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CLIMATIC ENVIRONMENT OF THE EAST SLOPE OF THE COLORADO FRONT RANGE

Roger G. Barry

Final Report to the National Science Foundation

Washington, D.C.

Grant Number, GA-15528

1972

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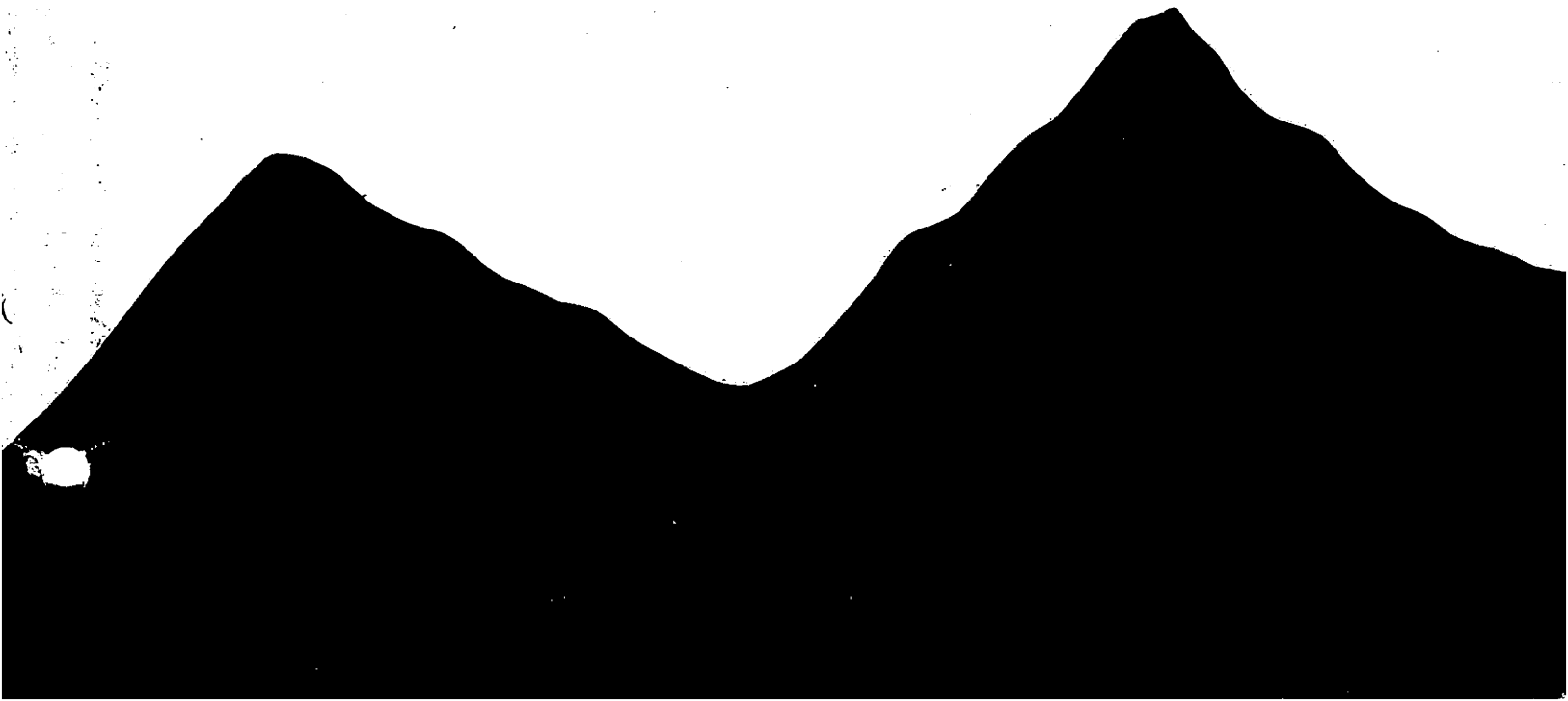

CLIMATIC ENVIRONMENT OF THE EAST SLOPE OF THE COLORADO FRONT RANGE

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Final Report, NSF Grant GA-15528

Atmospherical Science Section

National Science Foundation

Occasional Paper No. 3

Institute of Arctic and Alpine Research

University of Colorado

Boulder, Colorado, 80302

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ABSTRACT

Climatic data for 1952-70 collected at four stations at ridge sites on the east slope of the Front Range in Colorado (40^{o}N, 105^{o}W) between 7,200 and 12,300 ft. are analyzed using an information retrieval system (TAXIR).

The principal results show: (1) no significant change in annual totals of solar radiation between 8,500 and 12,300 ft. (2) annual precipitation increases from about 22 in. at 7,200 - 8,500 ft. to 40 in. at 12,300 ft. (3) there is a decreasing difference with elevation between temperatures at sites with different exposure. Temperature records were also examined with respect to time trends, return periods and the possible occurrence of singularities.

A daily classification of circulation types was determined using Lund's correlation method for 700 mb heights and 700 mb height deviations from the monthly mean. These and other descriptors of 700 mb conditions over Denver were used in synoptic climatological analyses of temperature and precipitation data.

An assessment of computational and related costs indicates that the TAXIR approach is at least comparable with a conventional computer analysis apart from its other advantages.

1. INTRODUCTION

The objective of this study is an analysis of climatological data from stations maintained by the Institute of Arctic and Alpine Research on the east slope of the Colorado Front Range since October 1952. The four principal stations are located in the Lower Montane Forest (A-1 at 2195 m), the Upper Montane Forest (B-1 at 2591 m), the Sub-Alpine Forest[1] (C-1 at 3048 m) and the Alpine Tundra (D-1 at 3750 m) belts. Figs. 1 and 2 show their location and relationship to the Continental Divide.

Ecological descriptions of the four vegetation climax belts are given by Marr (1961) who also provided a preliminary analysis of the climatological observations for October 1952-September 1953. For this 12 month period, observations were kept at four sites in each of the four altitudinal belts - north-facing and south-facing slopes, valley floor and ridge top sites. The stations operated continuously since October 1952 are at the ridge sites. Details of all the sites may be found in Marr (1961). The daily data from the sixteen stations are tabulated in Marr (1967) and the data for the four principal stations are similarly tabulated for 1953-58 in Marr et al. (1968A) and for 1959-64 in Marr et al. (1968B). No thorough climatological study of these data was carried out prior to this investigation and much of the data for 1966-70 had not been abstracted from the original chart records.

The general aims of the present study were:

1. to organize the available climatological data (up to September 1970) into data banks suitable for computer manipulation and to establish a system which would allow new information to be added to the banks

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[1] Löve (1970) recommends that the term "subalpine" refer only to the forest-tundra ecotone (between C-1 and D-1). The three belts would then be submontane (A-1), middle montane (B-1) and upper montane forest (C-1).

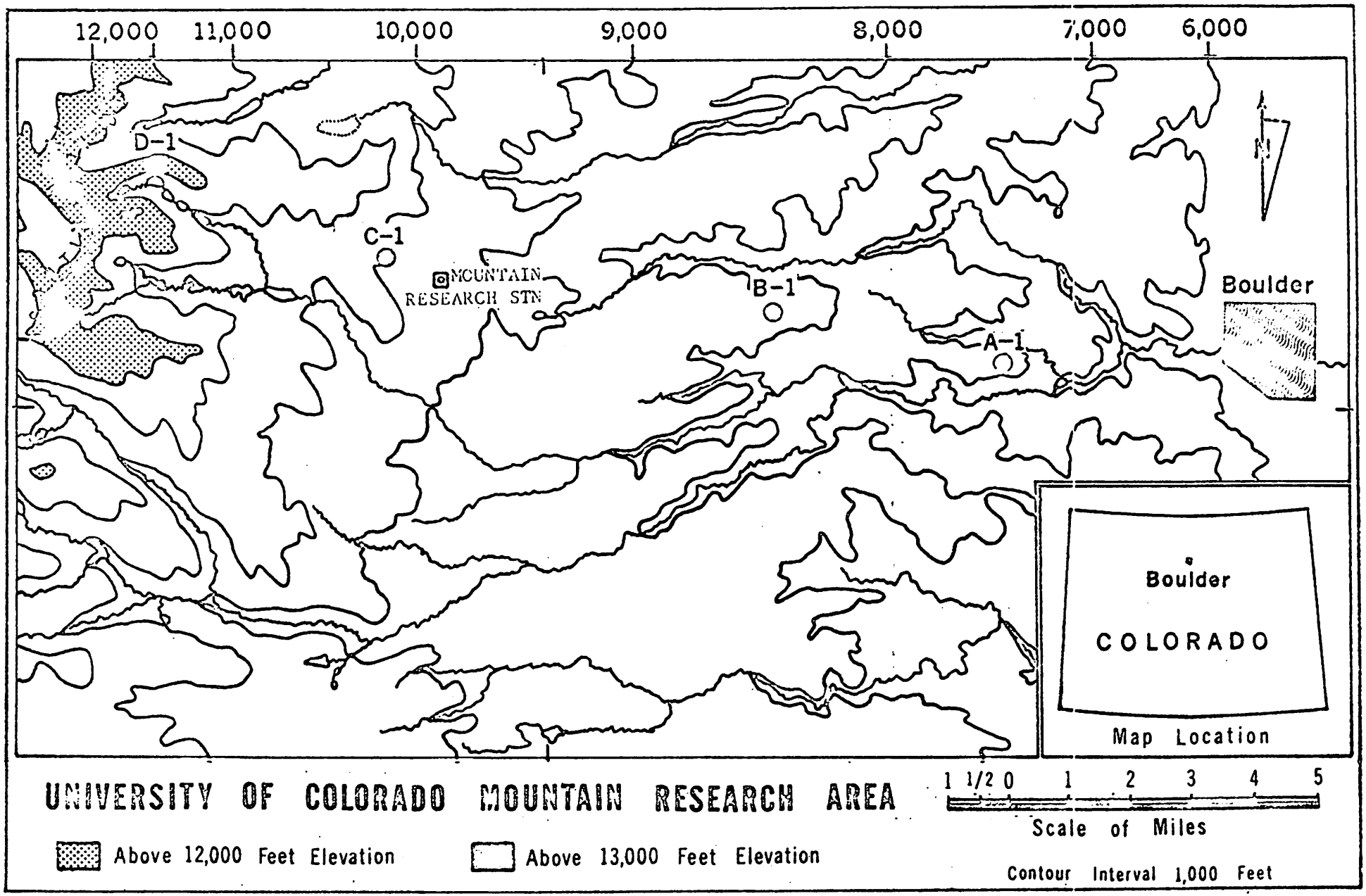
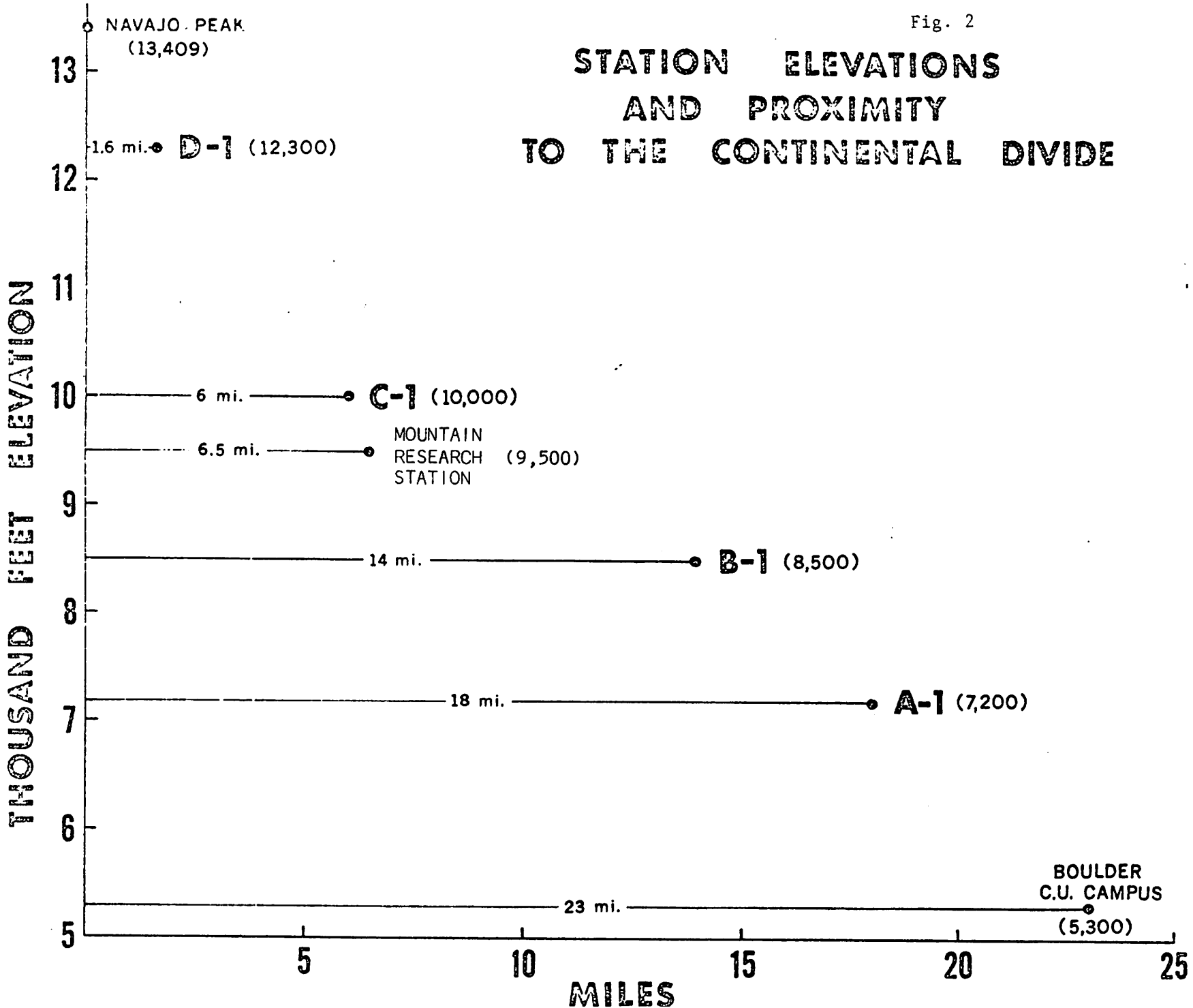

12,000
11,000
10,000
9,000
8,000
7,000
6,000
D-1
C-1
MOUNTAIN
RESEARCH STN
B-1
A-1
Boulder
N
Boulder
COLORADO
Map Location
UNIVERSITY OF COLORADO MOUNTAIN RESEARCH AREA
1 1/2 0 1 2 3 4 5
Scale of Miles
Above 12,000 Feet Elevation
Above 13,000 Feet Elevation
Contour Interval 1,000 Feet

Fig. 1

Fig. 2

STATION ELEVATIONS AND PROXIMITY TO THE CONTINENTAL DIVIDE



2. to incorporate suitable descriptors of the regional circulation characteristics into the data banks for synoptic climatological studies
3. to develop the TAXIR information storage and retrieval system as a general tool for climatological analysis and to evaluate its effectiveness in this context.

Other specific problems which were considered are discussed in the sections dealing with results.

2. METHODS

Data Banks and the TAXIR System

TAXIR (Taxonomic Information Retrieval) is an information storage and retrieval system designed for general use on digital computers by D. J. Rogers and associates under NSF GN-656. Its mathematical basis of boolean operations is described by Estabrook and Brill (1969). Practical aspects, as developed under the present grant, are detailed in a primer (Brill, 1971).

The development of a data bank involves three steps:

1. the determination of appropriate descriptors (i.e., climatic parameters and other characteristics)
2. the selection of an item identification scheme (e.g., station - day)
3. the description of each item in the bank in terms of the appropriate state of each descriptor and the assignment of item identifications.

The dimensions of the banks in terms of computer storage had to be taken carefully into account in order to optimize the costs of subsequent data retrieval and analysis.

Four data banks were constructed:

1) Daily, Sixteen Station Bank for October 1952-September 1953

2) "Weekly" Bank for 1952-1964

3) Daily Bank, Part 1, 4 stations, for 1952-64

4) Daily Bank, Part 2, 4-6 stations, for 1962-70 (with space to ca. 1976).

The descriptors contained in each of these are listed in Tables 2.1 and 2.2. The instrumentation and observing practices relating to the observational data are set out in Appendix 1.

The selection of the parameters for the data banks was determined by first, the available data; second, parameters such as mean and range which could be derived from the first by simple arithmetic in a data conversion program prior to entry in the bank; and third, synoptic parameters which were chosen to provide a convenient characterization of atmospheric conditions (large-scale and local) over the area.

Table 2.1 List of Descriptors in Daily Banks

* = Part 2 only

Descriptor	Descriptor States	Description
STATION	6	
YEAR	(15)*	
MONTH	12	
DAY	31	
TMAX	127	Daily maximum temperature (^{o}F)
TMIN	126	Daily minimum temperature (^{o}F)
*TEMP V	3	Temperature data reliability (valid, estimated, doubtful)†
TMEAN	121	Daily mean temperature
TRANGE	63	Daily (maximum-minimum) temperature
RHMAX	101	Daily maximum relative humidity (%)
RHMIN	101	Daily minimum relative humidity
RH V	3	Humidity data reliability
RHMEAN	101	Daily mean relative humidity
RH RANGE	101	Daily (maximum-minimum) relative humidity
*RAD	101	Daily solar radiation total (10 ly)
*RAD V	3	Radiation data reliability
*PRECIP	511	Daily precipitation (hundredth inch)
*PRECIP V	3	Precipitation data reliability
*WIND	127	Mean daily speed (m.p.h.)
*GUST	201	Peak gust (m.p.h.)
DEN T	62	700 mb Denver temperature, 12 GMT (^{o}C)
DEN RH	101	700 mb Denver relative humidity, 12 GMT (%)
DEN DIR	37	700 mb Denver wind direction (ten degrees)
DEN VEL	63	700 mb Denver wind speed (m s^{-1})
FL	351	Height of Denver freezing level (10 m)
UA 1	31	700 mb statistical type (heights)
UA 2	31	700 mb statistical type (height anomaly)

† Daily Part 1 has TMAX V and TMIN V instead of TEMP V.

Table 2.2 List of Descriptors in "Weekly" Bank

STATION	
YEAR	
MONTH	
DAY	
DURATION	Interval (days) since last servicing
TMAX	Maximum temperature (^{o}F) since last servicing
TMAX V	Reliability of maximum temperature data
TMIN	Minimum temperature since last servicing
TMIN V	Reliability of minimum temperature data
TRANGE	Temperature range since last servicing
RAD	Solar radiation total (10 ly) since last servicing
RAD V	Radiation data reliability
PRECIP	Precipitation since last servicing (hundredth inch)
PRECIP V	Precipitation data reliability
SOIL MAX 1	Maximum soil temperature at 6 " (^{o}F) since last servicing
SOIL MIN 1	Minimum soil temperature at 6 " (^{o}F) since last servicing
SOIL RANGE 1	Range of soil temperature at 6 " (^{o}F) since last servicing
SOIL MAX 2	Maximum soil temperature at 12 " (^{o}F) since last servicing
SOIL MIN 2	Minimum soil temperature at 12 " (^{o}F) since last servicing
SOIL RANGE 2	Range of soil temperature at 12 " (^{o}F) since last servicing
WIND	Mean speed since last servicing (m.p.h.)
SNOW DEPTH	Inches

Descriptors of the Regional Circulation

It was originally planned to use the synoptic classification catalog developed by Sands (1966) for the western United States. Punched card data on this were borrowed from the Geography Department, University of Denver. The catalog is tabulated on a daily basis for 1958-63 and gives the "features of circulation" present in the sector (approximately) 25^{o}-50^{o}N, 80^{o}-130^{o}W, at the surface and 500 mb level.

Analysis by W. A. R. Brinkmann showed that the classification was not suitable for present purposes. For a given day, all features within the defined sector are recorded, regardless of their intensity and exact location. Thus, it was impossible to isolate the one or two systems which might be dominating the local circulation without reexamination of all the original daily pressure and contour maps.

It was decided that, in order to obtain a consistent catalog of daily circulation types for the 18 year period, a quasi-objective typing procedure suitable for computer analysis would have to be used. The method of Lund (1963) was adopted as being most suited to the available data. It operates as follows:

1. the correlation coefficient (r) between all pairs of 700 mb contour maps for 12 GMT each day of a given month are calculated using grid-point height values.
2. the day which has the largest number of days correlated with it for r values above a selected threshold is regarded as the pattern for type 1 and this group is extracted from the matrix.

3. the next largest group, type 2, is similarly determined and extracted from the matrix and this process is repeated until no groups with more than 5 cases remain. If two groups are of equal size, the first one encountered in date sequence is extracted.
4. after the groups have been removed, days remaining unassigned were checked as to which other dates they correlated with (above the threshold value). If a majority of these matched dates had been allocated to a single group, the day in question was added to the group.

The input data were for a 31 point diamond grid (Fig. 2.1) between 20^{o}-60^{o}N and 95^{o}-125^{o}W. 700 mb height data were obtained from National Weather Records Center, Asheville, for 1952-65. For 1966-70, data for the NMC octagonal grid were kindly made available through the National Center for Atmospheric Research, Boulder, and heights were interpolated to the 31 point grid using a 16 point interpolation scheme developed by Dr. R. Jenne, NCAR. The grid size may be compared with one of 52 points for 30^{o}-60^{o}N, 100^{o}-150^{o}W used by Augulis (1969) for the 500 mb level and one of 12 points (6 of them interpolated) for a 10^{o} latitude, 15^{o} longitude sector for the surface and 700 mb level by Hartranft et al. (1970). The extent of the grid determines what circulation features will be represented. With a relatively large area being considered, the problem may arise of a high overall correlation between two maps, but with pronounced local anomalies affecting a few grid points. In order to try and circumvent this, without going to a regional scale typing scheme, it was decided to calculate correlations (as above) using the anomaly field for each day with respect to the mean for 1952-70. In this way each day is classified in two categories.

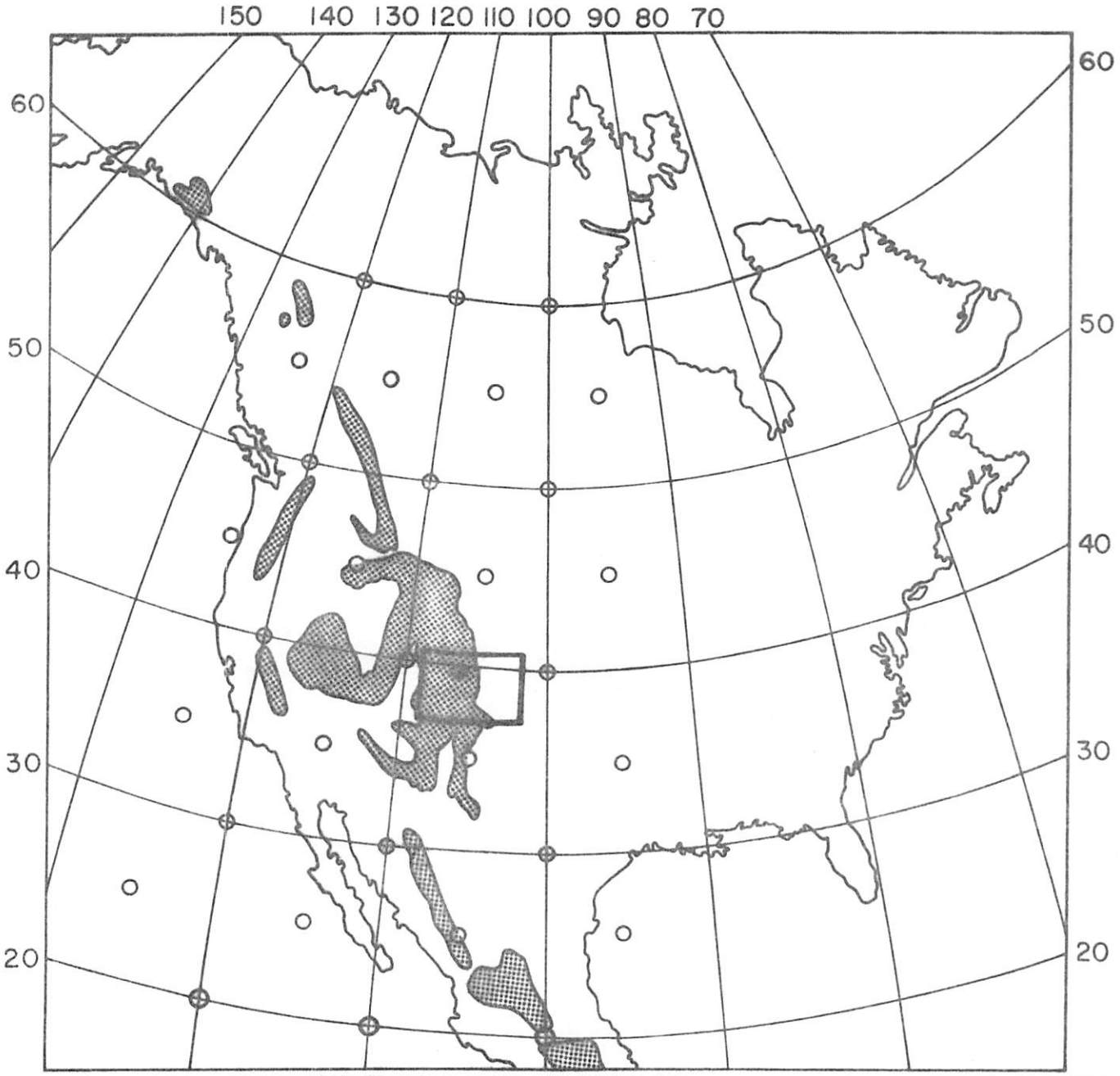


Fig. 2.1 31-point diamond grid, State area and location of climatic station (full circle).

Contingency tables for the height and deviation types are discussed below. The critical threshold for the r values was chosen subjectively on a trial-and-error basis. If r is set too low, a few heterogeneous groups are obtained, whereas if r is too high many small, but more homogeneous, groups result. For the height patterns it was found that satisfactory groups were obtained with $r \geq +0.95$ for October-March and $r \geq +0.922$ for April-September. For the deviations the threshold was dropped to $r \geq +0.7$. Augulis used a threshold of 0.8 for 500 mb maps while Hartranft et al. found 0.7 best for surface maps and 0.9 best for 700 mb maps. In some studies (e.g., Hartranft, Restivo and Sabin, 1970) the grouping procedure of the Lund method is modified such that, after the initial groups are obtained, a day which is highly correlated with several type patterns is reassigned according to the maximum r value. This procedure was not adopted in the present study as the threshold levels of r used for the height patterns are sufficiently high that misclassification is unlikely to be serious. Also, considerable extra computational costs would have been incurred.

The implications of any misclassification arising in this way can be evaluated. For the selected thresholds of r the coefficient of determination r^2 (variance accounted for) is as follows:

r	r^2 (%)
0.7	49
0.92	85
0.95	90

The difference in explained variance between that corresponding to the threshold of 0.92 and the maximum possible is only 15%, which is unlikely to reflect a serious discrepancy in map pattern (except perhaps in a few

isolated cases). With the deviation fields where the threshold value is r = +0.7, however, there will be some problems through the allocation of days to the first group extracted from the data set on this basis, regardless of their maximum r value.

The statistical significance of the possible difference between the threshold and maximum r value must also be considered. Using the z transformation (Arkin and Colton, 1963, Table 15) and a standard error for $z = 1/\sqrt{n-3}$, we obtain:

	value of r significantly different from the threshold value for n = 31	
threshold r	95% probability	99% probability
0.70	0.848	0.893
0.92	0.962	0.974
0.95	0.976	0.984

This demonstrates that a statistical criterion for regrouping can be formulated (cf., Hartranft et al., 1970, where an arbitrary difference of r is used). However, even if the difference in explained variance is statistically significant, it will only represent a minor variation between the patterns for thresholds exceeding about 0.9.

Other workers have either considered all days together (Lund, 1963) or determined seasonal types (Augulis, 1969; Hartranft et al., 1970). The size of the matrix for an 18-year period on a monthly basis exceeds 500 × 500 and it was, therefore, impracticable to calculate seasonal groups. Instead, the monthly groups have been correlated amongst themselves as a basis for determining month-to-month resemblances and continuity.

For each group (based on the pattern day) a "true mean" height (and mean deviation) field has been calculated, together with the respective standard deviations at each grid point. Maps of the main patterns

are shown in Figs. 5.1-5.40.These data were then used to compute correlations between the major groups in each month (see Tables 5.1-5.4). As is to be expected, there are some discrepancies and difficulties due to the appearance of hybrid categories, but the more frequent patterns seem to be reasonably consistent during the course of the year.

Alternative circulation descriptors were also included as guide to the relative success of more simple and readily available data. These are parameters for Denver RAWINSONDE at 12 GMT:

700 mb wind speed and direction
700 mb temperature
700 mb relative humidity
and the height of the freezing level.

The first three parameters were obtained on punched cards from the National Weather Records Center, Asheville. The freezing level heights were abstracted by NWRC in a job requested for this study. The freezing level was specified for two cases: where the temperature at the surface was $> 0^{o}C$; and where the temperature at the surface was below $0^{o}C$ with an inversion above. In the latter case the level at which the temperature reached $0^{o}C$ above the inversion was included.

Statistical Programs

The TAXIR system was not conceived as a tool for large-scale processing of quantitative data, although it has now been suitably modified for this purpose.

Under this grant R. C. Brill developed the facility of generating a magnetic tape file from a TAXIR query (Brill, 1971 p. 49-50) in order to provide input to statistical programs. A variety of statistical programs developed at the Institute of Behavioral Science, University of Colorado, were modified by J. Z. Little

to accept TAXIR-generated tapes. A routine was also developed to concatenate files generated by the same query on Daily Bank, Parts 1 and 2, so that the entire record can be analysed in one operation. These statistical routines are briefly documented in Appendix 2; details are available from the author.

Availability of data in the banks

The data banks (under the terms of the grant) are now available to any interested user at cost. They exist as follows:

7 track magnetic tape (binary)

IBM punched cards (of variable format)

The TAXIR system allows ready retrieval of all or specified subsets of the data in the following ways (see Brill, 1969, pp. 32-51).

HOW MANY statement - provides count of the number of items with specific properties and the proportion of the bank thus represented

PRINT statement - provides computer print out relating to specific query statement (including number of items in the response and the proportion of the bank thus represented)

GENERATE statement - provides data relating to a specific query statement as for PRINT but in a machine-readable file (e.g., on magnetic tape).

3. CLIMATOGRAPHY

Single Station Analysis

The basic statistical characteristics of the climatological elements (mean, standard deviation, number of observations) are summarized by station in Tables 3.1 - 3.4. Averages are computed only where there are at least 25 days of data for a given month. These data are discussed below. Figures 3.1-3.6 convey a summary of some of the major features of the climatic regimes at the four stations. The highest station D-1 is particularly distinctive with respect to the small diurnal temperature range throughout the year, the concentration of precipitation in winter and also the high average wind speeds.

Other basic items such as the number of days with a climatic parameter above or below a certain threshold, frequency distributions, etc. are not produced here. These user-orientated statistics can by readily obtained from the established banks by a simple TAXIR query and, where necessary, the appropriate statistical routines.

Time Trends

Although the series is a relatively short one, it is of considerable interest to examine the temperature record for any evidence of climatic fluctuations in view of Lloyd's (1970) claim of a downward trend. Figure 3.7 shows mean temperatures at C-1 for June - August (the main ablation season on the Front Range glaciers) extended with the latest data. There is a downward trend of 0.13°F/year which is significant at the 5% level by Student's *t* test. A similar analysis for D-1 reveals no significant trend, however, and there is none at C-1 or D-1 in the main accumulation season (November - April) although the sign of regression coefficients in these 3 cases is negative.

Fig. 3.1 MEAN DAILY MAXIMUM TEMPERATURE 1952-70

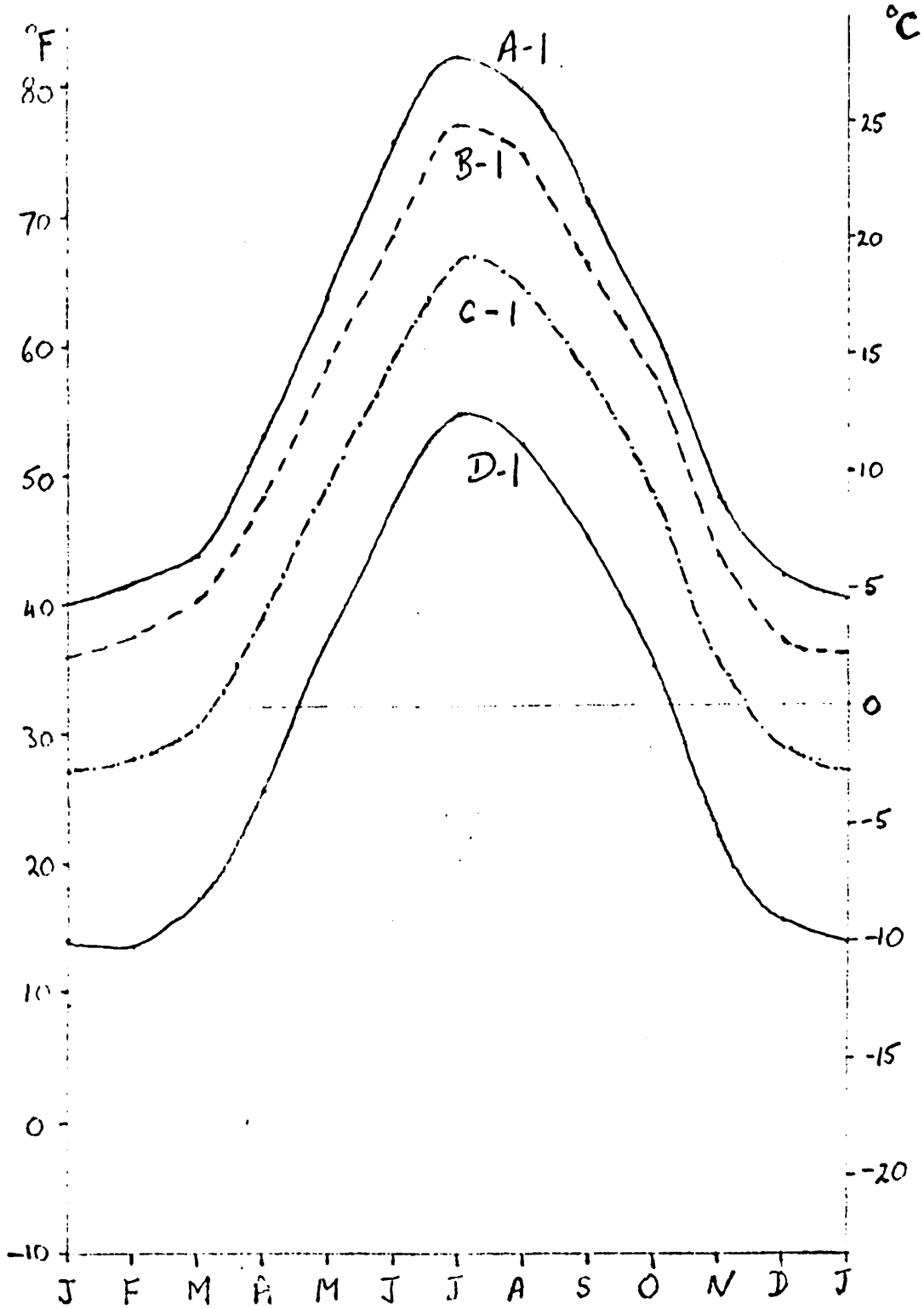


Fig. 3.2 MEAN DAILY MINIMUM TEMPERATURE 1952-70

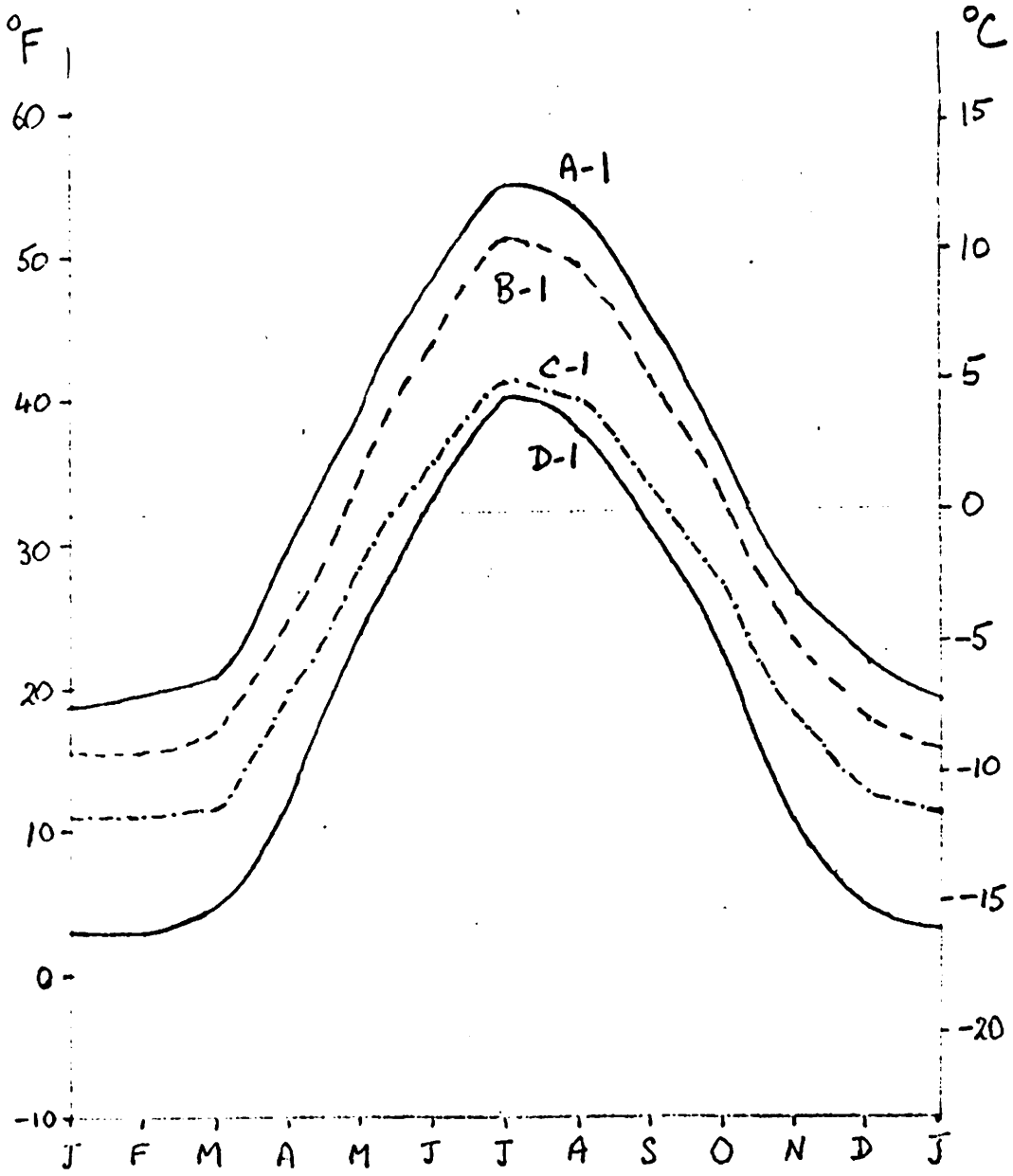


Fig. 3.3 MEAN MAXIMA AND MINIMA OF EXTREME MONTHS, A-1 1952-70

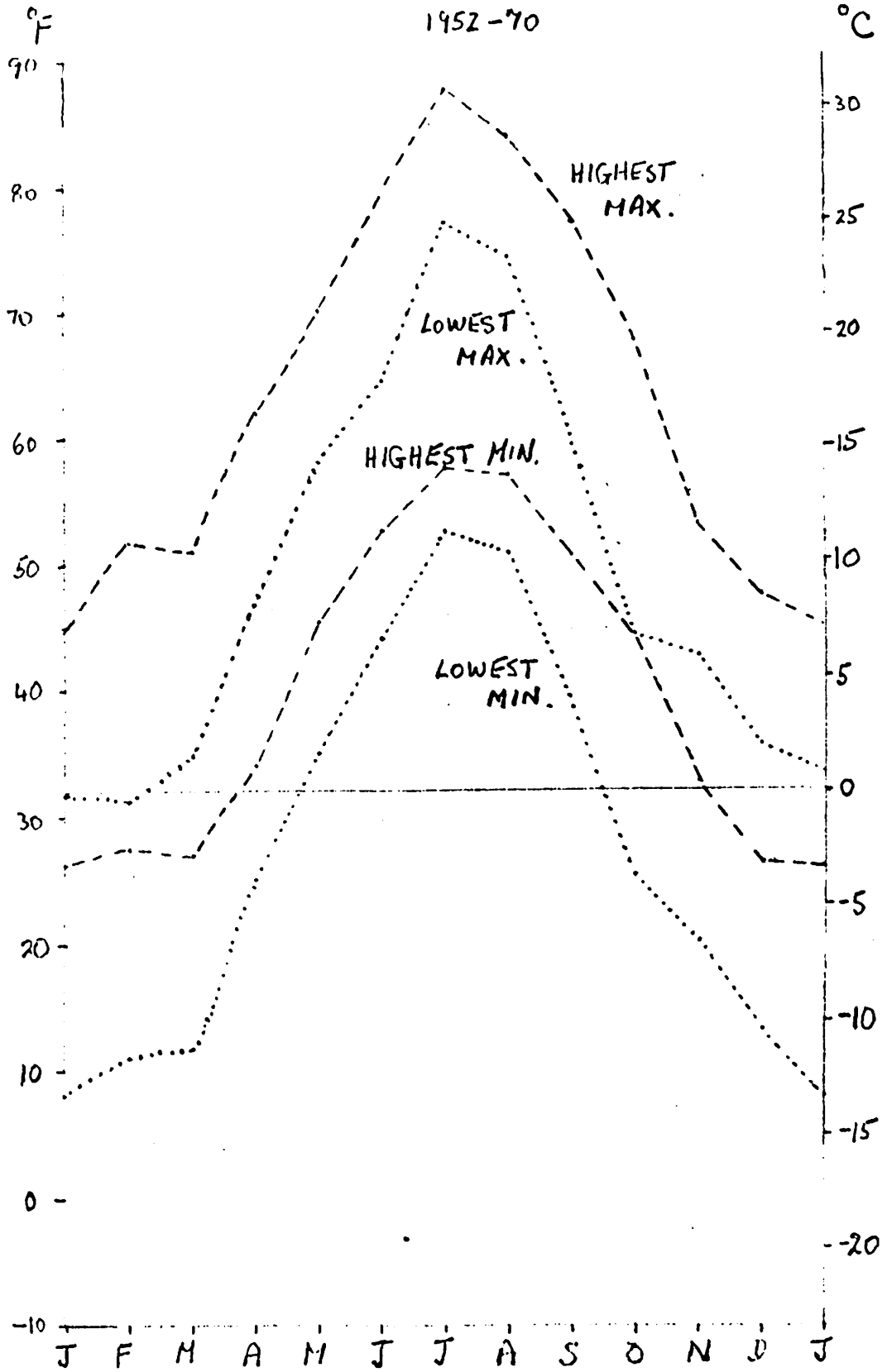


Fig. 3.4 MEAN MAXIMA AND MINIMA OF EXTREME MONTHS, D-1 1952-70

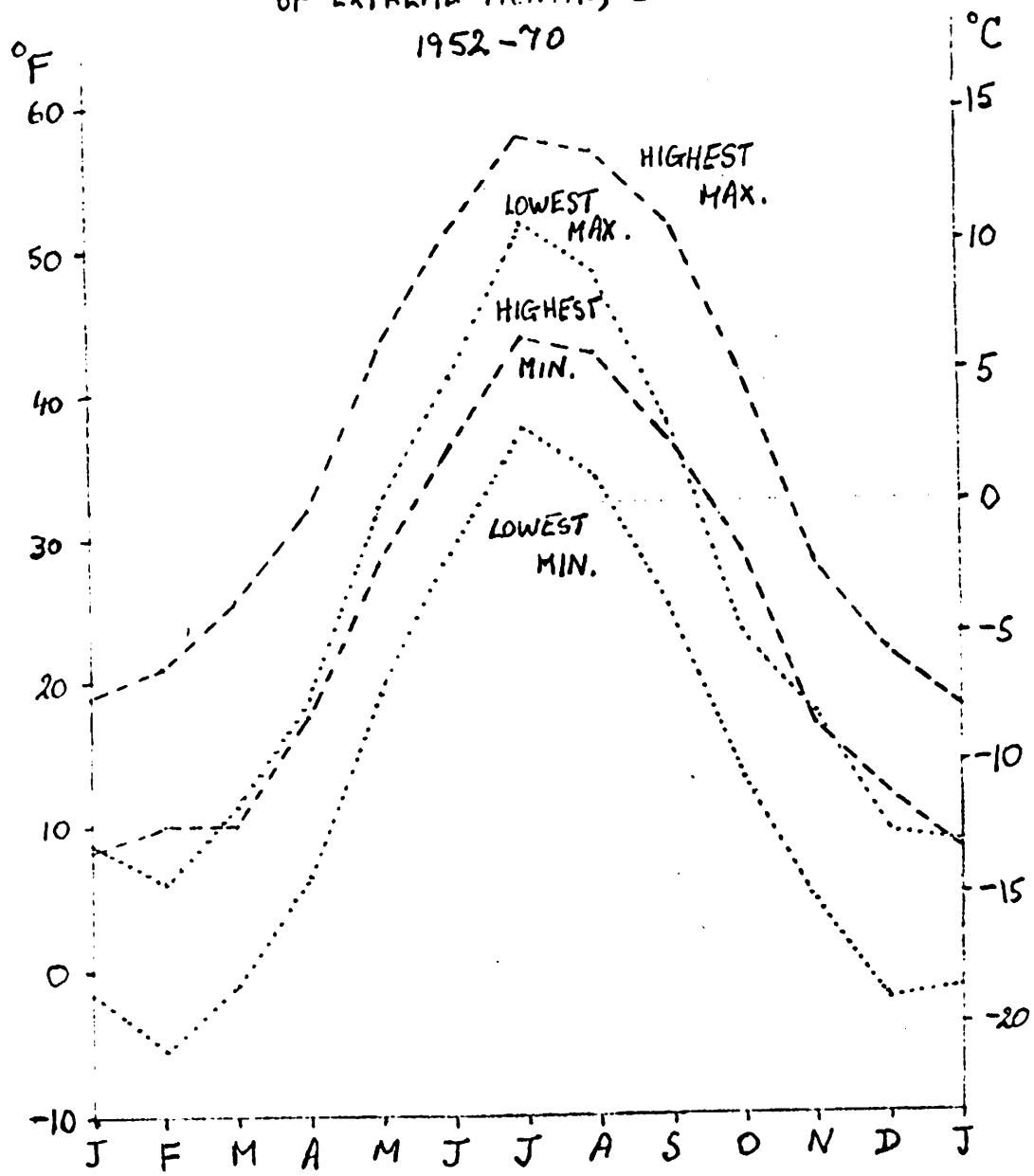
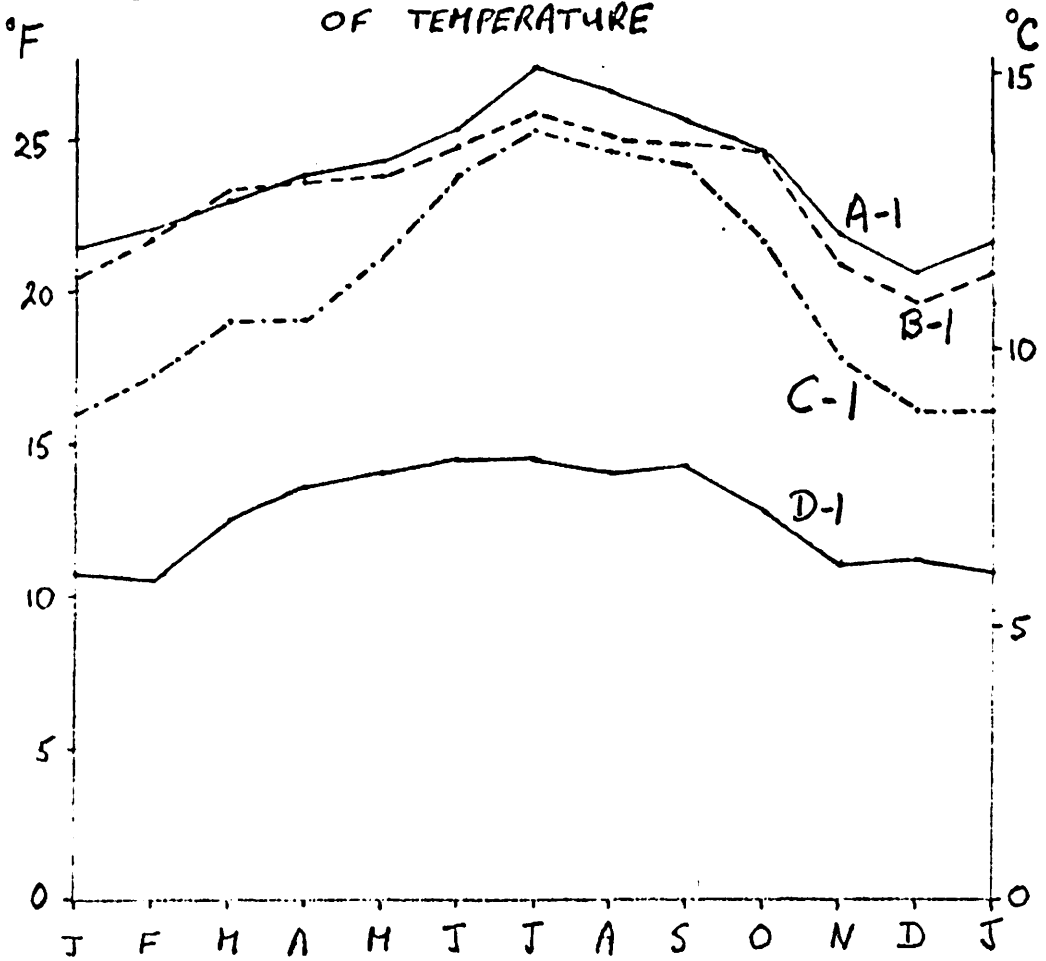


Fig. 3.5 MEAN DAILY RANGE OF TEMPERATURE



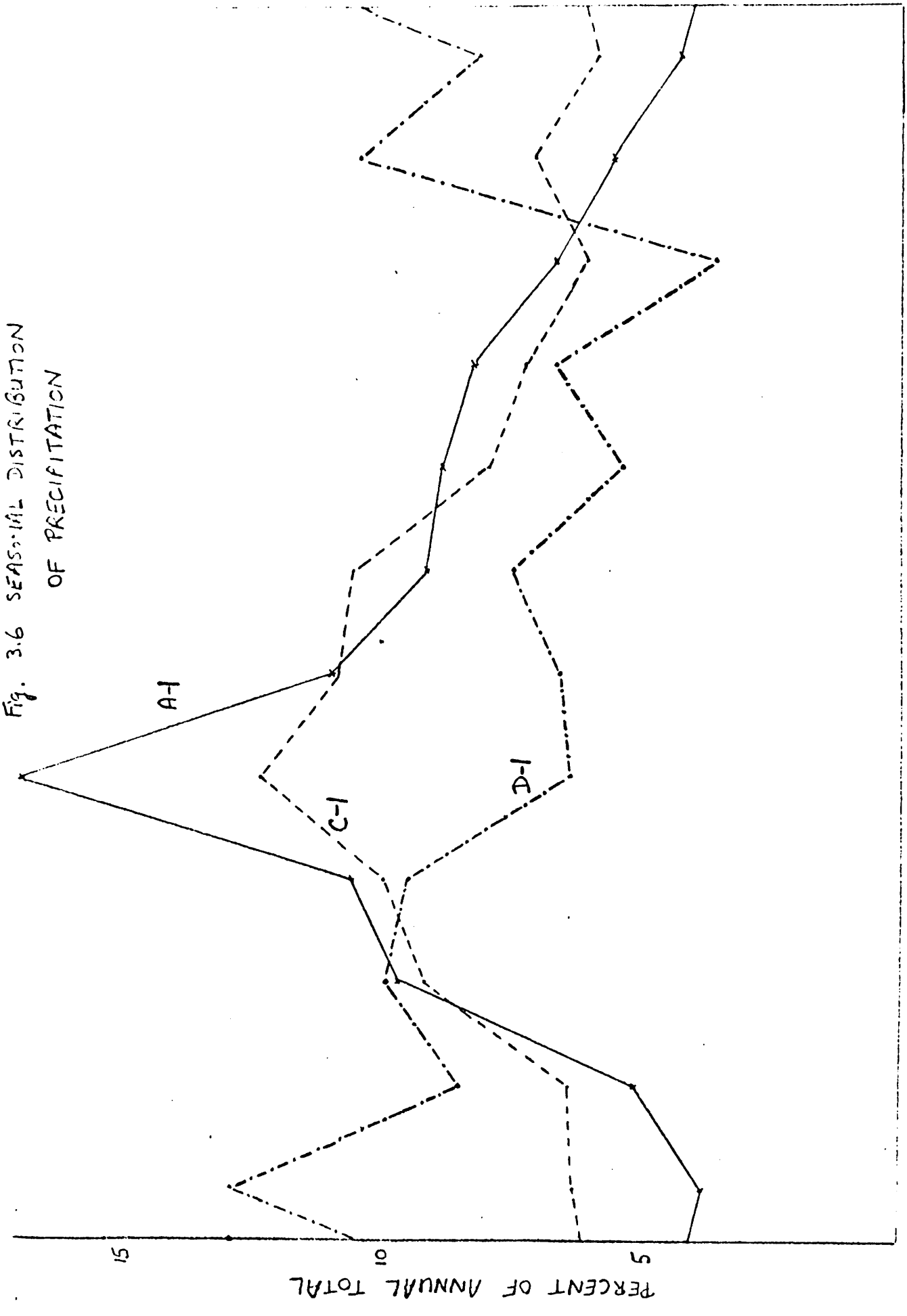


Fig. 3.6 SEASONAL DISTRIBUTION OF PRECIPITATION

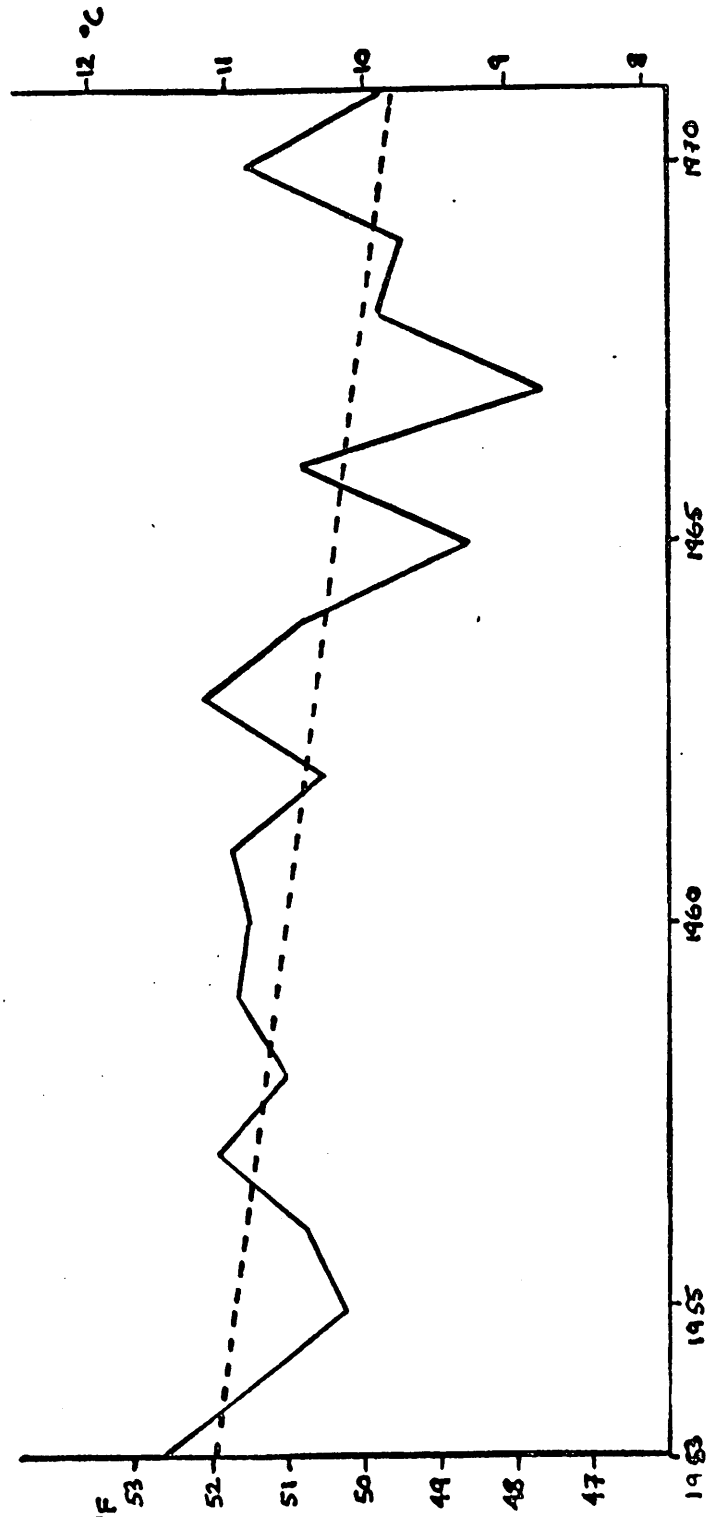


Fig. 3.7 MEAN DAILY TEMPERATURE AT C-1, JUNE THROUGH AUGUST

Table 3.1 Mean daily maximum, minimum, mean temperature and range (^{o}F) for each month at the four stations, October 1952-September 1970 (S.D. = standard deviation, N = number of cases).

JANUARY

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	44.8	8.32	31	26.2	11.11	31	35.3	9.26	31	18.7	6.48	31
1954	44.5	10.40	31	22.5	11.02	31	33.3	10.15	31	22.0	7.23	31
1955	38.3	8.48	31	17.7	6.92	31	27.8	7.31	31	20.6	4.98	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	37.0	9.39	30	14.1	10.64	30	25.3	9.08	30	22.9	8.71	30
1958	44.1	7.17	31	22.4	6.32	31	33.0	6.26	31	21.7	5.10	31
1959	39.4	14.04	31	17.2	13.86	31	28.0	13.74	31	22.2	4.80	31
1960	37.7	13.36	31	16.6	12.67	31	26.9	12.49	31	21.2	6.86	31
1961	43.6	11.10	31	21.0	11.18	31	31.9	10.81	31	22.6	5.64	31
1962	36.6	15.31	31	12.3	16.99	31	24.3	15.72	31	24.3	6.20	31
1963	33.4	14.58	31	8.0	19.99	31	20.5	16.46	31	25.4	11.17	31
1964	38.9	9.50	31	18.1	9.82	31	28.3	9.19	31	20.8	6.02	31
1965	41.5	7.57	31	22.6	6.93	31	31.9	6.89	31	18.9	4.71	31
1966	37.9	11.21	31	17.5	11.36	31	27.5	11.12	31	20.4	4.11	31
1967	42.0	9.80	31	22.2	11.01	31	31.8	10.06	31	19.8	5.84	31
1968	42.6	9.91	31	19.6	9.65	31	30.8	9.18	31	23.0	6.31	31
1969	43.1	9.10	31	22.8	10.45	31	32.7	9.48	31	20.3	5.11	31
1970	38.8	12.24	31	19.2	12.18	31	28.6	12.04	31	19.6	4.70	31
18-YR	40.2	3.30	17	18.8	4.47	17	29.3	3.80	17	21.4	1.84	17

JANUARY

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	40.8	8.86	31	21.2	10.56	31	30.6	9.06	31	19.6	7.34	31
1954	39.5	9.42	31	19.0	9.96	31	28.9	9.33	31	20.4	5.47	31
1955	32.1	9.77	31	11.4	7.31	31	21.5	8.34	31	20.8	5.06	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	33.1	8.06	29	10.1	10.24	29	21.3	8.49	29	23.0	7.11	29
1958	38.7	7.84	31	16.3	7.30	31	27.3	6.98	31	22.4	6.27	31
1959	35.0	13.92	31	13.7	13.33	31	24.3	13.30	31	21.3	4.99	31
1960	32.9	13.03	31	13.8	11.39	31	23.1	11.94	31	19.2	5.09	31
1961	39.8	11.93	31	17.5	10.78	31	28.3	10.90	31	22.2	5.87	31
1962	35.2	14.89	28	12.9	14.03	28	23.8	14.09	28	22.3	5.67	28
1963	30.4	10.27	29	7.7	17.78	29	18.9	13.25	29	22.8	11.17	29
1964	32.7	10.75	31	11.6	9.05	31	21.9	9.37	31	21.1	6.99	31
1965	36.7	8.66	31	18.6	7.13	31	27.4	7.41	31	18.1	5.67	31
1966	32.3	10.47	31	13.1	11.14	31	22.5	10.44	31	19.2	5.29	31
1967	37.0	9.96	31	19.5	10.48	31	28.0	10.04	31	17.5	4.73	31
1968	41.5	8.72	31	19.0	8.23	31	30.1	8.23	31	22.5	4.84	31
1969	38.9	8.66	31	20.6	10.18	31	29.5	8.98	31	18.4	5.70	31
1970	33.3	10.55	31	16.7	11.19	31	24.7	10.51	31	16.6	5.46	31
18-YR	35.9	3.48	17	15.5	4.00	17	25.4	3.58	17	20.4	2.02	17

JANUARY

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	29.1	6.88	31	16.3	8.40	31	22.5	7.10	31	12.8	5.77	31
1954	29.6	7.34	31	14.9	8.71	31	22.1	7.44	31	14.9	5.97	31
1955	26.6	8.14	24	11.9	7.17	24	19.0	6.94	24	14.7	6.39	24
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	23.7	8.16	29	7.8	8.62	29	15.6	7.80	29	15.9	6.01	29
1958	29.0	8.27	31	7.8	8.46	31	18.2	6.84	31	21.2	9.76	31
1959	26.5	12.30	31	8.9	11.89	31	17.5	11.47	31	17.6	7.00	31
1960	25.0	11.41	31	10.4	11.66	31	17.5	11.15	31	14.5	5.48	31
1961	32.2	9.29	31	11.5	11.16	31	21.5	8.96	31	20.7	9.94	31
1962	27.8	11.46	31	9.7	15.17	31	18.5	12.72	31	18.0	8.17	31
1963	24.2	10.45	29	6.1	15.67	29	15.1	11.70	29	18.1	12.33	29
1964	21.4	10.06	31	5.4	11.21	30	13.3	9.93	30	16.0	7.40	30
1965	27.5	8.35	31	12.3	7.67	31	19.5	7.24	31	15.2	7.30	31
1966	23.5	8.35	31	7.0	11.55	31	15.0	9.10	31	16.5	6.50	31
1967	26.4	8.64	31	13.5	9.81	31	19.7	8.97	31	12.6	4.39	31
1968	32.4	9.47	31	15.5	8.54	31	23.6	8.42	31	16.8	6.19	31
1969	29.4	8.17	31	15.5	10.15	31	22.2	8.74	31	13.9	6.24	31
1970	22.7	10.07	31	11.4	10.77	31	16.8	9.94	31	11.4	6.16	31
18-YR	26.9	3.31	16	10.9	3.55	16	18.7	3.12	16	16.0	2.72	16

JANUARY

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	17.6	6.41	31	8.3	6.46	31	12.8	6.14	31	9.3	4.04	31
1954	15.6	5.46	18	5.5	4.68	18	10.4	4.86	18	10.1	3.15	18
1955	11.4	7.04	16	2.7	6.94	16	6.8	6.44	16	8.7	4.92	16
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	11.6	7.70	31	.5	7.59	31	5.9	7.08	31	11.2	4.90	31
1958	15.0	7.71	31	2.6	7.27	31	8.6	7.06	31	12.4	4.68	31
1959	13.7	10.43	30	2.6	12.20	29	8.1	10.91	29	11.3	5.24	29
1960	11.0	10.53	23	1.2	10.23	23	6.0	9.88	23	9.8	4.60	23
1961	18.1	8.36	31	6.7	7.53	31	12.2	7.60	31	11.4	3.98	31
1962	13.7	9.34	27	1.3	9.93	27	7.4	9.10	27	12.3	5.47	27
1963	11.6	10.10	28	1.1	9.83	28	6.3	9.47	28	10.5	5.08	28
1964	10.2	9.07	31	-1.5	8.88	31	4.2	8.51	31	11.6	4.36	31
1965	15.5	6.94	31	5.9	8.43	31	10.4	7.17	31	9.5	5.18	31
1966	9.5	9.08	31	-.9	9.84	31	4.2	9.07	31	10.4	4.38	31
1967	14.8	8.16	31	4.2	10.35	31	9.4	8.89	31	10.6	4.79	31
1968	17.8	8.74	31	5.7	8.75	31	11.5	8.23	31	12.1	5.58	31
1969	15.5	7.68	31	6.0	10.11	31	10.6	8.28	31	9.5	5.95	31
1970	8.7	11.26	31	.4	11.52	31	4.5	10.93	31	8.3	5.48	31
18-YR	13.8	3.10	14	3.1	3.08	14	8.3	2.97	14	10.7	1.24	14

FEBRUARY

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	39.8	10.85	28	17.5	10.91	28	28.5	10.38	28	22.3	6.81	28
1954	51.7	8.64	28	27.5	8.11	28	39.4	8.04	28	24.2	4.91	28
1955	36.5	11.96	28	14.6	11.80	28	25.3	11.37	28	22.0	6.99	28
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	48.0	6.09	28	26.7	7.05	28	37.1	5.69	28	21.3	6.70	28
1958	46.6	10.72	28	26.4	10.04	28	36.3	9.96	28	20.2	5.70	28
1959	39.8	9.76	28	17.2	7.53	28	28.2	7.80	28	22.6	7.55	28
1960	31.3	11.49	29	11.1	11.38	29	21.0	11.01	29	20.2	5.27	29
1961	42.8	10.17	28	20.6	8.57	28	31.5	9.02	28	22.2	5.76	28
1962	40.9	17.73	28	18.7	18.66	28	29.6	17.57	28	22.1	8.24	28
1963	44.6	11.98	28	22.8	11.86	28	33.5	11.55	28	21.8	6.03	28
1964	35.8	8.68	29	14.4	8.20	29	24.8	7.95	29	21.4	6.10	29
1965	40.2	12.50	28	16.0	12.52	28	27.8	11.99	28	24.2	7.11	28
1966	38.1	8.50	28	15.0	8.42	28	26.3	8.15	28	23.2	4.82	28
1967	41.5	9.48	28	18.6	8.90	28	29.7	8.66	28	22.9	6.26	28
1968	41.5	7.64	29	20.6	7.63	29	30.8	6.93	29	20.9	6.52	29
1969	41.8	8.42	28	21.3	6.22	28	31.2	7.03	28	20.5	4.90	28
1970	47.3	7.81	28	23.6	6.41	28	35.2	6.55	28	23.6	5.57	28
18-YR	41.7	4.98	17	19.6	4.75	17	30.4	4.83	17	22.1	1.28	17

FEBRUARY

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	34.8	11.63	28	13.2	10.52	28	23.8	10.54	28	21.6	7.13	28
1954	45.4	8.49	28	22.4	7.90	28	33.6	7.88	28	22.9	4.53	28
1955	32.9	11.09	28	9.4	12.58	28	20.9	11.48	28	23.4	5.78	28
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	43.2	6.03	28	23.6	5.63	28	33.1	5.46	28	19.5	3.99	28
1958	41.2	10.91	28	21.7	8.84	28	31.3	9.56	28	19.5	5.17	28
1959	36.3	8.98	28	13.6	7.49	28	24.6	7.50	28	22.7	6.88	28
1960	27.9	10.22	29	7.5	10.87	29	17.5	10.15	29	20.3	5.80	29
1961	39.2	9.27	28	16.7	8.48	28	27.7	8.50	28	22.5	5.41	28
1962	37.4	15.06	28	15.0	17.17	28	26.0	15.64	28	22.4	7.84	28
1963	40.0	10.39	28	18.9	10.87	28	29.2	10.18	28	21.1	5.83	28
1964	30.4	9.47	29	8.0	7.37	29	19.0	7.72	29	22.4	6.96	29
1965	37.3	12.16	28	12.9	12.27	28	24.8	11.60	28	24.4	7.29	28
1966	34.7	8.57	28	12.0	8.28	28	23.1	7.98	28	22.7	5.20	28
1967	36.6	9.83	28	15.8	8.62	28	26.0	8.53	28	20.8	7.21	28
1968	40.1	8.00	29	18.1	6.22	29	28.9	6.42	29	22.0	6.21	29
1969	38.0	8.31	28	17.1	6.05	28	27.3	6.79	28	20.9	5.13	28
1970	40.5	9.37	28	19.3	6.98	28	29.6	7.64	28	21.1	6.27	28
18-YR	37.4	4.43	17	15.6	4.84	17	26.3	4.58	17	21.8	1.35	17

FEBRUARY

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	24.6	9.52	28	8.2	10.23	28	16.2	9.33	28	16.5	5.97	28
1954	34.3	9.53	28	18.5	8.50	28	26.1	8.56	28	15.8	5.40	28
1955	27.9	6.87	14	14.3	6.76	14	20.9	6.53	14	13.6	3.67	14
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	34.4	6.73	28	18.8	6.95	28	26.4	5.81	28	15.6	7.05	28
1958	31.0	10.99	28	15.7	7.34	28	23.1	8.85	28	15.2	5.82	28
1959	26.7	7.26	28	8.2	8.00	28	17.2	6.86	28	18.5	6.75	28
1960	20.1	8.36	29	3.1	11.46	29	11.4	9.26	29	17.1	6.77	29
1961	31.5	7.88	26	12.4	10.43	25	22.0	8.22	25	19.7	7.59	25
1962	30.3	10.91	28	14.9	13.55	28	22.3	11.82	28	15.4	6.41	28
1963	31.3	9.51	28	13.0	13.30	28	21.9	10.69	28	18.2	8.80	28
1964	20.8	8.32	29	3.8	7.63	28	12.0	7.47	28	16.7	5.49	28
1965	25.7	10.37	28	8.5	12.62	28	16.9	10.87	28	17.2	6.87	28
1966	22.5	9.21	28	3.7	7.85	28	12.9	7.49	28	18.8	8.47	28
1967	25.4	8.36	28	11.2	8.34	28	18.0	7.81	28	14.2	5.81	28
1968	31.4	5.76	29	12.4	7.15	29	21.6	4.53	29	18.9	9.34	29
1969	29.7	9.79	28	10.1	10.17	28	19.7	9.06	28	19.7	8.41	28
1970	29.8	8.08	28	12.2	9.61	28	20.8	7.76	28	17.5	8.60	28
18-YR	28.1	4.50	16	10.9	4.87	16	19.3	4.61	16	17.2	1.68	16

FEBRUARY

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	12.9	8.43	28	1.5	8.24	28	7.0	7.84	28	11.4	4.73	28
1954	20.9	7.34	22	9.7	7.43	22	15.1	7.13	22	11.2	3.82	22
1955	10.6	8.32	14	1.4	8.71	14	5.9	8.12	14	9.1	3.80	14
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	19.4	6.40	28	10.0	4.98	28	14.4	5.49	28	9.4	3.46	28
1958	15.5	10.57	28	7.6	9.03	28	11.4	9.59	28	7.9	3.67	28
1959	13.4	5.93	28	1.1	7.19	28	7.2	5.87	28	12.3	5.72	28
1960	6.0	7.97	29	-5.3	8.54	29	.3	7.69	29	11.2	4.71	29
1961	15.7	7.75	28	3.6	7.56	28	9.6	7.23	28	12.1	4.81	28
1962	14.5	9.57	28	5.4	10.08	28	9.8	9.56	28	9.1	3.37	28
1963	15.9	9.98	26	5.3	9.71	26	10.3	9.35	26	10.6	5.71	26
1964	6.8	7.34	29	-5.6	7.24	29	.7	6.78	29	12.3	4.03	29
1965	14.2	8.26	24	2.7	9.19	24	8.3	8.37	24	11.6	4.26	24
1966	9.6	10.00	28	-2.1	8.16	28	3.7	8.57	28	11.7	4.93	28
1967	12.8	7.65	28	2.2	7.53	28	7.4	7.17	28	10.6	3.55	28
1968	15.6	5.74	29	5.8	4.62	29	10.5	4.73	29	9.8	4.30	29
1969	14.0	7.87	28	3.9	6.36	28	8.8	6.64	28	10.2	4.45	28
1970	16.1	7.24	28	6.0	7.27	28	10.8	6.72	28	10.2	4.66	28
18-YR	13.5	3.73	14	2.8	4.58	14	8.0	4.05	14	10.6	1.31	14

MARCH
A-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	50.9	11.33	31	26.2	7.14	31	38.3	8.91	31	24.7	6.53	31
1954	41.8	12.22	31	17.5	11.56	31	29.4	11.09	31	24.3	8.51	31
1955	43.4	11.34	31	17.9	13.42	31	30.5	11.66	31	25.5	8.21	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	46.2	7.89	31	22.5	7.32	31	34.1	7.06	31	23.7	5.59	31
1958	37.3	9.73	31	18.5	9.01	31	27.6	8.60	31	18.8	7.25	31
1959	44.4	8.67	31	22.2	8.43	31	33.1	8.10	31	22.2	5.46	31
1960	46.4	12.49	31	22.6	14.19	31	34.4	12.84	31	23.8	7.54	31
1961	43.0	9.79	31	22.8	6.94	31	32.7	7.72	31	20.2	6.93	31
1962	42.7	10.28	31	20.4	8.97	31	31.3	9.02	31	22.3	6.64	31
1963	47.3	13.21	31	23.8	10.55	31	35.4	11.42	31	23.5	6.92	31
1964	40.3	10.31	31	17.5	9.28	31	28.6	9.23	31	22.8	6.33	31
1965	34.8	14.11	31	11.8	13.17	31	23.1	13.11	31	22.9	7.18	31
1966	48.4	14.37	31	23.1	12.45	31	35.6	13.31	31	25.3	4.34	31
1967	49.5	12.88	31	27.0	10.88	31	38.0	11.35	31	22.5	7.38	31
1968	47.2	11.82	31	24.1	9.36	31	35.3	9.94	31	23.1	7.91	31
1969	39.5	13.21	31	16.0	12.85	31	27.5	12.67	31	23.5	6.69	31
1970	39.9	10.91	31	18.2	8.97	31	28.8	9.29	31	21.6	7.15	31
18-YR	43.7	4.45	17	20.7	3.96	17	32.0	4.13	17	23.0	1.70	17

MARCH
B-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	45.1	11.86	31	21.2	8.31	31	32.9	9.64	31	23.9	6.62	31
1954	36.5	11.26	31	13.4	10.53	31	24.6	10.19	31	23.1	7.66	31
1955	40.1	10.71	29	15.0	11.63	29	27.3	10.34	29	25.0	8.42	29
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	42.5	7.74	31	19.4	8.18	31	30.8	7.24	31	23.1	6.51	31
1958	36.6	10.09	31	13.4	9.16	31	24.7	9.11	31	23.2	6.63	31
1959	39.4	9.04	31	16.6	8.48	31	27.7	8.08	31	22.8	6.66	31
1960	41.9	11.26	31	19.8	11.94	31	30.6	11.29	31	22.1	5.17	31
1961	39.8	9.58	31	19.0	7.12	31	29.1	7.92	31	20.8	5.96	31
1962	37.9	10.45	31	15.3	9.23	31	26.3	9.52	31	22.6	5.00	31
1963	42.6	11.87	31	19.3	9.95	31	30.7	10.44	31	23.3	6.67	31
1964	37.9	10.78	27	12.3	9.02	27	24.8	9.64	27	25.6	5.19	27
1965	32.2	13.17	31	8.5	12.67	31	20.1	12.55	31	23.8	6.49	31
1966	47.3	12.33	31	22.4	10.30	31	34.6	11.14	31	24.9	4.96	31
1967	47.5	11.08	31	23.9	10.51	31	35.4	10.28	31	23.6	6.38	31
1968	44.5	11.33	31	20.7	8.89	31	32.3	9.46	31	23.8	7.47	31
1969	39.0	10.36	31	14.5	12.21	31	26.5	10.51	31	24.5	8.34	31
1970	34.7	9.18	31	14.4	7.84	31	24.2	8.06	31	20.4	5.53	31
18-YR	40.3	4.28	17	17.0	4.12	17	28.4	4.16	17	23.3	1.37	17

MARCH

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	33.5	10.65	31	16.1	7.19	31	24.5	8.67	31	17.4	5.89	31
1954	28.4	8.86	31	10.1	10.28	31	19.0	9.05	31	18.2	6.64	31
1955	31.4	8.05	20	15.4	7.80	20	23.1	7.18	20	15.9	6.85	20
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	33.1	7.40	31	14.2	8.46	31	23.4	7.10	31	18.9	7.08	31
1958	27.7	7.14	31	7.6	8.98	31	17.5	7.27	31	20.2	6.96	31
1959	28.6	8.42	31	12.1	8.27	31	20.2	7.80	31	16.5	6.03	31
1960	33.0	10.13	31	16.8	9.96	31	24.6	9.72	31	16.2	5.22	31
1961	32.4	8.45	31	13.4	7.04	27	21.9	6.74	27	17.4	6.48	27
1962	29.5	9.04	31	10.0	10.63	31	19.5	9.17	31	19.6	7.06	31
1963	30.9	12.00	31	11.2	9.98	31	20.8	10.33	31	19.7	8.01	31
1964	26.3	9.72	31	7.1	8.77	31	16.5	8.87	31	19.1	5.55	31
1965	23.9	11.67	31	2.3	12.42	31	13.0	11.35	31	21.6	7.41	31
1966	35.6	12.30	31	16.4	11.38	31	25.8	11.42	31	19.3	5.35	31
1967	35.8	10.14	31	18.7	9.75	31	27.0	9.55	31	17.2	5.16	31
1968	36.1	9.51	31	14.6	10.65	31	25.1	8.88	31	21.4	9.48	31
1969	28.0	11.09	31	5.3	15.33	31	16.5	12.18	31	22.7	9.92	31
1970	27.1	7.58	29	9.3	8.69	29	18.0	7.67	29	17.8	5.88	29
18-YR	30.6	3.72	16	11.6	4.56	16	20.8	4.00	16	18.9	1.88	16

MARCH

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	21.0	10.07	31	9.1	9.31	31	14.8	9.49	31	11.9	4.08	31
1954	17.4	8.84	20	4.1	10.21	20	10.6	8.89	20	13.3	6.23	20
1955	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	18.7	7.76	31	5.5	7.87	31	11.9	7.50	31	13.2	4.41	31
1958	14.7	6.36	31	3.4	6.31	31	8.8	5.96	31	11.3	4.23	31
1959	15.7	6.89	27	3.7	6.54	27	9.6	6.44	27	12.0	4.12	27
1960	18.9	9.72	30	7.2	9.62	30	12.9	9.30	30	11.8	4.80	30
1961	18.9	7.90	31	5.9	6.95	31	12.1	7.02	31	13.0	4.91	31
1962	14.8	8.68	31	1.5	8.07	31	8.0	7.84	31	13.3	5.22	31
1963	19.2	12.20	28	6.1	9.18	28	12.4	10.47	28	13.1	5.00	28
1964	12.0	8.40	31	-.9	7.16	31	5.4	7.19	31	13.0	4.98	31
1965	11.3	10.25	31	.4	10.76	31	5.8	10.13	31	10.9	4.69	31
1966	21.9	12.21	31	7.9	13.19	31	14.7	12.31	31	14.1	4.96	31
1967	23.2	7.79	31	9.9	9.57	31	16.4	8.32	31	13.3	4.94	31
1968	20.7	9.01	31	7.1	7.89	31	13.8	8.08	31	13.5	4.88	31
1969	14.0	9.25	31	1.4	9.24	31	7.6	8.95	31	12.6	3.33	31
1970	12.5	6.60	31	.8	6.72	31	6.5	6.15	31	11.7	4.39	31
18-YR	17.2	3.82	15	4.6	3.40	15	10.7	3.57	15	12.6	.92	15

APRIL

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	47.7	13.47	30	25.2	11.12	30	36.1	11.83	30	22.4	7.00	30
1954	61.9	11.45	30	34.1	7.08	30	47.7	8.65	30	27.9	8.06	30
1955	57.7	12.05	30	31.1	8.01	30	44.1	9.71	30	26.6	6.58	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	48.3	11.12	30	25.8	8.54	30	36.8	9.33	30	22.6	6.46	30
1958	49.8	11.10	30	29.1	7.38	30	39.1	8.84	30	20.7	6.49	30
1959	51.6	15.00	30	28.6	11.43	29	40.3	12.36	29	24.0	7.86	29
1960	55.5	12.74	30	31.8	9.79	30	43.4	10.80	30	23.7	6.85	30
1961	50.0	13.28	30	26.0	8.37	30	37.7	10.33	30	24.0	8.12	30
1962	57.4	12.92	30	33.7	10.01	30	45.3	11.13	30	23.7	6.61	30
1963	56.6	8.85	30	30.8	6.23	30	43.5	6.94	30	25.8	6.36	30
1964	50.8	11.60	30	28.5	7.77	30	39.4	9.19	30	22.3	6.85	30
1965	54.6	10.93	30	33.0	6.35	30	43.6	8.10	30	21.5	7.31	30
1966	51.7	12.27	30	26.1	8.98	30	38.6	10.05	30	25.5	7.16	30
1967	53.7	10.40	30	31.1	6.52	30	42.2	7.86	30	22.6	7.29	30
1968	48.5	12.32	30	24.9	8.72	30	36.4	9.93	30	23.6	7.78	30
1969	56.8	9.59	30	32.7	5.62	30	44.5	7.02	30	24.0	6.82	30
1970	46.7	10.38	30	25.0	8.18	30	35.6	8.92	30	21.7	5.77	30
18-YR	52.9	4.30	17	29.3	3.28	17	40.8	3.70	17	23.7	1.90	17

APRIL

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	43.5	12.97	30	19.8	11.19	30	31.4	11.69	30	23.7	7.15	30
1954	55.3	9.65	30	28.9	6.59	30	41.8	7.60	30	26.3	6.65	30
1955	51.2	12.88	30	25.9	8.17	30	38.2	10.35	30	25.3	6.33	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	45.3	10.89	30	21.3	8.56	30	33.0	9.15	30	24.0	7.00	30
1958	44.5	9.47	30	23.5	7.51	30	33.8	8.08	30	21.1	5.33	30
1959	47.2	13.89	30	23.4	12.25	30	35.0	12.60	30	23.8	7.41	30
1960	50.7	11.78	30	27.7	9.82	30	39.0	10.41	30	23.0	6.49	30
1961	44.1	11.79	30	22.2	8.26	30	32.9	9.62	30	22.0	6.50	30
1962	52.0	12.55	30	29.3	9.04	30	40.5	10.53	30	22.7	6.09	30
1963	52.5	8.88	30	27.1	6.09	30	39.5	7.06	30	25.3	5.60	30
1964	45.5	11.00	30	23.5	7.66	30	34.3	8.96	30	22.0	6.16	30
1965	48.8	10.39	30	27.6	5.83	30	38.0	7.66	30	21.2	6.94	30
1966	47.3	11.09	30	22.3	9.12	30	34.6	9.57	30	25.0	6.41	30
1967	52.4	10.82	22	28.2	5.87	22	40.0	7.77	22	24.2	8.18	22
1968	46.7	11.35	30	22.3	8.49	30	34.3	9.40	30	24.4	6.98	30
1969	53.0	10.75	30	29.6	6.28	30	41.1	7.98	30	23.4	7.29	30
1970	42.9	9.55	29	20.9	8.64	29	31.6	8.71	29	22.0	5.40	29
18-YR	48.2	3.85	16	24.7	3.27	16	36.2	3.49	16	23.5	1.58	16

APRIL C-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	35.5	10.38	30	17.5	9.31	30	26.3	9.41	30	18.0	5.99	30
1954	43.6	7.42	30	24.1	5.64	30	33.6	6.19	30	19.4	4.78	30
1955	39.4	11.44	30	19.4	9.62	30	29.1	9.95	30	20.0	7.66	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	36.4	9.77	30	18.2	7.70	30	27.1	8.29	30	18.3	5.91	30
1958	34.5	8.72	30	14.9	9.36	30	24.4	8.17	30	19.6	7.32	30
1959	38.3	12.66	30	19.9	11.79	30	28.9	11.76	30	18.5	6.99	30
1960	42.7	9.49	30	23.0	9.82	30	32.6	9.25	30	19.7	5.84	30
1961	37.2	10.19	30	19.4	9.11	30	28.1	9.37	30	17.8	5.27	30
1962	43.5	10.93	30	24.0	7.90	30	33.6	9.07	30	19.5	5.72	30
1963	41.8	8.82	30	21.8	7.36	30	31.5	7.43	30	20.0	6.59	30
1964	36.8	9.83	30	19.6	7.70	30	27.9	8.32	30	17.2	5.67	30
1965	39.6	9.32	30	21.3	6.57	30	30.1	7.53	30	18.3	6.05	30
1966	38.9	10.78	30	17.7	8.48	30	28.2	8.94	30	21.2	7.79	30
1967	39.8	9.46	30	20.0	7.03	30	29.7	7.34	30	19.8	7.81	30
1968	35.8	9.02	30	16.4	9.03	30	25.9	8.54	30	19.4	5.67	30
1969	43.0	8.67	30	21.7	6.54	30	32.1	6.67	30	21.3	7.35	30
1970	32.8	9.74	30	16.7	8.45	30	24.5	8.77	30	16.1	5.01	30
18-YR	38.8	3.31	17	19.7	2.67	17	29.0	2.93	17	19.1	1.36	17

APRIL D-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	23.2	10.52	30	11.2	9.08	30	17.0	9.69	30	12.0	3.80	30
1954	31.8	6.37	28	17.5	5.85	28	24.5	5.77	28	14.2	3.45	28
1955	31.0	6.70	12	12.2	9.40	12	21.4	7.22	12	18.8	7.63	12
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	22.2	8.22	30	10.3	7.69	30	16.1	7.46	30	11.9	5.18	30
1958	22.8	7.57	30	9.8	7.48	30	16.0	7.14	30	13.0	5.01	30
1959	24.4	11.25	30	11.0	9.94	30	17.4	10.29	30	13.4	5.07	30
1960	28.4	9.62	30	13.5	9.52	30	20.8	9.24	30	14.9	5.03	30
1961	22.9	9.10	30	11.0	8.54	30	16.7	8.61	30	12.0	3.40	30
1962	30.1	11.68	30	15.9	9.82	30	22.7	10.54	30	14.2	4.36	30
1963	27.5	8.92	30	13.5	7.87	30	20.3	8.05	30	13.9	4.73	30
1964	24.1	8.13	29	11.9	7.21	29	17.8	7.39	29	12.1	3.67	29
1965	26.7	9.15	30	13.4	6.83	30	19.8	7.69	30	13.3	4.80	30
1966	26.2	9.61	30	12.1	8.88	30	19.0	9.00	30	14.1	4.55	30
1967	27.5	9.38	30	13.1	7.53	30	20.0	8.13	30	14.4	5.24	30
1968	21.5	8.62	30	8.3	8.15	30	14.7	8.12	30	13.2	4.41	30
1969	29.4	9.45	30	14.6	7.60	30	21.8	8.23	30	14.8	5.09	30
1970	18.8	10.27	30	6.4	7.25	30	12.3	8.49	30	12.4	5.23	30
18-YR	25.5	3.54	16	12.1	2.77	16	18.6	3.16	16	13.4	1.05	16

MAY

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	59.1	13.68	31	35.3	8.40	31	46.9	10.64	31	23.8	8.21	31
1954	63.5	14.13	31	37.8	9.63	31	50.5	11.42	31	25.6	7.83	31
1955	65.6	9.91	31	39.7	6.68	31	52.4	7.53	31	25.9	7.23	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	58.1	11.29	31	36.7	9.43	31	47.1	8.00	31	21.4	7.57	31
1958	69.9	11.10	31	45.3	6.81	31	57.4	8.51	31	24.6	6.96	31
1959	60.6	11.98	31	39.1	6.10	31	49.6	8.69	31	21.5	7.84	31
1960	63.0	10.50	31	38.6	7.35	31	50.5	8.77	31	24.4	5.37	31
1961	59.8	11.95	31	39.1	7.33	31	49.1	9.04	31	20.7	8.14	31
1962	67.0	8.17	31	43.1	6.58	31	54.7	7.12	31	23.9	4.26	31
1963	69.1	8.28	31	41.7	5.62	31	55.2	6.62	31	27.3	5.22	31
1964	65.7	13.42	31	39.8	9.67	31	52.5	11.01	31	25.9	8.19	31
1965	61.3	11.06	31	38.6	6.64	31	49.6	8.46	31	22.6	7.09	31
1966	69.3	11.56	31	41.9	8.43	31	55.3	9.53	31	27.4	6.81	31
1967	57.9	14.39	31	36.3	8.76	31	46.8	10.97	31	21.6	9.03	31
1968	59.6	9.08	31	34.9	6.24	31	47.0	7.21	31	24.7	6.15	31
1969	63.6	12.25	31	41.1	6.81	31	52.1	8.97	31	22.5	8.56	31
1970	66.1	9.68	31	39.2	7.56	31	52.4	8.16	31	26.9	5.83	31
18-YR	63.5	4.00	17	39.3	2.75	17	51.1	3.27	17	24.2	2.16	17

MAY

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	52.9	13.92	31	28.5	8.74	31	40.3	10.93	31	24.4	8.06	31
1954	59.4	11.97	31	33.5	9.57	31	46.1	10.24	31	25.8	7.09	31
1955	59.9	9.91	31	34.5	6.41	31	47.0	7.51	31	25.4	7.10	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	53.8	10.48	31	33.1	4.74	31	43.1	7.28	31	20.7	7.24	31
1958	63.5	10.18	31	40.1	6.75	31	51.5	8.21	31	23.3	5.41	31
1959	56.0	10.72	31	34.9	5.94	31	45.3	8.01	31	21.1	6.65	31
1960	59.1	10.14	31	34.5	7.33	31	46.6	8.48	31	24.6	5.01	31
1961	56.6	11.28	31	35.4	6.79	31	45.8	8.62	31	21.2	7.61	31
1962	60.7	8.68	31	37.3	6.42	31	48.7	7.31	31	23.4	4.25	31
1963	65.1	7.85	31	38.4	5.40	31	51.5	6.29	31	26.7	4.82	31
1964	60.9	13.23	31	35.4	9.51	31	47.9	10.83	31	25.5	7.90	31
1965	56.3	10.70	31	34.3	6.37	31	45.1	8.18	31	22.0	6.76	31
1966	64.0	10.03	31	37.7	8.82	31	50.7	9.06	31	26.3	5.01	31
1967	54.2	13.69	31	33.7	9.28	31	43.7	11.10	31	20.5	7.33	31
1968	55.6	9.69	31	31.1	6.08	31	43.0	7.36	31	24.5	6.38	31
1969	59.9	11.69	31	37.6	6.59	31	48.6	8.63	31	22.4	7.80	31
1970	62.0	9.48	31	36.8	7.60	31	49.2	8.02	31	25.2	5.93	31
18-YR	58.8	3.71	17	35.1	2.82	17	46.7	3.15	17	23.7	2.06	17

MAY

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	43.1	11.02	31	24.7	8.57	31	33.7	9.21	31	18.4	6.69	31
1954	48.8	9.53	31	26.9	7.42	31	37.6	7.83	31	21.9	6.80	31
1955	48.5	8.09	29	28.7	5.45	29	38.4	6.17	29	19.8	6.11	29
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	43.6	7.77	31	26.1	4.03	31	34.7	5.51	31	17.5	5.78	31
1958	52.7	8.02	31	31.3	5.35	31	41.8	6.33	31	21.4	5.43	31
1959	47.3	8.54	31	28.2	5.24	31	37.5	6.64	31	19.1	5.38	31
1960	50.9	8.92	31	28.0	5.72	31	39.2	6.96	31	22.9	5.49	31
1961	50.0	10.12	31	30.3	4.62	31	39.9	7.01	31	19.7	7.07	31
1962	50.9	7.81	31	30.1	4.74	31	40.2	6.00	31	20.7	5.03	31
1963	55.6	6.19	31	32.1	4.30	31	43.6	4.63	31	23.5	5.37	31
1964	52.5	11.64	31	29.3	7.18	31	40.6	8.97	31	23.2	7.15	31
1965	46.5	8.91	31	27.0	5.90	31	36.5	6.95	31	19.5	5.98	31
1966	54.8	8.08	31	29.8	5.94	31	42.1	6.36	31	25.0	6.40	31
1967	44.6	10.94	31	25.7	7.70	31	35.0	8.89	31	18.8	6.96	31
1968	45.6	7.98	31	25.6	5.33	31	35.5	6.19	31	20.0	5.59	31
1969	50.2	8.65	31	29.3	4.15	31	39.5	5.73	31	20.9	7.55	31
1970	50.5	9.17	31	28.2	6.28	31	39.1	7.12	31	22.3	6.41	31
18-YR	49.2	3.70	17	28.3	2.09	17	38.5	2.80	17	20.9	2.05	17

MAY

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	32.0	10.57	31	19.0	9.24	31	25.2	9.62	31	13.0	4.96	31
1954	40.6	9.23	27	24.1	8.60	27	32.0	8.65	27	16.5	4.48	27
1955	35.4	7.14	22	22.4	5.98	22	28.7	5.98	22	13.0	5.64	22
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	35.5	9.23	31	21.5	5.12	31	28.2	6.96	31	14.0	5.34	31
1958	40.6	7.68	31	27.8	6.09	31	34.0	6.80	31	12.8	2.94	31
1959	36.1	6.65	31	22.1	5.11	31	28.9	5.66	31	14.0	3.84	31
1960	36.2	8.67	31	22.5	7.29	31	29.2	7.89	31	13.7	3.22	31
1961	38.4	9.28	31	24.6	6.87	31	31.3	7.94	31	13.8	3.72	31
1962	37.7	7.75	31	24.2	6.48	31	30.7	6.99	31	13.5	3.18	31
1963	42.8	4.61	29	28.3	4.80	29	35.3	4.35	29	14.4	3.41	29
1964	38.3	11.56	31	23.3	11.22	31	30.6	11.18	31	15.0	4.36	31
1965	33.1	8.17	31	20.9	7.39	31	26.8	7.44	31	12.2	3.99	31
1966	43.1	8.06	31	26.4	9.34	31	34.4	8.36	31	16.6	5.26	31
1967	32.0	11.46	31	21.0	10.65	31	26.3	10.78	31	11.0	3.98	31
1968	33.5	8.43	31	20.2	8.03	31	26.6	7.79	31	13.3	5.14	31
1969	41.5	8.07	31	28.0	6.22	31	34.4	6.78	31	13.5	4.83	31
1970	40.0	9.28	31	25.0	8.81	31	32.3	8.88	31	15.0	3.87	31
18-YR	37.6	3.70	16	23.7	2.90	16	30.4	3.23	16	13.9	1.44	16

JUNE A-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	79.8	10.60	30	52.3	5.98	30	65.8	8.01	30	27.4	6.92	30
1954	79.1	9.98	30	47.8	9.18	30	63.2	8.89	30	31.3	6.80	30
1955	69.4	10.96	30	44.7	6.30	30	56.9	8.40	30	24.7	6.58	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	74.3	11.11	30	47.0	6.97	30	60.4	8.45	30	27.3	7.64	30
1958	75.7	10.31	30	49.7	6.08	30	62.4	7.50	30	26.0	7.69	30
1959	79.3	8.53	30	52.5	5.41	30	65.7	6.75	30	26.7	5.32	30
1960	74.9	10.52	30	48.9	5.80	30	61.7	7.63	30	26.0	7.18	30
1961	72.6	10.66	30	48.9	6.60	30	60.5	8.36	30	23.6	5.53	30
1962	71.9	9.82	30	47.4	6.11	30	59.5	7.70	30	24.4	5.49	30
1963	76.3	10.67	30	50.2	6.43	30	62.9	8.20	30	26.1	6.70	30
1964	70.1	10.45	30	46.1	6.12	30	57.9	8.02	30	24.1	6.22	30
1965	69.1	8.47	30	46.0	4.30	30	57.4	5.89	30	23.1	6.26	30
1966	73.0	11.48	30	47.5	6.25	30	60.1	8.47	30	25.4	7.53	30
1967	64.9	8.99	30	44.8	4.03	30	54.7	6.18	30	20.1	6.42	30
1968	75.5	10.33	30	48.4	6.45	30	61.6	8.01	30	27.2	6.67	30
1969	64.4	12.46	30	44.1	6.76	30	54.0	9.16	30	20.3	8.29	30
1970	72.0	10.16	30	45.7	9.33	30	58.6	9.43	30	26.3	5.13	30
18-YR	73.1	4.54	17	47.8	2.48	17	60.2	3.39	17	25.3	2.69	17

JUNE B-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	73.5	10.05	30	47.4	6.90	30	60.2	8.03	30	26.1	6.38	30
1954	73.1	10.29	30	42.6	9.67	30	57.5	9.51	30	30.5	6.35	30
1955	63.3	10.49	30	40.3	6.28	30	51.5	8.25	30	23.0	5.46	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	68.8	10.46	30	43.4	6.80	30	55.9	8.18	30	25.4	6.67	30
1958	70.1	9.79	30	44.9	6.20	30	57.3	7.17	30	25.1	7.58	30
1959	73.4	8.08	30	47.7	5.54	30	60.4	6.53	30	25.8	4.83	30
1960	70.5	9.77	30	44.9	5.23	30	57.4	7.09	30	25.6	6.95	30
1961	68.8	10.34	30	45.8	6.56	30	57.0	8.18	30	23.0	5.37	30
1962	66.7	10.02	30	42.5	5.95	30	54.3	7.74	30	24.2	5.85	30
1963	71.1	10.29	30	45.7	6.28	30	58.2	7.93	30	25.4	6.28	30
1964	66.0	10.34	30	42.5	6.52	30	54.0	8.02	30	23.5	6.15	30
1965	64.4	8.40	30	42.1	4.55	30	53.0	5.85	30	22.3	6.57	30
1966	68.6	9.85	30	43.5	6.17	30	55.8	7.39	30	25.1	6.96	30
1967	62.4	8.15	30	41.7	4.07	30	51.8	5.77	30	20.7	5.73	30
1968	71.7	8.44	30	45.1	7.14	30	58.1	7.49	30	26.7	4.51	30
1969	60.3	11.48	30	38.9	6.35	30	49.3	8.43	30	21.4	7.73	30
1970	68.7	9.99	30	42.5	7.96	30	55.4	8.83	30	26.2	3.83	30
18-YR	68.3	3.96	17	43.6	2.36	17	55.7	3.07	17	24.7	2.31	17

JUNE C-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	63.1	8.34	30	38.1	5.09	30	50.4	6.18	30	25.0	6.26	30
1954	60.1	9.05	30	34.1	7.40	30	46.8	7.73	30	26.0	6.12	30
1955	54.7	9.46	30	33.8	3.84	30	44.0	6.40	30	20.9	6.48	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	58.7	8.50	30	35.9	5.03	30	47.1	6.12	30	22.8	6.55	30
1958	61.8	6.92	30	36.5	4.09	30	48.9	4.74	30	25.3	6.04	30
1959	63.7	6.81	30	37.3	4.64	30	50.2	5.08	30	26.4	5.61	30
1960	62.1	7.19	30	37.5	4.34	30	49.5	5.31	30	24.5	5.21	30
1961	61.6	9.34	30	37.9	4.51	30	49.5	6.37	30	23.7	6.96	30
1962	58.7	9.48	30	33.7	4.32	30	46.0	6.44	30	25.0	7.17	30
1963	62.1	8.82	30	35.9	3.96	30	48.7	5.43	30	26.2	8.38	30
1964	57.5	8.82	30	34.6	4.17	30	45.9	5.99	30	22.9	6.92	30
1965	56.2	6.35	30	34.2	3.25	30	44.9	4.09	30	22.0	6.03	30
1966	58.1	7.45	30	35.5	5.25	30	46.6	5.52	30	22.6	7.02	30
1967	53.8	7.09	30	32.6	5.69	30	42.9	5.70	30	21.2	6.22	30
1968	61.3	7.50	30	35.9	5.40	30	48.4	5.74	30	25.5	6.55	30
1969	51.8	8.88	30	32.6	5.28	30	41.9	6.14	30	19.3	7.93	30
1970	59.7	8.88	30	35.2	6.52	30	47.3	7.32	30	24.5	5.51	30
18-YR	59.1	3.43	17	35.4	1.75	17	47.0	2.52	17	23.8	2.06	17

JUNE D-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	50.9	8.08	30	36.2	6.91	30	43.3	7.34	30	14.7	3.81	30
1954	49.6	9.51	30	32.4	10.49	30	40.8	9.77	30	17.2	3.78	30
1955	42.4	10.69	19	29.9	7.68	19	35.8	9.11	19	12.5	4.01	19
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	45.8	8.58	30	31.6	6.52	30	38.5	7.36	30	14.2	4.02	30
1958	49.5	4.11	30	35.0	4.39	30	41.9	4.07	30	14.5	2.49	30
1959	50.8	5.62	30	35.5	5.34	30	42.9	5.40	30	15.3	2.39	30
1960	49.2	6.07	30	34.3	5.26	30	41.6	5.42	30	14.9	3.32	30
1961	47.4	8.50	30	34.6	6.11	30	40.8	7.11	30	12.8	3.87	30
1962	46.6	8.19	30	32.0	6.52	30	39.0	7.24	30	14.6	3.37	30
1963	50.2	8.81	28	35.7	6.81	28	42.7	7.62	28	14.5	3.99	28
1964	43.4	8.42	30	29.0	6.86	30	35.9	7.36	30	14.4	5.05	30
1965	43.6	6.87	30	30.6	5.05	30	36.8	5.44	30	13.0	4.91	30
1966	48.6	6.71	30	33.3	5.46	30	40.7	5.81	30	15.3	3.90	30
1967	44.6	5.33	30	30.4	3.68	30	37.2	4.23	30	14.1	3.25	30
1968	50.2	7.41	30	33.7	8.85	30	41.7	7.74	30	16.6	5.58	30
1969	40.9	8.72	30	28.8	6.05	30	34.5	7.02	30	12.1	5.22	30
1970	47.6	9.31	30	33.0	8.00	30	40.1	8.43	30	14.6	4.05	30
18-YR	47.4	3.04	16	32.9	2.34	16	39.9	2.65	16	14.5	1.27	16

JULY
A-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	83.5	8.51	31	57.4	4.60	31	70.2	6.04	31	26.1	6.67	31
1954	87.4	7.58	31	57.0	4.67	31	71.9	5.82	31	30.4	4.66	31
1955	84.7	4.74	31	55.6	3.32	31	69.9	3.38	31	29.1	4.64	31
1956	81.1	6.58	30	52.8	4.31	30	66.7	5.06	30	28.3	4.76	30
1957	83.0	8.23	31	57.2	4.23	31	69.8	5.88	31	25.9	5.80	31
1958	79.0	7.86	31	52.5	4.30	31	65.5	5.57	31	26.4	5.96	31
1959	81.9	5.30	31	53.6	4.90	31	67.5	4.77	31	28.2	4.12	31
1960	81.0	9.45	31	53.7	5.41	31	67.1	7.11	31	27.3	5.95	31
1961	79.0	7.89	31	52.9	5.21	31	65.7	6.41	31	26.1	3.99	31
1962	81.8	5.98	31	53.0	4.21	31	67.2	4.90	31	28.7	3.55	31
1963	85.6	6.79	31	57.6	2.96	31	71.3	4.29	31	28.0	5.92	31
1964	85.5	5.63	31	56.5	4.17	31	70.7	4.48	31	28.9	4.37	31
1965	78.6	7.71	31	53.8	3.64	31	65.9	5.08	31	24.8	6.60	31
1966	85.7	5.38	31	57.1	3.27	31	71.1	3.91	31	28.6	4.16	31
1967	77.0	6.19	31	53.5	3.82	31	65.0	4.78	31	23.4	3.78	31
1968	79.4	8.92	31	52.7	6.21	31	65.7	6.99	31	26.7	6.55	31
1969	81.2	7.45	31	55.6	4.62	31	68.1	5.56	31	25.6	5.55	31
1970	81.0	5.25	31	55.0	4.59	31	67.8	4.36	31	26.0	4.51	31
18-YR	82.0	2.91	18	54.9	1.87	18	68.2	2.26	18	27.2	1.77	18

JULY
B-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	77.4	8.20	31	53.3	3.98	31	65.1	5.67	31	24.1	6.26	31
1954	81.5	6.82	31	52.8	4.08	31	67.0	5.13	31	28.6	4.67	31
1955	78.4	4.97	31	51.2	3.51	31	64.4	3.65	31	27.2	4.69	31
1956	75.5	7.20	31	48.7	4.24	31	61.9	5.20	31	26.8	5.71	31
1957	76.7	7.22	31	52.0	3.91	31	64.1	5.13	31	24.6	5.39	31
1958	73.5	7.81	31	47.4	4.86	31	60.2	5.97	31	26.2	5.01	31
1959	76.3	5.12	31	49.1	4.78	31	62.5	4.54	31	27.2	3.78	31
1960	75.5	9.38	31	50.1	5.28	31	62.6	7.00	31	25.4	6.10	31
1961	73.6	7.48	31	49.1	5.19	31	61.2	6.15	31	24.5	4.29	31
1962	76.6	4.96	31	49.6	4.27	31	62.8	4.35	31	27.0	3.11	31
1963	79.8	6.54	31	53.3	3.31	31	66.2	4.32	31	26.5	5.93	31
1964	80.0	4.75	31	53.4	4.18	31	66.5	3.77	31	26.6	4.72	31
1965	73.6	6.79	31	50.4	3.86	31	61.8	4.77	31	23.3	5.66	31
1966	81.2	5.45	31	54.4	3.56	31	67.5	3.94	31	26.8	4.71	31
1967	72.9	5.53	31	50.6	3.31	31	61.5	4.15	31	22.2	3.84	31
1968	74.7	7.59	31	48.4	5.70	31	61.3	6.18	31	26.3	5.56	31
1969	76.3	6.60	31	51.6	4.10	31	63.8	4.81	31	24.7	5.49	31
1970	77.0	5.22	31	51.1	4.21	31	63.8	4.25	31	25.9	4.43	31
18-YR	76.7	2.62	18	50.9	1.99	18	63.6	2.19	18	25.8	1.60	18

JULY
C-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	66.6	5.93	30	43.8	3.52	30	54.9	3.84	30	22.8	5.84	30
1954	67.8	5.53	31	44.6	3.01	31	56.0	3.67	31	23.2	4.93	31
1955	66.6	3.40	31	42.0	3.95	31	54.0	2.63	31	24.5	5.21	31
1956	64.5	5.44	31	38.2	4.28	31	51.1	3.95	31	26.4	6.02	31
1957	66.4	5.15	31	44.0	4.67	31	55.0	3.96	31	22.4	5.86	31
1958	64.1	5.75	31	38.8	4.28	31	51.3	4.39	31	25.4	5.24	31
1959	65.9	4.10	31	38.3	5.32	31	51.8	3.99	31	27.6	5.00	31
1960	66.3	7.17	31	38.9	4.71	31	52.3	5.24	31	27.4	6.12	31
1961	65.7	6.47	31	41.5	4.37	31	53.3	4.83	31	24.3	5.13	31
1962	66.0	4.25	31	38.9	3.69	31	52.2	3.45	31	27.1	3.79	31
1963	68.9	4.11	31	41.5	4.43	31	55.0	3.57	31	27.4	4.62	31
1964	70.6	3.79	31	42.9	4.40	31	56.5	2.92	31	27.7	5.71	31
1965	63.3	4.11	31	40.6	4.26	31	51.6	3.26	31	22.6	5.24	31
1966	69.0	3.95	31	40.9	3.08	31	54.8	2.63	31	28.1	4.76	31
1967	63.9	4.67	31	40.0	4.74	31	51.8	3.59	31	24.0	6.11	31
1968	65.0	5.52	31	39.8	5.84	31	52.2	4.98	31	25.2	5.73	31
1969	65.6	5.03	31	41.7	5.05	31	53.4	3.92	31	23.9	6.37	31
1970	66.1	3.24	31	41.7	3.92	31	53.6	2.50	31	24.4	5.21	31
18-YR	66.2	1.89	18	41.0	2.00	18	53.4	1.69	18	25.2	1.95	18

JULY
D-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	54.5	5.05	31	41.3	3.15	31	47.6	3.74	31	13.2	3.58	31
1954	57.6	3.33	25	42.6	2.78	25	49.9	2.88	25	15.0	2.08	25
1955	54.3	3.88	20	40.9	2.40	20	47.3	2.64	20	13.4	3.65	20
1956	53.5	4.23	31	37.6	3.84	31	45.2	3.68	31	15.9	3.29	31
1957	52.9	4.38	31	39.1	3.01	31	45.7	3.43	31	13.8	2.93	31
1958	52.2	5.17	31	37.8	4.42	31	44.7	4.55	31	14.4	2.96	31
1959	51.6	2.86	31	37.3	3.80	31	44.3	2.92	31	14.4	3.12	31
1960	53.2	5.16	31	39.4	3.91	31	46.0	4.28	31	13.8	3.09	31
1961	52.5	5.21	31	38.4	4.52	31	45.2	4.69	31	14.1	2.57	31
1962	53.6	4.29	31	38.7	3.62	31	45.9	3.82	31	14.9	2.25	31
1963	57.5	2.88	31	42.2	2.36	31	49.5	2.45	31	15.2	2.28	31
1964	55.9	3.41	31	41.5	3.11	31	48.5	2.84	31	14.4	3.17	31
1965	53.4	3.95	31	38.9	2.83	31	45.8	3.22	31	14.5	2.54	31
1966	58.2	3.15	31	43.5	2.19	31	50.6	2.54	31	14.7	2.05	31
1967	54.7	4.27	30	40.7	3.75	30	47.4	3.81	30	14.1	2.13	30
1968	54.1	4.37	31	39.6	4.72	31	46.6	4.23	31	14.4	3.50	31
1969	55.2	4.05	31	41.0	3.13	31	47.8	3.25	31	14.2	3.03	31
1970	55.7	3.20	31	41.2	3.49	31	48.2	2.86	31	14.5	3.65	31
18-YR	54.5	1.96	17	40.0	1.87	17	47.0	1.89	17	14.4	.61	17

AUGUST
A-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	78.9	6.95	31	52.8	4.34	31	65.7	5.25	31	26.1	4.92	31
1954	81.5	7.93	31	52.6	4.62	31	66.8	5.64	31	28.9	6.34	31
1955	80.3	6.36	31	54.5	4.19	31	67.1	5.03	31	25.7	4.24	31
1956	77.8	8.02	30	52.4	5.46	30	64.8	6.22	30	25.4	5.86	30
1957	82.3	6.29	31	55.0	4.06	31	68.5	4.85	31	27.3	3.89	31
1958	83.3	8.37	31	56.9	4.50	31	69.9	6.25	31	26.4	5.17	31
1959	81.5	8.16	31	55.0	4.37	31	68.0	5.69	31	26.5	6.61	31
1960	81.4	10.09	31	52.3	6.47	31	66.6	7.77	31	29.0	6.68	31
1961	79.6	5.28	31	53.3	2.59	31	66.2	3.87	31	26.3	3.29	31
1962	83.8	8.86	31	54.1	6.93	31	68.7	7.53	31	29.7	4.82	31
1963	75.5	6.82	31	52.7	2.96	31	63.9	4.38	31	22.7	5.73	31
1964	80.0	6.68	31	51.3	6.32	31	65.5	5.84	31	28.8	5.79	31
1965	75.9	7.91	31	52.1	5.52	31	63.7	6.36	31	23.7	4.87	31
1966	77.6	8.81	31	51.2	4.83	31	64.2	6.26	31	26.5	6.94	31
1967	77.0	8.81	31	51.7	4.56	31	64.1	6.32	31	25.4	6.21	31
1968	74.2	8.69	31	50.7	5.44	31	62.2	6.50	31	23.5	6.37	31
1969	82.0	7.33	31	55.0	4.39	31	68.3	5.58	31	27.1	4.73	31
1970	83.1	7.18	31	56.7	4.50	31	69.7	5.32	31	26.4	5.27	31
18-YR	79.8	2.89	18	53.3	1.84	18	66.3	2.23	18	26.4	1.92	18

AUGUST
B-1

YEAR	TMAX MEAN	TMAX S.D.	TMAX N	TMIN MEAN	TMIN S.D.	TMIN N	TMEAN MEAN	TMEAN S.D.	TMEAN N	TRANGE MEAN	TRANGE S.D.	TRANGE N
1953	73.3	6.27	31	48.5	4.12	31	60.6	4.67	31	24.8	4.71	31
1954	76.5	7.03	31	48.9	4.63	31	62.5	5.19	31	27.5	5.68	31
1955	73.0	5.34	31	50.4	3.99	31	61.4	4.40	31	22.6	3.64	31
1956	71.3	7.66	31	47.2	5.56	31	58.9	6.17	31	24.1	5.22	31
1957	75.9	5.07	31	50.4	4.17	31	62.9	4.28	31	25.5	3.39	31
1958	76.9	8.04	31	51.9	4.55	31	64.1	6.06	31	25.0	5.04	31
1959	74.6	7.64	31	49.9	4.12	31	62.1	5.55	31	24.7	5.60	31
1960	76.7	9.57	31	47.9	6.93	31	62.1	7.75	31	28.8	6.44	31
1961	73.3	5.15	31	48.9	3.31	31	60.8	4.05	31	24.4	3.31	31
1962	77.6	8.37	31	49.4	7.11	31	63.3	7.34	31	28.2	5.14	31
1963	70.6	6.12	31	49.5	3.05	31	59.9	4.14	31	21.1	5.09	31
1964	74.0	6.45	31	46.3	6.46	31	59.9	5.86	31	27.7	5.18	31
1965	70.7	7.46	31	48.5	5.20	31	59.4	6.00	31	22.2	4.69	31
1966	73.0	7.90	31	48.4	4.46	31	60.4	5.40	31	24.6	6.73	31
1967	71.3	7.99	24	48.4	4.23	24	59.5	5.72	24	22.9	5.36	24
1968	69.7	8.21	31	47.5	6.13	31	58.4	6.38	31	22.2	6.90	31
1969	78.2	6.66	31	51.1	5.49	31	64.5	5.54	31	27.1	5.06	31
1970	78.7	6.72	31	52.5	3.75	31	65.4	4.86	31	26.3	5.13	31
18-YR	74.4	2.82	17	49.2	1.66	17	61.6	2.03	17	25.1	2.27	17

AUGUST

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	65.1	4.04	31	40.9	3.97	31	52.7	2.95	31	24.2	5.42	31
1954	64.7	5.49	31	38.9	4.01	31	51.5	3.64	31	25.8	6.31	31
1955	63.6	3.45	31	41.9	4.67	31	52.5	3.47	31	21.7	4.51	31
1956	62.4	5.52	31	38.7	3.82	31	50.3	3.91	31	23.7	5.31	31
1957	65.0	4.22	31	42.5	3.40	31	53.5	3.18	31	22.5	4.48	31
1958	66.4	6.31	31	40.0	3.90	31	52.9	4.09	31	26.4	6.47	31
1959	64.5	5.61	31	41.6	3.72	31	52.8	3.82	31	22.9	5.58	31
1960	67.2	6.66	31	38.9	6.05	31	52.8	5.47	31	28.4	6.36	31
1961	64.5	3.89	31	40.6	3.24	31	52.3	2.48	31	23.8	5.24	31
1962	67.2	5.73	31	40.0	6.47	31	53.4	5.50	31	27.1	5.68	31
1963	63.4	4.41	31	42.0	3.73	31	52.5	3.34	31	21.3	4.71	31
1964	62.5	6.12	31	37.9	5.67	31	50.0	5.18	31	24.6	5.87	31
1965	61.3	6.17	31	37.9	4.03	31	49.4	4.06	31	23.4	6.71	31
1966	65.2	5.26	29	37.2	4.21	29	51.0	2.76	29	27.9	7.72	29
1967	60.6	6.50	31	36.2	3.96	31	48.2	4.05	31	24.4	7.17	31
1968	59.5	6.58	31	38.8	4.84	31	48.9	4.94	31	20.7	6.37	31
1969	65.7	4.52	29	41.2	3.65	29	53.2	3.00	29	24.5	5.58	29
1970	66.8	5.21	31	40.5	5.37	31	53.5	4.17	31	26.3	6.68	31
18-YR	64.2	2.23	18	39.8	1.80	18	51.7	1.70	18	24.4	2.21	18

AUGUST

-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	51.4	3.45	31	37.0	2.88	31	43.9	2.99	31	14.3	2.29	31
1954	53.4	4.98	24	38.9	4.58	24	45.9	4.62	24	14.5	2.98	24
1955	53.0	3.25	27	40.8	2.90	27	46.7	2.81	27	12.2	2.69	27
1956	49.9	5.89	31	35.5	5.23	31	42.4	5.38	31	14.5	3.11	31
1957	52.5	4.15	31	37.7	3.60	31	44.8	3.74	31	14.8	2.63	31
1958	55.1	5.21	31	41.0	3.87	31	47.8	4.49	31	14.2	2.68	31
1959	51.5	4.43	31	38.6	3.17	31	44.8	3.66	31	12.8	2.67	31
1960	54.3	5.25	31	37.8	6.96	31	45.7	5.70	31	16.5	4.31	31
1961	51.7	3.76	31	38.6	2.76	31	44.9	3.10	31	13.1	2.40	31
1962	53.6	4.70	31	37.6	5.59	31	45.4	4.98	31	16.0	2.86	31
1963	51.5	3.91	31	38.8	2.46	31	45.0	2.96	31	12.7	3.16	31
1964	48.1	6.76	31	33.9	6.49	31	40.8	6.39	31	14.2	3.53	31
1965	49.0	5.55	31	36.5	4.66	31	42.6	4.86	31	12.5	3.00	31
1966	53.4	4.61	31	37.7	4.28	31	45.3	4.04	31	15.6	3.57	31
1967	51.0	3.88	31	37.1	3.45	31	43.8	3.47	31	13.9	2.30	31
1968	49.3	5.69	31	35.4	6.10	31	42.0	5.43	31	13.9	4.71	31
1969	56.1	4.70	31	41.9	3.93	31	48.7	4.15	31	14.2	2.90	31
1970	56.4	4.62	26	42.4	2.79	26	49.2	3.46	26	14.0	3.12	26
18-YR	52.2	2.43	17	38.1	2.33	17	44.9	2.30	17	14.1	1.20	17

SEPTEMBER

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	77.0	8.26	30	48.6	6.56	30	62.6	6.77	30	28.4	6.12	30
1954	73.0	11.37	30	46.7	8.10	30	59.6	9.01	30	26.4	7.96	30
1955	72.7	13.25	30	46.4	8.94	30	59.3	10.88	30	26.2	6.56	30
1956	79.0	9.64	30	49.3	6.99	30	63.9	7.80	30	29.7	6.05	30
1957	70.6	10.72	30	44.5	7.34	30	57.4	8.70	30	26.1	6.11	30
1958	74.0	10.97	30	46.1	9.74	30	59.8	9.92	30	27.9	6.13	30
1959	68.5	18.09	30	44.1	11.72	30	56.0	14.68	30	24.3	8.38	30
1960	72.4	10.71	30	46.8	7.91	30	59.4	8.86	30	25.7	6.70	30
1961	61.7	13.94	30	38.5	9.00	30	49.8	10.89	30	23.2	9.01	30
1962	72.6	9.92	30	46.9	7.92	30	59.5	8.30	30	25.6	6.91	30
1963	74.4	6.97	30	50.4	3.97	30	62.2	4.97	30	24.0	5.85	30
1964	72.2	10.54	30	45.3	7.83	30	58.5	8.75	30	26.9	6.08	30
1965	59.3	16.41	30	38.8	10.81	30	48.8	13.19	30	20.5	8.72	30
1966	69.7	11.06	24	47.7	6.38	24	58.4	8.43	24	22.0	6.44	24
1967	69.7	8.93	30	45.9	6.55	30	57.6	7.25	30	23.8	5.71	30
1968	68.7	9.67	30	43.3	6.66	30	55.7	7.80	30	25.4	5.49	30
1969	71.7	7.43	26	47.4	5.02	26	59.3	5.74	26	24.3	5.21	26
1970	64.9	13.76	30	39.8	9.18	29	52.3	11.04	29	25.4	7.80	29
18-YR	70.7	5.05	17	45.2	3.46	17	57.7	4.17	17	25.5	2.14	17

SEPTEMBER

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	71.0	7.47	30	43.5	6.46	30	57.0	6.40	30	27.5	5.67	30
1954	70.0	9.34	30	43.4	7.47	30	56.4	7.89	30	26.6	6.23	30
1955	66.8	11.33	30	42.6	8.32	30	54.5	9.61	30	24.2	5.65	30
1956	73.6	8.92	30	44.4	6.67	30	58.8	7.20	30	29.3	6.31	30
1957	66.1	9.78	30	40.0	7.55	30	52.8	8.44	30	26.1	5.16	30
1958	68.2	10.58	30	40.9	9.31	30	54.3	9.51	30	27.3	5.84	30
1959	63.3	16.72	30	39.8	11.13	30	51.3	13.60	30	23.5	7.55	30
1960	68.2	9.32	30	42.9	7.50	30	55.4	8.05	30	25.2	5.26	30
1961	57.2	12.84	30	34.6	9.12	30	45.7	10.63	30	22.7	6.85	30
1962	68.0	8.61	30	43.2	7.20	30	55.4	7.46	30	24.8	5.43	30
1963	68.6	6.55	30	46.0	3.58	30	57.0	4.41	30	22.6	5.82	30
1964	67.1	10.40	30	40.9	7.44	30	53.7	8.48	30	26.2	6.53	30
1965	55.4	14.08	30	35.0	9.90	30	44.9	11.55	30	20.4	7.22	30
1966	65.9	9.83	30	43.6	6.46	30	54.5	7.67	30	22.3	6.30	30
1967	64.3	8.69	30	42.2	6.63	30	53.0	7.18	30	22.0	5.42	30
1968	64.6	9.34	30	39.7	6.87	30	51.9	7.91	30	25.0	4.33	30
1969	68.7	7.39	30	44.8	4.69	30	56.5	5.65	30	23.9	4.74	30
1970	63.4	11.99	30	36.2	9.01	30	49.6	10.13	30	27.2	6.85	30
18-YR	66.1	4.45	18	41.3	3.29	18	53.5	3.74	18	24.8	2.33	18

SEPTEMBER

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	61.5	5.10	30	35.6	5.93	30	48.3	4.76	30	25.9	5.71	30
1954	59.5	6.34	30	36.7	5.58	30	47.9	4.89	30	22.7	7.02	30
1955	58.7	7.37	30	34.4	6.10	30	46.3	6.17	30	24.3	5.71	30
1956	63.5	5.84	30	35.2	6.89	30	49.2	5.25	30	28.3	7.30	30
1957	56.7	7.65	30	31.3	5.05	30	43.8	5.70	30	25.5	6.13	30
1958	59.9	8.83	30	33.6	6.36	30	46.5	7.12	30	26.3	6.01	30
1959	55.4	14.24	30	32.3	9.18	30	43.6	11.31	30	23.1	8.57	30
1960	60.5	7.61	30	36.0	6.66	30	48.0	6.76	30	24.5	5.13	30
1961	50.2	10.86	30	29.3	6.65	30	39.6	8.21	30	20.9	7.59	30
1962	60.5	6.85	30	33.7	6.51	30	46.9	5.54	30	26.8	7.67	30
1963	61.5	4.88	30	36.3	4.68	30	48.7	2.99	30	25.2	7.42	30
1964	57.7	7.56	30	32.7	6.74	30	45.0	6.30	30	25.0	6.98	30
1965	49.1	9.77	30	30.4	8.08	30	39.6	8.45	30	18.6	6.42	30
1966	56.5	7.77	30	34.3	4.47	30	45.2	5.36	30	22.3	6.77	30
1967	54.8	7.56	30	33.4	5.70	30	43.8	5.79	30	21.4	6.74	30
1968	55.4	9.40	30	32.5	6.17	30	43.7	6.87	30	22.9	8.18	30
1969	58.0	5.33	30	35.6	4.36	30	46.5	3.64	30	22.4	6.43	30
1970	53.8	9.88	24	29.3	6.34	24	41.4	7.40	24	24.5	7.29	24
18-YR	57.6	3.86	17	33.7	2.12	17	45.4	2.86	17	23.9	2.42	17

SEPTEMBER

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	49.1	4.31	30	33.7	4.60	30	41.1	4.27	30	15.5	2.60	30
1954	45.4	7.98	21	32.8	6.11	21	38.8	6.96	21	12.6	3.87	21
1955	47.5	6.06	22	32.7	6.37	22	39.9	6.04	22	14.8	2.92	22
1956	51.6	5.30	30	34.4	4.84	30	42.6	4.80	30	17.2	3.21	30
1957	42.9	7.86	30	28.4	6.51	30	35.4	7.08	30	14.5	3.76	30
1958	48.3	7.15	30	31.9	7.43	30	39.9	7.07	30	16.4	3.07	30
1959	44.0	12.90	28	30.7	10.78	29	37.6	11.27	28	12.5	4.18	28
1960	47.3	7.40	30	33.0	5.93	30	40.0	6.46	30	14.3	3.26	30
1961	37.2	9.43	30	24.9	8.61	30	30.7	8.78	30	12.3	4.32	30
1962	46.5	7.52	30	32.0	7.12	30	39.1	7.16	30	14.5	3.28	30
1963	50.1	4.49	30	36.6	3.33	30	43.0	3.65	30	13.5	2.86	30
1964	44.2	6.65	30	30.0	5.13	30	36.9	5.68	30	14.2	3.47	30
1965	37.7	8.95	30	25.5	7.38	30	31.3	7.90	30	12.2	4.24	30
1966	46.7	6.80	30	31.9	5.52	30	39.0	5.99	30	14.8	2.85	30
1967	43.9	8.48	30	29.9	6.92	30	36.6	7.44	30	14.0	3.98	30
1968	42.9	9.10	30	28.4	7.14	30	35.4	8.06	30	14.5	3.55	30
1969	45.9	5.63	30	32.2	4.05	30	38.8	4.63	30	13.7	3.04	30
1970	43.6	8.41	30	29.3	7.92	30	36.2	8.00	30	14.3	3.15	30
18-YR	45.1	3.96	16	30.8	3.09	16	37.7	3.50	16	14.3	1.35	16

OCTOBER

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	65.5	10.94	31	37.2	8.35	31	51.1	8.97	31	28.3	7.97	31
1953	62.6	13.79	31	38.8	8.62	31	50.5	10.78	31	23.8	7.62	31
1954	59.6	13.88	31	33.6	10.95	31	46.4	11.90	31	26.0	7.83	31
1955	64.1	10.49	31	38.4	7.81	31	51.1	8.90	31	25.7	4.62	31
1956	67.6	10.59	31	40.5	7.49	31	53.8	8.79	31	27.0	5.61	31
1957	56.4	11.45	31	37.3	7.63	31	46.5	8.97	31	19.1	7.42	31
1958	63.9	13.95	31	38.7	10.71	31	51.1	11.92	31	25.2	6.88	31
1959	55.3	12.13	31	30.6	7.94	31	42.8	9.13	31	24.7	9.06	31
1960	58.5	12.54	31	36.6	9.10	31	47.3	10.49	31	21.9	5.89	31
1961	59.0	11.89	31	34.7	9.43	31	46.6	9.96	31	24.3	7.78	31
1962	65.7	9.19	31	39.9	7.08	31	52.5	7.78	31	25.8	5.54	31
1963	67.4	9.94	31	44.4	8.20	31	55.6	8.82	31	23.0	4.69	31
1964	64.0	9.79	31	35.5	7.51	31	49.5	8.10	31	28.5	6.63	31
1965	64.3	8.99	31	39.7	6.30	31	51.8	7.37	31	24.6	5.08	31
1966	61.5	10.23	31	35.4	9.13	31	48.2	9.31	31	26.2	5.79	31
1967	62.6	10.32	23	37.2	10.46	23	49.7	9.95	23	25.3	5.87	23
1968	61.2	9.73	31	36.4	8.89	31	48.6	8.93	31	24.8	5.62	31
1969	44.3	13.24	31	25.4	10.03	31	34.6	11.07	31	18.9	7.79	31
18-YR	61.2	5.65	17	36.7	4.24	17	48.7	4.80	17	24.6	2.68	17

OCTOBER

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	61.2	10.43	31	33.6	7.34	31	47.2	8.16	31	27.6	7.44	31
1953	59.0	12.30	31	35.5	8.10	31	47.0	9.85	31	23.5	7.10	31
1954	58.2	12.58	31	32.8	11.69	31	45.3	11.74	31	25.4	6.03	31
1955	59.1	10.84	31	33.3	7.73	31	45.9	8.98	31	25.8	5.11	31
1956	62.6	9.75	31	35.1	6.83	31	48.6	7.99	31	27.5	5.29	31
1957	54.5	11.12	31	33.3	7.99	31	43.7	9.08	31	21.1	7.12	31
1958	58.5	12.92	31	34.0	10.53	31	46.1	11.41	31	24.6	5.75	31
1959	52.6	9.47	28	28.4	7.68	26	40.0	8.10	26	23.7	6.37	26
1960	55.5	12.02	31	33.1	9.27	31	44.0	10.42	31	22.4	5.00	31
1961	55.9	11.36	31	31.3	8.45	31	43.3	9.27	31	24.6	7.62	31
1962	60.4	8.75	31	35.1	7.12	31	47.5	7.31	31	25.3	5.99	31
1963	62.6	9.39	31	39.9	8.28	31	51.0	8.54	31	22.7	4.83	31
1964	59.3	8.93	31	31.6	7.54	31	45.2	7.73	31	27.7	6.35	31
1965	61.1	8.55	31	37.1	6.04	31	48.8	6.99	31	24.0	4.86	31
1966	56.8	9.44	31	32.5	8.18	31	44.4	8.40	31	24.3	5.38	31
1967	56.3	9.76	31	31.4	8.81	31	43.6	8.89	31	24.9	5.30	31
1968	57.1	10.09	31	33.9	8.19	31	45.3	8.86	31	23.2	5.20	31
1969	44.1	12.15	31	23.1	9.82	31	33.4	10.22	31	21.0	8.56	31
18-YR	57.5	4.32	18	33.1	3.50	18	45.0	3.82	18	24.4	1.99	18

OCTOBER

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	52.9	7.56	31	27.6	6.04	31	40.0	6.02	31	25.4	6.70	31
1953	49.0	11.09	31	27.8	6.15	31	38.1	8.00	31	21.2	7.91	31
1954	48.8	10.63	31	29.1	11.14	31	38.7	10.42	31	19.7	5.96	31
1955	49.1	10.64	31	28.1	7.30	31	38.3	8.42	31	21.0	7.10	31
1956	51.9	7.97	31	27.2	5.99	31	39.3	6.36	31	24.7	5.79	31
1957	46.7	9.08	31	26.8	6.30	31	36.5	6.83	31	20.0	7.39	31
1958	50.5	10.33	31	26.3	9.85	31	38.1	9.56	31	24.3	6.42	31
1959	44.8	9.32	31	25.1	8.35	31	34.7	8.06	31	19.8	7.39	31
1960	47.6	10.55	31	27.5	7.95	31	37.3	8.74	31	20.2	6.74	31
1961	48.4	8.86	28	27.8	5.76	28	37.9	6.54	28	20.6	7.13	28
1962	51.3	7.82	31	27.8	5.55	31	39.3	5.92	31	23.5	6.80	31
1963	54.5	7.59	31	30.8	5.51	31	42.4	5.67	31	23.7	7.07	31
1964	50.4	7.69	31	27.1	6.86	31	38.5	6.52	31	23.3	6.44	31
1965	52.1	6.97	31	29.1	4.77	31	40.3	4.59	31	23.1	7.60	31
1966	45.2	8.67	31	25.0	7.73	31	34.8	7.50	31	20.2	6.68	31
1967	46.9	9.34	31	27.9	8.18	31	37.1	8.36	31	19.0	5.02	31
1968	47.3	8.71	31	27.6	6.22	31	37.2	7.03	31	19.7	5.89	31
1969	37.3	10.11	31	19.5	8.66	31	28.1	8.83	31	17.8	6.48	31
18-YR	48.6	3.86	18	27.1	2.33	18	37.6	2.99	18	21.5	2.21	18

OCTOBER

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	40.8	6.46	31	26.9	6.16	31	33.6	6.01	31	13.9	3.43	31
1953	36.2	10.09	27	24.0	8.20	27	29.8	9.07	27	12.2	3.72	27
1954	10.0	-0.00	1	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1955	33.7	11.72	20	20.4	10.60	20	26.8	10.96	20	13.3	4.62	20
1956	38.3	8.20	31	22.7	9.04	31	30.2	8.55	31	15.5	3.11	31
1957	33.7	8.80	31	22.5	6.29	31	27.9	7.30	31	11.2	4.17	31
1958	38.2	9.66	31	24.2	9.29	31	31.0	9.24	31	14.0	4.58	31
1959	30.1	5.81	31	17.9	6.55	31	23.8	5.76	31	12.2	4.25	31
1960	33.8	9.87	31	21.3	9.57	31	27.3	9.57	31	12.6	3.27	31
1961	34.4	8.26	31	20.8	8.01	31	27.4	7.76	31	13.5	4.66	31
1962	37.8	6.85	31	24.8	5.49	31	31.1	5.87	31	13.0	4.23	31
1963	40.9	8.11	31	28.7	6.40	31	34.6	7.07	31	12.2	3.84	31
1964	37.2	7.26	31	23.8	6.33	31	30.4	6.65	31	13.4	3.44	31
1965	38.0	6.53	31	26.1	5.42	31	31.7	5.79	31	11.9	2.76	31
1966	32.4	8.24	31	20.3	8.35	31	26.1	7.95	31	12.1	4.83	31
1967	34.5	9.51	31	20.4	9.68	31	27.1	9.37	31	14.1	4.48	31
1968	31.7	9.25	31	19.9	8.17	31	25.5	8.32	31	11.8	5.22	31
1969	23.2	8.49	31	13.0	8.50	31	17.8	8.29	31	10.2	4.42	31
18-YR	35.1	4.46	16	22.3	3.79	16	28.5	4.09	16	12.7	1.31	16

NOVEMBER

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	41.3	15.94	30	20.2	12.47	30	30.4	13.78	30	21.1	7.63	30
1953	49.9	13.77	30	29.6	11.06	30	39.5	12.03	30	20.3	6.74	30
1954	52.4	11.01	30	29.9	8.23	30	40.9	9.32	30	22.6	6.17	30
1955	43.8	13.14	30	21.4	11.25	30	32.4	11.67	30	22.3	7.34	30
1956	47.4	12.34	30	24.2	10.70	30	35.5	11.20	30	23.1	5.64	30
1957	40.9	11.13	30	23.6	8.56	30	32.0	9.17	30	17.3	7.46	30
1958	50.1	12.84	30	27.2	11.25	30	38.4	11.52	30	22.9	6.66	30
1959	46.7	14.42	30	20.4	13.39	30	33.3	13.01	30	26.3	9.71	30
1960	48.8	10.43	30	27.2	8.12	30	37.8	8.73	30	21.6	6.52	30
1961	43.7	10.92	30	22.8	8.40	30	32.9	9.05	30	20.8	7.08	30
1962	52.1	11.37	30	30.7	8.78	30	41.2	9.55	30	21.4	7.03	30
1963	52.6	7.89	30	30.3	7.46	30	41.1	7.35	30	22.3	4.48	30
1964	45.9	13.94	30	25.3	9.50	30	35.4	11.29	30	20.6	7.48	30
1965	52.9	8.72	30	32.7	6.68	30	42.6	7.35	30	20.2	4.95	30
1966	50.3	8.91	30	28.4	9.67	30	39.1	8.66	30	21.9	6.78	30
1967	49.5	10.77	30	26.5	11.68	30	37.8	10.84	30	23.0	6.30	30
1968	42.4	8.98	22	23.5	7.70	22	32.7	7.83	22	18.9	5.65	22
1969	47.4	9.52	30	24.3	9.79	30	35.6	9.27	30	23.1	5.21	30
18-YR	48.0	3.85	17	26.2	3.80	17	36.8	3.72	17	21.8	1.87	17

NOVEMBER

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	37.3	16.02	30	16.0	12.42	30	26.4	13.89	30	21.3	7.46	30
1953	47.2	11.93	30	27.7	10.49	30	37.2	10.75	30	19.5	6.42	30
1954	47.9	11.58	30	25.8	8.65	30	36.6	9.66	30	22.1	6.62	30
1955	39.5	10.87	30	17.9	10.91	30	28.4	10.33	30	21.6	7.07	30
1956	42.6	13.77	21	21.8	10.66	21	31.9	11.95	21	20.9	6.44	21
1957	35.1	10.76	30	18.1	8.65	30	26.3	9.12	30	17.0	6.71	30
1958	46.5	10.04	30	23.5	11.72	30	34.7	10.58	30	23.0	5.88	30
1959	41.5	11.76	30	18.8	12.99	30	29.9	11.65	30	22.7	8.35	30
1960	45.1	8.60	30	23.1	8.01	30	33.8	7.64	30	22.1	6.65	30
1961	41.2	10.89	30	18.4	8.34	30	29.5	8.72	30	22.9	8.03	30
1962	46.4	9.58	30	27.2	7.49	30	36.6	8.08	30	19.2	5.78	30
1963	47.1	6.92	30	26.2	6.66	30	36.4	6.44	30	20.9	4.49	30
1964	42.7	12.49	30	22.2	9.20	30	32.2	10.53	30	20.5	6.08	30
1965	47.5	9.07	30	29.2	7.10	30	38.2	7.73	30	18.2	4.99	30
1966	47.7	7.55	30	28.1	8.12	30	37.7	7.43	30	19.6	4.66	30
1967	43.2	9.60	30	22.0	12.34	30	32.4	10.31	30	21.2	7.73	30
1968	38.6	9.70	30	19.8	9.29	30	29.0	9.17	30	18.9	5.44	30
1969	44.3	10.23	30	21.3	9.76	30	32.5	9.64	30	23.0	5.06	30
18-YR	43.5	4.03	17	22.7	4.14	17	32.8	4.00	17	20.8	1.81	17

NOVEMBER

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	30.0	13.64	30	11.6	12.38	30	20.6	12.34	30	18.4	7.85	30
1953	36.3	10.78	30	20.5	9.93	30	28.2	9.92	30	15.9	6.19	30
1954	39.1	11.00	30	21.8	8.64	30	30.2	9.30	30	17.3	6.62	30
1955	33.7	7.23	19	18.5	7.98	19	25.8	6.87	19	15.2	6.99	19
1956	31.9	11.55	30	12.7	12.95	30	22.1	11.62	30	19.2	7.78	30
1957	28.2	9.93	30	11.9	9.20	30	19.8	9.22	30	16.3	5.38	30
1958	37.8	9.00	30	20.0	9.79	30	28.7	8.72	30	17.8	6.87	30
1959	34.3	10.15	30	17.8	9.77	30	25.9	9.29	30	16.5	7.41	30
1960	37.5	8.21	30	19.3	7.76	30	28.2	7.39	30	18.2	5.80	30
1961	35.6	6.61	25	14.1	9.53	25	24.6	6.83	25	21.6	9.11	25
1962	39.7	8.79	30	21.8	8.66	30	30.4	8.17	30	17.9	6.49	30
1963	40.3	6.44	30	22.0	7.34	30	30.9	5.88	30	18.3	7.05	30
1964	35.6	10.39	30	17.4	7.14	30	26.3	8.11	30	18.2	7.63	30
1965	37.0	8.83	30	22.4	6.61	30	29.5	7.07	30	14.7	6.83	30
1966	37.6	7.00	30	21.6	8.26	30	29.4	7.13	30	16.0	5.55	30
1967	34.8	9.46	30	19.0	10.28	30	26.6	9.29	30	15.8	6.68	30
1968	31.1	8.92	30	13.1	11.19	30	21.9	9.23	30	17.9	8.39	30
1969	35.3	8.14	30	14.7	11.05	30	24.7	7.94	30	20.6	11.26	30
18-YR	35.4	3.43	17	17.7	3.90	17	26.3	3.57	17	17.7	1.76	17

NOVEMBER

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	18.2	11.32	30	6.7	12.55	30	12.3	11.55	30	11.4	5.23	30
1953	24.5	7.85	24	15.0	8.69	24	19.5	7.86	24	9.5	5.12	24
1954	28.2	8.41	18	16.8	5.39	18	22.3	6.66	18	11.3	4.95	18
1955	21.1	4.08	20	12.0	4.84	20	16.3	3.93	20	9.1	4.33	20
1956	17.6	10.86	22	4.4	10.57	22	10.8	9.77	22	13.2	8.15	22
1957	13.8	9.49	30	3.9	9.25	30	8.7	8.94	30	9.9	5.06	30
1958	25.9	7.29	30	13.4	9.99	30	19.4	8.05	30	12.5	6.15	30
1959	19.6	8.88	30	8.2	10.35	30	13.7	9.23	30	11.4	4.91	30
1960	23.8	6.59	27	11.2	8.04	28	17.6	6.70	27	12.0	4.60	27
1961	21.4	6.68	30	8.5	8.80	30	14.7	7.40	30	12.9	5.17	30
1962	26.4	6.87	30	15.8	7.51	30	20.9	7.00	30	10.6	3.61	30
1963	25.8	5.18	30	14.5	6.44	30	19.9	5.35	30	11.3	4.84	30
1964	21.4	9.27	30	10.1	9.11	30	15.5	9.02	30	11.4	3.85	30
1965	24.2	9.73	30	15.1	9.15	30	19.4	9.31	30	9.1	3.61	30
1966	24.2	6.11	30	14.4	7.91	30	19.1	6.72	30	9.7	4.50	30
1967	20.4	9.79	30	11.4	10.87	30	15.7	10.11	30	9.0	3.85	30
1968	19.3	8.68	30	8.3	8.88	30	13.6	8.44	30	11.0	4.86	30
1969	22.3	7.82	30	10.0	8.07	30	15.9	7.39	30	12.4	5.16	30
18-YR	21.9	3.52	14	10.8	3.53	14	16.2	3.45	14	11.1	1.23	14

DECEMBER

A-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	39.6	9.36	31	21.5	7.61	31	30.3	8.15	31	18.0	5.22	31
1953	37.8	9.53	31	18.2	8.31	31	27.7	8.31	31	19.6	6.45	31
1954	44.9	10.69	31	24.2	10.28	31	34.3	9.90	31	20.7	6.57	31
1955	43.2	12.27	29	24.6	13.06	29	33.8	12.16	29	18.7	8.05	29
1956	45.7	10.38	31	25.3	8.46	31	35.3	9.16	31	20.4	5.56	31
1957	47.2	8.84	31	26.5	8.99	31	36.6	8.11	31	20.6	7.37	31
1958	44.7	8.44	31	24.2	9.13	31	34.2	8.26	31	20.5	6.16	31
1959	45.3	8.52	31	23.0	8.03	31	33.9	7.75	31	22.2	5.58	31
1960	42.4	10.80	31	20.0	8.90	31	31.0	9.50	31	22.4	5.34	31
1961	35.9	12.29	31	16.1	12.75	31	25.9	12.26	31	19.8	4.73	31
1962	46.0	12.48	31	23.2	10.95	31	34.4	11.37	31	22.8	5.87	31
1963	39.8	11.75	31	19.7	11.86	31	29.5	11.36	31	20.1	6.19	31
1964	40.2	8.43	31	19.7	11.80	31	29.6	9.64	31	20.5	7.40	31
1965	44.3	12.08	31	24.2	11.53	31	34.0	11.39	31	20.0	5.83	31
1966	41.5	11.73	31	20.8	10.13	31	30.8	10.38	31	20.7	6.86	31
1967	35.7	12.15	30	13.3	10.84	30	24.2	10.93	30	22.4	7.41	30
1968	38.1	12.22	31	16.4	10.80	31	27.0	10.99	31	21.7	6.74	31
1969	42.3	11.71	31	24.2	9.96	31	33.0	10.49	31	18.1	5.62	31
18-YR	41.9	3.54	18	21.4	3.65	18	31.4	3.52	18	20.5	1.42	18

DECEMBER

B-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	36.2	10.89	31	17.6	8.80	31	26.7	9.30	31	18.6	6.71	31
1953	33.3	9.09	31	13.8	8.75	31	23.4	8.24	31	19.5	6.92	31
1954	39.6	11.02	31	18.7	9.90	31	28.9	9.84	31	20.9	6.84	31
1955	38.3	10.07	31	19.5	11.49	31	28.6	10.15	31	18.9	7.34	31
1956	41.9	10.24	31	20.6	8.68	31	31.0	9.02	31	21.2	5.58	31
1957	40.0	9.06	31	20.7	8.30	31	30.1	8.13	31	19.3	6.27	31
1958	37.5	7.87	31	19.2	9.19	31	28.1	8.07	31	18.4	5.91	31
1959	41.5	8.58	31	18.6	7.00	31	29.8	7.32	31	22.9	5.85	31
1960	38.1	10.28	31	16.9	8.70	31	27.2	9.11	31	21.2	5.68	31
1961	31.0	11.20	31	11.8	12.06	31	21.2	11.27	31	19.2	4.87	31
1962	40.5	11.85	31	20.1	11.35	31	30.1	11.35	31	20.5	5.31	31
1963	36.6	11.00	28	18.3	9.56	28	27.2	9.93	28	18.3	5.91	28
1964	34.4	8.23	31	14.9	11.70	31	24.3	9.24	31	19.5	8.02	31
1965	40.0	11.27	31	20.9	11.02	31	30.2	10.84	31	19.1	5.51	31
1966	37.6	11.18	31	19.1	10.13	31	28.0	10.45	31	18.5	4.82	31
1967	31.2	10.17	29	10.2	9.45	30	20.6	9.27	29	20.7	6.44	29
1968	33.3	11.37	31	14.5	10.30	31	23.6	10.41	31	18.8	6.13	31
1969	37.3	12.11	31	20.6	11.47	31	28.6	11.37	31	16.6	6.22	31
18-YR	37.1	3.35	18	17.6	3.22	18	27.1	3.17	18	19.6	1.45	18

DECEMBER

C-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	27.1	9.35	31	13.0	8.52	31	19.8	8.38	31	14.1	5.86	31
1953	24.8	7.63	31	9.2	9.05	31	16.7	7.24	31	15.6	8.26	31
1954	31.6	9.48	28	15.6	8.21	28	23.4	8.31	28	16.0	5.99	28
1955	31.1	9.28	25	19.8	9.63	25	25.3	9.09	25	11.4	5.09	25
1956	32.8	8.78	31	14.9	8.77	31	23.6	7.83	31	17.9	7.76	31
1957	30.4	7.96	31	15.7	8.55	31	22.8	7.81	31	14.7	5.92	31
1958	30.6	7.74	31	16.6	10.00	31	23.5	8.19	31	14.0	7.27	31
1959	34.6	7.46	31	16.4	8.10	31	25.3	6.90	31	18.3	7.14	31
1960	32.1	9.61	31	11.4	9.70	31	21.5	8.22	31	20.7	10.37	31
1961	22.1	9.76	31	8.1	10.24	31	14.9	9.64	31	14.1	4.43	31
1962	31.7	11.26	31	15.7	10.63	31	23.5	10.56	31	16.0	5.23	31
1963	27.6	11.46	31	11.4	9.76	31	19.3	9.76	31	16.2	7.96	31
1964	25.3	7.20	31	8.8	10.98	31	16.7	8.28	31	16.5	8.43	31
1965	32.5	10.39	31	14.4	11.43	31	23.2	10.42	31	18.0	6.80	31
1966	28.4	10.01	31	11.0	10.98	31	19.5	9.63	31	17.4	8.17	31
1967	22.2	10.16	31	4.5	10.29	31	13.1	9.45	31	17.8	7.31	31
1968	25.1	10.79	31	9.9	10.53	31	17.3	10.10	31	15.2	6.88	31
1969	28.0	11.52	31	11.3	11.39	31	19.5	10.62	31	16.7	8.25	31
18-YR	28.8	3.73	18	12.6	3.81	18	20.5	3.63	18	16.1	2.12	18

DECEMBER

D-1	TMAX			TMIN			TMEAN			TRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	15.2	8.96	31	4.7	8.87	31	9.7	8.42	31	10.5	4.80	31
1953	13.4	6.57	17	3.4	7.25	17	8.2	6.39	17	9.9	4.96	17
1954	20.9	11.63	17	9.2	10.73	17	14.9	10.71	17	11.7	5.69	17
1955	22.0	8.16	19	11.9	10.39	19	16.7	8.71	19	10.1	6.72	19
1956	19.7	9.34	22	6.3	10.06	22	12.8	9.28	22	13.4	4.82	22
1957	16.6	6.87	31	4.0	9.11	31	10.1	7.52	31	12.6	5.31	31
1958	18.1	6.65	31	8.7	7.06	31	13.2	6.47	31	9.4	4.24	31
1959	19.8	7.69	31	7.8	8.45	31	13.7	7.78	31	12.1	4.08	31
1960	17.6	9.52	31	5.5	8.54	31	11.3	8.56	31	12.2	5.29	31
1961	9.5	8.05	31	-1.9	9.84	31	3.7	8.43	31	11.3	5.43	31
1962	19.2	9.38	31	8.9	9.90	31	13.9	9.34	31	10.3	4.12	31
1963	15.5	10.88	31	3.6	9.40	31	9.5	9.48	31	11.8	6.84	31
1964	13.2	7.04	31	2.7	8.96	31	7.8	7.59	31	10.5	4.77	31
1965	18.8	9.70	31	8.9	9.31	31	13.6	9.34	31	9.8	3.95	31
1966	16.6	9.12	31	4.7	9.78	31	10.5	8.76	31	11.9	6.22	31
1967	11.5	9.73	31	-2.2	11.07	31	4.5	9.33	31	13.7	8.46	31
1968	11.1	9.02	31	.2	10.54	31	5.6	9.18	31	10.9	6.32	31
1969	15.9	13.19	31	5.7	12.51	31	10.7	12.47	31	10.1	4.17	31
18-YR	15.6	3.21	14	4.4	3.70	14	9.9	3.37	14	11.2	1.21	14

Table 3.2 Mean daily maximum, minimum, mean relative humidity and range (%) at the four stations, October 1952-September 1970 (S.D. = standard deviation, N = number of cases).

JANUARY

A-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	65.9	20.17	29	31.0	8.60	29	48.1	12.02	29	34.9	19.57	29
1954	74.0	22.54	31	34.3	17.38	31	53.8	17.41	31	39.7	20.06	31
1955	71.6	23.42	31	32.8	14.74	31	51.9	17.66	31	38.7	16.97	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	86.9	19.50	28	49.9	27.99	28	68.2	21.47	28	37.1	22.35	28
1958	72.8	24.34	31	35.9	16.58	31	54.2	18.45	31	36.9	19.37	31
1959	83.3	23.24	31	44.0	22.13	31	63.5	19.78	31	39.3	22.10	31
1960	80.4	22.83	31	40.2	23.45	31	60.1	20.82	31	40.3	20.32	31
1961	56.7	29.47	26	21.1	10.29	25	37.8	17.94	25	33.8	24.00	25
1962	69.7	32.04	27	29.2	22.75	25	48.1	25.15	25	38.1	24.08	25
1963	74.8	27.38	28	32.4	14.43	28	53.4	19.29	28	42.4	20.58	28
1964	83.3	19.66	31	40.2	16.19	31	61.5	15.86	31	43.2	17.21	31
1965	89.0	18.74	31	42.7	17.56	31	65.7	16.58	31	46.3	14.56	31
1966	83.3	23.47	31	42.9	21.89	31	62.9	20.45	31	40.4	19.99	31
1967	72.6	26.76	31	29.7	17.23	31	51.0	18.86	31	42.9	24.85	31
1968	70.4	29.14	31	23.9	19.99	31	46.9	21.53	31	46.5	25.49	31
1969	71.4	30.84	31	22.6	18.62	31	46.8	20.85	31	48.8	29.27	31
1970	81.1	22.54	29	32.8	14.19	29	56.7	15.42	29	48.3	21.74	29
18-YR	75.7	8.32	17	34.4	8.05	17	54.7	8.09	17	41.0	4.49	17

JANUARY

B-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	85.8	11.83	31	48.1	18.38	31	66.7	12.92	31	37.7	17.08	31
1954	80.1	21.21	28	34.2	12.75	28	57.0	14.10	28	45.9	20.64	28
1955	73.4	25.74	9	34.3	12.66	9	53.8	17.82	9	39.1	19.50	9
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	88.6	17.99	29	42.4	18.99	29	65.3	16.10	29	46.2	18.18	29
1958	74.3	25.38	31	35.3	17.89	31	54.5	19.64	31	39.0	19.65	31
1959	83.8	22.89	24	38.6	19.68	24	61.0	18.43	24	45.2	21.71	24
1960	83.7	20.89	31	42.0	19.31	31	62.6	18.38	31	41.6	16.53	31
1961	64.3	29.49	31	28.9	18.33	31	46.6	21.59	31	35.4	23.39	31
1962	74.2	26.22	28	38.2	19.78	28	55.9	21.49	28	36.0	17.57	28
1963	80.1	23.68	28	40.1	12.79	28	59.8	16.53	28	40.1	19.04	28
1964	72.2	25.30	31	27.7	11.80	31	49.7	16.64	31	44.5	21.32	31
1965	87.8	18.30	31	43.6	16.32	31	65.5	15.00	31	44.3	17.31	31
1966	73.9	26.25	31	34.2	18.37	31	53.9	19.88	31	39.7	21.93	31
1967	79.8	19.76	31	40.4	16.35	31	60.0	15.85	31	39.5	17.85	31
1968	75.2	23.40	31	32.7	10.91	31	53.8	15.37	31	42.5	19.64	31
1969	76.8	22.81	31	30.3	17.18	31	53.4	16.46	31	46.5	23.48	31
1970	80.1	17.95	31	42.5	11.73	31	61.2	12.51	31	37.6	16.99	31
18-YR	78.5	6.50	15	37.4	6.00	15	57.7	5.93	15	41.1	3.73	15

JANUARY

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	90.2	14.87	31	46.5	18.33	31	68.2	14.71	31	43.7	16.17	31
1954	86.1	19.46	31	38.9	16.83	31	62.5	16.19	31	47.1	16.64	31
1955	91.2	18.62	23	48.0	25.08	23	69.5	19.27	23	43.2	21.94	23
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	98.1	4.96	29	59.8	23.80	29	78.7	13.06	29	38.3	22.38	29
1958	86.2	18.50	31	42.5	26.53	31	64.2	19.89	31	43.6	22.79	31
1959	89.0	21.54	31	45.1	23.04	31	66.9	20.18	31	43.8	19.16	31
1960	90.6	16.42	31	52.3	20.65	31	71.4	16.93	31	38.3	16.12	31
1961	66.4	28.98	31	25.5	18.49	31	45.6	21.66	31	40.9	22.15	31
1962	75.0	25.29	31	38.8	25.40	31	56.7	23.97	31	36.2	16.91	31
1963	88.4	20.34	29	50.7	22.54	29	69.2	18.79	29	37.7	20.66	29
1964	86.9	17.99	29	38.2	20.67	28	62.3	17.51	28	48.4	17.22	28
1965	90.7	16.75	31	42.3	24.24	31	66.3	18.38	31	48.4	19.90	31
1966	83.5	24.49	26	37.4	17.07	26	60.3	19.24	26	46.1	17.62	26
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	78.2	21.35	31	38.9	15.92	31	58.3	17.16	31	39.3	15.81	31
1969	91.5	14.48	31	40.3	17.72	31	65.8	13.20	31	51.3	18.55	31
1970	89.6	13.73	31	48.3	20.94	31	68.9	15.25	31	41.3	18.04	31
18-YR	86.0	7.73	15	43.0	7.98	15	64.3	7.53	15	43.0	4.58	15

JANUARY

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	100.0	0.00	31	75.8	25.65	31	87.8	12.88	31	24.2	25.65	31
1954	94.9	10.66	19	57.1	25.94	19	75.9	16.44	19	37.8	22.21	19
1955	91.1	17.55	10	63.6	29.99	10	77.2	21.48	10	27.5	24.08	10
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	96.8	2.89	14	61.4	27.78	14	78.9	13.91	14	35.4	28.30	14
1958	79.3	22.31	31	46.4	26.60	31	62.7	21.97	31	32.8	21.88	31
1959	90.8	20.06	25	61.9	31.65	25	76.2	23.27	25	28.9	25.65	25
1960	95.8	17.91	18	58.9	35.11	17	77.1	23.04	17	36.6	32.27	17
1961	71.5	29.41	28	33.8	32.38	28	52.5	27.46	28	37.7	28.79	28
1962	84.7	23.63	26	50.2	33.85	25	67.6	25.76	25	35.1	28.15	25
1963	96.2	10.34	28	76.6	28.43	28	86.3	17.80	28	19.6	23.97	28
1964	97.2	12.30	20	63.1	37.73	13	79.2	22.94	13	32.7	35.25	13
1965	96.0	13.04	25	66.0	36.07	25	80.9	21.58	25	30.1	33.20	25
1966	89.7	22.03	19	53.2	35.64	19	71.3	25.18	19	36.5	31.73	19
1967	97.6	8.51	23	66.3	27.56	23	81.7	16.25	23	31.3	24.85	23
1968	86.0	20.05	27	32.4	21.79	28	58.7	19.12	27	54.0	18.17	27
1969	97.9	8.10	23	51.4	25.06	23	74.5	13.73	23	46.5	25.33	23
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
18-YR	88.1	9.60	8	55.4	17.40	8	71.6	13.16	8	32.8	10.35	8

FEBRUARY
A-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	81.9	19.52	28	36.5	16.78	28	59.0	15.33	28	45.4	19.83	28
1954	70.3	23.85	28	29.1	11.18	28	49.5	15.78	28	41.2	19.78	28
1955	79.3	23.13	28	32.8	18.49	28	55.9	18.93	28	46.5	17.77	28
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	83.7	21.45	28	34.8	17.88	28	59.1	16.27	28	48.9	22.44	28
1958	81.1	22.02	28	43.0	21.48	28	61.9	19.82	28	38.1	17.67	28
1959	88.8	20.25	28	39.9	18.36	28	64.2	16.68	28	48.9	19.85	28
1960	93.3	13.04	29	43.4	19.60	29	68.1	13.96	29	49.9	18.38	29
1961	79.3	21.34	28	36.9	25.15	28	57.9	19.91	28	42.5	24.39	28
1962	81.0	22.96	28	37.1	22.82	28	58.8	19.45	28	43.9	24.08	28
1963	72.1	29.38	28	27.6	19.87	28	49.6	22.68	28	44.5	21.51	28
1964	92.9	13.37	29	51.0	22.95	29	71.8	15.38	29	41.8	21.71	29
1965	87.0	20.30	28	38.6	24.66	28	62.6	19.66	28	48.4	22.55	28
1966	94.4	11.69	28	55.7	23.83	28	74.9	15.52	28	38.6	21.09	28
1967	83.0	24.18	28	27.7	18.38	28	55.2	18.38	28	55.3	22.52	28
1968	82.6	23.18	29	36.6	21.89	29	59.4	19.53	29	46.0	22.51	29
1969	75.0	30.03	28	34.1	27.38	28	54.4	25.95	28	40.9	24.93	28
1970	82.8	23.39	23	32.6	23.27	23	57.5	20.07	23	50.3	23.76	23
18-YR	82.9	7.13	16	37.8	7.72	16	60.1	7.08	16	45.0	4.56	16

FEBRUARY
B-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	93.1	8.83	28	53.8	22.79	28	73.2	13.60	28	39.2	21.42	28
1954	74.7	24.16	28	30.5	9.92	28	52.5	15.52	28	44.2	20.04	28
1955	80.7	24.31	24	33.1	15.64	24	56.6	17.96	24	47.5	19.55	24
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	82.9	20.78	28	37.8	15.96	28	60.2	16.15	28	45.1	18.08	28
1958	82.7	21.00	28	42.8	16.55	28	62.6	17.35	28	39.9	15.09	28
1959	87.6	20.18	26	38.1	20.00	27	62.9	17.59	26	49.0	20.20	26
1960	95.9	9.14	29	46.3	19.52	29	71.0	12.56	29	49.6	17.52	29
1961	88.6	16.92	28	38.7	19.06	28	63.6	14.51	28	50.0	21.36	28
1962	86.3	19.38	28	39.0	15.53	28	62.5	14.96	28	47.2	18.48	28
1963	81.5	22.49	28	37.3	18.26	28	59.1	18.47	28	44.2	18.01	28
1964	87.0	19.61	29	34.8	16.70	29	60.7	15.08	29	52.2	20.39	29
1965	82.0	20.08	28	39.9	17.65	28	60.7	17.03	28	42.1	16.53	28
1966	83.1	22.20	28	38.6	18.13	28	60.8	18.00	28	44.5	18.67	28
1967	87.2	18.75	28	38.6	17.07	28	62.8	15.71	28	48.6	17.24	28
1968	90.3	15.93	29	40.9	17.70	29	65.5	14.12	29	49.4	18.41	29
1969	78.9	26.59	28	30.0	14.51	28	54.2	18.95	28	48.9	20.14	28
1970	82.6	18.89	28	36.3	14.64	28	59.2	14.81	28	46.3	16.65	28
18-YR	85.3	5.33	16	39.0	5.64	16	62.0	5.15	16	46.3	3.75	16

FEBRUARY

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	92.4	13.76	28	46.5	21.17	28	69.4	14.51	28	45.9	21.03	28
1954	80.9	24.96	23	37.7	18.04	23	59.2	19.98	23	43.2	17.20	23
1955	90.1	19.66	11	36.5	20.40	11	63.3	16.32	11	53.5	23.51	11
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	91.6	16.70	28	49.1	18.08	28	70.1	14.75	28	42.5	18.31	28
1958	92.4	16.20	28	53.8	21.25	28	72.9	17.23	28	38.5	15.53	28
1959	89.6	18.28	28	45.4	23.52	28	67.2	18.51	28	44.2	20.24	28
1960	99.7	1.86	29	62.1	22.26	29	80.8	11.23	29	37.5	22.23	29
1961	92.2	12.96	28	41.2	20.23	28	66.5	13.60	28	51.1	20.11	28
1962	88.2	15.41	28	44.6	14.22	28	66.2	13.19	28	43.7	13.44	28
1963	89.6	20.05	19	46.4	18.96	19	67.8	17.24	19	43.3	17.92	19
1964	89.2	17.05	20	35.3	16.52	20	61.9	15.05	20	53.9	15.16	20
1965	85.6	16.81	28	47.5	15.06	28	66.3	14.35	28	38.0	13.61	28
1966	93.7	15.06	28	45.1	19.04	28	69.3	14.42	28	48.6	18.76	28
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	94.8	9.48	26	53.9	23.19	26	74.1	14.35	26	41.0	20.85	26
1969	87.7	14.49	28	41.1	17.26	28	64.2	13.99	28	46.6	15.34	28
1970	84.9	18.63	28	39.9	23.20	28	62.3	19.22	28	45.1	17.42	28
18-YR	91.1	4.15	12	47.5	6.44	12	69.1	4.98	12	43.6	4.25	12

FEBRUARY

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	100.0	0.00	28	72.2	23.74	28	86.0	11.89	28	27.7	23.74	28
1954	82.9	24.06	18	43.4	24.90	18	63.1	21.43	18	39.6	23.77	18
1955	95.3	14.00	9	52.8	27.09	9	73.9	16.96	9	42.6	26.28	9
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	92.6	15.18	28	51.6	23.90	28	71.9	16.55	28	41.0	22.25	28
1958	88.3	14.74	28	67.4	23.74	28	77.6	17.34	28	20.9	18.89	28
1959	98.4	4.73	25	70.0	27.24	25	84.0	14.58	25	28.4	26.38	25
1960	100.0	0.00	13	72.8	33.28	13	86.2	16.76	13	27.2	33.28	13
1961	97.3	10.94	27	57.5	32.66	27	77.2	18.96	27	39.8	30.78	27
1962	98.4	5.05	28	73.0	26.77	28	85.5	14.42	28	25.4	25.60	28
1963	99.5	2.56	22	81.4	21.14	18	90.3	11.35	18	17.9	19.98	18
1964	98.3	8.40	25	53.8	24.95	12	76.6	16.37	10	38.4	24.44	10
1965	94.6	10.20	22	64.1	23.75	22	79.2	15.21	22	30.5	20.37	22
1966	98.3	6.18	28	81.7	28.10	28	89.9	16.20	28	16.6	24.92	28
1967	98.8	3.96	21	72.9	25.00	20	85.7	13.94	20	25.8	22.60	20
1968	93.4	17.99	16	50.1	36.64	17	71.7	23.53	16	43.1	36.02	16
1969	93.9	16.92	28	51.4	34.87	28	72.5	22.80	28	42.4	30.66	28
1970	80.7	10.96	8	49.5	13.67	8	64.9	9.37	8	31.3	15.73	8
18-YR	96.2	3.80	9	65.6	10.97	8	80.6	6.69	8	30.3	9.72	8

MARCH

A-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	71.9	21.02	31	29.4	17.09	31	50.4	16.85	31	42.5	19.70	31
1954	85.6	21.92	28	40.1	18.11	28	62.7	17.18	28	45.5	21.12	28
1955	79.1	26.37	31	29.6	15.88	31	54.1	18.48	31	49.4	23.07	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	93.7	11.63	31	42.6	18.55	31	67.9	12.96	31	51.1	17.22	31
1958	99.5	2.69	31	63.4	30.60	31	81.3	15.70	31	36.1	30.10	31
1959	86.3	21.29	31	38.5	15.93	31	62.3	15.94	31	47.7	19.82	31
1960	85.7	21.67	31	35.8	15.21	31	60.5	15.71	31	49.9	20.20	31
1961	83.9	21.95	31	41.8	27.79	31	62.6	22.46	31	42.1	22.50	31
1962	84.3	24.16	31	27.8	19.39	31	56.8	18.70	31	56.5	22.82	31
1963	71.6	26.74	25	26.1	18.99	25	48.7	20.30	25	45.5	22.71	25
1964	91.2	16.37	31	49.1	21.99	31	70.0	16.43	31	42.1	20.52	31
1965	97.5	9.77	31	55.5	27.99	31	76.4	16.11	31	42.0	26.83	31
1966	89.8	15.95	31	38.4	12.00	31	64.0	11.47	31	51.5	16.40	31
1967	76.8	33.50	31	30.7	30.34	31	53.6	27.97	31	46.1	31.01	31
1968	66.5	34.18	31	26.0	25.17	31	46.1	26.64	31	40.5	27.91	31
1969	83.4	26.86	31	41.4	31.62	31	62.2	25.89	31	42.0	28.07	31
1970	92.1	20.86	31	47.6	30.17	31	69.7	21.81	31	44.5	28.09	31
18-YR	84.6	9.20	17	39.0	10.59	17	61.7	9.62	17	45.6	4.99	17

MARCH

B-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	87.7	12.36	31	37.9	20.16	31	62.6	14.33	31	49.8	17.11	31
1954	92.5	16.21	31	44.1	19.65	31	68.2	14.93	31	48.5	20.16	31
1955	82.9	22.97	29	35.6	17.50	29	59.0	17.31	29	47.3	21.87	29
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	92.4	12.22	31	41.8	15.73	31	66.9	12.07	31	50.6	14.53	31
1958	98.7	7.00	31	55.1	24.09	30	76.8	13.41	30	43.6	23.34	30
1959	87.4	19.60	31	36.8	17.87	31	62.0	15.68	31	50.6	20.44	31
1960	85.1	21.33	31	35.4	12.52	31	60.1	15.23	31	49.7	17.14	31
1961	91.0	15.86	31	43.4	23.55	31	67.1	17.29	31	47.6	20.58	31
1962	86.4	21.02	31	32.8	14.82	31	59.5	15.33	31	53.6	19.83	31
1963	73.8	26.27	31	30.5	18.14	31	51.9	19.92	31	43.2	21.23	31
1964	90.1	16.00	27	44.6	14.77	27	67.1	12.93	27	45.6	16.90	27
1965	96.8	10.07	31	49.9	18.89	31	73.2	12.24	31	46.9	17.81	31
1966	78.9	21.03	31	28.1	8.09	31	53.3	12.29	31	50.9	20.58	31
1967	81.1	27.89	31	32.9	19.39	31	56.8	20.45	31	48.2	25.39	31
1968	81.1	23.84	31	37.9	23.76	31	59.3	20.89	31	43.2	23.11	31
1969	83.3	24.72	27	38.6	25.56	27	60.8	21.69	27	44.7	25.55	27
1970	93.5	14.01	31	48.5	17.56	31	70.9	13.55	31	45.0	16.62	31
18-YR	87.2	6.04	17	39.6	7.26	17	63.3	6.83	17	47.6	3.06	17

MARCH

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	86.8	17.23	31	36.8	19.40	31	61.6	16.26	31	50.0	17.01	31
1954	94.6	15.32	31	44.9	20.77	31	69.7	15.23	31	49.6	19.97	31
1955	88.9	18.82	16	37.2	16.34	16	63.1	14.61	16	51.7	19.96	16
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	96.9	7.46	31	53.2	17.50	31	74.8	10.86	31	43.7	15.77	31
1958	98.5	6.08	31	56.4	25.38	31	77.3	13.96	31	42.1	24.20	31
1959	91.9	16.05	31	44.8	17.69	31	68.1	15.19	31	47.2	14.99	31
1960	91.5	16.43	31	50.3	17.78	31	70.7	14.92	31	41.2	16.96	31
1961	94.9	11.92	28	44.5	22.39	28	69.4	15.06	28	50.4	19.48	28
1962	88.1	17.41	31	31.5	11.27	31	59.6	12.36	31	56.6	15.69	31
1963	86.4	16.52	31	40.2	21.28	31	63.0	16.71	31	46.2	18.12	31
1964	87.0	17.85	27	37.3	16.45	27	62.0	14.78	27	49.8	17.50	27
1965	99.6	2.33	31	60.8	19.77	31	79.9	10.33	31	38.8	19.32	31
1966	92.0	12.60	31	38.8	15.82	31	65.3	11.78	31	53.2	16.41	31
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	88.5	18.11	31	44.9	24.32	31	66.6	18.31	31	43.6	22.35	31
1969	85.6	18.81	26	50.0	26.63	26	67.7	20.18	26	35.6	22.27	26
1970	95.0	13.27	31	50.0	22.43	31	72.4	14.96	31	45.0	21.66	31
18-YR	91.8	4.61	15	45.6	7.97	15	68.5	5.88	15	46.2	5.61	15

MARCH

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	95.6	11.10	31	63.2	25.95	31	79.3	16.24	31	32.5	23.26	31
1954	100.0	0.00	10	49.2	20.27	10	74.6	10.13	10	50.8	20.27	10
1955	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	95.7	11.61	23	53.5	25.01	23	74.3	15.19	23	42.3	24.33	23
1958	98.3	3.16	31	74.9	21.05	31	86.4	11.05	31	23.3	20.41	31
1959	98.6	6.80	25	75.5	25.07	25	86.9	14.07	25	23.1	23.78	25
1960	93.5	11.42	26	70.8	27.66	26	82.0	18.51	26	22.7	20.60	26
1961	98.9	4.84	31	75.1	27.59	26	86.7	15.05	26	23.5	26.26	26
1962	94.2	15.76	28	55.0	28.05	28	74.4	18.92	28	39.1	25.66	28
1963	92.3	16.04	23	56.4	30.36	22	74.0	20.18	22	35.6	27.68	22
1964	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1965	97.6	8.57	31	77.0	28.98	31	87.2	17.34	31	20.6	25.13	31
1966	95.2	12.22	31	53.6	27.03	31	74.2	16.72	31	41.6	25.53	31
1967	90.2	20.96	30	53.5	30.31	30	71.7	22.31	30	36.7	27.15	30
1968	92.9	16.46	28	51.1	25.78	28	71.7	18.63	28	41.7	21.83	28
1969	96.5	9.96	29	59.9	26.48	29	78.1	16.04	29	36.6	24.10	29
1970	98.6	4.54	16	69.1	18.07	16	83.7	10.02	16	29.6	17.08	16
18-YR	95.6	2.73	11	64.5	10.35	11	79.9	6.28	11	31.1	8.45	11

APRIL A-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	87.3	17.82	30	36.4	18.22	30	61.6	16.05	30	50.9	16.29	30
1954	70.2	26.32	30	26.7	19.92	30	48.2	19.91	30	43.5	24.07	30
1955	60.5	23.89	30	22.3	9.10	30	41.3	15.51	30	38.2	18.54	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	99.0	3.13	30	55.7	26.12	30	77.2	13.69	30	43.4	25.32	30
1958	88.8	21.50	29	45.8	25.72	28	67.0	20.99	28	42.6	22.78	28
1959	86.3	19.75	30	42.8	24.94	30	64.4	19.60	30	43.4	22.48	30
1960	77.0	26.20	30	30.0	24.25	30	53.2	22.23	30	47.0	24.26	30
1961	90.6	22.06	24	29.2	22.98	27	60.6	18.87	24	59.5	26.00	24
1962	80.1	29.49	30	30.6	19.97	30	55.0	21.44	30	49.5	26.20	30
1963	76.3	27.13	30	20.9	17.64	30	48.4	17.99	30	55.4	28.15	30
1964	85.1	20.50	30	40.5	23.51	30	62.6	19.65	30	44.6	20.12	30
1965	83.9	24.48	30	34.6	28.23	30	59.1	22.49	30	49.2	27.75	30
1966	95.0	12.86	30	40.6	29.11	30	67.7	17.82	30	54.4	27.63	30
1967	82.0	24.10	30	27.6	23.65	30	54.6	20.86	30	54.4	23.52	30
1968	78.7	27.71	30	27.1	22.29	28	52.0	22.68	28	50.1	22.68	28
1969	89.2	20.46	30	34.3	27.99	30	61.5	20.47	30	54.9	27.30	30
1970	79.9	29.39	30	30.0	26.69	30	54.8	24.25	30	49.9	28.68	30
18-YR	82.4	9.27	16	33.8	9.00	17	58.0	8.91	16	48.2	5.20	16

APRIL B-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	91.5	14.36	30	43.1	17.35	30	67.0	14.07	30	48.5	14.87	30
1954	75.6	26.42	30	28.1	15.78	30	51.7	17.61	30	47.5	25.66	30
1955	66.6	23.06	30	28.3	11.40	30	47.2	16.10	30	38.3	17.03	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	98.1	5.93	30	51.0	22.30	30	74.4	12.13	30	47.2	21.89	30
1958	90.1	20.32	30	44.6	21.58	30	67.2	17.90	30	45.5	22.02	30
1959	84.5	20.76	30	37.3	20.47	30	60.8	18.00	30	47.1	20.29	30
1960	76.1	25.89	30	32.2	18.79	30	54.0	20.01	30	43.8	20.91	30
1961	93.2	17.82	30	34.7	19.61	30	63.9	15.51	30	58.6	21.17	30
1962	81.3	27.78	30	31.4	18.26	30	56.1	20.38	30	49.9	23.55	30
1963	79.0	24.12	30	22.2	13.76	30	50.3	15.97	30	56.8	22.92	30
1964	91.5	16.52	30	49.3	20.33	30	70.2	16.17	30	42.2	18.33	30
1965	87.6	21.44	30	36.5	23.35	30	61.9	18.73	30	51.1	24.73	30
1966	91.0	16.29	30	35.6	20.17	30	63.3	14.52	30	55.4	22.45	30
1967	82.9	22.95	23	31.5	21.45	21	56.2	19.53	21	49.8	22.22	21
1968	84.0	23.29	30	38.3	23.93	30	61.0	20.52	30	45.6	23.49	30
1969	85.9	23.01	30	35.8	23.59	30	60.7	19.79	30	50.1	24.72	30
1970	83.8	21.26	28	38.2	15.79	28	60.9	16.29	28	45.6	18.39	28
18-YR	85.0	7.97	16	36.7	7.65	16	60.7	7.36	16	48.3	5.31	16

APRIL
C-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	90.8	15.76	30	34.4	15.37	30	62.5	13.57	30	56.4	15.51	30
1954	82.3	25.45	30	30.7	18.81	30	56.4	18.27	30	51.6	25.82	30
1955	76.2	23.79	27	33.8	15.66	27	54.9	18.04	27	42.4	18.13	27
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	100.0	0.00	30	61.0	19.87	30	80.1	9.94	30	39.0	19.87	30
1958	93.9	15.81	30	49.3	23.92	30	71.4	17.15	30	44.6	21.60	30
1959	81.6	23.53	30	35.1	20.74	30	58.1	19.86	30	46.5	19.69	30
1960	82.2	21.96	30	38.9	16.54	30	60.3	16.85	30	43.4	19.68	30
1961	94.1	15.47	30	42.2	21.63	30	68.0	15.90	30	51.9	20.09	30
1962	85.3	22.88	30	31.7	19.10	30	58.3	18.61	30	53.5	19.82	30
1963	93.0	11.43	30	33.2	13.02	30	62.8	9.79	30	59.8	14.49	30
1964	89.7	20.88	30	37.3	17.24	30	63.2	17.21	30	52.4	16.92	30
1965	94.4	13.05	30	45.9	25.05	30	70.0	16.31	30	48.5	23.22	30
1966	99.0	5.48	30	57.6	19.78	30	78.2	10.60	30	41.4	19.73	30
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	89.5	18.43	30	43.6	24.16	30	66.4	17.90	30	45.9	23.86	30
1969	91.3	15.00	30	38.1	22.93	30	64.5	16.49	30	53.3	20.47	30
1970	88.4	19.94	25	39.7	18.98	24	63.7	17.11	24	48.2	19.42	24
18-YR	89.5	6.56	16	40.9	9.20	15	65.0	7.50	15	48.7	5.98	15

APRIL
D-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	98.2	6.33	30	64.2	26.15	30	81.0	14.27	30	34.0	25.34	30
1954	84.9	22.04	28	35.9	10.47	28	60.3	14.57	28	49.0	18.62	28
1955	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	99.6	.84	19	64.8	26.31	19	82.1	13.25	19	34.7	26.20	19
1958	95.3	13.33	21	57.2	23.13	21	76.0	14.94	21	38.0	23.10	21
1959	92.4	15.76	30	61.6	30.89	30	76.7	20.74	30	30.8	26.46	30
1960	90.5	19.60	30	47.1	30.29	30	68.6	21.16	30	43.4	28.72	30
1961	93.8	15.97	30	63.7	30.28	30	78.6	20.50	30	30.1	25.70	30
1962	82.1	26.54	30	49.4	34.49	30	65.5	27.85	30	32.7	26.57	30
1963	93.8	16.93	30	56.3	27.02	30	74.9	18.86	30	37.4	24.71	30
1964	94.9	15.33	9	62.1	25.90	9	78.4	18.31	9	32.8	21.62	9
1965	98.1	7.12	27	57.5	26.94	27	77.5	14.96	26	40.9	26.81	26
1966	94.4	12.87	25	51.4	25.13	25	72.6	16.53	25	43.0	22.54	25
1967	90.7	19.30	30	46.1	32.01	30	68.3	22.16	30	44.6	29.02	30
1968	93.6	15.17	29	64.0	28.87	28	78.5	19.50	28	29.4	24.94	28
1969	91.0	19.19	30	50.1	28.76	30	70.4	20.33	30	40.9	27.31	30
1970	90.8	12.85	29	58.0	20.22	29	74.3	14.05	29	32.8	18.96	29
18-YR	91.9	4.52	13	54.3	8.50	13	72.9	5.99	13	37.6	6.40	13

MAY
A-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	86.7	17.30	31	36.5	21.81	31	61.4	16.77	31	50.3	20.66	31
1954	88.9	16.32	31	39.0	20.64	31	63.7	16.58	31	49.9	16.92	31
1955	75.5	27.98	31	27.3	18.99	31	51.2	21.04	31	48.3	22.91	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	96.5	10.40	31	55.6	29.50	31	75.9	17.25	31	40.8	27.76	31
1958	80.7	20.99	31	35.2	23.26	31	57.8	18.94	31	45.5	23.27	31
1959	91.7	15.54	29	53.4	30.22	29	72.4	20.05	29	38.3	26.68	29
1960	80.6	24.96	31	32.0	19.61	31	56.2	20.24	31	48.6	19.64	31
1961	90.7	23.13	31	43.4	29.21	31	66.9	22.82	31	47.4	26.52	31
1962	68.4	28.83	31	24.4	10.23	31	46.1	18.36	31	44.0	22.58	31
1963	80.6	27.66	31	20.8	17.81	31	50.5	18.53	31	59.8	28.18	31
1964	77.1	27.30	31	38.9	29.90	31	57.7	25.58	31	38.2	25.83	31
1965	87.8	20.04	31	37.5	24.22	31	62.5	19.43	31	50.3	21.77	31
1966	68.1	28.45	31	23.3	19.73	31	45.5	21.37	31	44.8	24.10	31
1967	90.4	21.43	31	47.0	35.99	31	68.6	25.01	31	43.5	31.80	31
1968	93.6	20.03	28	37.6	28.67	28	65.4	20.09	28	56.0	28.75	28
1969	81.5	29.79	31	33.5	34.51	31	57.4	28.39	31	48.1	30.79	31
1970	73.2	33.99	31	23.2	20.14	31	48.0	24.30	31	50.0	27.70	31
18-YR	83.1	8.64	17	35.8	10.22	17	59.2	9.08	17	47.3	5.64	17

MAY
B-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	92.7	12.97	31	44.8	20.37	31	68.5	14.12	31	47.9	19.36	31
1954	94.1	13.02	31	37.1	19.48	31	65.5	13.91	31	57.0	18.03	31
1955	79.8	26.25	31	31.0	19.32	31	55.3	19.93	31	48.9	23.12	31
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	96.4	9.64	31	52.2	22.81	31	74.1	13.92	31	44.2	21.15	31
1958	88.2	19.50	31	37.4	23.16	31	62.6	17.79	31	50.8	23.99	31
1959	90.2	16.47	31	47.2	29.02	31	68.6	19.98	31	43.0	25.25	31
1960	82.9	25.07	31	33.4	17.94	31	58.0	18.98	31	49.5	21.54	31
1961	91.7	22.16	29	38.8	26.75	25	63.5	21.44	24	52.8	26.09	24
1962	73.9	24.49	31	30.5	13.56	31	51.9	17.60	31	43.4	18.54	31
1963	80.3	25.79	31	26.5	16.16	31	53.1	17.59	31	53.9	24.95	31
1964	80.5	25.33	23	39.7	26.27	23	59.9	23.12	23	40.8	22.60	23
1965	87.7	19.53	31	39.6	20.06	31	63.5	17.52	31	48.1	18.70	31
1966	68.5	27.20	31	27.6	17.01	31	47.9	19.36	31	40.8	23.65	31
1967	89.3	19.51	31	47.4	28.26	31	68.1	21.15	31	41.8	24.23	31
1968	94.5	16.51	31	38.7	23.29	31	66.5	16.03	31	55.8	24.67	31
1969	84.5	24.96	29	38.5	29.20	29	61.3	23.52	29	46.0	27.49	29
1970	77.4	25.79	31	31.4	14.79	31	54.2	17.93	31	46.0	21.86	31
18-YR	85.8	8.04	16	37.6	7.46	16	61.3	7.56	15	47.8	4.96	15

MAY C-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	96.1	10.60	31	39.0	21.94	31	67.5	13.68	31	57.1	20.96	31
1954	98.9	4.14	31	36.4	23.95	31	67.4	12.62	31	62.6	23.55	31
1955	86.7	18.43	23	41.4	20.19	23	63.9	17.48	23	45.3	16.66	23
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	99.0	3.89	31	53.1	20.79	31	75.9	11.00	31	45.9	20.37	31
1958	96.0	8.90	31	38.3	20.95	31	66.9	12.07	31	57.7	21.31	31
1959	93.6	14.68	31	42.5	26.16	31	67.8	17.18	31	51.1	24.92	31
1960	93.3	14.74	31	38.0	17.22	31	65.5	13.31	31	55.2	17.91	31
1961	93.1	19.91	31	34.6	22.95	27	63.3	18.33	27	57.5	24.60	27
1962	83.3	20.70	31	27.1	11.85	31	55.0	14.64	31	56.2	16.68	31
1963	90.3	17.77	31	29.5	15.87	31	59.6	13.08	31	60.8	21.14	31
1964	88.5	19.09	26	27.3	15.68	26	57.7	14.21	26	61.2	20.38	26
1965	98.4	7.35	31	40.5	20.12	31	69.3	11.44	31	57.9	19.80	31
1966	98.1	6.67	31	44.4	18.00	31	71.2	10.16	31	53.7	18.13	31
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	98.8	6.65	31	40.2	16.19	31	69.4	9.52	31	58.6	16.01	31
1969	95.8	9.05	31	36.4	26.27	31	66.0	15.04	31	59.4	25.33	31
1970	89.1	15.66	31	23.9	11.18	31	56.3	11.37	31	65.2	14.86	31
18-YR	94.2	4.65	15	36.7	7.55	15	65.3	5.86	15	57.4	4.71	15

MAY D-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	95.2	12.54	24	58.9	29.94	24	76.9	18.31	24	36.3	27.89	24
1954	91.3	14.62	25	39.1	17.37	25	65.1	12.82	25	52.2	19.28	25
1955	95.1	13.42	21	51.2	24.25	21	72.9	15.71	21	43.9	23.55	21
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	95.9	7.25	31	55.5	21.12	31	75.5	11.72	31	40.4	21.15	31
1958	91.9	17.76	31	47.4	20.04	31	69.3	15.43	31	44.5	21.84	31
1959	97.2	7.55	31	41.9	19.78	31	69.3	11.18	31	55.3	19.88	31
1960	85.9	21.14	31	39.6	24.02	31	62.6	19.72	31	46.3	22.19	31
1961	88.8	21.54	31	37.4	23.78	31	63.0	19.43	31	51.4	23.51	31
1962	82.2	26.30	31	34.0	20.15	31	57.9	19.90	31	48.1	24.91	31
1963	92.1	14.10	29	41.2	16.49	29	66.5	11.91	29	50.9	19.16	29
1964	86.7	22.46	20	47.9	29.17	20	67.0	22.62	20	38.8	26.18	20
1965	96.5	10.25	31	62.2	31.48	28	78.9	18.67	28	33.9	28.93	28
1966	79.6	26.64	27	38.0	26.06	27	58.6	23.35	27	41.5	24.77	27
1967	92.8	15.85	31	60.6	29.80	31	76.6	20.31	31	32.2	25.18	31
1968	96.6	12.65	30	47.6	27.52	30	71.9	16.54	30	48.9	27.10	30
1969	89.8	18.87	31	40.6	27.29	31	65.1	19.20	31	49.2	27.08	31
1970	85.4	22.79	31	41.3	14.00	31	63.2	16.21	31	44.1	19.58	31
18-YR	90.4	5.52	14	44.8	8.81	14	67.4	6.50	14	45.6	6.77	14

JUNE

A-1 YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	79.2	20.46	30	28.7	18.05	30	53.8	17.27	30	50.5	16.88	30
1954	72.2	22.19	30	25.6	11.87	30	48.6	15.42	30	46.6	17.74	30
1955	85.3	21.60	30	31.6	15.43	30	58.3	16.79	30	53.6	17.09	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	85.1	18.43	30	33.0	22.05	30	58.9	17.03	30	52.0	22.33	30
1958	84.8	23.90	30	35.5	20.59	30	60.0	19.61	30	49.3	21.33	30
1959	80.3	20.41	30	34.4	15.78	30	57.1	15.85	30	45.9	18.18	30
1960	84.6	21.53	30	30.7	23.01	30	57.5	19.13	30	53.9	22.66	30
1961	79.3	23.79	30	33.0	21.98	30	56.0	20.41	30	46.3	21.29	30
1962	84.9	19.34	30	34.9	17.43	30	59.6	16.33	30	50.0	16.92	30
1963	62.0	28.55	30	23.3	22.63	30	42.4	23.35	30	38.7	21.59	30
1964	85.8	21.61	30	39.6	21.54	30	62.6	19.27	30	46.2	19.71	30
1965	90.8	16.16	30	42.0	25.91	30	66.1	18.87	30	48.9	21.29	30
1966	84.2	23.03	30	34.7	28.10	30	59.2	21.83	30	49.5	27.40	30
1967	97.9	9.14	30	54.5	29.28	30	76.0	16.85	30	43.4	27.50	30
1968	72.6	30.83	30	24.3	20.87	30	48.2	24.01	30	48.3	21.66	30
1969	84.5	24.77	30	38.8	33.74	30	61.5	26.10	30	45.7	27.94	30
1970	86.8	18.33	30	29.5	14.56	30	57.9	13.65	30	57.4	18.69	30
18-YR	82.4	7.98	17	33.8	7.44	17	57.9	7.42	17	48.6	4.37	17

JUNE

B-1 YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	87.7	17.87	30	34.7	17.37	30	61.0	15.35	30	53.1	17.25	30
1954	78.4	25.33	30	26.4	13.79	30	52.2	16.50	30	51.9	23.80	30
1955	88.5	17.55	30	36.8	17.30	30	62.5	15.15	30	51.7	17.46	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	84.2	17.89	27	35.4	20.47	27	59.7	15.81	27	48.8	22.02	27
1958	85.9	24.97	30	36.8	23.11	30	61.2	20.42	30	49.0	25.40	30
1959	81.8	23.28	30	31.5	17.08	30	56.5	17.72	30	50.3	20.34	30
1960	83.9	24.38	30	29.6	19.75	30	56.5	19.04	30	54.2	22.82	30
1961	84.0	21.18	30	36.1	19.50	30	59.8	17.82	30	47.8	19.70	30
1962	87.9	17.69	30	35.8	16.75	30	61.7	14.85	30	52.2	17.49	30
1963	67.1	26.77	30	23.7	17.70	30	45.2	20.09	30	43.5	21.16	30
1964	83.5	21.42	30	37.5	16.07	30	60.3	16.69	30	46.0	17.97	30
1965	92.4	15.93	30	42.0	23.16	30	66.9	16.96	30	50.3	20.60	30
1966	83.1	23.91	30	33.6	24.64	30	58.2	20.77	30	49.5	25.37	30
1967	98.5	6.86	30	53.2	25.98	30	75.7	14.28	30	45.3	25.26	30
1968	75.4	26.24	30	29.3	15.95	30	52.2	19.45	30	46.1	19.50	30
1969	94.1	14.91	30	46.7	28.22	30	70.2	18.52	30	47.4	26.13	30
1970	85.8	18.43	30	32.9	10.66	30	59.2	13.15	30	52.9	14.80	30
18-YR	84.8	7.17	17	35.4	7.12	17	59.9	6.99	17	49.4	3.08	17

JUNE
C-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	94.9	14.41	30	26.5	17.54	30	60.6	12.46	30	68.4	20.29	30
1954	88.0	19.68	30	27.5	16.53	30	57.5	14.96	30	60.5	20.46	30
1955	98.7	4.44	30	41.6	20.47	30	70.1	10.97	30	57.1	19.91	30
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	98.0	7.42	30	40.6	19.17	30	69.1	10.84	30	57.4	19.45	30
1958	92.6	15.82	28	33.8	22.77	28	63.0	15.77	28	58.9	23.45	28
1959	97.0	9.42	30	29.5	13.29	30	63.1	9.09	30	67.5	14.02	30
1960	93.4	15.57	30	35.2	16.85	30	64.1	13.09	30	58.2	19.10	30
1961	95.7	10.57	30	33.3	18.21	30	64.3	11.84	30	62.4	18.15	30
1962	98.0	5.37	30	30.8	19.75	30	64.2	10.54	30	67.2	19.86	30
1963	89.7	19.47	30	31.4	22.28	30	60.2	17.30	30	58.3	23.40	30
1964	98.5	5.14	30	34.6	16.60	30	66.3	9.48	30	63.9	15.58	30
1965	98.7	6.06	30	39.8	22.85	30	69.0	12.34	30	58.9	22.69	30
1966	87.8	18.93	30	32.3	17.92	30	59.9	15.46	30	55.5	20.38	30
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	90.6	19.66	30	30.3	12.08	30	60.3	13.24	30	60.2	18.78	30
1969	98.4	8.95	30	47.3	27.69	30	72.7	15.44	30	51.0	27.41	30
1970	96.7	10.13	29	26.9	13.66	28	61.6	9.25	28	69.7	15.54	28
18-YR	94.8	3.94	16	33.8	5.87	16	64.1	4.29	16	60.9	5.19	16

JUNE
D-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	82.9	22.75	30	31.0	12.93	30	56.6	15.42	30	51.9	20.42	30
1954	82.1	23.34	28	32.0	11.28	28	56.9	15.55	28	50.1	19.27	28
1955	89.8	16.65	19	34.7	21.00	19	62.0	15.18	19	55.1	22.57	19
1956	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1957	89.0	15.03	30	41.5	15.74	30	65.1	13.73	30	47.6	13.86	30
1958	83.0	26.69	30	34.1	12.11	30	58.3	17.23	30	48.9	22.81	30
1959	87.7	20.25	24	31.2	10.10	24	59.2	13.46	24	56.5	17.61	24
1960	79.2	25.91	30	27.1	12.45	30	53.0	17.22	30	52.0	21.80	30
1961	80.8	22.92	30	32.2	18.25	30	56.3	18.20	30	48.6	19.90	30
1962	88.1	18.25	30	29.6	15.45	30	58.7	14.25	30	58.5	18.47	30
1963	80.6	23.00	28	38.0	23.53	28	59.1	20.58	28	42.5	21.81	28
1964	94.5	15.09	30	48.4	26.58	30	71.2	17.64	30	46.0	25.29	30
1965	93.6	14.92	30	39.9	26.26	30	66.6	16.74	30	53.7	26.65	30
1966	81.5	25.15	30	32.1	19.24	30	56.6	19.67	30	49.4	21.25	30
1967	98.5	8.22	30	40.5	16.34	30	69.4	9.81	30	58.0	16.93	30
1968	82.1	23.62	30	32.1	14.14	30	57.0	16.45	30	50.1	20.92	30
1969	99.1	4.93	30	57.4	30.08	30	78.1	15.76	30	41.7	29.44	30
1970	89.6	14.60	30	40.8	16.66	30	65.0	13.08	30	48.9	17.37	30
18-YR	87.0	6.78	15	37.1	8.00	15	61.9	7.03	15	49.9	4.70	15

JULY
A-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	78.4	22.44	31	31.2	15.15	31	54.6	16.86	31	47.3	18.25	31
1954	79.0	17.76	29	26.6	9.89	29	52.5	12.43	29	52.4	14.48	29
1955	74.0	24.07	31	25.8	9.78	31	49.7	16.02	31	48.3	18.29	31
1956	89.2	16.98	30	36.1	13.70	30	62.3	13.59	30	53.1	14.81	30
1957	85.3	22.30	31	36.6	16.36	31	60.8	17.63	31	48.7	17.05	31
1958	87.3	20.19	31	31.8	16.26	31	59.3	16.22	31	55.5	17.19	31
1959	78.5	20.36	31	33.7	6.62	31	56.0	12.62	31	44.8	16.74	31
1960	80.0	25.93	31	28.2	18.97	31	53.9	19.25	31	51.7	24.25	31
1961	82.2	25.71	31	26.6	11.37	31	54.2	17.42	31	55.6	19.34	31
1962	85.3	21.20	31	27.7	12.41	31	56.2	14.40	31	57.5	19.10	31
1963	73.0	24.99	31	26.1	16.82	31	49.3	18.28	31	46.9	21.83	31
1964	80.3	22.51	31	29.6	10.36	31	54.6	15.41	31	50.7	16.89	31
1965	92.0	16.07	31	39.2	23.47	31	65.4	17.00	31	52.8	21.80	31
1966	86.6	21.63	31	29.6	15.03	31	57.9	16.44	31	57.0	17.64	31
1967	94.5	12.66	31	36.9	16.61	31	65.6	12.50	31	57.6	15.61	31
1968	87.6	20.28	31	30.1	21.54	31	58.7	17.39	31	57.5	23.28	31
1969	77.8	29.46	29	16.8	16.25	29	47.1	20.74	29	60.9	23.61	29
1970	90.4	14.55	31	33.1	13.56	31	61.5	12.19	31	57.4	13.84	31
18-YR	83.4	6.18	18	30.3	5.30	18	56.7	5.30	18	53.1	4.60	18

JULY
B-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1953	75.7	24.80	31	28.4	13.51	31	51.9	17.26	31	47.3	20.02	31
1954	85.8	17.80	31	30.4	9.97	31	57.9	12.52	31	55.5	14.66	31
1955	80.3	22.96	26	29.2	9.71	26	54.5	15.25	26	51.2	17.73	26
1956	86.8	19.46	31	35.9	16.77	31	61.1	15.14	31	50.8	20.08	31
1957	85.0	21.48	31	39.7	12.53	31	62.3	15.87	31	45.2	15.12	31
1958	91.9	17.89	31	34.7	20.19	31	63.0	15.78	31	57.2	21.33	31
1959	76.7	22.24	31	29.9	7.90	31	53.1	13.87	31	46.9	18.63	31
1960	92.7	14.24	18	44.1	23.60	18	68.2	16.39	18	48.6	21.48	18
1961	87.7	21.17	31	33.1	14.61	31	60.2	15.90	31	54.6	17.65	31
1962	84.4	20.27	31	27.9	11.22	31	56.0	13.94	31	56.5	17.41	31
1963	78.8	23.19	31	28.9	15.80	31	53.6	16.97	31	49.9	20.65	31
1964	77.3	23.95	31	30.8	9.13	31	53.9	15.24	31	46.5	19.70	31
1965	93.8	13.80	31	37.8	18.42	31	65.6	13.26	31	56.1	18.97	31
1966	85.3	22.13	31	28.3	13.21	31	56.7	15.95	31	57.0	17.60	31
1967	95.2	11.26	31	40.1	14.85	31	67.5	11.13	31	55.1	14.13	31
1968	88.6	20.74	31	32.9	16.22	31	60.6	15.24	31	55.7	21.33	31
1969	87.6	17.21	24	37.3	13.18	24	62.3	13.29	24	50.2	15.37	24
1970	90.8	14.25	29	35.7	10.71	29	63.1	10.93	29	55.1	12.66	29
18-YR	85.3	6.12	16	32.7	4.15	16	58.8	4.80	16	52.5	4.21	16

JULY

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	96.5	8.60	31	36.6	21.12	31	66.4	12.59	31	59.9	20.28	31
1954	96.6	10.94	31	32.3	12.88	31	64.2	9.53	31	64.4	14.38	31
1955	92.7	17.88	31	37.1	12.70	31	64.6	12.82	31	55.6	17.40	31
1956	98.9	3.99	31	42.8	17.36	31	70.7	9.05	31	56.1	17.63	31
1957	94.6	13.25	31	42.9	13.14	31	68.6	11.34	31	51.7	13.55	31
1958	97.8	10.22	31	35.8	12.13	31	66.5	9.03	31	62.0	13.36	31
1959	95.9	9.33	31	30.0	8.77	31	62.9	7.78	31	65.9	9.40	31
1960	100.0	0.00	13	49.2	21.17	13	74.4	10.60	13	50.8	21.17	13
1961	96.8	7.39	31	35.5	12.29	31	66.9	8.22	31	61.3	11.70	31
1962	95.0	9.24	31	25.2	11.36	31	59.9	8.64	31	69.9	11.37	31
1963	92.4	13.75	31	28.2	10.06	31	60.1	10.31	31	64.2	12.52	31
1964	95.5	8.97	31	27.9	12.17	31	61.5	8.56	31	67.6	12.86	31
1965	99.7	1.62	31	41.6	16.35	31	70.5	8.35	31	58.1	16.22	31
1966	90.6	17.03	31	30.5	10.79	31	60.5	12.23	31	60.1	14.82	31
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	96.5	10.41	31	39.3	16.93	31	67.7	10.98	31	57.2	17.55	31
1969	93.2	15.71	31	32.2	17.58	31	62.5	12.99	31	61.0	20.89	31
1970	96.7	8.02	31	31.8	14.19	31	64.1	8.86	31	64.9	14.53	31
18-YR	95.6	2.43	16	34.4	5.47	16	64.8	3.48	16	61.2	4.81	16

JULY

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	85.4	20.67	31	40.8	15.85	31	62.8	15.97	31	44.5	18.48	31
1954	88.1	15.45	24	39.7	12.41	24	63.8	12.59	24	48.4	12.56	24
1955	82.6	22.82	20	41.7	18.33	20	61.9	18.06	20	40.9	20.10	20
1956	90.2	18.02	25	36.8	9.65	25	63.3	10.86	25	53.4	19.06	25
1957	91.6	15.36	31	50.5	14.85	31	70.9	13.69	31	41.1	12.81	31
1958	91.3	19.00	31	38.1	13.11	31	64.4	14.00	31	53.3	16.88	31
1959	81.1	19.24	31	35.0	8.67	31	57.8	12.84	31	46.1	15.35	31
1960	86.5	19.73	31	41.3	14.11	31	63.6	15.21	31	45.2	15.43	31
1961	90.0	17.81	31	33.8	13.29	31	61.8	12.90	31	56.1	18.10	31
1962	83.4	24.44	31	28.0	12.30	31	55.5	16.58	31	55.4	19.89	31
1963	85.5	23.56	31	31.0	11.54	31	58.0	15.46	31	54.5	20.43	31
1964	90.5	16.82	30	41.8	14.76	30	66.0	13.73	30	48.7	15.73	30
1965	95.3	12.63	31	52.1	19.81	31	73.5	13.85	31	43.1	18.55	31
1966	89.8	21.02	31	37.6	15.29	31	63.5	15.81	31	52.2	18.77	31
1967	96.8	7.88	31	41.5	20.91	31	68.9	12.34	31	55.3	19.67	31
1968	93.9	12.53	31	41.1	18.47	31	67.4	12.59	31	52.8	18.92	31
1969	79.4	24.07	31	32.6	11.49	31	55.8	15.84	31	46.7	20.55	31
1970	89.1	13.96	31	41.7	9.57	31	65.3	10.60	31	47.4	11.24	31
18-YR	88.7	4.89	16	39.0	6.41	16	63.7	5.16	16	49.7	4.91	16

AUGUS

A-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	77.7	19.37	31	30.8	12.95	31	54.0	15.34	31	46.8	12.03	31
1954	74.2	22.03	31	29.3	14.51	31	51.6	16.26	31	44.9	18.31	31
1955	83.3	20.75	31	30.6	10.94	31	56.8	14.60	31	52.7	16.05	31
1956	80.5	21.79	28	39.5	24.95	28	59.9	20.97	28	41.1	21.19	28
1957	92.7	14.26	29	32.9	11.92	29	62.6	11.25	29	59.8	13.60	29
1958	78.9	22.95	31	28.1	12.12	31	53.3	16.04	31	50.8	18.08	31
1959	72.5	27.24	31	28.2	17.61	31	50.2	20.24	31	44.4	21.58	31
1960	73.1	27.52	31	23.2	17.86	31	47.9	19.80	31	50.0	24.33	31
1961	85.9	20.54	31	28.3	11.29	31	56.9	14.36	31	57.6	16.77	31
1962	59.4	26.98	31	20.2	11.78	31	39.5	17.76	31	39.2	21.35	31
1963	93.4	15.63	31	41.1	13.58	31	67.1	12.88	31	52.3	13.97	31
1964	86.1	16.40	31	28.8	9.86	31	57.2	10.79	31	57.3	16.47	31
1965	79.9	24.04	31	35.1	22.06	31	57.3	20.83	31	44.8	19.77	31
1966	84.9	24.00	31	32.4	21.58	31	58.5	20.71	31	52.5	19.58	31
1967	84.1	23.01	31	34.3	26.52	31	59.1	21.48	31	49.8	25.09	31
1968	79.4	24.72	31	31.2	24.84	31	55.2	20.95	31	48.2	26.58	31
1969	75.3	25.91	31	15.8	10.11	31	45.4	16.01	31	59.5	22.94	31
1970	84.7	21.35	24	28.0	14.61	24	56.1	16.36	24	56.7	16.69	24
18-YR	80.1	8.12	17	30.0	6.28	17	54.8	6.59	17	50.1	6.19	17

AUGUST

B-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	78.9	20.59	31	30.6	10.89	31	54.5	14.90	31	48.3	14.19	31
1954	81.4	20.21	31	30.8	14.70	31	55.9	14.76	31	50.6	19.75	31
1955	90.8	14.60	31	38.8	12.40	31	64.7	11.60	31	52.0	13.83	31
1956	80.3	22.58	31	38.0	20.40	31	58.8	18.76	31	42.3	21.16	31
1957	92.6	14.00	31	37.2	10.77	31	64.8	10.69	31	55.5	13.16	31
1958	80.1	21.97	31	33.7	11.81	31	56.6	15.57	31	46.4	16.76	31
1959	73.4	27.86	31	29.1	16.89	31	51.1	20.44	31	44.3	21.26	31
1960	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1961	90.2	17.58	31	35.5	12.80	31	62.7	13.26	31	54.7	15.61	31
1962	63.5	25.82	31	22.9	13.55	31	43.0	18.39	31	40.6	18.50	31
1963	94.5	11.99	31	42.5	12.06	31	68.2	10.49	31	52.0	12.01	31
1964	82.5	16.49	30	31.4	9.45	30	56.7	10.88	30	51.1	15.75	30
1965	81.4	23.45	31	37.1	16.28	31	59.0	18.18	31	44.3	17.79	31
1966	87.1	21.88	31	33.3	18.12	31	60.1	17.76	31	53.8	18.63	31
1967	86.3	19.30	31	41.8	20.59	31	63.9	17.20	31	44.5	20.22	31
1968	84.3	19.56	31	39.2	21.72	31	61.5	17.39	31	45.1	22.58	31
1969	90.7	15.29	31	38.2	10.56	31	64.3	11.81	31	52.5	11.96	31
1970	80.3	19.94	31	31.2	11.07	31	55.5	14.21	31	49.2	15.39	31
18-YR	83.4	7.68	17	34.8	5.08	17	58.9	6.11	17	48.6	4.58	17

AUGUST

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	97.9	5.84	31	33.2	14.07	31	65.4	8.16	31	64.7	13.95	31
1954	92.5	12.36	31	30.3	17.68	31	61.1	12.27	31	62.3	18.04	31
1955	99.4	2.46	31	45.2	15.15	31	72.1	8.06	31	54.2	14.69	31
1956	98.1	5.61	31	39.1	15.75	31	68.5	8.80	31	59.0	15.82	31
1957	99.9	.72	31	42.0	13.46	31	70.8	6.79	31	57.9	13.38	31
1958	98.9	3.77	31	40.7	15.14	31	69.5	8.07	31	58.3	14.92	31
1959	87.2	18.75	31	31.3	12.80	31	59.0	14.41	31	55.9	14.04	31
1960	82.5	20.11	21	22.2	9.82	21	52.0	12.75	21	60.2	18.79	21
1961	99.1	3.94	31	40.4	14.12	31	69.5	7.30	31	58.7	14.76	31
1962	81.5	22.11	30	24.6	11.46	30	52.8	14.88	30	57.0	18.76	30
1963	99.7	1.62	31	46.6	14.91	31	72.8	7.62	31	53.1	14.70	31
1964	97.4	8.73	25	30.4	11.64	24	63.6	7.44	24	66.9	14.29	24
1965	98.9	3.60	31	39.5	14.04	29	68.8	7.60	29	59.3	13.76	29
1966	93.7	10.97	26	29.6	14.58	26	61.5	10.69	26	64.2	14.27	26
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	96.3	8.99	31	44.3	20.39	31	70.1	12.14	31	52.0	20.17	31
1969	97.3	7.84	31	34.9	13.56	31	65.9	8.58	31	62.4	14.07	31
1970	97.1	8.43	30	30.1	15.46	27	63.5	9.87	27	66.9	15.74	27
18-YR	95.9	5.06	16	36.8	6.69	15	66.1	5.59	15	59.0	4.36	15

AUGUST

-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	92.5	16.63	31	43.1	13.92	31	67.6	13.07	31	49.4	16.13	31
1954	83.2	21.73	24	33.7	12.84	24	58.3	15.77	24	49.5	16.87	24
1955	92.7	15.94	27	42.1	12.80	27	67.3	12.36	27	50.7	14.96	27
1956	84.6	20.04	31	37.5	15.62	31	60.7	15.04	31	47.1	19.60	31
1957	95.7	10.00	31	50.6	12.04	31	73.0	9.43	31	45.1	11.67	31
1958	88.9	17.39	31	43.0	14.95	31	65.7	14.54	31	45.8	14.47	31
1959	81.1	25.18	31	36.9	13.66	31	58.8	18.27	31	44.2	17.52	31
1960	74.0	26.06	31	30.9	9.62	31	52.2	16.50	31	43.0	21.26	31
1961	94.9	12.18	31	40.4	16.69	31	67.4	11.90	31	54.5	16.87	31
1962	76.8	25.04	26	35.7	12.46	26	55.9	17.09	26	41.1	19.91	26
1963	96.5	10.38	31	50.0	13.08	31	73.1	9.96	31	46.5	12.64	31
1964	92.9	14.18	31	39.1	18.85	31	65.9	13.75	31	53.8	18.90	31
1965	88.2	18.52	31	48.1	21.59	31	68.0	17.37	31	40.1	20.23	31
1966	88.5	20.29	31	35.9	18.30	31	61.9	16.13	31	52.6	21.45	31
1967	91.7	16.85	31	42.7	17.05	31	67.0	14.83	31	49.0	16.85	31
1968	94.7	14.16	31	50.1	24.26	31	72.1	16.83	31	44.6	21.52	31
1969	86.4	15.59	31	40.5	9.93	31	63.3	11.14	31	45.9	13.75	31
1970	86.5	15.49	31	44.0	12.99	31	65.1	12.20	31	42.5	14.98	31
18-YR	88.6	6.54	17	41.8	5.62	17	65.0	5.75	17	46.8	4.29	17

SEPTEMBER

A-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	61.5	21.20	30	23.9	12.28	30	42.4	14.76	30	37.7	18.19	30
1954	70.5	21.97	30	33.8	15.72	30	52.0	17.45	30	36.7	15.62	30
1955	66.7	26.13	30	29.2	21.88	30	47.7	22.33	30	37.5	23.46	30
1956	60.6	28.28	27	25.9	18.92	27	43.0	22.01	27	34.8	19.82	27
1957	78.1	25.20	30	33.3	23.59	30	55.6	21.54	30	44.8	23.00	30
1958	79.2	25.48	30	27.0	15.49	30	52.9	18.58	30	52.1	20.07	30
1959	72.5	27.41	30	36.8	23.50	30	54.4	23.00	30	35.7	22.24	30
1960	73.6	25.97	30	24.3	12.81	30	48.8	17.72	30	49.3	20.76	30
1961	82.8	22.90	30	36.7	26.57	30	59.5	21.73	30	46.0	24.10	30
1962	68.0	33.21	30	25.3	20.07	30	46.4	24.12	30	42.8	26.15	30
1963	83.3	21.00	30	36.5	19.60	30	59.6	17.53	30	46.8	20.24	30
1964	82.2	20.71	30	36.5	20.56	30	59.2	18.09	30	45.7	20.07	30
1965	83.8	24.31	30	46.6	35.64	30	65.1	26.98	30	37.2	28.82	30
1966	82.6	25.15	25	37.2	26.90	24	59.4	22.76	24	44.6	26.01	24
1967	87.5	21.45	30	33.0	22.79	30	60.1	18.83	30	54.5	23.27	30
1968	72.3	29.10	30	22.0	20.42	30	47.0	21.32	30	50.3	26.71	30
1969	60.8	32.99	30	13.9	15.15	30	37.1	21.91	30	46.9	26.76	30
1970	82.0	19.97	30	35.2	24.04	30	58.4	19.79	30	46.7	19.84	30
18-YR	74.9	8.71	18	30.6	7.71	17	52.3	7.67	17	43.9	6.19	17

SEPTEMBER

B-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	71.3	23.07	27	29.8	10.74	27	50.3	14.58	27	41.5	21.04	27
1954	81.1	19.67	30	34.8	13.86	30	57.7	14.87	30	46.3	16.65	30
1955	70.8	23.66	19	32.2	17.72	19	51.3	17.89	19	38.6	21.97	19
1956	65.9	27.49	30	25.0	12.09	30	45.2	17.75	30	40.9	23.30	30
1957	79.2	23.78	30	36.2	18.33	29	57.8	18.62	29	43.7	20.92	29
1958	81.8	23.98	30	31.9	16.33	30	56.7	17.31	30	49.9	22.12	30
1959	73.4	28.90	28	34.4	18.45	28	53.7	22.21	28	38.9	19.89	28
1960	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1961	84.1	22.88	30	35.5	21.20	30	59.6	19.57	30	48.6	20.83	30
1962	72.0	30.57	30	23.9	12.28	30	47.7	20.13	30	48.1	23.65	30
1963	85.5	19.58	28	37.5	17.40	28	61.3	15.82	28	48.0	19.33	28
1964	76.1	23.64	27	26.9	19.48	27	51.4	18.54	27	49.3	22.51	27
1965	88.0	18.97	30	50.1	30.42	30	68.9	21.68	30	37.9	26.60	30
1966	85.7	19.82	30	41.6	21.17	30	63.4	16.97	30	44.0	23.13	30
1967	88.7	19.98	30	38.7	19.45	30	63.5	16.64	30	50.0	21.52	30
1968	75.3	25.90	30	27.2	16.37	30	51.1	18.82	30	48.1	21.63	30
1969	76.5	23.42	30	36.5	14.23	30	56.4	17.51	30	39.9	16.91	30
1970	81.0	19.32	30	34.8	15.30	30	57.8	15.49	30	46.2	16.02	30
18-YR	79.1	6.56	16	34.1	6.68	16	56.4	6.30	16	45.1	4.13	16

SEPTEMBER

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	79.1	24.28	30	25.2	13.50	30	52.0	15.88	30	54.0	23.04	30
1954	87.4	19.83	30	35.7	18.57	30	61.2	16.96	30	51.7	18.27	30
1955	85.2	19.83	30	34.1	16.84	30	59.5	15.20	30	51.1	20.75	30
1956	76.3	23.45	30	28.6	9.03	30	52.1	14.33	30	47.7	20.97	30
1957	97.3	5.97	30	35.1	11.77	30	66.1	7.48	30	62.3	11.21	30
1958	90.2	17.77	30	32.2	14.50	30	61.0	13.91	30	58.0	16.73	30
1959	86.8	20.10	30	35.6	18.62	30	61.0	16.84	30	51.2	19.01	30
1960	90.7	16.25	30	29.5	13.65	30	60.0	12.58	30	61.3	16.54	30
1961	98.1	5.90	30	36.7	14.85	30	67.0	9.11	30	61.4	13.42	30
1962	81.8	25.74	30	28.9	13.75	30	55.1	17.73	30	52.9	21.05	30
1963	100.0	0.00	30	38.8	18.05	30	69.1	9.10	30	61.2	18.05	30
1964	91.6	14.58	30	32.9	19.33	30	62.0	13.70	30	58.7	20.64	30
1965	93.6	13.06	30	45.9	18.00	27	69.3	13.50	27	47.0	17.20	27
1966	98.1	8.50	20	39.6	17.88	20	68.8	10.31	20	58.5	19.01	20
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	95.4	7.76	30	36.7	17.89	30	65.8	10.72	30	58.7	17.35	30
1969	88.0	20.04	30	32.8	13.28	30	60.3	14.10	30	55.1	19.22	30
1970	92.6	14.31	9	23.9	7.20	9	58.0	7.63	9	68.7	16.79	9
18-YR	89.4	6.95	15	33.9	4.96	15	61.4	5.45	15	55.5	5.13	15

SEPTEMBER

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1953	69.7	25.11	30	29.6	8.19	30	49.5	15.08	30	40.2	21.94	30
1954	79.9	29.52	15	47.5	25.00	15	63.5	25.21	15	32.4	21.02	15
1955	84.3	23.44	18	35.9	14.17	18	59.8	16.54	18	48.4	20.22	18
1956	64.9	26.80	30	26.4	10.47	30	45.5	17.10	30	38.5	22.10	30
1957	83.3	21.16	30	40.9	12.49	30	62.0	15.09	30	42.4	17.20	30
1958	86.8	22.08	30	37.5	12.96	30	62.0	15.36	30	49.4	19.04	30
1959	71.9	30.90	30	44.5	29.07	30	58.0	28.14	30	27.5	21.03	30
1960	86.2	19.39	30	39.3	12.80	30	62.4	14.51	30	46.9	15.07	30
1961	93.9	14.10	30	46.5	29.00	30	70.0	18.03	30	47.4	28.09	30
1962	71.5	29.73	30	37.9	19.23	30	54.4	22.62	30	33.6	21.15	30
1963	85.5	20.84	30	39.1	14.55	30	62.0	16.20	30	46.4	15.87	30
1964	87.3	19.06	30	34.0	19.16	30	60.4	16.37	30	53.3	19.74	30
1965	96.4	10.59	23	63.5	25.76	23	79.8	16.08	23	32.9	22.96	23
1966	96.9	6.54	30	46.5	17.63	30	71.5	10.19	30	50.4	17.13	30
1967	92.9	17.72	30	43.4	22.09	29	67.8	16.93	29	49.2	21.67	29
1968	83.6	22.99	30	40.4	22.19	30	61.8	19.83	30	43.2	21.75	30
1969	81.1	17.77	30	41.6	11.94	30	61.2	13.64	30	39.5	12.98	30
1970	85.2	18.13	30	42.6	15.71	30	63.6	14.58	30	42.5	17.54	30
18-YR	82.7	9.35	15	39.3	5.75	15	60.8	6.94	15	43.4	6.84	15

OCTOBER
A-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1952	59.7	24.58	29	25.3	14.11	29	42.3	17.64	29	34.4	18.94	29
1953	66.7	25.96	31	33.9	20.29	31	50.1	21.83	31	32.8	16.33	31
1954	75.3	23.84	26	33.7	20.56	26	54.4	19.98	26	41.7	19.75	26
1955	64.6	27.93	31	25.0	10.76	31	44.5	18.56	31	39.6	20.43	31
1956	73.6	21.66	31	32.9	12.39	31	53.1	15.41	31	40.7	17.38	31
1957	89.2	19.39	31	52.9	28.71	31	70.9	21.40	31	36.4	24.01	31
1958	58.3	33.26	31	26.4	24.44	31	42.1	26.50	31	31.9	24.66	31
1959	85.9	22.80	31	40.4	25.11	31	63.0	20.19	31	45.6	26.10	31
1960	68.3	28.57	31	32.5	22.31	31	50.2	23.60	31	35.9	19.96	31
1961	70.8	29.76	31	28.0	21.02	31	49.1	22.63	31	42.8	24.81	31
1962	69.6	30.62	31	24.1	12.99	31	46.6	20.17	31	45.5	24.22	31
1963	60.1	23.54	31	28.9	13.95	31	44.3	17.18	31	31.2	18.05	31
1964	69.5	31.87	31	20.5	12.01	31	44.7	20.29	31	49.1	26.09	31
1965	62.5	27.71	31	27.2	17.16	31	44.6	20.26	31	35.3	21.72	31
1966	74.9	30.82	31	23.7	16.75	31	49.2	21.17	31	51.2	26.26	31
1967	84.0	23.03	31	39.7	24.21	31	61.7	20.41	31	44.2	23.91	31
1968	66.8	35.70	21	18.3	21.04	21	42.3	24.28	21	48.4	32.96	21
1969	87.9	25.41	31	45.8	36.84	31	66.7	27.49	31	42.1	31.67	31
18-YR	71.8	9.96	17	31.8	8.67	17	51.6	8.87	17	40.0	6.03	17

OCTOBER
B-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1952	66.5	28.10	31	25.4	15.75	31	45.7	19.62	31	41.1	23.22	31
1953	70.2	27.36	22	35.8	17.99	22	52.8	21.02	22	34.4	19.49	22
1954	76.5	25.52	31	33.4	20.30	31	54.7	19.62	31	43.1	24.46	31
1955	70.7	26.94	21	26.7	8.95	21	48.6	17.15	21	44.0	20.73	21
1956	71.3	21.48	31	30.6	9.50	30	51.1	13.94	30	41.5	17.98	30
1957	89.7	18.72	31	47.4	26.17	31	68.4	18.94	31	42.3	25.35	31
1958	60.7	31.32	31	30.3	22.13	31	45.3	24.41	31	30.4	23.93	31
1959	86.1	22.82	19	45.2	17.41	19	65.5	17.85	19	40.9	19.09	19
1960	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1961	75.8	27.46	31	30.5	18.70	31	52.9	20.26	31	45.3	23.92	31
1962	73.8	30.02	31	25.1	15.26	31	49.3	20.31	31	48.7	25.04	31
1963	67.5	23.29	31	32.3	15.39	31	49.7	16.82	31	35.3	20.48	31
1964	69.9	30.51	31	20.5	8.82	31	45.0	18.15	31	49.4	26.40	31
1965	63.3	26.60	31	27.4	13.63	31	45.1	18.53	31	35.9	20.59	31
1966	76.8	28.04	31	29.9	13.25	31	53.2	18.49	31	47.0	23.70	31
1967	75.0	28.74	31	29.0	14.84	31	51.9	19.67	31	46.0	23.44	31
1968	61.8	32.47	31	22.5	15.44	31	41.9	21.93	31	39.3	25.82	31
1969	92.9	14.67	31	49.9	22.93	31	71.3	16.22	31	43.1	20.64	31
18-YR	73.0	9.50	14	31.0	8.33	14	51.8	8.53	14	42.0	5.39	14

OCTOBER
C-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1952	70.2	23.37	31	21.4	12.08	31	45.5	14.89	31	48.8	22.33	31
1953	82.5	21.22	31	37.2	23.65	31	59.7	19.45	31	45.4	22.45	31
1954	85.9	19.69	31	40.9	18.89	31	63.2	15.94	31	45.0	21.96	31
1955	82.2	25.97	20	31.1	9.87	20	56.4	16.38	20	51.1	22.00	20
1956	83.7	18.61	31	33.5	9.97	31	58.3	12.50	31	50.2	16.35	31
1957	96.5	10.96	31	46.5	21.73	31	71.4	13.68	31	50.0	20.86	31
1958	68.9	26.31	31	28.5	17.26	31	48.4	19.61	31	40.4	20.96	31
1959	80.5	26.95	26	33.2	20.70	26	56.8	21.33	26	47.4	22.18	26
1960	78.7	21.10	31	34.4	20.73	31	56.4	18.73	31	44.4	18.68	31
1961	77.0	25.52	22	27.3	20.51	21	51.4	20.30	21	48.5	22.87	21
1962	82.3	24.95	31	33.0	20.72	31	57.3	20.10	31	49.3	22.04	31
1963	90.9	16.74	31	26.3	11.92	31	58.4	11.81	31	64.6	16.95	31
1964	77.0	24.69	31	27.8	11.01	31	52.1	16.16	31	49.2	20.27	31
1965	83.3	19.60	29	31.2	12.01	29	57.0	12.22	29	52.1	21.44	29
1966	85.5	21.42	31	35.0	16.63	31	60.1	16.15	31	50.5	20.87	31
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	72.4	27.62	31	31.2	17.63	31	51.6	20.62	31	41.2	21.14	31
1969	92.5	16.72	31	42.3	26.18	31	67.2	18.43	31	50.2	24.26	31
18-YR	82.1	7.89	15	33.5	6.47	15	57.6	6.67	15	48.6	5.64	15

OCTOBER
D-1

YEAR	RHMAX MEAN	RHMAX S.D.	RHMAX N	RHMIN MEAN	RHMIN S.D.	RHMIN N	RHMEAN MEAN	RHMEAN S.D.	RHMEAN N	RHRANGE MEAN	RHRANGE S.D.	RHRANGE N
1952	61.4	25.51	31	29.7	9.63	31	45.3	16.18	31	31.7	20.84	31
1953	75.3	28.54	27	40.6	27.29	27	57.7	25.16	27	34.7	24.42	27
1954	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1955	77.9	33.03	19	36.1	23.13	19	56.7	25.45	19	41.8	26.12	19
1956	75.6	22.28	31	34.1	11.50	31	54.7	15.34	31	41.5	17.91	31
1957	89.6	15.75	17	42.2	12.22	17	65.8	11.87	17	47.4	15.33	17
1958	72.6	27.04	31	39.6	20.48	31	55.9	21.83	31	33.0	19.98	31
1959	90.5	19.10	31	49.8	28.93	31	70.0	21.17	31	40.6	24.88	31
1960	82.5	21.59	31	50.5	24.39	31	66.2	20.65	31	32.0	20.25	31
1961	80.0	26.95	30	30.3	18.12	30	54.9	19.64	30	49.7	23.69	30
1962	84.2	20.39	31	51.9	23.98	31	67.9	19.58	31	32.3	21.58	31
1963	85.5	17.85	31	42.4	14.73	31	63.7	13.36	31	43.1	19.01	31
1964	67.8	27.62	31	28.6	14.19	31	48.0	19.01	31	39.3	21.67	31
1965	79.9	21.07	29	41.3	20.33	29	60.5	17.50	29	38.6	22.32	29
1966	87.5	23.04	31	43.7	24.98	31	65.4	20.50	31	43.8	25.19	31
1967	79.8	29.73	31	42.0	25.91	31	60.6	25.21	31	37.8	23.91	31
1968	82.7	26.32	31	35.5	29.67	31	59.0	24.40	31	47.2	27.82	31
1969	94.4	6.57	18	49.0	14.67	18	71.4	9.00	18	45.4	13.76	18
18-YR	78.9	7.86	14	40.0	7.64	14	59.3	7.21	14	38.9	5.78	14

NOVEMBER

A-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	69.0	26.91	30	37.4	23.16	30	52.9	23.44	30	31.6	18.02	30
1953	70.0	26.00	30	36.9	22.69	30	53.2	22.64	30	33.1	18.21	30
1954	69.6	23.82	30	31.4	10.73	30	50.3	15.93	30	38.2	18.58	30
1955	78.8	26.39	30	33.6	20.39	30	56.0	20.73	30	45.2	22.38	30
1956	81.2	22.89	30	37.3	19.78	30	59.1	19.46	30	43.9	17.78	30
1957	91.3	19.92	28	54.1	33.62	28	72.6	23.24	28	37.2	29.97	28
1958	72.1	28.76	30	29.9	22.12	30	50.8	22.65	30	42.3	24.27	30
1959	80.8	26.12	30	26.9	17.71	30	53.7	17.76	30	53.9	26.99	30
1960	68.3	31.04	30	24.8	20.79	30	46.4	22.73	30	43.6	26.89	30
1961	80.0	23.75	30	32.6	24.39	30	56.0	20.85	30	47.4	24.13	30
1962	73.4	26.40	30	36.2	25.55	30	54.5	22.92	30	37.2	24.87	30
1963	74.6	28.44	30	30.5	10.50	30	52.3	17.85	30	44.1	23.57	30
1964	71.6	31.75	30	34.2	31.90	30	52.7	28.22	30	37.4	29.62	30
1965	76.0	25.68	30	30.5	10.52	30	53.0	16.41	30	45.6	21.53	30
1966	76.7	27.20	30	27.9	20.84	30	52.1	20.53	30	48.8	25.72	30
1967	89.0	18.49	26	44.2	27.80	26	66.4	19.56	26	44.8	26.45	26
1968	80.1	29.34	30	30.8	25.84	30	55.3	24.46	30	49.3	25.81	30
1969	68.6	33.39	28	24.9	27.36	28	46.6	27.08	28	43.7	28.34	28
18-YR	76.2	6.75	18	33.6	7.09	18	54.7	6.31	18	42.6	5.82	18

NOVEMBER

B-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	EAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	77.0	27.79	30	39.0	25.01	30	57.8	23.69	30	38.0	23.07	30
1953	72.8	25.86	30	41.1	22.16	30	56.7	21.90	30	31.7	19.58	30
1954	71.5	24.06	28	31.2	10.56	28	51.1	15.71	28	40.3	19.76	28
1955	81.5	22.23	22	35.3	17.39	22	58.2	17.26	22	46.2	20.16	22
1956	72.6	26.17	17	35.3	17.86	17	53.7	20.38	17	37.3	18.83	17
1957	88.9	18.98	30	47.9	28.51	30	68.3	20.54	30	41.0	25.84	30
1958	70.3	25.02	30	30.8	16.46	30	50.3	18.71	30	39.5	19.96	30
1959	76.1	25.04	28	36.3	12.59	28	56.1	17.32	28	39.8	19.14	28
1960	75.4	28.07	30	27.7	14.79	30	51.3	18.89	30	47.7	24.01	30
1961	84.8	19.23	30	37.4	22.40	30	60.9	17.84	30	47.4	21.90	30
1962	66.8	23.48	23	27.4	10.07	23	46.9	15.23	23	39.4	19.66	23
1963	72.3	27.53	30	29.9	9.70	30	50.9	17.15	30	42.4	22.84	30
1964	71.9	29.06	30	32.4	22.00	30	52.0	23.11	30	39.5	22.74	30
1965	78.0	21.80	30	35.7	11.50	30	56.6	15.35	30	42.3	16.57	30
1966	79.6	20.25	30	33.6	16.40	30	56.5	15.52	30	46.0	19.86	30
1967	80.7	25.19	30	34.5	16.99	30	57.4	18.14	30	46.2	22.97	30
1968	82.7	24.38	30	35.8	24.04	30	59.0	21.49	30	46.8	22.55	30
1969	76.5	24.24	30	33.9	16.44	30	55.1	18.09	30	42.5	20.31	30
18-YR	77.2	5.36	15	35.1	5.01	15	56.0	4.72	15	42.1	4.33	15

NOVEMBER

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	81.1	25.95	30	40.5	27.70	30	60.6	23.85	30	40.6	24.86	30
1953	80.7	24.75	25	40.6	21.59	25	60.5	21.48	25	40.2	17.44	25
1954	82.3	16.03	30	40.8	18.76	30	61.3	15.47	30	41.4	16.02	30
1955	59.7	22.54	4	27.2	3.30	4	43.2	12.45	4	32.5	20.86	4
1956	87.2	19.67	30	45.0	23.94	30	65.9	18.77	30	42.2	22.68	30
1957	92.1	14.86	30	51.4	25.41	29	71.5	17.81	29	40.4	21.68	29
1958	79.9	21.45	30	33.3	17.42	30	56.5	17.10	30	46.7	18.98	30
1959	69.0	29.28	30	28.7	18.37	30	48.7	21.96	30	40.3	21.68	30
1960	74.9	25.99	30	26.0	16.04	30	50.3	18.50	30	48.9	22.20	30
1961	90.8	14.97	23	37.5	18.40	23	64.5	14.25	21	50.6	17.36	21
1962	78.0	22.61	30	40.4	23.87	30	58.9	20.84	30	37.6	20.40	30
1963	71.1	27.42	30	21.9	13.83	30	46.3	18.69	30	49.2	22.38	30
1964	83.5	21.57	30	39.5	22.85	30	61.3	19.82	30	44.0	20.33	30
1965	90.2	15.50	30	48.4	17.75	30	69.0	15.05	30	41.8	14.45	30
1966	85.7	20.17	30	36.6	17.42	30	61.0	15.86	30	49.1	20.37	30
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	89.7	18.99	30	41.0	23.33	30	65.2	18.89	30	48.7	19.61	30
1969	76.3	26.74	30	29.8	21.25	30	52.9	21.42	30	46.5	22.63	30
18-YR	81.4	6.87	15	37.6	8.25	15	59.3	7.30	15	43.8	3.97	15

NOVEMBER

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	87.5	21.78	30	53.7	31.68	30	70.4	24.01	30	33.8	26.01	30
1953	75.8	31.48	13	37.5	23.60	13	56.4	25.88	13	38.3	20.83	13
1954	86.4	21.01	20	52.5	22.78	20	69.2	19.19	20	33.9	21.14	20
1955	97.1	9.80	20	62.3	29.31	20	79.5	17.09	20	34.8	27.67	20
1956	90.5	18.63	19	57.1	30.67	19	73.6	22.32	19	33.4	24.35	19
1957	95.0	10.69	30	61.9	23.27	30	78.3	14.82	30	33.1	20.74	30
1958	88.7	19.03	30	52.8	25.21	30	70.4	19.64	30	35.9	21.31	30
1959	84.5	22.60	27	49.1	29.67	27	66.6	23.71	27	35.4	23.58	27
1960	83.6	23.10	27	41.1	24.41	27	62.0	20.18	27	42.5	25.05	27
1961	83.8	26.36	22	30.0	22.87	21	56.4	21.12	21	53.0	26.28	21
1962	91.6	17.51	30	53.5	28.96	29	72.2	20.66	29	37.9	24.73	29
1963	87.0	24.04	30	40.2	27.69	30	63.4	22.02	30	46.9	27.70	30
1964	82.6	27.42	26	42.0	29.75	23	60.9	26.89	23	38.3	22.25	23
1965	93.2	12.64	30	74.0	27.18	30	83.4	18.68	30	19.1	20.29	30
1966	92.7	14.09	30	53.5	28.18	30	73.0	17.89	30	39.2	26.66	30
1967	88.9	18.70	27	49.1	27.38	27	68.9	19.75	27	39.8	25.39	27
1968	94.5	17.38	26	46.3	35.86	26	70.2	21.86	26	48.2	35.55	26
1969	73.8	21.35	18	35.8	8.63	18	54.6	13.50	18	38.1	18.24	18
18-YR	89.1	4.28	12	52.3	9.48	11	70.8	6.14	11	37.4	7.82	11

DECEMBER

A-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	70.5	24.08	31	33.1	14.88	31	51.5	18.61	31	37.4	14.85	31
1953	79.9	20.48	31	38.5	14.89	31	59.0	15.80	31	41.5	16.69	31
1954	60.6	25.49	21	30.0	20.73	21	45.1	20.98	21	30.6	20.30	21
1955	76.7	24.56	29	37.3	23.59	29	56.8	21.31	29	39.4	22.47	29
1956	71.9	26.05	31	36.4	21.17	31	54.0	21.07	31	35.5	21.99	31
1957	71.8	25.80	31	30.3	16.48	31	50.8	18.65	31	41.5	21.91	31
1958	79.5	28.55	31	31.7	22.42	31	55.5	22.22	31	47.9	25.71	31
1959	75.9	25.82	31	27.2	10.64	31	51.3	16.32	31	48.7	22.19	31
1960	82.7	24.10	31	30.5	17.10	31	56.4	18.50	31	52.1	19.28	31
1961	78.4	21.47	31	31.9	18.06	31	54.8	16.55	31	46.5	22.11	31
1962	75.5	28.25	31	31.2	19.27	31	53.0	21.51	31	44.4	21.92	31
1963	85.2	21.42	31	49.9	22.22	31	67.3	19.56	31	35.3	19.44	31
1964	84.3	23.51	29	35.5	18.25	29	59.7	18.51	29	48.8	19.96	29
1965	70.5	30.36	31	39.6	27.10	31	54.9	26.73	31	30.8	21.49	31
1966	72.1	28.62	31	31.0	23.68	31	51.4	23.73	31	41.1	23.03	31
1967	85.1	24.35	31	41.1	29.45	31	63.0	23.57	31	44.1	26.48	31
1968	74.9	30.96	31	20.9	21.09	31	47.6	21.98	31	54.0	29.52	31
1969	75.5	27.78	31	38.2	28.15	31	56.7	25.06	31	37.4	24.94	31
18-YR	77.1	5.04	17	34.4	6.43	17	55.5	4.82	17	42.7	6.42	17

DECEMBER

B-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	79.4	22.56	29	38.5	20.90	29	58.8	20.16	29	40.9	16.47	29
1953	84.4	18.34	31	41.6	13.15	31	62.7	14.21	31	42.8	14.68	31
1954	73.6	27.60	25	27.0	12.64	25	50.2	16.87	25	46.6	26.54	25
1955	79.8	21.91	29	35.7	20.58	29	57.5	17.95	29	44.1	23.10	29
1956	73.1	22.63	29	35.9	15.86	29	54.3	16.99	29	37.2	19.32	29
1957	72.1	25.84	31	32.3	14.89	31	51.9	18.76	31	39.7	19.41	31
1958	80.2	26.38	31	35.7	20.26	31	57.8	20.63	31	44.5	22.67	31
1959	81.7	20.71	31	36.4	10.29	31	58.9	13.58	31	45.4	17.98	31
1960	86.8	21.64	31	35.6	18.39	31	60.9	17.98	31	51.3	17.89	31
1961	84.2	17.95	31	38.2	13.88	31	60.8	12.78	31	46.0	19.32	31
1962	75.5	24.77	31	35.0	18.29	31	55.1	19.56	31	40.5	18.98	31
1963	69.4	28.21	27	32.2	21.22	27	50.6	22.04	27	37.1	23.40	27
1964	79.5	24.78	31	30.9	14.94	31	55.0	17.98	31	48.6	19.84	31
1965	63.9	31.70	31	28.7	20.40	31	46.1	24.57	31	35.1	20.72	31
1966	75.3	22.35	31	33.3	14.17	31	54.2	16.23	31	42.0	18.84	31
1967	88.8	19.07	31	49.3	23.45	31	68.9	18.60	31	39.5	21.09	31
1968	78.8	27.22	31	29.1	16.14	31	53.7	18.87	31	49.7	24.07	31
1969	78.1	22.28	31	45.1	17.54	31	61.5	18.15	31	32.9	17.09	31
18-YR	78.0	6.27	18	35.6	5.66	18	56.6	5.40	18	42.5	5.07	18

DECEMBER

C-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	86.5	20.51	31	46.9	22.67	31	66.5	20.07	31	39.6	16.55	31
1953	95.7	10.26	31	45.4	18.18	31	70.5	11.62	31	50.3	18.20	31
1954	82.4	24.45	28	34.3	22.24	28	58.1	19.83	28	48.1	24.91	28
1955	89.7	16.57	26	49.2	19.85	26	69.3	15.93	26	40.5	17.91	26
1956	84.2	18.69	31	43.5	20.60	31	63.7	17.45	31	40.6	18.13	31
1957	86.0	26.15	31	40.9	22.78	31	63.3	21.80	31	45.1	22.46	31
1958	91.3	16.03	21	46.4	27.00	21	68.6	19.21	21	44.9	22.21	21
1959	74.8	24.55	31	23.9	15.48	31	49.2	17.75	31	50.9	20.67	31
1960	94.1	13.75	31	40.2	23.94	31	66.9	15.93	31	53.9	22.72	31
1961	93.5	14.75	31	48.3	20.88	31	70.8	14.99	31	45.3	20.55	31
1962	80.9	22.58	31	44.2	20.82	31	62.3	20.04	31	36.8	16.59	31
1963	80.9	21.79	31	40.5	24.68	31	60.5	21.20	31	40.4	19.25	31
1964	94.4	11.60	31	41.3	20.90	31	67.6	14.09	31	53.2	18.76	31
1965	79.6	22.32	31	37.1	22.32	31	58.1	20.77	31	42.6	16.53	31
1966	85.7	19.21	31	42.0	21.21	31	63.7	18.04	31	43.6	18.46	31
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0
1968	80.8	24.17	30	41.5	19.34	30	61.0	20.26	30	39.2	16.90	30
1969	84.4	21.93	31	44.9	24.79	31	64.5	20.55	31	39.4	22.58	31
18-YR	85.9	6.14	16	41.5	6.09	16	63.5	5.50	16	44.3	5.42	16

DECEMBER

D-1	RHMAX			RHMIN			RHMEAN			RHRANGE		
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N
1952	94.9	15.88	31	63.9	29.06	31	79.2	19.19	31	31.1	27.13	31
1953	93.4	13.10	16	65.8	27.14	16	79.6	18.35	16	27.6	21.59	16
1954	82.2	21.93	13	47.1	26.25	13	64.5	21.39	13	35.2	23.01	13
1955	100.0	0.00	23	61.0	29.21	23	80.3	14.76	23	39.0	29.21	23
1956	77.0	23.03	11	40.5	25.96	11	58.5	22.62	11	36.5	19.16	11
1957	86.7	20.72	28	54.5	24.88	28	70.5	20.08	28	32.2	22.06	28
1958	96.3	10.37	26	63.4	31.52	26	79.7	18.74	26	32.9	28.49	26
1959	83.9	22.32	31	34.3	26.90	31	58.9	21.35	31	49.6	25.06	31
1960	90.0	19.43	25	45.2	32.03	25	67.4	21.78	25	44.8	30.38	25
1961	98.5	5.89	31	73.4	24.74	31	85.6	14.13	31	25.2	22.46	31
1962	93.3	14.54	29	60.1	30.55	29	76.5	20.10	29	33.2	26.30	29
1963	85.8	18.92	15	43.1	27.70	15	64.2	19.79	15	42.7	26.51	15
1964	95.6	16.66	29	45.4	34.82	16	68.4	23.80	16	46.6	33.86	16
1965	87.4	24.79	31	57.6	34.74	30	72.5	27.41	30	30.1	26.57	30
1966	93.5	17.40	31	62.7	34.61	31	78.0	22.77	31	30.8	30.47	31
1967	95.3	14.98	20	67.3	28.85	20	81.1	19.27	20	27.9	25.05	20
1968	91.3	14.93	28	59.3	26.26	28	75.1	18.32	28	32.0	22.11	28
1969	68.9	27.16	12	40.3	18.57	12	54.6	20.43	12	28.6	22.13	12
18-YR	92.0	4.53	11	57.4	10.87	10	74.3	7.49	10	34.2	7.32	10

Table 3.3 Mean daily wind speed, gust speed (m.p.h.) and solar radiation (cal $cm^{-2}day^{-1}$) at B-1, C-1 and D-1, January 1965-December 1970. (S.D. = standard deviation, N = number of cases)

JANUARY

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	
B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	157.7	53.90	31	4890.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	9.9	6.17	31	45.7	20.91	31	-0.0	-0.00	0	-0.0
1968	6.0	2.98	31	29.1	15.56	31	-0.0	-0.00	0	-0.0
1969	8.3	5.90	31	40.0	22.21	31	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	8.1	1.99	3	38.3	8.44	3	157.7	0.00	1	
C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	186.5	72.00	31	5780.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	212.3	67.66	31	6580.0
1967	16.0	6.78	31	59.1	15.68	31	229.7	28.08	30	6890.0
1968	9.9	5.14	31	43.1	19.06	31	-0.0	-0.00	0	-0.0
1969	14.0	6.65	31	58.8	17.23	31	212.9	64.09	31	6600.0
1970	11.9	4.98	30	56.8	13.12	30	199.4	57.73	31	6180.0
6-YR	13.0	2.64	4	54.4	7.64	4	208.1	16.21	5	
D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	180.0	61.39	27	4860.0
1966	24.7	8.15	21	66.7	15.02	17	-0.0	-0.00	0	-0.0
1967	37.0	11.62	22	89.8	18.85	22	-0.0	-0.00	0	-0.0
1968	31.0	11.47	28	70.1	22.14	28	-0.0	-0.00	0	-0.0
1969	27.3	9.89	7	75.6	26.86	7	203.9	77.06	31	6320.0
1970	46.1	7.43	7	86.0	12.84	6	209.0	76.54	31	6480.0
6-YR	31.0	0.00	1	70.1	0.00	1	197.6	15.49	3	

FEBRUARY

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	
B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	238.9	70.18	28	6690.0
1966	5.1	3.38	27	27.6	16.46	27	-0.0	-0.00	0	-0.0
1967	8.7	5.41	28	42.8	20.47	28	-0.0	-0.00	0	-0.0
1968	5.6	3.61	29	28.8	18.40	29	-0.0	-0.00	0	-0.0
1969	4.8	3.46	28	25.9	16.30	28	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	6.0	1.81	4	31.3	7.76	4	238.9	0.00	1	
C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	290.4	105.92	28	8130.0
1966	10.1	8.14	28	40.5	20.27	28	290.7	87.73	28	8140.0
1967	13.3	6.42	27	55.7	17.74	27	291.8	114.34	28	8170.0
1968	10.1	7.01	29	40.2	21.12	29	-0.0	-0.00	0	-0.0
1969	8.7	4.41	28	41.8	17.37	28	295.4	101.09	28	8270.0
1970	7.3	4.61	28	40.5	18.16	28	293.6	104.04	28	8220.0
6-YR	9.9	2.23	5	43.7	6.74	5	292.4	2.09	5	
D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	317.4	80.56	27	8570.0
1966	30.2	11.04	20	75.5	13.51	19	-0.0	-0.00	0	-0.0
1967	35.9	9.66	27	88.6	22.23	26	-0.0	-0.00	0	-0.0
1968	20.4	11.77	29	54.5	25.07	28	-0.0	-0.00	0	-0.0
1969	23.4	8.70	25	61.9	23.34	24	297.1	84.23	28	8320.0
1970	27.9	13.39	17	58.9	20.32	17	304.3	96.97	28	8520.0
6-YR	26.5	8.21	3	71.6	24.12	2	306.3	10.28	3	

MARCH

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	
B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	303.5	110.98	31	9410.0
1966	6.0	3.28	29	31.3	15.01	29	-0.0	-0.00	0	-0.0
1967	6.5	3.75	31	30.5	15.28	31	-0.0	-0.00	0	-0.0
1968	5.4	3.31	31	26.6	16.93	31	-0.0	-0.00	0	-0.0
1969	4.0	3.21	30	21.3	16.00	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	5.5	1.08	4	27.4	4.56	4	303.5	0.00	1	
C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	378.9	153.68	28	10610.0
1966	10.7	5.48	29	42.0	16.41	29	404.5	105.32	31	12540.0
1967	9.9	5.55	31	48.0	17.42	31	418.7	115.75	31	12980.0
1968	8.5	4.95	12	34.4	17.57	12	-0.0	-0.00	0	-0.0
1969	6.8	4.84	31	32.8	21.29	31	374.2	131.17	31	11600.0
1970	7.0	5.78	27	36.7	20.83	27	343.5	110.40	31	10650.0
6-YR	8.6	2.00	4	39.9	6.58	4	384.0	29.09	5	
D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	343.9	104.90	31	10660.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	30.3	11.51	30	75.1	14.80	28	-0.0	-0.00	0	-0.0
1968	23.8	10.92	28	64.7	21.66	27	-0.0	-0.00	0	-0.0
1969	20.8	9.84	21	57.5	21.19	19	429.7	103.49	31	13320.0
1970	27.9	10.66	19	68.0	19.57	18	393.2	100.51	31	12190.0
6-YR	27.1	4.58	2	69.9	7.41	2	388.9	43.06	3	

APRIL

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	417.0	157.31	30	12510.0
1966	3.9	2.61	29	22.0	10.67	29	-0.0	-0.00	0	-0.0
1967	5.3	3.12	30	24.7	14.10	30	-0.0	-0.00	0	-0.0
1968	5.3	2.61	30	29.5	17.07	30	-0.0	-0.00	0	-0.0
1969	4.2	3.08	30	21.3	14.82	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	4.7	.76	4	24.3	3.72	4	417.0	0.00	1	

C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	513.1	162.92	29	14880.0
1966	5.6	2.99	30	33.5	14.89	30	508.0	120.09	30	15240.0
1967	7.4	4.23	30	36.4	14.89	30	523.0	150.16	30	15690.0
1968	9.0	4.51	30	39.9	17.85	30	-0.0	-0.00	0	-0.0
1969	6.5	4.95	2	39.0	29.70	2	448.3	180.08	30	13450.0
1970	7.8	4.23	28	42.7	16.36	28	473.0	143.60	30	14190.0
6-YR	7.4	1.41	4	38.2	4.01	4	493.1	31.32	5	

D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	503.7	113.00	30	15110.0
1966	21.8	8.27	29	65.4	18.36	28	-0.0	-0.00	0	-0.0
1967	21.5	7.66	30	67.6	19.11	28	-0.0	-0.00	0	-0.0
1968	24.7	9.72	30	66.1	20.36	30	-0.0	-0.00	0	-0.0
1969	17.2	10.02	26	49.8	18.63	25	507.0	107.42	30	15210.0
1970	30.1	8.08	9	78.0	12.04	7	498.7	101.43	30	14960.0
6-YR	21.3	3.09	4	62.2	8.35	4	503.1	4.19	3	

MAY

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	429.7	158.19	29	12460.0
1966	3.8	1.83	29	21.9	9.72	29	-0.0	-0.00	0	-0.0
1967	3.6	2.13	29	18.2	11.14	29	-0.0	-0.00	0	-0.0
1968	4.5	2.55	31	24.8	13.91	31	-0.0	-0.00	0	-0.0
1969	3.0	1.03	30	16.8	6.78	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	3.7	.65	4	20.4	3.64	4	429.7	0.00	1	

C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	473.1	176.68	29	13720.0
1966	5.6	3.35	27	32.9	18.41	27	568.7	161.28	31	17630.0
1967	6.9	6.05	28	32.2	20.49	28	472.3	205.59	13	6140.0
1968	6.0	3.61	31	32.4	16.66	31	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	515.5	173.95	31	15980.0
1970	5.7	3.48	19	31.0	14.34	19	567.1		31	
6-YR	6.2	.69	3	32.5	.38	3	531.1		4	

D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	513.2	100.81	31	15910.0
1966	17.3	8.93	31	54.6	21.35	30	-0.0	-0.00	0	-0.0
1967	21.3	12.91	31	59.0	19.45	28	-0.0	-0.00	0	-0.0
1968	21.2	9.26	31	61.4	20.80	31	-0.0	-0.00	0	-0.0
1969	16.1	6.03	18	54.1	16.68	14	544.5	99.59	31	16880.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	564.5	117.13	31	17500.0
6-YR	19.9	2.29	3	58.3	3.41	3	540.8	25.85	3	

JUNE

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	507.7	189.82	30	15230.0
1966	3.4	1.22	28	18.1	7.58	28	-0.0	-0.00	0	-0.0
1967	2.6	.87	29	15.4	7.44	29	-0.0	-0.00	0	-0.0
1968	3.8	1.24	30	22.5	8.34	30	-0.0	-0.00	0	-0.0
1969	3.5	2.50	30	18.4	17.08	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	3.3	.52	4	18.6	2.94	4	507.7	0.00	1	

C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	405.3	172.30	30	12160.0
1966	4.9	2.05	28	26.3	11.03	28	573.5	180.22	26	14910.0
1967	4.1	1.38	22	20.4	9.53	22	496.0	159.02	30	14880.0
1968	5.3	2.29	30	31.3	13.24	30	245.0	37.80	8	1960.0
1969	3.8	3.33	23	23.8	18.92	23	418.0	205.25	30	12540.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	586.0	130.47	30	17580.0
6-YR	5.1	.26	2	28.8	3.50	2	495.8	84.27	5	

D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	472.5	169.93	24	11340.0
1966	16.9	5.79	19	58.6	14.07	18	-0.0	-0.00	0	-0.0
1967	16.8	7.14	30	56.6	15.77	30	-0.0	-0.00	0	-0.0
1968	18.3	6.62	28	59.3	17.54	28	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	523.0	174.24	30	15690.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	17.5	1.10	2	58.0	1.90	2	523.0	0.00	1	

JULY

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	489.0	154.82	31	15160.0
1966	3.1	.92	31	15.0	6.16	31	-0.0	-0.00	0	-0.0
1967	2.6	.89	31	13.7	6.05	31	-0.0	-0.00	0	-0.0
1968	3.0	.98	31	16.4	5.51	31	-0.0	-0.00	0	-0.0
1969	2.8	.87	31	16.8	10.22	31	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	2.9	.24	4	15.5	1.42	4	489.0	0.00	1	

C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	387.7	142.42	31	12020.0
1966	4.4	1.52	30	21.1	8.20	30	535.8	154.96	31	16610.0
1967	4.1	1.33	31	19.5	7.85	31	526.8	175.41	31	16330.0
1968	4.4	1.85	30	20.9	8.05	30	325.0	149.90	6	1950.0
1969	4.4	1.38	29	22.3	7.83	29	501.9	154.41	31	15560.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	539.6	147.42	23	12410.0
6-YR	4.3	.16	4	21.0	1.14	4	488.1	68.40	4	

D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	482.6	156.35	31	14960.0
1966	16.4	6.10	13	44.8	11.36	12	-0.0	-0.00	0	-0.0
1967	13.9	6.34	30	43.3	14.62	27	-0.0	-0.00	0	-0.0
1968	12.1	4.88	29	38.5	10.38	29	-0.0	-0.00	0	-0.0
1969	16.2	5.85	6	50.8	18.77	6	444.5	109.45	31	13780.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	13.0	1.32	2	40.9	3.43	2	463.5	26.92	2	

AUGUST

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	514.8	160.62	31	15960.0
1966	3.3	.90	28	15.0	5.82	28	-0.0	-0.00	0	-0.0
1967	2.3	.82	31	13.6	5.99	31	-0.0	-0.00	0	-0.0
1968	3.3	1.72	31	18.6	10.06	31	-0.0	-0.00	0	-0.0
1969	2.6	.98	31	14.6	6.70	31	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	2.9	.52	4	15.5	2.18	4	514.8	0.00	1	

C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	402.9	137.70	31	12490.0
1966	4.4	1.33	31	22.4	7.11	31	470.7	140.68	27	12710.0
1967	4.3	1.57	31	18.8	8.08	31	411.0	134.50	31	12740.0
1968	4.4	2.03	28	22.7	13.84	28	412.9	170.81	31	12800.0
1969	4.5	1.43	28	23.4	7.24	28	490.0	120.61	31	15190.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	436.8	154.93	31	13540.0
6-YR	4.4	.12	4	21.8	2.07	4	437.4	35.69	6	

D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	451.0	147.20	31	13980.0
1966	12.4	4.78	29	45.9	10.08	28	-0.0	-0.00	0	-0.0
1967	12.0	3.61	28	42.6	7.91	25	-0.0	-0.00	0	-0.0
1968	14.9	8.08	28	48.3	24.87	28	-0.0	-0.00	0	-0.0
1969	11.9	4.29	31	43.7	10.73	31	467.7	86.98	31	14500.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	12.8	1.39	4	45.1	2.54	4	459.4	11.86	2	

SEPTEMBER

A-1 YEAR	WIND MEAN	S.D.	N	GUST MEAN	S.D.	N	RADIATION MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1 YEAR	WIND MEAN	S.D.	N	GUST MEAN	S.D.	N	RADIATION MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	355.7	170.75	30	10670.0
1966	3.5	1.28	30	15.8	7.65	30	-0.0	-0.00	0	-0.0
1967	2.7	1.30	30	13.7	8.56	30	-0.0	-0.00	0	-0.0
1968	3.8	1.58	30	20.1	10.82	30	-0.0	-0.00	0	-0.0
1969	2.6	.77	30	15.6	7.83	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	3.1	.62	4	16.3	2.68	4	355.7	0.00	1	

C-1 YEAR	WIND MEAN	S.D.	N	GUST MEAN	S.D.	N	RADIATION MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	307.0	122.39	30	9210.0
1966	5.2	2.94	30	25.6	12.16	30	415.6	122.68	25	10390.0
1967	5.4	2.86	30	24.6	15.20	30	416.9	142.98	29	12090.0
1968	5.2	2.70	26	29.5	13.85	26	439.0	128.57	29	12730.0
1969	4.8	1.85	30	26.4	13.28	30	380.7	109.73	30	11420.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	422.7	143.43	26	10990.0
6-YR	5.1	.26	4	26.5	2.10	4	397.0	48.02	6	

D-1 YEAR	WIND MEAN	S.D.	N	GUST MEAN	S.D.	N	RADIATION MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	347.0	121.49	27	9370.0
1966	17.3	10.01	30	50.6	18.97	30	-0.0	-0.00	0	-0.0
1967	17.2	9.47	29	51.7	20.69	28	-0.0	-0.00	0	-0.0
1968	19.7	9.26	30	53.5	18.57	30	-0.0	-0.00	0	-0.0
1969	16.6	9.70	30	46.9	17.86	29	386.7	83.89	30	11600.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	17.7	1.36	4	50.7	2.82	4	366.9	28.02	2	

OCTOBER

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	341.6	75.77	31	10590.0
1966	5.7	2.76	30	23.7	11.95	30	-0.0	-0.00	0	-0.0
1967	3.8	1.71	31	22.4	14.17	31	-0.0	-0.00	0	-0.0
1968	5.2	2.21	29	27.6	11.43	29	-0.0	-0.00	0	-0.0
1969	3.1	1.63	30	17.9	10.31	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	4.5	1.20	4	22.9	3.97	4	341.6	0.00	1	

C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	311.9	76.00	31	9670.0
1966	8.2	4.46	31	37.6	15.77	31	358.9	84.00	27	9690.0
1967	9.3	4.73	31	44.1	16.72	31	349.0	82.52	31	10820.0
1968	8.5	4.26	26	43.5	14.54	26	353.5	63.85	31	10960.0
1969	6.1	3.44	28	32.1	18.43	28	301.3	101.71	31	9340.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	8.0	1.35	4	39.3	5.63	4	334.9	26.36	5	

D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	325.5	79.07	31	10090.0
1966	25.9	9.15	31	72.5	23.19	31	-0.0	-0.00	0	-0.0
1967	33.1	10.22	31	74.9	16.26	31	-0.0	-0.00	0	-0.0
1968	29.5	10.23	28	68.5	16.67	28	327.9	90.24	28	9180.0
1969	23.6	9.66	29	60.1	16.88	27	251.0	110.46	31	7780.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	28.0	4.15	4	69.0	6.50	4	301.4	43.72	3	

NOVEMBER

A-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	
B-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	222.3	47.90	30	6670.0
1966	6.1	3.33	30	30.4	15.38	30	-0.0	-0.00	0	-0.0
1967	5.8	4.87	30	26.9	17.45	30	-0.0	-0.00	0	-0.0
1968	3.0	1.83	7	17.3	9.71	7	-0.0	-0.00	0	-0.0
1969	4.6	2.49	30	27.1	15.95	30	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	5.5	.79	3	28.2	1.98	3	222.3	0.00	1	
C-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	202.7	70.51	30	6080.0
1966	10.5	5.77	30	48.3	15.98	30	241.0	79.02	30	7230.0
1967	9.1	5.01	30	45.1	19.09	30	247.2	97.21	29	7170.0
1968	8.4	6.52	14	41.3	24.63	14	230.7	78.96	30	6920.0
1969	9.6	6.59	27	43.7	19.15	27	236.7	61.55	30	7100.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	9.7	.69	3	45.7	2.33	3	231.6	17.30	5	
D-1	WIND			GUST			RADIATION			
YEAR	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.	N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	181.3	85.03	23	4170.0
1966	26.7	9.75	25	67.3	21.16	21	-0.0	-0.00	0	-0.0
1967	34.9	7.93	30	78.2	19.95	30	-0.0	-0.00	0	-0.0
1968	28.5	11.72	30	72.5	23.31	30	222.0	71.22	30	6660.0
1969	31.9	12.12	23	72.6	23.61	22	223.7	75.59	30	6710.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	30.0	4.28	3	75.4	4.05	2	222.8	1.18	2	

DECEMBER

A-1 YEAR	WIND MEAN	WIND S.D.	WIND N	GUST MEAN	GUST S.D.	GUST N	RADIATION MEAN	RADIATION S.D.	RADIATION N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1966	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1967	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1968	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1969	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	

B-1 YEAR	WIND MEAN	WIND S.D.	WIND N	GUST MEAN	GUST S.D.	GUST N	RADIATION MEAN	RADIATION S.D.	RADIATION N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	161.7	51.67	30	4850.0
1966	5.1	2.49	31	26.8	12.53	31	-0.0	-0.00	0	-0.0
1967	7.7	5.05	29	35.9	20.70	29	-0.0	-0.00	0	-0.0
1968	7.9	4.72	18	38.1	19.12	18	-0.0	-0.00	0	-0.0
1969	5.8	5.05	31	29.0	23.22	31	-0.0	-0.00	0	-0.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	6.2	1.36	3	30.6	4.76	3	161.7	0.00	1	

C-1 YEAR	WIND MEAN	WIND S.D.	WIND N	GUST MEAN	GUST S.D.	GUST N	RADIATION MEAN	RADIATION S.D.	RADIATION N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	167.7	59.54	31	5200.0
1966	10.8	5.06	31	45.2	13.75	31	226.8	64.83	31	7030.0
1967	10.7	7.00	31	46.0	22.98	31	179.3	66.33	30	5380.0
1968	13.6	8.23	19	57.3	18.93	19	196.8	55.94	31	6100.0
1969	7.9	6.66	31	40.5	23.17	31	171.6	59.67	31	5320.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	9.8	1.64	3	43.9	2.96	3	188.4	24.15	5	

D-1 YEAR	WIND MEAN	WIND S.D.	WIND N	GUST MEAN	GUST S.D.	GUST N	RADIATION MEAN	RADIATION S.D.	RADIATION N	TOTAL
1965	-0.0	-0.00	0	-0.0	-0.00	0	169.0	49.67	29	4900.0
1966	29.0	9.36	26	69.7	20.25	25	-0.0	-0.00	0	-0.0
1967	28.0	13.38	31	69.8	27.31	31	-0.0	-0.00	0	-0.0
1968	34.5	11.75	31	81.8	24.16	31	170.3	53.07	31	5280.0
1969	33.1	12.65	15	83.8	27.05	12	175.2	72.24	31	5430.0
1970	-0.0	-0.00	0	-0.0	-0.00	0	-0.0	-0.00	0	-0.0
6-YR	30.5	3.52	3	73.8	6.93	3	171.5	3.26	3	

TABLE 3.4 TOTAL MONTHLY PRECIPITATION (INCHES) 1965-70

STATION A-1

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1966	.21(11)	1.74(28)	.20(31)	2.15(30)	1.12(31)	1.27(30)	1.62(31)	1.63(31)	3.05(29)	.78(31)	.53(30)	.52(31)
1967	1.13(31)	1.11(28)	1.75(31)	1.63(30)	4.94(31)	3.86(30)	2.03(31)	2.33(31)	1.69(30)	1.52(31)	1.56(30)	2.49(31)
1968	.23(31)	1.39(29)	1.15(31)	2.26(30)	2.14(31)	1.20(30)	1.17(31)	3.58(31)	1.56(30)	.45(31)	1.06(30)	.39(31)
1969	.50(31)	.41(28)	1.70(31)	2.51(30)	11.61(31)	5.66(30)	1.61(31)	.90(31)	.51(30)	6.70(31)	.97(30)	1.14(31)
1970	.21(31)	.25(28)	5.71(31)	1.43(30)	.80(31)	2.33(30)	1.10(31)	.95(31)	4.21(30	M	M	M

STATION B-1

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1965	M	M	M	M	M	M	M	M	M	.33(24)	.27(30)	.56(31)
1966	.70(31)	1.77(28)	.20(31)	1.99(30)	1.07(31)	1.63(30)	2.24(31)	1.95(31)	2.84(30)	1.07(31)	.47(30)	.66(31)
1967	.95(31)	1.75(28)	1.90(31)	1.60(22)	4.66(31)	3.50(30)	3.36(31)	2.57(31)	1.74(30)	1.58(31)	1.53(30)	2.30(31)
1968	.24(31)	1.34(29)	.99(31)	2.14(30)	2.64(31)	1.04(30)	.93(31)	3.85(31)	1.74(30)	.60(31)	1.60(30)	.33(31)
1969	.49(31)	.30(28)	1.60(31)	2.19(30)	9.83(31)	5.78(30)	1.26(31)	1.46(31)	.66(30)	6.09(31)	.84(31)	1.25(31)
1970	.24(29)	.32(28)	4.67(31)	1.52(30)	.75(31)	2.57(30)	1.82(31)	1.23(31)	4.38(30)	M	M	M

M = missing data

Number of days in parenthesis

TABLE 3.4 (continued)

STATION C-1

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1965	3.43(25)	1.65(28)	4.46(31)	3.59(30)	2.54(31)	3.77(30)	8.70(31)	1.92(31)	2.69(30)	.34(31)	2.03(30)	1.31(31)
1966	.51(31)	2.08(28)	.35(31)	3.07(31)	2.01(31)	2.04(30)	2.17(31)	2.23(31)	2.02(30)	1.66(31)	.67(31)	1.23(31)
1967	2.26(31)	2.49(28)	2.95(31)	2.50(30)	4.40(31)	3.15(30)	2.32(31)	3.86(31)	2.37(30)	2.13(31)	2.73(30)	2.95(31)
1968	.33(28)	2.99(29)	1.87(31)	2.90(30)	2.83(31)	1.47(30)	1.76(31)	3.28(31)	2.05(30)	.76(31)	3.13(30)	1.10(31)
1969	2.04(31)	.89(28)	2.38(31)	2.96(30)	9.11(31)	6.60(30)	1.45(25)	2.14(31)	1.94(30)	3.57(25)	1.31(24)	2.07(28)
1970	2.26(31)	1.46(28)	4.75(31)	3.22(30)	1.21(27)	2.69(30)	2.27(31)	1.17(31)	4.69(24)	M	M	M

STATION D-1

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1965	9.10(31)	2.51(26)	9.07(31)	5.16(30)	2.09(23)	3.53(30)	6.93(31)	1.57(31)	3.23(30)	.38(31)	8.08(30)	3.80(31)
1966	3.02(31)	5.23(28)	2.15(29)	4.80(30)	2.80(31)	1.75(30)	2.11(31)	1.98(31)	1.83(30)	2.95(31)	1.65(30)	4.64(30)
1967	9.10(31)	5.08(17)	M	M	M	M	M	M	M	1.34(20)	2.91(30)	3.78(31)
1968	1.10(24)	4.28(29)	2.65(31)	3.19(30)	3.66(31)	.82(30)	1.63(31)	3.31(31)	2.61(30)	1.27(31)	4.35(26)	3.36(31)
1969	3.45(30)	1.81(19)	2.48(31)	3.68(28)	3.69(31)	5.79(30)	.46(09)	M	M	.46(17)	.67(20)	1.52(31)
1970	2.27(31)	1.64(25)	1.29(12)	2.94(30)	.54(31)	1.83(30)	1.95(31)	2.13(31)	3.60(30)	M	M	M

M = missing data

Number of days in parenthesis

Differences according to Exposure

The 16 Station Bank for September 1952 - October 1953 provides data on exposure differences at the approximate elevation of the four major stations. Figs. 3.8 and 3.9 show the variations of temperature maxima and minima for December - January - February and June - July - August. In winter the variations are largely what would be anticipated with highest maxima and minima occurring at the South exposures at A, B and C. Also at A, B and C the lowest maxima are at the North and Valley sites and the lowest minima at the Valley sites. At the uppermost stations (D) the Valley site which was some 180 m lower than the other 3 sites has both the highest maxima and minima. The summer pattern of variations (Fig. 3.9) is very similar to the winter one.

Analysis of variance for exposure differences in each group (A, B, C, D) of stations and season for the four temperature descriptors (maximum, minimum, mean and range) indicates that exposure is a significant factor for all temperature parameters at all four stations (F significant at $\leq$ 1% level in all cases except minima at C where it is significant at 5%). The exposure-season interaction is significant only at A and B for temperature minima and range.

The variation of relative humidity with exposure is small except at the lowest stations (A) although the effect of exposure is statistically significant at A, B and C for all four humidity descriptors. At A the Ridge site has the highest maxima and minima and the Valley site the lowest in both winter and summer. The exposure-season interaction is significant for humidity maxima and range at A and B.

FIG. 3.8 EXPOSURE EFFECT ON MEAN WINTER TEMPERATURES 1952-3

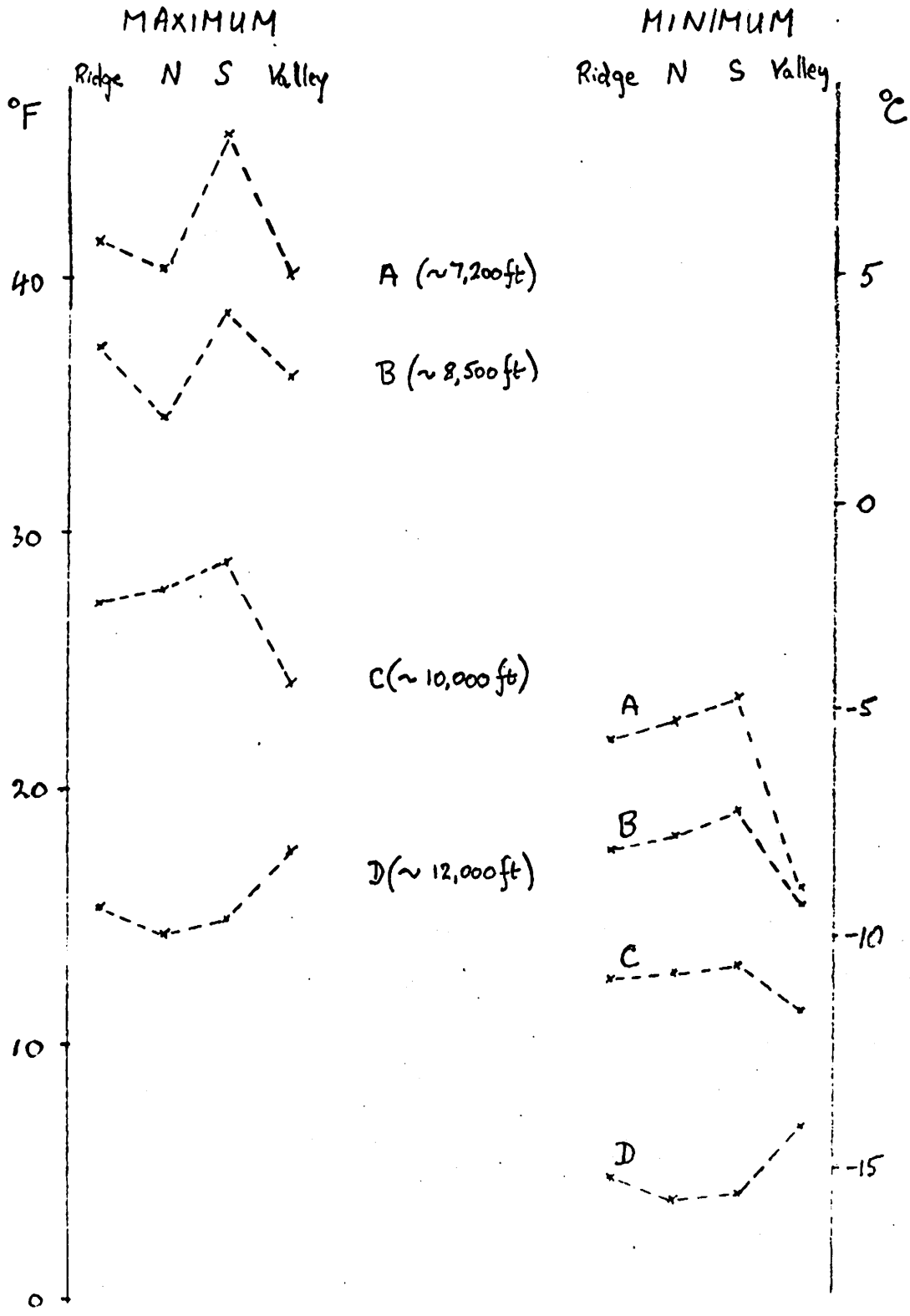
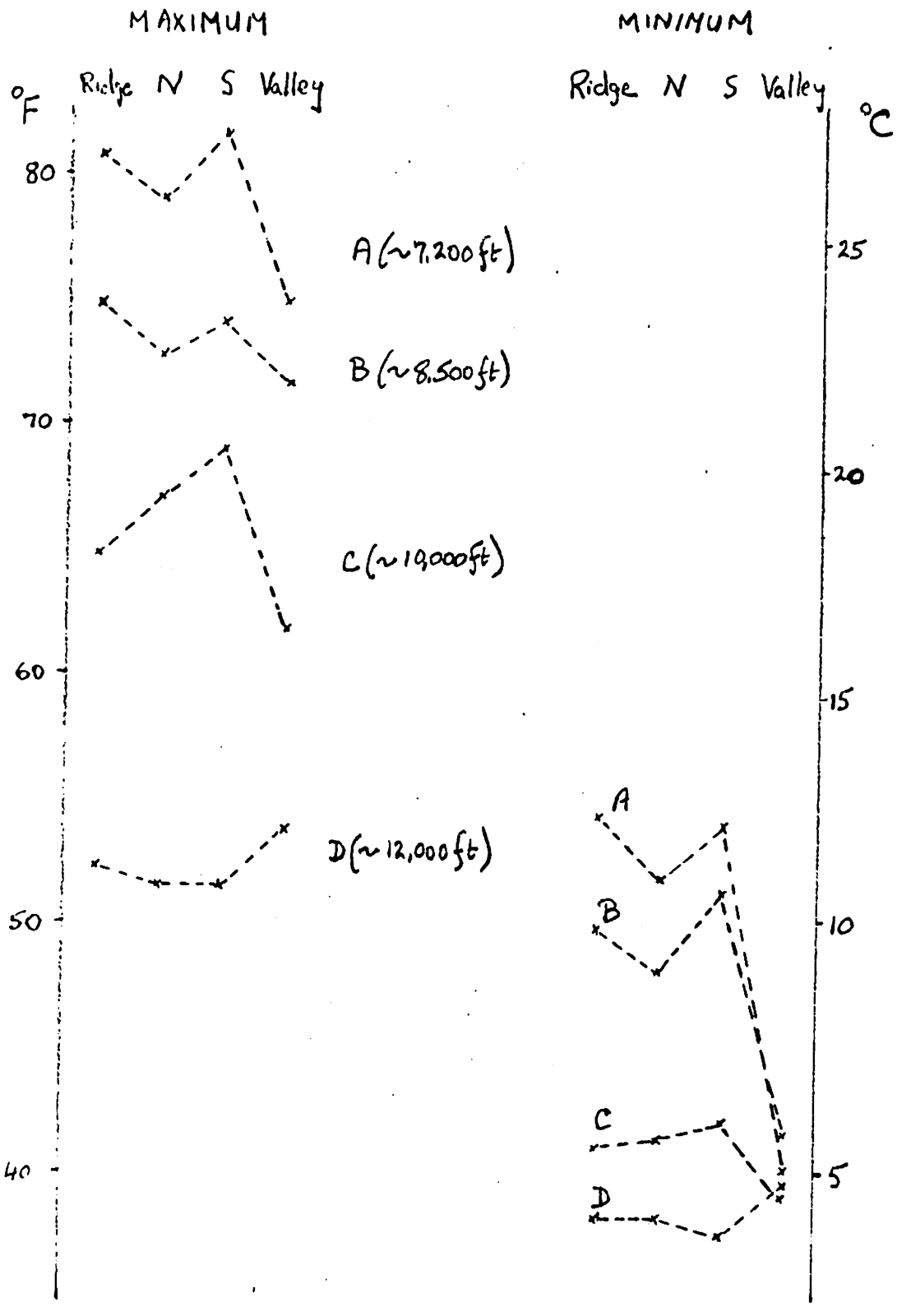


FIG. 3.9 EXPOSURE EFFECT ON MEAN SUMMER TEMPERATURES 1952-3



These results largely follow the expected patterns. Increased air flow at the higher elevations reduces the contrasts due to exposure as well as suppressing diurnal variations. Altitudinal effects are discussed below.

Soil Temperature

Soil temperature data were collected at the 16 sites during 1952-3 and at the four Ridge sites through 1964 (Marr, 1967; Marr et al., 1968A,B). Temperatures were read at approximately weekly intervals from maximum and minimum thermometers installed in stoppered metal pipes, at 5-7" and 11-13" depth, leading out from a waterproof metal box[1]. Monthly averages in the original data reports ignored the duration of the interval between the readings and the information in the Weekly Bank has therefore been used to calculate a weighted average to take account of this duration. Even so, care must be exercised in interpreting these values. The tabulations (not included here) are on file at the Institute of Arctic and Alpine Research.

As the soil temperature record is a relatively limited one it is of interest to assess what estimates may be made for subsequent time periods through the use of suitable predictors. Unfortunately virtually no solar radiation records were maintained during the period 1953-64. The multiple regression analysis used temperature (maximum, minimum, mean, range), precipitation, wind speed and snow depth as independent

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[1] Note: The maximum thermometers were reset 2°F below the current temperature reading in the box by pouring alcohol over them.

variables and mean "weekly" soil temperature (average of maximum and minimum) at either 6 in. or 12 in. as the dependent variable. The analysis was performed once with temperature maximum and minimum and a second time with the mean and range in order to avoid an ill-conditioned matrix due to the high intercorrelation of these variables. Separate analyses were carried out for winter (December - February), summer (June - August) and the whole year.

Mean air temperature accounts for 81-88% of the variance of mean soil temperature at both levels using annual data (Table 3.5), but if the analysis is limited to seasons the explanation is 20-60% in summer and only 7-48% with this parameter in winter. Other variables (snow depth, precipitation and wind speed) then appear in an inconsistent manner. The use of the other temperature descriptors is no more satisfactory on a seasonal basis. The implication of this is that the broad annual pattern of soil temperature will obviously closely match that of air temperature but that more precise specification within seasons cannot be obtained with the available descriptors. However, more attention would need to be given to the degree of non-linearity of the relationship with precipitation and snow-depth, for example, which has not been considered here. Undoubtedly, also, the inhomogeneities due to the irregular duration of the interval to which the data refer must cause additional problems in the analysis. The effort that would be required to eradicate some of these problems (thereby greatly limiting the data sample) was not regarded as concomitant with the likely value of the results for present purposes at least.

TABLE 3.5 SUMMARY OF PERCENTAGE VARIANCE IN MEAN SOIL TEMPERATURE AT 6 IN. AND 12 IN. WITH REGRESSION VARIABLES

	ANNUAL				WINTER				SUMMER			
	6"		12"		6"		12"		6"		12"	
A-1	Tmean	88.5	Tmean	85.4	Tmean	7.2	Tmean	7.3	Tmean	52.9	Tmean	60.7
					S.D.	3.2	S.D.	5.0				
B-1	Tmean	82.8	Tmean	82.5	S.D.	12.0	S.D.	7.2	Tmean	22.7	Tmean	35.7
					Tmean	7.2	Tmean	6.9				
					Wind	2.9						
C-1	Tmean	85.7	Tmean	82.4	Tmean	32.5	Tmean	17.3	Tmean	33.9	Tmean	40.8
			S.D.	3.2	Wind	6.7	Wind	5.4	Precip.	18.7	S.D.	4.5
					Precip.	3.3			S.D.	2.9		
D-1	Tmean	88.4	Tmean	83.2	Tmean	47.5	Tmean	38.9	Tmean	30.1	Tmean	19.7
A-1	Tmax	86.7	Tmax	82.9	Tmax	5.7	Tmax	6.3	Tmax	39.7	Tmax	51.4
	Tmin	2.6	Tmin	3.0	S.D.	3.2	Tmin	3.5	Tmin	13.2	Tmin	10.0
					Tmin	2.0	S.D.	3.1				
B-1	Tmax	80.8	Tmax	80.7	S.D.	12.0	S.D.	7.2	Tmax	16.8	Tmax	27.5
	Tmin	2.5	Tmin	2.4	Tmin	7.2	Tmin	5.8	Tmin	6.0	Tmin	8.5
					Wind	2.3						
C-1	Tmax	85.3	Tmax	82.0	Tmax	27.6	Tmax	15.7	Tmax	38.0	Tmax	37.1
			S.D.	3.1	Tmin	6.1	Wind	4.5	Precip.	10.2	Tmin	6.0
					Wind	5.6	Tmin	2.6	Tmin	5.8	S.D.	4.2
									Wind	2.9		
D-1	Tmax	84.6	Tmax	80.0	Tmax	36.4	Tmax	33.1	Tmin	25.2	Tmin	18.3
	Tmin	3.9	Tmin	3.4	Tmin	11.7	Tmin	7.3	Tmax	4.9		

S.D. = Snow depth

Temperature Singularities

The flexibility of the TAXIR system makes it easy to examine the characteristics of any descriptor on the basis of individual dates or groups thereof. A preliminary analysis has been performed on maximum temperatures at C-1 for 73 pentads (5-day intervals ignoring 29 February). Although 17 years is a rather short record and there is evidence of a trend in the mean daily temperature of the summer months at C-1, the data nevertheless seem adequate for an exploratory investigation.

The annual variation of pentad mean maximum temperatures was fitted by a harmonic expression

$$T = a_o + \sum_{i=1}^{n} (a_i \cos i\theta + b_i \sin i\theta)$$

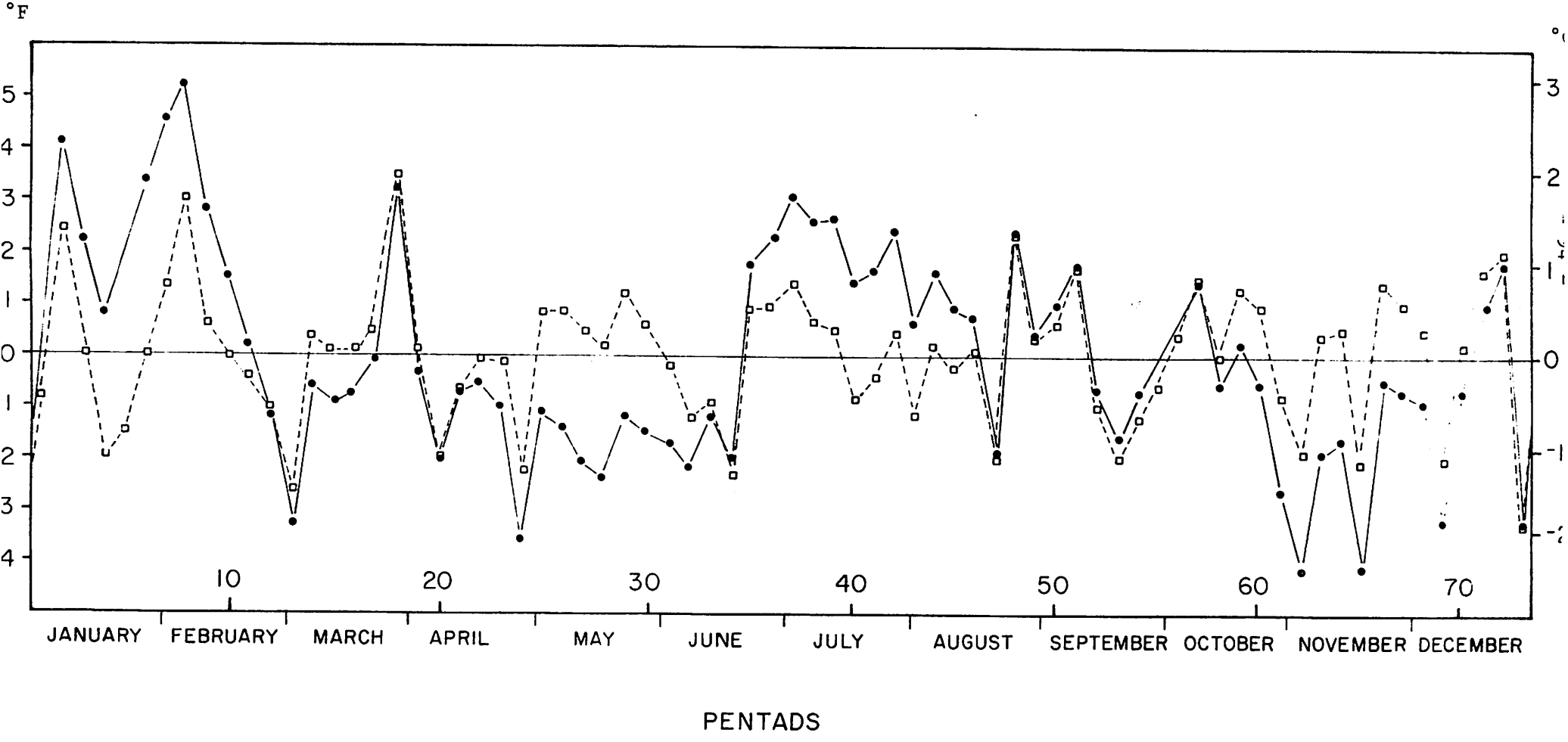
where $\theta = 0$ to 2π over the year (see Craddock, 1956). The analysis was carried out for 1, 2, ... 9 terms using BMD04R.

The residuals between the predicted pentad value for the specified harmonic representation and the actual value are plotted in Fig. 3.10. The explained variance is as follows:

No. of harmonic terms	Explained variance (%)
1	97.96
2	98.81
3	98.85
6	99.16

Visual inspection of Fig. 3.10 suggests that there may be some 6 or 7 warm peaks and 11 cold ones. The likely reality of these can be considered by examining the skewness in the frequency distribution of the pentad temperature over the 17 year record and by testing the significance of the residual on a given date

Fig. 3.10. Residuals from first harmonic (•——•) and first to sixth harmonic (▫----▫) estimates of pentad-mean maximum temperature at C-1 (1952-70)



from the value for a selected harmonic term. The overall residual variance of 1.2% for the two-term harmonic is slightly larger than most of Craddock's values at European stations, which probably reflects the shorter record, although it is in line with values he obtained at European mountain stations. Significance tests related to the residual from the two-term harmonic are given in Table 3.6. Residuals on five of the selected 18 dates are significant and there is also a significant change in temperature at the beginning of the year (pentads 73-2).

The sharp rise in mean maximum temperature about 21-25 November (pentads 66-67) at Denver noted by Namias (1968) does not apparently show up at C-1 although the positive anomaly in early July may reflect the mid-summer "High jump" in the southwest United States, described by Bryson and Lowry (1955).

The frequency of 700 mb circulation patterns has been determined for pentads which fall within a single month and compared with the monthly frequency of those patterns. Although some of the pentad frequencies appear to diverge markedly from the monthly frequencies in percentage terms, none of the cases show significant differences in the absolute frequencies by χ^2. At least in these terms, therefore, there is no evidence for particular synoptic patterns to predominate about certain calendar dates. This analysis could be pursued in future with respect to the 700 mb deviation patterns or pentad-mean 700 mb height maps, for example, using information available in the data banks.

TABLE 3.6 Possible Singularities in Maximum Temperature at C-1, 1953-70.

	Pentad	Mean Maximum Temperature (°F)	Standard Deviation	Residual from 1st + 2nd harmonic	t test on residual
	2	29.6	7.06	2.82	n.s.*
	4	25.6	7.51	-0.83	n.s.*
7 February	8	30.1	6.85	3.37	0.10
4 March	13	25.1	5.90	-4.24	0.02*
29 March	18	38.0	5.66	3.81	0.02
	20	36.0	7.51	-0.79	n.s.*
28 April	24	41.1	3.90	-1.78	0.10
	34	57.9	5.51	-1.96	n.s.
2 July	37	65.8	3.68	2.22	0.02
21 August	47	61.3	3.46	-3.19	0.01
26 August	48	64.7	2.07	1.15	0.05
	53	55.0	7.32	-1.46	n.s.
	57	51.9	7.30	2.73	n.s.*
	62	37.8	7.11	-2.20	n.s.
	65	32.7	7.91	-2.64	n.s.
	69	27.9	7.96	-2.63	n.s.
	72	29.5	5.71	1.35	n.s.*
29 December	73	23.9	7.88	-3.69	0.10*

Pentad pair	Temperature Change (°F)	t test
2-4	-4.0	n.s.
34-37	+7.9	0.01
69-72	+1.6	n.s.
73-2	+5.7	0.05

* Frequency distribution of pentad mean maximum temperature over 16-17 years is skewed in accordance with the postulated deviation (i.e. negatively skewed for warm anomalies and vice versa).

4. VARIATION OF CLIMATIC ELEMENTS WITH ALTITUDE

Radiation

The question of the altitudinal variation in global solar radiation has been much discussed from both a theoretical standpoint (Gates and Janke, 1966) and an observational one (Sauberer and Dirmhirn, 1958). The general statement that totals increase by 5-15% per 1000 m in the lower troposphere is often cited. However, Caldwell (1958) suggests that totals at 3050 m on the east slope of the Front Range may be the same as on the adjacent plains at 1500 m due to the greater cloudiness over the mountains. Sauberer and Dirmhirn show that in the Alps the percentage increase from 200 m to 3000 m is ca. 150% on overcast days compared with only 21% in June and 33% in December on clear days.

For 1965, daily actinograph totals are available from B-1 (2591 m), C-1 (3048 m) and D-1 (3750 m). Table 4.1 gives the mean daily values for each month and inter-station ratios. In December - May the daily mean increases from 2600 m to 3050 m but there is little change, and in some months a decrease, from 3050 to 3750 m. In June - November averages are highest at 2600 m but there is an increase from 3050 m to 3750 m, apart from November. Over the year there is no change in radiation totals with elevation, confirming Caldwell's suggestion.

For 1966-70 there are data at C-1 and D-1 (less complete in the latter case). One of the most significant features of Table 4.1 is the difference between the D-1/C-1 ratio in July - October 1965 and 1969. Further study is required to clarify which pattern is the more common. Examination of radiation totals in relation to the circulation types did not produce any clear-cut results, mainly as a result of the small samples.

TABLE 4.1 MEAN DAILY RADIATION*(CAL $CM^{-2}DAY^{-1}$) IN 1965 AND RATIOS BETWEEN STATIONS

	MEANS 1965			RATIOS 1965		
MONTH	B-1	C-1	D-1	C-1/B-1	D-1/B-1	D-1/C-1
J	157.7	186.5	180.0	1.18	1.14	0.96
F	238.9	290.4	293.6	1.22	1.23	1.01
M	303.5	378.9	343.9	1.25	1.13	0.91
A	417.0	513.1	503.7	1.23	1.21	0.98
M	429.7	473.1	513.2	1.10	1.19	1.09
J	507.7	405.3	472.5	0.80	0.93	1.17
J	489.0	387.7	482.6	0.77	0.98	1.24
A	514.8	402.9	451.0	0.78	0.87	1.12
S	355.7	307.0	347.0	0.86	0.98	1.13
O	341.7	311.9	325.5	0.91	0.95	1.04
N	222.3	202.7	181.3	0.91	0.82	0.89
D	161.7	167.7	169.0	1.04	1.05	1.01
YR	345.0	335.6	355.3	0.97	1.03	1.06

* n ≥ 23 days in each month.

	RATIO D-1/C-1		
MONTH	1968	1969	1970
J		0.96	1.05
F		1.01	1.04
M		1.15	1.14
A		1.13	1.05
M		1.06	1.00
J		1.25	
J		0.89	
A		0.95	
S		0.99	
O	0.93	0.83	
N	0.96	0.94	
D	0.86	1.02	
YR		1.01	

Wind

Wind speed data relate to continuous records since 1962, from which daily means determined from 10 minute averages at each hour have been entered in the bank. Prior to that only totalizing counters were read on service visits. Recording velocity systems provided by NCAR were operated at Gold Hill (2.3 miles north of B-1 at the same elevation), at C-1, and at D-1 (see Eden, 1970). For station details see Appendix 1. Daily data are included in the bank whenever there were records for at least 12 hours of the day. The gust speed is the maximum gust for the day.

As Table 4.2 shows, Niwot Ridge has very high mean velocities in winter although it is still much less windy than at Mount Washington observatory (1909 m), for example, where the monthly average in winter is about 50 m.p.h. The average daily peak gust at D-1 is 70-75 m.p.h. in the winter half-year and drops to 40-45 m.p.h. only in July - Augst. Extreme gusts reach ≥ 109 m.p.h. in winter and 103 m.p.h. in midsummer at D-1. The mean speeds at C-1 are probably unrepresentatively low since the anemometer is at 6.7 m which is close to tree-top height. The upwind (westward) distance to the edge of the clearing is only about 50 m.

Precipitation

Short-term mean monthly precipitation totals based on the years with recording gage data for at least 25 days in the month are given in Table 4.3. Two anomalies caused by this averaging are the low means at C-1 in September (4.7 in. fell in 24 days in September 1970) and at D-1 in October (here a similar large total almost certainly occurred in October 1969).

TABLE 4.2 (A) MEAN SPEED (M.P.H.)

	J	F	M	A	M	J	J	A	S	O	N	D	YR.
B-1	8.1(3)	6.0(4)	5.5(4)	4.7(4)	3.7(4)	3.3(4)	2.9(4)	2.9(4)	3.1(4)	4.5(4)	5.5(3)	6.2(3)	4.7
C-1	13.0(4)	6.9(5)	8.6(4)	7.4(4)	6.2(3)	5.1(2)	4.3(4)	4.4(4)	5.1(4)	8.0(4)	9.7(3)	9.8(3)	7.6
D-1	31.0(1)*	26.5(3)	27.1(2)	21.3(4)	19.9(3)	17.5(2)	13.0(2)	12.8(4)	17.7(4)	28.0(4)	30.0(3)	30.5(3)	22.9

Number of months in parentheses.

*Confirmed by a mean of 30.9 for 3 years with $\geq$ 21 days/month.

(B) EXTREME GUST

	J	F	M	A	M	J	J	A	S	O	N	D
B-1	109	79	76	81	58	67	57	51	51	58	80	81
C-1	108	82	87	77	76	73	41	59	66	85	85	84
D-1	109	109	106	107	108	98	92	103	90	108	106	106

The mean annual totals at the four stations confirm earlier views (Kreibich, 1966, for example) that there is little increase with altitude between 2200 m and 2600 m, whereas totals increase sharply at higher elevations[1]. The means of 40 in. (102 cm) at D-1 and 30 in. (77 cm) at C-1 contrast markedly with the figure of 25.8 in. at both stations determined with standard 8 in. gages for 1953-64 (Marr et al., 1968B)[2].

The significance of the wind data (Table 4.2) in terms of precipitation measurement is obvious. Larson (1971), for example, notes that under windy conditions an unshielded gage catches only 1/3 - 1/2 of the total snowfall and the addition of a small fence or Alter shield only raises this to 2/3 - 3/4 of the total. He demonstrates that the use of an Alter shield combined with snow fencing around the site is essential in order to catch the "true" fall. However, as experience at the sheltered C-1 site demonstrates, an Alter shield would rapidly disintegrate in the windy conditions at D-1. Shielding of the gage by a large snow fence was introduced at D-1 on 17 October 1964.

The question of wind effects on the D-1 data has been further checked by selecting days when precipitation fell at C-1 and the mean wind speed there was $\leq$ 10 m.p.h. The comparison between the daily totals at the two stations, excluding days with missing data from the main body of the table, is shown in Table 4.4. The January figures are somewhat

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[1] Hjermstad (1970) suggests that there may be a minimum zone of winter precipitation at about 8,500 ft. on the eastern slopes.

[2] Remarkably, Kreibich (1966, p. 48) cites an average of 36.7 in. (93.2 cm) at D-1 for 1953-65 but does not indicate how this value was derived. An average of 41.4 in. was recorded during 1907-12 at Corona Pass (11,660 ft.), on the Continental Divide, 12 miles south of D-1.

TABLE 4.3 (a) MEAN PRECIPITATION (INCHES) BASED ON 1965-70

	J	F	M	A	M	J	J	A	S	O	N	D	YR
A-1(2195m)	0.52(4)	0.98(5)	2.10(5)	2.00(5)	4.12(5)	2.87(5)	1.51(5)	1.88(5)	2.22(5)	2.36(4)	1.03(4)	1.20(4)	22.79
B-1(2591m)	0.53(5)	1.10(5)	1.87(5)	1.96(4)	3.79(5)	2.90(5)	1.92(5)	2.21(5)	2.27(5)	2.34(4)	0.94(5)	1.02(5)	22.75
C-1(3048m)	1.90(6)	1.93(6)	2.79(6)	3.04(6)	3.76(6)	3.29(6)	3.21(6)	2.43(6)	2.21(5)	1.86(5)	2.14(4)	1.78(5)	30.34
D-1(3750m)	5.42(5)	3.57(4)	4.15(4)	4.01(5)	4.01(5)	2.75(5)	3.16(4)	2.25(4)	2.82(4)	1.53(3)	4.41(4)	3.45(5)	40.19

CORRIGENDUM

TABLE 4.3 (b) MEANS AT A-1 AND B-1 FOR TOTAL RECORD 1952-70

(INCHES)

	J	F	M	A	M	J	J	A	S	O	N	D	YR
A-1	0.86(16)	1.07(17)	2.07(17)	2.27(17)	3.63(17)	2.35(17)	1.98(17)	1.92(17)	1.77(17)	1.37(17)	1.27(17)	0.89(17)	21.45
B-1	0.84(17)	1.27(17)	1.95(17)	2.22(16)	3.42(17)	2.14(17)	2.27(17)	2.32(17)	1.73(17)	1.41(17)	1.16(18)	0.96(18)	21.69

Number of months in parentheses

TABLE 4.4. PRECIPITATION (IN.) AT C-1 AND D-1 ON DAYS WITH WIND ≤ 10 M.P.H. AT C-1, 1966-70

	No. of Cases	C-1 Days with Precip.	C-1 Total Precip.	D-1 Days with Precip.	D-1 Total Precip.	C-1/D-1 (%)
Jan.	24	22	3.50	17	6.09	57
Apr.	44	34	7.94	30	7.15	112
May	39	25	4.98	20	4.20	119
July	50	27	3.76	18	3.09	123
Oct.	21	15	2.90	14	3.38	86
All Year	308	308	53.26	252	57.64	101

biased by a fall of 1.92 in. at D-1 on 14 January 1967 but omitting this day the C-1/D-1 ratio is still only 69%. Over the year as a whole there are almost identical totals at the two stations for the defined conditions. In fall and winter there is apparently a significant increase of precipitation with height as indicated by the mean totals in Table 4.3. The ratio of the mean totals is 39% in January (using an adjusted mean at D-1), 53% in October (using an adjusted mean at C-1) and 75% in April whereas those for May and July compare more nearly with Table 4.4. The absence of a height increase in April - May, when the precipitation is still in the form of snow at D-1, reflects the different circulation characteristics. There is, therefore, no evidence here that high wind speeds at D-1 greatly affected the catch during 1966-70 and this lends greater confidence to the mean figures.

Table 4.4 also shows that the intensity of precipitation, rather than more frequent occurrences, provides the main contribution to the higher totals at D-1 in the winter half-year.

TABLE 4.5 PRECIPITATION IN THE GREEN LAKES VALLEY, SUMMER 1969 (INCHES)

GAGE NUMBER	ALTITUDE(M)	1-29 JULY	30 JULY-27 AUG.	28 AUG.-24 SEPT.	SUMMER TOTAL
Green Lakes 1	3,459	1.76	2.13*	2.60†	6.49
Green Lakes 3	3,435	1.69	1.75*	2.26†	5.70
1	3,559	2.04	1.90	3.37	7.31
D-4	3,563	1.77	2.03	2.98	6.78
3	3,566	--	1.53	3.08	--
4	3,560	2.09	2.00	3.09	7.18
6	3,612	2.06	1.56	3.76	7.38
7	3,649	2.11	1.85	2.80	6.76
10	3,645	2.04	1.81	2.77	6.62
11	3,645	2.20	2.05	3.22	7.47
14	3,764	2.07	2.04	(3.19)‡	(7.30)‡
13	3,834	2.23	1.88	--	--
S.E. side of Navajo Peak 15	3,825	2.17	--	(4.22)††	6.39
S.E. side of Navajo Peak 16	3,889	--	1.83	3.20	--

* 30 July-31 August
† 1-24 September
†† 30 July-24 September

‡ Gage 14 data incomplete. Total from a nearby gage at 3,794 m operated during 28 Aug.-24 Sept.

Table 4.3 shows some interesting variations in the vertical distribution of precipitation with season. The highest averages occur at 3750 m from November through April and probably between 3050-3750 m from June through September. In May and October the distribution is very irregular from year-to-year. The extremes of May 1969 and October 1969 when there were large falls on the lower slopes unduly bias the averages. Synoptic aspects of these patterns are discussed below.

In summer 1969 a temporary network of gages was operated in the Green Lakes valley, south of Niwot Ridge, (see Fig. 1) by Dr. N. Caine of INSTAAR in conjunction with an NSF Research Participation Program. 15 of the stations provide an east-west profile normal to the Continental Divide. The totals in Table 4.5 do not demonstrate any very clear relationship with altitude, although there appears to be a maximum about 3630 m (11,900 feet).

Temperature

Temperature-elevation relationships are illustrated in Fig. 4.1. The implications of mean annual air temperature in relation to probabl permafrost occurrence at high elevations in the Rocky Mountains has been discussed by Ives and Fahey (1971). Mean lapse rates derived from Table 3.1 are shown in Fig. 4.1. and Table 4.6. The lapse rates of minima

TABLE 4.6. MEAN LAPSE RATES FOR MAXIMUM AND MINIMUM TEMPERATURES (°F/1,000 FEET)

	MAXIMUM			MINIMUM		
	A-1/B-1	B-1/C-1	C-1/D-1	A-1/B-1	B-1/C-1	C-1/D-1
JAN	3.3	6.0	5.7	2.5	3.1	3.4
APR	3.6	6.3	5.8	3.5	3.3	3.3
JULY	2.5	7.0	5.1	3.1	6.6	0.4
OCT	2.9	5.9	5.9	2.8	4.0	2.1

are all sub-adiabatic except for B-1/C-1 in July (which is confirmed by the August value). Also in July the C-1/D-1 change is nearly isothermal. For maxima the lapse rates between A-1 and B-1 are subadiabatic in all seasons while those for C-1/D-1 are close to or just above the dry adiabatic value. The B-1/C-1 values are superadiabatic in all seasons which is indicative of colder air about the 3,000 m level.

Examination of the 16 Station Bank (using the Difference Program) indicates the occurrence of this feature at the Valley, Ridge and South sites in the daily maxima for January 1953 and at the Ridge, South and North sites in the daily minima for July 1953. In the maxima for July it occurs at the Ridge and North sites. It is, therefore, not simply a local site characteristic.

Comparison of the minimum temperature at C-1 with the free air temperature at 700 mb over Denver at 1200 GMT (0500 MST) shows a close correlation in January. For 448 cases the correlation coefficient is +0.816 with mean values of $-5.4^{o}C$ over Denver and $-11.7^{o}C$ ($10.9^{o}F$) at C-1. In July the correlation drops to +0.578 with mean values of $12.7^{o}C$ over Denver and $5.0^{o}C$ ($40.9^{o}F$) at C-1[1]. There is similarly a high correlation between the minimum temperature at C-1 and the height of the freezing level over Denver in January. For 111 cases of normal lapse rate profile the r value is +0.93 (significant at < 0.1% level); including 99 inversion situations (where the height refers to the decrease below $0^{o}C$ on the upper side of the inversion) the r value is +0.91 (significant at < 0.1% level for 210 cases). In July this correlation drops to only +0.48 for 550 cases of normal lapse rate, although this coefficient is still highly significant.

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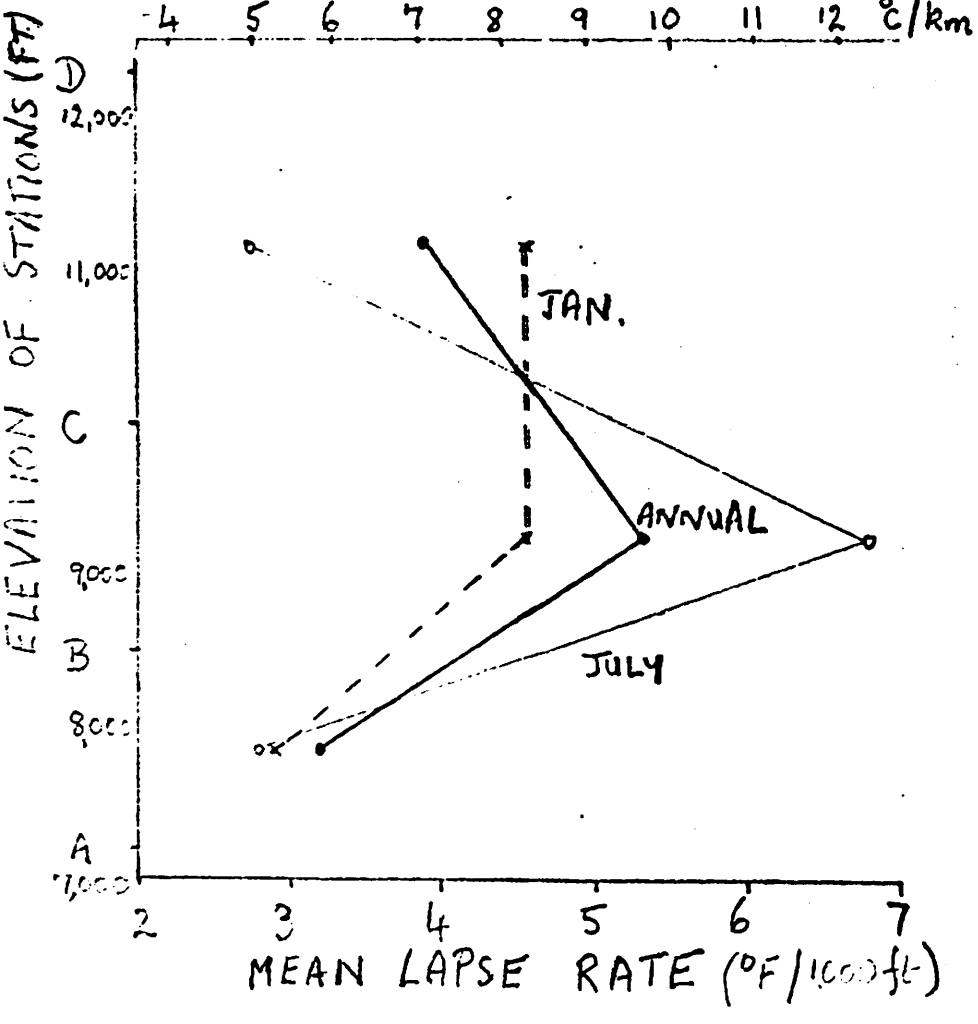
[1]The results cannot be compared with those of Sansom (1965) and similar studies because the time of the minimum and its relation to the 0500 MST temperature is unknown.

FIG. 4.1 TEMPERATURE/ELEVATION RELATIONSHIPS



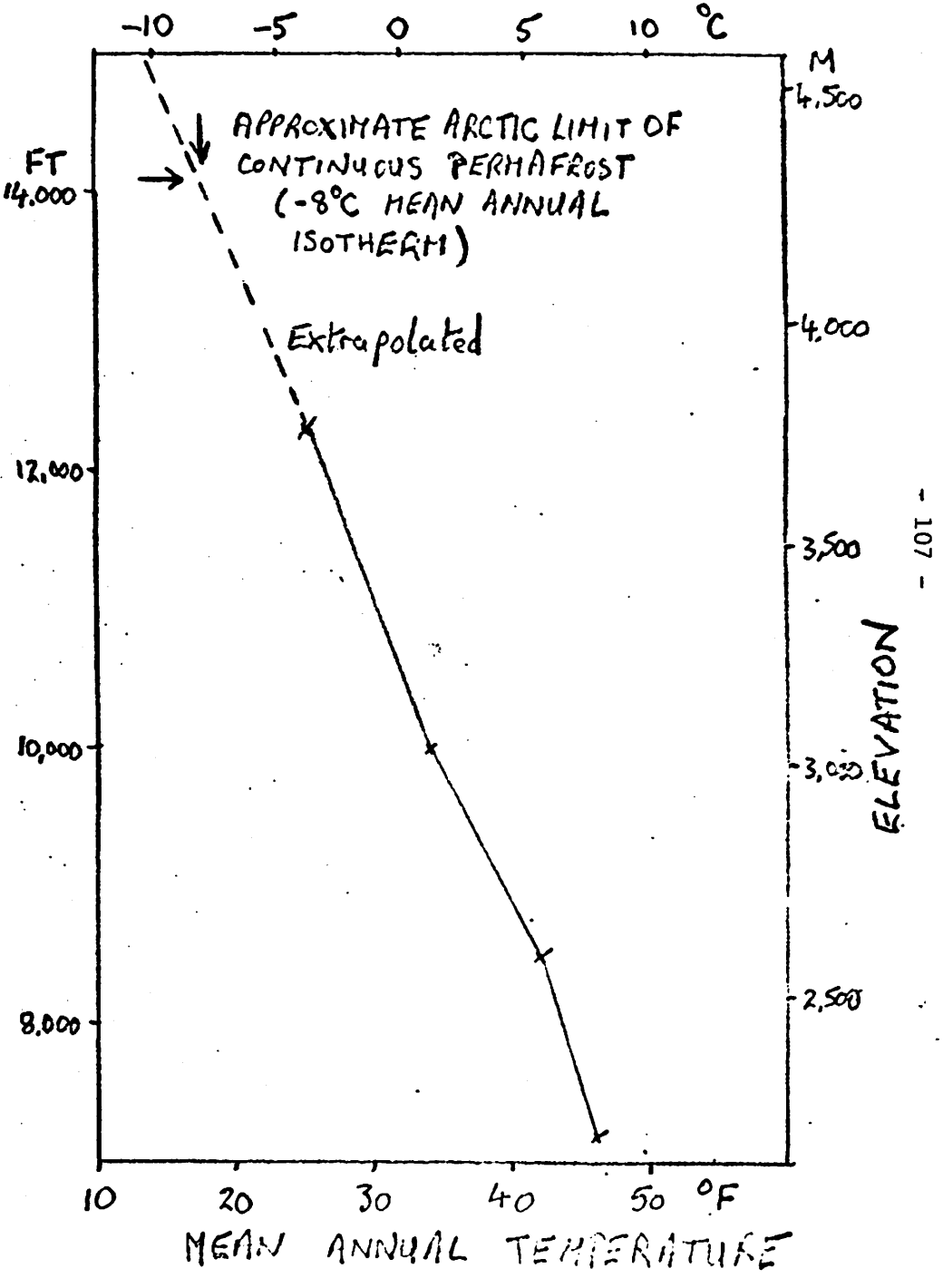


TABLE 4.7. TEMPERATURE LAPSE RATES (^{o}F/1,000 FT.) FOR 700 MB CIRCULATION TYPES

Type	Designation	JANUARY A-1/B-1 Max	A-1/B-1 Min	B-1/C-1 Max	B-1/C-1 Min	C-1/D-1 Max	C-1/D-1 Min
1	NW_z	4.0	3.2	7.1	3.6	5.7	4.0
2	SW_z	2.8	2.5	6.5	4.0	6.4	3.8
3	NW_c	4.2	2.3	5.7	1.7	5.4	2.9
4	NW, trough	2.3	-0.2	3.9	0.4	5.1	2.7
5	NW_a	2.3	3.2	6.1	3.5	7.0	3.5
6	AW_1	1.6	2.9	5.0	5.2	6.1	1.6
8	SW	3.2	1.5	5.7	4.7	7.0	2.3
9	NW	4.0	3.5	5.9	2.1	5.8	4.6
				JULY			
1	AW_1	4.2	2.9	7.1	7.0	5.2	0.2
2	ASW_1	4.8	3.2	7.2	6.5	5.5	0.6
3	NW_a	3.5	2.8	6.2	6.5	5.2	0.2
4	W_a	5.5	3.2	7.3	7.7	5.1	0.3
5	Weak W	4.5	3.0	7.6	6.1	5.1	1.1
6	A	4.8	3.5	6.5	6.6	5.1	0.5
7	AW_2	3.8	3.1	6.3	6.3	5.3	0.6
8	ASW_2	4.9	3.1	8.1	8.1	5.1	-0.4

Analysis of the lapse rates of maximum and minimum temperature for the 700 mb circulation patterns (identified in Section 5) shows that in July (Table 4.7) there is little variation from the average rates for B-1/C-1 or A-1/B-1 (with the exception of maxima for Westerly circulation-type 4 which is 1.65 times the average value). The lapse of maxima between C-1/D-1 is also very constant with circulation type but that of the temperature minima varies from inversion conditions (-0.4°F/1,000 ft. with Anticyclonic type 8), most likely indicating cold air drainage, to a lapse rate of 1.1°F/1,000 ft. (with Westerly type 5). In January the lapse rates are much more variable between circulation types. Surprisingly, actual inversion conditions at these slope stations are apparent in very few of the averages for these circulation types.

Return Periods

A preliminary study of return periods of monthly minimum temperature at the four stations has been carried out by E. Joseph (during the course of a summer NSF Research Participation Program). Figures 4.2-4.5 show the results in January, April and July. The results for October on a logarithmic plot show that October 1969 lay well outside the 100-year interval at A-1 and B-1 (Figure 4.6), whereas at C-1 and D-1 this month did not show up as being unusual. The synoptic events of that month, related to several spells dominated by an upper cold low and heavy snowfalls on the lower eastern slopes, were evidently most pronounced below 10,000 feet.

The question of station redundancy is considered below in terms of spatial interrelations. In terms of record length, the analysis of return periods suggests that the 17-18 year records at C-1 and D-1 are adequate to provide a reasonable characterization of climatic conditions (apart from the question of any trends) whereas those at A-1 and B-1 are probably insufficient in view of the greater variability.

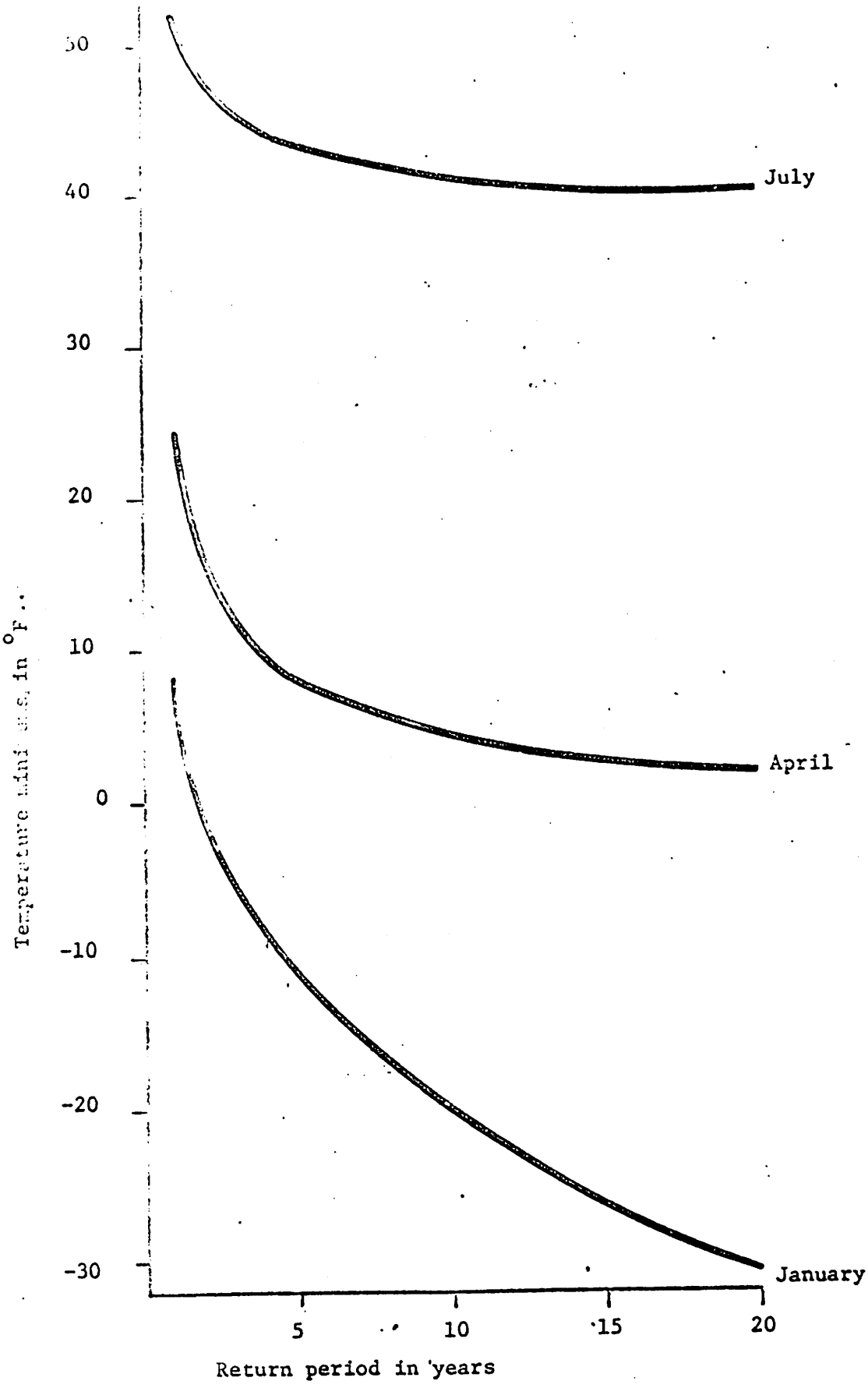


FIGURE 4.2

Return period of monthly temperature minima at A=1

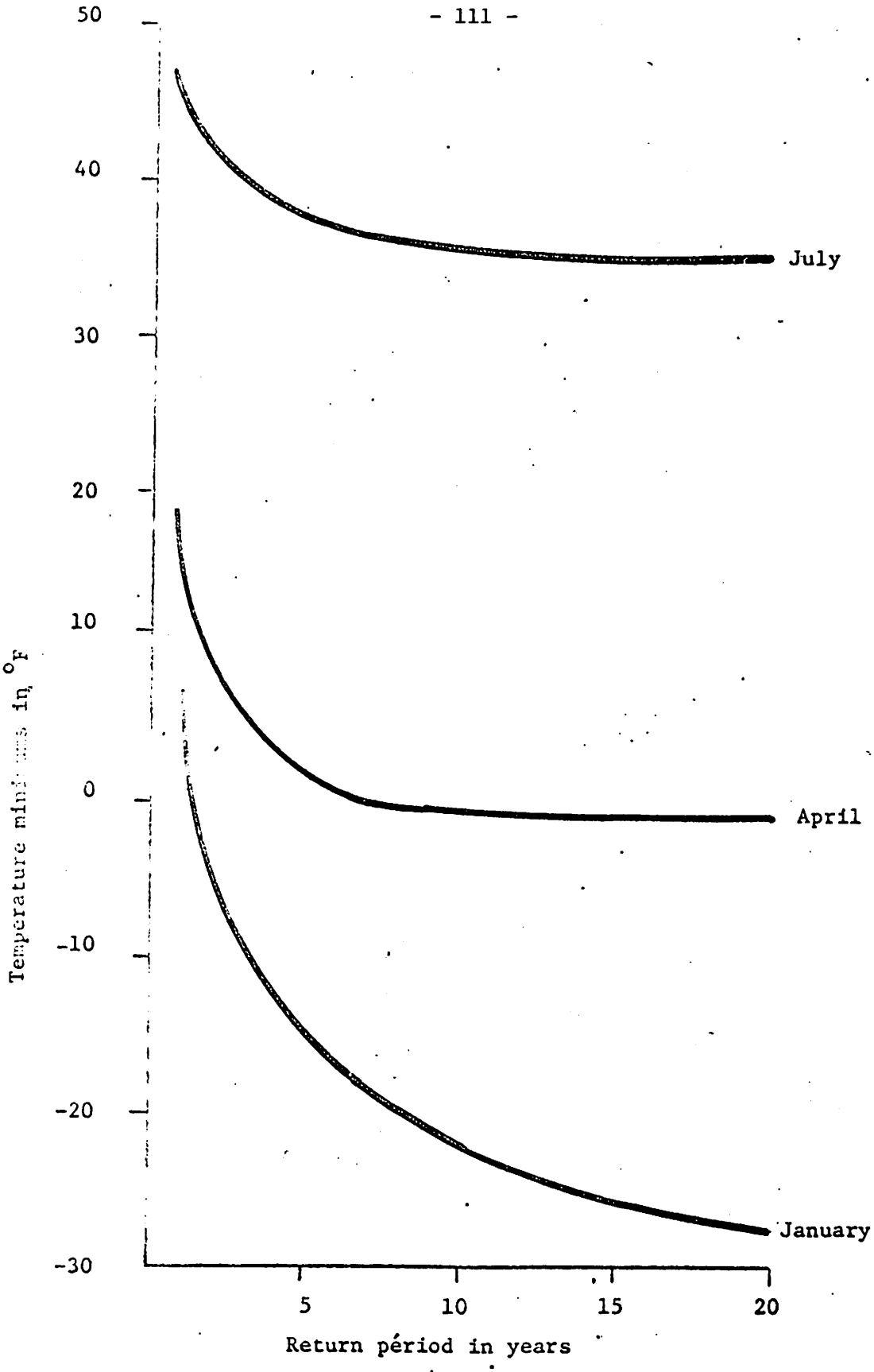


FIGURE 4. 3

Return period of monthly temperature minima at B-1

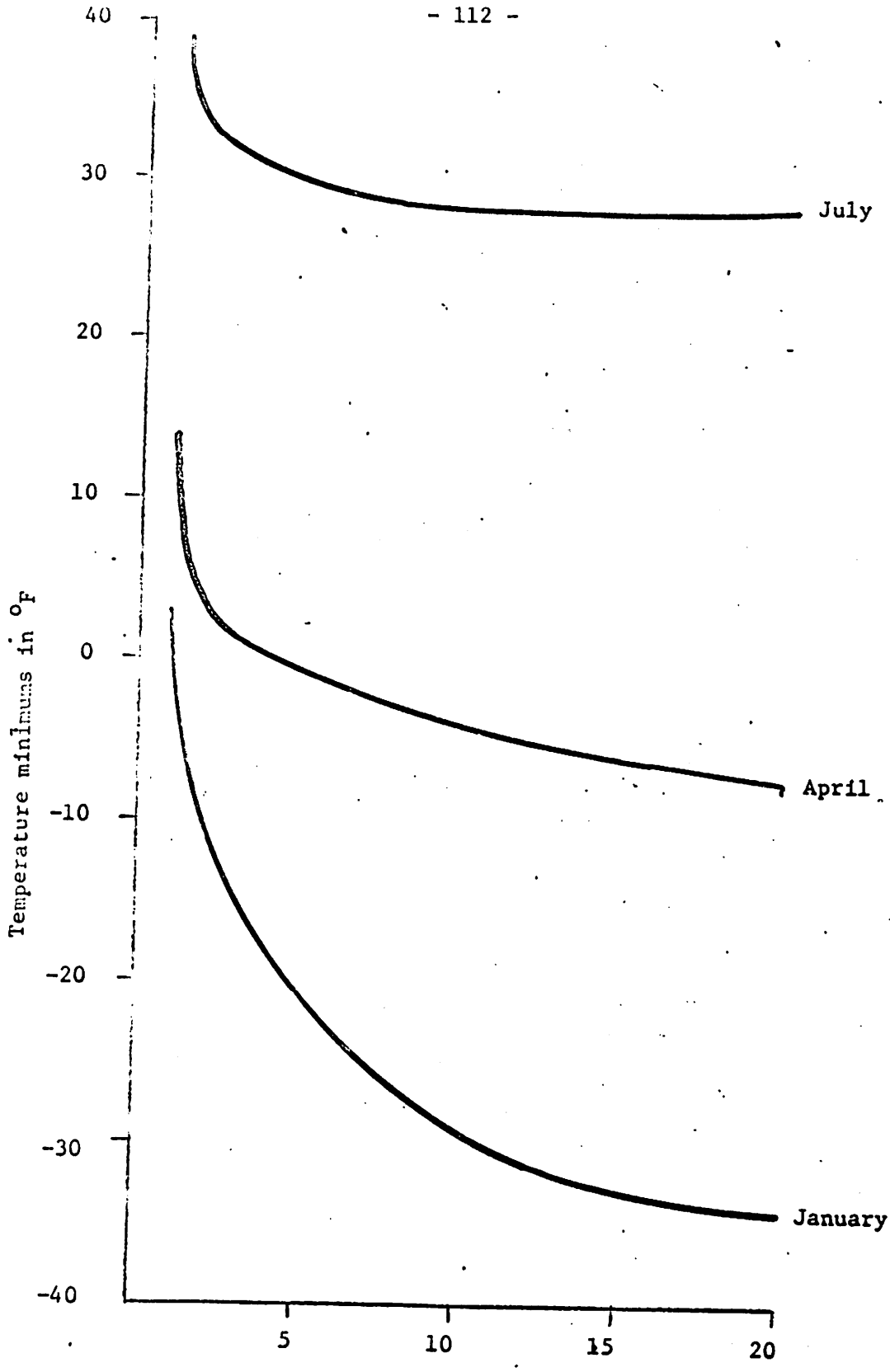


FIGURE 4.4

Return period of monthly temperature minima at C-1

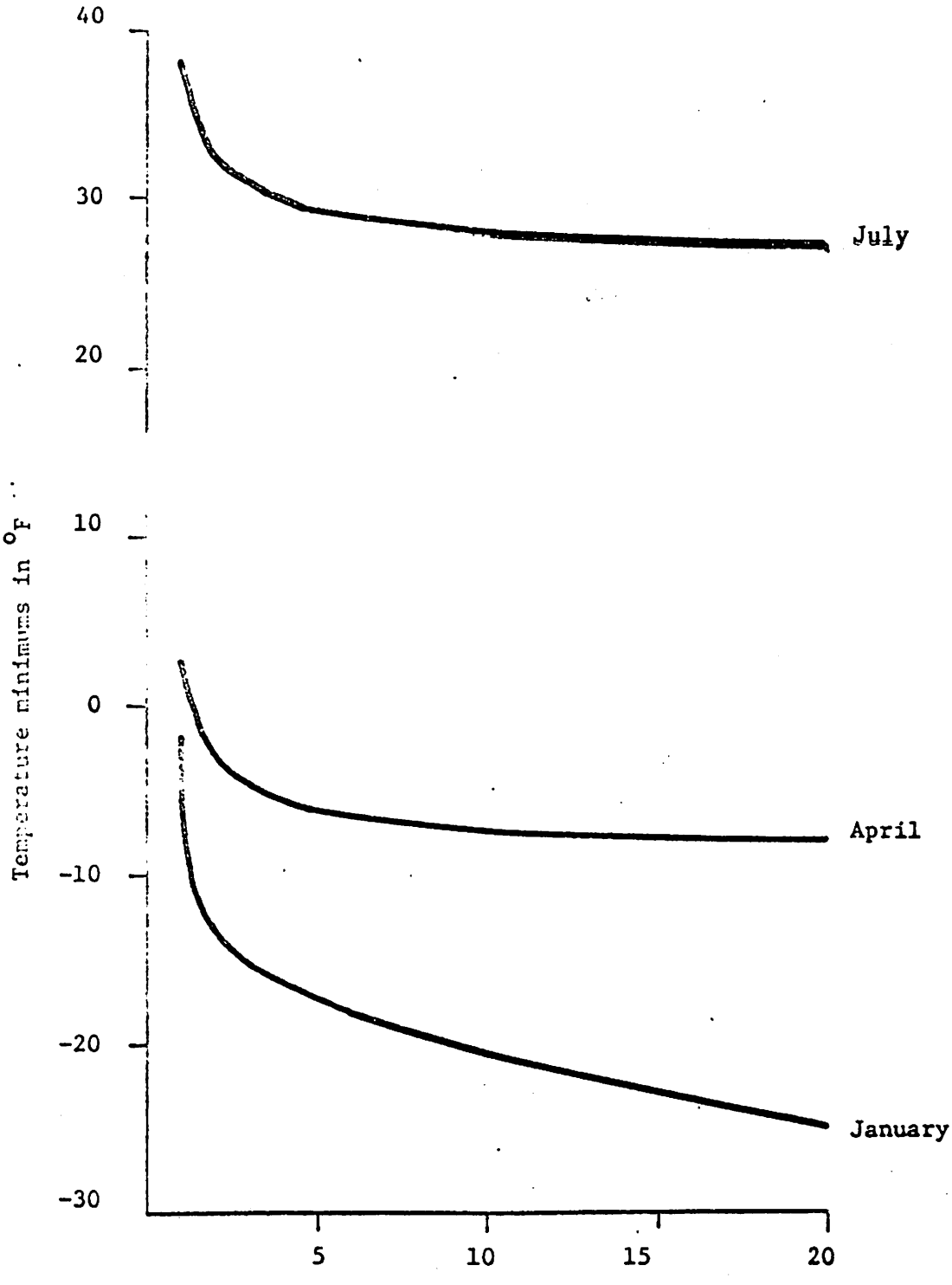


FIGURE 4.5

Return period of monthly temperature minima at D-1

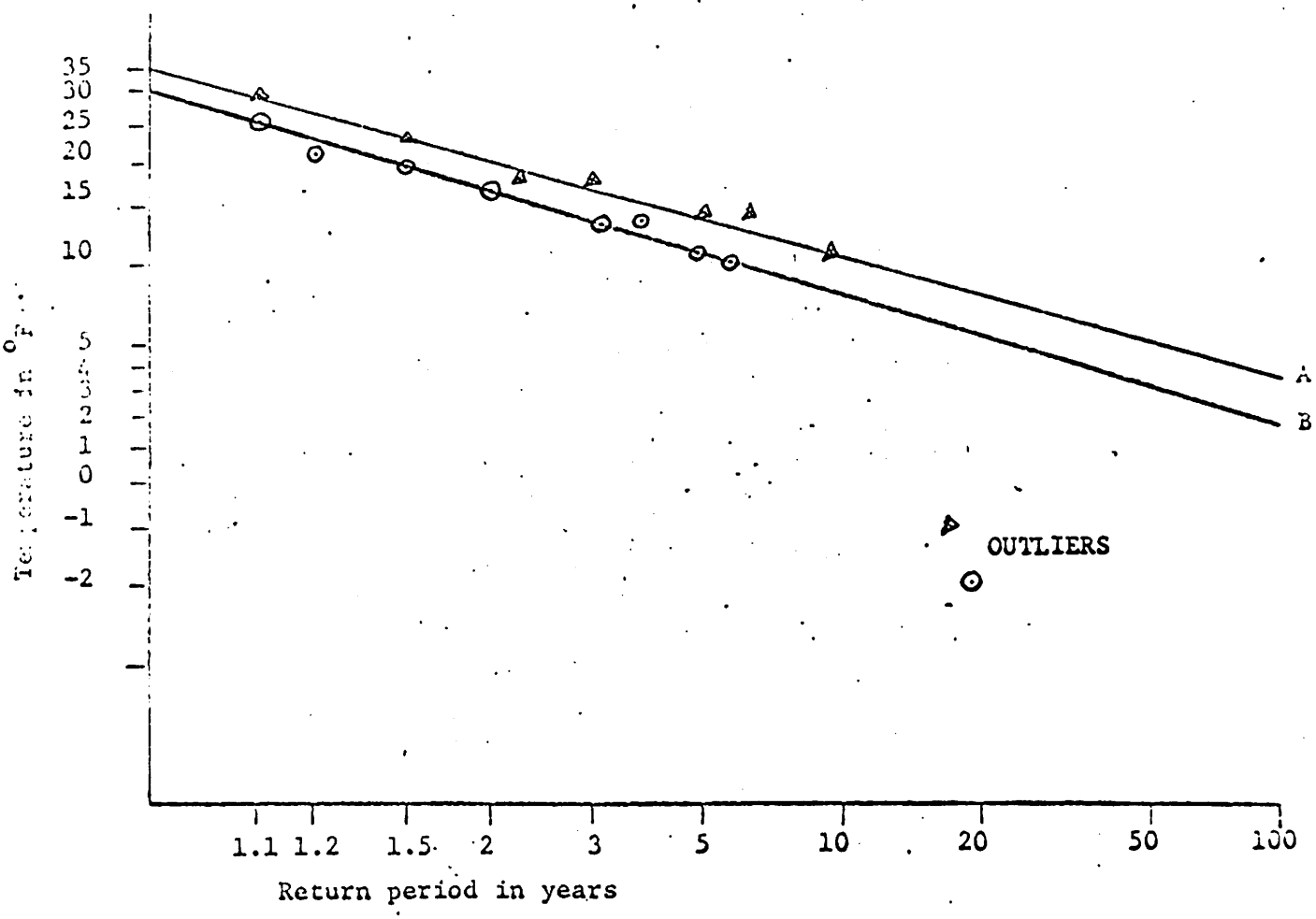


FIGURE 4.6

Return period of minima in October at A-1 and B-1

Station Interrelations

To provide some indication of the possible redundancy in the station network, a stepwise multiple regression analysis was made of the maximum and minimum temperature data for 1965. The following provides a summary of the highest correlations:

Maximum Temperature		Minimum Temperature	
A-1/B-1	0.910	A-1/B-1	0.945
B-1/C-1	0.928	B-1/C-1	0.928
C-1/D-1	0.943	B-1/D-1	0.931

The minimum at D-1 correlates best with the daily maximum at D-1 ($r = 0.963$); similarly at A-1 where the daily maxima and minima have an r value of 0.932.

In the case of A-1, for example, 82.9% the variance of the daily maximum is accounted for by the maximum at B-1 and a further 1.9% by that at C-1. 89.3% of the variance of the minimum at A-1 is accounted for by the minimum at B-1.

This analysis has been extended to the sixteen stations for the year 1952-53. For daily maximum and minimum temperatures the correlations between the major and ancillary stations are shown on the following page.

	Maximum Temperature	Minimum Temperature
A-1/A-2	0.8898	0.9172
A-3	0.9916	0.9922
A-4	0.9870	0.9015
B-1/B-2	0.9928	0.9951
B-3	0.9947	0.9929
B-4	0.9913	0.9158
C-1/C-2	0.9970	0.9950
C-3	0.9955	0.9945
C-4	0.9917	0.9835
D-1/D-2	0.9967	0.9973
D-3	0.9965	0.9974
D-4	0.9940	0.9920

The A-2 (North slope) station is most closely correlated with B-2 for maxima and minima (approximately 80% of the variance in common). The A-4 (Valley) station is likewise most closely correlated with B-4 for minimum temperatures. The C and D ancillary atations are most closely correlated with C-1 and D-1, respectively, for minimum temperatures. This is also the case for maximum temperatures at the ancillary D stations, at C-2 and C-4 (with C-1), and at B-2 and B-3 (with B-1).

These results indicate considerable redundancy between the ancillary and major stations in each zone. Only A-2, A-4 and B-4 exhibit some independent behavior. Thus, the year's data at the 16 stations probably provides sufficient indication of the general range of temperature variation with aspect.

The relationships between the four major stations are less precise. Also, as noted above, the slope lapse rates vary considerably with season, so that any attempt at extrapolation in the absence of one of these stations would need to take time of year into account.

Although extrapolation in the case of monthly, or even shorter period, temperature estimates would not be unreasonable, this is certainly not true of precipitation. As shown earlier, the vertical distribution in most months is quite irregular from year-to-year.

5. SYNOPTIC CLIMATOLOGY

The basis of the synoptic classification has been described in section 2. The characteristics of the circulation patterns are now considered following an outline of the procedures used.

The necessity of treating each month individually, in view of the vast correlation matrix that would otherwise have resulted, creates obvious difficulties in month-to-month comparison of the pressure types. The pattern types have therefore been considered with reference to the correlations in successive months between the mean pattern for each group.

The resulting correlation matrices were subjected to simple linkage analysis (see, for example, Perry 1968). This procedure could in future be made entirely objective. Examination was made of the possibility of using the TRANSMAT program (Dale et al. 1970) which has been applied in a similar context by Russell and Moore (1970). This has not to date been successful, primarily due to the different ancillary equipment available with the CDC 6400 at University of Colorado, but work on the problem is continuing.

700 mb Pattern Types

Illustrations of the five most frequent 700 mb patterns for the mid-season months are shown in Figs. 5.1 - 5.20. The heights are given in hundreds of feet. There is a visually-apparent similarity between several of the patterns in January and October whereas those of April and July show few similarities to any others. The linkages between successive months, based on a threshold correlation ≥ 0.95, are presented in Table 5.1. The major linkage is indicated by the columns and subsidiary ones exceeding

TABLE 5.1. SEQUENTIAL LINKAGE OF 700 MB TYPES

Designation	NW_z	W_z	ASW	Weak W	W_a	AW_1	SW	SW_z	NW	NW_a	NW_c	Weak SW	SW (S. Rockies)	AW_2	Unlinked
JAN	1*					6		2*		5*	3*				4,7
FEB	1	7				6		3	5	4	2				
MAR		1				4			6	7	2	5			3
APR		1*						(6)	5*		2	4*	3*		7
MAY	(6)	1			7				2		5	4	3		
JUNE		6	2		1				5	(3)			4	7	
JULY		(6)	2*	5*	4*	1*				3				7*	
AUG			4	2	(6) 5	1				3				7	
SEP			3		(5) 7	1				2				(4)	6
OCT			2		(6)	1	5*			3					4,7
NOV		1				4	3	(6)		2	5	(7)			
DEC		2				5	3	7		6	4				1
JAN	1		(7)			6		2		5	3				4

* Denotes pattern used as basis for designation.

Arrows indicate secondary linkage.

Types in parentheses are not given a designation.

TABLE 5.2 FREQUENCY OF 700 MB CIRCULATION TYPES

OCTOBER 1952 - JUNE 1970

Number of Days

TYPE		1	2	3	4	5	6	7	U
JAN	(a)	11.5	4.0	3.8	2.5	1.3	0.9	0.7	2.8
	(b)	23	10	14	13	5	4	5	6
	(c)	4	0	0	0	0	0	0	0
FEB	(a)	9.7	3.8	3.1	1.4	1.0	0.8	0.4	4.6
	(b)	13	12	8	6	6	3	3	15
	(c)	4	0	0	0	0	0	0	0
MAR	(a)	9.1	4.8	1.7	1.4	1.7	0.9	0.8	6.7
	(b)	17	12	7	4	5	6	2	19
	(c)	3	1	0	0	0	0	0	0
APR	(a)	11.1	3.6	2.1	1.7	1.4	0.8	1.2	3.9
	(b)	23	11	7	8	5	4	4	11
	(c)	4	0	0	0	0	0	0	0
MAY	(a)	8.6	4.6	2.3	1.9	1.3	0.9	0.6	6.0
	(b)	15	11	7	5	5	5	5	12
	(c)	1	0	0	0	0	0	0	0
JUNE	(a)	6.9	2.9	2.4	1.8	1.6	0.8	0.9	7.7
	(b)	17	7	11	7	6	3	6	15
	(c)	2	0	0	0	0	0	0	1
JULY	(a)	11.8	4.5	3.2	0.8	0.6	0.7	0.7	5.5
	(b)	18	11	9	3	3	2	6	11
	(c)	5	0	0	0	0	0	0	0
AUG	(a)	11.0	4.5	2.8	1.5	1.2	0.7	1.0	4.7
	(b)	20	13	10	5	4	10	4	15
	(c)	4	0	0	0	0	0	0	0
SEP	(a)	10.7	5.2	2.4	1.6	1.4	0.6	0.6	5.4
	(b)	16	9	6	6	6	2	2	19
	(c)	2	1	0	0	0	0	0	0
OCT	(a)	8.0	4.8	2.8	1.8	0.8	0.8	0.7	6.8
	(b)	14	17	8	5	3	4	4	22
	(c)	0	0	0	0	0	0	0	1
NOV	(a)	10.2	3.7	2.0	1.5	1.7	1.4	0.9	3.5
	(b)	16	13	7	4	6	5	3	9
	(c)	3	0	0	0	0	0	0	0
DEC	(a)	9.9	6.2	2.4	2.2	1.6	1.2	0.8	2.9
	(b)	18	13	7	5	6	4	3	10
	(c)	3	1	0	0	0	0	0	0

(a) = Mean (b) = Maximum (c) = Minimum

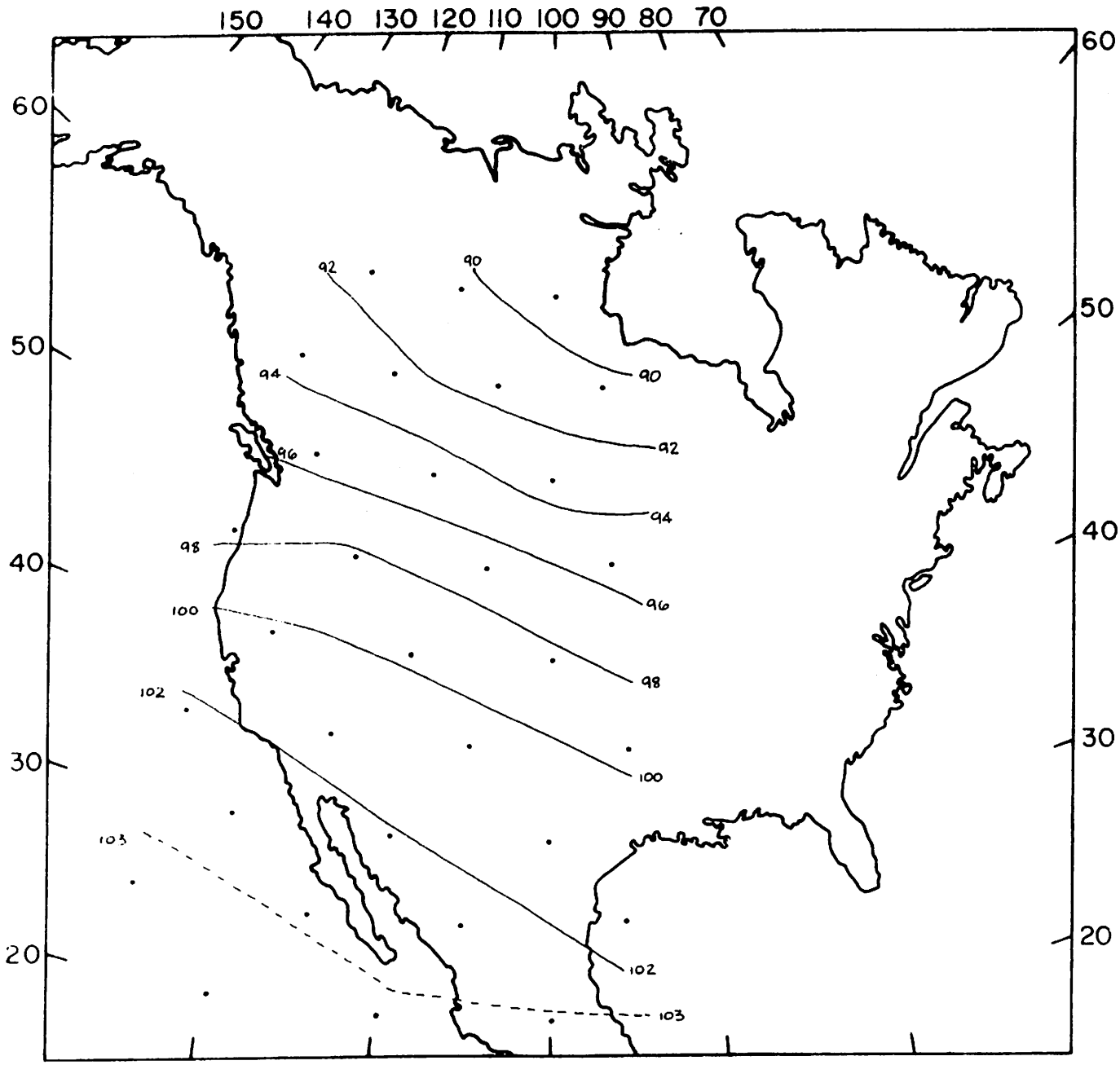


Fig. 5.1 700 mb type 1, January (NW_z)

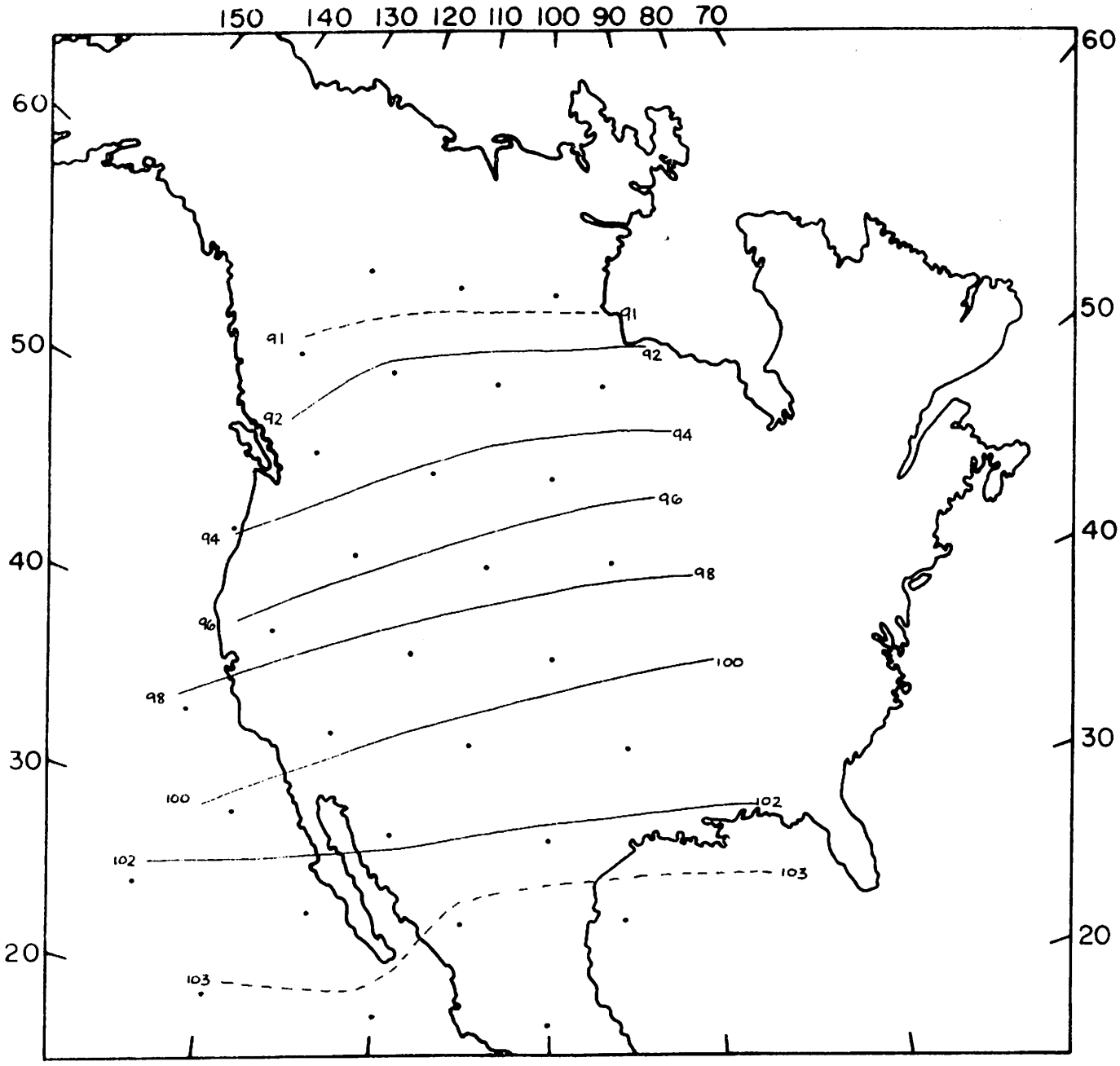


Fig. 5.2 700 mb type 2, January (SW_2)

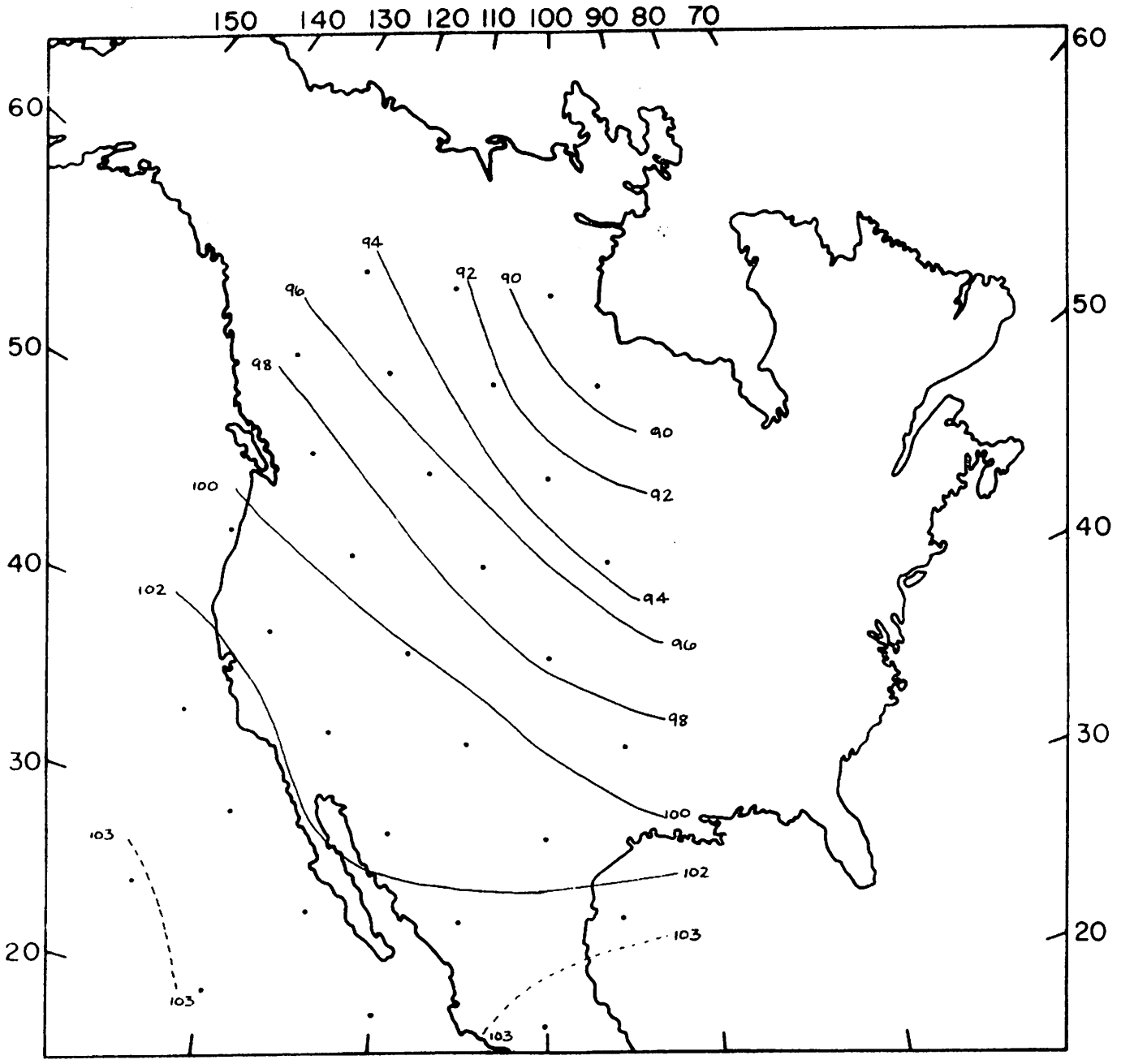


Fig. 5.3 700 mb type 3, January (NW_c)

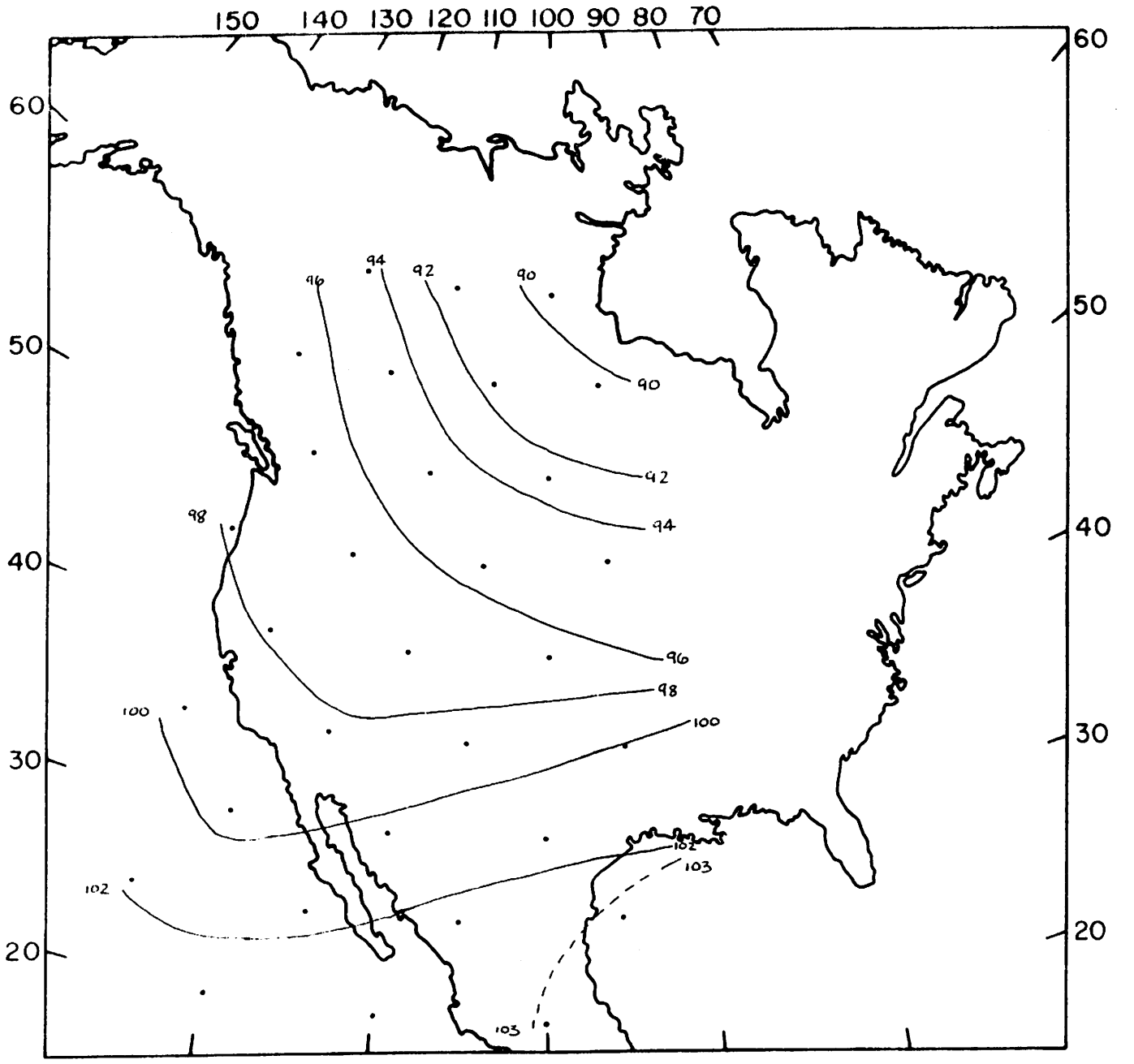


Fig. 5.4 700 mb type 4, January (NW, trough)

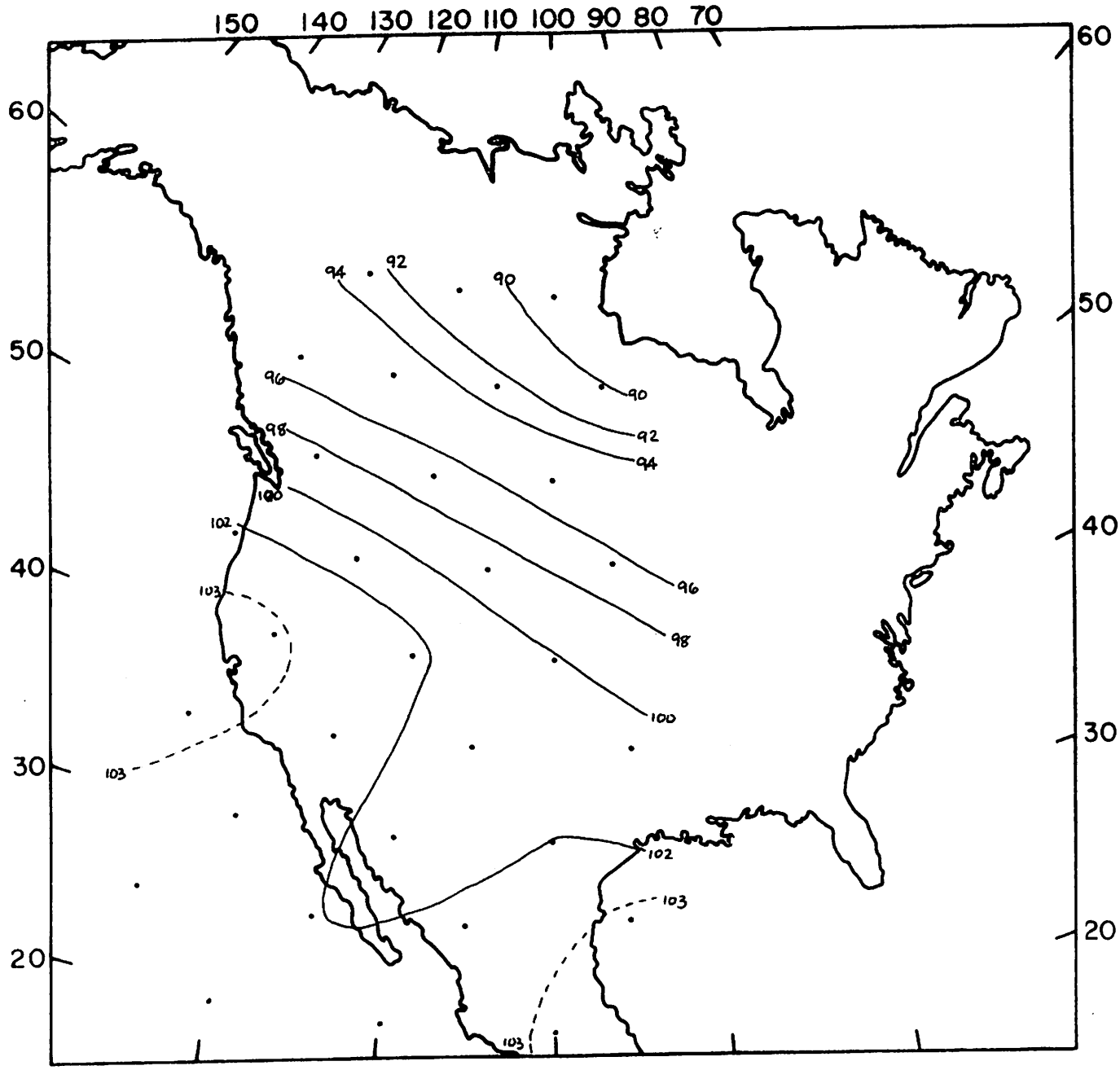


Fig. 5.5 700 mb type 5, January (NW_a)

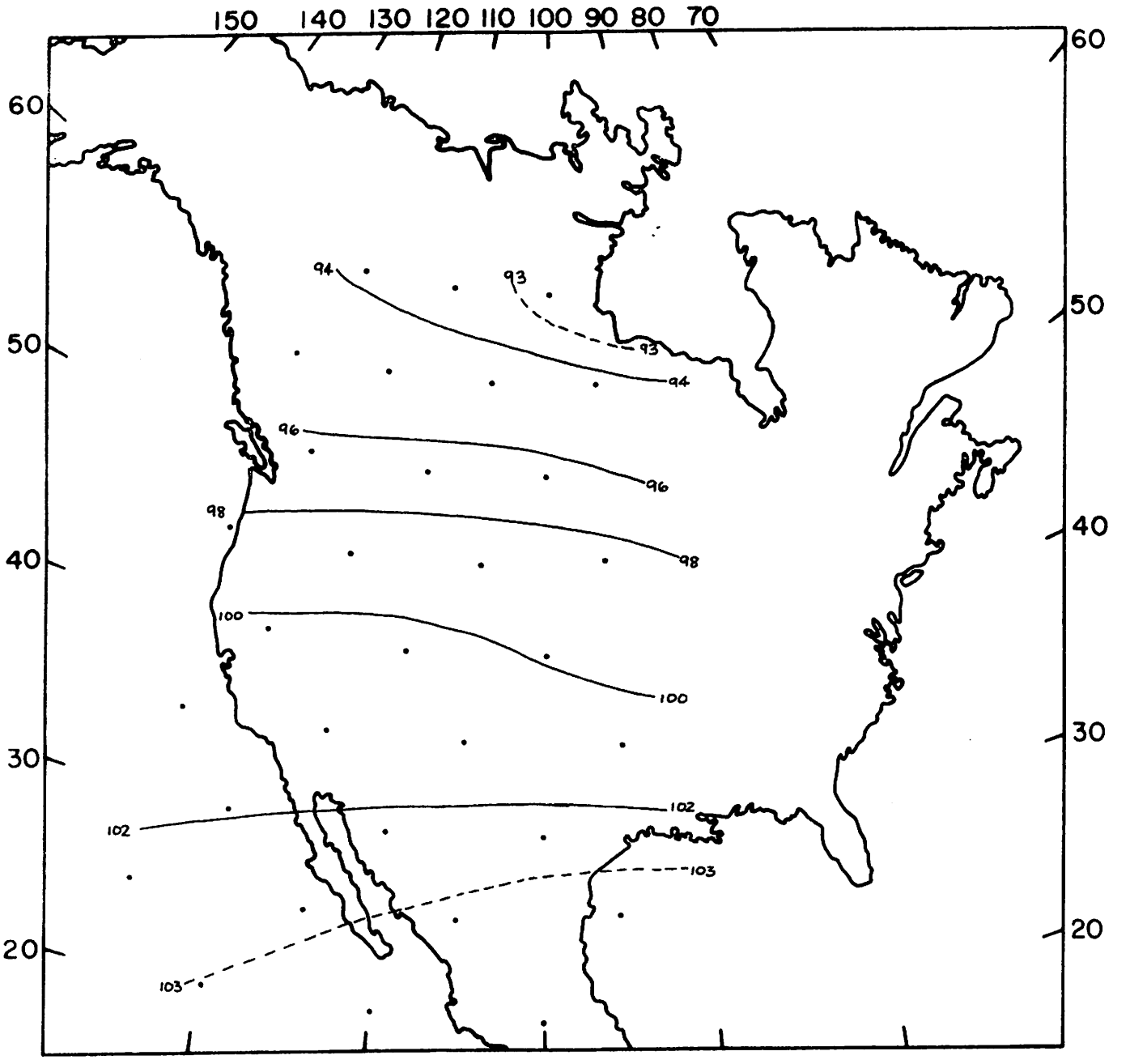


Fig. 5.6 700 mb type 1, April (W_z)

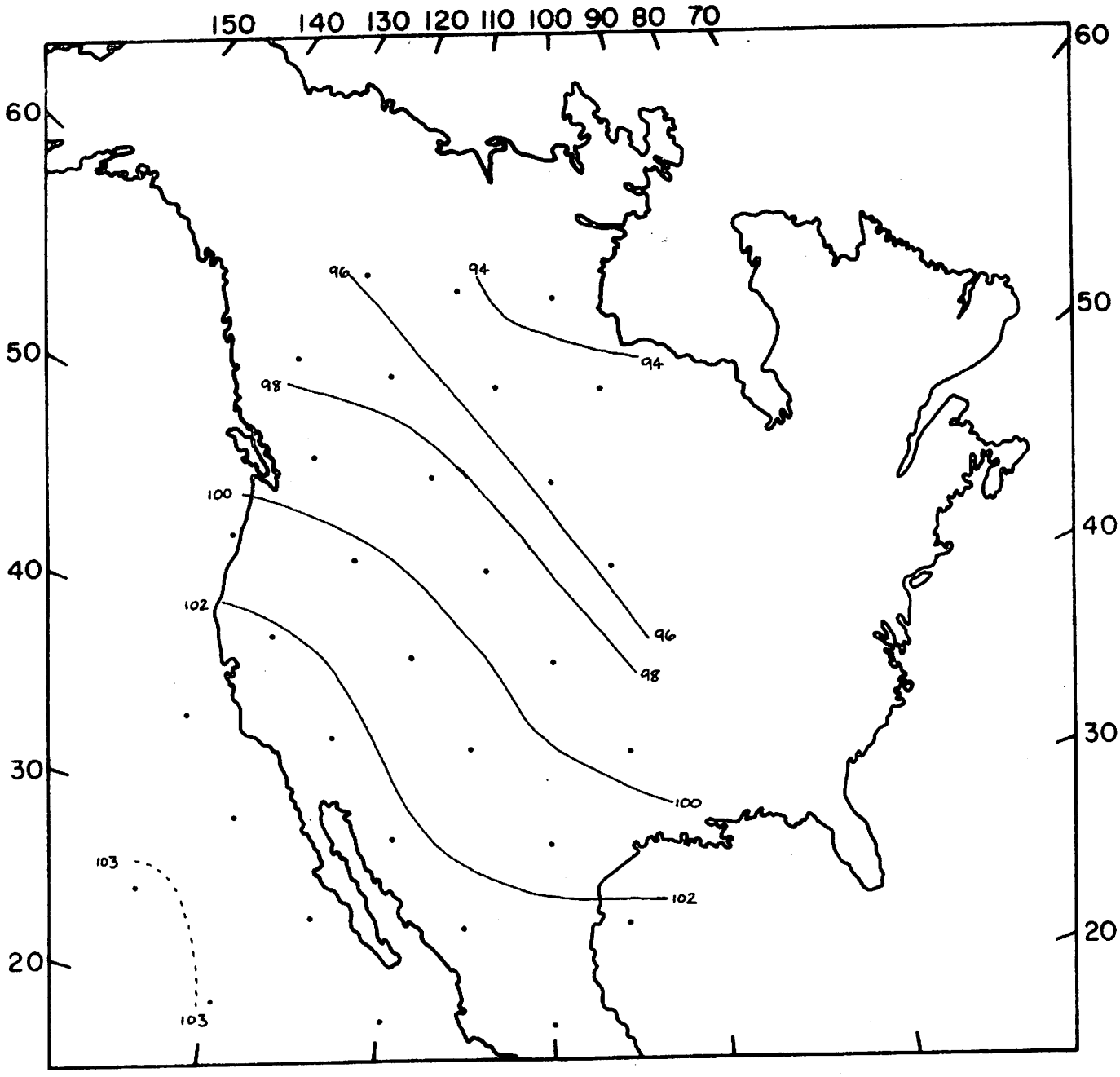


Fig. 5.7 700 mb type 2, April (NW_c)

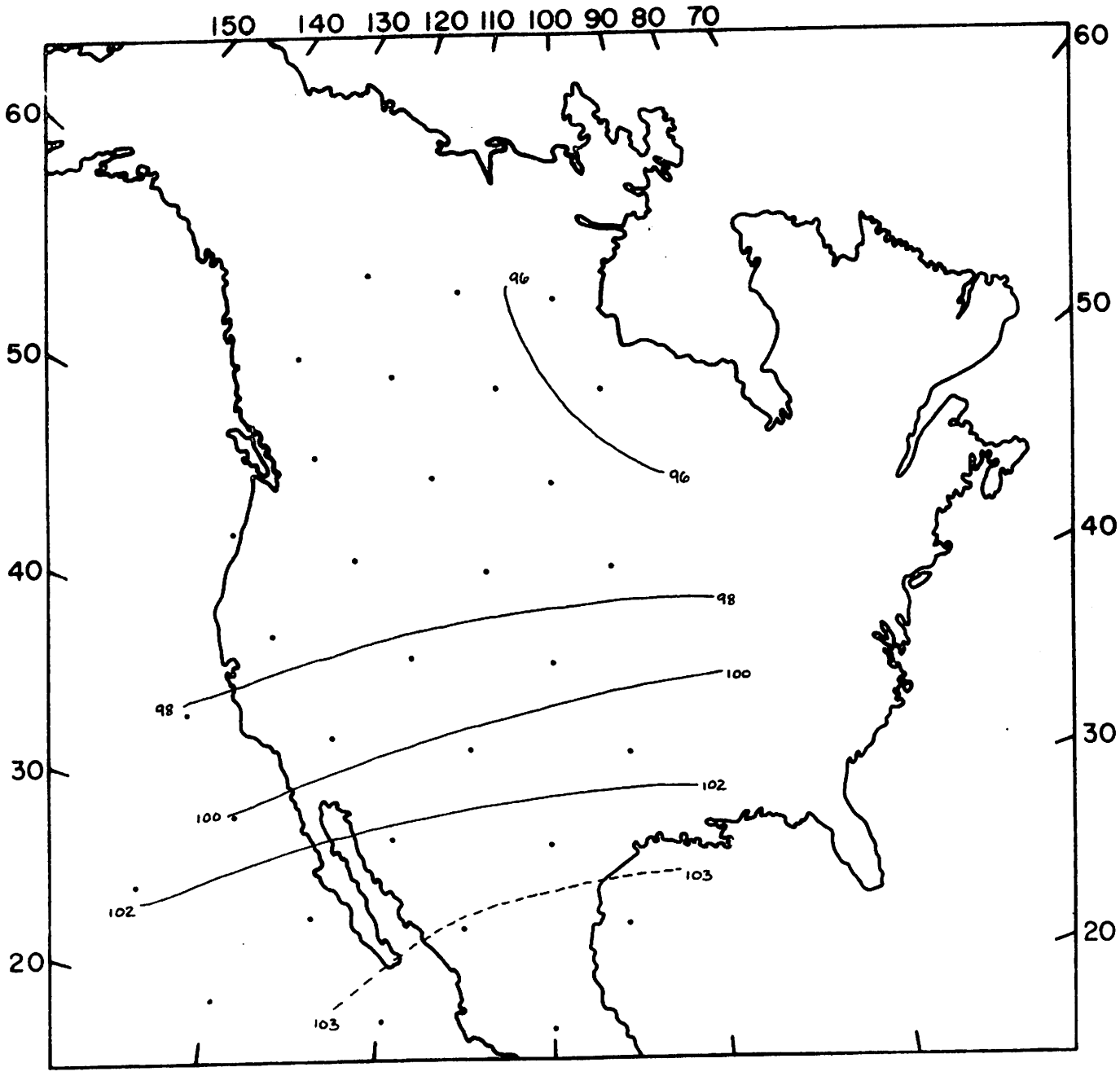


Fig. 5.8 700 mb type 3, April (SW, S. Rockies)

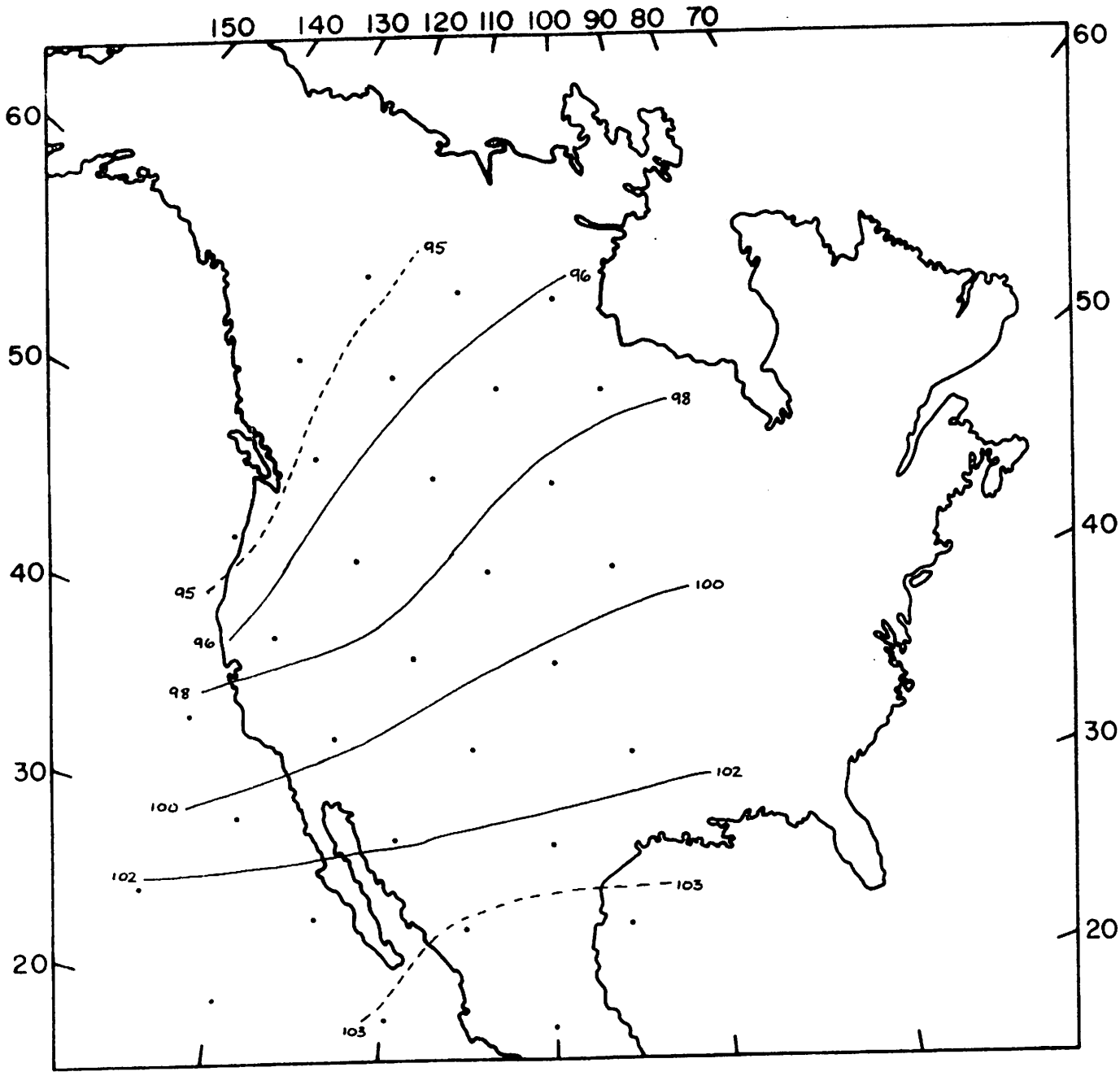


Fig. 5.9 700 mb type 4, April (Weak SW)

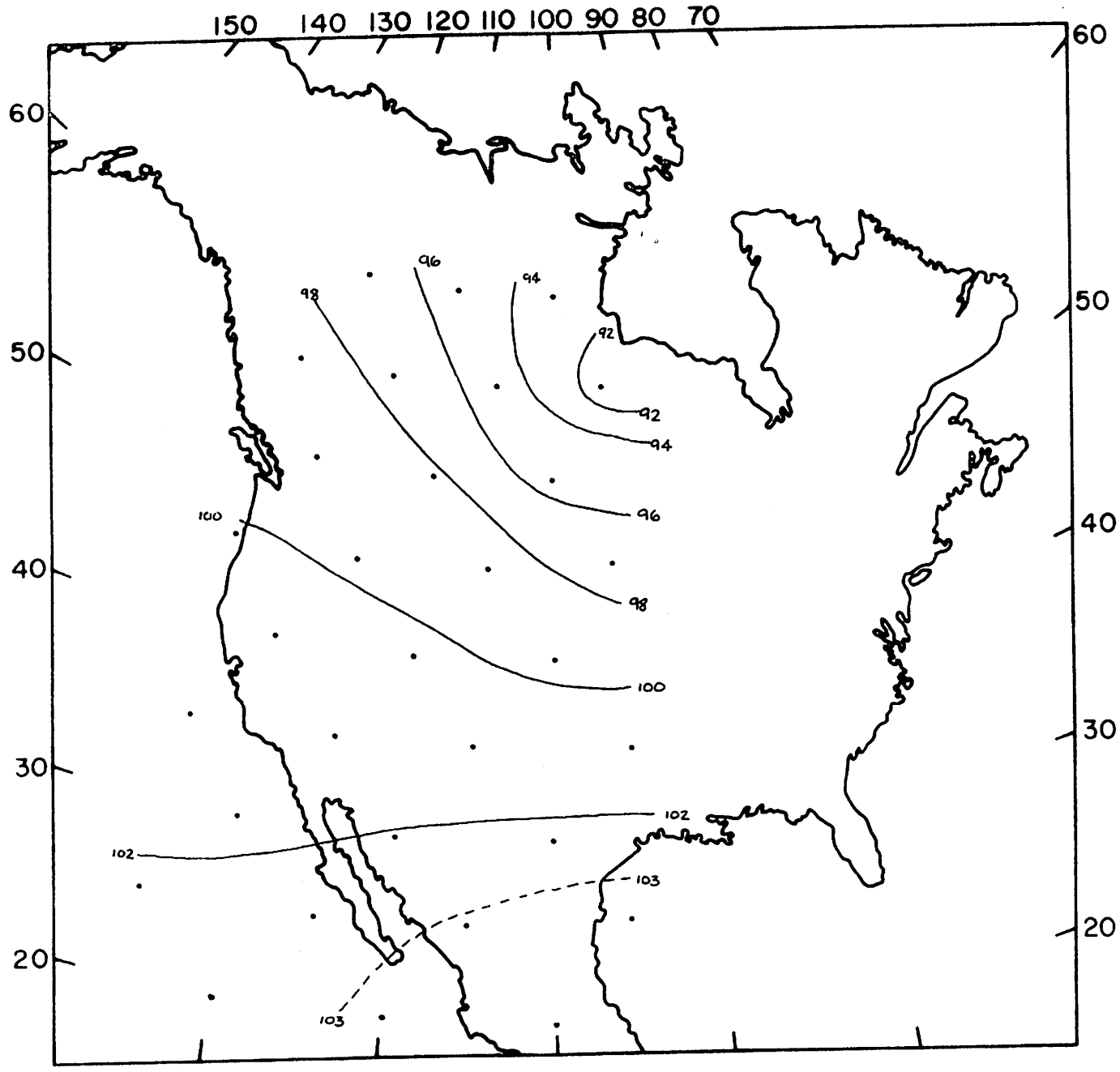


Fig. 5.10 700 mb type 5, April (NW)

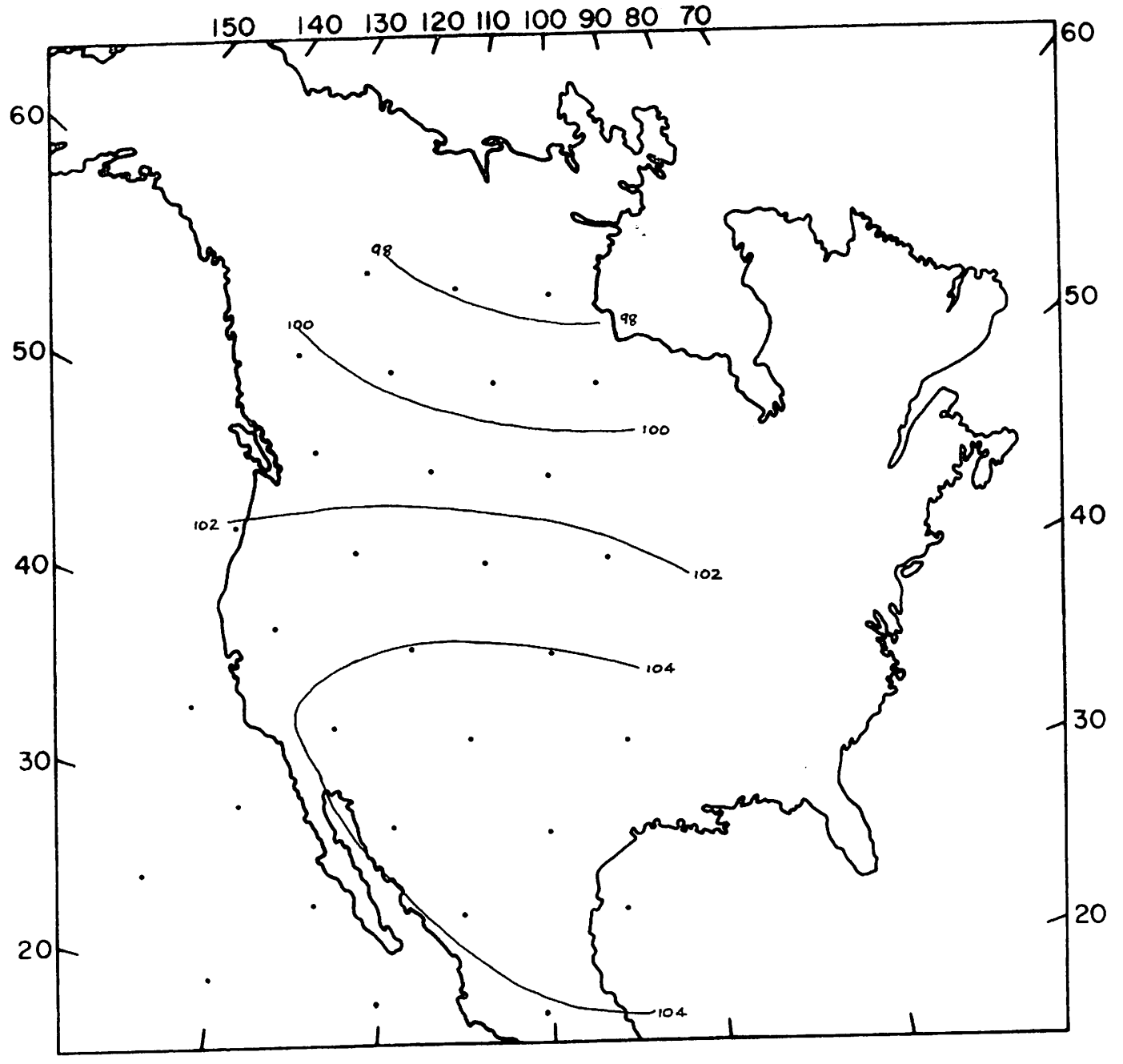


Fig. 5.11 700 mb type 1, July (AW_1)

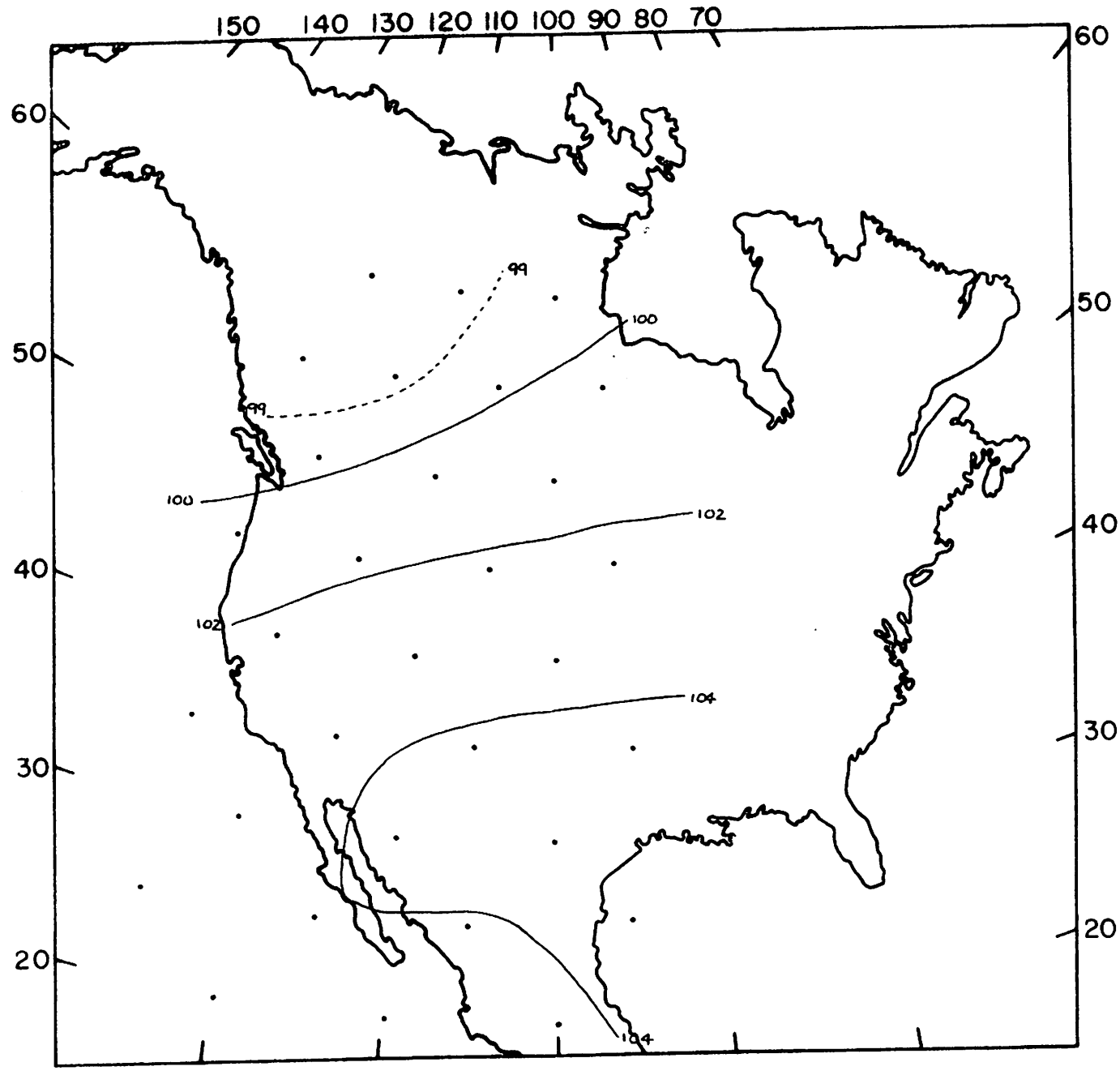


Fig. 5.12 700 mb type 2, July (ASW)

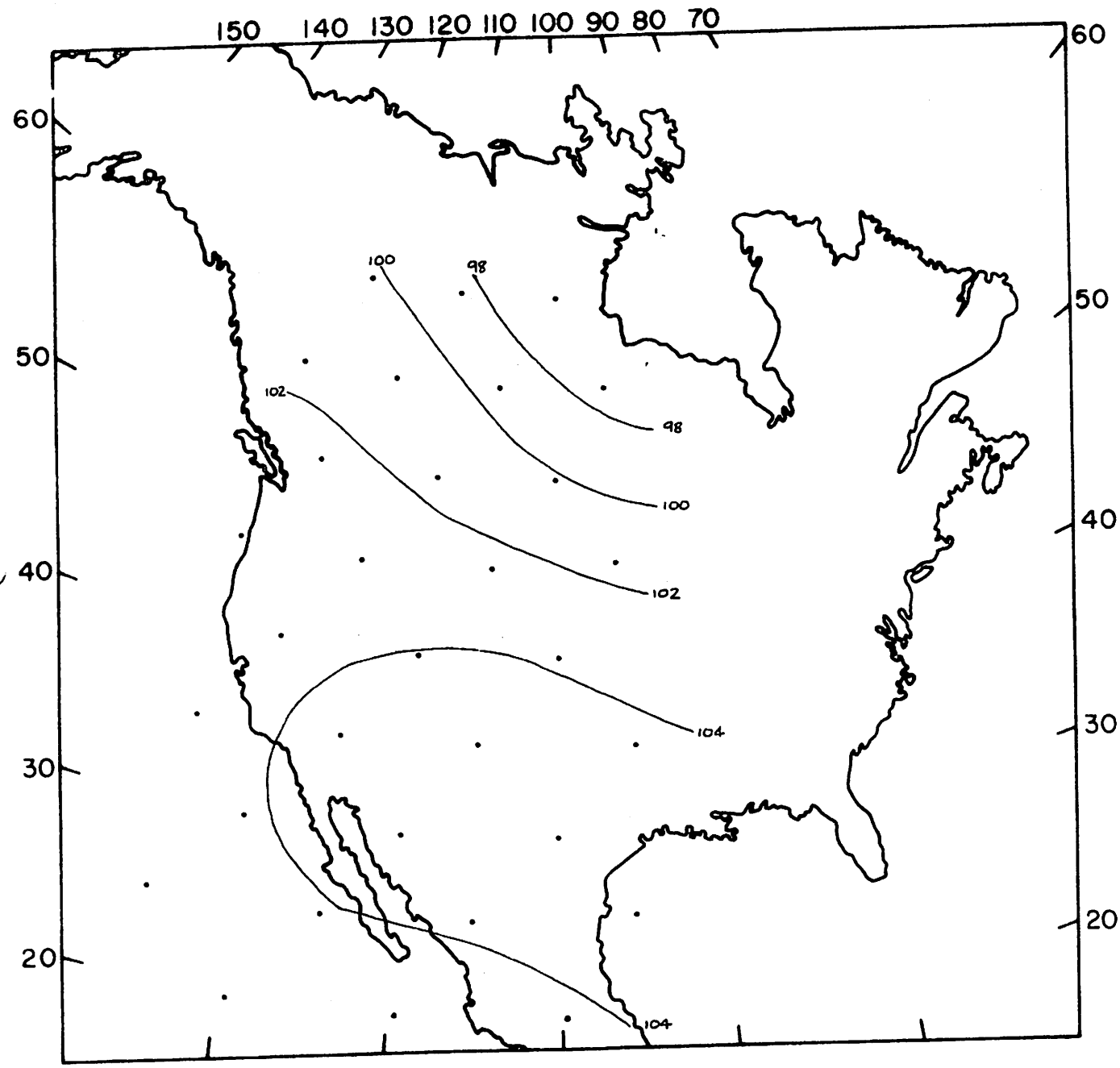


Fig. 5.13 700 mb type 3, July (NW_a)

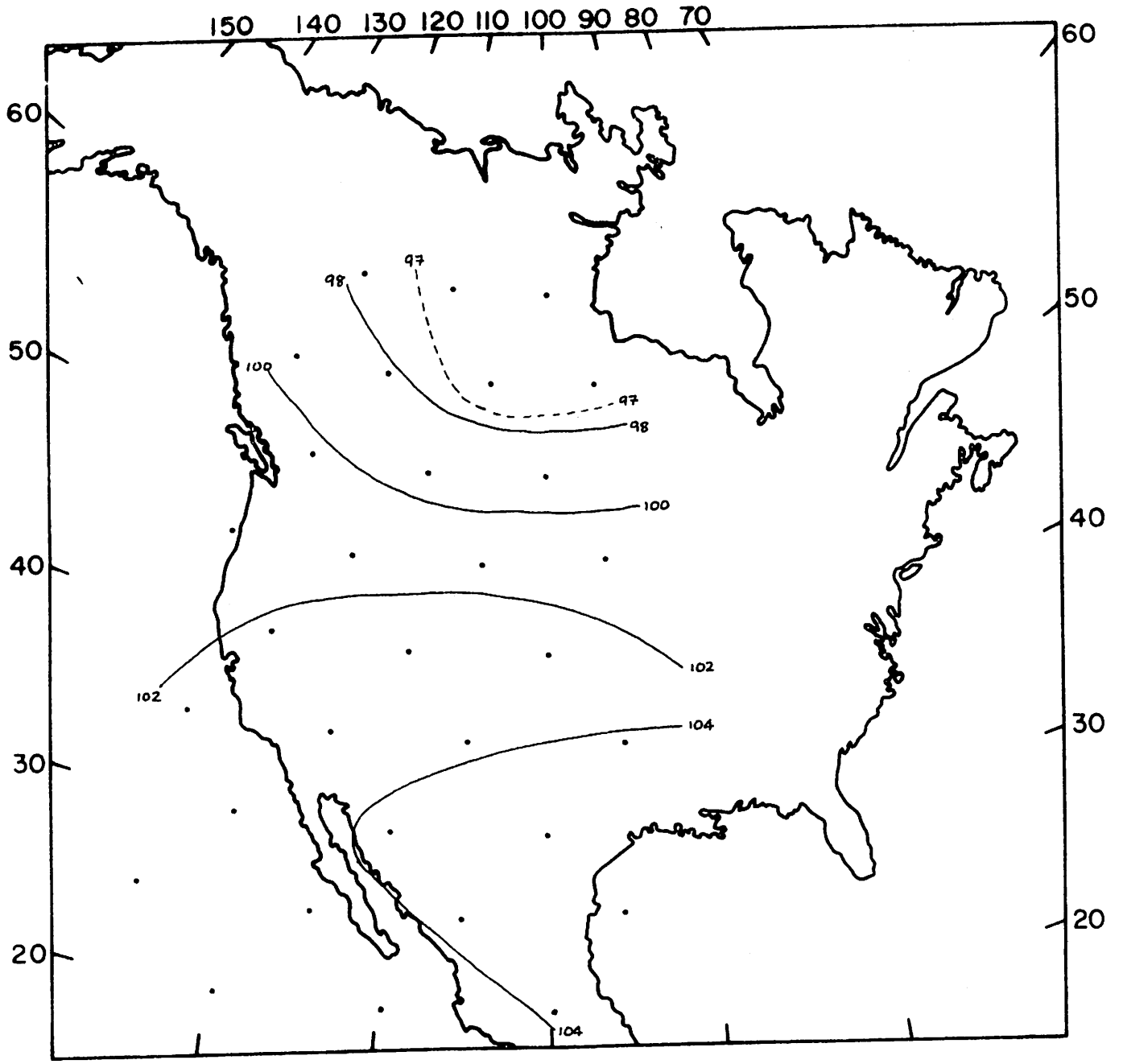


Fig. 5.14 700 mb type 4, July (W_a)

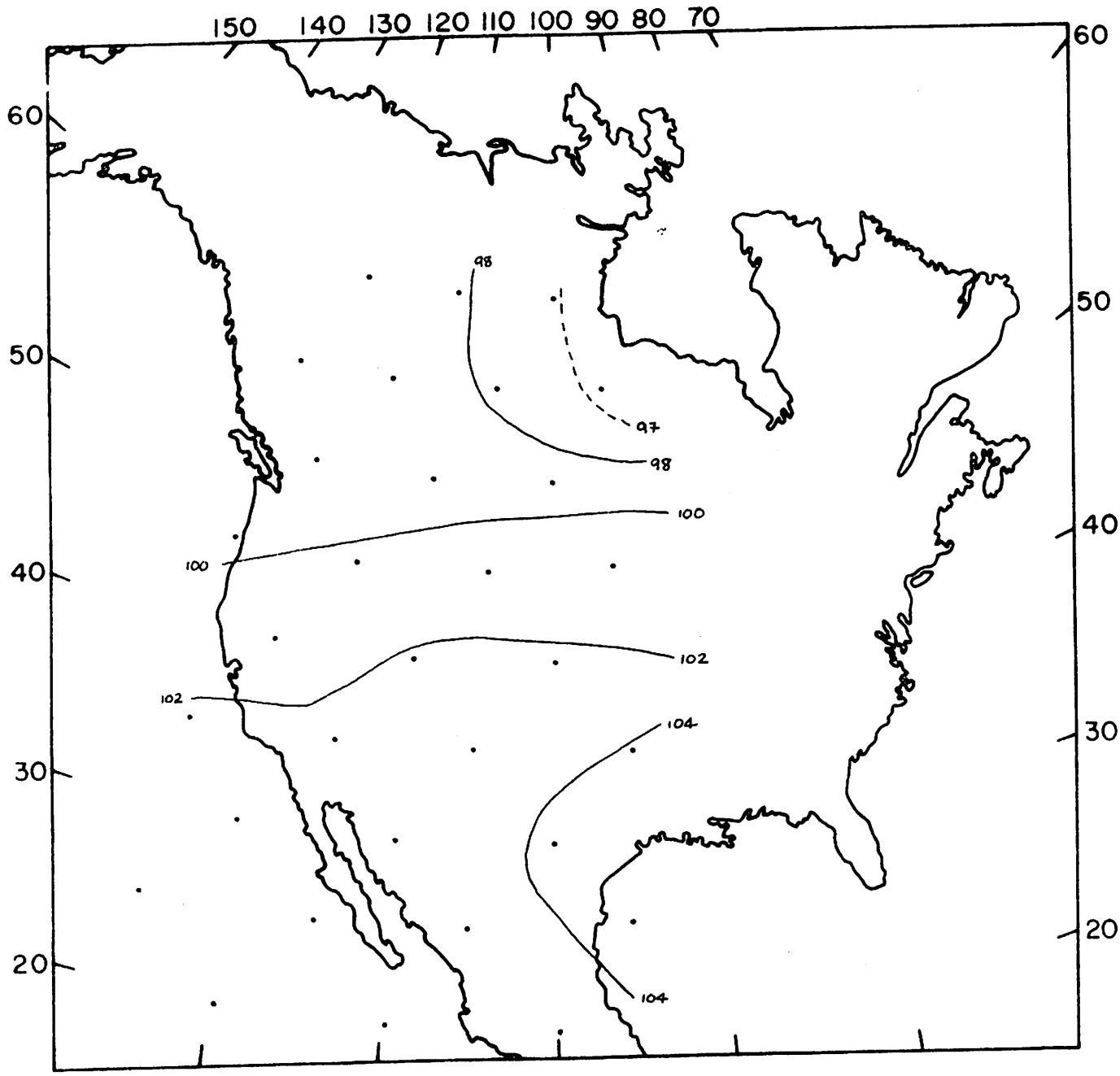


Fig. 5.15 700 mb type 5, July (Weak W)

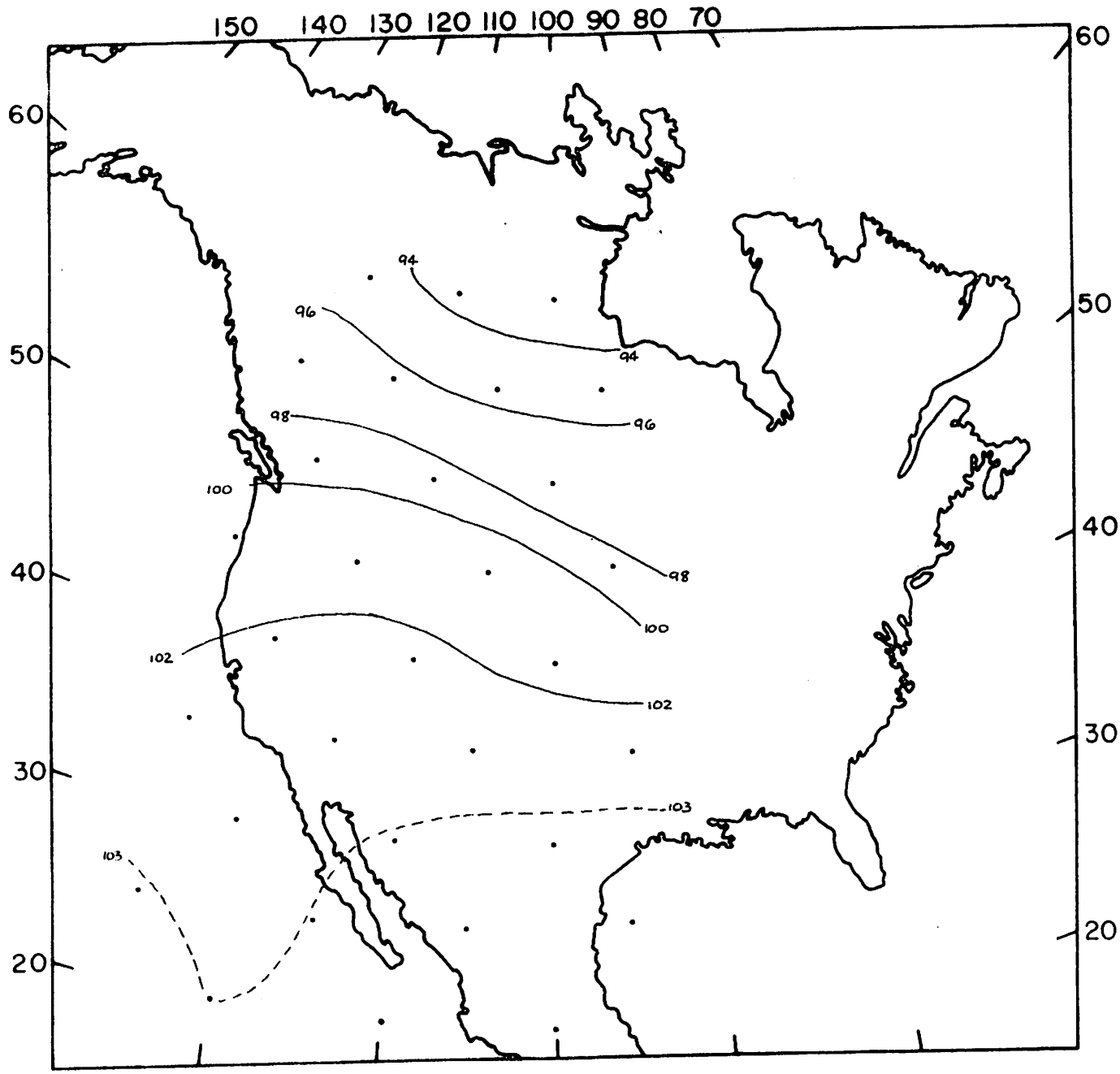


Fig. 5.16 700 mb type 1, October (AW_1)

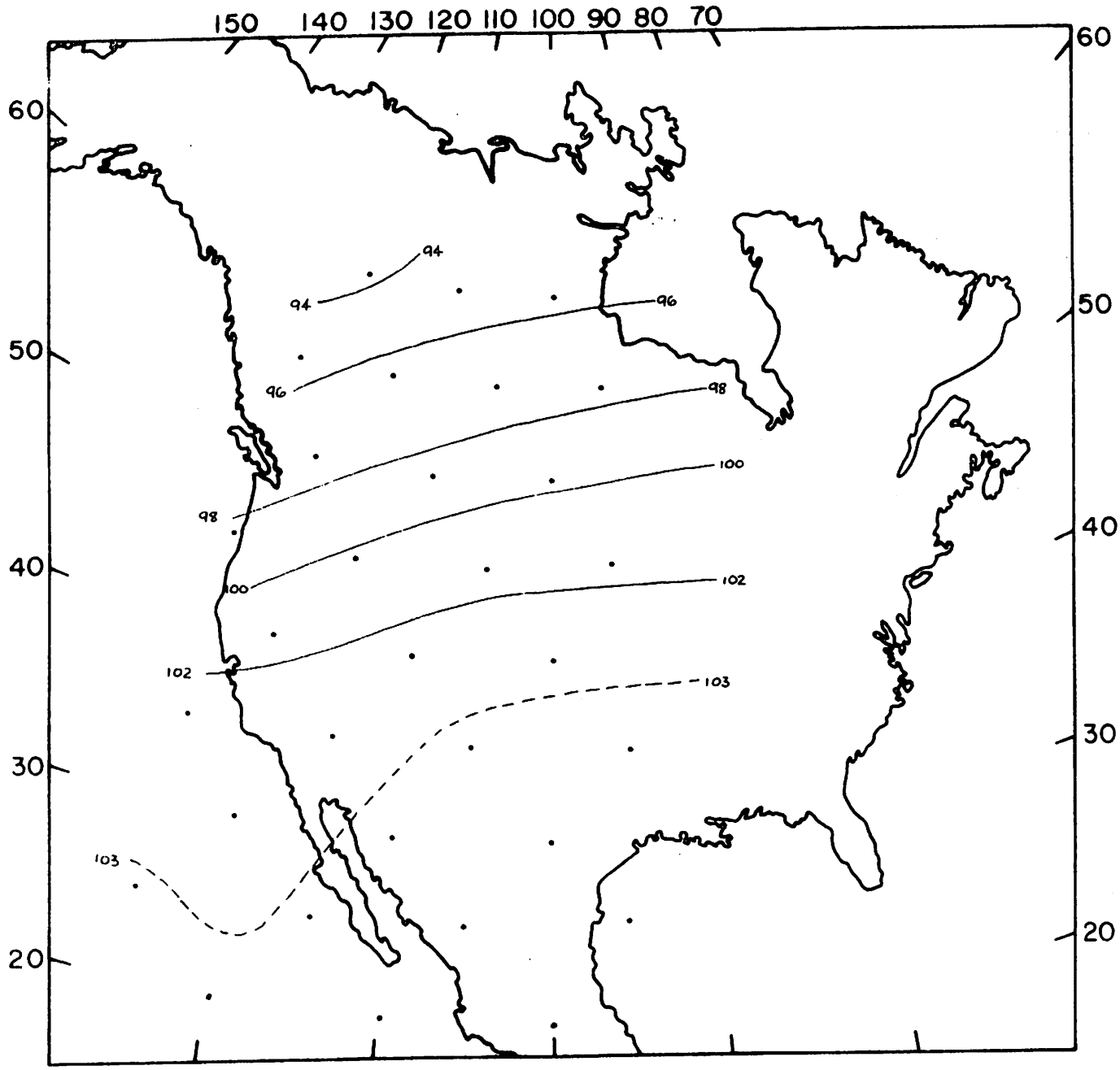


Fig. 5.17 700 mb type 2, October (ASW)

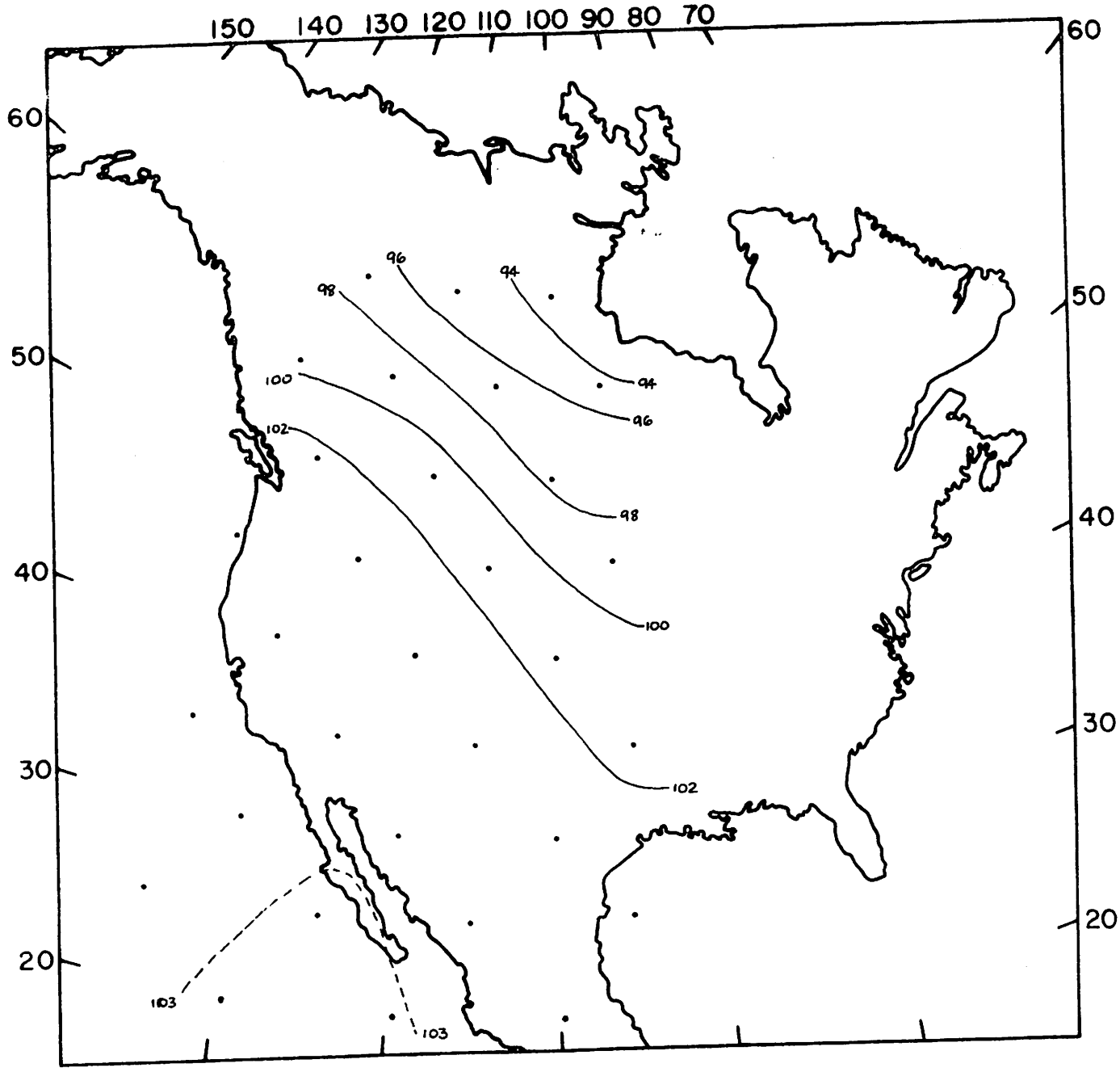


Fig. 5.18 700 mb type 3, October (NW_a)

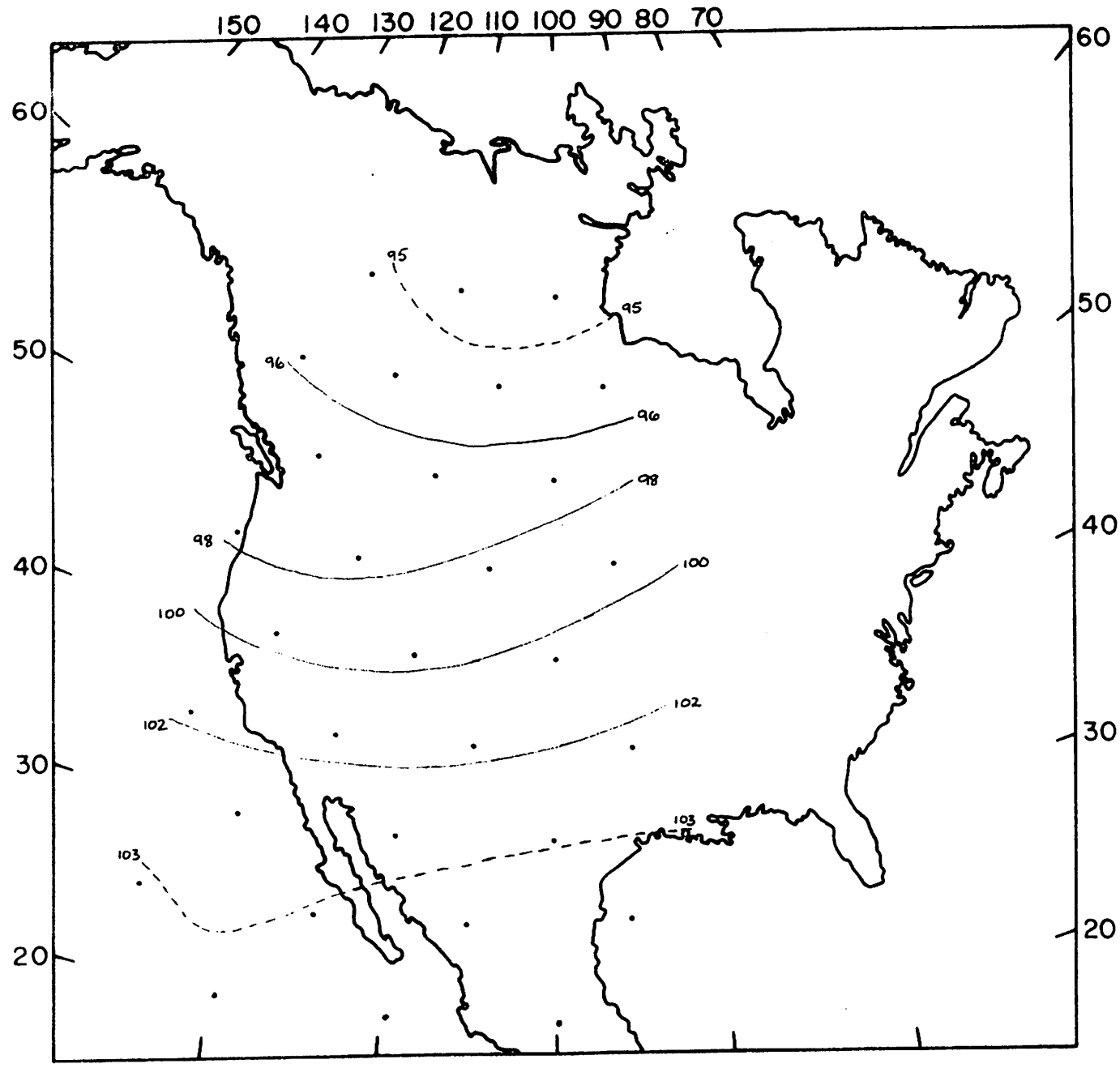


Fig. 5.19 700 mb type 4, October (W_c)

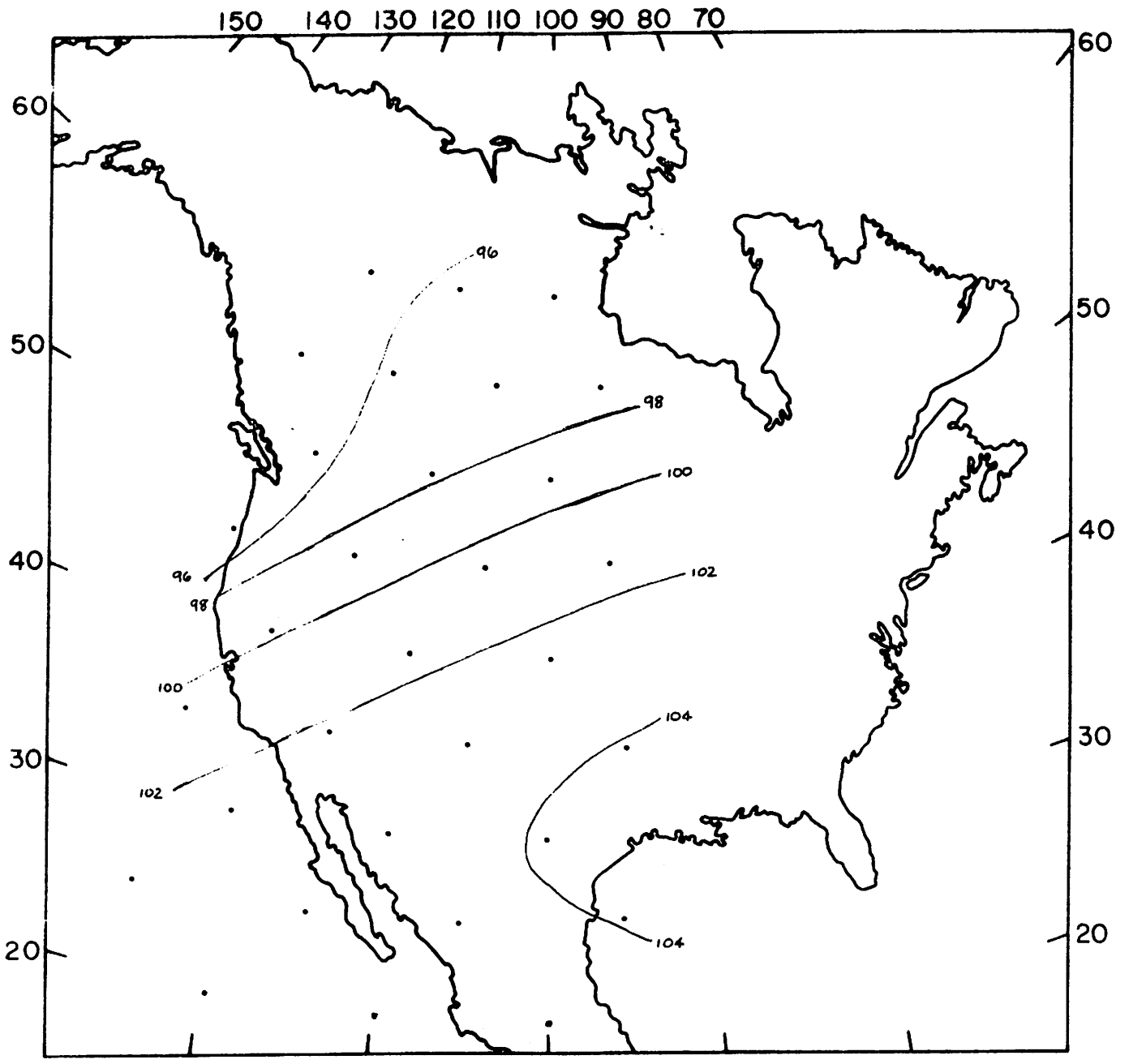


Fig. 5.20 700 mb type 5, October (SW)

the threshold are represented by the arrows. Checks on two of the proposed groupings - for October type 1 and January type 5; and for October type 3 and January type 6 - show that the results based on the month-to-month sequences are satisfactory. The occurrence of "hybrid" groups (reflected by the subsidiary linkages) is an unavoidable outcome of the correlation approach[1] although the seasonal shifts in the occurrence of the various pattern groups is itself of interest as a description of changes in the circulation characteristics.

The pattern which has been used as a guide to the designation of the groups is identified in Table 5.1 by an asterisk. Examination of Figs. 5.1-5.20 makes it apparent that there is little or no difference between some of the patterns as far as Colorado is concerned although the differences may be pronounced in other parts of the grid area. The designations are intended only to give some convenient descriptive reference:

NW = Northwesterly flow (neutral curvature)

NW_a = Northwesterly anticyclonic flow

A_w = Anticyclone, westerly flow (affecting central Rockies)

W_z = Strong westerly (zonal) flow.

Table 5.2 shows the absolute frequency of the pattern types occurring on an average of approximately 1 day per month or more. The maximum and minimum frequency in the 17-18 years is also shown. The prominence of the first group in each month is especially noticeable. The quite large

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[1] A full review of this approach and alternatives which provide orthogonal categories is given in Barry and Perry, Chapter 3 (in press).

TABLE 5.3. PERCENTAGE FREQUENCY OF PRINCIPAL 700 MB TYPES

Designation	NW_z	W_z	SW_z	ASW	Weak W	NW_a	W_a	AW_1	SW	NW	NW_c	Weak SW	SW (S. Rockies)	AW_2	Dec.1	U	Total
JAN	37		13			4		3			12					9	78
FEB	34	1	11			5		3		4	13					16	87
MAR		29				3		5		3	15	5				22	79
APR		37								5	12	6	7			13	80
MAY		28					2			15	4	6	7			19	81
JUNE		3		10			23			5			6	3		26	76
JULY				15	4	10	3	38						2		18	90
AUG				5	14	9	4	36						3		15	81
SEP				8		17	2	36								18	86
OCT				15		9		26	3							22	75
NOV		34				12		5	7		6					12	76
DEC		20	3			4		5	8		7				(32)	9	88

number of "unclassified" days (particularly in March, June and October) suggests that the thresholds should perhaps have been lower, at least in certain months. As noted earlier, however, a lower threshold results in greater variability in the characteristics of the group. Also the high cost of the correlation and grouping programs dictated against re-analysis using a different threshold value. Since each date is classified with respect to the 700 mb deviation patterns the occurrence of "unclassified" categories does not imply that a large number of days lack any reference category.

The fact that the frequency in group i for a certain month (Table 5.2) may be less than that of group i + 1 is a result of additions to the established groups from the residual days (when groups with at least 5 cases in a month over the 17-18 years had been extracted). Assignment was made of a residual day to an existing group if more than half of all the dates which with it was correlated at above the threshold value were themselves within that group.

The major features of the seasonal regime as indicated by the percentage frequency of the principal circulation patterns shown in Table 5.3 are as follows:

1. The most frequent 700 mb circulations are Northwesterly in January-February becoming Westerly in spring and Westerly anticyclonic in summer and fall. In November-December this reverts to Westerly again. In December, the most frequent type (which is "uncorrelated" with types in other months), is Westerly with a trough in the northeast of the sector.

2. Types of secondary importance are Northwesterly anticyclonic from July through November, Southwesterly anticyclonic from June through October and Northwesterly cyclonic from January through April.

The duration of spells of the more frequent circulation types has been determined for the four mid-season months. In January types 1, 2, 3 and 4, in April type 1, and in July type 1, persist for approximately 2½ days on the average. However, the arithmetic mean is of limited value since the distributions are approximately Poisson in form. A measure of the "stability" of a circulation pattern is obtained by expressing the frequency with which a given type recurs on the subsequent day as a percentage of its total frequency (Sands, 1966). The following table shows there is rather high stability in January compared with October in spite of the anticyclonic patterns in the latter month. The most frequent patterns in July (Anticyclonic westerly) and in April (zonal Westerly) are also rather persistent.

	January	April	July	October
Type 1	(NW_z) 58%	(W_z) 61%	(AW_1) 60%	(AW_1) 42%
2	(SW_z) 46	(NW_c) 46	(ASW) 43	(ASW) 41
3	(NW_c) 54	(SW) 40	(NW_a) 44	(NW_a) 42
4	(NW, trough) 56	(Weak SW) 29	(W_a) 14	(W_c) 19
5	(NW_a) 26	(NW) 28	(Weak W) 20	(SW) 29

The transition frequencies to other circulation types were also obtained in the course of this analysis but the results are not included here as they are somewhat indeterminate and they are not critical to the main discussion.

700 mb Deviation Pattern Types

The most frequent deviation patterns in the four mid-season months are illustrated in Figs. 5.21-5.40. The isolines are in tens of feet. These maps represent the circulation as a departure from normal for the month in question; for example, Fig. 5.21 shows an anomalous Southwesterly cyclonic circulation. The subsequent analyses demonstrate that these patterns are more indicative of weather conditions than the 700 mb height patterns. It is interesting, for example, that easterly circulations, which are of particular importance along the eastern slopes, are well represented (the second most frequent group in April (Fig. 5.27), May and June) whereas they are not identified as such in the height patterns, where in fact they occur mainly in the Unclassified category.

The deviation pattern groups in different months have also been examined by linkage analysis. However, care must exercised in the interpretation of similarities between these patterns because the mean 700 mb pattern to which the deviations relate is not the same for each month. The correlations between the deviation patterns show a wide range of coefficients, from strongly positive to strongly negative. Table 5.4, showing the linkages for correlations > +0.9 and, in parentheses, +0.8-0.9, indicates that many patterns are unlinked.

The first five deviation types in most months of the year occur on 2 days or more (Table 5.5) and it is noticeable that the most frequent type is much less dominant than in the case of the 700 mb height patterns (Table 5.3). Also, in most months there is a lesser occurrence of unclassified days for the deviation types.

TABLE 5.4. SEQUENTIAL LINKAGE OF 700 MB DEVIATION TYPES

Designation	N	NE	SE_c	W	S	NW	N_c	Weak S	W_c	S_a	NE_a	C_s	SW_c	NW_a
JAN	2	3			(5)								1	(4)
FEB	3	4	(2)		(6)									
MAR	5	(2)	(6)	3	4									
APR	3	(5)	(2)	1	4									
MAY		(5)	2	1		4								
JUNE			2			1	5	(4)						
JULY			5			1	6	(7)	4	2	3			
AUG						(3)		(6)	2	4	1			
SEP	(2)				3	(6)					(1)	(5)	(7)	
OCT	(2)				(5)						(7)	(3)	1	4
NOV	(6)				(4)				(7)			(5)	2	(3)
DEC	(2)								(6)				1	(4)

( ) denotes correlation +0.8 - 0.9 with <u>following</u> month (In the Northerly group Oct. 2 → Nov. 6 is +0.77).

TABLE 5.5. FREQUENCY OF 700 MB DEVIATION TYPES

OCTOBER 1952 - JUNE 1970

TYPE		1	2	3	4	5	6	7	U
JAN	(a)	4.5	4.2	3.4	2.3	2.0	1.4	1.3	3.2
	(b)	13	16	12	11	10	6	8	5
FEB	(a)	3.9	3.4	2.7	2.3	1.5	1.5	1.0	3.5
	(b)	10	17	8	8	8	6	4	6
MAR	(a)	4.9	4.3	3.9	2.4	2.4	1.5	1.3	2.7
	(b)	12	13	12	12	8	10	5	8
APR	(a)	4.6	4.0	2.2	2.2	2.2	0.8	1.3	4.2
	(b)	17	9	7	7	6	4	5	7
MAY	(a)	3.8	3.7	2.3	2.1	1.2	1.5	1.2	4.4
	(b)	9	8	12	7	5	5	4	8
JUNE	(a)	3.2	2.4	2.4	2.5	1.4	1.2	1.2	5.2
	(b)	8	6	9	8	8	3	4	9
JULY	(a)	3.8	4.5	3.9	2.9	1.5	1.2	1.4	4.8
	(b)	8	12	15	5	8	7	4	8
AUG	(a)	4.3	3.6	2.5	2.5	2.0	1.4	1.2	4.1
	(b)	10	10	8	11	5	8	6	8
SEP	(a)	3.2	2.6	2.8	2.7	2.1	1.3	1.0	3.4
	(b)	6	10	9	7	6	5	3	7
OCT	(a)	3.6	3.9	3.1	2.5	2.2	1.2	1.2	2.8
	(b)	10	9	15	5	12	4	4	6
NOV	(a)	3.7	3.6	3.3	2.3	1.7	1.5	1.4	3.4
	(b)	12	13	8	9	5	6	9	6
DEC	(a)	4.3	3.3	3.0	2.0	2.0	1.3	1.5	3.8
	(b)	10	8	8	8	8	7	5	9

(a) = Mean (b) = Maximum

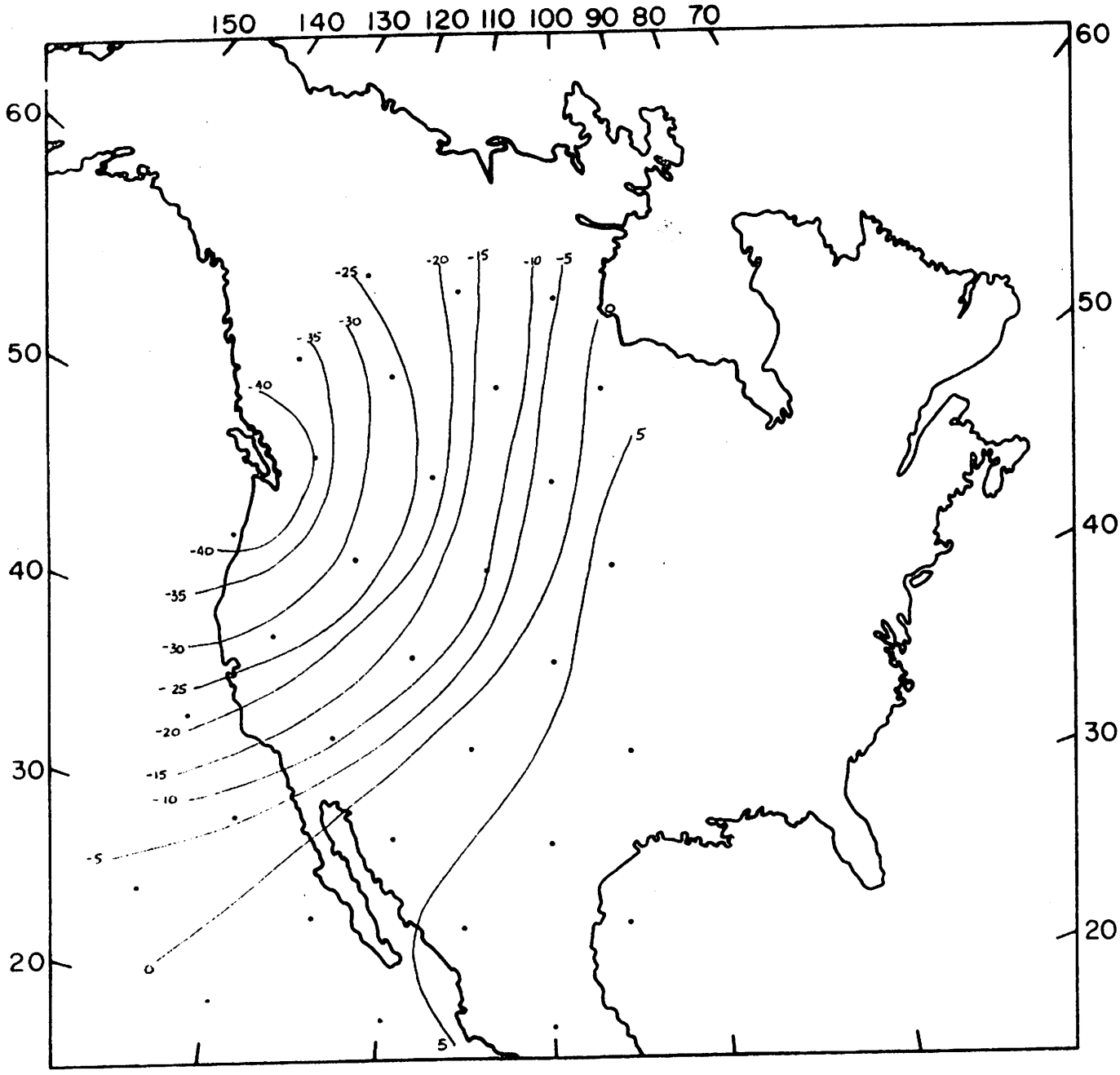


Fig. 5.21 700 mb deviation type 1, January (SW_c)

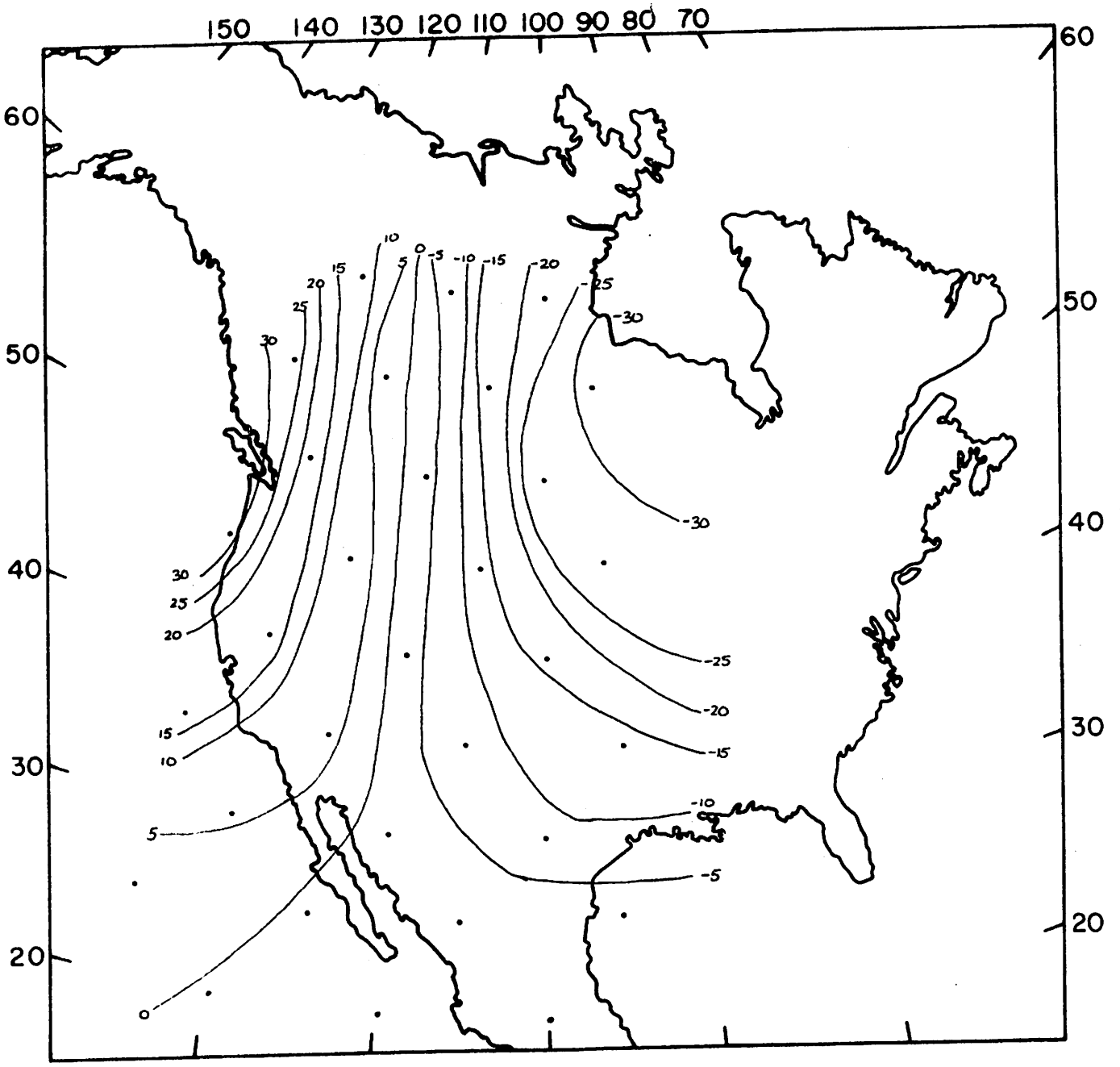


Fig. 5.22 700 mb deviation type 2, January (N)

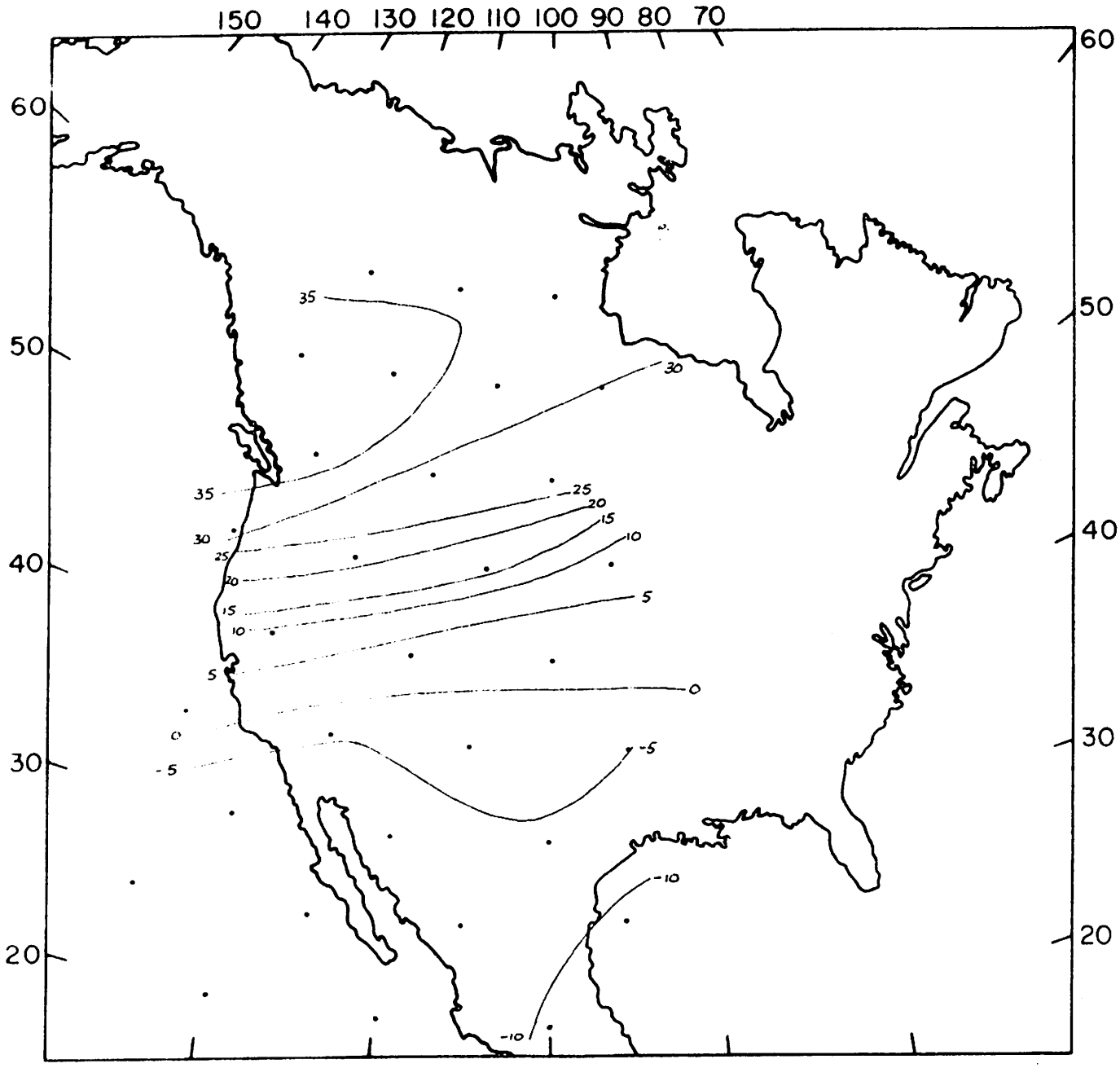


Fig. 5.23 700 mb deviation type 3, January (NE)

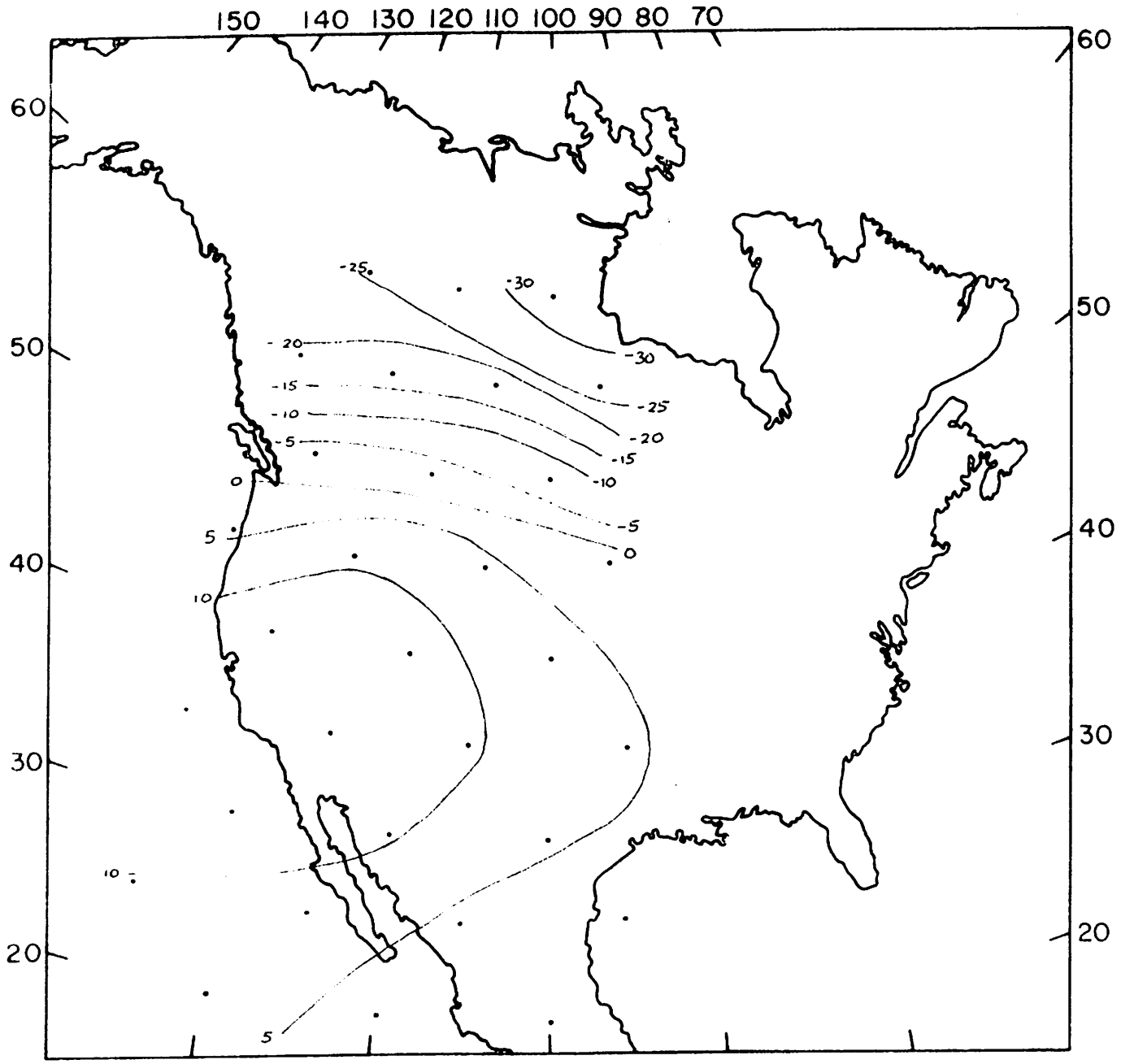


Fig. 5.24 700 mb deviation type 4, January (NW_a)

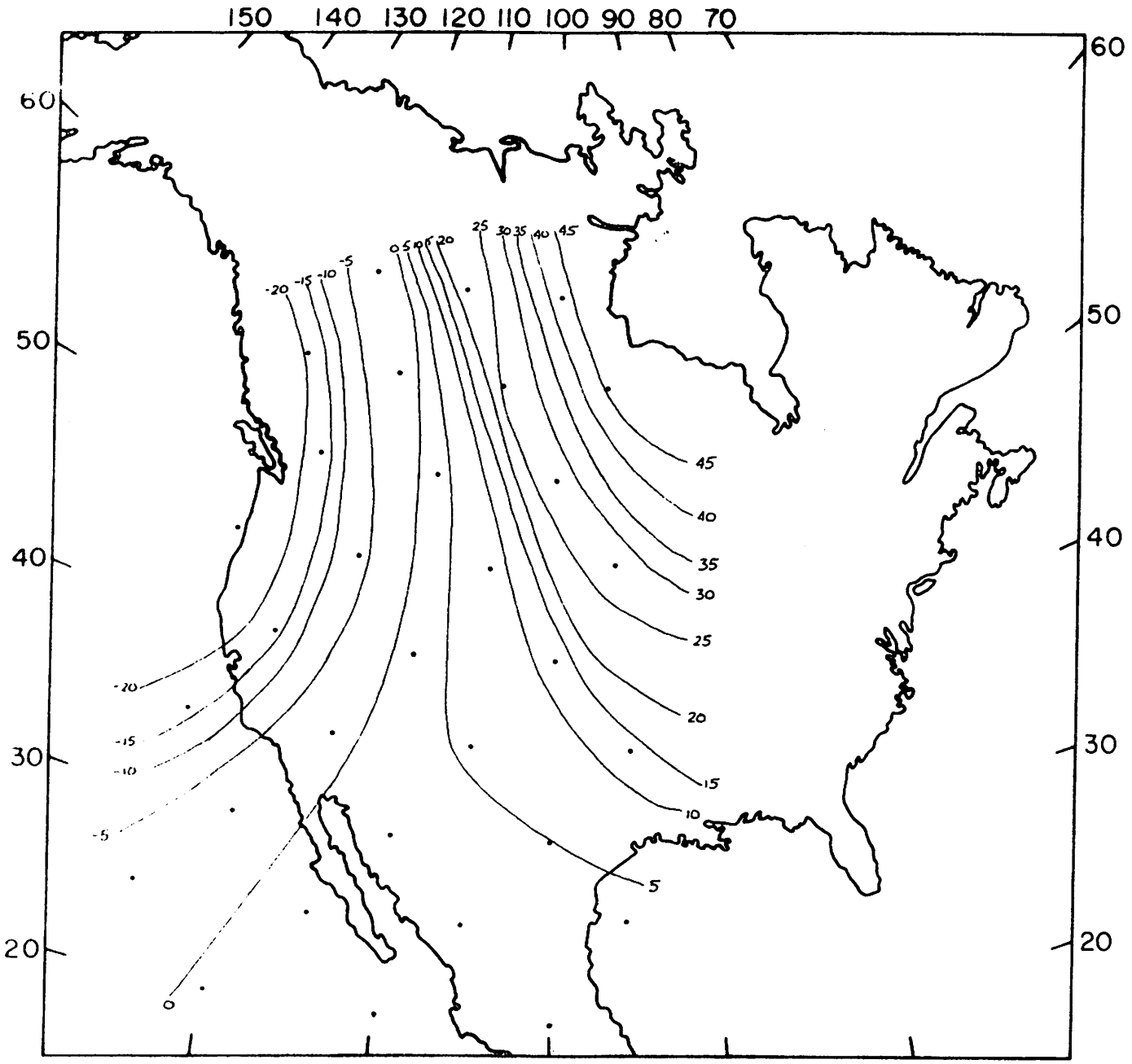


Fig. 5.25 700 mb deviation type 5, January (S)

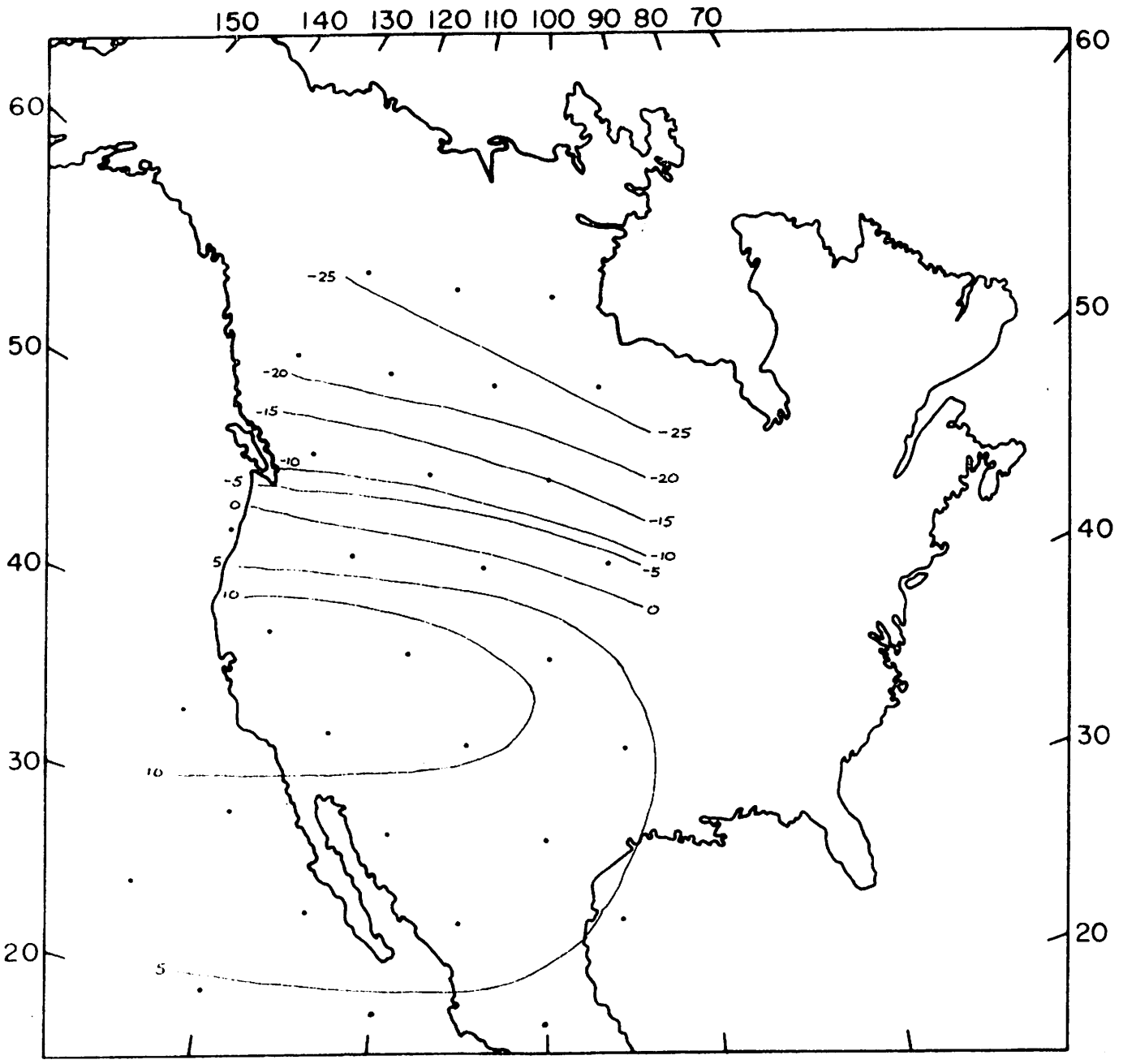


Fig. 5.26 700 mb deviation type 1, April (W)

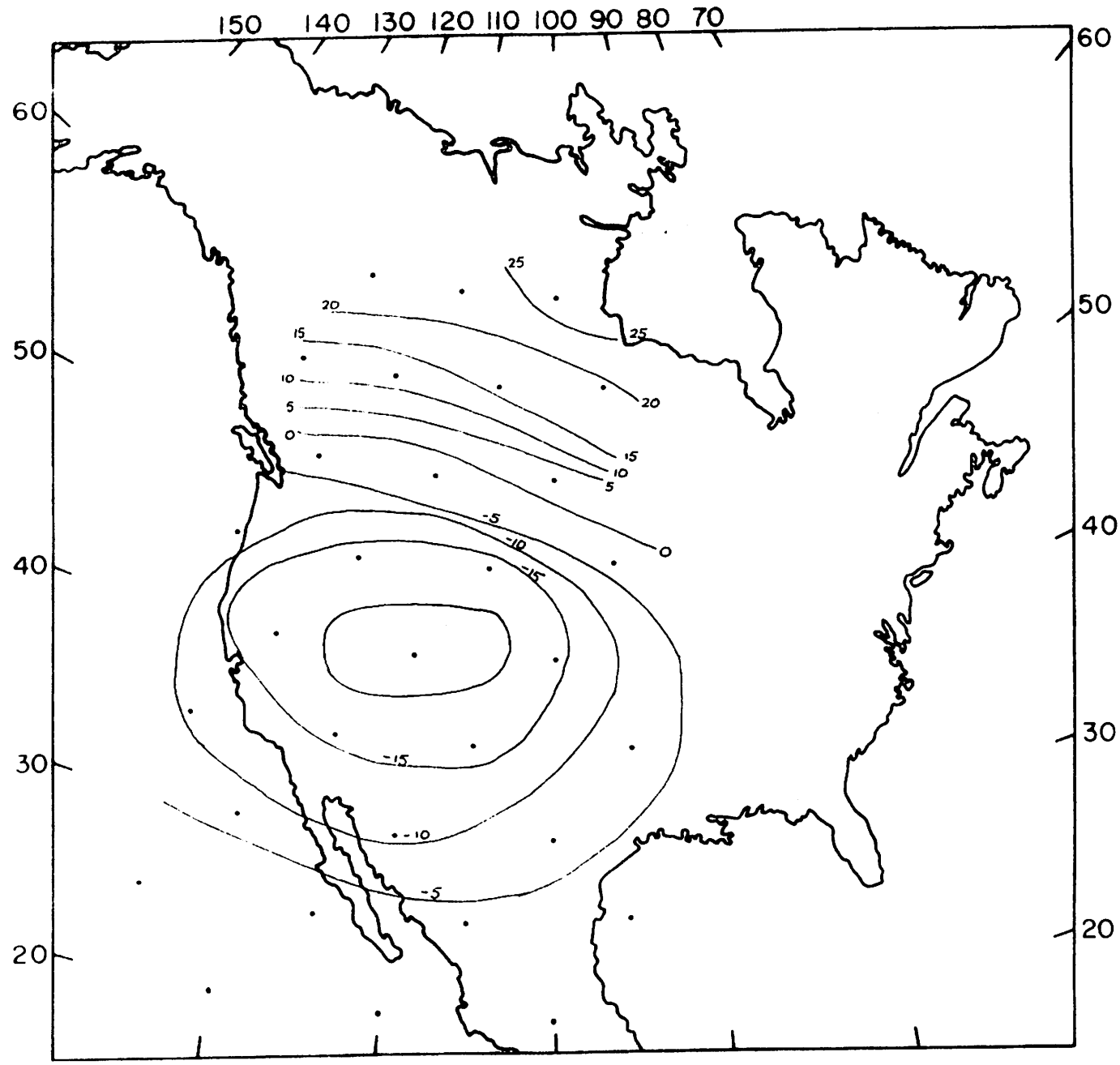


Fig. 5.27 700 mb deviation type 2, April (SE_c)

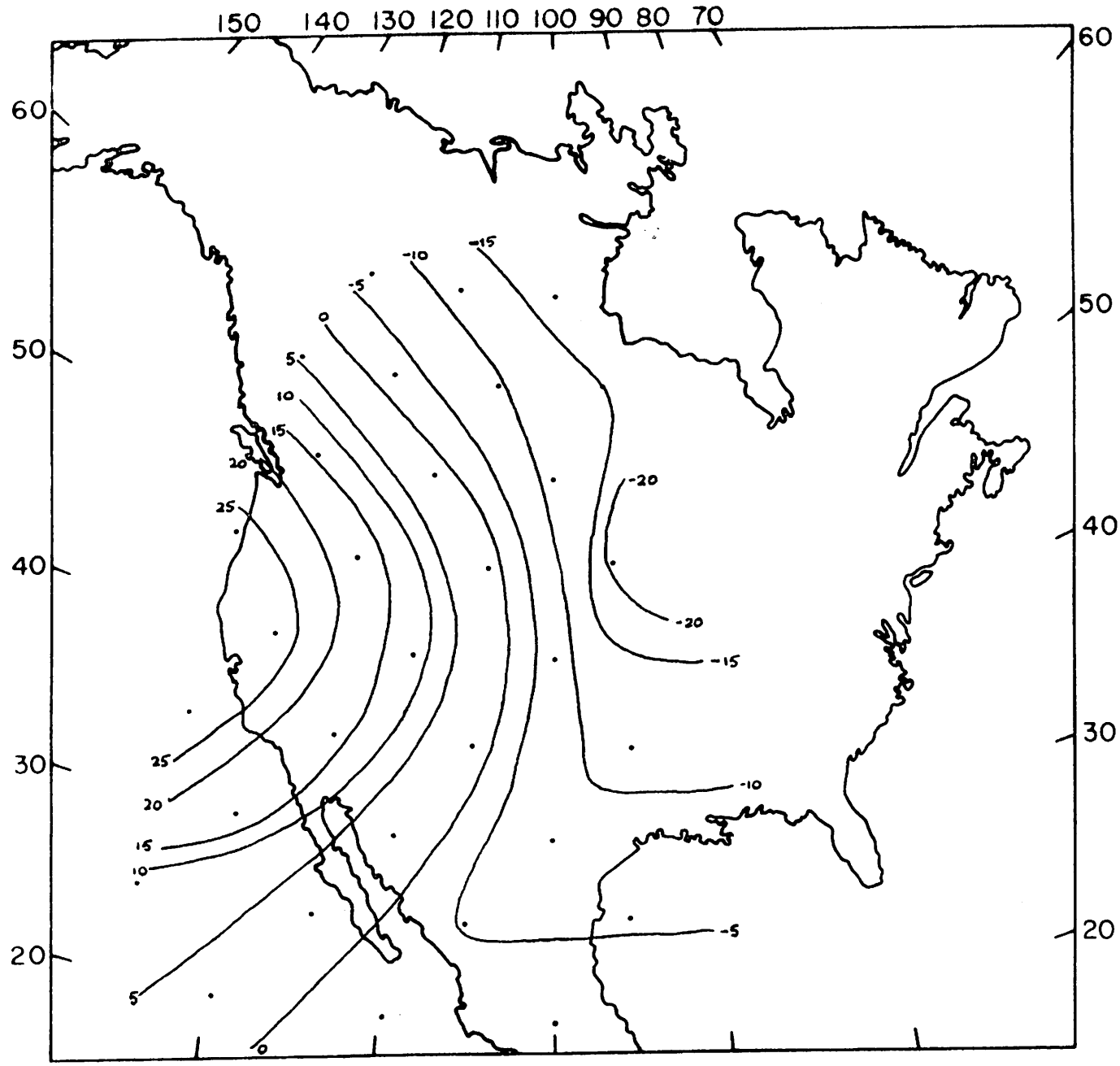


Fig. 5.28 700 mb deviation type 3, April (N)

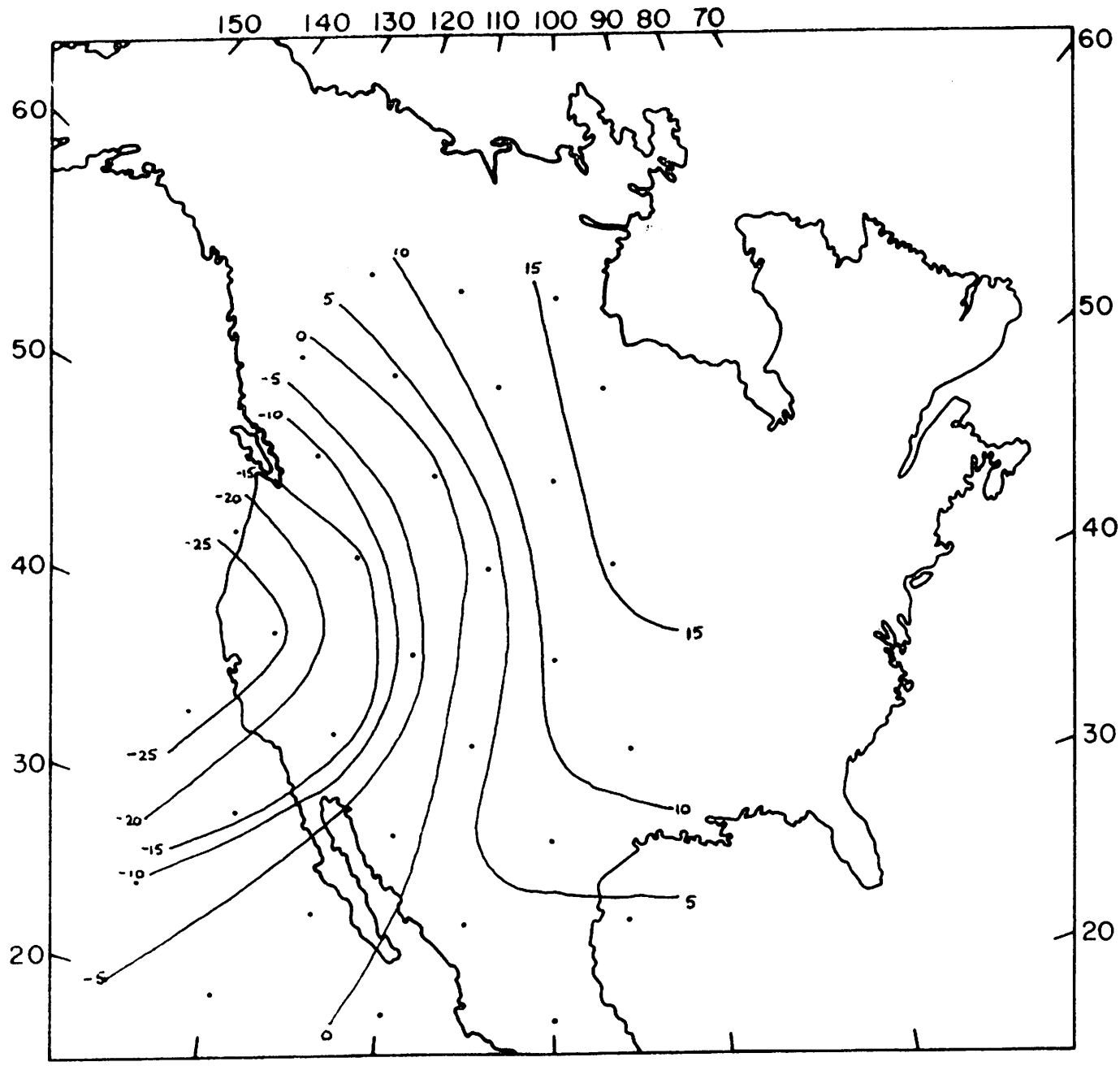


Fig. 5.29 700 mb deviation type 4, April (S)

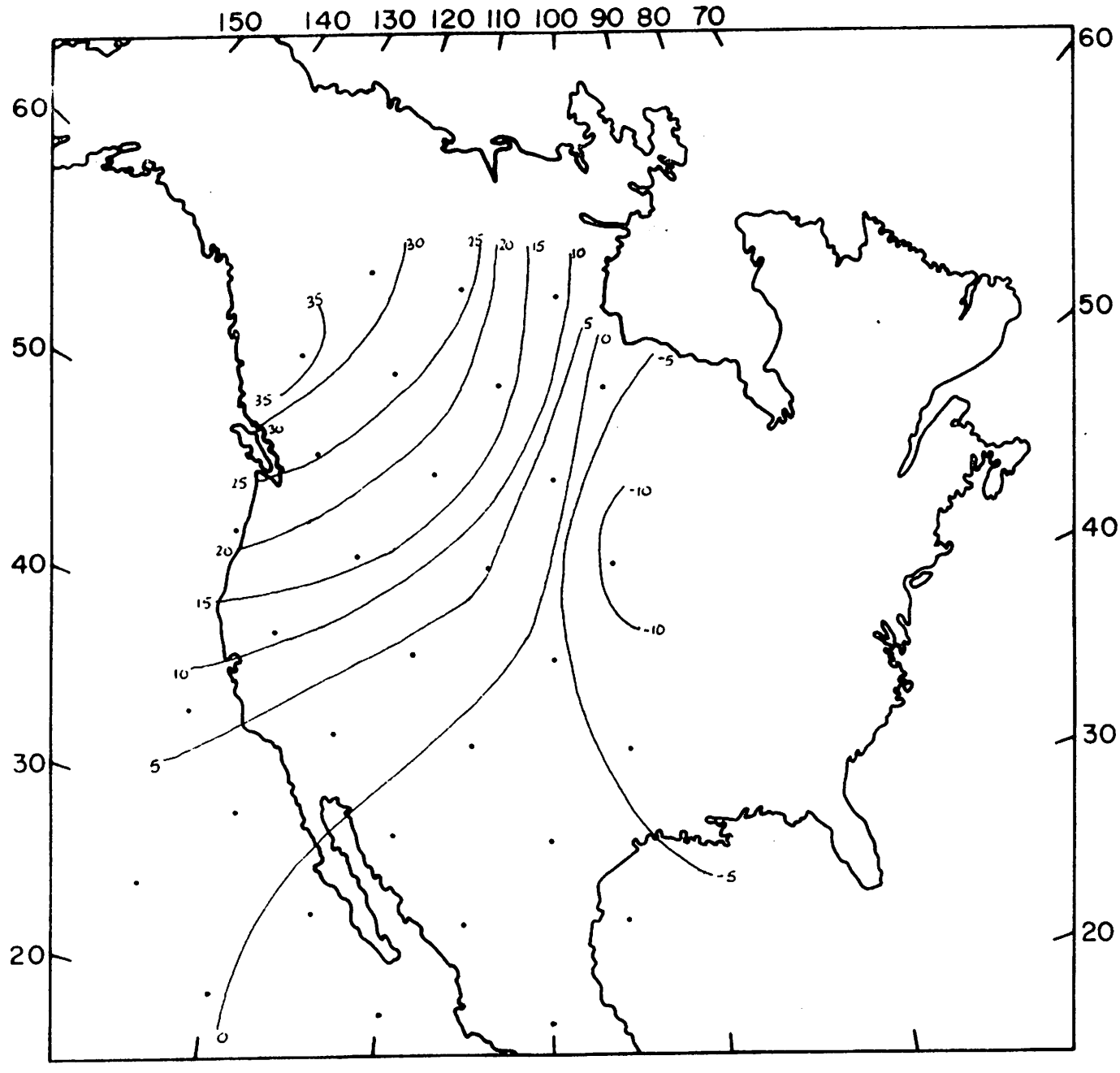


Fig. 5.30 700 mb deviation type 5, April (NE)

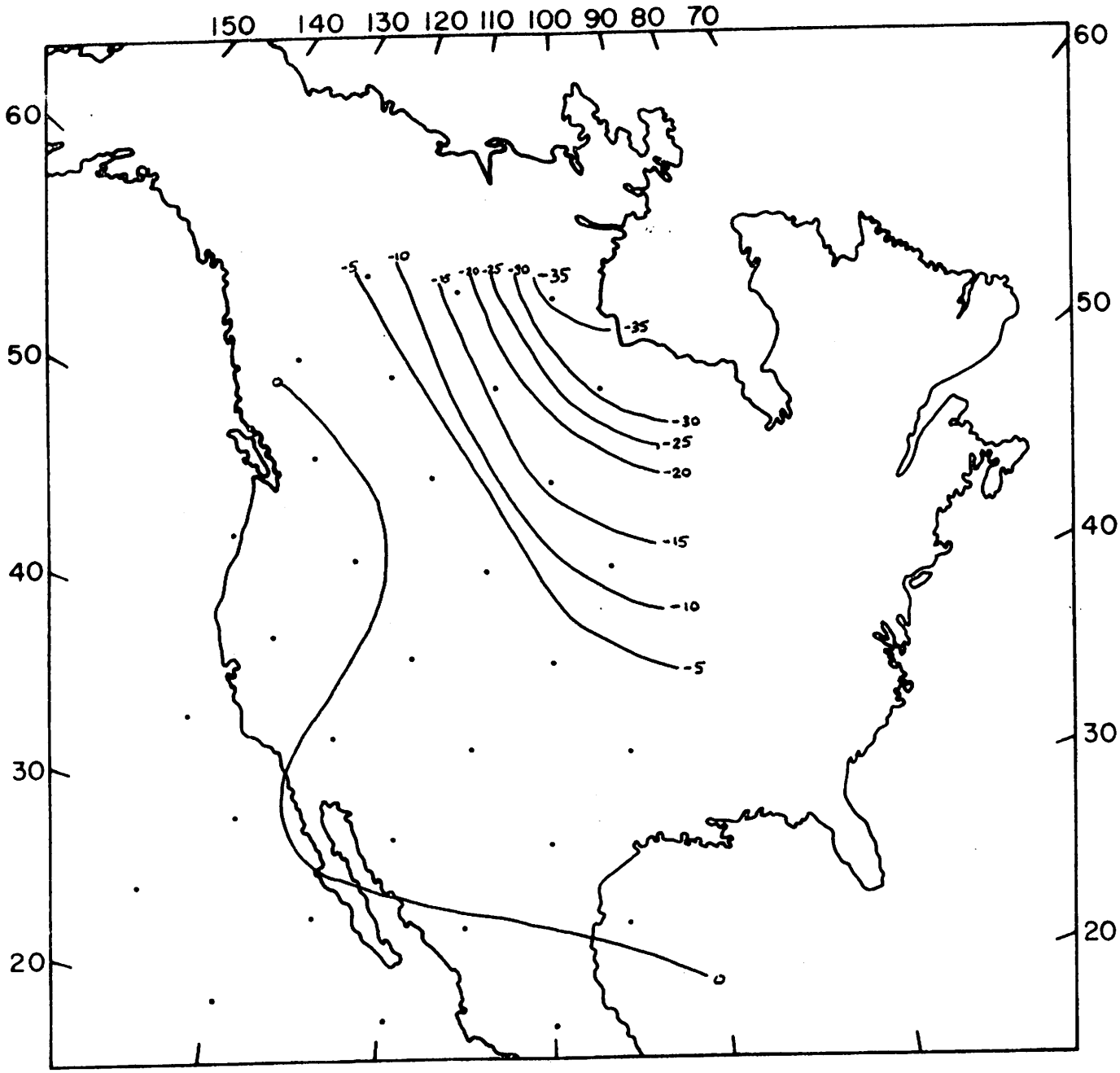


Fig. 5.31 700 mb deviation type 1, July (NW)

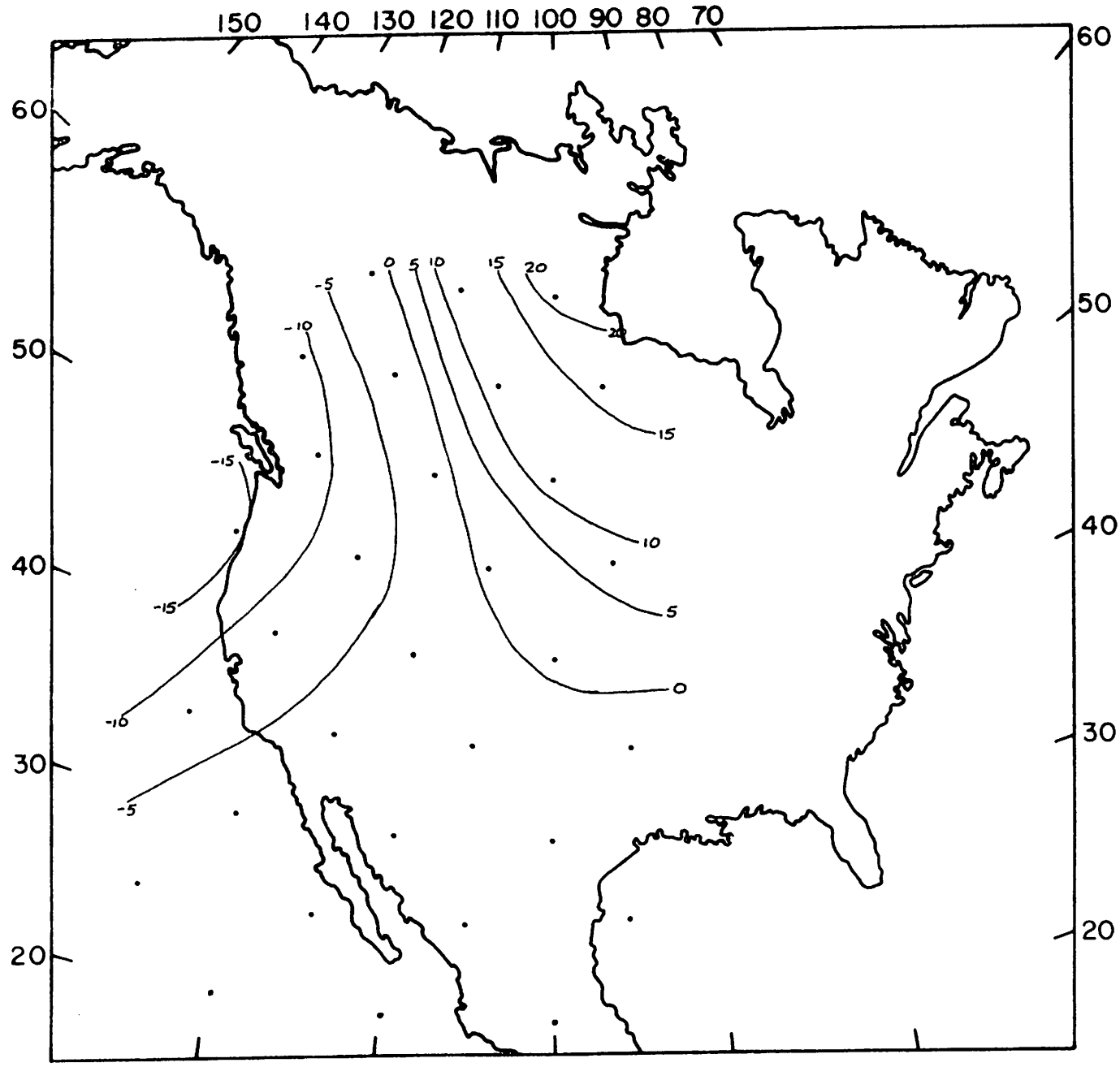


Fig. 5.32 700 mb deviation type 2, July (S_a)

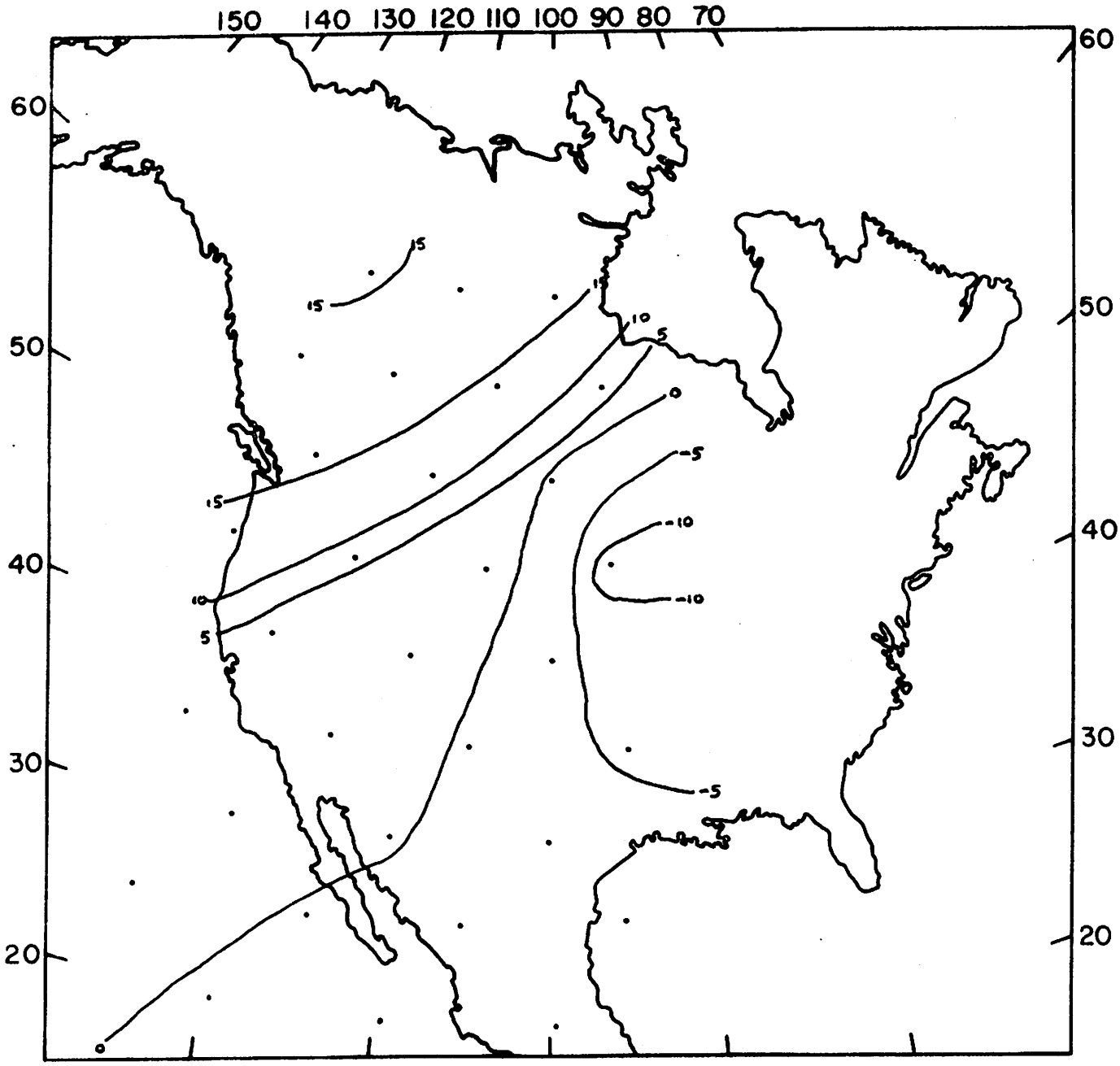


Fig. 5.33 700 mb deviation type 3, July (NE_a)

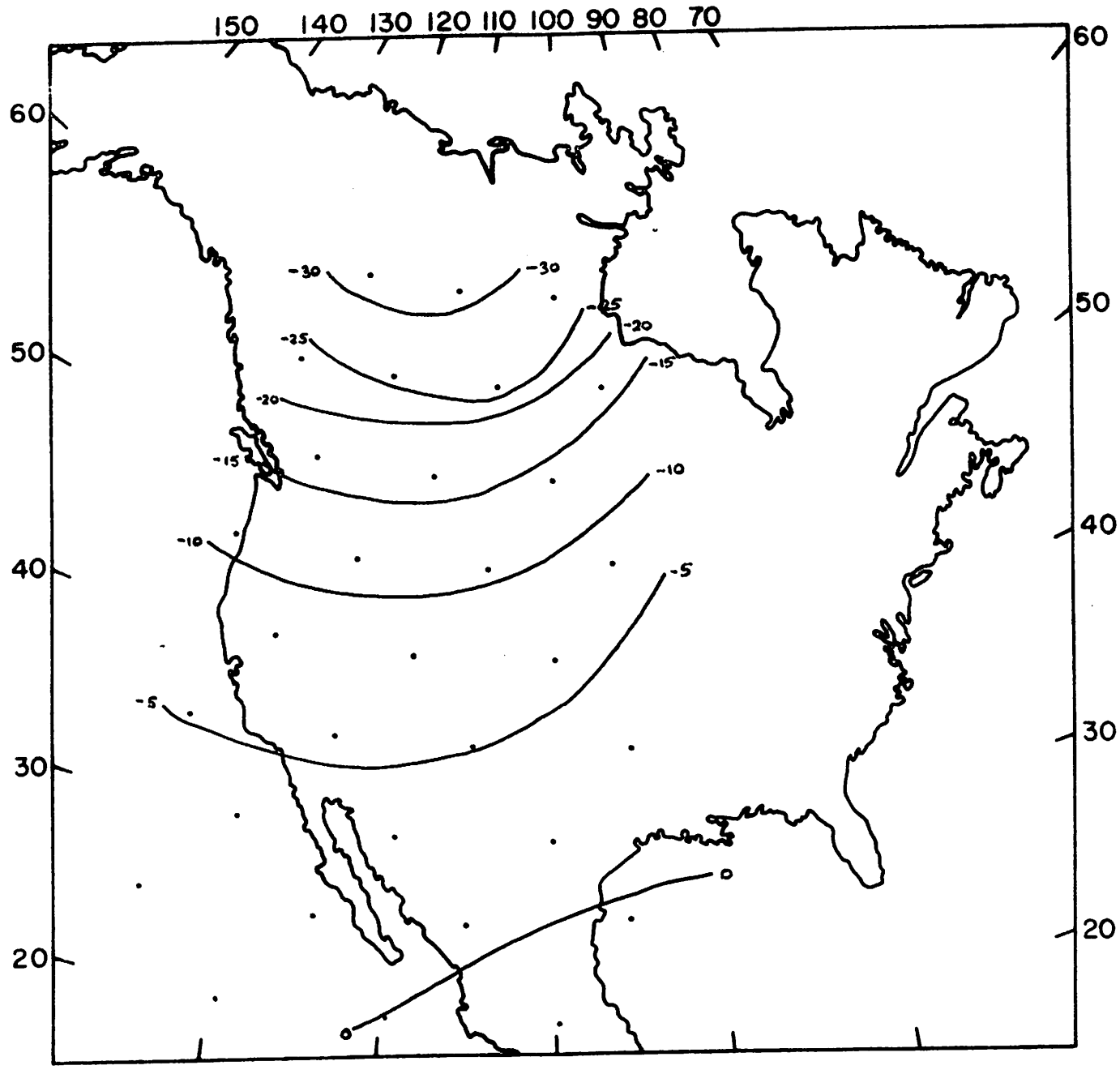


Fig. 5.34 700 mb deviation type 4, July (W_c)

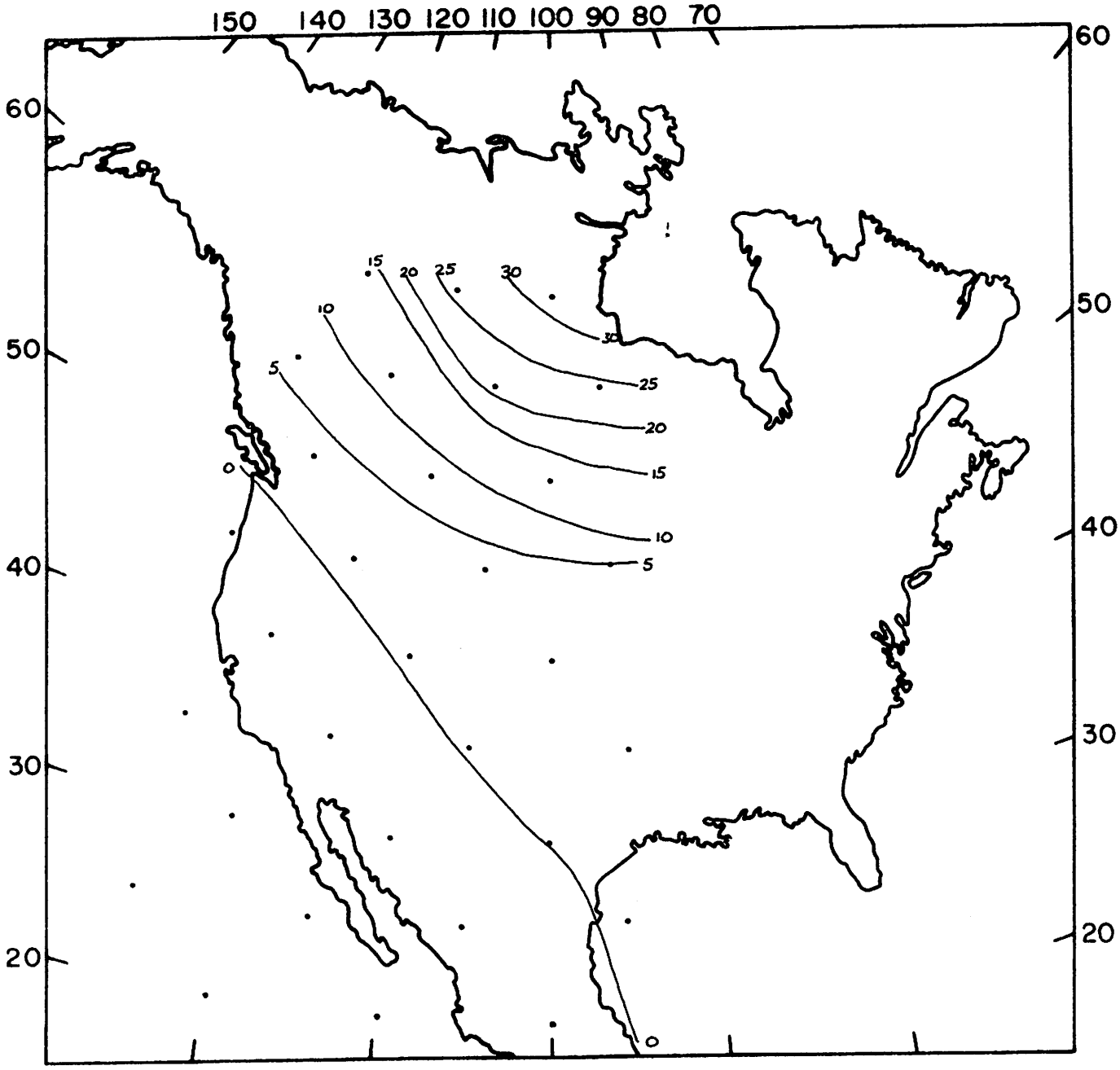


Fig. 5.35 700 mb deviation type 5, July (SE_c)

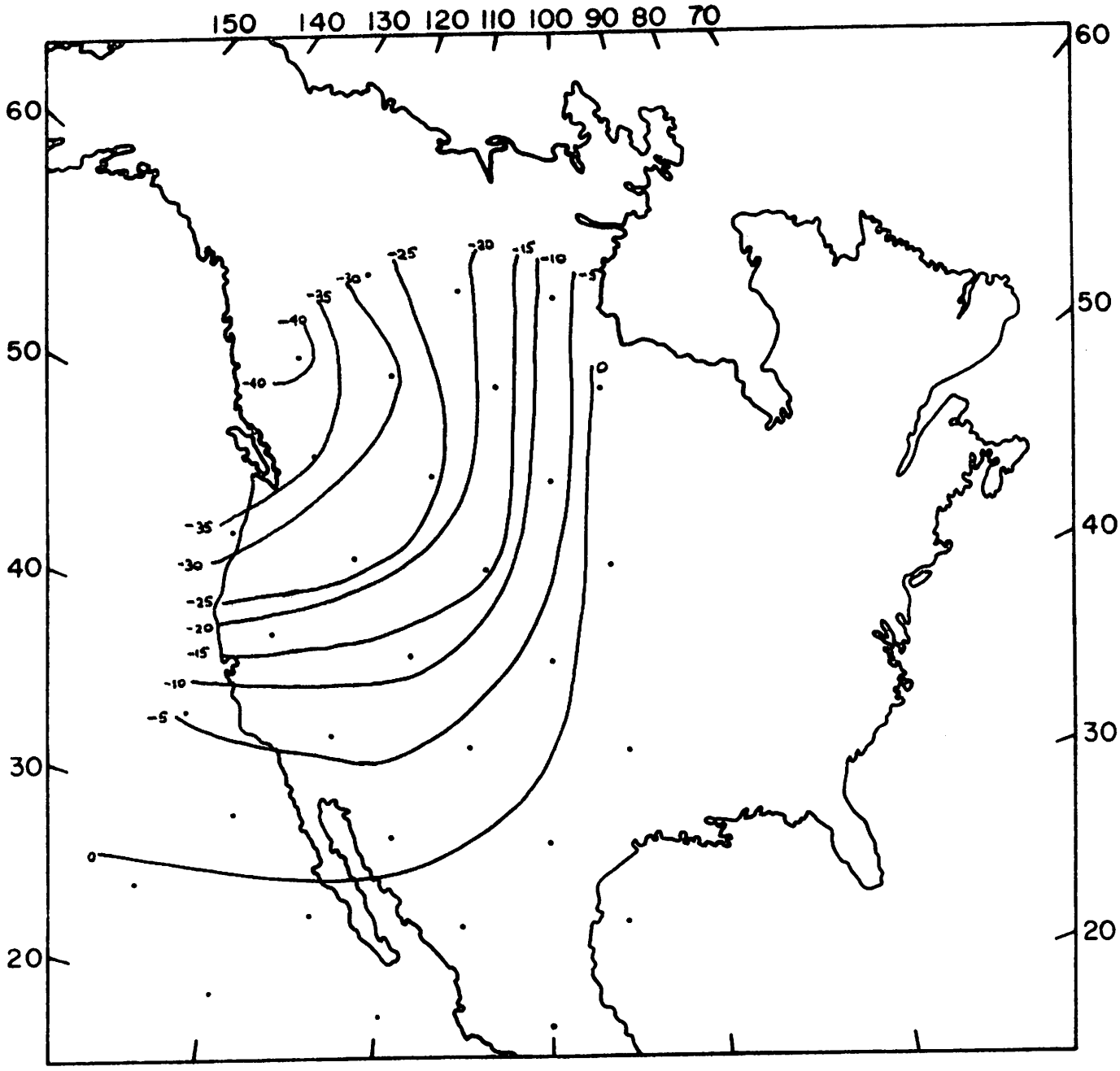


Fig. 5.36 700 mb deviation type 1, October (SW_c)

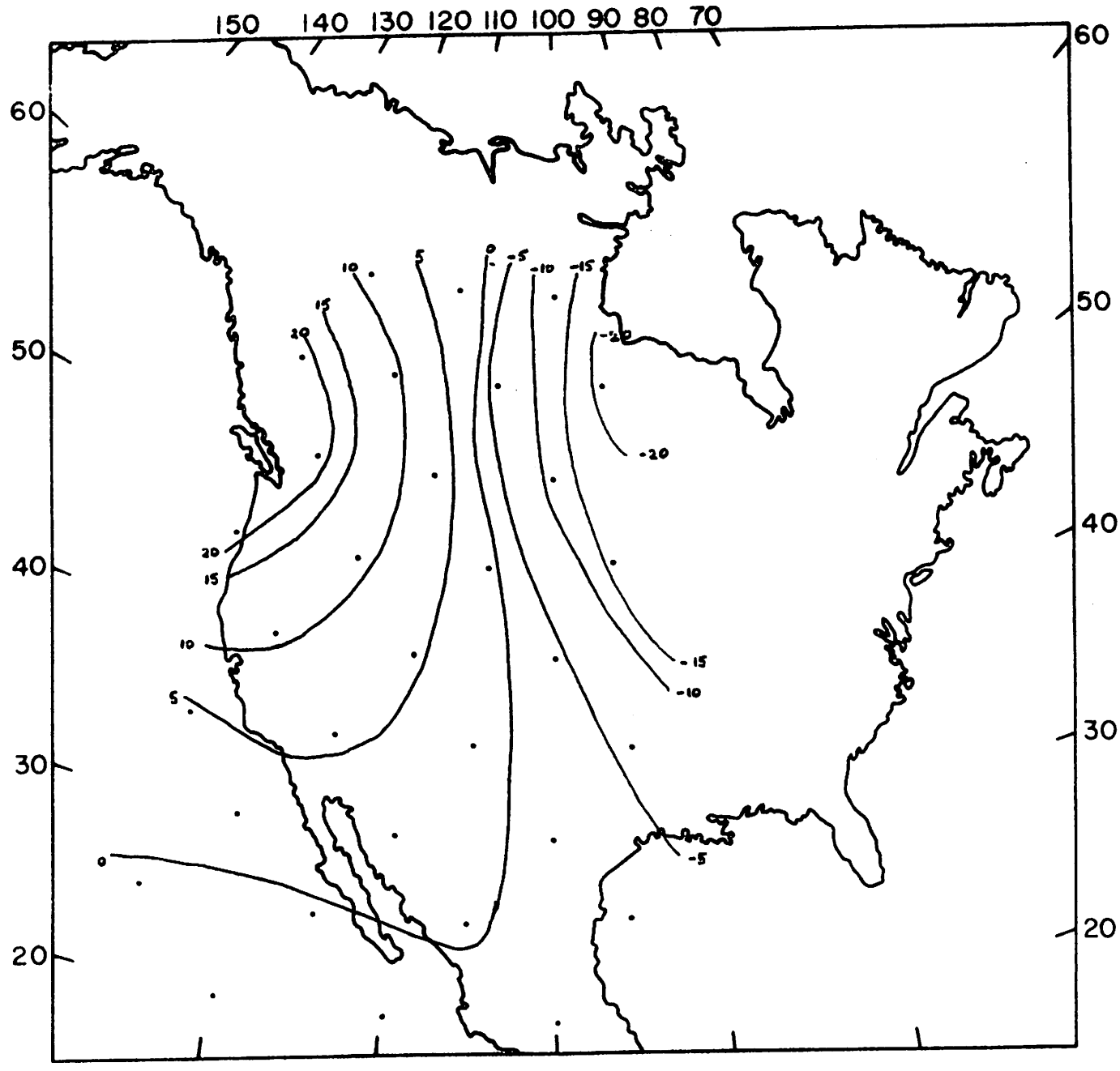


Fig. 5.37 700 mb deviation type 2, October (N)

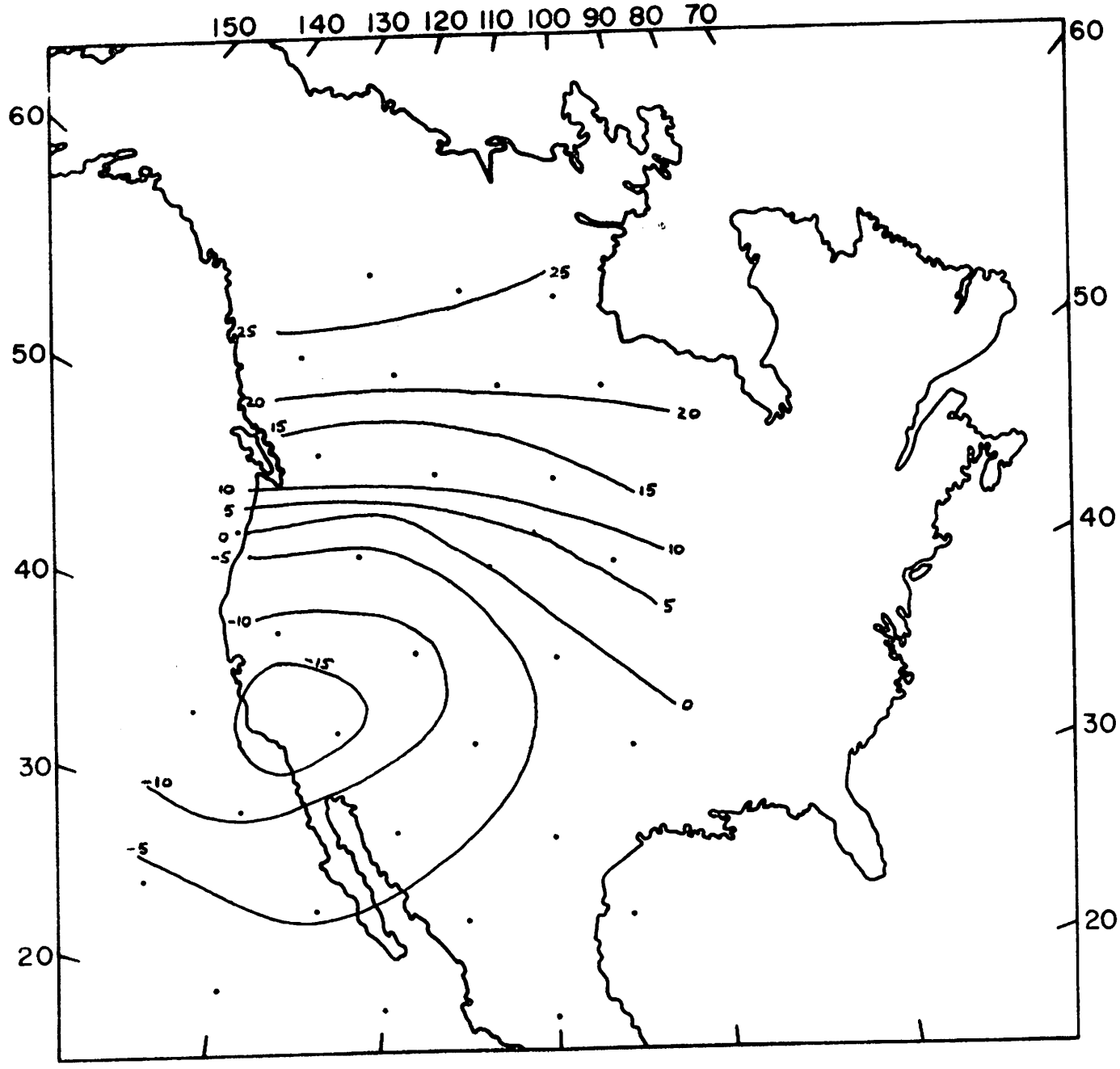


Fig. 5.38 700 mb deviation type 3, October (C_s)

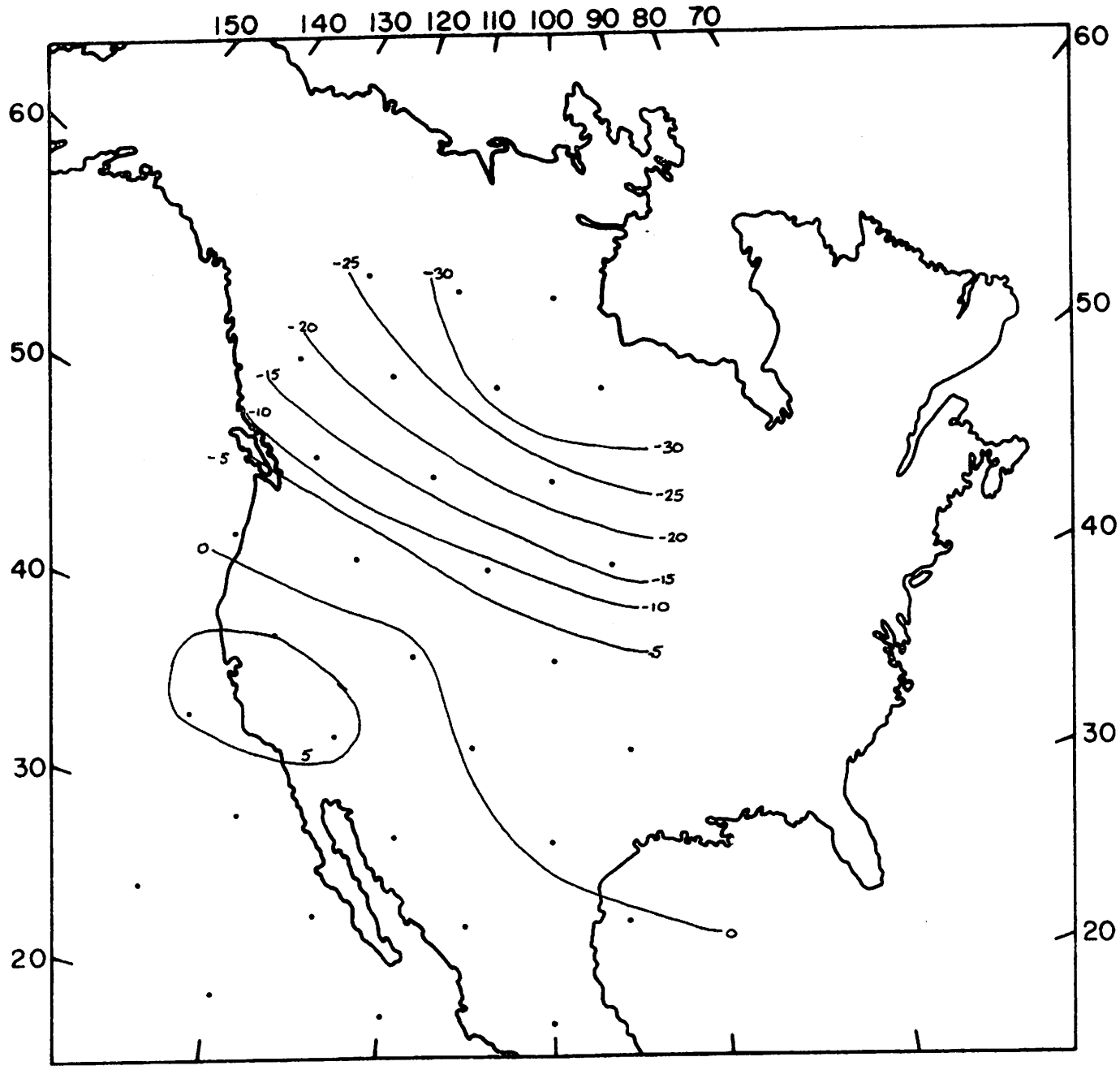


Fig. 5.39 700 mb deviation type 4, October (NW_a)

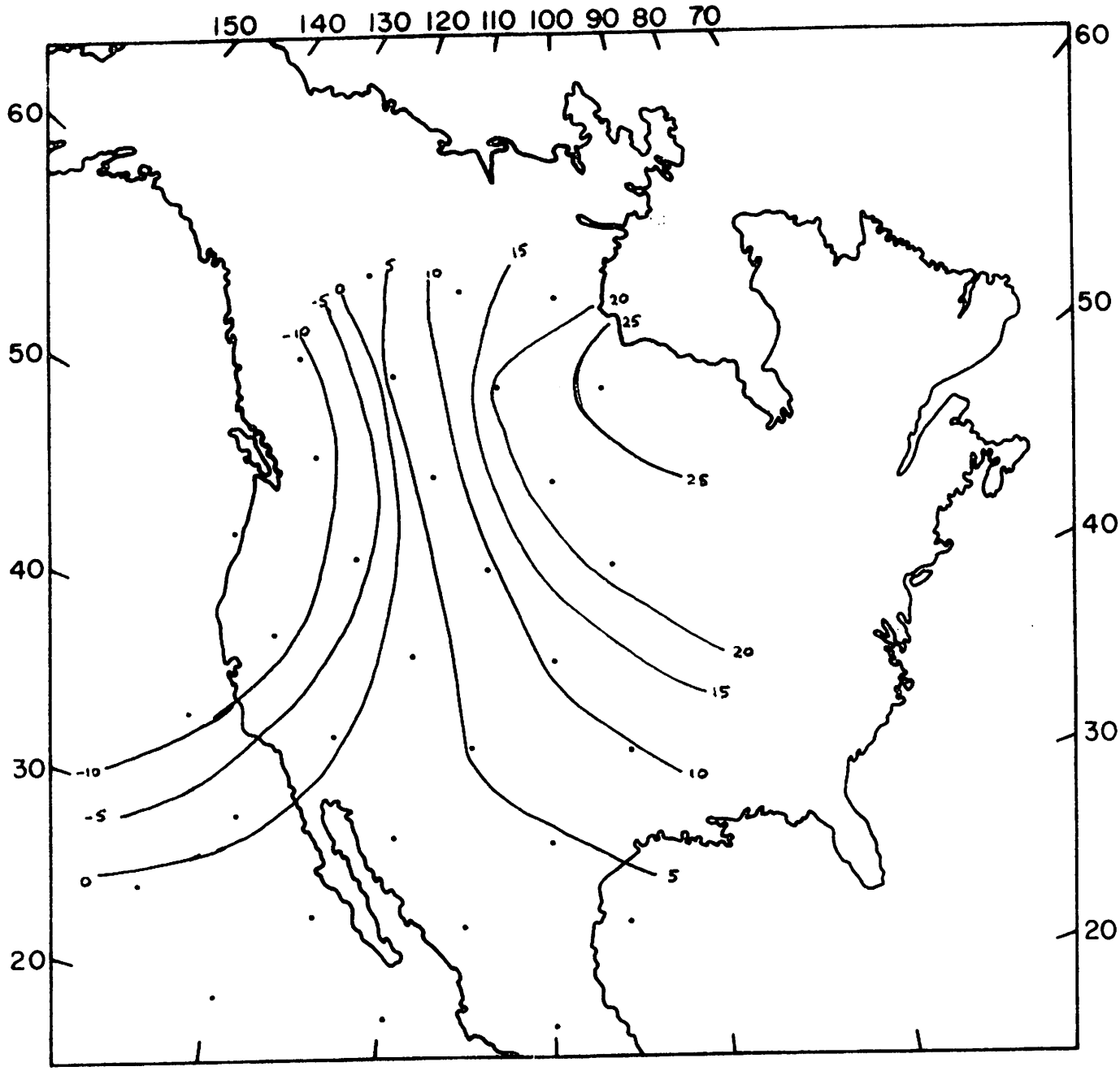


Fig. 5.40 700 mb deviation type 5, October (S)

CLIMATIC CHARACTERISTICS OF THE CIRCULATION TYPES

Temperature

Tables 5.6 -5.9 summarize the mean daily maximum and minimum temperatures at the four stations in mid-season months for each 700 mb type with more than 10 cases. The highest and lowest means associated with any type are also given irrespective of the number of cases. Using a ranking based on the mean daily maximum (since temperature minima are much more subject to local site factors), it is apparent from the tables that the order of types in any month shows only slight changes between the four stations.

It is of particular interest to see how successfully the classification distinguishes between different temperature levels. A comparison of Tables 5.6 and 5.8 with results obtained for C-1 in January and July using the 700 mb wind direction at Denver (not included) shows that the latter gives far less discrimination of temperature conditions. In January, the circulation types show a range of mean maximum temperature at C-1 of 24.5°F from 15.6°F (group 13) to 40.1°F (group 6) whereas the range with 9 categories of wind direction at 700 mb over Denver is only from 23.0°F to 30.3°F. In July, the corresponding ranges at C-1 are 8.0°F for the circulation types and 3.1°F for the 700 mb winds.

The circulation types do not all represent distinct categories, however, at least in terms of their temperature characteristics. The differences between the mean maximum and minimum temperatures of adjacent pairs of types in the listings are by no means all statistically significant by *t* tests as shown in the following summary for C-1 in January and July:

JANUARY			JULY		
Circulation Types	Maximum Temperature	Minimum Temperature	Circulation Types	Maximum Temperature	Minimum Temperature
6-5	n.s.	n.s.	8-2	n.s.	n.s.
5-2	<.01	n.s.	2-4	n.s.	n.s.
6-2	<.01	n.s.	8-4	n.s.	n.s.
2-1	<.05	<.05	2-11	n.s.	<.05
1-9	<.02	<.05	11-1	n.s.	n.s.
9-3	<.02	<.05	1-5	n.s.	n.s.
3-4	n.s.	n.s.	5-3	n.s.	<.01
9-4	<.01	<.02	1-3	<.01	<.01
4-13	n.s.	<.05	3-6	n.s.	n.s.
			5-6	<.05	<.05
			3-7	n.s.	n.s.
			6-13	n.s.	n.s.
			13-12	.02	.02

n.s. = not significant at .05 level

The tables show that especially in July, when the variance of temperature is much lower than in winter, there are many fewer significant differences between the types.

For January, where most of the types are significantly different with respect to temperatures, a check has been made of the temperatures for subsets of the circulation pattern types according to the deviation types (Table 5.10). That is, days with circulation type 1 have been divided according to their classification with respect to the type of deviation pattern. Designations of these patterns are given in Tables 5.1 and 5.5. The discrimination of temperature conditions between the subgroups appears to be slight.

TABLE 5.6 MEAN MAXIMUM AND MINIMUM TEMPERATURE AND STANDARD DEVIATION(^{o}F)

FOR 700 MB CIRCULATION PATTERN TYPES, JANUARY 1953-55, 1957-70

A-1				B-1			
CIRCULATION TYPE	DAYS	MAX	MIN	CIRCULATION TYPE	DAYS	MAX	MIN
6	14	49.7(7.1)	26.5(7.5)	6	14	47.6(5.9)	22.7(7.0)
5	23	49.0(6.9)	26.2(7.5)	5	23	46.0(7.8)	22.0(8.0)
2	64	44.9(8.7)	23.9(8.7)	2	64	41.2(8.0)	20.6(8.2)
1	204	43.6(8.3)	22.9(9.4)	1	202	38.4(8.8)	18.7(9.1)
9	10	38.9(3.4)	18.4(6.7)	9	10	33.7(3.8)	13.9(6.0)
3	69	35.1(9.4)	11.3(12.0)	3	68	29.7(8.7)	8.3(11.9)
4	40	28.1(11.1)	4.6(11.7)	4	39	25.1(8.1)	4.9(9.4)
8	8	52.0(4.1)	30.1(6.0)	8	8	47.9(4.9)	28.1(5.5)
13	7	22.6(4.2)	6.1(9.0)	13	7	18.7(6.7)	3.1(7.3)
TOTAL	439			TOTAL	425		
MEAN (17-YR)		40.2	18.8	MEAN (17-YR)		35.9	15.5

C-1				D-1			
6	14	40.1(5.1)	14.9(8.8)	6	14	26.0(4.8)	11.2(4.7)
5	23	36.8(7.7)	17.0(11.7)	5	21	20.7(7.1)	9.0(7.7)
2	64	31.4(7.9)	15.4(8.4)	2	60	16.7(7.4)	6.7(8.3)
1	203	27.8(8.4)	13.3(9.3)	1	190	14.6(7.9)	4.0(8.8)
9	10	24.9(3.3)	10.8(5.8)	9	10	11.6(3.8)	0.3(8.2)
3	69	21.2(7.8)	5.7(10.4)	3	61	8.7(8.3)	-0.9(7.8)
4	34	19.2(7.9)	4.3(9.1)	4	33	7.4(6.8)	-1.9(7.8)
8	8	39.4(5.2)	21.1(8.8)	8	8	23.3(4.8)	15.8(5.2)
13	5	15.6(11.5)	-2.0(8.0)	13	5	1.8(14.9)	-11.8(6.4)
TOTAL	425			TOTAL	402		
MEAN (16-YR)		26.9	10.9	MEAN (14-YR)		13.8	3.1

TABLE 5.7 MEAN MAXIMUM AND MINIMUM TEMPERATURE AND STANDARD DEVIATION(°F) FOR 700 MB CIRCULATION PATTERN TYPES, APRIL 1953-55, 1957-70

A-1				B-1			
CIRCULATION TYPE	DAYS	MAX	MIN	CIRCULATION TYPE	DAYS	MAX	MIN
4	30	63.3(7.7)	35.0(6.3)	4	29	59.5(8.9)	30.8(6.8)
1	188	58.2(10.2)	32.8(8.3)	1	187	53.1(9.4)	28.2(8.0)
6	14	53.4(12.7)	28.9(5.5)	6	14	50.7(12.1)	25.3(6.1)
3	35	51.0(10.7)	29.8(6.2)	3	29	48.8(9.5)	26.4(5.8)
5	22	50.7(12.7)	26.0(8.9)	5	22	46.2(11.7)	21.4(8.4)
2	60	48.8(10.7)	25.4(8.5)	2	60	43.5(9.8)	21.4(8.1)
7	22	46.1(7.6)	26.9(5.2)	7	22	42.2(7.7)	22.0(5.1)
8	13	44.7(13.1)	23.8(6.7)	8	13	39.6(10.8)	19.2(7.9)
9	10	37.3(9.3)	20.6(7.9)	9	10	35.0(8.2)	16.8(8.5)
14	3	73.7(6.7)	44.0(2.6)	14	3	67.3(3.2)	41.0(1.7)
TOTAL	397			TOTAL	389		
MEAN (17-YR)		52.9	29.3	MEAN (16-YR)		48.2	24.7

C-1				D-1			
4	30	47.7(6.9)	24.7(8.0)	4	28	33.4(7.8)	18.2(7.1)
1	188	43.1(8.1)	23.4(7.9)	1	179	29.5(8.4)	15.6(7.4)
6	14	39.3(8.6)	17.9(8.1)	6	13	27.5(6.8)	14.5(5.6)
3	35	38.2(8.2)	19.9(7.1)	5	22	25.0(8.2)	11.0(7.9)
5	22	37.7(10.3)	17.4(8.2)	3	34	24.3(8.5)	10.8(7.1)
2	60	34.9(8.6)	17.1(8.4)	7	21	21.8(6.3)	6.7(5.9)
8	13	33.2(8.3)	15.2(7.1)	2	60	21.2(8.6)	8.7(8.1)
7	22	32.9(7.4)	15.6(5.4)	9	10	19.4(4.3)	5.6(5.7)
9	10	29.3(8.8)	12.8(7.4)	8	13	18.2(7.4)	7.7(6.6)
14	3	57.0(2.6)	29.3(2.1)	14	3	43.0(2.6)	27.7(3.1)
15	7	28.7(7.8)	16.7(5.6)	15	7	16.3(8.5)	6.6(6.8)
12	7	30.7(4.7)	12.6(7.5)				
TOTAL	411			TOTAL	390		
MEAN (17-YR)		38.8	19.7	MEAN (16-YR)		25.5	12.1

TABLE 5.8 MEAN MAXIMUM AND MINIMUM TEMPERATURE AND STANDARD DEVIATION(°F) FOR 700 MB CIRCULATION PATTERN TYPES, JULY 1953-70

A-1				B-1			
CIRCULATION TYPE	DAYS	MAX	MIN	CIRCULATION TYPE	DAYS	MAX	MIN
8	10	86.7(4.3)	57.2(2.6)	8	10	80.3(3.1)	53.2(3.3)
4	13	85.7(5.5)	57.2(2.0)	11	11	79.5(3.0)	52.5(2.2)
2	77	84.9(5.9)	56.8(4.0)	2	82	78.7(5.6)	52.6(3.7)
11	11	84.5(2.3)	57.3(1.4)	4	14	78.6(4.3)	53.1(2.4)
5	12	83.8(6.5)	55.6(4.0)	5	13	78.2(5.7)	51.7(4.3)
1	200	83.3(7.6)	56.1(4.4)	1	211	77.9(7.0)	52.3(4.3)
6	12	80.6(8.4)	53.7(3.9)	3	57	74.6(6.3)	48.1(4.9)
3	55	79.2(6.8)	51.8(4.5)	6	14	74.4(7.6)	49.2(3.3)
7	12	79.1(7.4)	52.1(5.2)	7	12	74.1(5.7)	48.0(5.3)
13	6	71.3(4.3)	48.0(3.0)	13	6	68.3(5.0)	44.5(2.7)
TOTAL	408			TOTAL	430		
MEAN (18-YR)		82.0	54.9	MEAN (18-YR)		76.7	50.9

C-1				D-1			
8	10	68.2(4.8)	41.0(2.5)	8	10	56.5(2.1)	41.9(1.9)
2	82	67.9(4.3)	42.8(4.8)	11	10	56.0(2.1)	41.7(1.8)
4	14	67.6(3.3)	41.6(4.0)	4	14	55.9(3.3)	40.9(2.4)
11	11	67.6(2.7)	41.1(1.8)	1	205	55.3(4.4)	41.3(3.3)
1	210	67.2(5.3)	41.8(4.5)	2	79	55.2(4.0)	41.4(2.9)
5	13	66.8(4.3)	42.8(4.8)	5	13	55.1(2.5)	40.2(3.4)
3	57	65.3(4.5)	38.4(4.9)	3	57	53.4(4.3)	37.9(4.6)
6	14	64.6(5.9)	39.3(3.8)	6	13	52.8(4.4)	38.2(2.9)
7	12	64.6(4.2)	39.5(4.9)	7	12	52.5(4.3)	38.1(4.0)
13	6	60.2(5.3)	37.3(3.1)	13	5	48.6(2.4)	34.0(2.0)
12	8	66.6(2.4)	43.4(4.4)				
TOTAL	437			TOTAL	418		
MEAN (18-YR)		66.2	41.0	MEAN (17-YR)		54.5	40.0

TABLE 5.9 MEAN MAXIMUM AND MINIMUM TEMPERATURE AND STANDARD DEVIATION(^{o}F)

FOR 700 MB CIRCULATION PATTERN TYPES, OCTOBER 1952-69

A-1

CIRCULATION TYPE	DAYS	MAX	MIN
9	12	72.6(3.8)	44.8(4.5)
5	16	70.6(7.3)	45.7(6.2)
6	15	68.5(10.7)	42.3(8.2)
2	86	68.0(8.8)	43.2(6.7)
7	13	66.6(10.0)	40.2(4.6)
1	139	63.6(9.6)	37.2(8.5)
4	32	63.0(9.0)	38.3(7.2)
8	14	61.5(6.9)	36.0(6.6)
3	49	58.3(11.0)	32.7(7.4)
12	10	58.2(14.8)	38.1(7.2)
13	11	56.6(10.3)	27.5(6.6)
11	15	54.9(10.2)	30.3(7.4)
10	11	47.6(9.4)	23.8(7.7)
14	5	46.8(6.0)	23.2(5.1)
TOTAL	428		
MEAN (17-YR)		61.2	36.7

B-1

CIRCULATION TYPE	DAYS	MAX	MIN
9	12	67.5(4.7)	41.2(4.9)
5	16	66.9(5.1)	41.3(3.7)
6	15	63.9(10.5)	38.5(8.1)
2	87	63.6(7.9)	38.9(6.3)
7	13	62.3(7.6)	37.2(4.9)
1	143	59.1(8.8)	33.7(8.0)
4	32	58.8(8.1)	34.4(6.8)
8	14	55.7(6.2)	32.1(5.7)
12	10	55.1(13.2)	34.7(8.1)
3	51	54.8(9.7)	29.0(7.1)
13	11	51.5(9.5)	23.9(5.6)
11	15	48.6(10.8)	26.7(7.5)
10	11	45.3(10.1)	23.2(7.2)
14	5	39.0(6.4)	18.4(6.5)
TOTAL	435		
MEAN (18-YR)		57.5	33.1

C-1

9	12	56.8(3.7)	33.9(7.1)
5	16	56.2(4.4)	32.9(4.9)
7	13	54.4(5.7)	30.2(4.7)
6	15	54.2(9.2)	27.3(5.8)
2	87	53.4(6.9)	31.5(5.2)
12	10	50.1(9.6)	28.1(4.9)
1	144	49.5(7.8)	28.3(7.3)
4	32	48.8(6.9)	27.5(5.2)
3	51	47.1(8.2)	24.2(6.0)
8	14	46.3(5.9)	27.5(6.1)
13	11	42.2(8.6)	21.2(4.8)
11	15	39.3(12.0)	24.5(8.7)
14	5	30.4(9.5)	16.8(10.1)
TOTAL	425		
MEAN (18-YR)		48.6	27.1

D-1

5	15	42.5(4.9)	28.8(4.0)
7	11	41.8(6.2)	28.4(4.9)
6	15	40.9(7.5)	28.4(6.4)
2	76	39.7(7.5)	27.0(6.2)
12	10	39.1(6.7)	22.4(8.7)
1	133	35.1(7.7)	22.7(7.3)
3	46	34.4(7.8)	22.2(6.7)
4	32	33.3(7.5)	20.3(7.5)
8	13	32.2(5.4)	16.9(6.4)
10	10	27.4(5.7)	15.9(5.1)
11	15	24.4(11.8)	12.6(9.2)
14	5	17.0(8.7)	6.2(10.5)
9	7	40.3(13.8)	30.5(2.4)
TOTAL	388		
MEAN (16-YR)		35.1	22.3

TABLE 5.10. MEAN MAXIMUM AND MINIMUM TEMPERATURE AND STANDARD DEVIATION (^{o}F) AT C-1 FOR SUBTYPES BASED ON THE 700 MB DEVIATION PATTERN TYPES, JANUARY 1953-55, 1957-70

Circulation Type	Deviation Type	Days	Maximum	Minimum
1	1	27	29.2(5.7)	15.0(7.7)
1	4	37	29.8(6.2)	16.9(6.6)
1	7	18	30.2(6.4)	16.9(6.6)
1	All Cases	203	27.8(8.4)	13.3(9.3)
2	1	43	30.5(7.1)	15.6(9.0)
2	5	14	32.1(10.8)	14.4(7.0)
2	All Cases	64	31.4(7.9)	15.4(8.4)
3	2	45	19.7(6.1)	6.0(11.4)
3	All Cases	69	21.2(7.8)	5.7(10.4)

Examination of these differences by t tests shows that only those for minimum temperatures with type 1, deviation type 7 and type 1, deviation type 4, differ significantly from all cases of type 1. This subdivision of the circulation types has not been continued further, therefore.

Another approach to the temperature synoptic climatology can be made by examining the level of mean temperature in a given month in relation to the variation in frequency of the different circulation types. Stepwise regression analysis of mean daily temperature in January at C-1 with the frequencies of the first 9 circulation patterns (Table 5.11) shows they account for 39% of the variance of temperature. Types 2 and 9 (Southwesterly and Anticyclonic Northwesterly circulations) together account

TABLE 5.11 REGRESSION OF CIRCULATION TYPE FREQUENCIES ON MONTHLY MEAN TEMPERATURE DESCRIPTORS AT C-1, 1953-70

Percentage of Explained Variance

January

700 MB TYPES	MAX	MIN	MEAN	RA	700 MB DEVIATION TYPES	MAX	MIN	MEAN	RA
1	8.4	5.5			1	6.8	44.5*	27.1*	10.5
2	8.0	22.0	13.7	10.6	2				
3				8.5	3				35.0*
4	4.2		3.4		4		9.5	6.9	
5	7.5		3.3	15.5	5	3.1			6.2
6			3.4	17.1	6				
7					7	11.6	4.2	7.1	
8	11.6			17.5	8				
9		11.6	8.4	8.3	9	12.5	3.2	6.4	10.5
TOTAL	47.0	45.3	39.5	81.1	TOTAL	37.7	72.6	51.3	82.0

JULY

700 MB TYPES	MAX	MIN	MEAN	RA	700 MB DEVIATION TYPES	MAX	MIN	MEAN	RA
1		3.4		11.2	1		10.6	3.4*	19.7
2	29.1*		8.6		2	65.8**	40.0**	70.7**	12.4
3	3.1	55.0**	50.8**		3		9.3*	3.7*	
4	4.1			3.7	4	4.2	9.2		11.1
5				16.4	5		16.5	4.4	16.2
6	7.9		6.6		6				
7				3.3	7		8.1		
8	22.3*	7.9*	14.2**		8	4.1			
9		3.0		6.2	9	3.0		4.5	3.6
TOTAL	73.5	74.7	84.1^{+}	47.4	TOTAL	79.0^{+}	97.4^{++}	92.6^{++}	76.7

**Correlations significant at 1% level (*5% level).

$^{++}$F value significant at 1% level ($^{+}$5% level).

for 22%. However, the correlation coefficient of +0.37 between temperature and the frequency of circulation type 2 is not significant and neither is the overall F value. Using mean minimum temperature in January at C-1, the frequencies of the first 9 circulation patterns account for 45% of the variance in temperature (with 34% due to types 2 and 9) but again the F value is not significant. The explained variance is raised considerably in the case of January minima if the 700 mb deviation types are used but even so the F value remains non-significant. In July the relationships are all much improved and using the deviation types as predictors the overall F values for maximum, minimum and mean temperature are significant. Deviation type 2 ("anomalous" Southerly flow) is especially important.

These results are fairly encouraging in view of the large scale of the circulation patterns and the fact that the air mass characteristics of any type group are obviously somewhat heterogeneous. It would appear that the deviation types by themselves may be a useful discriminator in spite of their limited value as subgroups of the height patterns. This will be investigated further subsequently.

Precipitation

The precipitation characteristics of the circulation types at each of the four stations are given for mid-season months in Tables 5.12-5.15.

There is clear evidence of increasing frequency and intensity of precipitation at higher altitudes with types 1 and 3 (Northwesterly) and type 2 (Southwesterly) in January. The first two types account for 2/3 of the total at C-1 and D-1, although the large number of dry days which also occur with these types demonstrates that additional criteria

would be required if the synoptic situation were to be used as a predictor. At A-1 and B-1 there are no dominant types or, at least, the types samples are too small for firm conclusions to be drawn.

In April, type 1 (Westerly) and type 9 (Trough, Northerly) account for 21-23% and 26-29% of the 1966-70 totals, respectively, at A-1 and B-1. The percentage is similar at C-1 and D-1 for type 1, but that with type 9 decreases to 7% at D-1. At the two higher stations types 3 (Southwesterly), 7 (Westerly cyclonic) and 15 (Northwesterly cyclonic) make important contributions to the total. These 5 types account for 64% of the total precipitation at C-1 and 52% at D-1.

In July, type 1 (Westerly anticyclonic) contributes about 1/4 of the total at B-1 and D-1 and just over 1/3 at A-1 and C-1. The variability with altitude may be a result of the different years for which data were available. At A-1 no other single type is a major contributor to the total precipitation, whereas at C-1 and D-1 types 2 (Southwesterly anti-cyclonic) and 3 (Northwesterly) jointly account for a further 1/4 of the total. Types 2 and 3 are also important at B-1. It is interesting that in this respect B-1 is more like C-1 than A-1 in this month, whereas in the other months B-1 is more like A-1.

There are no clearly dominant types in October at any of the stations, apart from the "Unclassified" days.

The considerable totals with "Unclassified" days, especially in October, raises an important problem. However, scrutiny of these cases shows that a few heavy falls account for much of the total in many instances. For example, 2.05" in 4 days at D-1 in January, 1.65" in 3 days at A-1 in April, 3.02" in 3 days at C-1 in July and 4.54" in 5 days at A-1 in October. Heavy precipitation on 5-7 May 1969 also occurred on days which were Unclassified.

TABLE 5.12 Precipitation (in.) for 700 MB Circulation Pattern Types, January

A-1 (1966-70)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data*
1	6	.21	.05	46	6
2	1	.08	.08	27	4
3	3	.72	.24	10	0
4	0	0	0	3	0
5	1	.03	.03	3	1
11	1	.02	.02	0	0
12	3	.75	.25	1	0
Other Types	0	0	0	15	0
U	4	.47	.12	11	5
Total	19	2.28	.12	116	16

* 20 days of 1966 missing

B-1 (1966-70)

1	7	.29	.04	52	0
2	5	.35	.07	28	0
3	5	.78	.16	8	0
4	0	0	0	3	0
5	1	.02	.02	4	0
11	0	0	0	1	6
12	4	.72	.18	0	0
Other Types	0	0	0	15	2
U	4	.46	.12	16	0
Total	26	2.62	.10	127	

C-1 (1965-70)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	28	3.37	.12	38	2
2	14	1.37	.10	25	0
3	10	3.51	.35	5	5
4	1	.04	.04	1	1
5	1	.02	.02	6	0
7	2	.42	.21	2	0
9	2	.64	.32	1	0
11	1	.10	.10	1	0
12	3	.60	.20	1	0
13	2	.03	.02	1	0
Other Types	0	0	0	10	0
U	6	.73	.12	17	0
Total	70	10.83	.15	108	8

D-1 (1965-70)

1	49	10.72	.22	18	1
2	21	2.98	.14	17	1
3	13	8.24	.63	7	0
4	3	.73	.24	0	0
5	1	.59	.59	3	2
7	4	.74	.18	0	0
8	1	.07	.07	3	0
9	3	1.04	.35	0	0
11	1	.14	.14	0	1
12	4	.79	.20	0	0
14	1	.03	.03	1	0
Other Types	0	0	0	7	0
U	11	2.49	.23	10	2
Total	112	28.56	.26	66	7

TABLE 5.13 Precipitation (in.) for 700 MB Circulation Pattern Types, April

A-1 (1966-70)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	10	2.11	.21	36	0
2	3	.39	.13	10	0
3	4	.58	.15	8	0
4	1	.03	.03	5	0
5	1	.36	.36	5	0
6	2	.19	.10	6	0
7	2	.11	.06	6	0
9	6	2.84	.47	0	0
10	1	.24	.24	1	0
12	1	.25	.25	1	0
13	1	.05	.05	1	0
Other Types	0	0	0	12	0
U	11	2.83	.26	16	0
Total	43	9.98	.23	107	0

B-1 (1966-70)

1	8	2.20	.28	38	0
2	4	.24	.06	9	0
3	3	.29	.10	3	6
5	1	.27	.27	5	0
6	4	.30	.08	4	0
7	5	.17	.03	3	0
9	6	2.44	.41	0	0
10	1	.14	.14	1	0
12	1	.20	.20	1	0
13	2	.12	.06	0	0
Other Types	0	0	0	16	2
U	13	3.07	.24	14	0
Total	48	9.44	.20	94	8

C-1 (1965-70)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	9	3.33	.37	38	0
2	7	.69	.10	7	0
3	12	2.26	.19	6	0
4	4	.27	.08	5	0
5	1	.34	.34	6	0
6	2	.38	.19	6	0
6	8	1.51	.19	1	0
8	1	.06	.06	1	0
9	6	2.75	.46	0	0
10	1	.08	.08	1	0
11	1	.01	.01	4	0
12	3	.63	.21	0	0
13	1	.24	.24	1	0
15	4	1.82	.46	0	0
Other Types	0	0	0	1	0
U	18	4.07	.23	12	0
Total	78	18.44	.24	89	0

D-1 (1965-6,1968-70)

1	23	4.27	.19	27	0
2	8	1.58	.20	6	0
3	9	1.79	.20	2	0
4	5	.61	.12	2	0
5	2	.49	.25	3	0
6	2	.48	.24	6	0
7	4	1.07	.25	2	1
8	2	.30	.15	0	0
9	6	1.42	.24	0	0
10	1	.10	.10	1	0
11	1	.32	.32	0	0
12	2	.32	.16	1	0
13	1	.32	.32	0	0
15	3	1.72	.57	1	0
Other Types	0	0	0	3	0
U	20	4.88	.24	5	1
Total	89	19.67	.22	59	2

TABLE 5.14 Precipitation (in.) for 700 MB Circulation Pattern Types, July

A-1 (1966-70)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	19	2.74	.14	40	0
2	4	.24	.06	12	0
3	3	.58	.19	6	0
5	1	.23	.23	1	0
6	2	.06	.03	1	0
8	1	.13	.13	1	0
10	1	.33	.33	0	0
11	1	.01	.01	1	0
12	1	.39	.39	0	0
13	1	.13	.13	0	0
Other Types	0	0	0	5	0
U	29	2.64	.09	25	0
Total	63	7.48	.12	92	0

B-1 (1966-70)

1	15	2.37	.16	44	0
2	10	1.25	.13	11	0
3	6	1.17	.20	5	0
5	2	.22	.11	1	0
6	4	.64	.16	1	0
8	2	.16	.08	0	0
11	2	.25	.13	0	0
12	2	1.07	.51	0	0
Other Types	0	0	0	11	0
U	14	2.44	.11	15	0
Total	57	9.52	.17	88	0

C-1 (1965-70)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	36	6.66	.19	40	3
2	10	2.48	.25	16	0
3	11	2.24	.10	5	0
5	2	.45	.23	2	1
6	3	.32	.11	2	0
8	2	.26	.13	0	0
11	1	.02	.02	1	0
13	1	.01	.01	0	0
14	1	.73	.73	2	0
Other Types	0	0	0	11	0
U	19	5.50	.29	15	2
Total	86	18.67	.22	92	6

D-1 (1965-6, 1968-70)

1	22	3.62	.16	30	14
2	8	2.49	.31	11	3
3	6	1.33	.22	9	0
4	1	.02	.02	2	1
5	3	.79	.26	2	0
6	1	.06	.06	1	1
8	2	.13	.07	0	0
11	1	.02	.02	1	0
12	1	.28	.28	1	0
Other Types	0	0	0	4	3
U	13	4.34	.33	14	0
Total	58	13.08	.23	75	22

TABLE 5.15 Precipitation (in.) for 700 MB Circulation Pattern Types, October

A-1 (1966-69)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	3	.34	.11	27	0
2	1	.01	.01	8	0
3	2	.22	.11	6	0
4	3	.45	.15	8	0
8	2	.17	.09	4	0
9	1	.50	.50	0	0
11	2	.09	.05	7	0
13	3	.10	.03	2	0
14	3	.59	.20	0	0
Other Types	0	0	0	11	0
U	18	6.98	.39	14	0
Total	38	9.45	.25	87	0

B-1 (1965-69)

1	5	1.27	.25	35	2
2	2	.33	.17	9	1
3	2	.24	.12	10	1
4	1	.01	.01	12	0
8	1	.10	.10	6	1
9	1	.36	.36	0	0
11	2	.14	.07	6	1
13	2	.27	.14	2	0
14	2	.50	.25	1	0
Other Types	0	0	0	14	1
U	14	6.45	.40	20	0
Total	32	9.67	.30	115	7

C-1 (1965-69)

Circulation Type	Days with Precip.	Total Precip.	Mean Daily Precip.	Days Without Precip.	Missing Data
1	5	.88	.18	37	0
2	3	.28	.09	9	0
3	2	.36	.18	11	0
4	4	.79	.20	8	1
8	5	.42	.08	3	0
9	1	.40	.40	0	0
11	2	.21	.11	8	0
13	2	.24	.12	0	2
14	3	.86	.29	0	0
Other Types	0	0	0	15	0
U	11	4.02	.37	20	3
Total	38	8.46	.22	111	6

D-1 (1965-69)

1	7	.97	.14	35	0
2	3	.37	.12	8	0
3	3	.29	.10	10	0
4	3	.81	.27	8	2
8	4	.55	.14	2	2
10	1	.05	.05	0	0
11	1	.05	.05	5	4
13	1	.05	.05	1	2
14	3	1.29	.43	0	0
Other Types	0	0	0	11	4
U	8	1.97	.25	16	10
Total	34	6.40	.19	96	24

The synoptic maps for the Unclassified dates with heavy precipitation show a typical cut-off cold low affecting Colorado in many cases. Fig. 5.41(a) for 6 May 1969 illustrates this type of situation. In other instances of heavy precipitation the low pressure area forms part of a deep trough extending from Hudson Bay (Fig. 5.41(b) for 12 October 1969). The heaviest falls on the east slope generally occur with strong southerly to easterly flow components at 500 mb. For precipitation to occur at A-1 appears to require frontal activity in the area of Colorado. For the maximum precipitation to occur at D-1 also requires this situation at the surface, but the upper low in these cases is to the west or northwest, rather than to the southwest, so that the airflow has a westerly component, not an upslope one.

In view of the significance of these situations, which are generally unclassified in the 700 mb height types, attention is being given to finding a means of identifying them as an additional group. Shortage of time and computer funds has so far prevented a similar analysis of the 700 mb deviation types in relation to precipitation.

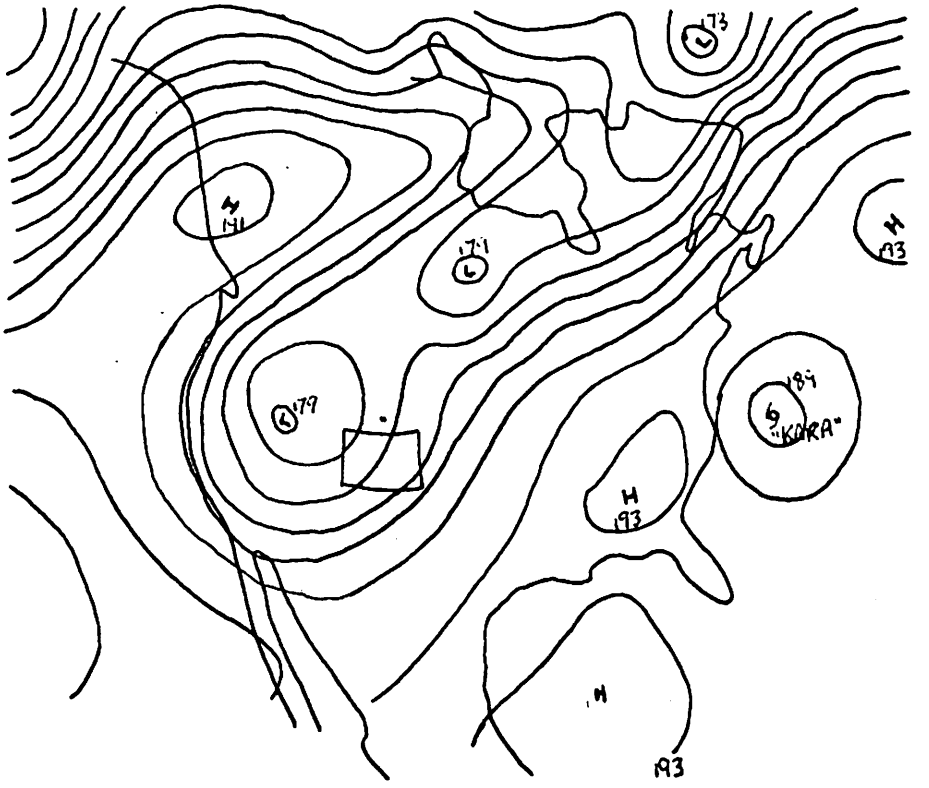
Precipitation in relation to the 700 mb wind velocity over Denver:

As another basis for examining the precipitation characteristics of the east slope, a study using the 700 mb wind velocity over Denver was carried out by Jill Henderson. The analysis related both to wind direction and wind speed categories. In view of the limited sample sizes only the general results are presented here.

In January, when westerly flow predominates, the highest elevations receive the largest precipitation totals with lower elevations in the precipitation shadow. In all mid-season months except July the greatest

Fig. 5.41 500 mb contours for "Unclassified" days associated with heavy precipitation at A-1 (heights in hundred feet).

(a) 6 May 1969



(b) 12 October 1969

totals occur at the highest elevation with northwesterly flow. In the summer when the 700 mb airflow direction is more variable some precipitation occurs with southerly and easterly winds at all elevations, but less than with winds from southwest to northwest. In April southerly winds at 700 mb give the most precipitation at A-1 and B-1 while at C-1 northerly winds give slightly more than southerly ones. Northwesterly and westerly winds are still associated with most precipitation at D-1 in April. In May northeasterly and easterly upslope winds give the highest precipitation at A-1 and B-1 with a significant contribution at C-1. The small sample size makes the results for October less clear-cut.

An analysis of wind speed classes for each wind direction could not be performed because of the limited sample sizes. The results, nevertheless, provide some useful information. In January, the mean daily precipitation and relative frequency of precipitation days increases with wind speed at all elevations. In April, May, October and especially July, however, the mean daily precipitation and precipitation totals decrease with increasing wind velocity. In April, May and October this is true up to 10,000 feet; in July it applies to all four stations. This confirms Hjermstad's (1970) suggestion and contrasts with his finding of the reverse on the western slopes, although he was dealing with November-April. The association reflects the precipitation shadow due to an insufficiency of moisture on the lee slope. It is interesting that in January precipitation totals increase with elevation for all wind velocities due to greater mean daily falls with 700 mb winds < 15 ms^{-1} and as a result of more frequent precipitation days for stronger winds. There is a 4·4 ratio between precipitation totals at A-1 and D-1 for January type 1 (NW_z) circulations. Hjermstad

also found that the maximum ratio in winter on the western slopes between 5,000 ft. and 10,500 ft. occurred with W-NW flow at 500 mb. The problem of sample sizes prevented further investigation along these lines.

6. COST EVALUATION

A cost analysis was maintained during the project as a basis for assessing the cost effectiveness of the TAXIR approach. Table 6.1 summarizes the three major categories. A brief explanation of some items may be helpful:

TAXIR development - includes modification of the then existing programs and addition of some new functions.

Statistics programs - modification and testing of the programs incorporated in the package plus some new ones (see Appendix 2).

Pressure data programs - conversion programs for the selection of the required data from NOAA and NCAR tapes and for the correlation analysis and grouping.

Data conversion and data banks - includes preparation of back-up tapes for the banks.

Pressure data analysis - the correlation and grouping analysis for 700 mb height and anomaly patterns in each month 1952-70.

TAXIR queries - some of these are also included under "statistical analyses" where the output was in the GENERATE format and subjected to further analysis.

The proportionate cost of unsuccessful computer runs is considerably greater in the development stage (41%) than in the production (29%). In particular, TAXIR queries are virtually foolproof.

We may postulate that a "conventional" climatological analysis of the data would comprise: storage of the climatic data and a synoptic catalog on card (or magnetic tape) files, and the use of existing computer routines

for statistical analysis (given some special purpose programs to manipulate the data). The costs of such an analysis are not easily estimated directly but this question can be approached, using Table 6.1, by considering what features would be different from those associated with the TAXIR study.

The expenditures in the development stage - 33% of the total costs for computation and consultancy - should not be included as they stand since these represent an investment which is already being realized in other projects in the Institute. If the systems were to be used, for example, in another four projects it would be reasonable to include 20% ($1,900) of these costs. The costs listed as "Other" in Table 6.1 can be ignored as they would be incurred in both a TAXIR and a non-TAXIR approach. The manpower costs in the production stage would also be likely to be very similar in either type of approach, although we may include the difference in cost of a part-time trained programmer/systems operator and of a graduate assistant, amounting to about $2,000, assuming that the latter could readily deal with existing computer programs. Examining the computation costs in the production stage, we will assume that the pressure data analysis would be the same (and this would provide the synoptic catalog), contingency analyses would have to be substituted for the TAXIR queries, with a higher cost for a standard linear search through the data files, and the statistical analyses would each require a special formatting of the data. It is the last two items which are the most difficult to cost. The principal difference (assuming that a sort/merge program was available or could be readily written and tested) would occur in the time required to read in the TAXIR data banks as against a binary data tape. Experience shows that the former costs about 35 cents, the latter about $5 for the entire 18 years of record. Depending on the amount of processing, the cost ratio is between 1.3-2.8 times more for the non-TAXIR method of analysis.

TABLE 6.1. SUMMARY OF COSTS

	COMPUTATION COSTS			CONSULTANT COSTS	OTHER COSTS	
	Productive runs	Unsuccessful runs	Total			
A. Development					Data abstraction	$300
TAXIR development	$313	$ 92		$2,600	Punching and verifying	1600
Statistics programs	197	287		4,300	NOAA data (upper air)	615
Pressure data programs	277	177		300	Tapes, cards	250
	$787	$556	$1,343	$7,200	Keypunch rental	1800
Unspecified development and testing			890			
B. Production			$2,233			
Data conversion, data banks, etc.	$698	$556		2,000		
Pressure data analysis	1728	599		11,413*		
TAXIR queries	349	28				
Statistical analyses	878	283				
	$3,653	$1,466	$5,119			
			$7,352	$20,613		$4,565

* Graduate assistants and programmer/systems operator

(University overhead and fringe benefits excluded)

We might reasonably assume, therefore, that the contingency and other statistical analyses would cost ca. $3,000 (i.e. a factor of two).

Using these assumptions we can cost the non-TAXIR approach and make a comparison with those of Table 6.1 with the modifications indicated. This is shown in Table 6.2.

TABLE 6.2. A COMPARISON OF ACTUAL COSTS AND ESTIMATED COSTS FOR A NON-TAXIR APPROACH

		TAXIR	NON-TAXIR	COMMENTS
Development:	pressure data	$454	$454	
Development:	computation	356*	---	Assumes 20% of cost of TAXIR and statistical programs
	consultant	1,680*	300	
Other costs		4,565	4,565	
Production:	data banks	1,254	---	
	pressure data	2,327	2,327	
	statistical analyses	1,528	3,000	
	manpower	13,413	9,413	
		$25,577	$20,059	

The costs are remarkably close for either method.

There are of course additional advantages of the TAXIR system which have not been considered in the above. The daily data bank can be readily extended as new observations are collected. New descriptors can be added as long as the item definition is unchanged. More important, the cost of further TAXIR queries to any interested user will be much less than that of a comparable special purpose analysis. For a permanent data bank which is likely to be of interest to scientists in a variety of disciplines this is a major consideration.

7. CONCLUSIONS AND RECOMMENDATIONS

The climatological data collected at the stations operated by the Institute of Arctic and Alpine Research on the east slopes of the Colorado Front Range since 1952 have now been organized in the framework of a data retrieval system for permanent record and subjected to analysis. The sparsity of observational records at high elevations, especially for stations which are not in valley locations, and the comparatively long series, gives this climatic transect along the east slopes particular significance. The record at D-1 (12,300 ft.) is, to the best of our knowledge, unique in North America in these respects. The major climatological findings are summarized first, followed by a more general discussion of some implications for future investigations.

1. The solar radiation data show no evidence for any increase in annual totals with elevation. The small differences are well within the accuracy of the actinograph records. There is an increase in radiation with elevation during December-May but it is not clear whether this is the case above 10,000 ft. (3050 m). The available data were insufficient to examine the effect of different synoptic patterns although such a study is highly desirable.

2. The daily precipitation records since 1965 have drastically revised the annual averages at C-1 and D-1. Annual precipitation increases with elevation to the highest station (12,300 ft.; 3,750 m) where it is at least 40 in. (102 cm). There is little or no difference between the annual totals at 7,200 ft. and 8,500 m where about 22 in. (56 cm) is recorded. The 1965-70 records at these two stations are essentially in line with those for 1952-64. The vertical distribution of precipitation shows not

only major seasonal contrasts, with a winter maximum at the highest elevation and a May maximum at the other stations, but it also varies markedly in the same month in different years. This is primarily in response to the occurrence of upslope events in spring and fall in association with upper cold lows or troughs.

At the highest elevation most precipitation occurs with NW flow (at 700 mb) in all mid-season months except July. In July at all elevations and in April, May and October up to 10,000 ft. mean daily precipitation and totals decrease with increasing wind velocity.

3. The temperature differences between sites at the four elevations follow expected patterns. The effect of exposure on maxima and minima decreases with elevation in association with the increasing wind speeds. However, it should be noted that the slopes at the D-1 to D-4 sites are not steep and, therefore, are not properly representative of the rugged alpine topography. The evidence for a "cold zone" at about the 10,000 ft. level suggests the need for studies of drainage winds in this area.

4. The 700 mb synoptic classification and the other 700 mb descriptors have provided a useful basis for examining some of the synoptic climatological characteristics of the stations. The characteristics of the 700 mb deviation types, in particular, appear to warrant further analysis since it is in these patterns that upslope situations are most clearly represented. Regression analysis of monthly precipitation in relation to type frequencies would be of interest when the period of reliable precipitation data is adequate.

5. Harmonic analysis suggests that some 5 or 6 singularities may exist in the annual march of maximum temperatures at C-1. No clear evidence

of distinctive synoptic patterns about these dates was found, however.

6. Cost evaluation of the TAXIR system suggests that, even with a conservative estimates of its saving on computer time in querying the banks, the overall costs compare favorably with estimates for a non-TAXIR approach. Comparison with other information retrieval systems would be desirable, but the only reliable way in which this could be effected would be actually to replicate the analysis with them. This whole problem merits further investigation.

Some of the recommendations which follow stem from experience gained in the analysis and attempted interpretation of the available data. Others are ideas stimulated by consideration of the general problems created by scale interactions in a mountain environment.

(1) The original chart records still contain much unused information. The analysis of precipitation gage records by storm events would probably be of most value and to date this has not been carried out systematically due to shortage of manpower. Similarly, 6-hourly temperature, humidity and wind velocity data could be extracted from the chart records (cf. Gartner, 1967) and some work along these lines is desirable, at least to assess how much information is being lost through the extraction of only daily maxima and minima and mean wind speed.

(2) The record lengths at C and D provide an adequate characterization of temperature conditions but certainly not of precipitation. However, the downward trend in summer temperature at C-1 warrants continued study and other requirements necessitate continued measurements at D. For example, the ongoing ground temperature and glaciological programs can be reliably linked in to the 18 year record if several years of concurrent data are

collected. However, it may prove preferable in terms of logistics, with consequently more complete records, if the main high level station were maintained at the Saddle (11,600 ft.), one mile farther east along Niwot Ridge than D-1, in conjunction with the IBP Tundra Biome alpine site. From climatological and ecological points-of-view the records at A and B are still too short, but the generally smaller altitudinal changes on the lower slopes allows consideration to be given to the discontinuation of one of other station. In terms of exposure the B-1 site is better than A-1 and the Gold Hill wind data are from a site close to B-1. Also B-1 is a shorter distance from the Divide and the other two stations.

(3) The major shortcoming of the measurement program up to now has been the inadequacy of data on the energy and moisture balances. The IBP program at the Saddle is collecting such information for the alpine belt but consideration of the vertical and spatial variation is required for an adequate climatonomy of the mountains. Moreover, this approach is essential for a proper analysis of problems connected with snow melt patterns, vegetation productivity, geomorphic and pedologic processes and so on. The background climatic data now available provides only limited input to problems in these areas as it is more suited to purely climatological questions.

(4) Another topic requiring more study is the mesoscale pattern of wind flow. Some information on local regimes in the valley-head cirques below the Continental Divide is available (Lloyd, 1970), but investigation of the links between the flow across the Divide and the downslope winds of Boulder, for example, necessitates better data and a more extensive network of east slope stations. In particular, as shown by W.A.R. Brinkmann[1] the humidity data from the hygrothermograph records are inadequate to examine changes in moisture content in downslope flow.

[1] Ph.D. Thesis "Climatological study of the chinook wind in the Front Range, Boulder County, Colorado" due to be completed late 1972.

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Appendix 1: Station Locations and History

Name	Coordinates	Elevation	Description	Record*
A-1	40°00'35"N 105°22'01"W	7,200 ft	2.4 mi. ESE of Sugar Loaf village, Boulder Co., Sec. 32, T.1N,R,71W. Small clearing on a ridge top	23 Sept. 1961 to present
A-2		7.200 ft	0.1 mi. W of A-1. 18% N slope, clearing	29 Sept. 1951-1 Oct. 1953.
A-3		7.200 ft	0.1 mi. S of A-1. 18% S slope, clearing	23 Sept. 1951 - 1 Oct. 1953
A-4	40°00'15"N 105°25'30"W	7,500 ft	North Boulder Creek at Switzerland Park, Boulder Co., Sec.34,T.1N,R.22W Valley floor	25 Sept. 1951 - 14 Oct. 1953
B-1	40°01'21"N 105°25'43"W	8,500 ft	1.2 mi. W of Sugar Loaf village off "Switzerland Trail", Boulder Co., Colo., Sec.26,T.1N,R.72W. Hill crest, exposed	23 Sept. 1951 to present
B-2		8,500 ft	0.6 mi. N of B-1. 13% N slope, Close forest	23 Sept. 1951 - 1 Oct. 1953.
B-3		8,500 ft	0.5 mi. S of B-1 18% S slope, open forest	27 Sept. 1951 - 1 Oct. 1953
B-4	39°59'30"N 105°30'01"W	8,200 ft	Near City of Boulder Lakewood Reservoir off Colorado 119, Boulder Co. Open valley floor	24 Sept. 1951 - 8 July 1954
C-1	40°02'13"N 105°32'39"W	10,000 ft	0.6 mi. NW of University of Colorado Mountain Research Station, Boulder Co., Sec. 22,T.1N,R.73W. Clearing	25 Sept. 1951 to present
C-2		10,000 ft	0.2 mi. N of C-1. 15% N Slope	25 Sept. 1951 - 1 Oct. 1953
C-3		10,000 ft	0.5 mi. SE of C-1 14% S slope	25 Sept. 1951 - 1 Oct. 1953
C-4	40°01'50"N 105°34'40"W	10,200 ft	North shore of Silver Lake City of Boulder watershed Sec.21,T.1N,R.73W. Valley floor	18 Sept. 1952 - 1 Oct. 1953

Name	Coordinates	Elevation	Description	Record*
D-1	40°03'34"N 105°37'02"W	12,300 ft	5 mi. NW of Mountain Research Station, Boulder Co., Sec.7,T.1NW,R.73W Crest of Niwot Ridge	18 Sept. 1951 to present
D-2		12,300 ft	0.1 mi. N of D-1 17% N slope	18 Sept. 1951 - 31 Dec. 1953
D-3		12,300 ft	0.1 mi. S of D-1 16% S slope	18 Sept. 1951 - 1 Oct. 1953
D-4		11,700 ft	0.3 mi. S of D-1 Green Lakes valley	Sept. 1951 - Oct. 1953

* Records prior to September 1952 were obtained primarily as a pilot project to test instrumentation and observing practices.

Instrumentation

Details of the instrumentation and its accuracy are given by Marr (1957). A Weather Bureau instrument shelter of the "cotton belt" type at about 4 feet above the ground housed maximum and minimum thermometers, thermograph and a hair-element hygrograph . Daily temperature and humidity maxima and minima were obtained from the chart records and cross-checked by thermometer and psychrometer readings on servicing visits.

Precipitation totals were from standard 8 in. diameter gages with the rim about 3 feet above ground level. Recording gages were introduced at C-1 in 1962 and at the other three main stations in 1964-66.

Anemometers:

Station	Height of totalizer cups	Height of generating velocity transmitter
A-1	30 ft*	
B-1	34 ft*	11 ft (2.3 mi.N of B-1)
C-1	34 ft*	22 ft
D-1	6½ft	25 ft

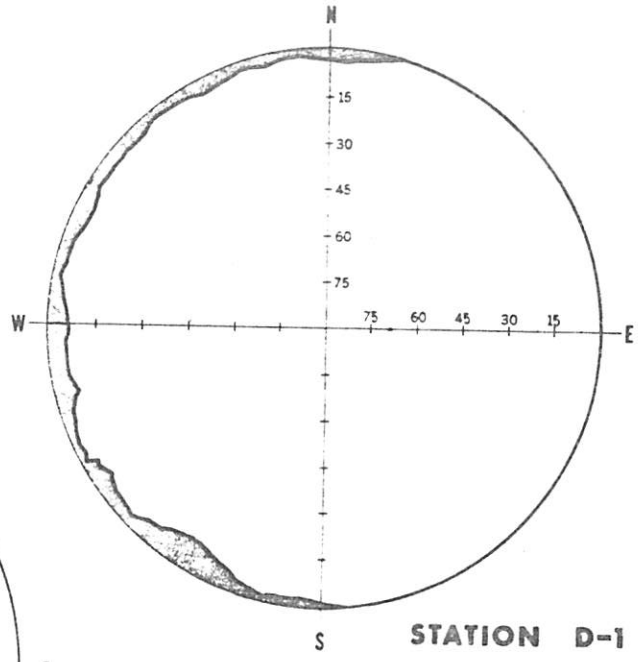
*Approximately 2 feet above the tree crowns in the area. At A-1 and B-1 the

anemometers were mounted in the top of a tree above the general crown level.

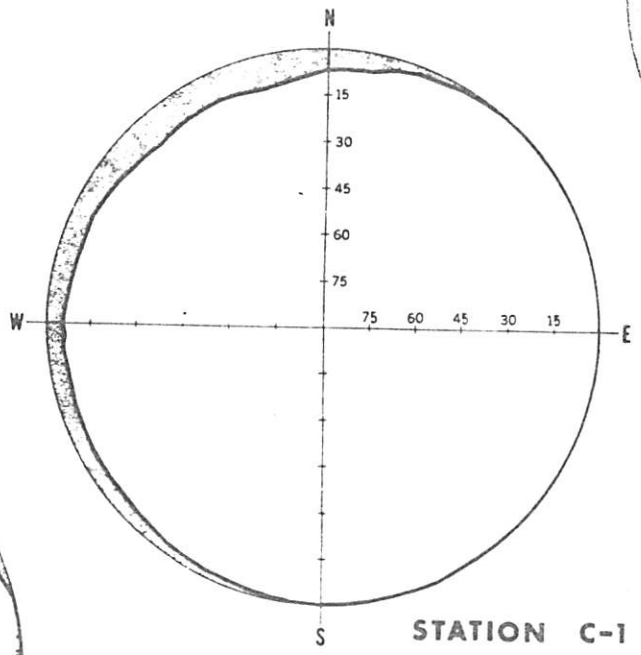
Solar radiation data were determined from weekly-reading bimetallic actinographs at B-1, C-1 and D-1 and from January 1966 by the integration of chart records from an Eppley pyranometer at C-1.

Horizon diagrams for stations B-1, C-1 and D-1, with respect to the radiation instruments are given in Appendix Fig. 1.

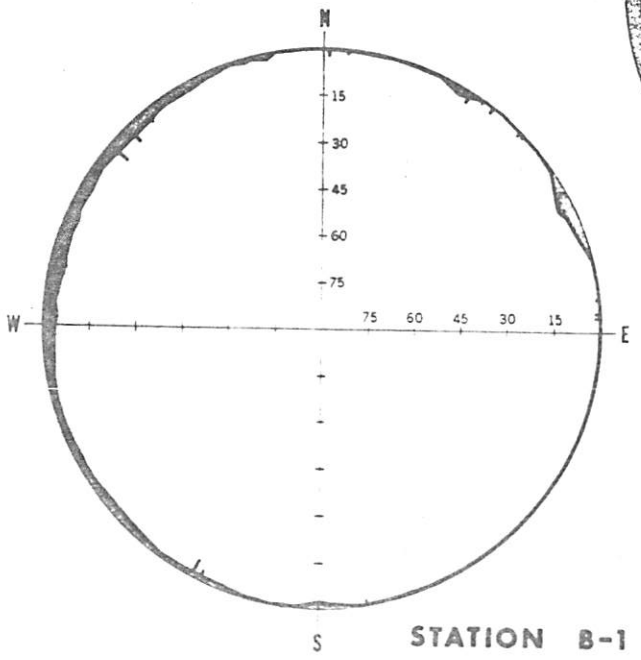
STATION HORIZONS



STATION D-1



STATION C-1



STATION B-1

AREA OBSTRUCTED

AREA UNOBSTRUCTED

OBSTRUCTING TREES STATION B-1)

SCALE IN DEGREES ABOVE THE HORIZONTAL

Appendix Fig. 1. Horizon diagrams

Appendix 2: Statistics Programs

The following programs have been selected from the BMD collection and a collection in the Institute of Behavioral Science, University of Colorado and suitably modified to accept the GENERATE file output from TAXIR on the University of Colorado CDC 6400:

Name	Description	Source
AMPPHAS	amplitude and phase analysis	BMD01T
ANOVA 1	one-way analysis of variance	IBS
ANOVA 23	two- or three-way analysis of variance	IBS
AUTOCOV	autocovariance and power spectral analysis	BMD02T
CANONIC	basic correlational/canonical analysis	IBS
CONCAT	concatenation of two GENERATE files	
DIFF	difference program with t test	IBS
DISCRIM	discriminant analysis	IBS
FIDDLE	subroutine to manipulate a GENERATE file	
FREQY	frequency distribution	IBS
FREQ 2	two-way frequency and contingency table analysis	BMD02S
MERGE	merges binary data files giving binary output tape	
PEARSON	product-moment correlation	IBS
PERIOD	periodic regression and harmonic analysis	BMD04R
PRNTAPE	tabulation of data from tape	
STDEV	mean, variance, standard deviation	IBS
STEPWIS	stepwise regression analysis	IBS
TTEST	t test with stratified random sampling	IBS

Program write-ups and notes on some common operating problems of TAXIR and the statistics programs on the CDC 6400 under the KRONOS operating system are on file at the Institute of Arctic and Alpine Research.

Occasional Papers

INSTITUTE OF ARCTIC AND ALPINE RESEARCH

Occasional Paper No. 1: The Taxir Primer, R.C. Brill, 1971.

Occasional Paper No. 2: Present and Paleo-Climatic Influences on the Glacierization and Deglacierization of Cumberland Peninsula, Baffin Island, J. T. Andrews and R. G. Barry, and others, 1972.

Occasional Paper No. 3: Climatic Environment of the East Slope of the Colorado Front Range, R. G. Barry, 1972.