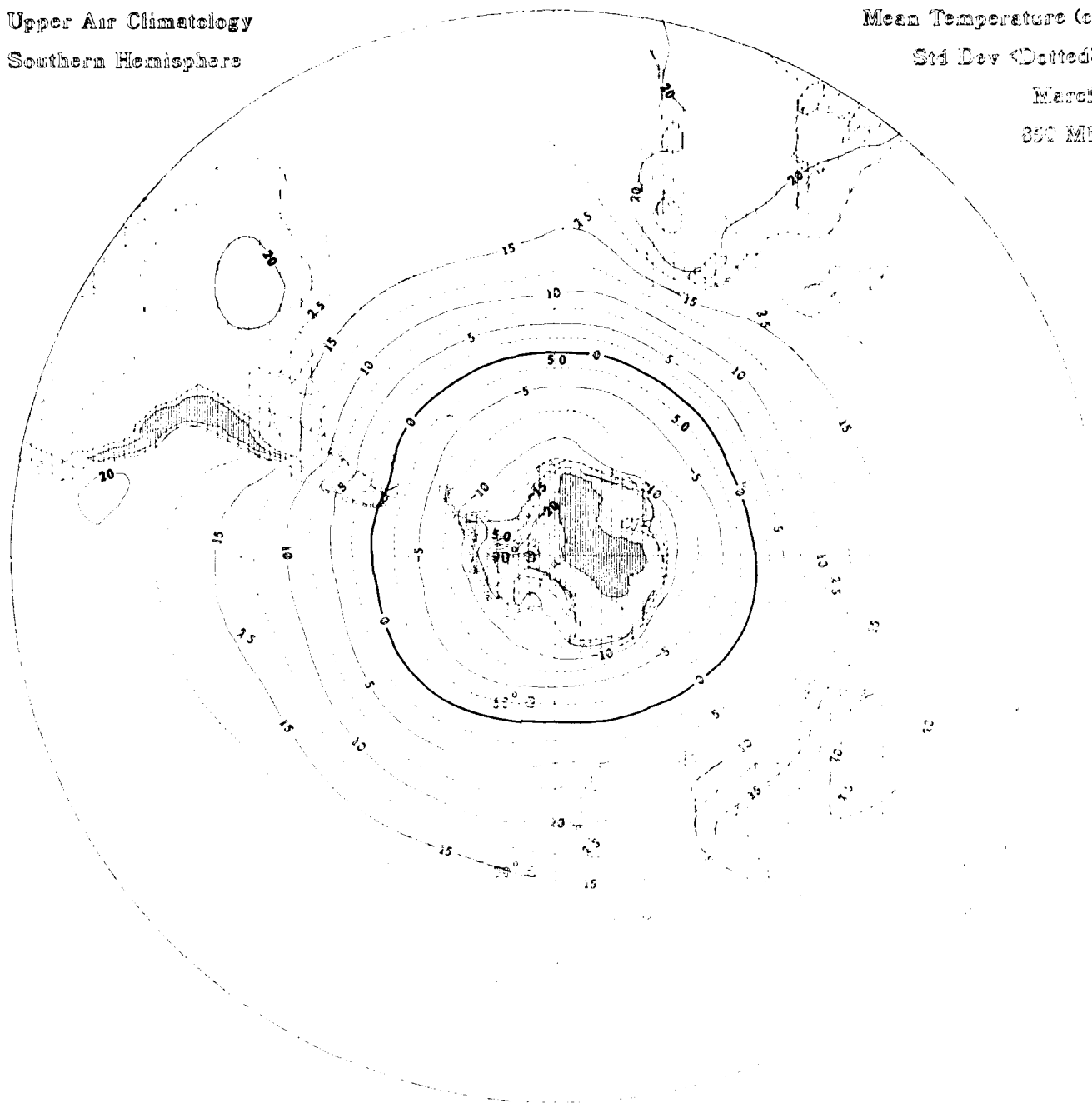
Upper Air Climatology
Southern Hemisphere

Mean Temperature (c)

Std Dev (Dotted)

March

850 MB



Mean Temperature (C)

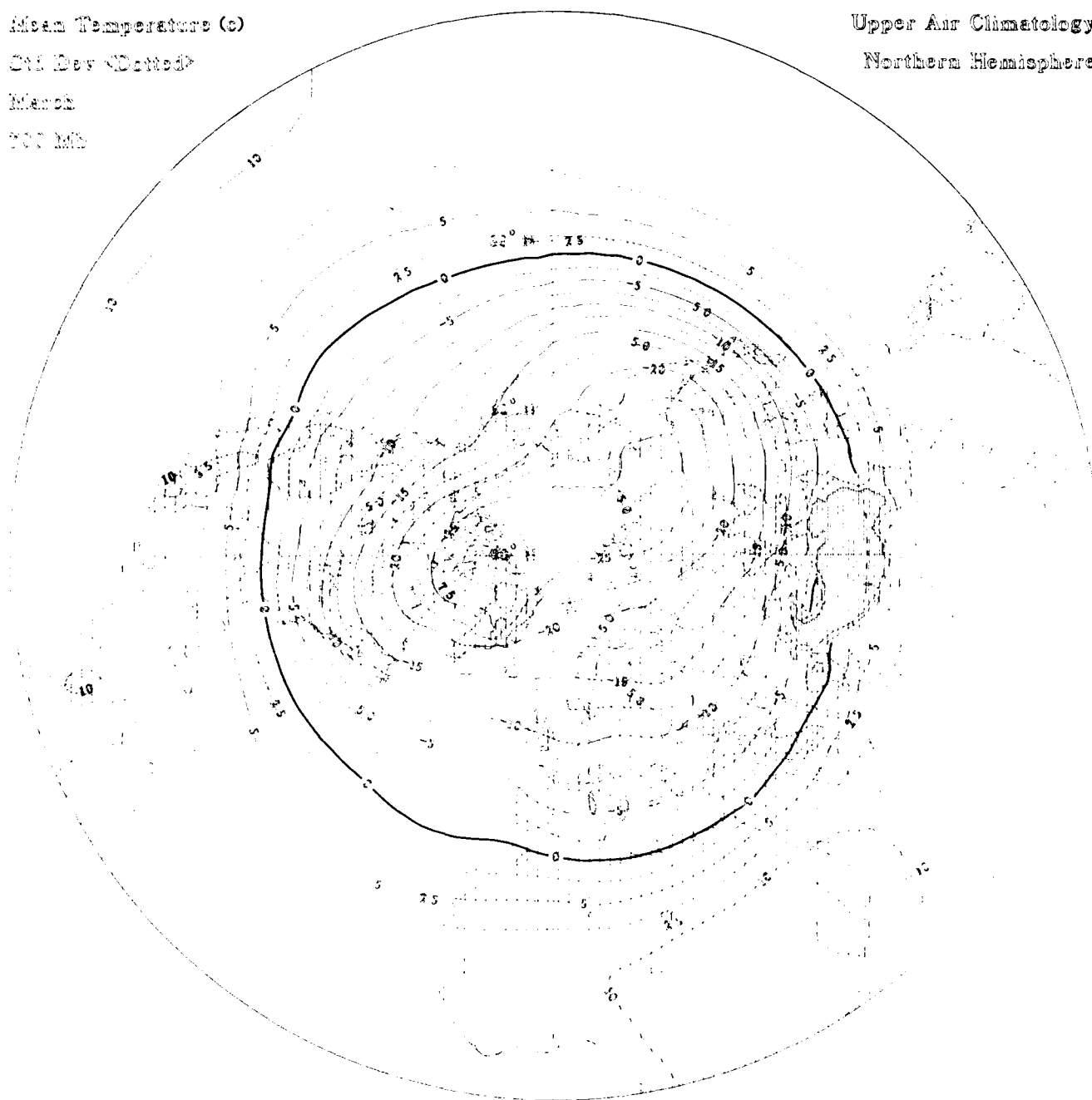
Std Dev (Dotted)

March

700 MB

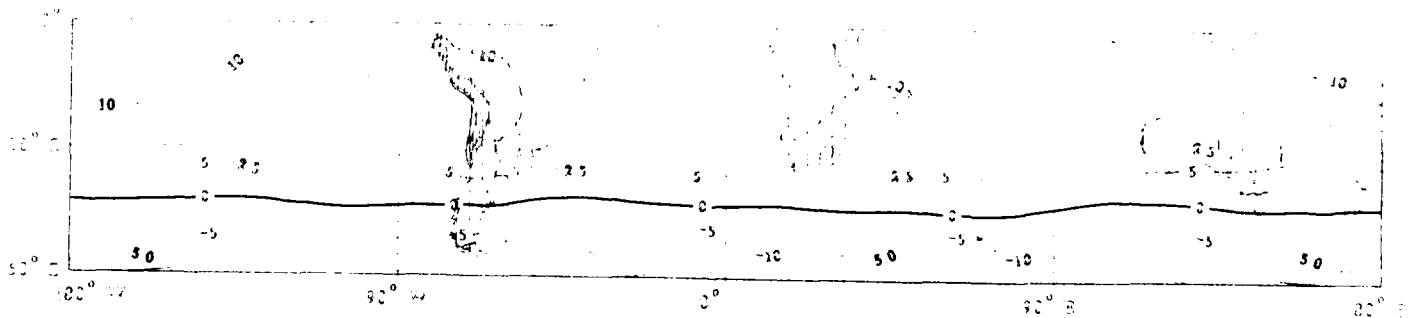
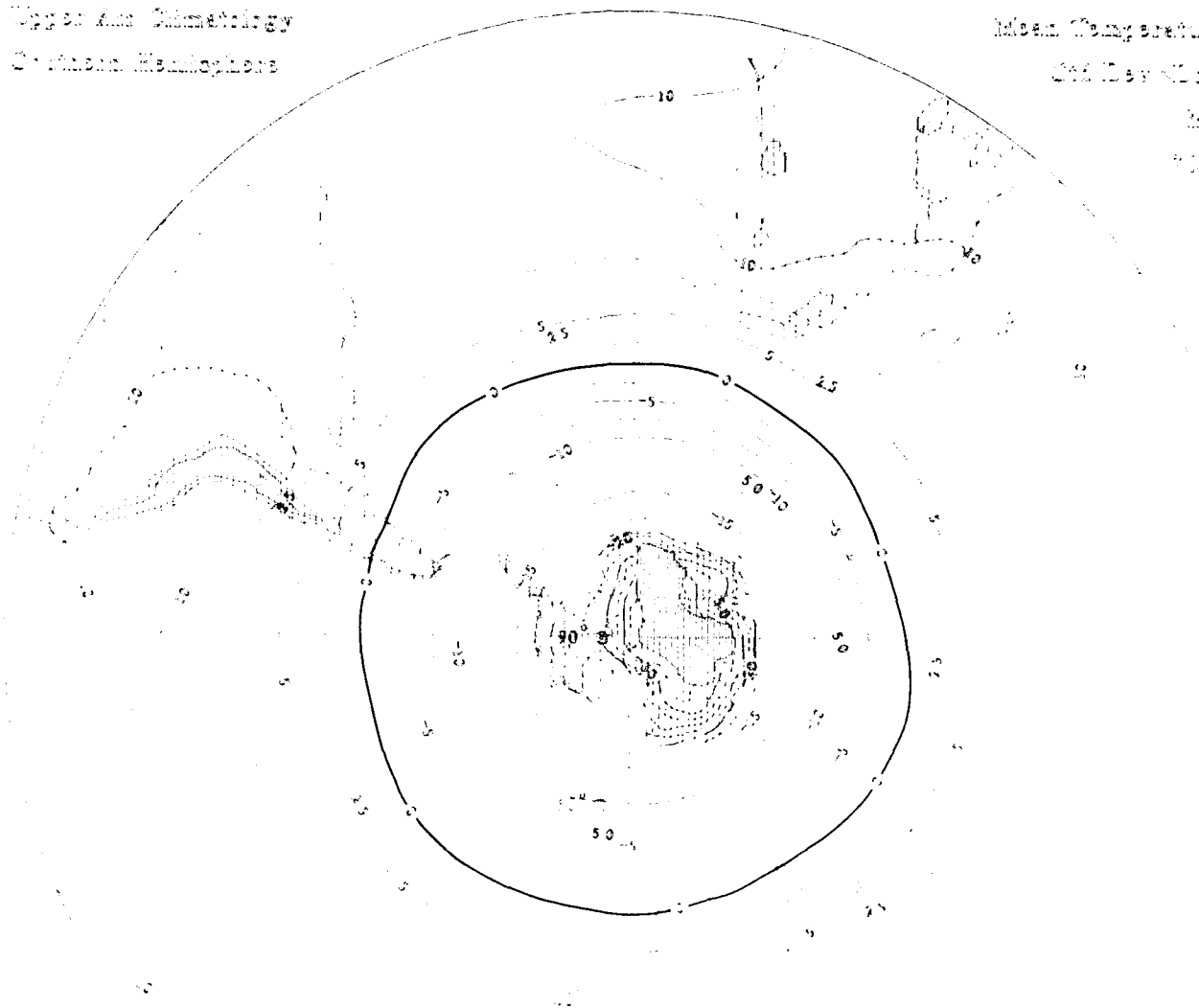
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
 Southern Hemisphere

Mean Temperature (°C)
 500 Day (March)
 1950-1951



Mean Temperature (c)

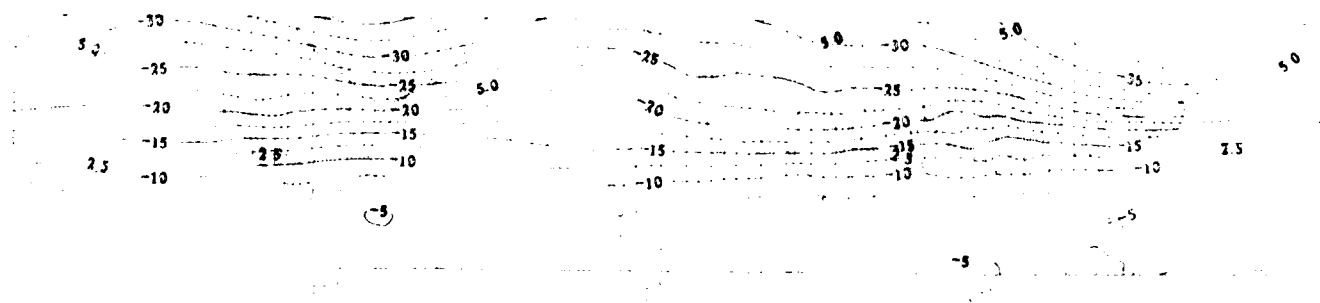
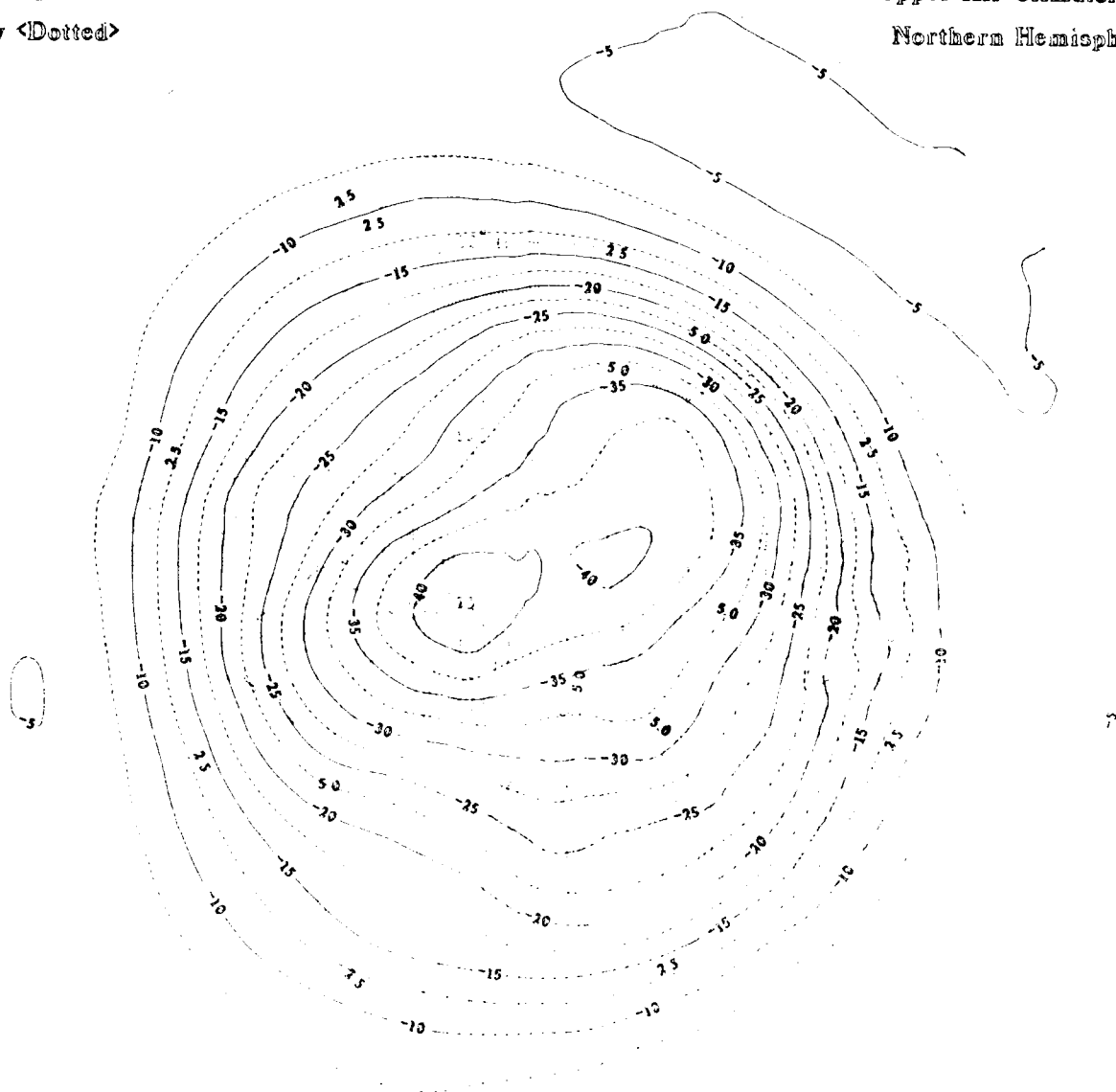
Std Dev <Dotted>

March

500 Mb

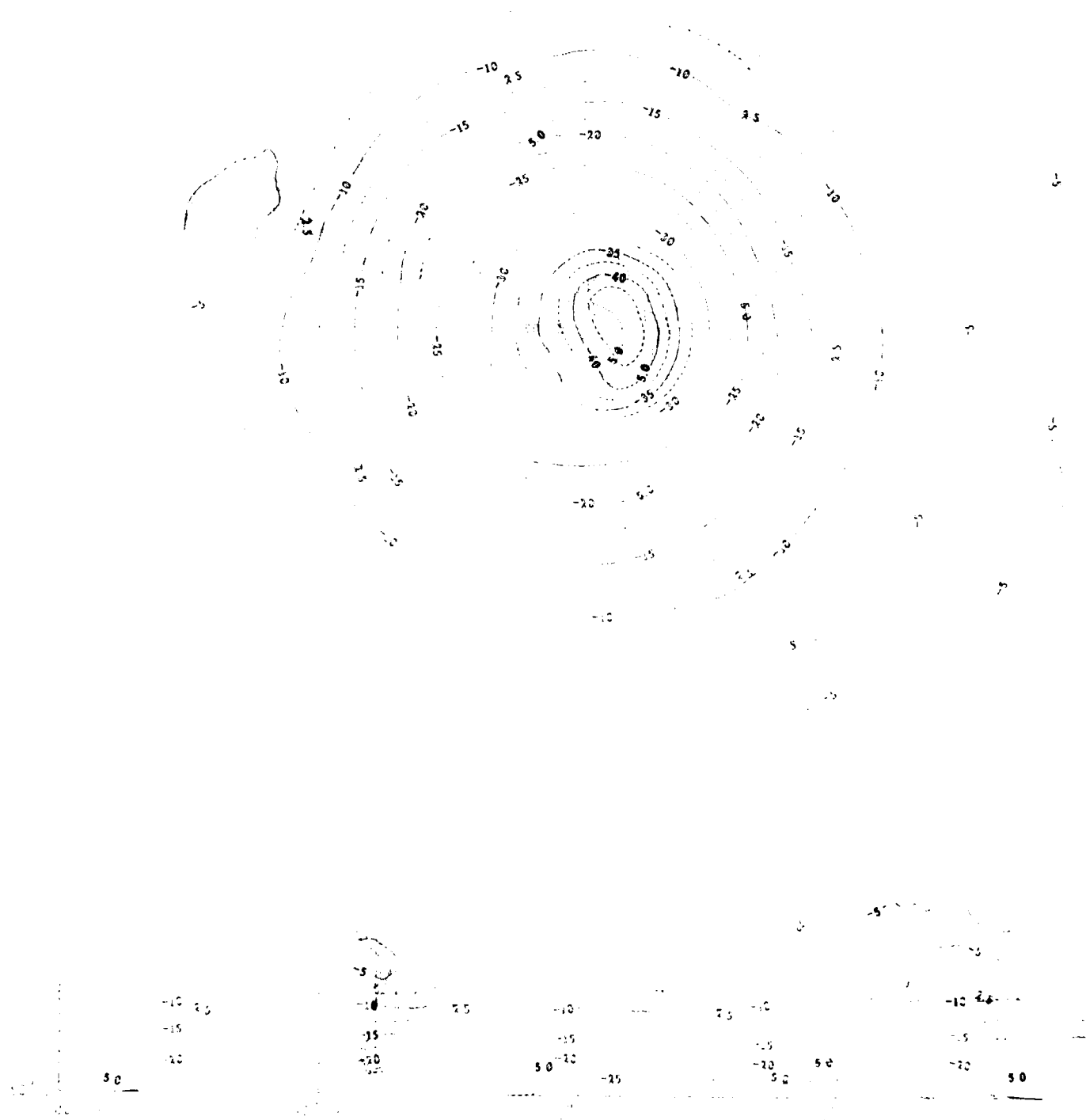
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

Mean Temperature (c)
Std Dev <Dotted>
March
500 Mb



Mean Temperature (°C)

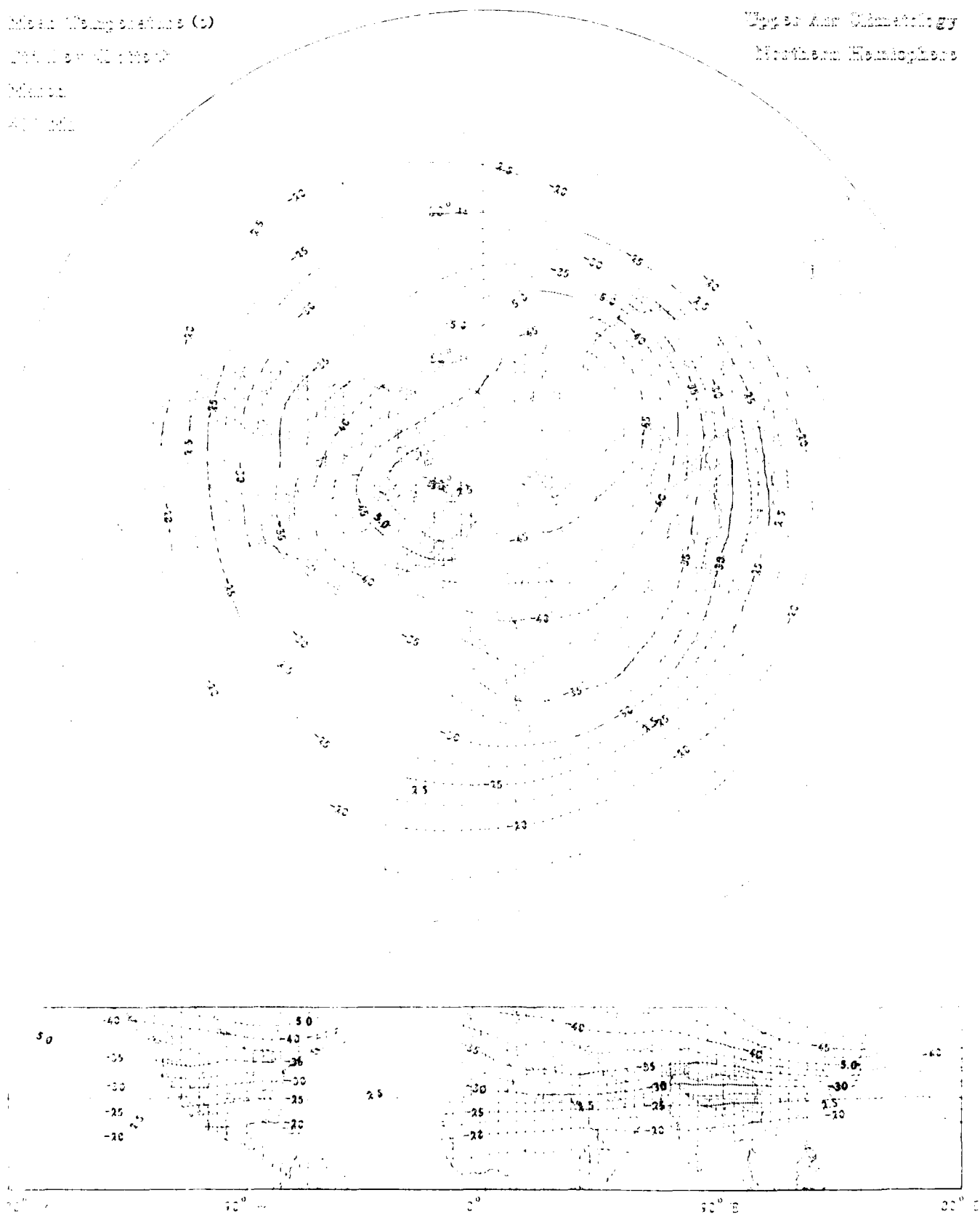
1971-1972

Winter

1971-1972

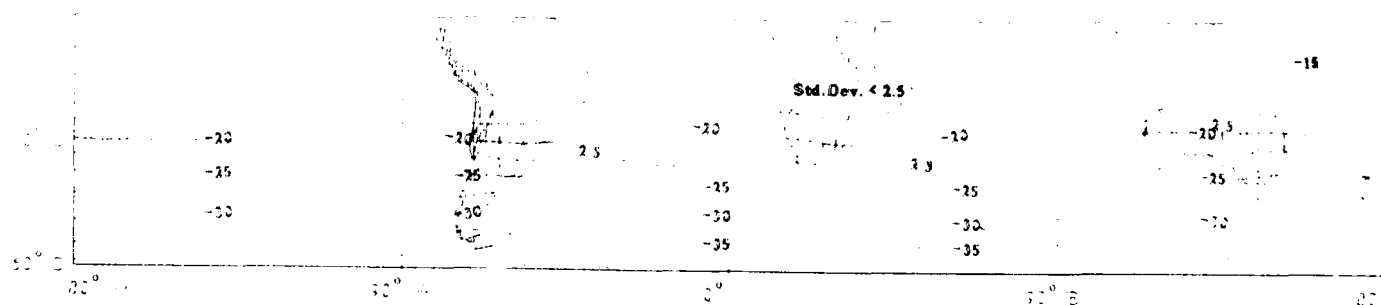
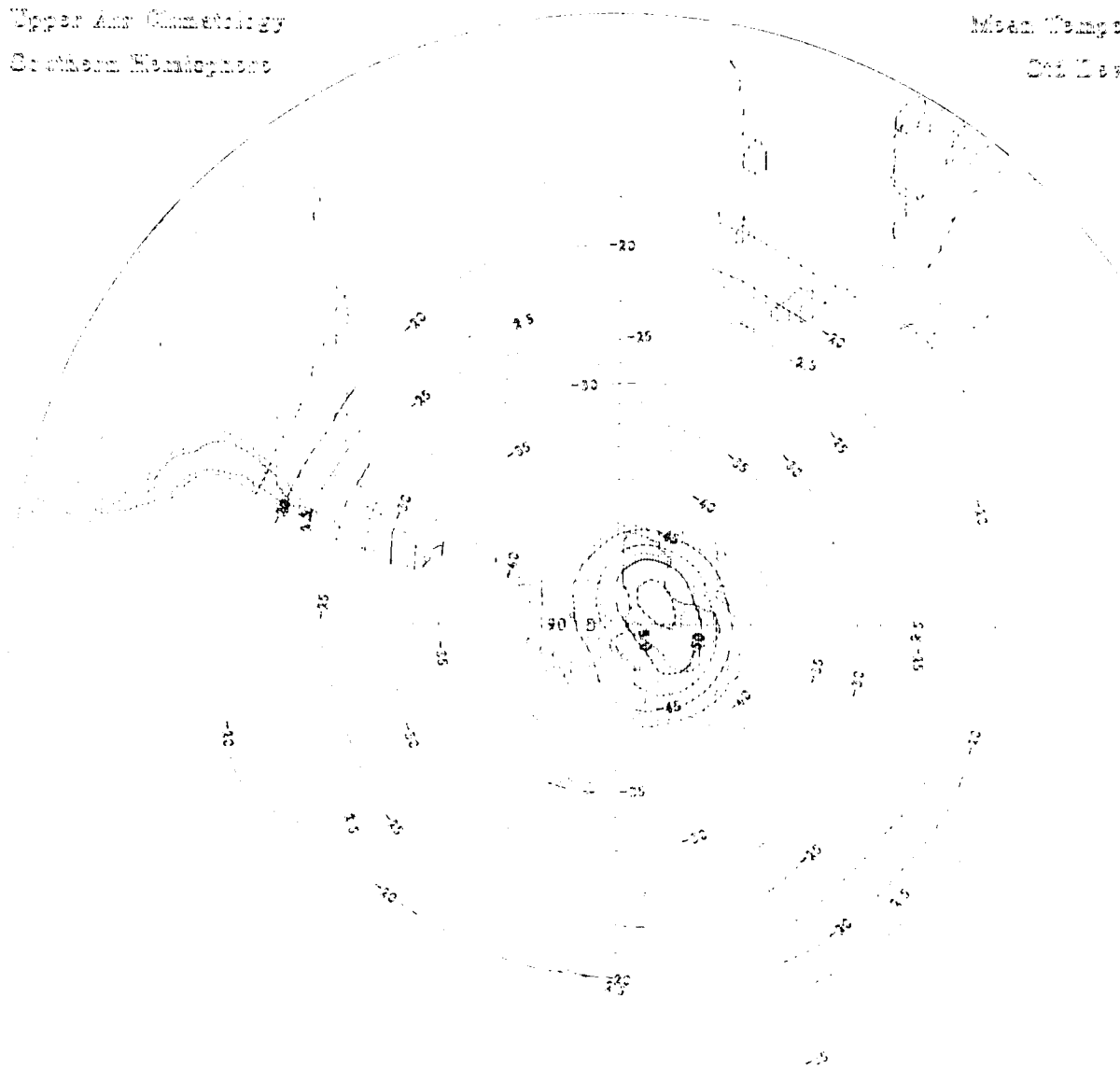
Upper Air Climatology

Western Hemisphere



Upper Air Climatology
 Southern Hemisphere

Mean Temperature (°C)
 Day 1 of Cycle 0
 March
 411 121



Mean Temperature (c)

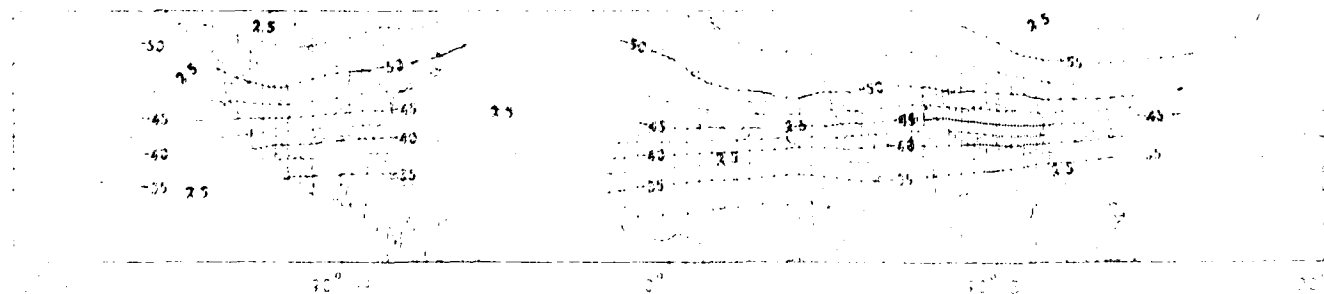
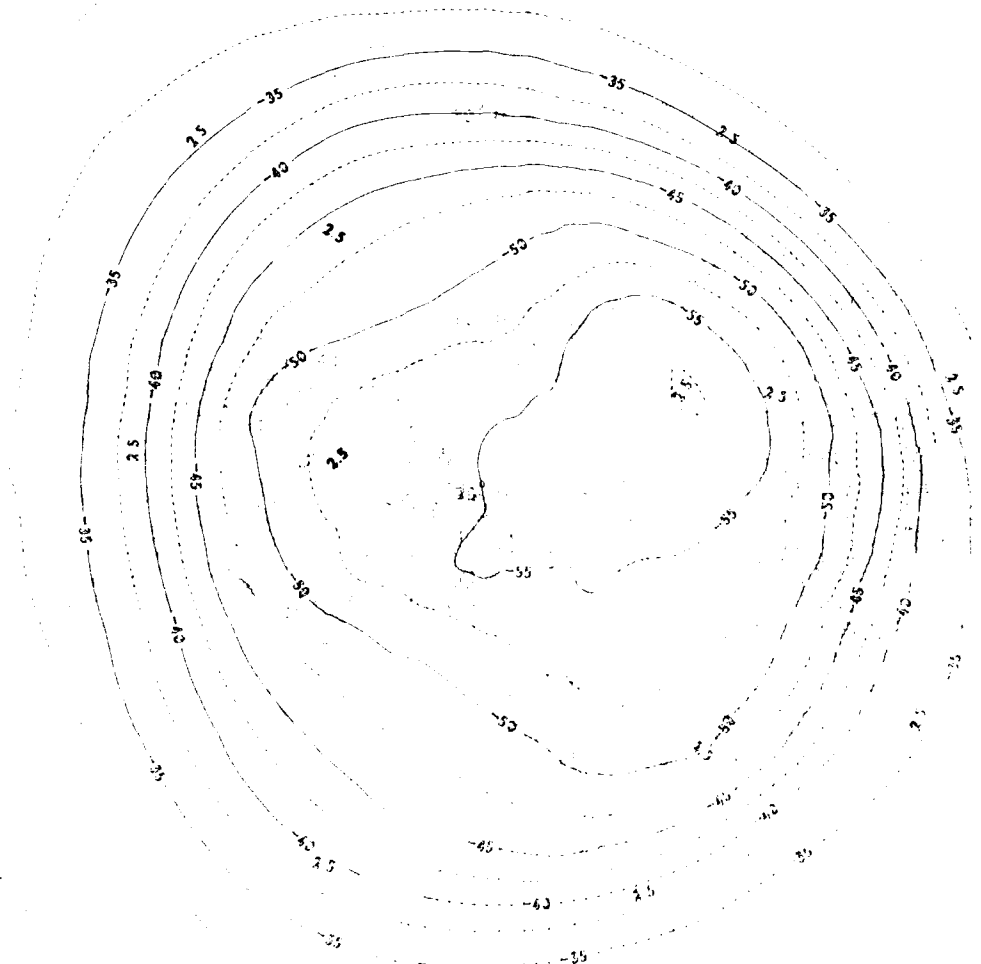
Std Dev <Dotted>

March

300 Mb

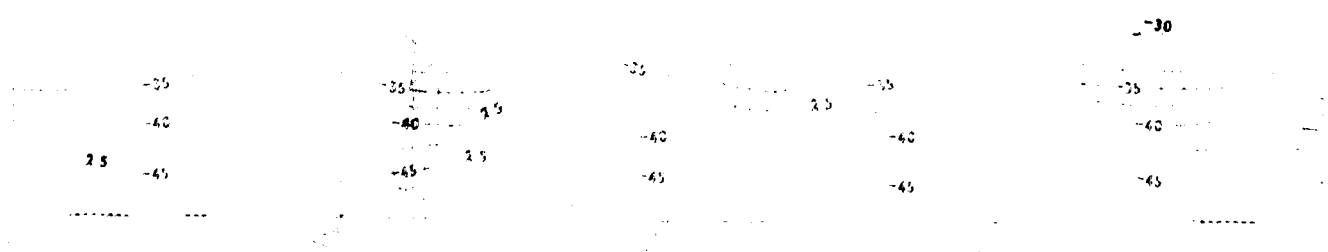
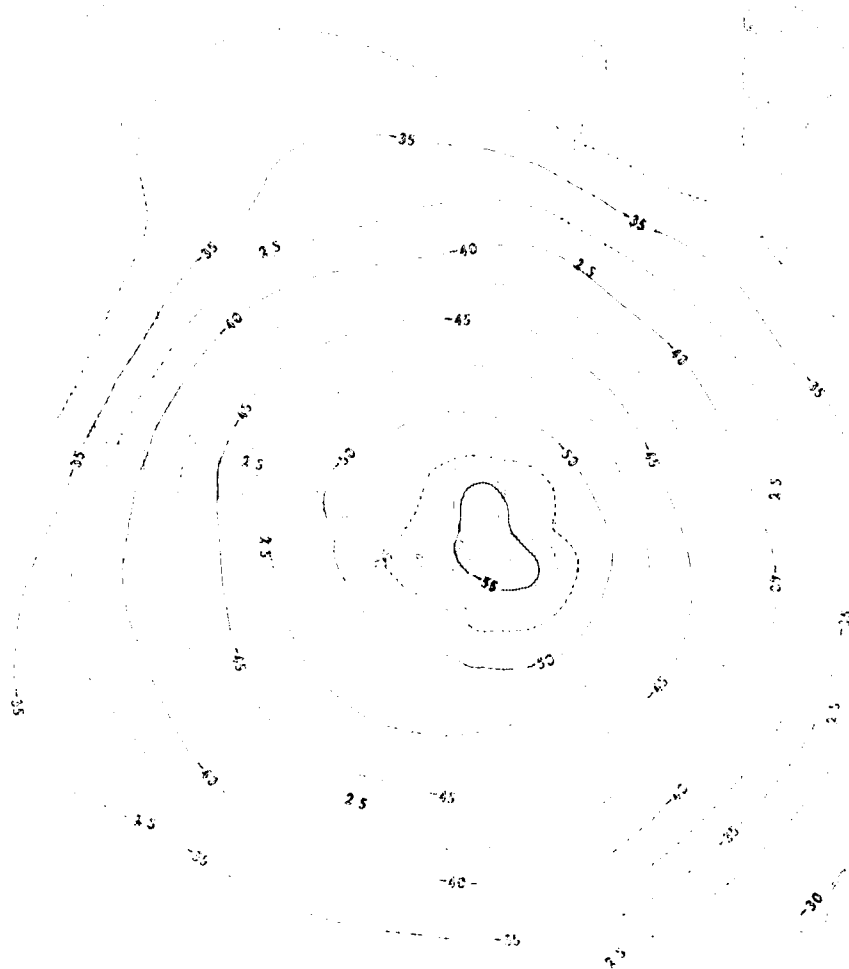
Upper Air Climatology

Northern Hemisphere



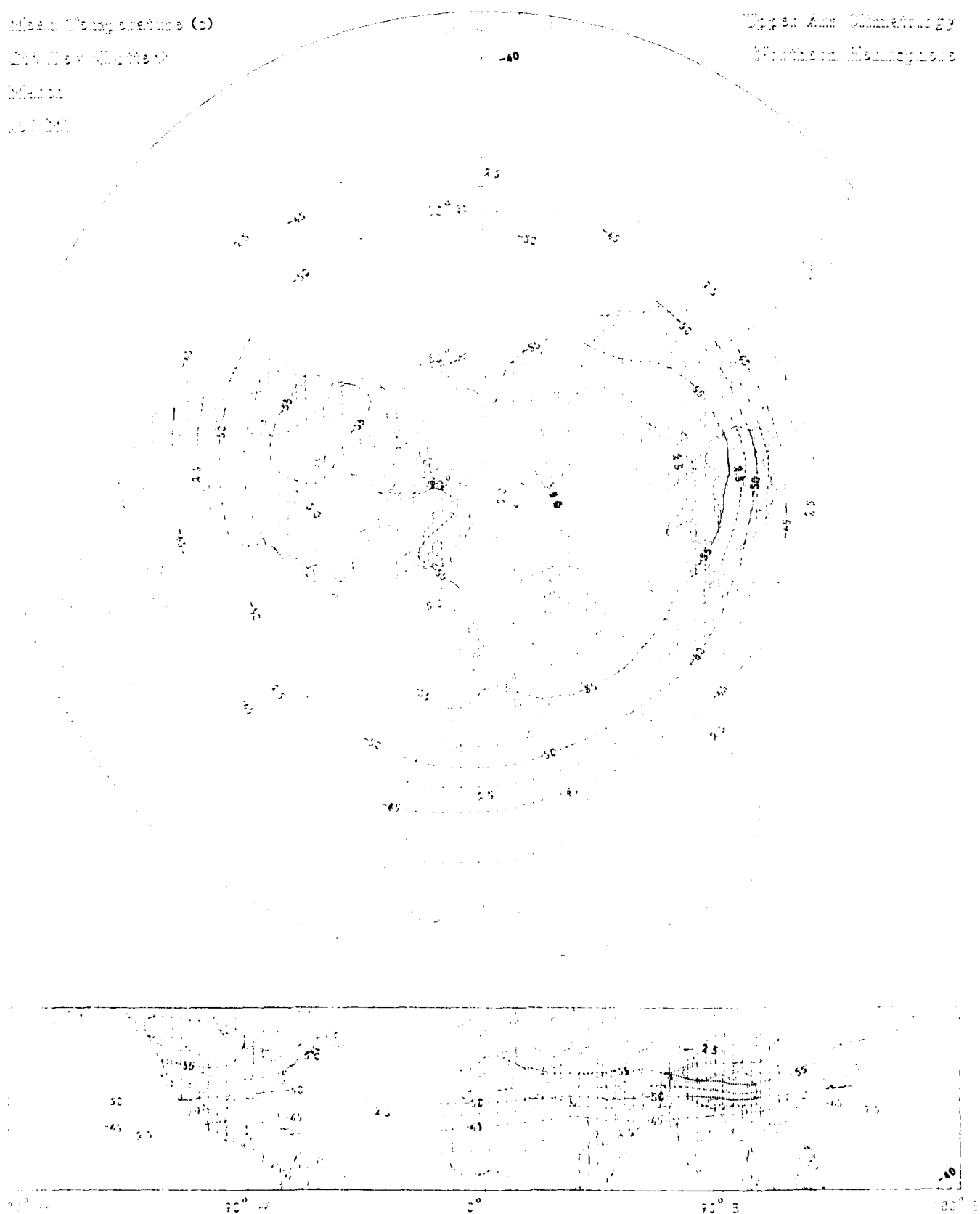
Upper Air Climatology
Southern Hemisphere

Mean Temperature (c)
Std Dev <Dotted>
March
300 MB



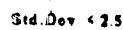
The figure consists of two separate line graphs. The left graph plots 'Rate of reaction' on the y-axis against 'Temperature (°C)' on the x-axis. The x-axis has markings for 10, 20, 30, 40, and 50. The curve starts at a low rate at 10°C, rises to a peak at 40°C, and then begins to decline at 50°C. The right graph also plots 'Rate of reaction' on the y-axis against 'Temperature (°C)' on the x-axis. The x-axis has markings for 10, 20, 30, 40, and 50. This curve shows a steep, exponential increase in the rate of reaction as temperature rises from 10°C to 40°C, and then it levels off, showing a much smaller increase in rate between 40°C and 50°C.

Abstract



— 225 —

1992



Mean Temperature (°C)

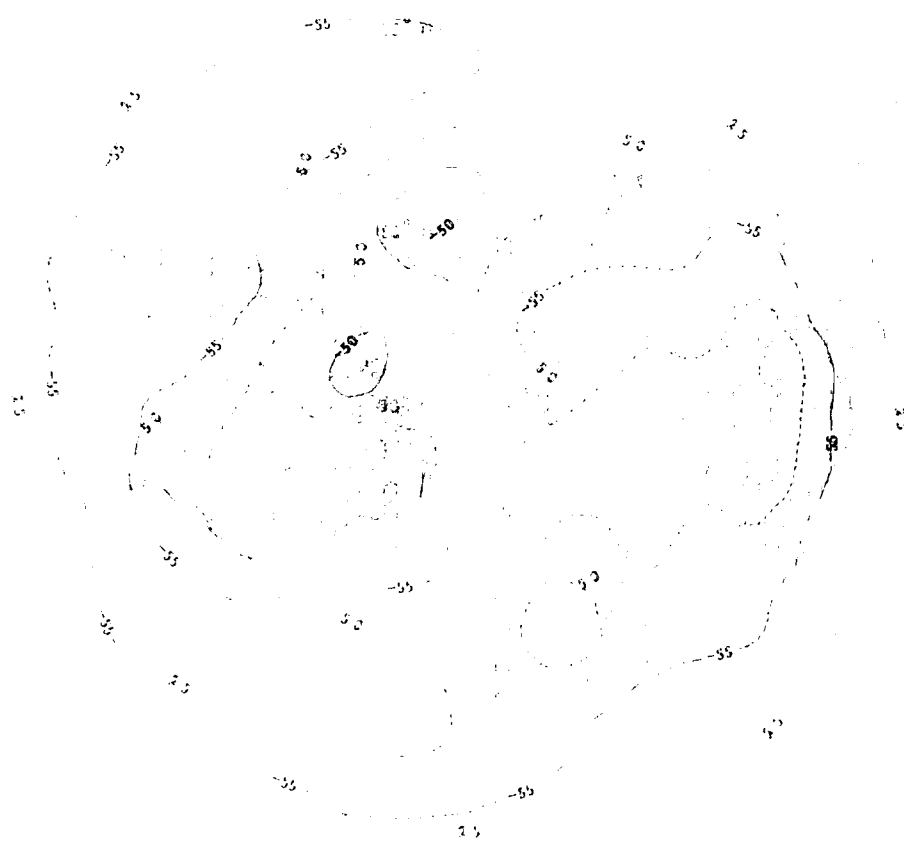
Oct. Dec. 1950-51

March

1951-52

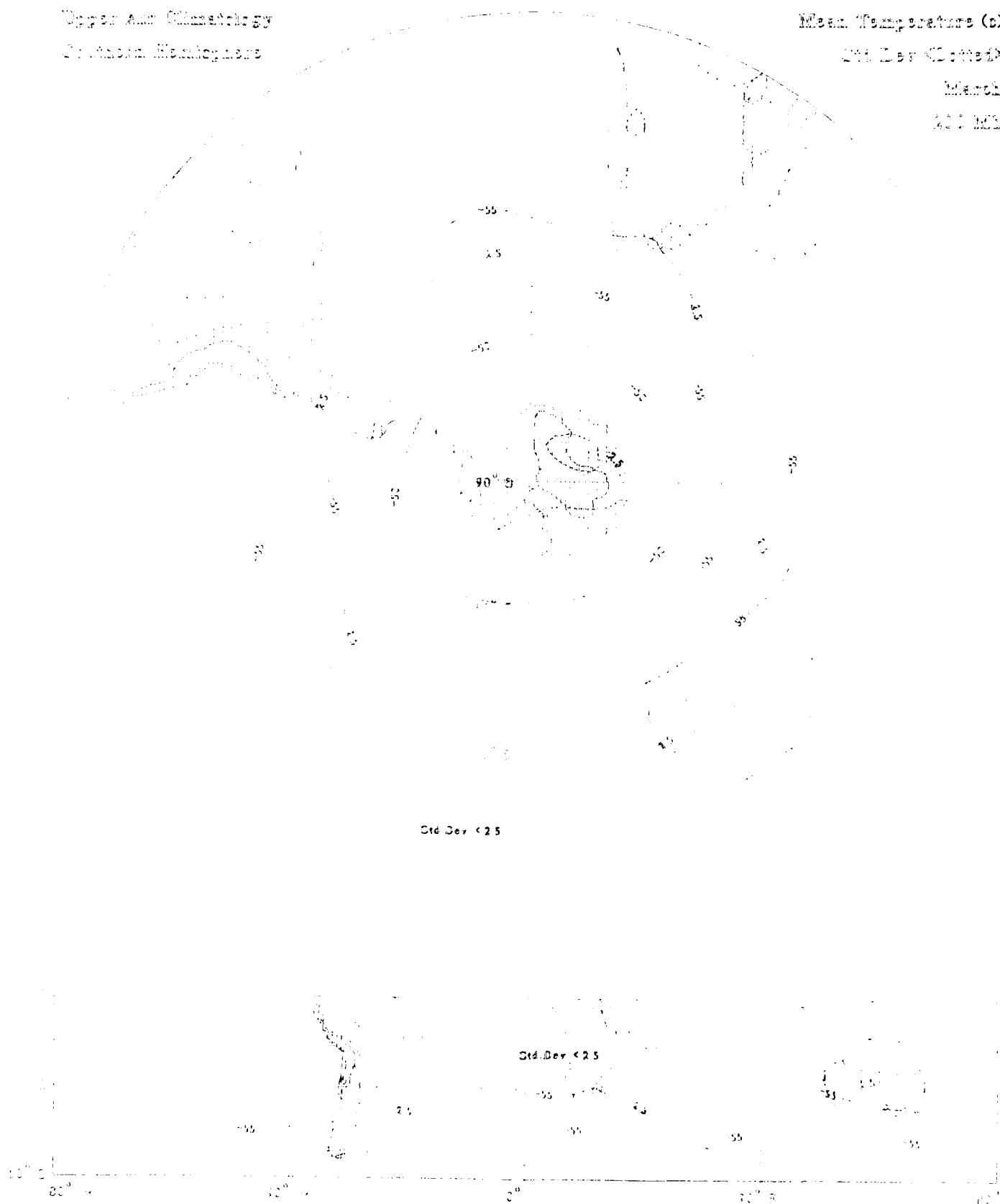
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
 Circulation Maps

Mean Temperature (C)
 101 hPa (Dotted)
 March
 1951-1952



Mean Temperature (°C)

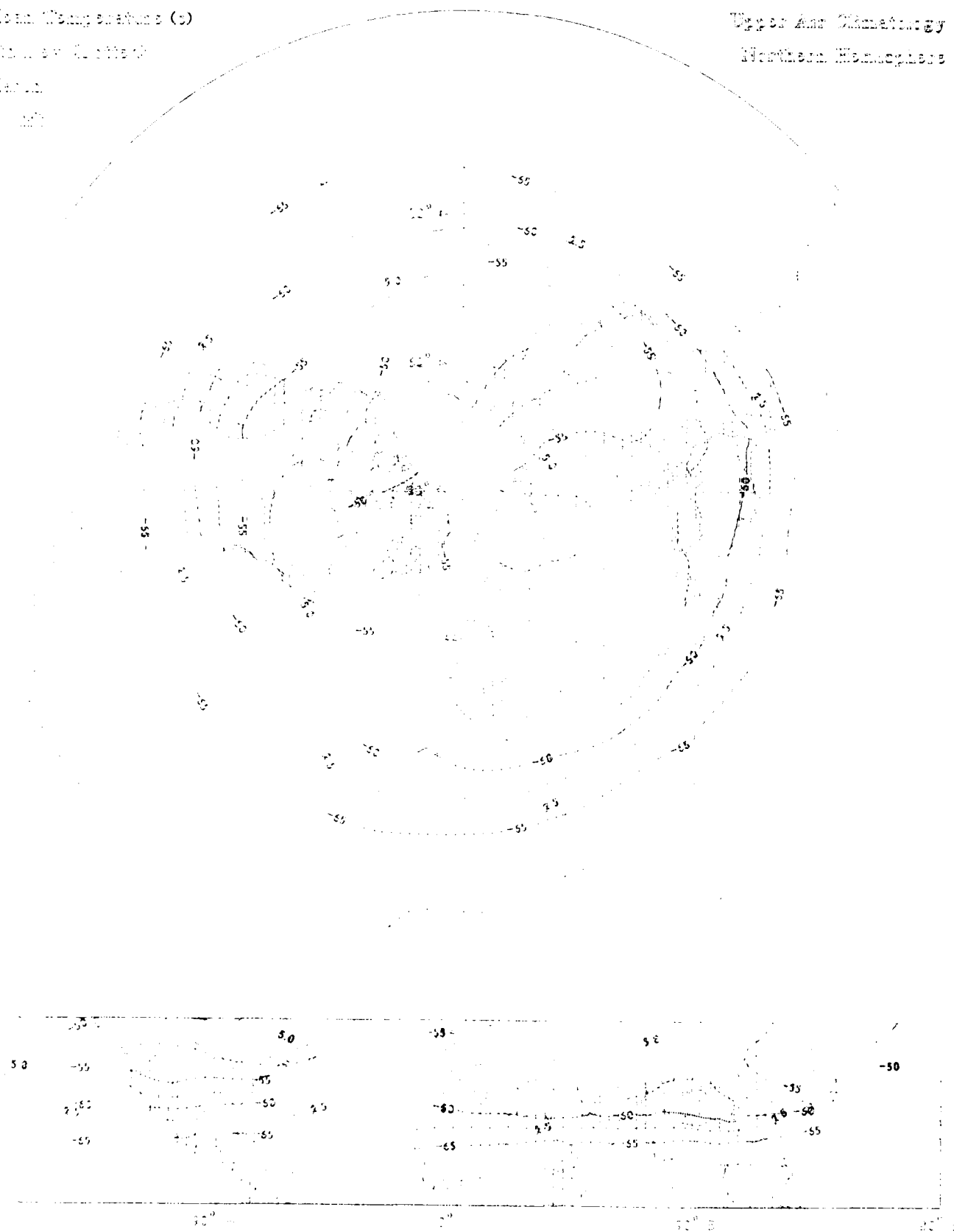
January 1950

Map 11

1:500

Upper Air Climatology

Northern Hemisphere



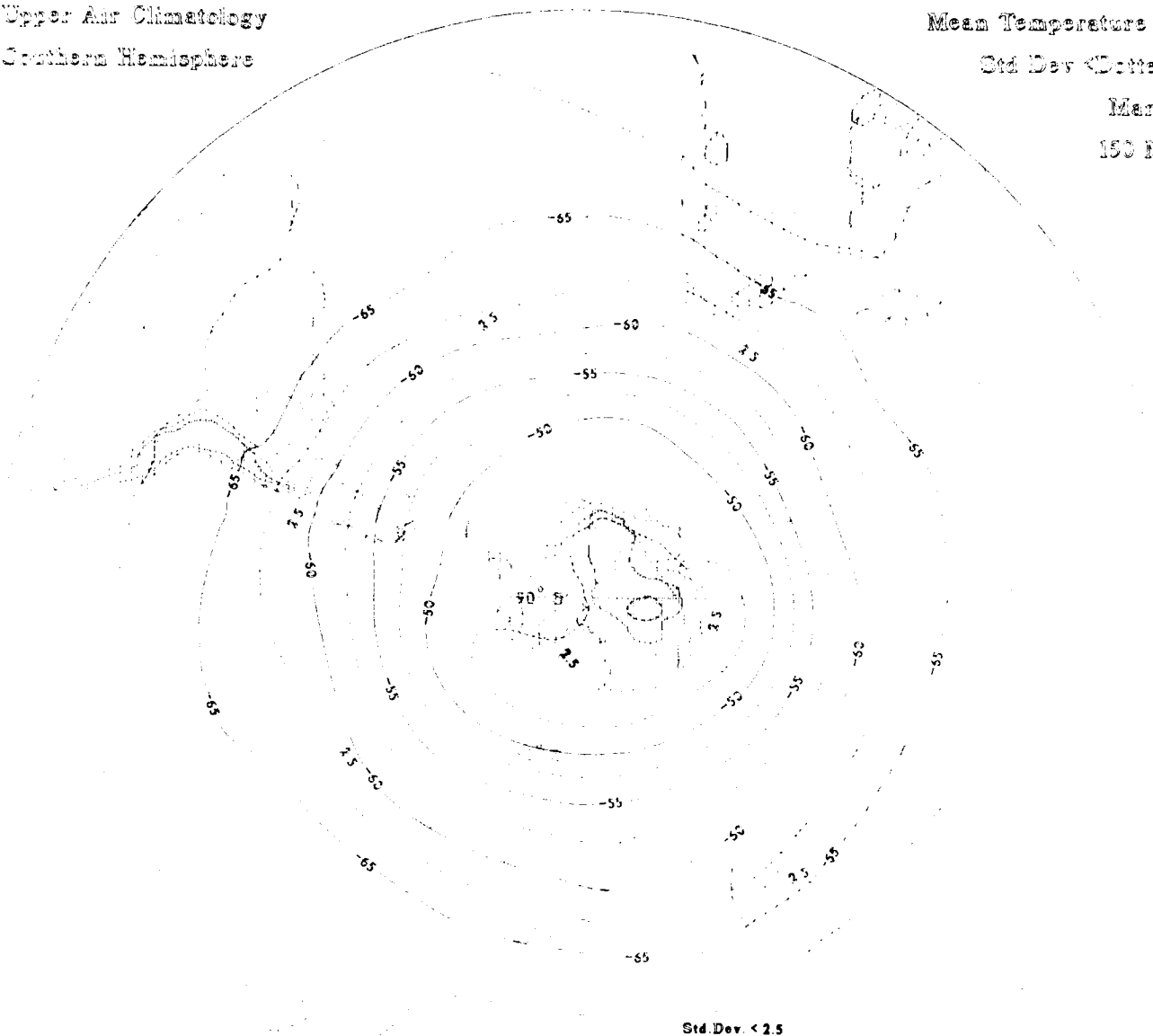
Upper Air Climatology
Southern Hemisphere

Mean Temperature (c)

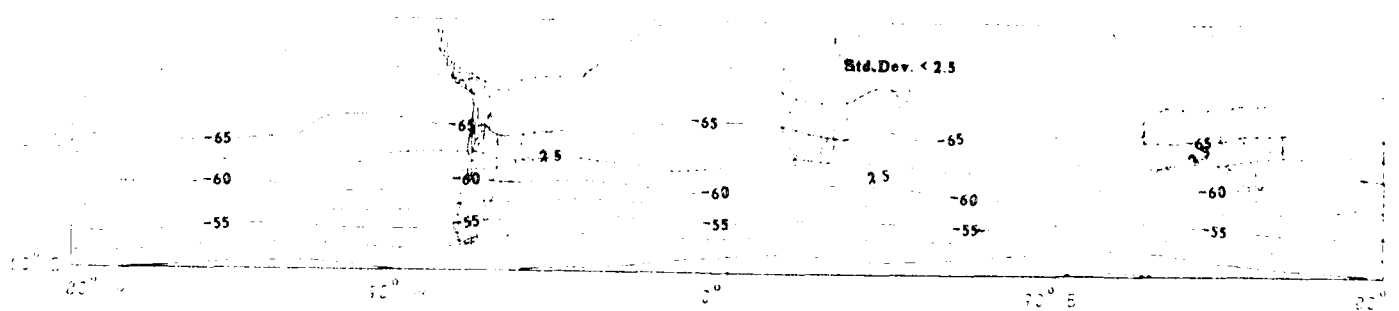
Std Dev <Dotted>

March

150 MB



Std. Dev. < 2.5



Std. Dev. < 2.5

Mean Temperature (°C)

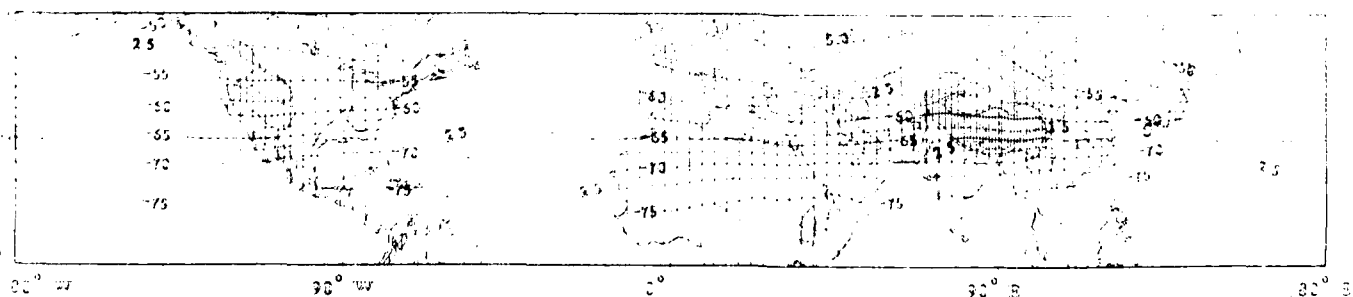
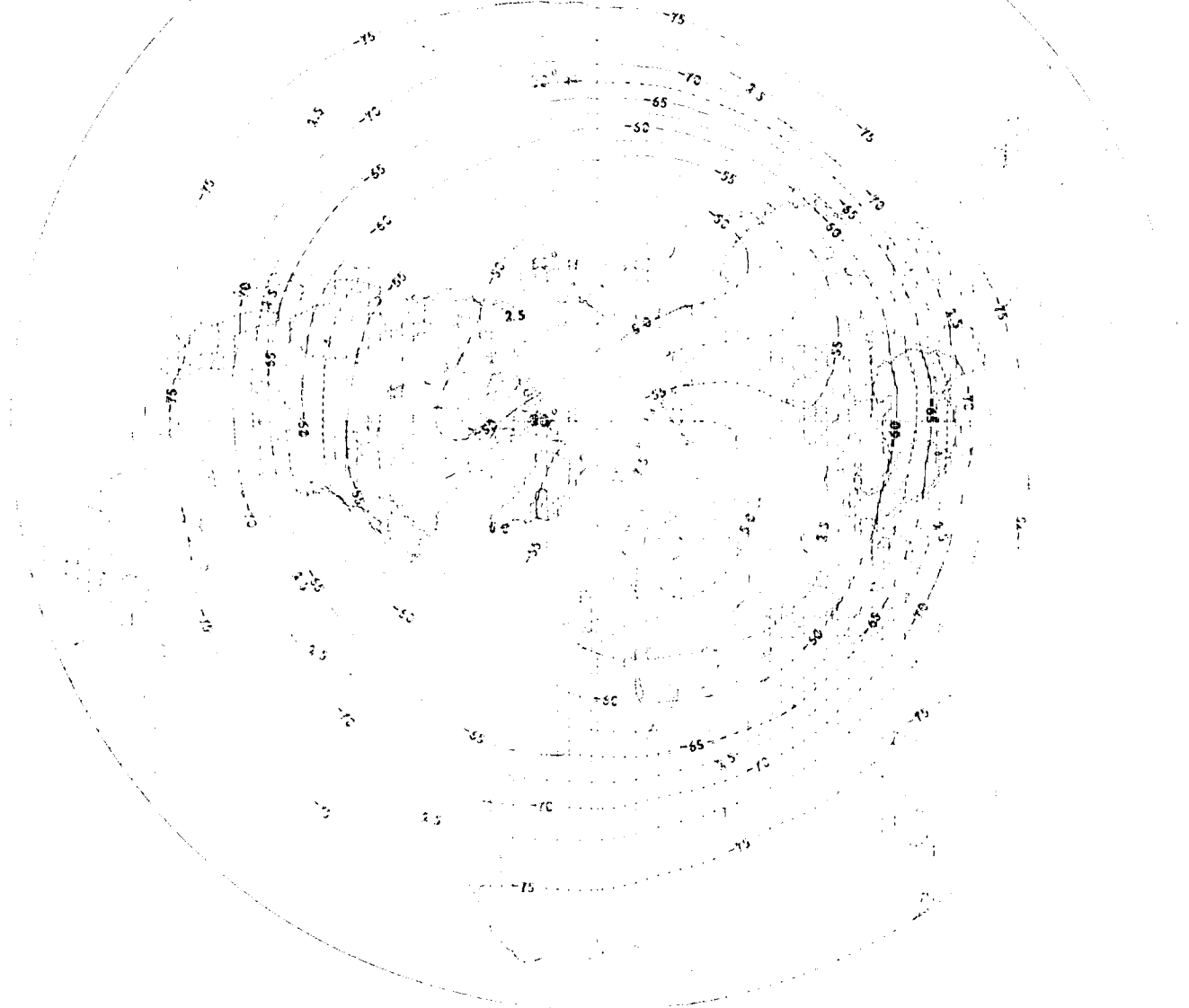
Sea Level (Climat)

March

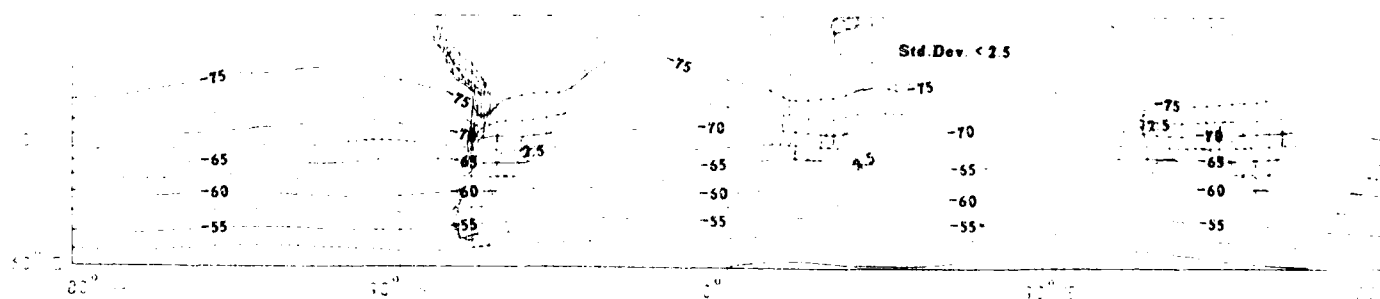
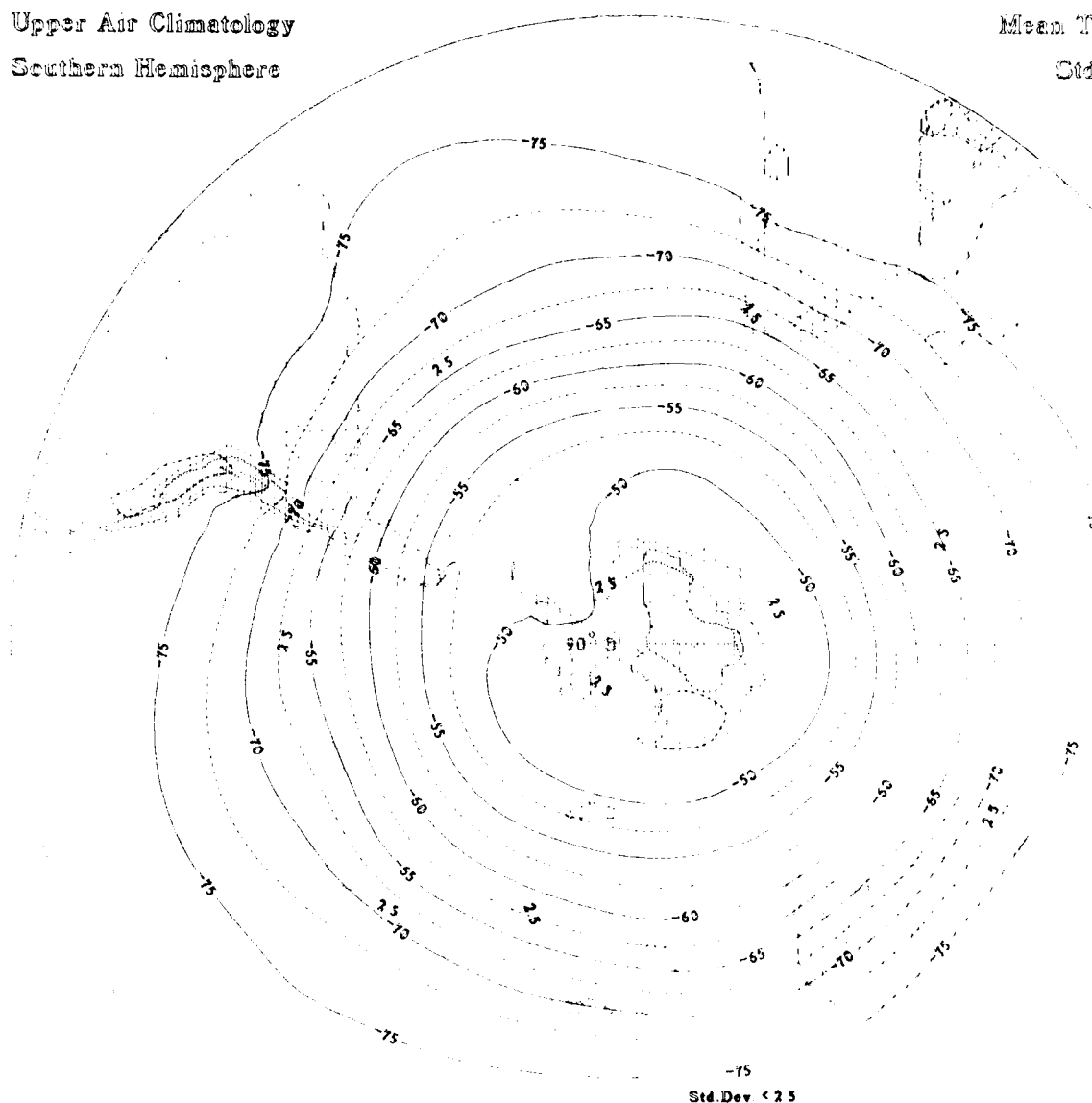
100 mb

Upper Air Climatology

Northern Hemisphere

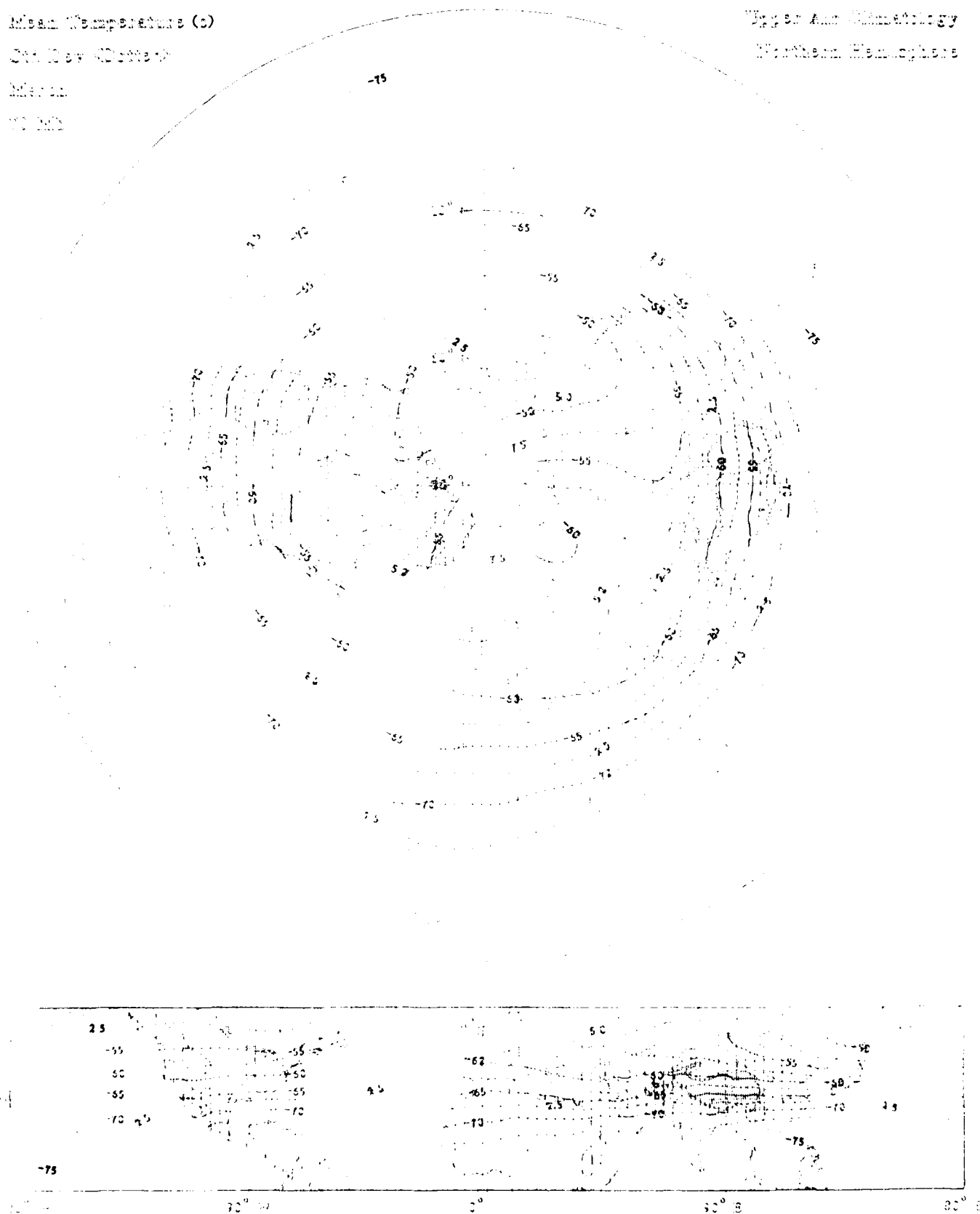


Mean Temperature (C)
Std Dev (Dotted)
March
100 MB



Mean Temperature (°C)
 Sea Level (Dashed)
 Mean
 100 mb

Fig. 8. Air Climatology
 Northern Hemisphere



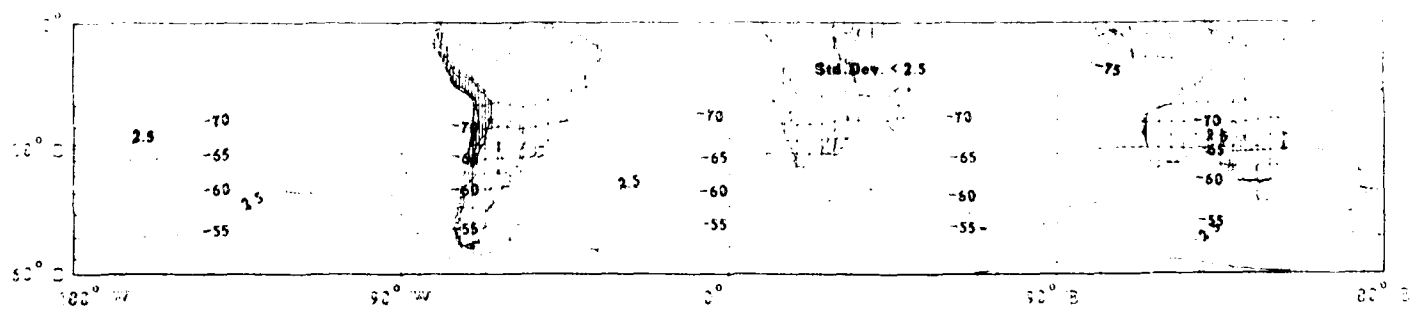
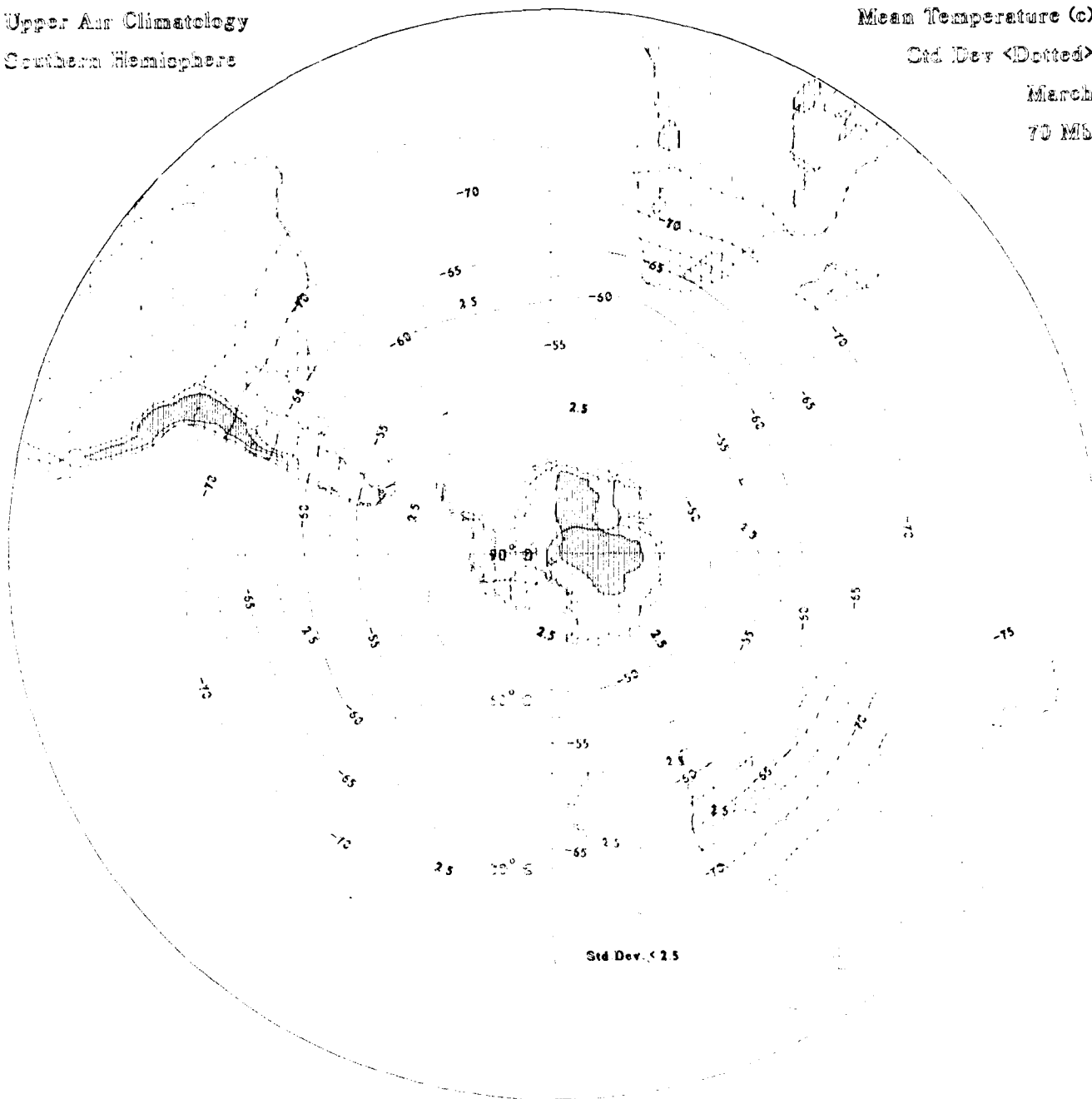
Upper Air Climatology
Southern Hemisphere

Mean Temperature (c)

Std Dev <Dotted>

March

70 MB



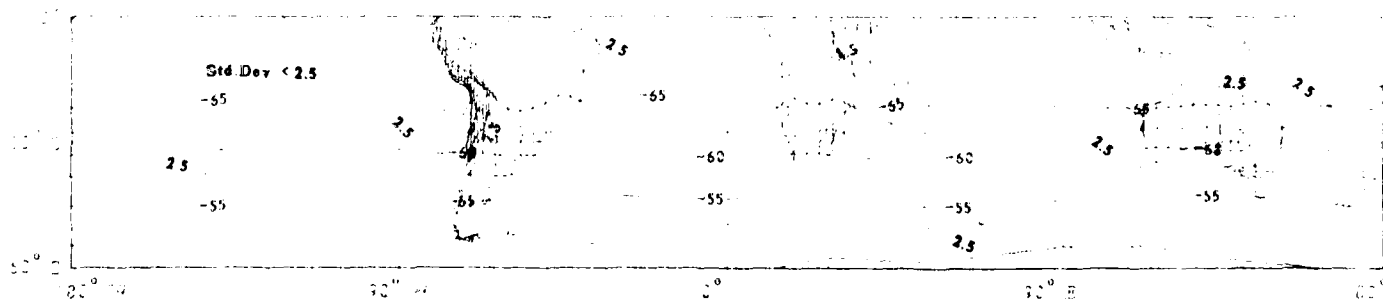
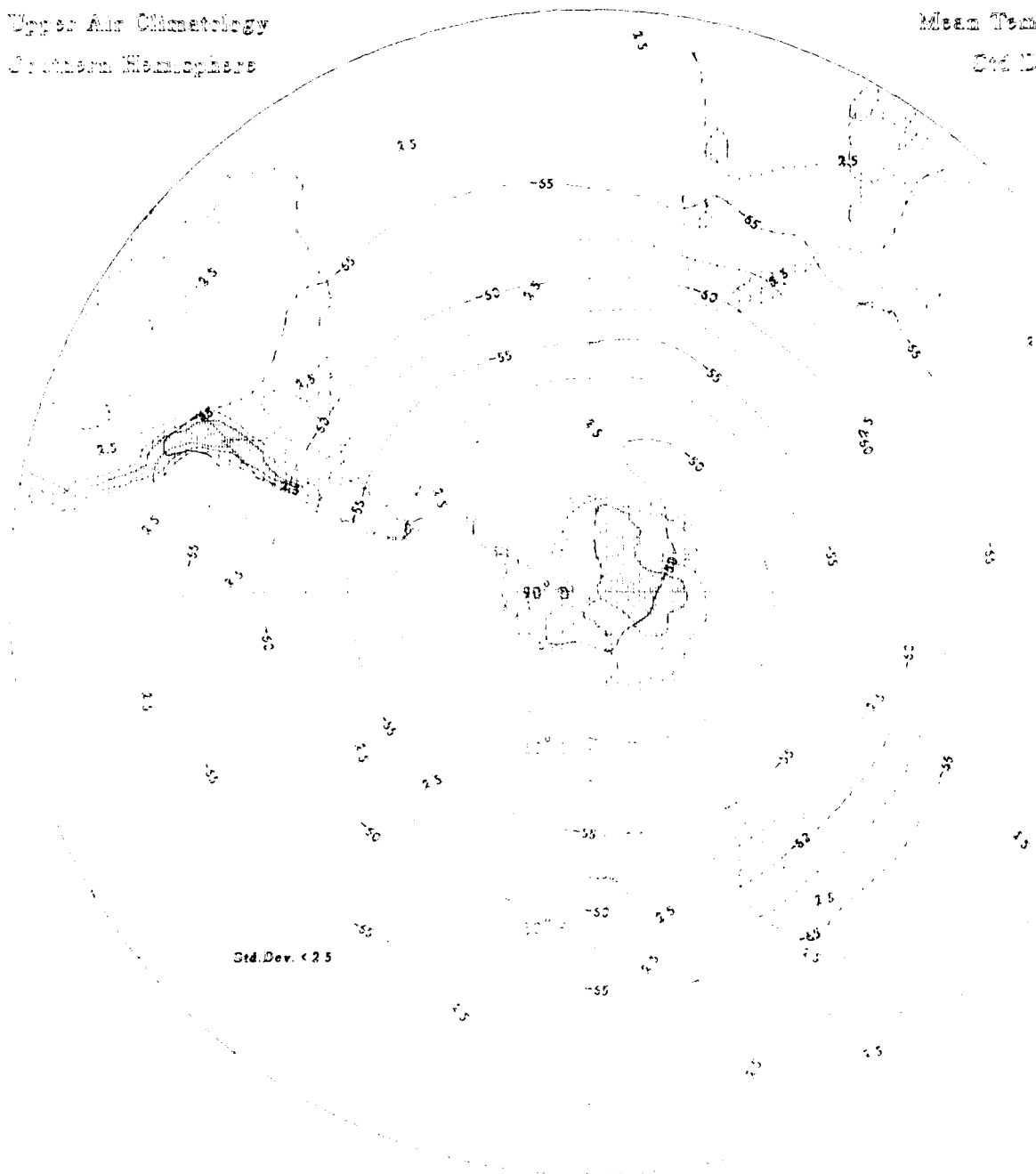
922

Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

Mean Temperature (°C)
Std Dev (Celsius)
March
60 MB



Mean Temperature (c)

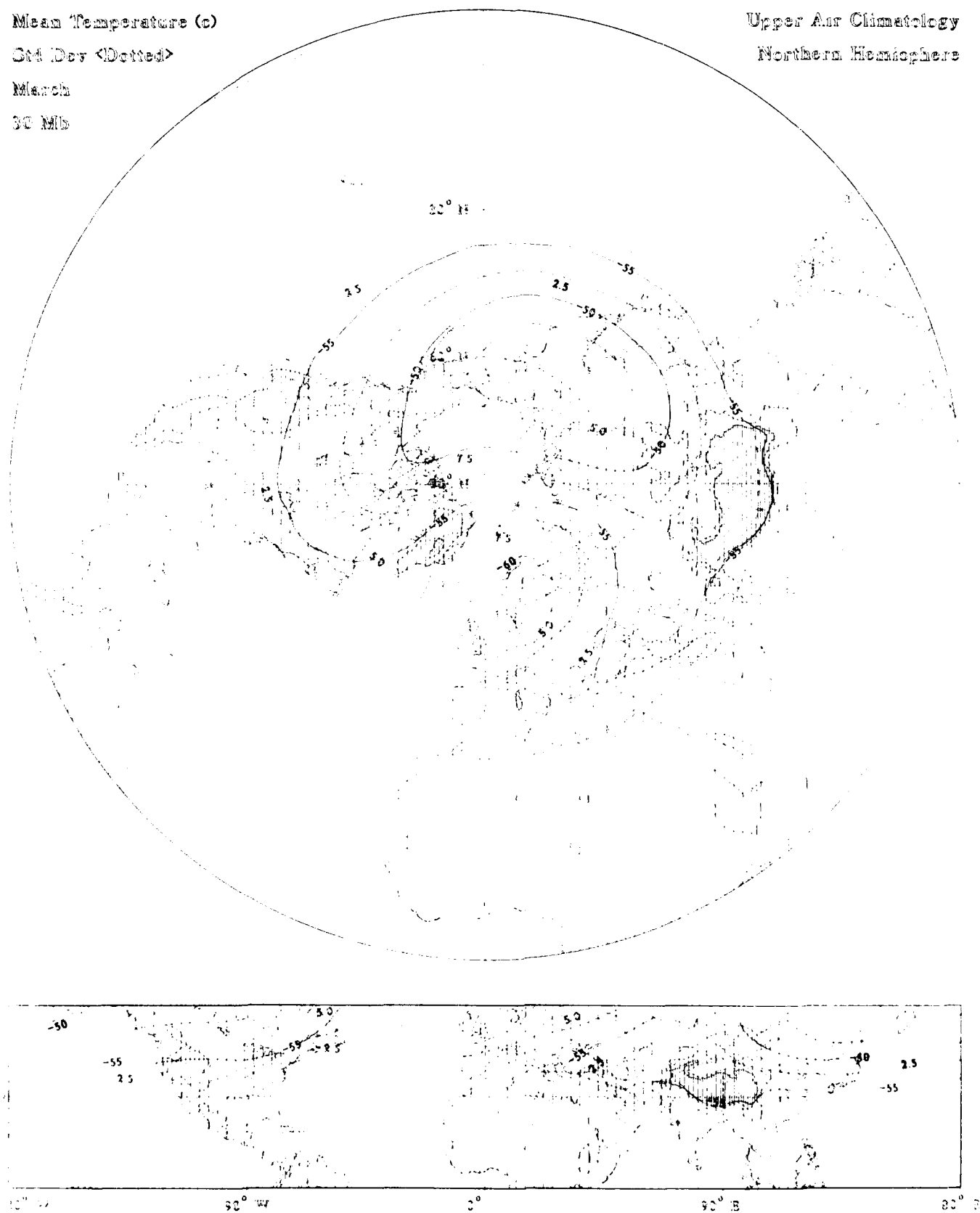
Std Dev (Dotted)

March

30 Mb

Upper Air Climatology

Northern Hemisphere



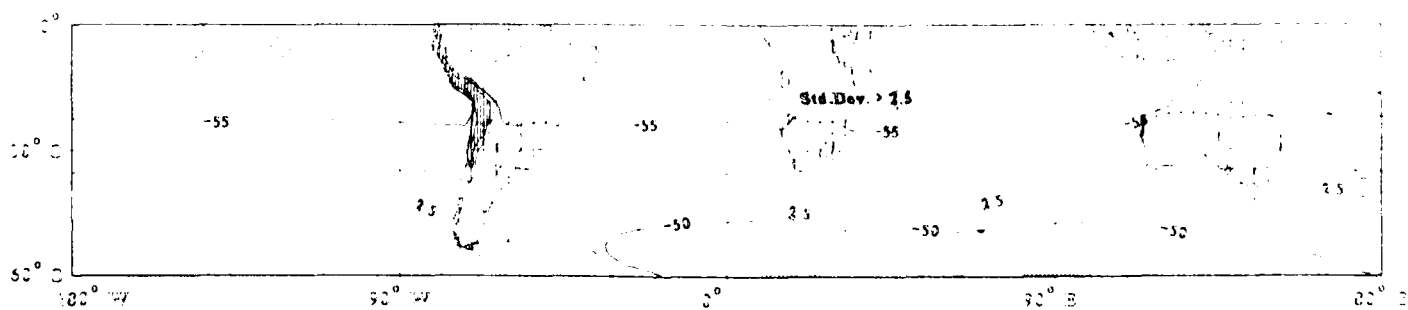
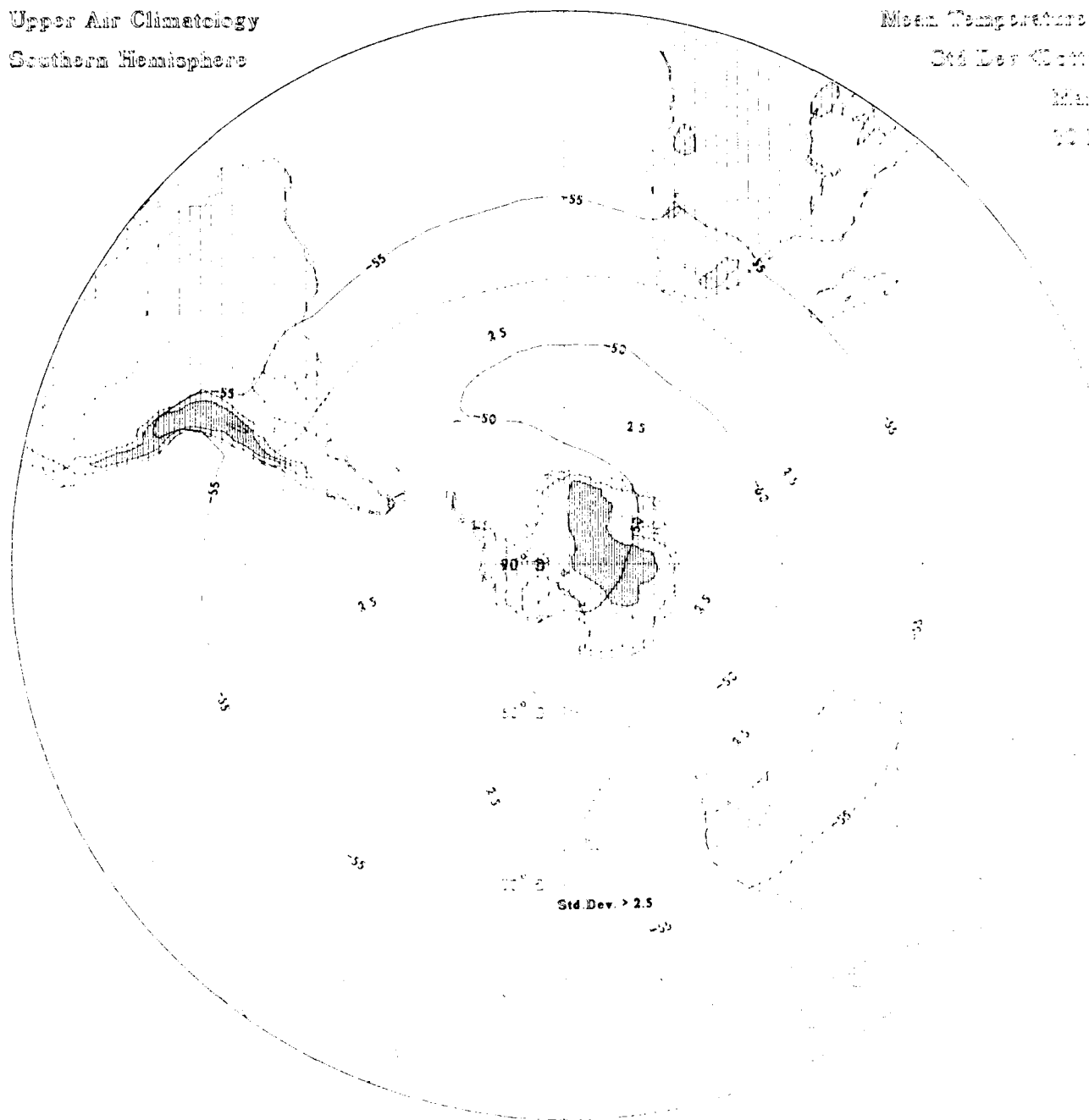
Upper Air Climatology
Southern Hemisphere

Mean Temperature (°C)

Std. Dev. (°C)

March

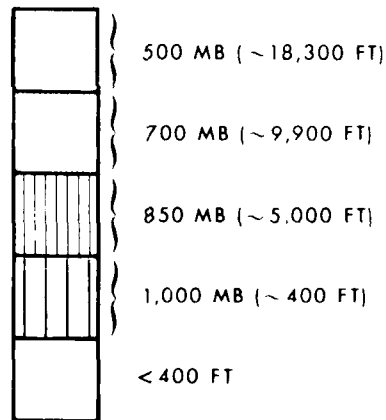
10 MB



DEW POINT
(6 LEVELS, 1000 TO 300 MB)

- Contours of mean dew point (solid and dashed lines) in °C; solids labeled, dashed intermediates unlabeled.
- Dew point labeled interval: 5°C
- Contours of standard deviation of dew point (dotted lines) in °C
- Standard deviation of dew point labeled interval: 2.5°C
- Contours blanked for geographic areas with elevations exceeding specified geopotential heights

ELEVATION SCALE



Mean Dew Point (c)

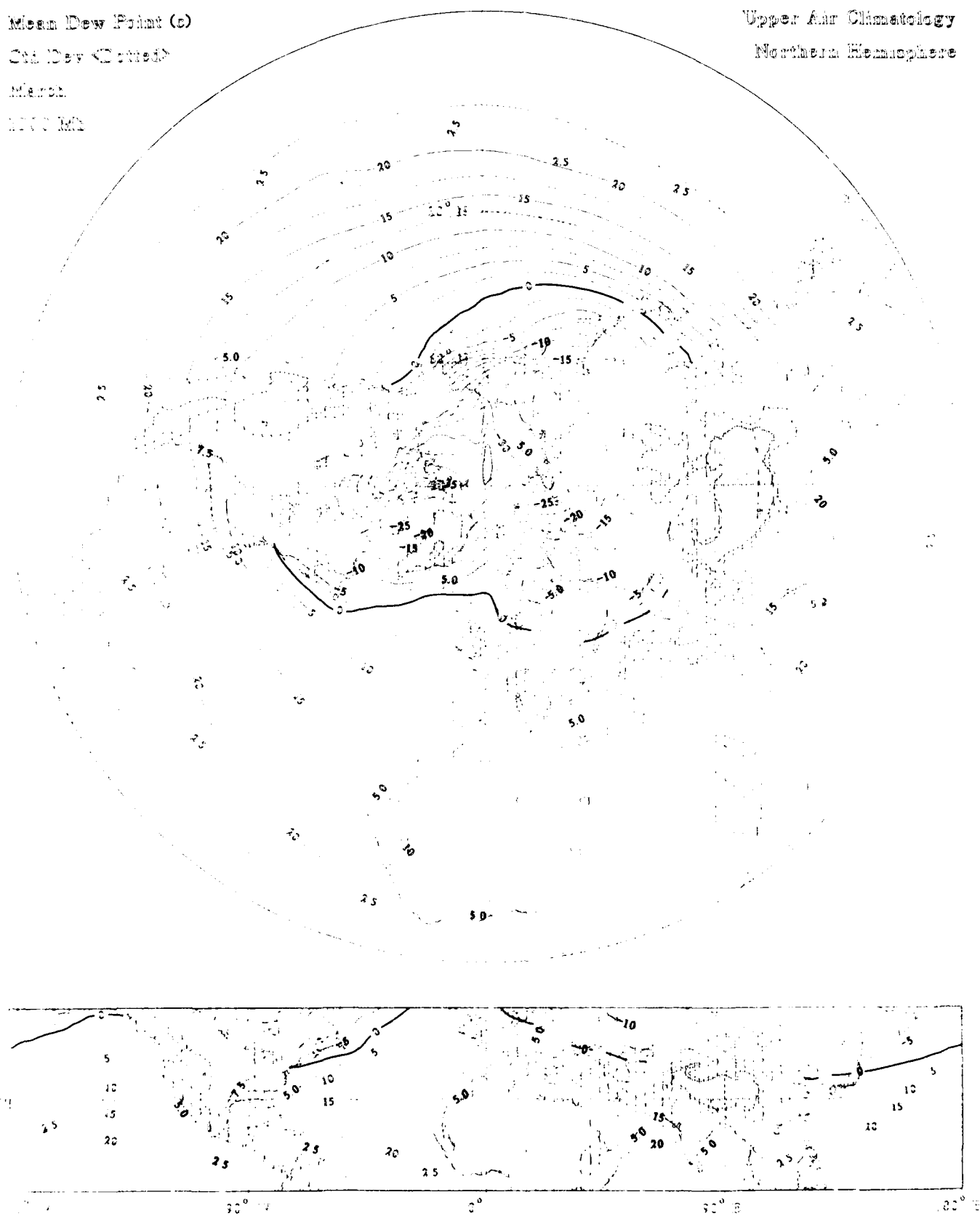
Std Dev (Cm/s)

March

1700 MB

Upper Air Climatology

Northern Hemisphere



Topographic Contouring

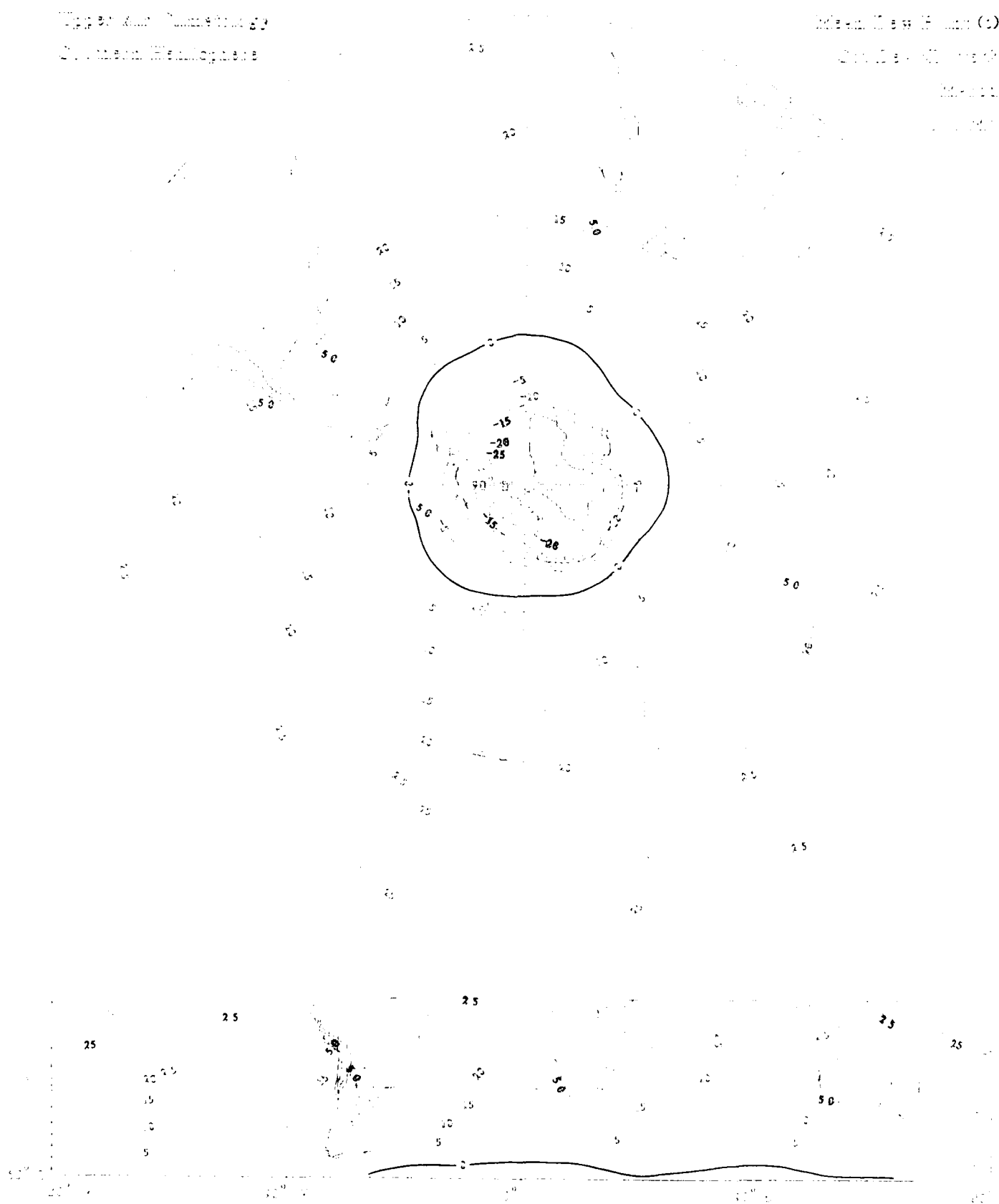
Contour Interval: 50 Feet

Section 36, T. 33 N., R. 10 E.

Map No. 1000

Scale

1" = 100'



Mean Dew Point (°C)

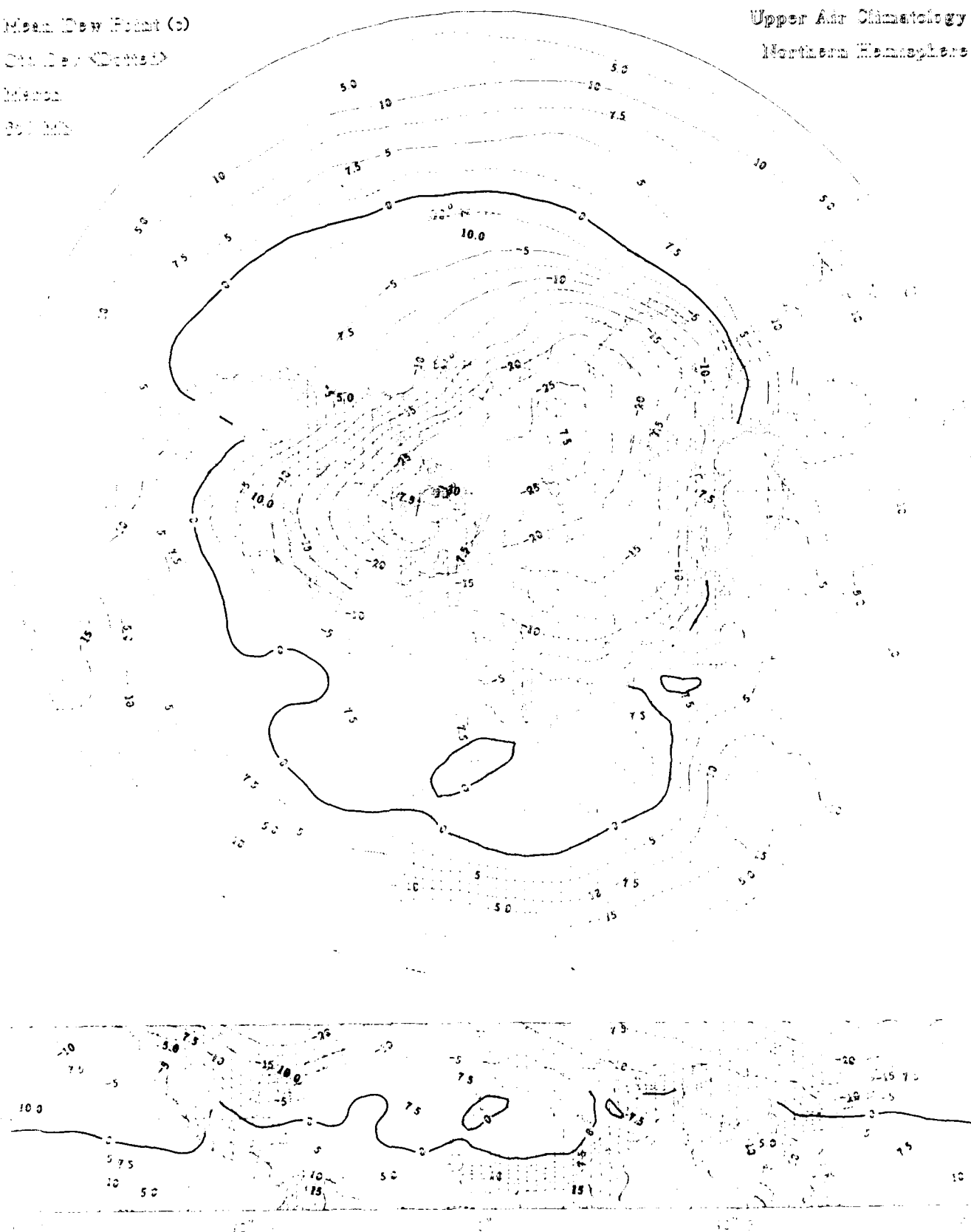
Oct. Day (Dewmax)

Mean

300 mb

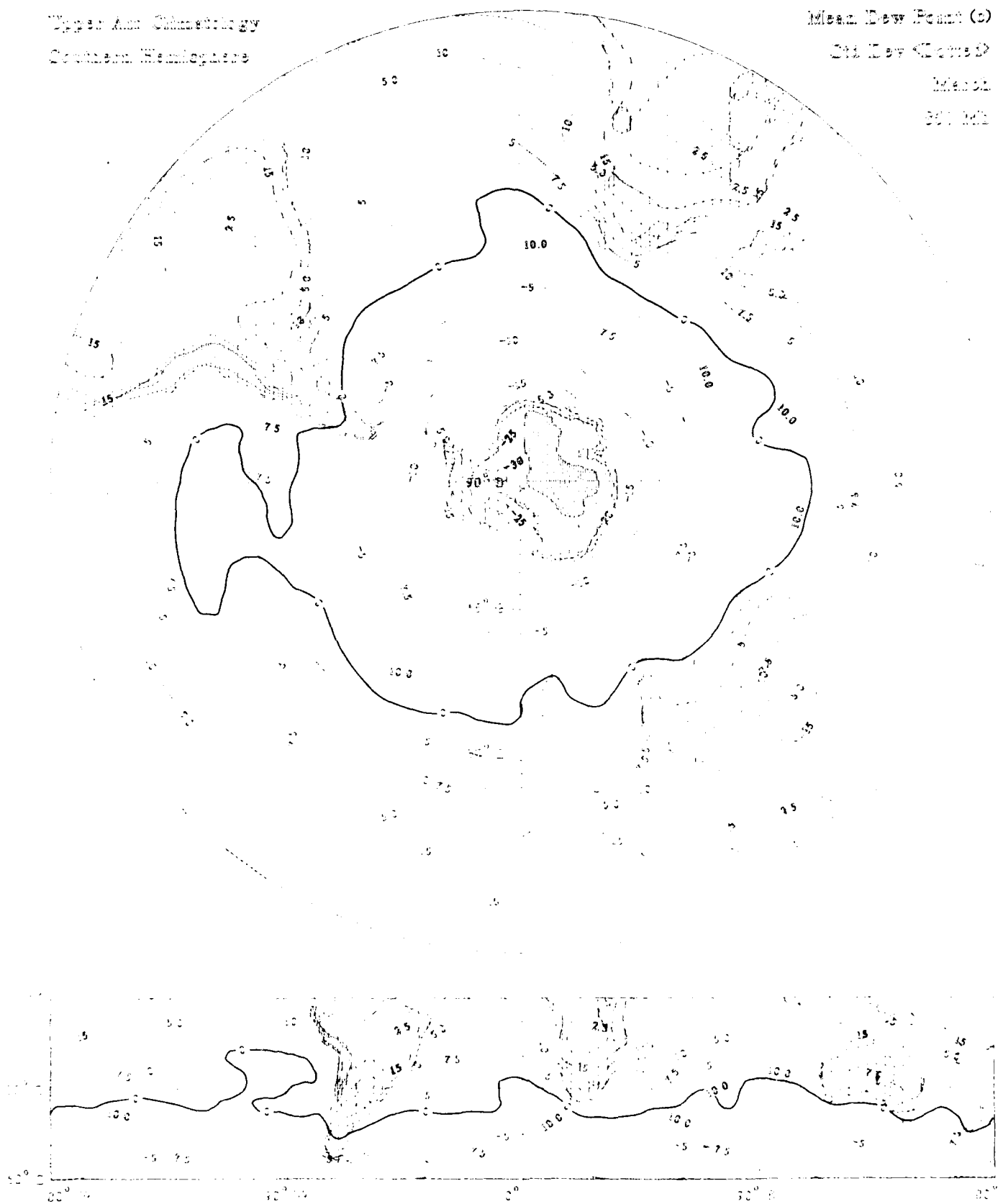
Upper Air Climatology

Northern Hemisphere



Upper Air Charting
 Southern Hemisphere

Mean Dew Point (°)
 012 May (1962)
 1200Z
 500 mb



Mean Dew Point (c)
 Sea Level (Celsius)
 March
 1971-1972

Upper Air Climatology
 Northern Hemisphere



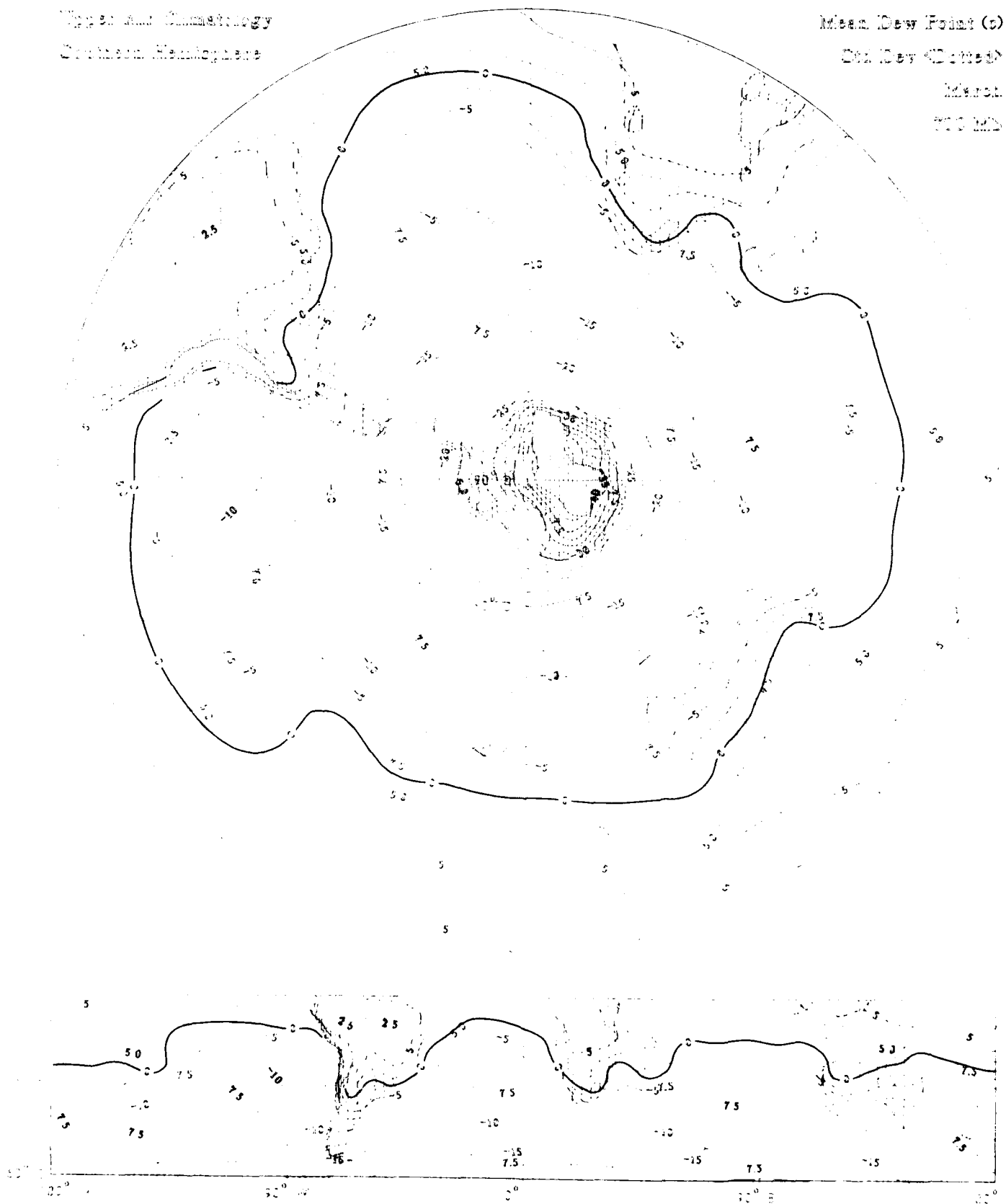
Upper Air Chart
Northern Hemisphere

Mean Dew Point (°)

Old Day (Cont'd)

March

1950



Mean Dew Point (c)

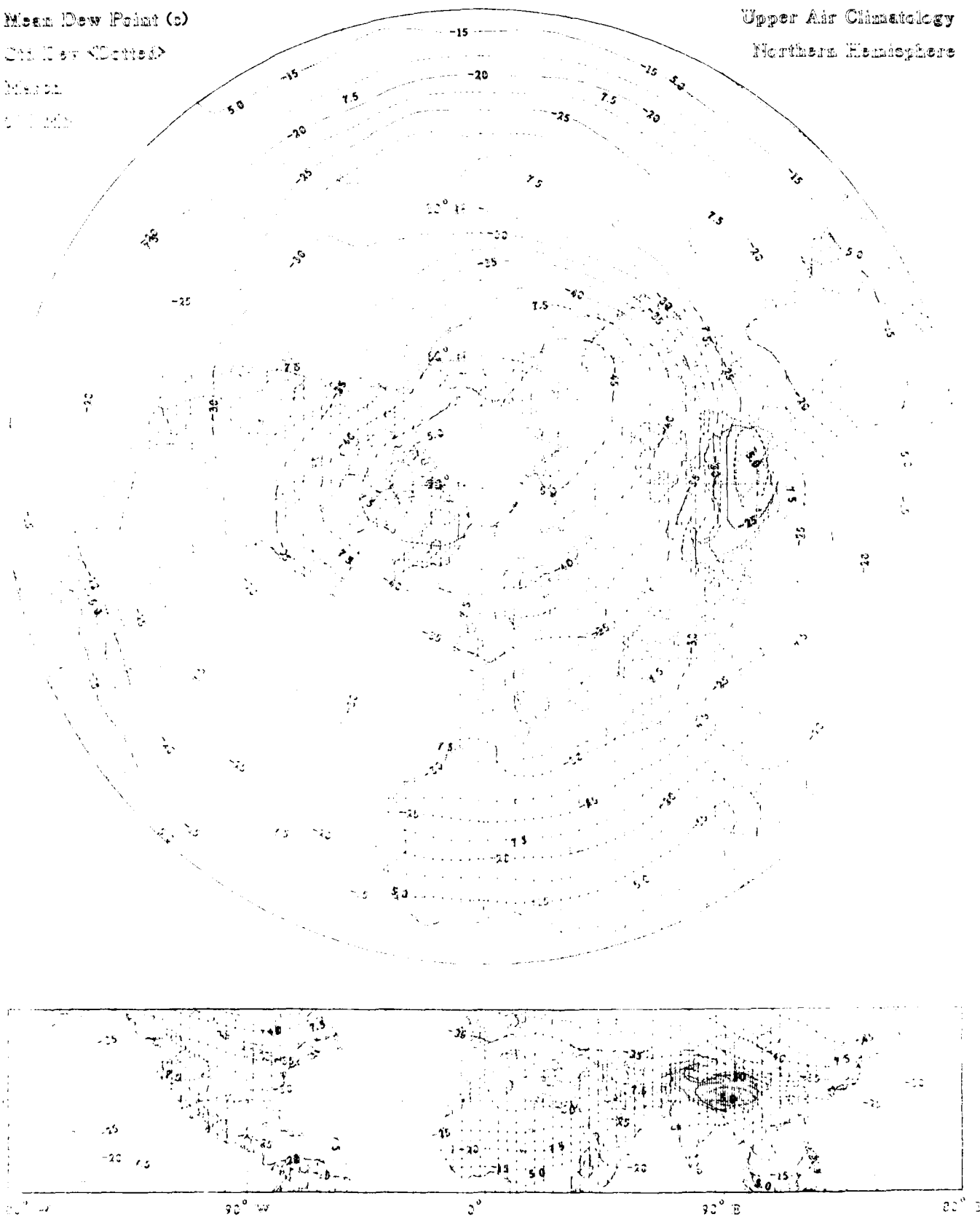
Sea Level (Corrected)

March

0000 UTC

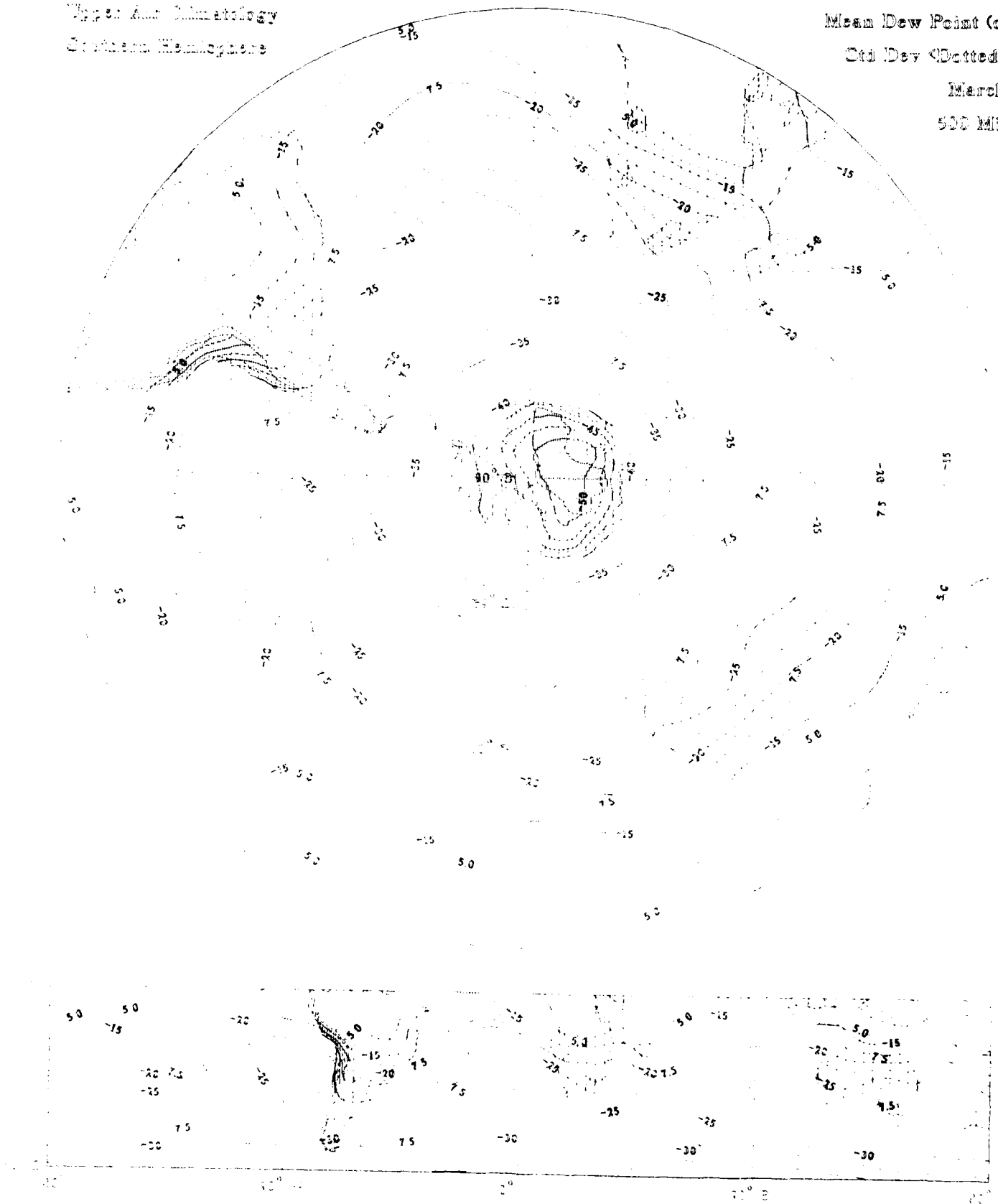
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
 Southern Hemisphere

Mean Dew Point (c)
 Old Day (Dotted)
 March
 500 MB



Mean Dew Point (c)

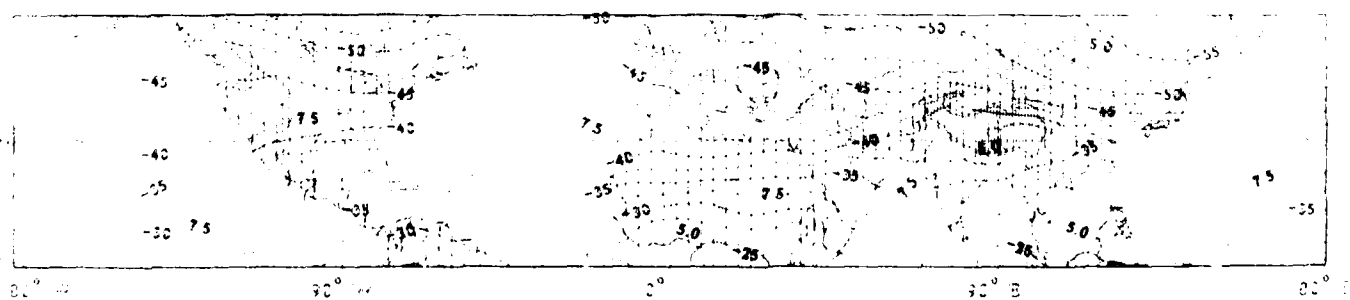
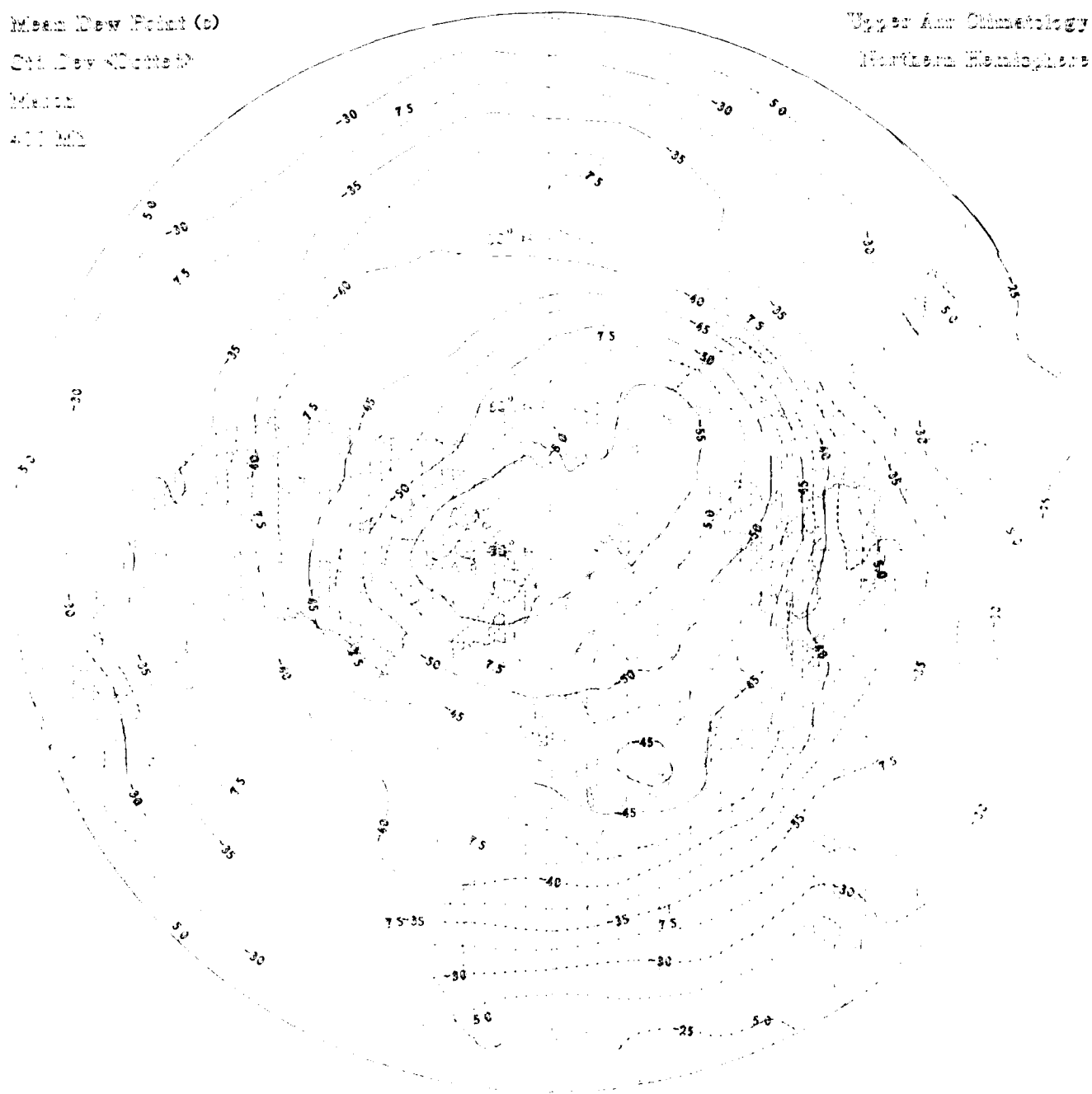
On Day 40 (Feb 9)

Mean

400 mb

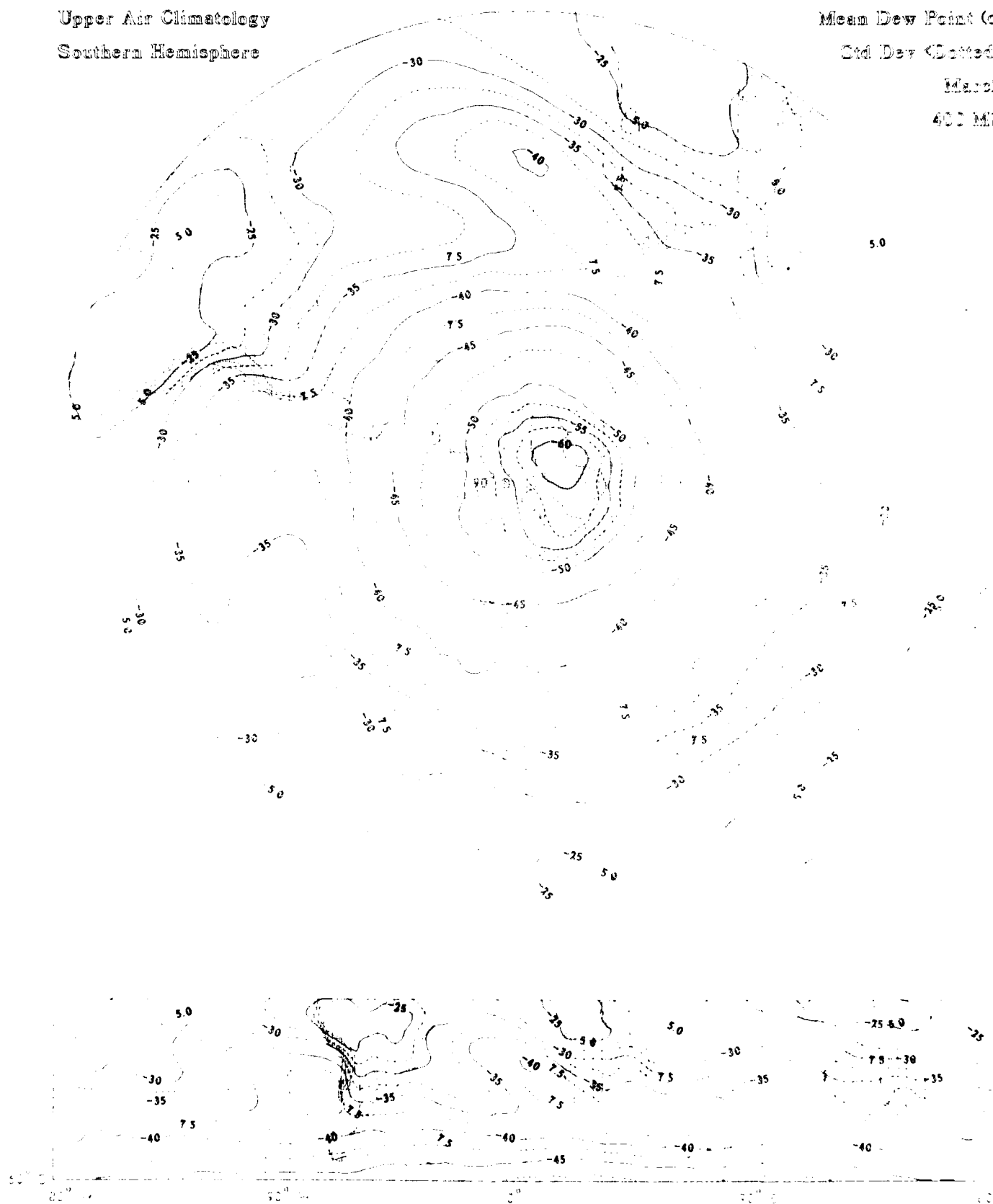
Upper Air Climatology

Northern Hemisphere



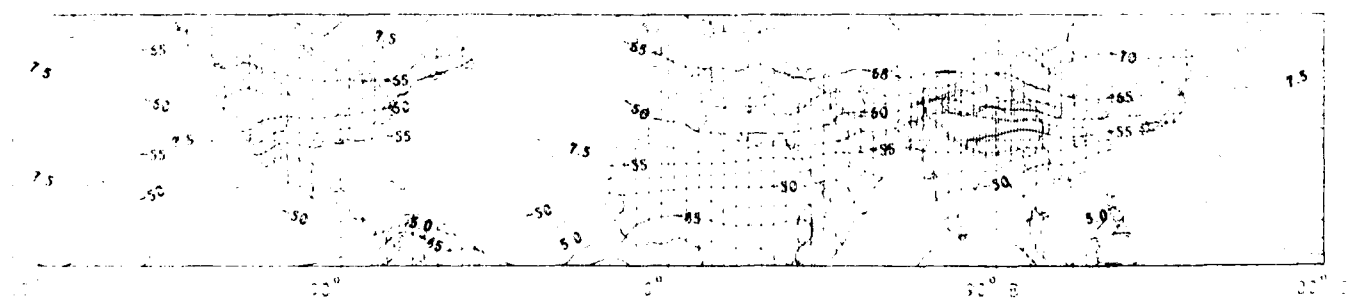
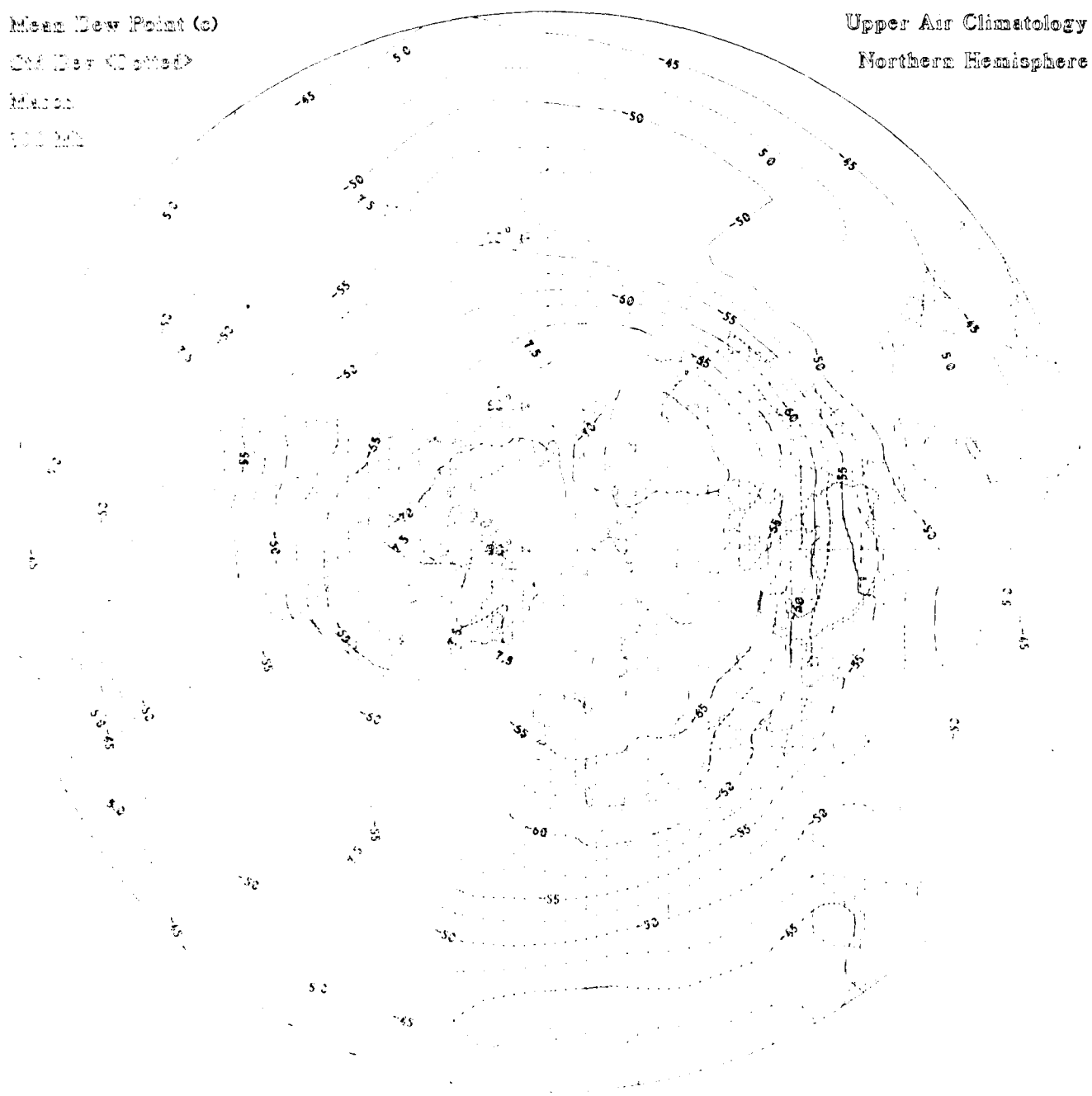
Upper Air Climatology
Southern Hemisphere

Mean Dew Point (°C)
Std Dev (Dotted)
March
400 MB



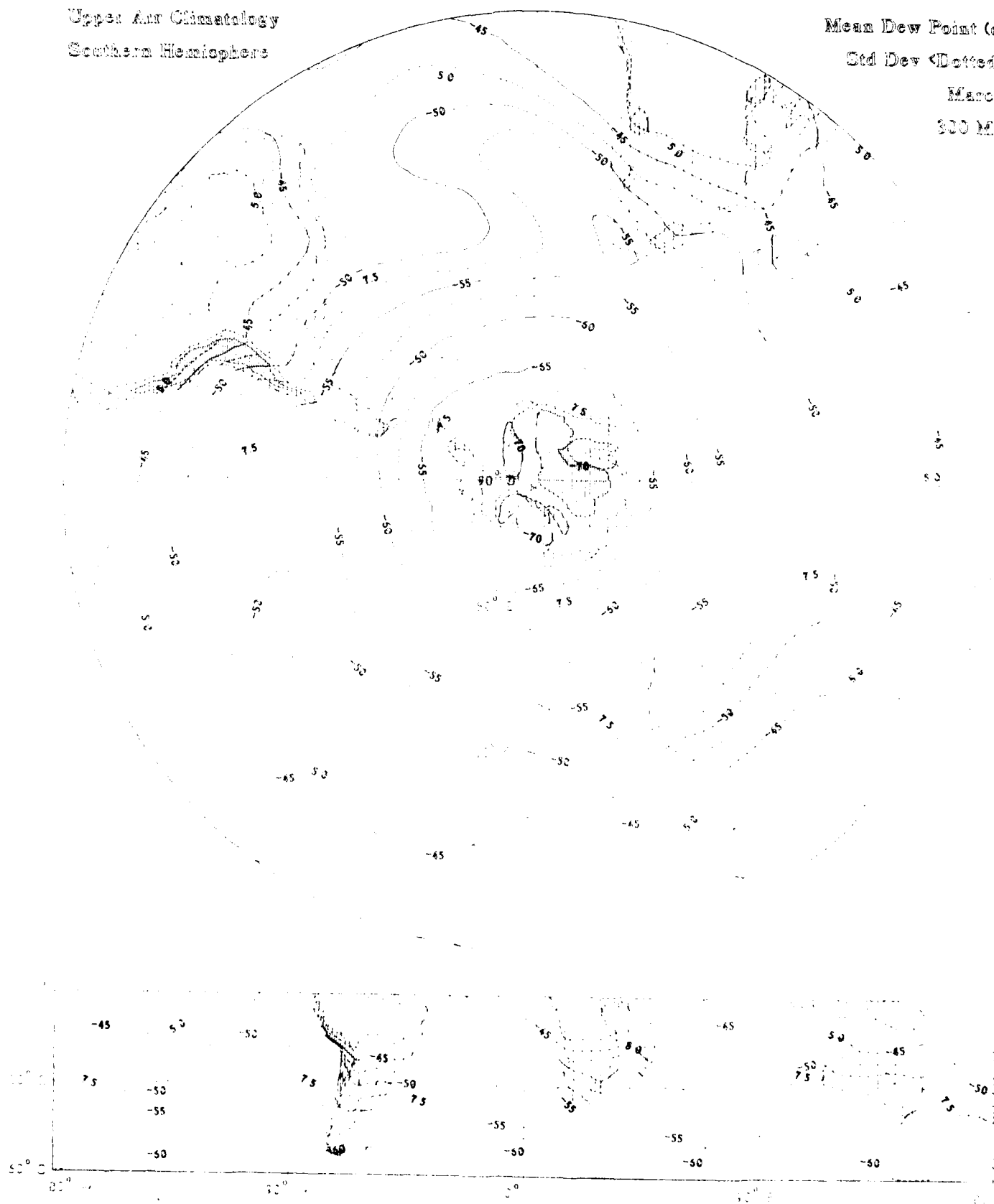
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Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

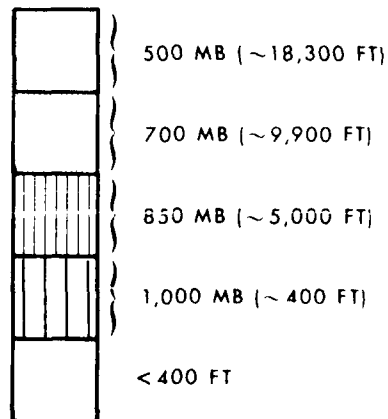
Mean Dew Point (c)
Std Dev (Dotted)
March
300 mb



DENSITY
(13 LEVELS, 1000 TO 30 MB)

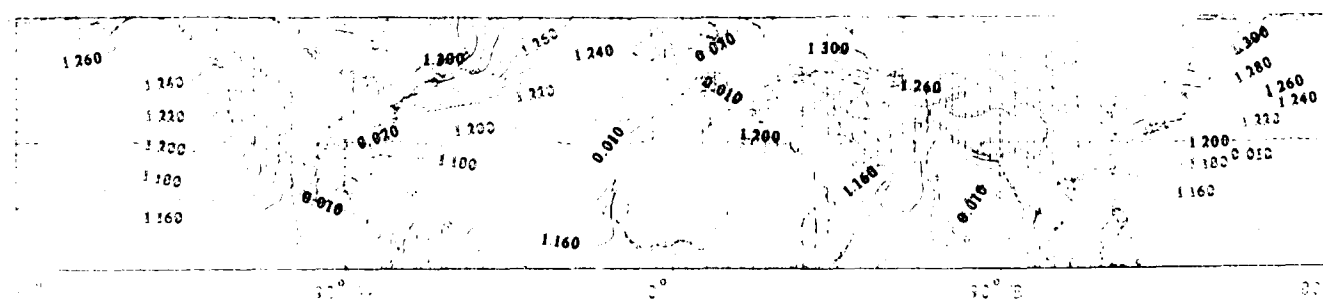
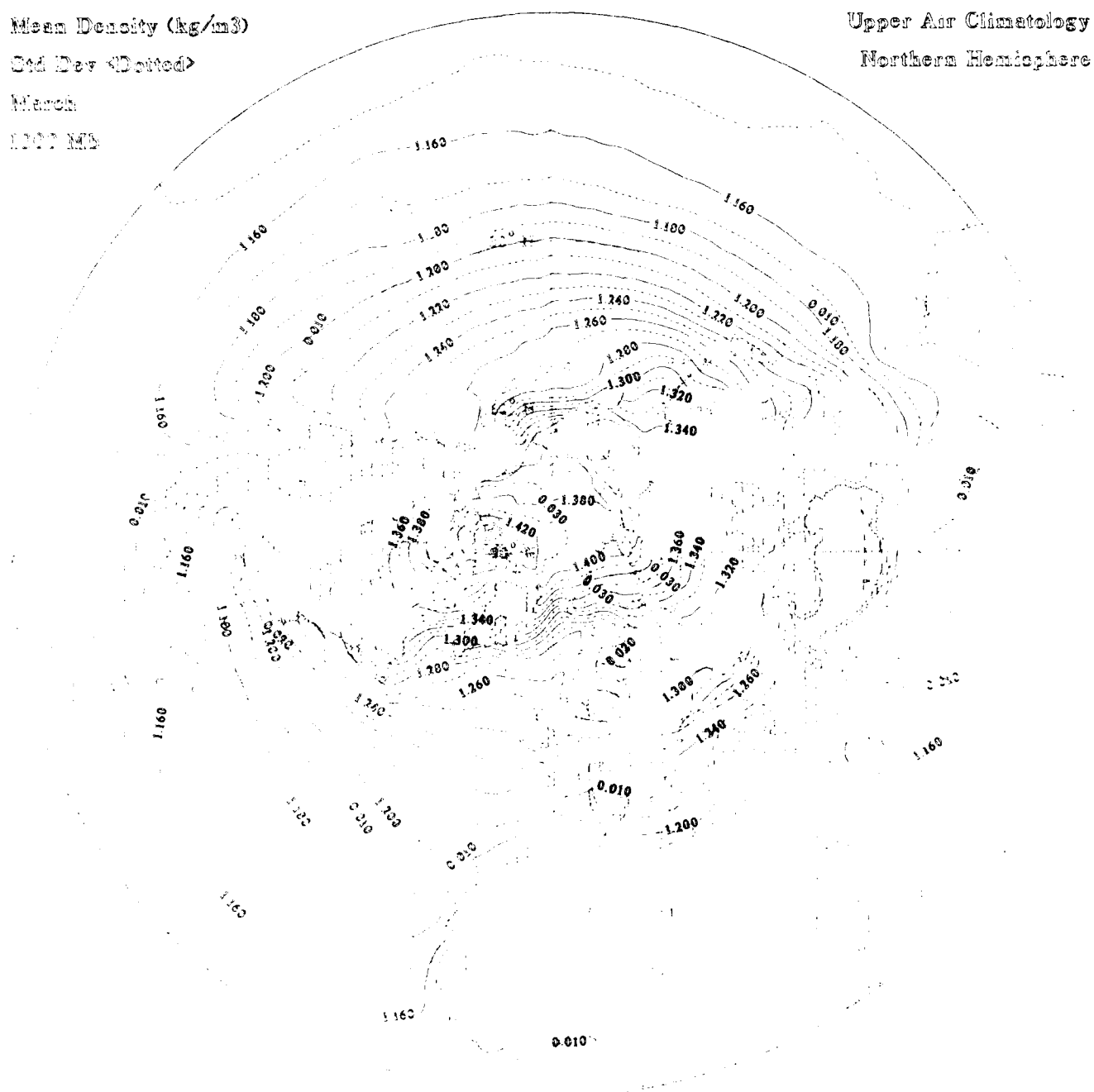
- Contours of mean density (solid and dashed lines) in kilograms/cubic meter; solids labeled, dashed intermediates unlabeled
- Density labeled interval:
 - .02 kilograms/cubic meter - 1000 MB to 400 MB
 - .01 kilograms/cubic meter - 300 MB to 200 MB
 - .006 kilograms/cubic meter - 150 MB to 30 MB
- Contours of standard deviation of density (dotted lines) in kilograms/cubic meter
- Standard deviation of density labeled interval:
 - .01 kilograms/cubic meter - 1000 MB to 400 MB
 - .005 kilograms/cubic meter - 300 MB to 200 MB
 - .003 kilograms/cubic meter - 150 MB to 30 MB
- Contours blanked for geographic areas with elevations exceeding specified geopotential heights

ELEVATION SCALE



1207 MB

Northern Hemisphere



100 Ms



Mean Density (kg/m³)

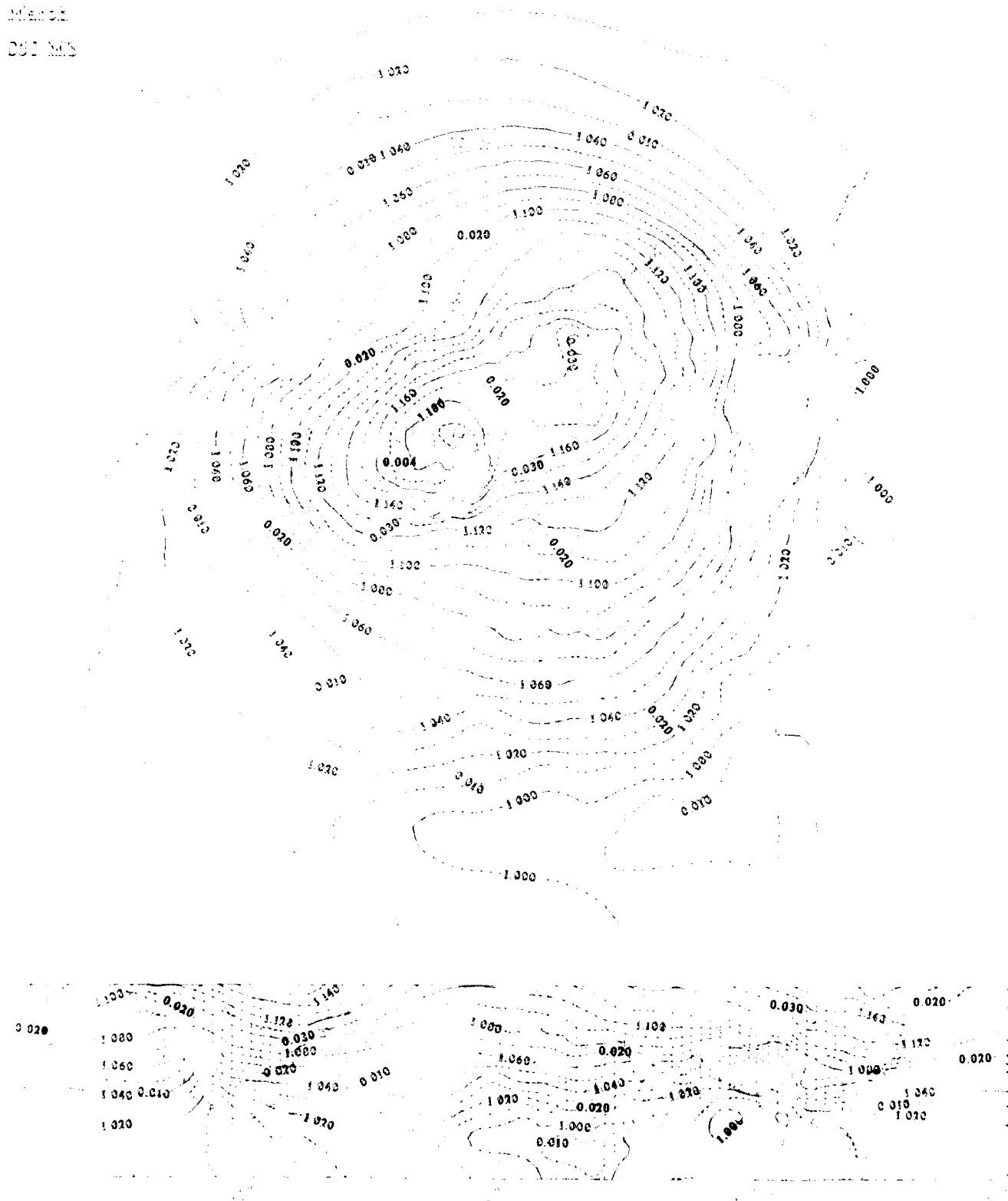
Std Dev (Dotted)

March

001 MS

Upper Air Climatology

Northern Hemisphere



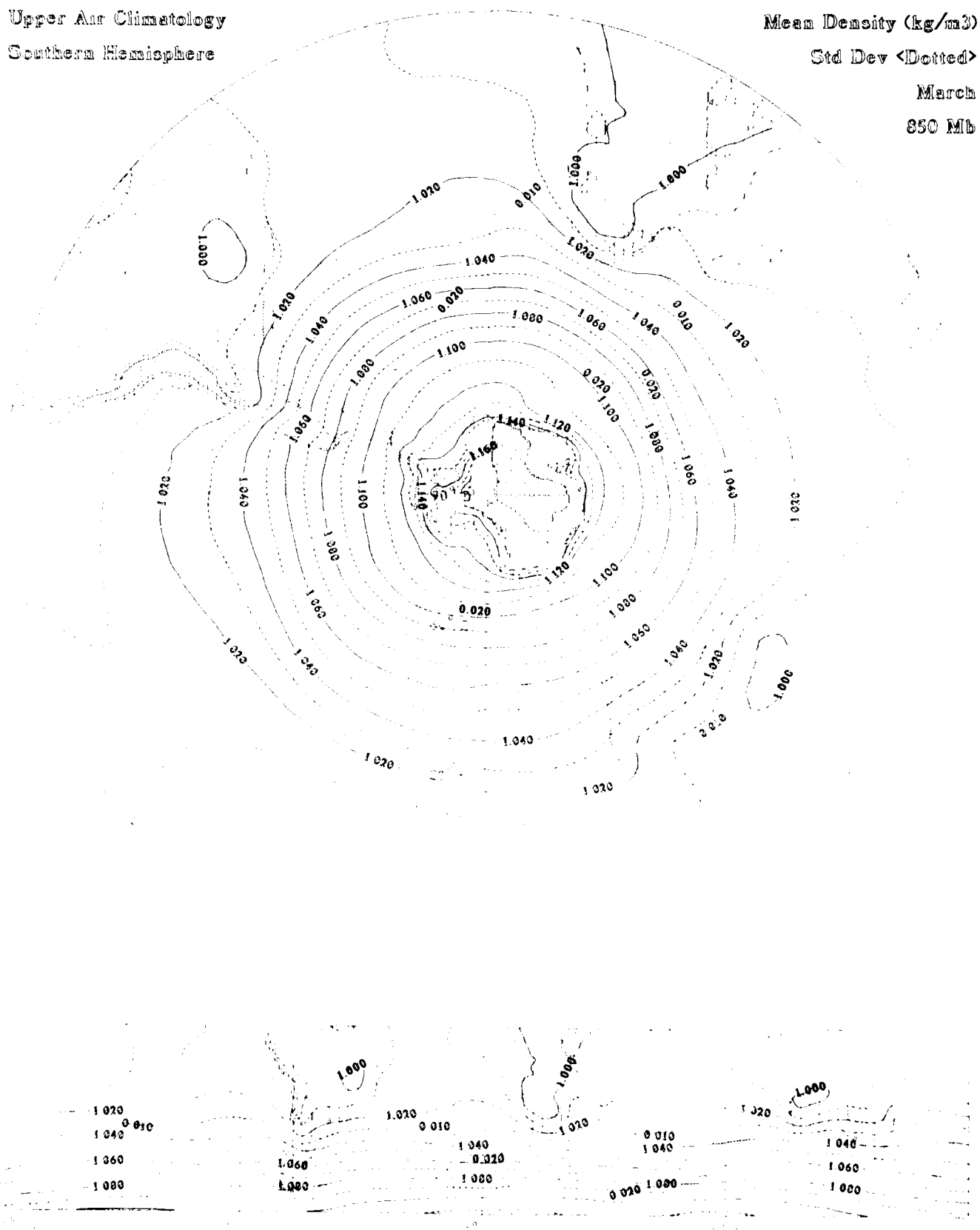
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std Dev <Dotted>

March

850 Mb



Mean Density (kg/m³)

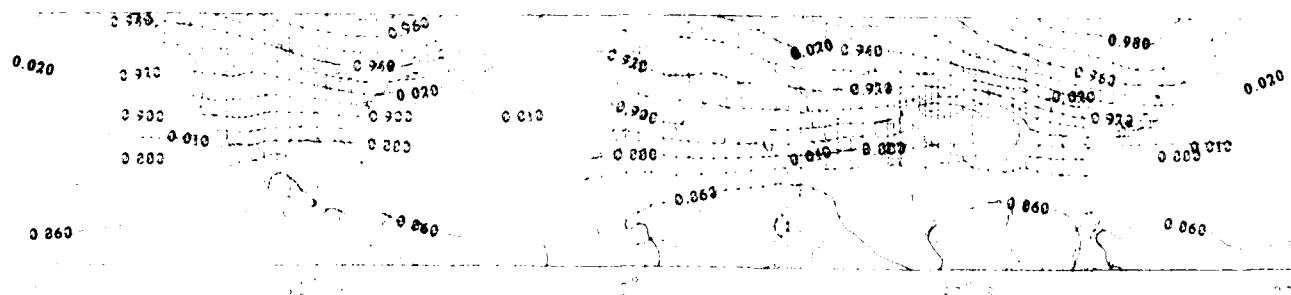
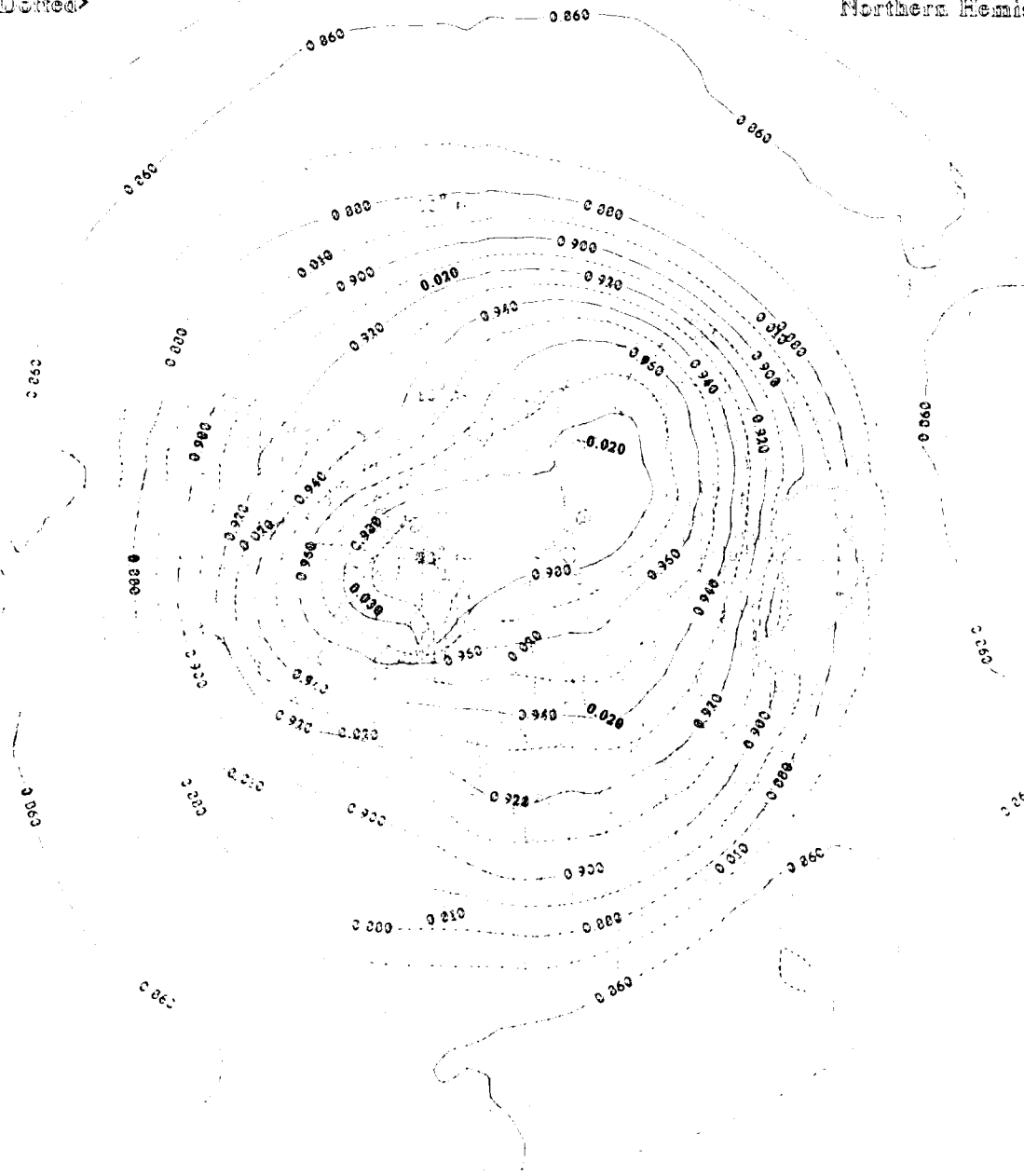
Std Dev (Dotted)

March

700 MB

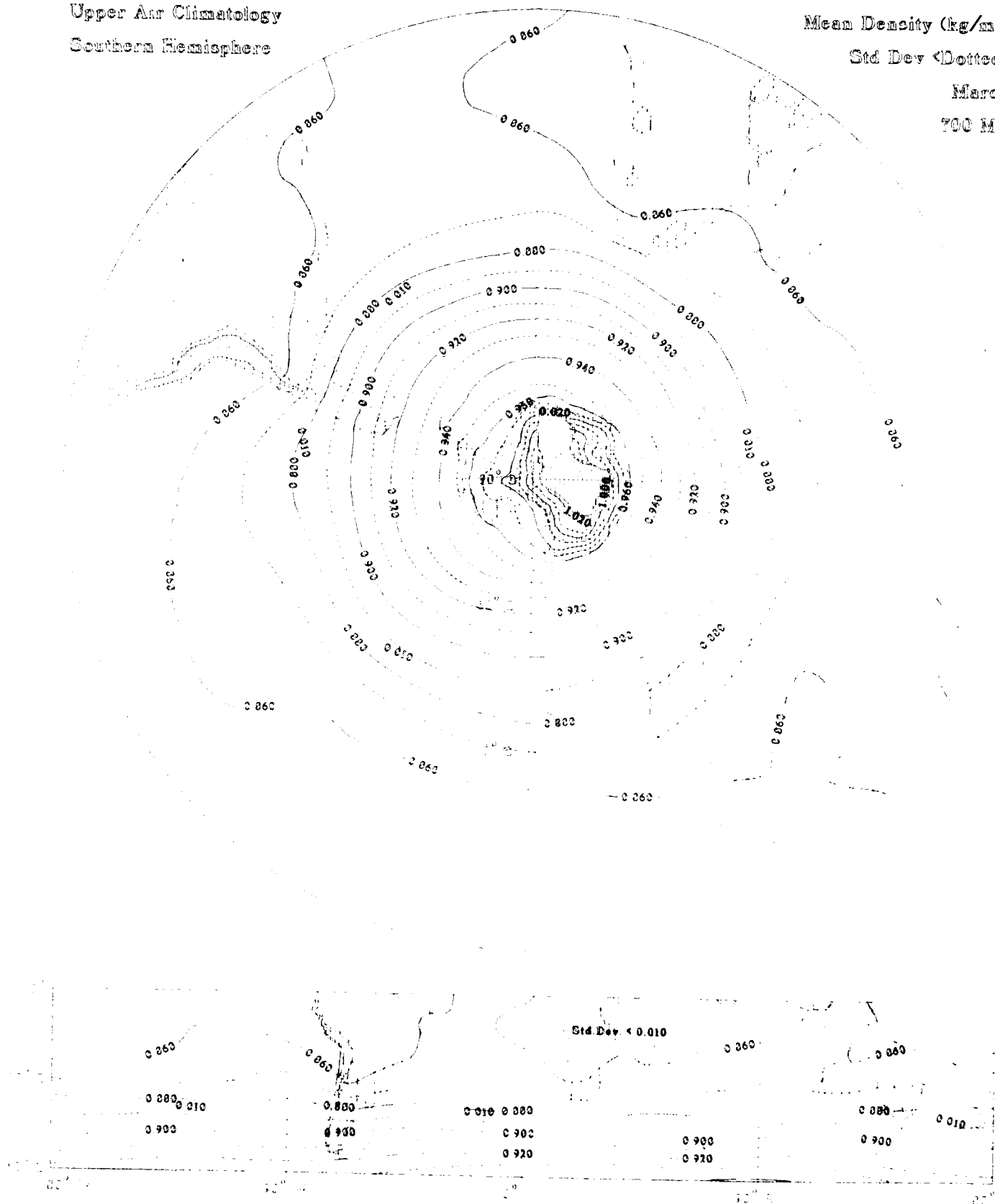
Upper Air Climatology

Northern Hemisphere



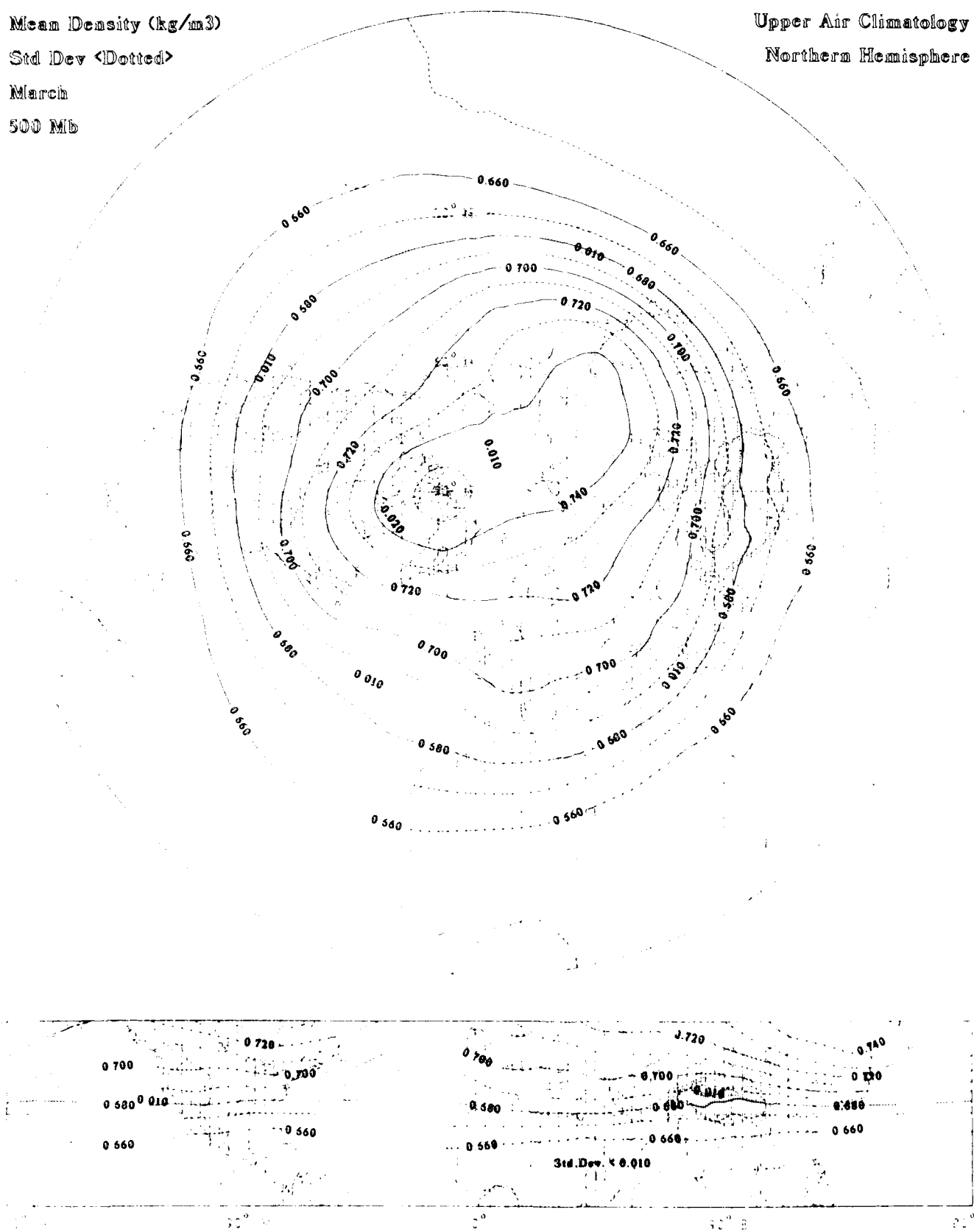
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)
Std Dev <Dotted>
March
700 MB



Mean Density (kg/m³)
 Std Dev <Dotted>
 March
 500 Mb

Upper Air Climatology
 Northern Hemisphere



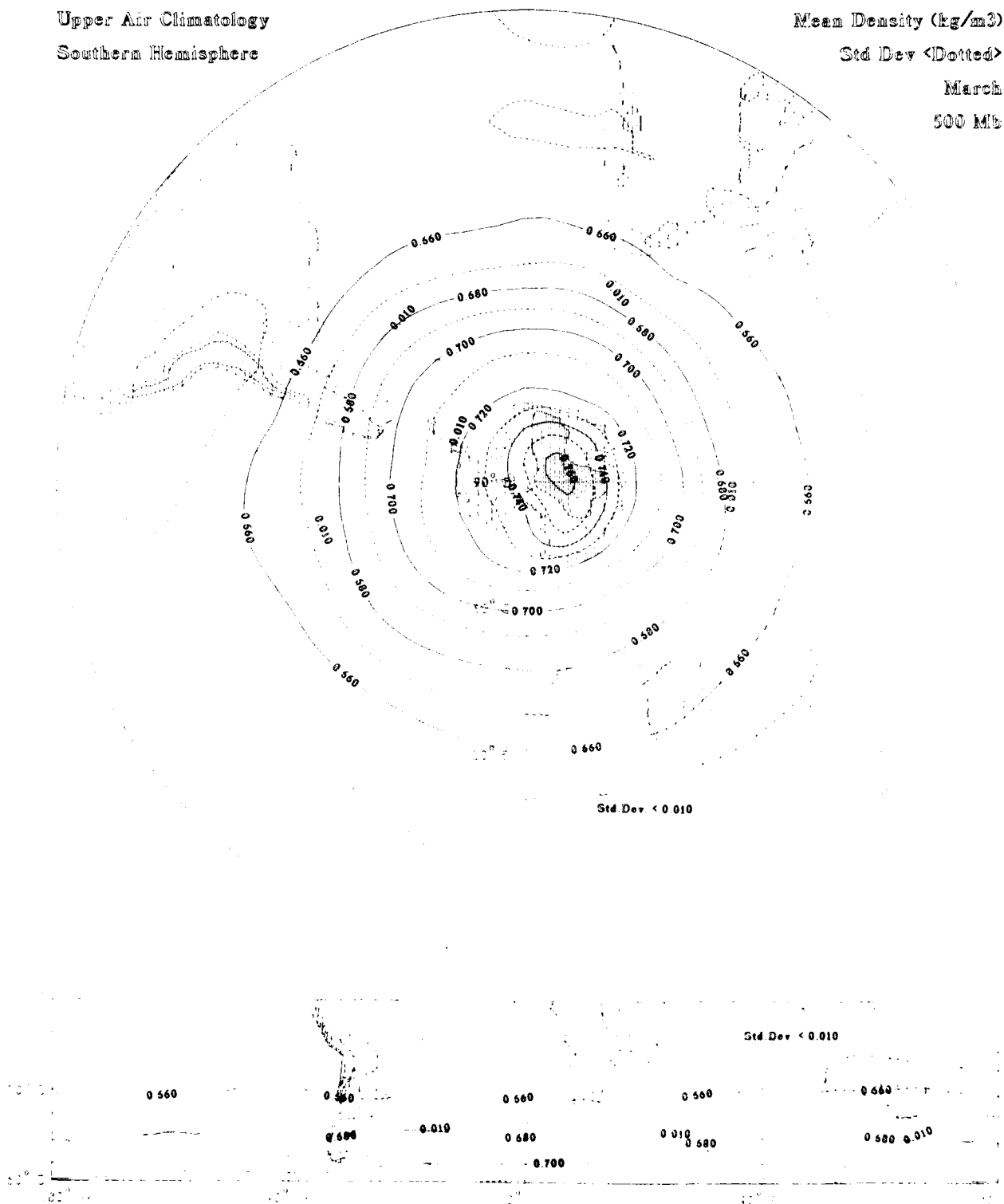
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std Dev <Dotted>

March

500 MB



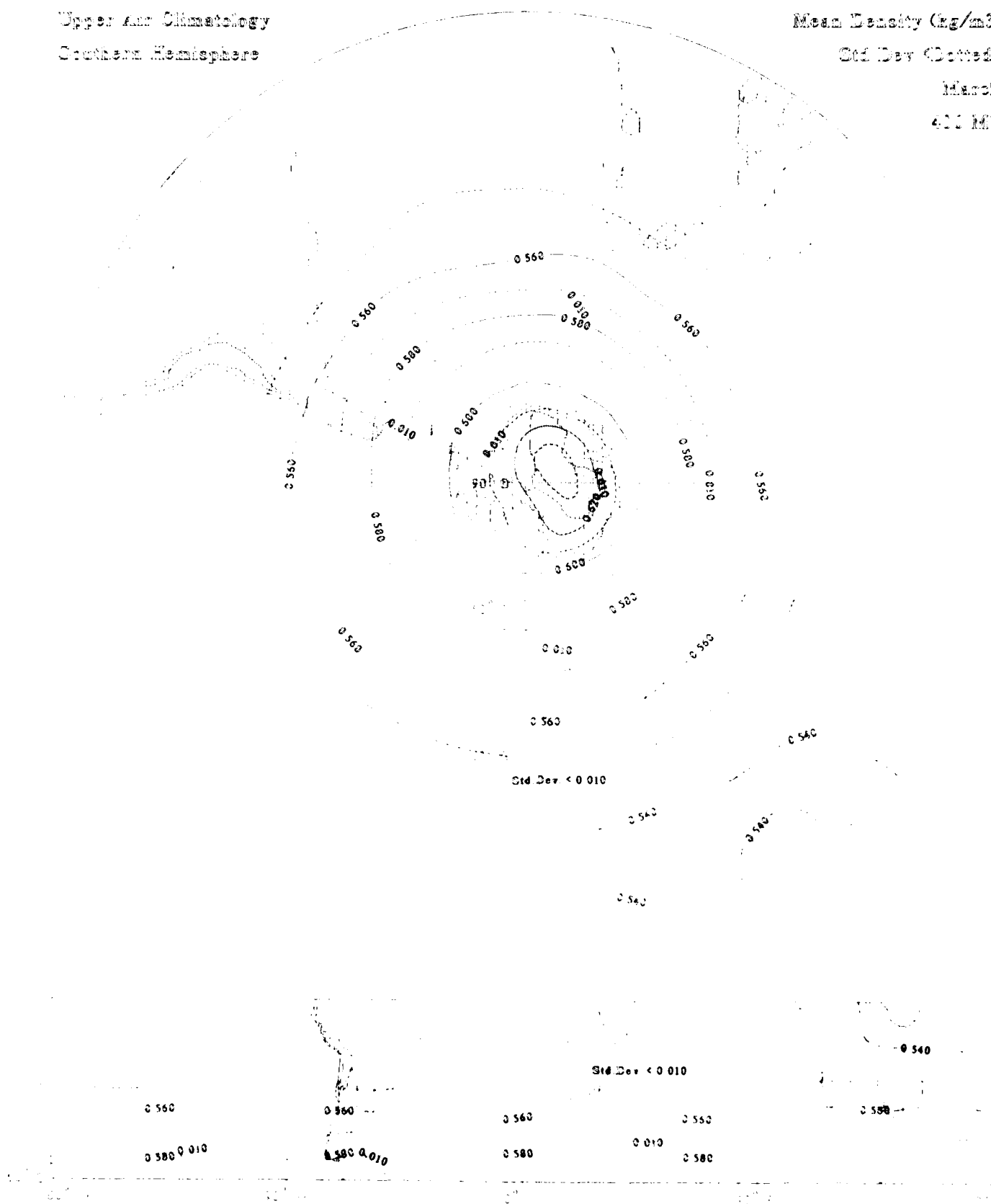
4-11-1965

Northern Hemisphere



Upper Air Climatology
 Southern Hemisphere

Mean Density (kg/m^3)
 Std Dev (Dotted)
 March
 400 MB



Mean Density (kg/m³)

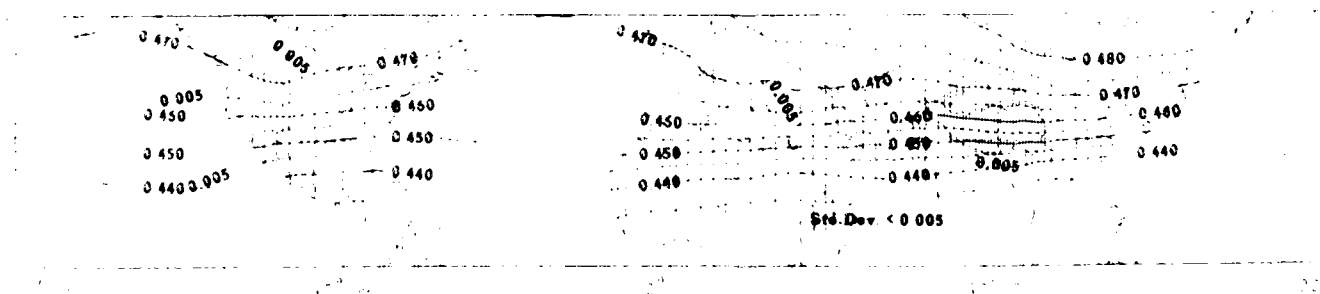
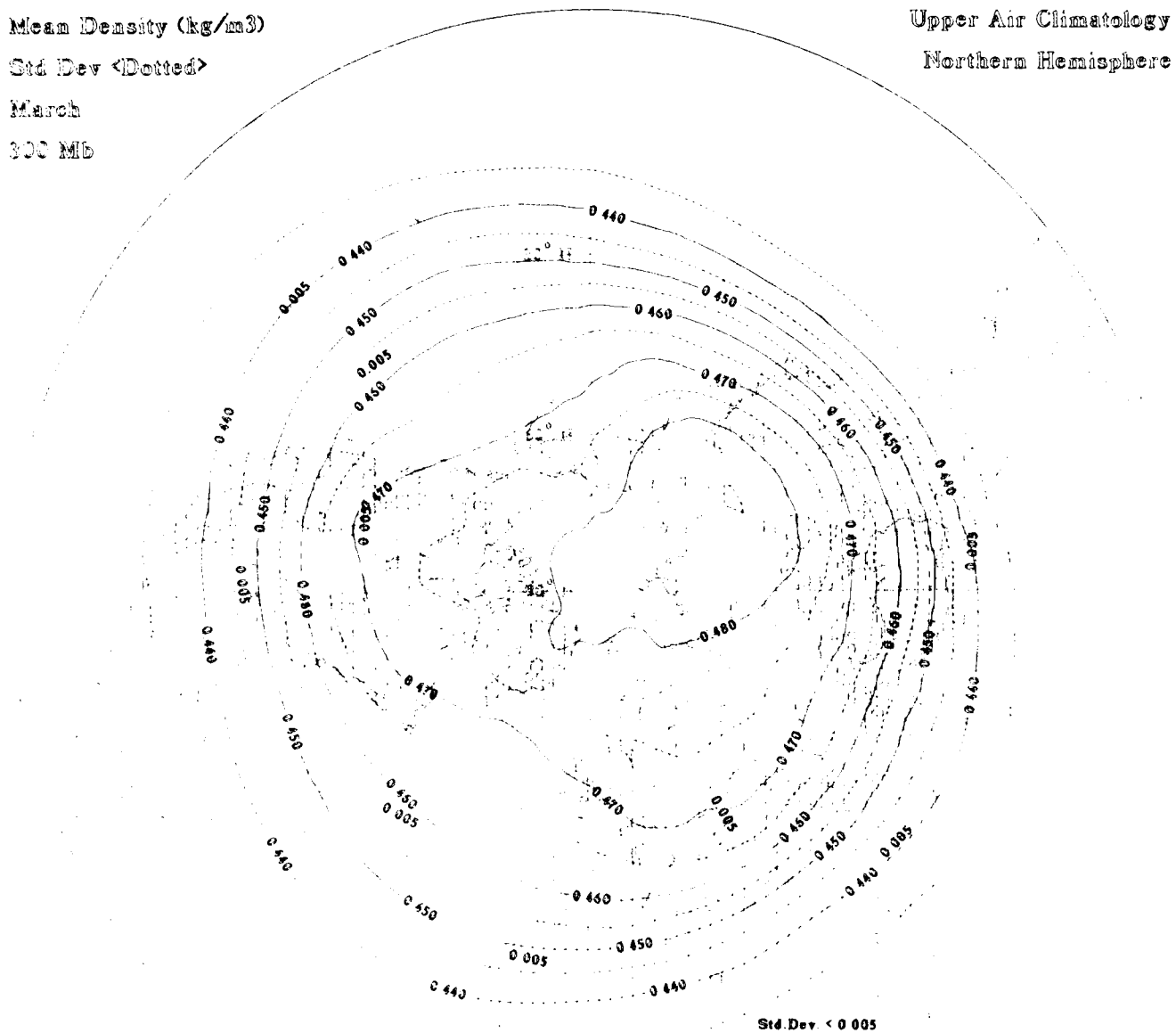
Std Dev <Dotted>

March

300 MB

Upper Air Climatology

Northern Hemisphere



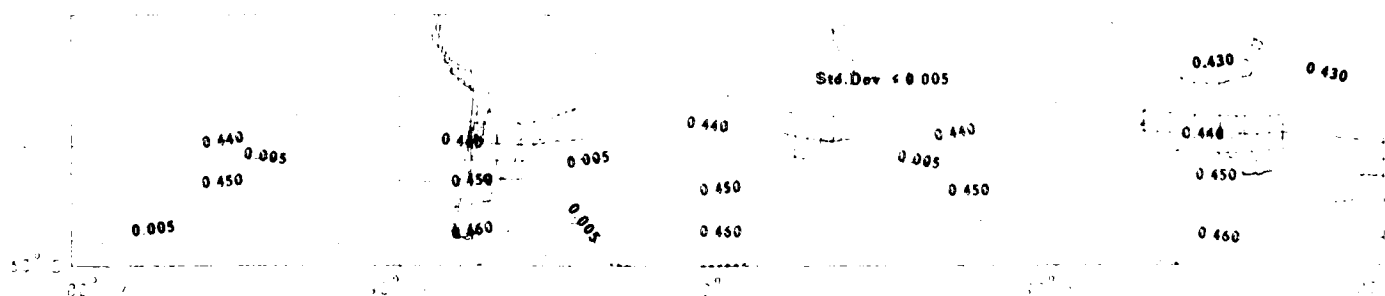
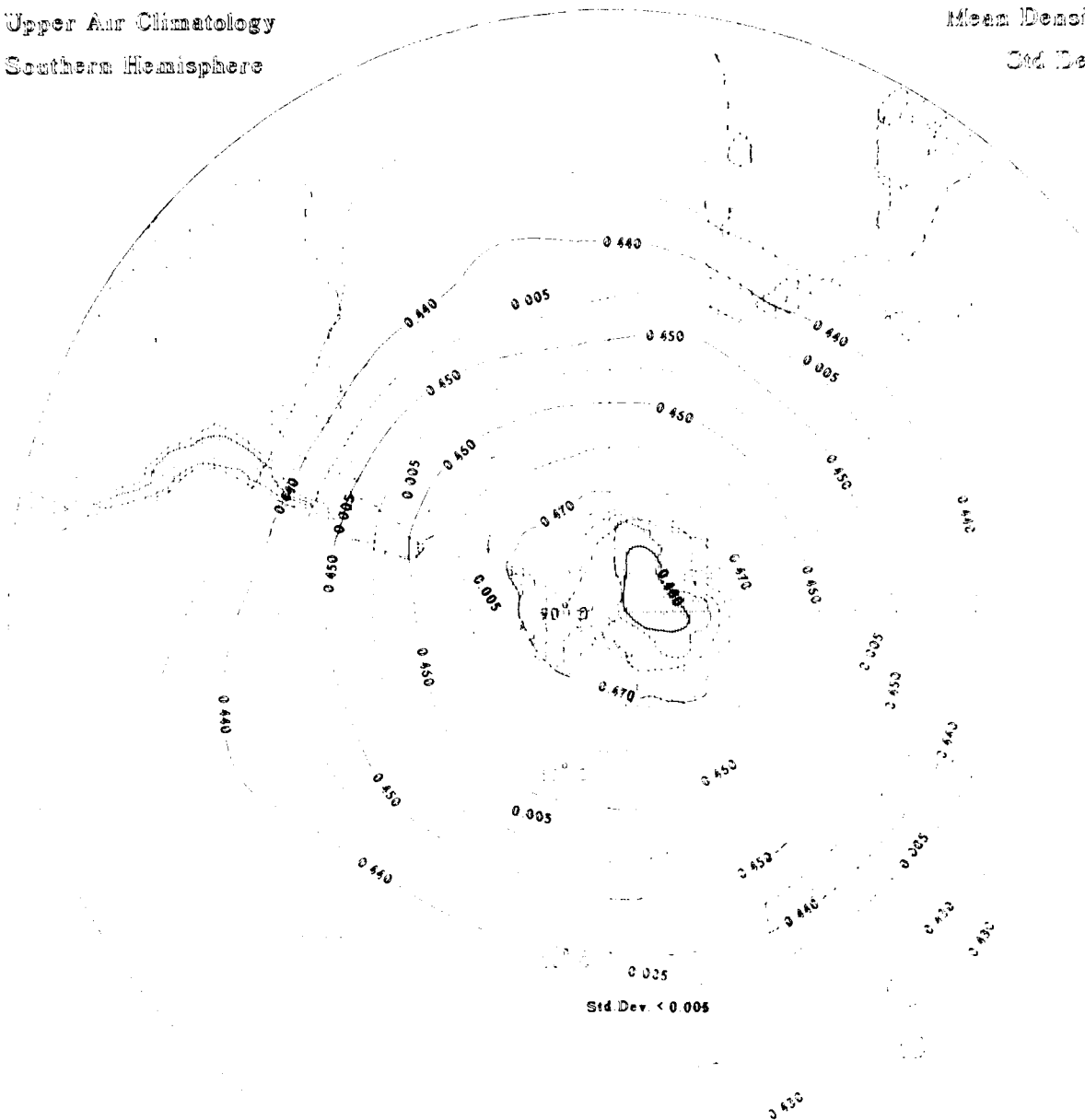
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std. Dev. Cont'd

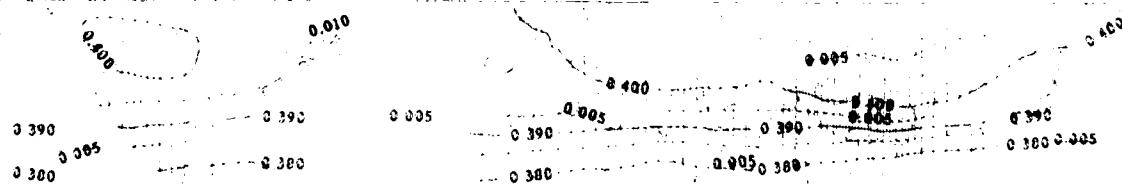
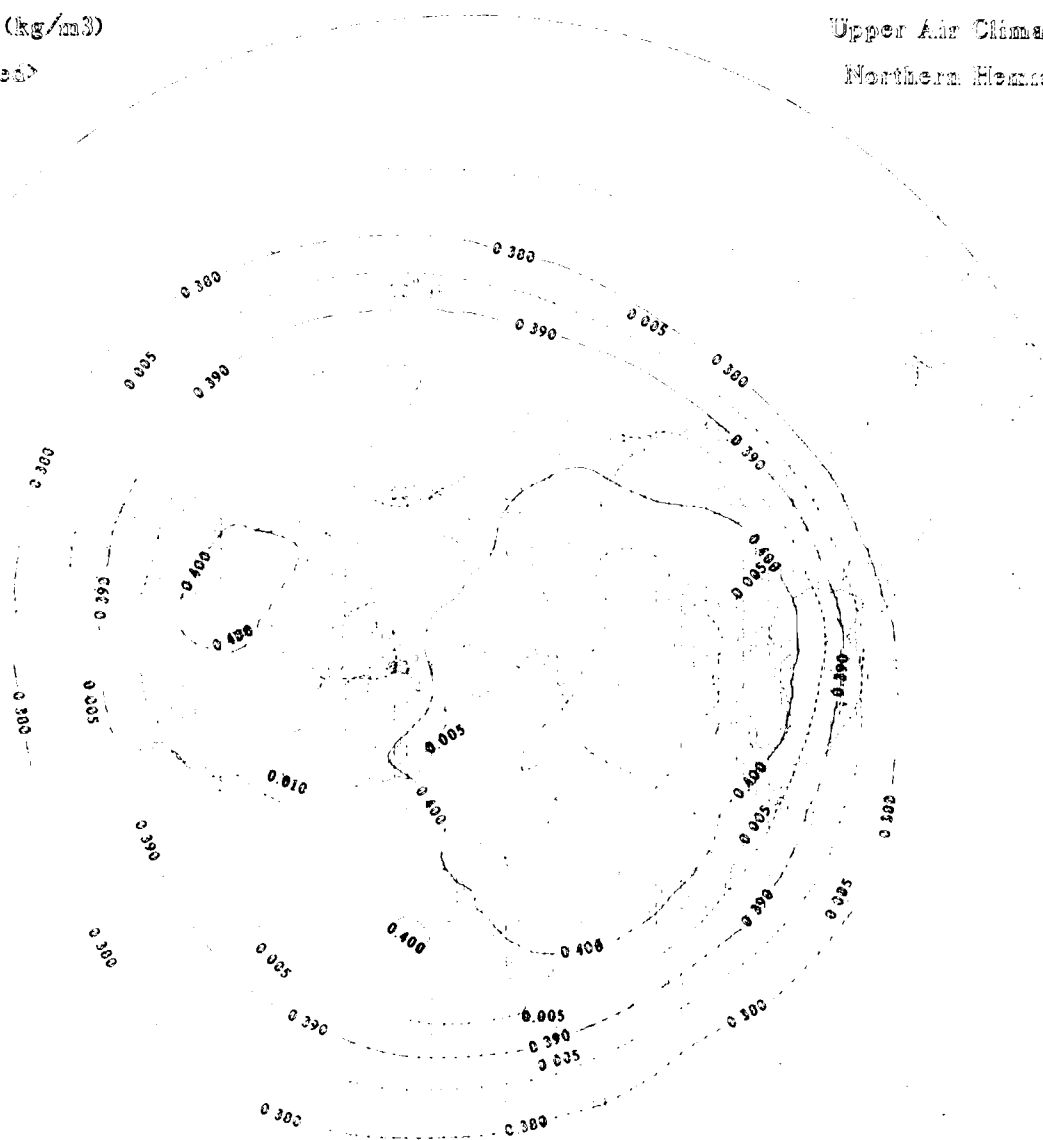
March

200 MB



250 MB

Northern Hemisphere



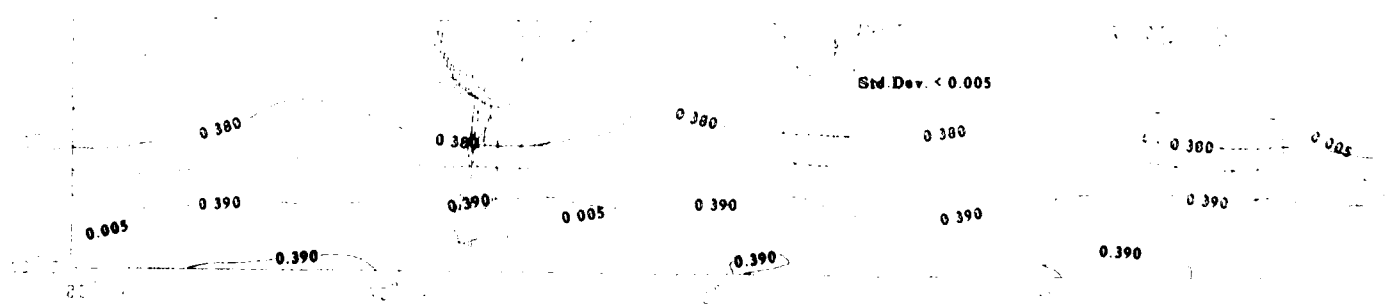
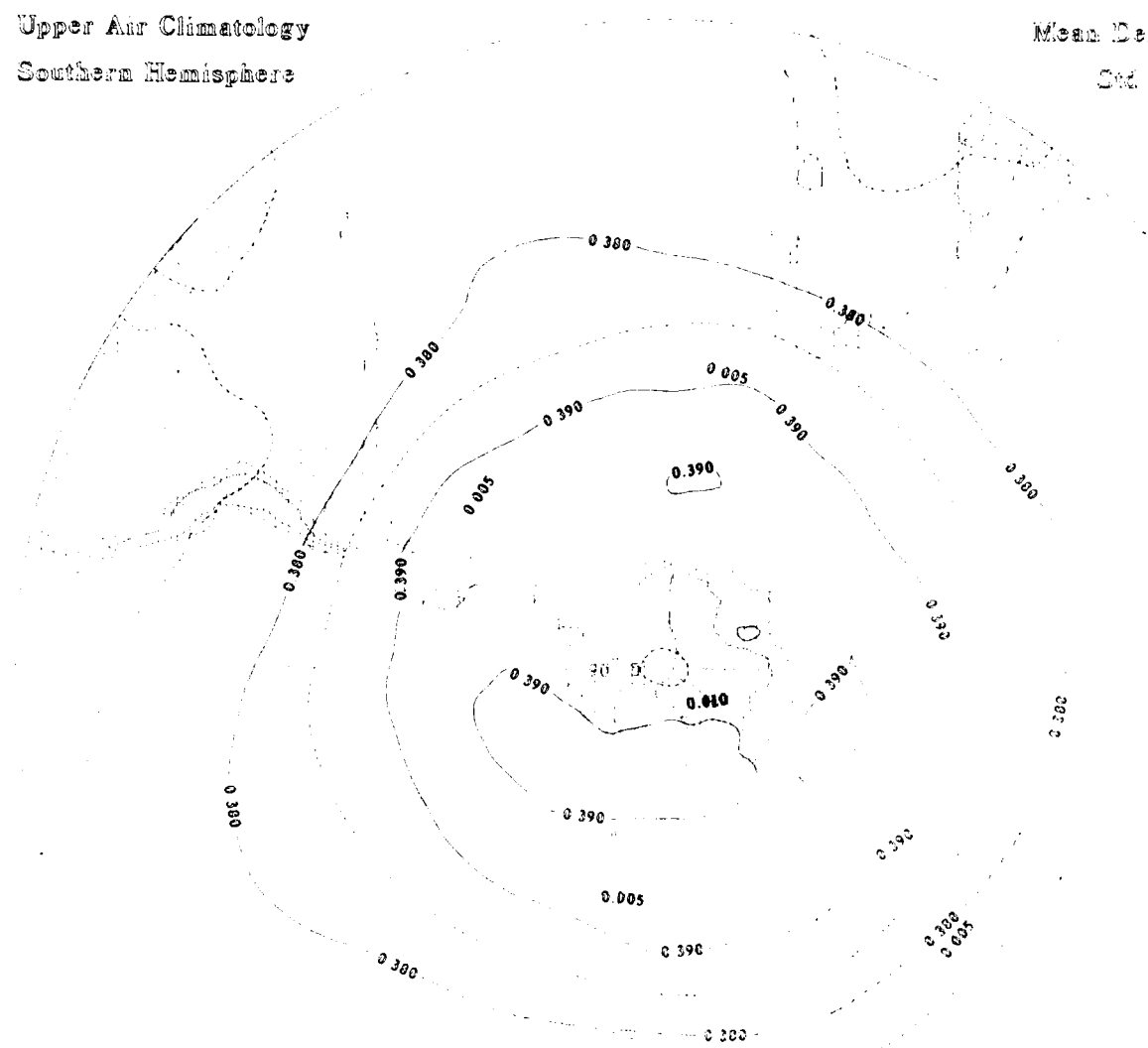
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std. Dev. < 0.005

March

200 mb



Mean Density (kg/m³)

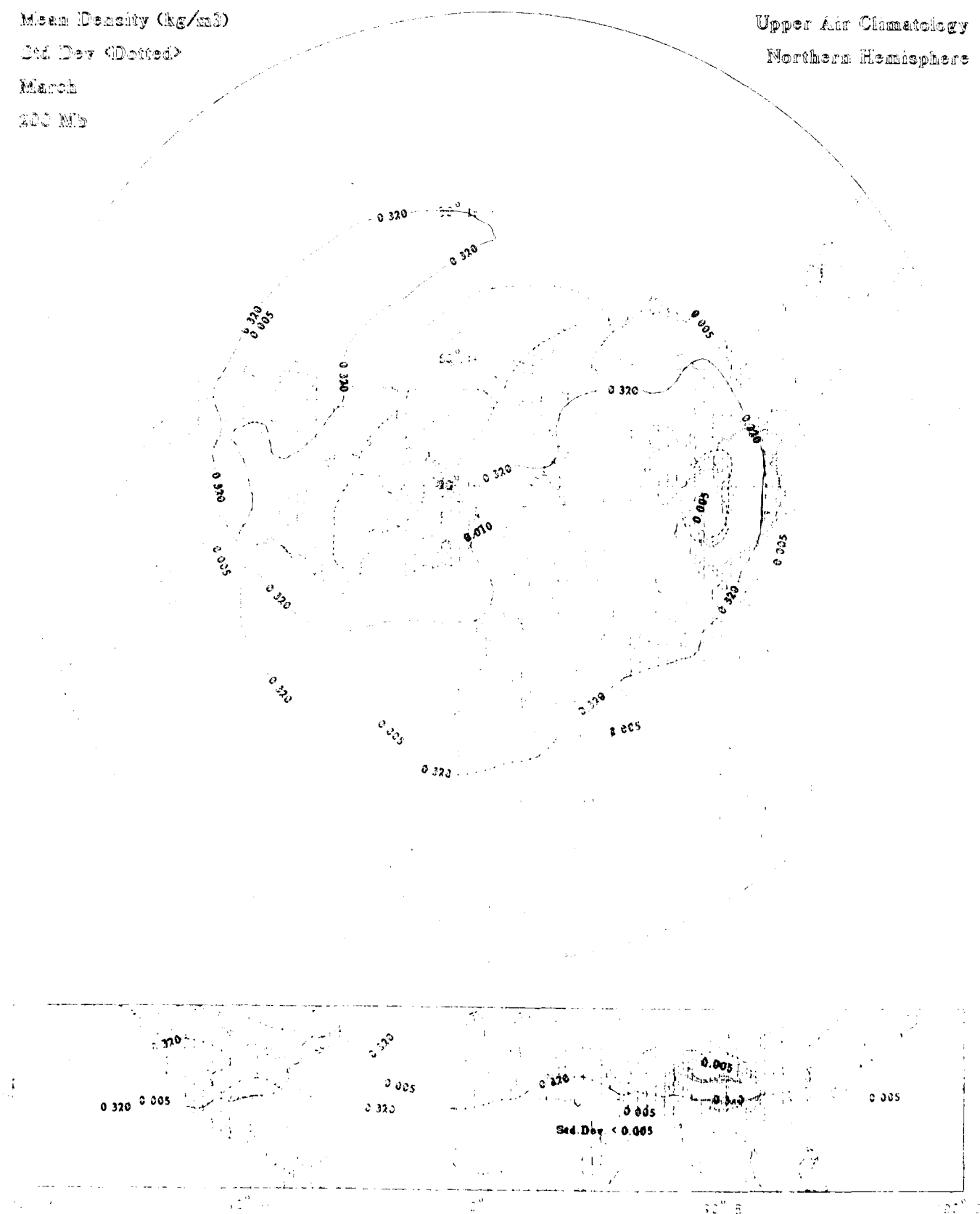
Std Dev (Dotted)

March

200 MB

Upper Air Climatology

Northern Hemisphere



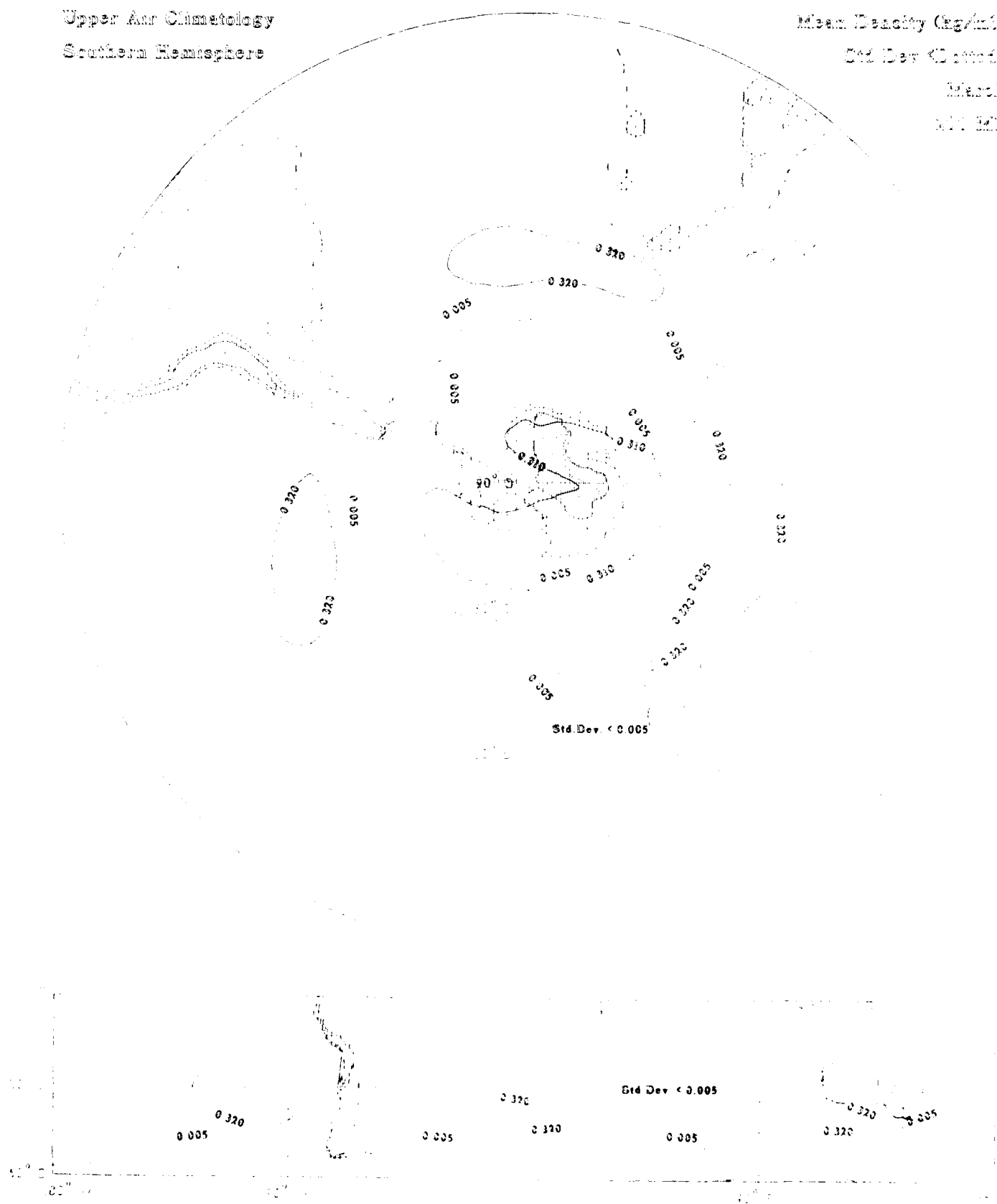
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std. Dev. (kg/m³)

March

1971-1972



Mean Density (kg/m³)

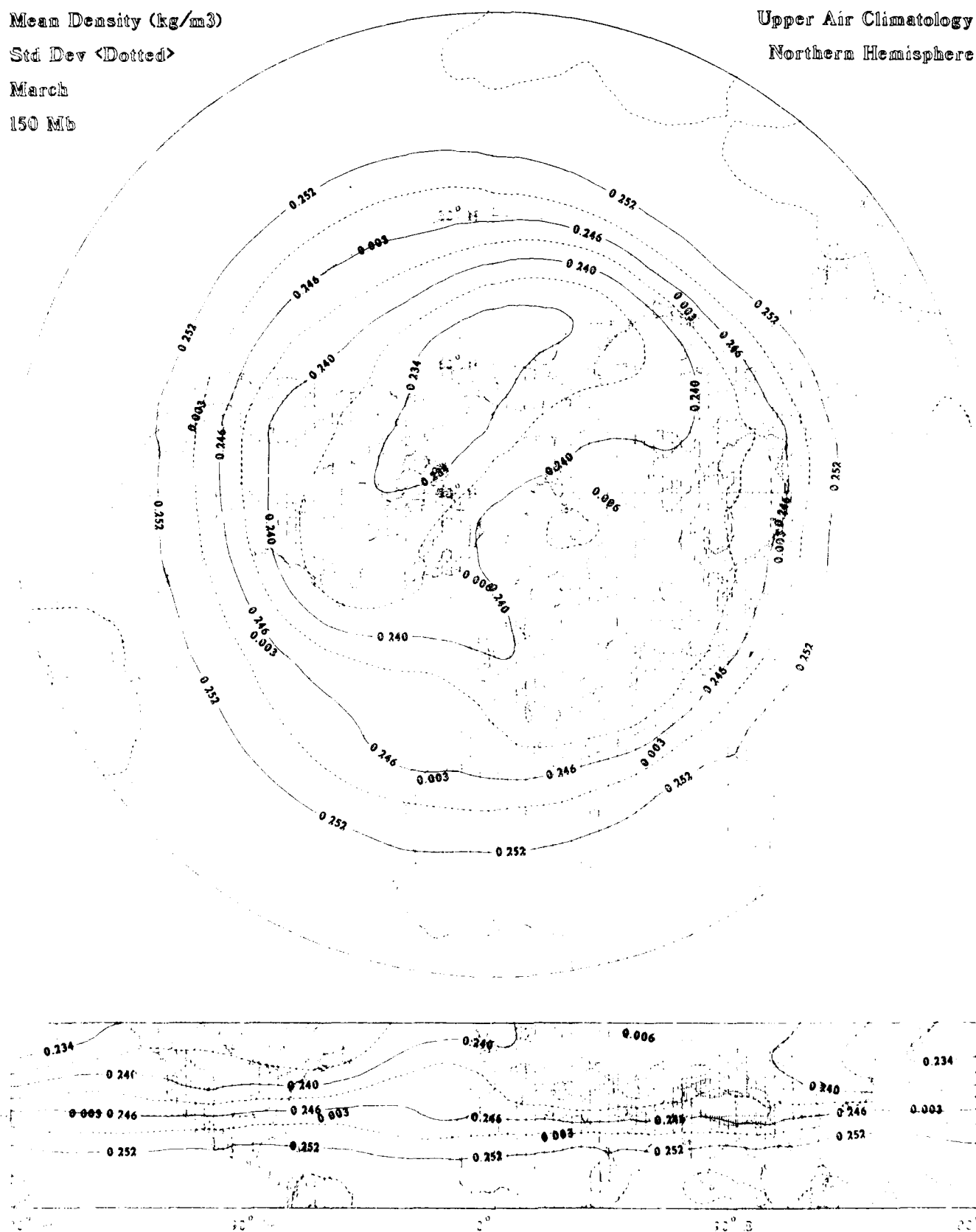
Std Dev <Dotted>

March

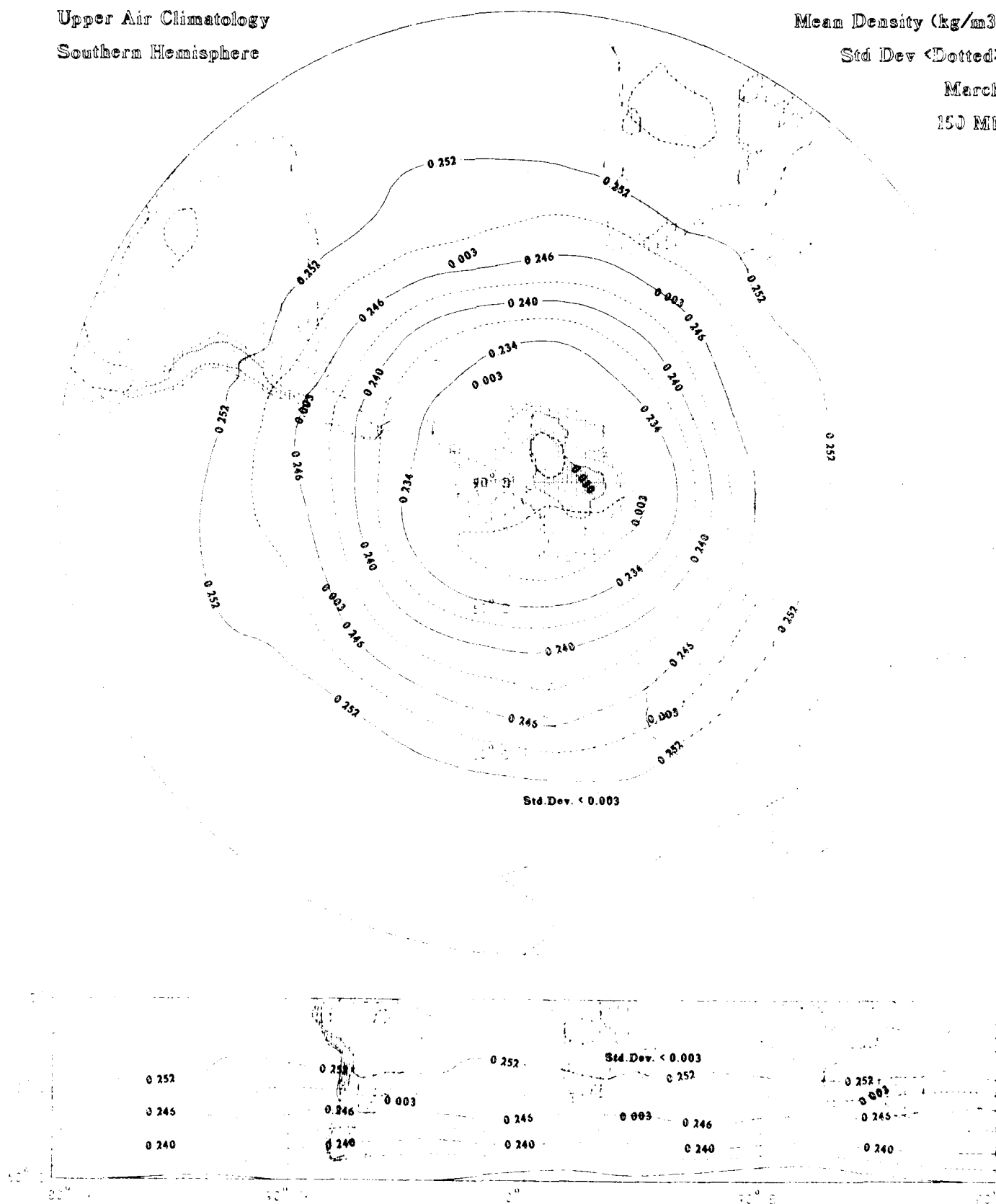
150 Mb

Upper Air Climatology

Northern Hemisphere

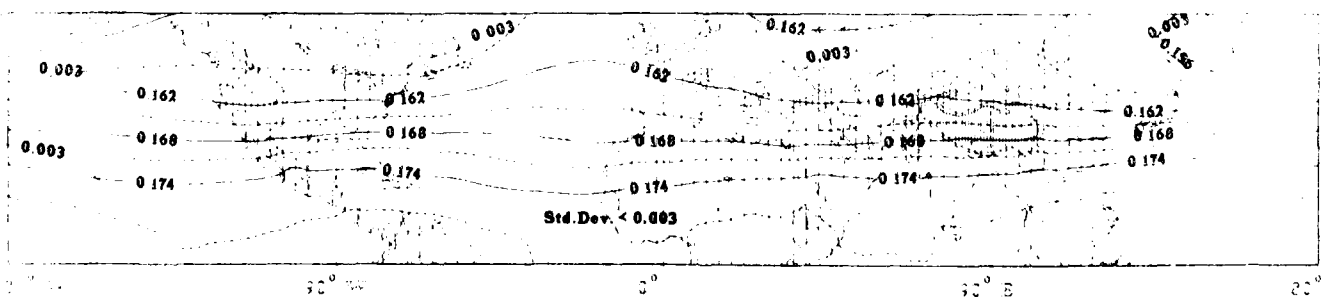
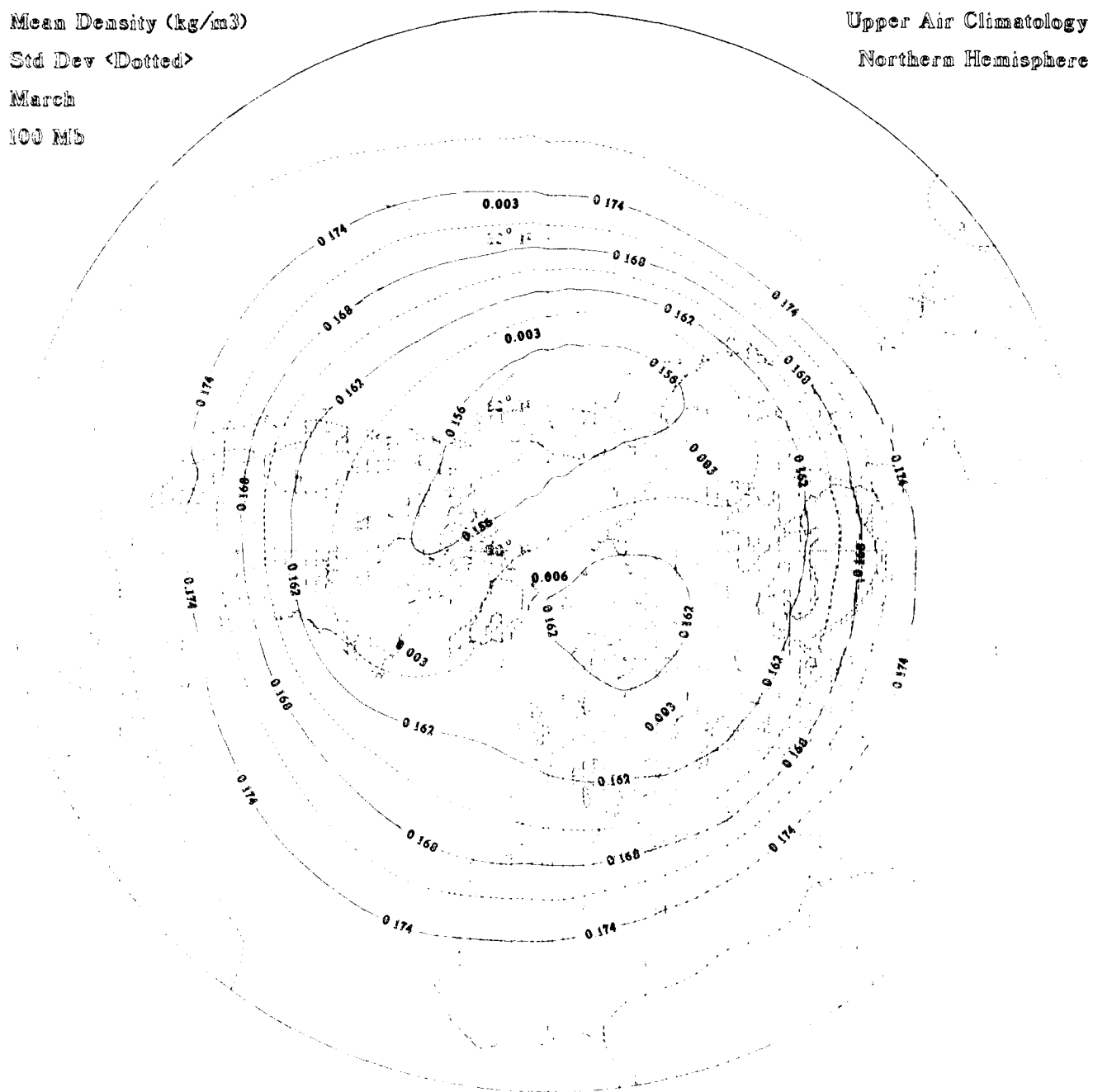


Mean Density (kg/m3)
Std Dev <Dotted>
March
150 Mb

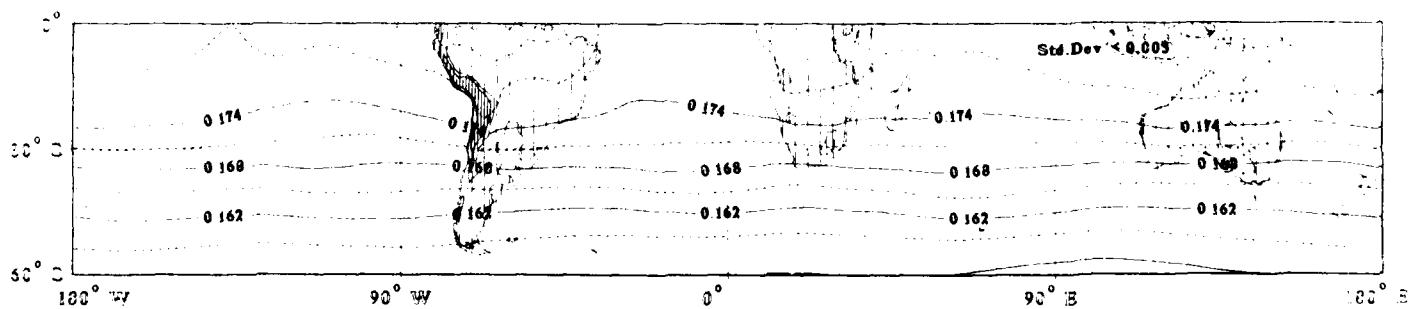
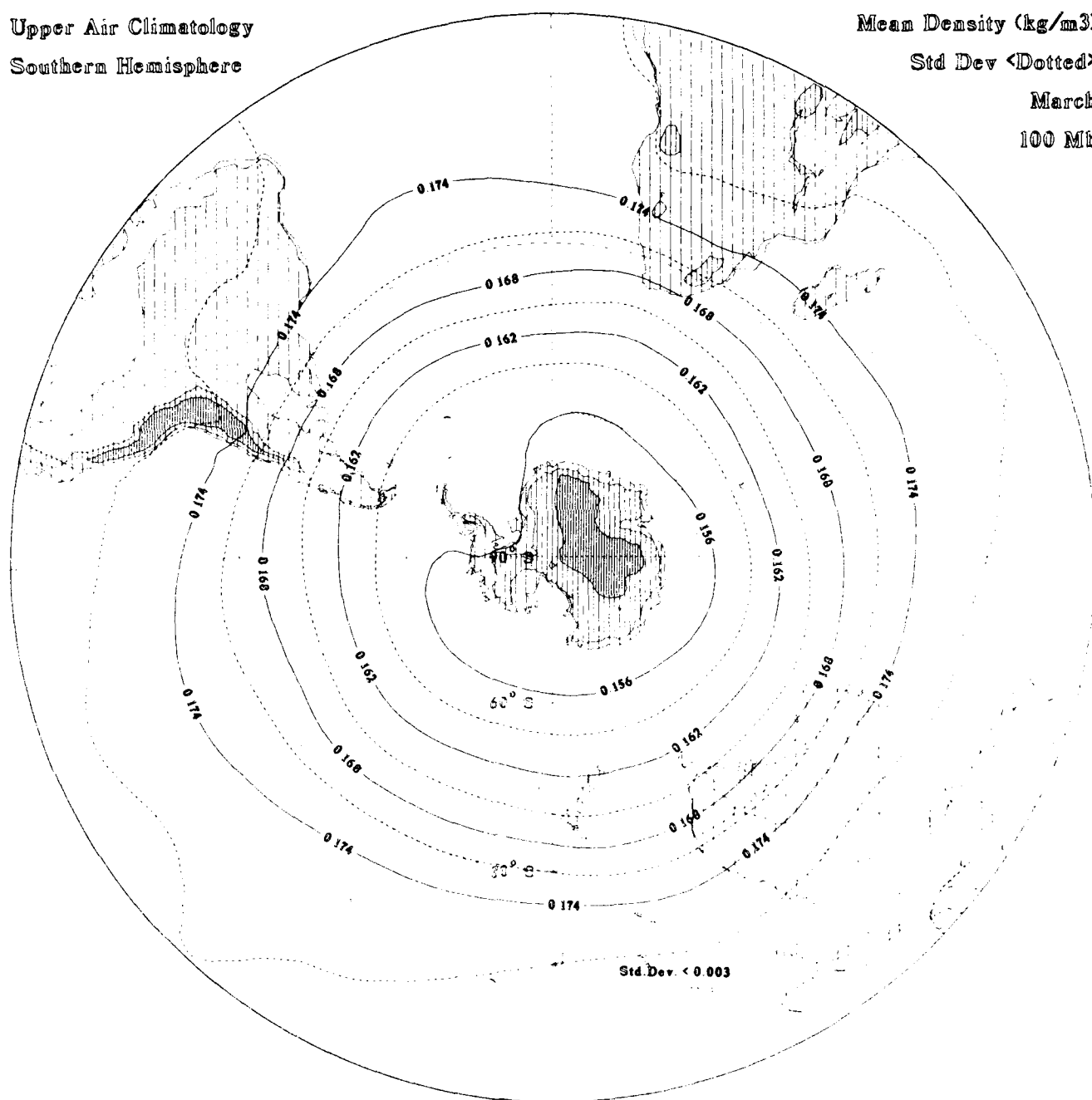


Upper Air Climatology

Northern Hemisphere



100 Mb



Mean Density (kg/m³)

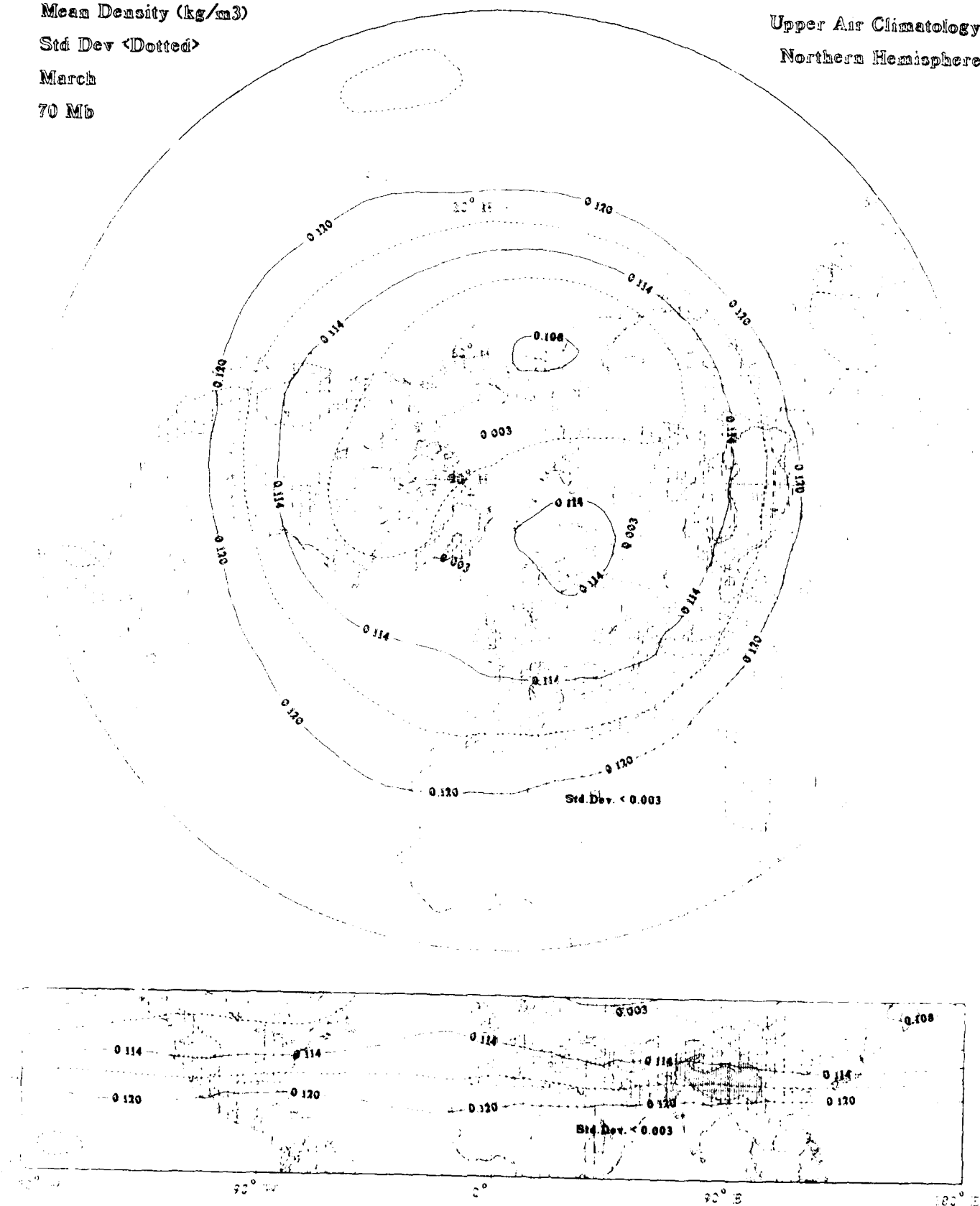
Std Dev <Dotted>

March

70 Mb

Upper Air Climatology

Northern Hemisphere



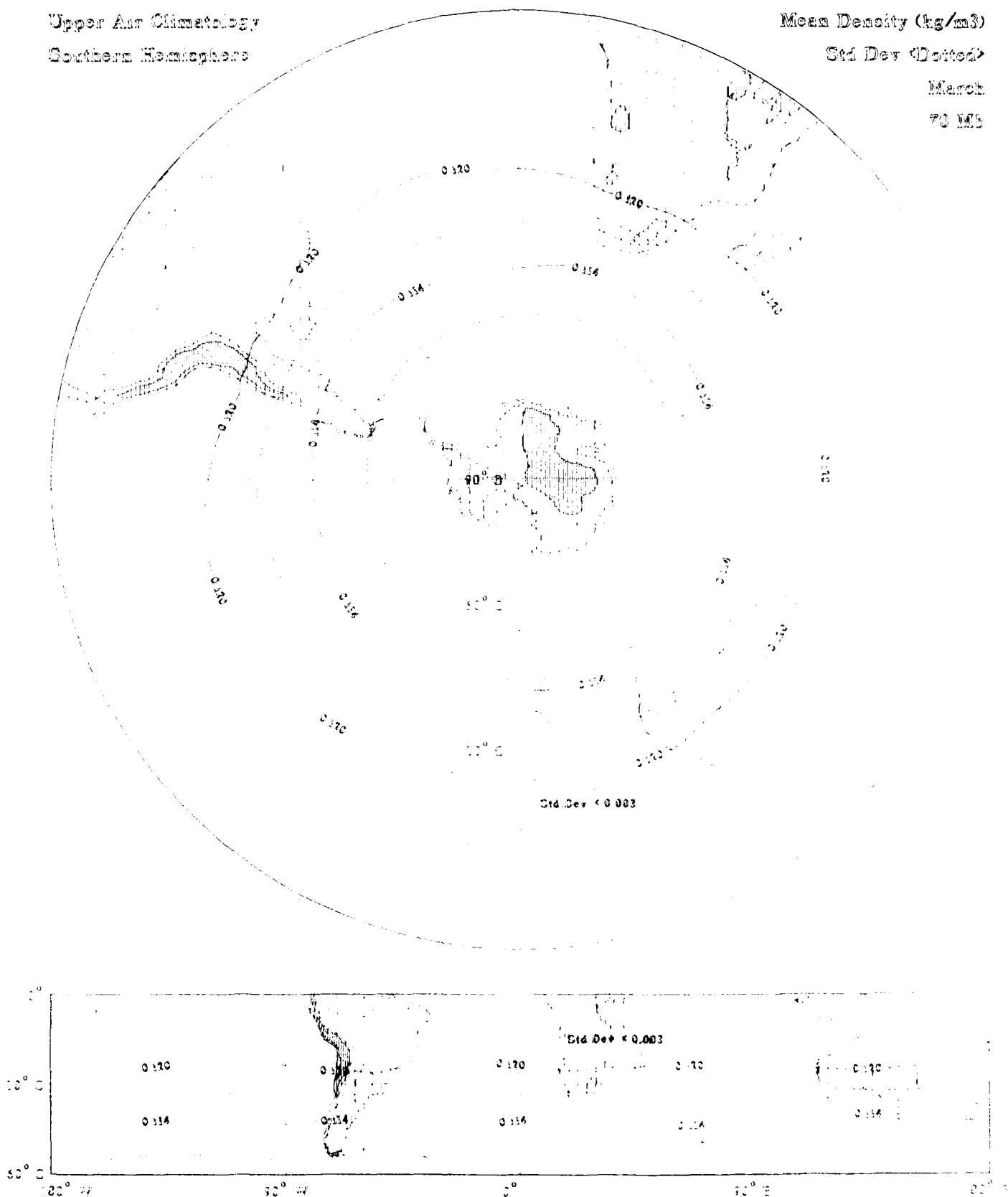
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std Dev (Dotted)

March

70 MB



Mean Density (kg/m³)

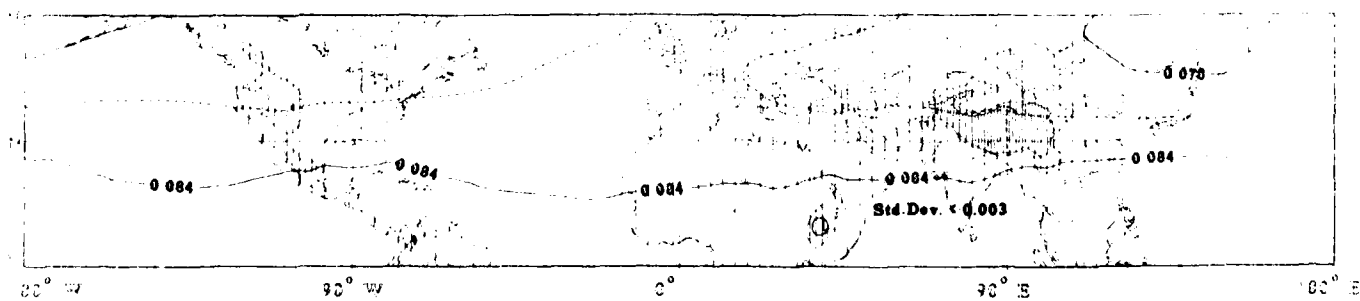
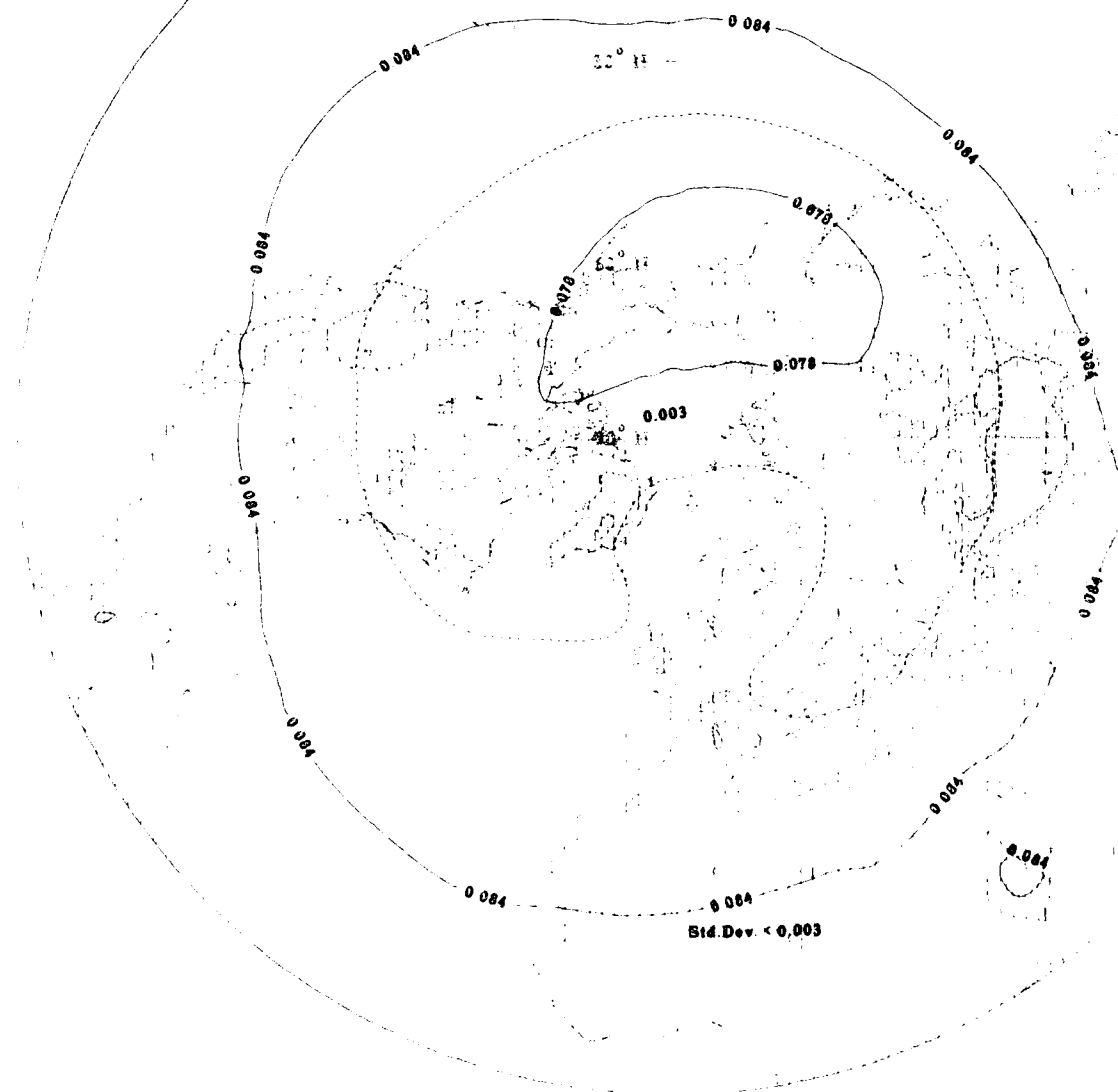
Std Dev <Dotted>

March

50 Mb

Upper Air Climatology

Northern Hemisphere



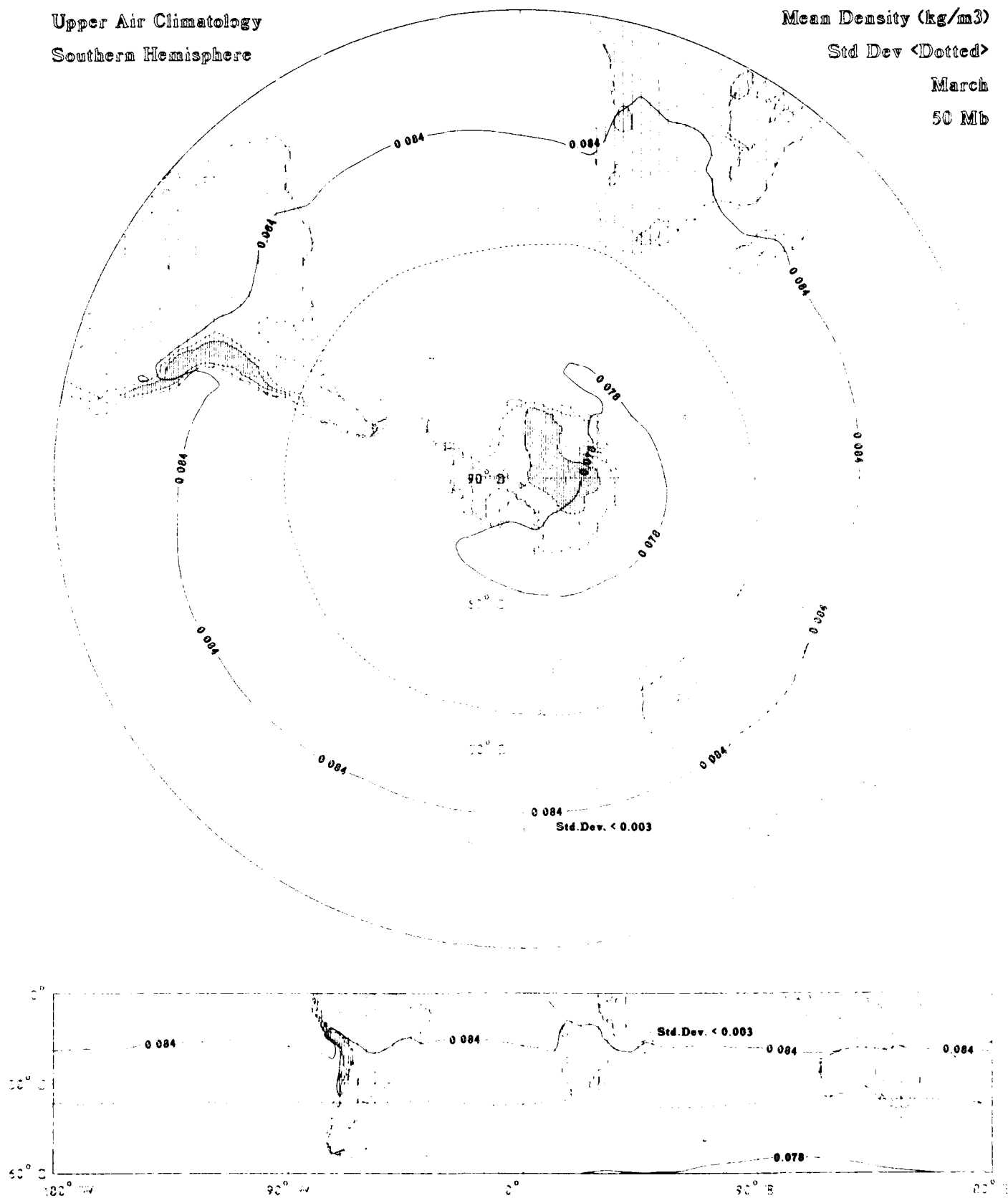
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std Dev <Dotted>

March

50 Mb



Std Dev <Dotted>

30 Mb

Northern Hemisphere



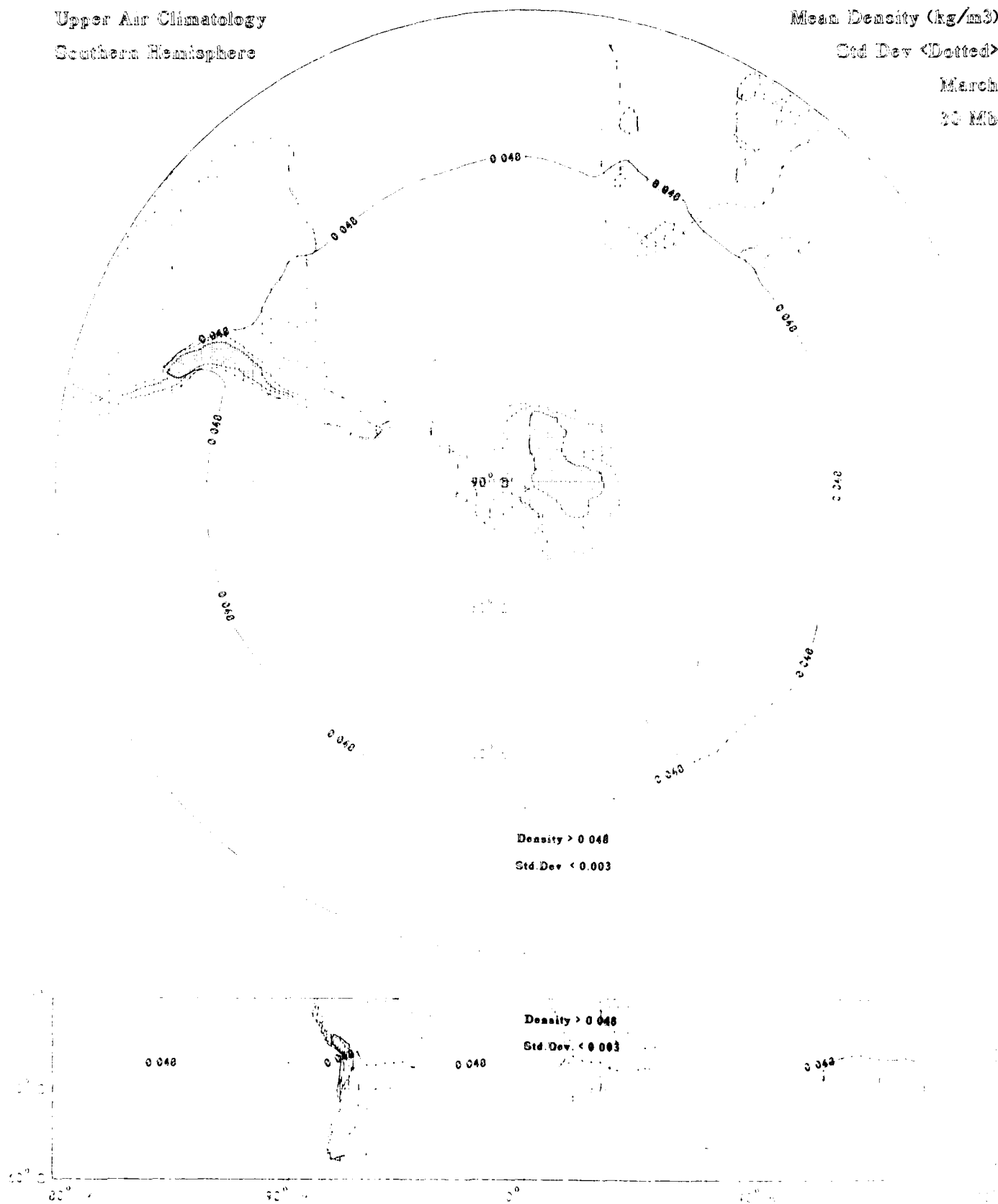
Upper Air Climatology
Southern Hemisphere

Mean Density (kg/m³)

Std. Dev. <Dotted>

March

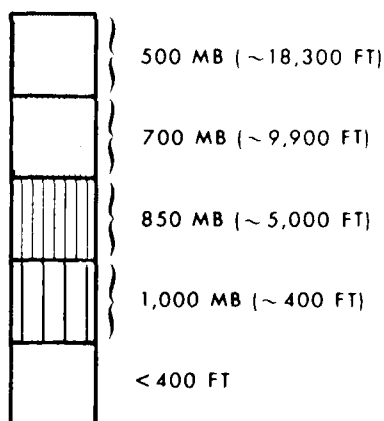
20 MB



STANDARD DEVIATION OF HEIGHT
STANDARD DEVIATION OF VECTOR MEAN WIND
(13 LEVELS, 1000 TO 30 MB)

- Contours of standard deviation of height (solid lines) in geopotential dekameters
- Standard deviation of height labeled interval:
 - 3 dekameters (30 meters) - 1000 MB to 400 MB
 - 6 dekameters (60 meters) - 300 MB to 200 MB
 - 4 dekameters (40 meters) - 150 MB to 30 MB
- Contours of standard deviation of vector mean wind (dashed lines) in knots
- Standard deviation of vector mean wind labeled interval: 5 knots
- Contours blanked for geographic areas with elevations exceeding specified geopotential heights

ELEVATION SCALE



Height (km) Std Dev <Solid>

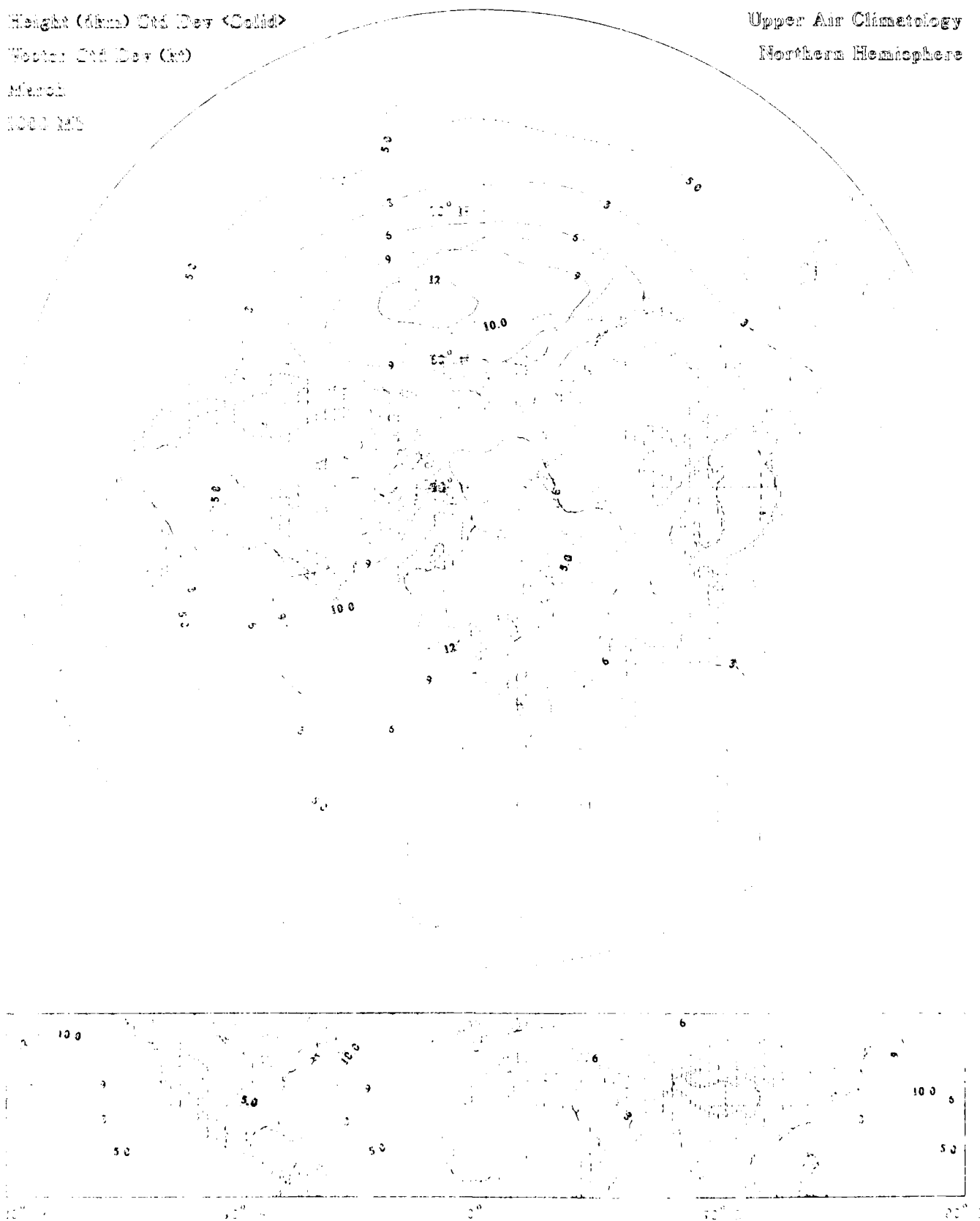
Wester: Std Dev (kt)

Merid:

1000 MB

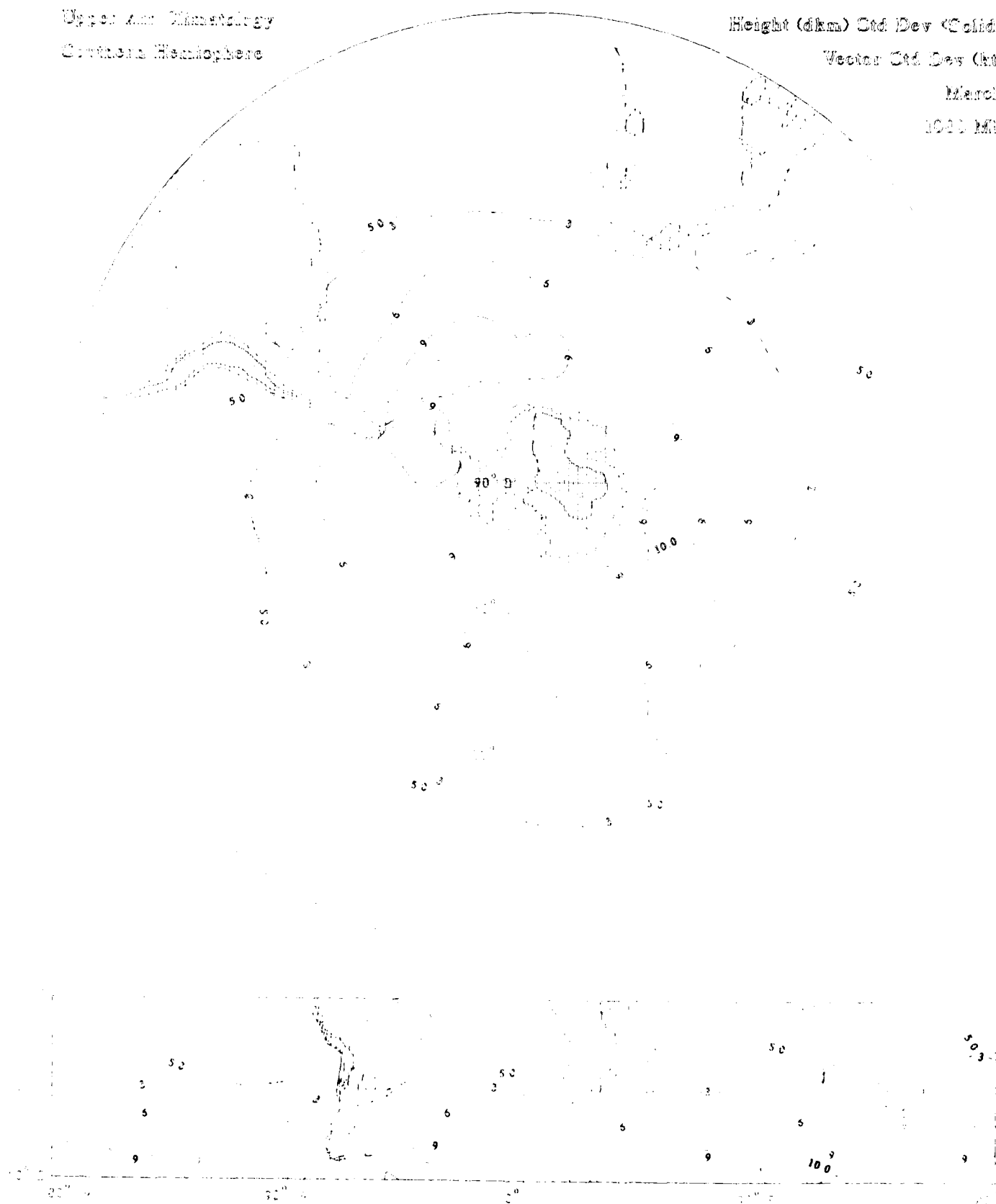
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
 Southern Hemisphere

Height (dkm) Std Dev (Solid)
 Vector Std Dev (ht)
 March
 1000 MB



Height (gkm) Std Dev (Solid)

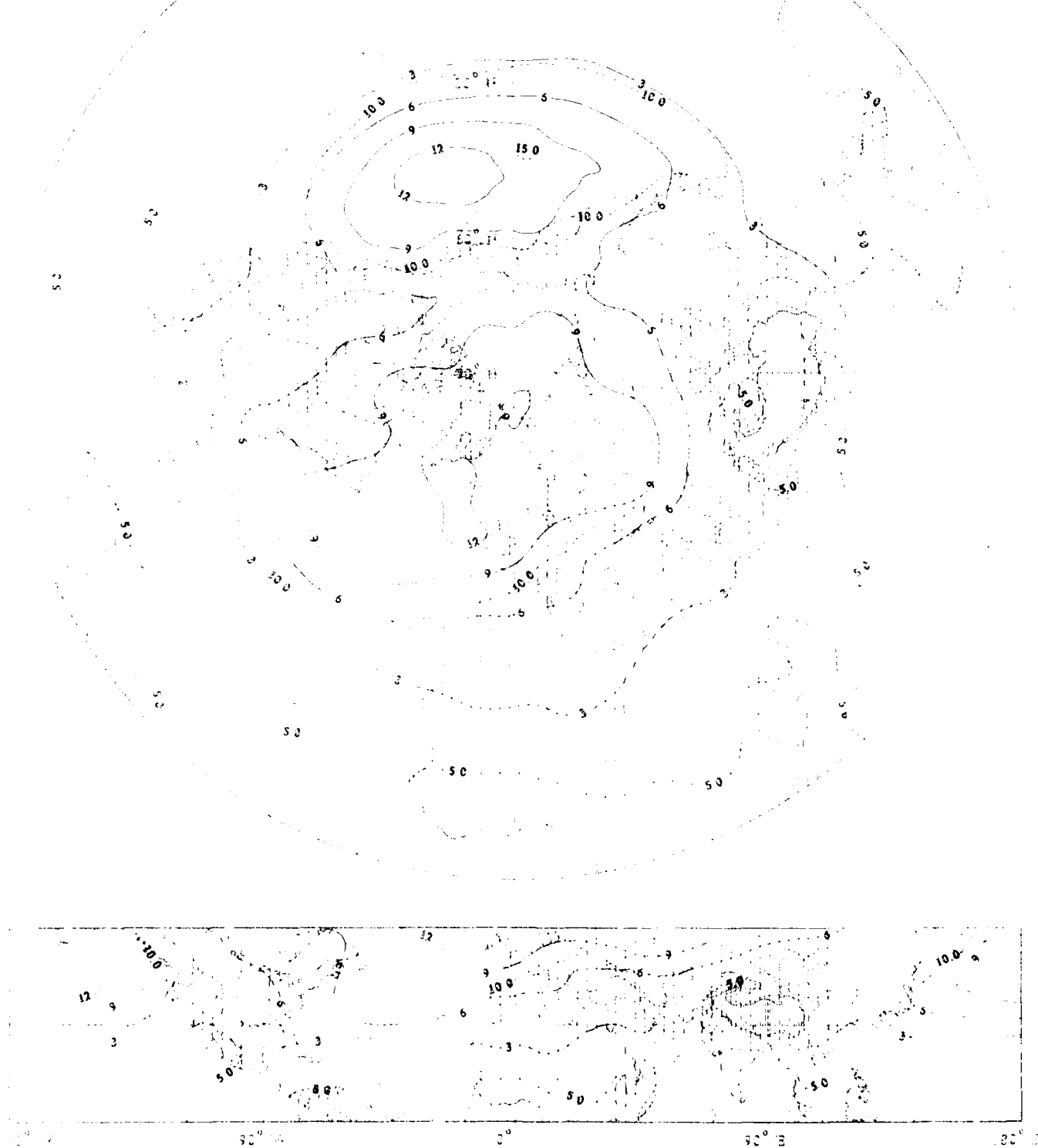
Vector Std Dev (dashed)

March

350 mb

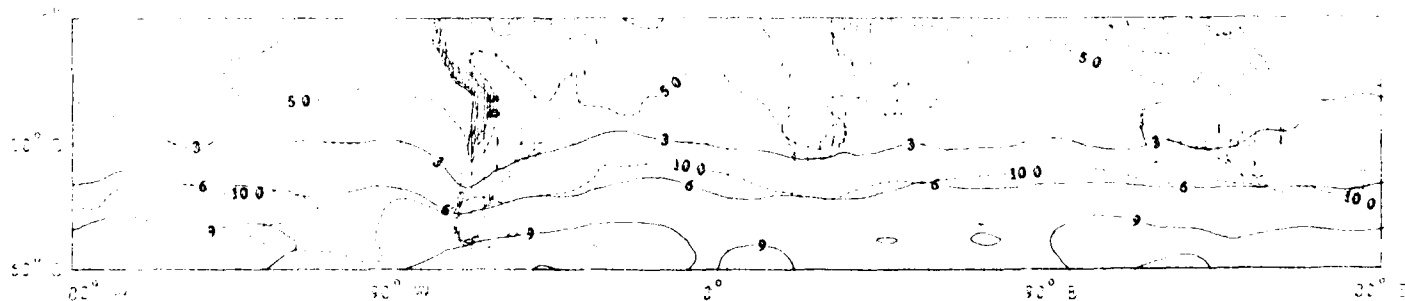
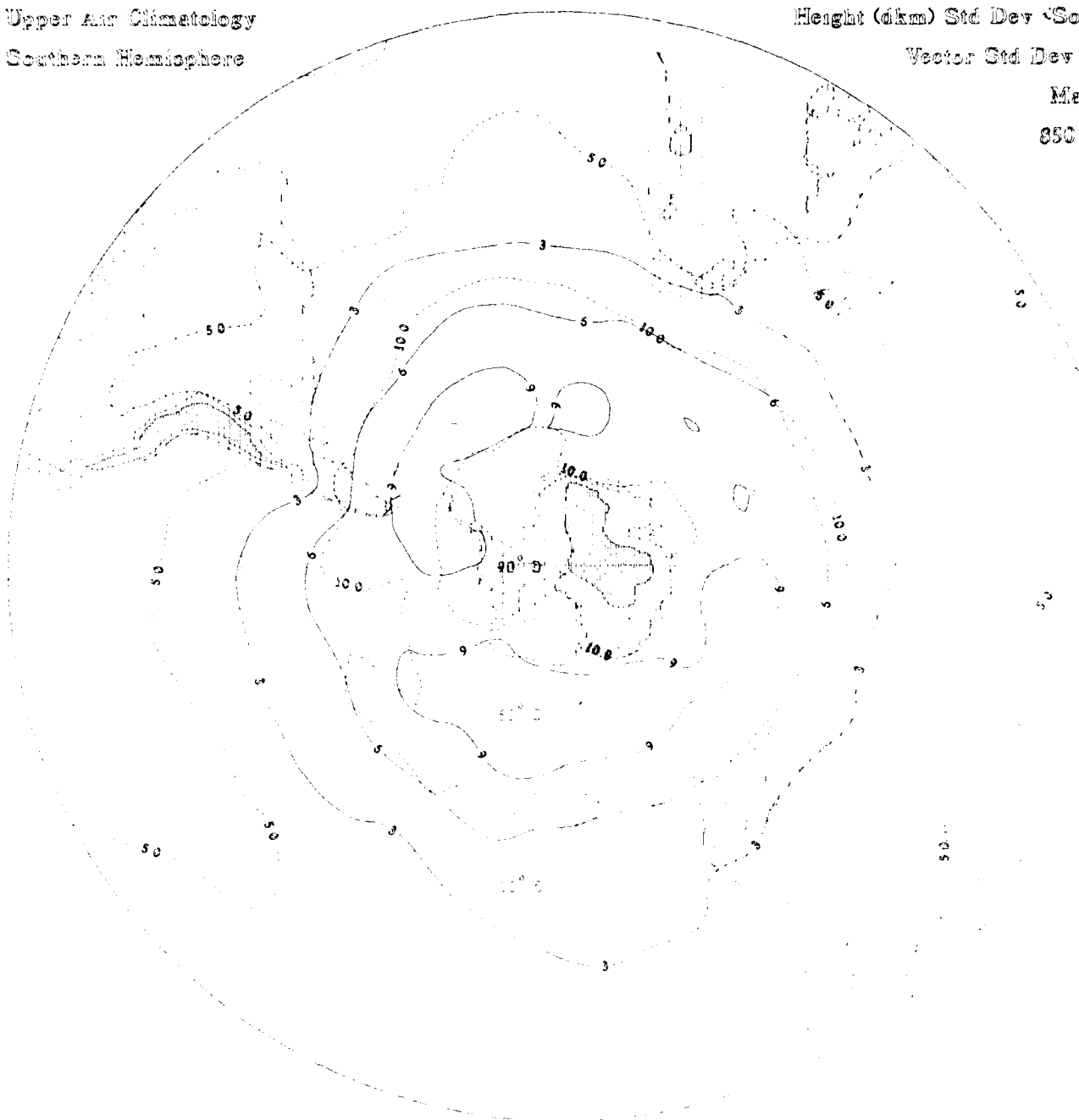
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

Height (dkm) Std Dev (Solid)
Vector Std Dev (kt)
March
850 Mb



Height (dkm) Std Dev <Solid>

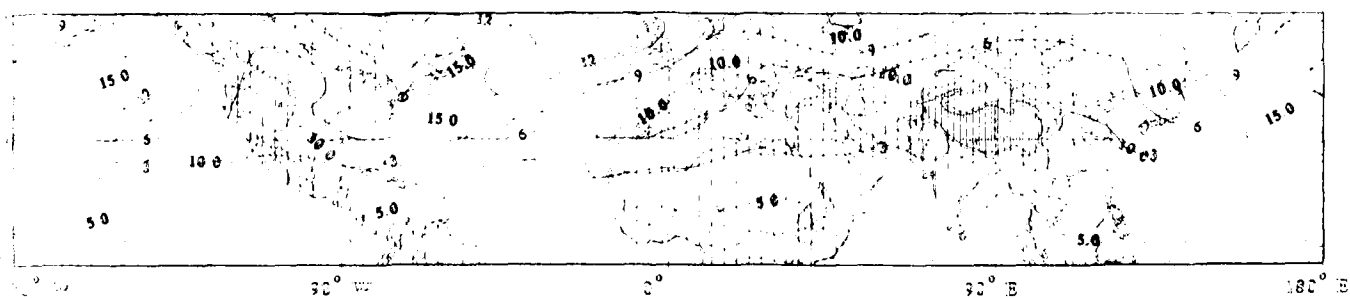
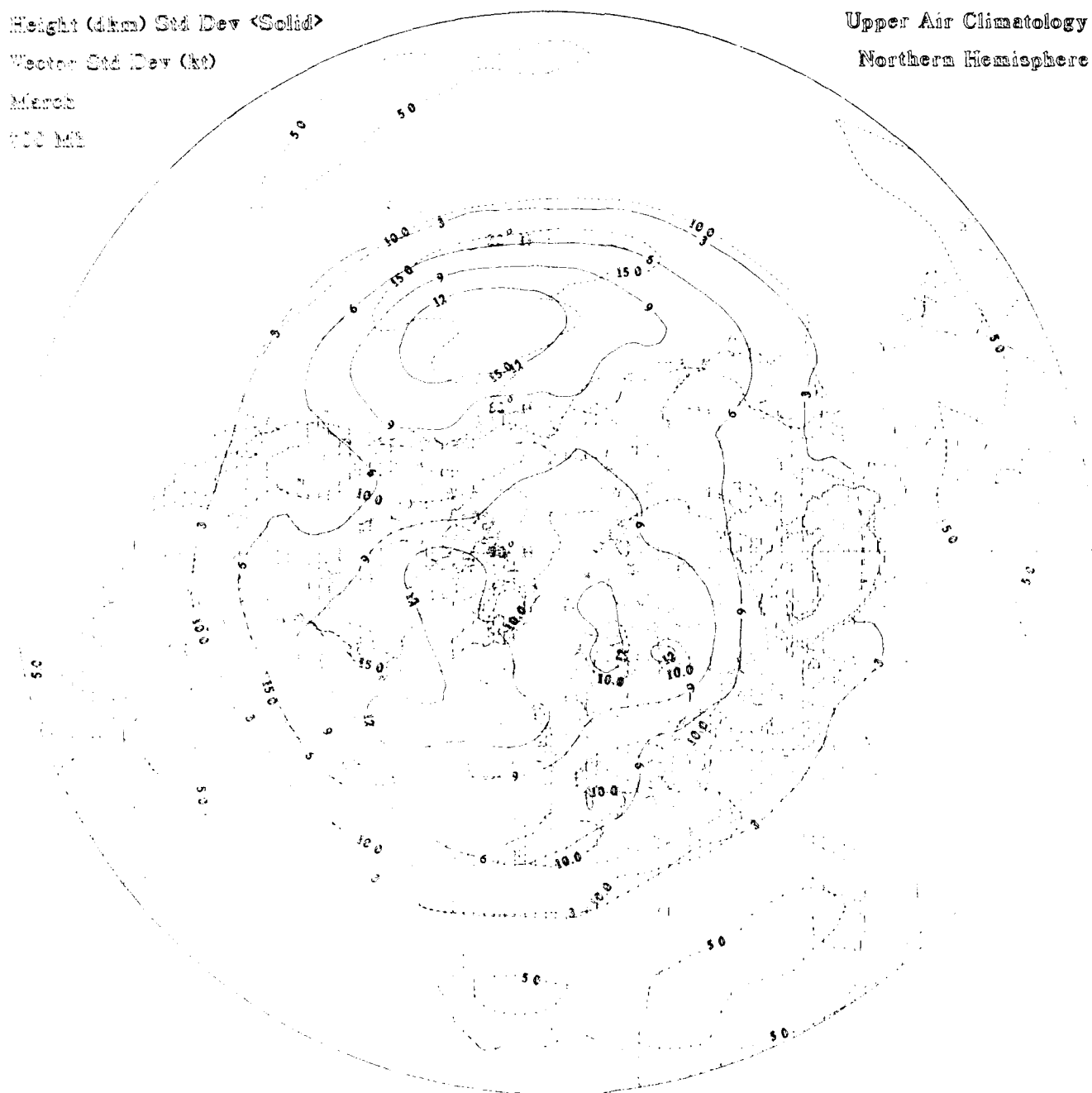
Wester Std Dev (kt)

March

700 MB

Upper Air Climatology

Northern Hemisphere



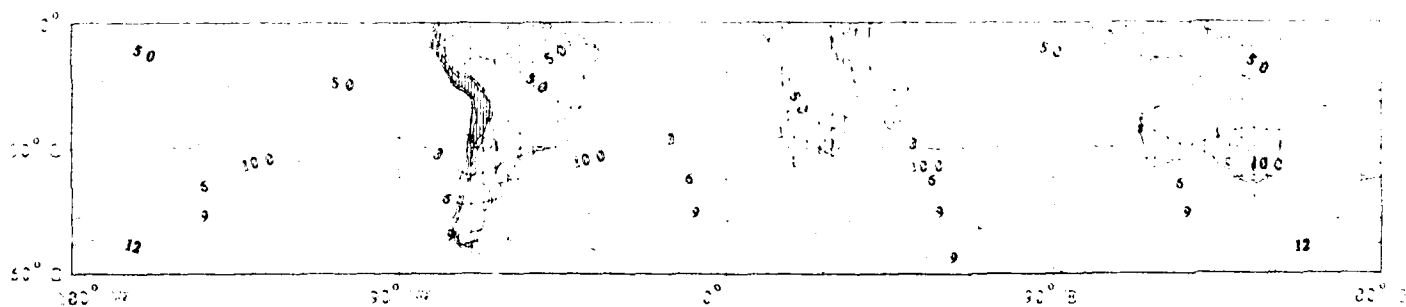
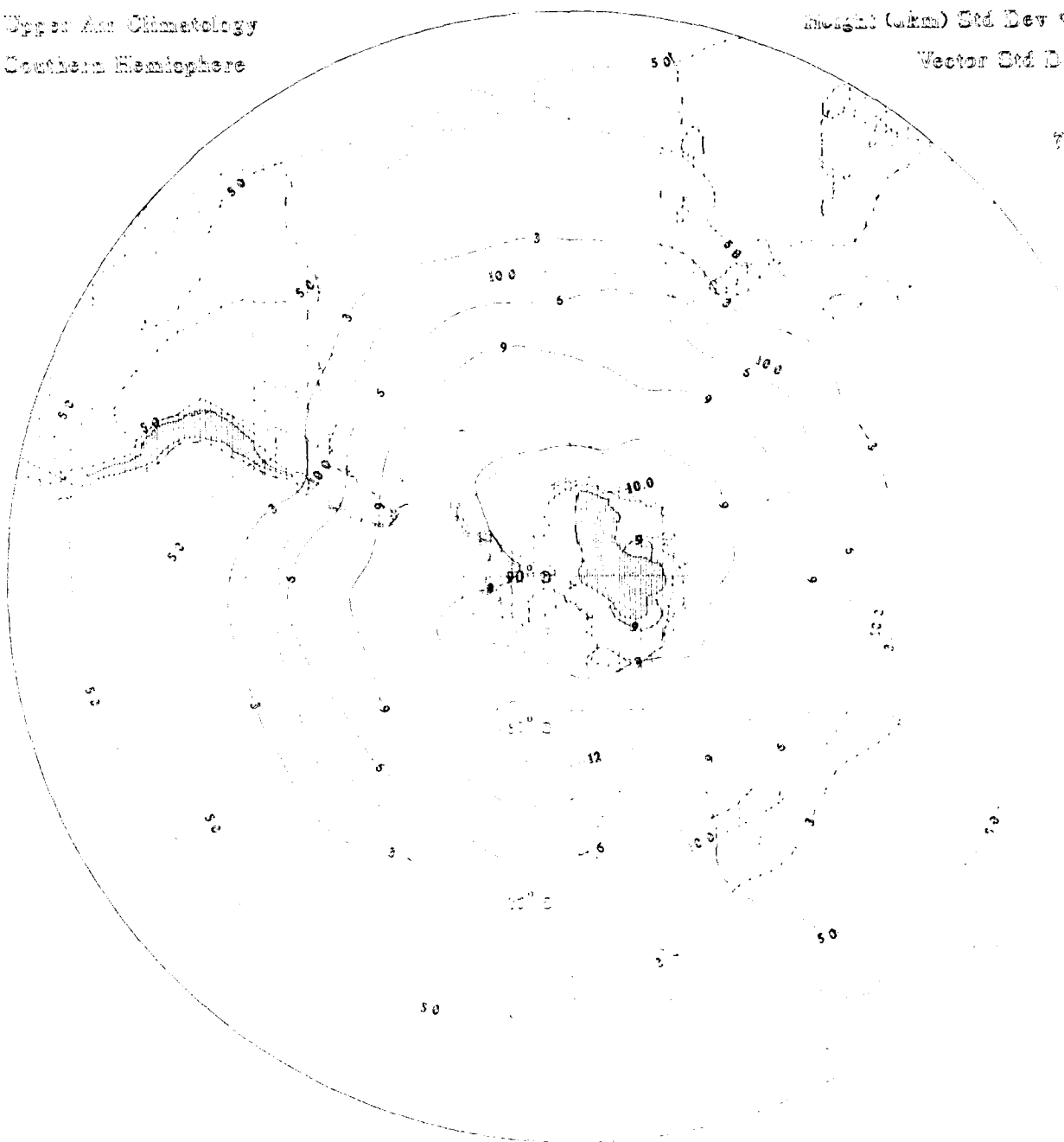
Upper Air Climatology
Southern Hemisphere

Height (gkm) Std Dev (Solid)

Vector Std Dev (ht)

March

700 mb



Height (dkm) Std Dev <Solid>

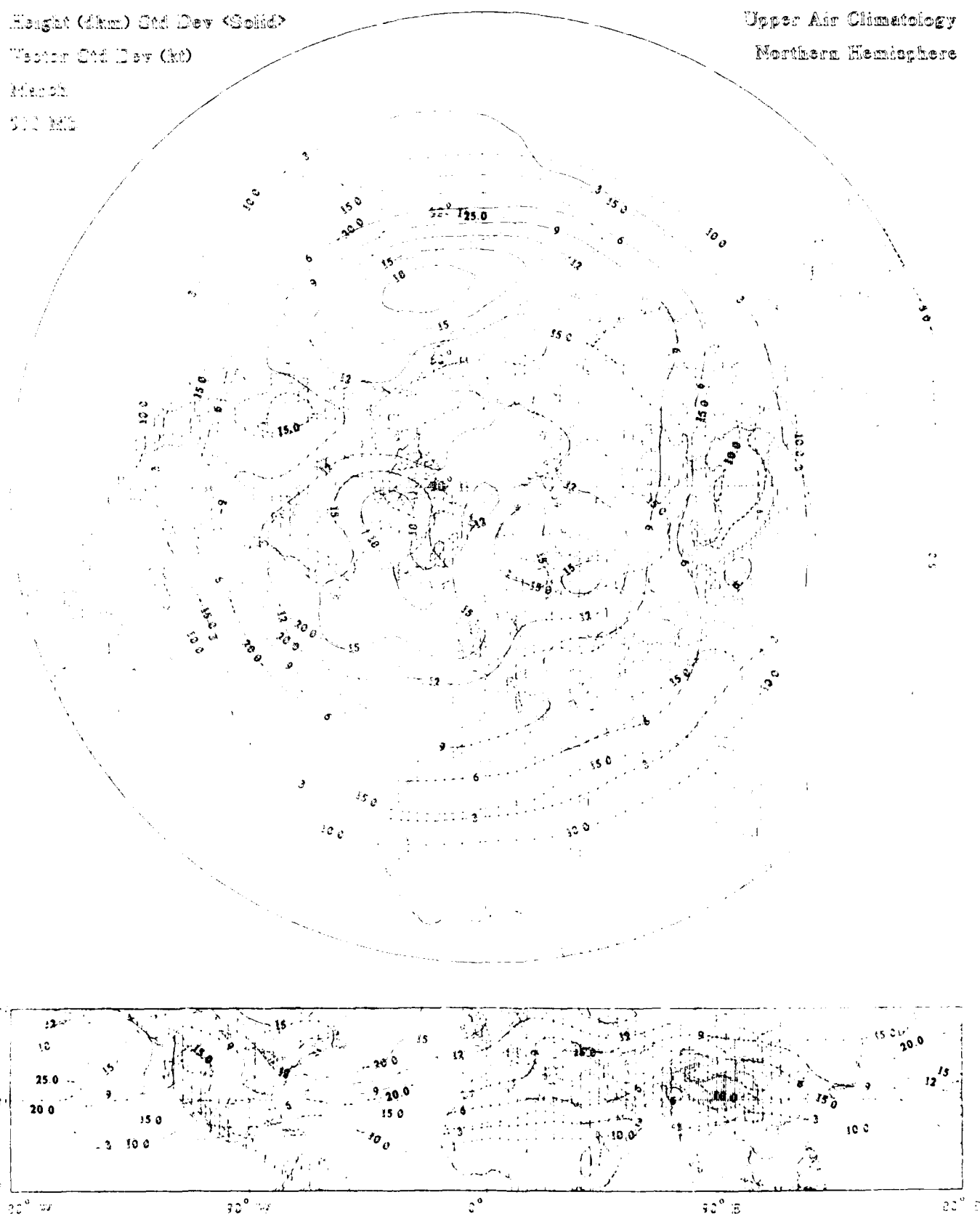
Wester Std Dev (kt)

March

500 MB

Upper Air Climatology

Northern Hemisphere



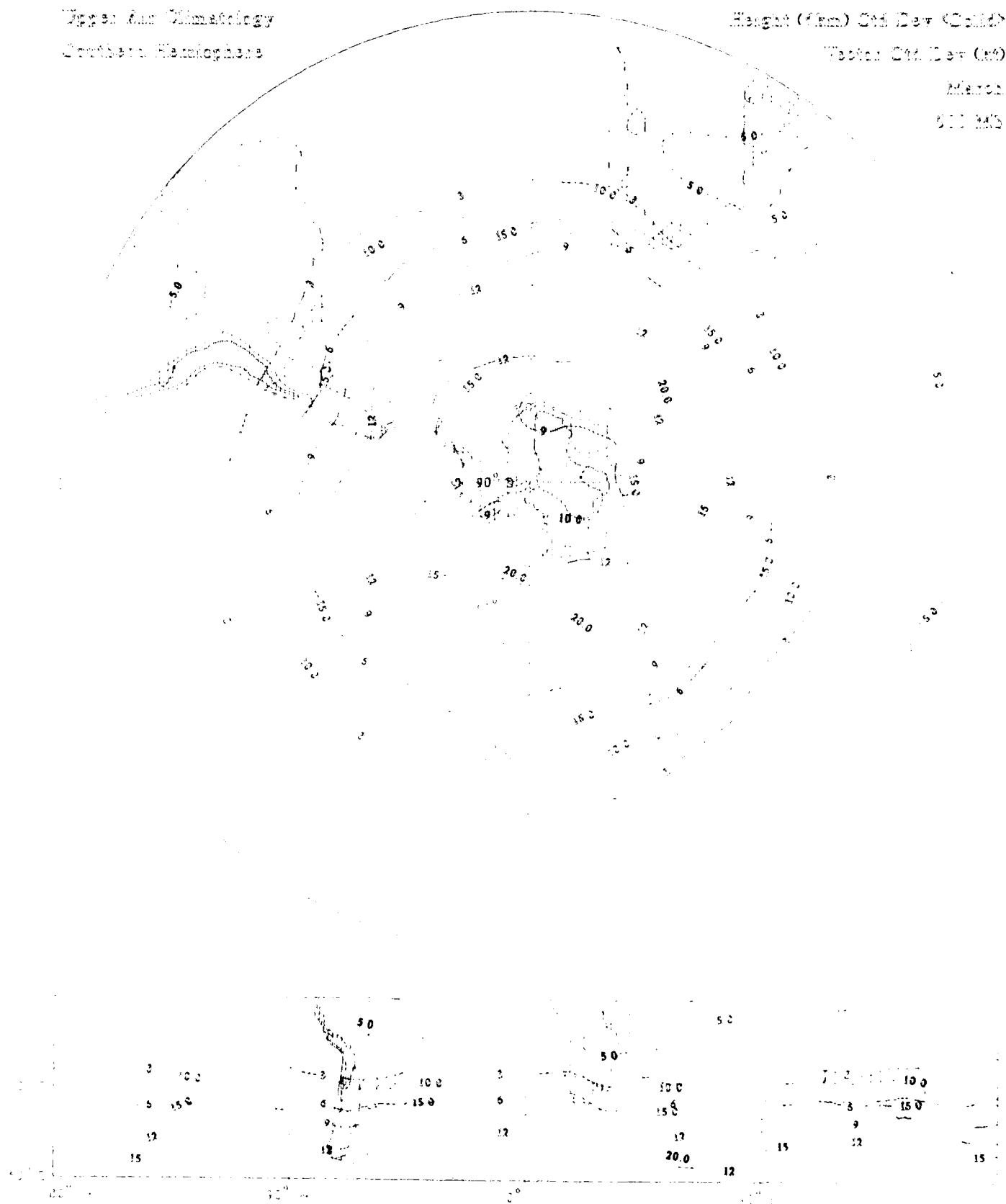
Types and Climatology
Southern Hemisphere

Height (km) Std Dev (km)

Feet Std Dev (m)

March

011 1415



Height (km) OM Dev (Solid)

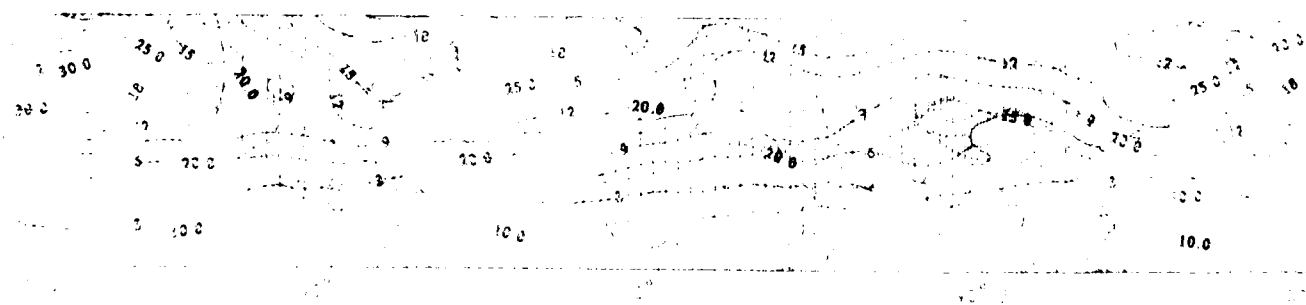
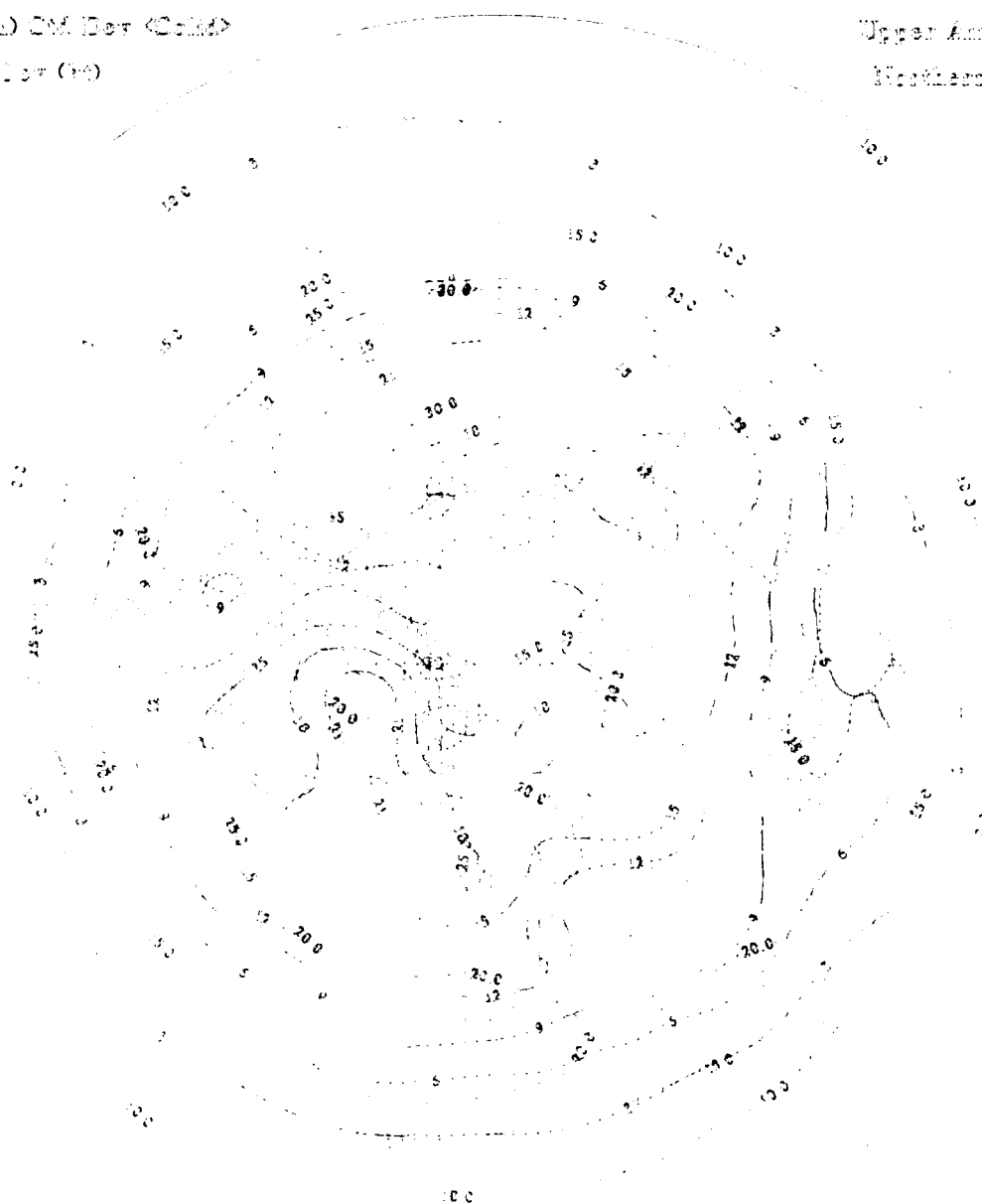
Height (km) OM Dev (Dashed)

Mean

400 200

Upper Air Climatology

Western Hemisphere



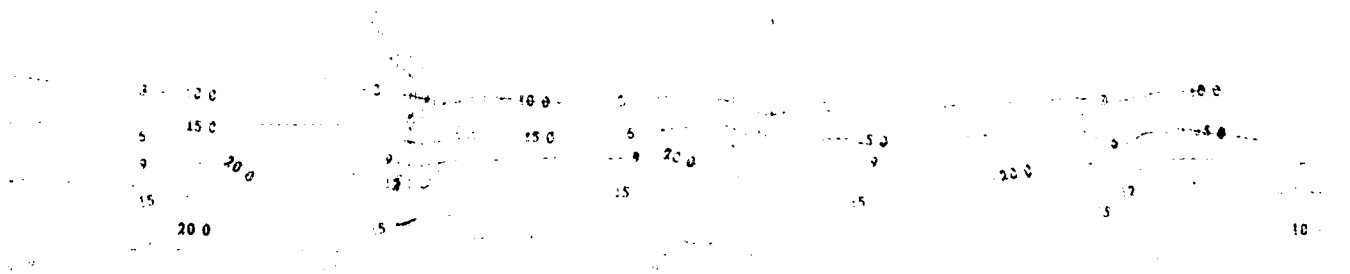
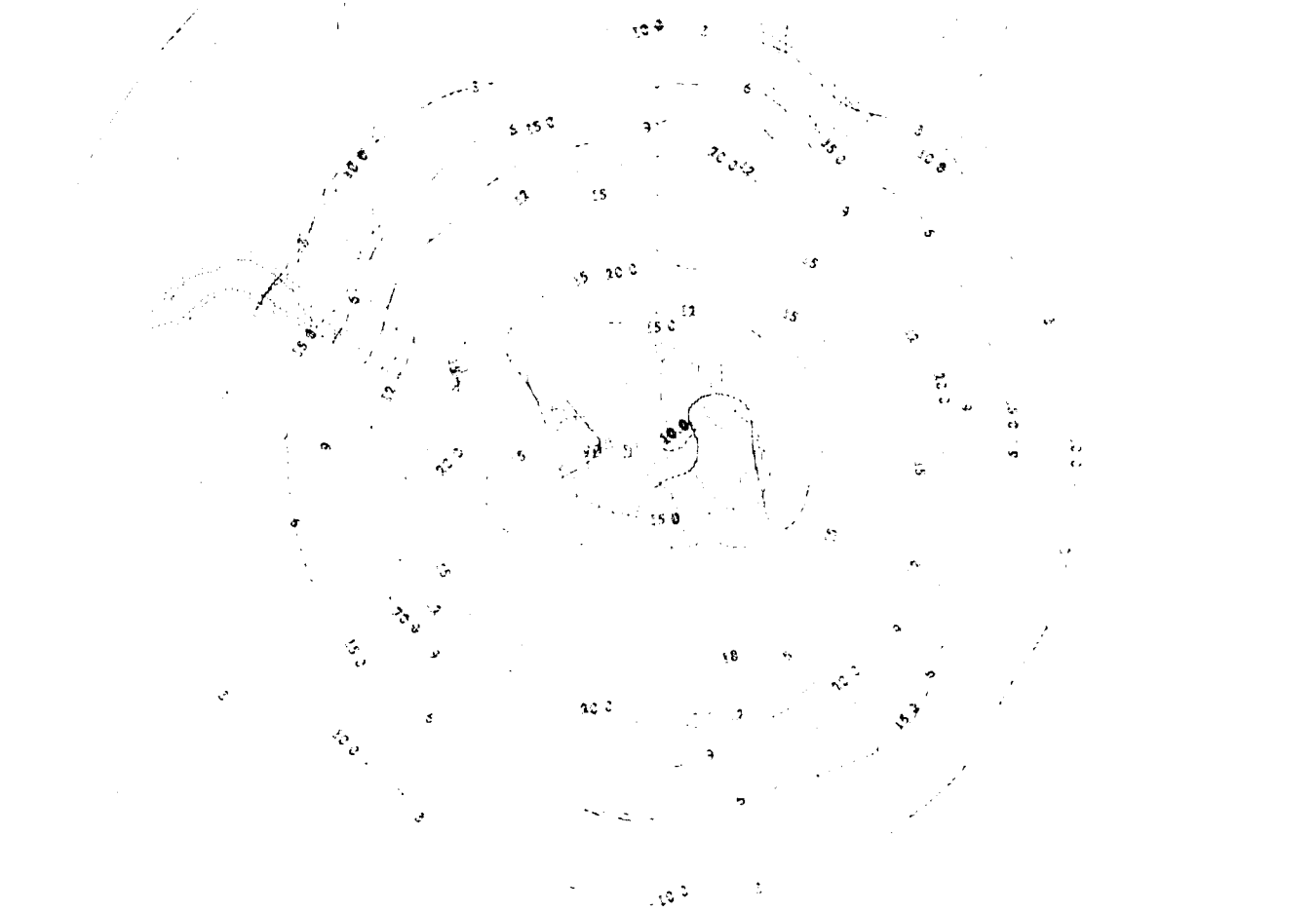
Wegpunkt 1000m
 Grotte 1000m

Heights (m) 1000m 1000m

Wegpunkt 1000m 1000m

1000m

1000m



Height (dkm) Std Dev (Solid)

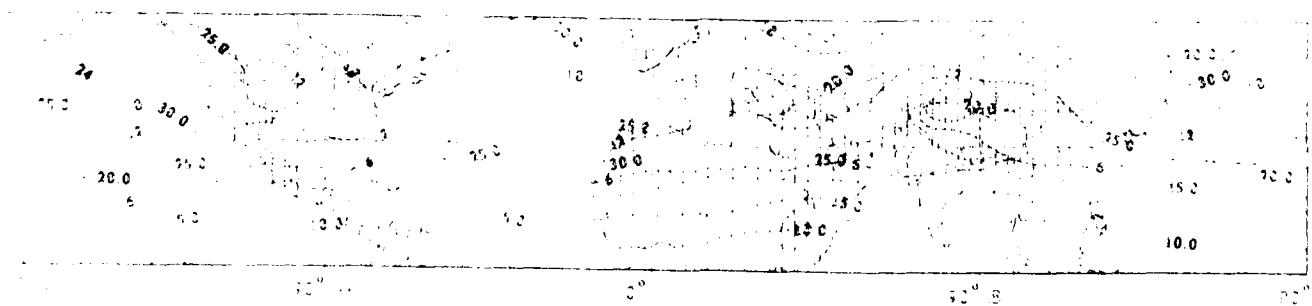
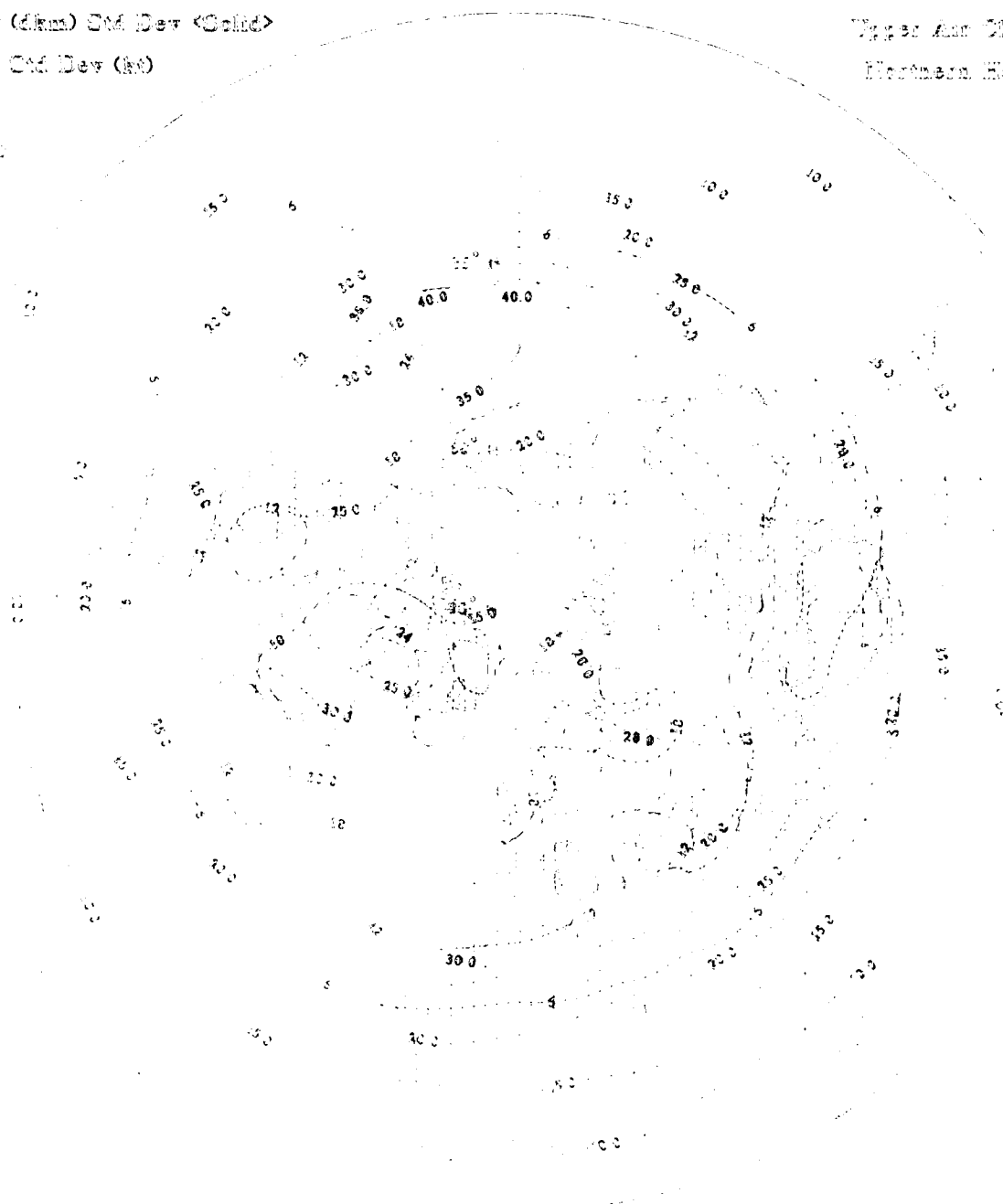
Topos Std Dev (dotted)

March

1970-1971

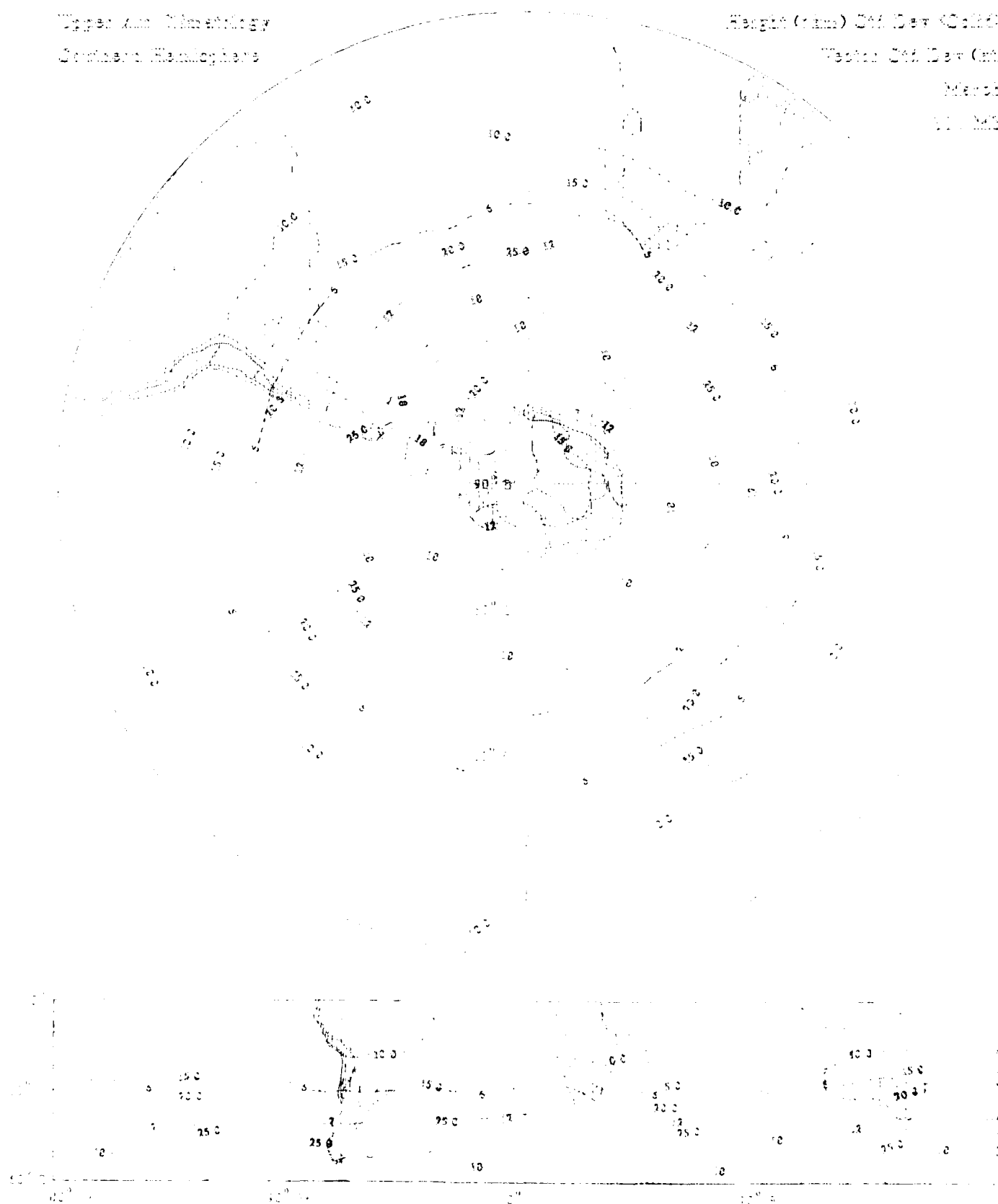
Types and Climatology

Northern Hemisphere



Upper Air Climatology
 Southern Hemisphere

Height (km) Jan Dec 1950
 Western Jan Dec (m)
 March
 11. 1950



Height (km) 0.1 Day (Solid)

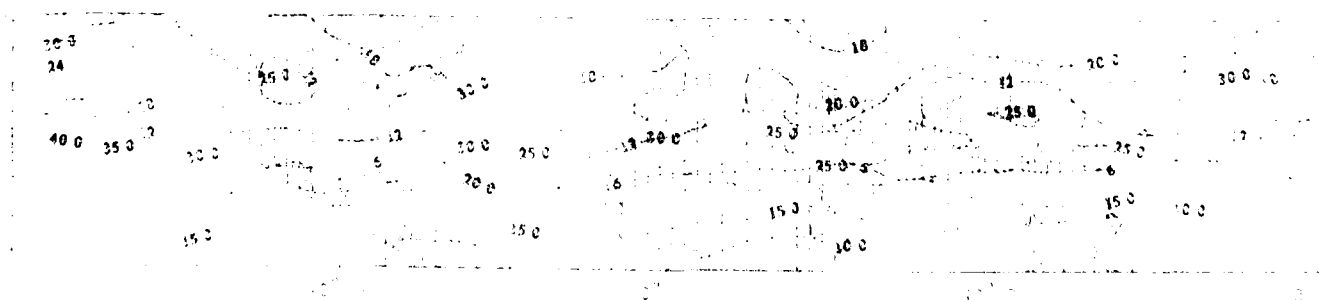
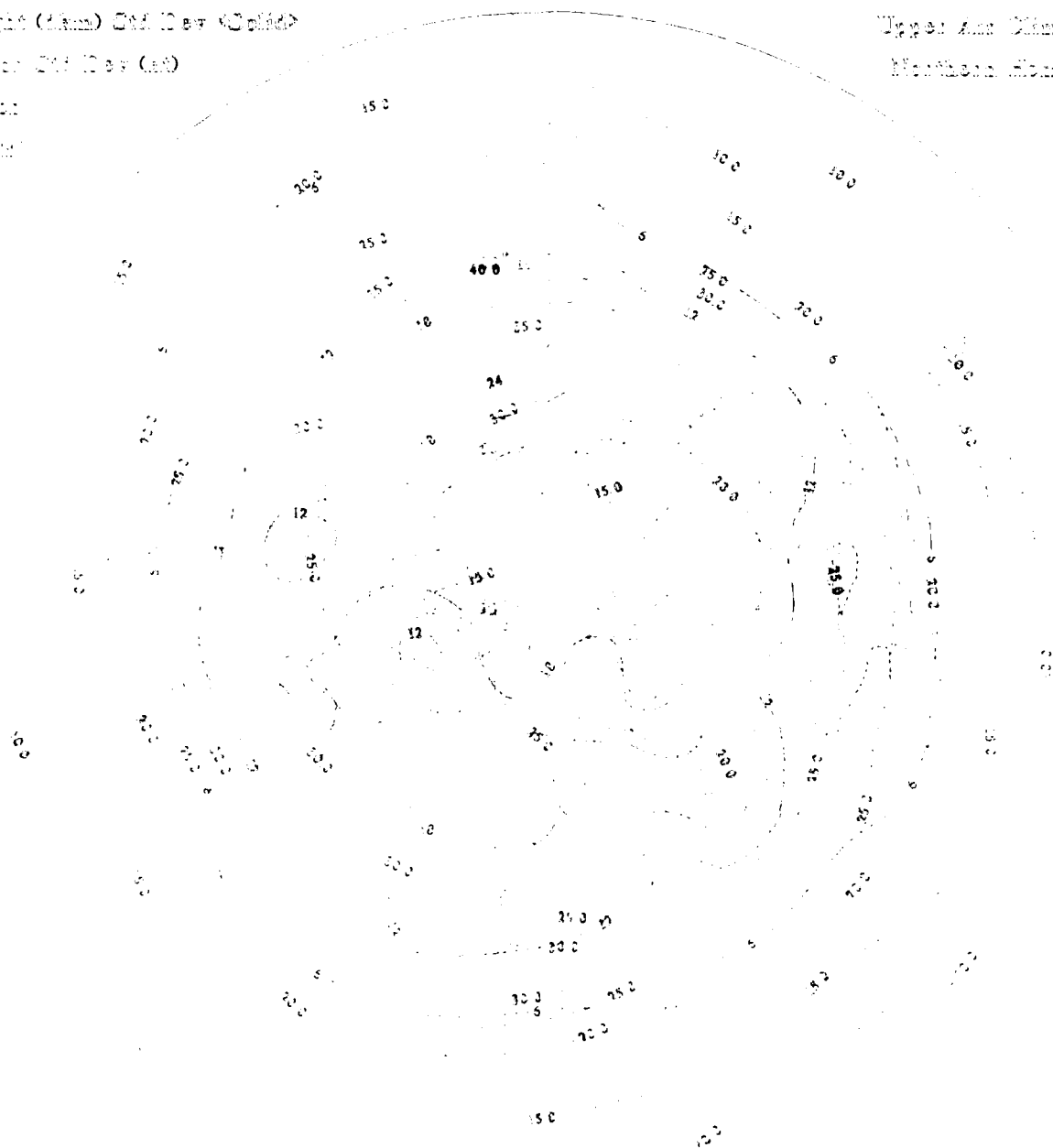
Water Day (d)

Mean

1.2

Upper Air Climatology

Northern Hemisphere



Topography
 Surface Elevation

Height (ft) of Sea Level

Water Level (ft)

Mean

1911-1912



Figure (mm) for Dec 1960

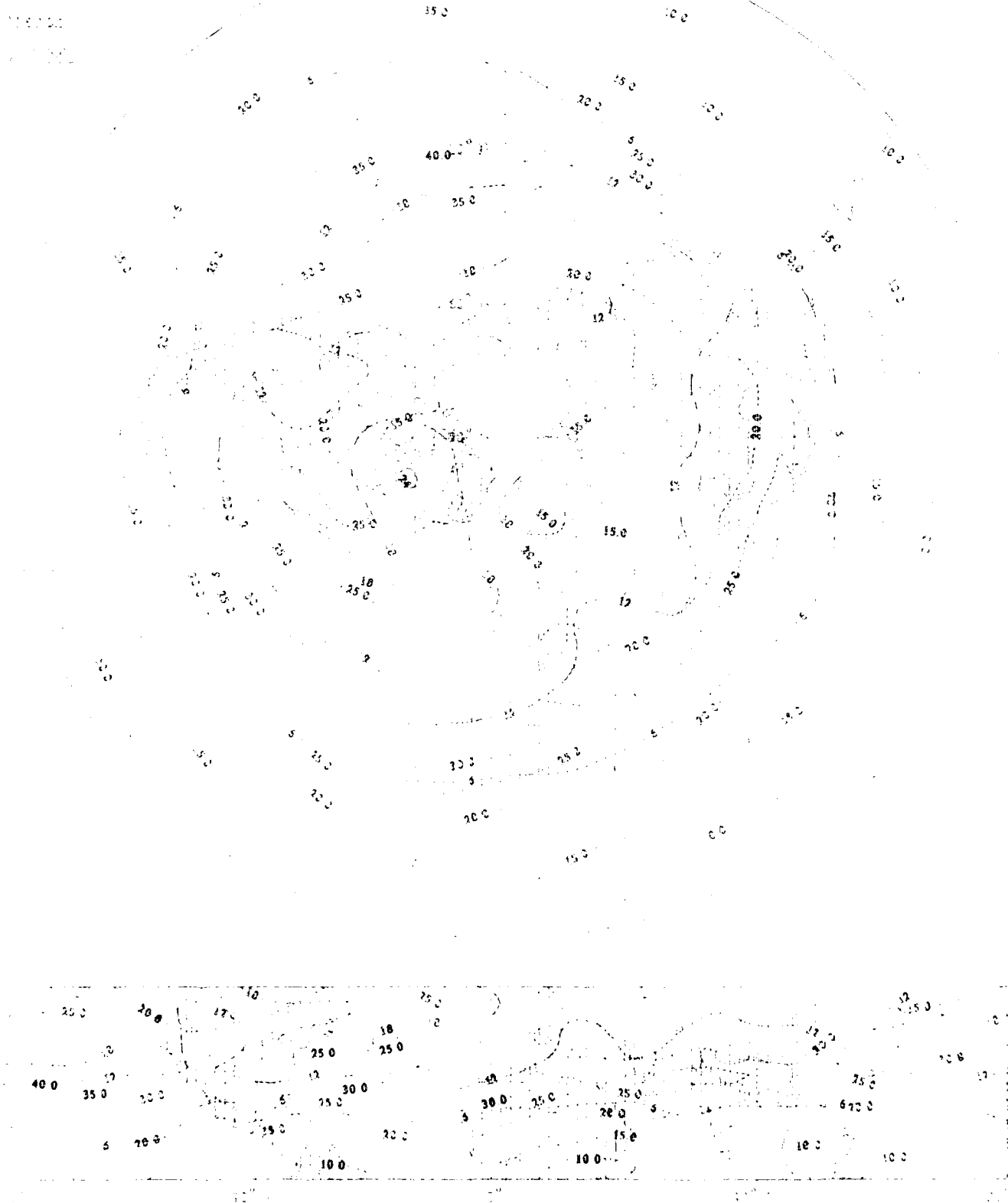
Figure (mm) for Dec 1960

Figure

Figure

Figure for Climatology

Northern Hemisphere



Upper Air Climatology
 Northern Hemisphere

Height (km) Std Dev <Solid>

Vector Std Dev (kt)

March

1951-1952



Height (km) Std Dev (Gm)

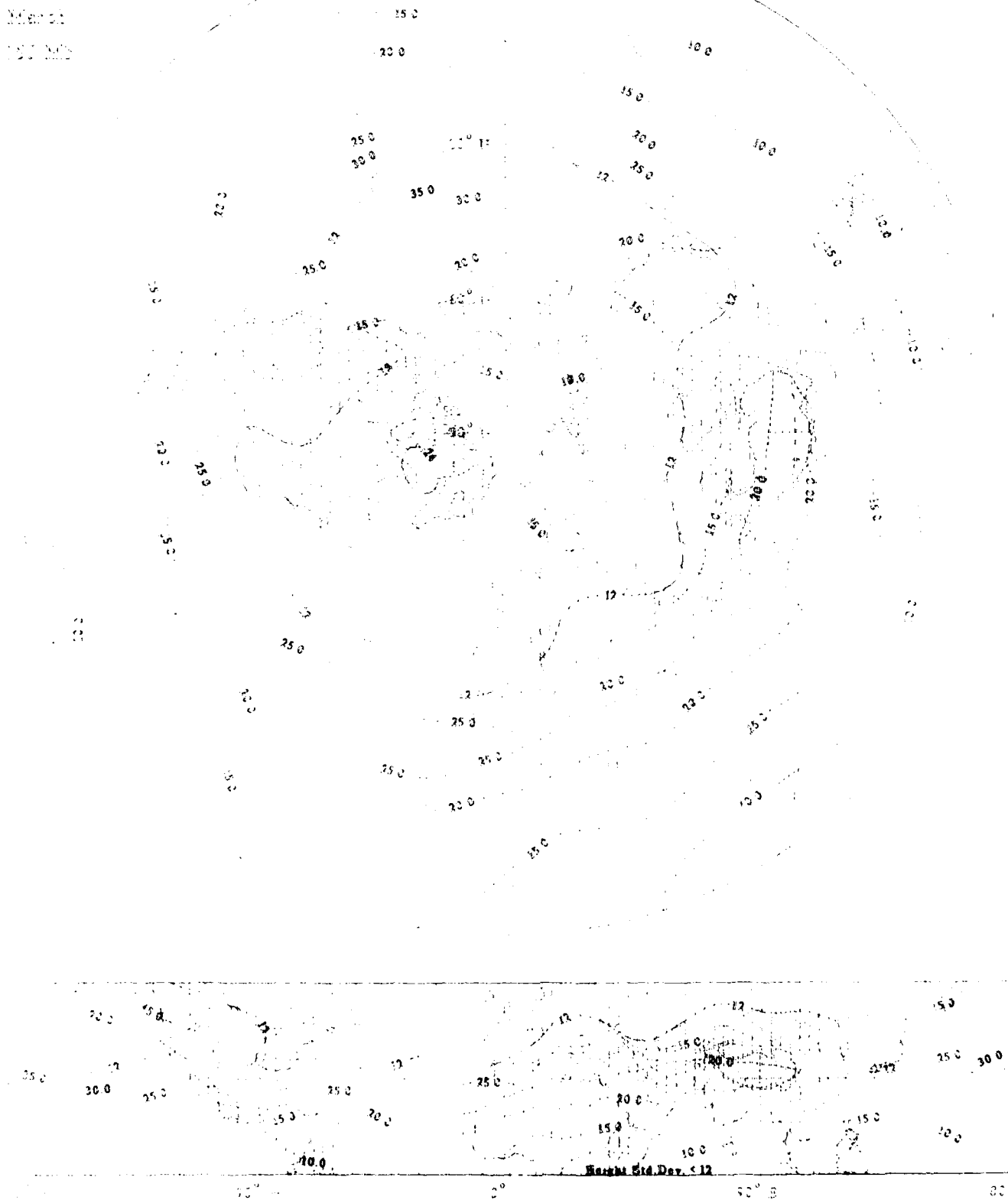
Weight Std Dev (km)

Mean

100000

Upper Air Climatology

Northern Hemisphere



Height (dkm) Std Dev <Solid>

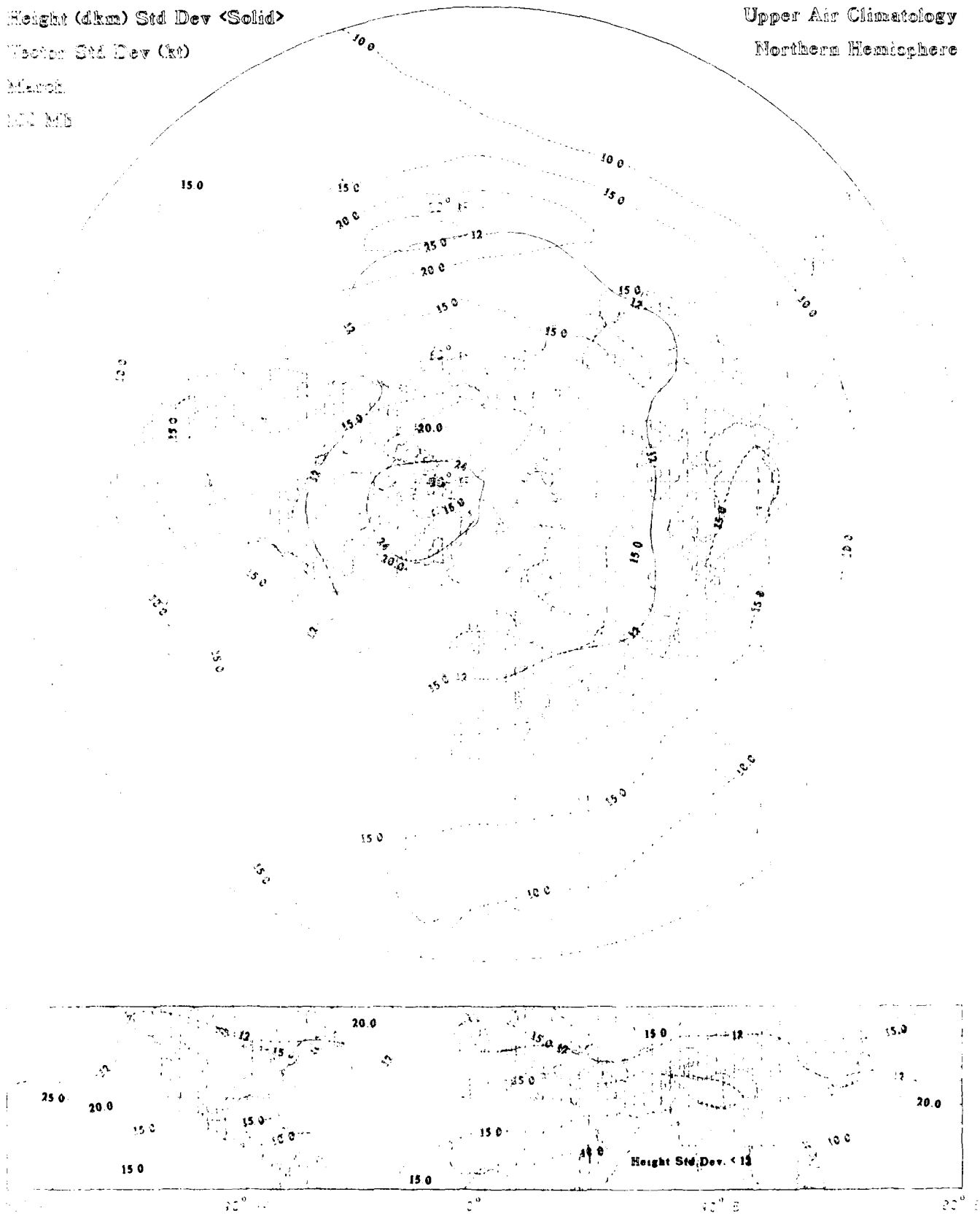
Vector Std Dev (kt)

March

100 MB

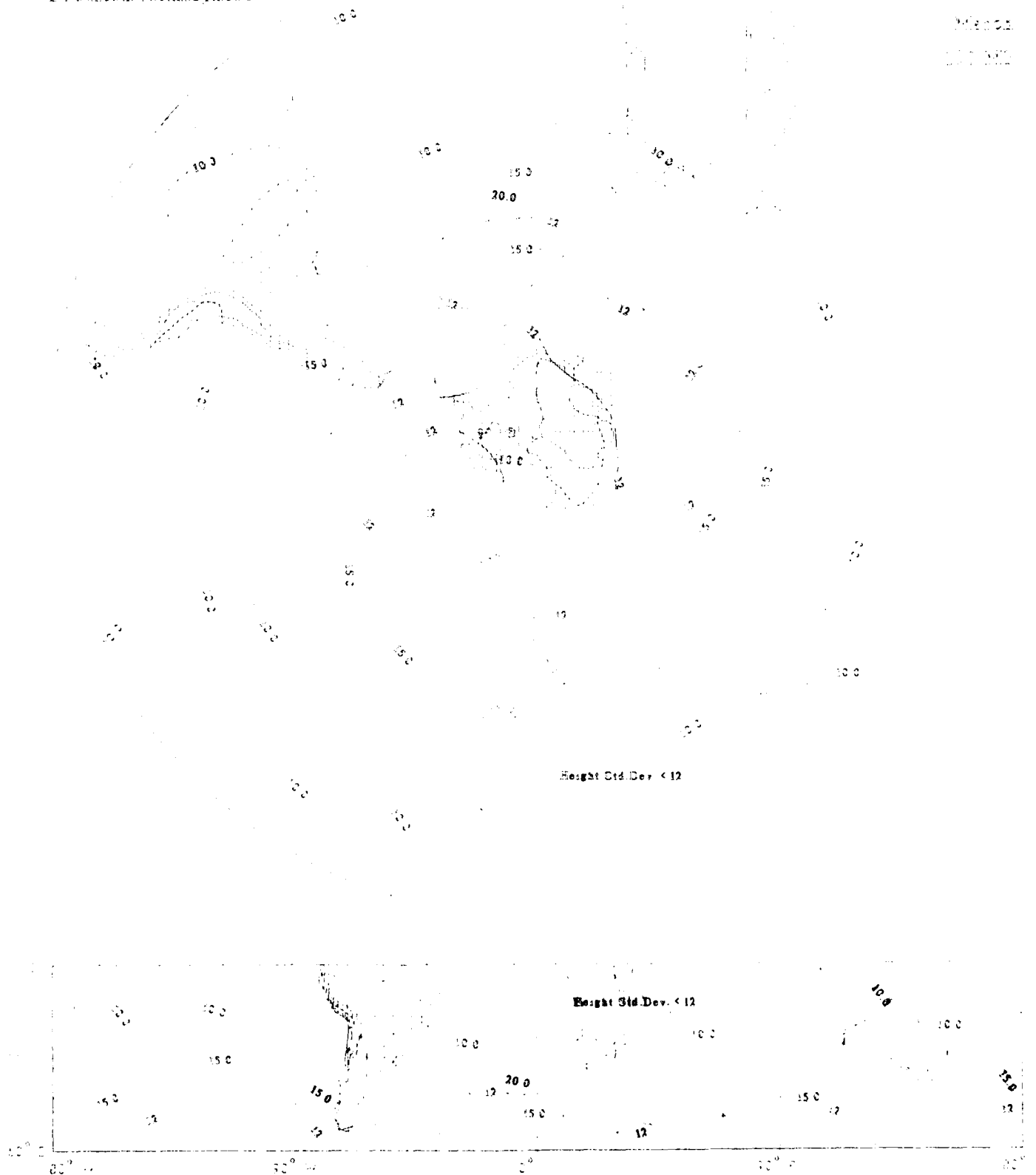
Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
 Northern Hemisphere

Height (km) Std. Dev. (km)
 10.0
 15.0
 20.0



Height (dkm) Std Dev <Solid>

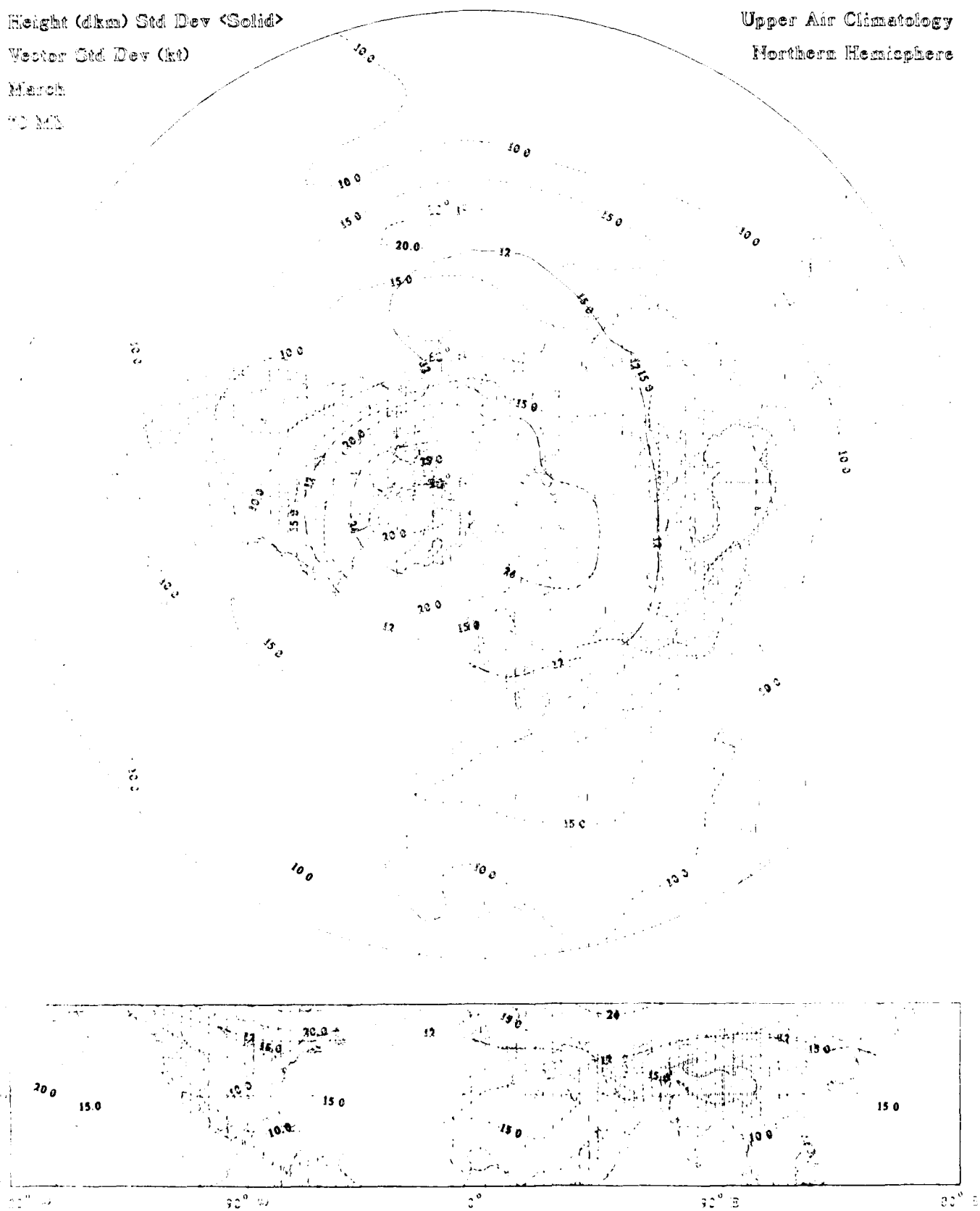
Vector Std Dev (kt)

March

70 MB

Upper Air Climatology

Northern Hemisphere



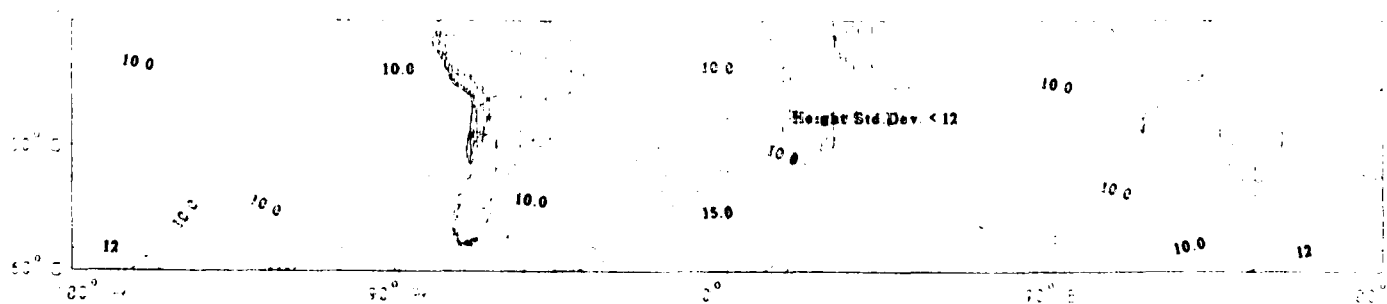
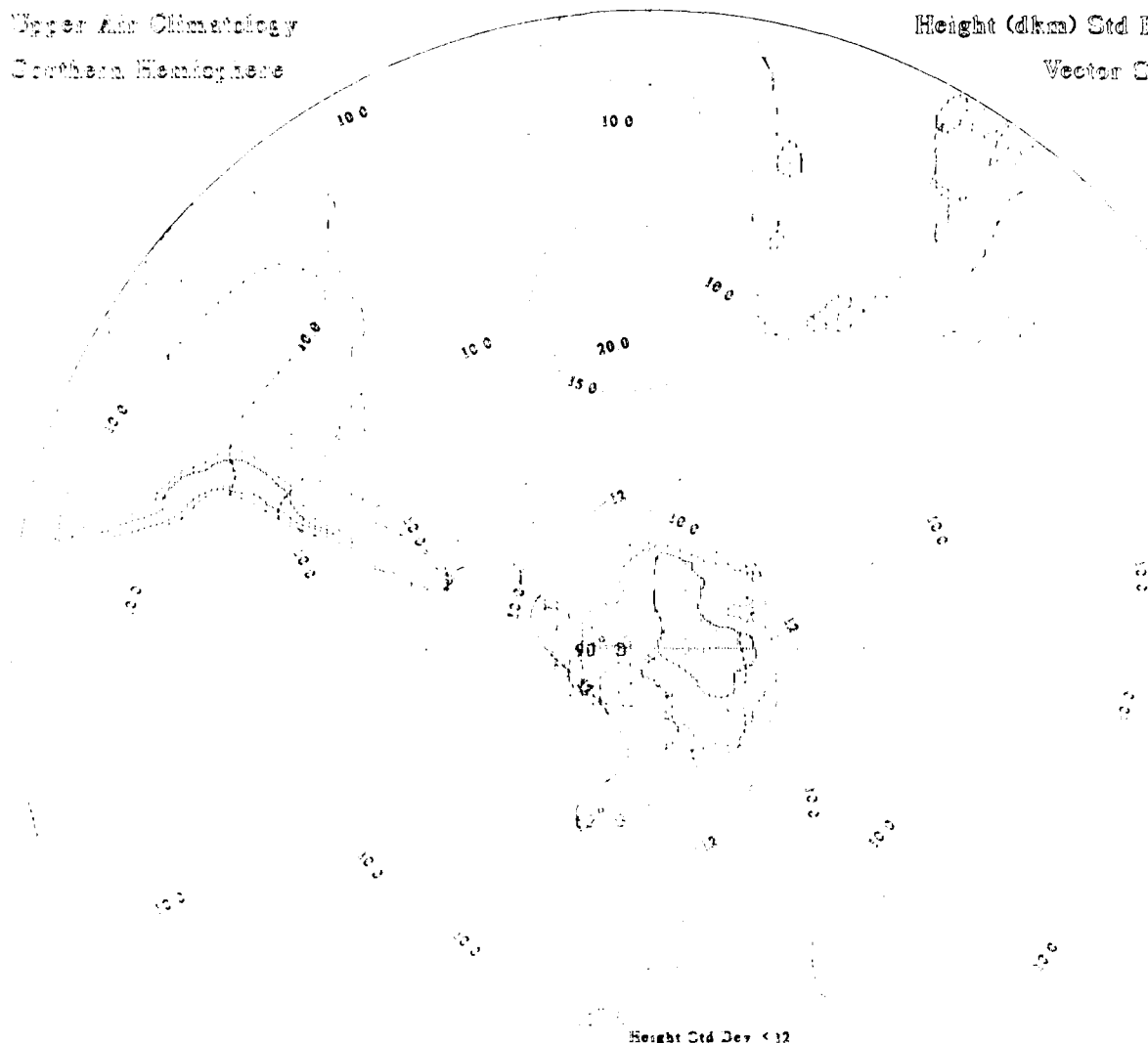
Upper Air Climatology
Southern Hemisphere

Height (dkm) Std Dev <Solid>

Vector Std Dev (kt)

March

70 MB



Height (km) and Dew (mm)

Water (mm) and (mm)

Water

Water

Upper and Lower

Water and Dew

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Topographic Map
 of the Hawaiian Islands

Height (ft.) Dist. Dev. (mi.)
 Width Dist. Dev. (mi.)
 Meron
 10000



Height (hkm) Std Dev (Solid)

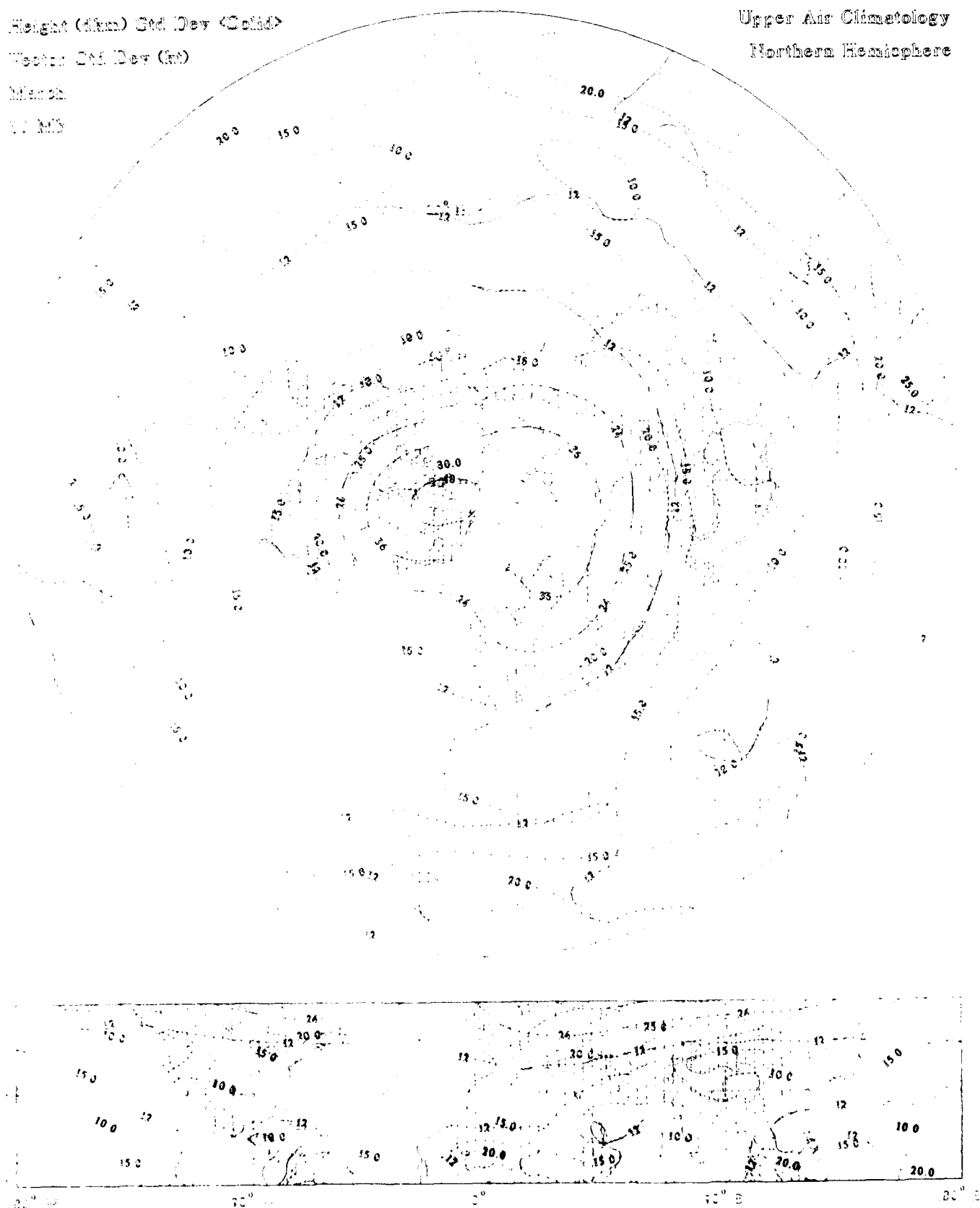
Wester Std Dev (dashed)

March

10 AM

Upper Air Climatology

Northern Hemisphere



Upper Air Climatology
Southern Hemisphere

Height (dkm) Std Dev <Solid>

Vector Std Dev (m)

March

10 MB

