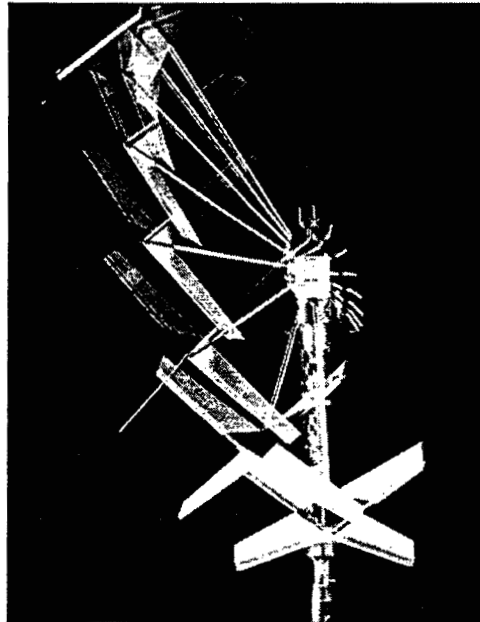
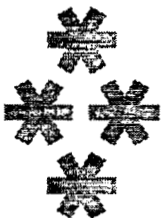
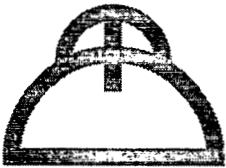
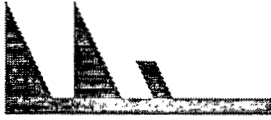
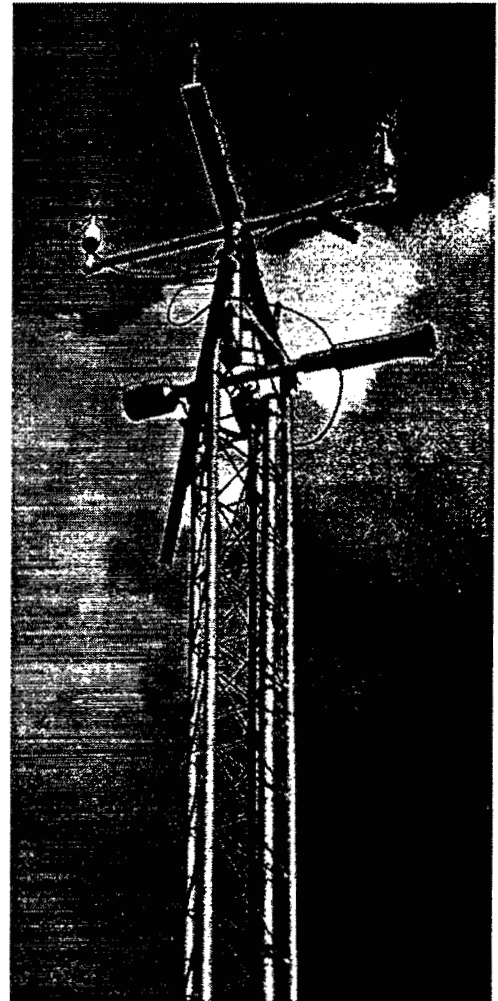


# Meteorological Annual Report for 1995



at the Savannah River Site



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## Meteorological Annual Report for 1995 (U)

by  
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# Meteorological Annual Report for 1995<sup>(U)</sup>

C. H. Hunter  
C. P. Tatum

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# Executive Summary

An analysis of meteorological data collected at the Savannah River Site (SRS) in 1995 shows that weather conditions were slightly cooler and wetter than average overall despite a warm and extremely dry spring. November and December were particularly cool with average temperatures for both months more than 5°F lower than their respective monthly averages for the 31-year period 1964-94. June and September temperatures were also well below average. Temperature extremes for the year ranged from 20°F on February 16 and December 24 to 98°F on August 30.

Monthly rainfall was above average for seven of the 12 months of the year; moreover, February's monthly total of 7.97 inches was the highest February rainfall since precipitation measurements at SRS began in 1952. Alternatively, total rainfall recorded during the three spring months of 1995 (March, April, and May), 3.96 inches, was the second lowest of all springs since 1952. The maximum 24-hour rainfall was 3.5 inches on January 6. Rains in excess of 2 inches occurred on February 17, June 5, and August 25.

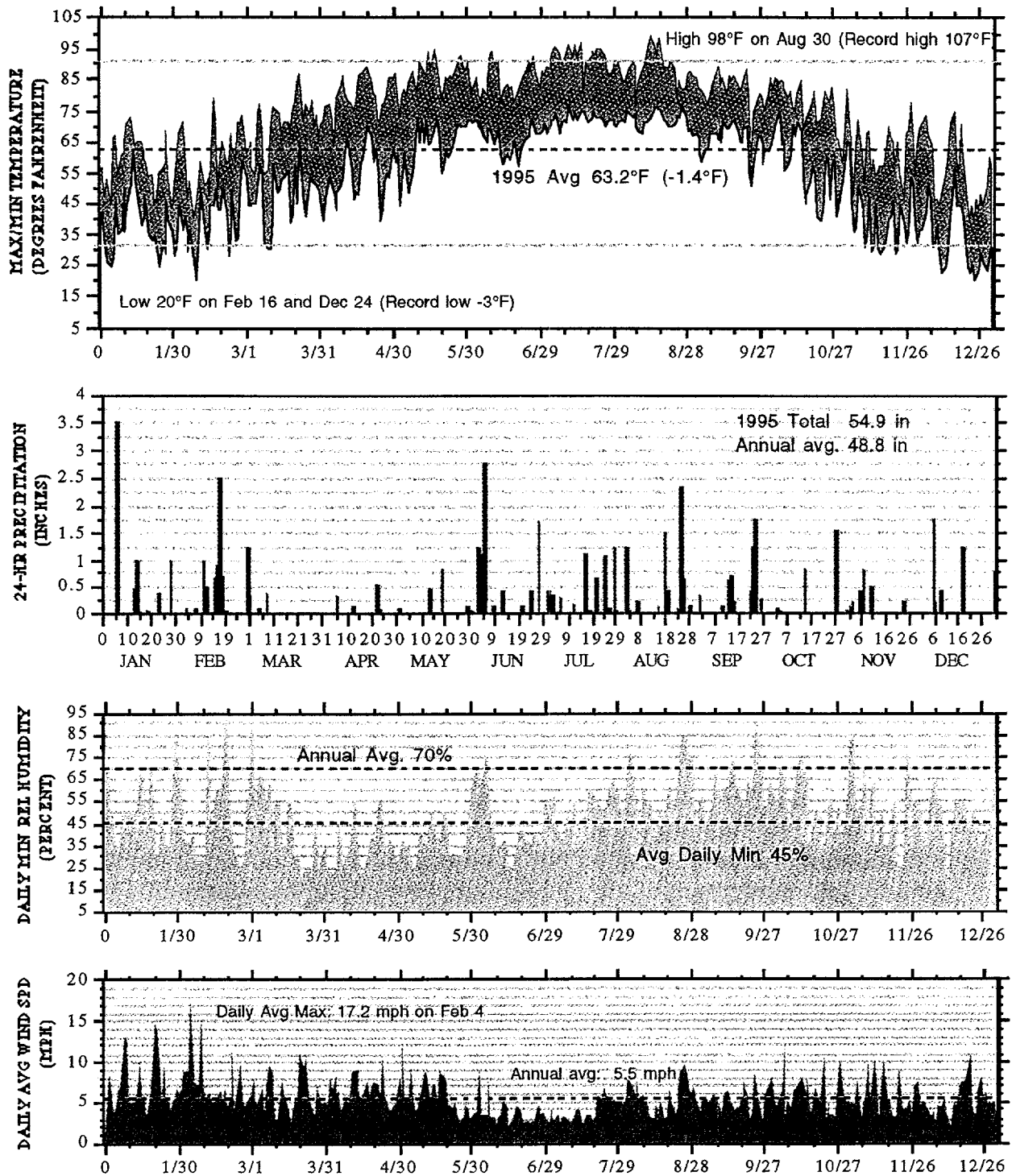
Summaries of wind direction data for 1995 show a slightly higher frequency of northeasterly winds and a slightly lower frequency of southwesterly winds than were observed in a previous 5-year period. These anomalies were due primarily to the clockwise circulation around an unusually persistent high pressure to the north and east of the area during the summer and early autumn. A winter storm that formed off the North Carolina coast on February 4 produced the most notable period of sustained strong winds. Daily and 15-minute average wind speeds of 17.2 miles per hour (mph) and 30.3 mph, respectively, were recorded at the Central Climatology Facility meteorological tower. The average wind speed for the year was 5.5 mph.

Monthly average relative humidity for 1995 was lowest during the spring months (56% in April) and highest in the summer and early fall (79% in September). The average relative humidity for the year was 70%, and the average daily minimum relative humidity, which typically occurs during the afternoon, was 45%.

Summary plots of 1995 daily minimum/maximum temperature, 24-hour total precipitation, daily minimum relative humidity, and daily average wind speed are shown in Figure 1.

Three tropical storms affected SRS in 1995—Tropical Storm Allison on June 5, Tropical Storm Jerry on August 25, and Hurricane Opal on October 4-5. The effects of these storms on SRS were minor.

FIGURE 1. SUMMARY OF DAILY DATA FOR 1995



# Introduction

## General SRS Climate

The southeastern U. S. has a humid subtropical climate characterized by relatively short, mild winters and long, warm, and humid summers (Oliver and Fairbridge 1987).

Summerlike weather conditions typically last from May through September when the area is under the influence of the western extension of the semi-permanent Atlantic subtropical anticyclone (i.e., the Bermuda high). Winds in summer are light and cold fronts generally remain well north of the area. Daily high temperatures during the summer months exceed 90°F on more than half of all days on the average. The persistent heat and humidity often result in scattered afternoon and evening thunderstorms.

The influence of the Bermuda high begins to wane during the fall, resulting in lower humidity and more moderate temperatures. Average rainfall during the fall is usually the least of the four seasons.

The weather becomes changeable during the winter months as mid-latitude low-pressure systems and fronts migrate through the region. Weather conditions frequently alternate between warm, moist, subtropical air from the Gulf of Mexico region and cool, dry polar air. Although outbreaks of Arctic air occasionally can affect SRS, the extremely cold weather associated with these air masses is moderated by the Appalachian Mountains to the north and northwest. As a result, less than one-third of winter days have minimum temperatures below freezing on the average, and days with temperatures below 20°F are infrequent. Measurable snowfall is rare.

Spring is characterized by a higher frequency of occurrence of tornadoes and severe thunderstorms than the other seasons. Although spring weather is somewhat windy, temperatures are mild and the humidity is relatively low.

Detailed descriptions of the SRS climate are contained in Hunter (1989), Hoel (1984), and Weber (1993).

## SRS Meteorological Monitoring Program

The Environmental Technology Section (ETS) of the Savannah River Technology Center (SRTC) collects, archives, and analyzes basic meteorological data supporting a variety of activities at SRS. These activities include the design, construction, and operation of nuclear and non-nuclear facilities, emergency response, environmental compliance, resource management, and environmental research.

The Environmental Technology Section maintains a network of eight 200-foot meteorological observation towers located at A, C, D, F, H, K, L, and P Areas. Additional meteorological instrumentation is located at the Central Climatology Facility near N Area, which includes a 200-foot observation tower, and on the 1000-foot WJBF-TV tower near Beech Island, South Carolina. Measurements of wind speed, direction, turbulence, air temperature, and dew point temperature are taken at a height of 200 feet above ground on all of the site towers. Identical measurements are made on the Central Climatology Facility tower at heights of 13, 58, 116, and 200 feet. Additional measurements conducted at the Central Climatology Facility consist of precipitation, evaporation, solar radiation, barometric pressure, and soil temperature. At the WJBF-TV tower, measurements of wind speed, direction, turbulence, and air temperature are recorded at seven levels through 1000 ft. A measurement from each sensor in the network is taken at 1.5 second intervals by a centrally located computer. Fifteen-minute averages and standard deviations are computed and stored in a relational database.

Additional measurements of temperature and relative humidity are taken with a hygrothermograph mounted in a standard National Weather Service 'cotton region' instrument shelter adjacent to Building 773-A. Data from the hygrothermograph are continuously fed to a strip chart recorder. Daily maximum and minimum values of temperature and relative humidity are manually extracted from

the strip charts and entered into a computer database. Daily precipitation is measured with a plastic wedge rain gauge located adjacent to the instrument shelter. Rainfall measurements are taken once per day, usually around 9 a.m. Data collection at or near the Building 773-A site has been conducted since 1952 and the data have been used extensively in basic descriptions of the SRS climate. The data recorded at this site are subject to a manual quality control inspection to ensure the reasonableness of the data; nevertheless, some errors may be present in the data record.

A map showing each of the measurement locations is given in Attachment A. Parker and Addis (1994) and Kurzeja (1993) provide detailed descriptions of the ETS meteorological monitoring facilities and instrumentation.

## Data Sources for the 1995 Annual Meteorological Report

This report contains tabular and graphical summaries of data collected during 1995 for temperature, precipitation, relative humidity, wind, barometric pressure, and solar radiation. Most of these data were collected at the Central Climatology Facility. Summaries of temperature and relative humidity were generated with data from the lowest level of measurement at the Central Climatology Site tower (13 feet above ground). (Relative humidity is calcu-

lated from measurements of dew-point temperature.) Wind speed summaries were generated with data from the second measurement level (58 feet above ground). Wind speed measurements from this level are believed to best represent open, well-exposed areas of the Site. Precipitation summaries were based on data from the Building 773-A site since quality control algorithms for the Central Climatology Facility rain gauge data were not finalized at the time this report was prepared.

Extensive maintenance of electrical systems at the Central Climatology Facility during June resulted in considerable missing data. During this period, data sets used to generate summaries of daily minimum and maximum temperature and relative humidity were supplemented with data from the Building 773-A instrument shelter, as needed. Similarly, data sets of daily extremes of wind speed were supplemented with data from the H-Area meteorological tower. Summaries that use data from these supplemental sources, or were otherwise affected by lost record, are noted as appropriate.

This report also contains seasonal and annual summaries of joint occurrence frequencies for selected wind speed categories by 22.5 degree wind direction sector (i.e. wind roses). Wind rose summaries are provided for the 200-foot level of the Central Climatology tower and for each of the eight 200-foot area towers.

# Data Summaries

## Overview

Annual and monthly averages and extremes for each of the meteorological variables analyzed for this report are summarized in Table 1. Plots of daily minimum and maximum temperatures, 24-hour total precipitation, daily minimum relative humidity, and daily average wind speed are shown in Figure 1.

Weather conditions during January and February of 1995 were characterized by slightly below average temperatures (-0.1°F and -0.5°F, respectively) and much above average rainfall (+2.65 inches and +3.51 inches, respectively). Moreover, February's rainfall of 7.97 inches was the highest for any February since precipitation measurements at SRS began in 1952. The greatest 24-hour rainfall of the year, 3.5 inches, occurred January 6. A strong storm that developed off the North Carolina coast on February 4 produced the most sustained period of strong winds of the year with a 24-hour average wind speed of 17.2 mph and a 15-minute average wind of 30.3 mph.

During the spring months (March, April, and May), the persistent presence of the Atlantic subtropical anticyclone (i.e., the Bermuda high) over the eastern Gulf of Mexico and southeast U.S. kept the predominant storm track well north of the area (NOAA 1995). As a result, the weather was characterized by considerable sunshine, above-average temperatures (+1.5°F), and much below-average rainfall (-8.15 inches). Total rainfall for the spring of 1995, 3.96 inches, was the second lowest spring rainfall that has been recorded at SRS.

The Bermuda high shifted northward during the summer months and, on several occasions, persisted for lengthy periods off the mid-Atlantic and northeast U.S. coast (NOAA 1995). This position is several hundred miles north of an average summertime location (Riehl 1979). The clockwise circulation around this high pressure area resulted in an unusually high frequency of moist easterly winds at SRS from June through September. The cumulative frequency of observed winds from the north-northeast clockwise through southeast direction sectors was 20% higher during the summer of 1995 than was observed during the five summers of 1987-91. The total rainfall for this period, 26.5 inches, was approximately eight inches greater than the average total rainfall for these months. Moreover, the number of days in which the maximum

temperature exceeded 90°F, 48 days, was more than one-third fewer than the summertime average of 76 days. The remnants of Hurricane Allison and Tropical Storm Jerry passed very near the Site on June 5 and August 25, respectively. No strong winds were observed during the passage of these storms; however, Allison produced a 24-hour rainfall of 2.75 inches and Jerry produced a 24-hour rainfall of 2.3 inches.

A brush with Hurricane Opal punctuated an otherwise mild and typically dry October. Maximum instantaneous and 15-minute average wind speeds of 36 and 23 mph, respectively, were observed on the morning of October 5 as the center of Opal moved through extreme western Georgia and eastern Tennessee. Rainfall associated with Hurricane Opal was light.

The remainder of the year was characterized by a pronounced southward migration of the polar jet into the southern U.S. The persistent presence of polar air over the area resulted in much below average temperatures during November and December (-5.5°F and -5.2°F, respectively). The number of days of minimum temperatures below 32°F, 24 days, was nearly twice the average for these months. The lowest temperature of the year, 20°F, was observed on December 24. Monthly rainfall was near average.

## Detailed Summaries by Variable

### Temperature

Figure 2 provides a plot of 1995 daily minimum and maximum temperatures. Annual and monthly average temperatures since 1964 are summarized in Table 2 and plotted in Figures 3 and 4.

Temperatures for 1995 ranged from 20°F, observed on the mornings of February 9 and December 24, to 98°F, observed on the afternoon of August 14. The average temperature for 1995 was 63.3°F, which is about 1.3 degrees below the average for the previous 31 years from 1964 through 1994.

(Note that monthly and annual average temperatures for 1964-94 should be considered approximate values, as they are based on averages of observed daily minima and maxima at the Building 773-A measurement site. Average tem-

peratures reported for 1995 are based on a near continuous record of 15-minute values at the Central Climatology Facility.)

July was the warmest month of the year with an average daily maximum of 91.2°F and an average daily minimum of 71.4°F; December was the coldest month with an average daily high of 56.4°F and an average daily low of 34.2°F. Monthly average temperatures for 1995 were near or slightly above their respective 31-year averages through May and generally below average June through December. November and December were particularly cool with average temperatures for both months more than 5°F below the climatological average. Average temperatures for June and September also were well below average. High temperatures greater than 90°F were observed on 48 days during the year, including 22 days during July (see Figure 5). The average number of days per year with temperatures equal to or exceeding 90°F is 74 days. Minimum temperatures below 32°F were observed on 39 days; 16 of these days occurred in December. No occurrence of extremely hot or cold weather (temperatures greater than 100°F, or less than 20°F, respectively) was observed.

## Precipitation

Daily precipitation for 1995 is summarized graphically in Figure 6. Annual and monthly rainfall since 1952 is summarized in Table 3 and plotted in Figures 7 and 8, respectively.

Rainfall of 0.01 inches or more was observed on 124 days during the year. The maximum 24-hour rainfall was 3.5 inches on January 6. Rains in excess of 2 inches occurred on February 17, June 5, and August 25. The heavy rains on June 5 and August 25 were associated with the remnants of Hurricane Allison and Tropical Storm Jerry, respectively.

Total precipitation for 1995 was 54.9 inches, 6.1 inches above the average annual precipitation of 48.76 inches over the period 1952-94. Above average rainfall was recorded in seven of the 12 months (January through February, June through September, and December); moreover, rainfall totals for February (7.97 inches) and June (8.15 inches) were the highest and third highest, respectively, over the period of record. Alternatively, total rainfall for March, 0.91 inches, was the lowest for any March since 1952; total rainfall for the three spring months (March, April, and May), 3.96 inches, was the second lowest of all springs in the period of record.

## Relative Humidity

A plot of daily minimum and maximum relative humidity is shown in Figure 9. Annual average relative humidity and monthly average minimum relative humidity is plotted in Figures 10 and 11, respectively.

(Note: Relative humidity is defined as the ratio of the vapor pressure of ambient air to its saturation vapor pressure. As the ambient temperature cools to the dew point temperature (assuming constant pressure), morning values of relative humidity can often approach 100%, even when the moisture content of the atmosphere is relatively low. Therefore, daily minima of relative humidity are emphasized in the following discussion, as a more meaningful indicator of prevailing atmospheric moisture.)

The lowest relative humidity observed in 1995 was 6% on December 10, associated with a strong high pressure over the southeast U.S. Daily minimum relative humidity was frequently less than 30% during the winter and spring months, but rarely below 40% during the summer and early fall.

The average relative humidity for 1995 was 70%, slightly higher than the annual average value of 68% for the 31-year period 1964-94. The average daily maximum for 1995 was 88% and the average daily minimum was 45%. Monthly average relative humidity ranged from 56% in April to 79% in June and September. Monthly average minimum relative humidity for January through May was less than monthly averages over the 31-year period 1964-94. Conversely, monthly averages for June through November were greater than their respective 31-year averages.

## Wind

A plot of daily average wind speed for 1995 is shown in Figure 12. The annual average wind speed for 1995 was 5.5 mph (measured at an elevation of 58 feet above ground). Monthly average speeds ranged from 7.2 mph in February to 3.2 mph in June. The most notable period of strong winds during the year occurred February 4, as a strong low pressure area formed off the North Carolina coast and moved slowly northward. Daily and maximum 15-minute average wind speeds for the day were 17.2 mph and 30.3 mph, respectively. The maximum instantaneous gust for the year, 50 mph, occurred on November 11 following the passage of a strong cold front.

Annual and seasonal wind rose plots for wind data collected at the 200-foot level of the Central Climatology Facility tower are shown in Figures 13 and 14, respectively. Annual and seasonal wind roses for a five-year data set, 1987-91, are shown in Figures 13 and 15, respectively. (The 5-year wind rose data set is comprised primarily of measurements from the H-Area tower, approximately 3 miles northeast of the Central Climatology Facility.)

The annual wind rose for 1995 shows northeasterly winds occurred about 5% more often and southwesterly winds occurred about 5% less often than were observed during the 5-year period 1987-91 (see Figure 13). This difference is due primarily to an anomalous wind pattern that occurred during the summer and early fall of the year (see Figures 14 and 15). An examination of surface pressure patterns during this period (NOAA 1995) indicates that the Bermuda high persisted over the Atlantic Ocean off the mid-Atlantic and northeast U.S. coast, a position that is well north of an average summertime location to the south and east of the southeast U.S. (Riehl 1979). As a result, winds from the north-northeast clockwise through southeast sectors occurred 20% more often during the summer of 1995 than were observed in the earlier 5-year summer period. Conversely, winds from the south clockwise through west sectors occurred about 20% less often. Wind patterns during winter, spring, and fall of 1995 were not substantially different from the seasonal patterns for the 5-year period.

The annual average wind speed at the 200-foot level of the Central Climatology Facility tower was 8.5 mph, slightly less than the 5-year average of 8.7 mph.

Wind roses for the A-, C-, D-, and F-Area towers and for the H-, K-, L-, and P-Area towers are shown in Figures 16 and 17, respectively. Wind roses for each of the area towers are similar, except for the D-Area tower. Since the D Area is located in the Savannah River valley, channeling of the wind by nearby terrain to the northeast and southwest resulted in slightly higher frequencies of northwest and southeasterly winds than was observed at the other towers. Annual average wind speeds for the area towers ranged from 7.8 mph at the D- and H-Area towers to 9.2 mph at the A-, C-, F-, L-, and P-Area towers. The frequency statistics used to generate the wind rose plots in Figures 13-17 are summarized in Appendix A.

## Barometric Pressure

Average barometric pressure for 1995 was 1005.6 millibars (mb). The lowest daily average value, 987 mb, occurred on December 19; the highest daily average value, 1022.5 mb, occurred on March 10. Daily average barometric pressure is plotted in Figure 18. The greatest variability in daily average pressure occurred in January through March and again in November through December.

## Solar Radiation

The average daily total solar radiation for the year was 372 langley per day (ly/day). Monthly average daily values ranged from 519 ly/day in July to 217 ly/day in December. A comparison of observed daily solar radiation to a theoretical, clear-sky maximum was performed to infer relative cloudiness. The theoretical values were estimated from tables in Budyko (1974). April was the 'sunniest' month with an observed average daily solar radiation of 76% of the theoretical maximum for the month. January, February and September were the 'cloudiest' months with an observed average daily solar radiation of 57% of the theoretical maximum. Daily total solar radiation is plotted in Figure 19.

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Table 1. Means and Extremes of SRS Meteorological Data for 1995

<sup>a</sup> Data from the 773-A instrument shelter

Month	Temperatures (°F)											Precipitation (in) <sup>a</sup>							
	Average				Extremes				Number of Days				Total	Departure	Greatest in 24 hrs	Date	No. of Days		
	Daily Maximum	Daily Minimum	Month	Departure	Highest	Date	Lowest	Date	Maximum ≥ 90 °F	Maximum ≥ 100 °F	Minimum ≤ 32 °F	Minimum ≤ 20 °F					≥ 0.01 in.	≥ 0.1 in.	≥ 0.5 in.
Jan	57.0	37.7	45.5	-0.1	73	13th	24	25th			7		6.96	+2.65	3.50	6th	12	6	3
Feb	60.9	40.6	49.9	-0.5	79	16th	20 <sup>a</sup>	9th			6		7.97	+3.51	2.50	17th	14	9	6
Mar	69.4	48.6	58.6	+2.0	87	23rd	30	10th			2		0.91	-3.99	0.37	8th	5	3	
Apr	79.2	53.6	65.9	+1.1	89	20th	39	25th					1.28	-2.07	0.54	22nd	6	4	1
May	85.5	62.1	73.5	+1.5	94	17th	45	3rd	8				1.77	-2.09	0.79	19th	9	4	1
Jun	84.4	65.8	75.0	-3.4	92	10th	57 <sup>a</sup>	20th	8				8.15	+3.68	2.75	5th	13	8	4
Jul	91.2	71.4	79.9	-1.3	97	16th	68 <sup>a</sup>	7th	22				5.71	+0.50	1.25	28th	16	9	4
Aug	88.1	72.2	79.0	-1.3	98	14th	67	31st	10				6.92	+1.93	2.30	25th	14	9	4
Sep	81.2	65.2	71.8	-3.0	89	10th	50	24th					5.75	+1.89	1.75	24th	11	9	4
Oct	77.3	57.4	65.9	+0.2	85	2nd	39	22nd					2.64	-0.47	1.51	27th	8	3	2
Nov	62.7	41.5	50.8	-5.6	82	2nd	28	16th			8		2.38	-0.31	0.82	7th	9	6	1
Dec	56.4	34.2	43.8	-5.5	75	16th	20	24th			16	1	4.47	+0.91	1.75	6th	7	5	3
Year	74.4	54.2	63.3	-1.3	98	8/14	20	12/24	48	0	39	1	54.90	+6.14	2.75	6/5	124	75	33



Table 1 (cont). Means and Extremes of SRS Meteorological Data for 1995

<sup>a</sup> Data from H-area tower, 61m level

<sup>b</sup> Data from the 773-A instrument shelter

N/A - Data not available

Monthly Average	Wind Speed (mph)				Barometric Pressure (mb)					Solar Radiation (ly)					Relative Humidity (%)					
	Month	Max 15-min Average	Max Instantaneous	Date	Average	Lowest	Date	Highest	Date	Average Daily Total	% of Theoretical Max	Minimum Daily Total	Date	Maximum Daily Total	Date	Avg. Daily Maximum	Avg. Daily Minimum	Monthly	Lowest	Date
Jan	6.7	24.3	41	20th	1007.0	993.2	7th	1021.3	5th	243	0.57	35	29th	372	25th	86	47	69	22	5th
Feb	7.2	30.3	45	4th	1007.2	991.4	4th	1017.9	9th	280	0.57	51	18th	448	22nd	85	43	66	18	24th
Mar	6.0	22.8	37	21st	1006.6	988.0	22nd	1022.5	10th	378	0.63	76	1st	580	28th	80	37	60	15	21st
Apr	6.2	21.7	49	12th	1003.9	992.2	24th	1012.2	3rd	528	0.76	162	6th	676	26th	79	31	56	20	15th
May	5.9	19.2	34	19th	1003.2	992.5	2nd	1012.2	23rd	518	0.68	206	19th	672	6th	87	36	63	22	6th
Jun	3.2	25.4 <sup>a</sup>	46 <sup>a</sup>	10th	N/A	N/A		N/A		N/A		N/A		N/A		92	53	79	20 <sup>b</sup>	14th
Jul	3.9	16.8	43	16th	1004.1	994.1	26th	1011.0	29th	519	0.67	184	27th	832	17th	92	50	77	33	7th
Aug	5.4	18.7	37	19th	1003.5	996.1	27th	1010.8	3rd	423	0.59	102	25th	625	6th	93	54	76	13	7th
Sep	5.0	16.0	33	2nd	1005.8	996.8	17th	1012.7	12th	353	0.57	65	24th	561	3rd	93	57	79	41	3rd
Oct	5.8	22.9	36	5th	1005.8	993.1	4th	1017.6	30th	361	0.70	54	31st	488	8th	90	48	72	22	26th
Nov	5.6	26.1	50	11th	1008.5	992.4	7th	1019.6	5th	259	0.63	35	11th	398	4th	94	46	74	21	21st
Dec	5.0	21.0	40	4th	1008.8	987.1	19th	1020.3	11th	217	0.61	43	18th	313	10th	90	44	71	6	10th
Year	5.5	30.3	50	11/11	1005.6	987.1	12/19	1022.5	3/10	372	0.62	35	11/11	832	7/17	88	45	70	6	12/10

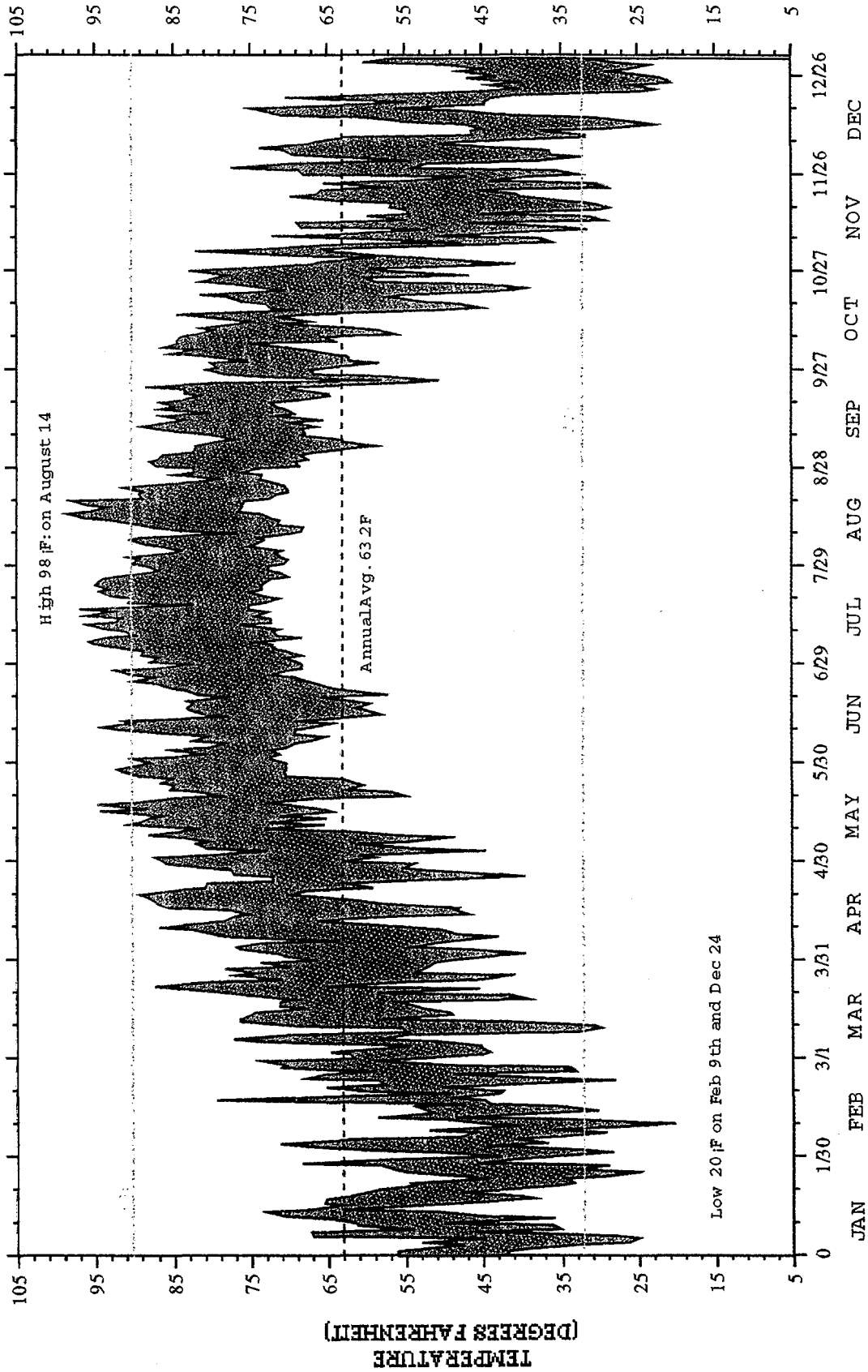
**Table 2. Monthly and Annual Average and Extreme Temperatures Since 1964**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1964	43.6	43.5	54.9	64.6	74.0	81.6	79.4	80.0	75.1	60.8	58.8	49.8	63.8
1965	46.4	48.4	52.8	65.9	76.1	74.2	78.1	79.2	74.7	61.3	54.5	46.0	63.1
1966	38.9	48.5	53.7	62.8	70.4	74.4	81.2	79.0	74.4	64.4	55.0	47.3	62.5
1967	49.0	45.5	59.9	67.9	69.9	75.6	78.5	78.2	70.6	64.0	53.2	53.6	63.8
1968	43.5	43.4	57.1	66.5	71.3	80.0	83.1	82.8	77.0	67.0	55.4	45.9	64.4
1969	46.5	46.6	51.5	64.5	70.5	80.3	83.3	77.6	72.8	66.1	52.1	45.4	63.1
1970	39.0	47.2	55.9	66.8	74.2	79.0	81.1	80.8	78.6	67.0	51.6	49.3	64.2
1971	44.6	46.4	49.5	63.4	70.7	81.3	80.7	80.4	75.2	70.2	55.5	56.9	64.6
1972	51.7	45.6	57.6	67.4	72.4	75.3	79.7	80.6	77.2	64.8	54.4	53.2	65.0
1973	46.1	45.9	60.7	61.9	70.5	77.7	79.1	74.5	70.5	62.4	59.0	50.3	63.2
1974	59.6	50.8	62.2	66.2	75.3	77.5	81.5	80.9	75.3	64.5	56.6	49.0	66.6
1975	51.4	53.2	55.8	63.9	75.6	79.1	79.7	82.4	75.7	68.7	59.3	48.5	66.1
1976	44.2	55.7	61.5	64.8	68.9	75.6	80.4	78.0	73.1	60.1	48.7	44.8	63.0
1977	35.3	47.1	60.0	66.9	73.3	80.6	83.6	80.6	77.9	62.1	58.2	46.7	64.4
1978	39.3	41.3	54.2	65.7	70.9	79.7	82.1	81.2	77.1	65.6	60.7	49.6	64.0
1979	42.1	44.6	57.5	64.5	71.3	75.1	79.6	80.5	73.4	64.8	57.4	47.4	63.2
1980	45.9	44.3	52.6	63.5	71.2	78.3	83.8	82.5	79.2	62.7	52.8	46.0	63.6
1981	40.4	48.5	53.0	67.0	68.6	81.3	81.3	76.3	74.0	62.1	54.4	43.2	62.5
1982	43.0	50.0	58.9	62.4	75.7	78.8	80.9	80.1	75.0	66.2	58.7	54.8	65.4
1983	43.3	48.0	55.3	59.4	66.8	76.7	84.3	83.9	74.8	67.2	56.4	45.8	63.5
1984	45.0	51.7	56.5	62.6	71.9	80.1	80.1	80.8	74.0	73.4	53.4	56.9	65.5
1985	42.9	49.5	60.2	67.5	74.5	80.8	81.1	79.7	75.7	70.8	65.5	45.4	66.1
1986	45.4	54.6	57.9	66.4	74.4	82.7	86.9	80.1	78.4	67.1	61.3	49.3	67.0
1987	46.2	48.6	56.5	62.3	74.5	79.9	82.8	83.8	76.6	60.7	59.1	52.9	65.3
1988	42.3	47.8	56.8	64.2	70.4	76.8	81.6	81.4	75.4	61.2	58.0	49.1	63.8
1989	52.2	52.0	58.3	64.2	70.6	79.8	81.4	80.9	75.3	67.3	52.4	44.2	64.9
1990	54.9	57.5	60.0	64.0	72.9	80.5	83.7	83.8	79.0	69.4	59.9	54.6	68.3
1991	47.9	54.1	60.3	69.2	76.9	79.5	83.6	81.2	77.4	68.1	55.4	54.0	67.3
1992	49.5	54.1	57.2	65.0	71.2	78.9	83.7	80.7	76.9	65.0	57.1	48.0	65.6
1993	51.7	47.8	53.2	58.9	69.7	78.2	83.6	80.0	75.2	62.8	55.2	43.6	63.3
1994	41.5	50.1	60.2	68.0	71.2	82.3	81.8	81.2	77.4	67.2	62.3	53.3	66.4
1995	45.5	49.9	58.6	65.9	73.5	75.0	79.9	79.0	71.8	65.9	50.8	43.8	63.3
Avg	45.6	48.8	56.9	64.8	72.2	78.6	81.6	80.4	75.5	65.3	56.3	49.0	64.6
Min	35.3	41.3	49.5	58.9	66.8	74.2	78.1	74.5	70.5	60.1	48.7	43.2	62.5
Yr Min	1977	1978	1971	1993	1983	1965	1965	1973	1973	1976	1976	1981	1981
Rec Low	-3	13	11	29	38	48	58	56	41	28	18	7	-3
Yr Rec	1985	1980	1980	1983	1989	1984	1972	1986	1967	1976	1970	1983	1985
Max	59.6	57.5	62.2	69.2	76.9	82.7	86.9	83.9	79.2	73.4	65.5	56.9	68.3
Yr Max	1974	1990	1974	1991	1991	1986	1986	1983	1980	1984	1985	1971	1990
Rec High	86	86	90	99	99	105	107	107	104	96	89	82	107
Yr Rec	1975	1989	1974	1986	1985	1985	1986	1983	1990	1986	1974	1984	1986

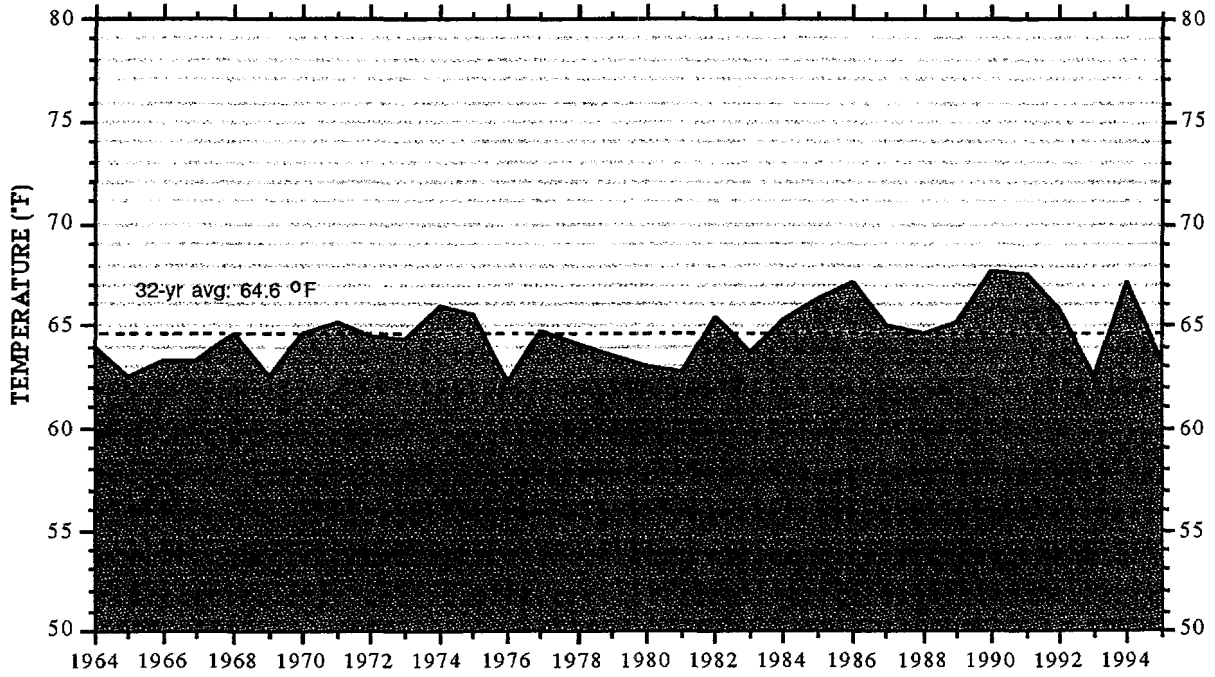
**Table 3. Monthly and Annual Rainfall Since 1952**

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1952	2.07	3.23	6.55	3.12	5.56	5.67	2.82	5.98	3.34	1.36	2.86	3.99	46.55
1953	2.69	5.48	3.83	2.96	4.42	5.38	3.63	3.61	8.53	0.11	1.04	7.51	49.19
1954	1.26	1.64	2.95	2.50	2.89	2.91	2.03	4.10	1.43	1.29	2.94	2.88	28.82
1955	4.75	2.62	2.21	5.57	4.53	3.31	3.94	5.07	3.42	1.32	2.93	0.46	40.13
1956	1.67	7.94	4.84	3.21	3.07	2.34	4.34	3.18	4.56	1.83	0.93	2.05	39.96
1957	2.05	1.58	4.29	2.75	8.02	4.17	3.51	2.41	5.04	6.12	6.46	2.24	48.64
1958	4.01	4.38	4.96	5.63	2.07	2.50	5.32	2.76	1.12	0.96	0.21	4.42	38.34
1959	3.54	6.06	6.44	2.03	3.81	4.06	5.80	2.93	8.71	10.86	1.97	3.54	59.75
1960	6.91	5.81	5.76	5.07	1.96	3.66	5.27	2.81	4.84	0.97	0.83	2.93	46.82
1961	3.59	5.76	7.23	8.20	3.88	3.01	3.09	7.15	1.00	0.07	1.83	6.60	51.41
1962	4.64	5.14	6.52	4.03	3.50	4.41	2.56	3.43	5.55	2.27	3.50	2.20	47.75
1963	5.96	3.64	3.34	3.70	2.98	8.42	3.18	1.04	5.37	0.00	3.68	4.47	45.78
1964	7.79	6.00	5.79	5.94	3.62	4.50	10.42	12.34	5.68	6.13	0.88	4.38	73.47
1965	2.00	6.39	8.67	2.43	1.33	5.04	8.04	1.94	2.83	2.59	2.17	1.41	44.84
1966	7.18	5.96	4.43	2.53	5.51	4.66	4.11	5.23	3.64	1.25	1.05	3.40	48.95
1967	3.66	3.80	5.68	2.82	5.01	3.74	7.52	7.32	1.70	0.64	2.51	3.13	47.53
1968	3.98	0.94	1.49	2.12	3.46	6.20	3.88	4.27	2.24	3.00	3.39	2.73	37.70
1969	2.00	2.46	3.38	4.09	3.02	3.95	2.71	5.42	4.56	1.16	0.40	4.19	37.34
1970	2.79	2.69	7.36	1.38	4.16	3.46	4.85	3.79	1.71	5.01	1.68	4.92	43.80
1971	5.11	4.16	8.68	2.92	2.98	5.92	10.53	8.76	3.80	5.95	2.31	2.89	64.01
1972	8.91	4.42	2.82	0.57	4.72	6.57	2.64	6.05	1.47	1.20	3.56	5.23	48.16
1973	5.36	5.26	6.38	4.58	3.50	10.89	6.04	3.81	3.71	1.22	0.31	4.64	55.70
1974	2.58	7.03	2.87	2.93	4.15	2.79	4.08	6.27	3.22	0.08	2.19	3.83	42.02
1975	4.98	6.64	5.91	4.42	5.15	3.84	8.55	3.83	5.18	1.74	3.41	2.03	55.68
1976	4.18	1.08	3.83	2.50	10.90	4.35	1.95	1.64	5.48	4.92	4.19	5.08	50.10
1977	3.72	1.62	6.86	6.86	1.27	1.79	2.47	7.30	5.50	4.27	1.63	3.86	43.71
1978	10.02	1.32	3.07	3.53	3.64	3.43	4.12	5.11	4.06	0.06	3.54	1.88	43.78
1979	3.59	7.74	3.09	6.49	8.94	1.54	7.85	2.12	6.13	1.35	3.95	2.17	54.96
1980	5.12	3.48	10.96	1.69	3.49	2.99	0.90	2.03	5.86	2.14	2.50	1.91	43.07
1981	0.89	5.02	4.72	2.07	6.90	4.29	3.97	5.79	0.54	2.81	1.00	9.55	47.55
1982	3.94	4.45	2.50	5.68	2.72	4.27	11.48	5.00	4.62	3.87	2.40	4.83	55.76
1983	3.77	7.21	6.77	5.77	1.67	6.57	4.85	6.32	3.56	1.92	5.38	4.15	57.94
1984	3.51	7.09	6.05	8.00	9.79	2.54	7.28	5.52	0.60	0.31	0.90	1.38	52.97
1985	3.01	6.91	1.31	0.84	1.70	4.61	8.10	4.37	0.49	6.34	6.36	2.48	46.52
1986	1.46	3.56	4.08	1.44	3.83	3.00	2.96	10.89	1.54	4.18	5.82	5.82	48.58
1987	7.39	7.55	4.97	0.69	3.57	5.64	4.86	4.92	3.55	0.29	2.74	1.41	47.58
1988	4.15	3.18	2.90	4.78	2.85	7.11	1.78	6.77	4.40	3.39	2.16	2.91	46.38
1989	1.42	3.59	5.52	4.89	2.60	6.67	11.46	3.27	4.87	3.35	2.99	4.41	55.04
1990	3.07	2.38	2.37	1.21	2.95	0.89	7.31	8.07	0.62	19.62	3.11	1.57	53.17
1991	7.03	1.84	5.44	4.73	3.06	2.17	7.89	9.26	4.40	0.99	1.55	3.32	51.68
1992	4.45	3.89	2.98	2.40	1.34	6.27	3.69	4.84	6.38	3.11	7.78	2.86	49.99
1993	7.45	3.62	8.37	1.75	1.43	3.27	3.12	2.48	7.29	4.13	1.87	1.81	46.59
1994	4.80	3.91	6.42	1.04	1.45	5.08	7.47	3.47	1.67	10.01	3.05	4.62	52.99
1995	6.95	7.97	0.91	1.28	1.77	8.15	5.71	6.92	5.75	2.64	2.38	4.47	54.90
Avg.	4.30	4.46	4.90	3.35	3.86	4.47	5.21	4.99	3.86	3.11	2.69	3.56	48.76
Max	10.02	7.97	10.96	8.20	10.90	10.89	11.48	12.34	8.71	19.62	7.78	9.55	73.47
Yr. Max	1978	1995	1980	1961	1976	1973	1982	1964	1959	1990	1992	1981	1964
Min	0.89	0.94	0.91	0.57	1.33	0.89	0.90	1.04	0.49	0.00	0.21	0.46	28.82
Yr. Min	1981	1968	1995	1972	1965	1990	1980	1963	1985	1963	1958	1955	1954

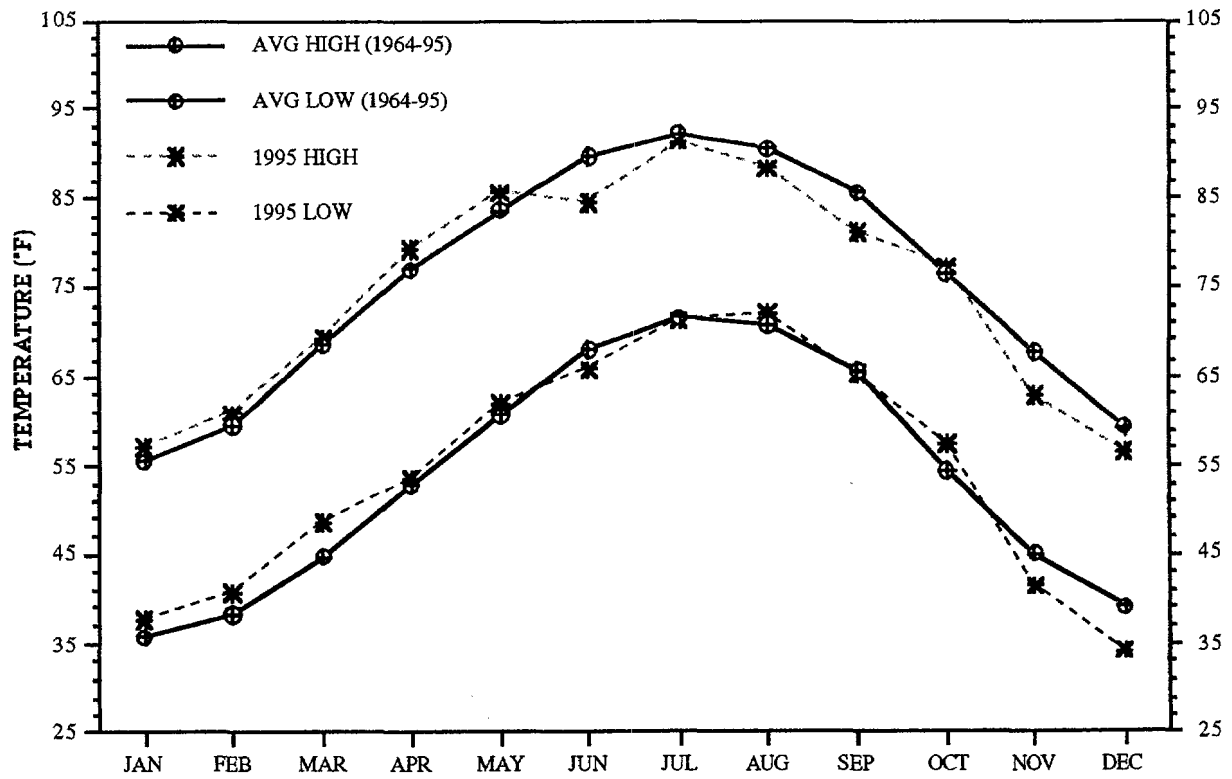
FIGURE 2. 1995 DAILY HIGH AND LOW TEMPERATURES



**FIGURE 3. SRS ANNUAL AVERAGE TEMPERATURE 1964-1995**



**FIGURE 4. SRS MONTHLY AVERAGE TEMPERATURE**



**FIGURE 5. NUMBER OF FREEZING (<32°F) AND SWELTERING (>90°F) DAYS**

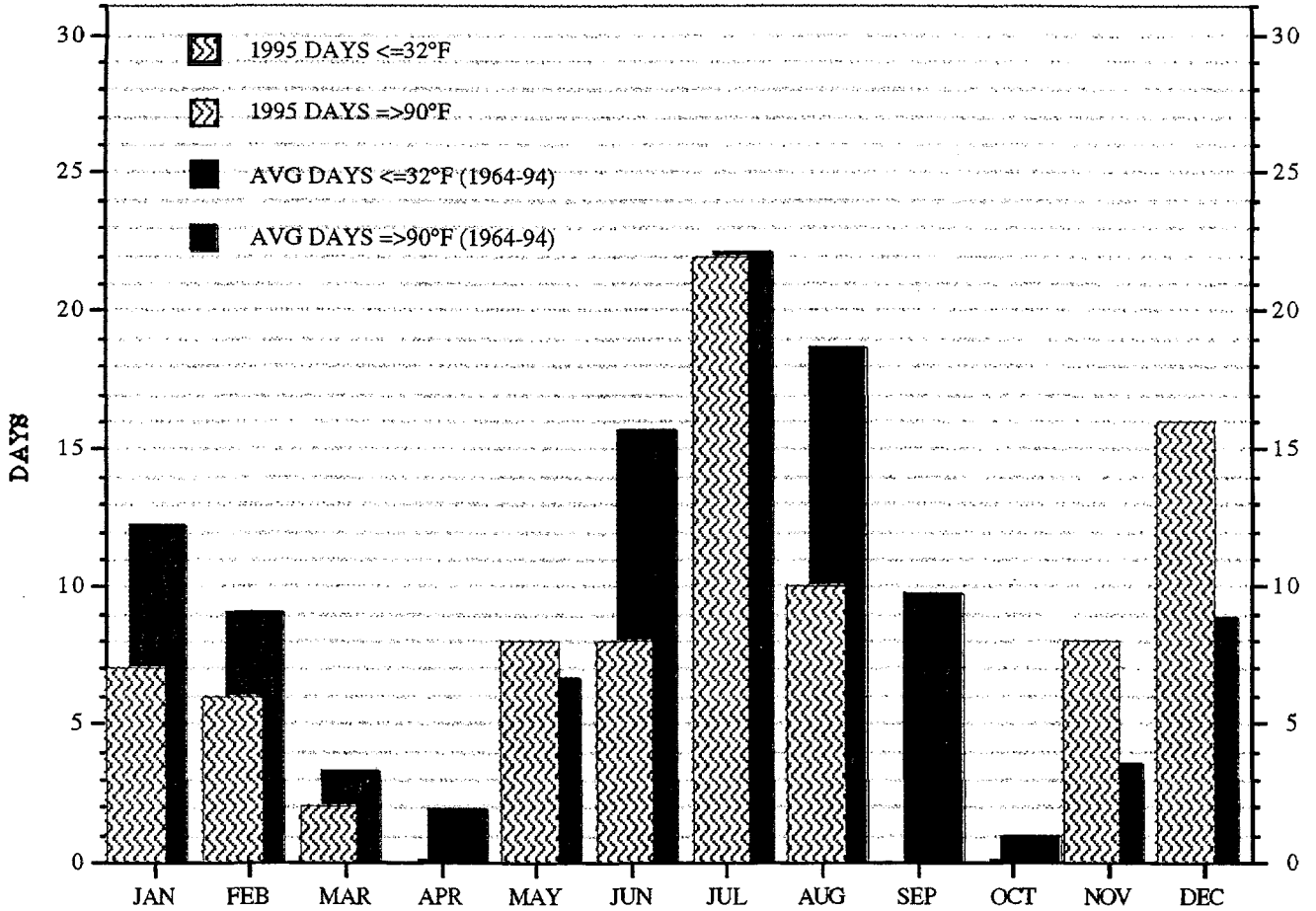
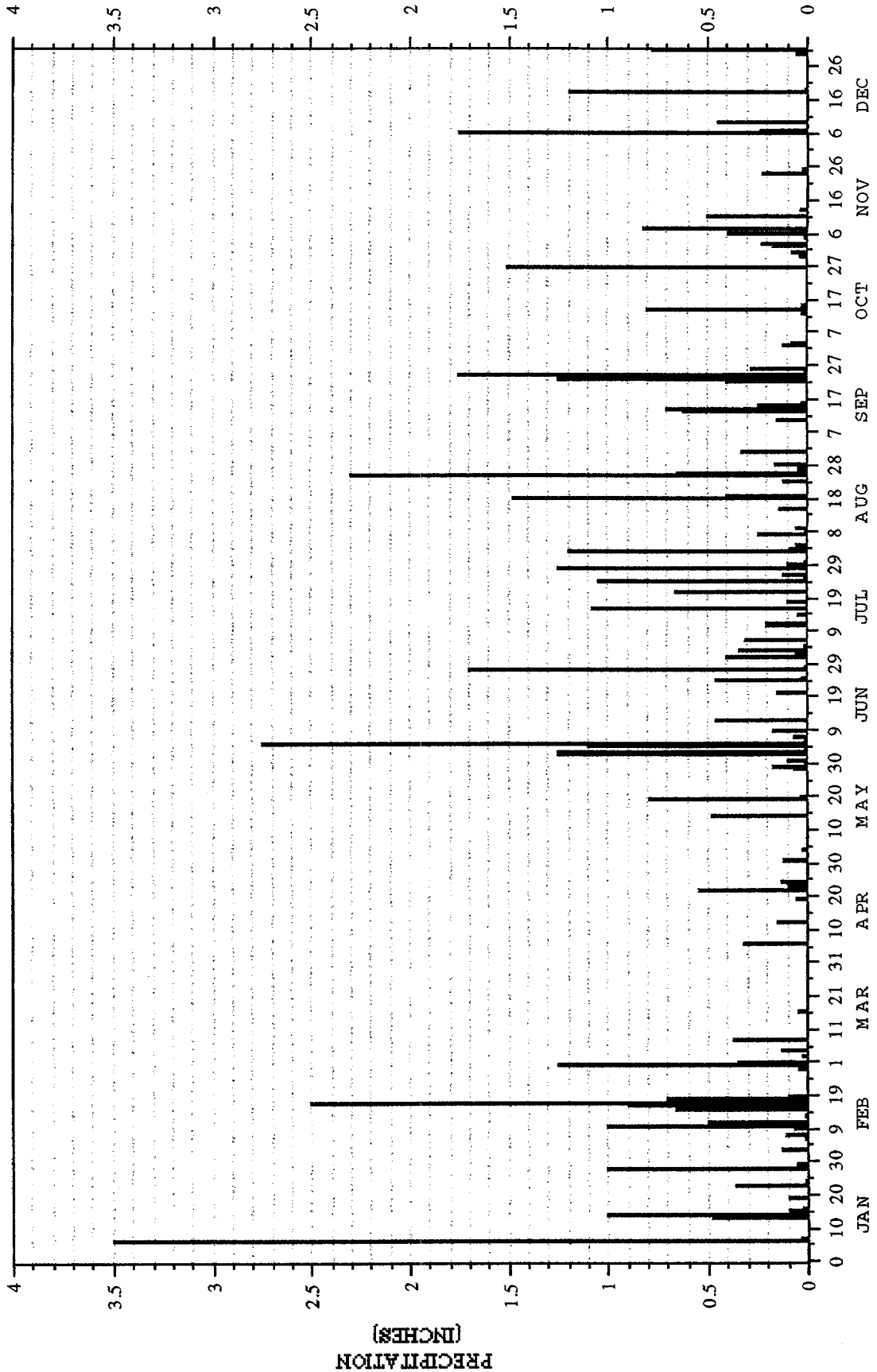
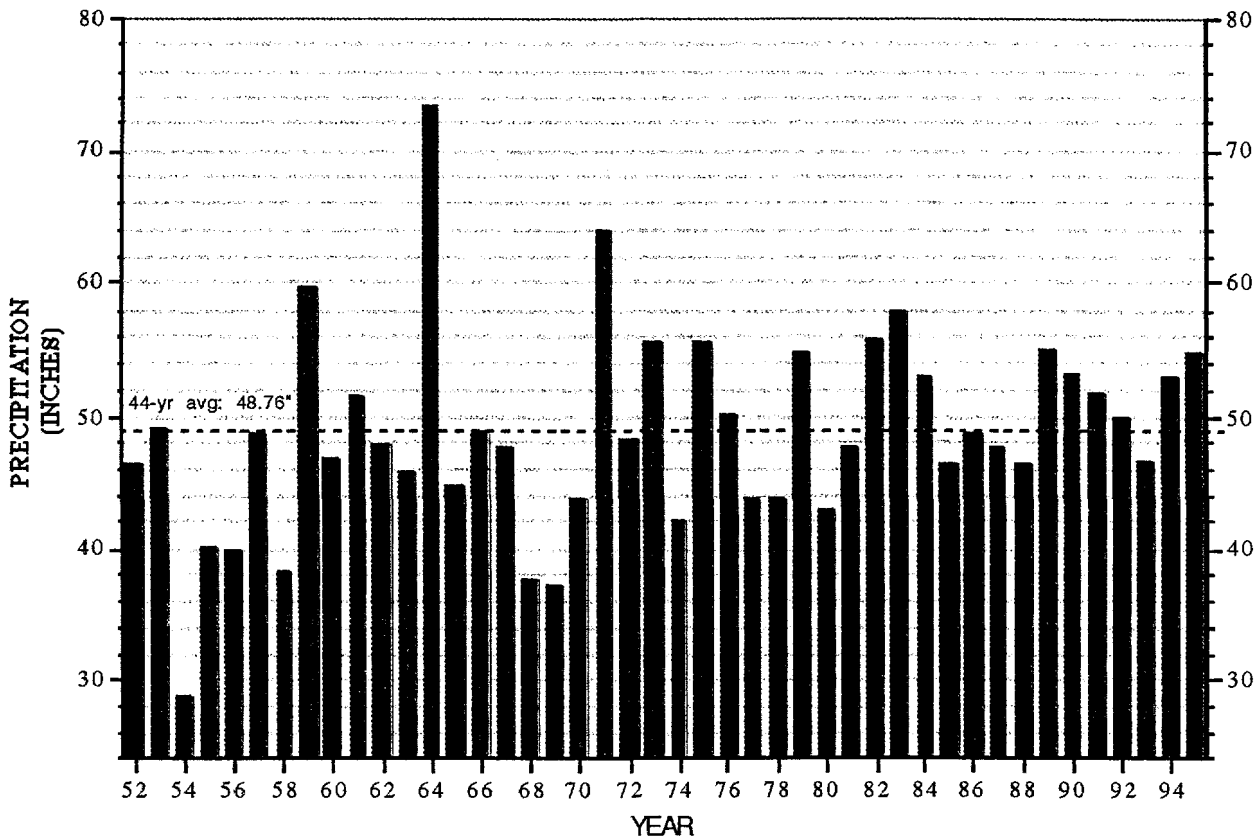


FIGURE 6. 1995 SRTC DAILY PRECIPITATION



**FIGURE 7. SRTC ANNUAL PRECIPITATION 1952-1995**



**FIGURE 8. SRTC MONTHLY PRECIPITATION**

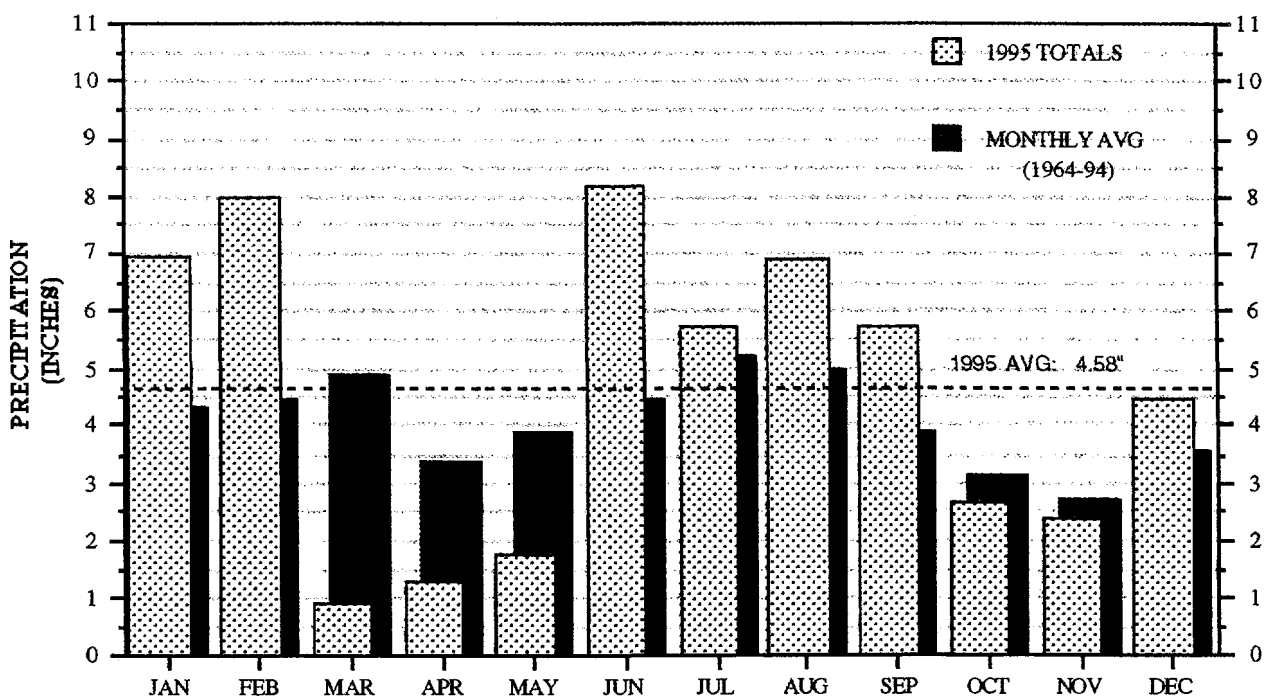
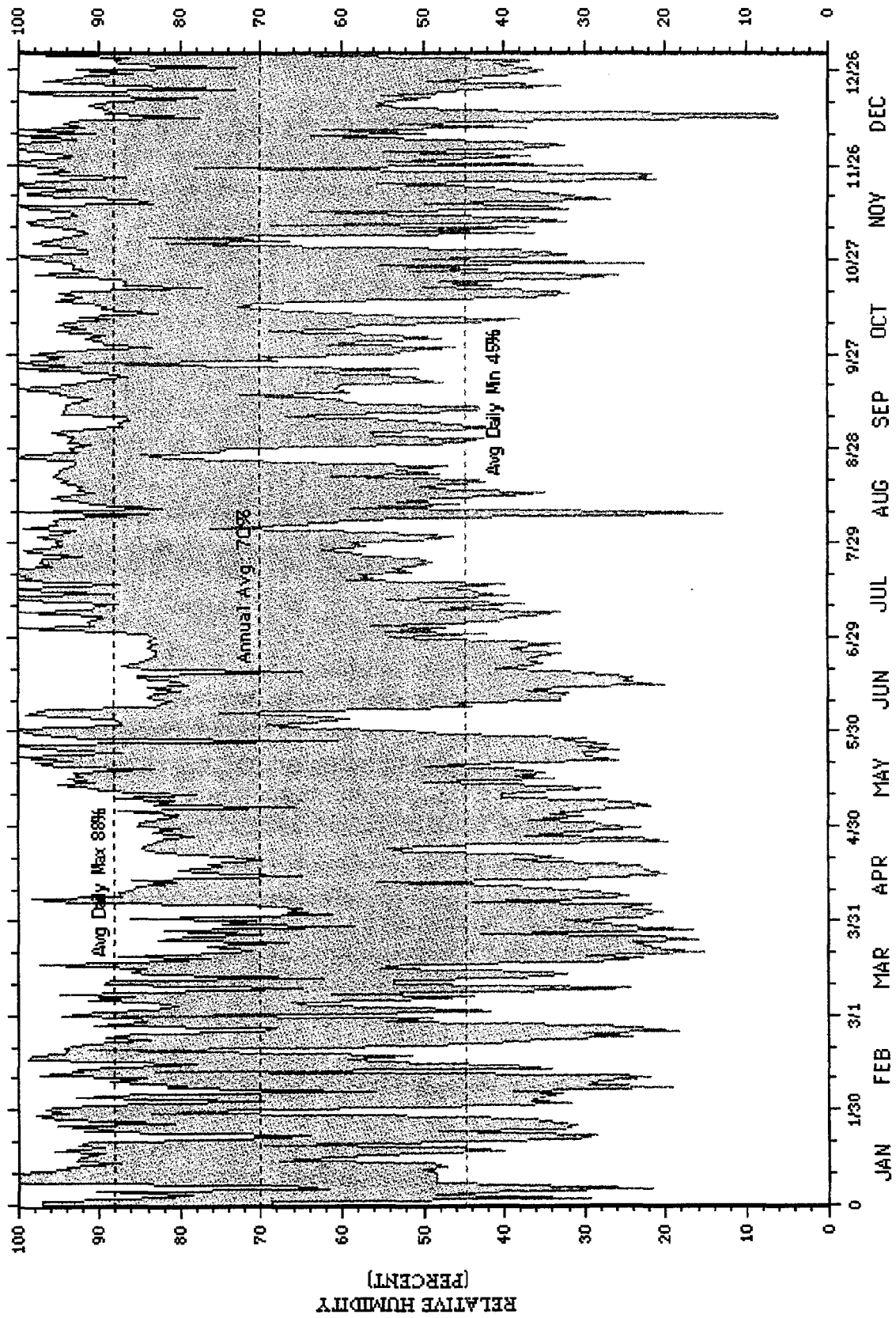
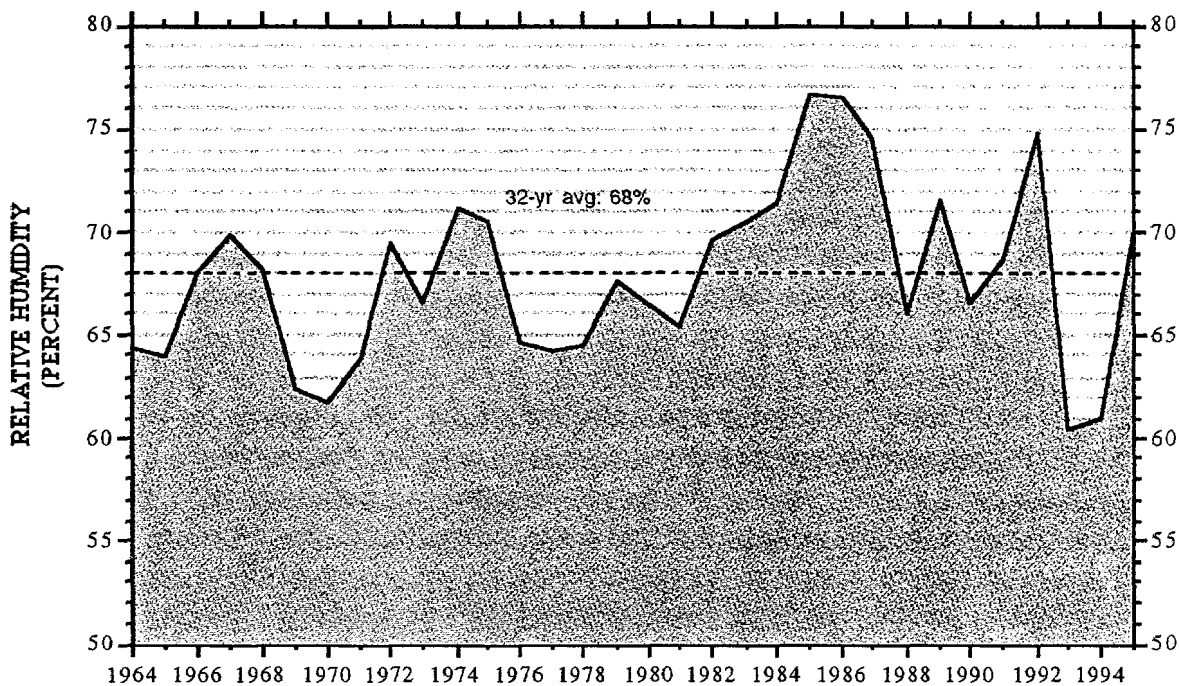




FIGURE 9. 1995 DAILY HIGH AND LOW HUMIDITY



**FIGURE 10. SRS ANNUAL AVERAGE HUMIDITY 1964-1995**



**FIGURE 11. SRS MONTHLY AVERAGE MINIMUM RELATIVE HUMIDITY**

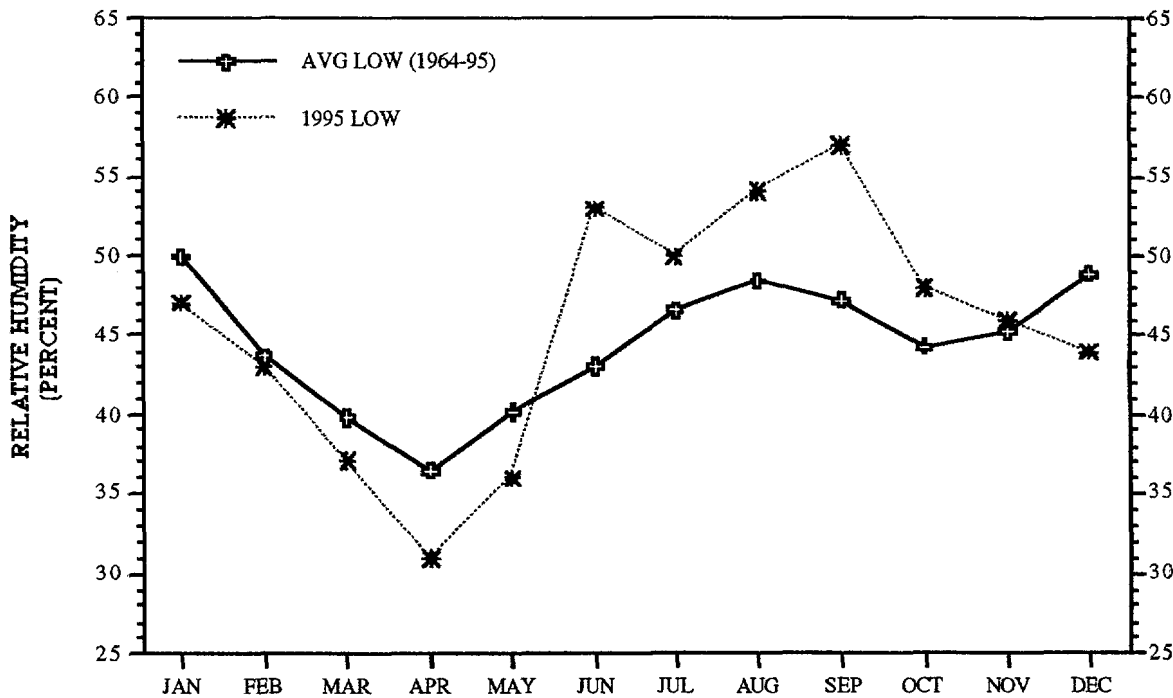


FIGURE 12. 1995 DAILY AVERAGE WIND SPEED

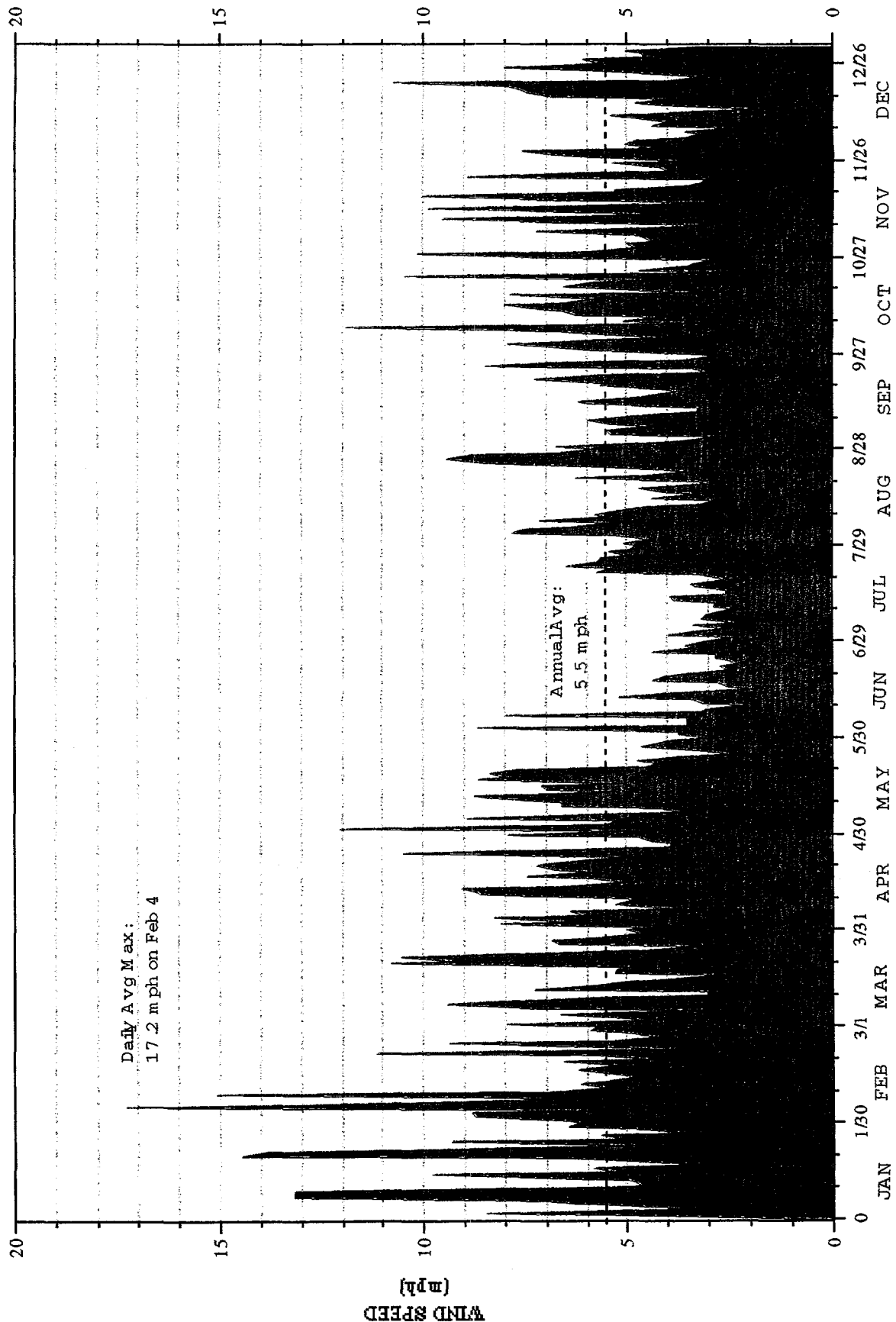
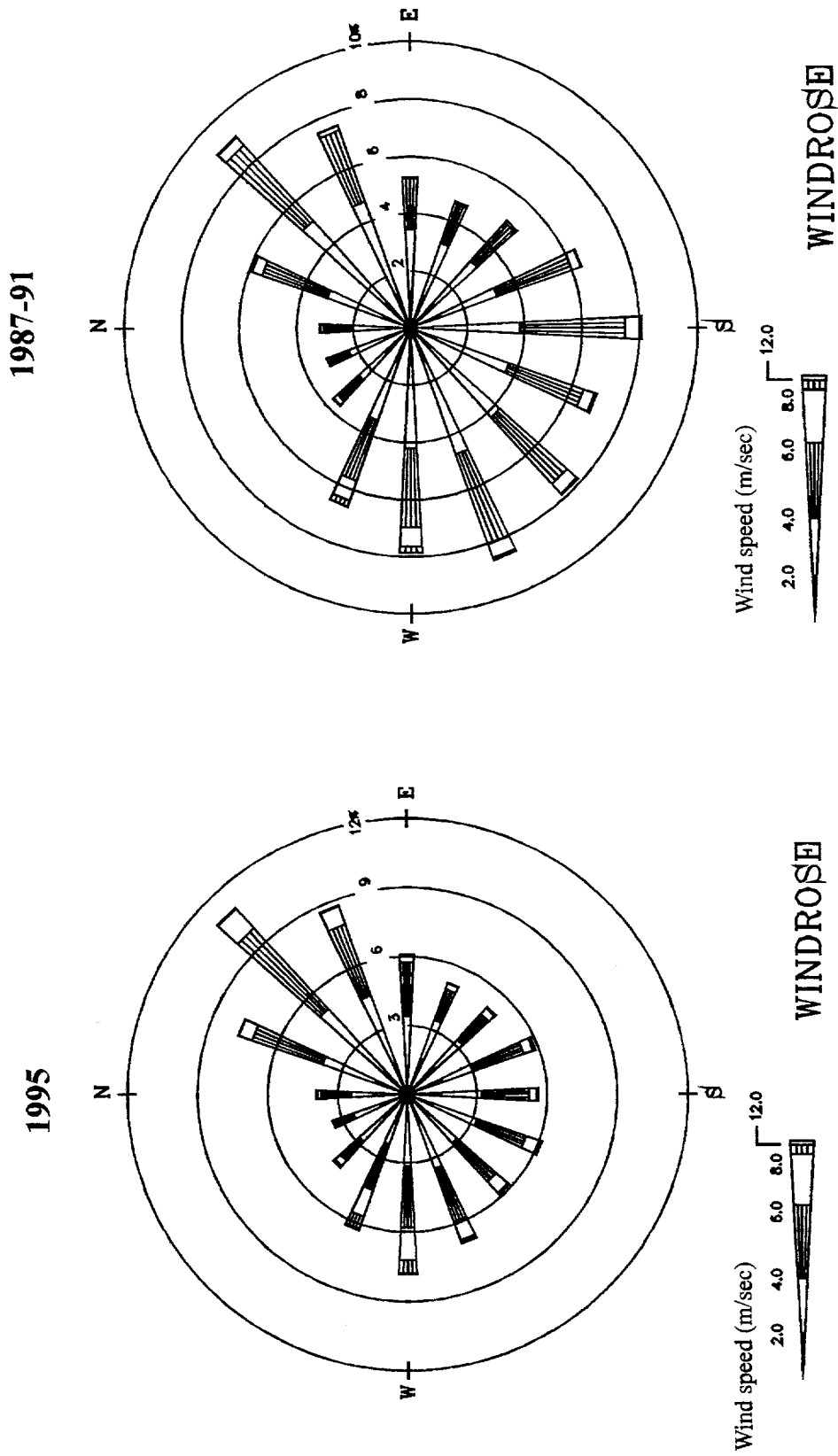
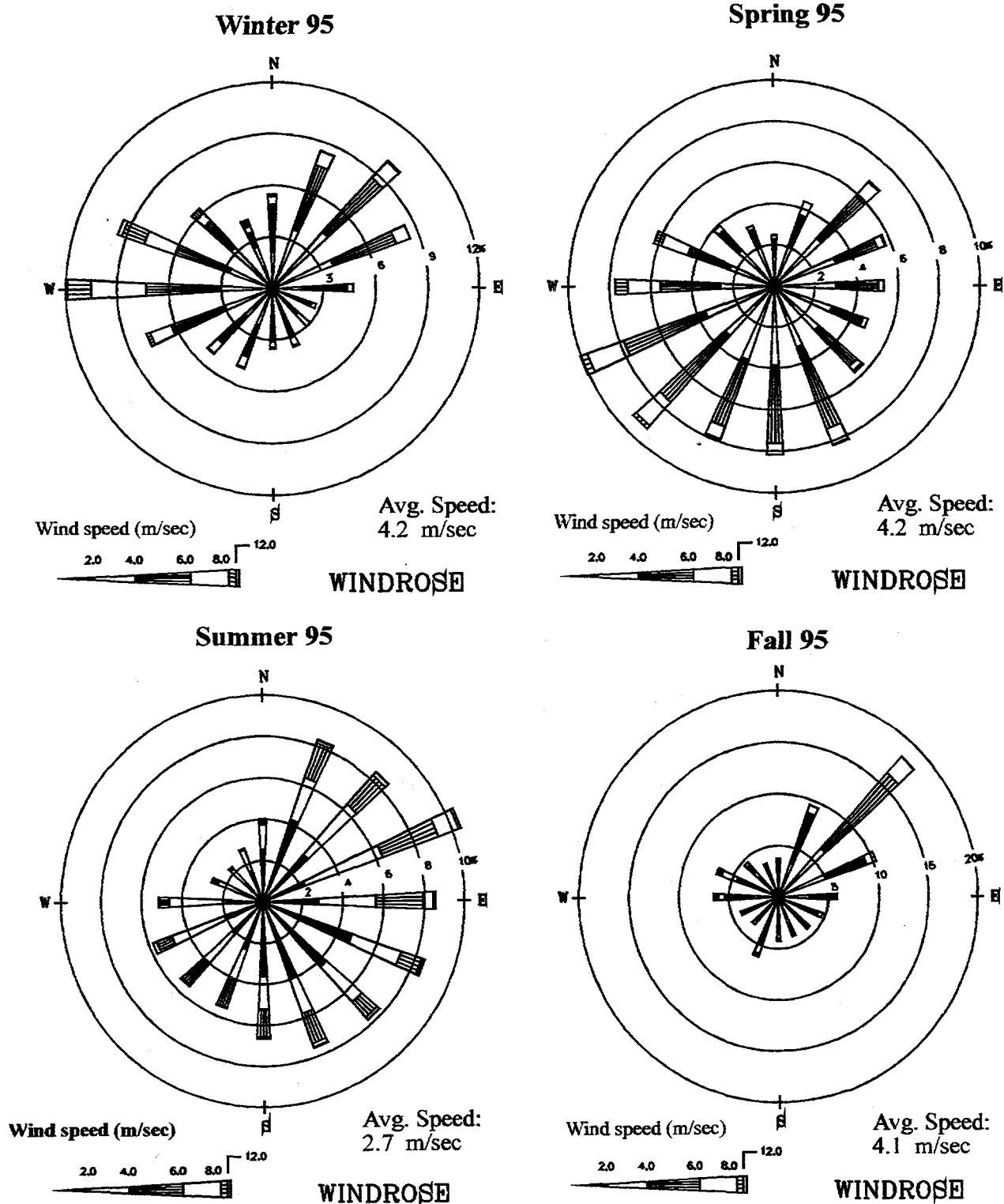


FIGURE 13. ANNUAL WIND ROSES, 1995 AND 1987-91



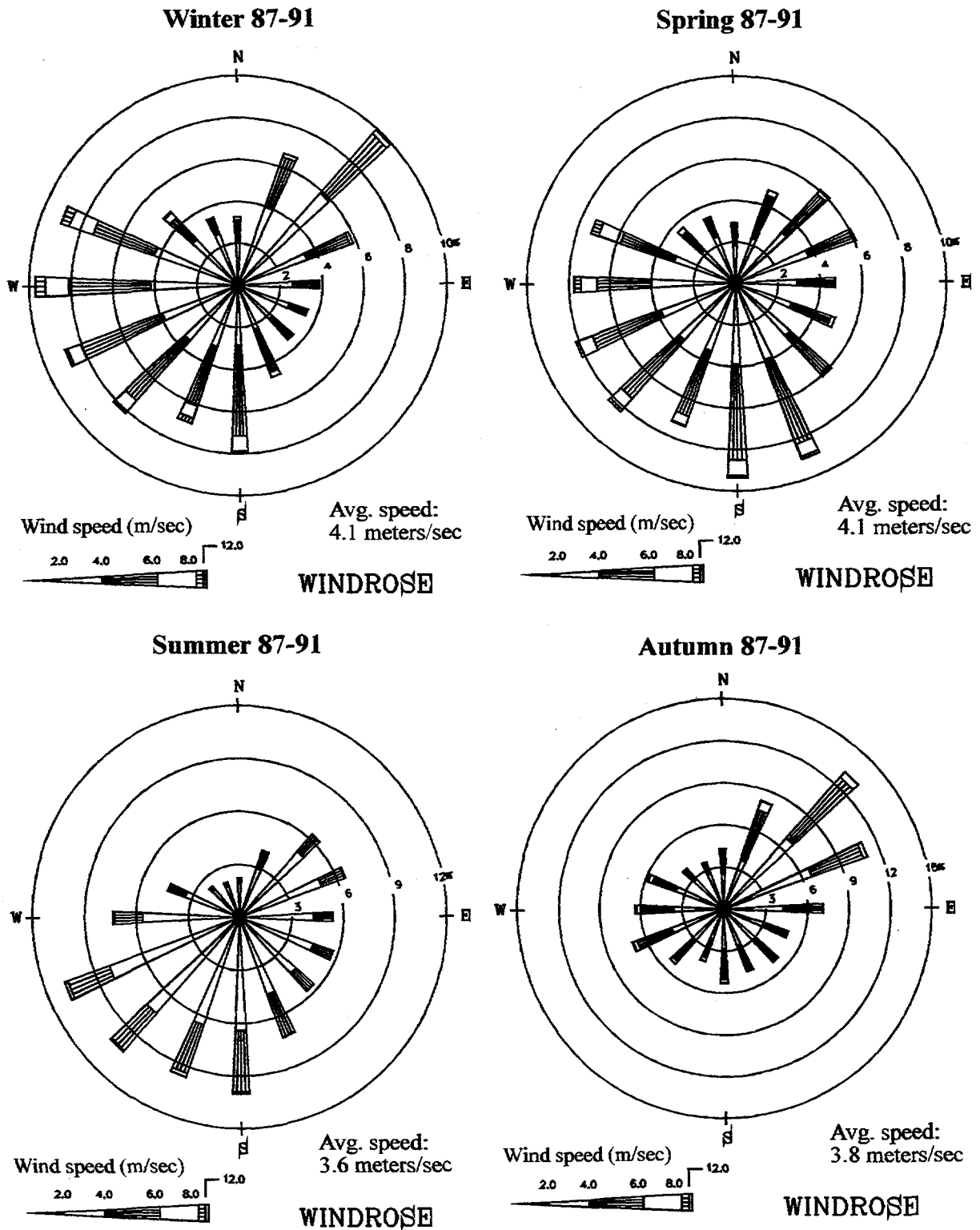
Note: Directions are compass sectors from which the wind blows

**FIGURE 14. SEASONAL WIND ROSES FOR 1995**



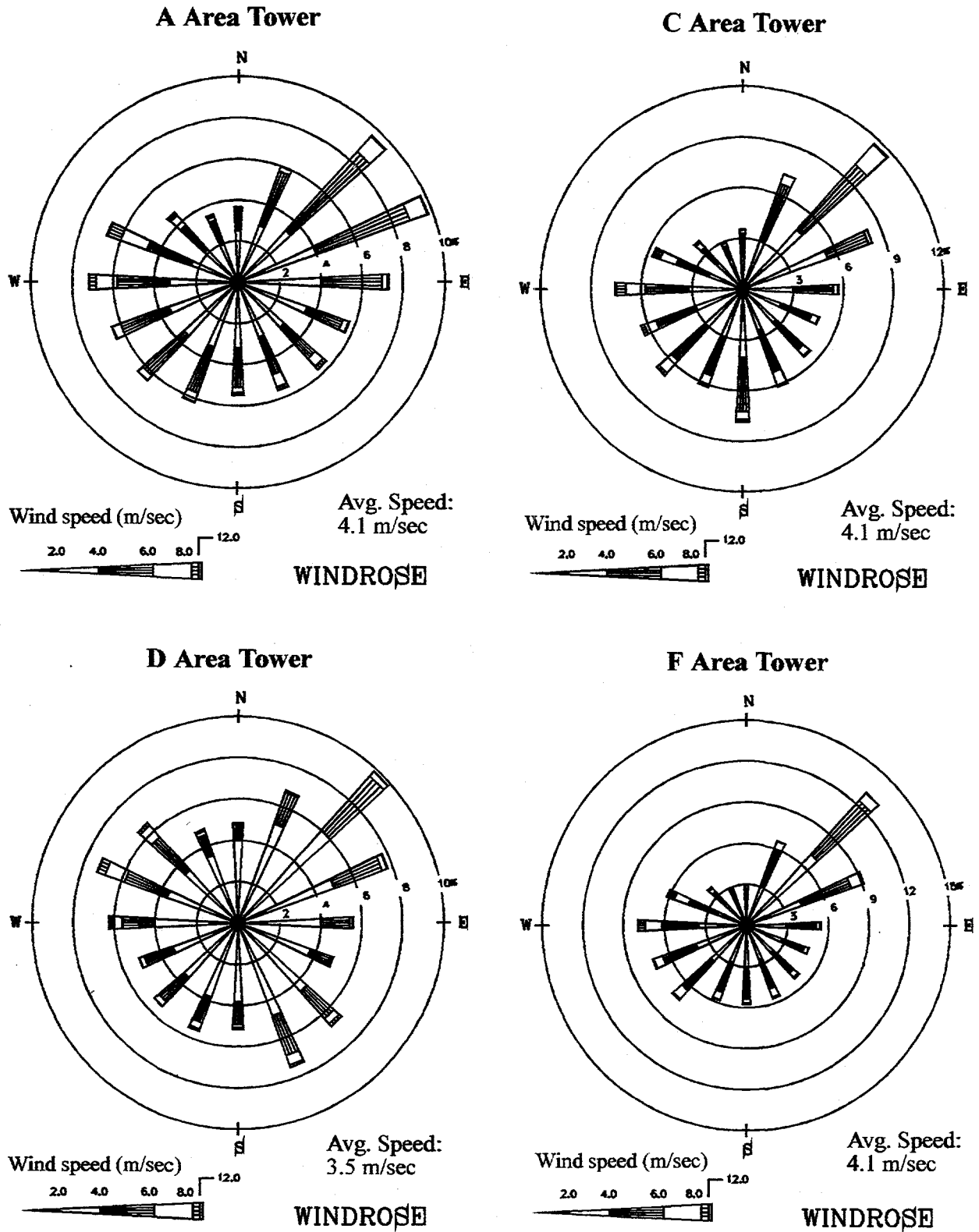
Note: Directions are compass sectors from which the wind blows.

FIGURE 15. SEASONAL WIND ROSES, 1987-91



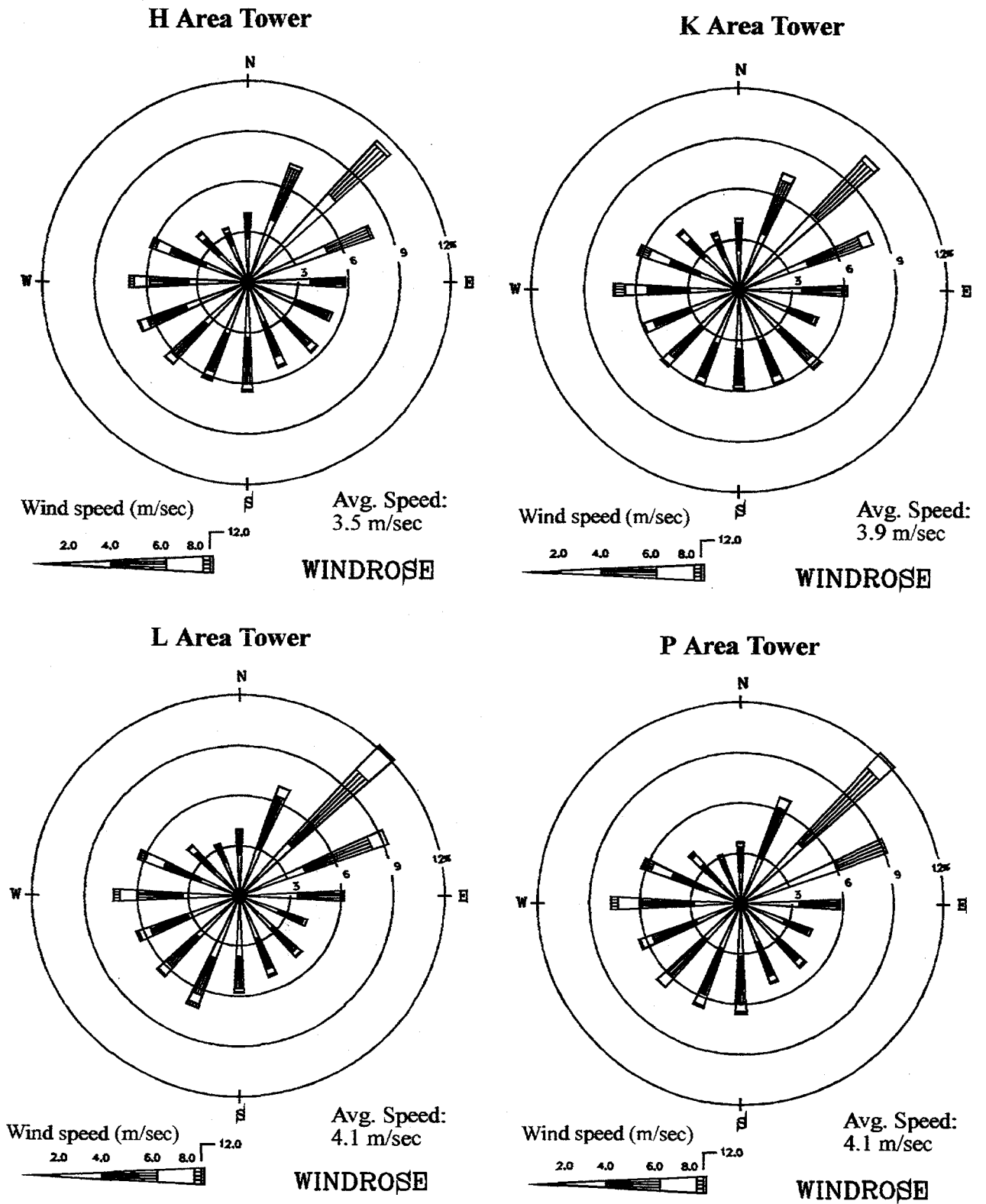
Note: Directions are compass sector from which the wind blows

**FIGURE 16. ANNUAL WIND ROSE FOR A, C, D, AND F TOWERS, 1995**



Note: Directions are compass sectors from which the wind blows

**FIGURE 17. ANNUAL WIND ROSE FOR H, K, L, AND P TOWERS, 1995**



Note: Directions are compass sectors from which the wind blows



FIGURE 18. 1995 DAILY AVERAGE BAROMETRIC PRESSURE

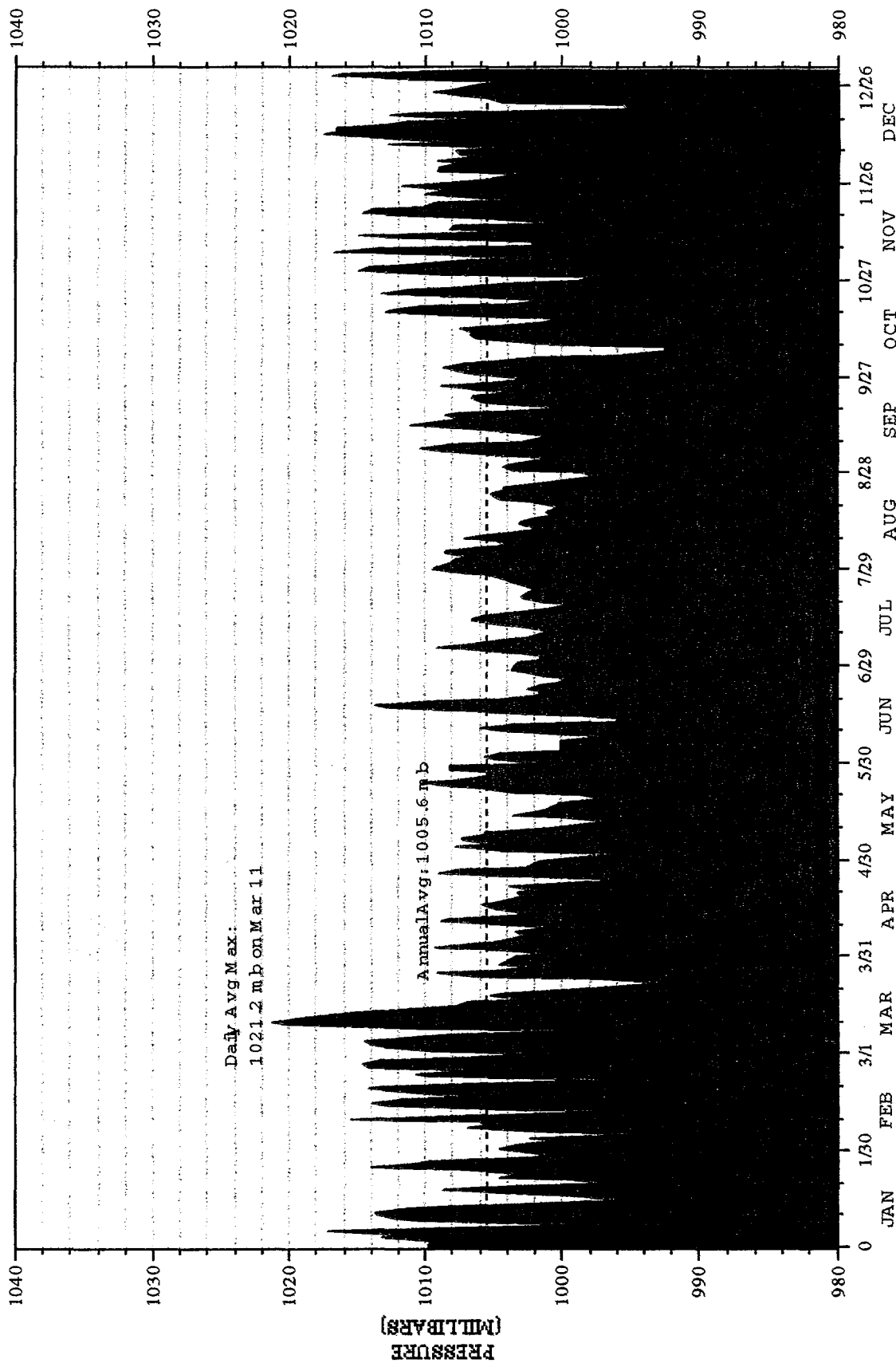
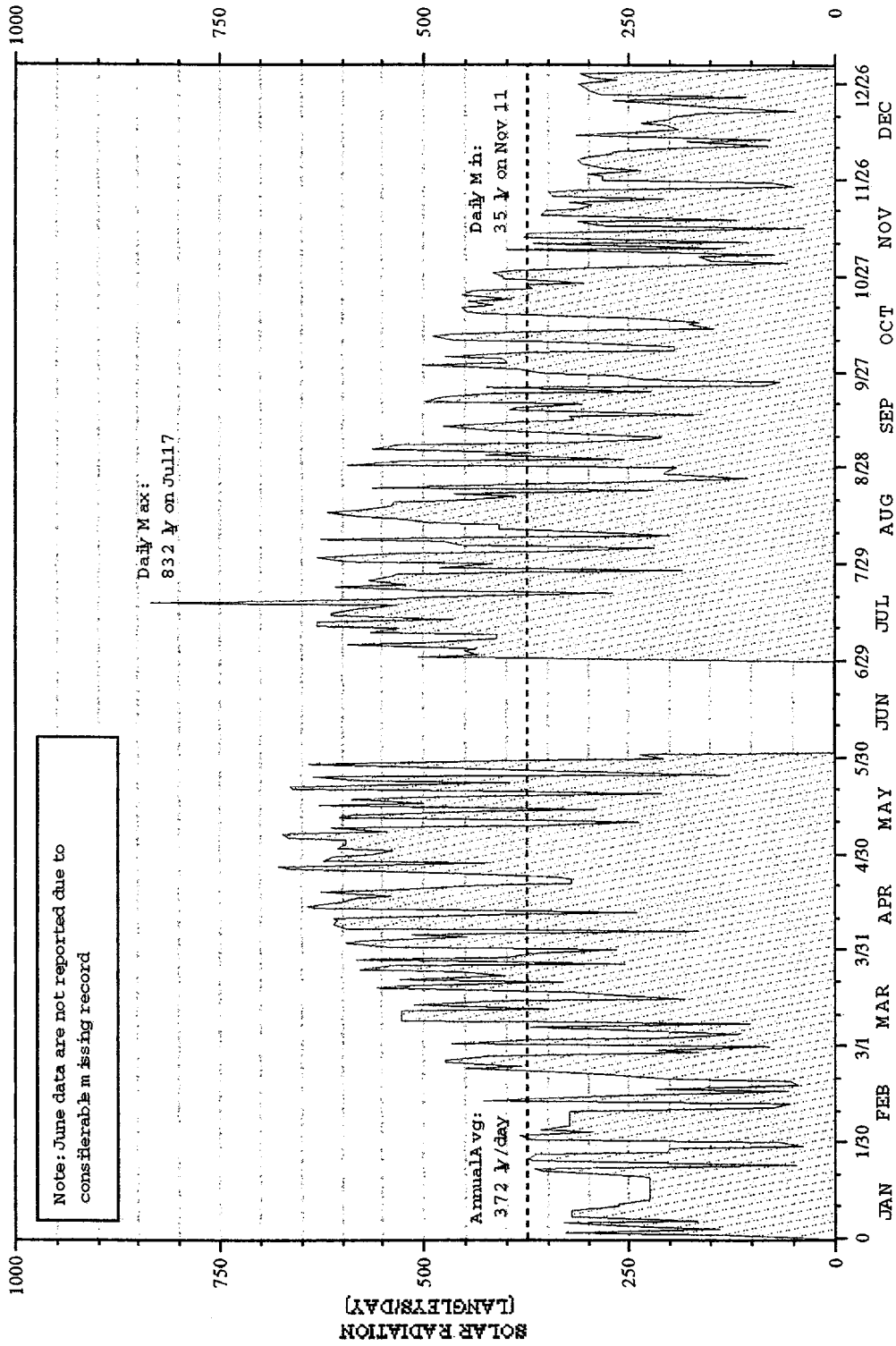
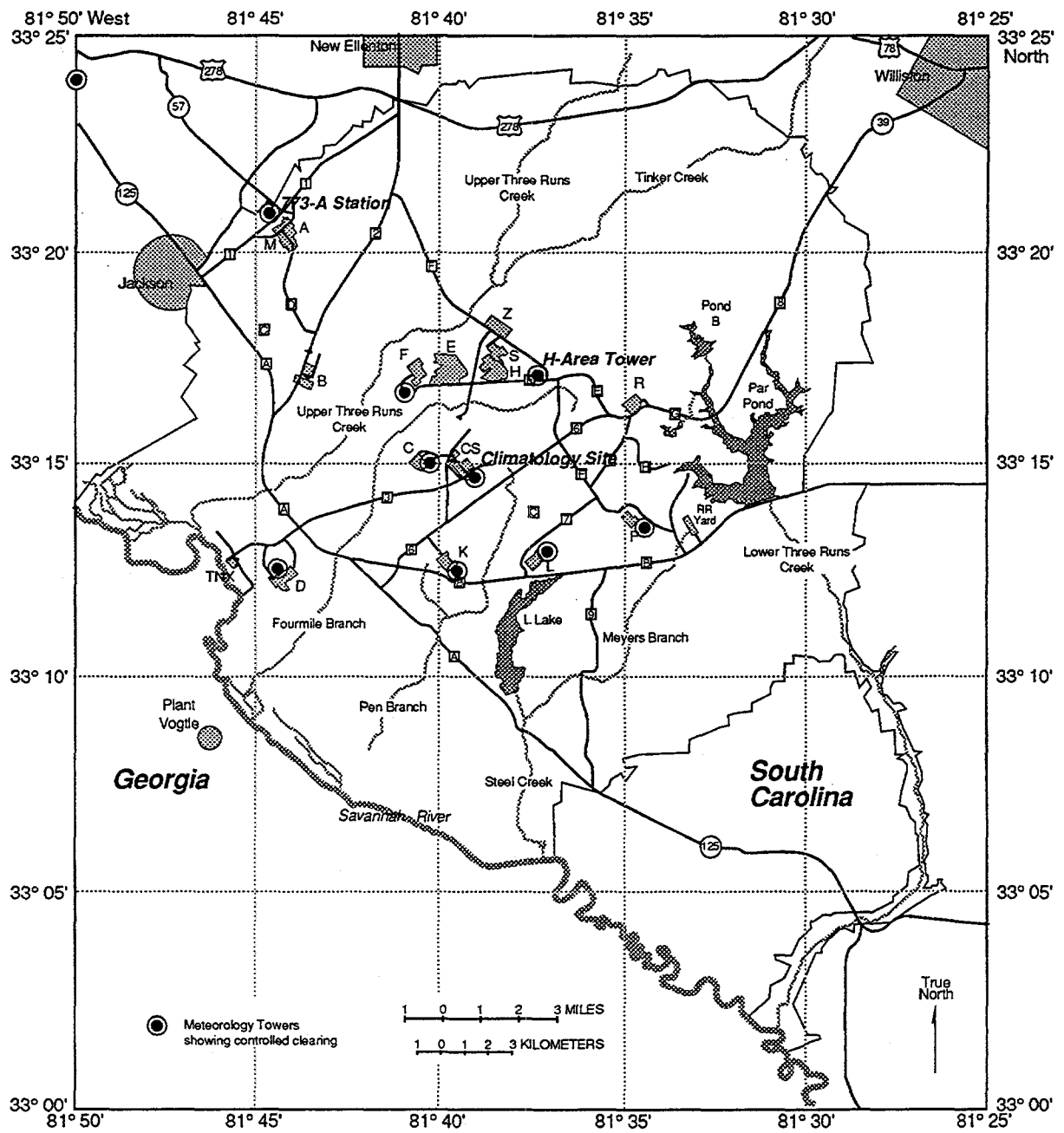


FIGURE 19. 1995 DAILY SOLAR RADIATION





M9300379.01 SRS

Attachment A. Map of the Savannah River Site Showing the Location of the Meteorological Towers.



**Appendix A-1: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in 1995 at the Central Climatology Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	Total
N	.00996	.01405	.01297	.00175	.00035	.00015	.03924
NNE	.01449	.02425	.03185	.00614	.00021	.00000	.07694
NE	.01353	.03693	.04742	.01131	.00050	.00000	.10969
ENE	.01026	.03553	.03290	.00833	.00044	.00000	.08745
E	.01043	.02343	.02373	.00295	.00023	.00000	.06078
ESE	.01625	.01803	.01464	.00266	.00015	.00000	.05172
SE	.01625	.01607	.01517	.00342	.00055	.00012	.05157
SSE	.01610	.01502	.02221	.00412	.00102	.00000	.05847
S	.01443	.01780	.02004	.00330	.00082	.00000	.05639
SSW	.01107	.02083	.02232	.00590	.00108	.00009	.06130
SW	.00979	.01899	.02259	.00660	.00073	.00003	.05873
WSW	.00991	.02440	.02466	.00844	.00155	.00003	.06899
W	.01005	.02168	.02644	.01394	.00599	.00029	.07840
WNW	.00713	.01592	.02115	.01224	.00576	.00064	.06285
NW	.01029	.01759	.01113	.00301	.00111	.00006	.04319
NNW	.00967	.01508	.00698	.00140	.00108	.00003	.03425
Total	.18960	.33561	.35621	.09552	.02156	.00143	.99994

**Appendix A-2: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
for Winter 1987 to 1991 at the H-Area Tower (supplemented) at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	Total
N	.00511	.01497	.01041	.00121	.00007	.00000	.03176
NNE	.00614	.02480	.02426	.00365	.00043	.00000	.05928
NE	.00653	.04425	.03601	.00381	.00030	.00000	.09089
ENE	.00646	.04050	.02677	.00180	.00005	.00000	.07558
E	.00584	.02843	.01812	.00046	.00005	.00000	.05289
ESE	.00536	.02608	.01488	.00082	.00005	.00000	.04719
SE	.00602	.02562	.01814	.00089	.00000	.00000	.05068
SSE	.00559	.02690	.02779	.00294	.00037	.00000	.06360
S	.00589	.03254	.03674	.00507	.00062	.00000	.08085
SSW	.00536	.03135	.02759	.00399	.00087	.00000	.06916
SW	.00657	.03560	.03144	.00436	.00064	.00000	.07861
WSW	.00561	.04128	.03354	.00500	.00078	.00002	.08623
W	.00641	.03569	.02759	.00682	.00228	.00000	.07879
WNW	.00607	.02809	.02250	.00719	.00240	.00002	.06627
NW	.00557	.01898	.01009	.00201	.00027	.00000	.03692
NNW	.00605	.01695	.00723	.00089	.00018	.00000	.03131
TOTAL	.09458	.47205	.37308	.05091	.00934	.00005	1.00000

**Appendix A-3: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in the Winter 1995 at the Central Climatology Facility at 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00407	.01723	.02770	.00466	.00116	.00000	.05482
NNE	.00501	.03119	.04016	.00838	.00035	.00000	.08509
NE	.00524	.03853	.04284	.01269	.00081	.00000	.10011
ENE	.00489	.03283	.03841	.00826	.00012	.00000	.08451
E	.00233	.01560	.02584	.00326	.00000	.00000	.04703
ESE	.00198	.00920	.01350	.00268	.00000	.00000	.02735
SE	.00244	.00535	.01292	.00896	.00023	.00000	.02991
SSE	.00198	.00570	.02316	.00454	.00105	.00000	.03644
S	.00198	.01315	.01595	.00326	.00093	.00000	.03527
SSW	.00303	.01956	.01991	.00652	.00070	.00000	.04970
SW	.00349	.01828	.02153	.00757	.00058	.00000	.05145
WSW	.00477	.02444	.03317	.01280	.00221	.00012	.07752
W	.00698	.02305	.04272	.03248	.01397	.00035	.11954
WNW	.00663	.02037	.03259	.01932	.01362	.00244	.09498
NW	.01106	.0216	5.02084	.00605	.00361	.00012	.06332
NNW	.00768	.01828	.00908	.00361	.00419	.00012	.04295
TOTAL	.07356	.31440	.42032	.14503	.04353	.00314	.99999

**Appendix A-4: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in the Spring 1995 at the Central Climatology Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00460	.00955	.00837	.00189	.00024	.00000	.02464
NNE	.00566	.01474	.01627	.00707	.00000	.00000	.04374
NE	.00790	.02299	.02794	.00931	.00071	.00000	.06885
ENE	.00648	.02499	.02158	.00389	.00047	.00000	.05742
E	.00589	.02393	.02051	.00259	.00000	.00000	.05294
ESE	.01155	.01792	.01603	.00224	.00012	.00000	.04787
SE	.01344	.01556	.02405	.00283	.00082	.00035	.05706
SSE	.01544	.01615	.04221	.00778	.00047	.00000	.08206
S	.01332	.02535	.03749	.00566	.00000	.00000	.08182
SSW	.01026	.02782	.03443	.00625	.00059	.00000	.07934
SW	.00920	.02323	.04339	.01521	.00200	.00000	.09302
WSW	.00778	.02794	.04233	.01875	.00365	.00000	.10045
W	.00825	.01792	.02924	.01592	.00589	.00012	.07734
WNW	.00589	.01745	.02146	.01368	.00389	.00000	.06237
NW	.00743	.01615	.01285	.00295	.00047	.00000	.03985
NNW	.00684	.01285	.00967	.00165	.00012	.00000	.03113
TOTAL	.13994	.31455	.40781	.11766	.01945	.00047	.99989



**Appendix A-5: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in the Summer 1995 at the Central Climatology Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.02520	.01206	.00201	.00024	.00000	.00059	.04010
NNE	.04235	.02141	.01774	.00130	.00035	.00000	.08316
NE	.03076	.03253	.01904	.00201	.00012	.00000	.08446
ENE	.02236	.04093	.02910	.01088	.00118	.00000	.10445
E	.02803	.02803	.02354	.00485	.00095	.00000	.08540
ESE	.04720	.02555	.01053	.00118	.00047	.00000	.08493
SE	.04282	.02307	.01005	.00142	.00012	.00012	.07760
SSE	.03998	.01774	.01550	.00189	.00035	.00000	.07547
S	.03631	.01609	.01337	.00083	.00000	.00000	.06659
SSW	.02448	.01668	.01337	.00035	.00000	.00024	.05512
SW	.02117	.01975	.01360	.00047	.00012	.00000	.05512
WSW	.02035	.02744	.00804	.00189	.00024	.00000	.05796
W	.01845	.02780	.00473	.00024	.00012	.00012	.05145
WNW	.01100	.01313	.00319	.00000	.00000	.00000	.02733
NW	.01266	.00911	.00083	.00024	.00012	.00012	.02307
NNW	.01620	.01076	.00059	.00012	.00000	.00000	.02768
TOTAL	.43932	.34209	.18524	.02792	.00414	.00118	.99988

**Appendix A-6: Occurrence Frequencies of Wind Director Sector by Wind Speed Category  
in the Fall 1995 at the Central Climatology Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00621	.01725	.01357	.00023	.00000	.00000	.03725
NNE	.00540	.02943	.05255	.00770	.00012	.00000	.09520
NE	.01046	.05324	.09854	.02093	.00035	.00000	.18351
ENE	.00747	.04323	.04220	.01023	.00000	.00000	.10314
E	.00575	.02622	.02495	.00115	.00000	.00000	.05807
ESE	.00483	.01955	.01840	.00448	.00000	.00000	.04726
SE	.00678	.02035	.01368	.00046	.00103	.00000	.04231
SSE	.00747	.02047	.00828	.00230	.00219	.00000	.04071
S	.00655	.01667	.01357	.00345	.00230	.00000	.04254
SSW	.00678	.01932	.02162	.01035	.00299	.00012	.06117
SW	.00552	.01483	.01207	.00322	.00023	.00012	.03599
WSW	.00690	.01794	.01518	.00046	.00012	.00000	.04059
W	.00667	.01805	.02875	.00701	.00391	.00058	.06496
WNW	.00506	.01276	.02702	.01575	.00540	.00012	.06612
NW	.01000	.02323	.00989	.00276	.00023	.00000	.04611
NNW	.00805	.01828	.00851	.00023	.00000	.00000	.03507
TOTAL	.10992	.37082	.40876	.09072	.01886	.00092	1.00000

**Appendix A-7: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category in the Winter 1987-91 at the H-Area Tower (supplemented) at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00553	.01520	.01042	.00159	.00000	.00000	.03274
NNE	.00765	.03189	.02540	.00181	.00000	.00000	.06675
NE	.00861	.05028	.03784	.00255	.00021	.00000	.09949
ENE	.00648	.02817	.02211	.00149	.00000	.00000	.05825
E	.00638	.01956	.01201	.00043	.00000	.00000	.03837
ESE	.00606	.01966	.00925	.00011	.00000	.00000	.03508
SE	.00627	.01552	.01297	.00021	.00000	.00000	.03497
SSE	.00404	.01818	.02179	.00234	.00000	.00000	.04634
S	.00468	.02360	.04326	.00733	.00085	.00000	.07972
SSW	.00500	.02583	.03008	.00617	.00244	.00000	.06952
SW	.00659	.02838	.03848	.00723	.00064	.00000	.08131
WSW	.00521	.03370	.04156	.00670	.00117	.00000	.08833
W	.00563	.03635	.03922	.01116	.00468	.00000	.09705
WNW	.00627	.03646	.03083	.01201	.00404	.00011	.08971
NW	.00532	.02434	.01403	.00340	.00074	.00000	.04783
NNW	.00521	.02083	.00797	.00053	.00000	.00000	.03454
TOTAL	.09492	.42793	.39722	.06505	.01477	.00011	1.00000

**Appendix A-8: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in the Spring 1987-91 at the H-Area Tower (supplemented) at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00362	.01449	.01033	.00081	.00000	.00000	.02926
NNE	.00417	.01884	.02201	.00272	.00009	.00000	.04783
NE	.00408	.02853	.02554	.00272	.00009	.00000	.06096
ENE	.00552	.03143	.02274	.00100	.00009	.00000	.06078
E	.00417	.02482	.01812	.00027	.00000	.00000	.04737
ESE	.00435	.02364	.01993	.00217	.00000	.00000	.05009
SE	.00507	.02926	.02473	.00199	.00000	.00000	.06105
SSE	.00489	.03442	.04312	.00652	.00127	.00000	.09022
S	.00580	.03324	.04601	.00770	.00109	.00000	.09384
SSW	.00552	.02880	.03360	.00471	.00045	.00000	.07310
SW	.00462	.03207	.03768	.00697	.00145	.00000	.08279
WSW	.00435	.03360	.03505	.00716	.00127	.00000	.08143
W	.00471	.03542	.02609	.00815	.00308	.00000	.07745
WNW	.00507	.02600	.02699	.01105	.00399	.00000	.07310
NW	.00435	.01712	.01259	.00245	.00000	.00000	.03650
NNW	.00562	.01839	.00969	.00036	.00018	.00000	.03424
TOTAL	.07591	.43007	.41422	.06676	.01304	.00000	1.00000

**Appendix A-9: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category in the Summer 1987-91 at the H-Area Tower (supplemented) at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00707	.01205	.00272	.00036	.00000	.00000	.02219
NNE	.00743	.02174	.01087	.00045	.00000	.00000	.04049
NE	.00888	.04112	.01232	.00063	.00000	.00000	.06295
ENE	.00815	.04203	.01404	.00063	.00000	.00000	.06486
E	.00752	.03496	.01069	.00045	.00009	.00000	.05371
ESE	.00670	.03813	.01196	.00027	.00000	.00000	.05707
SE	.00824	.03496	.01341	.00027	.00000	.00000	.05688
SSE	.00806	.03804	.02554	.00054	.00000	.00000	.07219
S	.00978	.05462	.03460	.00127	.00009	.00000	.10036
SSW	.00833	.05643	.02917	.00217	.00018	.00000	.09629
SW	.01015	.06295	.02817	.00072	.00018	.00000	.10217
WSW	.00806	.07237	.02591	.00172	.00000	.00000	.10806
W	.00833	.04764	.01685	.00054	.00000	.00000	.07337
WNW	.00806	.02563	.01005	.00036	.00018	.00000	.04429
NW	.00652	.01486	.00245	.00009	.00000	.00000	.02391
NNW	.00788	.01078	.00217	.00036	.00000	.00000	.02119
TOTAL	.12917	.60833	.25091	.01087	.00072	.00000	1.00000

**Appendix A-10: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
Fall 1987-91 at the H-Area Tower (supplemented) at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00568	.01914	.01612	.00174	.00018	.00000	.04286
NNE	.00668	.03040	.03791	.00659	.00037	.00000	.08196
NE	.00751	.06016	.05861	.00504	.00009	.00000	.13141
ENE	.00833	.05852	.04039	.00275	.00009	.00000	.11007
E	.00678	.03581	.02811	.00037	.00009	.00000	.07116
ESE	.00687	.02509	.01648	.00018	.00018	.00000	.04881
SE	.00678	.02418	.02005	.00073	.00000	.00000	.05174
SSE	.00659	.02079	.01886	.00119	.00009	.00000	.04753
S	.00531	.02308	.02180	.00275	.00027	.00000	.05321
SSW	.00467	.01804	.01465	.00229	.00046	.00000	.04011
SW	.00678	.02344	.02033	.00201	.00018	.00000	.05275
WSW	.00769	.03214	.02665	.00302	.00037	.00009	.06996
W	.00870	.02729	.02317	.00375	.00092	.00000	.06383
WNW	.00769	.02866	.01832	.00302	.00146	.00000	.05916
NW	.00760	.02115	.00925	.00119	.00027	.00000	.03947
NNW	.00714	.01950	.00733	.00146	.00055	.00000	.03599
TOTAL	.11081	.46740	.37802	.03809	.00559	.00009	1.00000

**Appendix A-11: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category in 1995 at the A- Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00602	.01897	.01079	.00061	.00012	.00003	.03653
NNE	.00445	.02464	.02837	.00228	.00003	.00000	.05978
NE	.00474	.02898	.05189	.01001	.00064	.00003	.09628
ENE	.00599	.03421	.04833	.00888	.00046	.00000	.09787
E	.00570	.03453	.02944	.00310	.00029	.00000	.07306
ESE	.00587	.02947	.01845	.00278	.00043	.00000	.05701
SE	.00576	.02375	.02062	.00509	.00188	.00009	.05718
SSE	.00541	.02270	.01958	.00639	.00182	.00003	.05594
S	.00463	.02725	.01912	.00278	.00122	.00000	.05498
SSW	.00552	.02777	.02372	.00451	.00043	.00000	.06195
SW	.00607	.02904	.02623	.00301	.00023	.00000	.06458
WSW	.00628	.02887	.02485	.00414	.00035	.00003	.06450
W	.00645	.02623	.02551	.01044	.00315	.00000	.07179
WNW	.00593	.01802	.02227	.01377	.00656	.00052	.06707
NW	.00492	.01657	.01599	.00636	.00176	.00000	.04561
NNW	.00544	.01394	.01249	.00188	.00122	.00017	.03514
TOTAL	.08917	.40495	.39766	.08602	.02059	.00090	.99928

**Appendix A-12: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in 1995 at the C-Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00517	.01423	.01336	.00189	.00044	.00003	.03512
NNE	.00555	.02559	.03523	.00601	.00026	.00003	.07267
NE	.00651	.04110	.05240	.01615	.00064	.00003	.11682
ENE	.00793	.04554	.02637	.00218	.00012	.00000	.08214
E	.00534	.02431	.02408	.00305	.00041	.00000	.05719
ESE	.00488	.01923	.01917	.00444	.00035	.00000	.04807
SE	.00505	.02114	.02199	.00476	.00087	.00014	.05396
SSE	.00584	.01993	.02623	.00822	.00090	.00000	.06111
S	.00836	.03236	.03186	.00471	.00139	.00000	.07868
SSW	.00598	.02411	.02448	.00604	.00102	.00003	.06166
SW	.00645	.02425	.02655	.00982	.00177	.00009	.06892
WSW	.00604	.02344	.02536	.00720	.00203	.00009	.06416
W	.00654	.02565	.02518	.01182	.00561	.00049	.07529
WNW	.00590	.01539	.02039	.01040	.00412	.00052	.05673
NW	.00505	.01571	.01258	.00398	.00125	.00000	.03857
NNW	.00500	.01362	.00874	.00160	.00070	.00000	.02965
TOTAL	.09559	.38560	.39397	.10227	.02187	.00145	1.00075



**Appendix A-13: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category in 1995 at the D-Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.01230	.02842	.00677	.00046	.00012	.00000	.04807
NNE	.01007	.04063	.01641	.00075	.00000	.00009	.06795
NE	.00961	.05065	.03528	.00278	.00029	.00000	.09860
ENE	.00923	.04020	.02509	.00261	.00038	.00000	.07750
E	.00972	.03024	.01421	.00148	.00006	.00000	.05571
ESE	.00906	.02816	.01004	.00122	.00032	.00000	.04879
SE	.01030	.03429	.01780	.00344	.00156	.00012	.06752
SSE	.01016	.03754	.02069	.00489	.00119	.00003	.07449
S	.01042	.02790	.01077	.00165	.00078	.00003	.05154
SSW	.00967	.02827	.01326	.00336	.00098	.00003	.05557
SW	.00984	.02576	.01571	.00275	.00026	.00003	.05435
WSW	.00891	.02460	.01456	.00243	.00020	.00003	.05073
W	.01256	.02830	.01522	.00524	.00107	.00003	.06242
WNW	.01059	.02561	.02214	.00998	.00391	.00038	.07261
NW	.01062	.02402	.02153	.00721	.00156	.00006	.06500
NNW	.01187	.02283	.01077	.00194	.00078	.00000	.04818
TOTAL	.16493	.49742	.27024	.05218	.01346	.00081	.99905

**Appendix A-14: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in 1995 at the F-Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00519	.01064	.01093	.00245	.00035	.00000	.02956
NNE	.00606	.02455	.02922	.00606	.00020	.00009	.06618
NE	.01009	.05992	.05333	.00746	.00038	.00000	.13117
ENE	.00773	.03484	.03895	.00892	.00102	.00006	.09152
E	.00504	.02388	.02146	.00324	.00058	.00003	.05423
ESE	.00493	.02233	.01778	.00274	.00032	.00000	.04811
SE	.00522	.02111	.01974	.00466	.00114	.00012	.05199
SSE	.00525	.02111	.02216	.00671	.00120	.00003	.05645
S	.00618	.02417	.02341	.00268	.00108	.00000	.05753
SSW	.00551	.02306	.02312	.00601	.00076	.00000	.05846
SW	.00709	.02816	.02866	.00831	.00114	.00003	.07339
WSW	.00857	.03064	.02589	.00685	.00105	.00000	.07301
W	.00764	.02720	.02723	.01198	.00501	.00017	.07925
WNW	.00606	.01639	.02257	.01114	.00466	.00088	.06169
NW	.00537	.01601	.01219	.00350	.00111	.00000	.03817
NNW	.00525	.01335	.00787	.00155	.00082	.00003	.02886
Total	.10117	.39737	.38451	.09426	.02082	.00143	.99957

**Appendix A-15: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category in 1995 at the H-Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00675	.01922	.01362	.00096	.00049	.00003	.04106
NNE	.00736	.03225	.03296	.00232	.00012	.00003	.07504
NE	.01027	.06103	.04014	.00232	.00006	.00000	.11382
ENE	.00749	.04323	.02686	.00139	.00003	.00003	.07904
E	.00681	.03076	.01906	.00136	.00019	.00000	.05818
ESE	.00551	.02469	.02145	.00170	.00019	.00000	.05354
SE	.00610	.02358	.02182	.00390	.00059	.00006	.05604
SSE	.00591	.01968	.02182	.00545	.00130	.00000	.05416
S	.00616	.02692	.02733	.00340	.00121	.00003	.06505
SSW	.00628	.02668	.02389	.00470	.00077	.00000	.06233
SW	.00709	.02742	.02668	.00421	.00053	.00000	.06592
WSW	.00724	.03181	.02445	.00473	.00071	.00000	.06895
W	.00743	.02754	.02312	.00928	.00263	.00012	.07012
WNW	.00690	.01987	.02219	.00894	.00337	.00016	.06143
NW	.00616	.01696	.01253	.00387	.00074	.00003	.04029
NNW	.00672	.01708	.00780	.00217	.00084	.00006	.03466
TOTAL	.11017	.44872	.36569	.06072	.01377	.00056	.99963

**Appendix A-16: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in 1995 K-Area Tower in 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00624	.01754	.01607	.00217	.00029	.00000	.04231
NNE	.00694	.02905	.03367	.00436	.00009	.00009	.07419
NE	.00922	.05238	.04316	.00346	.00012	.00000	.10833
ENE	.00653	.03552	.03273	.00662	.00029	.00000	.08169
E	.00682	.02907	.02307	.00252	.00032	.00000	.06181
ESE	.00574	.02383	.01558	.00199	.00053	.00000	.04767
SE	.00606	.02632	.02439	.00518	.00117	.00015	.06327
SSE	.00603	.02615	.02246	.00407	.00108	.00006	.05985
S	.00656	.02843	.02140	.00211	.00070	.00006	.05926
SSW	.00659	.02764	.02129	.00337	.00056	.00000	.05944
SW	.00609	.02530	.02375	.00556	.00053	.00006	.06128
WSW	.00629	.02433	.02237	.00571	.00126	.00003	.05999
W	.00750	.02140	.02448	.01323	.00580	.00053	.07293
WNW	.00744	.01730	.01856	.01268	.00600	.00064	.06263
NW	.00791	.02014	.01312	.00609	.00152	.00000	.04878
NNW	.00653	.01443	.01124	.00269	.00149	.00018	.03657
TOTAL	.10848	.41884	.36734	.08181	.02175	.00178	1.00000

**Appendix A-17: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category in 1995 at the L-Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00723	.01736	.01283	.00152	.00021	.00051	.03965
NNE	.00592	.02471	.03284	.00601	.00027	.00003	.06978
NE	.00819	.03450	.05942	.01905	.00080	.00003	.12200
ENE	.00643	.03480	.04174	.00947	.00015	.00000	.09258
E	.00738	.02715	.02513	.00176	.00027	.00000	.06168
ESE	.00485	.01995	.01560	.00190	.00015	.00000	.04245
SE	.00583	.02141	.01896	.00277	.00071	.00012	.04981
SSE	.00491	.02248	.01941	.00378	.00125	.00003	.05186
S	.00720	.02923	.01902	.00200	.00074	.00006	.05826
SSW	.00688	.03299	.02361	.00560	.00220	.00012	.07139
SW	.00676	.02718	.02417	.00616	.00101	.00006	.06534
WSW	.00726	.02507	.02346	.00705	.00143	.00006	.06433
W	.00804	.02533	.02629	.01030	.00333	.00021	.07350
WNW	.00581	.01840	.02334	.01164	.00399	.00039	.06356
NW	.00563	.01474	.01530	.00432	.00095	.00003	.04096
NNW	.00664	.01500	.00941	.00149	.00068	.00000	.03322
TOTAL	.10497	.39028	.39052	.09482	.01816	.00164	1.00039

**Appendix A-18: Occurrence Frequencies of Wind Direction Sector by Wind Speed Category  
in 1995 at the P-Area Tower at the 61-Meter Level**

Direction	0-2 m/s	2-4 m/s	4-6 m/s	6-8 m/s	8-12 m/s	>12 m/s	TOTAL
N	.00541	.01354	.01465	.00249	.00056	.00006	.03670
NNE	.00772	.02129	.03246	.00602	.00029	.00003	.06781
NE	.00792	.04170	.06059	.01146	.00035	.00000	.12202
ENE	.00962	.05147	.02918	.00152	.00003	.00003	.09185
E	.00626	.02831	.02170	.00158	.00015	.00003	.05802
ESE	.00512	.02219	.01512	.00175	.00015	.00000	.04433
SE	.00602	.02298	.01769	.00360	.00094	.00012	.05135
SSE	.00515	.01980	.02108	.00368	.00094	.00006	.05070
S	.00573	.02591	.02798	.00491	.00126	.00006	.06585
SSW	.00635	.02243	.02942	.00664	.00111	.00006	.06600
SW	.00617	.02278	.03044	.00743	.00035	.00006	.06723
WSW	.00681	.02129	.02798	.00734	.00091	.00006	.06439
W	.00705	.02091	.03079	.01430	.00398	.00023	.07726
WNW	.00515	.01617	.02272	.01278	.00515	.00091	.06287
NW	.00406	.01231	.01591	.00722	.00228	.00009	.04187
NNW	.00518	.01196	.01129	.00149	.00117	.00006	.03114
TOTAL	.09971	.37502	.40900	.09422	.01959	.00184	.99938

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