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ESSA RESEARCH LABORATORIES
Air Resources Laboratories
Las Vegas, Nevada
August 1968

Climatological Data Nevada Test Site and Nuclear Rocket Development Station

Technical Memorandum ERLTM-ARL 7

U.S. DEPARTMENT OF COMMERCE / ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

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U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
RESEARCH LABORATORIES

ESSA Research Laboratories Technical Memorandum - ARL 7

CLIMATOLOGICAL DATA NEVADA TEST SITE AND NUCLEAR ROCKET DEVELOPMENT STATION

Ralph F. Quiring

AIR RESOURCES LABORATORY
TECHNICAL MEMORANDUM NO. 7

LAS VEGAS, NEVADA 89114
AUGUST 1968

FOREWORD

The loose-leaf construction and page-numbering system used in this Technical Memorandum were chosen because several lengthy additions and insertions of supplementary data are planned. They will be distributed intermittently as the data are processed.

The initial distribution of the additions will be the same as that of the original Memorandum. Those who obtain copies of the Memorandum from CFSTI should address their inquiries concerning possible additions to:

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Las Vegas, Nevada 89114

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CLIMATOLOGICAL DATA

NEVADA TEST SITE AND NUCLEAR ROCKET DEVELOPMENT STATION

RALPH F. QUIRING

This summary provides a collection of climatological data for the Nevada Test Site and Nuclear Rocket Development Station. The data and analyses are presented as samples from substantially different topographic environments to show the salient features of the seasonal and diurnal variations of wind and temperature near ground level and aloft. An evaluation of precipitation data for a 20-station network on the test site and a 5-yr climatological summary for the continuously manned Yucca weather station are included.

Key Words: wind, temperature, precipitation, relative humidity, sky cover, pressure, upper air, diurnal variation, extreme wind speed, precipitation probability.

1.0 INTRODUCTION

1.1 General

This publication presents climatological data for selected stations on the Nevada Test Site and Nuclear Rocket Development Station for use in operational planning and facility design. Due to the complex topography and the rugged terrain, there is a good possibility that the distributions of a given meteorological parameter measured at two locations a short distance apart may be significantly different. The stations for which data are presented have therefore been selected on the basis of length of record as samples from differing topographic

environments. Generalizations for similar environments in other areas of the test site may be made, provided they are tempered with sound meteorological judgment or comparison with a limited sample in the area of interest.

The material has been prepared in loose-leaf form to facilitate revisions and the incorporation of additional data as analyses in progress are completed. Information concerning surface winds, surface air temperatures, precipitation, and upper-air data are included here. Surface humidity data will be added in the near future.

1.2 Topography

The Nevada Test Site and Nuclear Rocket Development Station encompass an approximately rectangular area 50 mi north to south and 30 mi east to west within a region of generally north-south trending ridges and valleys in southern Nevada. The terrain is extremely irregular, with elevations ranging from a high of 7700 ft on Rainier Mesa in the north to a low of 3100 ft in Frenchman Flat in the southeast and 2700 ft in the extreme southwest corner on the edge of the Amargosa Desert. There is a general but frequently interrupted downward slope from north to south.

Figure 1.1 is an attempt to portray the rugged terrain and covers the approximate area of the combined Nevada Test Site and Nuclear Rocket Development Station. This figure was produced from a film negative of a map drawn on a scale of 1:62500 with a contour interval of 40 ft and greatly reduced in size. Spacing of

the contours determines the whiteness of the map so that relatively flat areas are dark and the steep slopes of valleys and ridges are white. While the extreme roughness of the area is readily apparent, the relative heights are not easily discernible.

1.3 Observation Network

The observation program of the Weather Bureau was started in March 1956. Since that time more than 100 sites have been instrumented for various periods to measure wind, temperature, relative humidity, or precipitation, or combinations of these elements. Upper-air observations began at the Yucca weather station in October 1956 and have been made daily at 0400 PST since that time, except for brief periods, and a few extended periods when operations were switched to Jackass Flats. Observations of winds aloft were generally made at intervals of 3 or 6 hr, except during test support, when the interval was shortened to 1 hr and occasionally to 15 min. Around-the-clock surface observations were started at this station in December 1961 and have continued with only a few minor interruptions since that time.

Much of the data from this vast observational network have been put on punched cards. The card decks are currently being edited to provide an index of the type of data and period of record available for each station. As soon as this index is available it will be made a part of this publication.

Four stations have been selected from the observational network to represent the wind and temperature distributions in four substantially different environments: Conditions on an exposed,

high plateau are represented by the Area 12 Mesa station; the BJY station represents conditions near the center of a large basin; Tower 4 is situated in an elongated valley oriented northeast to southwest; and Tower 5A is on top of an isolated hill within this same valley near the point at which the valley turns toward the south. The locations of the stations are shown in figures 1.2 and 1.3, with identifying information being given in table 1.1. Station elevations are given as the elevation at ground level, and the tower height or shelter height must be added to obtain the elevation at which the sensors are located.

Wind summaries are also available for 24 additional stations identified in table 1.2, where they are listed starting with station one in the southwest corner of the test site and progressing from west to east and northward. Figure 1.4 provides a station locator. The summaries give the frequency of occurrence of wind direction and speed in 10° increments of direction and 5-mph increments of speed to 19 mph and 10-mph increments to 49 mph for 3-hr intervals (hours 00-02, 03-05, etc.) for each month. For the four stations for which analyses are presented the summaries are by 1-hr rather than 3-hr intervals.

1.4 General Climatology

Table 1.3 presents a general description of the climate of the test site in tabular form with a brief narrative summary. Even though no single location can accurately depict the climate of the area the 5-yr climatological summary for the Yucca weather station represents the only substantial collection of data

available from a continuously manned location. The tabular data are comparable to the data provided by the Environmental Data Service for first-order Weather Bureau stations.

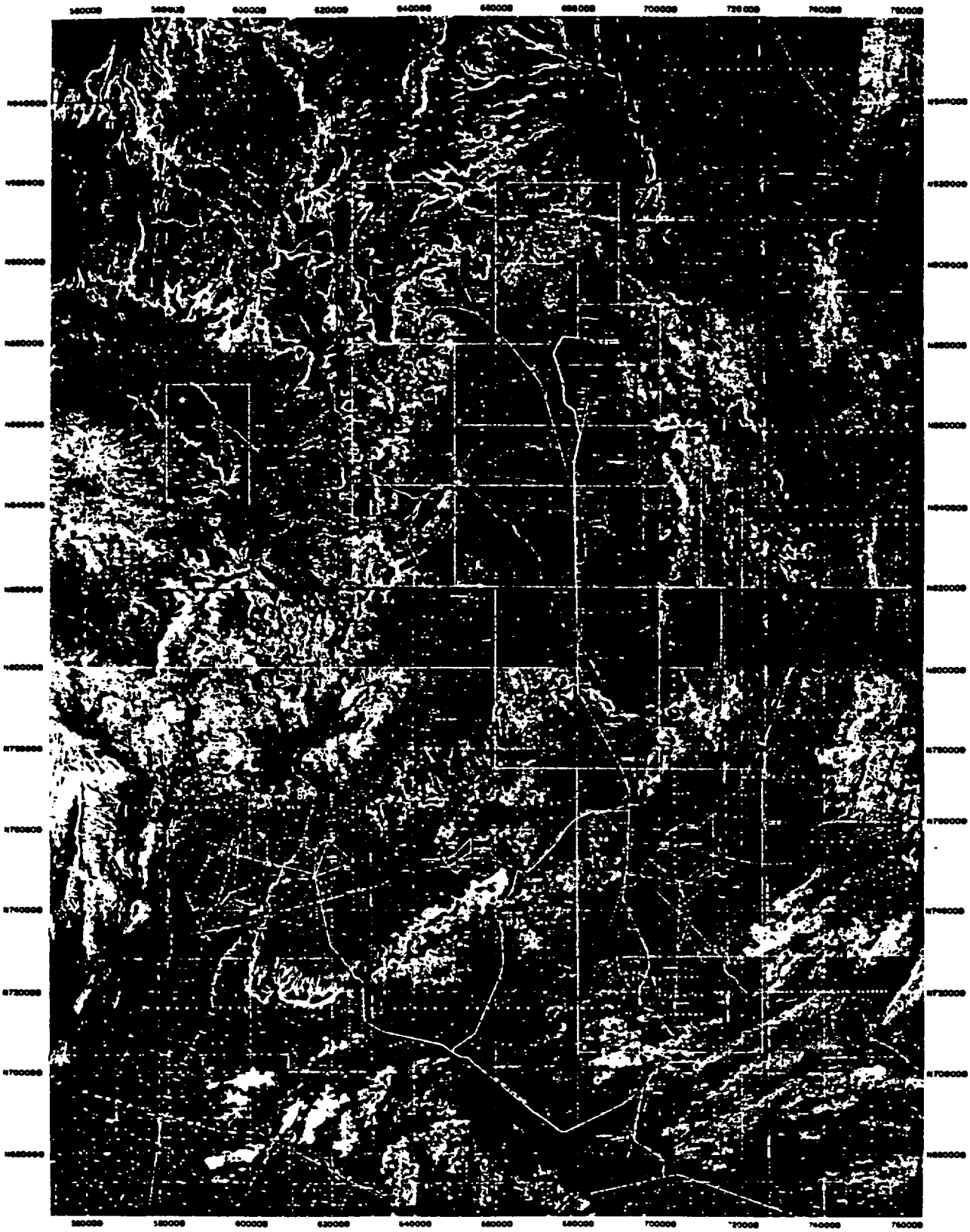

Fig. I.1 Map of the test site area.

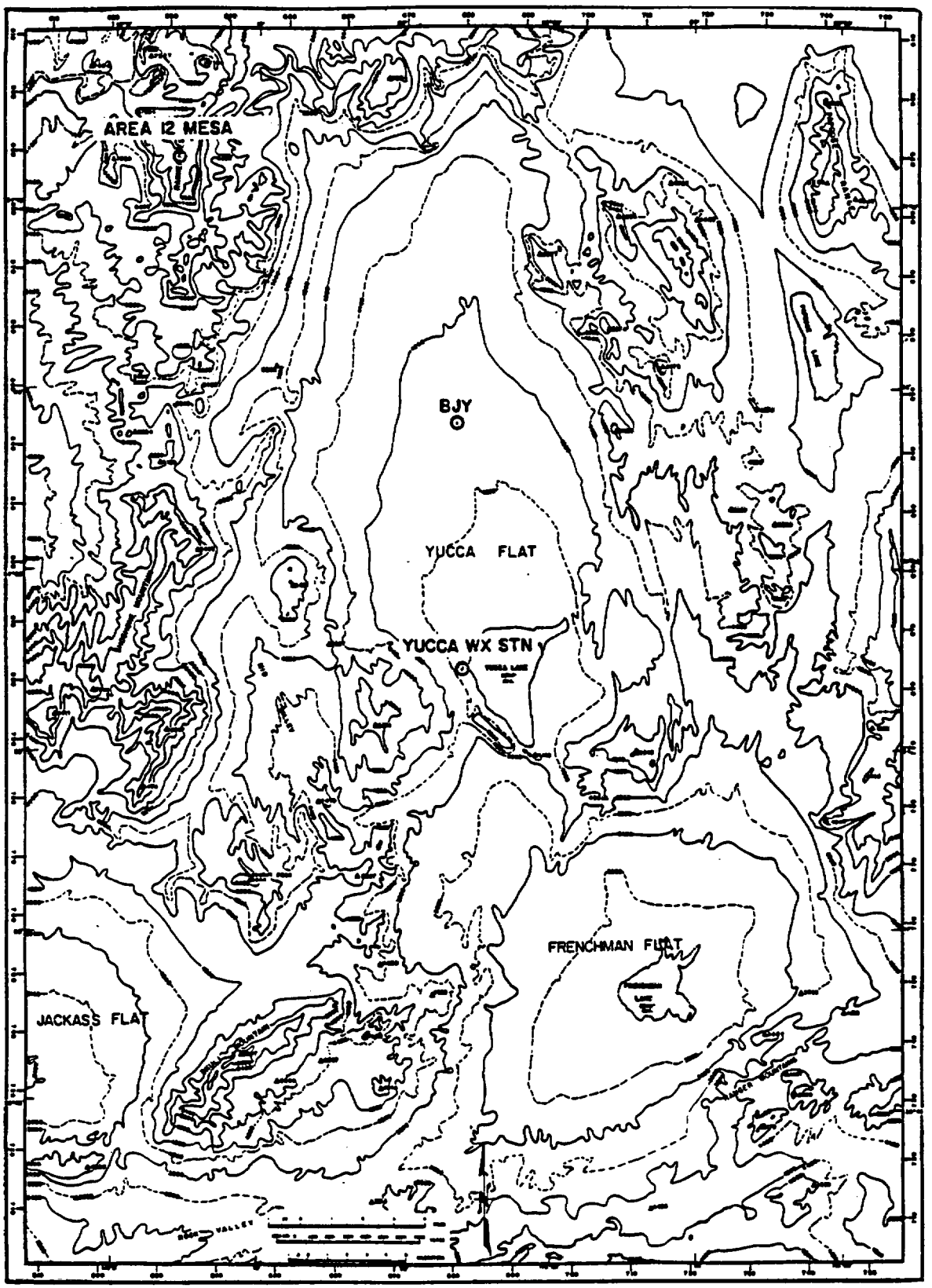

Fig. I.2 Station locator for NTS stations.

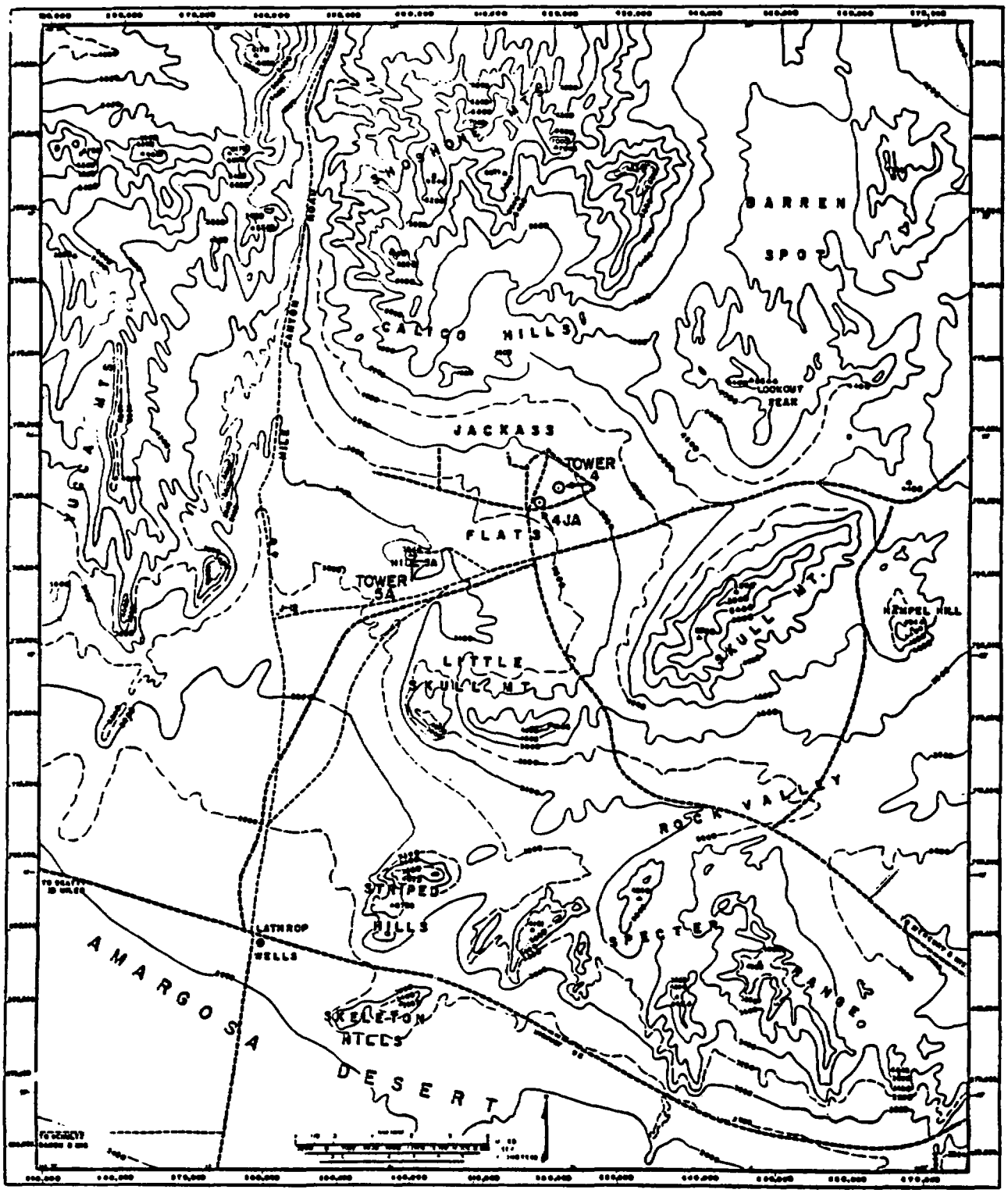

Fig. I.3 Station locator for NRDS stations.

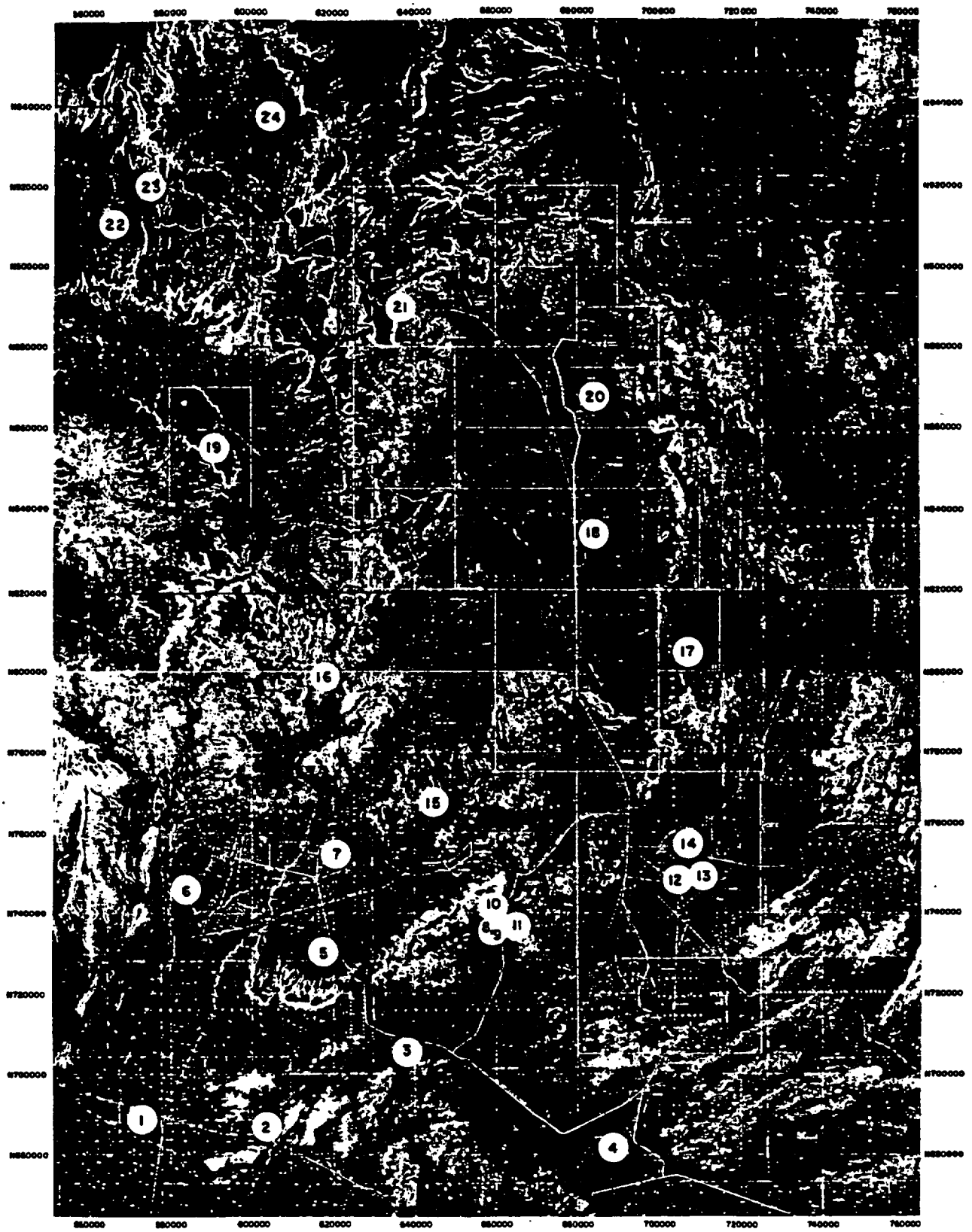

Fig. I.4 Station locator for wind summaries (see table 1.2).

Table 1.1 Identifying Information for Wind and Temperature Stations

Station	Location Nevada State Grid (Central) E	N	Elevation (Feet)	Tower Height (Feet)	Period of Record Wind	Temperature
Area 12 Mesa	631,450	889,090	7480	100	8/29/57 - 12/31/64	9/05/57 - 12/31/64
BJY	679,000	844,000	4075	96	7/11/57 - 12/31/64	6/14/57 - 7/31/64
Tower 4	620,000	752,000	3735	96	3/12/56 - 2/12/62	4/16/56 - 12/31/64
Tower 5A	599,150	742,050	3644	96	11/07/58 - 12/31/64	11/07/58 - 12/31/66

Table 1.2. Additional Stations for Which Wind Summaries Are Available

Map No.	Station	Location Nevada State Grid (Central) E	N	Elevation (Feet)	Tower Height (Feet)	Period of Record
1.	Lathrop Wells	577,900	688,700	2650	9	10/31/63 - 12/31/64
2.	Highway 95	604,200	688,300	2955	9	10/31/63 - 12/31/64
3.	Rock Valley	638,336	704,692	3367	9	2/26/63 - 12/31/64
4.	Desert Rock	686,800	681,950	3220	10	10/14/63 - 12/31/64
5.	Tower 5	619,000	730,000	3836	96	3/18/56 - 11/07/58
6.	Tower 6	584,800	745,600	3156	96	3/20/56 - 12/15/60
7.	Photo Tower	619,910	754,100	3758	89	11/24/62 - 2/06/64
8.	Area 410 Basin W	659,860	737,750	4320	20	5/20/63 - 12/31/64
9.	Area 410 Basin	660,750	737,500	4321	9	6/30/60 - 6/04/62
10.	Area 410 Basin NW	658,600	740,220	4420	20	5/28/63 - 12/31/64
11.	Area 410 Hilltop	662,400	737,500	4400	20	6/08/60 - 1/19/62
12.	Well 5B	704,300	747,900	3090	30	8/26/63 - 12/31/66
13.	Frenchman Flat #1	709,450	748,400	3079	9	3/10/62 - 8/26/63
14.	K-Bunker	705,000	756,375	3128	20	5/25/61 - 6/30/64
15.	Lookout Peak	646,156	766,785	5644	100	9/24/57 - 6/19/62
16.	Shoshone Mountain	618,450	798,500	7066	96	6/03/60 - 12/31/63
17.	Area 11	707,700	803,800	3993	9	9/30/62 - 12/31/64
18.	Area 3	685,125	833,000	4025	9	9/09/61 - 6/30/64
19.	Area 18	591,493	856,865	5428	20	6/18/60 - 9/21/64
20.	Area 9	683,800	867,600	4224	9	6/04/62 - 12/31/64
21.	Mesa Slope	636,500	890,000	6660	9	9/18/61 - 1/30/64
22.	Pahute Mesa #1	566,000	908,700	6540	30	8/28/63 - 4/12/66
23.	Pahute Mesa Drl.H.	576,000	920,000	6560	9	9/04/63 - 5/06/64
24.	Pahute Mesa #5	604,040	937,190	6733	9	7/01/64 - 8/31/66

Latitude 36° 57' N
Longitude 116° 03' W
Elevation 3,924 Feet

Nevada State Grid (Central)
E 680,500
N 803,550

Table 1.3. Five-Year Climatological Summary (1962-1966)
Yucca Weather Station, Nevada Test Site, Nevada

Month	Temperature (°F) Averages: Daily Maximum	Daily Minimum	Monthly	Extremes: Highest	Lowest	Degree Days (65° F Base)	Precipitation (inches): Average	Greatest Monthly	Least Monthly	Greatest Daily	Snow: Average	Greatest Monthly	Greatest Daily	Relative Humidity %: 4:00 AM PST	10:00 AM PST	4:00 PM PST	10:00 PM PST	Wind (a): Average Speed (MPH)	Prevailing Direction	Station Pressure (inches): Average	Highest	Lowest	(b) Average Sky Cover Sunrise to Sunset
JAN	52.0	19.0	35.5	70	0	908	.12	.18	.01	.18	1.4	4.3	4.3	61	44	30	54	10.0	360	26.11	26.54	25.42	4.1
FEB	56.6	24.4	40.5	77	5	683	.47	1.21	T	.73	0.2	1.0	1.0	63	41	28	50	10.6	010	26.06	26.38	25.56	4.4
MAR	60.3	26.0	43.2	87	10	668	.33	.47	.02	.23	2.4	6.7	4.0	56	28	21	42	11.6	350	25.98	26.35	25.46	5.1
APR	69.8	35.7	52.8	89	15	362	.66	2.57	.04	1.08	0.6	3.0	3.0	49	26	19	34	12.1	010	25.99	26.39	25.50	5.1
MAY	78.7	43.0	60.9	94	26	150	.12	.23	.01	.21	T	T	T	42	19	15	27	10.9	200	25.94	26.21	25.61	4.4
JUN	87.0	49.0	68.0	101	34	34	.11	.19	.02	.16	0	0	0	36	17	12	24	11.7	210	25.92	26.20	25.56	3.2
JUL	96.2	54.1	74.7	104	40	0	.51	1.54	0	.56	0	0	0	32	16	12	22	11.0	200	25.99	26.19	25.60	2.5
AUG	94.3	66.5	78.5	104	45	0	.37	1.04	0	.35	0	0	0	40	20	14	27	10.7	200	26.00	26.22	25.71	2.4
SEP	86.3	45.8	66.1	98	31	47	.66	2.30	0	.76	0	0	0	42	21	15	31	10.3	350	26.00	26.26	25.59	2.0
OCT	78.9	38.3	58.6	94	22	202	.13	.25	0	.25	0	0	0	45	22	17	35	9.8	360	26.06	26.39	25.59	2.6
NOV	61.7	27.7	44.7	82	13	603	.84	3.02	0	.80	1.0	4.0	2.3	62	39	33	53	8.5	360	26.07	26.39	25.64	5.1
DEC	53.5	21.8	37.7	70	1	841	.84	2.66	T	1.31	0.1	0.5	0.5	66	46	37	61	8.7	360	26.08	26.52	25.49	4.4
ANN.	72.9	36.8	54.8	104	0	4498	5.16	3.02	0	1.31	6.7	6.7	4.3	50	28	21	38	10.5	360	26.02	26.54	25.42	3.8

Month	Average Number of Days: Sunrise to Sunset: Clear	Partly Cloudy	Cloudy	Precipitation: ≥ .01 inch	≥ .10 inch	≥ .50 inch	≥ 1.00 inch	Thunderstorms	Temperature: Maximum ≥ 90° F	Maximum ≤ 32° F	Minimum ≤ 32° F	Minimum ≤ 0° F
JAN	15	9	7	2	*	0	0	*	0	1	29	*
FEB	13	7	8	3	1	*	0	0	0	*	24	0
MAR	12	9	10	4	1	0	0	1	0	0	26	0
APR	11	9	10	3	1	*	*	1	0	0	10	0
MAY	15	12	6	2	*	0	0	1	3	0	3	0
JUN	17	9	4	2	*	0	0	2	13	0	0	0
JUL	21	6	4	3	2	*	0	2	29	0	0	0
AUG	22	7	2	3	2	0	0	4	26	0	0	0
SEP	23	5	2	2	1	1	0	1	12	0	1	0
OCT	21	6	4	2	1	0	0	*	3	0	8	0
NOV	12	8	10	4	3	1	0	*	0	0	24	0
DEC	14	7	10	2	1	1	*	*	0	0	29	0
ANN.	194	94	77	32	15	5	1	15	86	1	184	*

* One or more occurrences during the period of record but average less than 0.5 day.

T Trace, an amount to small to measure.

(a) Average wind speed is based on observations on the hour from towers of varying height during the period of record (BJY 100' tower 1/1/62 - 11/9/64, Yucca 9' tower 11/23/64 - 7/15/66, Yucca 30' tower 7/16/66 - 12/31/66). Prevailing wind direction was taken from the summary of 1-hour average winds for the BJY 100' tower for the period 7/11/57 - 12/31/64.

(b) Sky cover is expressed in the range from 0 for no clouds to 10 for complete sky cover. Clear, partly cloudy, and cloudy days are based on average daytime cloudiness 0-3, 4-7, and 8-10 tenths respectively.

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NARRATIVE SUMMARY

The Yucca Weather Station is located on the western edge of normally dry Yucca lake in a basin which measures about 20 miles long by 10 miles wide with the long axis oriented NNW-SSE. The lowest point in the basin is at an elevation of about 3900 feet MSL. The rim of the basin varies in height from near 4000 feet MSL to the southeast of the station to 7800 feet to the northeast. The main topographic feature of the area surrounding the basin consists of a series of ridges and valleys oriented in a general N-S direction.

The climate reflected in the 5-year summary for the Yucca Weather Station is that of a typical high desert basin. The temperature fluctuates between wide limits under predominantly clear skies and low relative humidities. The average daily temperature range varies from near 40 degrees in summer to near 32 degrees in winter. A daily temperature range of 50 to 55 degrees is not uncommon. Temperature extremes of 110 and -5 degrees were recorded prior to 1962.

The average annual precipitation of 5.16 inches is slightly less than normal for the area for an elevation of 3924 feet MSL; however, some of the monthly averages depart radically from expected normals due to the vagaries of precipitation in arid regions combined with the short period of record. The normal pattern of monthly precipitation amounts consists of a definite peak in January or February dipping to a pronounced low in June then rising to a secondary peak in July or August with a secondary low in October. This pattern is only vaguely apparent in the Yucca record because some of the monthly averages have been distorted by exceptionally heavy precipitation in some years for some of the months.

The prevailing wind direction tabulated in the summary is on a 24-hour basis and shows predominantly northerly winds except for the months May through August when winds from the south-southwest predominate. Due to the prevalent mountain-valley winds in the Yucca basin, however, south to southwest winds predominate during daylight hours in nearly all months. During the winter months southerly winds have only a slight edge over northerly winds for a few hours during the warmest part of the day.

The user of this 5-year summary is cautioned that climatological conditions at other locations on the Nevada Test Site may be substantially different due to local terrain effects and differences in elevation.

2.0 TOWER WINDS

2.1 General

The wind data presented in this section are based on analog records produced by wind sensors mounted approximately 100 ft above ground. Before October 1, 1960, the wind direction and speed were averaged over the 15-min interval immediately preceding the hour. After that date, they have been averaged for the entire hour preceding the hour of record. This difference in the averaging interval should not have an appreciable effect on the wind distributions, however.

Fourteen charts are provided for each station to display the behavior of the wind. The first twelve show the frequency of occurrence of wind direction in percent by time of day for each month. Wind direction is given in 10° increments as the direction from which the wind is blowing. A frequency read from the charts for a selected time and direction applies to a 10° sector centered on the selected direction. Frequencies may be summed over larger sectors as long as values are read in increments of 10°. If the width of the sector of interest is not a multiple of 10, the fractional part remaining should be adjusted in proportion to the frequencies for the 10° sectors on either side of the 10° sector to which the fractional part belongs. The frequency isopleths were subjectively smoothed without compromising accuracy to provide

clearer definition of the diurnal changes. The standard isopleth interval is 2 percent from one to seven and 4 percent above seven. Intermediate isopleths have been entered as dashed lines to more clearly define the patterns. Labels within closed isopleths have been placed to identify the point of maximum or minimum frequency.

The thirteenth chart in the series for each station gives the average wind speed in miles per hour by month and time of day. Isopleths are drawn at intervals of 1 mi/hr, with closed centers labeled to identify the points of maximum or minimum average speed.

The fourteenth chart in the series for each station provides the constancy of the wind expressed as the percentage ratio of the mean vector wind speed to the mean scalar speed. These charts give a relative measure of the variability of the wind on a scale from 0 to 100. If the wind distribution were absolutely symmetrical (same frequency and average speed from opposing directions), the constancy would be zero. On the other hand, if the wind always blew from the same direction, the constancy would be 100. These extremes are rare. However, if the constancy charts are examined in conjunction with the wind direction frequency charts, one can readily see that high values of constancy are associated with a tendency for the wind direction to cluster about a preferred direction. In contrast, with low values of constancy, there is either no preferred direction or possibly a preference for two opposing directions.

There are essentially three scales of physical activity that interact to produce the low-level wind distributions observed on

the test site. The movement of large-scale pressure systems controls the seasonal changes in the wind direction frequencies, with southerly winds predominating in summer and northerly winds in winter. The general downward slope in the terrain from north to south results in an intermediate scale of activity that is reflected in the characteristic diurnal wind reversal from southerly during the day to northerly at night. This diurnal oscillation results from nonuniform heating and cooling of the air near the earth's surface and therefore reaches its maximum amplitude in summer, and it is frequently intense enough to override the air movement associated with large-scale pressure systems. The behavior of this intermediate scale of activity with regard to the wind distribution is very sensitive to the orientation of the slopes and valleys. There are also small-scale activities, such as terrain-induced eddies and cellular convection. These are important in the diffusion problem, but they are associated with an oscillation period of less than 1 hr and do not have an appreciable effect on wind distributions based on 1-hr averages.

2.2 Area 12 Mesa

The Area 12 Mesa station is in a small clearing on Rainier Mesa at an elevation of 7480 ft. The 100-ft tower rises well above the scrub oak, juniper, and pinion pine that grow to a height of 10 to 15 ft surrounding the clearing. The open exposure results in a wind distribution quite similar to that obtained in the free atmosphere at 8000 ft above sea level over Yucca Flat. The

wind direction frequency by time of day is shown for each month in figures 2.1.1 through 2.1.12. Because terrain effects are much less pronounced than they are at stations at lower elevations, the seasonal changes in wind direction are the predominant feature. In January, there is a definite predominance of northerly winds during all hours, with only a slight increase in the frequency of southwesterly winds during midafternoon and a corresponding decrease in the frequency of northerly winds. By contrast, in July, southwesterly winds predominate during all hours with only a slight increase in the frequency of northerly winds at night. During the intervening months, the frequency of northerly and southwesterly winds fluctuates between the extremes of these two months.

Figure 2.1.13 shows the variation of the average wind speed by time of day and month. An interesting feature of this chart is that from April through September the average wind speeds are highest near midafternoon, while from November through February they are lowest near midafternoon. There is no such seasonal change at stations at lower elevations on the slopes and in the valleys, where the average wind speeds are highest near midafternoon in all months. This anomaly demonstrates the modifying effect of the intermediate scale of activity on the large-scale air motion through a depth of at least 4000 ft.

Figure 2.1.14 supplements figures 2.1.1 through 2.1.12 and shows at a glance the seasonal and diurnal variations in the variability of the wind. Winds are least variable (high values of constancy) during midafternoon in July and most

variable (low values of constancy) during the afternoon and evening hours in October and November. The tendency toward greater variability near sunrise in summer and during the early afternoon in winter is readily apparent but not nearly as pronounced as at lower elevations on the slopes and in the valleys.

2.3 BJY

The BJY station is located near the center of Yucca Flat at an elevation of 4075 ft. The 100-ft tower places the wind sensors about 255 ft above the lowest elevations of normally dry Yucca Lake to the south-southeast. The valley is oriented north-northwest-south-southeast, with a ridge across the southern end rising to elevations from about 50 to 560 ft above the lowest point in the valley.

The wind direction frequency by time of day is shown for each month in figures 2.2.1 through 2.2.12. The outstanding feature of this series of charts is the diurnal wind reversal from northerly at night to southerly during the day. This reversal is the result of the intermediate scale of motion discussed earlier and is most pronounced during the summer months. Examination of the chart for July (fig 2.2.7) reveals the tendency of the northerly nighttime wind to turn through east as the first rays of the rising sun hit the western slope of the valley. By 1000 PST, the major portion of the distribution is centered at 170°. The center of the distribution then shifts gradually, reaching a maximum frequency at 1700 PST from 220°. There is then a slight tendency for the wind to return to the northerly nighttime direction through west as the shaded western slope of the valley starts to cool. In January

(fig 2.2.1), the diurnal reversal is much less pronounced. Northerly winds predominate during all hours; however, the frequency of southerly winds increases during the daylight hours, reaching a maximum frequency about 1500 PST with the center of the distribution at 170 to 180°.

The variation of the average wind speed by time of day and month is shown in figure 2.2.13. In contrast to Area 12 Mesa, the average wind speeds are highest during midafternoon in all months. The lowest average speeds occur a few hours after sunrise and again a few hours after sunset. These times correspond to the periods of wind reversal when the wind is generally light and variable. The highest average wind speeds occur in spring and are associated with the large-scale storms that exert the controlling influence during this period.

Figure 2.2.14, supplementing figures 2.2.1 through 2.2.12, shows the seasonal and diurnal fluctuations in the variability of the wind. The outstanding feature here is the ring of low constancy values (most variable winds) that defines approximately the average time of the wind reversal. Higher values of constancy outside the ring are associated with the predominantly northerly winds; inside the ring, southerly winds predominate. The wind reversal is most pronounced in summer as reflected by the relatively low variability (high constancy) of the northerly down-valley wind near sunrise in July followed a few hours after sunrise by the relatively low variability of the southerly up-valley wind, with a return to the northerly down-valley wind a few hours after sunset. By contrast, in January, heating during the day is often not sufficient to override the

large-scale air motion so that air movement from the north predominates during all hours. There is, however, a marked increase in the variability of the wind during daylight hours, which reaches a maximum (low-constancy values) in late afternoon.

2.4 Tower 4

Tower 4 was located near the center of Jackass Flats at an elevation of 3735 ft. The terrain in the vicinity of the tower slopes gently downward from northeast to southwest. The surrounding mountains form a somewhat elliptical valley opening into the Amargosa Desert at the southwest end.

Figures 2.3.1 through 2.3.12 show the wind direction frequency by time of day for each month. Of particular interest are the diurnal wind reversal and the seasonal shift in the predominant day and night directions. The seasonal shift can be seen quite clearly from the charts for January (fig 2.3.1) and July (fig 2.3.7). In January the winds are aligned with the valley axis, with the distribution of the northerly nighttime winds centered near 040° and the southerly daytime winds near 210°. In July the alignment is more nearly north-south.

Average wind speeds by time of day and month are shown in figure 2.3.13. Average speeds are highest during midafternoon and lowest a few hours after sunrise in all months.

The chart in figure 2.3.14 of the variability of the wind by time of day and month shows a ring of low constancy (high variability) that corresponds approximately with the average time of the diurnal wind reversal. Southerly winds predominate inside the

ring and are least variable (highest values of constancy) during midafternoon in June, July, and August. The relatively low afternoon values of constancy in July are attributed to increased variability of the predominantly southerly winds due to local terrain effects. Northerly winds predominate outside the ring of low constancy and tend to be least variable near sunrise.

2.5 Tower 5A

Tower 5A is on top of a hill approximately 4½ mi down-valley from Tower 4 at an elevation of 3644 ft. The 100-ft tower places the wind sensors about 350 ft above the valley floor at a point where the orientation of the valley changes from northeast-southwest to more north-south.

The wind direction frequency by time of day for each month is given in figures 2.4.1 through 2.4.12. The predominance of southerly winds in the daytime and northeasterly winds at night is readily apparent in all months. In the summer months, however, the diurnal reversal is much less pronounced than at other valley stations. The northeasterly down-valley winds predominate at night, but the distribution is spread out through east to southeast. This anomaly is attributed to the proximity of the wind sensors to the top of the nocturnal inversion in summer.

As seen in figure 2.4.13, the highest average wind speeds occur during midafternoon in all months, with a peak in May. Average wind speeds are lowest shortly after sunrise in all months with a minimum in July.

The seasonal and diurnal fluctuations in the variability of the wind are readily apparent in figure 2.4.14. The average time of the diurnal wind reversal is approximated by the zone of low constancy (relatively variable winds) surrounding the zone of maximum constancy centered at midafternoon in July and August. In contrast to BJY and Tower 4, Tower 5A tends to show considerably greater variability (lower values of constancy) in the wind at night and consequently a less pronounced diurnal wind reversal.

2.6 Extreme Wind Speeds

The analog wind recorders in use at the test site have been set to record from 0 to 60 mi/hr since January 1958 and therefore do not provide useful data for an evaluation of extreme wind speeds. The data presented in table 2.1 have been extracted from a U.S. Weather Bureau manuscript, July 1959, by H. C. S. Thom, "Distribution of Extreme Winds in the United States". These data are valid at 30 ft above ground for selected return periods (average interval in years between recurrences). The fastest mile is approximately equivalent to a 1-min average wind speed and at 60 mi/hr is exactly a 1-min average.

Table 2.1. Extreme Wind Speeds in Miles per Hour at 30 ft Above Ground

Return Period (years)	Fastest Mile	Gust
2	48	62
5	55	72
10	61	79
50	75	97
100	82	107

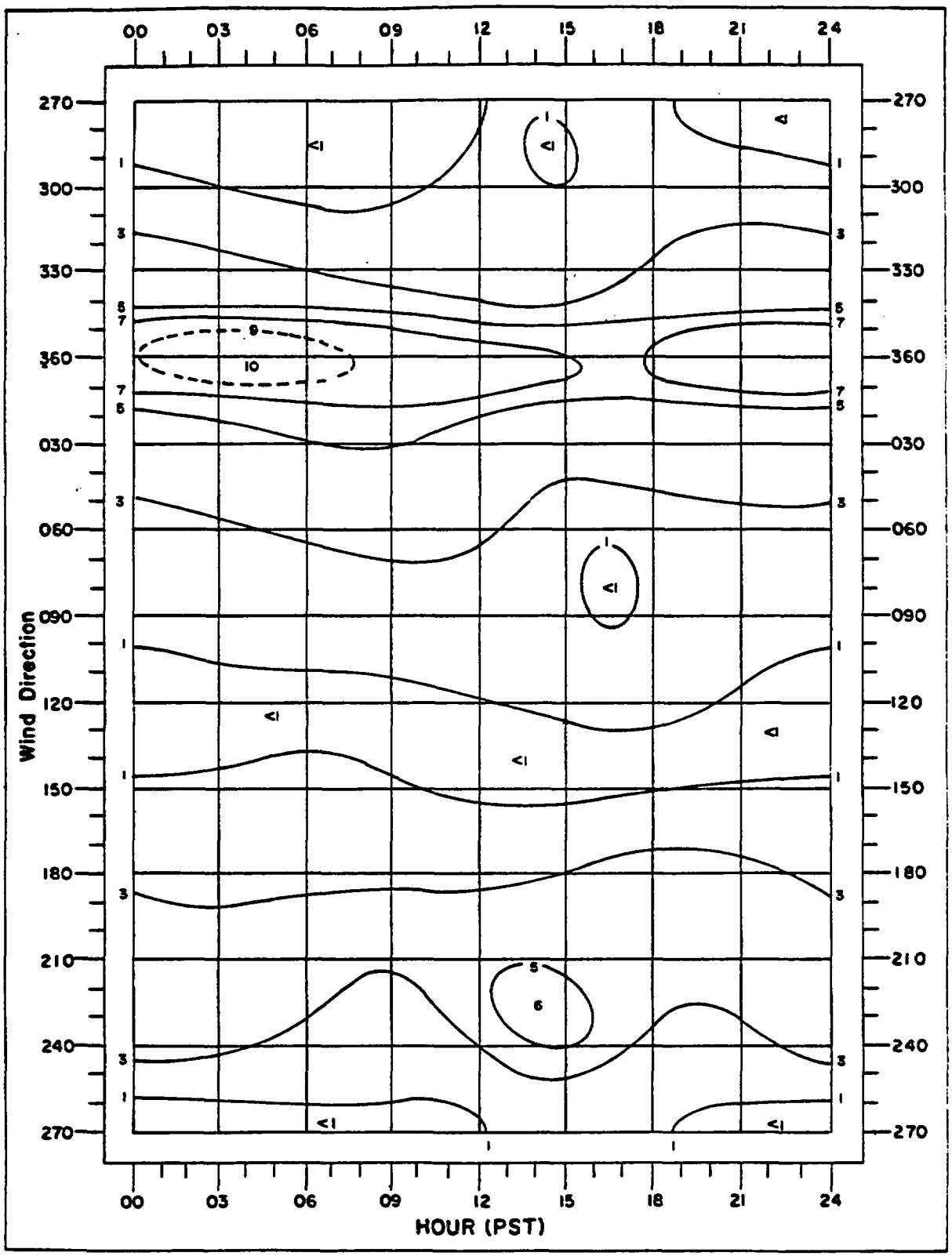

Fig. 2.1.1 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: January

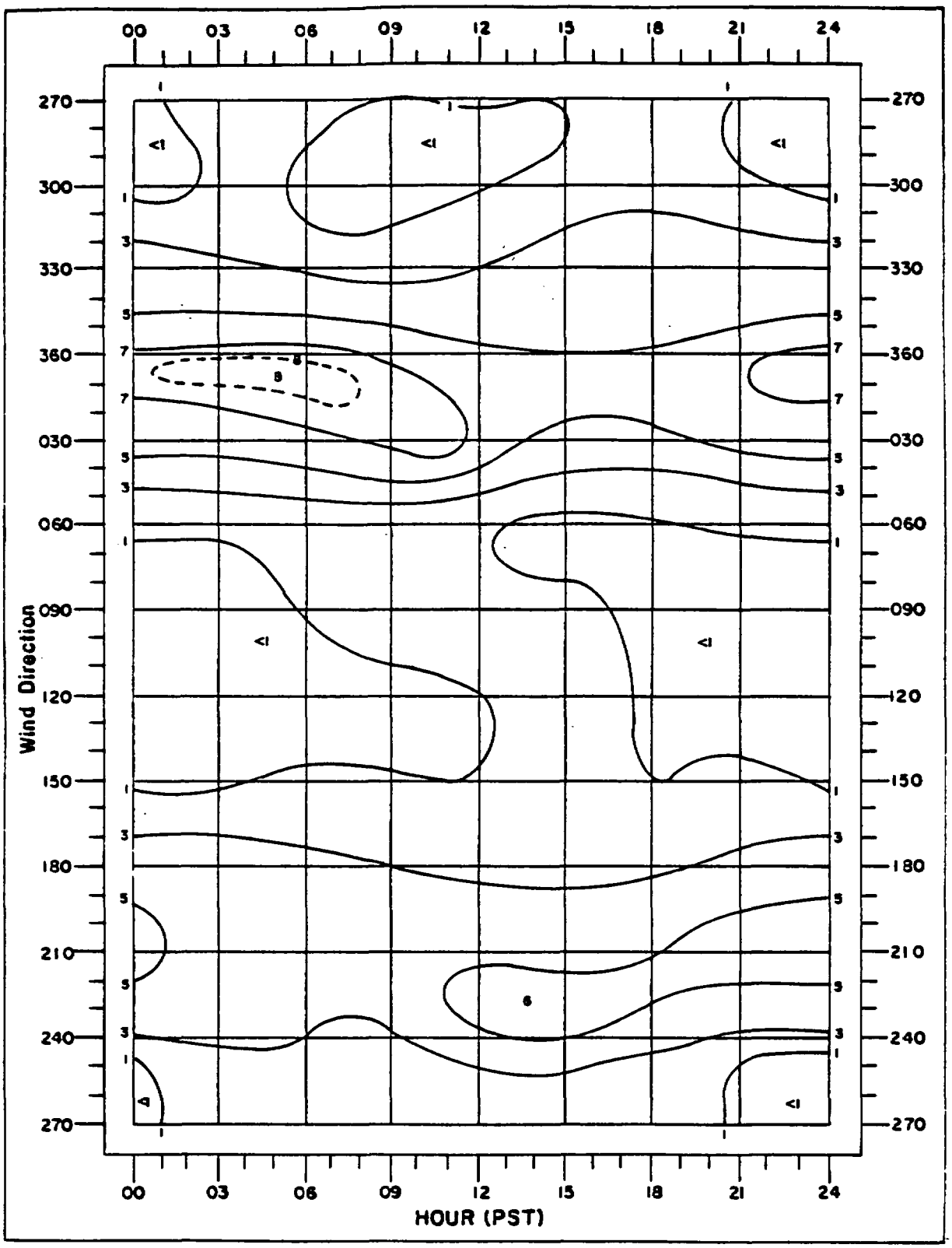

Fig. 2.1.2 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: February

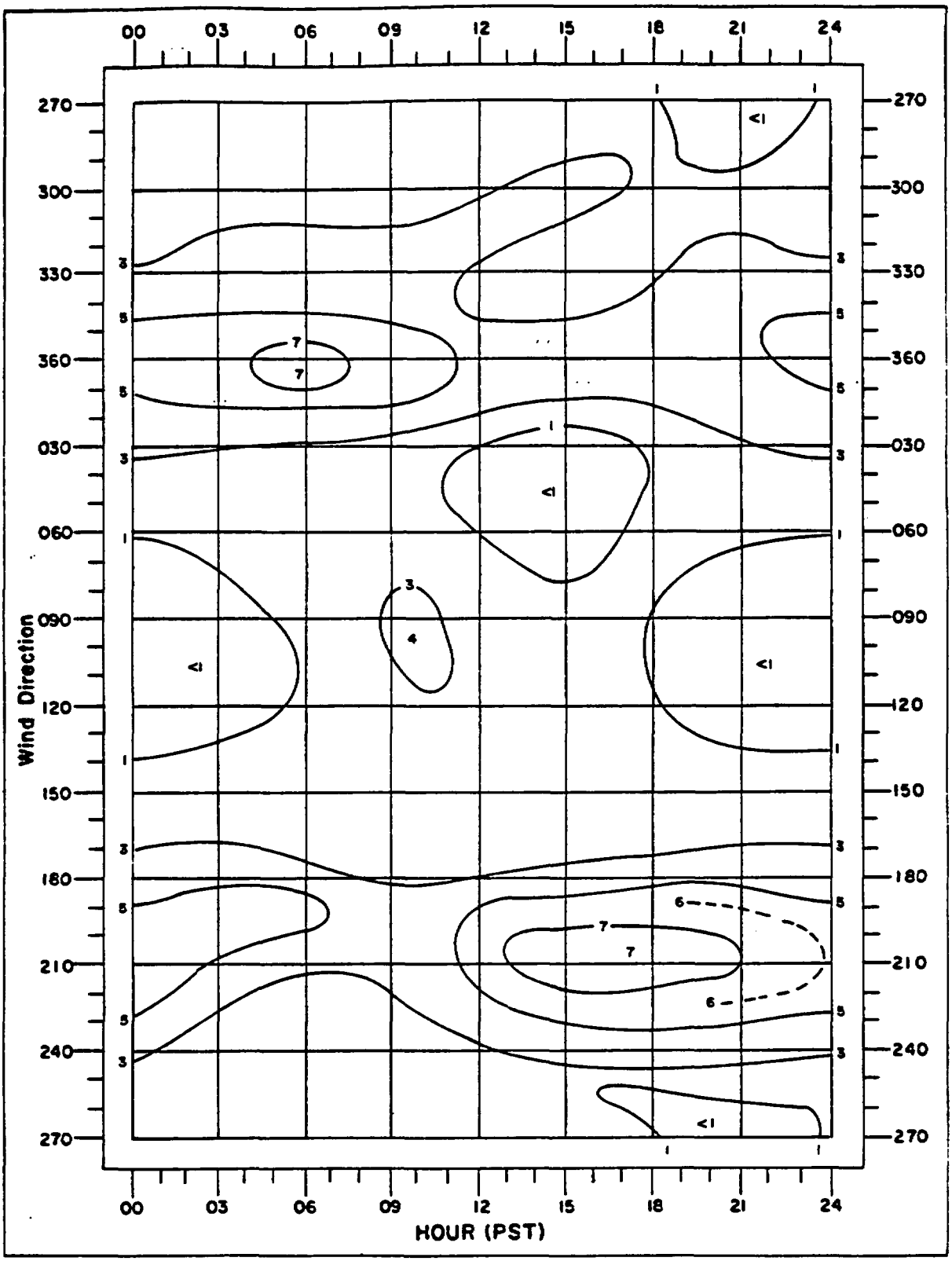

Fig. 2.1.3 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: March

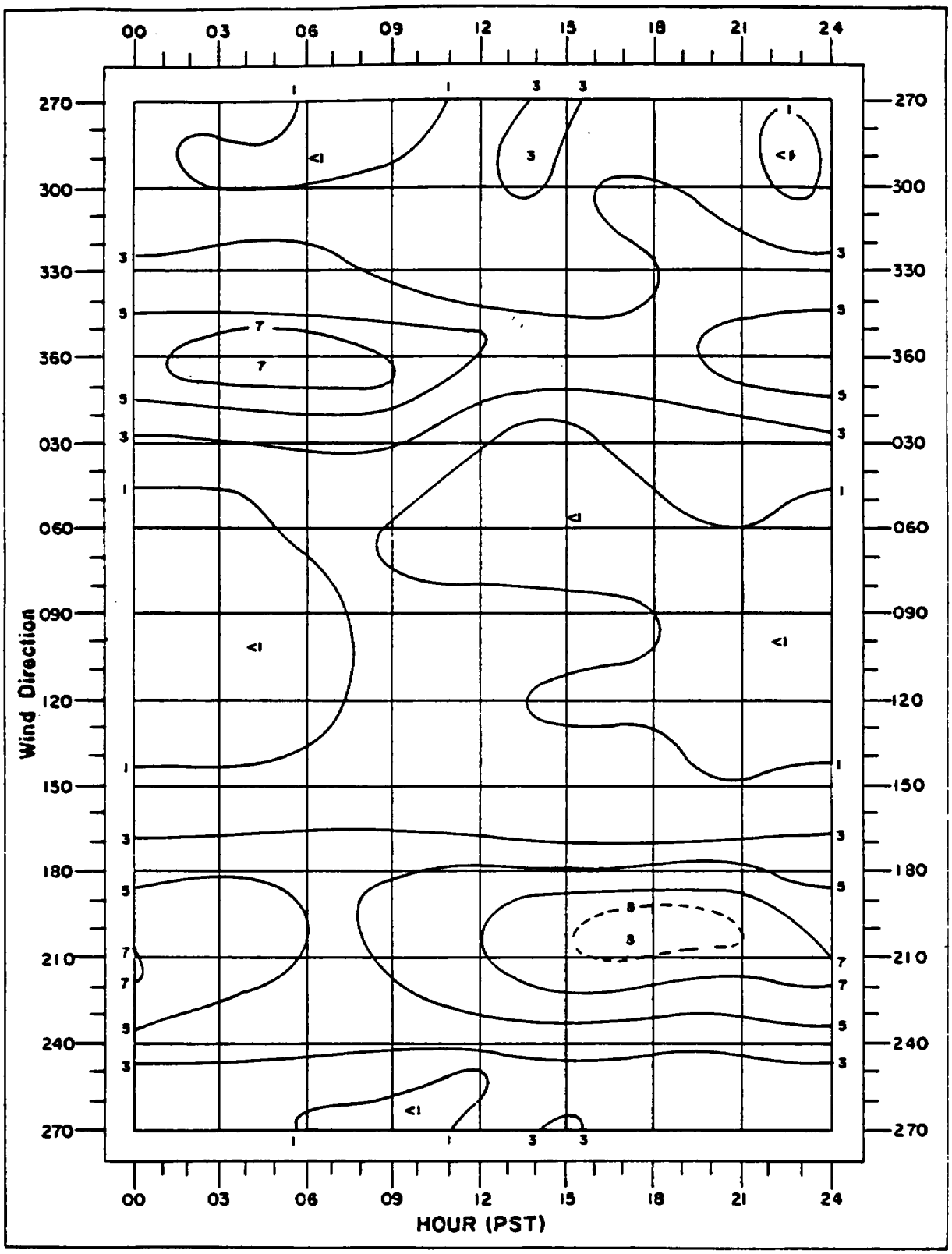

Fig. 2.1.4 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: April

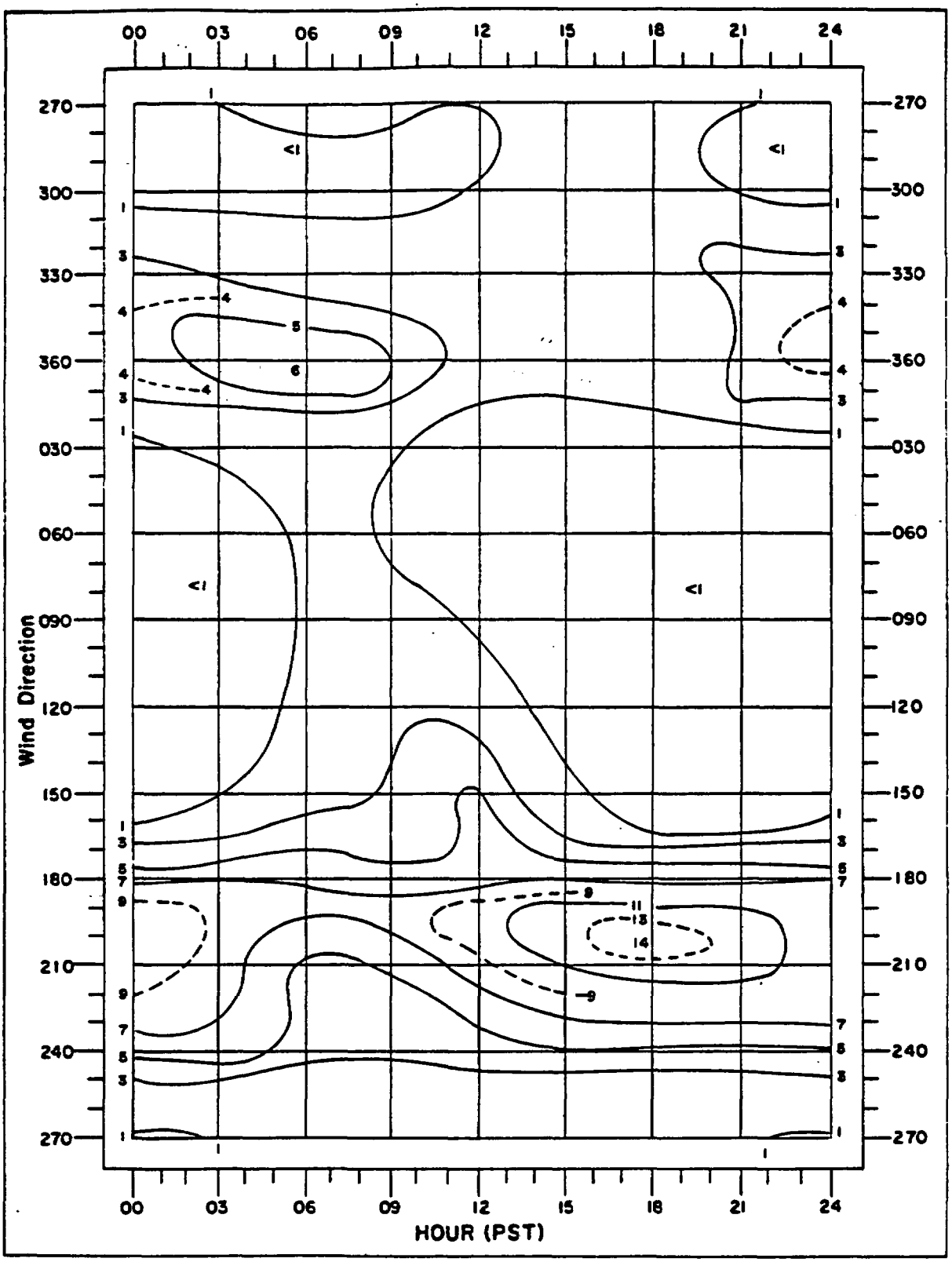

Fig. 2.1.5 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: May

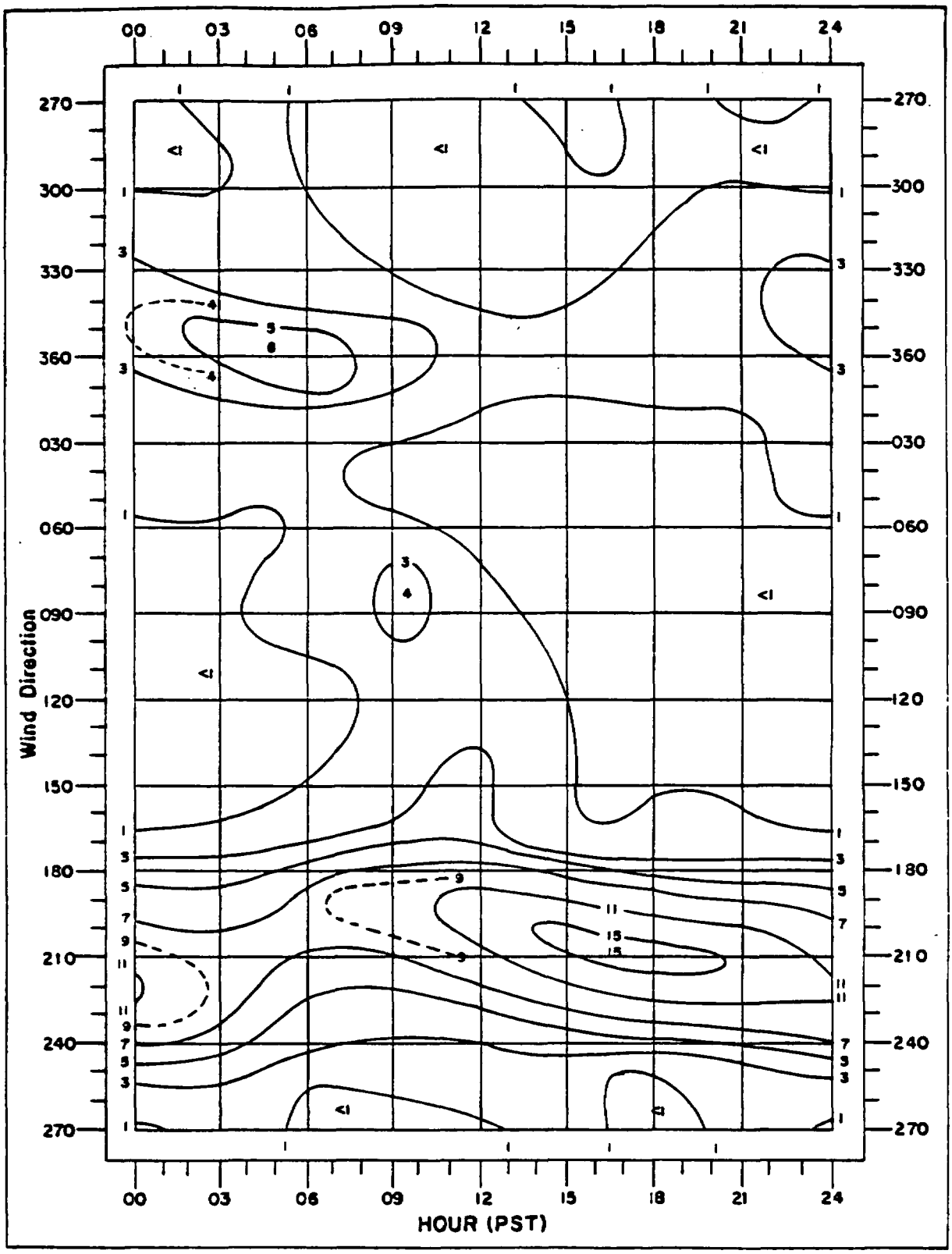

Fig. 2.1.6 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: June

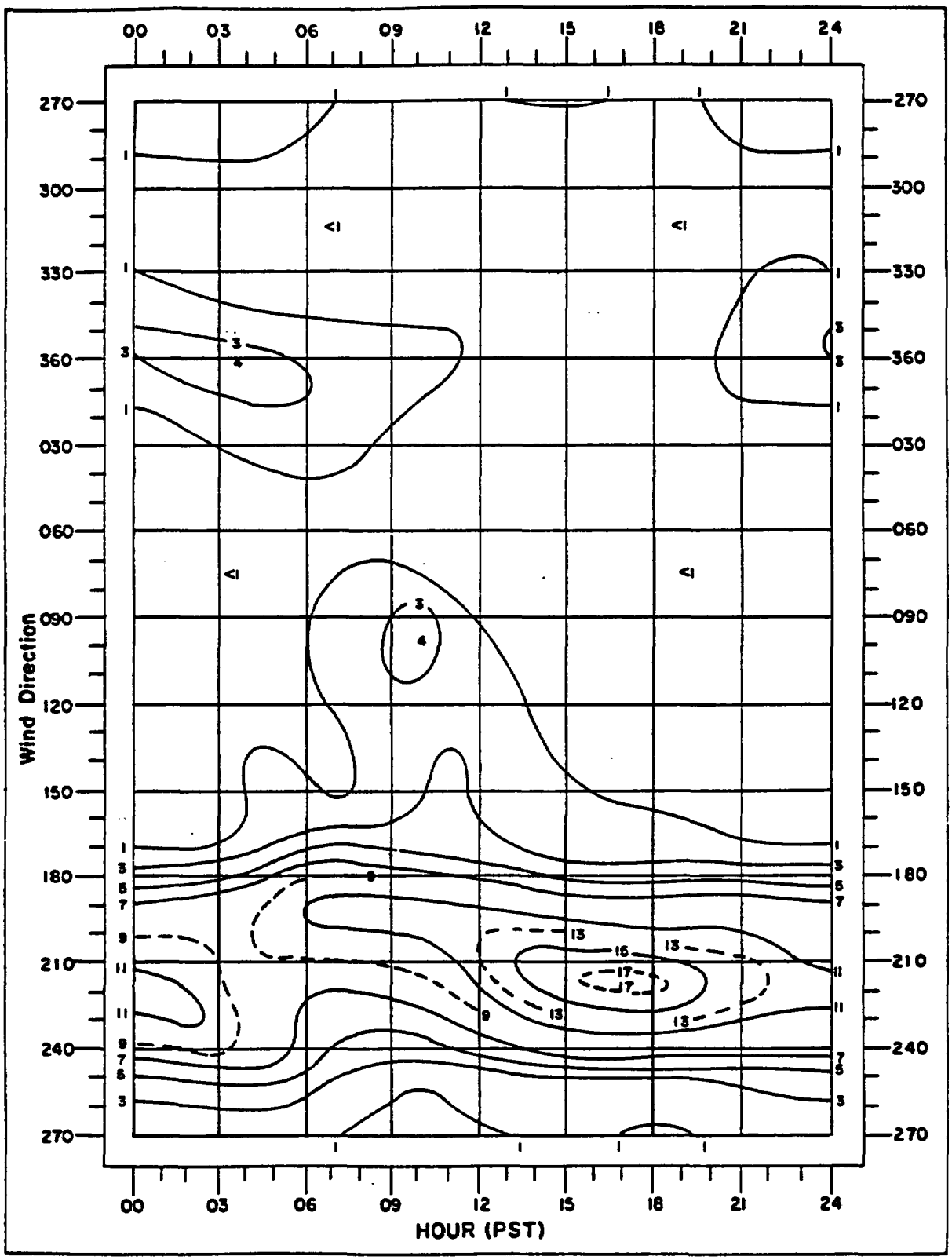

Fig. 2.1.7 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: July

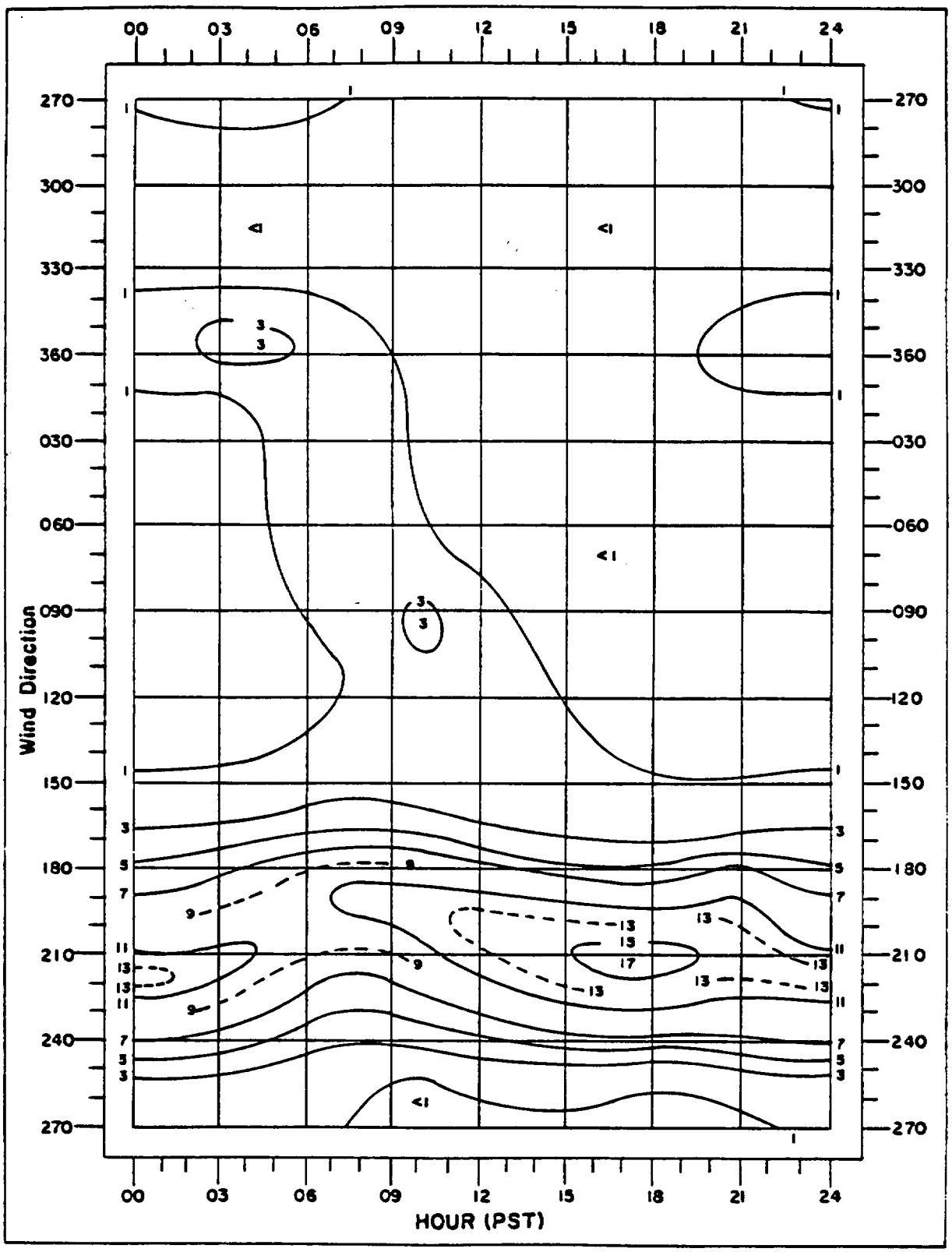

Fig. 2.1.8 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: August

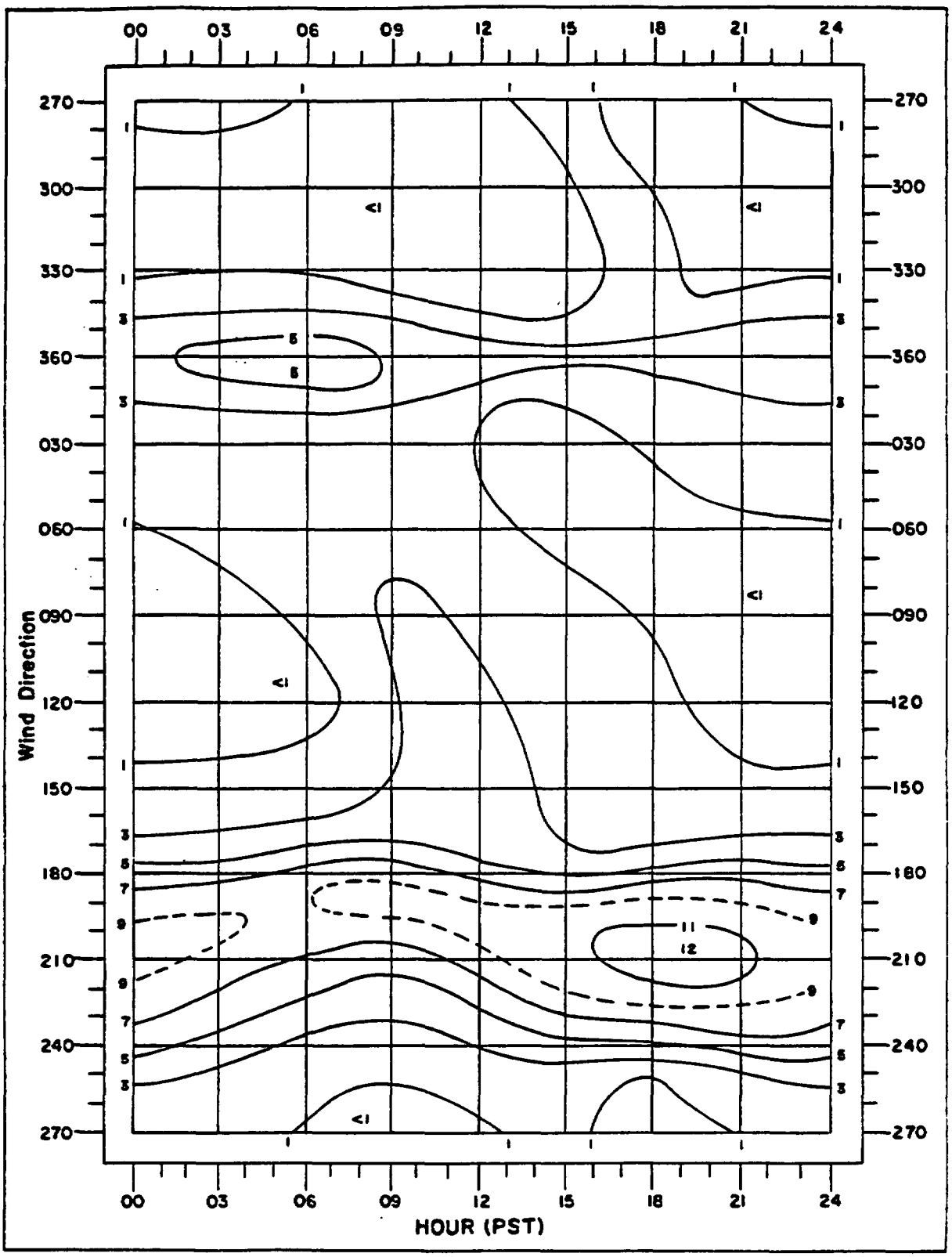

Fig. 2.1.9 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: September

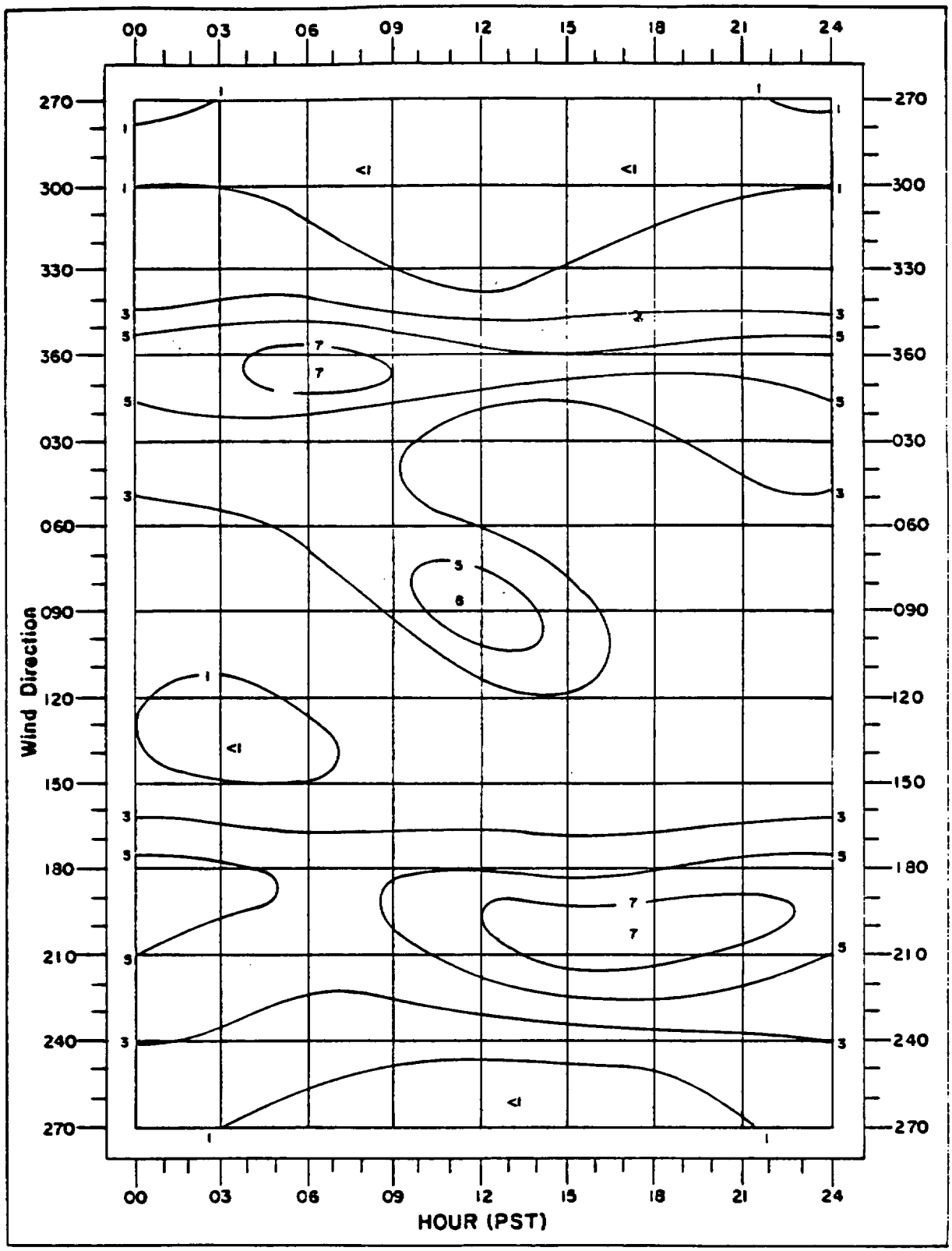

Fig. 2.1.10 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: October

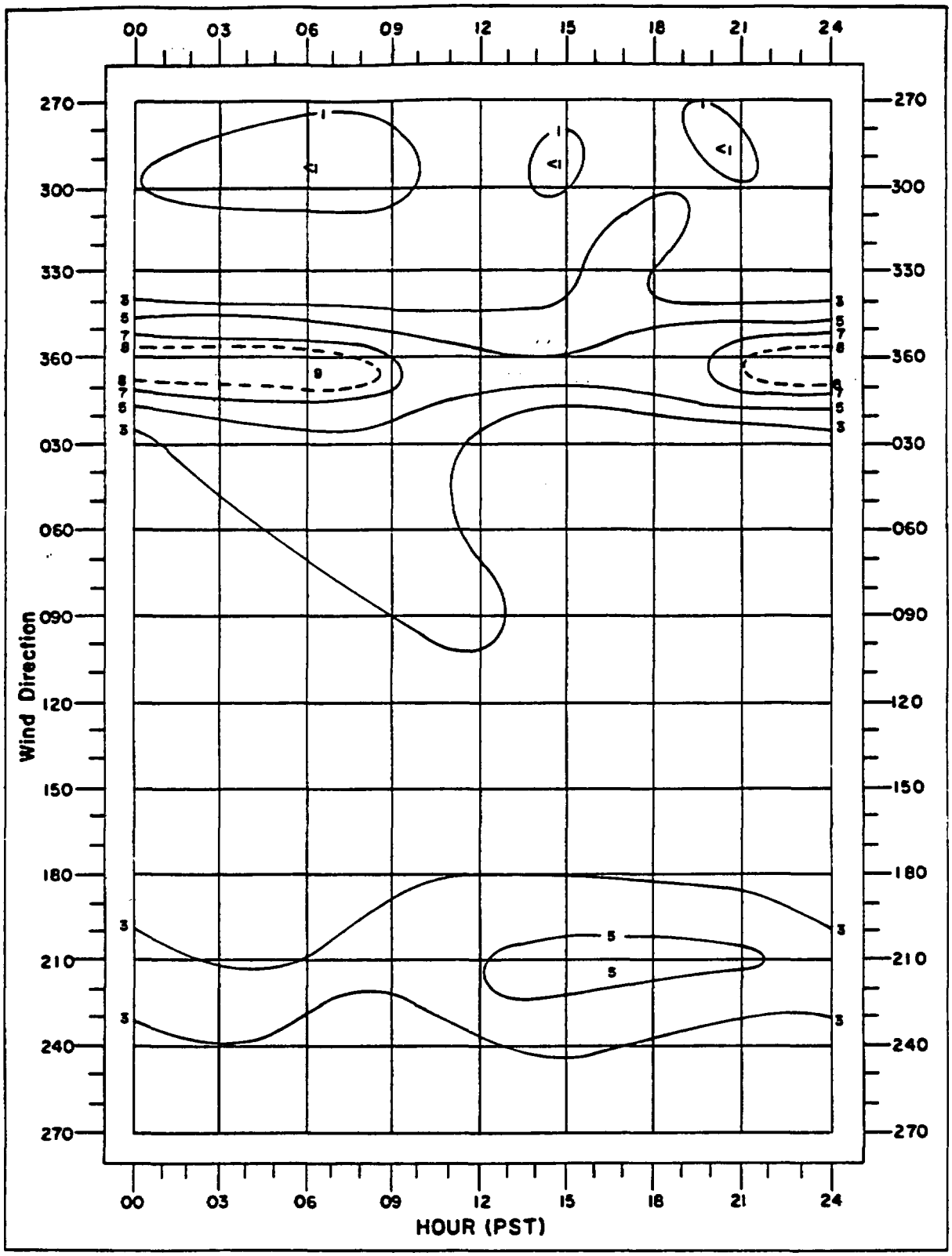

Fig. 2.1.11 Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: November

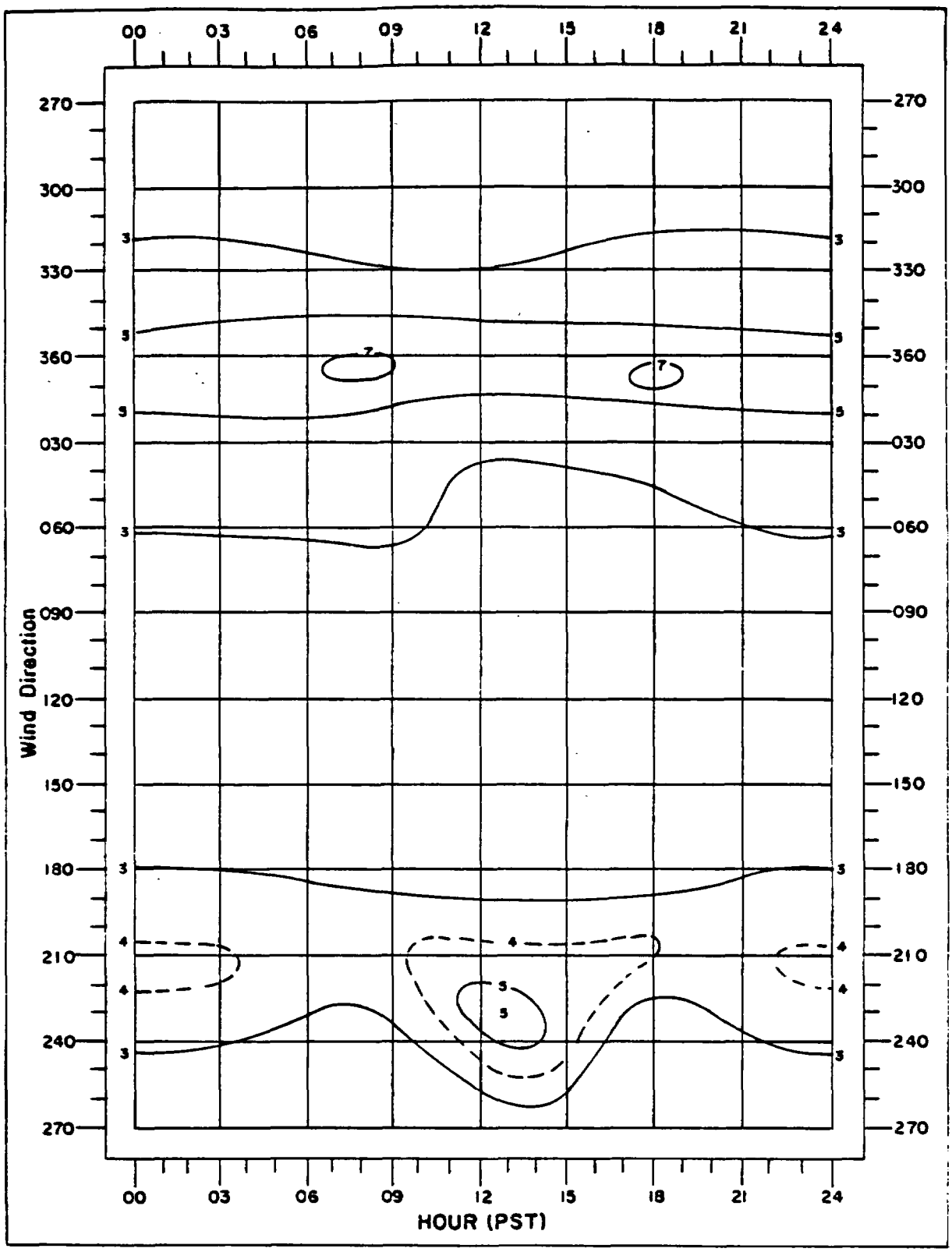

Fig. 2.1.12 -Wind direction frequency (%) for 10 degree increments of direction.

Station: Area 12 Mesa Month: December

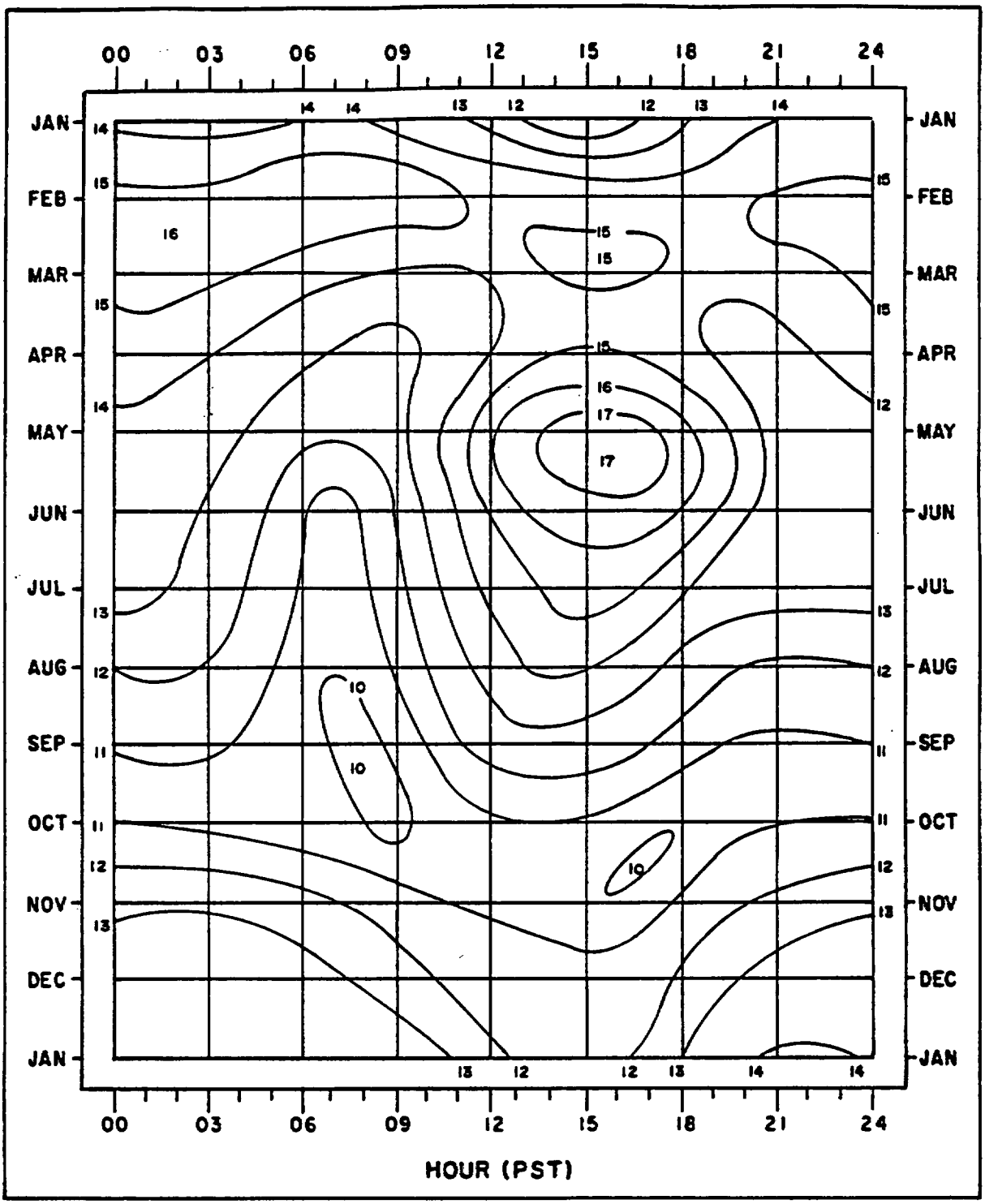

Fig. 2.1.13 Average wind speed in miles per hour as a function of time of day.

Station: Area 12 Mesa

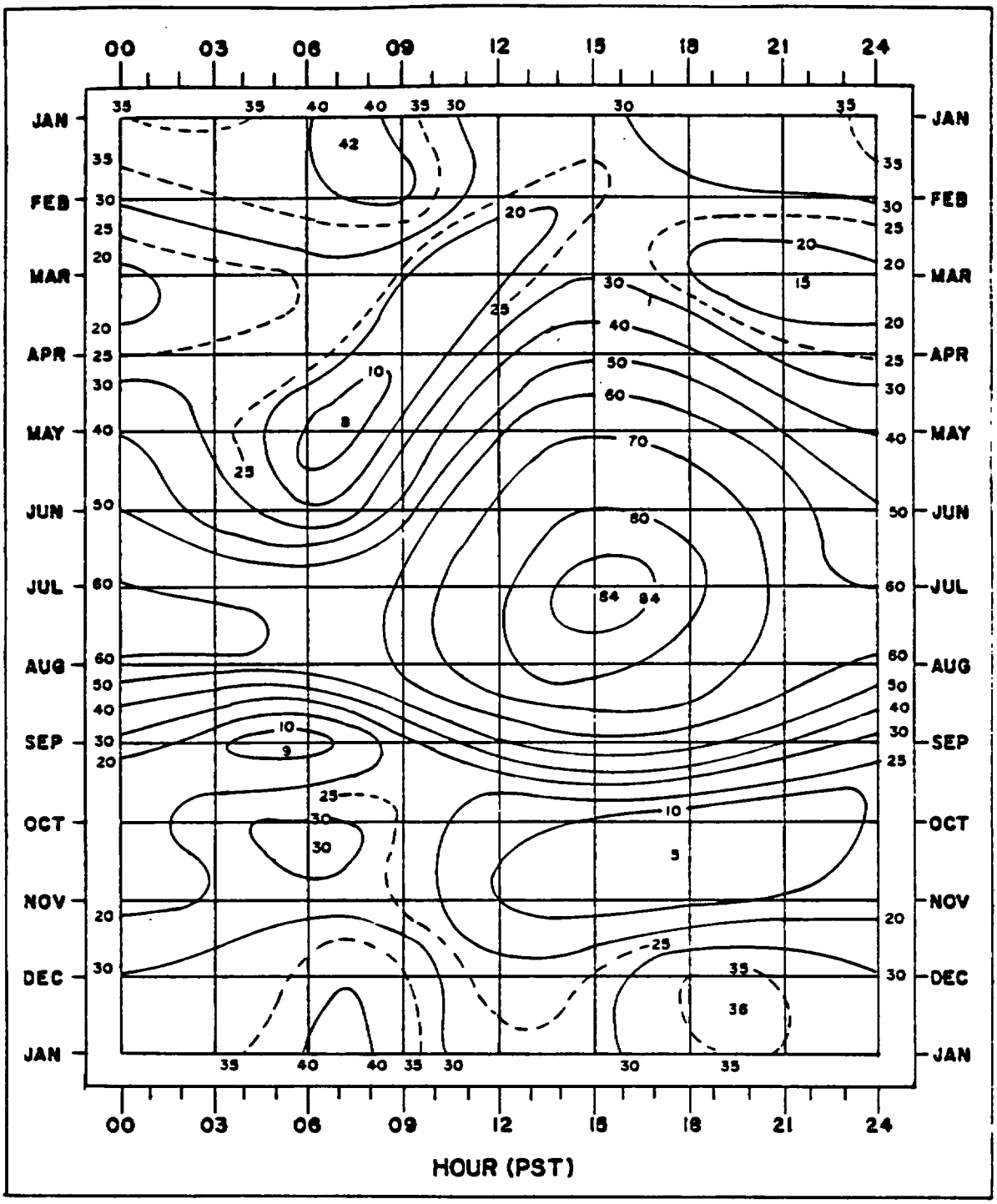

Fig. 2.1.14 Constancy of the wind expressed as the percentage ratio of the mean vector wind speed to the mean scalar speed.

Station: Area 12 Mesa

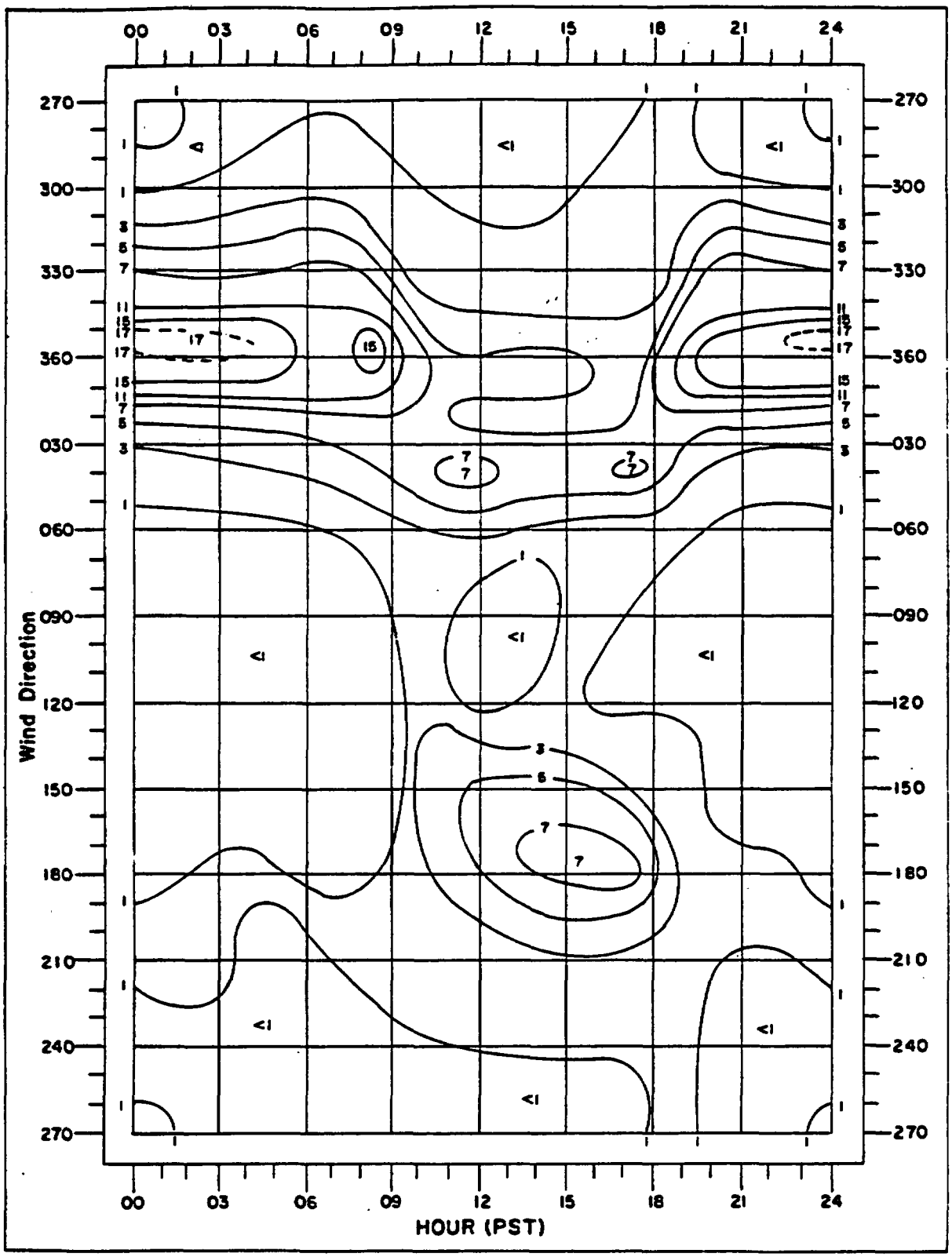

Fig. 2.2.1 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: January

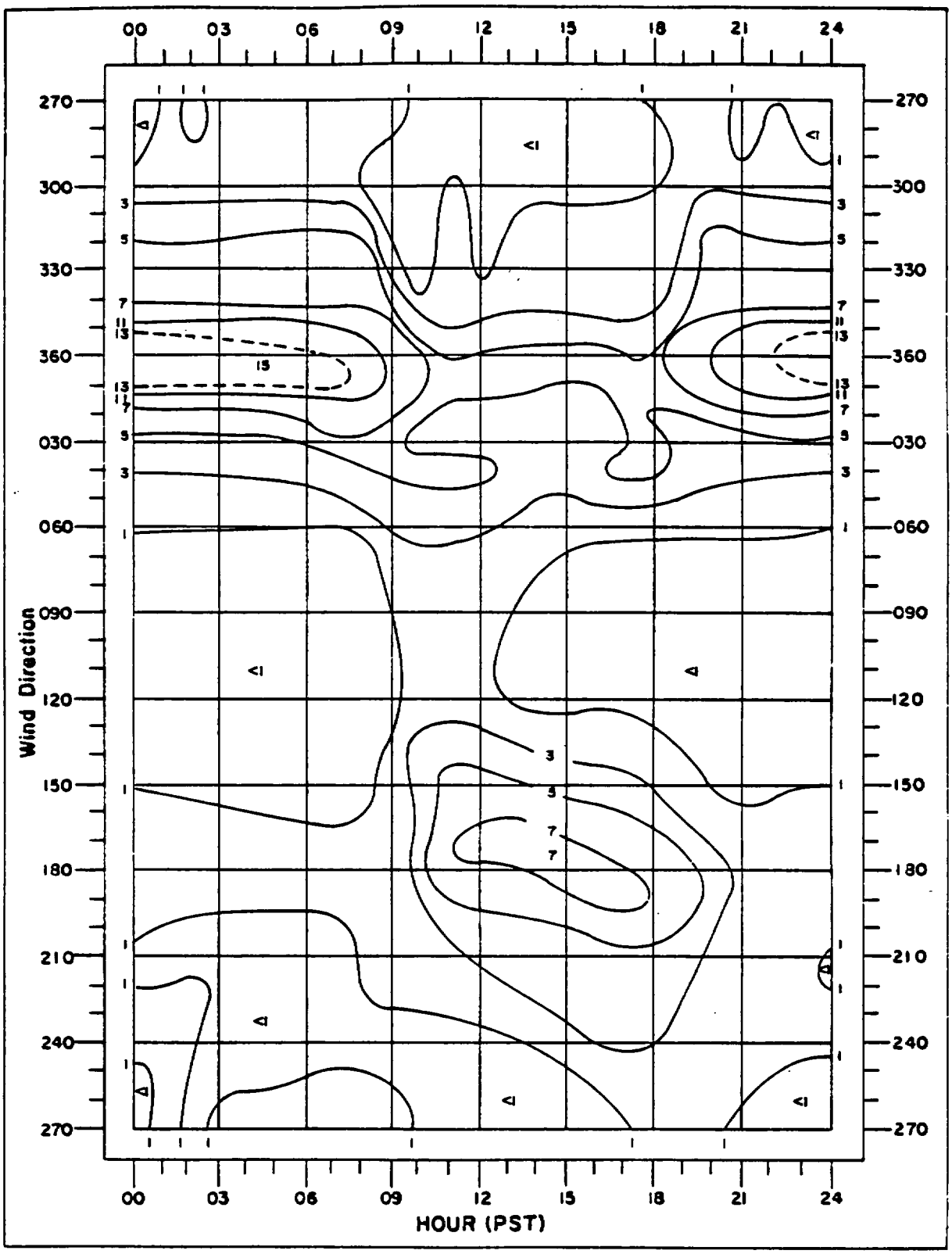

Fig. 2.2.2 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: February

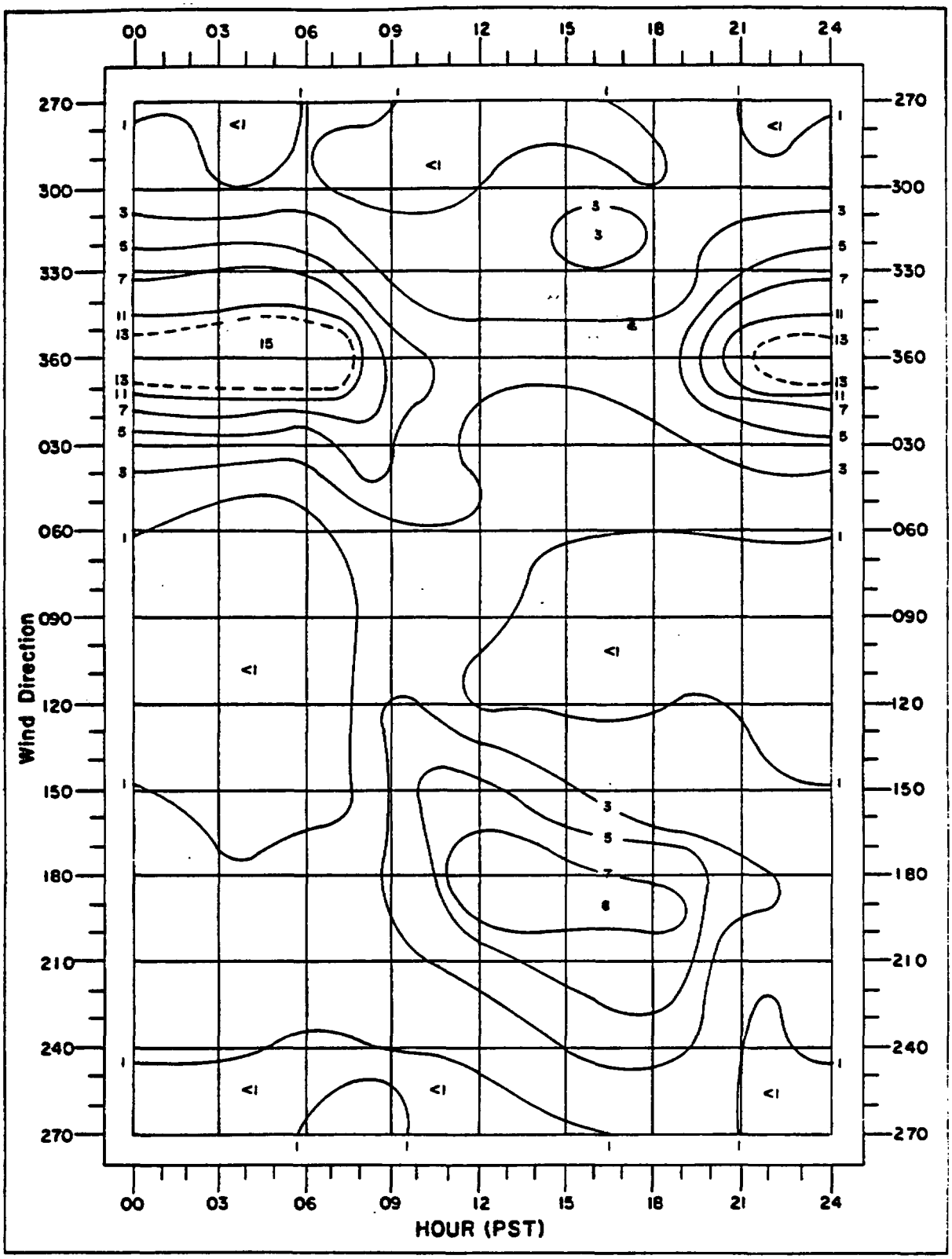

Fig. 2.2.3 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: March

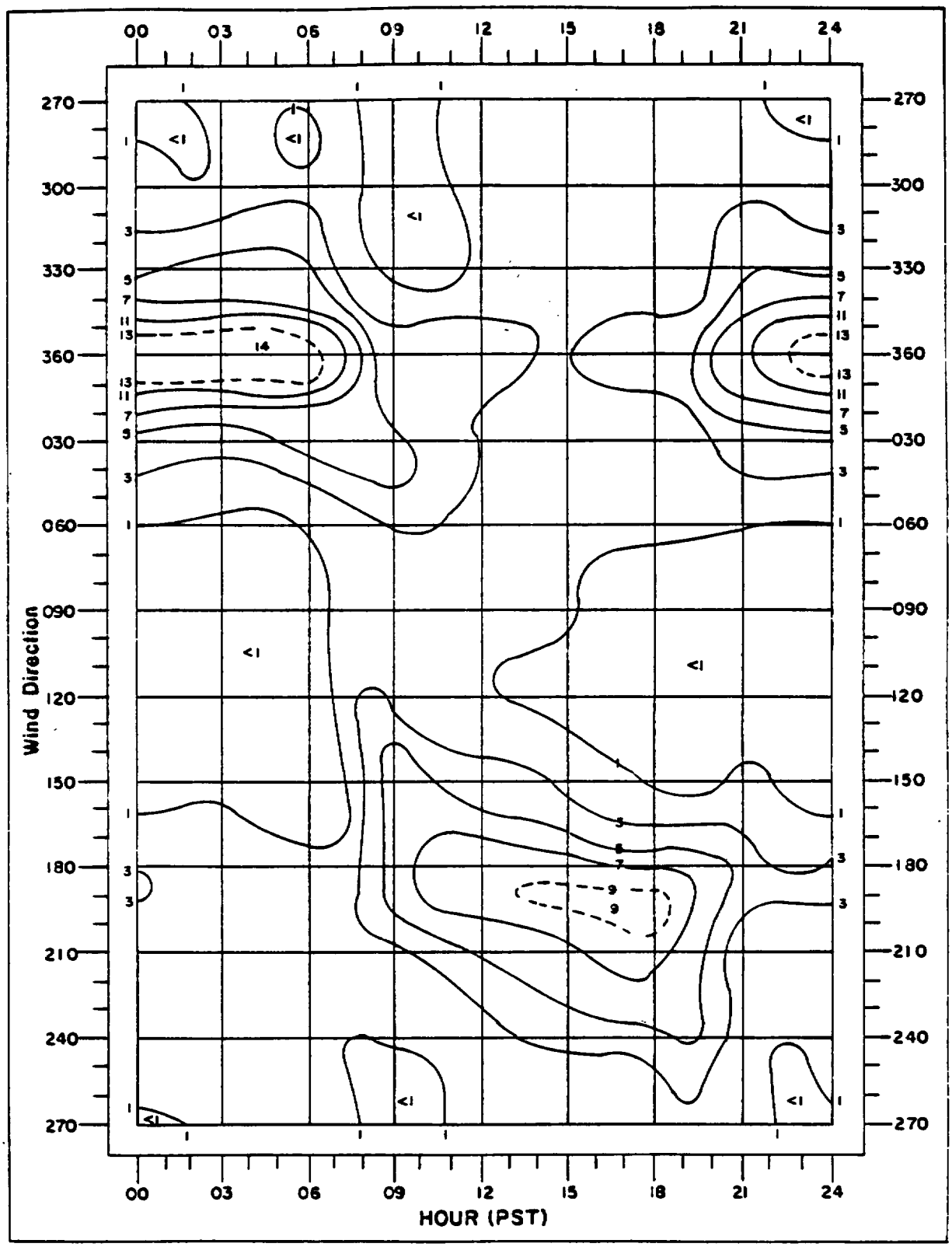

Fig. 2.2.4 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: April

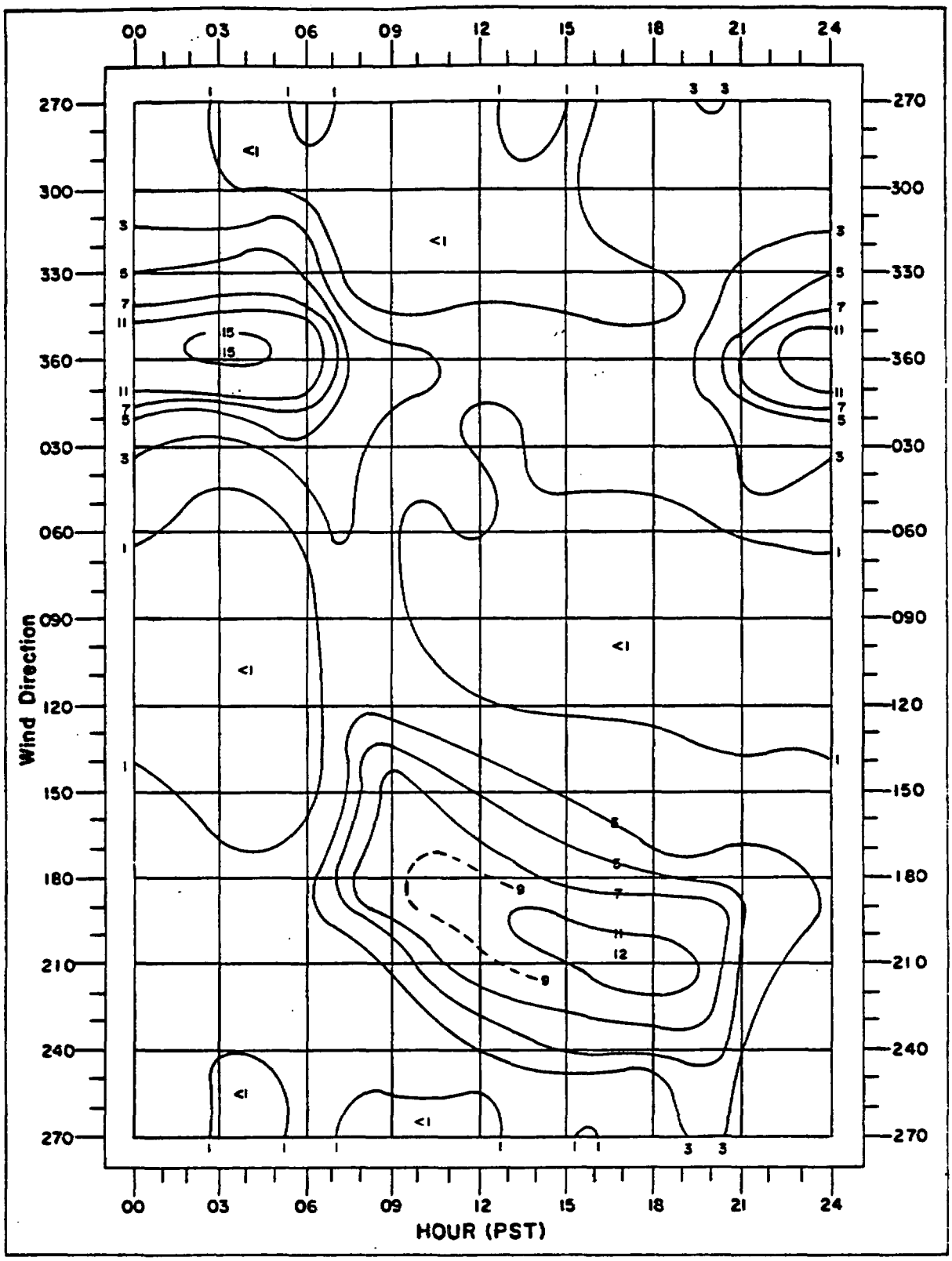

Fig. 2.2.5 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: May

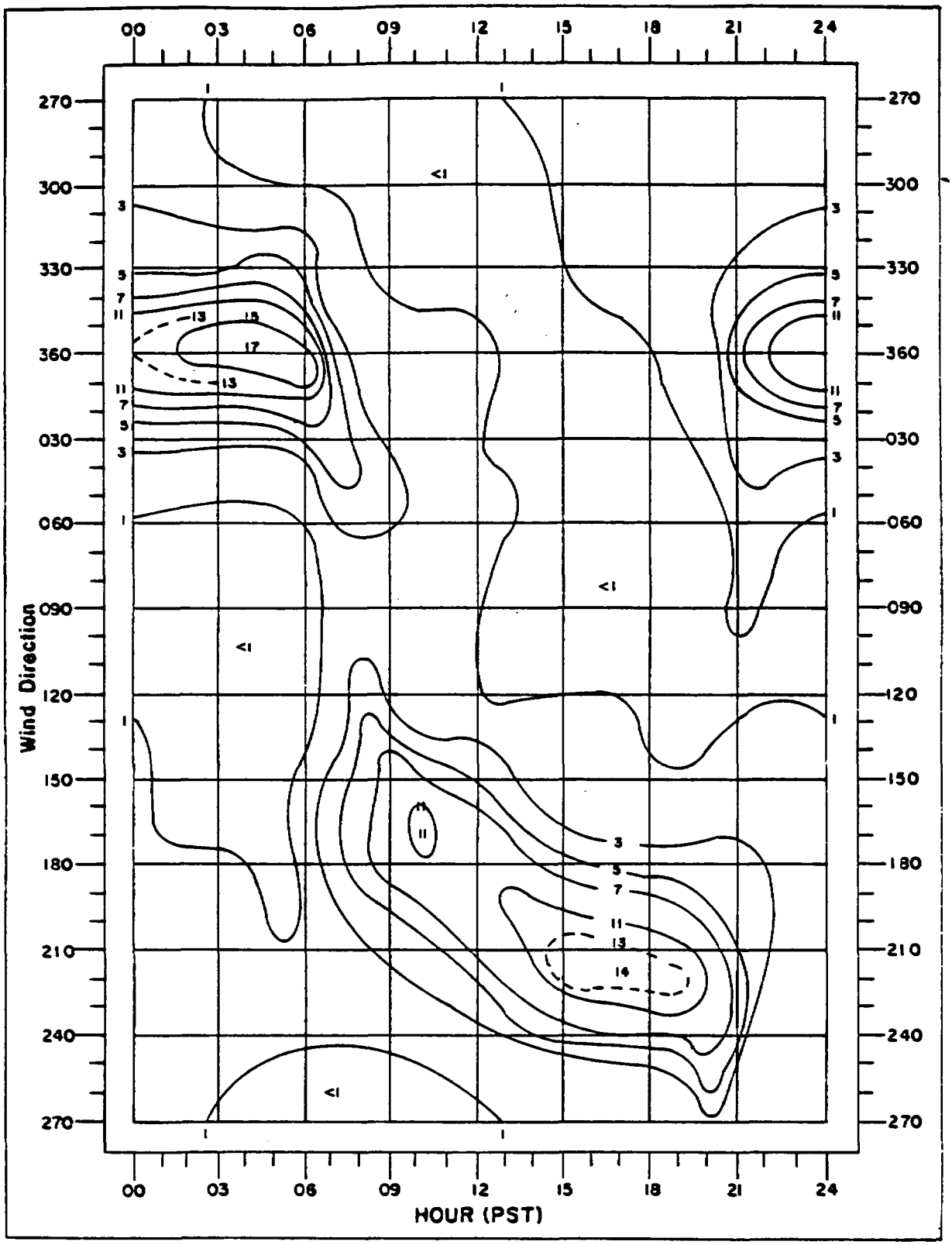

Fig. 2.2.6 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: June

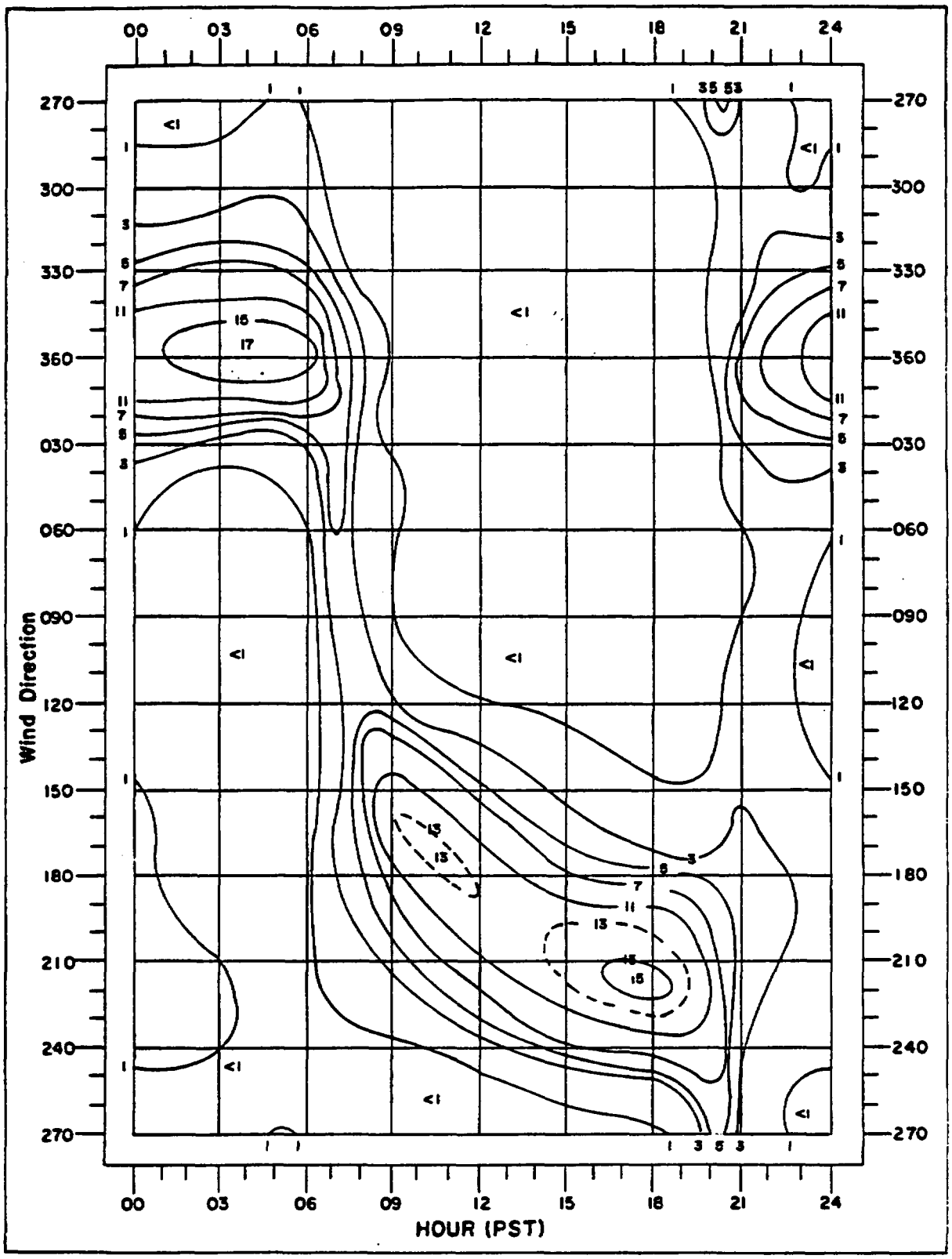

Fig. 2.2.7 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: July

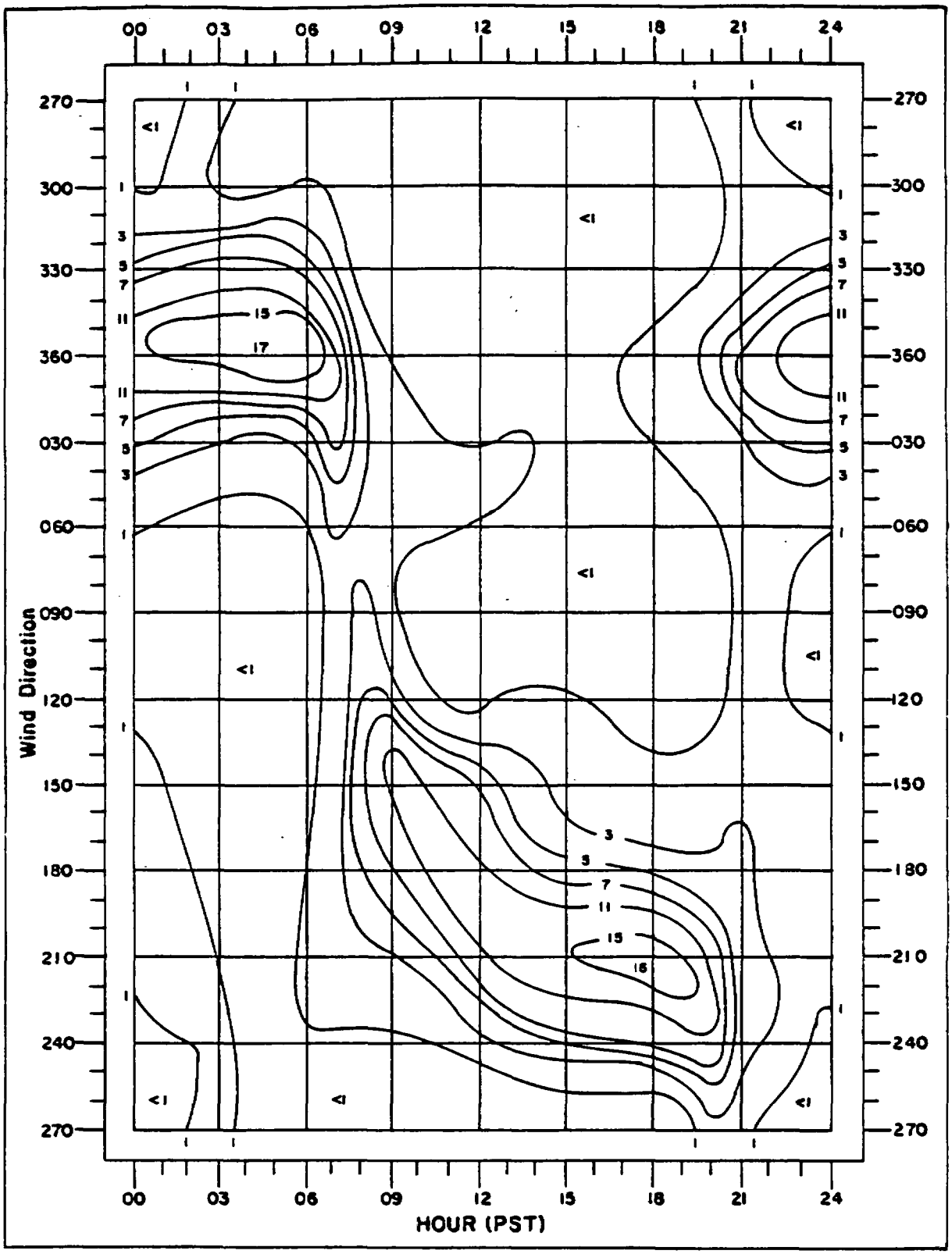

Fig. 2.2.8 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: August

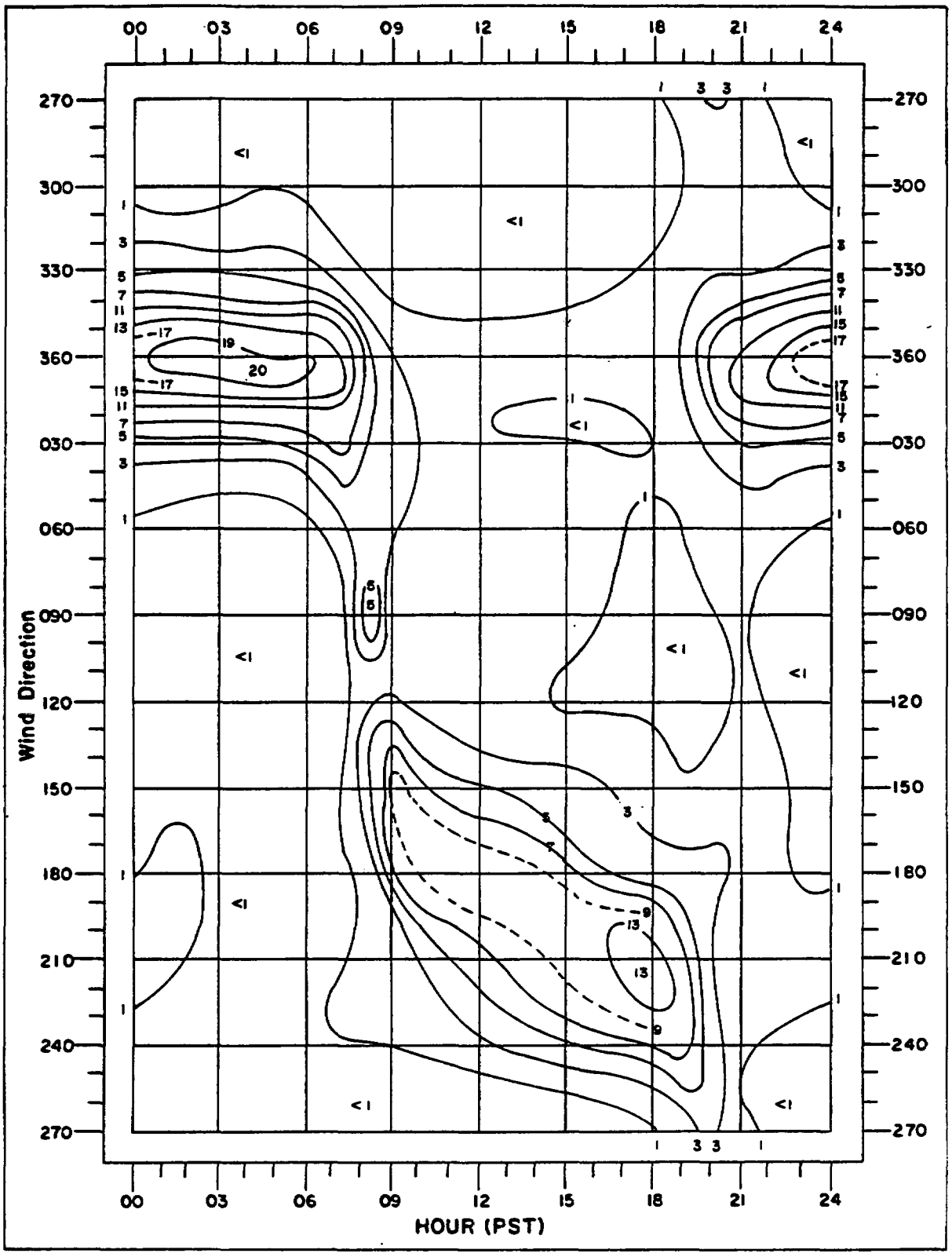

Fig. 2.2.9 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: September

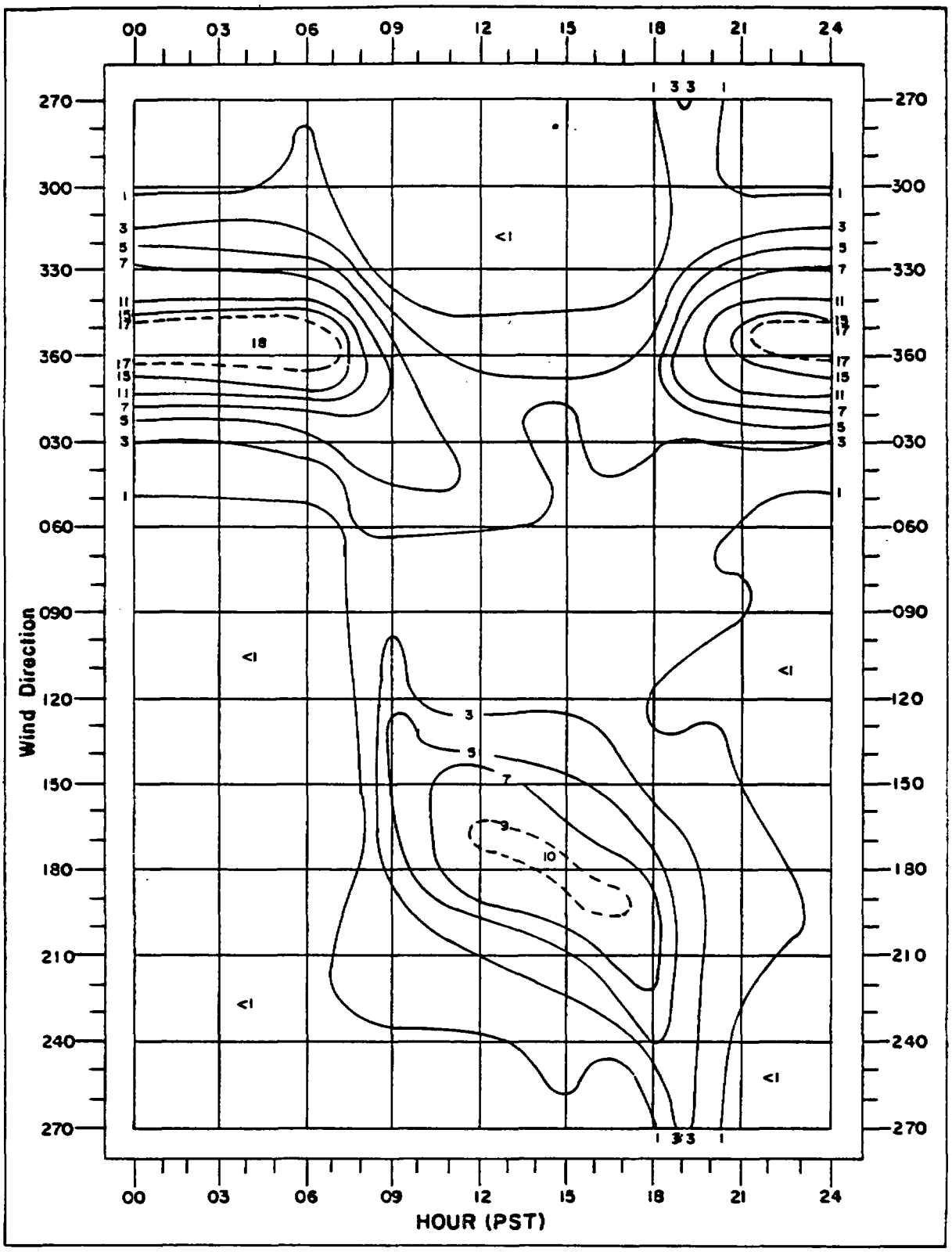

Fig. 2.2.10 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: October

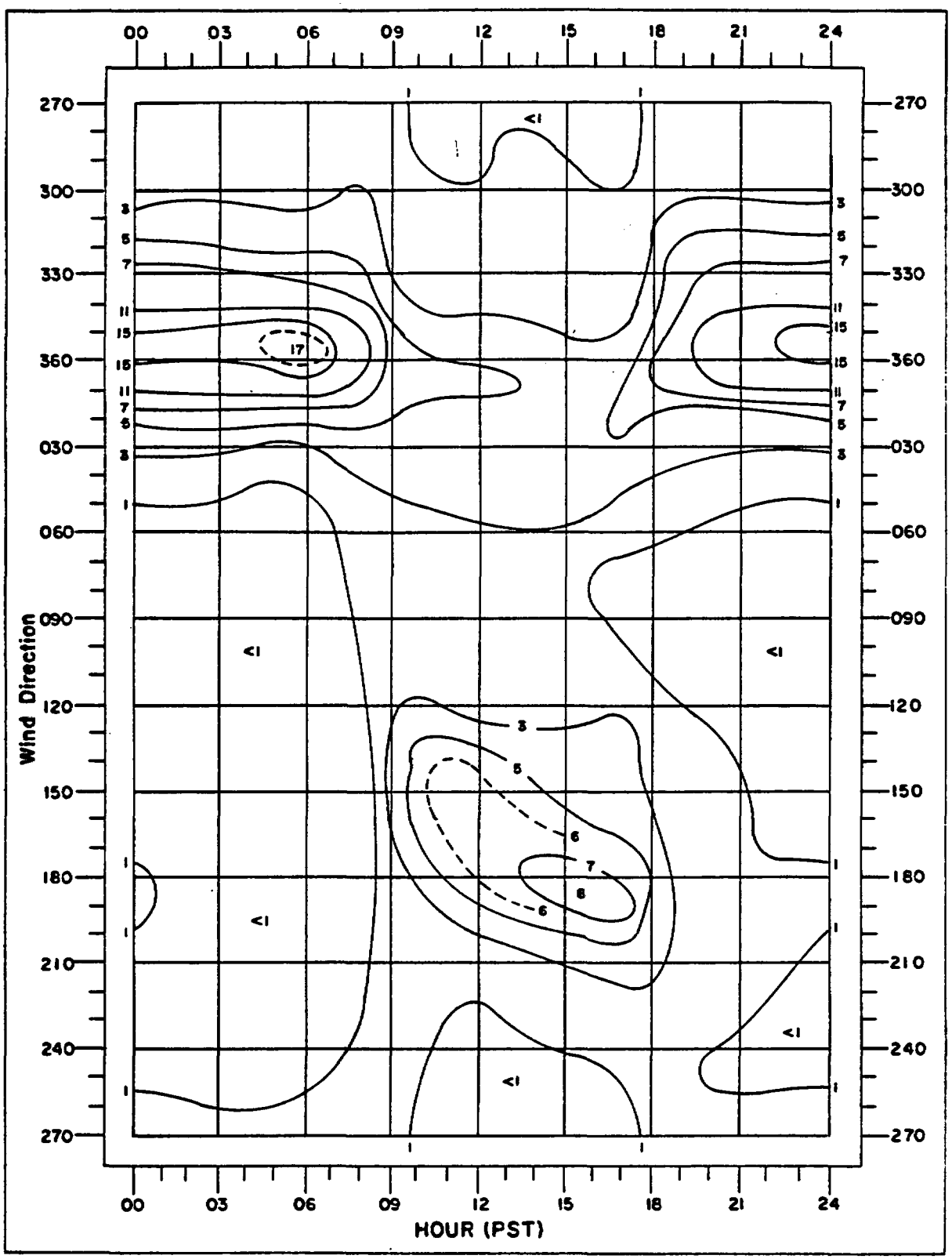

Fig. 2.2.11 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: November

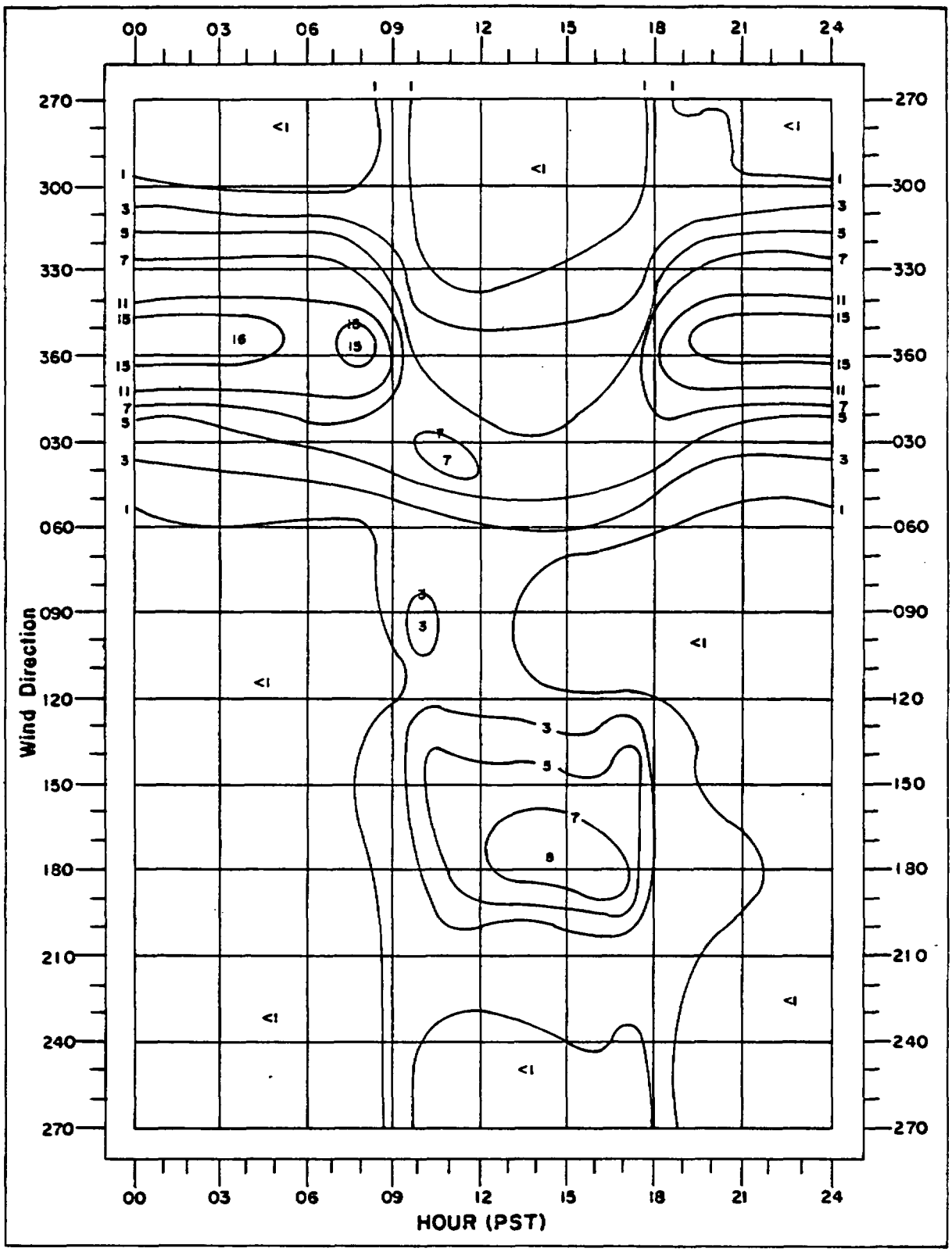

Fig. 2.2.12 Wind direction frequency (%) for 10 degree increments of direction.

Station: BJY Month: December

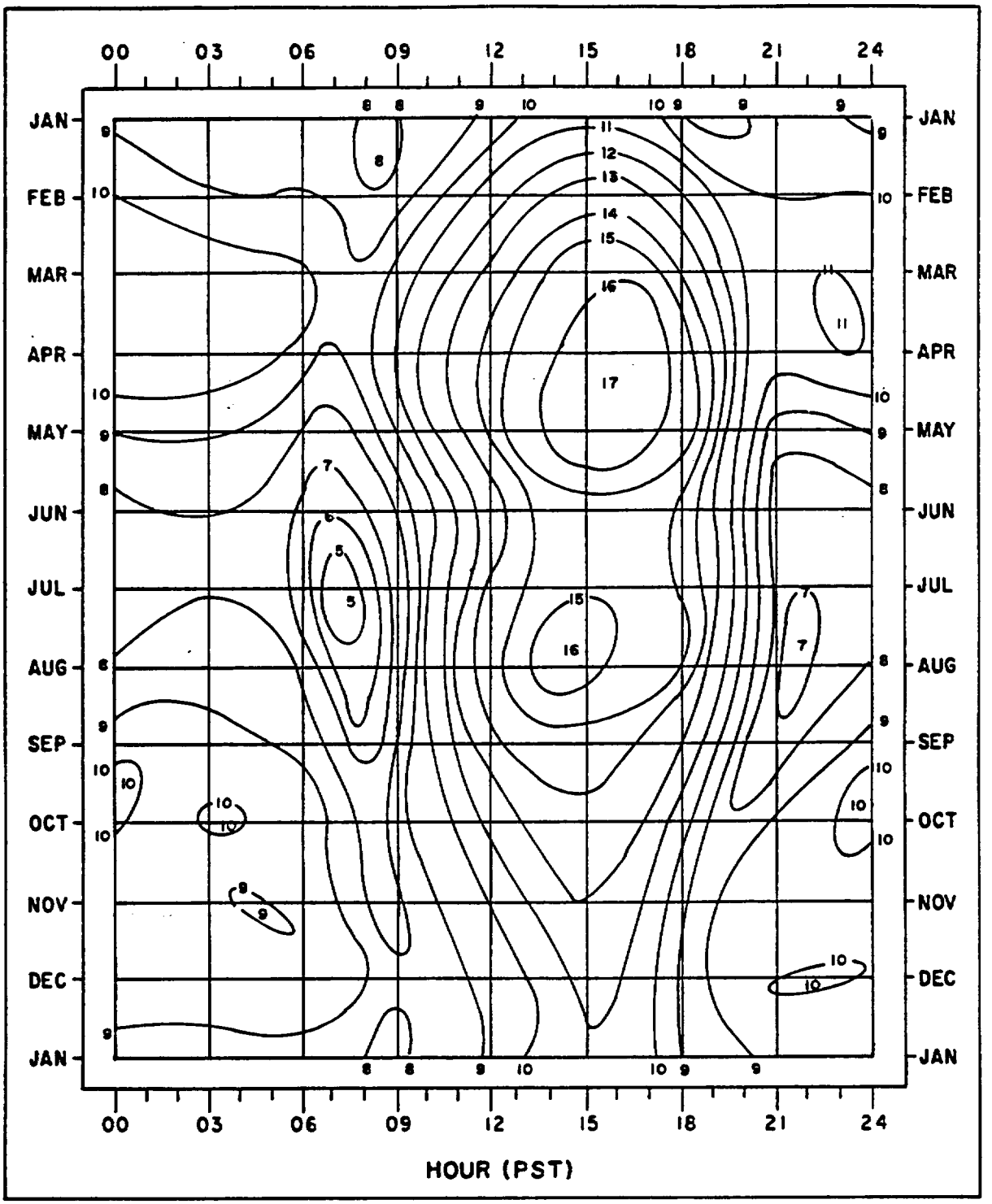

Fig. 2.2.13 Average wind speed in miles per hour as a function of time of day.

Station: BJY

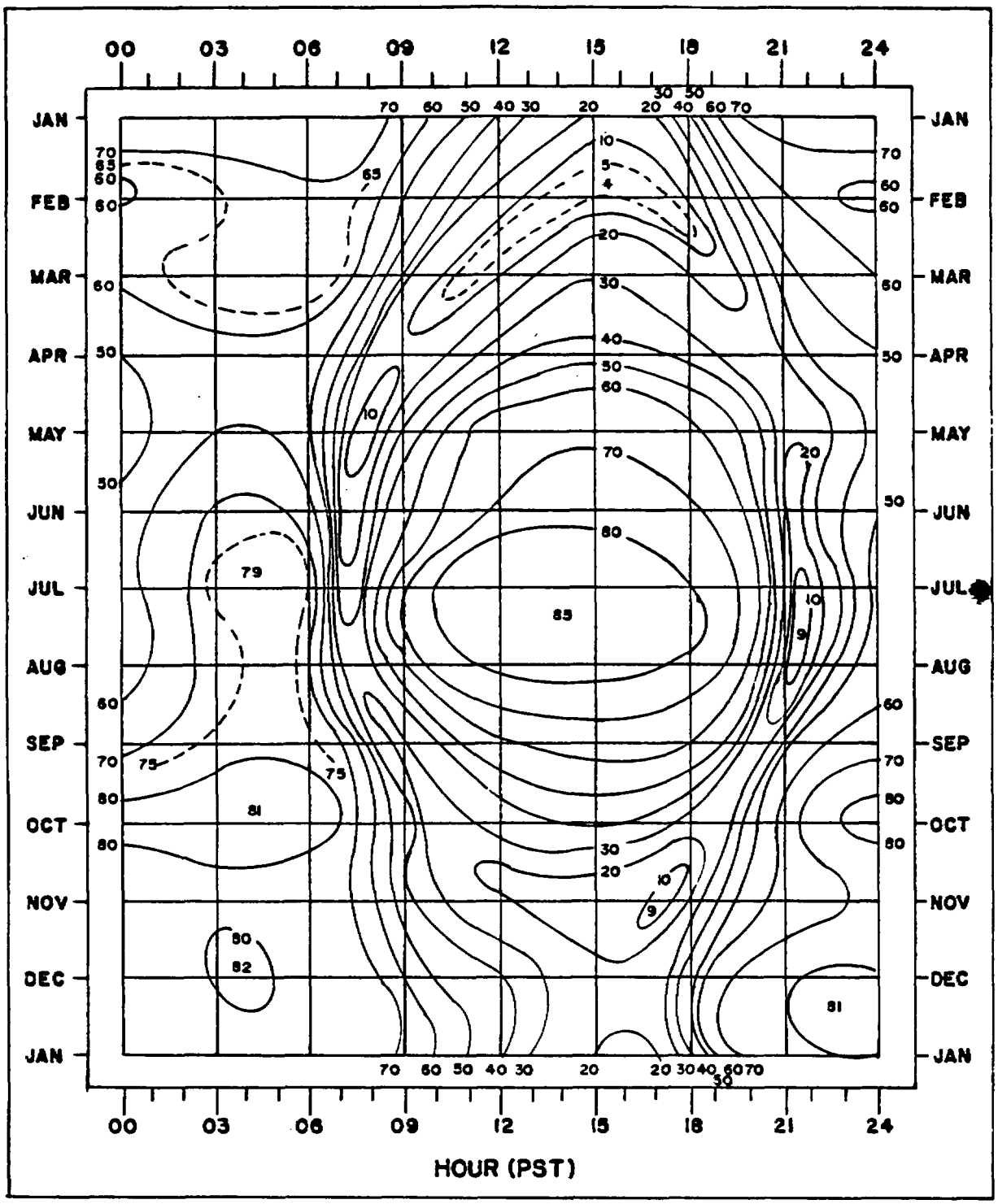

Fig. 2.2.14 Constancy of the wind expressed as the percentage ratio of the mean vector wind speed to the mean scalar speed.

Station: BJY

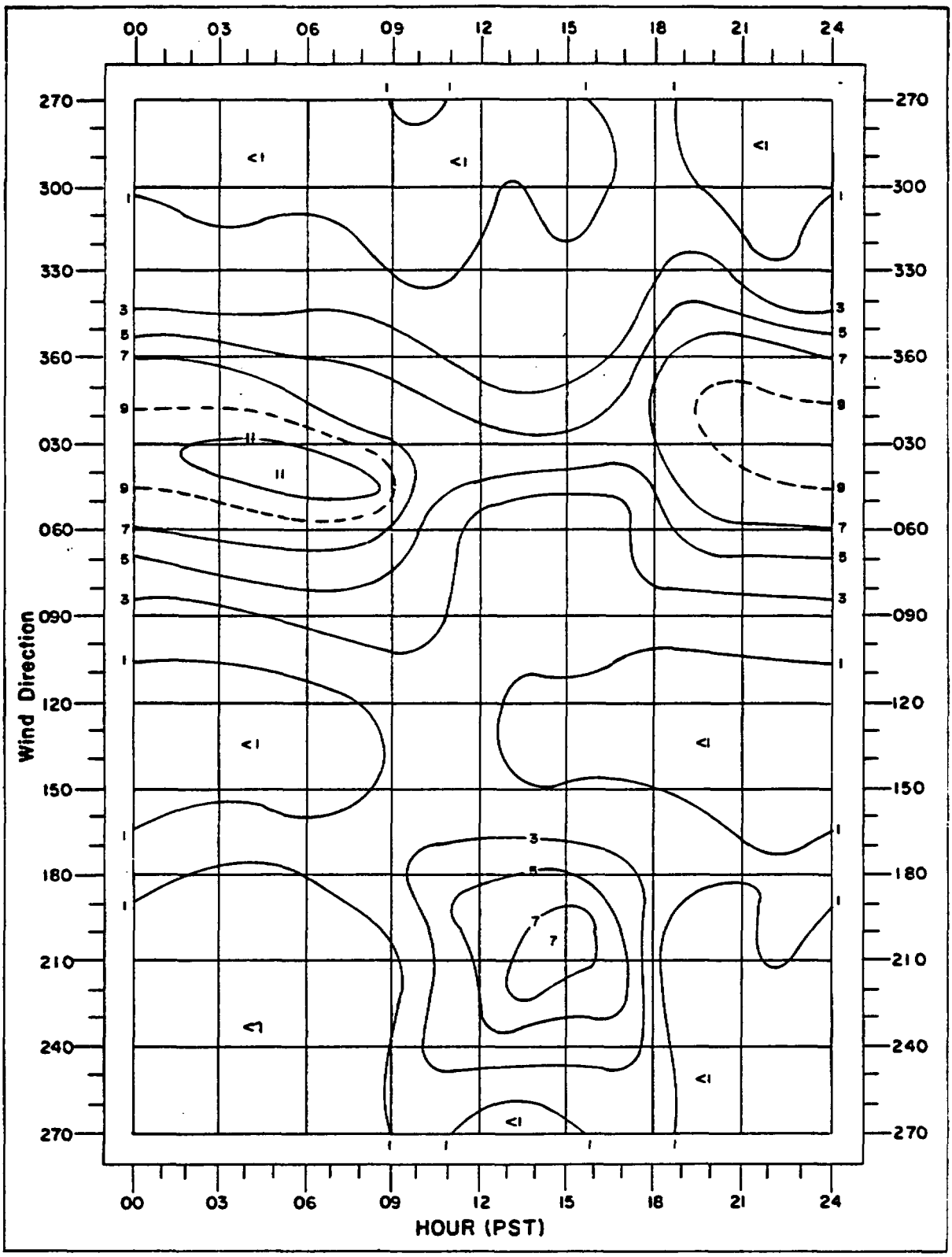

Fig. 2.3.1 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: January

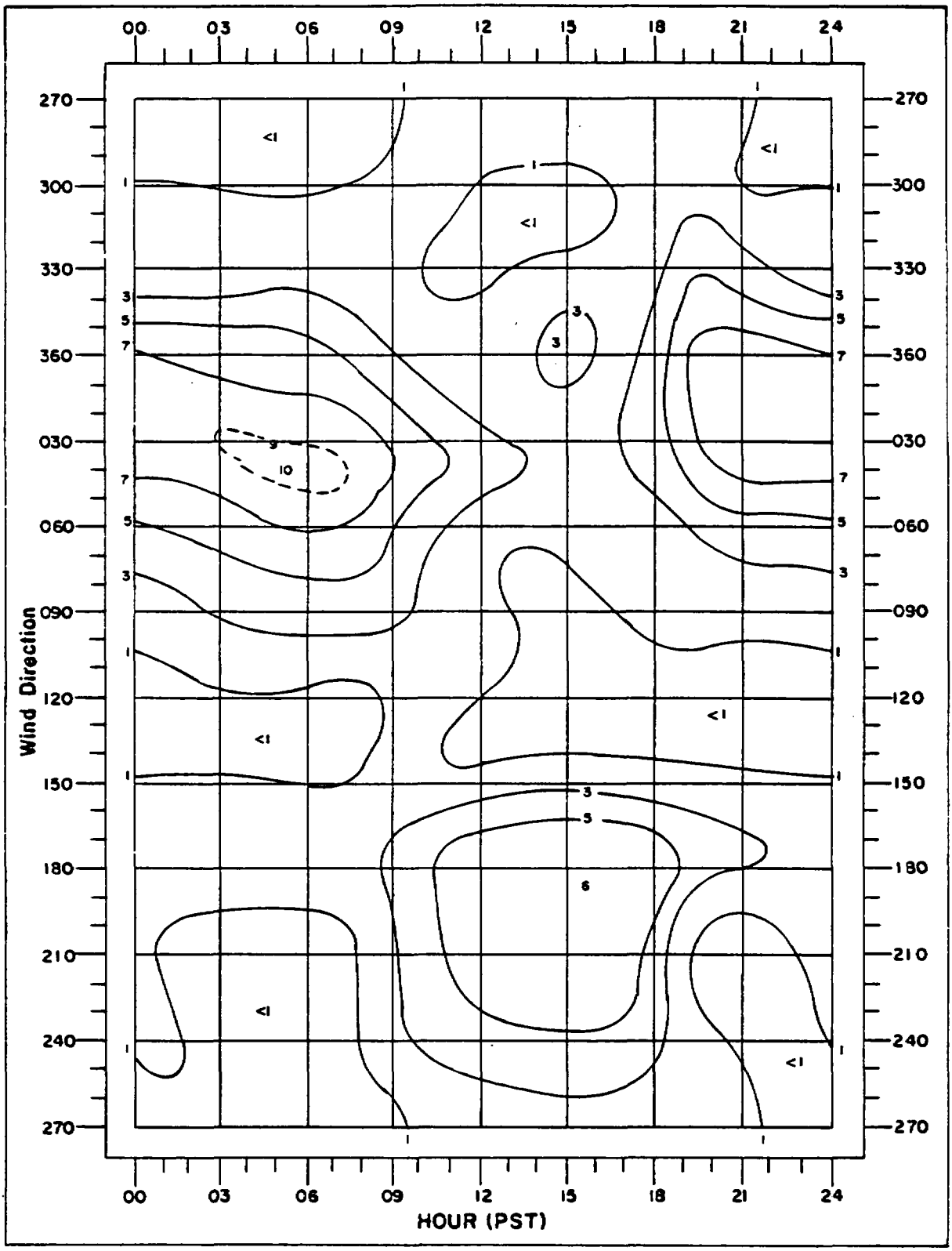

Fig. 2.3.2 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: February

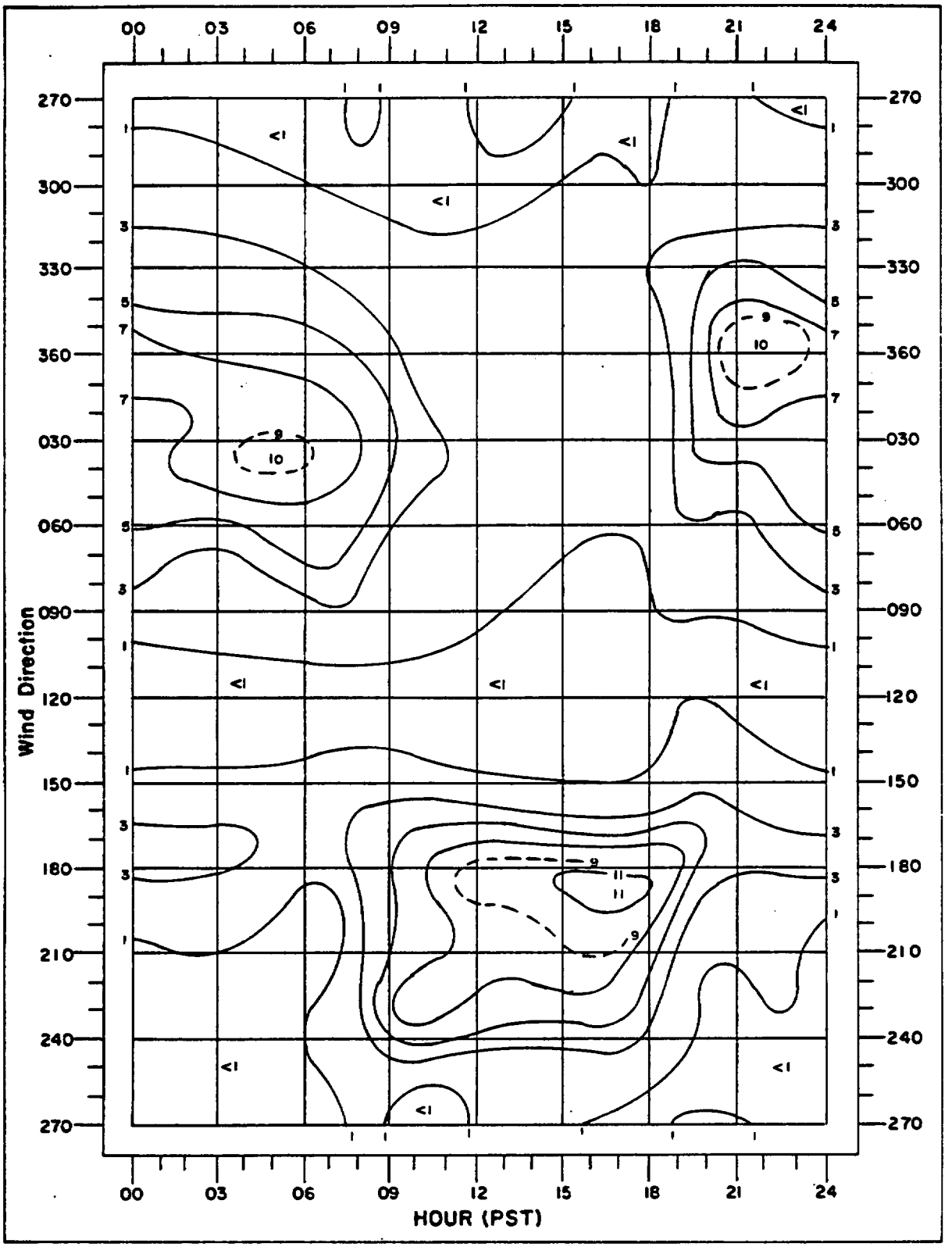

Fig. 2.3.3 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: March

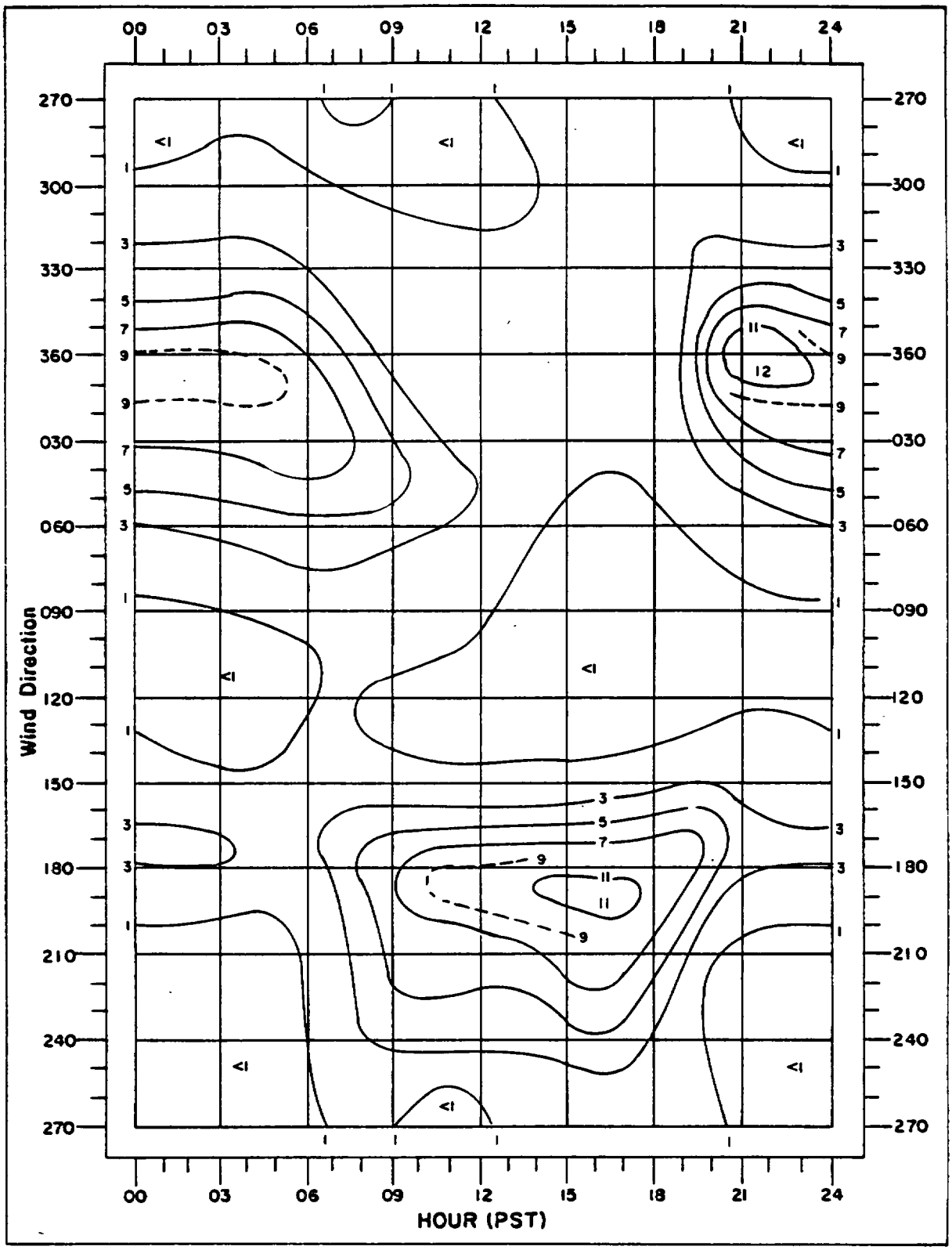

Fig. 2.3.4 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: April

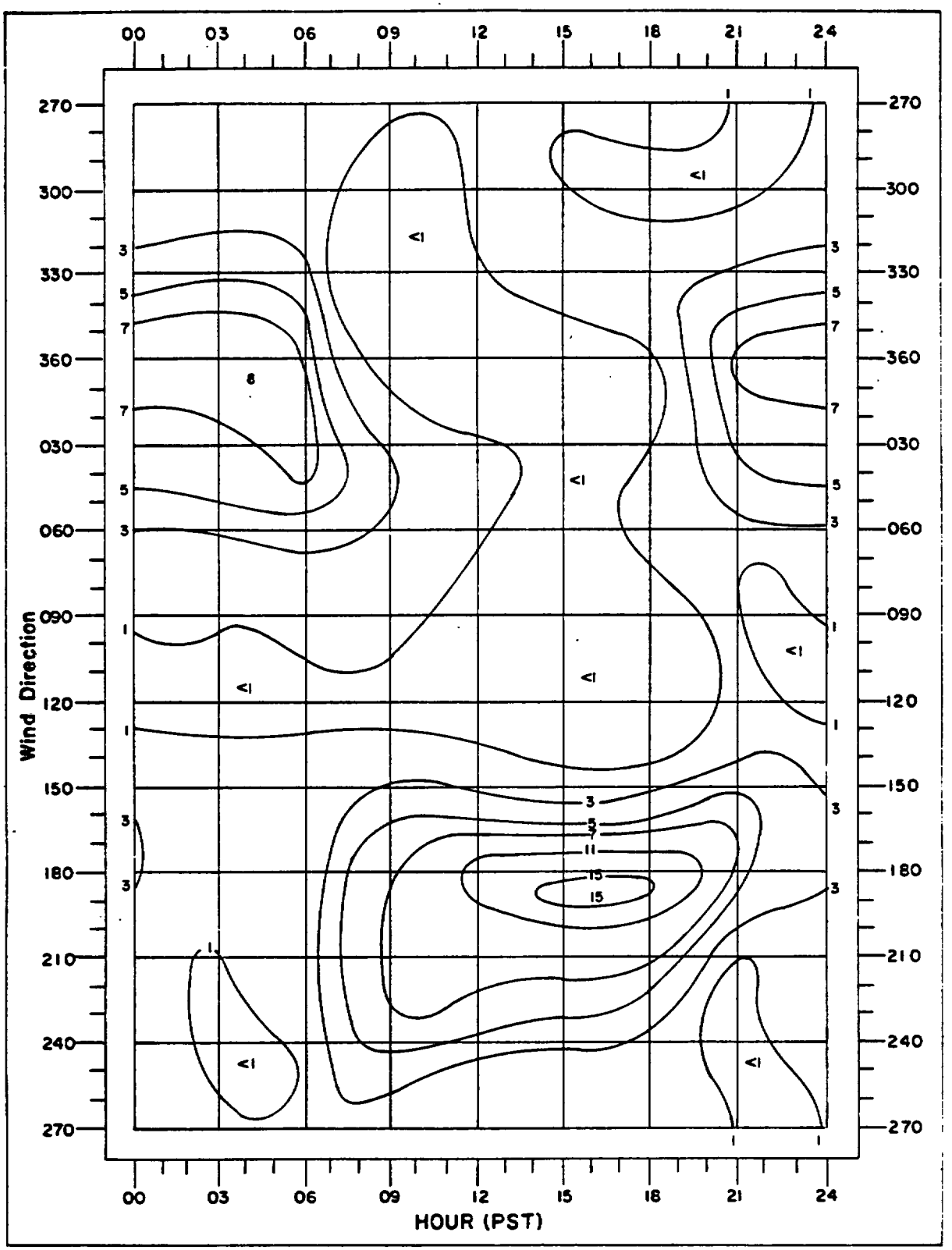

Fig. 2.3.5 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: May

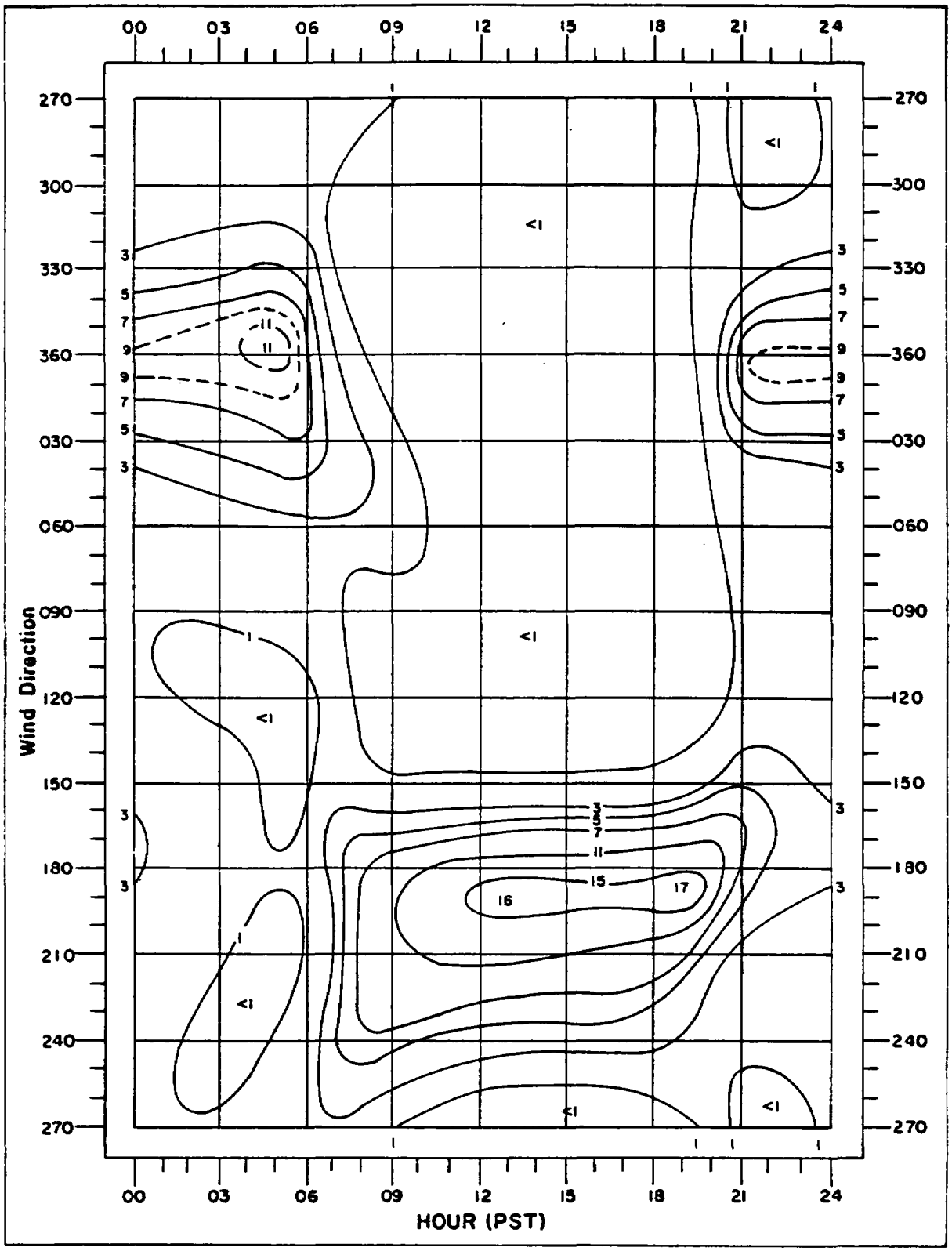

Fig. 2.3.6 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: June

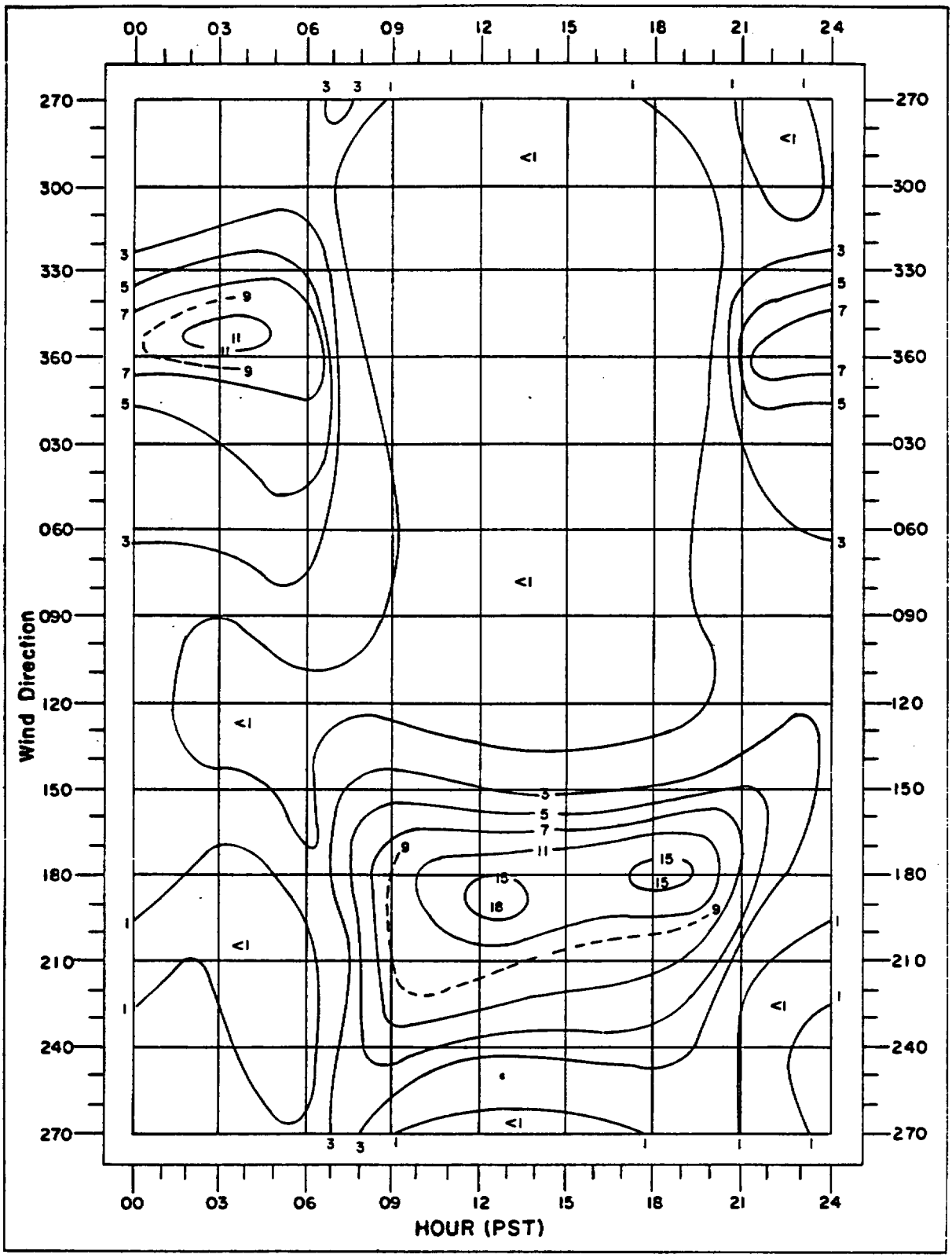

Fig. 2.3.7 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: July

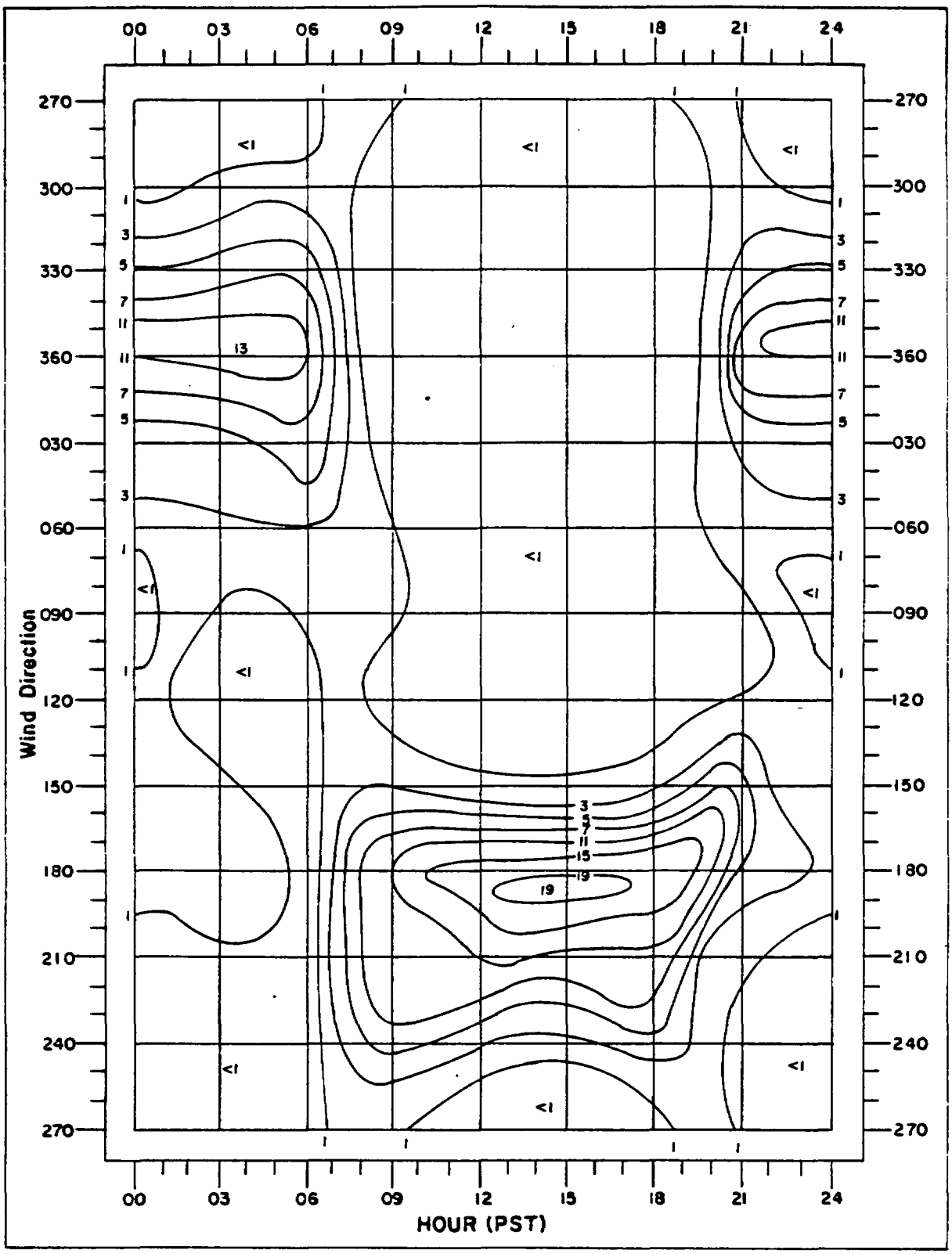

Fig. 2.3.8 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: August

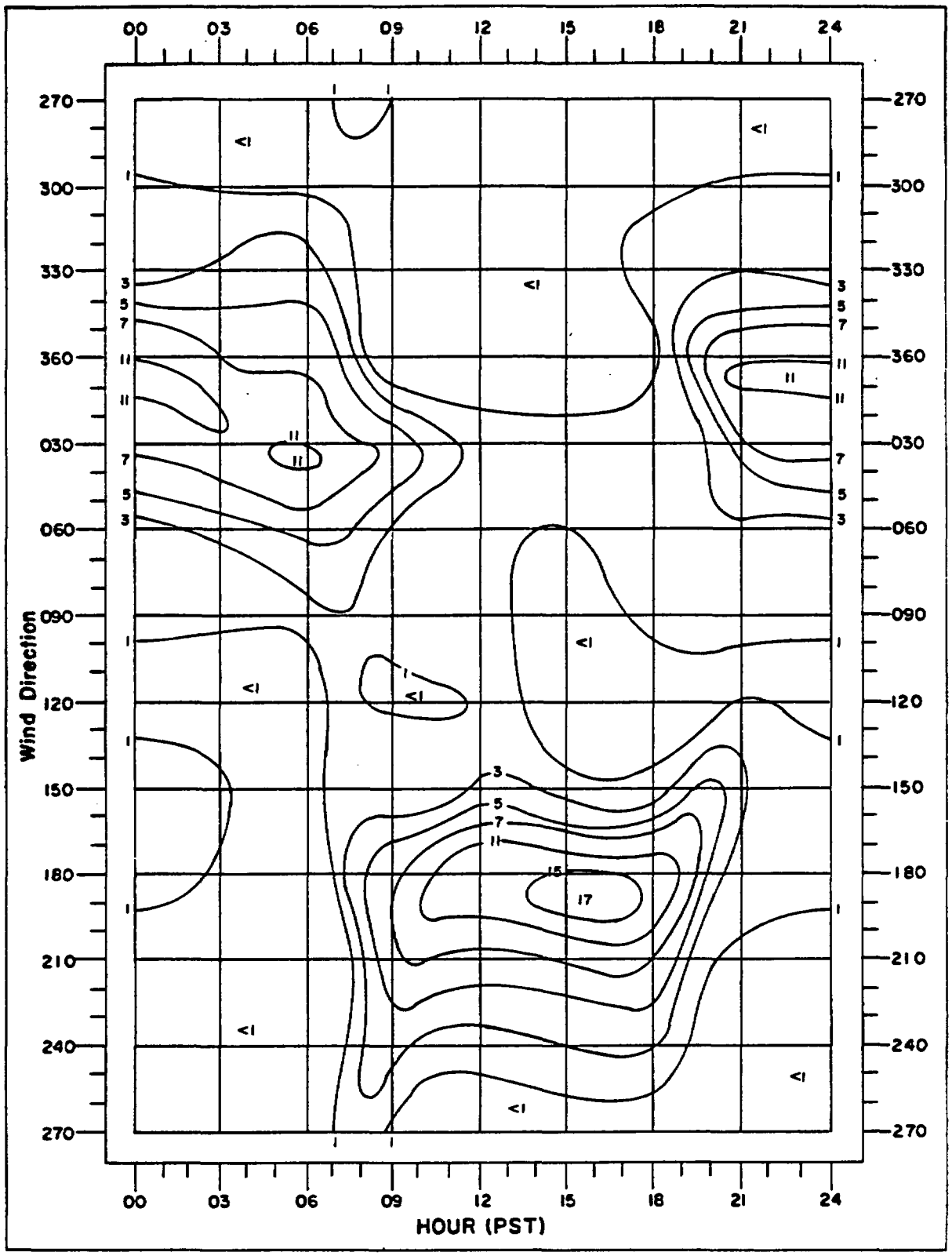

Fig. 2.3.9 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: September

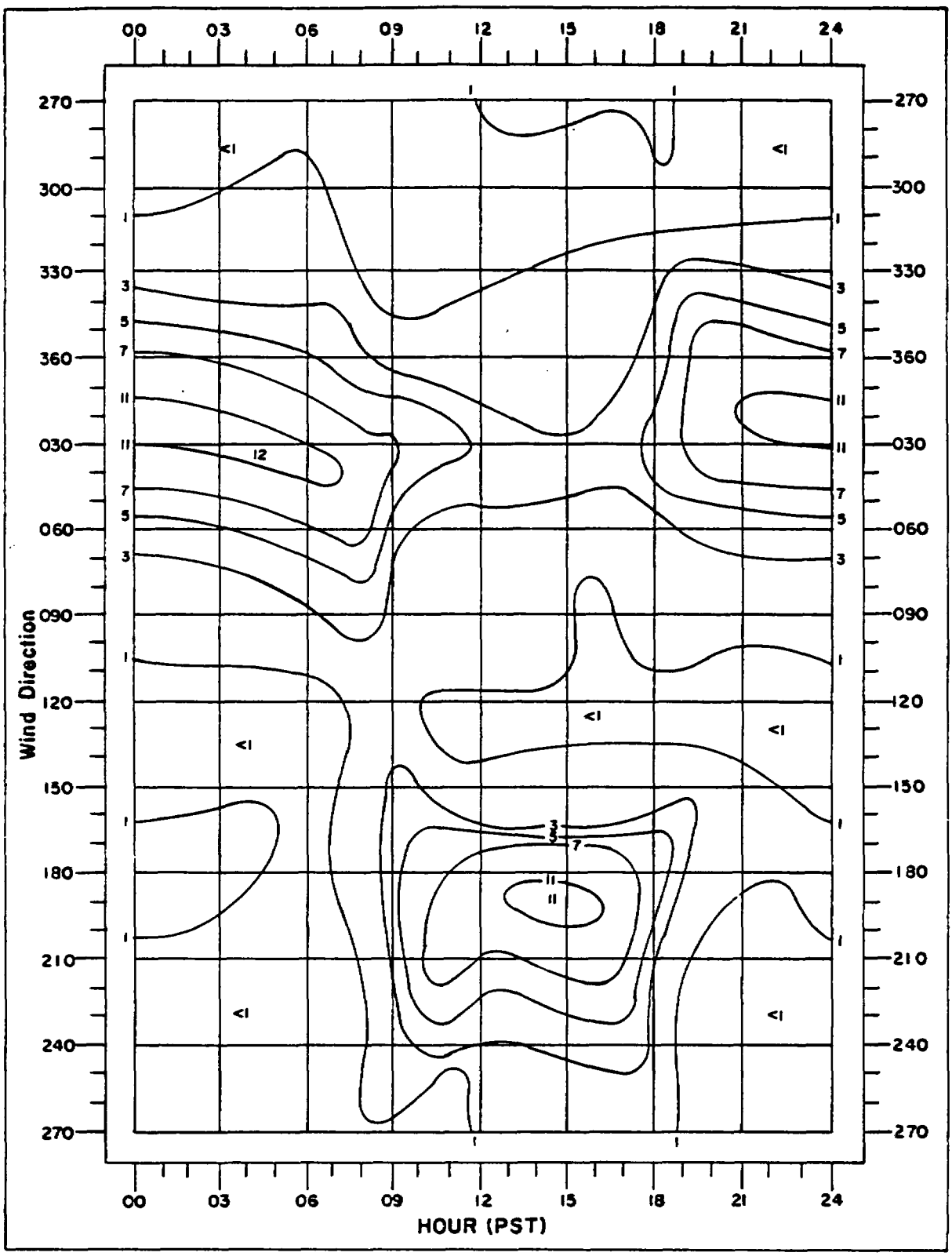

Fig. 2.3.10 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: October

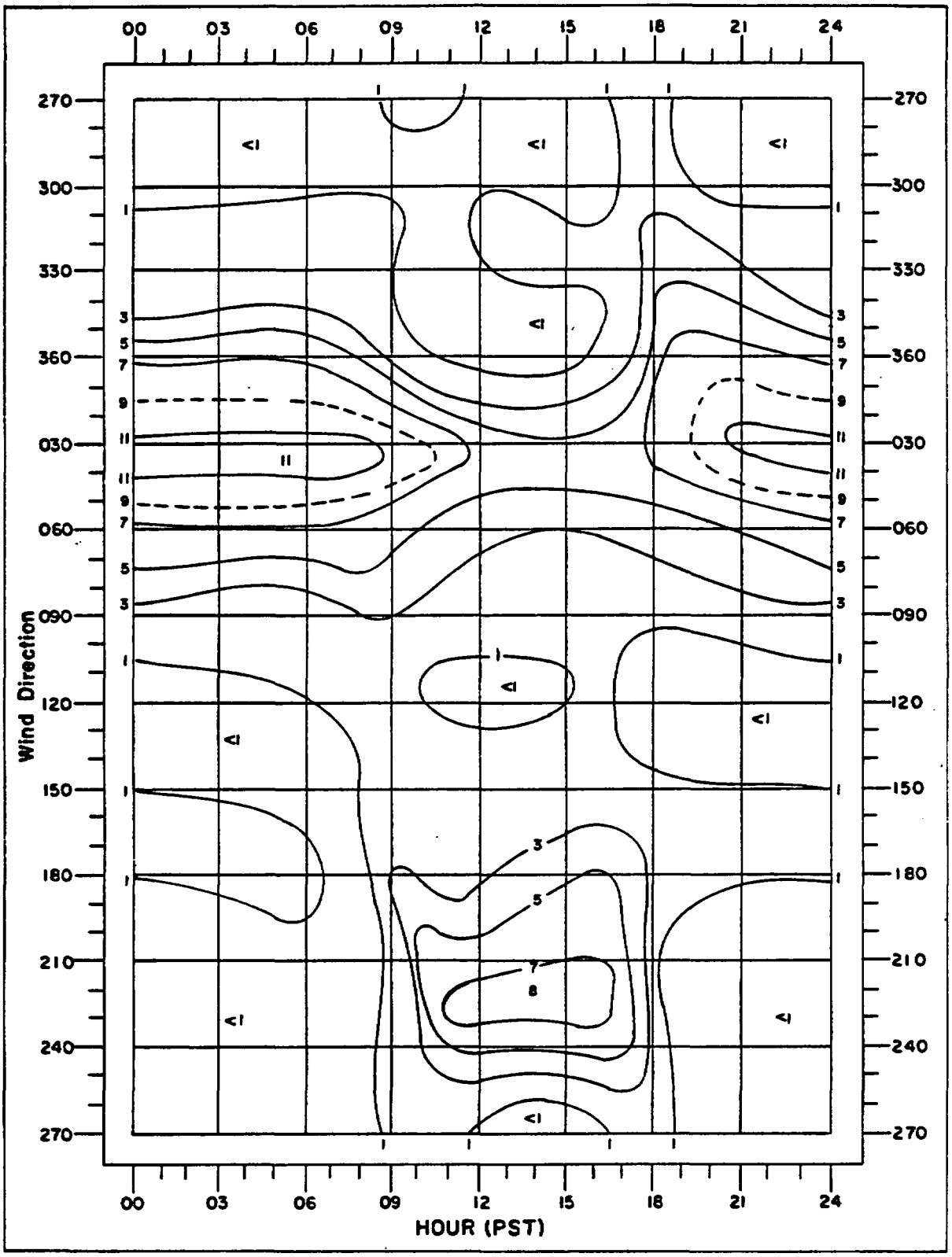

Fig. 2.3.11 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: November

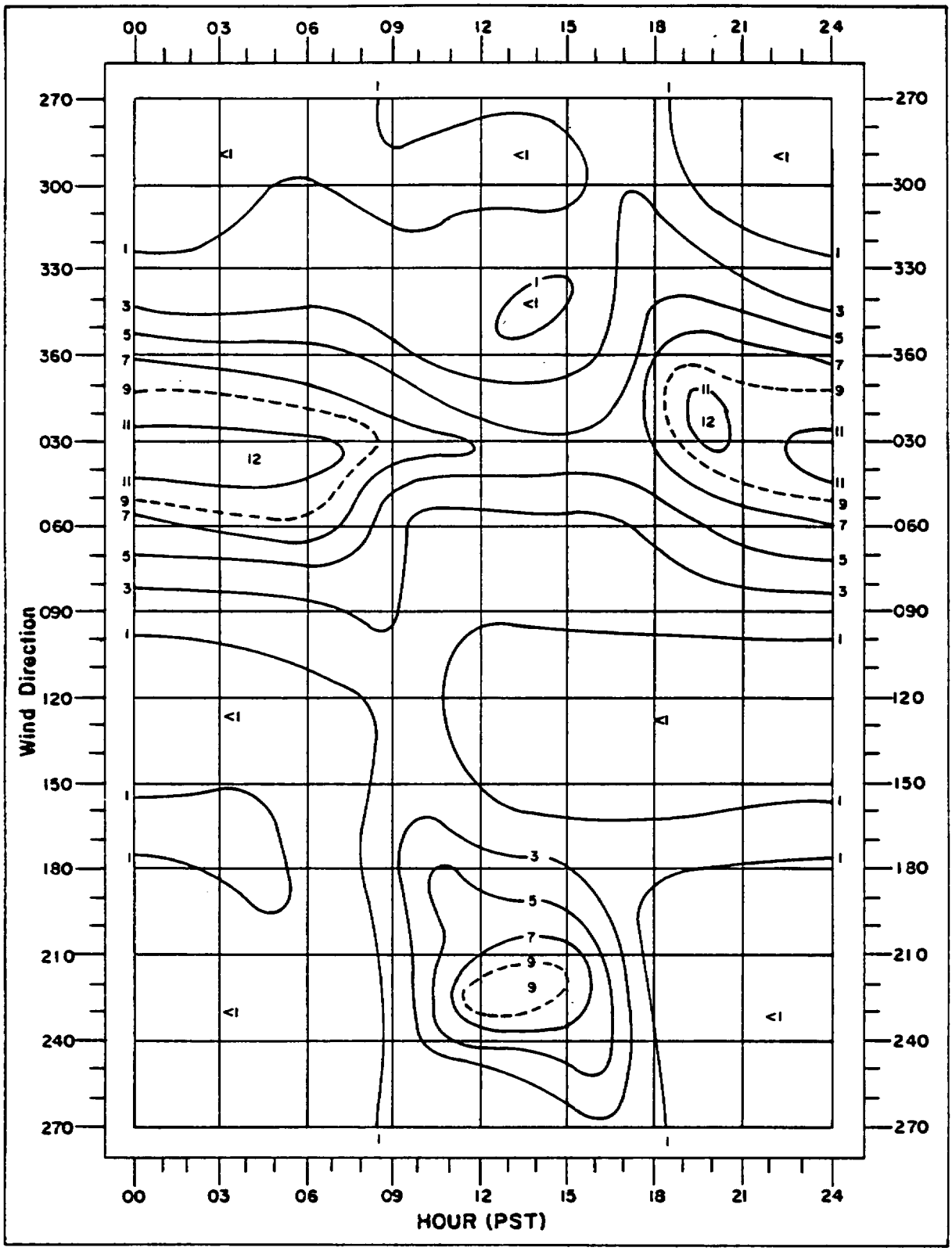

Fig. 2.3.12 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 4 Month: December

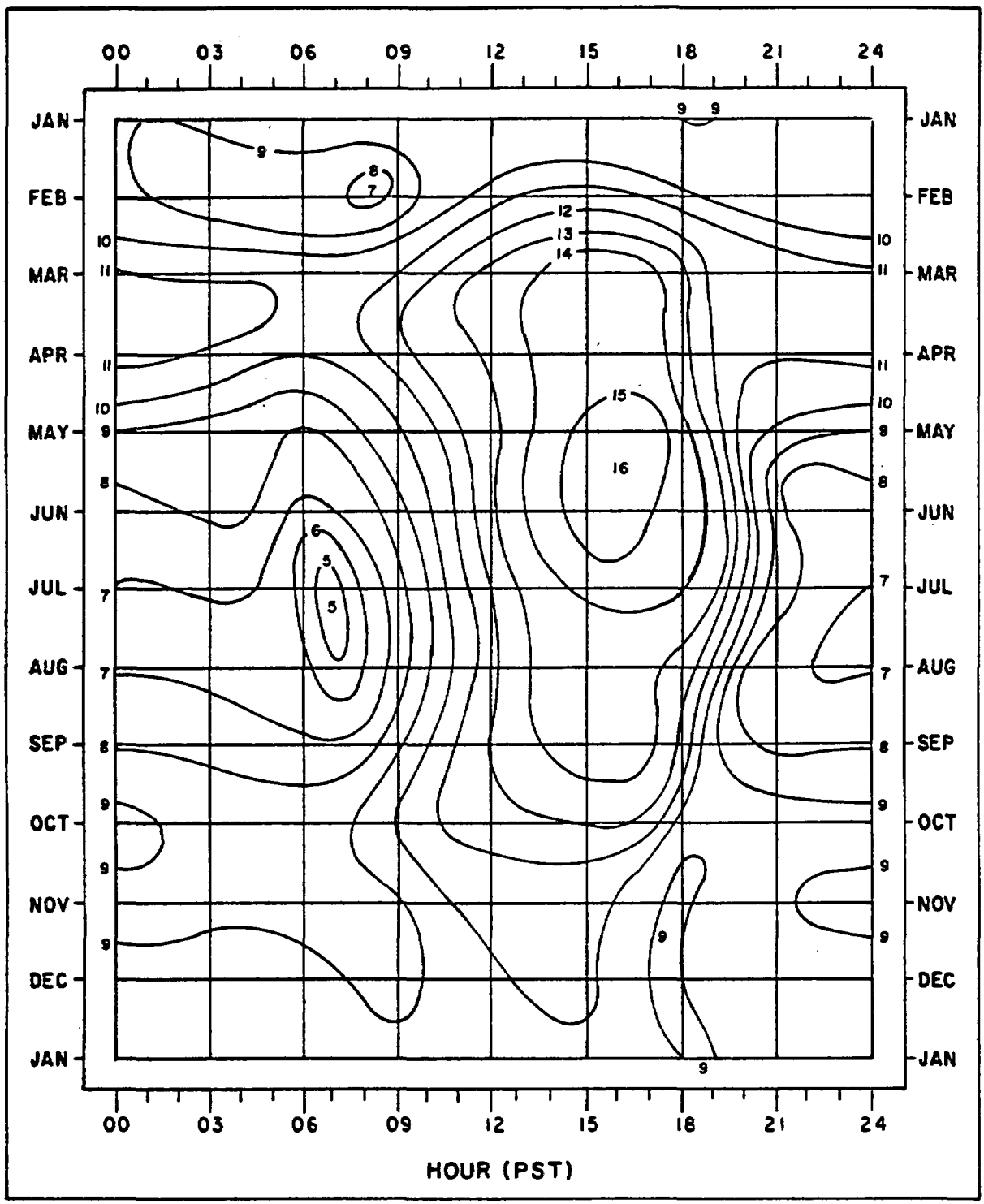

Fig. 2.3.13 Average wind speed in miles per hour as a function of time of day.

Station: Tower 4

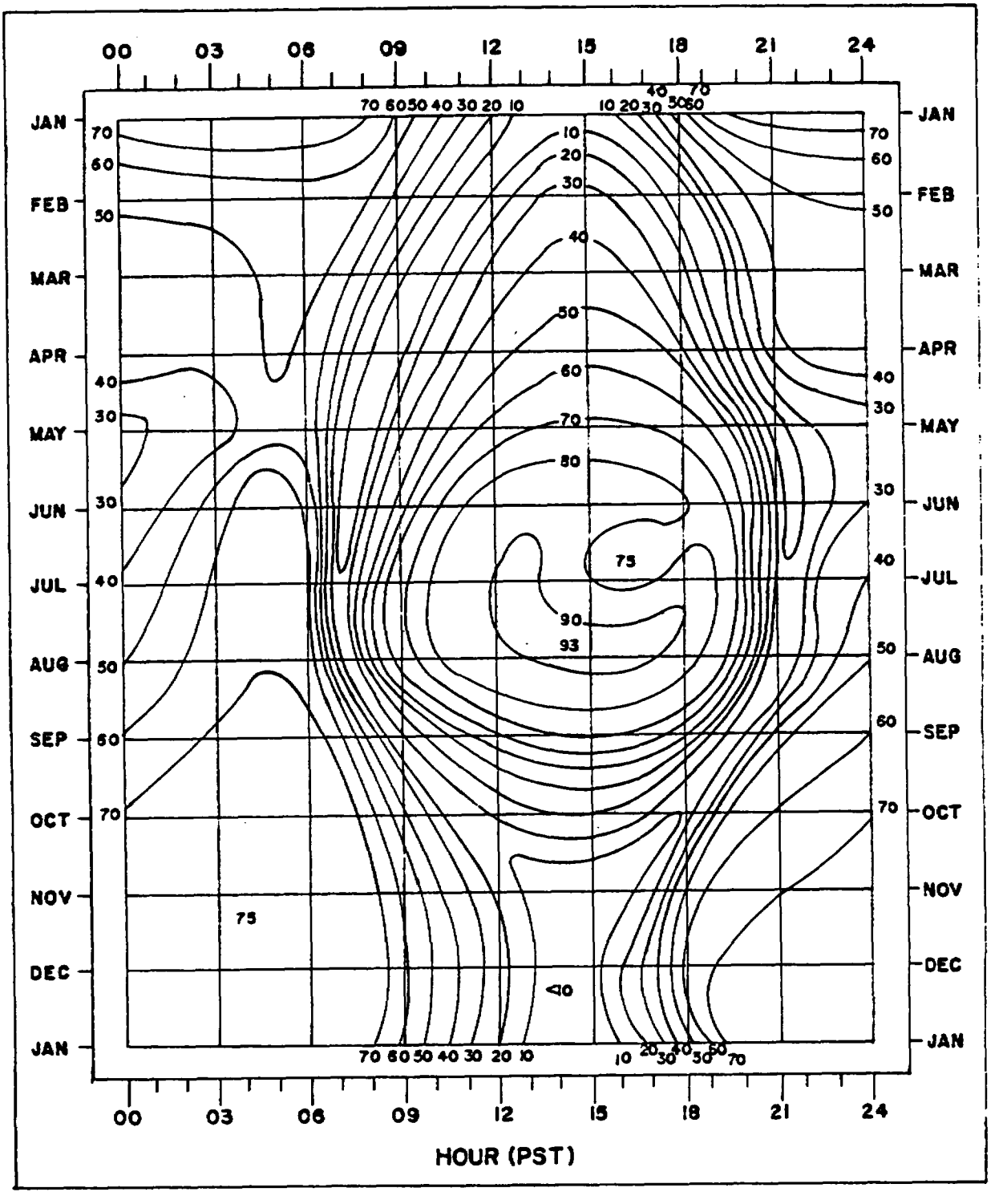

Fig. 2.3.14 Constancy of the wind expressed as the percentage ratio of the mean vector wind speed to the mean scalar speed.

Station: Tower 4

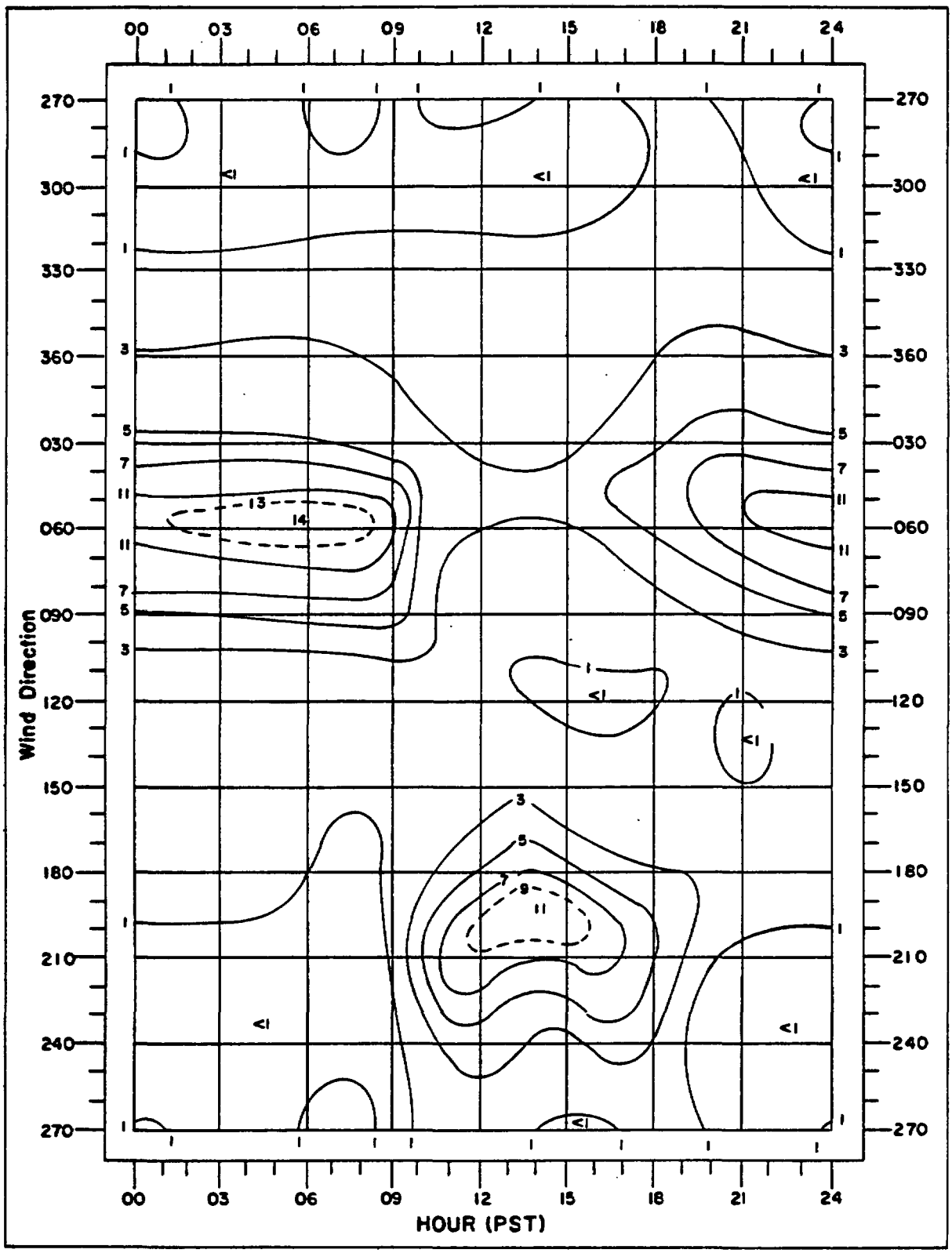

Fig. 2.4.1 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: January

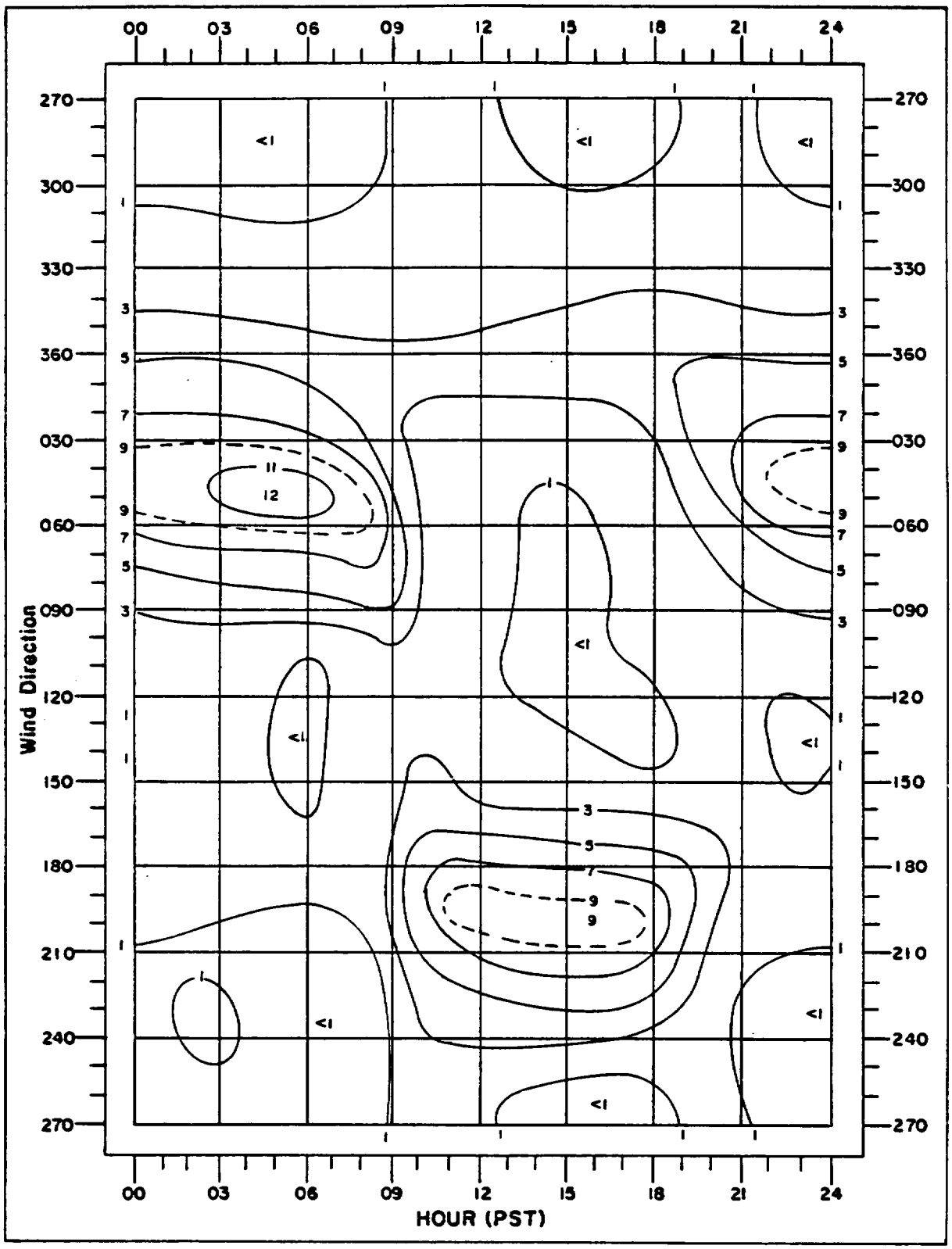

Fig. 2.4.2 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: February

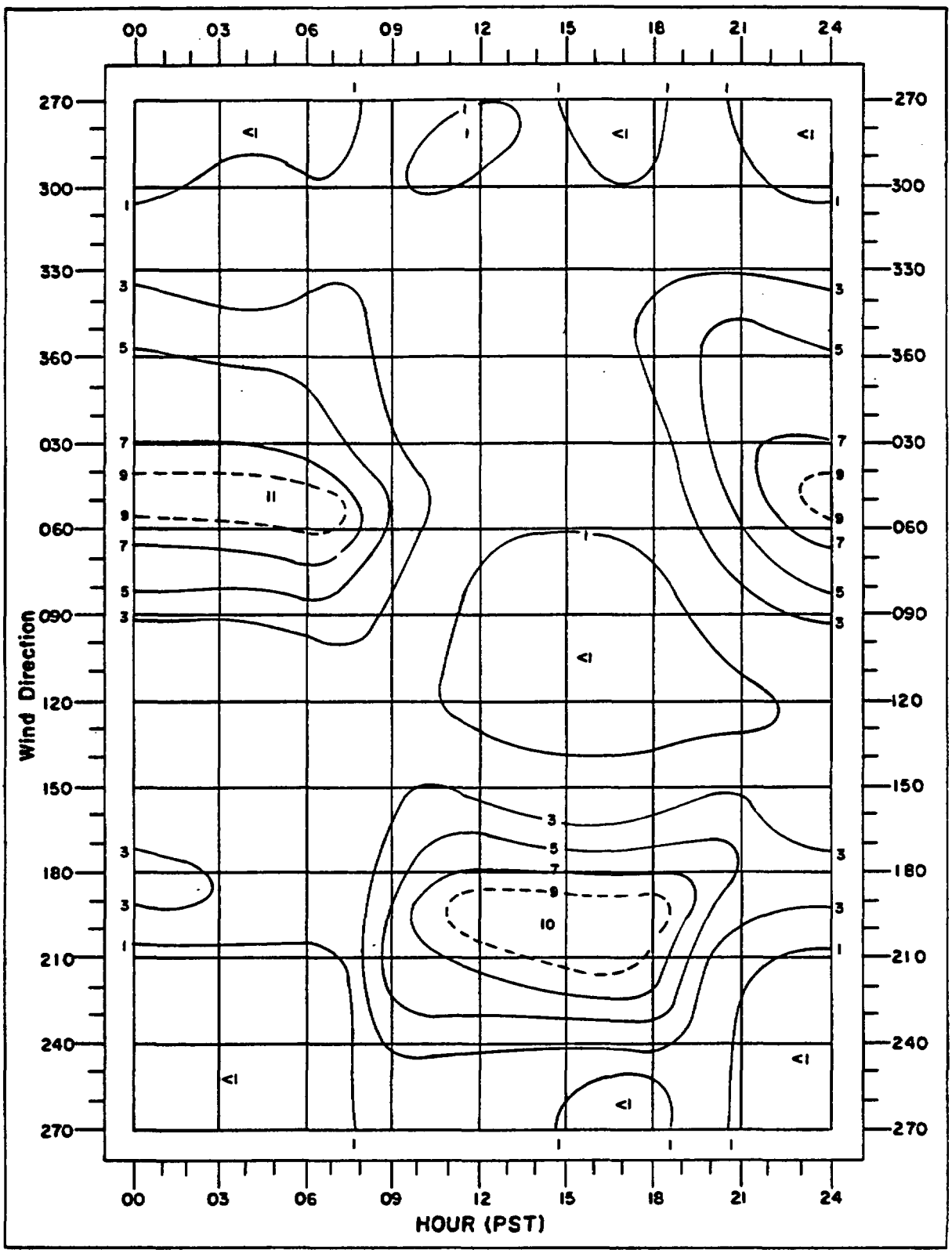

Fig. 2.4.3 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: March

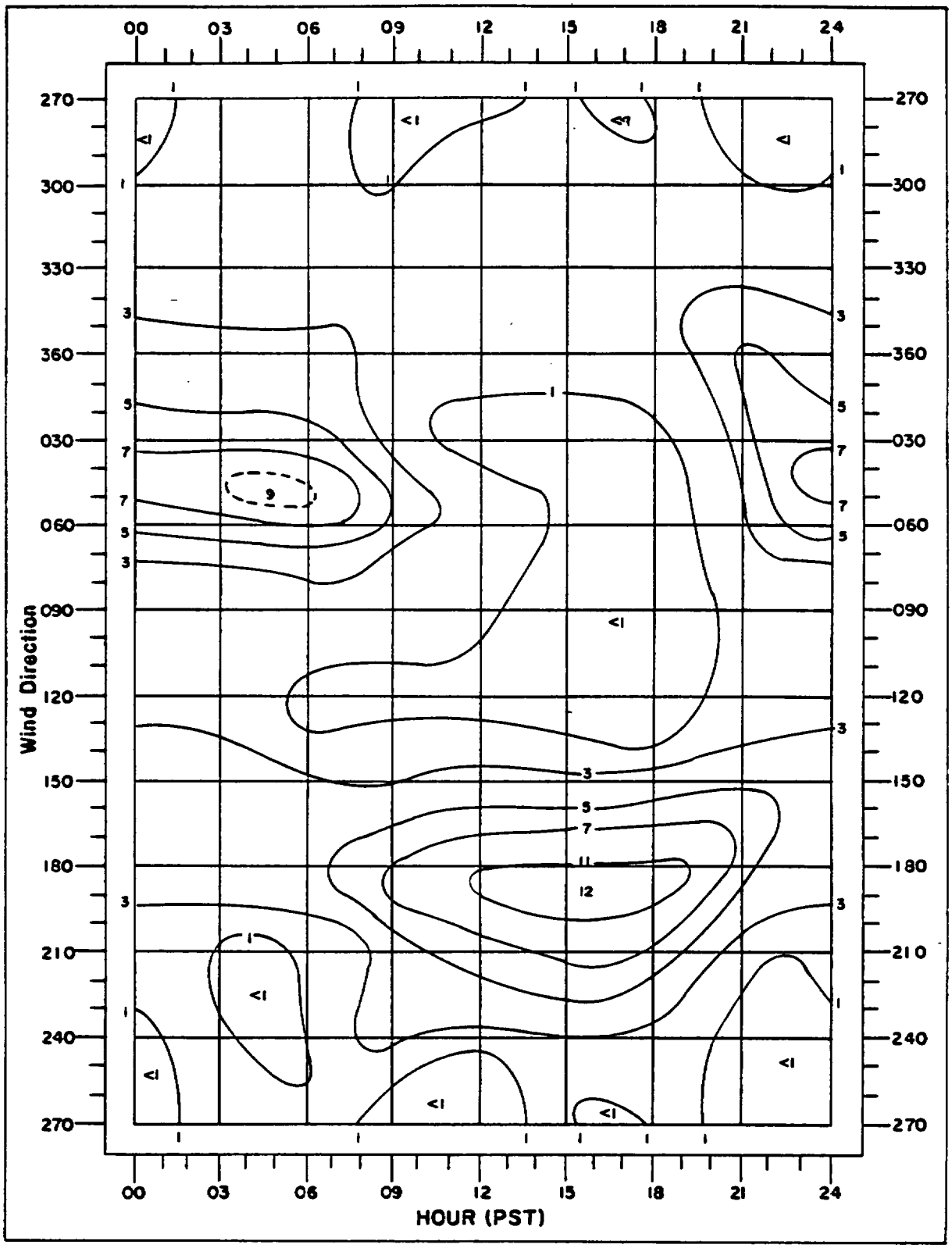

Fig. 2.4.4 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: April

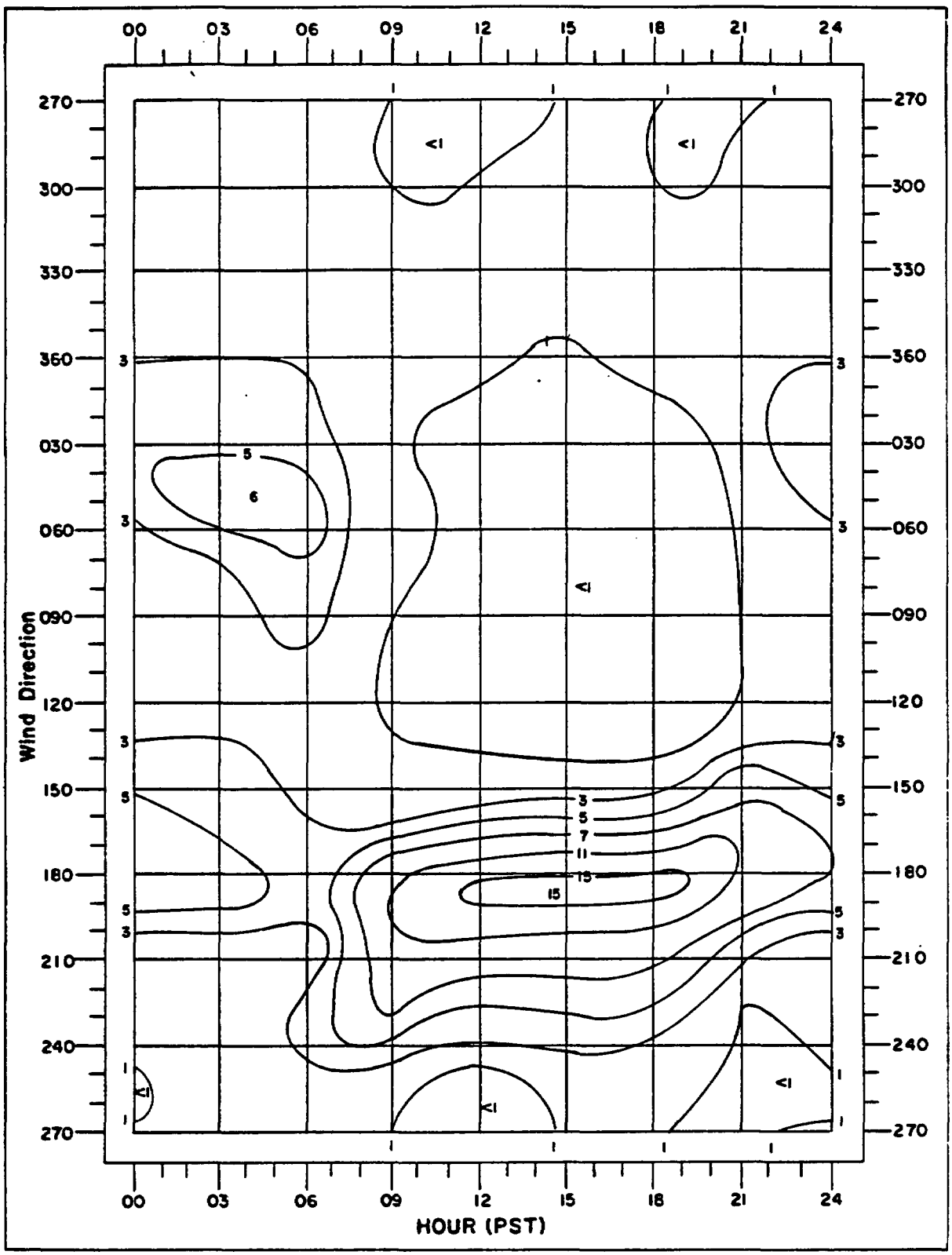

Fig. 2.4.5 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: May

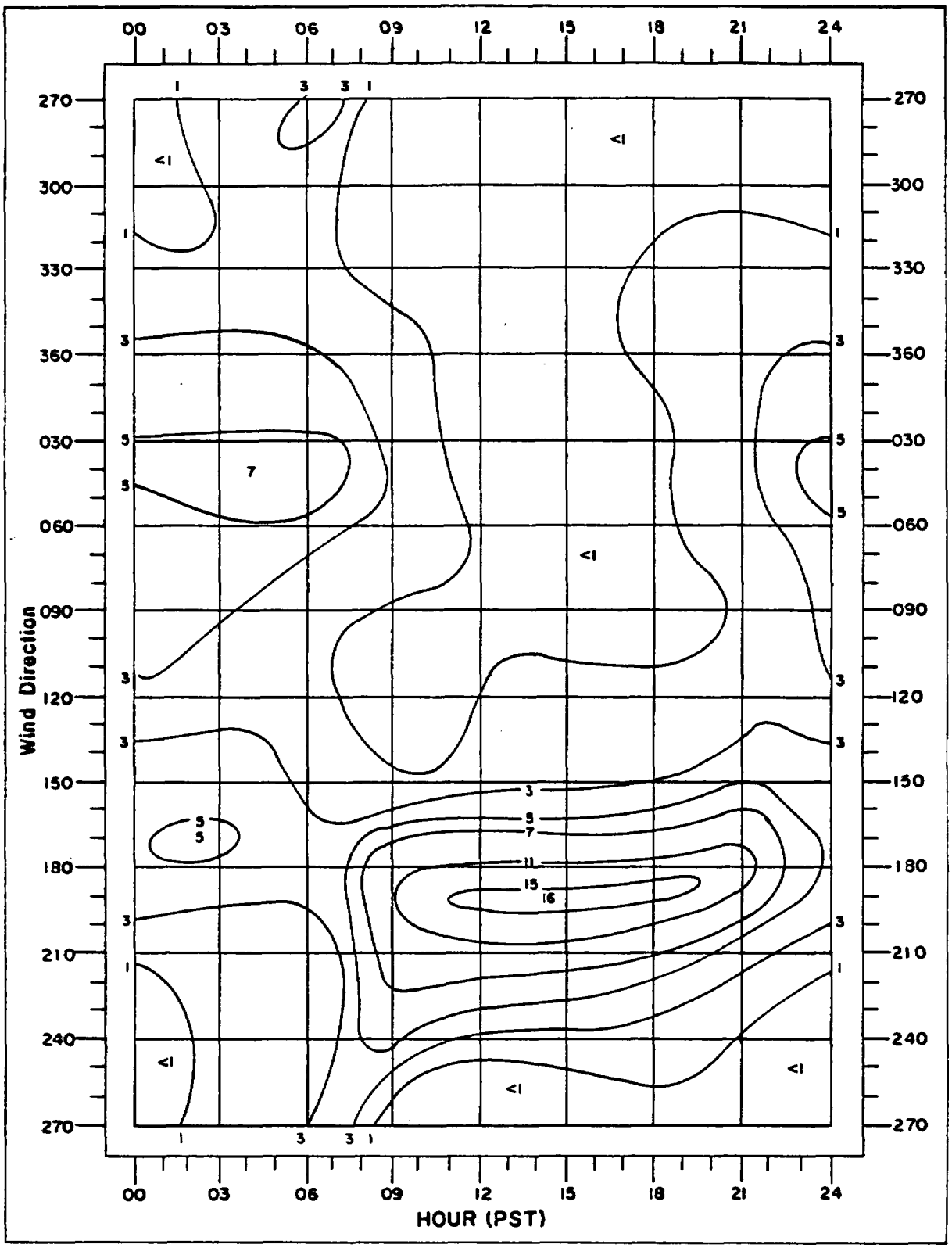

Fig. 2.4.6 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: June

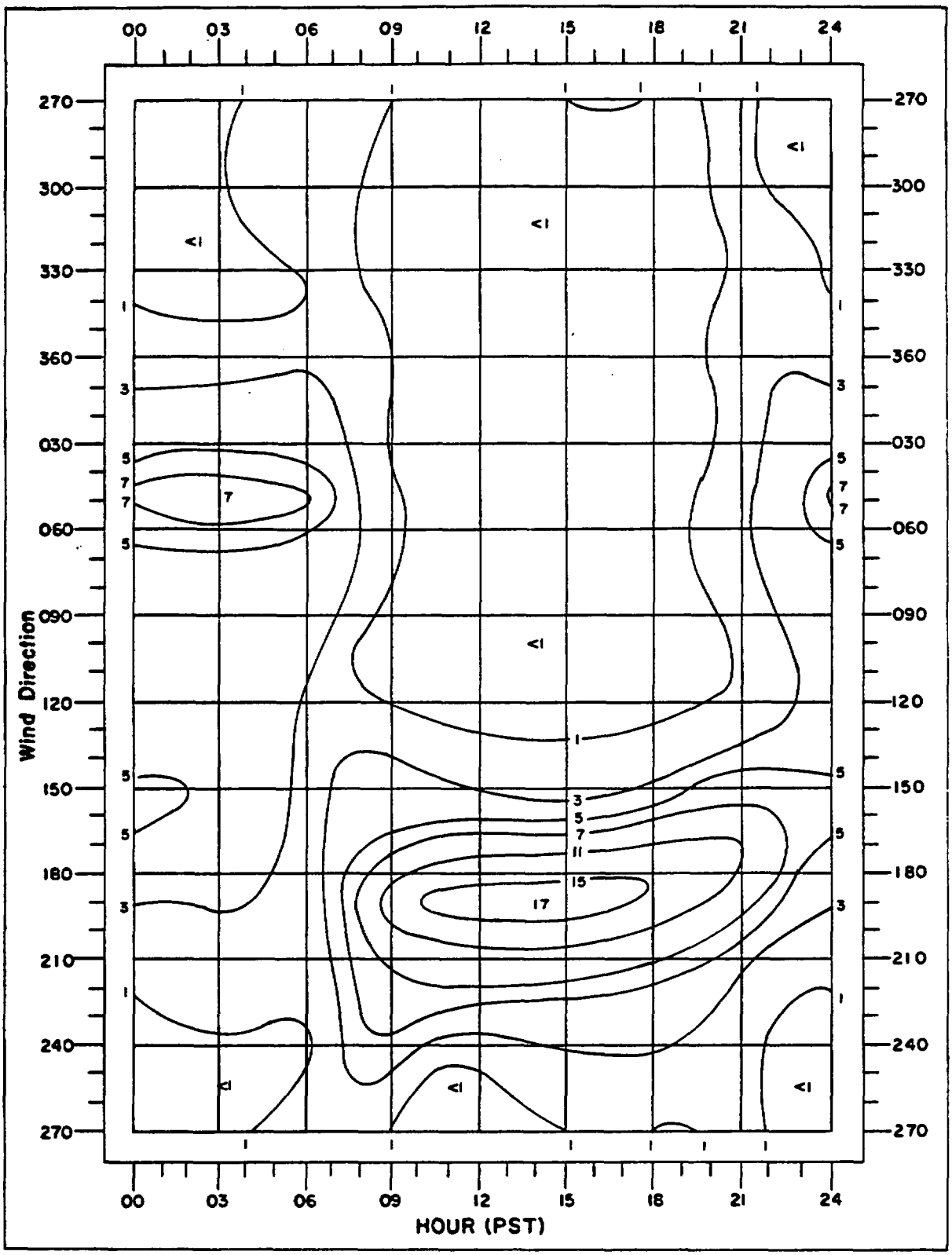

Fig. 2.4.7 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: July

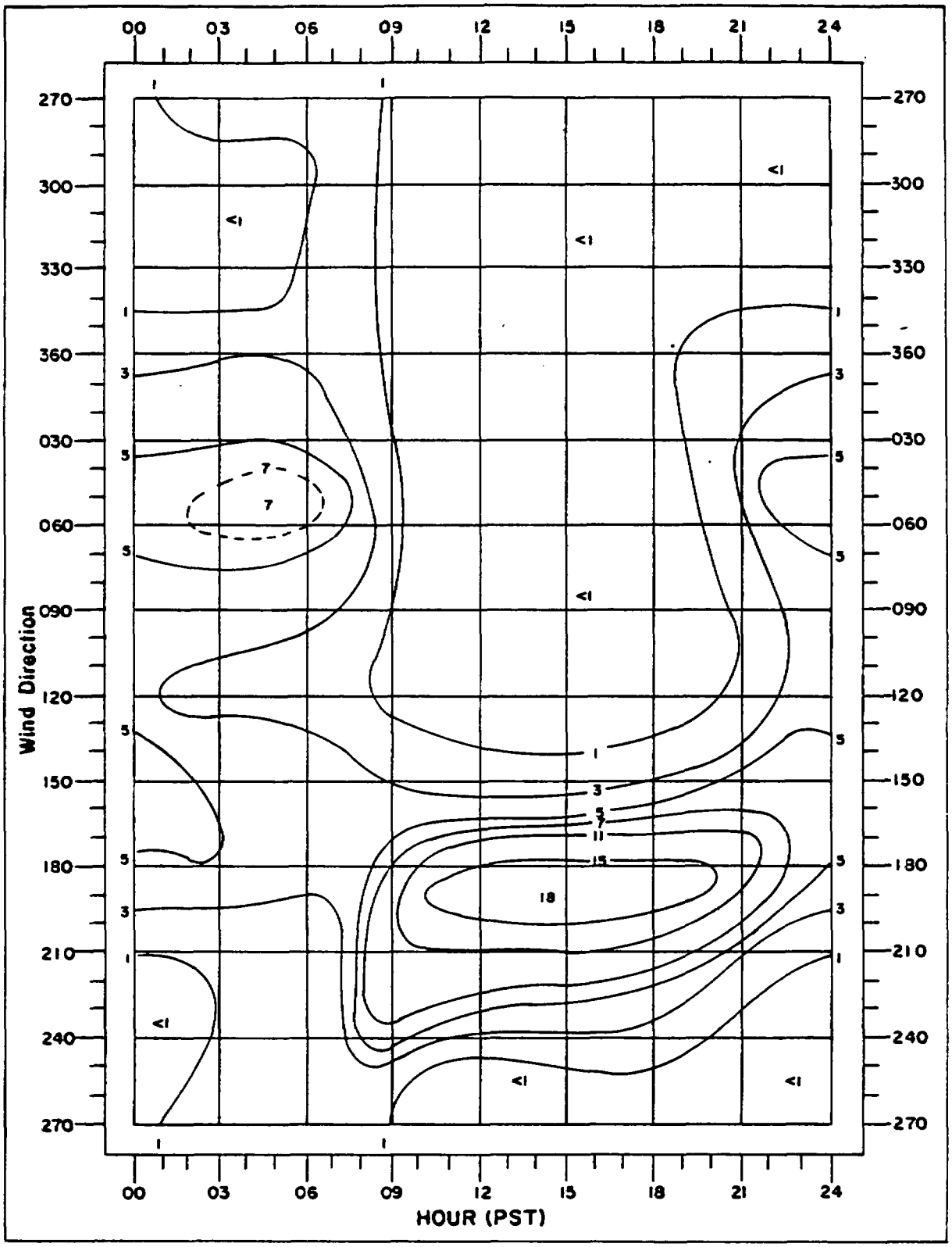

Fig. 2.4.8 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: August

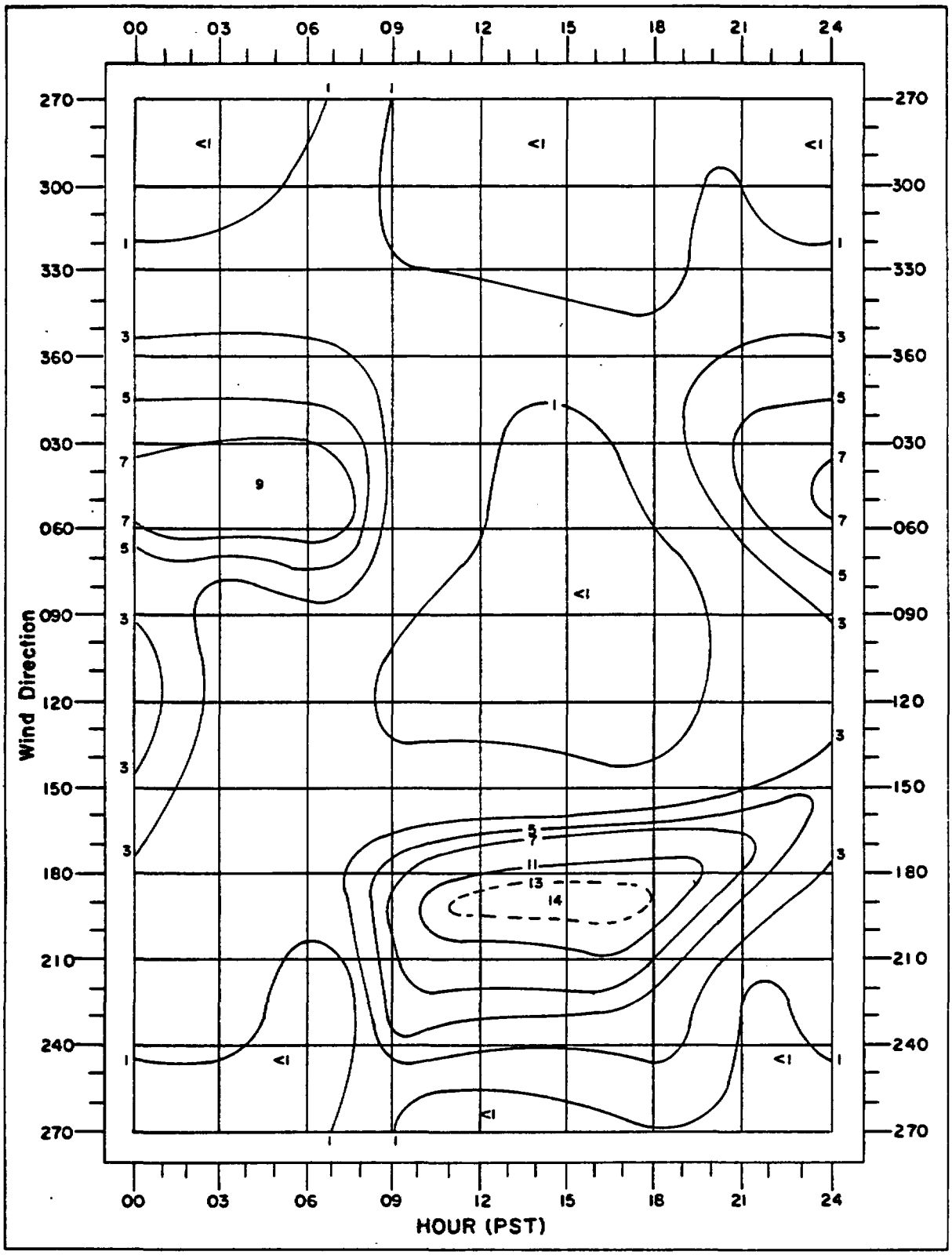

Fig. 2.4.9 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: September

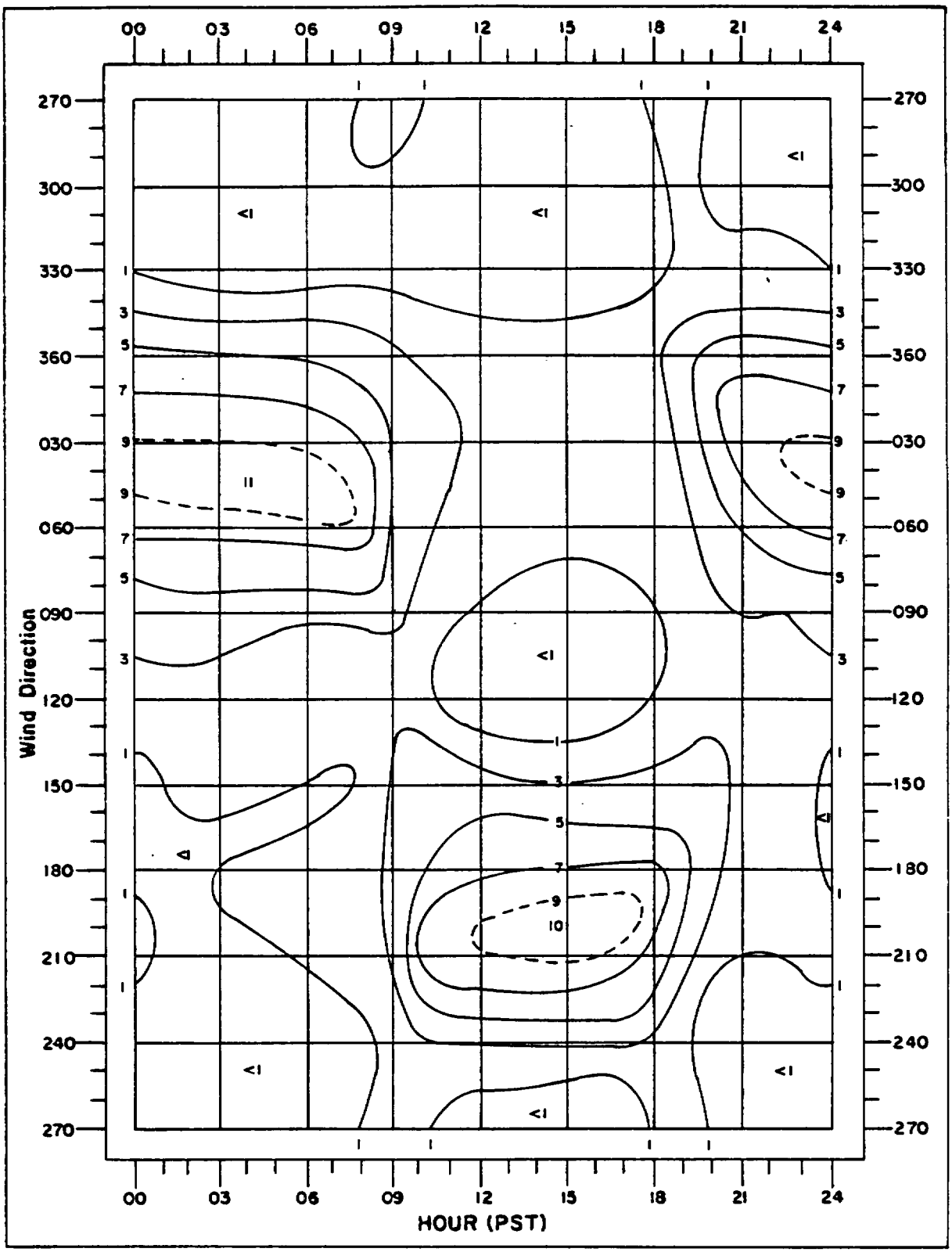

Fig. 2.4.10 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: October

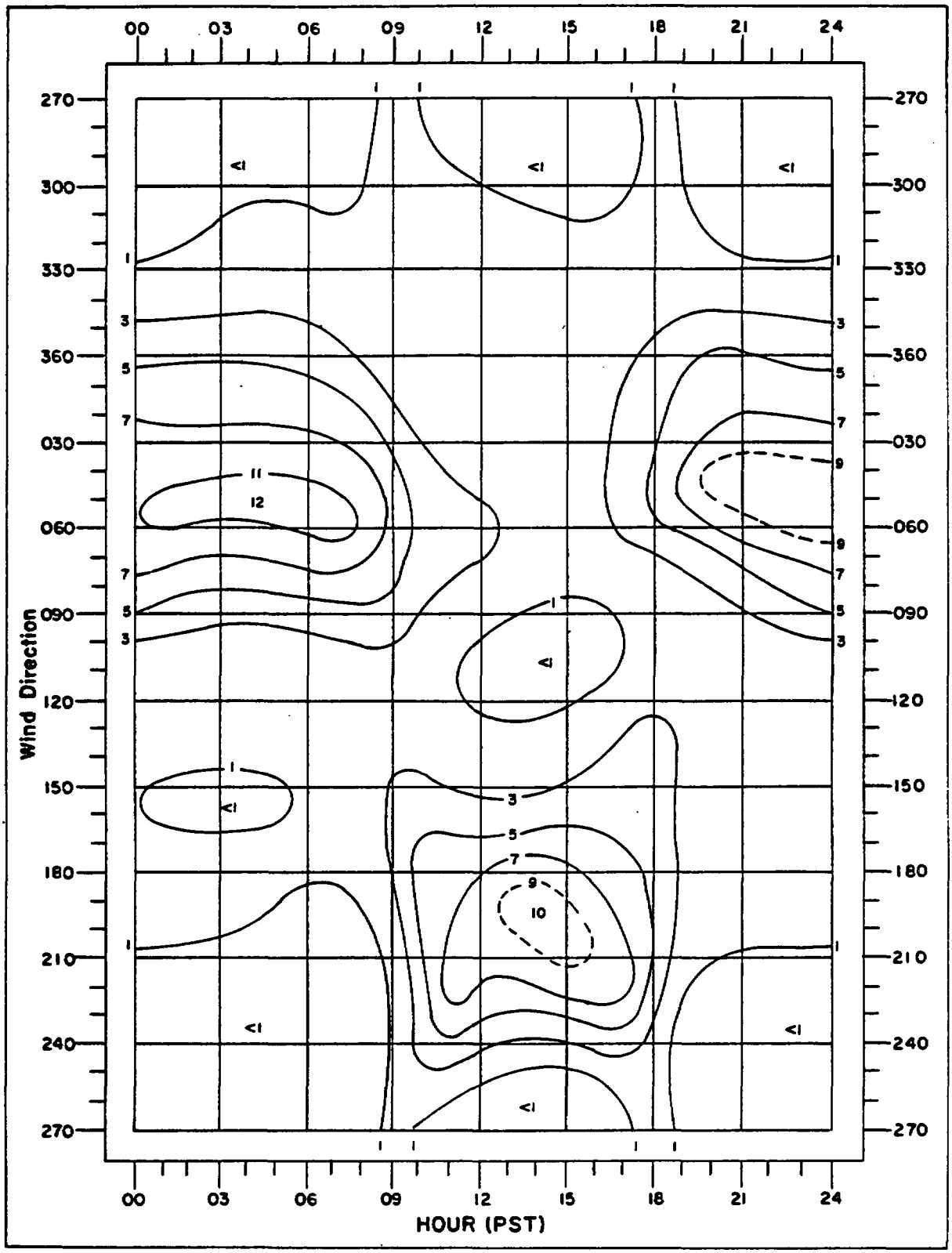

Fig. 2.4.11 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: November

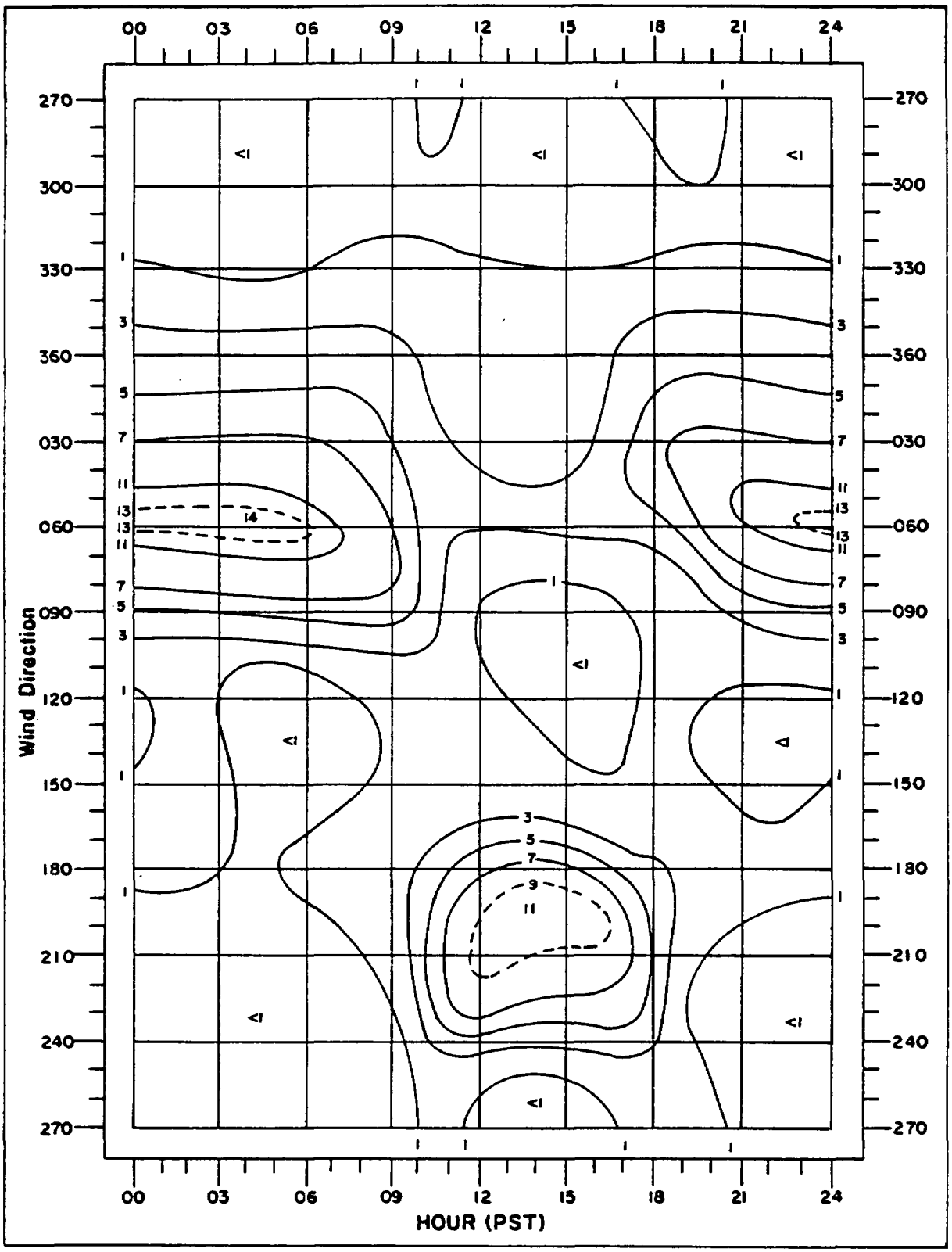

Fig. 2.4.12 Wind direction frequency (%) for 10 degree increments of direction.

Station: Tower 5A Month: December

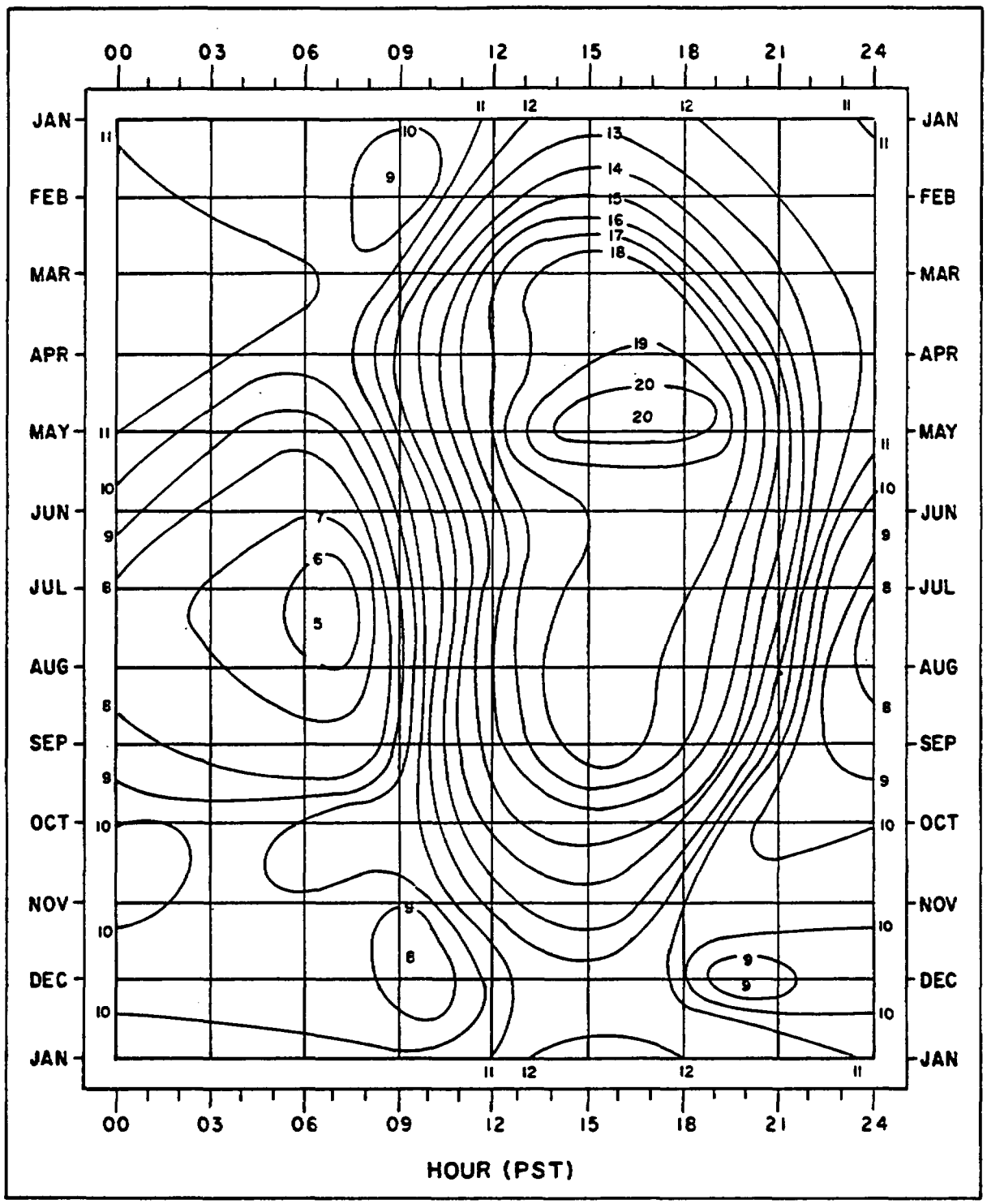

Fig. 2.4.13 Average wind speed in miles per hour as a function of time of day.

Station: Tower 5A

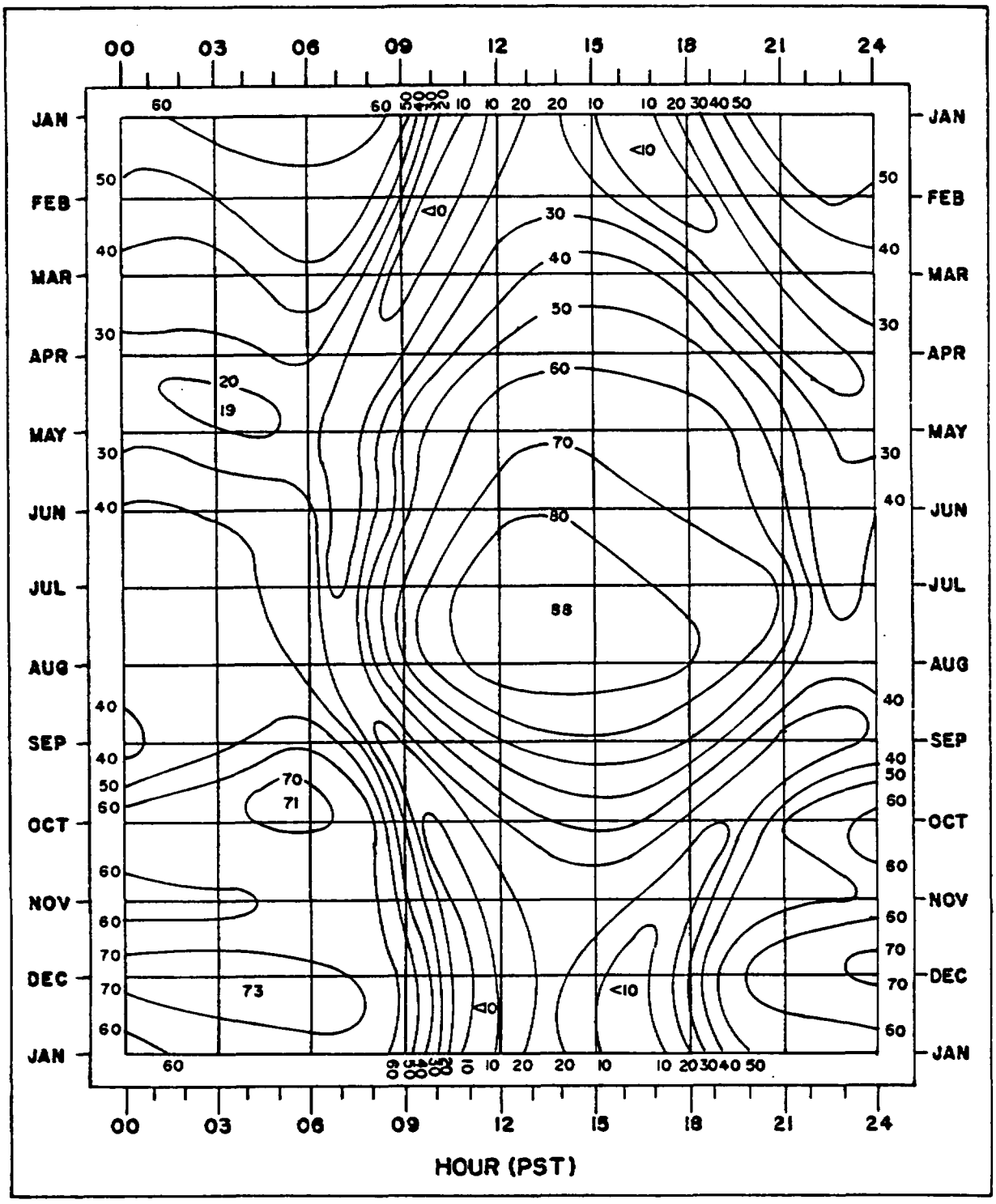

Fig. 2.4.14 Constancy of the wind expressed as the percentage ratio of the mean vector wind speed to the mean scalar speed.

Station: Tower 5A

3.0 TEMPERATURE

3.1 General

The temperature at any point on the test site is regulated to a large extent by elevation and topography. At the time of the maximum temperature in midafternoon, elevation exerts the major control, with the temperature decreasing at the rate of 3 to 4° F per 1000 ft increase in elevation. The lower limit applies in winter and the higher limit in summer. At the time of the minimum temperature near sunrise, topography exerts the major control in association with air drainage, and the change of temperature with elevation is no longer systematic. Large differences in the average daily minimum temperature at stations at the same elevation are a common occurrence due to the pooling of cold air in the basins, with continuous air movement down the slopes and across the ridges.

The temperature distributions presented in this section are based on records produced by either thermographs or hygrothermographs, or combinations of the two, exposed approximately 5 ft above ground in louvered shelters. Temperature values were read on the hour from the traces. Stations have been selected to demonstrate the effects of topography over a wide range of elevations.

The distributions of temperature are shown by month and time of day for selected percentiles. The curves labeled Hi and Lo represent a smoothed envelope of the extreme temperatures observed during the

period of record. The lowest and the highest points on the 50th percentile curve (median) approximate to within a degree or two the average daily minimum and the average daily maximum temperatures respectively. The difference between these two values, the amplitude of the 50th percentile curve, is the average daily range. The average of the two values gives to a close degree of approximation the average temperature for the month, consistent with standard procedures for determining average monthly temperatures.

3.2 Area 12 Mesa

The Area 12 Mesa station is located on a high point in relatively flat terrain on Rainier Mesa at an elevation of 7480 ft. The open exposure at high elevation is associated with substantial air movement throughout the night and results in a small average daily temperature range, as seen by the low amplitude of the 50th percentile curve. The distributions of temperature by month and time of day are shown in figures 3.1.1 through 3.1.12.

3.3 BJY

The BJY station is located near the center of Yucca Flat on gently sloping terrain at an elevation of 4075 ft, about 155 ft above the lowest elevations on normally dry Yucca Lake. The pronounced tendency toward air stagnation at night results in a large average daily temperature range, in contrast to the Area 12 Mesa station. This effect is most pronounced in December, January, and June through September when the average daily minimum temperature

at the BJY station is actually lower than at the Area 12 Mesa station, even though the latter is 3400 ft higher in elevation and might therefore be expected to be about 10 to 14° colder. Even greater average daily temperature ranges can be expected at the lower elevations on Yucca Lake. The distributions of temperature by month and time of day are shown in figures 3.2.1 through 3.2.12.

3.4 Tower 4

The temperature data for Tower 4 have been combined with data for 4JA (Jackass Flats weather station). Both stations were located near the center of Jackass Flats on terrain sloping downward to the southwest. Tower 4 was at an elevation of 3735 ft and 4JA at an elevation of 3610 ft. The difference in elevations is not significant, considering the similarity of the terrain and accuracy of the instrumentation. The distributions of temperature by month and time of day are shown in figures 3.3.1 through 3.3.12. The average daily temperature range is not as large as at BJY, indicating more persistent air drainage at night in the vicinity of Tower 4 than at BJY.

3.5 Tower 5A

Tower 5A is on top of a hill approximately 4½ mi down-valley from Tower 4, at an elevation of 3644 ft. The distributions of temperature by month and time of day are shown in figures 3.4.1 through 3.4.12. The major difference between the two stations is the smaller average daily temperature range at Tower 5A because of the higher average daily minimum temperatures in all months, even though the stations are at nearly the same elevation. This difference

is attributed to the fact that the hilltop rises about 250 ft above the valley floor and therefore places Tower 5A at a warmer point in the prevalent surface-based nocturnal inversion.

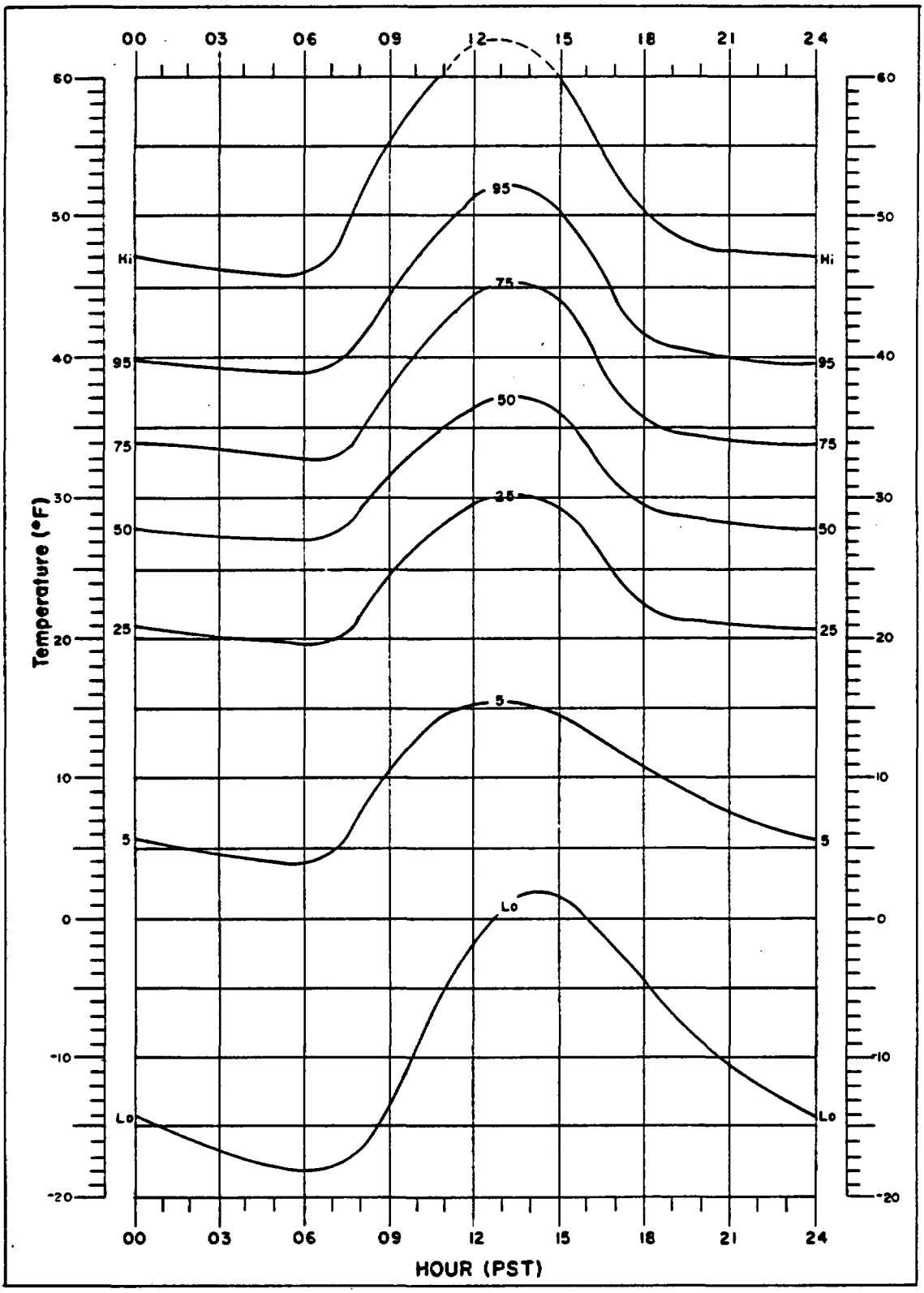

Fig. 3.1.1 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month January

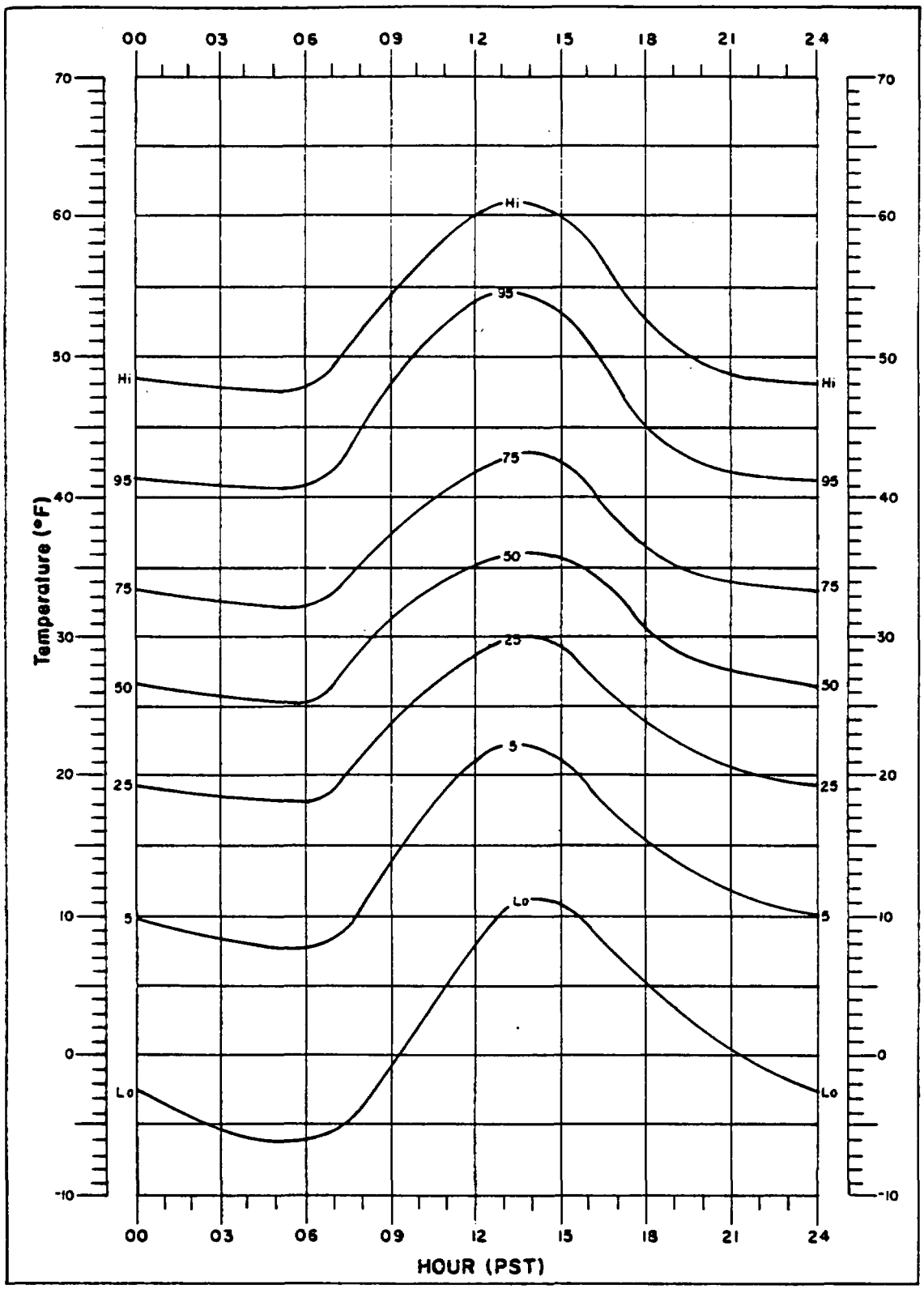

Fig. 3.1.2 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month February

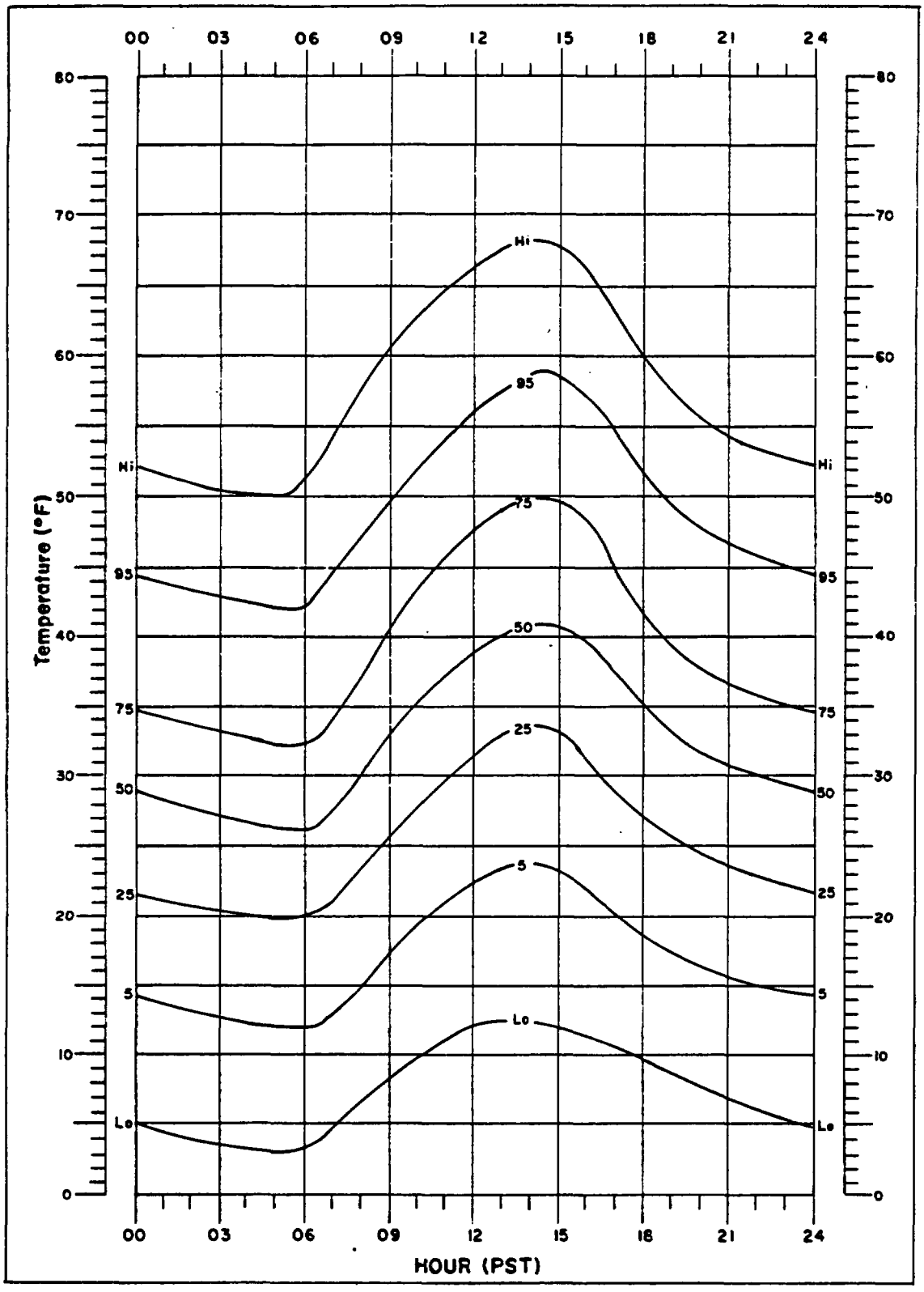

Fig. 3.1.3 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area-12 Mesa Month March

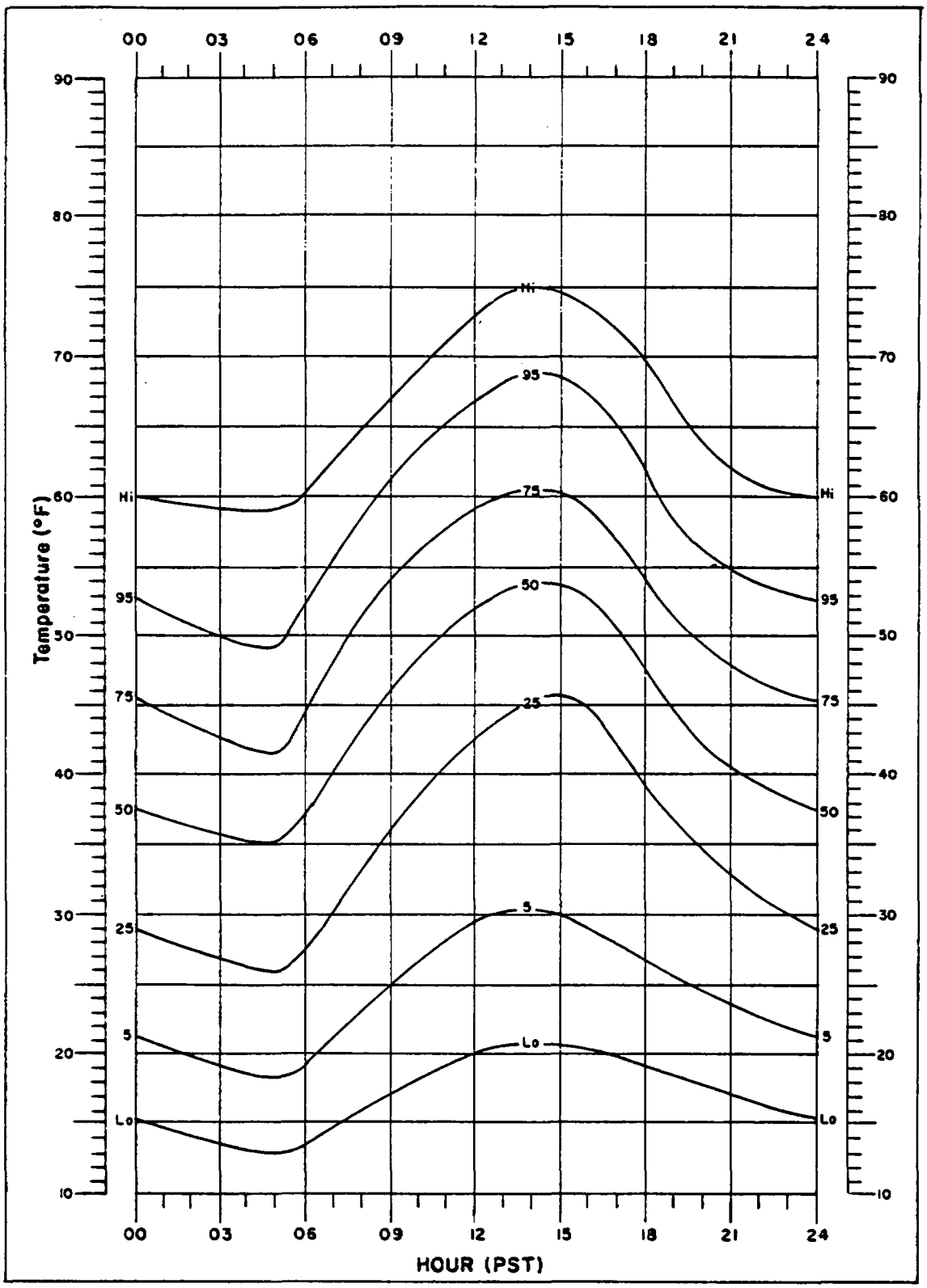

Fig. 3.1.4 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month April

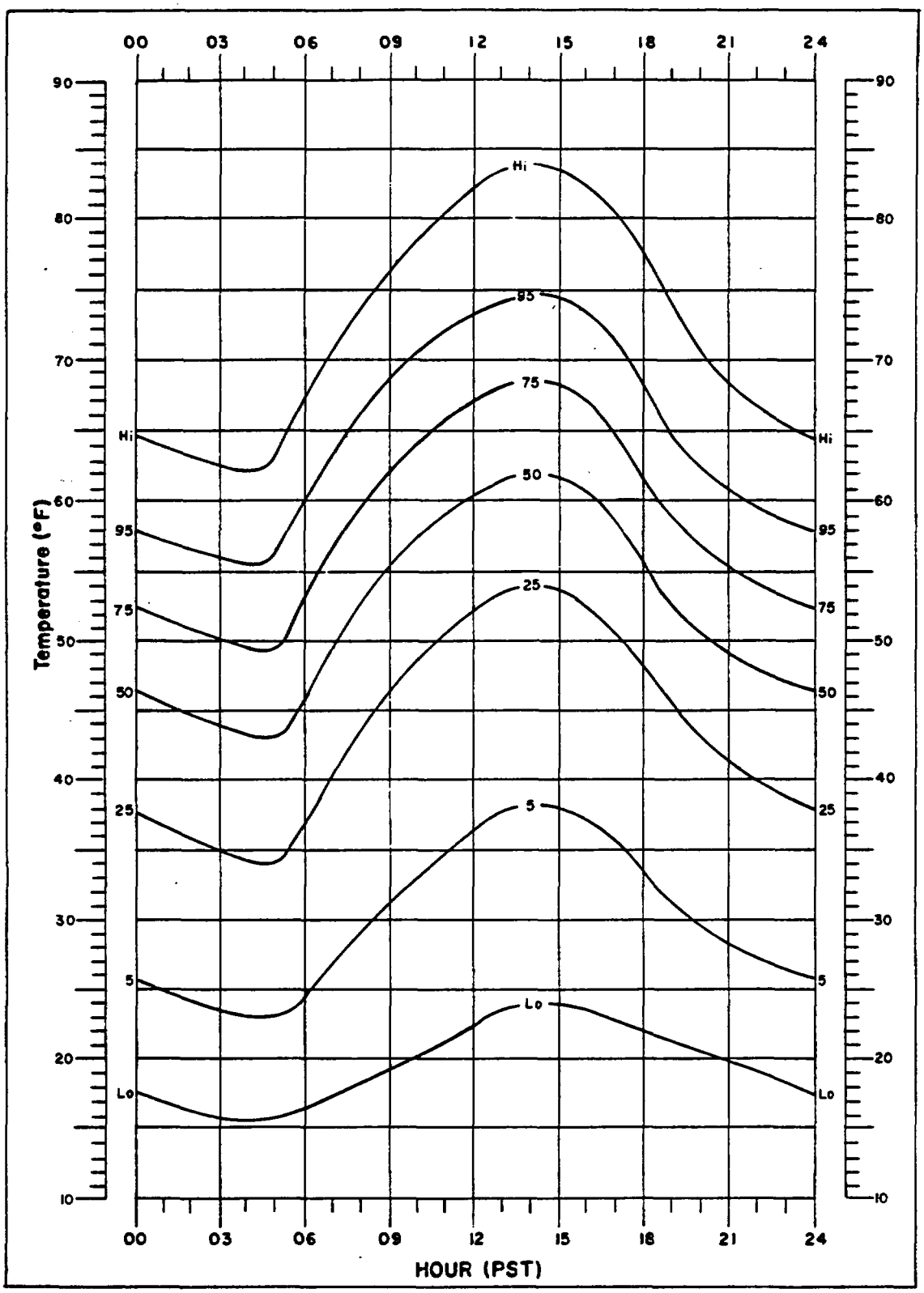

Fig. 3.1.8 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month May

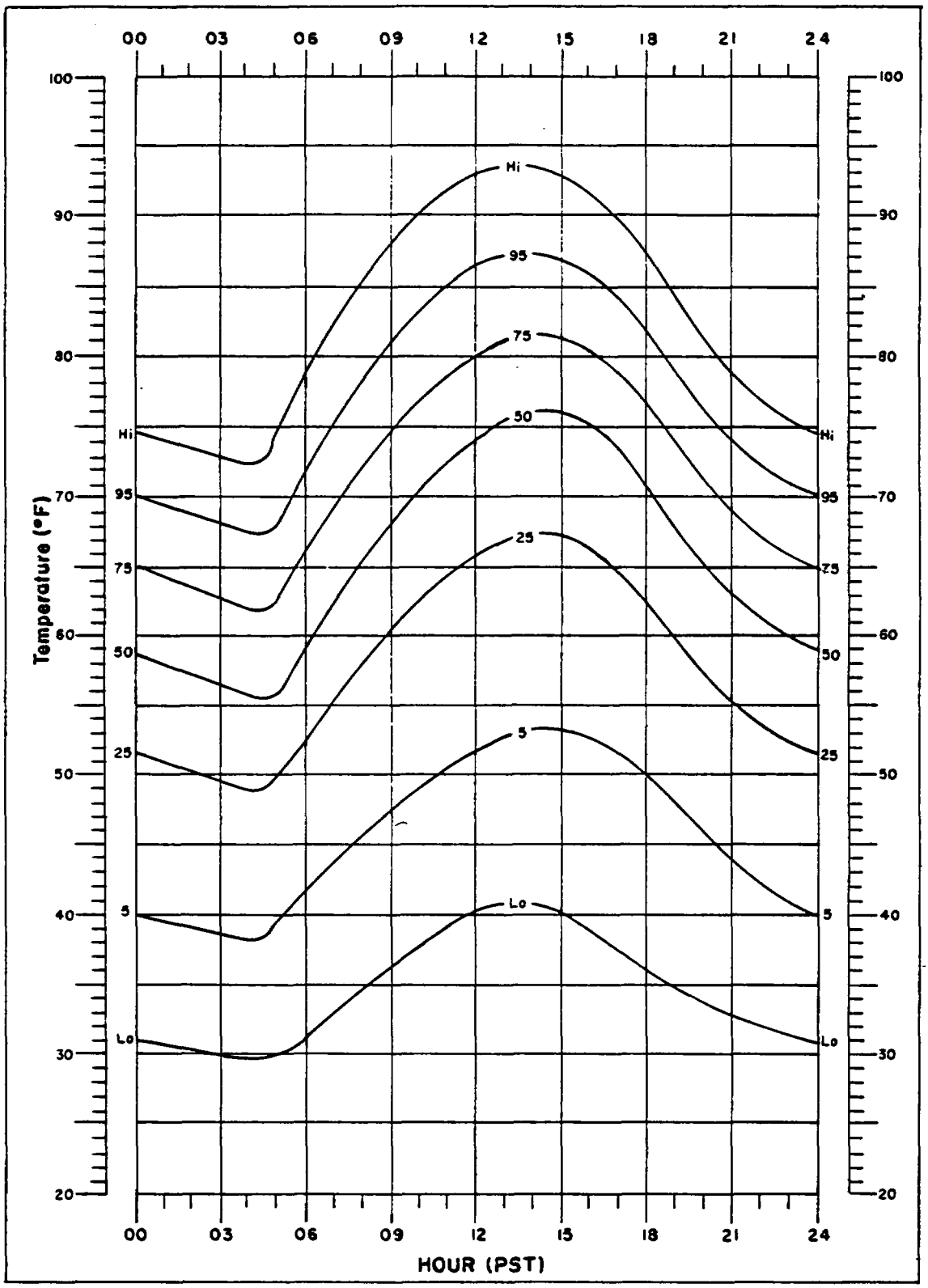

Fig. 3.1.6 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month June

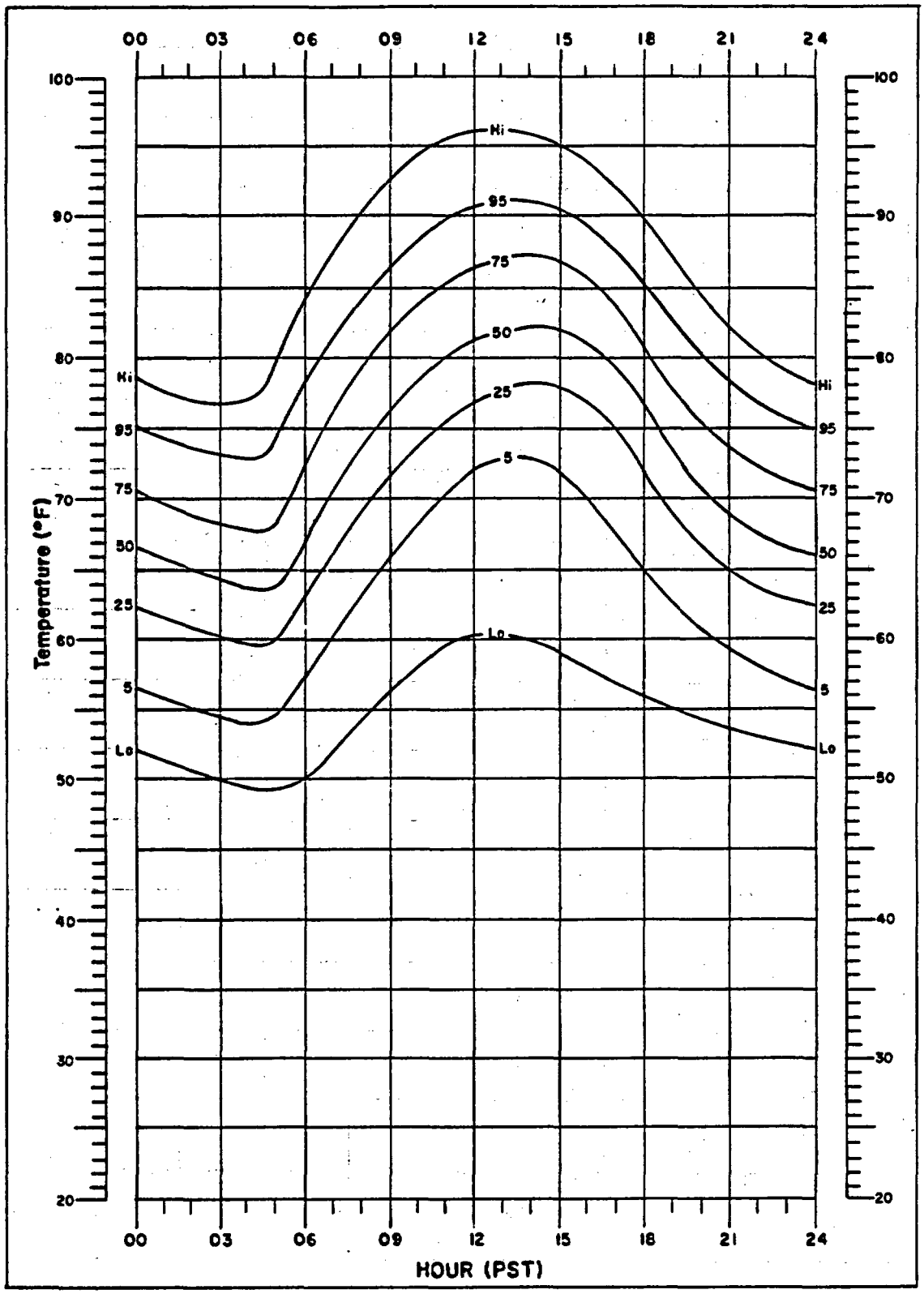

Fig. 3.1.7 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month July

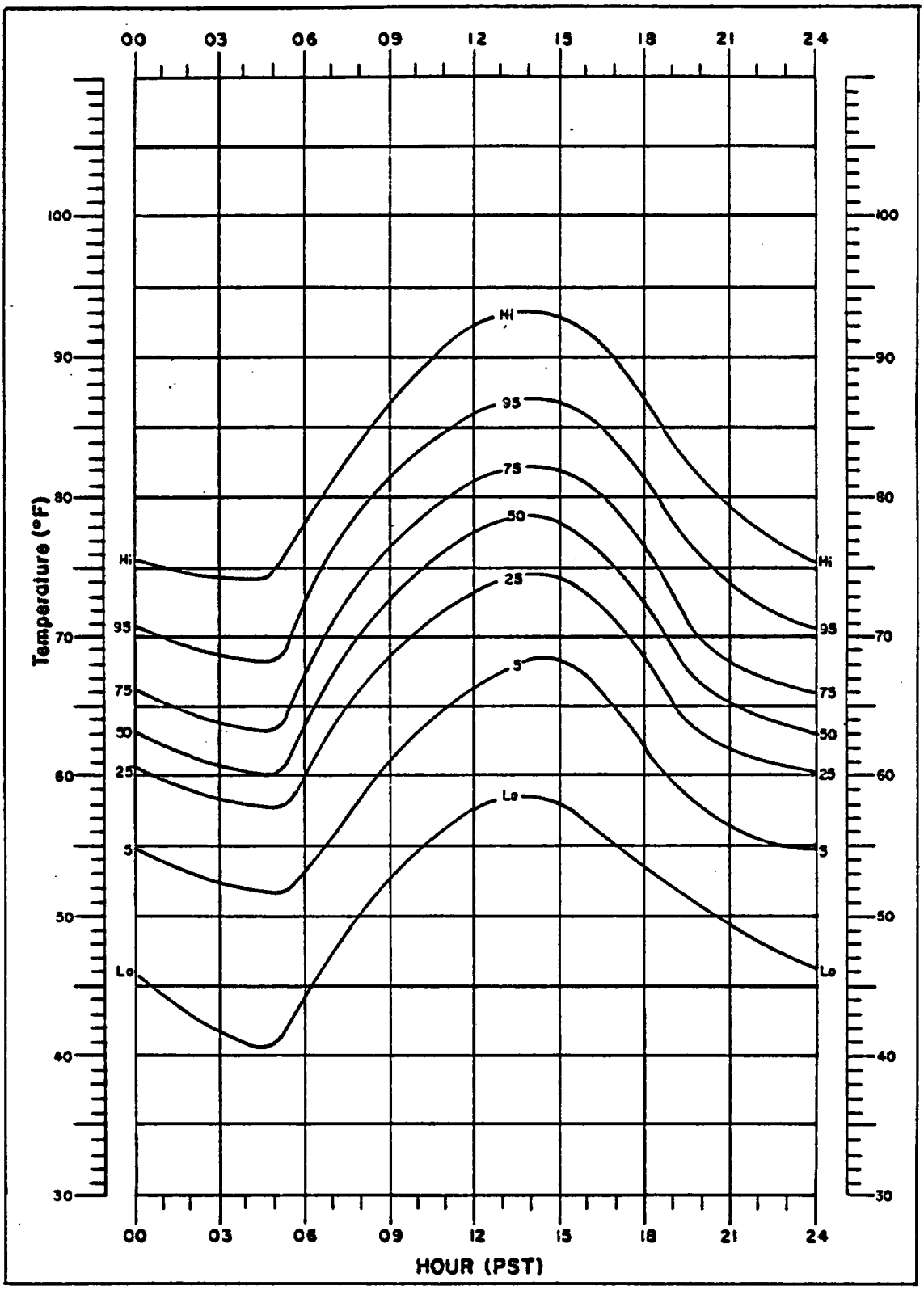

Fig. 3.1.8 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month August

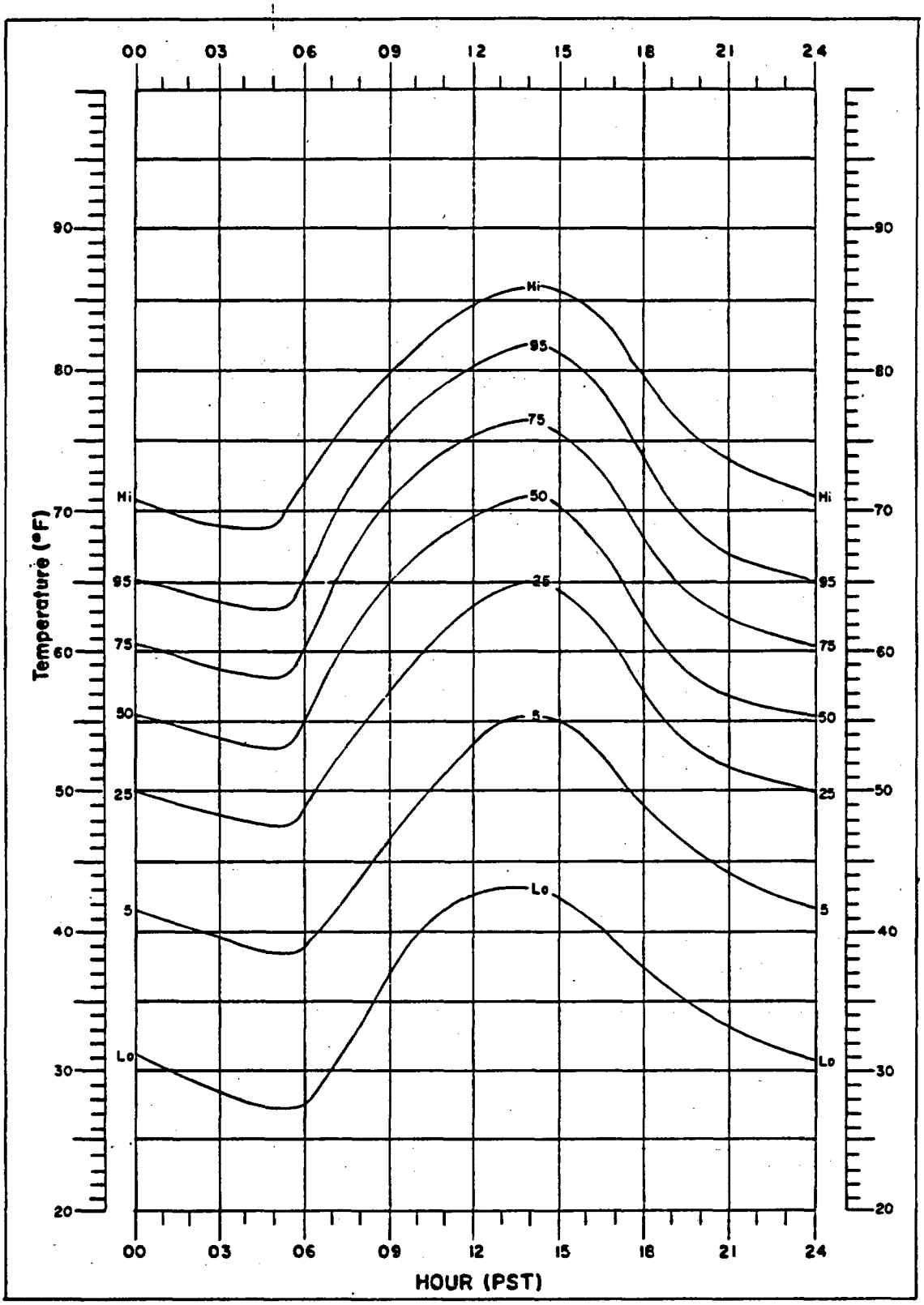

Fig. 3.1.9 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month September

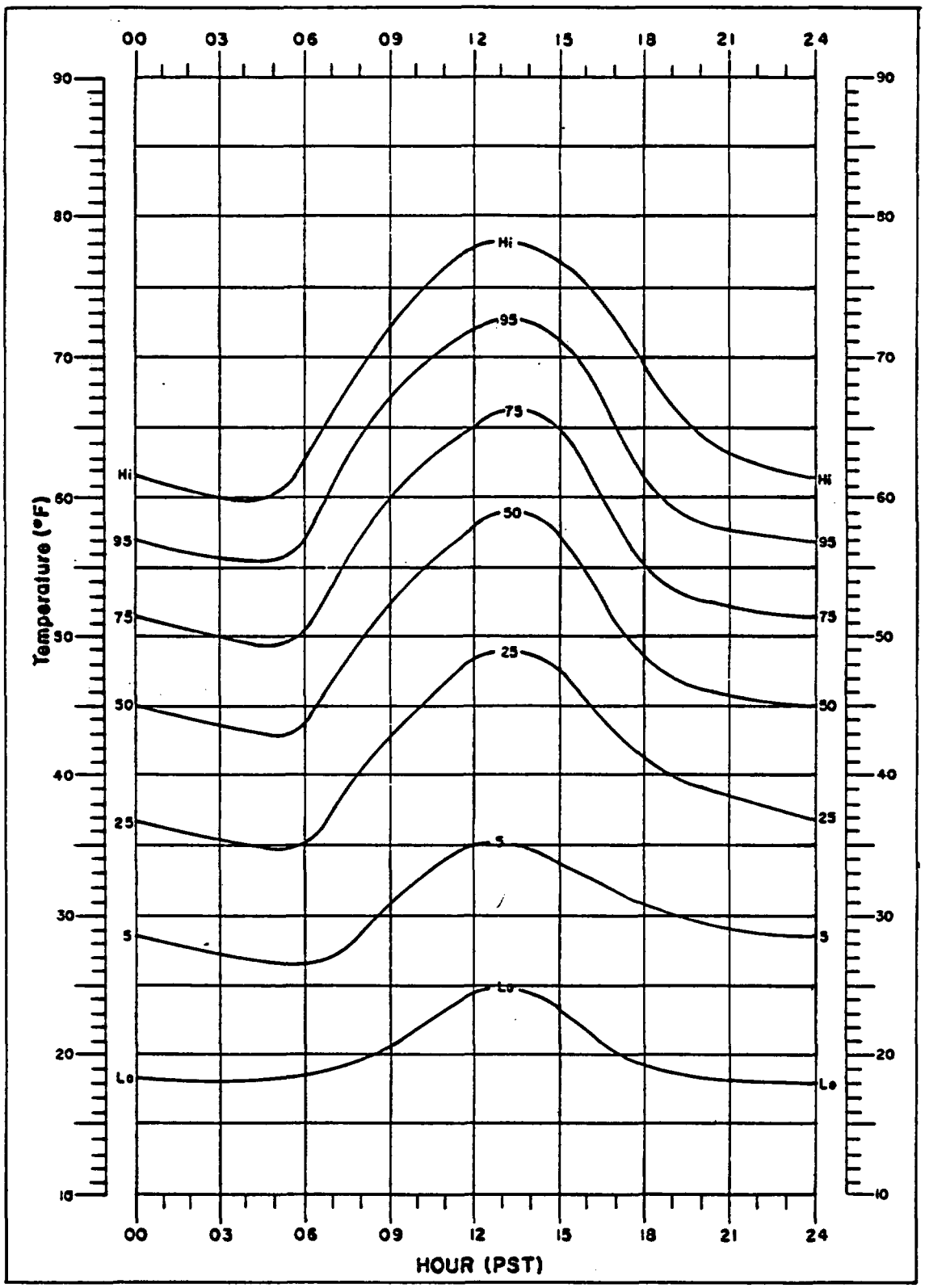

Fig. 3.1.10 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month October

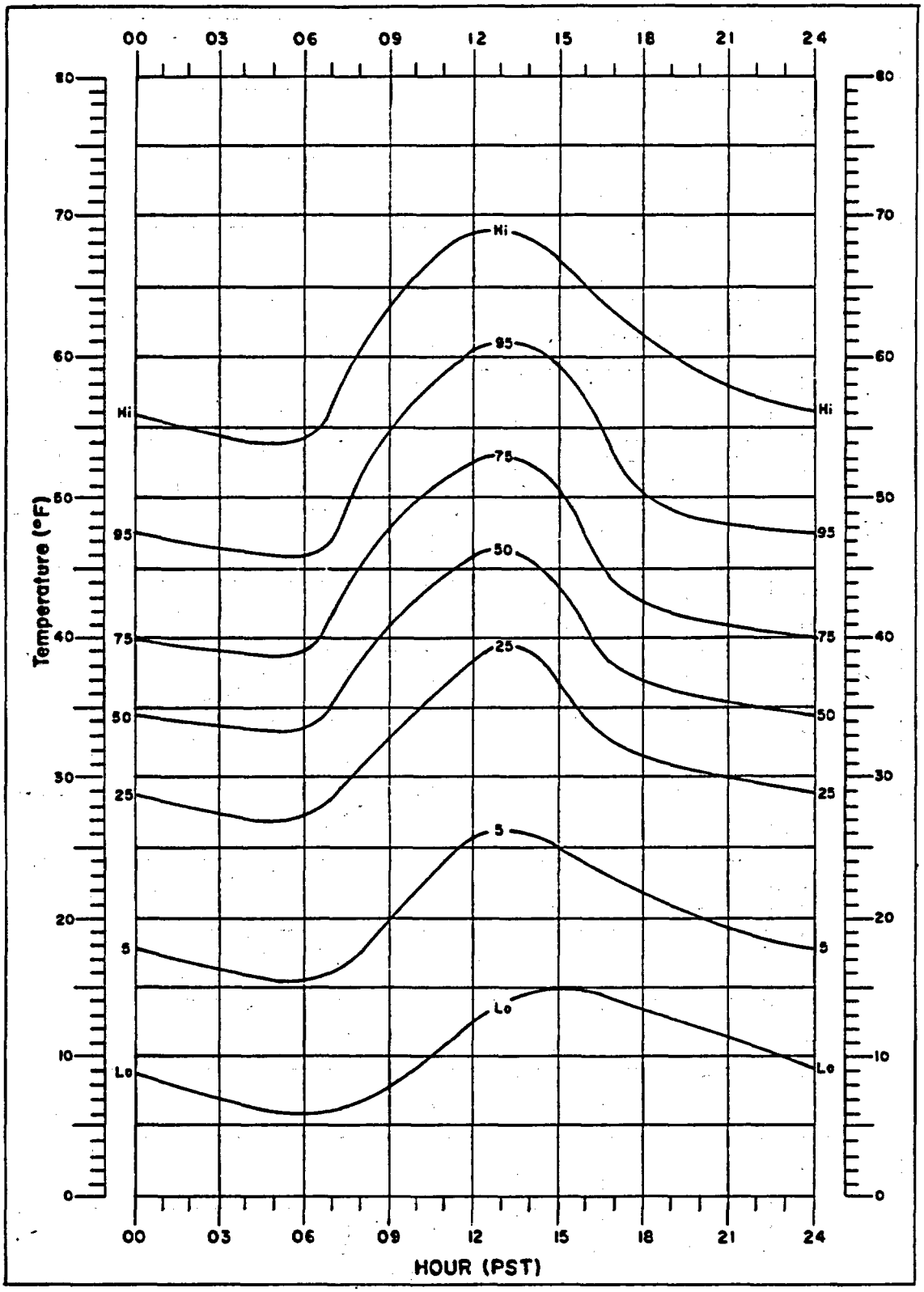

Fig. 3.1.11 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month November

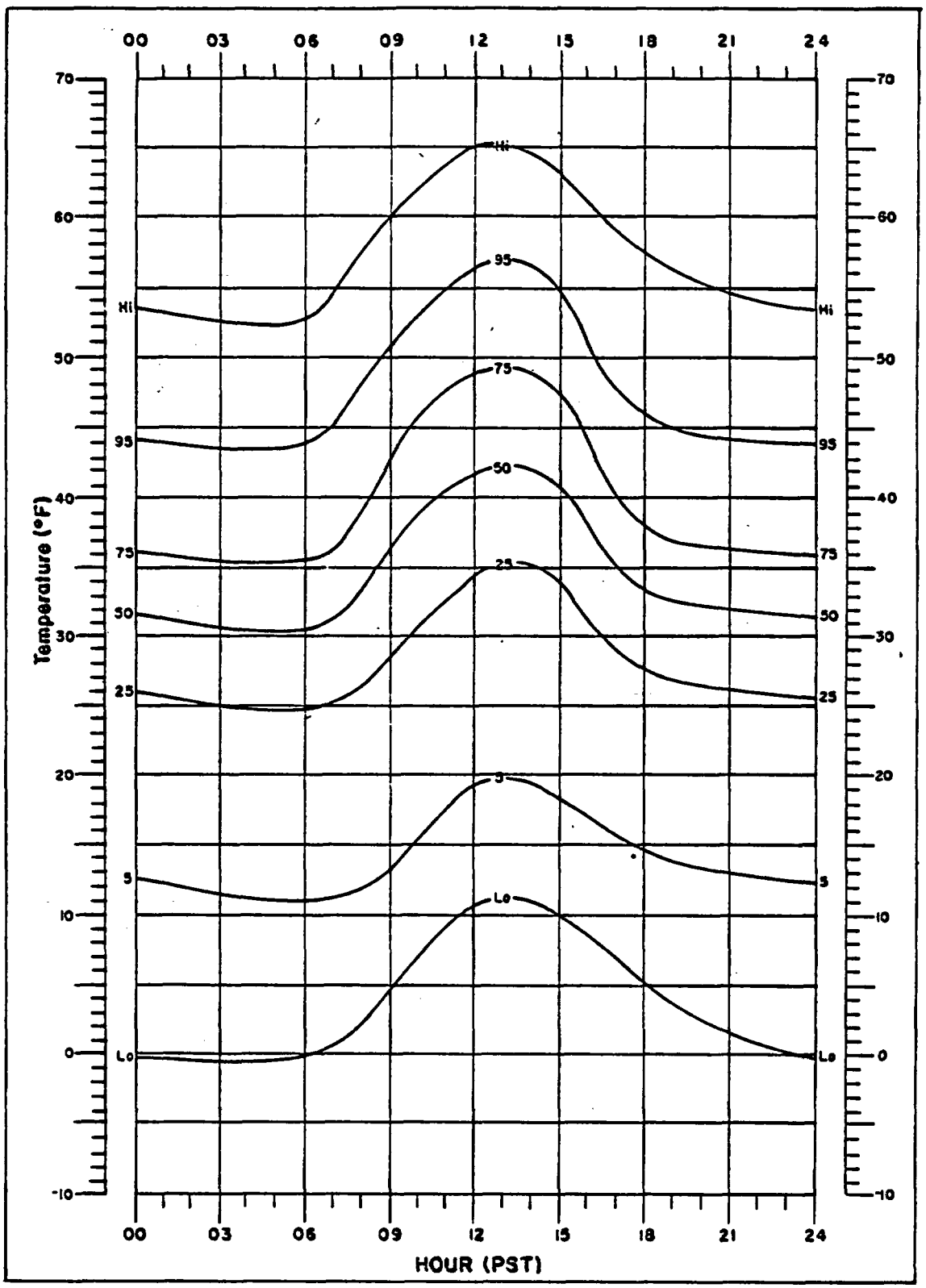

Fig. 3.1.12 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Area 12 Mesa Month December

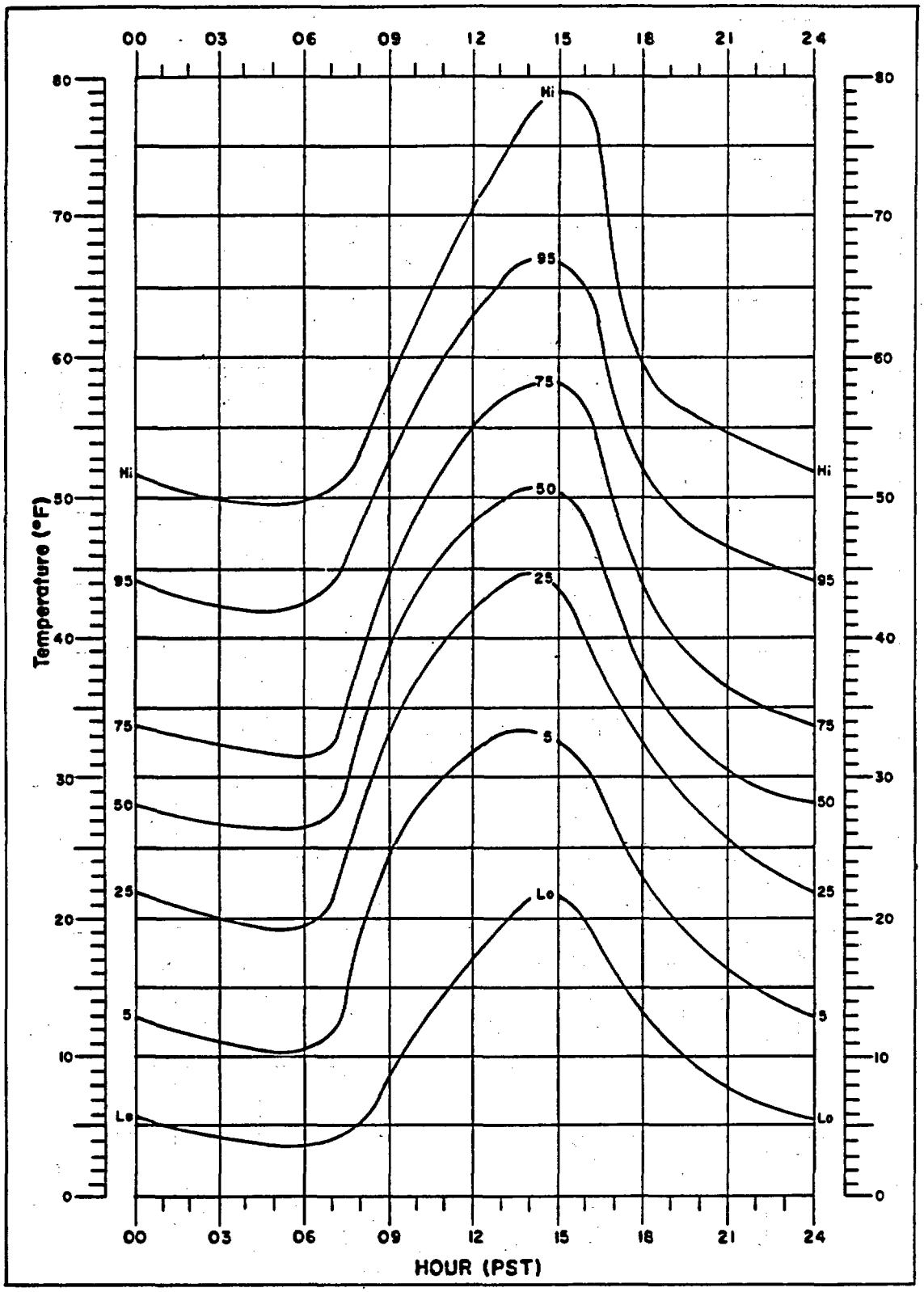

Fig. 3.2.1 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month January

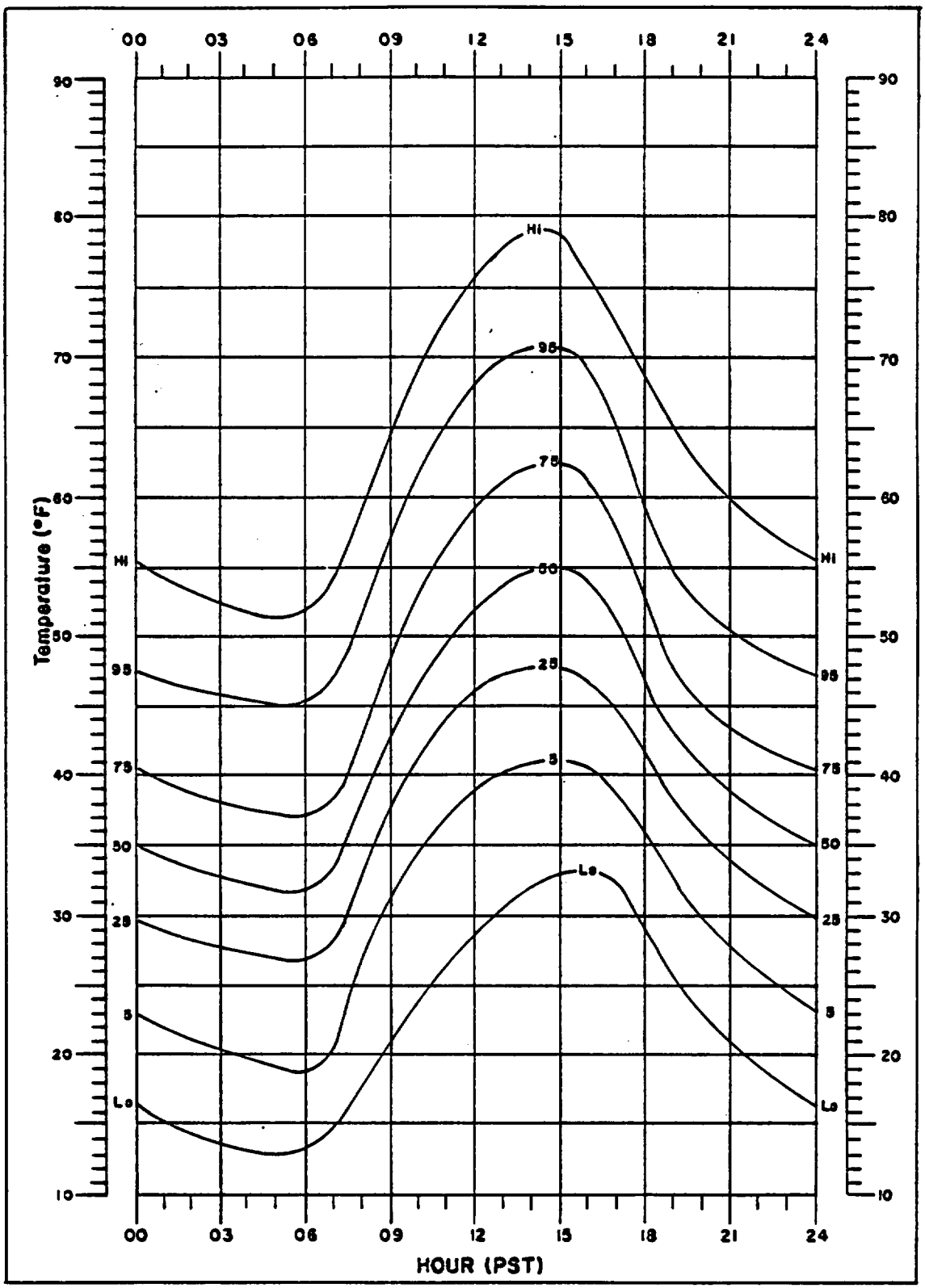

Fig. 3.2.2 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month February

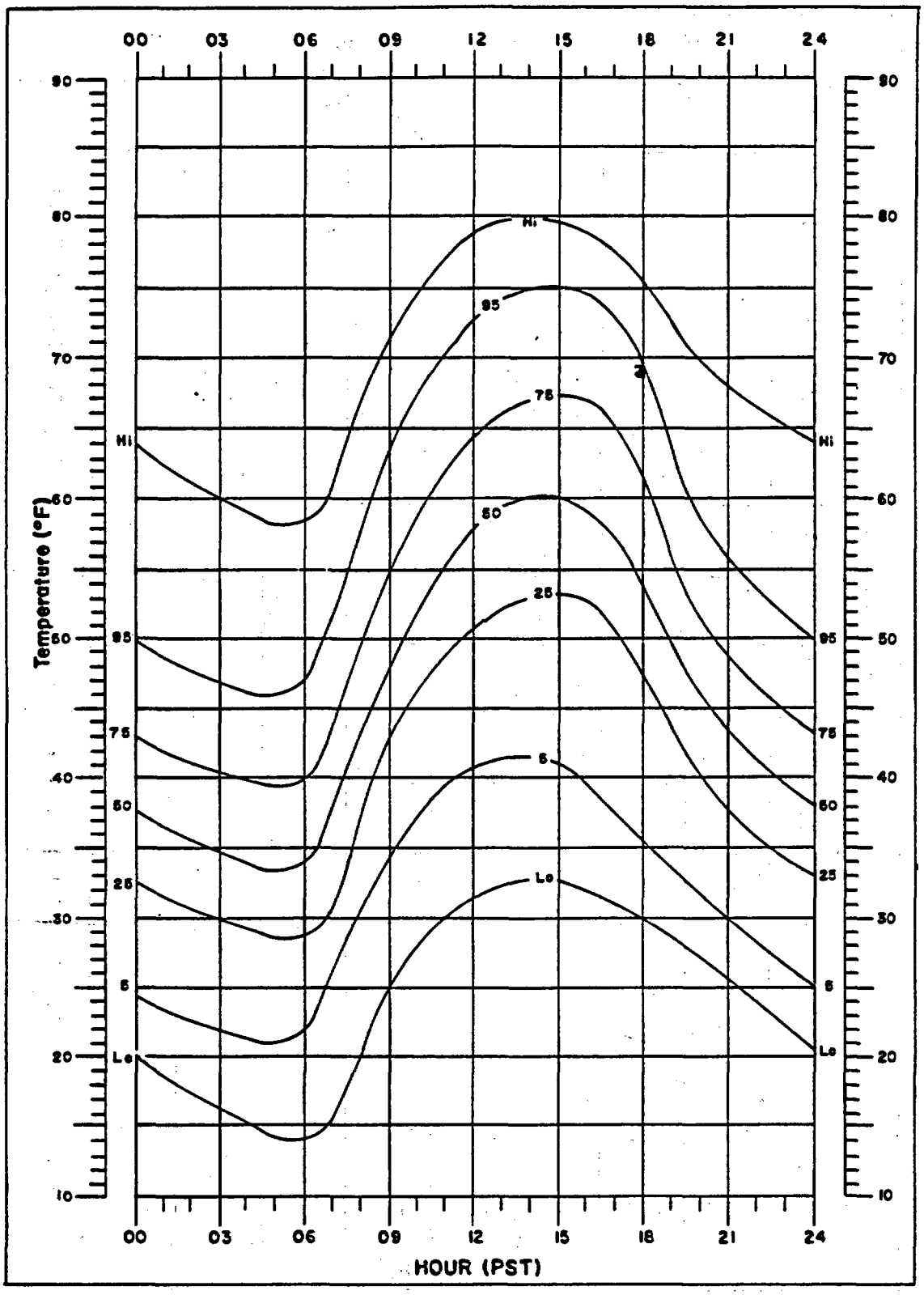

Fig. 3.2.3 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month March

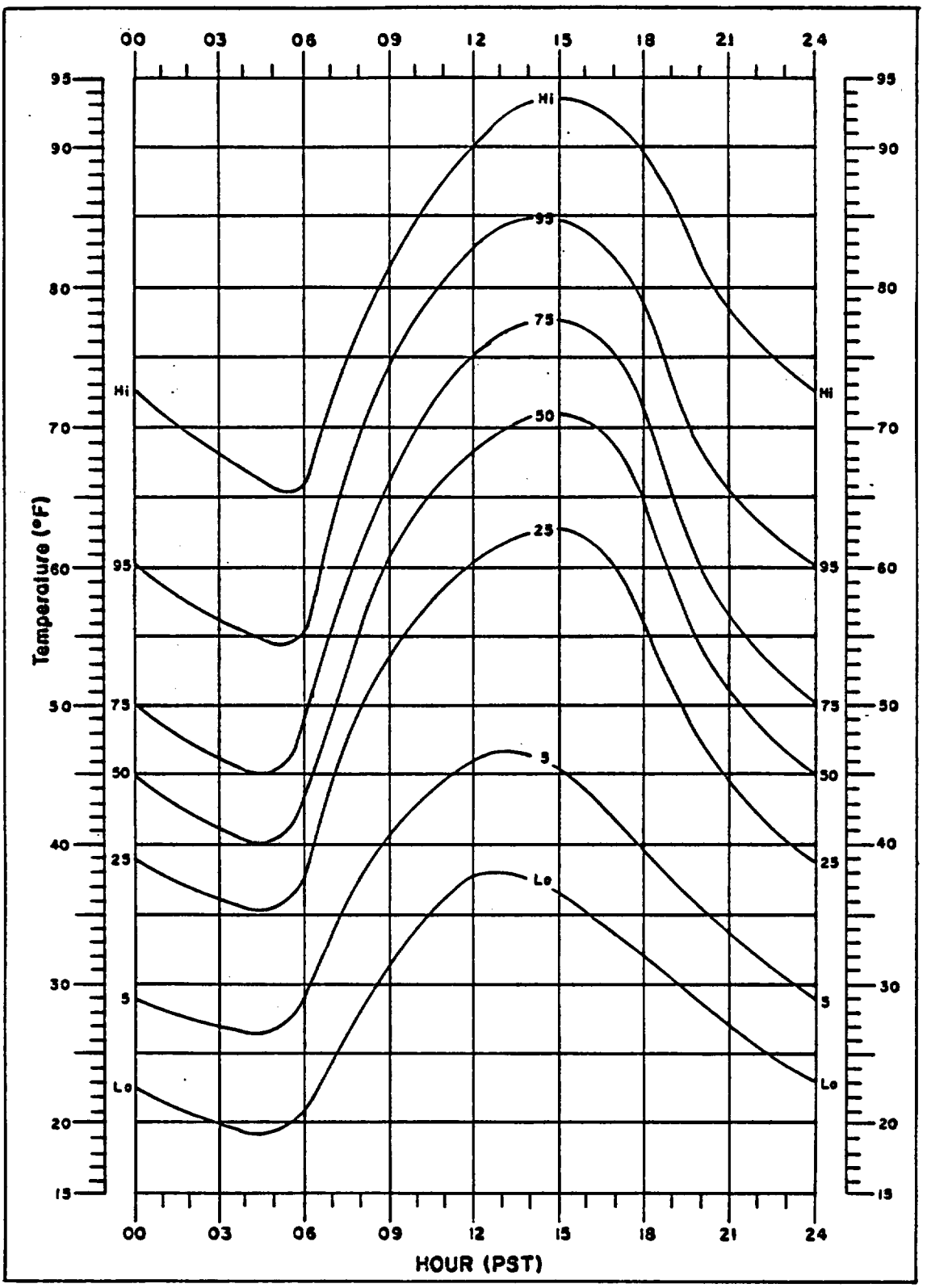

Fig. 3.2.4 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month April

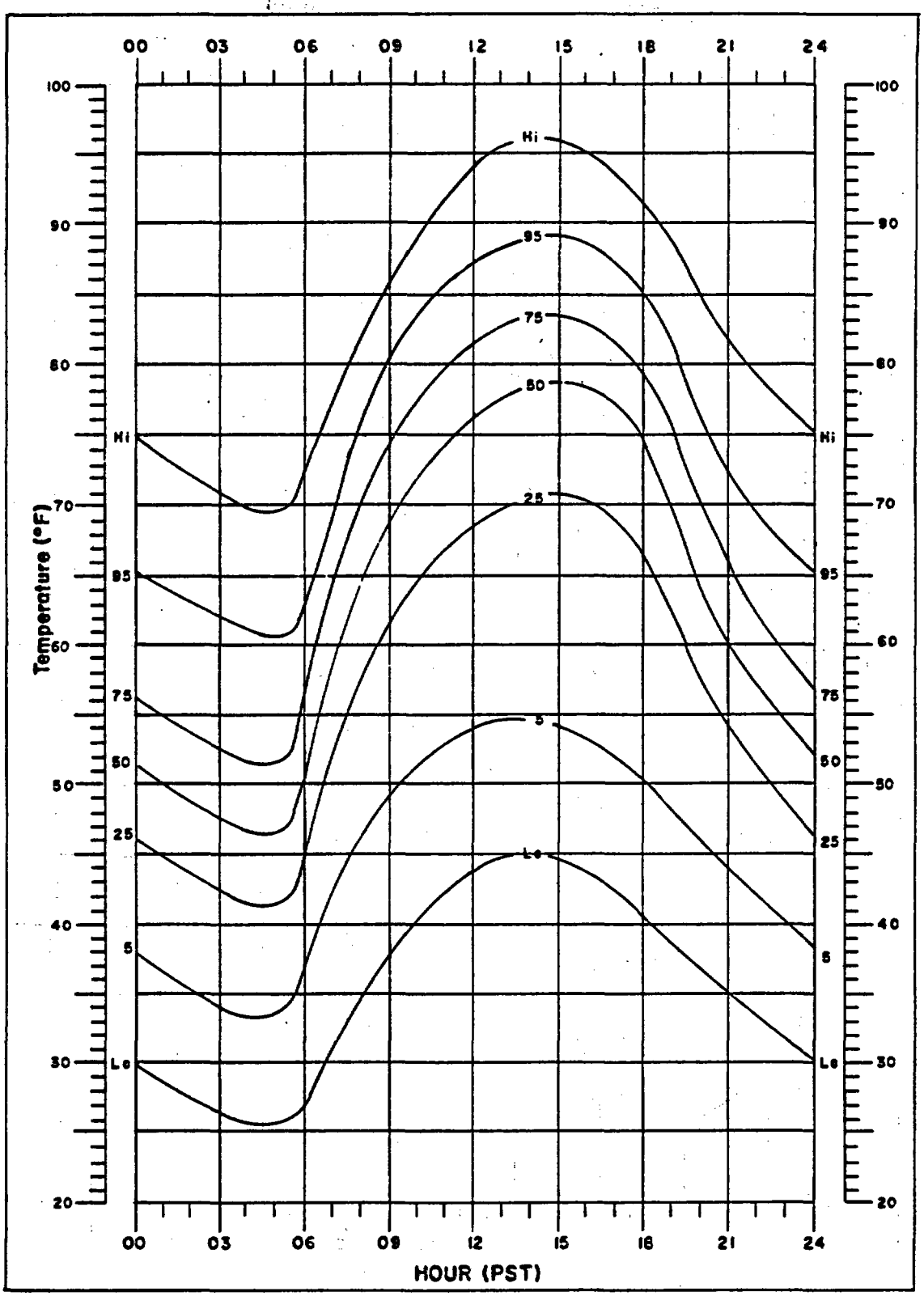

Fig. 3.2.8 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month May

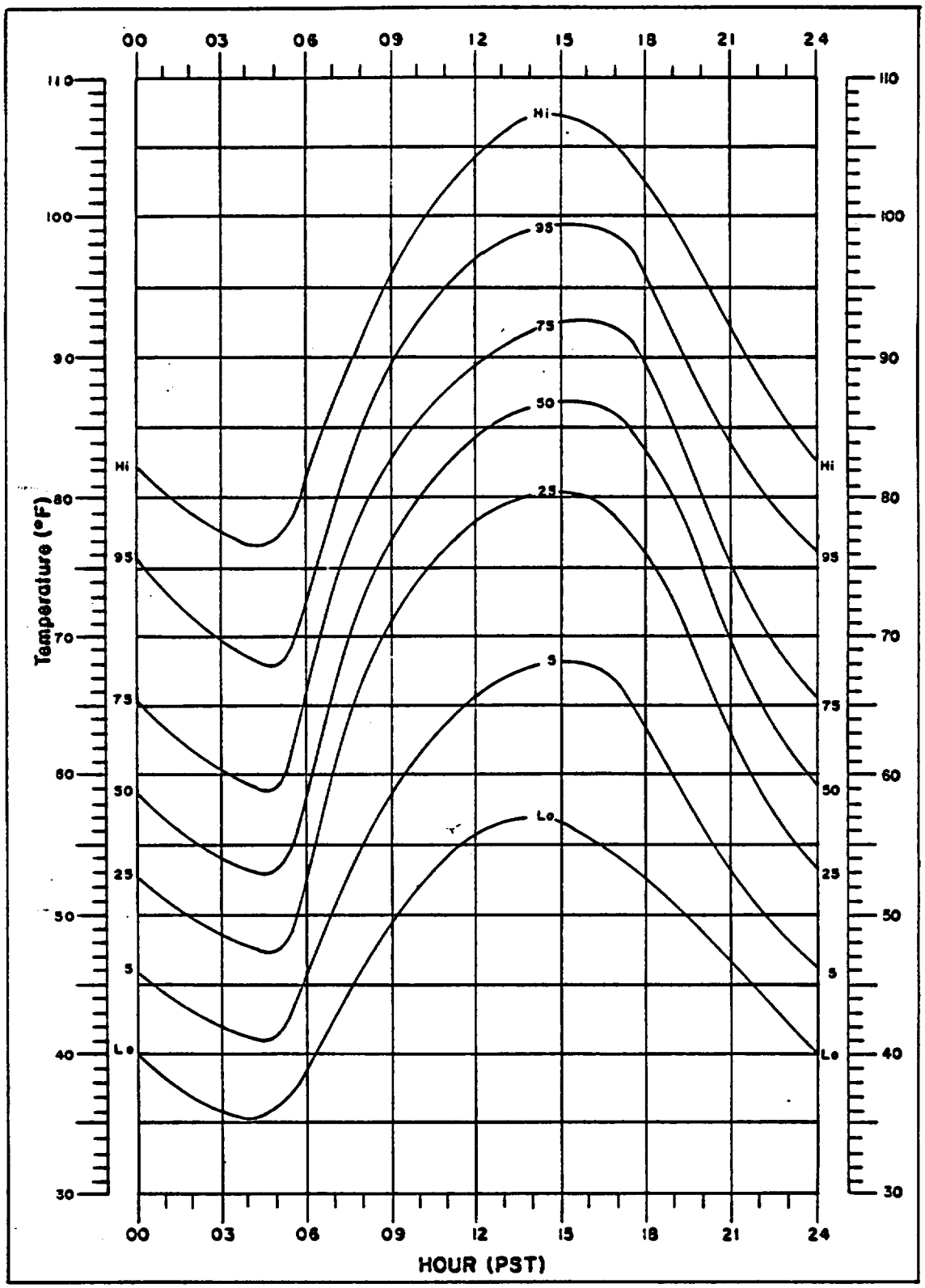

Fig. 3.2.6 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month June

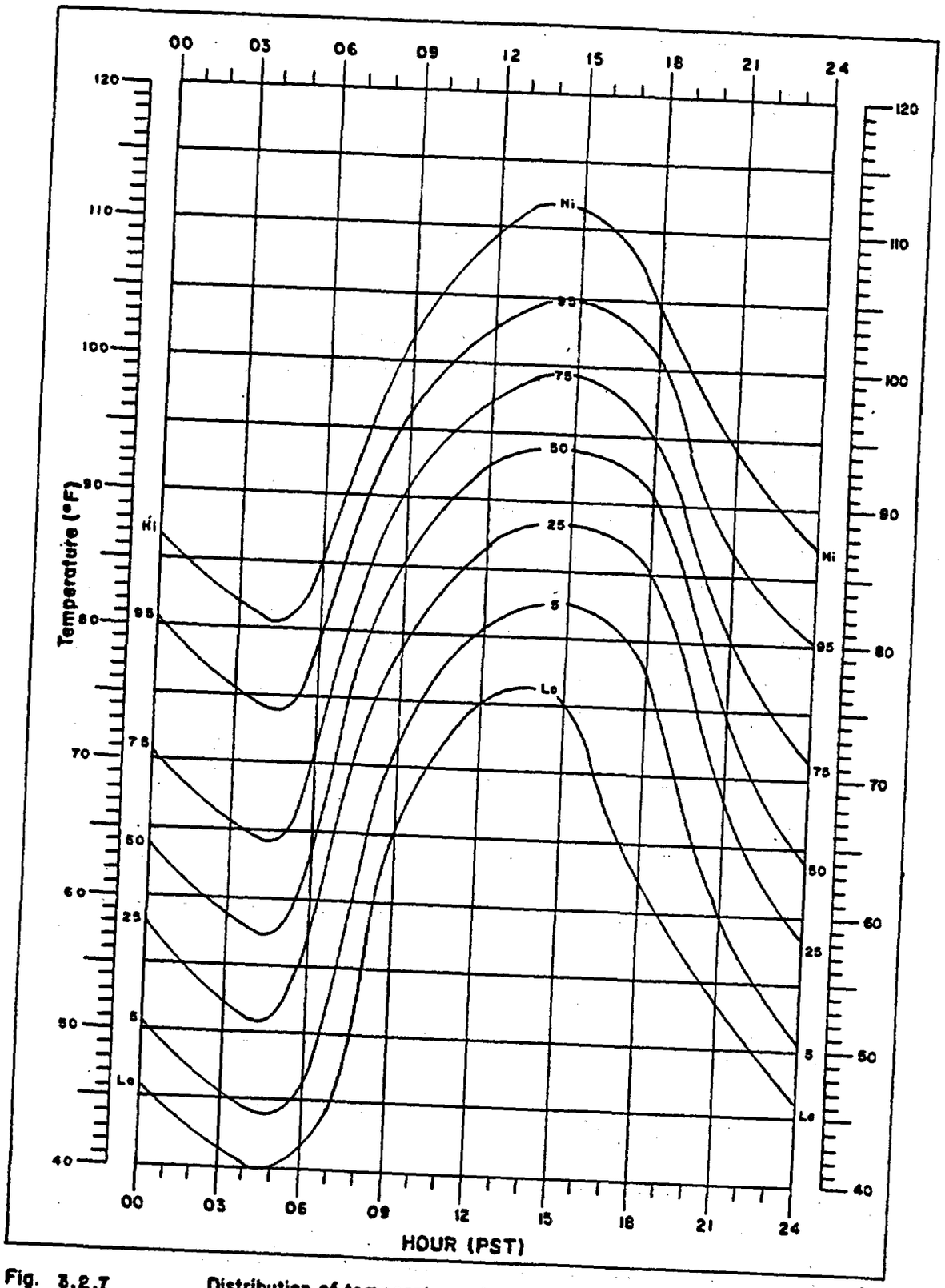

Fig. 3.2.7 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month July

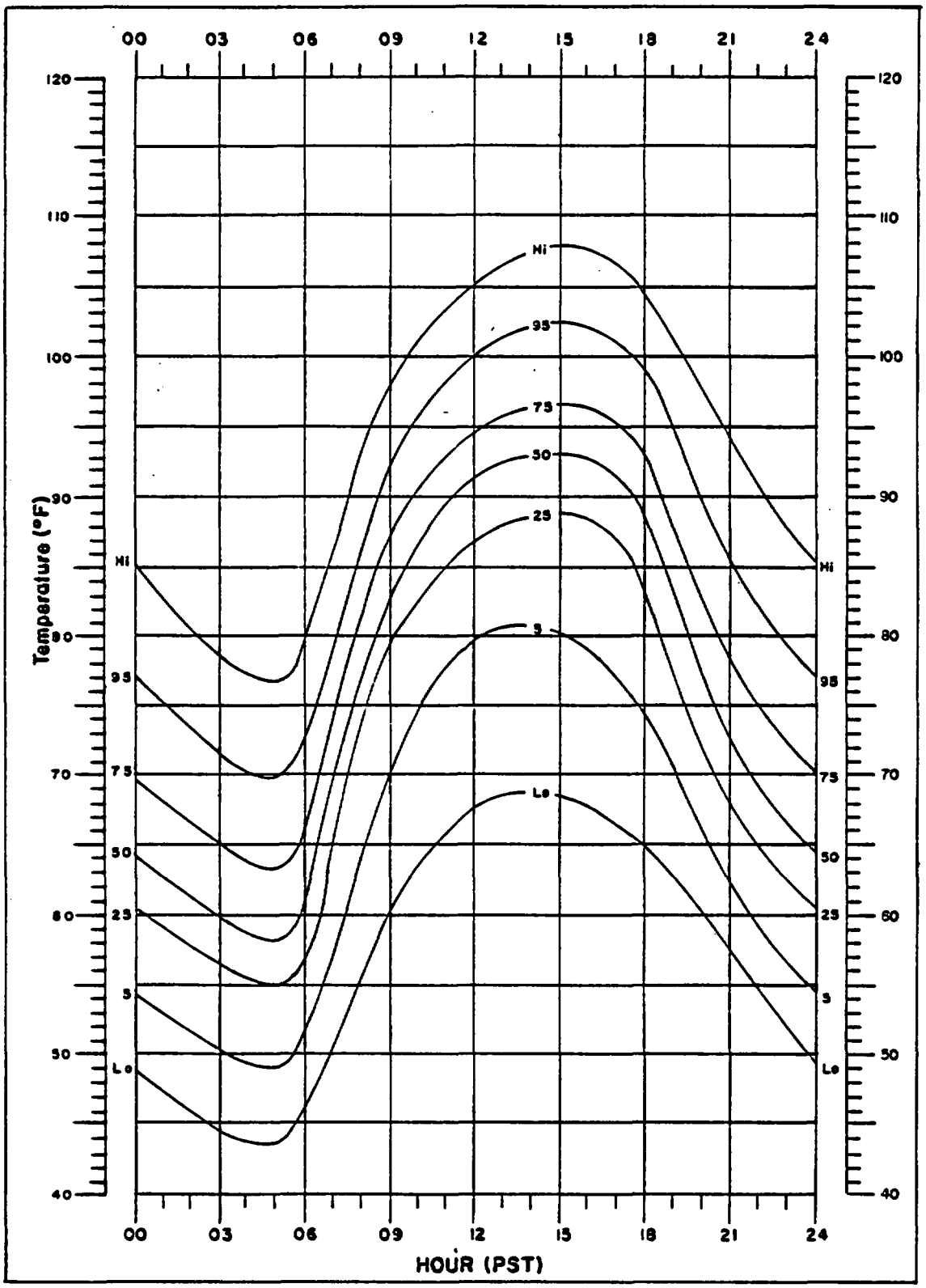

Fig. 3.2.8 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month August

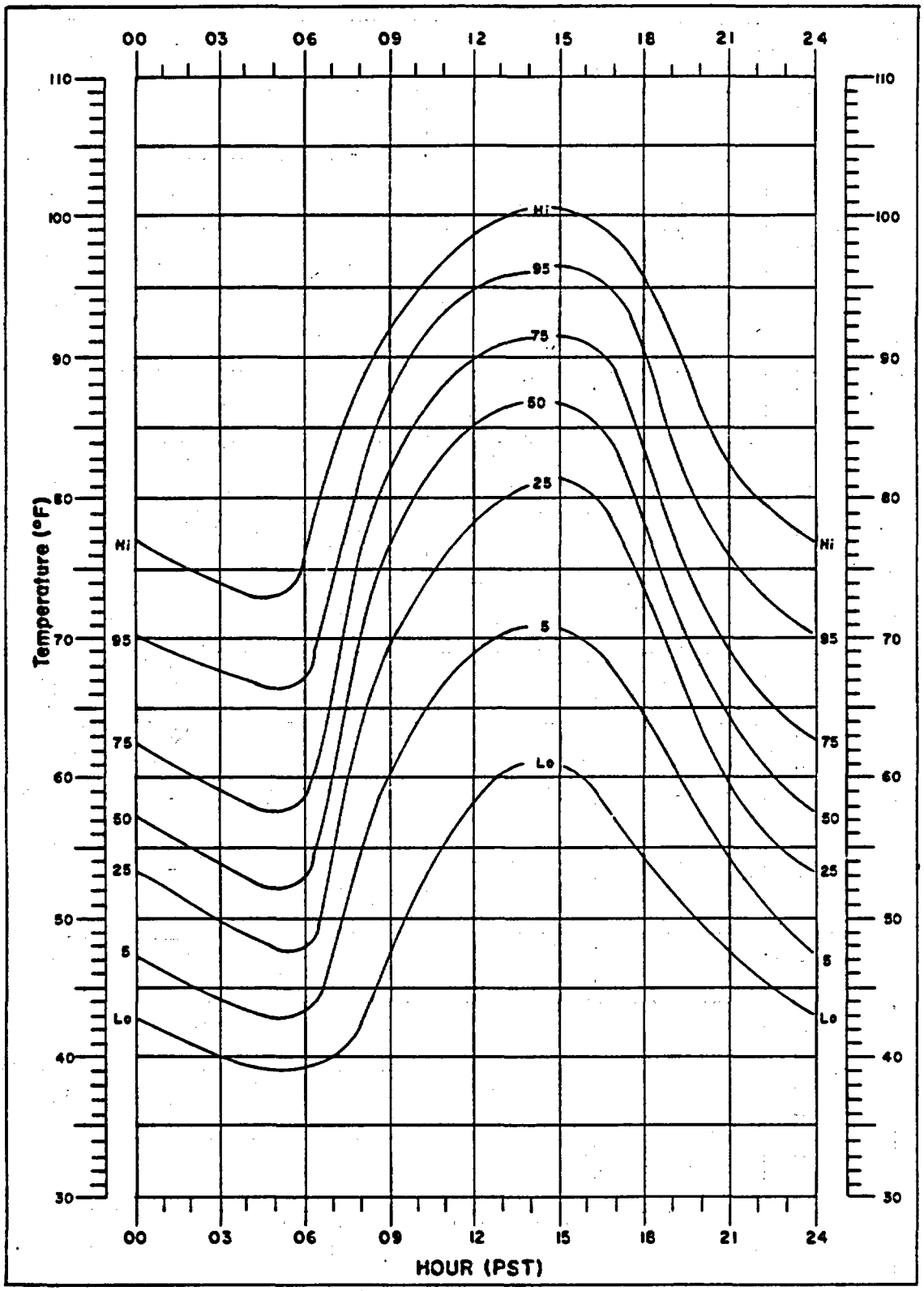

Fig. 3.2.9 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month September

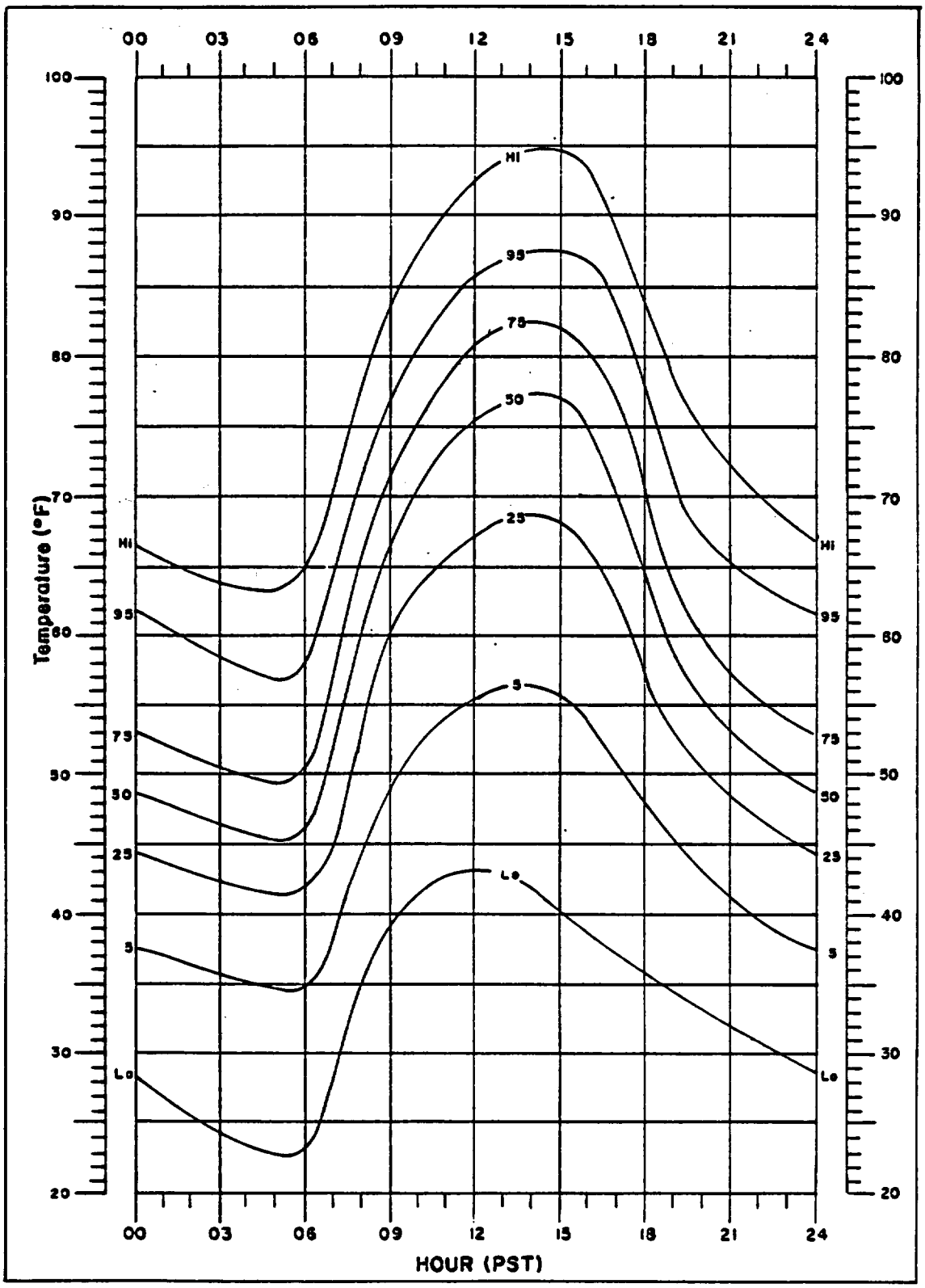

Fig. 3.2.10 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month October

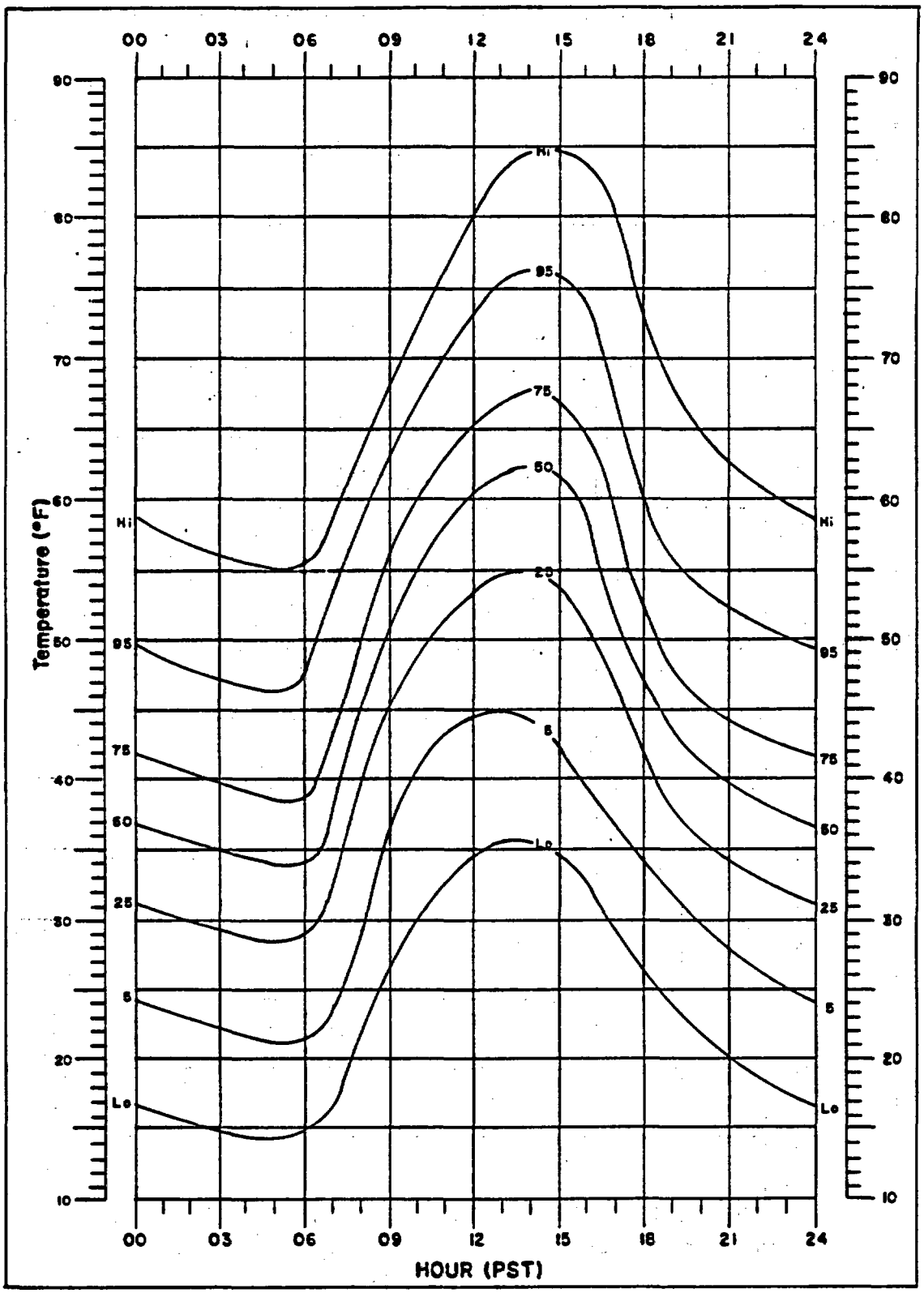

Fig. 3.2.11 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month November

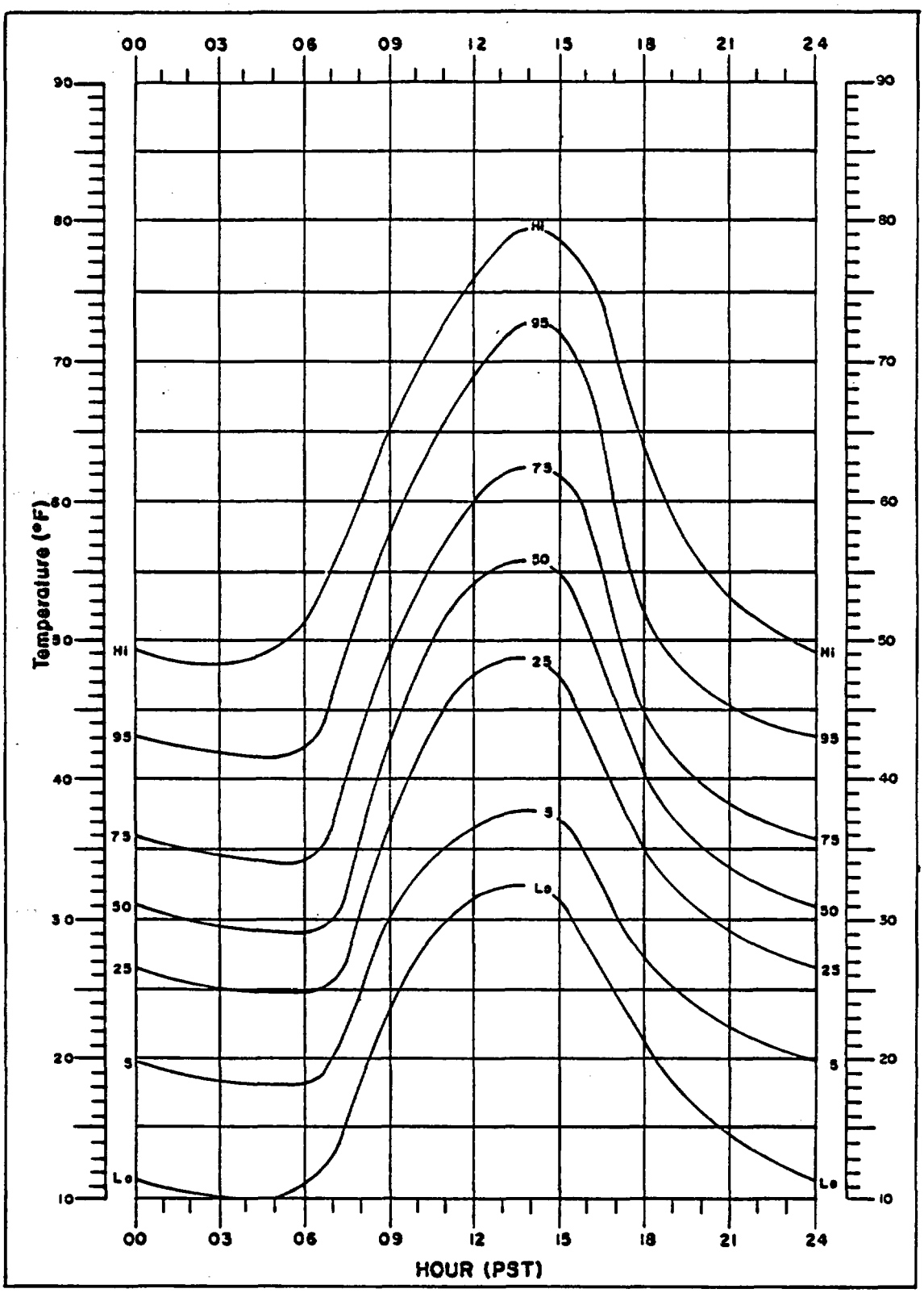

Fig. 3.2.12 Distribution of temperatures by selected percentiles as a function of time of day.

Station: BJY Month December

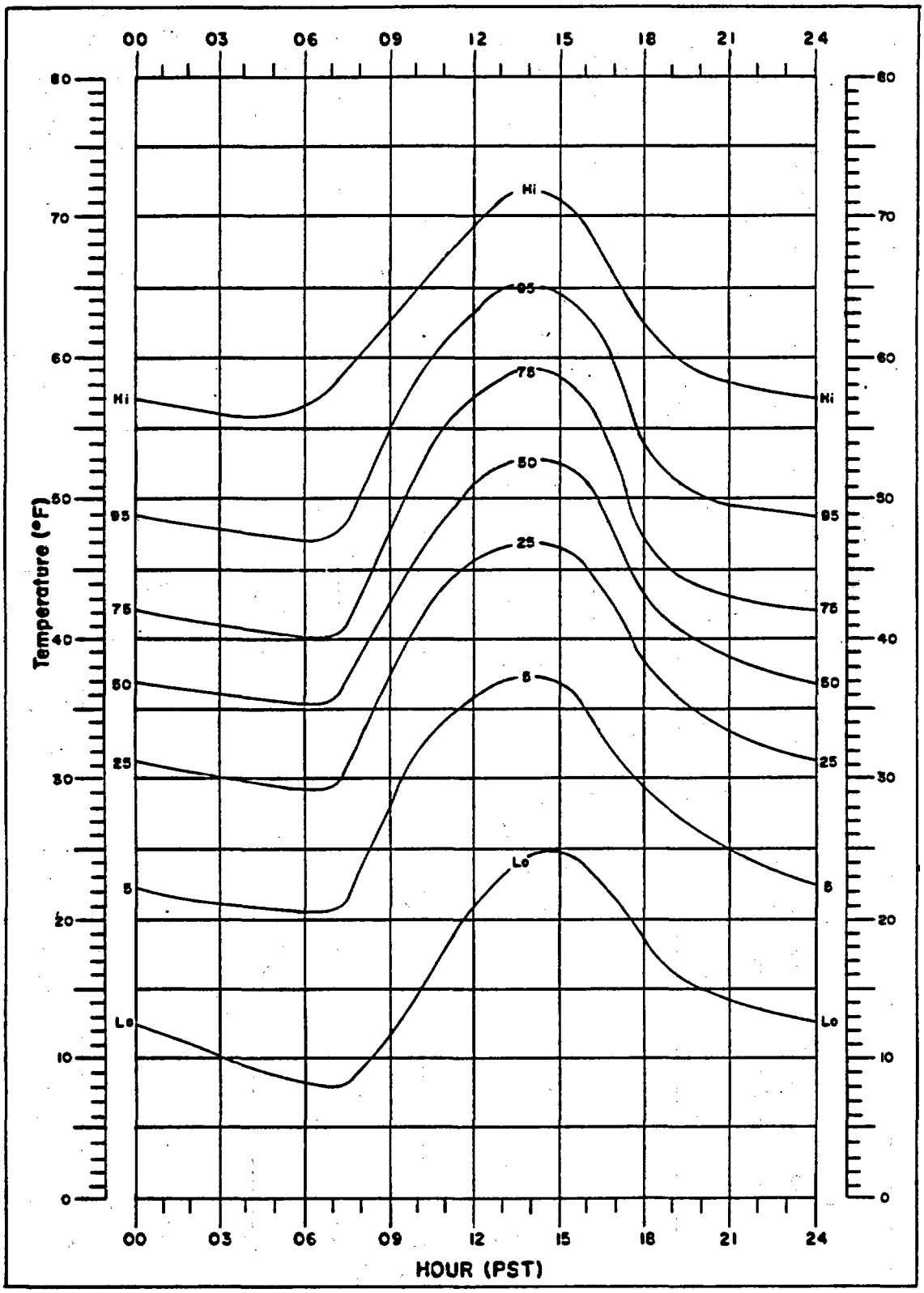

Fig. 3.3.1 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month January

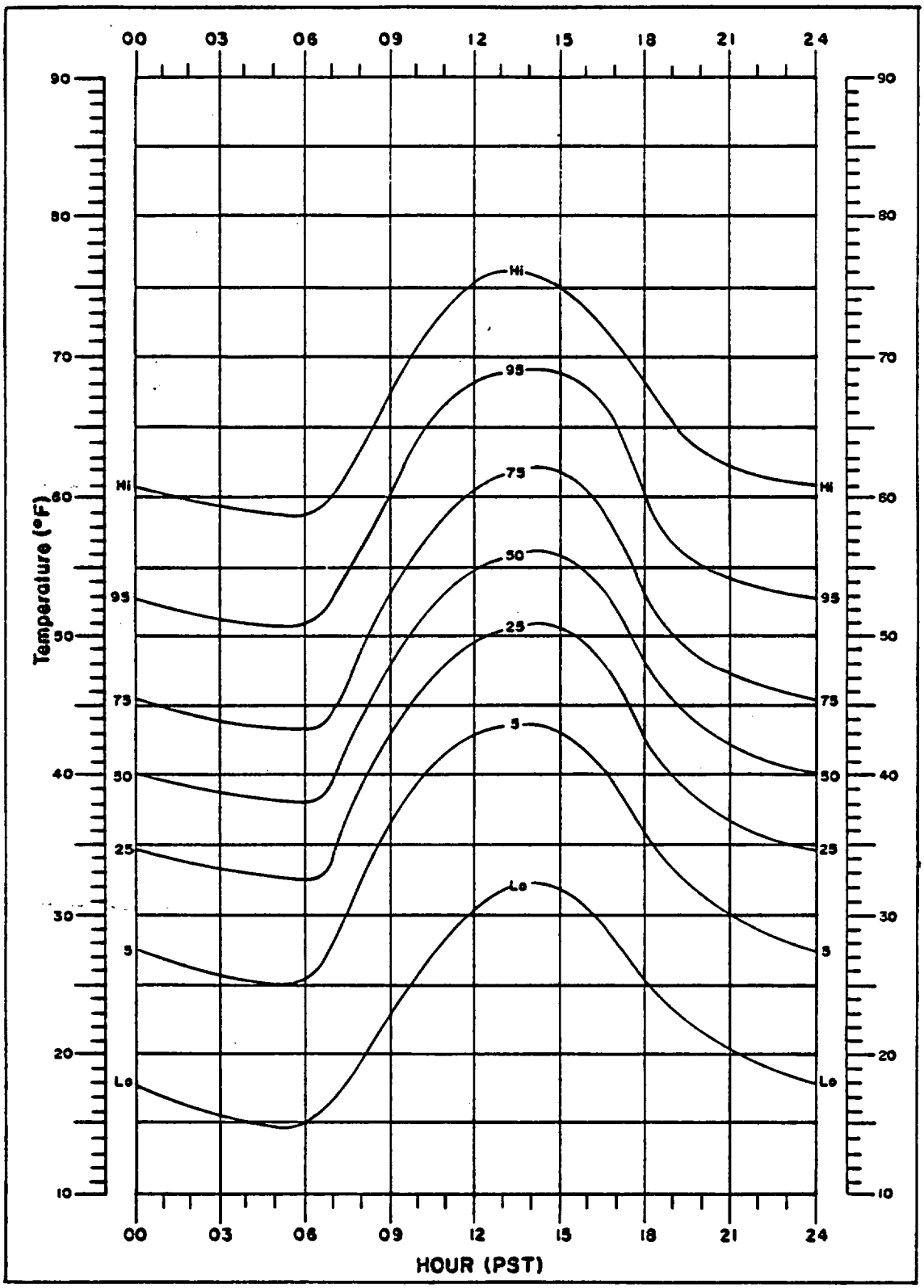

Fig. 3.3.2 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month February

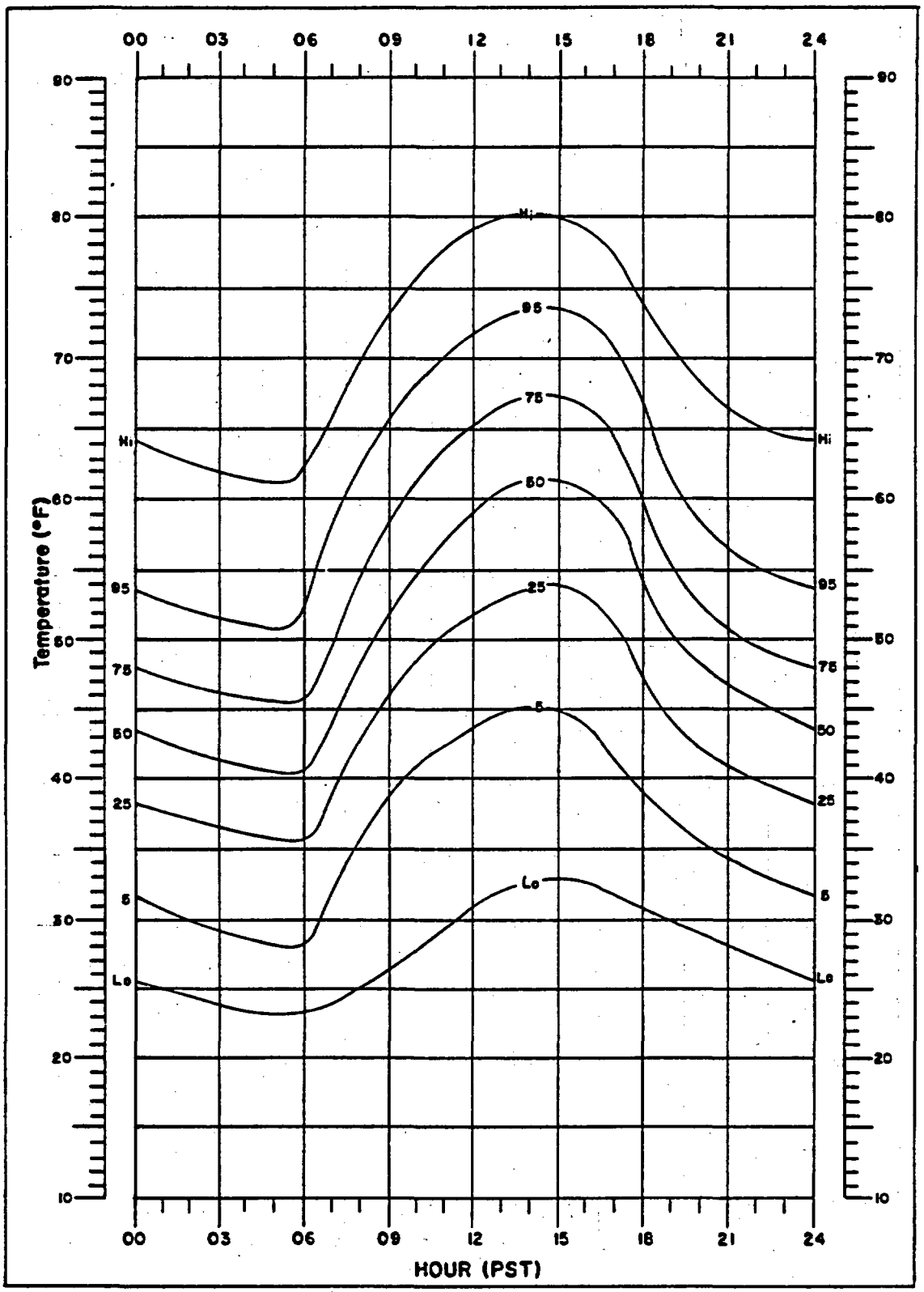

Fig. 3.3.3 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month March

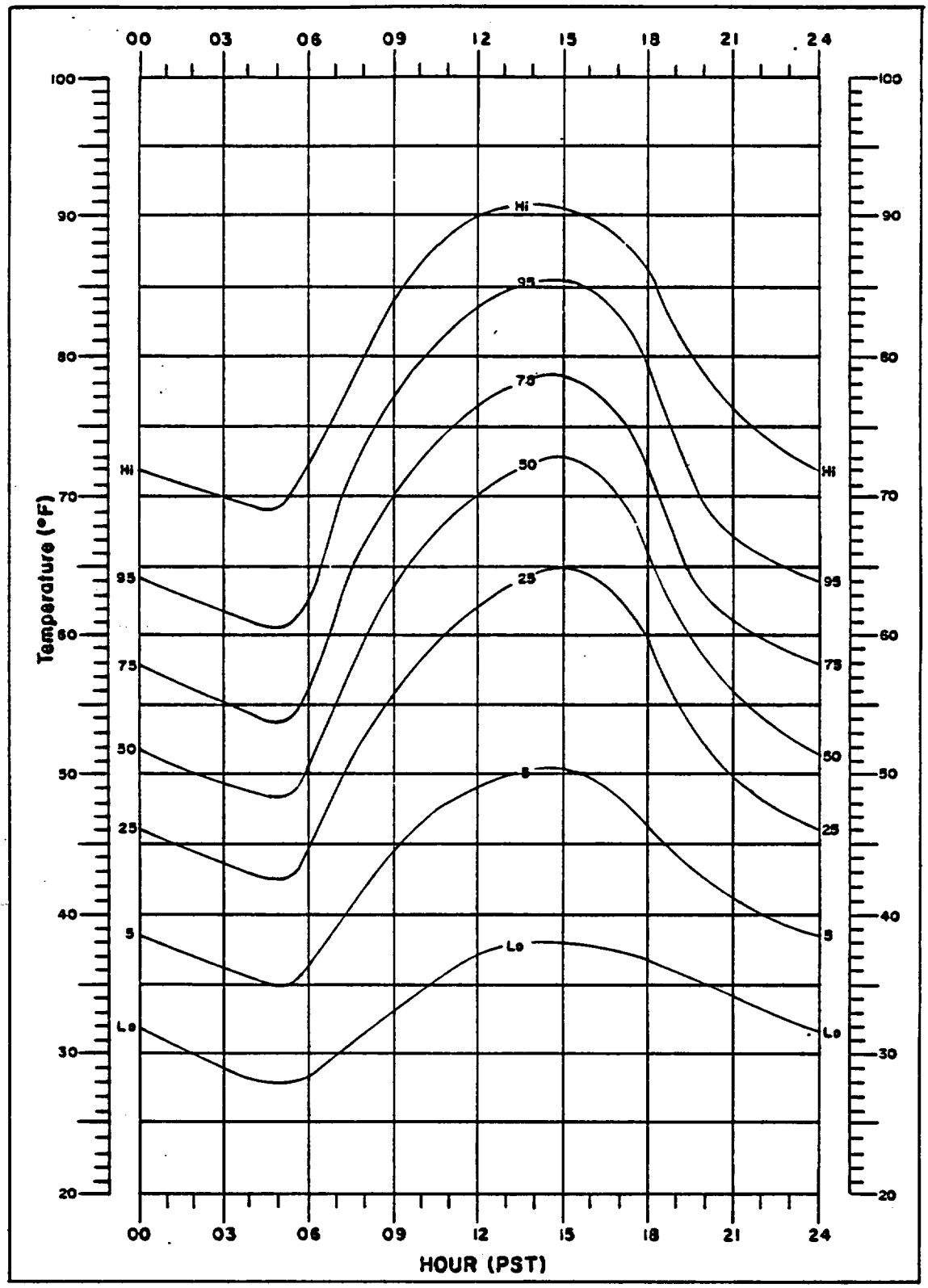

Fig. 3.3.4 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month April

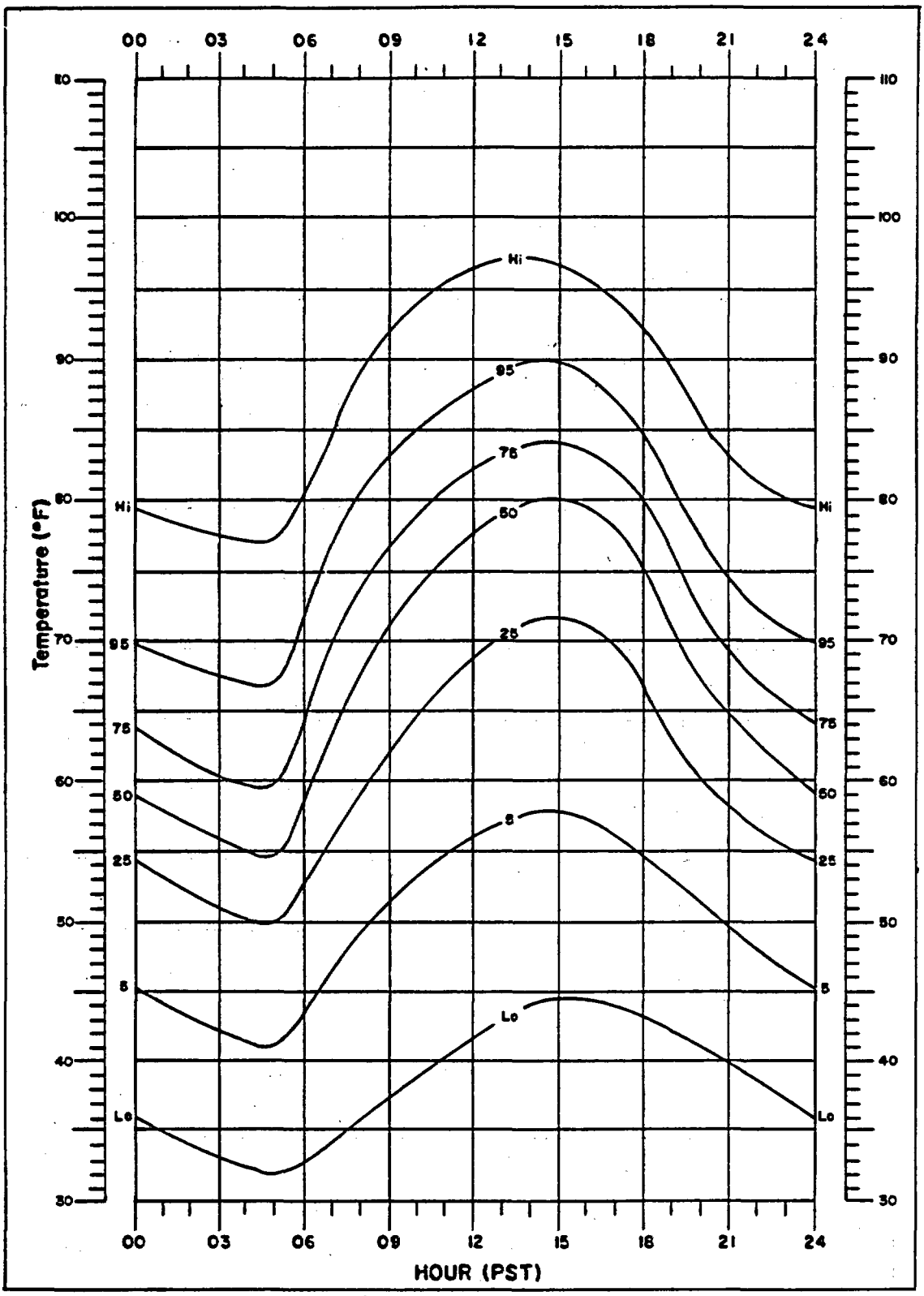

Fig. 3.3.5 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month May

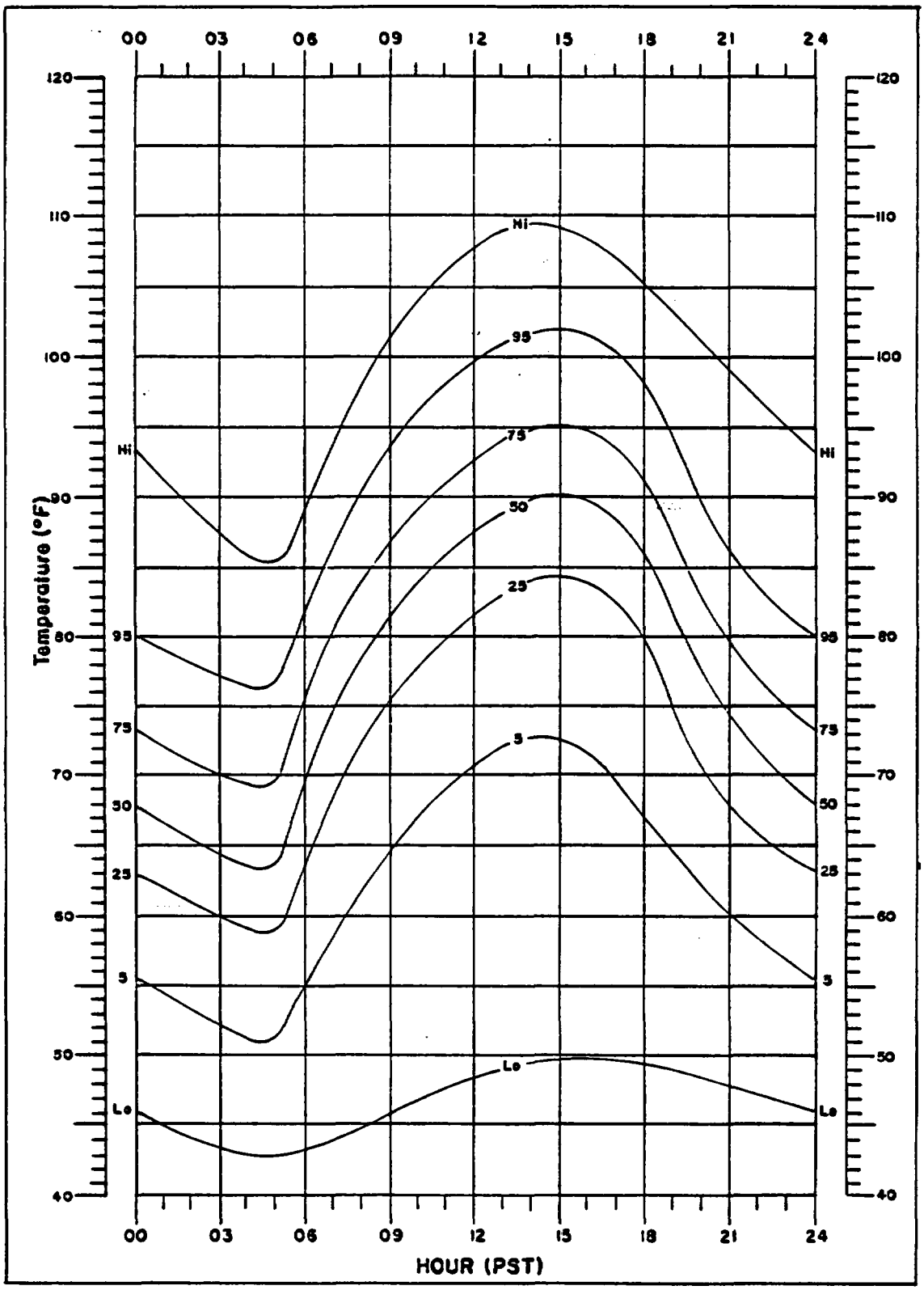

Fig. 3.3.6 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month June

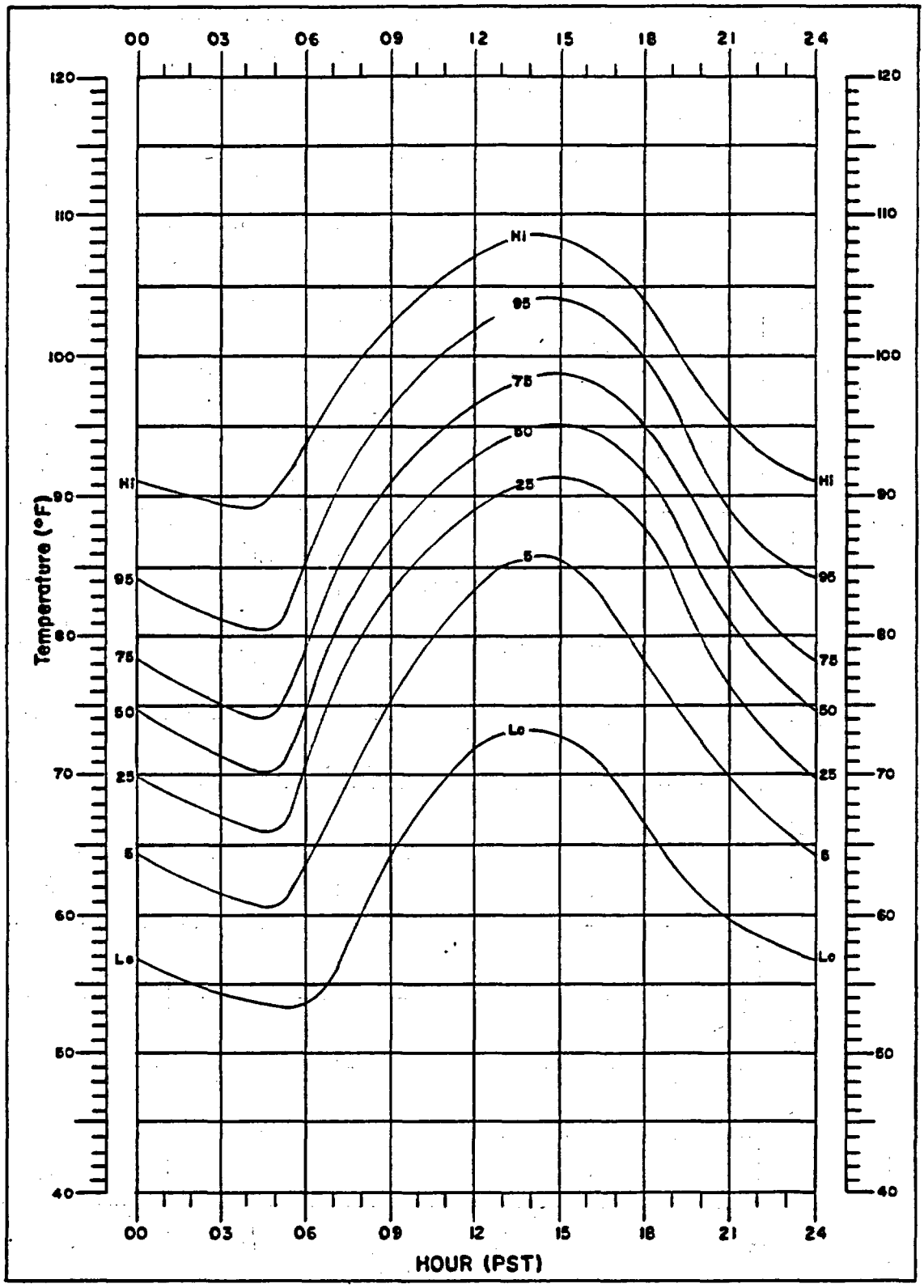

Fig. 3.3.7 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month July

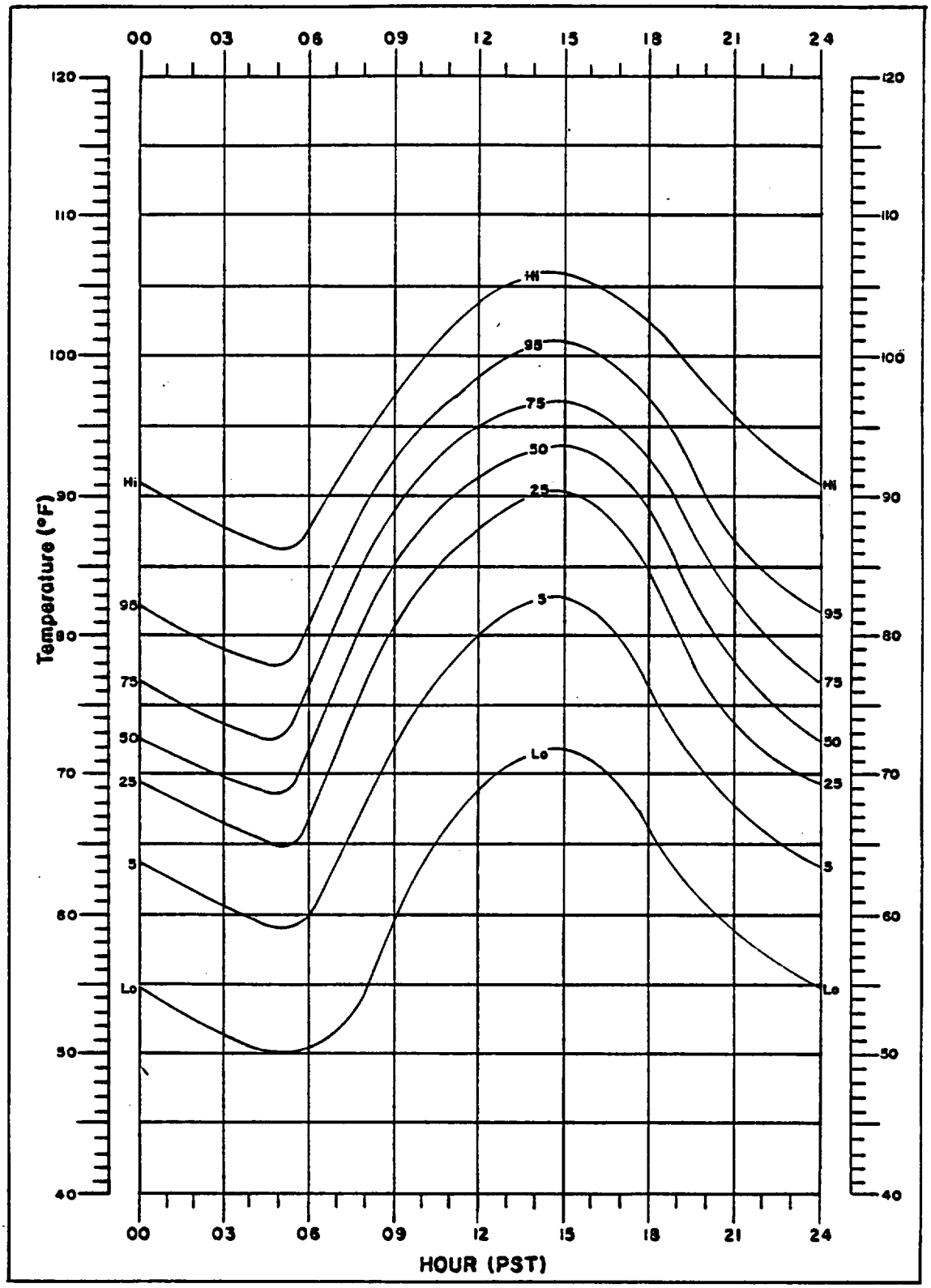

Fig. 3.3.8 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month August

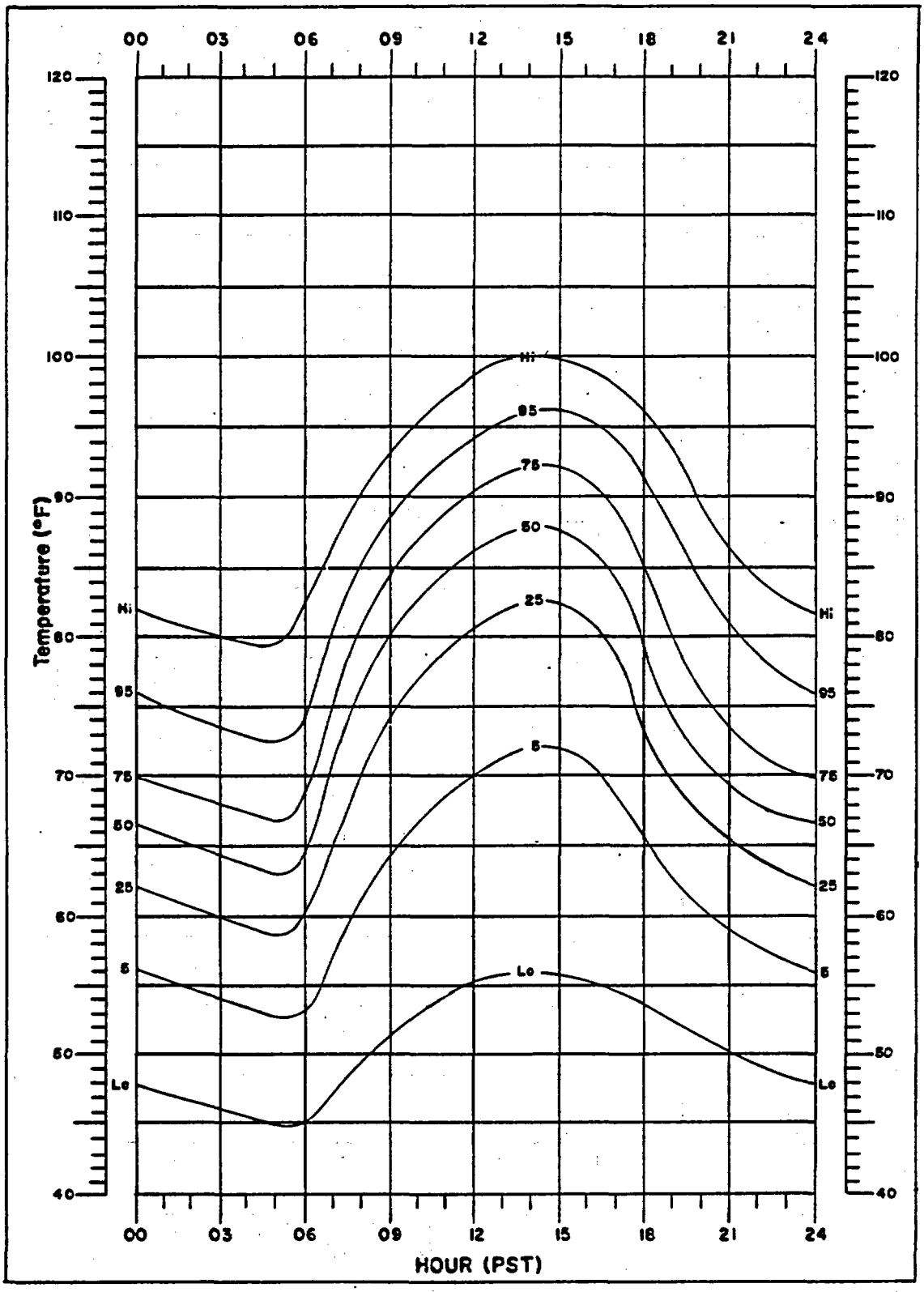

Fig. 3.3.9 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month September

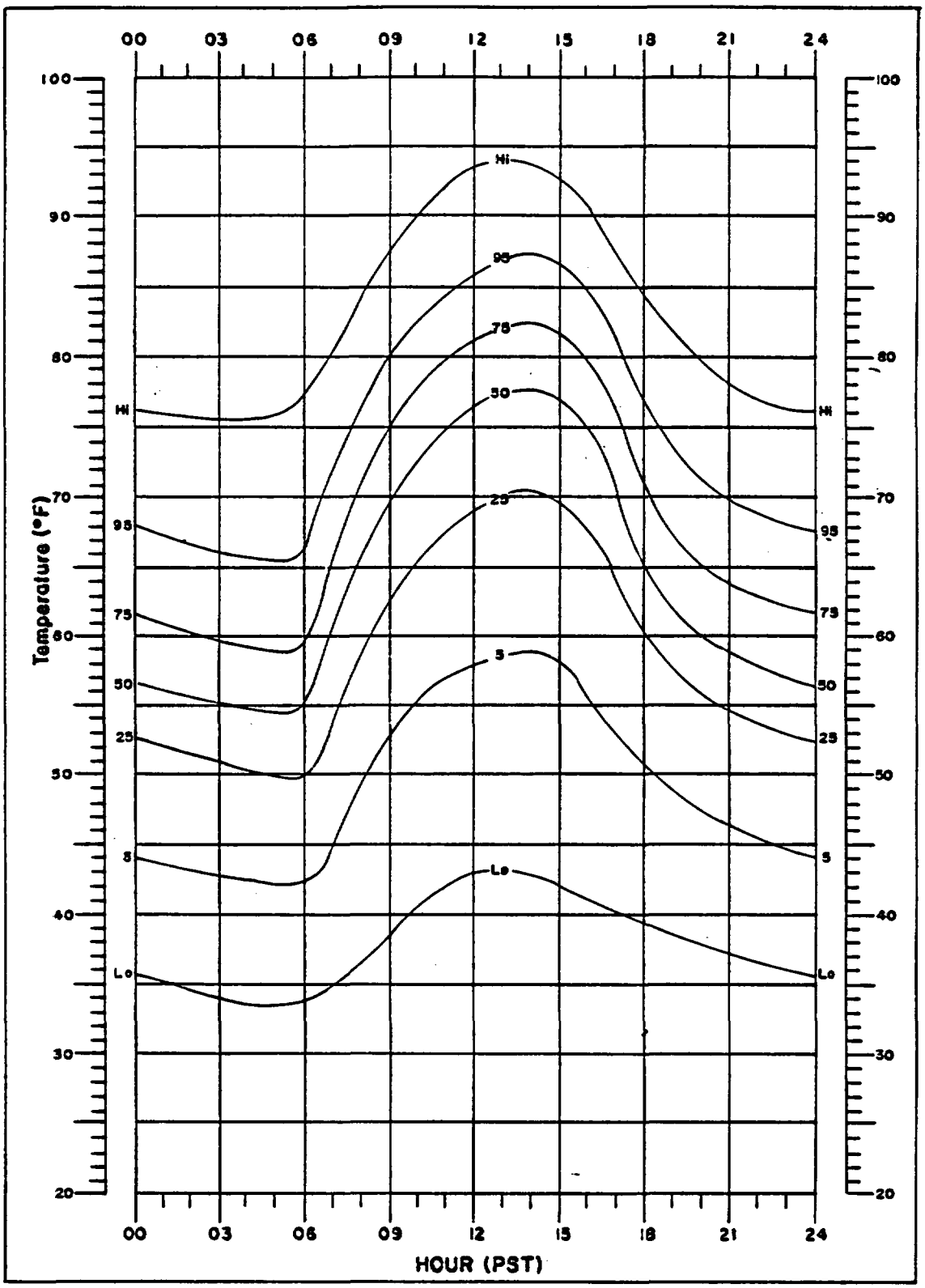

Fig. 3.3.10 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month October

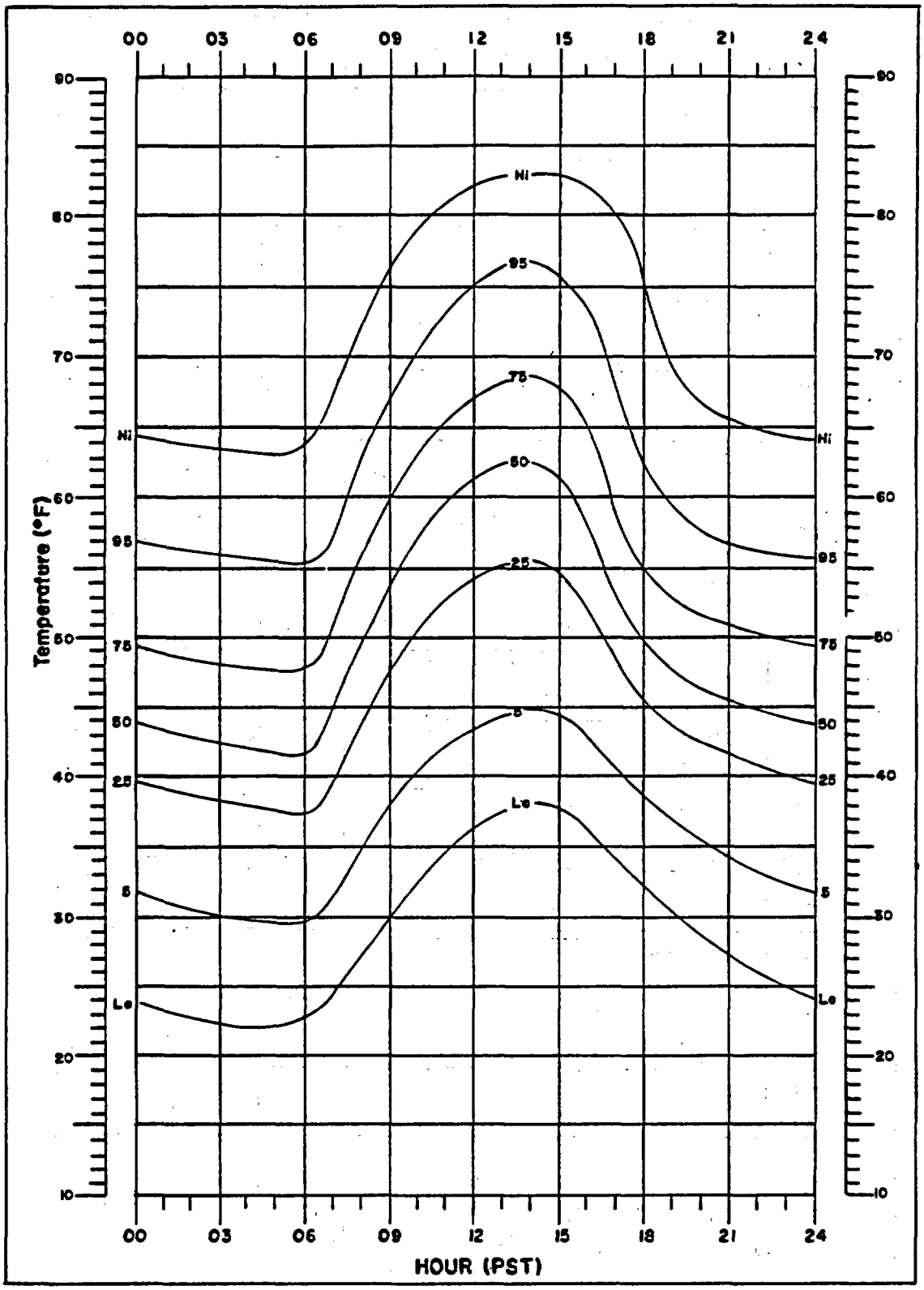

Fig. 3.3.11 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month November

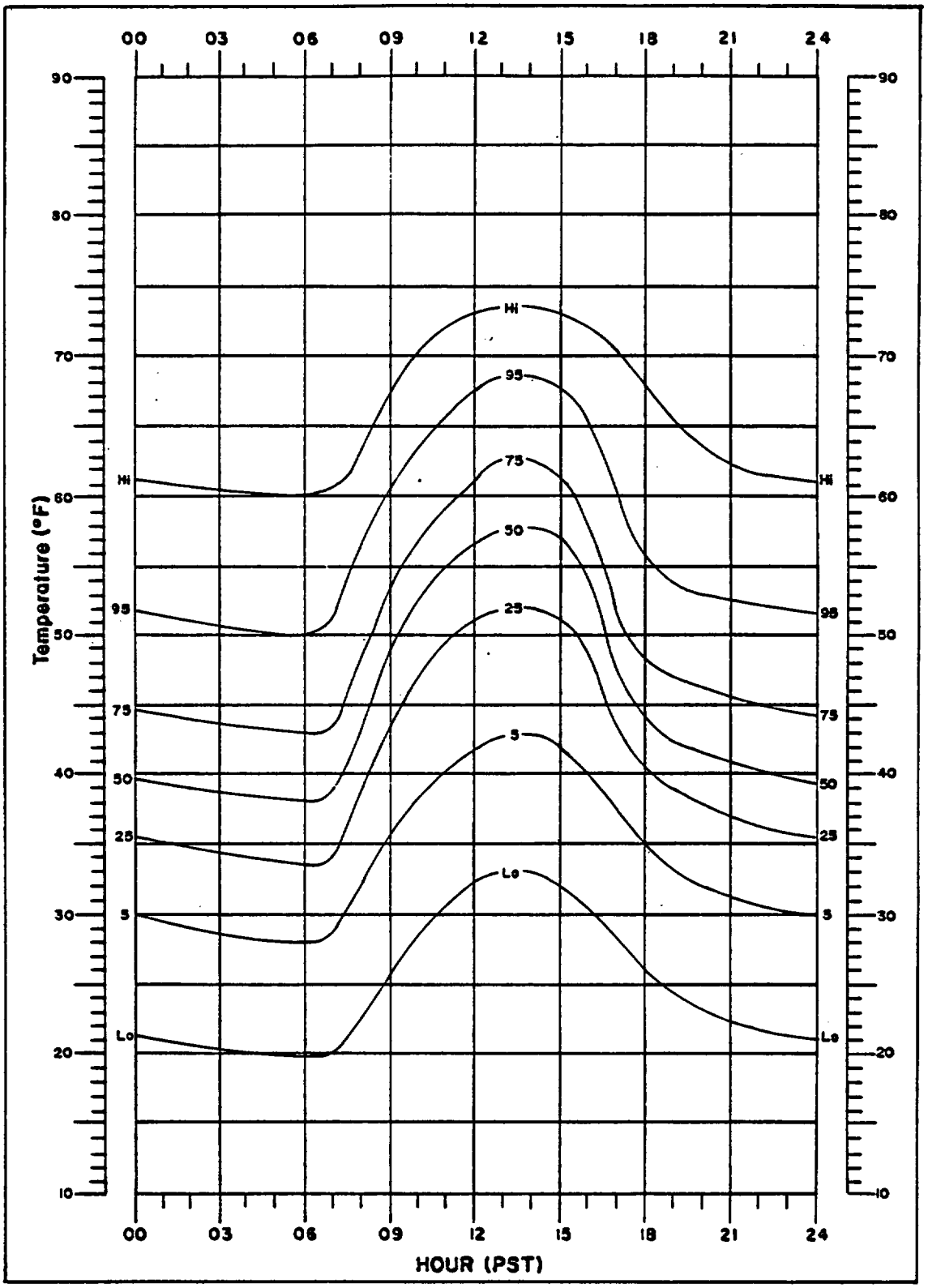

Fig. 3.3.12 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 4 Month December

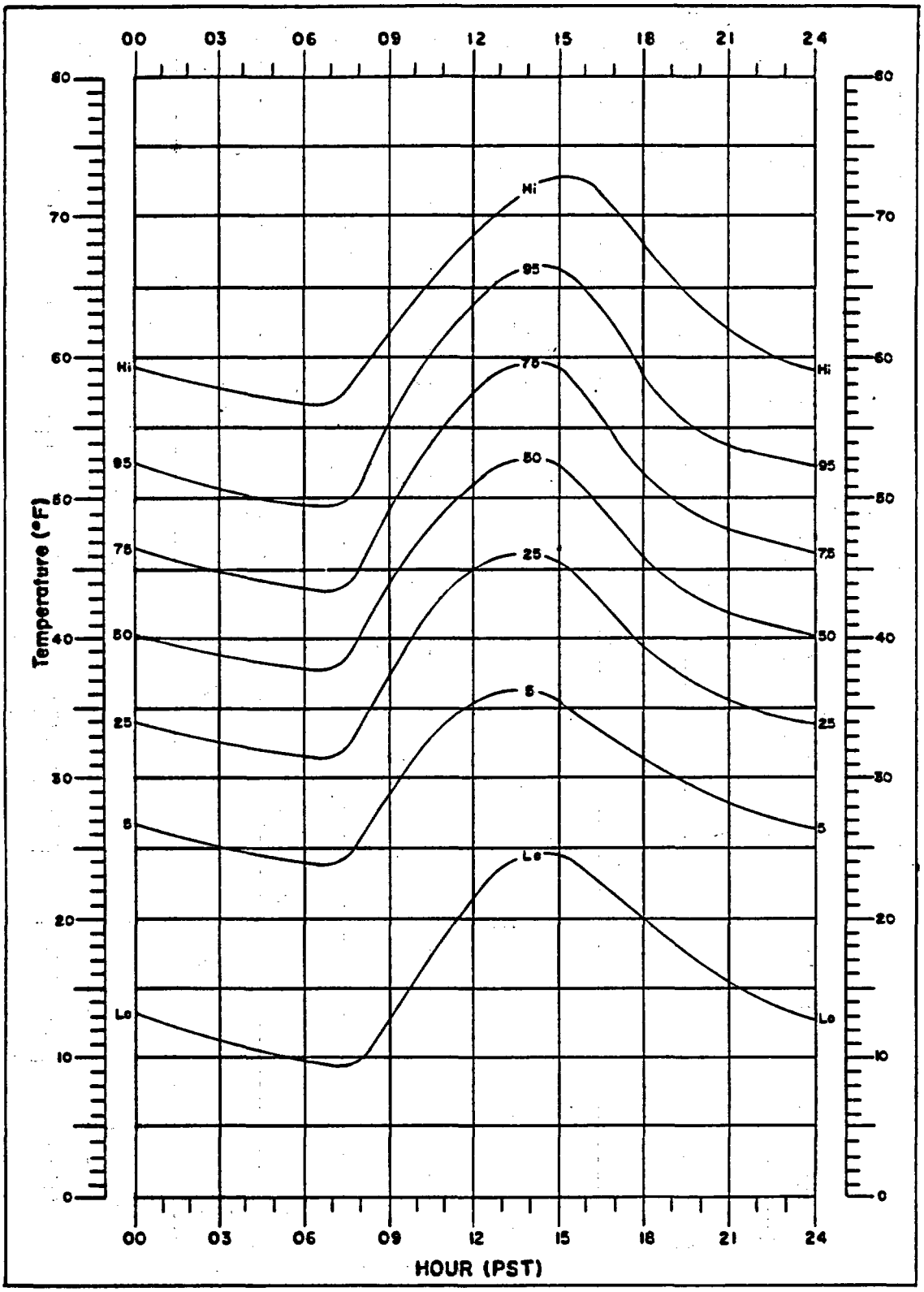

Fig. 3.4.1 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month January

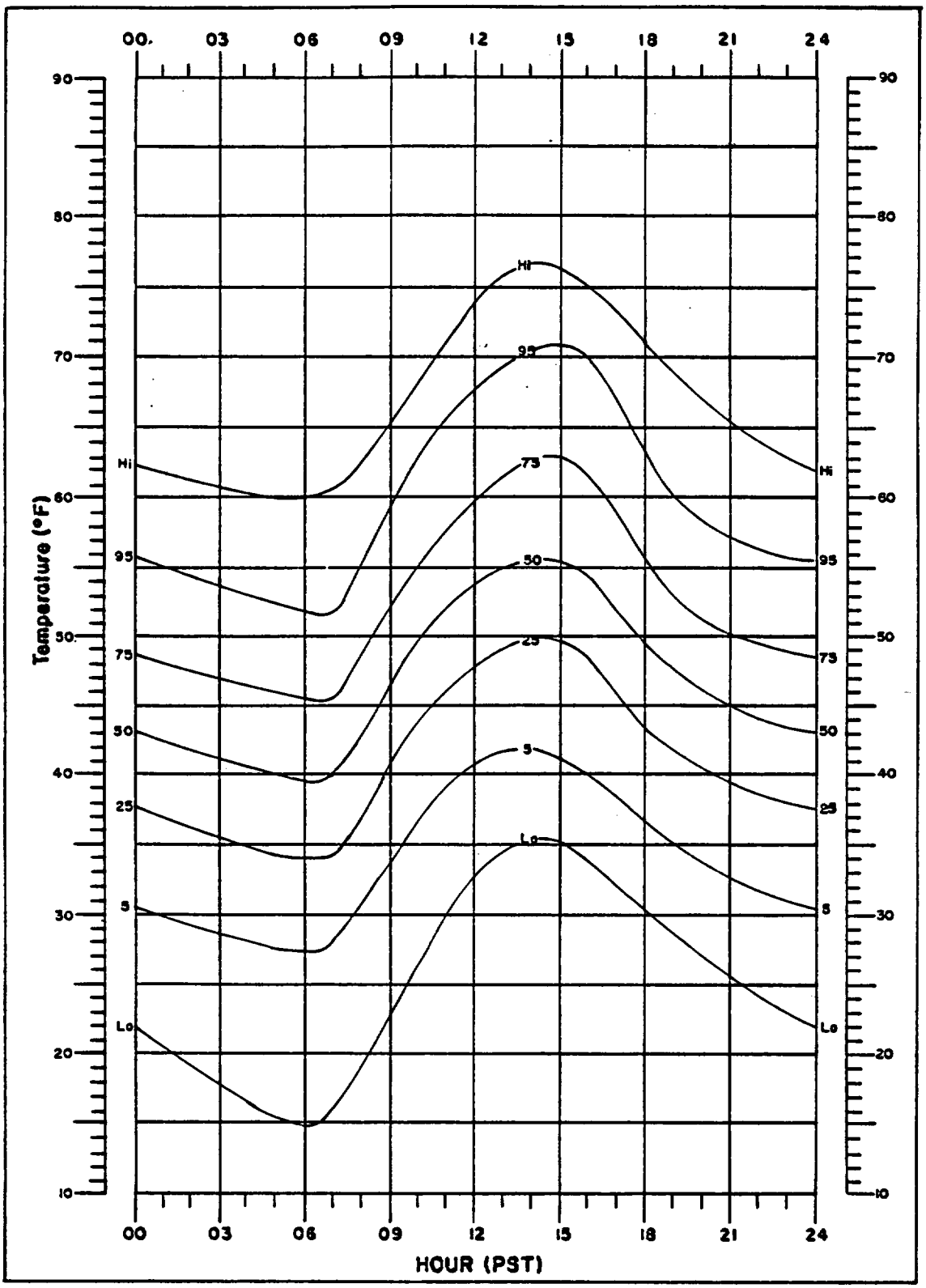

Fig. 3.4.2 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month February

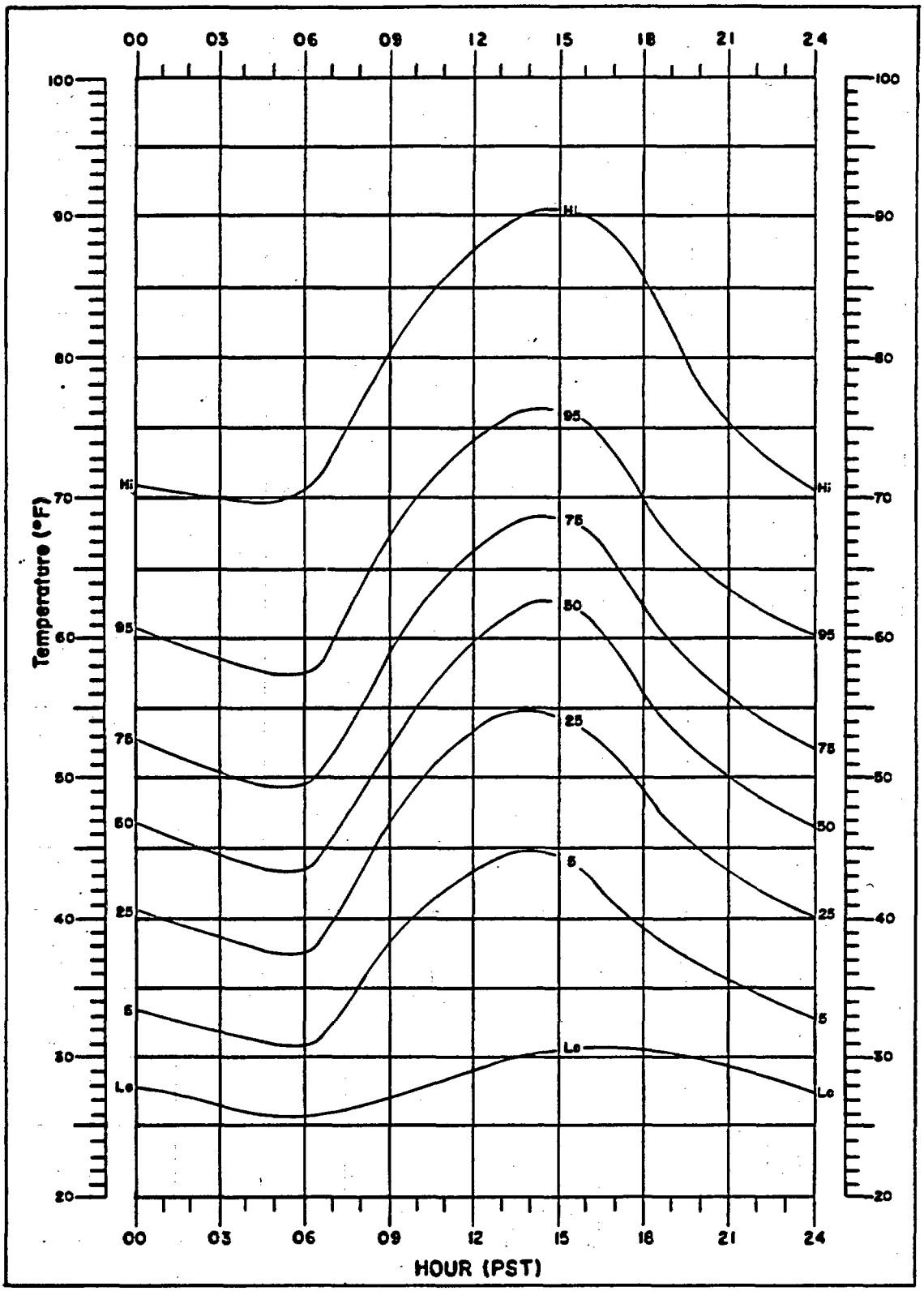

Fig. 3.4.3 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month March

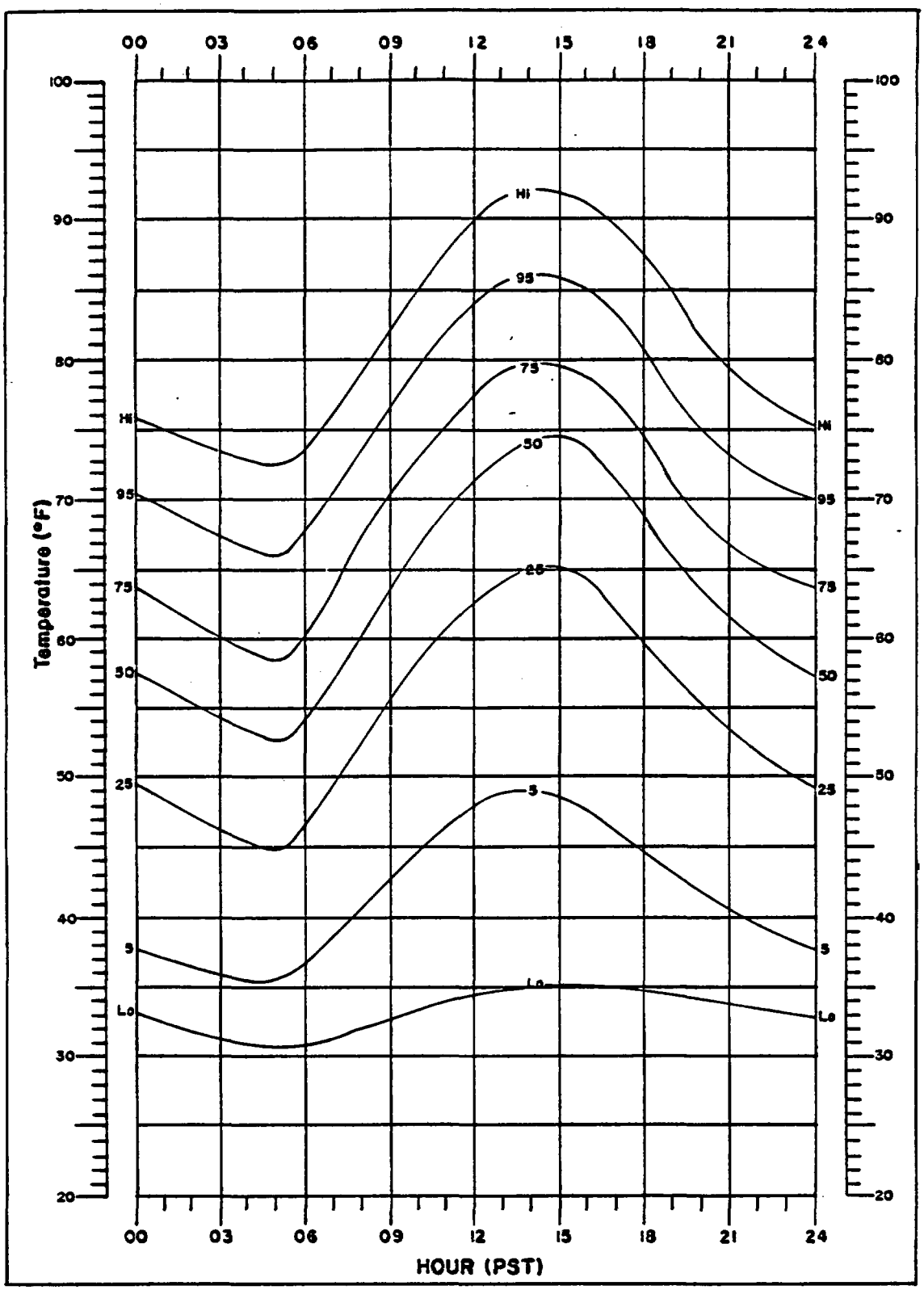

Fig. 3.4.4 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month April

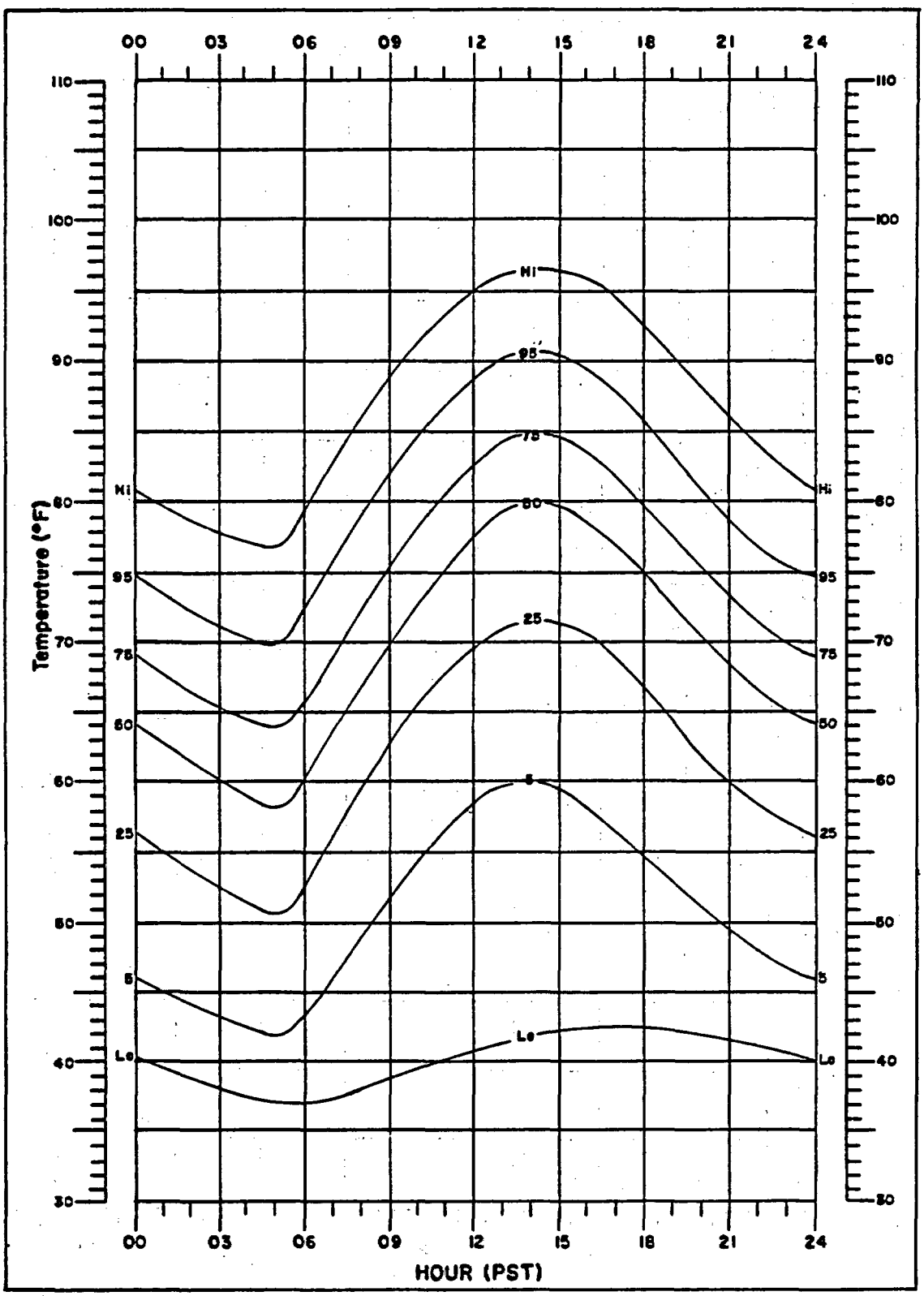

Fig. 3.4.5 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month May

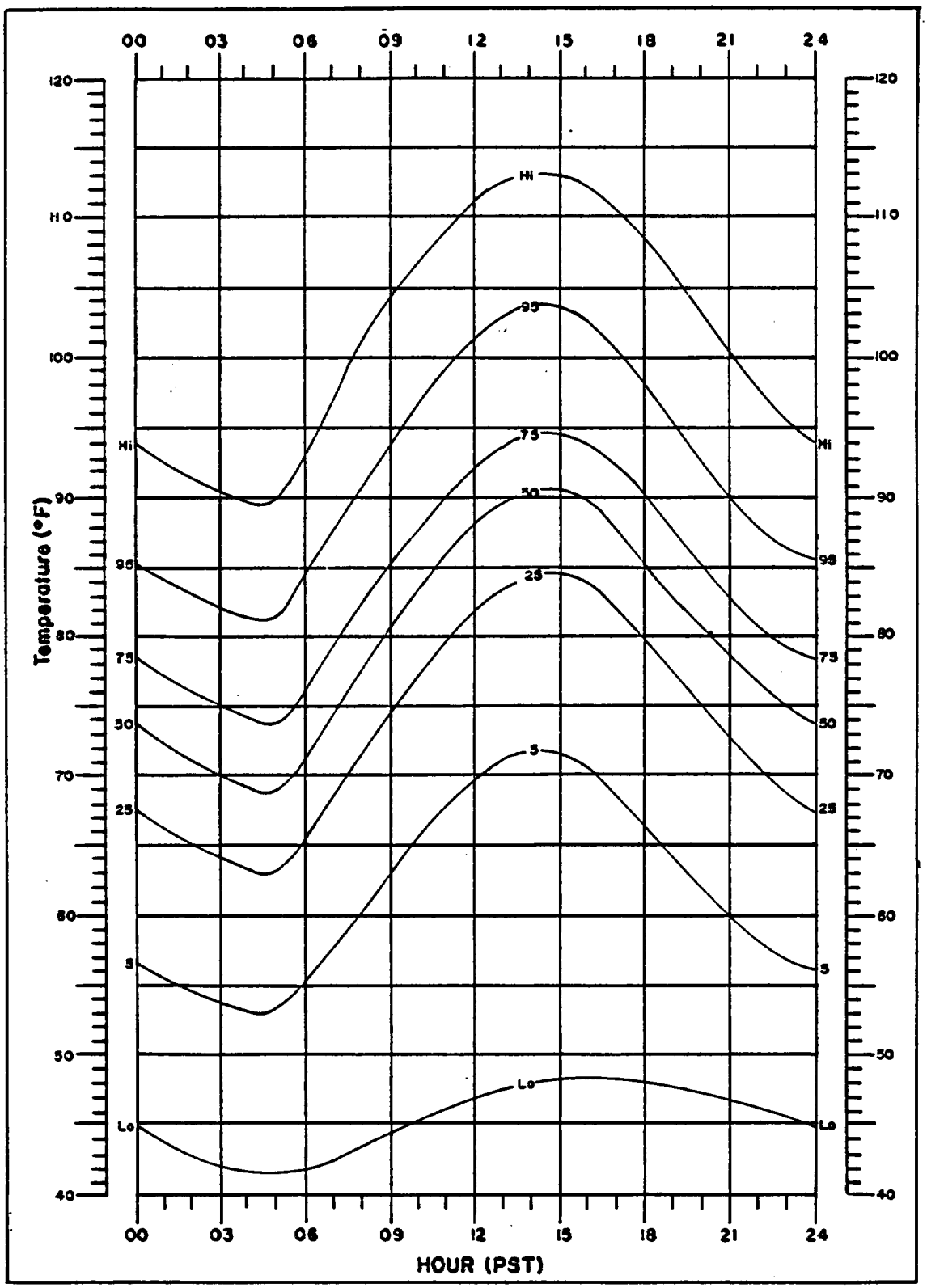

Fig. 3.4.6 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month June

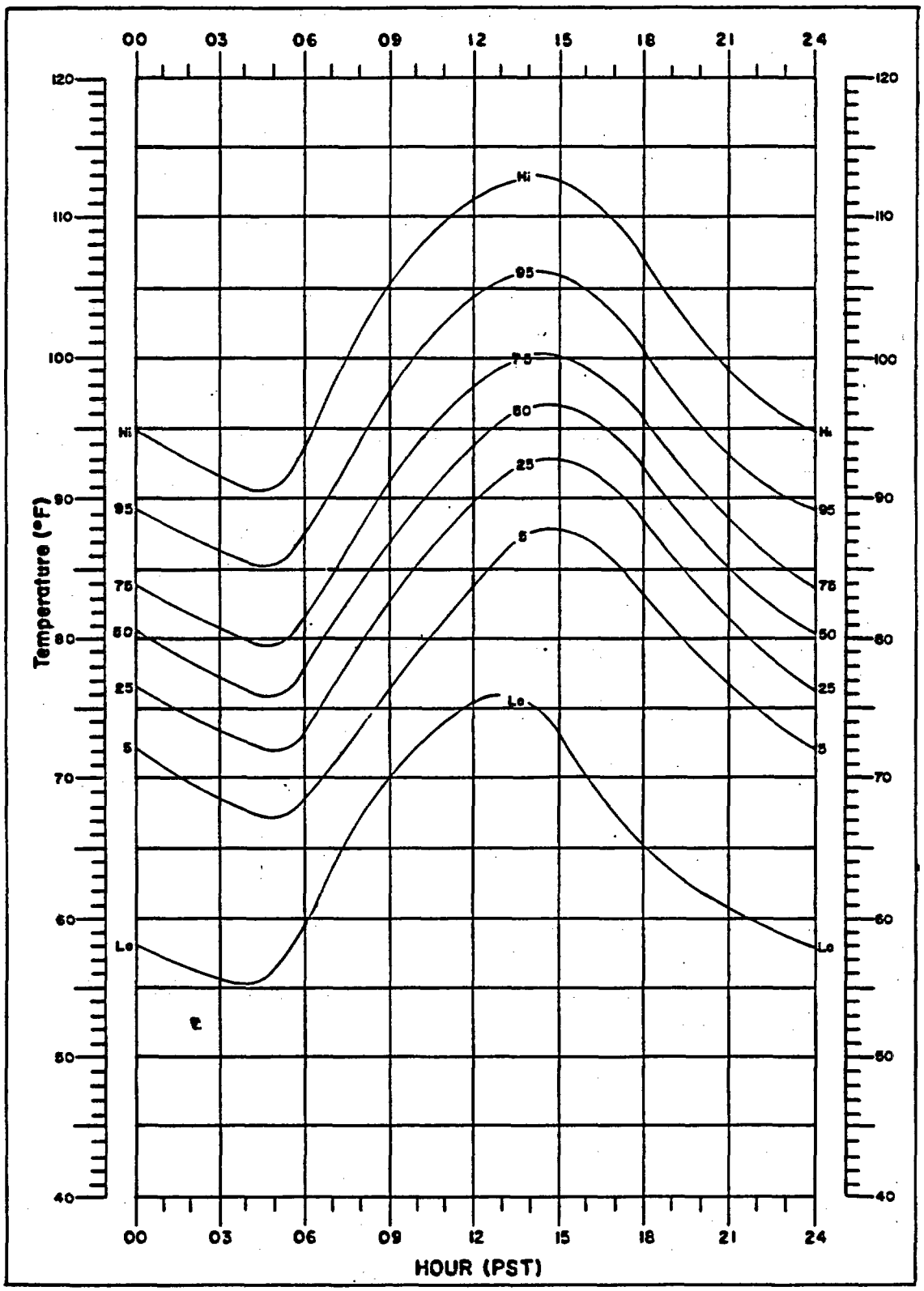

Fig. 3.4.7 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month July

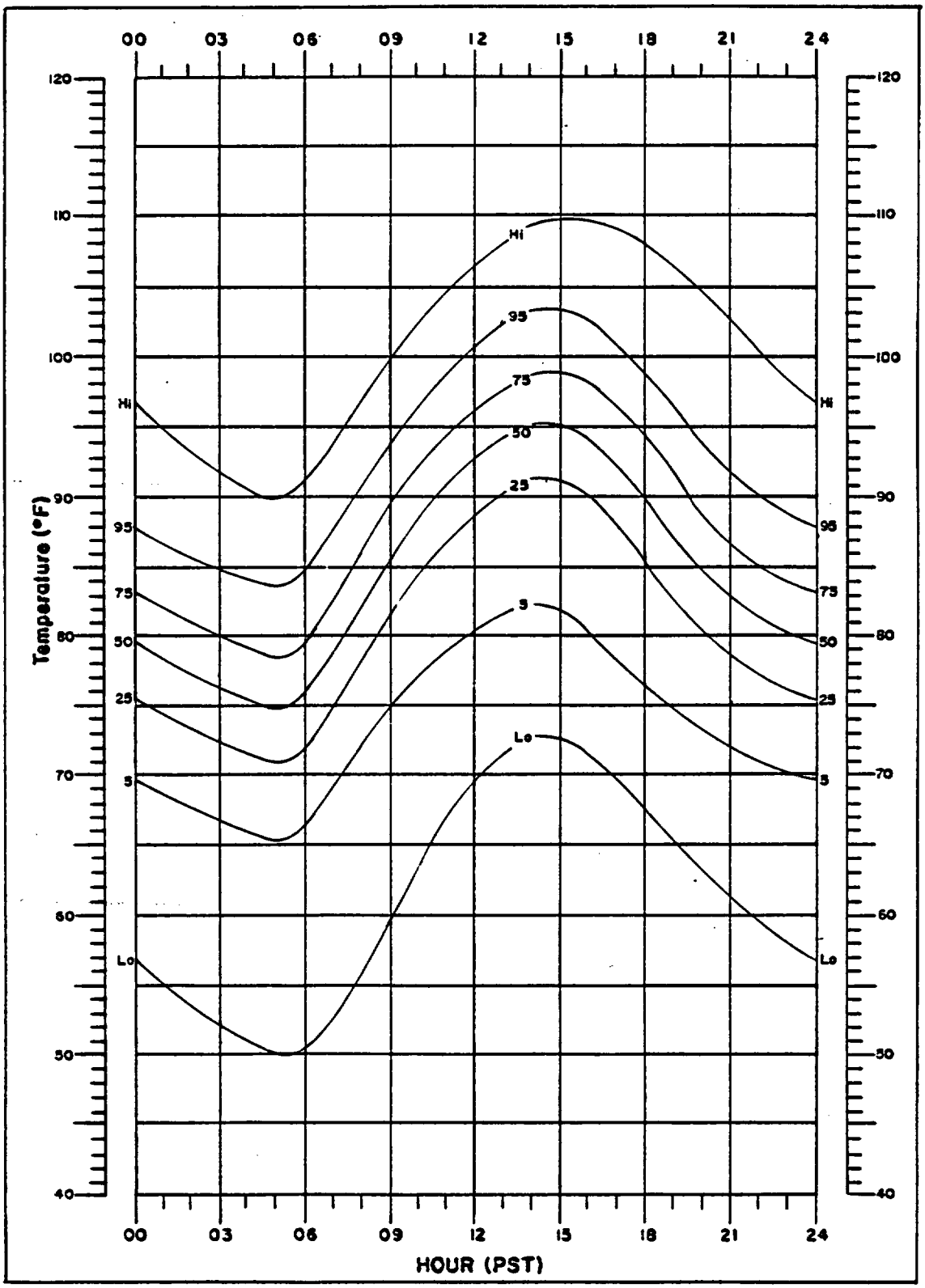

Fig. 3.4.8 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month August

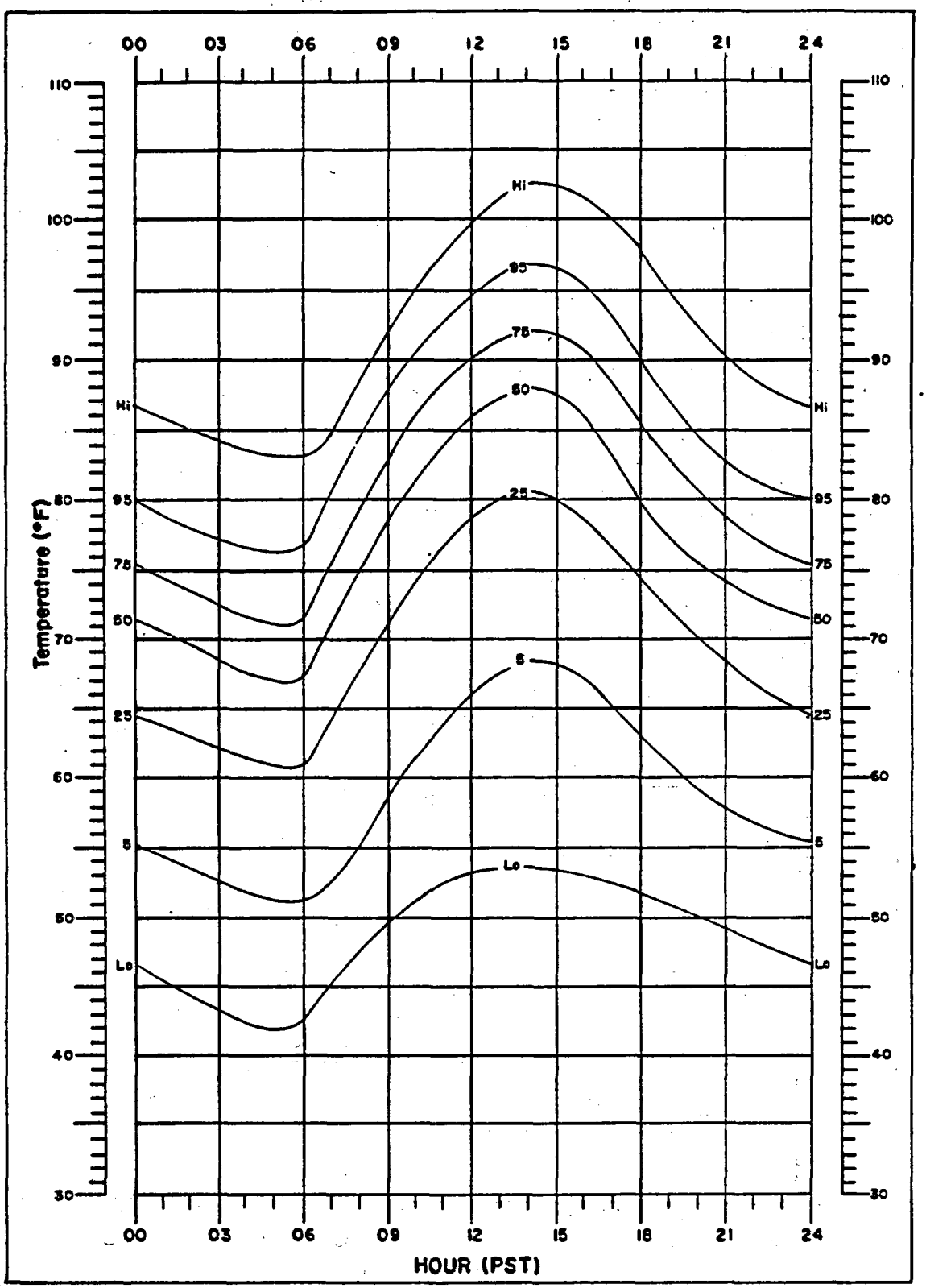

Fig. 3.4.9 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month September

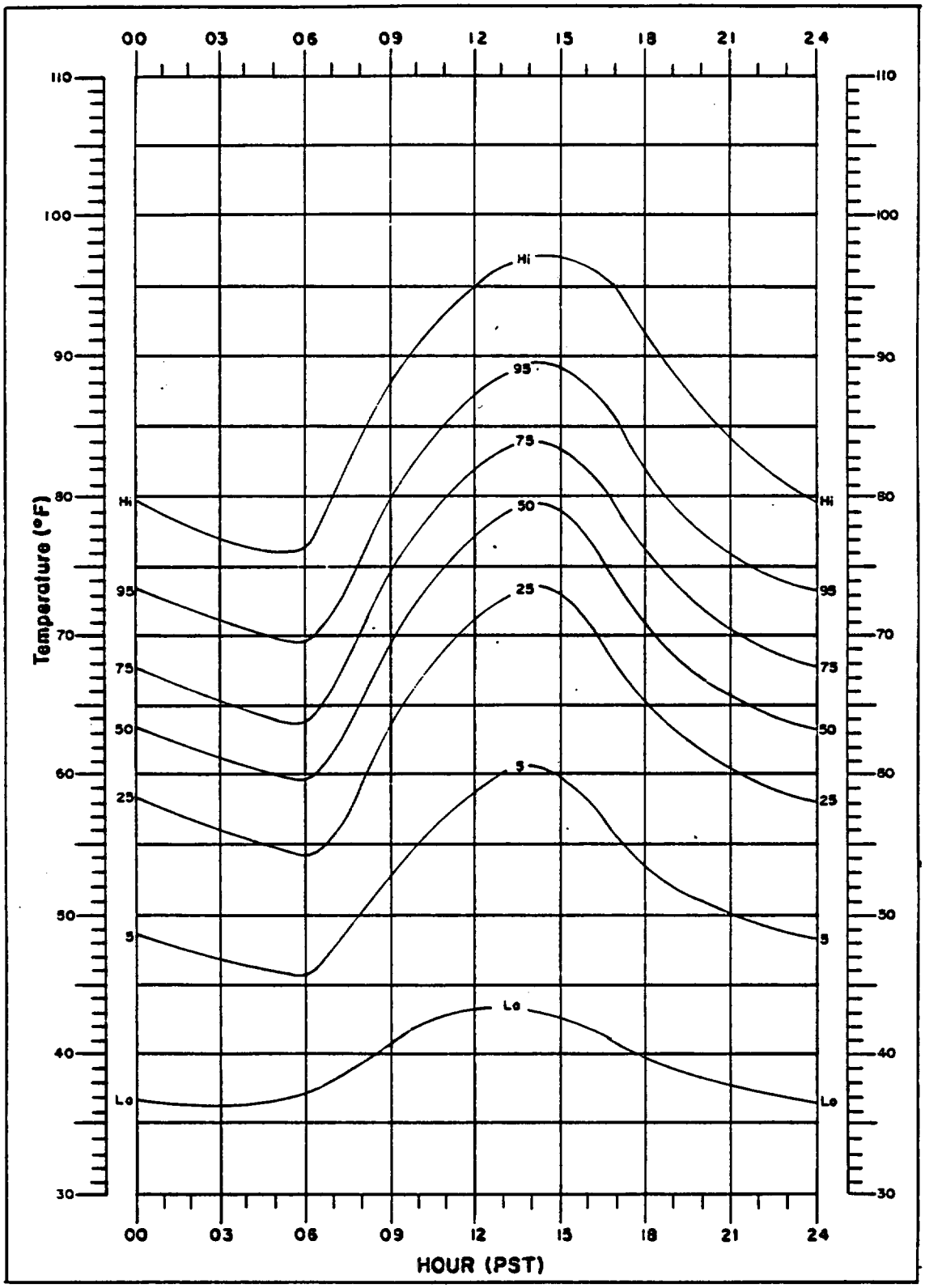

Fig. 3.4.10 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month October

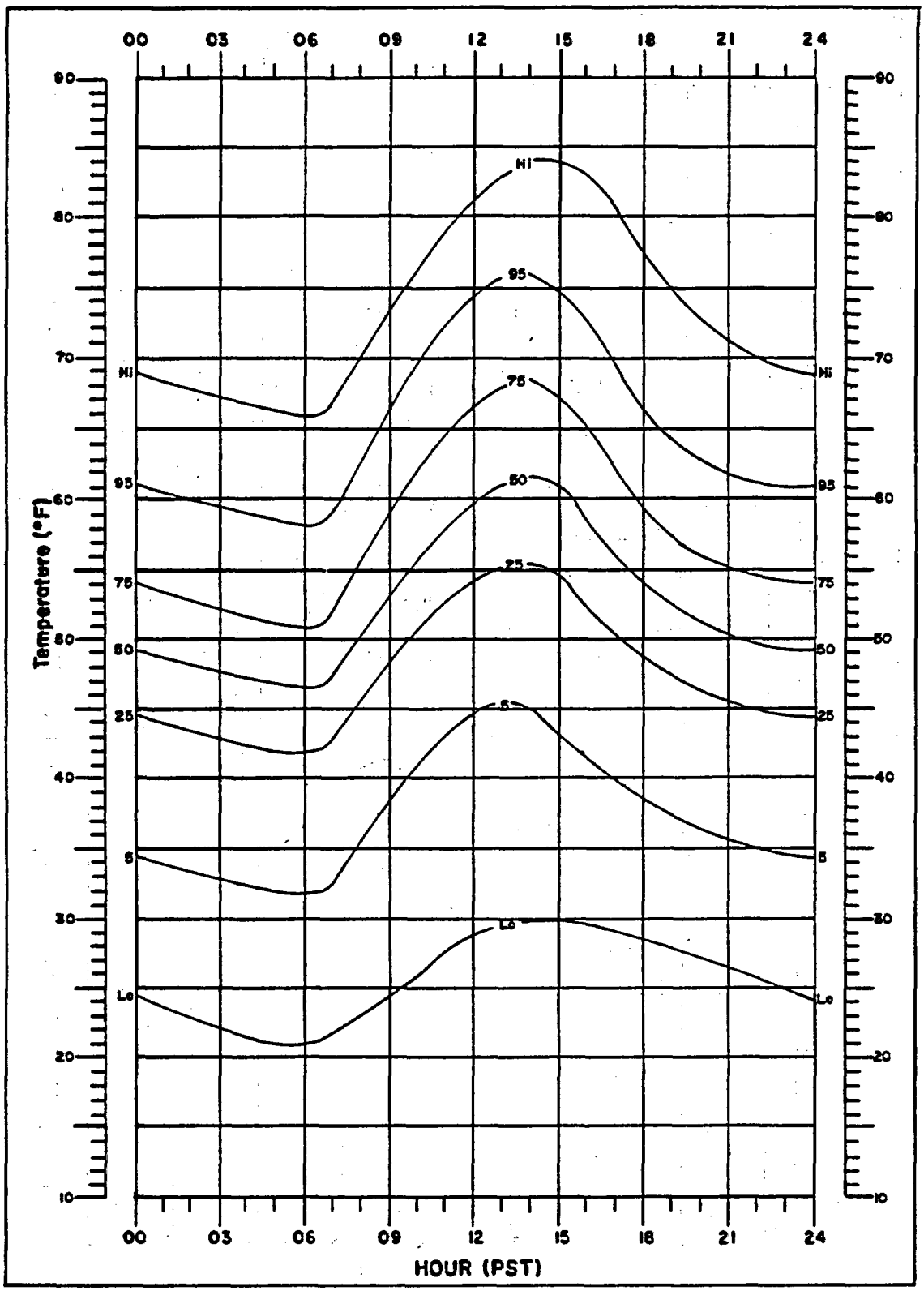

Fig. 3.4.11 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month November

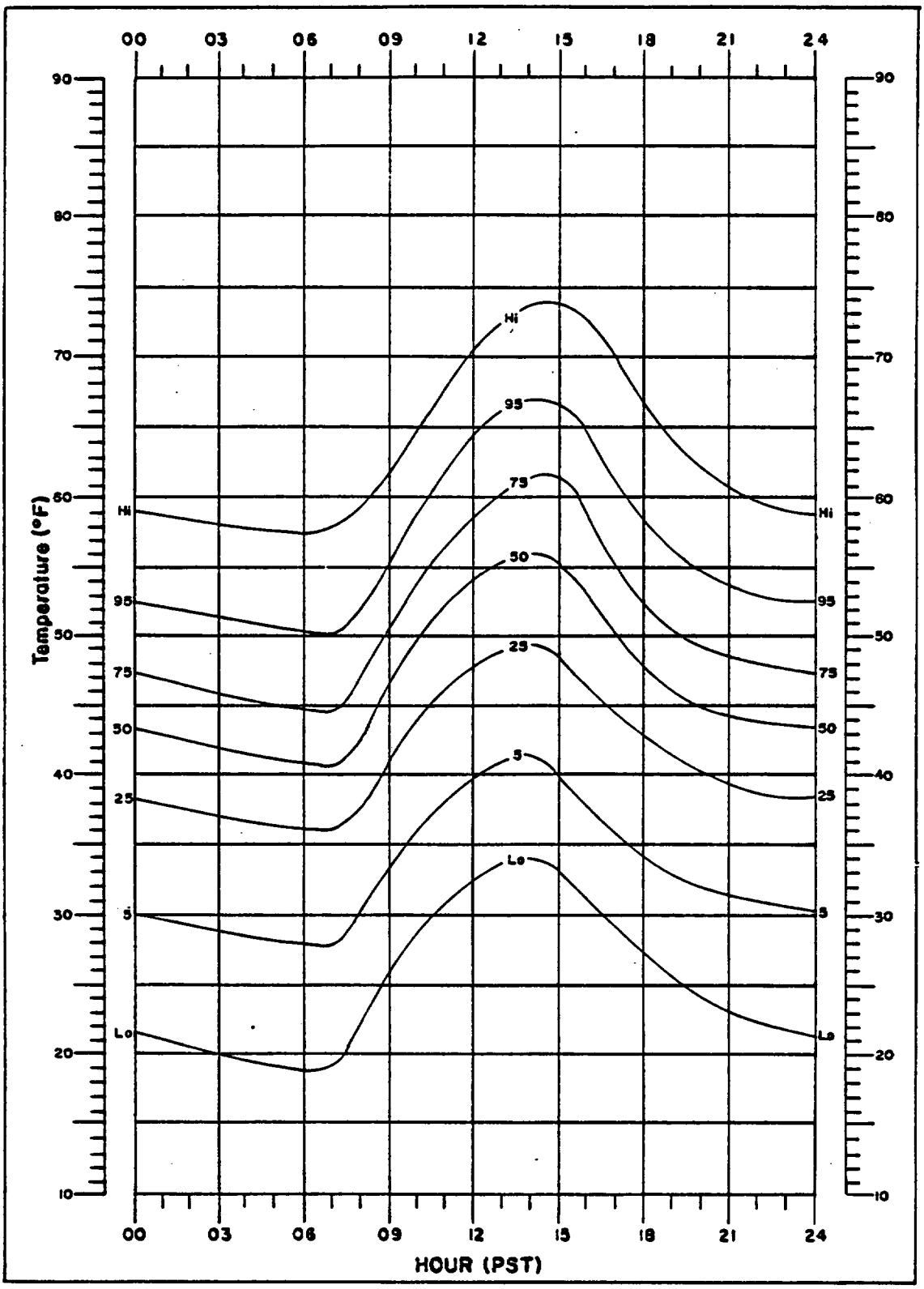

Fig. 3.4.12 Distribution of temperatures by selected percentiles as a function of time of day.

Station: Tower 5A Month December

4.0 SURFACE HUMIDITY

Refer to section 1, table 1.3, in which the average relative humidity at four times of day is presented for the Yucca weather station. These data are, of course, not truly representative of the entire test site; however, they do show the general seasonal and diurnal trends.

5.0 PRECIPITATION

5.1 General

Two major features of the atmospheric circulation govern the annual cycle of precipitation in southern Nevada. Winter storms bring in moisture from the Pacific and produce widespread areas of precipitation from November through April. The Sierra-Nevada range, however, imposes an extensive barrier that depletes the moisture supply and results in a rain shadow (precipitation deficit) east of the range. The effect of this rain shadow diminishes with increasing distance eastward from the range.

In summer, moisture is brought in mainly from the Gulf of Mexico with southeasterly winds that curve northward and then northeastward over Nevada. Precipitation usually falls in isolated showers, with large variations in precipitation amounts within a shower area. The extent of shower activity over southern Nevada depends to a large extent on how far the southeasterly winds extend into the state. Once the winds become southwesterly, precipitation is unlikely so that there is a strong tendency for shower activity to diminish northward and westward through southern Nevada. In September, and possibly early October, an occasional tropical storm will move northeastward from off the west coast of Mexico, bringing widespread and heavy precipitation to southern Nevada.

The general pattern of the annual precipitation cycle in southern Nevada can be seen in figure 5.1 for three stations surrounding the test site (Las Vegas to the southeast, Beatty to the west, and Adaven to the northeast). The winter precipitation maximum

is readily apparent at all stations. The rain shadow effect at Beatty is not as clear; however, winter precipitation is somewhat less than would be expected at that elevation. The summer precipitation maximum is most pronounced at Las Vegas, diminishes to a secondary maximum at Adaven, and is almost nonexistent at Beatty. All stations show a definite precipitation minimum in June, with a secondary minimum in September or October. The normal pattern of the annual precipitation cycle for the test site is a maximum from December through March, dipping to a minimum in June, then rising to a secondary maximum in July and August, followed by a secondary minimum in September or October.

5.2 Test Site Data

The precipitation network is currently composed of 12 weighing raingages and 8 tipping bucket rain gages. The latter do not record snowfall and are augmented with storage gages to obtain total precipitation in case of snow. Reliable precipitation measurements were started at a few stations in 1958, with stations being added more or less at random in subsequent years. The network was reorganized in September 1964 to provide fairly uniform spacing of raingages over a wide range of elevations and still maintain accessibility. The locations of the stations are shown in figure 5.2. Information pertaining to elevation, location, and period of record is given in table 5.1. The station listing starts in the southwest corner of the test site and progresses from west to east and northward.

Average precipitation amounts, average number of days with precipitation, and number of years of record for each month are given in table 5.2. For selected stations with the longest records, the maximum and minimum monthly and maximum daily precipitation amounts, and the maximum number of days with measurable precipitation are given. The records are too short to provide reliable averages and extremes for a mountainous desert area; pronounced changes can be expected with the addition of a few more years of record. The typical annual precipitation cycle seen in figure 5.1 for the 1931-1960 normal period has been obscured to some extent in the test site records by exceptionally heavy precipitation in some months and the short recording period.

5.3 Effect of Elevation

Annual precipitation in southern Nevada depends to a large extent on elevation. The log-linear relationships shown in figure 5.3 were developed from data for the 1931-1960 normal period for 30 stations in Nevada south of $38\frac{1}{2}^{\circ}$ of latitude and for two California stations. The upper regression line is based on 17 stations generally east of a north-south line through the test site. Elevation accounts for about 90 percent of the variation in annual precipitation for these stations. The lower regression line is based on 15 stations generally west of a north-south line through the test site; for these stations, elevation accounts for about 80 percent of the variation. The center regression line is based on all stations

combined. When the data are adjusted to the normal period, the test site stations with the longest records lie near this line, which is considered representative of the test site and should provide reasonable estimates of normal annual precipitation.

5.4 Precipitation Probability

Precipitation records for the test site are not suitable in evaluating precipitation amounts for short durations for engineering design purposes. The precipitation probability curves for from 5 min to 24 hr given in figure 5.4 were developed from the U. S. Weather Bureau Technical Paper No. 40. Values taken from figure 5.4 are considered generally representative of the test site.

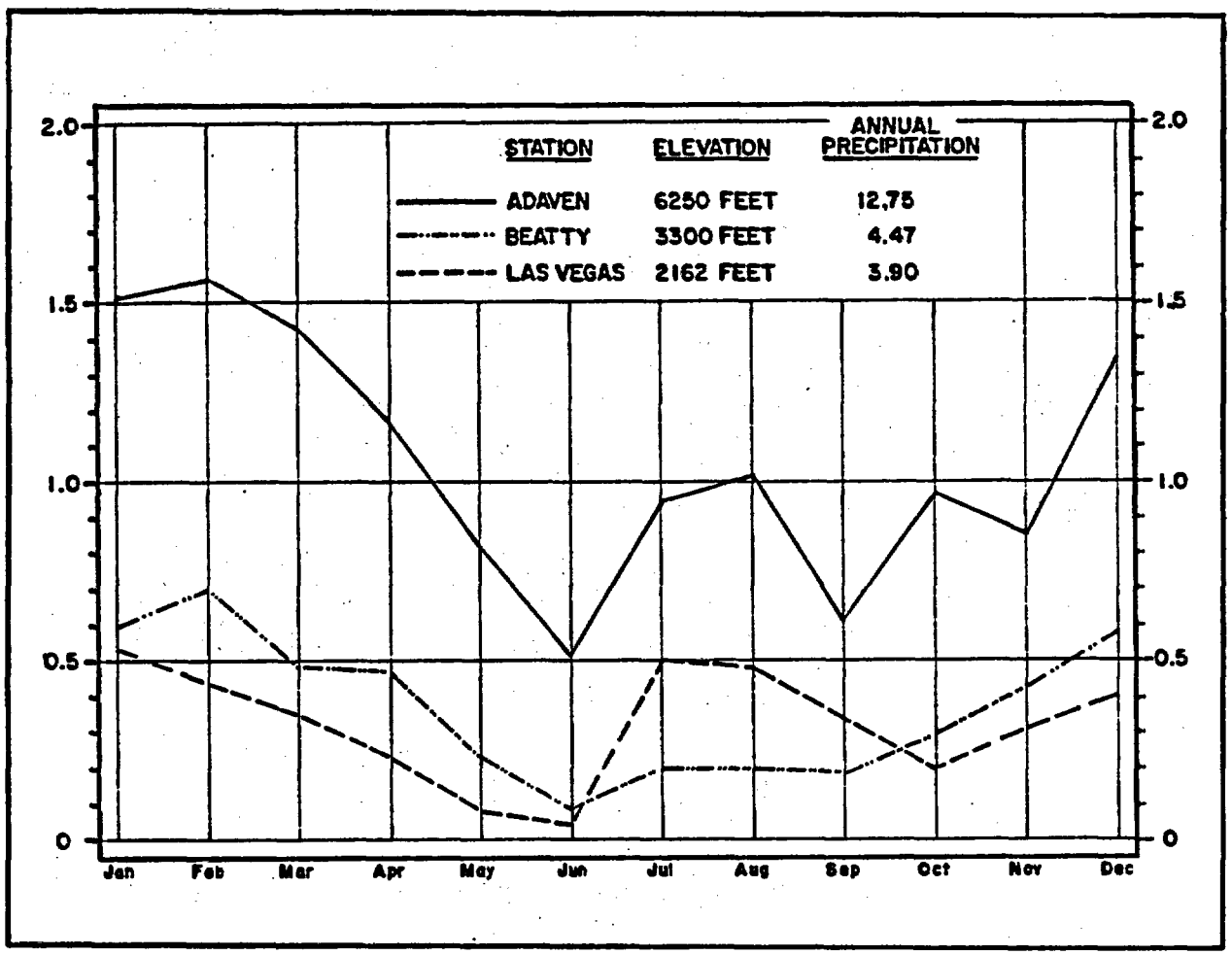

Fig. 5.1 Normal monthly precipitation in inches (1931–1960).

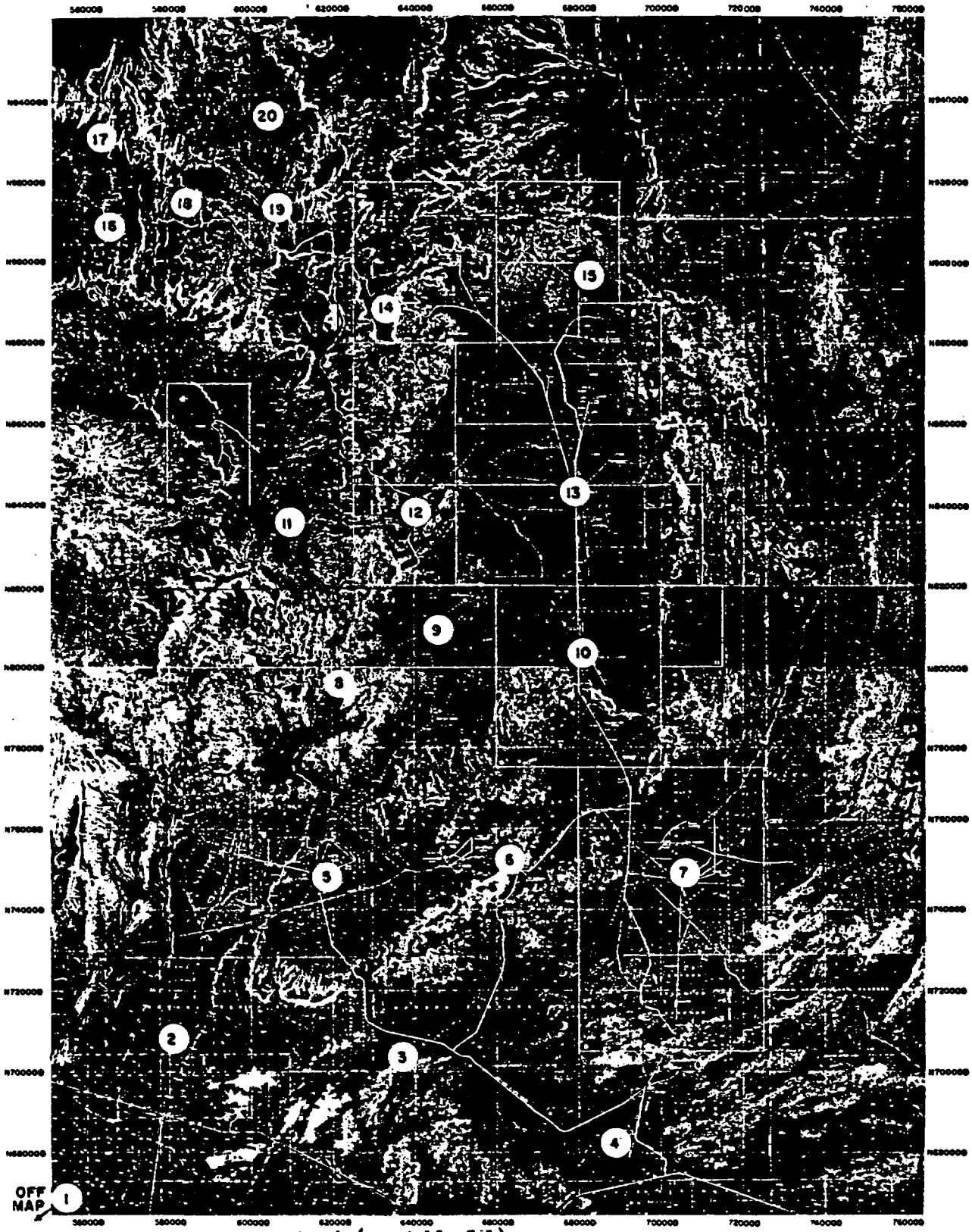

Fig. 5.2 Precipitation network (see table 5.1).

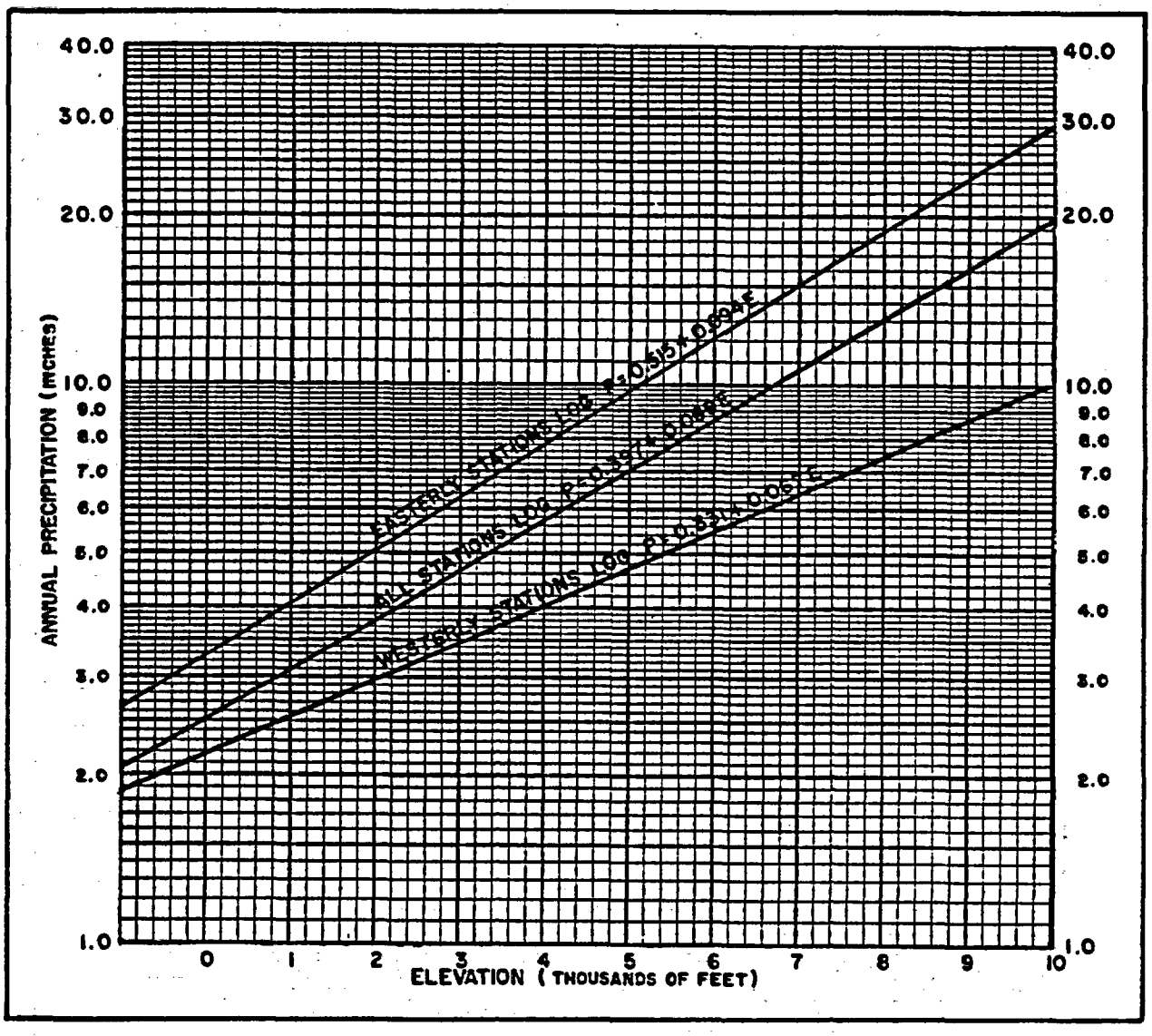

Fig. 5.3 Log-linear relationship between normal annual precipitation and elevation in southern Nevada (1931-1960).

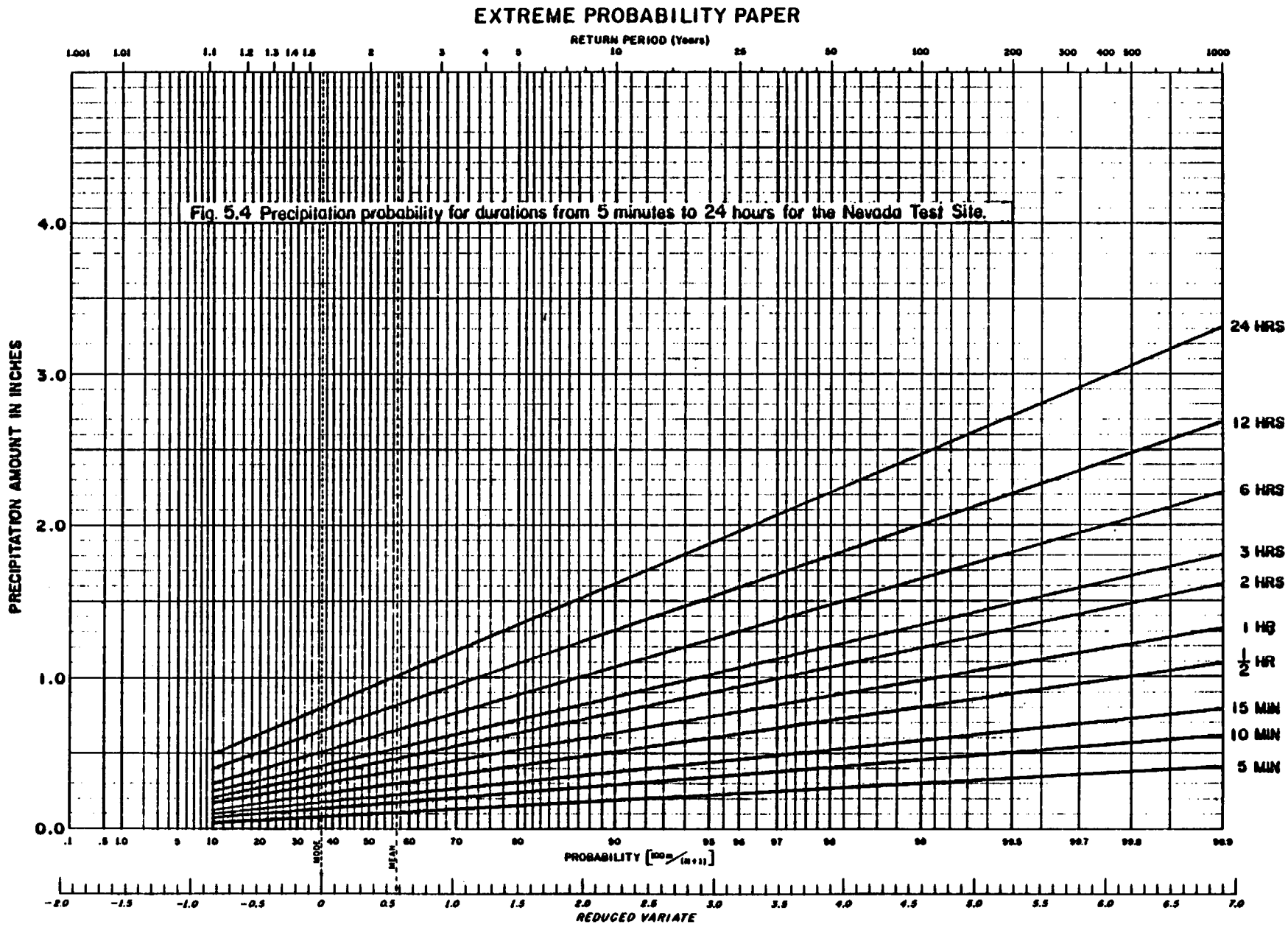

Fig. 5.4 Precipitation probability for durations from 5 minutes to 24 hours for the Nevada Test Site.

Table 5.1. Identifying Information for the Test Site Precipitation Network

Map No.	Station	Location Nevada State Grid (Central) E	N	Elevation (Feet)	Period of Record From	Through
1.	Schultz's Ranch	527,840	665,210	2386	Feb '64	Sep '67
2.	ADA 27	580,300	708,000	2840	Dec '64	Sep '67
3.	Rock Valley	638,336	704,692	3367	Mar '63	Sep '67
4.	Desert Rock	686,800	681,950	3220	Sep '62	Sep '67
5.	4JA	617,000	748,000	3610	Jan '58	Sep '67
6.	Cane Springs	663,600	751,000	3992	Oct '64	Sep '67
7.	Well 5B	704,300	747,900	3090	Jul '62	Sep '67
8.	Shoshone Basin	622,000	795,550	5600	Nov '59	Sep '67
9.	Mid Valley	644,660	809,410	4660	Oct '64	Sep '67
10.	Yucca Weather Station	680,500	803,550	3924	May '58	Sep '67
11.	40MN	609,670	837,660	4815	Mar '60	Sep '67
12.	Tippipah Springs #2	640,960	839,230	4918	Oct '64	Sep '67
13.	BJY	679,000	844,000	4075	Mar '60	Sep '67
14.	Area 12 Mesa	631,450	889,090	7480	Apr '59	Sep '67
15.	PHS Farm	682,190	895,440	4560	Oct '64	Sep '67
16.	Pahute Mesa #1	566,000	908,700	6540	Feb '64	Sep '67
17.	Pahute Mesa #2	561,480	929,990	6318	Oct '64	Sep '67
18.	Pahute Mesa #3	583,860	915,010	6429	Oct '64	Sep '67
19.	Pahute Mesa #4	606,160	913,000	6950	Oct '64	Sep '67
20.	Pahute Mesa #5	604,040	937,190	6733	Oct '64	Sep '67

Table 5.2. Precipitation Summary for Test Site Locations

A Average monthly precipitation amount (inches)
B Average number of days with measureable precipitation
C Number of years of record
D Maximum monthly precipitation amount
E Minimum monthly precipitation amount
F Maximum daily precipitation amount
G Maximum number of days with measureable precipitation

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Schultz' Ranch													
A	.30	.05	.11	.46	.12	.06	.51	.42	.05	.02	.38	.63	3.11
B	2.3	0.8	1.5	4.5	1.0	1.8	3.0	3.8	0.5	0.3	4.0	2.3	25.8
C	3	4	4	4	4	4	4	4	4	3	3	3	
ADA 27													
A	.43	.10	.09	.65	.14	.14	.46	.38	.15	.04	1.04	.90	4.52
B	2.3	1.7	2.3	4.3	2.7	2.3	3.0	3.3	1.0	1.0	4.0	1.7	29.6
C	3	3	3	3	3	3	3	3	3	2	2	3	
Rock Valley													
A	.53	.17	.25	.80	.15	.17	.34	.68	.36	.08	.78	.73	5.04
B	3.0	1.3	2.6	4.0	1.4	2.2	2.2	2.8	2.4	1.8	5.5	2.5	31.7
C	4	4	5	5	5	5	5	5	5	4	4	4	
Desert Rock													
A	.33	.25	.25	.70	.15	.22	.30	.68	.59	.10	.64	.63	4.84
B	2.4	1.4	3.0	4.4	2.8	2.6	3.2	3.6	1.8	1.8	3.2	2.4	32.6
C	5	5	5	5	5	5	5	5	6	5	5	5	

Table 5.2 (continued).

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
4JA													
A	.31	.35	.15	.37	.14	.08	.22	.27	.45	.21	.54	.63	3.72
B	1.9	2.5	2.7	3.2	1.2	1.5	2.2	2.7	2.1	1.4	3.1	1.8	26.3
C	10	10	10	10	10	10	10	10	10	9	9	9	
D	.69	1.01	.35	1.91	.33	.26	.48	.71	1.68	.63	1.67	3.03	
E	.01	0	0	0	0	0	0	0	0	0	0	0	
F	.42	.90	.20	.47	.27	.26	.24	.50	.86	.51	.89	1.85	
G	4	6	5	9	3	4	5	7	6	3	7	5	
Cane Springs													
A	.75	.22	.28	1.38	.19	.09	.36	.69	.18	.08	.89	1.28	6.39
B	3.3	1.7	2.7	5.7	2.3	2.7	3.7	4.3	2.3	0.7	5.0	3.3	37.7
C	3	3	3	3	3	3	3	3	3	3	3	3	
Well 5B													
A	.28	.20	.24	.62	.17	.21	.30	.34	.64	.09	.44	.68	4.21
B	2.4	1.4	3.0	5.0	2.6	2.6	2.8	3.3	2.7	1.6	3.2	2.4	33.0
C	5	5	5	5	5	5	6	6	6	5	5	5	
Shoshone Basin													
A	.48	.76	.39	.62	.19	.28	.40	.75	.90	.29	1.26	1.14	7.46
B	2.9	3.5	4.5	5.3	2.9	3.4	3.3	4.1	2.8	2.4	3.8	3.1	41.6
C	8	8	8	8	8	8	8	8	8	7	8	8	
D	.85	2.29	.92	2.36	.49	.94	1.14	2.20	2.48	.82	6.31	3.95	
E	.11	0	.01	.01	0	.01	.01	0	0	0	0	0	
F	.75	1.12	.35	.68	.31	.37	.65	.87	1.75	.45	2.50	2.40	
G	4	10	9	12	4	8	6	9	5	5	7	7	
Mid Valley													
A	.54	.08	.17	1.24	.19	.14	.78	.81	.23	.10	2.11	2.42	8.81
B	3.3	1.3	2.7	6.3	2.7	1.7	4.3	6.0	3.0	1.0	5.0	5.3	42.6
C	3	3	3	3	3	3	3	3	3	3	3	3	

Table 5.2 (continued).

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Yucca Weather Station													
A	.32	.38	.24	.54	.12	.14	.48	.43	.52	.24	.82	.71	4.94
B	2.0	2.2	3.1	3.9	1.6	1.6	2.6	3.3	2.3	1.7	3.7	1.7	29.7
C	9	9	8	8	9	9	10	10	10	9	9	9	
D	.75	1.20	.47	2.70	.21	.38	1.39	1.18	2.30	1.00	1.77	2.66	
E	.01	0	.02	0	.01	0	0	0	0	0	0	0	
F	.49	.73	.23	1.08	.21	.38	1.26	.52	.76	.92	1.11	1.31	
G	5	7	6	10	2	4	6	9	6	4	9	4	
40MN													
A	.31	.44	.36	.60	.17	.30	.62	.65	1.01	.23	.86	.69	6.24
B	2.7	2.6	4.0	4.6	2.6	2.8	3.4	4.8	2.9	2.1	4.1	3.1	39.7
C	7	7	8	8	8	8	8	8	8	7	7	7	
Tippipah Springs #2													
A	.33	.06	.23	1.43	.27	.29	.50	.66	.34	.10	1.34	1.39	6.94
B	3.3	1.7	2.7	7.7	3.0	2.3	5.0	5.3	3.3	1.0	5.0	4.0	44.3
C	3	3	3	3	3	3	3	3	3	3	3	3	
BJY													
A	.21	.27	.24	.47	.18	.19	.59	.45	.50	.21	.73	.73	4.77
B	2.1	2.4	3.4	4.5	2.9	2.3	3.6	4.3	3.1	1.7	4.0	2.0	36.3
C	7	7	8	8	8	8	8	8	8	7	7	7	
Area 12 Mesa													
A	.70	.81	.78	1.15	.34	.32	.78	1.17	.76	.28	1.40	1.05	9.54
B	3.4	3.6	5.0	5.9	3.1	3.1	4.1	5.9	3.4	2.5	4.8	4.1	48.9
C	8	8	8	9	9	9	9	8	8	8	8	8	
D	1.58	3.01	2.51	5.67	.84	.95	1.79	2.63	2.30	1.00	4.67	4.33	
E	.25	0	.03	.01	0	.01	.02	0	0	0	.05	0	
F	1.00	.73	1.79	1.37	.60	.25	.85	1.02	.90	.70	1.87	2.50	
G	7	11	7	14	6	8	7	12	8	5	9	10	

Table 5.2 (continued).

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
PHS Farm													
A	.27	.10	.42	1.29	.26	.07	.43	.73	.23	.02	1.10	1.30	6.22
B	2.3	1.7	2.0	7.0	2.7	1.7	6.3	5.0	1.3	0.3	5.7	5.0	41.0
C	3	3	3	3	3	3	3	3	2	3	3	3	
Pahute Mesa #1													
A	.45	.24	.38	1.14	.46	.34	.76	1.86	.46	.05	1.09	1.26	8.49
B	3.3	2.8	3.8	8.5	4.8	3.8	5.5	6.3	3.0	0.3	5.7	6.0	53.8
C	3	4	4	4	4	4	4	4	4	3	3	3	
Pahute Mesa #2													
A	.39	.38	.30	1.37	.34	.54	.73	1.41	.70	.05	1.07	1.36	8.64
B	3.0	2.7	3.7	9.0	4.7	4.7	6.0	6.3	2.7	0.3	5.7	6.7	55.5
C	3	3	3	3	3	3	3	3	3	3	3	3	
Pahute Mesa #3													
A	.53	.34	.44	1.84	.31	.58	1.37	2.14	1.05	.07	1.45	1.70	11.82
B	3.7	3.0	4.0	9.0	3.7	4.7	6.0	6.0	4.7	1.0	6.3	7.3	59.4
C	3	3	3	3	3	3	3	3	3	3	3	3	
Pahute Mesa #4													
A	.51	.37	.54	1.96	.33	.54	1.02	1.14	.49	.08	2.38	2.01	11.37
B	4.0	3.0	4.0	9.0	3.0	4.7	6.7	7.7	4.7	0.7	7.0	8.0	62.5
C	3	3	3	3	3	3	3	3	3	3	3	3	
Pahute Mesa #5													
A	.30	.25	.34	1.33	.25	.53	1.88	.88	.58	.27	.90	1.16	8.67
B	3.0	3.7	4.0	9.0	3.0	4.0	5.7	5.7	4.3	0.7	6.3	7.7	57.1
C	3	3	3	3	3	3	3	3	3	3	3	3	

6.0 UPPER-AIR DATA

The preliminary upper-air data presented in this section are based on observations at the Yucca weather station from April 1957 through December 1964. Frequency of occurrence and average wind speed by 30° sectors for five times of day for the midseason months are presented in tables 6.1 through 6.20 for levels from 5000 to 16,000 ft above sea level. Wind speeds are in knots. Averages of height (m), temperature (°C), and relative humidity (%), and their standard deviations at 0400 PST are presented in table 6.21 from 850 to 500 mb in increments of 50 mb. Surface data provide the average and standard deviation of pressure in place of height for the station elevation of 1196 m.

Table 6.1. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

January 0400 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	17	18	14	10	8	5	4	5	3
	Av Sp	10	16	20	20	18	18	24	19	26
045-074	% Freq	3	5	8	8	7	8	7	3	4
	Av Sp	4	7	15	17	20	17	13	18	27
075-104	% Freq	2	3	3	3	2	1	0	3	5
	Av Sp	4	5	9	13	16	16	-	13	11
105-134	% Freq	1	3	1	2	2	1	2	3	3
	Av Sp	8	6	6	7	10	7	16	15	17
135-164	% Freq	4	3	2	1	2	1	1	0	0
	Av Sp	4	4	7	2	6	9	6	-	-
165-194	% Freq	2	9	7	5	3	3	1	1	0
	Av Sp	16	13	15	12	13	12	24	39	-
195-224	% Freq	9	12	18	22	16	13	10	7	8
	Av Sp	16	20	20	22	22	25	25	21	26
225-254	% Freq	7	3	7	7	10	14	10	14	12
	Av Sp	6	11	13	15	22	20	30	31	40
255-284	% Freq	3	4	3	2	7	8	13	13	15
	Av Sp	4	9	12	14	14	18	20	23	27
285-314	% Freq	3	6	9	9	10	11	21	21	24
	Av Sp	4	8	14	17	20	23	25	31	36
315-344	% Freq	12	9	5	15	16	21	16	21	17
	Av Sp	6	8	13	15	19	19	22	29	35
345-014	% Freq	36	26	23	17	16	13	14	9	10
	Av Sp	12	16	17	22	23	28	27	36	44
Calm	% Freq	2	1	1	1	1	1	1	1	1
Av Sp All Obs		10	13	16	18	19	21	23	27	32
No. of Observations		153	153	153	153	154	155	155	153	153

Table 6.2. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

January 0700 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	14	28	21	15	12	7	8	3	3
	Av Sp	11	14	16	18	21	25	24	34	37
045-074	% Freq	2	4	10	10	8	7	9	6	10
	Av Sp	5	11	16	18	19	18	17	19	22
075-104	% Freq	1	2	1	3	2	3	0	4	2
	Av Sp	4	5	4	11	16	18	-	14	17
105-134	% Freq	1	2	4	2	2	3	3	4	2
	Av Sp	4	4	5	7	8	9	12	12	11
135-164	% Freq	0	2	0	0	0	0	0	0	0
	Av Sp	-	5	-	-	-	-	-	-	-
165-194	% Freq	5	4	6	6	3	3	3	1	1
	Av Sp	13	19	17	15	7	17	15	6	8
195-224	% Freq	9	16	14	14	13	7	3	3	5
	Av Sp	10	11	14	18	20	23	30	27	33
225-254	% Freq	4	3	6	6	10	9	10	10	7
	Av Sp	5	8	12	11	16	19	23	28	39
255-284	% Freq	2	2	3	4	3	7	10	11	14
	Av Sp	5	7	12	12	12	13	20	21	24
285-314	% Freq	6	6	5	6	11	15	19	21	19
	Av Sp	3	7	13	14	16	18	23	30	33
315-344	% Freq	10	6	9	15	17	17	18	20	21
	Av Sp	9	14	15	18	19	19	20	25	32
345-014	% Freq	44	26	21	19	19	22	19	18	16
	Av Sp	12	15	18	19	22	23	27	34	38
Calm	% Freq	2	0	0	0	0	0	0	0	0
Av Sp All Obs		10	13	15	17	19	20	22	26	31
No. of Observations		127	126	125	125	124	121	118	110	104

Table 6.3. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

January 1000 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	16	26	15	13	13	14	11	9	6
	Av Sp	11	12	13	18	21	20	23	34	22
045-074	% Freq	3	7	14	12	11	8	9	9	5
	Av Sp	4	11	15	17	18	19	14	16	21
075-104	% Freq	3	0	1	2	1	2	0	2	9
	Av Sp	6	-	13	8	7	15	-	17	15
105-134	% Freq	3	1	1	1	1	2	2	2	2
	Av Sp	3	7	7	17	14	12	13	16	20
135-164	% Freq	3	3	2	2	1	0	1	1	1
	Av Sp	5	10	9	8	11	-	14	17	20
165-194	% Freq	8	10	12	10	9	4	0	0	0
	Av Sp	6	13	15	17	18	20	-	-	-
195-224	% Freq	12	14	15	14	11	11	6	6	6
	Av Sp	12	13	18	22	23	20	29	36	38
225-254	% Freq	6	7	5	5	9	8	12	9	11
	Av Sp	8	8	9	11	16	24	23	33	30
255-284	% Freq	2	4	5	8	5	6	10	12	12
	Av Sp	3	8	12	11	13	18	22	22	25
285-314	% Freq	2	3	5	5	9	13	15	17	17
	Av Sp	2	8	10	15	20	18	26	32	37
315-334	% Freq	12	8	9	9	13	14	15	17	13
	Av Sp	10	10	13	17	17	18	22	23	30
335-014	% Freq	32	18	19	19	18	17	20	17	19
	Av Sp	11	15	16	17	17	19	22	28	35
Calm	% Freq	0	0	0	0	0	1	0	0	0
Av Sp All Obs		9	12	14	17	18	19	22	27	30
No. of Observations		157	156	156	152	150	145	142	132	129

Table 6.4. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

January 1300 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	26	21	15	13	13	13	4	4	3
	Av Sp	9	11	13	12	14	20	20	25	42
045-074	% Freq	8	11	9	10	10	9	7	7	12
	Av Sp	10	9	10	14	12	14	15	16	16
075-104	% Freq	2	2	2	3	2	3	7	6	3
	Av Sp	7	2	11	6	15	10	15	18	27
105-134	% Freq	3	0	1	1	1	1	2	2	3
	Av Sp	2	-	4	14	6	10	12	15	18
135-164	% Freq	1	0	0	1	0	1	0	1	1
	Av Sp	6	-	-	8	-	1	-	13	12
165-194	% Freq	13	3	2	1	0	1	0	0	0
	Av Sp	10	17	22	12	-	4	-	-	-
195-224	% Freq	18	15	14	8	8	2	1	1	0
	Av Sp	11	15	19	25	21	21	38	40	-
225-254	% Freq	6	8	4	10	12	10	8	5	4
	Av Sp	12	10	13	14	16	18	22	30	46
255-284	% Freq	1	4	5	5	2	12	17	16	14
	Av Sp	12	12	9	11	22	20	21	28	30
285-314	% Freq	3	4	9	11	11	11	17	20	28
	Av Sp	15	13	12	15	21	22	21	29	31
315-344	% Freq	6	11	18	13	16	18	13	21	18
	Av Sp	10	9	10	14	15	17	29	30	29
345-014	% Freq	16	22	23	26	24	18	24	17	15
	Av Sp	13	12	15	19	23	22	23	30	32
Calm	% Freq	1	0	0	0	0	0	0	0	0
Av Sp All Obs.		11	11	13	16	18	19	22	27	29
No. of Observations		104	103	103	102	99	97	92	84	78

Table 6.5. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

January 1600 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	15	19	17	12	9	11	9	8	6
	Av Sp	13	11	11	14	21	25	23	24	22
045-074	% Freq	6	7	9	9	7	7	3	3	2
	Av Sp	6	8	11	13	14	15	15	13	22
075-104	% Freq	2	3	1	2	4	3	7	7	5
	Av Sp	3	4	3	6	13	21	16	15	21
105-134	% Freq	3	2	2	1	1	3	2	2	2
	Av Sp	4	6	7	18	23	10	9	27	31
135-164	% Freq	6	2	2	2	2	1	1	2	1
	Av Sp	6	2	3	10	6	9	18	10	5
165-194	% Freq	18	13	7	6	5	3	2	2	3
	Av Sp	10	13	16	15	18	18	25	14	17
195-224	% Freq	16	12	13	11	12	7	3	3	3
	Av Sp	9	12	18	19	20	21	25	35	39
225-254	% Freq	2	4	6	9	8	11	12	11	8
	Av Sp	13	9	8	16	20	22	28	31	40
255-284	% Freq	3	6	3	2	6	8	10	11	17
	Av Sp	10	6	9	14	13	18	21	26	28
285-314	% Freq	3	6	12	8	7	12	18	17	19
	Av Sp	7	7	12	15	22	20	24	31	31
315-344	% Freq	11	15	16	22	18	19	18	22	21
	Av Sp	15	14	12	13	17	21	24	29	33
345-014	% Freq	16	12	14	17	21	14	16	14	14
	Av Sp	3	14	14	17	18	24	27	29	32
Calm	% Freq	2	1	0	0	0	0	0	0	0
Av Sp All Obs		11	11	12	15	18	21	24	27	30
No. of Observations		122	122	122	121	121	121	121	118	112

Table 6.6. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

April 0400 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	10	16	11	8	3	2	1	2	2
	Av Sp	8	11	17	17	23	19	16	18	19
045-074	% Freq	2	1	2	2	1	1	0	0	1
	Av Sp	6	7	6	5	7	16	-	-	5
075-104	% Freq	0	0	2	1	3	2	1	1	1
	Av Sp	-	-	8	15	9	11	5	4	5
105-134	% Freq	2	4	1	2	1	2	2	2	1
	Av Sp	3	5	2	5	8	8	9	11	8
135-164	% Freq	2	0	2	4	5	4	2	1	2
	Av Sp	9	-	12	8	9	9	8	13	10
165-194	% Freq	8	13	15	14	8	6	6	6	5
	Av Sp	18	22	21	19	15	16	15	19	29
195-224	% Freq	20	27	29	30	30	27	22	20	13
	Av Sp	11	14	15	17	21	20	22	23	33
225-254	% Freq	9	10	8	5	11	14	12	18	18
	Av Sp	9	9	11	15	16	19	19	25	27
255-284	% Freq	3	2	1	4	6	9	14	14	19
	Av Sp	3	12	9	6	10	15	18	28	32
285-314	% Freq	6	3	5	7	8	11	17	16	21
	Av Sp	8	14	18	14	14	15	19	24	27
315-344	% Freq	13	11	11	10	11	11	15	14	15
	Av Sp	11	13	15	26	26	22	21	23	29
345-014	% Freq	23	14	14	14	14	12	8	8	4
	Av Sp	14	18	17	16	16	15	17	24	27
Calm	% Freq	4	0	0	0	0	1	0	0	0
Av Sp All Obs		11	14	16	17	17	17	19	23	28
No. of Observations		104	104	104	104	104	104	105	102	102

Table 6.7. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

April 0700 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	18	15	12	14	12	7	1	0	0
	Av Sp	8	9	15	18	16	13	26	-	-
045-074	% Freq	2	13	12	6	1	1	1	1	2
	Av Sp	5	8	9	5	6	3	12	17	15
075-104	% Freq	1	2	5	6	1	1	2	0	0
	Av Sp	6	6	7	9	5	3	6	-	-
105-134	% Freq	1	2	2	1	7	1	1	1	0
	Av Sp	19	7	7	7	9	9	9	4	-
135-164	% Freq	2	1	2	3	2	6	1	4	2
	Av Sp	2	7	10	13	13	9	6	16	11
165-194	% Freq	13	18	16	17	14	13	7	4	3
	Av Sp	10	12	18	19	17	14	20	15	8
195-224	% Freq	15	20	17	16	16	15	22	12	15
	Av Sp	10	15	18	20	21	21	18	16	17
225-254	% Freq	2	2	8	9	15	15	11	17	19
	Av Sp	6	11	12	16	15	17	21	27	32
255-284	% Freq	3	2	1	3	7	9	15	15	12
	Av Sp	4	6	8	7	13	16	20	31	40
285-314	% Freq	7	6	2	3	5	7	12	12	18
	Av Sp	9	13	15	18	19	15	20	22	19
315-344	% Freq	8	3	9	9	7	13	12	19	19
	Av Sp	7	12	13	17	19	19	20	21	25
345-014	% Freq	26	15	14	12	13	12	13	15	12
	Av Sp	8	15	16	12	15	19	20	27	32
Calm	% Freq	0	0	0	0	0	0	1	0	0
Av Sp All Obs		8	12	14	16	16	17	19	23	26
No. of Observations		87	87	87	87	86	86	85	75	68

Table 6.8. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

April 1000 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	13	13	12	6	5	7	2	2	0
	Av Sp	10	10	9	8	16	12	19	4	-
045-074	% Freq	9	8	6	3	4	1	2	0	1
	Av Sp	8	8	10	11	6	12	7	-	17
075-104	% Freq	5	2	2	2	0	0	0	1	0
	Av Sp	4	5	2	4	-	-	-	15	-
105-134	% Freq	4	5	2	3	2	2	2	1	0
	Av Sp	3	5	8	7	8	9	8	6	-
135-164	% Freq	14	4	5	5	3	4	1	1	1
	Av Sp	7	8	10	11	10	8	8	8	6
165-194	% Freq	18	15	12	8	9	7	10	5	4
	Av Sp	13	12	13	21	20	20	20	16	15
195-224	% Freq	18	27	27	25	20	19	19	12	13
	Av Sp	18	16	17	17	18	20	19	25	24
225-254	% Freq	2	6	7	5	10	12	15	24	24
	Av Sp	11	11	7	7	17	17	21	23	30
255-284	% Freq	2	0	4	6	9	10	10	14	13
	Av Sp	2	-	10	11	10	15	21	30	39
285-314	% Freq	5	6	5	6	7	4	13	13	16
	Av Sp	20	17	14	15	13	18	21	29	27
315-344	% Freq	1	4	6	13	12	15	9	14	21
	Av Sp	23	10	11	11	14	14	22	25	25
345-014	% Freq	8	9	12	16	19	18	16	14	7
	Av Sp	11	12	14	14	14	18	21	23	35
Calm	% Freq	1	0	0	0	0	0	0	0	0
Av Sp All Obs		11	12	13	13	15	16	20	24	29
No. of Observations		96	96	96	95	94	94	88	87	83

Table 6.9. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

April 1300 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	6	6	4	3	0	3	3	4	6
	Av Sp	11	9	5	5	-	12	25	20	19
045-074	% Freq	7	4	3	1	0	0	2	0	0
	Av Sp	7	6	4	4	-	-	12	-	-
075-104	% Freq	1	3	0	1	0	1	0	0	0
	Av Sp	1	1	-	5	-	12	-	-	-
105-134	% Freq	7	1	0	0	3	0	0	0	0
	Av Sp	4	8	-	-	5	-	-	-	-
135-164	% Freq	7	3	4	3	3	4	2	2	0
	Av Sp	9	5	5	5	15	11	5	4	-
165-194	% Freq	25	21	15	14	8	6	8	2	4
	Av Sp	16	15	15	15	13	18	21	37	27
195-224	% Freq	21	30	37	32	33	30	16	13	10
	Av Sp	22	18	15	16	16	17	21	21	22
225-254	% Freq	8	8	6	11	11	11	25	27	32
	Av Sp	10	9	11	13	15	15	19	25	25
255-284	% Freq	0	1	6	7	7	10	9	11	10
	Av Sp	-	6	8	8	14	11	16	14	22
285-314	% Freq	8	8	7	8	13	14	14	15	10
	Av Sp	13	11	14	19	16	12	16	22	28
315-344	% Freq	7	8	8	8	7	9	14	20	18
	Av Sp	16	13	12	11	12	15	22	20	22
345-014	% Freq	4	7	10	12	15	11	8	7	10
	Av Sp	10	13	15	14	15	18	19	21	20
Calm	% Freq	0	0	1	0	0	0	0	0	0
Av Sp All Obs		14	13	13	14	15	15	19	21	24
No. of Observations		73	73	73	73	72	70	64	55	50

Table 6.10. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

April 1600 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	6	4	7	4	6	1	2	5	3
	Av Sp	18	15	9	6	8	6	7	24	34
045-074	% Freq	1	4	3	3	1	3	2	2	2
	Av Sp	6	4	8	9	2	6	34	33	8
075-104	% Freq	3	3	0	0	0	0	0	2	0
	Av Sp	4	2	-	-	-	-	-	14	-
105-134	% Freq	3	1	0	0	0	0	2	0	0
	Av Sp	5	5	-	-	-	-	9	-	-
135-164	% Freq	6	4	1	0	0	1	3	0	0
	Av Sp	5	7	5	-	-	31	21	-	-
165-194	% Freq	22	16	10	8	8	7	9	5	3
	Av Sp	16	20	17	14	16	15	12	17	23
195-224	% Freq	30	36	39	42	39	31	21	16	17
	Av Sp	21	18	19	18	17	19	26	23	34
225-254	% Freq	6	4	10	8	8	17	12	18	18
	Av Sp	10	12	10	10	15	15	20	29	29
255-284	% Freq	6	6	6	8	10	10	12	19	15
	Av Sp	13	14	13	13	11	10	20	27	29
285-314	% Freq	7	12	8	6	4	4	12	10	12
	Av Sp	11	10	12	11	8	15	18	23	32
315-344	% Freq	10	7	11	10	17	16	19	16	25
	Av Sp	16	13	10	13	13	14	19	26	30
345-014	% Freq	1	3	4	10	7	10	8	10	5
	Av Sp	14	15	11	13	17	14	20	16	13
Calm	% Freq	1	0	1	1	0	0	0	0	0
Av Sp All Obs		15	15	14	14	14	15	20	24	29
No. of Observations		73	73	72	72	72	71	67	63	60

Table 6.11. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

July 0400 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	2	4	6	2	0	0	0	2	0
	Av Sp	3	11	12	14	-	-	-	10	-
045-074	% Freq	2	2	0	2	2	0	0	0	4
	Av Sp	5	1	-	8	3	-	-	-	10
075-104	% Freq	0	0	0	2	0	0	4	2	4
	Av Sp	-	-	-	4	-	-	4	15	7
105-134	% Freq	2	2	2	0	0	0	8	6	6
	Av Sp	5	10	4	-	-	-	9	10	12
135-164	% Freq	4	2	0	2	4	0	6	15	6
	Av Sp	5	10	-	8	10	-	13	13	18
165-194	% Freq	15	17	23	17	31	38	33	33	25
	Av Sp	12	14	17	17	16	12	18	18	20
195-224	% Freq	29	48	48	50	40	42	40	27	27
	Av Sp	8	12	16	16	17	18	16	16	19
225-254	% Freq	8	10	13	21	19	13	4	10	23
	Av Sp	5	8	9	12	10	10	10	18	16
255-284	% Freq	10	8	6	4	0	2	0	2	0
	Av Sp	4	8	8	9	-	3	-	14	-
285-314	% Freq	4	2	0	0	2	0	2	0	4
	Av Sp	8	6	-	-	5	-	13	-	11
315-344	% Freq	8	0	0	0	0	2	0	0	0
	Av Sp	4	-	-	-	-	16	-	-	-
345-014	% Freq	8	4	2	0	2	2	2	2	0
	Av Sp	12	16	5	-	16	5	8	8	-
Calm	% Freq	6	0	0	0	0	2	0	0	0
Av Sp All Obs		7	12	14	15	14	14	15	16	17
No. of Observations		48	48	48	48	48	48	48	48	48

Table 6.12. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

July 0700 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	4	2	4	6	2	0	0	0	2
	Av Sp	6	10	12	9	11	-	-	-	13
045-074	% Freq	0	4	0	0	4	4	0	2	0
	Av Sp	-	5	-	-	6	4	-	10	-
075-104	% Freq	2	0	2	0	0	2	2	2	0
	Av Sp	1	-	7	-	-	2	8	11	-
105-134	% Freq	6	0	0	2	2	2	6	10	6
	Av Sp	3	-	-	7	4	5	4	10	13
135-164	% Freq	6	4	2	4	8	6	8	4	13
	Av Sp	4	11	10	11	9	8	9	22	13
165-194	% Freq	18	35	41	33	31	31	29	27	26
	Av Sp	5	12	15	15	15	15	18	20	18
195-224	% Freq	35	35	31	39	35	33	33	31	21
	Av Sp	7	10	12	13	14	16	18	19	21
225-254	% Freq	8	6	14	14	12	10	14	19	26
	Av Sp	4	5	7	9	12	11	14	15	20
255-284	% Freq	4	8	2	0	4	4	4	2	4
	Av Sp	4	5	12	-	5	15	13	12	19
285-314	% Freq	2	0	2	0	0	2	2	2	2
	Av Sp	3	-	3	-	-	3	14	16	6
315-344	% Freq	8	4	0	2	2	2	2	0	0
	Av Sp	9	8	-	1	2	2	4	-	-
345-014	% Freq	8	2	2	0	0	2	0	0	0
	Av Sp	5	9	4	-	-	11	-	-	-
Calm	% Freq	0	0	0	0	0	2	0	0	0
Av Sp All Obs		6	10	12	13	13	13	15	17	18
No. of Observations		49	49	49	49	49	49	49	48	47

Table 6.13. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

July 1000 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	0	0	0	0	0	0	0	0	0
	Av Sp	-	-	-	-	-	-	-	-	-
045-074	% Freq	0	2	2	0	0	0	2	2	2
	Av Sp	-	3	7	-	-	-	4	10	11
075-104	% Freq	2	0	0	0	0	0	6	4	0
	Av Sp	2	-	-	-	-	-	7	8	-
105-134	% Freq	2	2	4	8	6	9	9	8	14
	Av Sp	1	3	8	7	9	8	10	11	11
135-164	% Freq	23	13	11	9	9	11	6	6	6
	Av Sp	9	10	8	8	7	6	5	8	10
165-194	% Freq	45	40	38	28	26	23	23	21	17
	Av Sp	13	14	14	11	13	15	19	18	19
195-224	% Freq	21	28	28	40	42	34	32	34	31
	Av Sp	11	12	9	13	13	15	19	22	22
225-254	% Freq	2	9	9	8	6	13	11	11	14
	Av Sp	15	6	7	7	9	11	15	20	21
255-284	% Freq	2	0	2	2	6	6	6	6	14
	Av Sp	1	-	2	11	8	12	4	8	13
285-314	% Freq	0	2	2	2	2	0	2	4	4
	Av Sp	-	6	7	7	3	-	2	10	15
315-344	% Freq	2	0	0	0	2	2	2	6	0
	Av Sp	5	-	-	-	12	13	14	7	-
345-014	% Freq	2	4	4	4	2	2	2	0	0
	Av Sp	9	6	7	11	16	20	19	-	-
Calm	% Freq	0	0	0	0	0	0	0	0	0
Av Sp All Obs		11	11	11	11	12	13	15	16	18
No. of Observations		53	53	53	53	53	53	53	53	52

Table 6.14. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

July 1300 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	0	0	0	0	0	0	4	0	2
	Av Sp	-	-	-	-	-	-	6	-	11
045-074	% Freq	2	0	0	0	0	2	0	2	2
	Av Sp	2	-	-	-	-	3	-	6	10
075-104	% Freq	2	4	0	0	0	0	0	2	0
	Av Sp	4	2	-	-	-	-	-	11	-
105-134	% Freq	6	4	4	0	2	0	4	2	4
	Av Sp	7	8	5	-	4	-	8	13	14
135-164	% Freq	8	8	10	6	6	10	4	6	2
	Av Sp	9	10	8	5	15	13	10	9	4
165-194	% Freq	29	33	31	35	39	31	22	22	8
	Av Sp	16	13	16	14	15	14	14	14	10
195-224	% Freq	46	45	45	49	43	43	36	36	36
	Av Sp	17	18	17	18	17	17	19	16	17
225-254	% Freq	8	6	8	8	4	6	20	20	32
	Av Sp	12	17	14	10	13	13	14	19	17
255-284	% Freq	0	0	2	0	6	4	4	4	8
	Av Sp	-	-	2	-	7	12	11	9	11
285-314	% Freq	0	0	0	2	0	0	2	2	2
	Av Sp	-	-	-	4	-	-	14	12	13
315-344	% Freq	0	0	0	0	0	0	2	4	4
	Av Sp	-	-	-	-	-	-	10	13	11
345-014	% Freq	0	0	0	0	0	4	2	0	0
	Av Sp	-	-	-	-	-	10	4	-	-
Calm	% Freq	0	0	0	0	0	0	0	0	0
Av Sp All Obs		15	15	15	15	15	15	15	15	15
No. of Observations		52	51	51	51	51	51	50	50	50

Table 6.15. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

July 1600 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	2	4	0	0	0	0	0	0	2
	Av Sp	9	12	-	-	-	-	-	-	13
045-074	% Freq	0	0	2	2	2	2	0	0	0
	Av Sp	-	-	16	14	12	9	-	-	-
075-104	% Freq	2	0	0	0	0	0	2	7	0
	Av Sp	6	-	-	-	-	-	2	8	-
105-134	% Freq	2	4	4	4	2	0	0	0	2
	Av Sp	10	7	5	7	8	-	-	-	21
135-164	% Freq	2	0	2	0	4	9	11	4	2
	Av Sp	6	-	4	-	11	10	12	10	7
165-194	% Freq	15	17	4	15	11	17	22	17	5
	Av Sp	14	13	10	10	13	12	13	14	15
195-224	% Freq	53	62	72	66	66	50	39	33	34
	Av Sp	19	18	17	17	15	17	16	15	15
225-254	% Freq	17	9	9	6	9	17	17	26	27
	Av Sp	14	15	13	11	9	9	14	13	15
255-284	% Freq	2	2	2	4	2	2	2	13	23
	Av Sp	21	23	20	13	10	7	12	10	11
285-314	% Freq	0	0	0	0	2	2	2	0	5
	Av Sp	-	-	-	-	14	9	9	-	7
315-344	% Freq	0	0	2	0	0	0	2	0	0
	Av Sp	-	-	6	-	-	-	11	-	-
345-014	% Freq	4	2	2	2	2	0	2	0	0
	Av Sp	26	28	28	24	19	-	5	-	-
Calm	% Freq	0	0	0	0	0	0	0	0	0
Av Sp All Obs		17	16	15	15	14	14	14	13	14
No. of Observations		47	47	47	47	47	46	46	46	44

Table 6.16. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

October 0400 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	16	15	17	16	12	12	7	10	12
	Av Sp	11	16	17	15	13	15	14	16	19
045-074	% Freq	4	8	6	6	10	9	9	5	4
	Av Sp	5	11	16	20	15	16	13	17	22
075-104	% Freq	2	1	5	7	5	5	6	6	4
	Av Sp	6	12	12	14	14	12	16	14	21
105-134	% Freq	3	2	2	3	3	3	3	5	4
	Av Sp	5	4	15	10	11	10	11	13	16
135-164	% Freq	0	5	5	4	6	6	5	4	6
	Av Sp	-	8	9	14	14	13	21	18	20
165-194	% Freq	9	13	16	17	11	10	4	5	5
	Av Sp	14	23	22	18	17	19	18	29	21
195-224	% Freq	12	12	12	13	19	18	17	14	13
	Av Sp	15	14	20	26	24	23	22	22	23
225-254	% Freq	3	4	3	0	2	4	16	15	15
	Av Sp	6	9	9	-	4	11	20	26	28
255-284	% Freq	1	3	4	5	3	5	7	9	13
	Av Sp	3	3	5	8	10	9	17	18	22
285-314	% Freq	6	4	4	5	8	12	8	12	12
	Av Sp	4	5	10	11	11	12	14	16	26
315-344	% Freq	13	5	8	9	9	6	9	8	7
	Av Sp	6	7	12	11	12	13	13	19	24
345-014	% Freq	28	27	16	13	10	8	7	5	5
	Av Sp	12	13	13	9	8	8	18	15	15
Calm	% Freq	3	0	0	0	0	0	0	1	1
Av Sp All Obs		10	13	15	15	15	15	17	19	22
No. of Observations		98	98	98	98	98	98	96	96	96

Table 6.17. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

October 0700 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	16	25	28	18	18	24	15	12	11
	Av Sp	11	14	14	17	16	14	17	20	17
045-074	% Freq	3	7	8	10	12	6	7	5	6
	Av Sp	6	10	18	12	14	17	19	17	22
075-104	% Freq	0	2	4	4	4	9	9	5	4
	Av Sp	-	6	6	22	20	19	14	20	22
105-134	% Freq	1	3	4	4	4	2	2	4	5
	Av Sp	6	6	7	6	7	8	6	11	10
135-164	% Freq	1	3	4	7	4	4	3	5	3
	Av Sp	5	9	8	7	8	8	11	12	10
165-194	% Freq	9	8	11	13	14	9	6	3	3
	Av Sp	9	15	15	18	16	14	16	17	15
195-224	% Freq	11	16	14	13	13	19	11	9	6
	Av Sp	12	14	20	20	22	21	21	19	18
225-254	% Freq	3	4	4	3	5	5	11	15	13
	Av Sp	4	9	13	12	13	10	24	26	26
255-284	% Freq	5	4	4	3	0	2	9	10	13
	Av Sp	4	5	5	9	-	14	12	14	20
285-314	% Freq	4	3	5	5	6	4	10	8	13
	Av Sp	4	9	10	15	15	13	14	14	18
315-344	% Freq	11	6	7	7	11	11	10	14	15
	Av Sp	9	9	10	14	14	16	16	18	21
345-014	% Freq	34	19	8	13	10	5	7	10	8
	Av Sp	10	14	15	11	9	6	12	16	26
Calm	% Freq	2	1	1	0	0	0	0	1	0
Av Sp All Obs		9	12	14	15	15	15	16	18	20
No. of Observations		116	116	115	115	114	114	108	101	95

Table 6.18. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

October 1000 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	25	29	24	17	16	11	14	16	10
	Av Sp	10	13	14	15	14	11	15	15	17
045-074	% Freq	10	11	10	13	10	11	8	7	5
	Av Sp	6	9	10	11	12	16	16	14	24
075-104	% Freq	1	2	6	10	9	5	7	3	3
	Av Sp	1	5	5	6	12	16	12	19	26
105-134	% Freq	7	2	3	3	2	4	6	4	1
	Av Sp	4	3	5	8	12	10	10	10	22
135-164	% Freq	9	6	6	4	3	2	4	8	7
	Av Sp	5	8	9	10	12	15	18	12	14
165-194	% Freq	14	15	13	13	14	14	4	3	5
	Av Sp	14	15	16	17	16	16	23	28	17
195-224	% Freq	9	12	14	17	18	15	13	10	6
	Av Sp	14	13	15	15	15	20	22	21	18
225-254	% Freq	4	3	5	2	6	9	13	16	13
	Av Sp	4	9	8	6	10	10	14	16	26
255-284	% Freq	2	2	1	2	1	5	5	11	15
	Av Sp	8	6	4	10	7	10	12	16	16
285-314	% Freq	4	5	5	4	5	5	8	7	13
	Av Sp	12	13	12	10	13	17	15	12	18
315-344	% Freq	2	4	6	8	10	10	13	10	10
	Av Sp	9	7	14	15	17	18	18	20	18
345-014	% Freq	14	7	8	8	7	11	5	7	13
	Av Sp	16	18	16	19	14	14	9	15	20
Calm	% Freq	2	2	1	0	0	0	0	1	1
Av Sp All Obs		10	12	12	13	14	15	16	16	19
No. of Observations		130	130	128	126	125	124	120	116	112

Table 6.19. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

October 1300 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	16	14	10	11	11	12	10	10	12
	Av Sp	10	10	10	10	11	12	14	15	19
045-074	% Freq	9	8	8	6	3	4	4	5	6
	Av Sp	9	9	10	8	8	14	18	18	13
075-104	% Freq	5	2	0	0	2	3	7	5	2
	Av Sp	6	10	-	-	13	9	6	6	18
105-134	% Freq	5	5	6	5	5	4	3	3	1
	Av Sp	7	7	10	13	10	14	13	7	11
135-164	% Freq	10	8	4	4	4	8	6	3	5
	Av Sp	7	8	5	5	9	5	14	19	8
165-194	% Freq	29	19	12	11	11	5	4	5	4
	Av Sp	13	10	10	14	14	19	14	14	21
195-224	% Freq	10	21	25	19	16	17	12	11	11
	Av Sp	15	16	15	16	16	18	23	26	20
225-254	% Freq	4	5	5	9	8	8	10	10	13
	Av Sp	13	9	8	8	9	12	17	17	19
255-284	% Freq	1	4	5	6	5	2	6	17	13
	Av Sp	8	9	8	7	11	12	12	16	18
285-314	% Freq	2	2	5	6	11	12	10	8	12
	Av Sp	5	6	12	10	11	10	13	15	17
315-344	% Freq	2	2	4	9	9	15	16	16	14
	Av Sp	6	4	7	8	10	12	17	18	17
345-014	% Freq	7	12	15	15	15	11	13	9	8
	Av Sp	10	10	11	12	12	16	14	16	16
Calm	% Freq	2	1	1	0	0	0	0	0	0
Av Sp All Obs		11	11	11	11	12	13	15	17	18
No. of Observations		134	134	134	133	132	131	128	126	119

Table 6.20. Wind Direction Frequency (%) and Average Speed (Kt) at the Yucca Weather Station

October 1600 PST

Height Above Sea Level (Ft)

Wind Direction		5000	6000	7000	8000	9000	10000	12000	14000	16000
015-044	% Freq	9	10	15	17	20	15	8	11	9
	Av Sp	11	13	10	10	12	15	15	17	18
045-074	% Freq	10	9	9	8	6	4	11	12	8
	Av Sp	7	9	9	7	8	6	12	15	25
075-104	% Freq	0	3	2	2	1	1	3	2	7
	Av Sp	-	5	7	6	12	10	8	12	10
105-134	% Freq	3	4	5	4	3	2	4	4	7
	Av Sp	7	7	8	12	14	21	19	21	13
135-164	% Freq	7	5	2	1	4	3	2	3	2
	Av Sp	9	5	5	8	6	8	10	9	11
165-194	% Freq	23	15	18	17	12	12	4	6	3
	Av Sp	11	10	13	13	15	13	17	19	22
195-224	% Freq	29	34	22	18	15	17	14	6	8
	Av Sp	15	14	15	15	17	17	17	17	16
225-254	% Freq	5	5	7	3	8	5	11	18	15
	Av Sp	13	11	6	9	8	8	16	20	24
255-284	% Freq	1	2	3	6	2	2	5	7	16
	Av Sp	18	11	7	5	5	13	11	17	17
285-314	% Freq	0	0	2	4	8	10	11	12	9
	Av Sp	-	-	6	7	7	7	11	12	18
315-344	% Freq	0	1	3	9	11	13	12	10	10
	Av Sp	-	5	9	8	9	10	15	20	20
345-014	% Freq	12	11	11	10	9	15	12	9	7
	Av Sp	16	15	13	17	13	11	17	13	15
Calm	% Freq	0	0	0	0	0	0	0	0	0
Av Sp All Obs		12	12	11	11	12	12	14	17	18
No. of Observations		99	99	99	99	99	99	97	94	89

Table 6.21. Average and Standard Deviation of Height, Temperature, and Relative Humidity at the Yucca Weather Station for Selected Pressure Levels

No. of Obs.			Surface (1196 m)			850 mb			800 mb		
			Press (mb)	Temp (°C)	RH (%)	Height (m)	Temp (°C)	RH (%)	Height (m)	Temp (°C)	RH (%)
137	Jan	Av	884	-3.6	63	1513	3.0	41	2002	1.1	38
		SD	5	5.3	22	49	4.6	19	50	4.9	21
113	Feb	Av	882	-1.3	67	1491	3.2	46	1981	0.9	43
		SD	6	4.2	22	57	3.9	18	58	4.3	20
124	Mar	Av	880	1.3	57	1480	6.0	38	1974	3.3	38
		SD	6	4.2	21	55	4.8	20	58	4.8	21
114	Apr	Av	879	5.1	46	1477	10.4	31	1979	7.4	32
		SD	5	4.6	20	51	5.3	20	56	5.6	21
84	May	Av	879	8.6	42	1475	14.8	29	1985	11.8	28
		SD	4	5.0	20	39	5.6	17	44	5.7	17
59	Jun	Av	878	14.5	33	1475	20.1	27	1995	17.2	28
		SD	3	4.1	11	35	4.5	11	40	4.8	14
85	Jul	Av	880	15.1	31	1500	23.3	23	2025	20.3	23
		SD	2	4.6	15	24	2.4	13	25	2.3	14
105	Aug	Av	881	16.0	34	1510	23.2	27	2035	20.1	27
		SD	2	4.4	15	24	2.9	15	27	2.9	15
113	Sep	Av	880	11.4	38	1496	19.6	27	2015	16.7	28
		SD	3	4.3	19	33	4.1	16	35	4.3	16
143	Oct	Av	882	7.2	53	1505	14.4	38	2014	11.6	37
		SD	4	4.2	23	43	4.5	20	46	4.7	20
150	Nov	Av	884	0.0	59	1519	8.0	39	2018	6.0	35
		SD	6	4.8	22	51	4.7	20	53	4.9	21
149	Dec	Av	886	-2.4	60	1533	6.4	35	2029	5.0	31
		SD	6	4.6	22	55	3.9	19	57	4.4	21

Table 6.21 (continued).

		750 mb			700 mb			650 mb		
		Height (m)	Temp (°C)	RH (%)	Height (m)	Temp (°C)	RH (%)	Height (m)	Temp (°C)	RH (%)
Jan	Av	2518	-0.9	37	3069	-3.2	34	3645	-6.5	33
	SD	56	4.8	23	60	4.4	23	69	4.4	25
Feb	Av	2497	-1.9	42	3043	-4.5	38	3620	-7.9	34
	SD	61	4.5	23	65	4.5	23	74	4.2	25
Mar	Av	2492	0.2	38	3045	-3.0	35	3623	-6.8	33
	SD	63	4.7	23	70	4.9	24	79	4.9	25
Apr	Av	2503	3.9	34	3063	0.1	34	3649	-3.9	34
	SD	61	5.4	22	70	5.2	22	77	4.9	22
May	Av	2518	7.9	30	3085	3.8	33	3678	-0.6	35
	SD	53	5.5	18	60	5.1	19	68	4.7	21
Jun	Av	2541	13.4	29	3118	9.1	30	3724	4.8	31
	SD	47	4.8	15	52	4.1	17	60	3.6	19
Jul	Av	2577	16.2	25	3159	11.5	28	3769	6.5	33
	SD	29	2.3	14	29	2.2	16	34	2.2	20
Aug	Av	2584	16.0	30	3168	11.4	35	3777	6.6	40
	SD	33	2.8	17	34	2.5	19	39	2.3	20
Sep	Av	2558	12.9	31	3135	8.5	34	3736	3.9	35
	SD	41	4.0	18	42	3.4	19	53	3.3	23
Oct	Av	2547	8.2	38	3117	4.5	40	3715	1.1	36
	SD	51	4.4	21	57	4.2	23	63	4.0	25
Nov	Av	2541	3.6	33	3102	1.0	29	3690	-2.4	28
	SD	58	4.8	22	64	4.7	23	73	4.7	23
Dec	Av	2552	3.0	29	3110	0.3	26	3695	-3.3	27
	SD	63	4.5	21	67	4.2	22	75	4.0	23

Table 6.21 (continued).

		600 mb			550 mb			500 mb		
		Height (m)	Temp (°C)	RH (%)	Height (m)	Temp (°C)	RH (%)	Height (m)	Temp (°C)	RH (%)
Jan	Av	4273	-10.1	31	4930	-14.4	30	5655	-19.2	28
	SD	75	4.2	24	83	4.2	23	94	4.3	24
Feb	Av	4241	-11.6	31	4897	-16.0	28	5614	-20.8	28
	SD	79	4.2	23	85	4.2	22	97	4.0	21
Mar	Av	4248	-10.9	31	4906	-15.5	29	5624	-20.5	29
	SD	88	4.8	22	100	4.9	22	110	4.8	22
Apr	Av	4280	-8.3	31	4943	-12.8	28	5670	-18.0	25
	SD	86	4.9	23	96	4.7	23	108	4.7	21
May	Av	4318	-5.1	33	4990	-9.7	29	5725	-14.7	25
	SD	77	4.4	22	86	4.3	23	98	4.3	22
Jun	Av	4375	0.2	31	5061	-4.3	26	5811	-9.4	22
	SD	65	3.1	23	72	3.1	22	79	3.0	20
Jul	Av	4423	1.5	33	5110	-3.6	33	5864	-8.7	26
	SD	35	2.1	22	37	2.1	26	40	1.9	25
Aug	Av	4433	1.6	41	5119	-3.2	35	5875	-8.2	27
	SD	41	2.2	23	44	2.2	26	47	2.1	24
Sep	Av	4385	-0.3	30	5068	-4.8	28	5819	-9.6	23
	SD	56	3.0	23	62	3.0	24	67	2.9	21
Oct	Av	4359	-2.8	33	5037	-7.1	28	5780	-12.1	26
	SD	69	3.9	25	76	3.9	24	86	3.7	21
Nov	Av	4325	-6.3	27	4995	-10.7	27	5727	-15.8	27
	SD	82	4.7	23	92	4.7	23	103	4.6	24
Dec	Av	4329	-7.2	27	4994	-11.6	26	5727	-16.7	24
	SD	82	4.0	22	90	4.1	21	99	4.0	21

7.0 MISCELLANEOUS

7.1 Sunrise and Sunset Tables

The times of sunrise and sunset given in table 7.1 are valid at latitude 37° N, longitude 116° W, within plus or minus 2 min for the remainder of the twentieth century. These times were computed on the basis of level terrain, an unobstructed horizon, and normal atmospheric conditions. They are also valid for any point on the test site within plus or minus 5 min subject to the conditions for which they were computed. Unusual atmospheric conditions could increase the limits of error by 1 or possibly 2 min.

Table 7.1. Times of Sunrise and Sunset at Latitude 37°N and Longitude 116°W in Pacific Standard Time. (Add 1 hr during the period of daylight saving time.)

	JAN		FEB		MAR		APR		MAY		JUN	
Day	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.
1	6 57	4 38	6 47	5 09	6 15	5 38	5 30	6 06	4 50	6 33	4 26	6 58
2	6 58	4 39	6 46	5 10	6 14	5 39	5 29	6 07	4 49	6 34	4 26	6 59
3	6 58	4 40	6 45	5 11	6 13	5 40	5 27	6 08	4 48	6 34	4 25	6 59
4	6 58	4 40	6 44	5 12	6 11	5 41	5 26	6 09	4 47	6 35	4 25	7 00
5	6 58	4 41	6 43	5 13	6 10	5 42	5 24	6 10	4 46	6 36	4 25	7 00
6	6 58	4 42	6 42	5 14	6 09	5 43	5 23	6 11	4 45	6 37	4 25	7 01
7	6 58	4 43	6 42	5 15	6 07	5 44	5 22	6 12	4 44	6 38	4 24	7 01
8	6 58	4 44	6 41	5 17	6 06	5 45	5 20	6 12	4 43	6 39	4 24	7 02
9	6 58	4 45	6 40	5 18	6 04	5 46	5 19	6 13	4 42	6 40	4 24	7 03
10	6 58	4 46	6 39	5 19	6 03	5 47	5 17	6 14	4 41	6 41	4 24	7 03
11	6 57	4 47	6 38	5 20	6 01	5 47	5 16	6 15	4 40	6 41	4 24	7 04
12	6 57	4 48	6 36	5 21	6 00	5 48	5 14	6 16	4 39	6 42	4 24	7 04
13	6 57	4 49	6 35	5 22	5 58	5 49	5 13	6 17	4 38	6 43	4 24	7 04
14	6 57	4 50	6 34	5 23	5 57	5 50	5 12	6 18	4 37	6 44	4 24	7 05
15	6 57	4 51	6 33	5 24	5 56	5 51	5 10	6 19	4 36	6 45	4 24	7 05
16	6 56	4 52	6 32	5 25	5 54	5 52	5 09	6 19	4 35	6 46	4 24	7 05
17	6 56	4 53	6 31	5 26	5 53	5 53	5 08	6 20	4 35	6 47	4 24	7 06
18	6 56	4 54	6 30	5 27	5 51	5 54	5 06	6 21	4 34	6 47	4 24	7 06
19	6 55	4 55	6 28	5 28	5 50	5 55	5 05	6 22	4 33	6 48	4 24	7 06
20	6 55	4 56	6 27	5 29	5 48	5 56	5 04	6 23	4 32	6 49	4 24	7 07
21	6 54	4 57	6 26	5 30	5 47	5 57	5 02	6 24	4 32	6 50	4 24	7 07
22	6 54	4 58	6 25	5 31	5 45	5 57	5 01	6 25	4 31	6 51	4 24	7 07
23	6 53	4 59	6 23	5 32	5 44	5 58	5 00	6 26	4 30	6 51	4 25	7 07
24	6 53	5 00	6 22	5 33	5 42	5 59	4 58	6 27	4 30	6 52	4 25	7 07
25	6 52	5 01	6 21	5 34	5 41	6 00	4 57	6 27	4 29	6 53	4 25	7 07
26	6 51	5 02	6 19	5 35	5 39	6 01	4 56	6 28	4 29	6 54	4 26	7 08
27	6 51	5 03	6 18	5 36	5 38	6 02	4 55	6 29	4 28	6 54	4 26	7 08
28	6 50	5 05	6 17	5 37	5 36	6 03	4 54	6 30	4 28	6 55	4 27	7 08
29	6 49	5 06	6 16	5 38	5 35	6 04	4 52	6 31	4 27	6 56	4 27	7 08
30	6 48	5 07			5 33	6 05	4 51	6 32	4 27	6 57	4 27	7 08
31	6 48	5 08			5 32	6 06			4 26	6 57		

Table 7.1 (continued).

	JUL		AUG		SEP		OCT		NOV		DEC	
Day	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.
1	4 28	7 08	4 49	6 51	5 14	6 13	5 39	5 28	6 08	4 47	6 38	4 28
2	4 28	7 08	4 50	6 50	5 15	6 12	5 40	5 26	6 09	4 46	6 39	4 27
3	4 29	7 07	4 50	6 49	5 16	6 10	5 41	5 25	6 10	4 45	6 40	4 27
4	4 29	7 07	4 51	6 48	5 17	6 09	5 41	5 23	6 11	4 44	6 41	4 27
5	4 30	7 07	4 52	6 47	5 18	6 07	5 42	5 22	6 12	4 43	6 42	4 27
6	4 30	7 07	4 53	6 46	5 19	6 06	5 43	5 21	6 13	4 42	6 43	4 27
7	4 31	7 07	4 54	6 45	5 19	6 04	5 44	5 19	6 14	4 41	6 44	4 27
8	4 31	7 06	4 55	6 44	5 20	6 03	5 45	5 18	6 15	4 40	6 45	4 27
9	4 32	7 06	4 55	6 43	5 21	6 01	5 46	5 16	6 16	4 39	6 45	4 27
10	4 33	7 06	4 56	6 42	5 22	6 00	5 47	5 15	6 17	4 38	6 46	4 27
11	4 33	7 05	4 57	6 41	5 23	5 58	5 48	5 13	6 18	4 38	6 47	4 27
12	4 34	7 05	4 58	6 40	5 24	5 57	5 49	5 12	6 19	4 37	6 48	4 28
13	4 35	7 05	4 59	6 38	5 24	5 55	5 50	5 11	6 20	4 36	6 49	4 28
14	4 35	7 04	5 00	6 37	5 25	5 54	5 50	5 09	6 21	4 35	6 49	4 28
15	4 36	7 04	5 00	6 36	5 26	5 52	5 51	5 08	6 22	4 35	6 50	4 28
16	4 36	7 03	5 01	6 35	5 27	5 51	5 52	5 06	6 23	4 34	6 51	4 29
17	4 37	7 03	5 02	6 34	5 27	5 49	5 53	5 05	6 24	4 33	6 51	4 29
18	4 38	7 02	5 03	6 32	5 28	5 48	5 54	5 04	6 25	4 33	6 52	4 29
19	4 39	7 01	5 04	6 31	5 29	5 46	5 55	5 03	6 26	4 32	6 53	4 30
20	4 40	7 01	5 05	6 30	5 30	5 45	5 56	5 01	6 28	4 32	6 53	4 30
21	4 40	7 00	5 05	6 28	5 31	5 43	5 57	5 00	6 29	4 31	6 53	4 30
22	4 41	7 00	5 06	6 27	5 31	5 42	5 58	4 59	6 30	4 31	6 53	4 30
23	4 42	6 59	5 07	6 26	5 32	5 40	5 59	4 57	6 31	4 30	6 54	4 31
24	4 42	6 58	5 08	6 24	5 33	5 38	6 00	4 56	6 32	4 30	6 55	4 32
25	4 43	6 57	5 09	6 23	5 34	5 37	6 01	4 55	6 33	4 29	6 55	4 33
26	4 44	6 56	5 10	6 22	5 35	5 35	6 02	4 54	6 34	4 29	6 56	4 33
27	4 45	6 56	5 10	6 20	5 36	5 34	6 03	4 53	6 35	4 29	6 56	4 34
28	4 46	6 55	5 11	6 19	5 37	5 32	6 04	4 51	6 36	4 28	6 56	4 35
29	4 46	6 54	5 12	6 17	5 37	5 31	6 05	4 50	6 36	4 28	6 57	4 36
30	4 47	6 53	5 13	6 16	5 38	5 29	6 06	4 49	6 37	4 28	6 57	4 36
31	4 48	6 52	5 14	6 14			6 07	4 48			6 57	4 37

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